



***Facility Study
For
Generation Interconnection
Request
GEN-2010-008
(Revision #1)***

SPP Tariff Studies

(#GEN-2010-008)

September 2011

Summary

Western Farmers Electric Cooperative (WFEC) performed a detailed Facility Study at the request of Southwest Power Pool (SPP) for Generation Interconnection request GEN-2010-008. 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 69 kV transmission line from the Generation Facility to the Point of Interconnection (POI), and the 69kV circuit breaker and related equipment, at WFEC's Woodward 69kV switching station in Woodward County, OK. Additionally, 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 **\$500,000** of Transmission Owner Interconnection Facilities and non-shared network upgrades.

Shared Network Upgrades

The interconnection customer was studied within the DISIS-2010-001-3 Impact Study (September 2011). At this time, the Interconnection Customer is allocated **\$0** of 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.

Other Network Upgrades

Certain Network Upgrades that are not the cost responsibility of the Customer are required for Interconnection. These Network Upgrades include the Woodward-Medicine Lodge double circuit 345kV transmission line and the Medicine Lodge – Wichita double circuit 345kV transmission line. These network upgrades are not schedule to be in service until December 31, 2014. Depending upon the status of higher or equally queued customers, the Interconnection Customer's in service date may be delayed until the in service date of these Network Upgrades.

Revision Summary

Western Farmers Electric Cooperative performed the Generation request Gen-2010-008 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

Due to real estate development around the area of the Fargo Jct substation, an alternative point of interconnection was evaluated. The point of interconnection to WFEC will be at the Woodward 69kV Switching Station. The customer will be responsible for the 69 kV line and right-of-way from the Wind turbine Collector Substation to the 69 kV Interconnection Substation near Woodward. The customer will also be responsible for the upgrade of electrical facilities at Woodward Switching Station.

The customer will also be responsible for maintaining +/- 0.95 % power factor at the point of interconnection to WFEC's facilities.

SPP performed a revised powerflow analysis with the point of interconnection at the Woodward 69kV substation. That analysis is attached and can be found in Appendix A.

WESTERN FARMERS ELECTRIC COOPERATIVE

FACILITY STUDY

For

Generation Interconnection Request 2010-008

65 MW Wind Generation Facility

In Woodward County

Near

Fargo, OK

September 13, 2011 (Revised Study)

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-2010-008. 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 adding a dead-end structure and circuit breaker and associated equipment at the Woodward Switching Station. See **Table One** for estimated costs for construction.

INTRODUCTION

The Southwest Power Pool has requested a facility Study for the purpose of interconnecting approximately 65MW of wind generation within the service territory of WFEC in Woodward County, Oklahoma. The interconnect station will be owned by WFEC. The proposed in-service date is December 21, 2011.

Power Flow analysis has indicated that for the power flow case studied, it is possible to interconnect the 65 MW of generation with transmission reinforcements within the local transmission system. Given the point of interconnection there are additional requirements for interconnection including bus, breakers, switches, relaying, metering, etc.

See **Table One** for estimated costs for construction.

INTERCONNECTION & TRANSMISSION FACILITIES

The requirements for interconnection consist of adding a dead-end structure and circuit breaker and associated equipment at WFEC's Woodward Switching Station.

As stated in your request the collector sub is approximately 5 miles from the interconnect sub and it is assumed that the customer has acquired the necessary right-of-way for the interconnect transmission line.

The total cost for WFEC to add equipment in Woodward Switching Station to accommodate the additional 69 kV line is estimated at \$500,000. This does not include building the line from the collector substation to the interconnect station or the dead-end structure at the Woodward Switching Station. In addition, the customer is required to maintain +/- 0.95% power factor at the point of interconnection to WFEC's facilities. For other costs see table one.

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:

Table 1: Interconnection Costs

Facility	Estimated Cost (2011 Dollars)
WFEC-Interconnection facility-Add 69 kV circuit breaker, line switches, relaying equipment, revenue metering equipment, etc.	\$500,000
Total	\$500,000

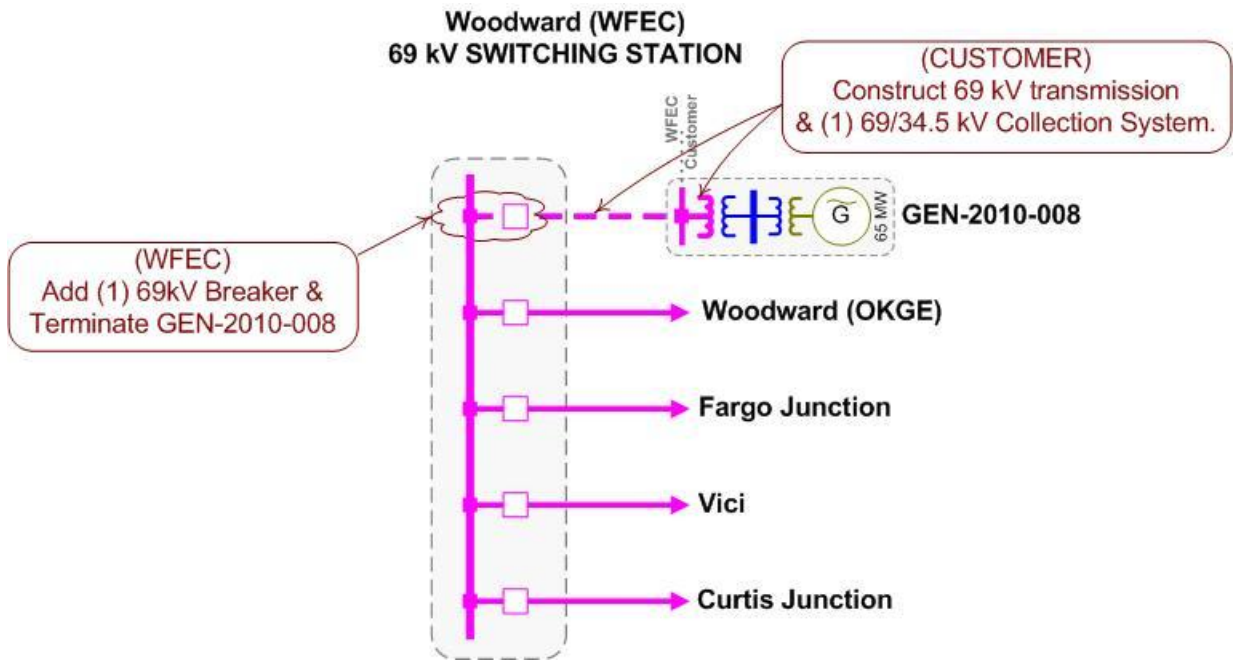


Figure 2: GEN-2010-008 Facility and Proposed Interconnection Configuration

Appendix A.

Revised Power Flow Analysis report follows

***Definitive Interconnection System
Impact Re-Study
For
Generation Interconnection
Request
GEN-2010-008***

***SPP Generation
Interconnection***

(#GEN-2010-008)

September 2011

Executive Summary

<OMITTED TEXT> (Customer) has requested interconnection under the Southwest Power Pool Open Access Transmission Tariff (OATT) for interconnection of 65 MW of wind generation within the balancing authority of Western Farmers Electric Cooperative (WFEC) in Woodward County, Oklahoma. The generation interconnection request is part of the DISIS-2010-001 cluster study. During the performance of the Facility Study, it was determined by the Transmission Owner and Interconnection Customer that development in the area of the Fargo Jct. 69kV substation was not conducive to expanding the substation for a generation interconnection. This restudy is being conducted to evaluate a move in the point of interconnection to the nearby Woodward 69kV substation two miles from Fargo Jct.

Power flow analysis has indicated that with system upgrades, the customer's wind facility can interconnect its full 65 MW of generation capacity into the WFEC transmission system. Due to a change in the point of interconnection to Woodward, the previously assigned Fargo Jct – Woodward 69kV reconductor is no longer required. Powerflow analysis was based on both summer and winter peak conditions and light loading cases.

The power factor requirements for GEN-2010-008 are outlined in the DISIS-2010-001 Impact Study and the GEN-2010-008 Facility Study.

The cost to interconnect is estimated at \$500,000.

Nothing in this study should be construed as a guarantee of transmission service. If the customer wishes to sell power from the facility, a separate request for transmission service shall be requested on Southwest Power Pool's OASIS by the Customer.

1.0 Introduction

<OMITTED TEXT> (Customer) has requested interconnection under the Southwest Power Pool Open Access Transmission Tariff (OATT) for interconnection of 65 MW of wind generation within the balancing authority of Western Farmers Electric Cooperative (WFEC) in Woodward County, Oklahoma. The generation interconnection request is part of the DISIS-2010-001 cluster study. During the performance of the Facility Study, it was determined by the Transmission Owner and Interconnection Customer that development in the area of the Fargo Jct. 69kV substation was not conducive to expanding the substation for a generation interconnection. This restudy is being conducted to evaluate a move in the point of interconnection to the nearby Woodward 69kV substation two miles from Fargo.

2.0 Purpose

The purpose of this Impact Study is to evaluate the impact of the proposed interconnection on the reliability of the Transmission System. The study considers the Base Case as well as all Generating Facilities (and with respect to (b) below, any identified Network Upgrades associated with such higher queued interconnection) that, on the date the study is commenced:

1. are directly interconnected to the Transmission System;
2. are interconnected to Affected Systems and may have an impact on the Interconnection Request;
3. have a pending higher queued Interconnection Request to interconnect to the Transmission System; or
4. have no Queue Position but have executed an LGIA or requested that an unexecuted LGIA be filed with FERC.

Any changes to these assumptions, for example, one or more of the previously queued projects not included in this study signing an interconnection agreement, may require a re-study of this request at the expense of the customer.

Nothing in this Impact Study constitutes a request for transmission service or confers upon the Interconnection Customer any right to receive transmission service.

3.0 Facilities

3.1 Generating Facility

The project was modeled as an equivalent wind turbine generator of 65 MW output. The wind turbine is connected to equivalent 0.69/34.5KV generator step unit (GSU). The high side of the GSU is connected to a 34.5/69kV substation transformer. A 69kV transmission line connects the Customer's substation transformer to the POI.

3.2 Interconnection Facility

The Point of Interconnection (POI) will be at the WFEC Woodward 69kV Interchange. Figure 1 shows the facility and proposed POI.

Interconnection costs are estimated at \$500,000.

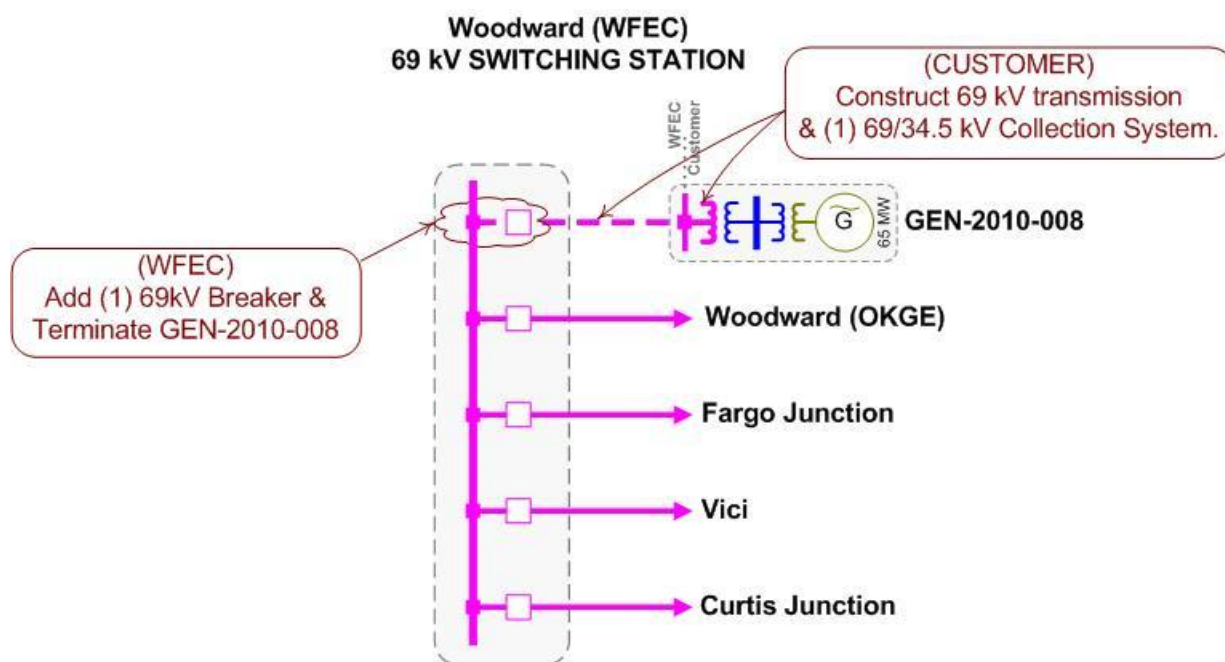


Figure 1: GEN-2010-008 Facility and Proposed Interconnection Configuration

4.0 Power Flow Analysis

A powerflow analysis was conducted for the Interconnection Customer's facility using modified versions of the 2011 spring peak, 2012 summer and winter peak and the 2016 summer and winter peak models. The output of the Interconnection Customer's facility was offset in each model by a reduction in output of existing online SPP generation. This method allows the request to be studied as an Energy Resource (ER) Interconnection Request. The available seasonal models used were through the 2014 Summer Peak.

The Southwest Power Pool (SPP) Criteria states that:

"The transmission system of the SPP region shall be planned and constructed so that the contingencies as set forth in the Criteria will meet the applicable NERC Reliability Standards for transmission planning. All MDWG power flow models shall be tested to verify compliance with the System Performance Standards from NERC Table 1 – Category A."

The ACCC function of PSS/E was used to simulate single contingencies in portions of or all of the control area of WFEC and other control areas within SPP and the resulting scenarios analyzed. This satisfies the “more probable” contingency testing criteria mandated by NERC and the SPP criteria.

Interconnection Upgrades are identified as constraints that have at least a 20% impact on the constraint from the generator being studied. The ACCC analysis indicates that the GEN-2010-008 as studied as part of the DISIS-2010-001 cluster can be interconnected to the WFEC transmission system without causing interconnection upgrades. These analysis results, including non-single contingencies analyzed, are listed in Table 1. The following network upgrades were assumed to be in service in this analysis.

1. Woodward – Thistle double circuit 345kV transmission line
2. Thistle – Wichita double circuit 345kV transmission line
3. Woodward – Tuco 345kV transmission line
4. 2nd 345/138kV autotransformer at Woodward
5. All other network upgrades listed in DISIS-2010-001-3 on page 7 and 8 at the following link

http://sppoasis.spp.org/documents/swpp/transmission/studies/files/2010_Generation_Studies/DISIS-2010-001-3_9_9_11_Final.pdf

Table 1: ACCC Analysis for GEN-2010-008 Interconnecting 65 MW of Wind Generation

GROUP	SCENARIO	SEASON	SOURCE	DIRECTION	MONTCOMMONNAME	RATEA	RATEB	TDF	TC% LOADING	CONTNAME
01G10_008	0	11G	G10_008	'TO->FROM'	'NORTHWEST - TATONGA7 345.00 345KV CKT 1'	1195	1195	0.21094	100.9716	'DBL-MEDLO-WI'
01G10_008	0	11G	G10_008	'TO->FROM'	'NORTHWEST - TATONGA7 345.00 345KV CKT 1'	1195	1195	0.26494	107.058	'DBL-WOOD-MED'

5.0 Power Factor Analysis

The power factor requirements for GEN-2010-008 are outlined in the Facility Study for GEN-2010-008.

6.0 Conclusion

<OMITTED TEXT> (Customer) has requested a Definitive Interconnection System Impact Study for interconnection service of 65 MW of wind generation within the balancing authority of Western Farmers Electric Cooperative (WFEC) in Woodward County, Oklahoma.

With the inclusion of system upgrades identified in the DISIS-2010-001-3 restudy, excluding the previously identified rebuild of the Fargo Jct. – Woodward 69kV Ckt. 1, the customer's wind facility can interconnect its full 65 MW of generation capacity at the WFEC Woodward substation.

The power factor requirements for GEN-2010-008 are outlined in its Generation Interconnection Agreement.

The estimated costs for interconnection facilities are estimated at \$500,000.

These estimates do not include any costs associated with the deliverability of the energy to final customers. These costs are determined by separate studies if the Customer requests transmission service through Southwest Power Pool's OASIS. It should be noted that the models used for simulation do not contain all SPP transmission service.