



SPP *Southwest Power Pool*

***System Impact Study SPP-2002-096
For Transmission Service
Requested By
Aquila Energy Marketing
Corporation***

From AEPW To ERCOTE

***For a Reserved Amount Of 50 MW
From 6/1/02
To 6/1/03***

SPP Coordinated Planning

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1. Executive Summary

Aquila Energy Marketing Corporation (AEMC) has requested a system impact study for long-term Firm Point-to-Point transmission service from AEPW to ERCOTE. The period of the transaction is from 6/1/02 to 6/1/03. The request is for OASIS reservation 356969 for 50 MW. OASIS reservation 356969 is the renewal of OASIS reservation 316427.

The principal objective of this study is to identify system problems and potential system modifications necessary to facilitate the additional 50 MW transfer while maintaining system reliability.

New overloads caused by the 50 MW transfer were identified along with determining the impact of the transfer on any previously assigned and identified facilities.

The AEPW to ERCOTE 50 MW transfer impacts facilities that have been identified as limiting constraints for previously studied transfers. Due to the inability to upgrade these limiting constraints within the reservation period using normal construction practices, the ATC is zero for the requested AEPW to ERCOTE 50 MW transfer.

Curtailed one of the previously confirmed AEPW to ERCOTE 50 MW transfers (Oasis Reservations 338087, 338088, 338089, and 338090) was looked at as an option to relieving the impact on the limiting facilities caused by the AEPW to ERCOTE 50 MW transfer.

2. Introduction

Aquila Energy Marketing Corporation (AEMC) has requested an impact study for transmission service from AEPW to ERCOTE.

The principal objective of this study is to identify the restraints on the SPP Regional Tariff System that may limit the transfer to less than 50 MW. This study includes steady-state contingency analyses (PSS/E function ACCC) and Available Transfer Capability (ATC) analyses.

The steady-state analyses consider the impact of the 50 MW transfer on transmission line loading and transmission bus voltages for outages of single and selected multiple transmission lines and transformers on the SPP system.

3. Study Methodology

A. Description

Two analyses were conducted to determine the impact of the 50 MW transfer on the system. The first analysis was conducted to identify any new overloads caused by the 50 MW transfer. The second analysis was done to ensure that available capacity exists on previously identified circuits.

The first analysis was to study the steady-state analysis impact of the 50 MW transfer on the SPP system. The second step was to study Available Transfer Capability (ATC) of the facilities identified in the steady-state analysis impact. The steady-state analysis was done to ensure current SPP Criteria and NERC Planning Standards requirements are fulfilled. The Southwest Power Pool (SPP) conforms to the NERC Planning Standards, which provide the strictest requirements, related to thermal overloads with a contingency. It requires that all facilities be within emergency ratings after a contingency.

The second analysis was done to determine the impact of the transfer on previously assigned and identified facilities.

B. Model Updates

SPP used five seasonal models to study the AEPW to ERCOTE 50 MW transfer. The SPP 2002 Series Cases: 2002 Summer Peak, 2002 Fall Peak, 2002/03 Winter Peak, 2003 April Minimum, and 2003 Spring Peak were used to study the impact of the 50 MW transfer on the SPP system during the transaction period of 6/1/02 to 6/1/03.

The chosen base case models were modified to reflect the most current modeling information. The cases were modified to reflect future firm transfers during the request period that were not already included in the January 2002 base case series models.

C. Transfer Analysis

Using the created models and the ACCC function of PSS\|E, single and select double contingency outages were analyzed. Then full AC solution was used to obtain the most accurate results possible. Any facility overloaded, using MVA ratings, in the transfer case and not overloaded in the base case was flagged. The PSS/E options chosen to conduct the Impact Study analysis can be found in Appendix A.

4. Study Results

A. Study Analysis Results

Tables 1, 2, and 3 contain the analysis results of the System Impact Study. The tables identify the seasonal case in which the event occurred; the emergency rating of the overloaded circuit (Rate B), the contingent loading percentage of circuit with and without the studied transfer, the estimated ATC value using interpolation if calculated, any SPP identification or assignment of the event, and any solutions received from the transmission owners.

Table 1 shows the new SPP facility overloads caused by the 50 MW transfer. Available solutions are given in the table.

Table 2 documents overloads on Non SPP Regional Tariff participants' transmission systems caused by the 50 MW transfer.

Table 3 documents the 50 MW transfer impact on previously assigned and identified SPP facilities. Available solutions are given in the table.

Table 4 documents the available confirmed reservations that, when curtailed, would relieve the additional loading on those facilities impacted by the AEPW to ERCOTE 50 MW transfer.

Table 1 – SPP Facility Overloads caused by the AEPW to ERCOTE 50 MW Transfer

Study Year	From Area To Area	Branch Over 100% Rate B	Rate B	BC %Loading	TC %Loading	Outaged Branch That Caused Overload	ATC	Solution
02SP		NONE					50	
02FA		NONE					50	
02WP		NONE					50	
03AP		NONE					50	
03G		NONE					50	

Table 2 – Non - SPP Facility Overloads caused by the AEPW to ERCOTE 50 MW Transfer

Study Year	From Area To Area	Branch Over 100% Rate B	Rate B	BC %Loading	TC %Loading	Outaged Branch That Caused Overload
02SP		NONE				
02FA		NONE				
02WP		NONE				
03AP		NONE				
03G		NONE				

Table 3 – Previously Assigned and Identified SPP Facilities Impacted by the AEPW to ERCOTE 50 MW Transfer

Study Year	From Area To Area	Branch Over 100% Rate B	Rate B	BC %Loading	TC %Loading	Outaged Branch That Caused Overload	ATC	Assignment
02SP	KACP-KACP	LACYGNE TO STILWELL. 350 KV 57981 LACYGNE7 345 to 57968 STILWEL7 345 CKT 1	1251	101.5	101.6	LACYGNE TO WEST GARDNER, 350 KV 57981 LACYGNE7 345 to 57965 W.GRDNR7 345 CKT1	0	SPP Flowgate, Upgrade Assigned to SPP-2000-108, Date Required 6/1/05: Build Parallel LaCygne to Stilwell 350 kV line Construction Lead-time 36 Months
02SP	GRRD-GRRD	CLAREMORE 161/69KV TRANSFORMER CKT 2 54451 CLARMR 5 161 to 54479 CLARMR 269.0 CKT 2	84	100.0	100.1	CLAREMORE 161/69KV TRANSFORMER CKT 1 54451 CLARMR 5 161 to 54479 CLARMR 269.0 CKT1	0	Identified In SPP-2002-050 Solution Undetermined
02FA		NONE					50	
02WP		NONE					50	
03AP		NONE					50	
03G		NONE					50	

Table 4 – Amount of Confirmed Reservation 338090 Needed for Curtailment

Overloaded Facility	Date Curtailment Needed	AEPW to ERCOTE % Response	AEPW to ERCOTE % Response	*ATC (MW) Needed	**Amount of AEPW to ERCOTE 50 MW transfer (Oasis Reservation 338090) Needed for Curtailment	ATC (MW) Available for AEPW to ERCOTE transfer after curtailment of 338090
LACYGNE TO STILWELL. 345 KV	6/1/02-10/1/02	3.0	3.0	50	50	50
CLAREMORE 161/69KV TRANSFORMER CKT 2	6/1/02-10/1/02	0.17	0.17	50	50	50

*Amount of Curtailment Needed = ATC Needed (MW) *AEPW to ERCOTE % Response / AEPW to ERCOTE % Response

5. Conclusion

The requested 50 MW of firm point-to-point transmission service was studied for the time period of the request (6/1/02-6/1/03).

The previously assigned and identified facilities limit the ATC to zero due to the inability to upgrade the constraints as required. The acceptance of the 50 MW AEPW to ERCOTE transfer is dependent on the curtailment of the previously confirmed AEPW to ERCOTE 50 MW transfer (Oasis Reservation 338090).

For the 2002 Summer (6/1/02-10/1/02), the ATC is zero due the loading of the La Cygne to Stilwell 345kV line and the Claremore 161/69 kV Transformer. The estimated construction lead-time for the La Cygne to Stilwell overload is 36 months. The curtailment of a confirmed 50 MW transfer from AEPW to ERCOTE may be used as an option to relieving these overloads.

The amount of curtailment required to accept the requested AEPW to ERCOTE 50 MW transfer is 50 MW of the confirmed AEPW to ERCOTE 50 MW transfer, OASIS reservation 338090. Without the availability of this curtailment, the requested AEPW to ERCOTE 50 MW transfer will be limited to an ATC of 0 MW for the 2002 Summer.

Appendix A

PSS/E CHOICES IN RUNNING LOAD FLOW PROGRAM AND ACCC

BASE CASES:

Solutions - Fixed slope decoupled Newton-Raphson solution (FDNS)

1. Tap adjustment – Stepping
2. Area interchange control – Tie lines only
3. Var limits – Apply immediately
4. Solution options - Phase shift adjustment
 - Flat start
 - Lock DC taps
 - Lock switched shunts

ACCC CASES:

Solutions – AC contingency checking (ACCC)

1. MW mismatch tolerance – 0.5
2. Contingency case rating – Rate B
3. Percent of rating – 100
4. Output code – Summary
5. Min flow change in overload report – 1mw
6. Excl'd cases w/ no overloads form report – YES
7. Exclude interfaces from report – NO
8. Perform voltage limit check – YES
9. Elements in available capacity table – 60000
10. Cutoff threshold for available capacity table – 99999.0
11. Min. contng. case Vltg chng for report – 0.02
12. Sorted output – None

Newton Solution:

1. Tap adjustment – Stepping
2. Area interchange control – Tie lines only
3. Var limits - Apply automatically
4. Solution options - Phase shift adjustment
 - Flat start
 - Lock DC taps
 - Lock switched shunts