Feasibility Study for Generation Interconnection in AEP Control Area

Southwest Transmission Planning
(#OAIP 00 004)

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Executive Summary

A feasibility study for interconnection of a merchant plant has been requested in the AEP Western (CSW) control area. The plant will have a maximum output of 800 MW and the projected in service date is 2005.

The principal objective of this study is to identify the costs associated with connecting the plant to AEP's 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, two scenarios were looked at. The first scenario consisted of sending 400 MW to Oklahoma Gas & Electric (OG&E) and 400 MW to PSO. The second scenario consisted of sending all 800 MW to Entergy in the New Orleans area.

The steady-state analysis considers the impact of an 800 MW transfer on transmission line loading and transmission bus voltages for outages of single, double, and triple circuit transmission lines, autotransformers, and generators on the western AEP system. The 00 Series Southwest Power Pool 2004 summer peak base case was used for this study.

The cost of interconnecting the generator to AEP's system is $3.3 million. This cost does not include any cost that might be associated with short circuit study results or stability study results. These costs will be determined when and if a System Impact Study is requested.

The analysis in this document shows that to accommodate an 800 MW transfer, upgrades will be required on the western AEP 69 kV, 138 kV, and 345 kV transmission systems. These upgrades are listed in Table 1 and Table 2.

Study Methodology

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

1) More probably 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 2005 summer peak was not available at the time of this study.

Using the created models and the ACCC function of PSS\E, single and select double contingency outages on the CSW system were analyzed.

System Improvements

In order to accommodate the total of 800 MW the following improvements must be made on the western AEP system.

Table 1: 400 MW to OG&E and 400 MW to PSO

SYSTEM IMPROVEMENT	ESTIMATED COST (2000 DOLLARS)
Construct new 345kV 3-breaker ring bus substation.	$3,300,000
Subtotal for interconnection	**$3,300,000**
Rebuild Bann – Alumax Tap (0.67 miles) with 1590 ACSR	$165,000
Replace Alumax Tap Switch	$20,000
Rebuild Cherokee – Knox Lee (3.25 miles) with 1590 ACSR	$718,000
Rebuild Lone Oak to Broken Bow (59 miles) with 795 ACSR	$9,800,000
Rebuild Hobart – Roosevelt Amoco Tap (10 miles) with 795 ACSR	$2,000,000
Replace Switches and Breaker at Valliant	$475,000
Add 3rd 345/138kV Auto at Valliant	$3,500,000
Construct new 138kV line from Atoka to Valliant	$19,500,000
Rebuild NW Texarkana – Patterson (13.4 miles) with 1590 ACSR	$3,350,000
Replace 138kV Switches & Breaker at Patterson	$200,000
Rebuild Valliant Kiamichi Pump Tap (4.82 miles) with 795 ACSR	$964,000
Rebuild Fixico Tap – Maud (11.83 miles) with 795 ACSR	$3,000,000
Rebuild Henryetta - Weleetka (1.48 miles) with 795 ACSR	$300,000
Replace Weleetka Line Trap	$15,000
Replace NES Line Trap	$15,000
Rebuild Foreman – Patterson (15.9 miles) with 795 ACSR	$3,180,000
Subtotal for Transmission Service Improvements	**$47,202,000**
TOTAL	**$50,502,000**

Interconnection Cost $3,300,000
System Improvements Cost $47,202,000

Table 2: 800 MW to Entergy – New Orleans

SYSTEM IMPROVEMENT	ESTIMATED COST (2000 DOLLARS)
Construct new 345kV 3-breaker ring bus substation.	$3,300,000
Subtotal for interconnection	**$3,300,000**
Rebuild Bann – Alumax Tap (0.67 miles) with 1590 ACSR	$165,000
Replace Alumax Tap Switch	$20,000
Rebuild Cherokee – Knox Lee (3.25 miles) with 1590 ACSR	$718,000
Rebuild Lone Oak - Broken Bow (59 miles) with 795 ACSR	$9,800,000
Rebuild Hobart – Roosevelt Amoco Tap (10 miles) with 795 ACSR	$2,000,000
Replace Switches and Breaker at Valliant	$475,000
Replace Snyder Line Trap	$15,000
Replace Gentry Tap Switch	$38,000
Replace 138kV Breaker & Switches at East Centerton	$168,000
Rebuild Dyess – East Rogers (13.42 miles) with 1590 ACSR	$4,000,000
Replace Line trap & Jumpers at Dyess	$25,000
Subtotal for Transmission Service Improvements	**$17,424,000**
TOTAL	**$20,724,000**

Interconnection Cost $3,300,000
System Improvements Cost $17,424,000