



SPP *Southwest Power Pool*

*System Impact Study
SPP-2004-030-1
For The Designation of a New
Network Resource
Requested By
Empire District Electric Company*

*For a Reserved Amount of 150 MW
From 6/1/2005
To 6/1/2025*

SPP Engineering, Tariff Studies

Table of Contents

1. EXECUTIVE SUMMARY	3
2. INTRODUCTION	4
3. STUDY METHODOLOGY.....	5
A. DESCRIPTION.....	5
B. MODEL UPDATES.....	5
C. TRANSFER ANALYSIS	5
D. UPGRADE ANALYSIS.....	5
4. STUDY RESULTS	6
A. STUDY ANALYSIS RESULTS.....	6
5. CONCLUSION.....	7
APPENDIX A	8

ATTACHMENT: *SPP-2004-030-1 Tables*

1. Executive Summary

Empire District Electric Company has requested a system impact study to designate a New Network Resource in the Western Farmers Control Area for 150 MW to serve EDE Network Load in the EDE Control Area. The period of the service requested is from 6/1/2005 to 6/1/2025. The request is for OASIS reservation numbers 652342, 652345, and 652348.

The principal objective of this study is to identify system problems and potential system modifications necessary to facilitate the additional 150 MW request while maintaining system reliability.

The service was modeled from the source in WFEC to EDE load. The new source location causes new facility overloads on the SPP and Non-SPP transmission system, as well as increasing the loading on previously overloaded facilities. Tables 1.1 and 2.1 summarize the results of the system impact analyses for the new source location for Scenario 1. Table 1.1 lists SPP facility overloads identified. Table 2.1 lists Non-SPP facility overloads identified. Tables 1.2 and 2.2 summarize the results of the system impact analyses for the new source location for Scenario 2. Table 1.2 lists SPP facility overloads identified. Table 2.2 lists Non-SPP facility overloads identified.

The WFEC to EDE request was studied independently of the WR to EDE request for 150MW with higher priority in the SPP OASIS queue. If it is decided that both requests for service are needed, the WFEC to EDE transfer will be reevaluated with the WR to EDE request in the study cases.

The study results of the WFEC to EDE request show that limiting constraints exist. Due to the limiting constraints identified, the Transmission Service Requests cannot be granted. Any solutions, upgrades, and costs provided in the System Impact Study are planning estimates only. The final ATC and upgrades required may vary from these results due to unknown facility upgrades and proposed transmission plans that will be identified during the facility study process.

Facilities were identified that limit the ATC to 0MW for the 2005 Summer and 2005 Winter cases. For some facilities, expediting the upgrade is not possible to accommodate the requested start date for the WFEC to EDE service. SPP will review the possibility of curtailment of previously confirmed service and/or the redispatch of units as an option for relieving the additional impacts on this facility. This option will be evaluated as part of the Facility Study. If no redispatch or curtailment of service option is identified for the facilities with an ATC of 0MW, the start date of the requested service may be delayed until the upgrade of the limiting facility is completed. The final ATC, upgrade solutions, cost assignments, complete evaluation of renewal rights, and available redispatch and curtailment options will be determined upon the completion of the facility study.

2. Introduction

Empire District Electric Company has requested a system impact study to designate a New Network Resource in the WFEC Control Area for 150 MW to serve EDE Network Load in the EDE Control Area. The principal objective of this study is to identify the restraints on the SPP Regional Tariff System that may limit the requested service.

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 150 MW requests on transmission line loading and transmission bus voltages for system intact and system 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 150 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.

The contingency set includes all SPP facilities 69kV and above, SPP First Tier facilities 115 kV and above, and any defined contingencies for these areas. The monitor elements include all SPP and first tier Non-SPP facilities 69 kV and above.

B. Model Updates

SPP used ten seasonal models to study the WFEC to EDE 150 MW transfer for the requested service period. The SPP 2004 Series Cases 2005 April Minimum (05AP), 2005 Spring Peak (05G), 2005 Summer Peak (05SP), 2005 Summer Shoulder (05SH), 2005 Fall Peak (05FA), 2005/06 Winter Peak (05WP), 2007 Summer Peak (07SP), 2007/08 Winter Peak (07WP), 2010 Summer Peak (10SP), and 2010/11 Winter Peak (10WP) were used to study the impact of 150 MW transfer on the system during the requested service period of 6/1/2005 to 6/1/2025.

The chosen base case models were modified to reflect the most current modeling information. The cases were modified to reflect firm transfers during the requested service period that were not already included in the SPP 2004 Series Cases. From the eleven seasonal models, two system scenarios were developed. Scenario 1 includes confirmed West to East transfers not already included in the January 2004 base case series models, SPS exporting, and the Lamar HVDC Tie flowing from SPS to Lamar, and ERCOT exporting. Scenario 2 includes confirmed East to West transfers not already included in the January 2004 base case series models, SPS importing, and the Lamar HVDC Tie flowing from Lamar to SPS, and ERCOT importing.

C. Transfer Analysis

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

D. Upgrade Analysis

This system impact study does not include analysis with the assigned upgrades modeled. To determine the final cost and possible start date of the requested service, additional analysis will be performed to determine the impact of modeling the assigned upgrades for the request.

4. Study Results

A. Study Analysis Results

Tables 1.1, 2.1, 1.2, and 2.2 contain the steady-state analysis results of the System Impact Study. The Tables are in the attached workbook *SPP-2004-030-1 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 150 MW transfer, and the estimated ATC value 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 1.1 lists the SPP Facility Overloads caused or impacted by the 150 MW transfer for Scenario 1. Solutions with engineering and construction costs are provided in the tables.

Tables 2.1 lists overloads on first tier Non - SPP Regional Tariff participants' transmission systems caused or impacted by the 150 MW transfer for Scenario 1.

Table 1.2 lists the SPP Facility Overloads caused or impacted by the 150 MW transfer for Scenario 2. Solutions with engineering and construction costs are provided in the tables.

Tables 2.2 lists overloads on first tier Non - SPP Regional Tariff participants' transmission systems caused or impacted by the 150 MW transfer for Scenario 2.

Tables 1.1a and 1.2a document the modeling representation of the events identified in Tables 1.1 and 1.2 respectively to include bus numbers and bus names.

5. Conclusion

The study results of the WFEC to EDE request show that limiting constraints exist. Due to the limiting constraints identified, the Transmission Service Requests cannot be granted. Any solutions, upgrades, and costs provided in the System Impact Study are planning estimates only. The final ATC and upgrades required may vary from these results due to unknown facility upgrades and proposed transmission plans that will be identified during the facility study process.

Facilities were identified that limit the ATC to 0MW for the 2005 Summer and 2005 Winter cases. For some facilities, expediting the upgrade is not possible to accommodate the requested start date for the WFEC to EDE service. SPP will review the possibility of curtailment of previously confirmed service and/or the redispatch of units as an option for relieving the additional impacts on this facility. This option will be evaluated as part of the Facility Study. If no redispatch or curtailment of service option is identified for the facilities with an ATC of 0MW, the start date of the requested service may be delayed until the upgrade of the limiting facility is completed. The final ATC, upgrade solutions, cost assignments, complete evaluation of renewal rights, and available redispatch and curtailment options will be determined upon the completion of the 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 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-2004-001-1 Scenario 1
 Table 1.1 - SPP Facility Overloads Caused or Impacted
 by 150 MW Transfer

Southwest Power Pool
 System Impact Study

Study Case	From Area	To Area	Monitored Branch Over 100% Rate B	Rate <MVA>	BC % Loading	TC % Loading	Outaged Branch Causing Overload	ATC (MW)	Solution	Estimated Cost
05AP	WFEC	WFEC	CARTER JCT - DILL JCT 69KV	26	97.8	117.2	ELK CITY - MOREWOOD SW 138KV	17	Current WFEC Work Plan to Reconnector from 410 to 795 - Complete by 2004 Winter	
06G	WFEC	WFEC	CARTER JCT - DILL JCT 69KV	26	95.6	115.3	ELK CITY - MOREWOOD SW 138KV	34	See Previous Upgrade Specified for Facility	
06G	AEPW	WFEC	CLINTON - CLINTON 138KV	143	1.4	100.6	WEATHERFORD - WEATHERFORD 138KV	149	Solution Undetermined	
05SH	AEPW	AEPW	CHAMBER SPRINGS - TONTITOWN 161KV	244	115.2	118.3	CHAMBER SPRINGS - FARMINGTON AEOC 161KV	0	AEPW Upgrade Schedule Completion Date 6/1/2007	
05SH	AEPW	AEPW	CHAMBER SPRINGS - TONTITOWN 161KV	244	107.4	109.7	FLINT CREEK - TONTITOWN 161KV	0	AEPW Upgrade Schedule Completion Date 6/1/2007	
05SH	AEPW	AEPW	CHAMBER SPRINGS - TONTITOWN 161KV	244	103.5	106.6	FARMINGTON AEOC - SOUTH FAYETTEVILLE 161KV	0	AEPW Upgrade Schedule Completion Date 6/1/2007	
05SH	AEPW	WFEC	ELK CITY - ELK CITY 69KV	39	89.5	102.7	CLINTO AIR FORCE BASE TAP - ELK CITY 138KV	120	WFEC Upgrade Estimated In-Service Date 12/2005	
05SH	AEPW	WFEC	ELK CITY - ELK CITY 69KV	39	88.4	101.4	CLINTO AIR FORCE BASE TAP - HOBART JUNCTION 138KV	134	WFEC Upgrade Estimated In-Service Date 12/2005	
05SP	SWPA	AEOC	BATTLEFIELD - SPRINGFIELD 69KV	36	93.9	106.4	NIXA #1 - SPRINGFIELD 161KV	73	Solution Undetermined	
05SP	SWPA	SPRM	BROOKLINE - SPRINGFIELD 161KV	319	97.0	100.5	BROOKLINE - JUNCTION 161KV	130	Replace disconnect switches at Springfield. Upgrade assigned to SPP-2003-253. Estimated In-Service Date 6/1/2007.	
05SP	AEPW	AEPW	CHAMBER SPRINGS - TONTITOWN 161KV	244	137.7	140.7	CHAMBER SPRINGS - FARMINGTON AEOC 161KV	0	AEPW Upgrade Schedule Completion Date 6/1/2007	
05SP	AEPW	AEPW	CHAMBER SPRINGS - TONTITOWN 161KV	244	128.2	130.8	FLINT CREEK - TONTITOWN 161KV	0	AEPW Upgrade Schedule Completion Date 6/1/2007	
05SP	AEPW	AEPW	CHAMBER SPRINGS - TONTITOWN 161KV	244	123.3	126.4	FARMINGTON AEOC - SOUTH FAYETTEVILLE 161KV	0	AEPW Upgrade Schedule Completion Date 6/1/2007	
05SP	AEPW	AEPW	CHAMBER SPRINGS - TONTITOWN 161KV	244	103.9	106.7	FLINT CREEK - GENTRY REC 161KV	0	AEPW Upgrade Schedule Completion Date 6/1/2007	
05SP	AEPW	AEPW	CHAMBER SPRINGS - TONTITOWN 161KV	244	103.1	105.8	EAST CENTERION - GENTRY REC 161KV	0	AEPW Upgrade Schedule Completion Date 6/1/2007	
05SP	AEPW	WFEC	ELK CITY - ELK CITY 69KV	39	85.9	108.9	CLINTO AIR FORCE BASE TAP - ELK CITY 138KV	47	WFEC Upgrade Estimated In-Service Date 12/2005	
05SP	AEPW	WFEC	ELK CITY - ELK CITY 69KV	39	94.3	107.4	CLINTO AIR FORCE BASE TAP - HOBART JUNCTION 138KV	65	WFEC Upgrade Estimated In-Service Date 12/2005	
05SP	AEPW	WFEC	ELK CITY - ELK CITY 69KV	36	86.0	102.0	BASE CASE		WFEC Upgrade Estimated In-Service Date 12/2005	
05SP	AEPW	AEPW	FLINT CREEK - GENTRY REC 161KV	353	100.0	101.3	LOWELL - TONTITOWN 161KV	0	AEPW Upgrade Schedule Completion Date 6/1/2007	
05WP	AEPW	AEPW	CHAMBER SPRINGS - TONTITOWN 161KV	275	102.9	105.8	CHAMBER SPRINGS - FARMINGTON AEOC 161KV	0	AEPW Upgrade Schedule Completion Date 6/1/2007	
05WP	AEPW	WFEC	CLINTON - CLINTON 138KV	143	0.9	101.1	WEATHERFORD - WEATHERFORD 138KV	148	Solution Undetermined	
05WP	AEPW	WFEC	ELK CITY - ELK CITY 69KV	39	88.8	103.5	ELK CITY - MOREWOOD SW 138KV	114	WFEC Upgrade Estimated In-Service Date 12/2005	
07SP	SWPA	ENTR	BULL SHOALS - BULL SHOALS HES 161KV	176	106.8	109.4	EUREKA SPRINGS - OSAGE CREEK (AEOC) 161KV	0	Rebuild buswork	\$ 500,000
07SP	AEPW	WFEC	ELK CITY - ELK CITY 69KV	39	96.0	111.4	CLINTO AIR FORCE BASE TAP - ELK CITY 138KV	23	WFEC Upgrade Estimated In-Service Date 12/2005	
07SP	AEPW	WFEC	ELK CITY - ELK CITY 69KV	39	96.3	109.7	CLINTO AIR FORCE BASE TAP - HOBART JUNCTION 138KV	41	WFEC Upgrade Estimated In-Service Date 12/2005	
07SP	AEPW	WFEC	ELK CITY - ELK CITY 69KV	36	87.8	104.2	BASE CASE		WFEC Upgrade Estimated In-Service Date 12/2005	
07SP	AEPW	WFEC	ELK CITY - ELK CITY 69KV	39	88.0	101.2	WEATHERFORD JCT - WEATHERFORD SOUTHEAST 138KV	138	WFEC Upgrade Estimated In-Service Date 12/2005	
07SP	AEPW	WFEC	ELK CITY - ELK CITY 69KV	39	84.3	100.9	HYDRO - WEATHERFORD 138KV	142	WFEC Upgrade Estimated In-Service Date 12/2005	
07SP	AEPW	WFEC	ELK CITY - ELK CITY 69KV	39	83.6	100.1	HYDRO - SICKLES 138KV	149	WFEC Upgrade Estimated In-Service Date 12/2005	
07WP	AEPW	WFEC	CLINTON - CLINTON 138KV	143	0.9	100.3	WEATHERFORD - WEATHERFORD 138KV	149	Solution Undetermined	
10SP	SWPA	ENTR	BULL SHOALS - BULL SHOALS HES 161KV	176	137.7	141.4	EUREKA SPRINGS - OSAGE CREEK (AEOC) 161KV	0	See Previous Upgrade Specified for Facility	
10SP	AEPW	AEPW	CHAMBER SPRINGS - TONTITOWN 161KV	244	99.5	101.7	TONTITOWN 345/161/138KV TRANSFORMER	31	New overload after completion of AEPW upgrades in area - Rebuild 12 miles with 2156 ACSR	\$ 7,200,000
10SP	AEPW	AEPW	CHAMBER SPRINGS - TONTITOWN 161KV	244	99.5	101.7	CHAMBER SPRINGS - TONTITOWN 345KV	34	See Previous Upgrade Specified for Facility	
10SP	OKGE	AEPW	FIXICO TAP - MAUD 138KV	107	95.8	100.4	FRANKLIN - FRANKLIN SW 138KV	138	Rebuild 11.83 miles of 3/0 shielded Copperweld with 795 ACSR.	\$ 3,305,000
10SP	OKGE	OKGE	PECAN CREEK 345/161KV TRANSFORMER	370	100.0	101.3	CLARKSVILLE - MUSKOGEE 345KV		Add 2nd 345/161 KV 369MVA transformer	\$ 3,000,000
10SP	EMDE	EMDE	SUB 217 - FAIRPLAY EAST - SUB 368 - DADEVILLE EAST 69KV	39	87.2	100.7	SUB 368 - DADEVILLE EAST - SUB 431 - BOLIVAR SOUTH 161KV	142	Solution Undetermined	
10SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST - SUB EXPLORER SPRING CITY TAP 69KV	39	87.7	102.1	SUB 184 - NEOSHO SOUTH JCT - SUB 314 - NEOSHO LINDE 69KV	128	Excluded due to EMDE Mitigation Plan	
									Total Estimated Cost	\$ 14,005,000

SPP-2004-001-1 Scenario 1
 Table 2.1 - Non-SPP Facility Overloads Caused or Impacted
 by 150 MW Transfer

Southwest Power Pool
 System Impact Study

Study Case	From Area	To Area	Monitored Branch Over 100% Rate B	Rate <MVA>	BC % Loading	TC % Loading	Outaged Branch Causing Overload	Comments
05SH	AECI	AECI	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV113.8 CKT 1	56	98.1	106.6	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV213.8 CKT 2	
05SH	AECI	AECI	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV213.8 CKT 2	56	101.7	110.4	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV113.8 CKT 1	
05SP	AECI	AECI	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV113.8 CKT 1	56	104.5	113.4	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV213.8 CKT 2	
05SP	AECI	AECI	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV213.8 CKT 2	56	108.3	117.5	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV113.8 CKT 1	
05SP	SWPA	AECI	52694 SPRGFLD2 69 to 96661 2BTLFD 69 CKT 1	36	93.9	106.4	52692 SPRGFLD5 161 to 96678 5NIXA-1 161 CKT 1	Solution Undetermined
05FA	AECI	AECI	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV113.8 CKT 1	56	92.7	101.4	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV213.8 CKT 2	
05FA	AECI	AECI	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV213.8 CKT 2	56	96.0	105.1	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV113.8 CKT 1	
05WP	AECI	AECI	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV113.8 CKT 1	56	104.2	113.5	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV213.8 CKT 2	
05WP	AECI	AECI	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV213.8 CKT 2	56	107.9	117.6	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV113.8 CKT 1	
07SP	AECI	AECI	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV113.8 CKT 1	56	117.6	128.3	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV213.8 CKT 2	
07SP	AECI	AECI	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV213.8 CKT 2	56	121.0	131.9	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV113.8 CKT 1	
07SP	SWPA	ENTR	52660 BULL SH5 161 to 99802 5BULLSH* 161 CKT 1	176	106.8	109.4	53136 EUREKA 5 161 to 99832 5OSAGE # 161 CKT 1	SWPA Upgrade Required
07SP	ENTR	ENTR	99802 5BULLSH* 161 to 99809 5FLIPN 161 CKT 1	162	112.4	115.2	53136 EUREKA 5 161 to 99832 5OSAGE # 161 CKT 1	Will be alleviated due to Entergy upgrades
07SP	ENTR	ENTR	99809 5FLIPN 161 to 99837 5SUMMIT 161 CKT 1	162	103.3	106.1	53136 EUREKA 5 161 to 99832 5OSAGE # 161 CKT 1	Will be alleviated due to Entergy upgrades
07WP	AECI	AECI	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV113.8 CKT 1	56	113.9	125.1	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV213.8 CKT 2	
07WP	AECI	AECI	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV213.8 CKT 2	56	117.2	128.7	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV113.8 CKT 1	
10SP	AECI	AECI	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV113.8 CKT 1	56	124.0	134.1	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV213.8 CKT 2	
10SP	AECI	AECI	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV213.8 CKT 2	56	127.5	137.8	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV113.8 CKT 1	
10SP	AECI	AECI	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV213.8 CKT 2	56	92.1	100.4	59478 DAD368 5 161 to 96101 5MORGAN 161 CKT 1	
10SP	AECI	AECI	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV213.8 CKT 2	56	91.9	100.3	59478 DAD368 5 161 to 59493 BOL431 5 161 CKT 1	
10SP	SWPA	ENTR	52660 BULL SH5 161 to 99802 5BULLSH* 161 CKT 1	176	137.7	141.4	53136 EUREKA 5 161 to 99832 5OSAGE # 161 CKT 1	SWPA Upgrade Required
10SP	ENTR	ENTR	99797 5HARR-S 161 to 99811 5HARR-E 161 CKT 1	223	153.6	156.6	53136 EUREKA 5 161 to 99832 5OSAGE # 161 CKT 1	Will be alleviated due to Entergy upgrades
10SP	ENTR	ENTR	99797 5HARR-S 161 to 99812 5HARR-W 161 CKT 1	223	144.6	147.5	53136 EUREKA 5 161 to 99832 5OSAGE # 161 CKT 1	Will be alleviated due to Entergy upgrades
10SP	ENTR	ENTR	99802 5BULLSH* 161 to 99809 5FLIPN 161 CKT 1	162	145.7	149.8	53136 EUREKA 5 161 to 99832 5OSAGE # 161 CKT 1	Will be alleviated due to Entergy upgrades
10SP	ENTR	ENTR	99802 5BULLSH* 161 to 99809 5FLIPN 161 CKT 1	162	98.9	102.2	52680 BEAVER 5 161 to 53136 EUREKA 5 161 CKT 1	Will be alleviated due to Entergy upgrades
10SP	ENTR	ENTR	99802 5BULLSH* 161 to 99809 5FLIPN 161 CKT 1	162	97.8	101.9	99519 5QUITMN 161 to 99799 5BEE BR 161 CKT 1	Will be alleviated due to Entergy upgrades
10SP	ENTR	ENTR	99809 5FLIPN 161 to 99837 5SUMMIT 161 CKT 1	162	134.9	138.9	53136 EUREKA 5 161 to 99832 5OSAGE # 161 CKT 1	Will be alleviated due to Entergy upgrades
10SP	ENTR	ENTR	99810 5GR FOR 161 to 99812 5HARR-W 161 CKT 1	223	112.3	114.6	53136 EUREKA 5 161 to 99832 5OSAGE # 161 CKT 1	Will be alleviated due to Entergy upgrades
10SP	ENTR	ENTR	99811 5HARR-E 161 to 99837 5SUMMIT 161 CKT 1	162	122.5	126.3	53136 EUREKA 5 161 to 99832 5OSAGE # 161 CKT 1	Will be alleviated due to Entergy upgrades
10WP	AECI	AECI	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV113.8 CKT 1	56	114.2	125.3	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV213.8 CKT 2	
10WP	AECI	AECI	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV213.8 CKT 2	56	117.4	128.9	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV113.8 CKT 1	

Study Case	From Area	To Area	Rate -MVA-	BC % Loading	TC % Loading	Outaged Branch Causing Overload	ATC (MW)	Solution	Estimated Cost
						Monitored Branch Over 100% Rate B			
05SH	AEPW	AEPW	244	97.8	103.7	CHAMBER SPRINGS - FARMINGTON AECC 161KV	116	AEPW Upgrade Schedule Completion Date 6/1/2007	
05SP	SWFA	ENTR	167	100.8	104.5	BEE BRANCH (AECC) - QUITMAN 161KV	0	Rebuild buswork - Identified for Scenario 1	
05SP	SWFA	ENTR	167	98.0	101.6	BEE BRANCH (AECC) - CLINTON 161KV	83	See Previous Upgrade Specified for Facility	
05SP	AEPW	AEPW	244	120.3	123.4	CHAMBER SPRINGS - FARMINGTON AECC 161KV	0	AEPW Upgrade Schedule Completion Date 6/1/2007	
05SP	AEPW	AEPW	244	114.8	117.2	FLINT CREEK - TONITTOWN 161KV	0	AEPW Upgrade Schedule Completion Date 6/1/2007	
05SP	AEPW	AEPW	244	105.8	108.9	FARMINGTON AECC - SOUTH FAYETTEVILLE 161KV	0	AEPW Upgrade Schedule Completion Date 6/1/2007	
05SP	AEPW	WFEC	143	1.0	100.0	WEATHERFORD - WEATHERFORD 138KV	150	Solution Undetermined	
05WP	SWFA	AECI	36	90.5	103.1	NIXA #1 - SPRINGFIELD 161KV	113	Solution Undetermined	
07SP	SWFA	ENTR	176	112.3	115.0	EUREKA SPRINGS - OSAGE CREEK (AECC) 161KV	0	See Previous Upgrade Specified for Facility	
07SP	SWFA	ENTR	176	97.7	101.2	BEE BRANCH (AECC) - QUITMAN 161KV	99	See Previous Upgrade Specified for Facility	
07SP	AEPW	WFEC	143	1.0	100.2	WEATHERFORD - WEATHERFORD 138KV	150	Solution Undetermined	
10SP	SWFA	ENTR	176	142.3	146.5	EUREKA SPRINGS - OSAGE CREEK (AECC) 161KV	0	See Previous Upgrade Specified for Facility	
10SP	SWFA	ENTR	176	113.7	117.3	BEE BRANCH (AECC) - QUITMAN 161KV	0	See Previous Upgrade Specified for Facility	
10SP	SWFA	ENTR	176	110.4	114.1	BEE BRANCH (AECC) - CLINTON 161KV	0	See Previous Upgrade Specified for Facility	
10SP	SWFA	ENTR	176	107.7	111.3	CLINTON - CLINTON WEST (AECC) 161KV	0	See Previous Upgrade Specified for Facility	
10SP	SWFA	ENTR	176	102.3	105.5	BEAVER - EUREKA SPRINGS 161KV	0	See Previous Upgrade Specified for Facility	
10SP	SWFA	ENTR	176	100.5	103.4	SUB 438 - RIVERSIDE - TABLE ROCK 161KV	0	See Previous Upgrade Specified for Facility	
10SP	SWFA	ENTR	176	96.8	100.6	BULL SHOALS - LEAD HILL 161KV	125	See Previous Upgrade Specified for Facility	
10SP	SWFA	ENTR	176	97.0	100.5	AECC BOTKINBURG - CLINTON WEST (AECC) 161KV	127	See Previous Upgrade Specified for Facility	
10SP	WFEC	AEPW	143	37.6	102.8	OKLAUNION - TUCCO INTERCHANGE 345KV	144	Solution Undetermined	
10SP	WFEC	AEPW	143	37.2	101.0	TUCCO INTERCHANGE 345/230KV TRANSFORMER	148	Solution Undetermined	
10SP	WFEC	AEPW	143	37.2	100.9	CARNEGIE - FORT COBB 138KV	148	Solution Undetermined	
10SP	WFEC	AEPW	143	35.6	100.5	OKLAUNION - LAWTON EASTSIDE 345KV	149	Solution Undetermined	
10SP	WFEC	AEPW	143	36.6	100.3	OKLAUNION - OKLAUNION 345KV	149	Solution Undetermined	
10SP	EMDE	SWPA	157	96.6	103.3	FLINT CREEK - SUB 392 - DECATUR SOUTH 161KV	75	Rebuild 161 KV line from 336 ACSR to 795 ACSR and replace terminal equipment	\$ 800,000
10SP	EMDE	EMDE	39	87.7	100.5	SUB 368 - DADEVILLE EAST - SUB 431 - BOLIVAR SOUTH 161KV	144	Solution Undetermined	
10SP	EMDE	EMDE	39	87.4	101.8	SUB 184 - NEOSHO SOUTH JCT. - SUB 314 - NEOSHO LINDE 69KV	131	Excluded due to EMDE Mitigation Plan	
								Total Estimated Cost	\$ 800,000

SPP-2004-001-1 Scenario 2
 Table 2.2 - Non-SPP Facility Overloads Caused or Impacted
 by 150 MW Transfer

Southwest Power Pool
 System Impact Study

Study Case	From Area	To Area	Monitored Branch Over 100% Rate B	Rate <MVA>	BC % Loading	TC % Loading	Outaged Branch Causing Overload	Comments
05SH	AECI	AECI	96089 5JAMESV 161 WND 2 JAMESV1 1	56	98.0	106.6	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV213.8 CKT 2	
05SH	AECI	AECI	96089 5JAMESV 161 WND 2 JAMESV2 2	56	101.6	110.5	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV113.8 CKT 1	
05SP	AECI	AECI	96089 5JAMESV 161 WND 2 JAMESV1 1	56	104.7	113.7	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV213.8 CKT 2	
05SP	AECI	AECI	96089 5JAMESV 161 WND 2 JAMESV2 2	56	108.5	117.7	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV113.8 CKT 1	
05SP	SWPA	ENTR	52660 BULL SH5 161 to 99802 5BULLSH* 161 CKT 1	167	100.8	104.5	99519 5QUITMN 161 to 99799 5BEE BR 161 CKT 1	SWPA Upgrade Required
05SP	SWPA	ENTR	52660 BULL SH5 161 to 99802 5BULLSH* 161 CKT 1	167	98.0	101.6	99799 5BEE BR 161 to 99807 5CLINTN 161 CKT 1	SWPA Upgrade Required
05SP	ENTR	ENTR	99802 5BULLSH* 161 to 99809 5FLIPN 161 CKT 1	162	100.5	104.3	99519 5QUITMN 161 to 99799 5BEE BR 161 CKT 1	Will be alleviated due to Entergy upgrades
05SP	ENTR	ENTR	99802 5BULLSH* 161 to 99809 5FLIPN 161 CKT 1	162	97.6	101.3	99799 5BEE BR 161 to 99807 5CLINTN 161 CKT 1	Will be alleviated due to Entergy upgrades
05FA	AECI	AECI	96089 5JAMESV 161 WND 2 JAMESV1 1	56	92.3	101.2	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV213.8 CKT 2	
05FA	AECI	AECI	96089 5JAMESV 161 WND 2 JAMESV2 2	56	95.6	104.8	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV113.8 CKT 1	
05WP	AECI	AECI	96089 5JAMESV 161 WND 2 JAMESV1 1	56	104.2	113.8	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV213.8 CKT 2	
05WP	AECI	AECI	96089 5JAMESV 161 WND 2 JAMESV2 2	56	108.0	117.9	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV113.8 CKT 1	
05WP	SWPA	AECI	52694 SPRGFLD2 69 to 96661 2BTLFD 69 CKT 1	36	90.5	103.1	52692 SPRGFLD5 161 to 96678 5NIXA-1 161 CKT 1	Solution Undetermined
07SP	AECI	AECI	96089 5JAMESV 161 WND 2 JAMESV1 1	56	115.6	126.3	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV213.8 CKT 2	
07SP	AECI	AECI	96089 5JAMESV 161 WND 2 JAMESV2 2	56	118.9	129.8	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV113.8 CKT 1	
07SP	SWPA	ENTR	52660 BULL SH5 161 to 99802 5BULLSH* 161 CKT 1	176	112.3	115.0	53136 EUREKA 5 161 to 99832 5OSAGE # 161 CKT 1	SWPA Upgrade Required
07SP	SWPA	ENTR	52660 BULL SH5 161 to 99802 5BULLSH* 161 CKT 1	176	97.7	101.2	99519 5QUITMN 161 to 99799 5BEE BR 161 CKT 1	SWPA Upgrade Required
07SP	ENTR	ENTR	99802 5BULLSH* 161 to 99809 5FLIPN 161 CKT 1	162	118.4	121.3	53136 EUREKA 5 161 to 99832 5OSAGE # 161 CKT 1	Will be alleviated due to Entergy upgrades
07SP	ENTR	ENTR	99802 5BULLSH* 161 to 99809 5FLIPN 161 CKT 1	162	102.6	106.4	99519 5QUITMN 161 to 99799 5BEE BR 161 CKT 1	Will be alleviated due to Entergy upgrades
07SP	ENTR	ENTR	99802 5BULLSH* 161 to 99809 5FLIPN 161 CKT 1	162	99.6	103.4	99799 5BEE BR 161 to 99807 5CLINTN 161 CKT 1	Will be alleviated due to Entergy upgrades
07SP	ENTR	ENTR	99809 5FLIPN 161 to 99837 5SUMMIT 161 CKT 1	162	109.4	112.2	53136 EUREKA 5 161 to 99832 5OSAGE # 161 CKT 1	Will be alleviated due to Entergy upgrades
07WP	AECI	AECI	96089 5JAMESV 161 WND 2 JAMESV1 1	56	112.1	123.5	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV213.8 CKT 2	
07WP	AECI	AECI	96089 5JAMESV 161 WND 2 JAMESV2 2	56	113.5	126.9	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV113.8 CKT 1	
10SP	AECI	AECI	96089 5JAMESV 161 WND 2 JAMESV1 1	56	122.5	132.9	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV213.8 CKT 2	
10SP	AECI	AECI	96089 5JAMESV 161 WND 2 JAMESV2 2	56	125.8	136.6	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV113.8 CKT 1	
10SP	AECI	AECI	96089 5JAMESV 161 WND 2 JAMESV2 2	56	92.7	101.2	59478 DAD368 5 161 to 96101 5MORGAN 161 CKT 1	
10SP	SWPA	ENTR	52660 BULL SH5 161 to 99802 5BULLSH* 161 CKT 1	176	142.3	146.5	53136 EUREKA 5 161 to 99832 5OSAGE # 161 CKT 1	SWPA Upgrade Required
10SP	SWPA	ENTR	52660 BULL SH5 161 to 99802 5BULLSH* 161 CKT 1	176	113.7	117.3	99519 5QUITMN 161 to 99799 5BEE BR 161 CKT 1	SWPA Upgrade Required
10SP	SWPA	ENTR	52660 BULL SH5 161 to 99802 5BULLSH* 161 CKT 1	176	110.4	114.1	99799 5BEE BR 161 to 99807 5CLINTN 161 CKT 1	SWPA Upgrade Required
10SP	ENTR	ENTR	99519 5QUITMN 161 to 99799 5BEE BR 161 CKT 1	167	97.8	101.9	53136 EUREKA 5 161 to 99832 5OSAGE # 161 CKT 1	Will be alleviated due to Entergy upgrades
10SP	ENTR	ENTR	99797 5HARR-S 161 to 99811 5HARR-E 161 CKT 1	223	152.3	156.3	53136 EUREKA 5 161 to 99832 5OSAGE # 161 CKT 1	Will be alleviated due to Entergy upgrades
10SP	ENTR	ENTR	99797 5HARR-S 161 to 99812 5HARR-W 161 CKT 1	223	143.4	147.2	53136 EUREKA 5 161 to 99832 5OSAGE # 161 CKT 1	Will be alleviated due to Entergy upgrades
10SP	ENTR	ENTR	99802 5BULLSH* 161 to 99809 5FLIPN 161 CKT 1	162	150.7	155.2	53136 EUREKA 5 161 to 99832 5OSAGE # 161 CKT 1	Will be alleviated due to Entergy upgrades
10SP	ENTR	ENTR	99802 5BULLSH* 161 to 99809 5FLIPN 161 CKT 1	162	119.8	123.8	99519 5QUITMN 161 to 99799 5BEE BR 161 CKT 1	Will be alleviated due to Entergy upgrades
10SP	ENTR	ENTR	99802 5BULLSH* 161 to 99809 5FLIPN 161 CKT 1	162	116.2	120.2	99799 5BEE BR 161 to 99807 5CLINTN 161 CKT 1	Will be alleviated due to Entergy upgrades
10SP	ENTR	ENTR	99809 5FLIPN 161 to 99837 5SUMMIT 161 CKT 1	162	139.8	144.3	53136 EUREKA 5 161 to 99832 5OSAGE # 161 CKT 1	Will be alleviated due to Entergy upgrades
10SP	ENTR	ENTR	99809 5FLIPN 161 to 99837 5SUMMIT 161 CKT 1	162	109.8	113.7	99519 5QUITMN 161 to 99799 5BEE BR 161 CKT 1	Will be alleviated due to Entergy upgrades
10SP	ENTR	ENTR	99809 5FLIPN 161 to 99837 5SUMMIT 161 CKT 1	162	106.3	110.3	99799 5BEE BR 161 to 99807 5CLINTN 161 CKT 1	Will be alleviated due to Entergy upgrades
10SP	ENTR	ENTR	99810 5GR FOR 161 to 99812 5HARR-W 161 CKT 1	223	111.2	114.4	53136 EUREKA 5 161 to 99832 5OSAGE # 161 CKT 1	Will be alleviated due to Entergy upgrades
10SP	ENTR	ENTR	99811 5HARR-E 161 to 99837 5SUMMIT 161 CKT 1	162	127.3	131.6	53136 EUREKA 5 161 to 99832 5OSAGE # 161 CKT 1	Will be alleviated due to Entergy upgrades
10SP	ENTR	ENTR	99811 5HARR-E 161 to 99837 5SUMMIT 161 CKT 1	162	98.2	102.0	99519 5QUITMN 161 to 99799 5BEE BR 161 CKT 1	Will be alleviated due to Entergy upgrades
10WP	AECI	AECI	96089 5JAMESV 161 WND 2 JAMESV1 1	56	112.5	123.5	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV213.8 CKT 2	
10WP	AECI	AECI	96089 5JAMESV 161 WND 2 JAMESV2 2	56	115.7	127.2	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV113.8 CKT 1	

SPP-2004-001-1 Scenario 1
 Table 1.1a - Modeling Representation for Table 1.1
 Includes Bus Numbers and Bus Names

Southwest Power Pool
 System Impact Study

Study Case	From Area	To Area	Monitored Branch Over 100% Rate B	Rate <MVA>	BC % Loading	TC % Loading	Outaged Branch Causing Overload	ATC (MW)	Solution	Estimated Cost
05AF	WFEC	WFEC	55846 CARTERJ2 69 to 55876 DILL J72 69 CKT 1	26	97.8	117.2	54121 ELKCTY-4 138 to 56001 MORWODS4 138 CKT 1	17	Current WFEC Work Plan to Reconduct from 4/0 to 795 - Complete by 2004 Winter	
05G	WFEC	WFEC	55846 CARTERJ2 69 to 55876 DILL J72 69 CKT 1	26	95.6	115.3	54121 ELKCTY-4 138 to 56001 MORWODS4 138 CKT 1	34	See Previous Upgrade Specified for Facility	
05G	AEPW	WFEC	54148 CLINTN-4 138 to 55856 CLINTON4 138 CKT 1	143	1.4	100.6	56092 WEATHFD4 138 to 55800 WEATHFD1 CKT 1	149	Solution Undetermined	
05SH	AEPW	AEPW	53154 CHAMSPRS 161 to 53170 TONTITNS 161 CKT 1	244	115.2	118.3	53154 CHAMSPRS 161 to 53195 FARMGTNS 161 CKT 1	0	AEPW Upgrade Schedule Completion Date 6/1/2007	
05SH	AEPW	AEPW	53154 CHAMSPRS 161 to 53170 TONTITNS 161 CKT 1	244	107.4	109.7	53139 FLINTCR5 161 to 53170 TONTITNS 161 CKT 1	0	AEPW Upgrade Schedule Completion Date 6/1/2007	
05SH	AEPW	AEPW	53154 CHAMSPRS 161 to 53170 TONTITNS 161 CKT 1	244	103.5	106.6	53157 SFAYTVL5 161 to 53195 FARMGTNS 161 CKT 1	0	AEPW Upgrade Schedule Completion Date 6/1/2007	
05SH	AEPW	WFEC	54122 ELKCTY-2 69 to 55897 ELKCTY2 69 CKT 1	39	89.5	102.7	54109 CL-AFTP4 138 to 54121 ELKCTY-4 138 CKT 1	120	WFEC Upgrade Estimated In-Service Date 12/2005	
05SH	AEPW	WFEC	54122 ELKCTY-2 69 to 55897 ELKCTY2 69 CKT 1	39	88.4	101.4	54109 CL-AFTP4 138 to 54126 HOB-JCT4 138 CKT 1	134	WFEC Upgrade Estimated In-Service Date 12/2005	
05SP	SWPA	AECT	52694 SPRGFLD2 69 to 56661 ZBTFLD 69 CKT 1	36	93.9	106.4	52692 SPRGFLD5 161 to 96678 5NIXA-1 161 CKT 1	73	Solution Undetermined	
05SP	SWPA	SPRM	52692 SPRGFLD5 161 to 59969 BRKLINE 5 161 CKT 1	319	97.0	100.5	59955 JUNCTN 5 161 to 59969 BRKLINE 5 161 CKT 1	130	Replace disconnect switches at Springfield. Upgrade assigned to SPP-2003-253. Estimated In-Service Date 6/1/2007.	
05SP	AEPW	AEPW	53154 CHAMSPRS 161 to 53170 TONTITNS 161 CKT 1	244	137.7	140.7	53154 CHAMSPRS 161 to 53195 FARMGTNS 161 CKT 1	0	AEPW Upgrade Schedule Completion Date 6/1/2007	
05SP	AEPW	AEPW	53154 CHAMSPRS 161 to 53170 TONTITNS 161 CKT 1	244	128.2	130.6	53139 FLINTCR5 161 to 53170 TONTITNS 161 CKT 1	0	AEPW Upgrade Schedule Completion Date 6/1/2007	
05SP	AEPW	AEPW	53154 CHAMSPRS 161 to 53170 TONTITNS 161 CKT 1	244	123.3	126.4	53157 SFAYTVL5 161 to 53195 FARMGTNS 161 CKT 1	0	AEPW Upgrade Schedule Completion Date 6/1/2007	
05SP	AEPW	AEPW	53154 CHAMSPRS 161 to 53170 TONTITNS 161 CKT 1	244	103.9	106.7	53139 FLINTCR5 161 to 53187 GENTRYR5 161 CKT 1	0	AEPW Upgrade Schedule Completion Date 6/1/2007	
05SP	AEPW	AEPW	53154 CHAMSPRS 161 to 53170 TONTITNS 161 CKT 1	244	103.1	105.8	53133 ECNTRTNS 161 to 53187 GENTRYR5 161 CKT 1	0	AEPW Upgrade Schedule Completion Date 6/1/2007	
05SP	AEPW	WFEC	54122 ELKCTY-2 69 to 55897 ELKCTY2 69 CKT 1	39	95.9	108.9	54109 CL-AFTP4 138 to 54121 ELKCTY-4 138 CKT 1	47	WFEC Upgrade Estimated In-Service Date 12/2005	
05SP	AEPW	WFEC	54122 ELKCTY-2 69 to 55897 ELKCTY2 69 CKT 1	39	94.3	107.4	54109 CL-AFTP4 138 to 54126 HOB-JCT4 138 CKT 1	65	WFEC Upgrade Estimated In-Service Date 12/2005	
05SP	AEPW	WFEC	54122 ELKCTY-2 69 to 55897 ELKCTY2 69 CKT 1	36	86.0	102.0	BASE CASE		WFEC Upgrade Estimated In-Service Date 12/2005	
05SP	AEPW	AEPW	53139 FLINTCR5 161 to 53187 GENTRYR5 161 CKT 1	353	100.0	101.3	53144 LOWELL 5 161 to 53170 TONTITNS 161 CKT 1	0	AEPW Upgrade Schedule Completion Date 6/1/2007	
05WP	AEPW	AEPW	53154 CHAMSPRS 161 to 53170 TONTITNS 161 CKT 1	275	102.9	105.6	53154 CHAMSPRS 161 to 53195 FARMGTNS 161 CKT 1	0	AEPW Upgrade Schedule Completion Date 6/1/2007	
05WP	AEPW	WFEC	54148 CLINTN-4 138 to 55856 CLINTON4 138 CKT 1	143	0.9	101.1	56092 WEATHFD4 138 to 55800 WEATHFD1 CKT 1	148	Solution Undetermined	
05WP	AEPW	WFEC	54122 ELKCTY-2 69 to 55897 ELKCTY2 69 CKT 1	39	88.8	103.5	54121 ELKCTY-4 138 to 56001 MORWODS4 138 CKT 1	114	WFEC Upgrade Estimated In-Service Date 12/2005	
07SP	SWPA	ENTR	52660 BULL SH5 161 to 99802 5BULLSH 161 CKT 1	176	106.8	109.4	53136 EUREKA 5 161 to 99832 SOSAGE # 161 CKT 1	0	Rebuild buswork	\$ 500,000
07SP	AEPW	WFEC	54122 ELKCTY-2 69 to 55897 ELKCTY2 69 CKT 1	39	96.0	111.4	54109 CL-AFTP4 138 to 54121 ELKCTY-4 138 CKT 1	23	WFEC Upgrade Estimated In-Service Date 12/2005	
07SP	AEPW	WFEC	54122 ELKCTY-2 69 to 55897 ELKCTY2 69 CKT 1	39	96.3	109.7	54109 CL-AFTP4 138 to 54126 HOB-JCT4 138 CKT 1	41	WFEC Upgrade Estimated In-Service Date 12/2005	
07SP	AEPW	WFEC	54122 ELKCTY-2 69 to 55897 ELKCTY2 69 CKT 1	36	87.8	104.2	BASE CASE		WFEC Upgrade Estimated In-Service Date 12/2005	
07SP	AEPW	WFEC	54122 ELKCTY-2 69 to 55897 ELKCTY2 69 CKT 1	39	88.0	101.2	54152 WTH JCT4 138 to 54160 WTH SE 4 138 CKT 1	136	WFEC Upgrade Estimated In-Service Date 12/2005	
07SP	AEPW	WFEC	54122 ELKCTY-2 69 to 55897 ELKCTY2 69 CKT 1	39	84.3	100.9	55950 HYDRO 4 138 to 56092 WEATHFD4 138 CKT 1	142	WFEC Upgrade Estimated In-Service Date 12/2005	
07SP	AEPW	WFEC	54122 ELKCTY-2 69 to 55897 ELKCTY2 69 CKT 1	39	83.6	100.1	55950 HYDRO 4 138 to 56050 SICKLES4 138 CKT 1	149	WFEC Upgrade Estimated In-Service Date 12/2005	
07WP	AEPW	WFEC	54148 CLINTN-4 138 to 55856 CLINTON4 138 CKT 1	143	0.9	100.3	56092 WEATHFD4 138 to 55800 WEATHFD1 CKT 1	149	Solution Undetermined	
10SP	SWPA	ENTR	52660 BULL SH5 161 to 99802 5BULLSH 161 CKT 1	176	137.7	141.4	53136 EUREKA 5 161 to 99832 SOSAGE # 161 CKT 1	0	See Previous Upgrade Specified for Facility	
10SP	AEPW	AEPW	53170 TONTITNS 161 to 53154 CHAMSPRS 161 CKT 1	244	99.5	101.7	NTITNS 161 to 53176 TONTITN7 345 to 53171 TONTITN11 31	31	New overload after completion of AEPW upgrades in area - Rebuild 12 miles with 2156 ACSR	\$ 7,200,000
10SP	AEPW	AEPW	53154 CHAMSPRS 161 to 53170 TONTITNS 161 CKT 1	244	99.5	101.7	53155 CHAMSPR7 345 to 53176 TONTITN7 345 CKT 1	34	See Previous Upgrade Specified for Facility	
10SP	OKGE	AEPW	54002 FIXCT4 138 to 55055 MAUD 4 138 CKT 1	107	95.8	100.4	55913 FRANKLN4 138 to 55917 FRANKLN4 138 CKT 1	138	Rebuild 11.83 miles of 3/0 shielded Copperweld with 795 ACSR.	\$ 3,305,000
10SP	OKGE	OKGE	55235 PECANCK7 345 WND 2 PECANCK1 1	370	100.0	101.3	53756 CLARKSV7 345 to 55224 MUSKOGEE7 345 CKT 1		Add 2nd 345/161 kv 369MVA transformer.	\$ 3,000,000
10SP	EMDE	EMDE	59545 FRP217 2 69 to 59585 DAD368 2 69 CKT 1	39	87.2	100.7	59478 DAD368 5 161 to 59493 BOL431 5 161 CKT 1	142	Solution Undetermined	
10SP	EMDE	EMDE	59438 EXP449T2 69 to 59592 JOP389 2 69 CKT 1	39	87.7	102.1	59543 NEO184 2 69 to 59563 LIN314 2 69 CKT 1	128	Excluded due to EMDE Mitigation Plan	
									Total Estimated Cost	\$ 14,005,000

SPP-2004-001-1 Scenario 2
 Table 1.2a - Modeling Representation for Table 1.2
 Includes Bus Numbers and Bus Names

Southwest Power Pool
 System Impact Study

Study Case	From Area	To Area	Monitored Branch Over 100% Rate B	Rate <MVA>	BC % Loading	TC % Loading	Outaged Branch Causing Overload	ATC (MW)	Solution	Estimated Cost
05SH	AEPW	AEPW	53154 CHAMSPRS 161 to 53170 TONTITNS 161 CKT 1	244	97.6	100.7	53154 CHAMSPRS 161 to 53195 FARMGTNS 161 CKT 1	116	AEPW Upgrade Schedule Completion Date 6/1/2007	
05SP	SWPA	ENTR	52660 BULL SH5 161 to 99802 5BULLSH* 161 CKT 1	167	100.8	104.5	99519 SQUITMN 161 to 99799 5BEE BR 161 CKT 1	0	Rebuild buswork - Identified for Scenario 1	
05SP	SWPA	ENTR	52660 BULL SH5 161 to 99802 5BULLSH* 161 CKT 1	167	98.0	101.6	99799 5BEE BR 161 to 99807 SCLINTN 161 CKT 1	83	See Previous Upgrade Specified for Facility	
05SP	AEPW	AEPW	53154 CHAMSPRS 161 to 53170 TONTITNS 161 CKT 1	244	120.3	123.4	53154 CHAMSPRS 161 to 53195 FARMGTNS 161 CKT 1	0	AEPW Upgrade Schedule Completion Date 6/1/2007	
05SP	AEPW	AEPW	53154 CHAMSPRS 161 to 53170 TONTITNS 161 CKT 1	244	114.8	117.2	53139 FLINTCR5 161 to 53170 TONTITNS 161 CKT 1	0	AEPW Upgrade Schedule Completion Date 6/1/2007	
05SP	AEPW	AEPW	53154 CHAMSPRS 161 to 53170 TONTITNS 161 CKT 1	244	105.8	108.9	53157 SFAYTVL5 161 to 53195 FARMGTNS 161 CKT 1	0	AEPW Upgrade Schedule Completion Date 6/1/2007	
05SP	AEPW	WFEC	54148 CLINTN-4 138 to 55856 CLINTON4 138 CKT 1	143	1.0	100.0	56092 WEATHFD4 138 to 56800 WEATHFD1 CKT 1	150	Solution Undetermined	
05WP	SWPA	AECI	52694 SPRGFLD2 69 to 96661 2BTLFD 69 CKT 1	36	90.5	103.1	52692 SPRGFLD5 161 to 96678 5NIXA-1 161 CKT 1	113	Solution Undetermined	
07SP	SWPA	ENTR	52660 BULL SH5 161 to 99802 5BULLSH* 161 CKT 1	176	112.3	115.0	53136 EUREKA 5 161 to 99832 5OSAGE # 161 CKT 1	0	See Previous Upgrade Specified for Facility	
07SP	SWPA	ENTR	52660 BULL SH5 161 to 99802 5BULLSH* 161 CKT 1	176	97.7	101.2	99519 SQUITMN 161 to 99799 5BEE BR 161 CKT 1	99	See Previous Upgrade Specified for Facility	
07SP	AEPW	WFEC	54148 CLINTN-4 138 to 55856 CLINTON4 138 CKT 1	143	1.0	100.2	56092 WEATHFD4 138 to 56800 WEATHFD1 CKT 1	150	Solution Undetermined	
10SP	SWPA	ENTR	52660 BULL SH5 161 to 99802 5BULLSH* 161 CKT 1	176	142.3	146.5	53136 EUREKA 5 161 to 99832 5OSAGE # 161 CKT 1	0	See Previous Upgrade Specified for Facility	
10SP	SWPA	ENTR	52660 BULL SH5 161 to 99802 5BULLSH* 161 CKT 1	176	113.7	117.3	99519 SQUITMN 161 to 99799 5BEE BR 161 CKT 1	0	See Previous Upgrade Specified for Facility	
10SP	SWPA	ENTR	52660 BULL SH5 161 to 99802 5BULLSH* 161 CKT 1	176	110.4	114.1	99799 5BEE BR 161 to 99807 SCLINTN 161 CKT 1	0	See Previous Upgrade Specified for Facility	
10SP	SWPA	ENTR	52660 BULL SH5 161 to 99802 5BULLSH* 161 CKT 1	176	107.7	111.3	99806 SCLIN-W# 161 to 99807 SCLINTN 161 CKT 1	0	See Previous Upgrade Specified for Facility	
10SP	SWPA	ENTR	52660 BULL SH5 161 to 99802 5BULLSH* 161 CKT 1	176	102.3	105.5	52680 BEAVER 5 161 to 53136 EUREKA 5 161 CKT 1	0	See Previous Upgrade Specified for Facility	
10SP	SWPA	ENTR	52660 BULL SH5 161 to 99802 5BULLSH* 161 CKT 1	176	100.5	105.4	52672 TABLE R5 161 to 59497 RVS438 5 161 CKT 1	0	See Previous Upgrade Specified for Facility	
10SP	SWPA	ENTR	52660 BULL SH5 161 to 99802 5BULLSH* 161 CKT 1	176	96.9	100.6	52660 BULL SH5 161 to 99859 5LEAD HL 161 CKT 1	125	See Previous Upgrade Specified for Facility	
10SP	SWPA	ENTR	52660 BULL SH5 161 to 99802 5BULLSH* 161 CKT 1	176	97.0	100.5	99806 SCLIN-W# 161 to 99847 5BOTKIN# 161 CKT 1	127	See Previous Upgrade Specified for Facility	
10SP	EMDE	SWPA	52686 NEO SPA5 161 to 59471 NEO184 5 161 CKT 1	157	96.6	103.3	53139 FLINTCR5 161 to 59484 DEC392 5 161 CKT 1	75	Rebuild 161 kV line from 336 ACSR to 795 ACSR and replace terminal equipment	\$ 800,000
10SP	WFEC	AEPW	54148 CLINTN-4 138 55856*CLINTON4 138 1	143	37.8	102.8	54119 O.K.U.-7345 51534 TUCO7 345 CKT 1 51534 TUCO7 345 51533 TUCO6 230 CKT 1	144	Solution Undetermined	
10SP	WFEC	AEPW	54148 CLINTN-4 138 55856*CLINTON4 138 1	143	35.6	100.5	54119 O.K.U.-7345 54131 L.E.S.-7345 CKT 1 54119 O.K.U.-7345 59991 OKLAUN 7345 CKT 1	149	Solution Undetermined	
10SP	WFEC	AEPW	54148 CLINTN-4 138 to 55856 CLINTON4 138 CKT 1	143	37.2	101.0	54108 CARNEG-4 138 to 54117 FTCOBNG4 138 CKT 1	148	Solution Undetermined	
10SP	WFEC	AEPW	54148 CLINTN-4 138 to 55856 CLINTON4 138 CKT 1	143	37.2	100.9	54117 FTCOBNG4 138 to 54140 S.W.S.-4 138 CKT 1	148	Solution Undetermined	
10SP	WFEC	AEPW	54148 CLINTN-4 138 to 55856 CLINTON4 138 CKT 1	143	36.6	100.3	54108 CARNEG-4 138 to 54126 HOB-JCT4 138 CKT 1	149	Solution Undetermined	
10SP	EMDE	EMDE	59438 EXP44GT2 69 to 59592 JOP389 2 69 CKT 1	39	87.4	101.8	59543 NEO184 2 69 to 59583 LIN314 2 69 CKT 1	131	Excluded due to EMDE Mitigation Plan	
10SP	EMDE	EMDE	59545 FRP217 2 69 to 59585 DAD368 2 69 CKT 1	39	87.7	100.5	59478 DAD368 5 161 to 59493 BOL431 5 161 CKT 1	144	Solution Undetermined	
									Total Estimated Cost	\$ 800,000