



SPP *Southwest Power Pool*

***System Impact Study SPP-2001-344
For Transmission Service
Requested By
Board of Public Utilities***

***From SPA
To KACY***

***For a Reserved Amount Of 38MW
From 1/1/02
To 1/1/03***

SPP Transmission Planning

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1. Executive Summary

Board of Public Utilities has requested a system impact study for long-term Firm Point-to-Point transmission service from SPA to KACY. The period of the transaction is from 1/1/02 to 1/1/03. The request is for OASIS reservation 307750 in the amount of 38MW.

The principal objective of this study is to identify system problems and potential system modifications necessary to facilitate the additional 38MW transfer while maintaining system reliability.

New overloads caused by the 38MW transfer were identified along with determining the impact of the transfer on any previously assigned and identified facilities.

The SPA to KACY transfer impacts several 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 SPA to KACY 38MW transfer.

2. Introduction

Board of Public Utilities has requested an impact study for transmission service from SPA to KACY.

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 38MW. 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 38MW 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 38MW.

3. Study Methodology

A. Description

Two analyses were conducted to determine the impact of the 38MW transfer on the system. The first analysis was conducted to identify any new overloads caused by the 38MW 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 38MW 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 three seasonal models to study the 38MW request. The SPP 2001 Series Cases 2001/02 Winter Peak, 2002 Summer Peak, and 2002/03 Winter Peak were used to study the impact of the 38MW transfer on the SPP system during the transaction period of 1/1/02 to 1/1/03.

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 2001 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 38MW transfer. Upgrades associated with these new overloads can be directly assigned to the SPA to KACY 38MW transfer.

Table 2 documents overloads on Non SPP Regional Tariff participants' transmission systems caused by the 38MW transfer.

Table 3 documents the 38MW 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 SPA to KACY 38MW 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
01WP		NONE				NONE	38	
02SP	EES-SWPA	MIDWAY TO BULL SHOALS, 161KV 99825 5MIDWAY# 161 to 52660 BULL SH5 161 CKT 1	162	99.8	100.8	BULL SHOALS TO BUFORD TAP, 161KV 52660 BULL SH5 161 to 52661 BUFRDTP5 161 CKT1	8	Upgrade Assigned to SPP-2000-108 Est. In-Service Date 6/1/2005
02WP		NONE				NONE	38	

Table 2 – Non - SPP Facility Overloads caused by the SPA to KACY 38MW Transfer

Study Year	From Area - To Area	Branch Over 100% Rate B	Rate B	BC % Loading	TC % Loading	Outaged Branch Causing Overload
01WP	AECI-AECI	96067 5CHAMOI 161 to 96626 2CHAMOI 69.0 CKT 1	50	99.8	100.1	96043 7KINGDM 345 to 96044 7MCCRED 345 CKT1
02SP	EES-SWPA	99825 5MIDWAY# 161 to 52660 BULL SH5 161 CKT 1	162	99.8	100.8	52660 BULL SH5 161 to 52661 BUFRDTP5 161 CKT1
02SP	AECI-SWPA	96730 2SILDOL 69.0 to 52674 TABLE R269.0 CKT 1	51	99.5	100.1	52674 TABLE R269.0 to 96735 2T.ROCK 69.0 CKT1
02WP	AECI-AECI	96067 5CHAMOI 161 to 96626 2CHAMOI 69.0 CKT 1	50	99.9	100.2	30233 CALIF 161 to 96063 5CALIF 161 CKT1

Table 3 – Previously Assigned and Identified SPP Facilities Impacted by the SPA to KACY 38MW 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
01WP		NONE				NONE	38	
02SP	EES-SWPA	MIDWAY TO BULL SHOALS, 161KV 99825 5MIDWAY# 161 to 52660 BULL SH5 161 CKT 1	162	112.8	113.3	ISES TO MOREFIELD, 161KV 99817 5ISES 1 161 to 99826 5MORFLD 161 CKT1	0	Upgrade Assigned to SPP-2000-108 Est. In-Service Date 6/1/2005
02SP	KACP-KACP	STILWELL TO LA CYGNE , 345KV 57968 STILWEL7 345 to 57981 LACYGNE7 345 CKT 1	1251	104.8	105.5	WEST GARDNER TO LA CYGNE, 345KV 57965 W.GRDNR7 345 to 57981 LACYGNE7 345 CKT1	0	SPP Flowgate
02WP		NONE				NONE	38	

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 (6/1/02-10/1/02) - The ATC is zero due the loading of the La Cygne to Stilwell, La Cygne to West Gardner 345kV flowgate and the Midway to Bull Shoals 161kV line. The possible in-service date for upgrades on the La Cygne to Stilwell, La Cygne to West Gardner flowgate is 12/1/2004. The estimated in-service date for upgrades on the Midway to Bull Shoals 161kV line is 6/1/2005.

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.

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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 - 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. 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