



**SPP**

*Southwest  
Power Pool*

***Facility Study  
For  
Generation Interconnection  
Request  
GEN-2010-043***

***SPP Generation  
Interconnection***

***(#GEN-2010-043)***

**February 2012**

## Summary

Western Farmers Electric Cooperative (WFEC) performed a detailed Facility Study at the request of Southwest Power Pool (SPP) for Generation Interconnection request GEN-2010-043. 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.

### Interconnection Customer Interconnection Facilities

The Interconnection Customer will be responsible for the 345 kV transmission line from its wind turbine Collector Substation to the Point of Interconnection (POI), the new Moorreland 345kV substation located in Woodward County. In addition, the customer will be responsible for reactive power compensation equipment to maintain 95% lagging (providing vars) and 95% leading (absorbing vars) power factor at the point of interconnection.

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

Per the following Facility Study, the Interconnection Customer is responsible for **\$28,357,894** of Transmission Owner Interconnection Facilities and non-shared network upgrades.

### Shared Network Upgrades

The interconnection customer was studied within the DISIS-2010-002 Impact Study. At this time, the Interconnection Customer is allocated the following cost for shared network upgrades:

Upgrade Description	Allocated Cost	Total Cost
Beaver County – Gray County 345kV. Build 345kV transmission line between Beaver County and Kansas State Line. Includes substation work at Beaver County. (Construction by OG&E)	\$17,125,225.89	\$105,609,050
Beaver County – Gray County 345kV. Build 48 miles of 345kV transmission line between Gray County and Oklahoma State Line. Includes construction of additional 345kV line terminal with reactor at Gray County. (Construction by Sunflower)	\$10,475,329.46	\$64,600,000
FPL Switch – Woodward 138kV Per 2010-AGP1-AFS-6 (Construction by OG&E)	\$6,000,000	\$6,000,000
<b>Total</b>	<b>\$33,600,555.35</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.

## Summary

Western Farmers Electric Cooperative performed the Generation request Gen-2010-043 at the request of SPP (Southwest Power Pool). The request for interconnection was placed with SPP in accordance with SPP's open Access Transmission Tariff, which cover new generation interconnections on SPP's transmission system.

Pursuant to the tariff, Western Farmers Electric Cooperative has performed this generation interconnect facility study to satisfy the agreement executed between the customer and SPP.

#### **Customer Interconnection Facilities**

It is assumed that the interconnection point to WFEC will be at the Moreland 345 kV switchyard. A new 345/138 kV switchyard will be built at the existing WFEC Moreland powerplant. Also, approximately 6 miles of 345 kV transmission line will be built from the new Mooreland 345 switchyard to an OG&E owned 345 kV switchyard to be determined at a later date.

# ***WESTERN FARMERS ELECTRIC COOPERATIVE***

## FACILITY STUDY

For

Generation Interconnection Request 2010-043

320 MW Combined Cycle Generation Facility

In Woodward County

Near

Moreland, OK

January 17, 2012

## SUMMARY

Pursuant to the tariff and at the request of the Southwest Power Pool (SPP), Western Farmers Electric Cooperative (WFEC) performed the following facility Study to satisfy the Facility Study agreement executed by the requesting customer for SPP Generation Interconnection request Gen-2010-043. 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. The requirements for interconnection consist of building a new 345/138 kV switching station at the Moreland Powerplant. The switchyard shall be a breaker-and-half arrangement. The switchyard will need to accommodate one circuit for each generator plus a 345/138 kV Auto-transformer to connect to the existing WFEC Mooreland Switchyard and one circuit to connect to OG&E for a total of 4 circuits. Also, approximately 6 miles of 345 kV transmission line will be built from the new Mooreland 345 switchyard to an OG&E owned 345 kV switchyard to be determined at a later date.

## INTRODUCTION

The Southwest Power Pool has requested a facility Study for the purpose of interconnecting approximately 320 MW's of generation within the service territory of WFEC in Mooreland, Oklahoma. The interconnect station will be owned by WFEC. The proposed in-service date is approximately 2017.

Power Flow analysis has indicated that for the power flow case studied, it is possible to interconnect the 320 MW's of generation with transmission reinforcements within the local transmission system. Given the point of interconnection there are additional requirements for interconnection including a new 345/138 kV Switching Station and approximately 6 miles of 345 kV transmission. Also approximately 0.5 miles of 138 kV transmission line to connect to the existing 138 kV switching station owned by WFEC. The existing 138 kV switching station owned by WFEC will also require a new 138 kV bay and associated equipment.

See table one for estimated costs for construction.

## INTERCONNECTION & TRANSMISSION FACILITIES

The requirements for interconnection consist of building a new 345/138 kV switching station and other line and equipment mentioned above. WFEC will be responsible for acquiring the necessary right-of-way for the 345 kV interconnect transmission line to OG&E.

The total cost for WFEC for this interconnection is estimated at \$14,000,000.

This facility study does not guarantee the availability of transmission service necessary to deliver additional generation to any specific point inside or outside of the SPP transmission system. The transmission network may not be adequate to deliver any additional generation output to the 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.

The costs of interconnecting to WFEC's facilities are listed in Table one below.

Facility	Estimated Cost (2012 Dollars)

A new 345/138 kV breaker-and-half switching station at the Moreland Powerplant.	\$8,000,000
Approximately 6 miles of 345 kV transmission. It is assumed that OG&E has included the cost of interconnection equipment in their station.	\$5,000,000
Approximately 0.5 miles of 138 kV transmission line to connect to the existing 138 kV switching station owned by WFEC	\$250,000
New 138 kV bay and associated equipment	\$750,000
<b>Total</b>	<b>\$14,000,000</b>

Table One





## **FACILITY STUDY**

**for**

### **Generation Interconnection Request 2010-043**

Generating Facility  
Mooreland Oklahoma

September 15, 2011

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-2010-043. 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. This does not include any relay change out or settings necessary at the Westar Thistle substation. The interconnection customer should contact Westar to determine these costs. The requirements for interconnection consist of building a new substation with three new 345kV breakers, three terminals, resetting relays at Woodward District EHV substation, and routing one circuit of the existing 345kV Woodward District EHV to Thistle double circuit transmission line into and out of the new substation. The total cost for OKGE to build the new substation with three new 345kV breakers and terminals at a new EHV substation site to be purchased by OG&E, the interconnection facility, is estimated at \$14,357,894.

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## **Introduction**

The Southwest Power Pool has requested a Facility Study for the purpose of interconnecting a new generating facility within the service territory of OG&E Electric Services (OKGE) in Woodward County Oklahoma. The proposed 345kV point of interconnection is at a new EHV Substation in Woodward County. This substation will be owned by OKGE.

The cost for adding a new 345kV terminal to a new EHV Substation, the required interconnection facility, is estimated at \$1,099,958. Other Network Constraints in the American Electric Power West (AEPW), 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 the interconnection consist of adding a new 345kV terminal in a new EHV Substation. This 345kV addition shall be constructed and maintained by OKGE. The Customer did not propose a route of its 345kV line 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 a new EHV Substation, the interconnection facility, is estimated at \$1,099,958. This cost does not include building 345kV line from the Customer substation into the new EHV Substation. The Customer is responsible for this 345kV line up to the point of interconnection. This cost does not include the Customer's 345-138kV substation costs and those cost estimates 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-2010-043 interconnection.

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

Facility	ESTIMATED COST (2011 DOLLARS)
OKGE – <b>Interconnection Facilities</b> - Add a new 345kV line terminal to a new EHV Substation. Dead end structures, line switches, line relaying, and revenue metering including CTs and PTs	<b>\$1,099,958</b>
OKGE – <b>Network Upgrades</b> at a new EHV sub, 3-5000A 345kV breakers, 2 line terminals, line relaying, disconnect switches, and associated equipment, reset relays at Woodward District EHV, route one circuit of existing double circuit 345kV line into and out of substation	<b>\$13,257,936</b>
OKGE - Right-of-Way for 345kV terminal addition	No Additional ROW
<b>Total</b>	<b>\$14,357,894</b>

Prepared by Steve M. Hardebeck, PE

September 15, 2011

Lead Engineer, Transmission Planning  
OG&E Electric Services

Reviewed by:

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Managing Director Transmission

9/23/11

# New Woodward District EHV to Western Resources Thistle 345kV Switching Station



