SPP Southwest Power Pool

System Impact Study SPP-2001-210
For Transmission Service
Requested By
Calpine Power Services Company

From AEPW To
OKGE

For a Reserved Amount Of 400MW
From 6/1/02
To 6/1/03

SPP Transmission Planning

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1. Executive Summary

Calpine Power Services Company has requested a system impact study for long-term Firm Point-to-Point transmission service from AEPW to OKGE. The period of the transaction is from 6/1/02 to 6/1/03. The request is for OASIS reservation 260673 in the amount of 400MW.

The principal objective of this study is to identify system problems and potential system modifications necessary to facilitate the additional 400MW transfer while maintaining system reliability.

New overloads caused by the 400MW transfer were identified along with determining the impact of the transfer on any previously assigned and identified facilities.

The AEPW to OKGE 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 OKGE 400MW transfer.

2. Introduction

Calpine Power Services Company has requested an impact study for transmission service from AEPW to OKGE.

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 400MW. 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 400MW transfer on transmission line loading and transmission bus voltages for outages of single and selected multiple transmission lines and transformers on the SPP system.

ATC analyses shows the amount of First Contingency Incremental Transfer Capabilities (FCITC) between the given study systems and what the limitations are, if any, for transferring up to 400MW.

3. Study Methodology

A. Description

Two analyses were conducted to determine the impact of the 400MW transfer on the system. The first analysis was conducted to identify any new overloads caused by the 400MW 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 400MW 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 four seasonal models to study the 400MW request. The SPP 2002 Series Cases 2002 Summer Peak, 2002 Fall, 2002/03 Winter Peak, and 2003 Spring were used to study the impact of the 400MW 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 facility overloads caused by the 400MW transfer.

Table 2 documents overloads on Non SPP Regional Tariff participants' transmission systems caused by the 400MW transfer.

Table 3 documents the 400MW transfer impact on previously assigned and identified facilities. Available estimated in-service dates for the completion of the previously assigned upgrades are given in the table.

Table 1 – SPP Facility Overloads caused by the AEPW to OKGE 400MW Transfer

Study Year	From Area - To Area	Branch Over 100% Rate B	Rate B	BC % Loading	TC % Loading	Outaged Branch Causing Overload	ATC (MW)	Solution
02SP	AEPW-AEPW	**ONETA TO BROKEN ARROW 101ST NORTH** 53818 ONETA--4 138 to 53781 BA101-N4 138 CKT 1	210	96.3	103.6	**RIVERSIDE STATION 345/138KV TRANSFORMER** 53785 RSSAUTO4 138 to 53794 R.S.S.-7 345 CKT1	202	Undetermined
02SP	OKGE-OKGE	**TIBBENS TO BEELINE, 69KV** 55237 TIBBENS269.0 to 55246 BEELINE269.0 CKT 1	66	97.3	102.8	**BLUEBELL 138/69KV TRANSFORMER** 55241 BLUEBEL269.0 to 55242 BLUEBEL4 138 CKT1	196	OKGE Operating Directive
02SP	AEPW-AEPW	**WELEETKA 138/69KV TRANSFORMER** 54028 WELETK4 138 to 54029 WELEETK269.0 CKT 1	55	97.7	100.3	**LONE OAK TO SOUTH MCALESTER TAP, 138KV** 54022 LONEOAK4 138 to 54032 SMCALTP4 138 CKT1	356	Undetermined
02SP	AEPW-AEPW	**WEL EETKA 138/69KV TRANSFORMER** 54028 WELETK4 138 to 54029 WELEETK269.0 CKT 1	55	99.1	104.4	**OKMULGEE 138/69KV TRANSFORMER** 54023 OKMULGE4 138 to 54025 OKMULGE269.0 CKT1	64	Undetermined
02SP	WERE-WERE	**CHASE TO WHITE JUNCTION, 69KV** 57588*CHASE 269.0 57605 WHITE J269.0 1	43	99.8	101.6	**WEAVER 138/69/13.2KV TRANSFORMER** 56991 WEAVER 4138 to 57604 WEAVER 269.0 to 57083 WEAVER 113.2 CKT 1	44	Undetermined
02FA		NONE				NONE		
02WP		NONE				NONE		
03G		NONE				NONE		

Table 2 – Non - SPP Facility Overloads caused by the AEPW to OKGE 400MW Transfer

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

Table 3 – Previously Assigned and Identified SPP Facilities Impacted by the AEPW to OKGE 400MW Transfer.

Study Year	From Area - To Area	Branch Over 100% Rate B	Rate B	BC % Loading	TC % Loading	Outaged Branch Causing Overload	ATC (MW)	Assignment
02SP	KACP-KACP	**STILWELL TO LA CYGNE, 345KV** 57968 STILWEL7 345 to 57981 LACYGNE7 345 CKT 1	1251	101.1	101.6	**WEST GARDNER TO LA CYGNE** 57965 W.GRDNR7 345 to 57981 LACYGNE7 345 CKT1	0	SPP Flowgate, Upgrade Assigned to SPP-2000-108, Date Required 6/1/2005: Build Parallel La Cygne to Stilwell 345kV line, Construction Lead-time 36 Months
02FA		NONE				NONE		
02WP		NONE				NONE		
03G		NONE				NONE		

5. Conclusion

The previously assigned and identified facilities limit the ATC to zero due to the inability to upgrade the constraints as required. Those facilities that have an ATC of zero are given below.

?? 2002 Summer Peak (6/1/2002 – 10/1/2002) – The AEPW to OKGE transfer increases the loading on the previously overloaded La Cygne to Stilwell 345kV line. The construction lead – time for this facility is approximately 36 months.

Given the estimated in service dates of these upgrades, the ATC of the existing transmission system cannot be increased as required to provide continuous service over the reservation period.

Due to these limitations, the requested reservation will be refused.

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 automatically
4. Solution options - X Phase shift adjustment
   _ Flat start
   _ Lock DC taps
   _ Lock switched shunts

ACCC CASES:
Solutions – AC contingency checking (ACCC)
1. MW mismatch tolerance –1.0
2. Contingency case rating – Rate B
3. Percent of rating – 100
4. Output code – Summary
5. Min flow change in overload report – 1mw
6. Excld 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 - X Phase shift adjustment
   _ Flat start
   _ Lock DC taps
   _ Lock switched shunts