



*Feasibility Study for Generation  
Interconnection Request of  
340MW in AEP  
Control Area*

*SPP Transmission Planning  
(#GEN-2000-010)*

December, 2000

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## **Executive Summary**

Customer has requested a feasibility study for interconnection of a merchant plant in the AEP Control Area near an existing 138kV substation. The plant will have a maximum output of 340 MW and the projected in service date is 2003.

The principal objective of this study is to identify the costs associated with connecting the plant to the area transmission system and what system problems and potential system modifications might be necessary to facilitate the installation of the plant. For the purposes of this study, an export to Entergy was evaluated. This export was accomplished by scaling generation in Entergy's control area down by 340 MW.

The proposed method of interconnection specified by Customer was to interconnect into the existing 138kV substation by means of a 138kV line with an approximate length of around 20 miles from the proposed project site. To accommodate the plant's output, the line was modeled with bundled 795MCM ACSR conductor.

The steady-state analysis considers the impact of an 340 MW transfer on transmission line loading for outages of single, double, and triple circuit transmission lines, autotransformers, and generators on the AEP control area and surrounding systems. A modified version of the 00 Series Southwest Power Pool 2004 summer peak base case was used for this study. The modified model includes transmission transactions that have been confirmed on Southwest Power Pool's OASIS since the release of the last model.

The costs of interconnecting the generator to the Southwest Power Pool transmission system are listed in the top section of 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 agreement is signed.

The analysis in this document shows that to accommodate a 340 MW transfer, transmission improvements will be required on the Southwest Power Pool transmission system. These costs are documented in the lower section of Table 1. Transmission improvements will also have to be made to facilities outside of SPP Tariff members. These facilities are listed in Table 2. Costs for alleviating these overloads must be addressed with the owning entities.

Construction of these transmission improvements does not guarantee transmission service from SPP. Transmission service must be requested separately through the SPP OASIS.

## **Study Methodology**

The Southwest Power Pool (SPP) criteria state that the following conditions be met in order to maintain a reliable and stable system.

- 1) More probable contingency testing .... must conclude that
  - a) All facility loadings are within their emergency ratings and all voltages are within their emergency limits (0.90-1.05 per unit) and
  - b) Facility loadings can be returned to their normal limits within four hours
  
- 2) Less probable contingency testing ... shall conclude that
  - a) Neither uncontrolled islanding, nor uncontrolled loss of large amounts of load will result.

More probable contingency testing is defined as losing any single piece of equipment or multi-circuit transmission lines. Less probable contingency testing involves the loss of any two critical pieces of equipment such as 345kV autotransformers and generating units or the loss of critical transmission lines in the same right-of-way.

The 00 Series Southwest Power Pool 2004 summer peak base case was used to model the transmission network and system loads. A base Southwest Power Pool Case for 2003 summer peak was not available at the time of this study.

Using the created models and the ACCC function of PSS\E, single contingencies in the AEPW and Entergy control areas and select double contingency outages in the entire Southwest Power Pool system were analyzed.

**Table 1.: Interconnection Facilities and SPP System Upgrades**

SYSTEM IMPROVEMENT	ESTIMATED COST (2001 DOLLARS)
Add 138kV line terminal at existing 138kV substation	\$500,000
Build approximately 20 miles of 138kV, 2-795 MCM ACSR from site to existing substations	\$7,550,000
Reset Current Transformers at existing substation	\$1,000
<b>Subtotal for interconnection</b>	<b>\$8,051,000</b>
Rebuild Cherokee-Knox Lee with 1590 MCM ACSR	\$718,000
Rebuild Cherokee-Tatum with 1272 MCM ACSR	\$1,300,000
Rebuild Rock Hill-Tatum 138kV with 1272 MCM ACSR	\$190,000
Replace Bus at North Mineola 69kV	\$40,000
Replace Jumpers and Bus at Poynter Substation	\$45,000
Replace Jumpers on Lone Star REA -Lone Star South	\$40,000
Rebuild Howell-Kilgore 69kV	\$600,000
Replace 69kV Breaker at NW Henderson Substation	\$100,000
<b>Subtotal for Transmission Service Improvements</b>	<b>\$3,033,000</b>
<b>TOTAL</b>	<b>\$11,084,000</b>

**Table 2.: Overloaded Non-SPP Tariff Facilities**

Facility	Transmission Owner
Mt Zion-Grimes 138kV	Entergy system
Carroll 138kV-Ringold 115kV	Entergy-CLECO system
Mt. Zion-4L558T48 138kV	Entergy system
Walden-Grimes 138kV	Entergy system
Grimes 345/138kV autotransformer	Entergy system
Stephens-McNeil 115kV	Entergy system
Arkla-Carpe 115kV	Entergy system

