



***Feasibility Study for Generation  
Interconnection Request  
For  
GEN – 2003 - 005***

***SPP Coordinated Planning  
(#GEN-2003-005)***

**December 2003**

## Introduction

The Customer has requested a Feasibility Study for interconnection of 120 MW wind generation facility at a new substation to be constructed on the Western Farmers Electric Cooperative (WFEC) 138 kV Anadarko to Paradise line near Apache, Oklahoma. 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, on a higher queued project, that they will build a new 138 kV line between Western Farmers Electric Cooperative (WFEC) Washita switch station and the Southwestern Station of AEPW-PSO. The point of interconnection for this project will be at a new substation to be constructed on the Western Farmers Electric Cooperative (WFEC) 138 kV Anadarko to Paradise line near Apache, Oklahoma. The new 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 other online WFEC 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 120 MW Wind power project shows that there are system upgrades required to handle the proposed additional 120 MW output at steady state conditions. The Customer requested the study be completed in increments of 50, 80, 100 and 120 MWs. Since the full 120 MW analyses showed the same upgrades are required as the 50, 80 and 100 MWs there has not been any differential made for the purpose of this report. There are several proposed generation additions in the general area of the Customer's facility with higher queue positions. It was assumed in the analysis that these other projects were all in service.

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 120 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	36.1	103.9

\* % 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**

<u>Facility</u>	<u>Transmission Owner</u>	<u>ESTIMATED COST (2003 DOLLARS)</u>
New Three breaker 138 kV Ring substation	WFEC	<b>1,700,000</b>
Anadarko – Blanchard 69 kV Line	WFEC	<b>5,800,000</b>
Total		<b>7,500,000</b>

**Conclusion**

The minimum cost of interconnecting the Customer’s Facility based on the feasibility study is \$ 7,500,000. The feasibility study found the required 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 120 MW.

The original impact study for the Customer's Washita interconnected facility discovered it is limited to 125 MW due to stability constraints on the WFEC electric system. Based on the proximity of this point of interconnection and the Customer's original facility a stability limit may be reached in this area also. It was determined on the Washita interconnection that the addition of a line connecting to the Southwestern Station of AEPW-PSO would mitigate the stability problem. The addition of this interconnection may also require the AEPW-PSO line for stability of this interconnection.

The feasibility interconnection cost does not include any cost that may be associated with short circuit or transient stability analysis as noted above. 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.