Facility Study
For
Generation Interconnection Request
GEN-2009-008

SPP Tariff Studies

(#GEN-2009-008)

March 2011

Summary

Midwest Energy (MIDW) performed a detailed Facility Study at the request of Southwest Power Pool (SPP) for Generation Interconnection request GEN-2009-008. 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 230 kV transmission line from its wind turbine Collector Substation to the Point of Interconnection (POI), the South Hays 230 kV Interchange in Ness County, KS. 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 **$414,378** of Transmission Owner Interconnection Facilities and non-shared network upgrades.

All interconnection facilities and associated costs contained in this report are provided under the assumption that the South Hays 230 kV bus has been previously expanded to a ring bus configuration to accommodate a prior queued interconnection customer (GEN-2006-032). The prior queued project is currently in suspension, and cancellation of the project would require costs for expansion to a ring bus at South Hays to be included in interconnection requirements for GEN-2009-008. At the time the GEN-2006-032 GIA was executed, the estimated cost for these facilities was $2,851,820.

Shared Network Upgrades

The interconnection customer was studied within the DISIS-2010-001-1 Impact Restudy (January 2011). At this time, the Interconnection Customer is allocated the following costs for shared network upgrades:

1. Post Rock 345/230/13.8kV Transformer CKT 2. DISIS-2010-001 Restudy	$8,043,937
2. South Hays – Hays Plant – Vine Street 115kV CKT 1. Rebuild approximately 4 miles of 115kV.	$2,831,442
Shared Network Upgrade Costs - TOTAL	**$10,875,379**

If higher queued interconnection customers withdraw from the queue, suspend or terminate their GIA, restudies will have to be conducted to determine the Interconnection Customer's 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:

1. Axtel - Post Rock 345kV transmission line,
2. Spearville-Axtell 345kV transmission line
3. Comanche - Medicine Lodge double circuit 345kV transmission line,
4. Spearville - Comanche double circuit 345kV transmission line, and
5. 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.

Midwest Energy Inc.

Facility Study for Generation Interconnection Request GEN-2009-008

February 1, 2011

Contents

Study Overview

At the request of Southwest Power Pool (SPP), Midwest Energy developed the following generation interconnection facility study for interconnection request GEN-2009-008 based on the results of Definitive Interconnection System Impact Study 2010-001 (DISIS-2010-001). As studied in DISIS-2010-001, GEN-2009-008 consists of 200 MW of wind generation interconnecting at Midwest Energy's South Hays 230 kV bus.

The purpose of this study is to identify only facilities and associated costs necessary for interconnection of the proposed wind generation with the 230 kV transmission system. Any network upgrades identified in DISIS-2010-001 are not included in this study. The wind collector system, collector substation, and any transmission line required between the collector substation and point of interconnection are not addressed in this study and are considered the responsibility of the interconnection customer.

Interconnection Facilities

A 230 kV line terminal will be added at the South Hays substation to accommodate the generation interconnection. The line terminal includes one 230 kV circuit breaker, substation bus work, dead end structures, metering, and associated hardware. Cost estimates for the facilities and equipment required for interconnection can be found in Table 1. All interconnection facilities and associated costs contained in this report are provided under the assumption that the South Hays 230 kV bus has been previously expanded to a ring bus configuration to accommodate a prior queued interconnection customer. The prior queued project is currently in suspension, and cancellation of the project would require costs for expansion to a ring bus at South Hays to be included in interconnection requirements for GEN-2009-008.

A fault study was conducted by Midwest Energy to determine if addition of the proposed generation caused fault levels on the Midwest Energy transmission system to exceed circuit breaker interrupting capabilities. Based on the results of the fault study, it was determined that all fault levels remain within the interrupting capability of existing circuit breakers.

Table 1 - Interconnection facility cost estimates

Facility	Estimated Cost
Interconnection Facilities: 230 kV Line Terminal (Dead end structure, substation steel, substation bus, interconnection metering, line switch, etc.)	$141,329
Network Upgrades at South Hays: 1-230 kV circuit breaker, switches, relaying, etc.	$273,049
Total	**$414,378**

Reactive Compensation Considerations

Power factor requirements for the interconnecting generation were studied and established in DISIS-2010-001. In addition to these requirements, Midwest Energy reserves the right to request installation of additional reactive compensation by the interconnection customer based on operational experience. Of particular concern are light load, low generation production situations resulting in elevated 230 kV bus voltage related to line capacitance of the interconnection customer's transmission line and wind generation collector system.

DISIS-2010-001 Appendix S: Stability Study for Group 11 states GEN-2009-008 will consist of GE 1.6 MW wind turbines. Based on operating experience with other wind generation utilizing GE wind turbines, Midwest Energy strongly encourages the interconnection customer to consider installation of GE's Wind Farm Management System or a comparable control system. Such control systems allow the facility operator to control the reactive power characteristics of the turbines, and hence the generating facility, in real time. If installed, such control system will allow the reactive power characteristics of the turbines to be adjusted to maintain the power voltage at the Point of Interconnection at levels not less than 95% of nominal and not greater than 105% of nominal under normal operating conditions.

In the event the Interconnection Customer does not commit to install the control system described above Midwest Energy will require the Interconnection Customer to provide sufficient capacitors, reactors and switching/control equipment to maintain the voltage at the Point of Interconnection at levels not less than 95% of nominal and not greater than 105% of nominal under normal operating conditions.

Midwest Energy Inc.

Facility Study for Generation Interconnection Request GEN-2009-008

April 4, 2011

Contents

Study Overview

At the request of Southwest Power Pool (SPP), Midwest Energy developed the following generation interconnection facility study for interconnection request GEN-2009-008 based on the results of Definitive Interconnection System Impact Study 2010-001 (DISIS-2010-001) and GEN-2009-008 Impact Restudy. As studied in DISIS-2010-001 and GEN-2009-008 Impact Restudy, GEN-2009-008 consists of 200 MW of wind generation interconnecting at Midwest Energy's South Hays 230 kV bus.

The purpose of this study is to identify only facilities and associated costs necessary for interconnection of the proposed wind generation with the 230 kV transmission system. Any network upgrades identified in DISIS-2010-001 are not included in this study. The wind collector system, collector substation, and any transmission line required between the collector substation and point of interconnection are not addressed in this study and are considered the responsibility of the interconnection customer.

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As stated in the GEN-2009-008 Impact Restudy report, GEN-2009-008 will consist of GE 1.6 MW wind turbines. Based on operating experience with other wind generation utilizing GE wind turbines, Midwest Energy strongly encourages the interconnection customer to consider installation of GE's Wind Farm Management System or a comparable control system. Such control systems allow the facility operator to control the reactive power characteristics of the turbines, and hence the generating facility, in real time. If installed, such control system will allow the reactive power characteristics of the turbines to be adjusted to maintain the power voltage at the Point of Interconnection at levels not less than 95% of nominal and not greater than 105% of nominal under normal operating conditions.

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