



***Feasibility Study for Generation
Interconnection Request
For
GEN – 2003 - 006***

***SPP Coordinated Planning
(#GEN-2003-006)***

December 2003

Introduction

The Customer has requested a Feasibility Study for interconnection of an additional 100 MW wind generation to their existing 75 MW facility near Apache, Oklahoma. Based on a higher queued project by the same Customer the new adjusted total for the Customer's facility will be 275 MW. The requested point of interconnection is the 138 kV Western Farmers Electric Cooperative (WFEC) Washita switch station. The projected in-service date of the facility is December 2006.

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 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 Customer has proposed that they build a new 138 kV line between Western Farmers Electric Cooperative (WFEC) Washita switch station and the Southwestern Station of AEP-PSO. The point of interconnection for this project will be at the Washita 138 kV switch station. The station shall be owned and maintained by WFEC.

The costs of interconnecting the facility to the Southwest Power Pool transmission system are listed in Table 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.

Powerflow Analysis

A powerflow analysis was conducted for the facility. The output of the Customer's facility was offset by a reduction in output of generation. A modified version of the 03 Series Southwest Power Pool 2009 summer peak base case was used for this study. The modified model includes transmission reservations that have been confirmed on Southwest Power Pool's OASIS since the release of the last model.

The analysis of the Customer's 275 MW Wind power project shows system upgrades are required to handle the proposed additional 100 MW output at steady state conditions. The Customer requested the study be completed in increments of 50, 80, and 100 MW. Since the 50 and 80 MW analyses showed the same system upgrades are required there has not been any differentiation made for the purpose of this report. There is a small cost of upgrade to achieve the full additional 100 MW output. There are several proposed generation additions in the general area of the Customer's facility with higher queue positions. The Customer's Phase V, higher queued project was not included in this analysis to provide the Customer with an "out of queue" study result for this project.

The results presented in Table 1 indicate the impact of the Customer's project on system performance in the event of several contingencies based on the 275 MW output.

Table 1.: Overloaded Facilities under contingency

<u>Critical Facility</u>	<u>Facility Rating</u>	<u>Loading</u>	
		<u>Max. Continuous Loading</u>	<u>% Current Loading*</u>
Anadarko –Blanchard	34.0	35.8	103.2
Tipton & Headerick–Snyder 69 kV	53.0	57.3	112.7

* % Loading based on seasonal emergency rating

Powerflow Analysis Methodology

The 03 Series Southwest Power Pool 2009 summer peak base case was used to model the transmission network and system loads

Using the created models and the ACCC function of PSS\E, single contingencies in the western Oklahoma zones of WFEC, AEP West and Oklahoma Gas & Electric were analyzed.

Table 2.: Network Upgrades

Facility	Transmission Owner	ESTIMATED COST (2003 DOLLARS)
Anadarko – Blanchard 69 kV Line	WFEC	\$ 5,800,000
Tipton & Headerich- Snyder 69 kV Line	AEPW	\$ 35,000
Total Cost (Additional 50 or 80 MW)		\$5,800,000
Total Cost (Additional 100 MW)		\$5,835,000

Conclusion

The potential cost of interconnecting the Customer's Facility at the full output based on the feasibility study is \$5,835,000. The feasibility study found network upgrades to the Transmission Owners electrical systems as noted in Table 1 and Table 2 needing to be installed or upgraded before the Customer's Facility can be interconnected at a maximum power output of 275 MW. The cost to upgrade the Anadarko – Blanchard 69 kV line requires rebuilding 29 miles of 3/0 line to 795 MCM. The cost for the Tipton & Headerich –

Snyder 69 kV line only requires replacement of the limiting wave trap elements. The Customer's phase V, higher queued project also overloaded the Anadarko – Blanchard 69 kV line. The cost to upgrade the line would not be applicable to this project if the Customer's higher queued project upgrades the line.

The original impact study for the Customer's Washita facility discovered it is limited to 125 MW due to stability constraints on the WFEC electric system. For the Customer's Facility to be connected at any level greater than 125MW the line to the Southwester Station of AEPW-PSO and the addition of an interconnection breaker needs to be addressed. The addition of this interconnection to AEPW-PSO may allow the facility to operate up to possibly 250 MW. At any level greater than this limit additional stability upgrades may be needed.

The feasibility interconnection cost does not include any cost that may be associated with short circuit or transient stability analysis as noted above to increase the limit above the MW capability based on the addition of the AEPW-PSO line. These studies will be performed if the Customer signs a system impact study agreement. The cost of any additional network upgrades that may be required will be estimated during the Impact study.

These 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.