



SPP *Southwest Power Pool*

*System Impact Study
SPP-2004-005-2
For Transmission Service
Requested By
Southwestern Public Service
Company*

From SPS To KACY

*For a Redirected Amount Of 21 MW
From 6/1/2004 To 6/1/2005*

SPP Engineering, Tariff Studies

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ATTACHMENT: *SPP-2004-005-2 Tables*

1. Executive Summary

Southwestern Public Service Company has requested a system impact study for long-term Firm Point-to-Point transmission service from SPS to KACY for 21 MW. The period of the service requested is from 6/1/2004 to 6/1/2005. The OASIS reservation number is 635315. This is a request to redirect the previously confirmed OASIS reservation 297076. Oasis Reservation 297076 is a 50 MW transfer from SPS to AMRN.

The principal objective of this study is to identify current system limitations using AC analyses and to determine the system upgrades necessary to provide the requested service.

Table 1 lists the SPP Facility Overloads caused or impacted by the requested service and includes solutions with engineering and construction costs to alleviate the limiting facilities. Table 2 includes Non - SPP Facility Overloads caused or impacted by the requested service.

The SPS to KACY 21 MW transfer does not create any new overloads or additional impacts on facilities requiring upgrades. Therefore, the service will be accepted.

2. Introduction

Southwestern Public Service Company has requested a system impact study for Point-to-Point Service from SPS to KACY for 21 MW. The principal objective of this study is to identify the restraints on the SPP Regional Tariff System that may limit the requested service and determine the least cost solutions required to alleviate the limiting facilities.

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 21 MW transfer and the impact of the required upgrades for service on transmission line loading and transmission bus voltages for outages of single and selected multiple transmission lines and transformers on the SPP systems and first tier Non - SPP systems.

3. Study Methodology

A. Description

The system impact analysis was conducted to determine the steady-state impact of the 21 MW transfer on the SPP and first tier Non - SPP systems. The steady-state analysis was done to ensure current SPP Criteria and NERC Planning Standards requirements are fulfilled. The Southwest Power Pool conforms to the NERC Planning Standards, which provide the strictest requirements, related to voltage violations and thermal overloads during normal conditions and during a contingency. It requires that all facilities be within normal operating ratings for normal system conditions and within emergency ratings after a contingency.

B. Model Updates

SPP used six seasonal models to study the SPS to KACY 21 MW transfer for the requested service period. The SPP 2004 Series Cases 2004 Summer Peak (04SP), 2004 Summer Shoulder (04SH), 2004 Fall Peak (04FA), 2004/05 Winter Peak (04WP), 2005 April Minimum (05AP), and 2005 Spring Peak (05G) were used to study the impact of the 21 MW transfer on the SPP system during the requested service period of 6/1/2004 to 6/1/2005. The Spring Peak models apply to April and May, the Summer Peak models apply to June through September, the Fall Peak models apply to October and November, and the Winter Peak models apply to December through March.

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 requested service period that were not already included in the January 2004 base case series models.

C. Transfer Analysis

Using the selected cases both with and without the requested transfer modeled, the PSS/E Activity ACCC was run on the cases and compared to determine the facility overloads caused or impacted by the transfer. The PSS/E options chosen to conduct the analysis can be found in Appendix A.

4. Study Results

A. Study Analysis Results

Tables 1 and 2 contain the steady-state analysis results of the System Impact Study. The Tables are in the attached workbook *SPP-2004-005-2 Tables*. The tables identify the seasonal case in which the event occurred, the facility control area location, applicable ratings of the overloaded facility, the loading percentage with and without the studied transfer, and the estimated ATC value using interpolation if calculated. Comments are provided in the tables to document any SPP or Non - SPP identification or assignment of the event, existing mitigations plans or criteria to disregard the event as a limiting constraint, upgrades and costs to mitigate a limiting constraint, or any specific study procedures associated with modeling an event.

Table 1 lists the SPP Facility Overloads caused or impacted by the 21 MW transfer. Solutions with engineering and construction costs are provided in the tables.

Table 2 lists overloads on first tier Non - SPP Regional Tariff participants' transmission systems caused or impacted by the 21 MW transfer. No Non – SPP facilities were identified.

Table 1a documents the modeling representation of the events identified in Table 1 to include bus numbers and bus names.

5. Conclusion

The SPS to KACY 21 MW transfer does not create any new overloads or additional impacts on facilities requiring upgrades. Therefore, the service will be accepted.

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

SPP-2004-005-2 Table 1 - SPP Facility Overloads
 Caused or Impacted by Redirect Path
 with Impact of Original Path Provided

Southwest Power Pool
 System Impact Study

Study Case	From Area	To Area	Monitored Branch Over 100% Rate B	Rate (MVA)	SPS to KACY BC % Loading	SPS to KACY TC % Loading	SPS to AMRN BC % Loading	SPS to AMRN TC % Loading	Outaged Branch Causing Overload	ATC (MW)	Solution	Estimated Cost
04SP	WERE	WERE	LAWRENCE HILL 230/115KV TRANSFORMER	308	109.2	109.5	109.2	109.4	LAWRENCE HILL TO MIDLAND JCT., 230KV	21	Westar Operating Procedure 901 - Outage of the Lawrence Hill-Midland Junction 230kV Line	
04SP	WERE	WERE	LAWRENCE HILL 230/115/13.8KV TRANSFORMER	308	109.2	109.4	109.2	109.2	MIDLAND JCT 230/115/118.0KV TRANSFORMER	21	Westar Operating Procedure 815 - Loss of the Midland Junction 230/115kV Transformer	
04SP	WERE	WERE	COUNTY LINE 115/69KV TRANSFORMER	66	105.7	106.0	105.7	105.9	HOYT TO STRANGER,345KV	21	Westar Operating Procedure 805 - Outage of the Hoyt to Stranger 345 kV line	
04SP	WERE	WERE	COUNTY LINE 115/69KV TRANSFORMER	66	105.7	105.8	105.7	105.7	STRANGER 345/115/14.4KV TRANSFORMER	21	Westar Operating Procedure 612 - Outage of the Stranger Creek 345/115kV Transformer	
04SP	WERE	WERE	LAWRENCE HILL 230/115KV TRANSFORMER	308	107.2	107.5	107.2	107.4	LAWRENCE HILL TO MIDLAND JCT., 230KV	21	Westar Operating Procedure 901 - Outage of the Lawrence Hill-Midland Junction 230kV Line	
04SP	WERE	WERE	LAWRENCE HILL 230/115/13.8KV TRANSFORMER	308	107.2	107.4	107.2	107.2	MIDLAND JCT 230/115/118.0KV TRANSFORMER	21	Westar Operating Procedure 615 - Loss of the Midland Junction 230/115kV Transformer	
04SH	WERE	WERE	AUBURN ROAD - JEFFREY ENERGY CENTER 230KV	565	104.0	104.2	104.0	104.1	HOYT - JEFFREY ENERGY CENTER 345KV	21	Westar Operating Procedure 400 - Outage of the Jeffrey Energy Center to Hoyt 345kV Line	
04FA	WERE	WERE	AUBURN ROAD - JEFFREY ENERGY CENTER 230KV	565	100.7	100.9	100.7	100.8	HOYT - JEFFREY ENERGY CENTER 345KV	21	Westar Operating Procedure 400 - Outage of the Jeffrey Energy Center to Hoyt 345kV Line	
04WP			NONE IDENTIFIED							21		
05AP			NONE IDENTIFIED							21		
05G			NONE IDENTIFIED							21		
Total Estimated Cost												\$0

SPP-2004-005-2 Table 2 - Non-SPP Facility Overloads
 Caused or Impacted by Redirect Path
 with Impact of Original Path Provided

Southwest Power Pool
 System Impact Study

Study Case	From Area	To Area	Monitored Branch Over 100% Rate B	Rate <MVA>	SPS to KACY BC % Loading	SPS to KACY TC % Loading	SPS to AMRN BC % Loading	SPS to AMRN TC % Loading	Outaged Branch Causing Overload	Comments
04SP			NONE IDENTIFIED							
04SH			NONE IDENTIFIED							
04FA			NONE IDENTIFIED							
04WP			NONE IDENTIFIED							
05AP			NONE IDENTIFIED							
05G			NONE IDENTIFIED							

Study Case	From Area	To Area	Monitored Branch Over 100% Rate B	Rate <MVA>	SPS to KACY BC % Loading	SPS to KACY TC % Loading	SPS to AMRN BC % Loading	SPS to AMRN TC % Loading	Outaged Branch Causing Overload	ATC (MW)	Solution	Estimated Cost
04SP	WERE	WERE	56853 LAWHILL6 230 WND 1 LAWHL29X 1	308	109.2	109.5	109.2	109.4	56853 LAWHILL6 230 to 56855 MIDLAND6 230 CKT 1	21	Westar Operating Procedure 901 - Outage of the Lawrence Hill-Midland Junction 230kV Line	
04SP	WERE	WERE	56853 LAWHILL6 230 WND 1 LAWHL29X 1	308	109.2	109.4	109.2	109.2	56855 MIDLAND6 230 to 57252 MIDLAND3 115 to 56884 MIDLAND118.0 CKT 1	21	Westar Operating Procedure 615 - Loss of the Midland Junction 230/115kV Transformer	
04SP	WERE	WERE	57153 COLINE 3 115 WND 1 COLINE5X 1	66	105.7	106.0	105.7	105.9	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	21	Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line	
04SP	WERE	WERE	57153 COLINE 3 115 WND 1 COLINE5X 1	66	105.7	105.8	105.7	105.7	56772 STRANGR7 345 to 57268 STRANGR3 115 to 56811 STRANGR114.4 CKT 1	21	Westar Operating Procedure 612 - Outage of the Stranger Creek 345/115kV Transformer	
04SP	WERE	WERE	57250 LWRNCHL3 115 WND 2 LAWHL29X 1	308	107.2	107.5	107.2	107.4	56853 LAWHILL6 230 to 56855 MIDLAND6 230 CKT 1	21	Westar Operating Procedure 901 - Outage of the Lawrence Hill-Midland Junction 230kV Line	
04SP	WERE	WERE	57250 LWRNCHL3 115 WND 2 LAWHL29X 1	308	107.2	107.4	107.2	107.2	56855 MIDLAND6 230 to 57252 MIDLAND3 115 to 56884 MIDLAND118.0 CKT 1	21	Westar Operating Procedure 615 - Loss of the Midland Junction 230/115kV Transformer	
04SH	WERE	WERE	56852 JEC 6 230 to 56851 AUBURN 6 230 CKT 1	565	104.0	104.2	104.0	104.1	56765 HOYT 7 345 to 56766 JEC N 7 345 CKT 1	21	Westar Operating Procedure 400 - Outage of the Jeffrey Energy Center to Hoyt 345kV Line	
04FA	WERE	WERE	56852 JEC 6 230 to 56851 AUBURN 6 230 CKT 1	565	100.7	100.9	100.7	100.8	56765 HOYT 7 345 to 56766 JEC N 7 345 CKT 1	21	Westar Operating Procedure 400 - Outage of the Jeffrey Energy Center to Hoyt 345kV Line	
04WP			NONE IDENTIFIED							21		
05AP			NONE IDENTIFIED							21		
05G			NONE IDENTIFIED							21		
											Total Estimated Cost	\$0