Southwest Power Pool

Facility Study For Generation Interconnection Request GEN-2010-045

SPP Generation Interconnection Studies

(#GEN-2010-045)

May 2014

Revision History

Date	Author	Change Description
7/29/2011	SPP	Facility Study Report Issued
3/26/2013	SPP	Account for Definitive Interconnection System Impact Restudy Results (DISIS-2010-002-4)
2/02/2014	SPP	Account for Definitive Interconnection System Impact Restudy Results (DISIS-2010-002-6) and Interconnection Reactive Power requirement

Summary

Sunflower Electric Power Corporation (SUNC) performed a detailed Facility Study at the request of Southwest Power Pool (SPP) for Generation Interconnection request GEN-2010-045. 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 Buckner 345kV substation located in Gray County, Kansas. 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

To allow interconnection the Transmission Owner will need to construct a 345kV terminal, two breakers and any associated equipment for acceptance of the Interconnection Customer's Interconnection Facilities. Also, the Transmission Owner will need to install a 345kV reactor and associated terminal equipment. The Interconnection Customer is responsible for an estimated cost of $11,926,929.00 of Transmission Owner Interconnection Facilities.

The Interconnection Customer was studied within the DISIS-2010-002-6 Impact Restudy. In addition, the GEN-2010-045 is responsible for $200,000.00 of Non-Shared Network Upgrades. At this time, the Interconnection Customer is allocated $12,126,929.00 for Transmission Owner Interconnection Facilities and Non-Shared Network Upgrades.

Non-Shared Network Upgrade Description	Allocated Cost	Total Cost
Buckner – Spearville 345kV circuit #1 – Replace terminal equipment	$200,000.00	$200,000.00
Total	**$200,000.00**	

Shared Network Upgrades

The Interconnection Customer was studied within the DISIS-2010-002-6 Impact Restudy. At this time, the Interconnection Customer is allocated $0.00 for shared network upgrades.

Upgrade Description	Allocated Cost	Total Cost
None	$0.00	$0.00
Total	**$0.00**	

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.

Additional Required Network Upgrades

Certain Network Upgrades that are not the cost responsibility of the Customer are required for Interconnection. These Network Upgrades include:

1. Hitchland – Woodward 345kV double circuit transmission line, scheduled for 6/30/2014 in-service
2. Hitchland 345/230kV Autotransformer circuit #2, scheduled for 6/30/2014 in-service
3. Spearville – Clark – Thistle 345kV double circuit 345kV transmission line, scheduled for 12/31/2014 in-service
4. Thistle – Wichita 345kV double circuit 345kV transmission line, scheduled for 12/31/2014 in-service
5. Thistle – Woodward 345kV double circuit transmission line, scheduled for 12/31/2014 in-service
6. TUCO Interchange 345/230/13.2kV Autotransformer circuit #2, scheduled for 3/31/2014 in-service
7. TUCO Interchange – Woodward 345kV circuit #1, scheduled for 5/19/2014 in-service
8. Woodward 345/138/13.8kV Transformer circuit #2, scheduled for 5/19/2014 in-service

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.

Conclusion

Interconnection Service for GEN-2010-045 will be delayed until the Transmission Owner Interconnection Facilities and Non-Shared Network Upgrades are constructed. The Interconnection Customer is responsible for $12,126,929.00 of Transmission Owner Interconnection Facilities and Non-Shared Network Upgrades. At this time, the Interconnection Customer is allocated $0.00 for Shared Network Upgrades. After all Interconnection Facilities and Network Upgrades have been placed into service, Interconnection Service for 197.8 MW, as requested by GEN-2010-045 can be allowed. At this time the total allocation of costs of Interconnection Service for GEN-2010-045 are estimated at $12,126,929.00.

Executive Summary

<OMITTED TEXT> (Customer) has requested a Facility Study under the Southwest Power Pool Open Access Transmission Tariff (OATT) for interconnecting a 197.8 MW wind powered generation facility in Gray County, Kansas to the transmission system of Sunflower Electric Power Corporation (SUNC). The wind powered generation facility studied is comprised of eighty-six (86) Siemens SWT 2.3 MW wind turbines. The wind powered generation facility will interconnect into the Buckner 345 kV Substation.

SUNC will add a 345kV breaker and a half leg to the substation bus at the Buckner substation to terminate the GEN-2010-045 wind farm. SUNC will also need to add a line reactor and associated terminal equipment. The Interconnection Customer's non shared network upgrades and interconnection facilities are estimated at $11,926,929.00.

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.

1. Introduction

<OMITTED TEXT> (Customer) has requested a Facility Study under the Southwest Power Pool Open Access Transmission Tariff (OATT) for interconnecting a 197.8 MW wind powered generation facility in Gray County, Kansas to the transmission system of Sunflower Electric Power Corporation (SUNC). The wind powered generation facility studied is comprised of eighty-six (86) Siemens SWT 2.3 MW wind turbines. The wind powered generation facility will interconnect into the Buckner 345kV Substation.

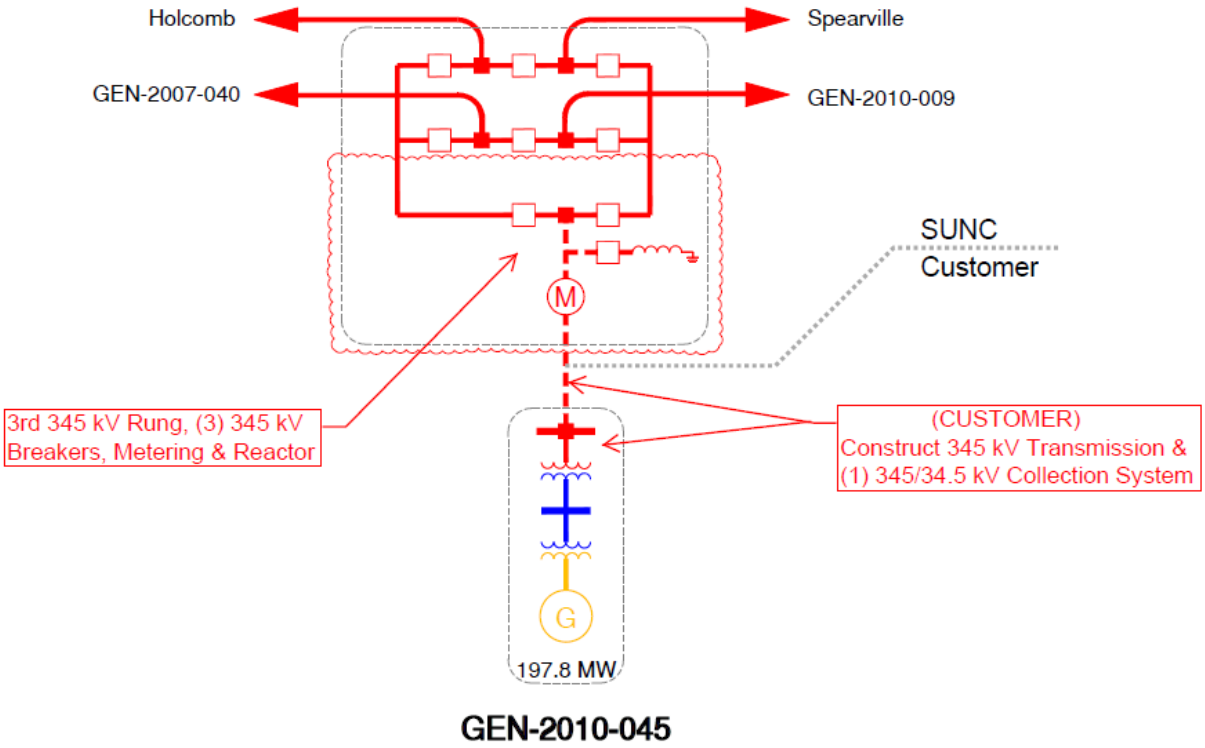
2. Interconnection Facilities and Network Upgrades

The cost for the Interconnection Facilities and Non-Shared Network Upgrades is listed below in Table 1. The one-line diagram is shown in Figure 1.

Table 1: Required Interconnection Facilities and Non Shared Network Upgrades

Project	Description	Estimated Cost
1	SUNC-add 345kV breakers and half leg to the ring bus at the planned Buckner substation, and terminate GEN-2010-045 wind farm. Build line reactor and associated terminal equipment	$11,926,929.00
	Total:	**$11,926,929.00**

Figure 1. Interconnection Configuration for GEN-2010-045



2.1. **<u>Customer Facilities</u>** – The Customer will be responsible for its Generating Facility and its 345/34.5 kV substation that will contain its 345/34.5 kV transformer(s) and wind turbine collector feeders. In addition, the Customer will be required to install the following equipment in its facilities.

2.1.1. **<u>Reactive Power Equipment</u>** – 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. Any capacitor banks installed by the Interconnection Customer shall not cause voltage distortion in accordance with Article 9.7.4 of the standard SPP Generation Interconnection Agreement.

3. <u>Conclusion</u>

The Interconnection Customer's interconnection facilities are estimated at $11,926,929.00.