SPP Southwest Power Pool

System Impact Study SPP-2001-186 For Transmission Service Requested By Western Resources Generation Services

From AEP To WR

For a Reserved Amount Of 50MW From 8/1/01 To 8/1/02

SPP Transmission Planning

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1. Executive Summary

Western Resources Generation Services has requested a system impact study for long-term Firm Point-to-Point transmission service from AEP to WR. The period of the transaction is from 8/1/01 to 8/1/02. The request is for OASIS reservation 255102 for 50MW.

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

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

The AEP to WR transfer overloads the Fort Smith 500/161kV transformer for the outage of the Fort Smith 345/161kV transformer for the 2002 Summer. Due to the inability to upgrade these limiting constraints within the reservation period using normal construction practices, the ATC is zero for the requested AEP to WR 50MW transfer.

Redispatch was looked at as an option to relieving the impact on the Fort Smith 500/161kV transformer caused by the 50MW transfer.

The Transmission Owners were given the opportunity to participate in the redispatch of their generation resources in order to relieve a system constraint caused by a transfer. Those companies owning units, which through increasing or decreasing generation will relieve the impact on the Fort Smith 500/161kV transformer, declined to participate in redispatching. There are no additional options available to relieve the impact on Fort Smith 500/161kV transformer caused by the 50MW AEP to WR transfer.

2. Introduction

Western Resources Generation Services has requested an impact study for transmission service from AEP control area with a sink of WR.

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 50MW. 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 50MW 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 50MW.

3. Study Methodology

A. Description

Two analyses were conducted to determine the impact of the 50MW transfer on the system. The first analysis was conducted to identify any new overloads caused by the 50MW 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 50MW 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 50MW request. The SPP 2001 Series Cases 2001 Summer Peak, 2001/02 Winter Peak, and 2002 Summer Peak were used to study the impact of the 50MW transfer on the SPP system during the transaction period of 8/1/01 to 8/1/02.

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, 3 and 4 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 50MW transfer. Upgrades associated with these new overloads can be directly assigned to the AEP to WR 50MW transfer.

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

Table 3 documents the 50MW transfer impact on previously assigned and identified facilities.

Table 4 documents the SPP Flowgates impacted by the 50MW AEP to WR transfer.

Table 1 – SPP Facility Overloads caused by the AEP to WR 50MW Transfer

Study Year	From Area - To Area	Branch Over 100% Rate B	RATEB	BC % Loading	TC %Loading	Outaged Branch That Caused Overload	ATC (MW)
		LEVEE TO NORTHEAST, 161KV				**NORTHEAST TO CHOUTEAU, 161KV**	
01SP	KACP-KACP	57976 LEVEE 5 161 to 57985 NEAST 5 161 CKT 1	335.0	99.9	100.2	57985 NEAST 5 161 to 58011 CHOUTEU5 161 CKT1	20
01WP		NONE				NONE	
		FORT SMITH 500/161KV TRANSFORMER				**FORT SMITH 161/345KV TRANSFORMER**	
02SP	OKGE-OKGE	55305 FTSMITH8 500 to 55300 FTSMITH5 161 CKT 1	480.0	100.0	100.3	55300 FTSMITH5 161 to 55302 FTSMITH7 345 CKT1	0

Table 2 – Non - SPP Facility Overloads caused by the AEP to WR 50MW Transfer

Study Year	From Area - To Area	Branch Over 100% Rate B	RATEB	BC % Loading	TC %Loading	Outaged Branch That Caused Overload	ATC (MW)
01SP	AECI-SWPA	96730 2SILDOL 69.0 to 52674 TABLE R269.0 CKT 1	51.0	99.9	100.1	52674 TABLE R269.0 to 96735 2T.ROCK 69.0 CKT1	18
01WP	AECI-AECI	96067 5CHAMOI 161 to 96626 2CHAMOI 69.0 CKT 1	50	99.5	100.3	31088 MCCREDIE 345 to 31230 MONTGMRY 345 CKT1	31
02SP	EES-EES	98107 8RICHARD 500 to 98430 8WEBRE 500 CKT 1	1732	100.0	100.2	98937 8B.WLSN 500 to 99203 8PERYVIL 500 CKT1	0
02SP	EES-EES	99750 5HRSBRG* 161 to 99782 5TRUMAN 161 CKT 1	148	99.9	100.2	99736 5CASH 1 161 to 99755 5JONES 161 CKT1	18
02SP	EES-EES	99808 5CUSHMN 161 to 99834 5SAGE * 161 CKT 1	148	99.9	100.5	99519 5QUITMN 161 to 99799 5BEE BR 161 CKT1	17
02SP	EES-EES	99817 5ISES 1 161 to 99826 5MORFLD 161 CKT 1	223	99.7	100.2	53277 LYDIA 7 345 to 54037 VALIANT7 345 CKT1	29
02SP	EES-EES	99837 5SUMMIT 161 to 99809 5FLIPN 161 CKT 1	162	99.6	100.2	99519 5QUITMN 161 to 99799 5BEE BR 161 CKT1	35

Table 3 – Previously Assigned and Identified SPP Facilities Impacted by the AEP to WR 50MW Transfer.

Study Year	From Area - To Area	Branch Over 100% RateB	RATEB	BC % Loading	TC % Loading	ATC (MW)	Outaged Branch That Caused Overload	Assignment
01SP		**NONE**					**NONE**	
01WP		NONE					NONE	
02SP	WERE-WERE	**KEENE TO SOUTH ALMA, 115KV** 57167 KEENE 3 115 to 57339 S ALMA 3 115 CKT 1	68	102.7	104.0	0	**JEFFREY ENERGY CENTER TO EAST MANHATTAN, 230KV** 56852 JEC 6 230 to 56861 EMANHAT6 230 CKT1	Western Resources Op-Guide

Table 4 – SPP Flowgates Impacted by the AEP to WR 50MW Transfer.

Study Year	Flowgate	From Area - To Area	Branch Over 100% Rate B	Flowgate Rating	BC % Loading	TC % Loading	Outaged Branch Causing Overload	Assignment
01WP	TupTupValPit	SWPA-WFEC	**TUPELO TO TUPELO TAP, 138KV** 52800 TUPELO 4 138 to 56071 TUPLOTP4 138 CKT 1	96	108.5	109.2	**VALLIANT TO PITTSBURG, 345KV** 54037 VALIANT7 345 to 54033 PITTSB-7 345 CKT1	Replace Wave Trap
02SP	BrkClaValPit	SWPA-AEPW	**BROKEN BOW TO BETHEL, 138KV** 52814 BRKN BW4 138 to 54054 BETHEL 4 138 CKT 1	107	102.2	103.1	**VALLIANT TO PITTSBURG, 345KV** 54037 VALIANT7 345 to 54033 PITTSB-7 345 CKT1	Replace 400Amp CT

5. Conclusion

The Fort Smith 500/161kV transformer is identified as a limiting constraint for the AEP to WR 50MW transfer. The ATC is zero for the 2002 Summer due to the inability to upgrade the constraint as required.

The Transmission Owners were given the opportunity to include their units for redispatch in order to provide relief on the facilities impacted by a certain transaction. The participants owning units that would relieve the Fort Smith 500/161kV transformer declined to participate in the redispatch of those units. No other options are available to provide the capacity needed for the 50MW transfer.

The final cost assignment of facilities and ATC granted to WRGS will be determined upon the completion of a facility study.

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 – 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. 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