SPP Southwest Power Pool

Feasibility Study For Generation Interconnection Request GEN-2003-017

SPP Tariff Studies
(#GEN-2003-017)

March 16, 2004

Executive Summary

<OMITTED TEXT> (Customer) has requested a feasibility study for the purpose of interconnecting 80MW of wind generation in Dallam 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 the existing Dalhart 115-69kV substation near Dalhart, TX. The proposed in-service date is December 15, 2005.

Power flow analysis has indicated that for the powerflow cases studied, it is possible to interconnect the 80MW 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 extending the 115kV bus in the existing SPS Dalhart Substation and adding a breaker, switches, metering, etc. These 115kV additions shall be constructed and maintained by SPS. The Customer proposed a 115kV line extending north 8 miles to serve its 115-34.5kV facilities. It is assumed that obtaining all necessary right-of-way for the necessary substation modifications to the SPS Dalhart Substation will not be a significant expense.

The total cost for modifications and additions to the existing Dalhart Substation, the interconnection facility, is estimated at $508 thousand 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 SPS Dalhart Substation. The cost to add to the Dalhart Substation includes 1 breaker 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 80MW 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 80MW of wind generation in Dallam County, Texas within the service territory of Southwestern Public Service Company. The proposed point of interconnection is at the existing Dalhart 115-69kV Substation. The proposed in-service date is December 15, 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.

The requirements for interconnection consist of extending the 115kV bus in the existing SPS Dalhart Substation and adding a breaker, switches, metering, etc. Additions and modifications to the existing SPS 115-69kV Dalhart Substation shall be constructed and maintained by SPS. The Customer proposed a 115kV line extending north 8 miles to serve its 115-34.5kV facilities. It is assumed that obtaining all necessary right-of-way for the necessary substation modifications to the SPS Dalhart Substation will not be a significant expense.

The total cost for modifications and additions to the existing Dalhart Substation, the interconnection facility, is estimated at $508 thousand 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 SPS Dalhart Substation. The Customer is responsible for this 115kV line up to the point of interconnection. The cost to add to the Dalhart Substation includes 1 breaker 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)
Total	**$0**

Table 2: Direct Assignment Facilities

Facility	ESTIMATED COST (2004 DOLLARS)
SPS Interconnection Facilities – Dalhart: Add 115kV bus, breaker, switches, metering, relaying, etc.	$508,260
Customer - 115-34.5 kV Substation facilities.	*
Customer - 115kV line between Customer substation and SPS Dalhart 115-69kV Substation.	*
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 modified versions of the 2005 April, 2005, 2007 and 2010 Summer and 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 15, 2005. The available seasonal models used were the 2005 April and 2005 through 2010 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 80MW 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.

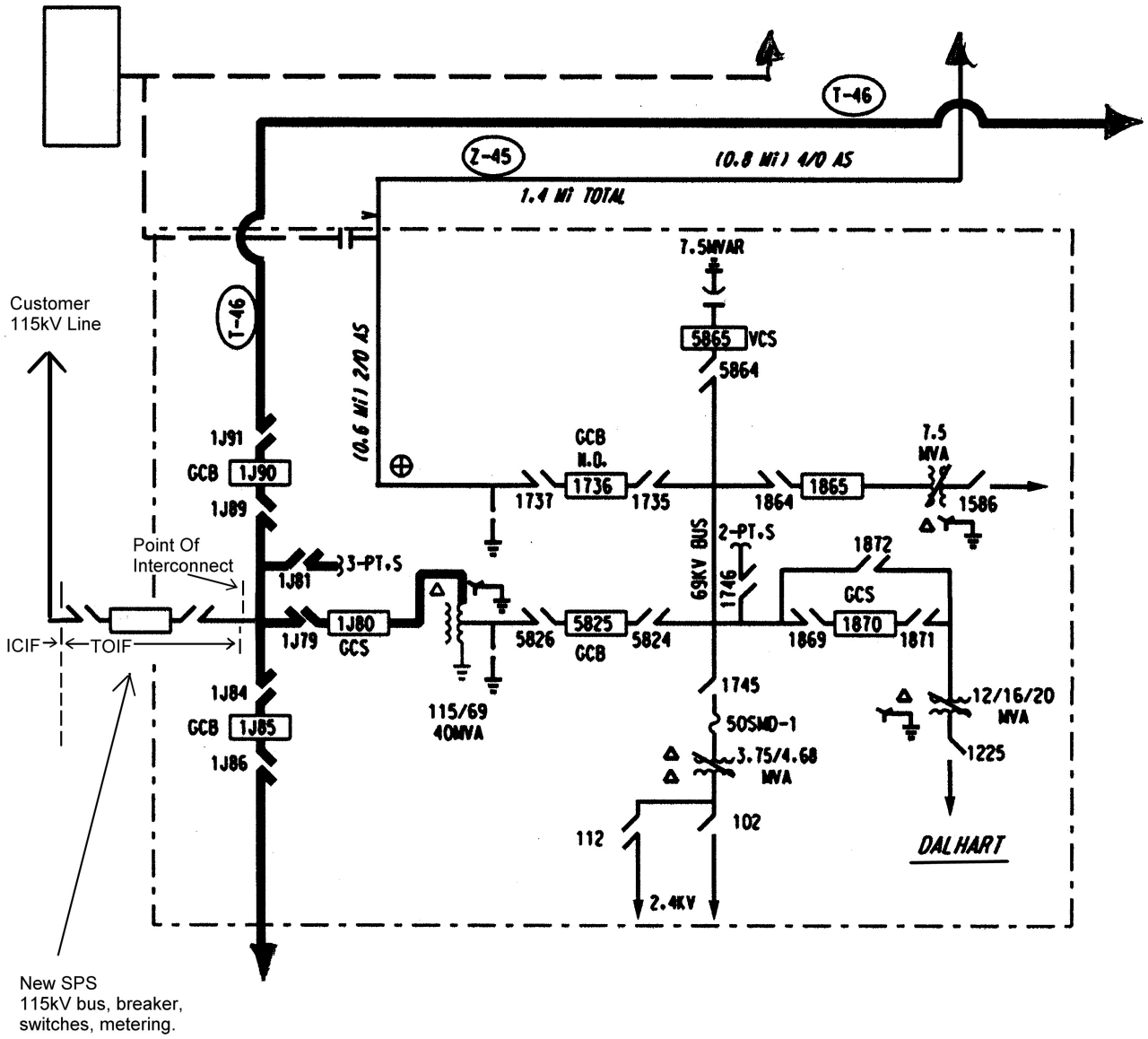
Using the created models and the ACCC function of PSS\E, single contingencies in the SPS control area were applied and the resulting scenarios analyzed. This satisfies the 'more probable' contingency testing criteria mandated by NERC and the SPP criteria.

Conclusion

The minimum cost of interconnecting the Customer project is estimated at $508 thousand dollars for SPS' interconnection facilities of which is a Direct Assignment. At this time, the cost estimates for other 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.



TOIF = Transmission Owner's Interconnection Facilities
ICIF = Interconnection Customer's Interconnection Facilities

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

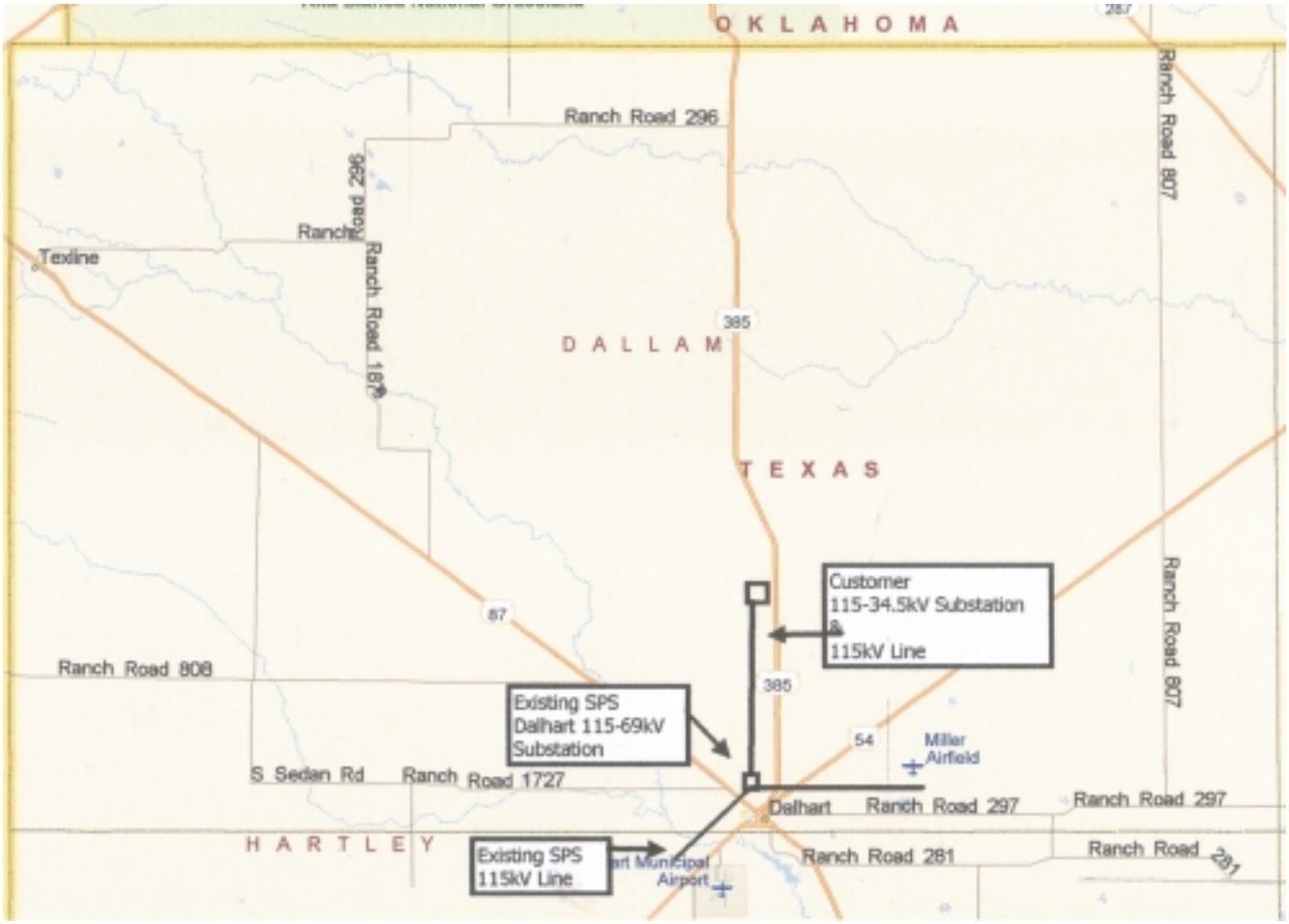


Figure 2: Map Of The Surrounding Area