SPP Southwest Power Pool

Feasibility Study For Generation Interconnection Request GEN-2003-016

SPP Tariff Studies
(#GEN-2003-016)

January 28, 2004

Executive Summary

<OMITTED TEXT> (Customer) has requested a feasibility study for the purpose of interconnecting 100.5MW of wind generation in Hutchinson County, Texas within the service territory of Southwestern Public Service Company (SPS) (d/b/a Xcel Energy, Inc.). The proposed point of interconnection is at a new 115kV switching station on circuit T7 approximately 4 miles northeast of Stinnett, TX. The proposed in-service date is December 1, 2005.

Power flow analysis has indicated that for the powerflow cases studied, it is possible to interconnect the 100.5 MW of generation without significant transmission system reinforcements within the local SPS transmission system. In order to maintain acceptable bus voltage, the customer may need to install a switched capacitor bank on the generator substation. Dynamic Stability studies performed as part of the impact study will provide guidance as to how much reactive compensation may be needed and whether the reactive compensation can be static or must be dynamic (such as a SVC).

The requirements for interconnection consist of a new 115 kV 3-breaker switching station in the existing Riverview – Pringle Interchange 115 kV T7 line. The 115kV SPS switching station shall be constructed and maintained by SPS. The Customer proposed a 115-34.5kV substation with 2 primary breakers and transformers including 4 secondary breakers serving the feeders. It is assumed that the 115kV SPS switching station will be located immediately adjacent to the Customer's proposed substation and that the Customer will not provide the land for the 115kV SPS switching station.

The total cost for this 115 kV switching station, the interconnection facility, is estimated at $2.6 million dollars which is based on estimates provided by the SPS engineering department. This cost does not include building 115 kV line from the Customer substation into the new SPS switching station. The cost to construct the switching station includes all breakers and metering equipment. This cost does not include the Customer's 115-34.5kV substation.

This feasibility study does not take into account static system reinforcements triggered by other generation projects that are positioned ahead in the queue. In the event that these generation projects and the system reinforcements triggered by these projects are not built, this feasibility study may have to be revisited, potentially changing the requirements necessary for interconnecting this Customer's 100.5 MW of generation.

There are several other proposed generation additions in the general area of the Customer's facility. It was assumed in the analysis that not all of these other projects will be in service. In the event that more than the assumed number of these other projects are either planned or contracted for interconnection, then this analysis must be revised. Those previously queued projects that have advanced to nearly complete phases were included in this feasibility study.

Introduction

<OMITTED TEXT> (Customer) has requested a feasibility study for the purpose of interconnecting 100.5 MW of wind generation in Hutchinson County, Texas within the service territory of Southwestern Public Service Company. The proposed point of interconnection is at the new 115kV switching station. The proposed in-service date is December 1, 2005.

Interconnection Facilities

The primary objective of this study is to identify the system problems associated with connecting the plant to the area transmission system and estimated costs of system modifications needed to alleviate the system problems.

The Feasibility and other subsequent Interconnection Studies are designed to identify attachment facilities and other direct assignment facilities needed to accept power into the grid at the interconnection receipt point.

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The total cost for this 115 kV interconnection facility is estimated at $2.6 million dollars, which is based on estimates provided by the SPS engineering department. The cost does not include building the 115 kV line from the Customer substation into the new switching station. The Customer is responsible for this 115kV line up to the point of interconnection. The cost to construct the switching station includes all breakers and metering equipment. This cost does not include the Customer's 115-34.5kV substation and the cost estimate should be determined by the Customer.

The costs of interconnecting the facility to the SPS transmission system are listed in Tables 1 and 2. **These costs do not include any cost that might be associated with short circuit study results or dynamic stability study results**. These costs will be determined when and if a System Impact Study is conducted.

Table 1: Network Upgrade Facilities

Facility	ESTIMATED COST (2004 DOLLARS)
SPS – New 115 kV 3-Breaker Switching Station.	$2,266,369
SPS - Right-of-Way for SPS Switching Station (site cost, surveying, permitting, etc.).	$105,000
SPS - 115kV Transmission Line Re-Termination	$219,121
Total	**$2,590,490**

Table 2: Direct Assignment Facilities

Facility	ESTIMATED COST (2004 DOLLARS)
Customer - 115-34.5 kV Substation Including Secondary Breakers.	*
Customer - 115kV line between Customer substation and SPS 115kV Switching Station.	*
Customer - Right-of-Way for Customer Substation & Line.	*
Total	*****

Note: * Estimates of cost to be determined by Customer.

Powerflow Analysis

A powerflow analysis was conducted for the facility using a modified version(s) of the 2009 Summer Peak and 2009 Winter Peak models. The output of the Customer's facility was offset in each model by a reduction in output of existing online SPS generation. The proposed in-service date of the generator is December 1, 2005. The next available seasonal models were the 2009 peak models. This is the end of the current SPP planning horizon.

The analysis of the Customer's project indicates that, given the requested generation level of 100.5MW and location, additional criteria violations will not occur on the existing SPS facilities under steady state conditions in all seasons out to the end of SPP's planning horizon.

There are several other proposed generation additions in the general area of the Customer's facility. It was assumed in the analysis that not all of these other projects will be in service. In the event that more than the assumed number of these other projects are either planned or contracted for interconnection, then this analysis must be revised. Those previously queued projects that have advanced to nearly complete phases were included in this feasibility study.

Powerflow Analysis Methodology

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 Planning Standards* for System Adequacy and Security – Transmission System Table l hereafter referred to as NERC Table l) and its applicable standards and measurements.

Using the created models and the ACCC function of PSS\E, single contingencies in the SPS control area were applied and the resulting scenarios analyzed. This satisfies the 'more probable' contingency testing criteria mandated by NERC and the SPP criteria.

Conclusion

The minimum cost of interconnecting the Customer project is estimated at $2.6 million dollars for Network Upgrades. At this time, the cost estimates for Direct Assignment facilities have not been defined by the Customer. As stated earlier, previously queued projects were not all assumed to be in service in this feasibility study. If any of those projects are constructed, then this feasibility study may have to be revisited to determine the impacts of this Customer's project on other SPS transmission facilities.

These interconnection costs do not include any cost that may be associated with short circuit or transient stability analysis. These studies will be performed if the Customer signs a system impact study agreement.

The costs 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.

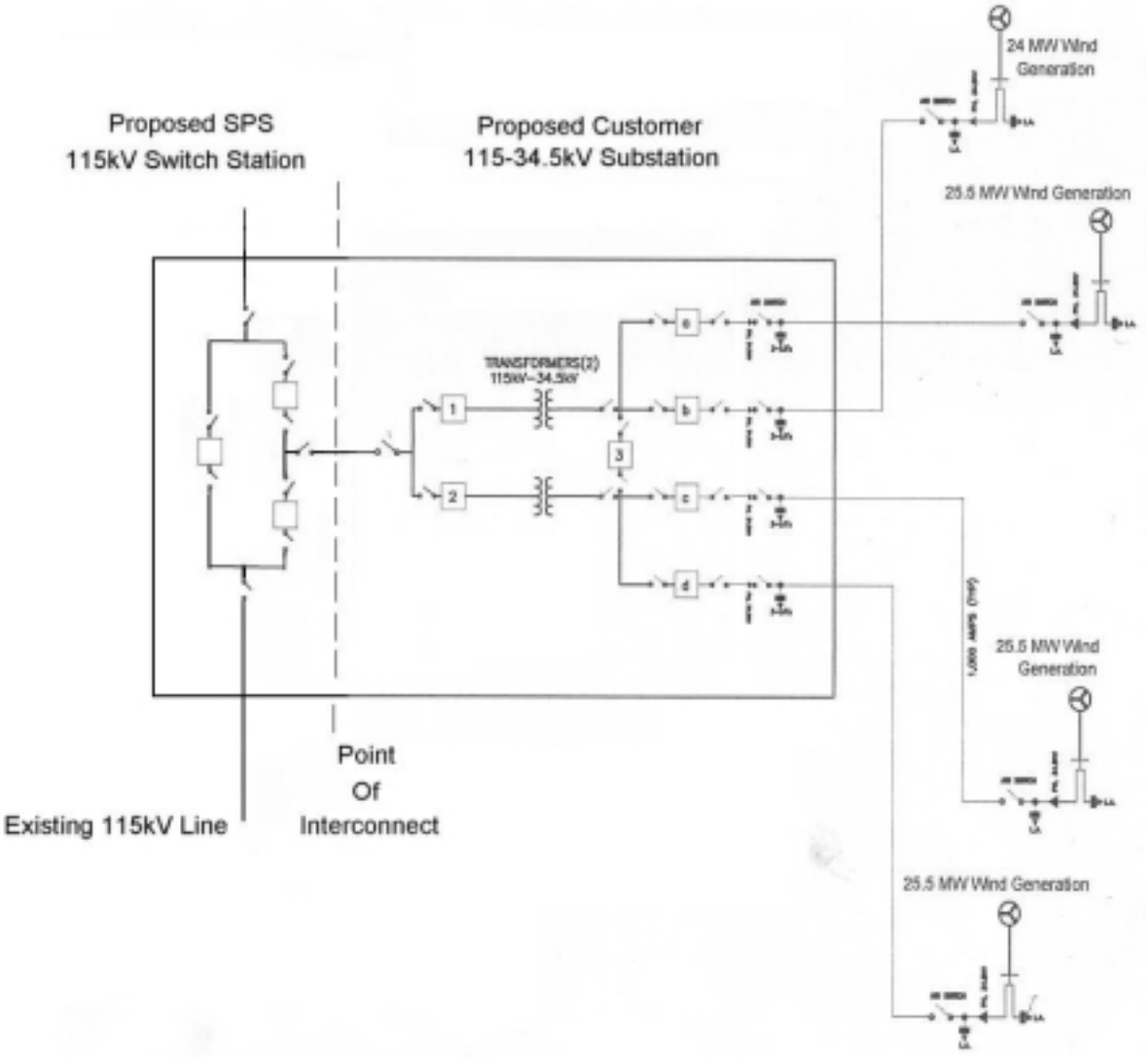

Figure 1: Proposed Interconnection
(Final substation design to be determined)

Figure 2: Map of the surrounding area