



***Feasibility Study
For
Generation Interconnection
Request
GEN-2004-010***

***SPP Tariff Studies
(#GEN-2004-010)***

October 19, 2004

Executive Summary

<OMITTED TEXT> (Customer) has requested a Feasibility Study for the purpose of interconnecting 300MW of wind generation within the service territory of Westar Energy (WERE) in Cowley County Kansas. The proposed point of interconnection is in the existing Rose Hill – Neosho 345kV line at a new switching station located 6 miles southeast of Latham, KS in Butler County. This 345kV line is owned by Westar Energy. The proposed in-service date is September 30, 2005.

Power flow analysis has indicated that for the powerflow cases studied, it is possible to interconnect the 300MW of generation with transmission system reinforcements within the local WERE transmission system. The requirements for interconnection consist of adding a 345kV line terminal in a new switching station. This 345kV addition shall be constructed and maintained by WERE. The Customer did not propose a specific 345kV line extending to serve its 345-34.5kV facilities. It is assumed that obtaining all necessary right-of-way for the necessary substation additions in the Rose Hill – Neosho 345kV line will not be a significant expense.

One 60MVAR capacitor bank plus a 40MVAR SVC are required at the Customer's facilities in order to maintain adequate bus voltages. Dynamic Stability studies performed as part of the impact study will provide guidance as to how much additional dynamic reactive compensation may be needed. If the customer chooses to reduce the capacity to be interconnected, then the capacity requirements of both the capacitor bank and SVC must be reviewed on a steady-state basis. However, the values of ATC in Table 3 may be used as a guideline for initial estimates. Given only 33MW of ATC without reactive compensation in an off-peak season, additions will be required.

The total cost for adding the 345kV line terminal in a new switching station, the interconnection facility, is estimated at \$877,000. Other Network Upgrades in the WERE system are required that are listed in Table 1. Therefore, the total estimated cost to the Customer is \$1,687,000. This cost does not include building 345kV line from the Customer substation into the new WERE Elk River Switching Station. This cost does not include the Customer's 345-34.5kV substation.

In Table 3, a value of Available Transfer Capability (ATC) associated with each overloaded facility is included. These values may be used by the Customer for future analyses including the determination of lower generation capacity levels that may be installed with different financial characteristics given the cost of Network Upgrades. When transmission service associated with this interconnection is evaluated, the loading of the facilities listed in this table may be greater due to higher priority reservations. If the loading of a facility is higher, the level of ATC will be lower.

There are several other proposed generation additions in the general area of the Customer's facility. It was assumed in this preliminary analysis that all of these other projects within Kansas City Power and Light's, Midwest Energy's and WERE's service territory will be in service. Those previously queued projects that have advanced to nearly complete phases were included in this Feasibility Study. In the event that another request for a generation interconnect with a higher priority withdraws, then this

request may have to be re-evaluated to determine the assignable Network Upgrades to accommodate the interconnect.

Introduction

<OMITTED TEXT> (Customer) has requested a Feasibility Study for the purpose of interconnecting 300MW of wind generation within the service territory of Westar Energy in Cowley County Kansas. The existing Rose Hill – Neosho 345kV line is owned by WERE, and the proposed generation interconnect is within WERE. The proposed point of interconnection is at a new 345kV switching station that will require an additional line terminal. The proposed in-service date is September 30, 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, Network Upgrades and other direct assignment facilities needed to accept power into the grid at the interconnection receipt point.

The requirements for interconnection consist of adding a line terminal to a 345kV switching station. This 345kV addition shall be constructed and maintained by WERE. The Customer did not propose a route of its 345kV line to serve its 345-34.5kV facilities. It is assumed that obtaining all necessary right-of-way for the new WERE 345kV switching station will not be a significant expense.

The total cost for WERE to add a line terminal in a new 345kV switching station, the interconnection facility, in the Rose Hill – Neosho 345kV line is estimated at \$877,000. Other Network Upgrades in the WERE system are required that are listed in Table 1. Therefore, the total estimated cost to the Customer is \$1,687,000. These estimates will be refined during the development of the impact study based on the final designs. This cost does not include building 345kV line from the Customer substation into the new WERE switching station. The Customer is responsible for this 345kV line up to the point of interconnection. This cost does not include the Customer's 345-34.5kV substation and the cost estimate should be determined by the Customer.

The costs of interconnecting the facility to the WERE transmission system are listed in Table 1. **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 3: Contingency Analysis Results

Facility	Model & Contingency	Facility Loading (% Rate B) Or Voltage (PU)	ATC (MW)	Date Required (M/D/Y)
2002-4 Elk River 345kV	05AP, 56793-99962, WERE SEAST - , NEOSHO - 2004-002 345kV	V INITIAL= 0.9595, V CONT= 0.8822.	174	10/1/2005
2002-4 Elk River 138kV	05AP, 56793-99962, WERE SEAST - , NEOSHO - 2004-002 345kV	V INITIAL= 0.9436, V CONT= 0.8574.	33	10/1/2005
2004-2 Caney River 345kV	05AP, 56793-99962, WERE SEAST - , NEOSHO - 2004-002 345kV	V INITIAL= 0.9658, V CONT= 0.8818.	172	10/1/2005
2004-10 Elk River 345kV	05AP, 56793-99962, WERE SEAST - , NEOSHO - 2004-002 345kV	V INITIAL= 0.9604, V CONT= 0.8835.	183	10/1/2005
2004-10 Elk River 345kV	05AP, 56794-99933, WERE SCENTRAL - , ROSE HILL - 2002-4TP 345kV	No solution without reactive compensation at the customer site.	220 *	10/1/2005
2004-10 Elk River 345kV	05WP, 56794-99933, WERE SCENTRAL - , ROSE HILL - 2002-4TP 345kV	No solution without reactive compensation at the customer site.	240 *	12/1/2005
2002-4 Elk River 138kV	07SP, 56793-99962, WERE SEAST - , NEOSHO - 2004-002 345kV	V INIT = 0.9479, V CONT = 0.8853.	207	6/1/2006
2004-10 Elk River 345kV	07SP, 56794-99933, WERE SCENTRAL - , ROSE HILL - 2002-4TP 345kV	No solution without reactive compensation at the customer site.	150 *	6/1/2006
2004-010 Elk River 345kV	07WP, 56794-99933, WERE SCENTRAL - , ROSE HILL - 2002-4TP 345kV	No solution without reactive compensation at the customer site.	240 *	12/1/2006

Note: Listed loading of each facility is the highest value when an operating guide is not applicable.

When transmission service associated with this interconnection is evaluated, the loading of the facilities listed in this table may be greater due to higher priority reservations. If the loading of a facility is higher, the level of ATC will be lower.

* Area interchange disabled for estimating ATC.

Table 3: Contingency Analysis Results

Facility	Model & Contingency	Facility Loading (% Rate B) Or Voltage (PU)	ATC (MW)	Date Required (M/D/Y)
El Paso - Farber 138kV, requiring line rebuild of 3.14 miles with new 1192.5 kcmil ACSR.	10SP, 56796-54715, WERE SCENTRAL - OKGE ENID, WICHITA - WOODRING 345kV	102.7	223	6/1/2008
2002-4 Elk River 138kV	10SP, 56791-56797, WERE SCENTRAL - WERE SEAST, BENTON - WOLF CREEK 345kV	V INIT = 0.933, V CONT = 0.8985.	278	6/1/2010
2002-4 Elk River 138kV	10SP, 56794-56797, WERE SCENTRAL - WERE SEAST, ROSE HILL - WOLF CREEK 345kV	V INIT = 0.933, V CONT = 0.8954.	232	6/1/2010
2002-4 Elk River 345kV	10SP, 56793-99962, WERE SEAST - , NEOSHO - 2004-002 -345kV	V INIT = 0.9498, V CONT = 0.8944.	260	6/1/2010
2002-4 Elk River 138kV	10SP, 56793-99962, WERE SEAST - , NEOSHO - 2004-002 -345kV	V INIT = 0.933, V CONT = 0.8713.	117	6/1/2008
2004-2 Caney River 345kV	10SP, 56793-99962, WERE SEAST - , NEOSHO - 2004-002 -345kV	V INIT = 0.9537, V CONT = 0.8941.	258	6/1/2010
2004-10 Elk River 345kV	10SP, 56793-99962, WERE SEAST - , NEOSHO - 2004-002 -345kV	V INIT = 0.9508, V CONT = 0.8957.	269	6/1/2010
2004-10 Elk River 345kV	10SP, 56794-99933, WERE SCENTRAL - , ROSE HILL - 2002-4TP 345kV	No solution without reactive compensation at the customer site.	165 *	6/1/2008
2004-10 Elk River 345kV	10WP, 56794-99933, WERE SCENTRAL - , ROSE HILL - 2002-4TP 345kV	No solution without reactive compensation at the customer site.	200 *	12/1/2008

Note: Listed loading of each facility is the highest value when an operating guide is not applicable.

When transmission service associated with this interconnection is evaluated, the loading of the facilities listed in this table may be greater due to higher priority reservations. If the loading of a facility is higher, the level of ATC will be lower.

* Area interchange disabled for estimating ATC.

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 SPP generation. The proposed in-service date of the generator is September 30, 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 300MW and location, additional criteria violations will occur on the existing WERE facilities under steady state conditions in the off-peak and peak seasons. Initially, a 60MVAR capacitor bank plus a 40MVAR SVC are required at the Customer's facilities in order to maintain adequate bus voltages along the Neosho – Rose Hill 345kV line. Without the SVC given an outage of the Rose Hill – Customer POI 345kV line, voltage collapse may occur as synchronous machines are not used at the wind farm to regulate voltage magnitude. To eliminate the overloading of the El Paso – Farber 138kV line, rebuilding using 1192.5kcmil ACSR is required by June 1, 2008.

There are several other proposed generation additions in the general area of the Customer's facility. Previously queued projects were assumed to be in service in this Feasibility Study. 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 I hereafter referred to as NERC Table I) and its applicable standards and measurements".

Using the created models and the ACCC function of PSS\E, single contingencies in the modeled control areas of Midwest Energy, Kansas City Power & Light, and Westar Energy were applied and the resulting scenarios analyzed. This satisfies the 'more probable' contingency testing criteria mandated by NERC and the SPP criteria.

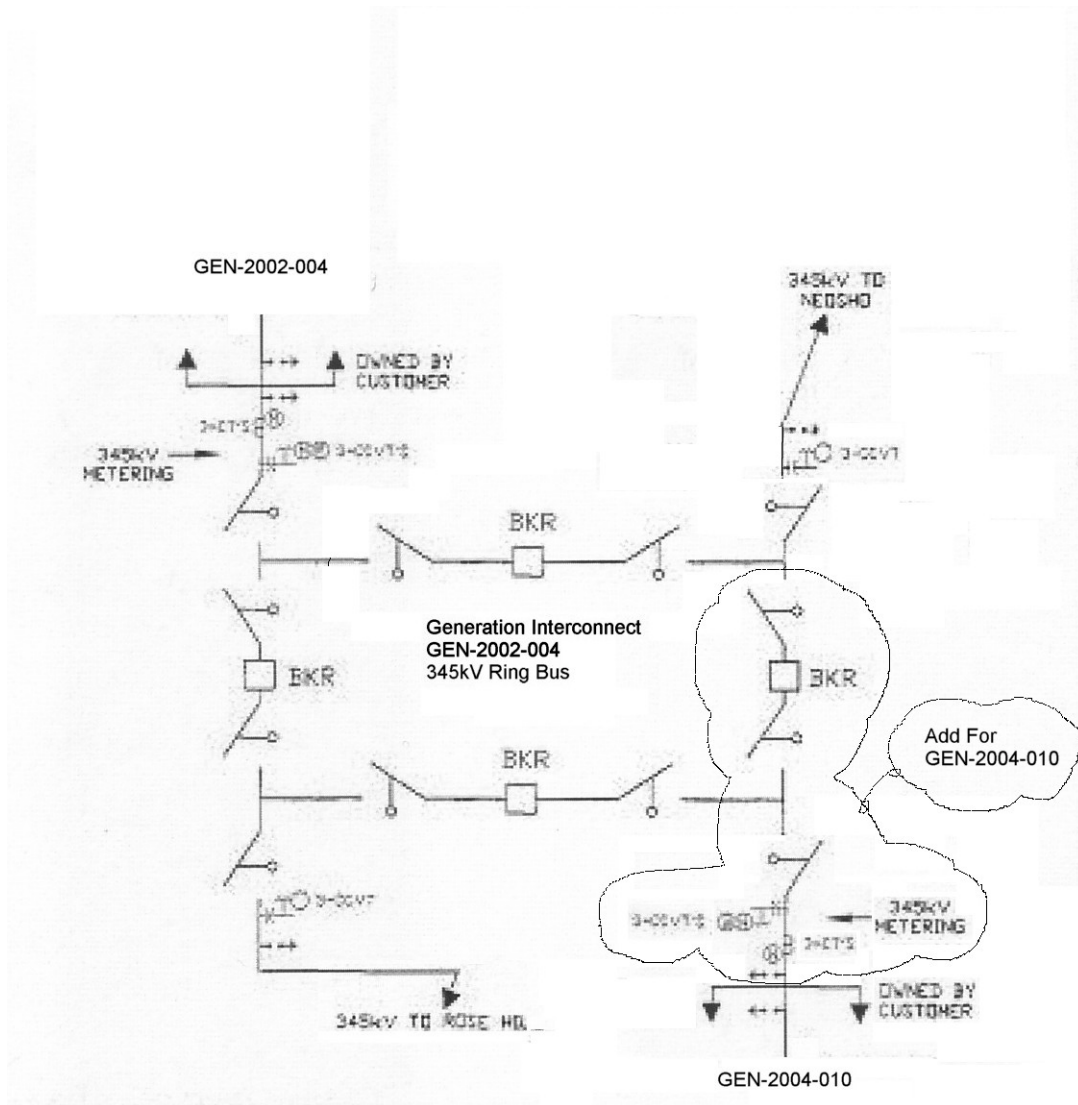
Conclusion

The minimum cost of interconnecting the Customer project is estimated at \$1,687,000 for WERE's interconnection facilities including other transmission upgrades by WERE listed in Table 1 of which are Network Upgrades. 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 assumed to be in service in this Feasibility Study. Reactive compensation is required in the Customer's 345-34.5kV substation using a 60MVAR 345kV capacitor bank and a 40MVAR SVC to maintain adequate voltages along the Neosho – Rose Hill 345kV line.

In Table 3, a value of Available Transfer Capability (ATC) associated with each overloaded facility is included. These values may be used by the Customer to determine lower generation capacity levels that may be installed with different financial characteristics given the cost of Network Upgrades. When transmission service associated with this interconnection is evaluated, the loading of the facilities listed in this table may be greater due to higher priority reservations.

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)**

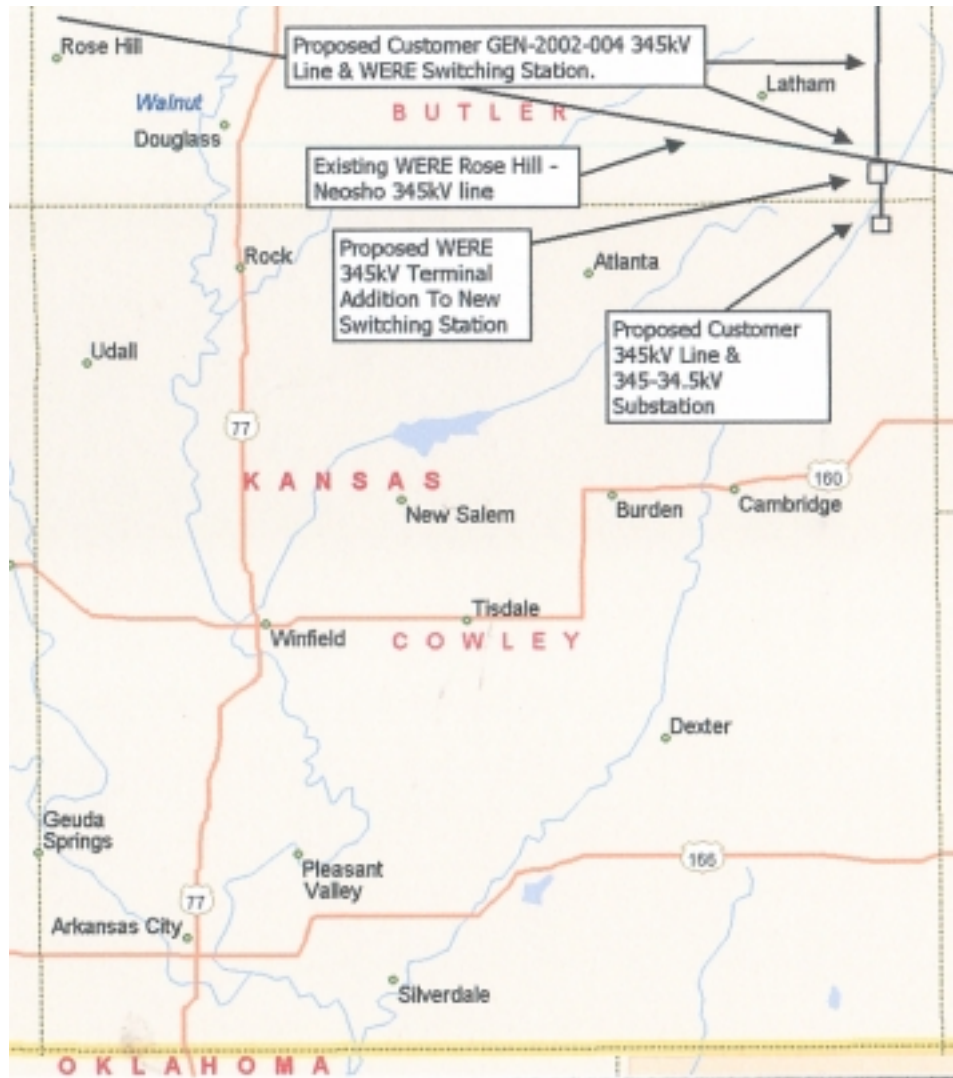


Figure 2: Map Of The Surrounding Area