



SPP *Southwest Power Pool*

*System Impact Study
SPP-2003-253-1
For The Designation of a New
Network Resource
Requested By
Empire District Electric Company*

*For a Reserved Amount Of 250 MW
From 6/1/2007
To 6/1/2028*

SPP Engineering, Tariff Studies

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ATTACHMENT: *SPP-2003-253-1 Tables*

1. Executive Summary

Empire District Electric Company has requested a system impact study to designate a New Network Resource in the EDE Control Area for 250 MW to serve EDE Network Load in the EDE Control Area. The period of the service requested is from 6/1/2007 to 6/1/2028. The study includes two options for the location of the new 250 MW source. Option 1 is for OASIS reservation numbers 614698, 614699, 614701, 614702, 614704, 614707, 614712, 614718, 614722, and 614724. Option 2 is for OASIS reservation numbers 614734, 614735, 614736, 614738, 614739, 614740, 614741, 614742, 614747, and 614748.

The principal objective of this study is to identify system problems and potential system modifications necessary to facilitate one of the additional 250 MW requests while maintaining system reliability. The study includes recently approved AEPW transmission upgrades for Northwest Arkansas. The upgrades include a new Chamber Springs to Tontitown 345 kV line and a new Siloam Springs to Chamber Springs 161 kV line.

The service was modeled from the two optional sources in EDE to marginally dispatched EDE units by five increments of 50 MW. Both new source location options studied cause 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 new source location option 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 new source location option 2. Table 1.2 lists SPP facility overloads identified. Table 2.2 lists Non-SPP facility overloads identified.

The study results of the two EDE to EDE requests show that limiting constraints exist for both new source location options. 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 the status of four higher priority requests. The four higher priority requests are a SPS to MPS 200 MW Redirect, a SPS to CSWS 13 MW Original, a GRDA to WR 25 MW Original, and a SPS to EDDY 67 MW Original. The only request modeled in the study cases is the GRDA to WR 25 MW Original. These requests have a minimal effect on the determined ATC.

SPP will also review the possibility of curtailment of previously confirmed service and/or the redispatch of units as an option for relieving the additional impacts on the SPP facilities caused by the EDE to EDE requests. These options will be evaluated as part of the Facility Study. Execution of a Facility Study Agreement is now required to maintain queue position. 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 EDE Control Area for 250 MW to serve EDE Network Load in the EDE Control Area. The study includes two options for the location of the new 250 MW source. 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 250 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 1200 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 eight seasonal models to study the two EDE to EDE 250 MW transfers for the requested service period. The SPP 2004 Series Cases 2005 April Minimum (05AP), 2005 Spring Peak (05G), 2005 Summer Shoulder (05SH), 2005 Fall Peak (05FA), 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 the two 250 MW transfers on the system during the requested service period of 6/1/07 to 6/1/28. The 2005 April Minimum (05AP), 2005 Spring Peak (05G), 2005 Summer Shoulder (05SH), and 2005 Fall Peak (05FA) cases serve as a proxy for future seasonal cases not included in the SPP 2004 Series Cases.

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. The recently approved AEPW transmission upgrades for Northwest Arkansas were included in the study cases. The upgrades include a new Chamber Springs to Tontitown 345 kV line and a new Siloam Springs to Chamber Springs 161 kV line.

C. Transfer Analysis

The service was modeled by five increments of 50 MW from the two optional sources in EDE to marginally dispatched EDE units. Two different transfer analyses were performed on each 250 MW option. The first transfer analysis was performed using the entire contingency set and monitored list. The analysis provides the impact of the full 250 MW transfers on SPP and Non-SPP facilities. The second transfer analysis was performed to more thoroughly determine the impact of the full 250 MW transfers in increments of 50 MW on the EDE system. Using the selected cases both with and without the respective transfer increments 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 one of the EDE to EDE requests.

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-2003-253-1 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 250 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. The estimated ATC was calculated by interpolation between 0 MW and 250 MW for all SPP facilities, excluding EDE facilities. The estimated ATC for EDE facilities was calculated by interpolating between the five incremental steps of 50 MW.

Table 1.1 lists the SPP Facility Overloads caused or impacted by the Option 1 250 MW transfer. Solutions with engineering and construction costs are provided in the tables.

Tables 2.1 lists overloads on fist tier Non - SPP Regional Tariff participants' transmission systems caused or impacted by the Option 1 250 MW transfer. Comments are provided in the tables.

Table 1.2 lists the SPP Facility Overloads caused or impacted by the Option 2 250 MW transfer. Solutions with engineering and construction costs are provided in the tables.

Tables 2.2 lists overloads on fist tier Non - SPP Regional Tariff participants' transmission systems caused or impacted by the Option 2 250 MW transfer. Comments are provided in the tables.

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 two EDE to EDE requests show that limiting constraints exist for both new source location options. 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 the status of four higher priority requests. The four higher priority requests are a SPS to MPS 200 MW Redirect, a SPS to CSWS 13 MW Original, a GRDA to WR 25 MW Original, and a SPS to EDDY 67 MW Original. The only request modeled in the study cases is the GRDA to WR 25 MW Original. These requests have a minimal effect on the determined ATC.

SPP will also review the possibility of curtailment of previously confirmed service and/or the redispatch of units as an option for relieving the additional impacts on the SPP facilities caused by the EDE to EDE requests. These options will be evaluated as part of the Facility Study. Execution of a Facility Study Agreement is now required to maintain queue position. 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-2003-253-1 Option 1
 Table 1.1 - SPP Facility Overloads Caused or Impacted
 by 250 MW Transfer

Southwest Power Pool
 System Impact Study

Study Case	From Area	To Area	Monitored Branch Overload	Rating <MVA>	BC % Loading	TC % Loading	Outaged Branch Causing Overload	ATC (MW)	Solution	Cost
05AP	EMDE	SWPA	NEOSHO - SUB 184 - NEOSHO SOUTH JCT. 161KV	157	31.0	115.7	Multiple Outage Contingency: FLINT CREEK - SUB 383 - MONETT 345KV	205	Solution Undetermined	
05AP	EMDE	SWPA	NEOSHO - SUB 184 - NEOSHO SOUTH JCT. 161KV	157	24.4	115.2	BROOKLINE - SUB 383 - MONETT 345KV	208	Solution Undetermined	
05AP	EMDE	SWPA	NEOSHO - SUB 184 - NEOSHO SOUTH JCT. 161KV	157	29.8	114.0	NEOSHO 161/69KV TRANSFORMER	209	Solution Undetermined	
05AP	EMDE	SWPA	NEOSHO - SUB 184 - NEOSHO SOUTH JCT. 161KV	157	30.6	114.0	DELAWARE - NORTHEAST STATION 345KV	209	Solution Undetermined	
05AP	EMDE	SWPA	NEOSHO - SUB 184 - NEOSHO SOUTH JCT. 161KV	157	14.1	117.6	AVOCA - EAST ROGERS 161KV	215	Solution Undetermined	
05AP	SWPA	SPRM	GOLDEN WEST - SPRINGFIELD 69KV CKT 1	72	101.7	102.8	JANE - SUB 435 - NOEL SOUTHWEST 161KV	250	Incorrect Rating, Emergency Rating 95 MVA	
05AP	SWPA	SPRM	GOLDEN WEST - SPRINGFIELD 69KV CKT 2	72	101.7	102.8	GOLDEN WEST - SPRINGFIELD 69KV CKT 2	250	Incorrect Rating, Emergency Rating 95 MVA	
05G			NONE IDENTIFIED				GOLDEN WEST - SPRINGFIELD 69KV CKT 1	250		
05SH	GRDA	GRDA	CLAREMORE 161/69KV TRANSFORMER CKT 2	84	100.2	100.6	CLAREMORE 161/69KV TRANSFORMER CKT 1	0	See Previous Upgrade Specified	
05SH	GRDA	GRDA	CLAREMORE 161/69KV TRANSFORMER CKT 1	84	99.9	100.3	CLAREMORE 161/69KV TRANSFORMER CKT 2	52	Add 3rd 161/69 KV Transformer	\$ 1,250,000
05SH	EMDE	EMDE	SUB 322 - ANDERSON SOUTHWEST - SUB 443 - NOEL CITY 69KV	49	43.2	104.8	SUB 184 - NEOSHO SOUTH JCT. 161/61KV TRANSFORMER	231	Solution Undetermined	
05SH	EMDE	SWPA	JANE - NEOSHO - SUB 184 161KV	218	29.4	104.9	Base Case	234	Solution Undetermined	
05SH	EMDE	SWPA	NEOSHO - SUB 184 - NEOSHO SOUTH JCT. 161KV	157	22.0	105.3	Multiple Outage Contingency: FLINT CREEK - SUB 383 - MONETT 345KV	236	Solution Undetermined	
05SH	EMDE	SWPA	NEOSHO - SUB 184 - NEOSHO SOUTH JCT. 161KV	157	9.8	105.3	BROOKLINE - SUB 383 - MONETT 345KV	236	Solution Undetermined	
05SH	EMDE	SWPA	NEOSHO - SUB 184 - NEOSHO SOUTH JCT. 161KV	157	32.2	103.4	NEOSHO 161/69KV TRANSFORMER	238	Solution Undetermined	
05SH	EMDE	SWPA	NEOSHO - SUB 184 - NEOSHO SOUTH JCT. 161KV	157	19.9	102.1	SUB 292 - TIPTON FORD - SUB 389 - JOPLIN SOUTHWEST 161KV	244	Solution Undetermined	
05SH	EMDE	SWPA	NEOSHO - SUB 184 - NEOSHO SOUTH JCT. 161KV	130	20.6	102.0	AVOCA - EAST ROGERS 161KV	244	Solution Undetermined	
05SH	EMDE	SWPA	NEOSHO - SUB 184 - NEOSHO SOUTH JCT. 161KV	157	19.9	100.2	Base Case	249	Solution Undetermined	
05FA	WERE	WERE	ATHENS SWITCHING STATION - COFFEY COUNTY NO. 4 VERNON 69KV	45	104.8	105.8	DELAWARE - NORTHEAST STATION 345KV	0	May be relieved due to Westar Operating Procedure 1304 Overload of the Athens to Wolf Creek 69 kV Line	
05FA	OKGE	OKGE	CLEVELAND TAP - IMO 69KV	36	116.0	116.1	SOUTH 4TH ST 138/69KV TRANSFORMER CKT 1	0	Possible Invalid Contingency	
05FA	WERE	WERE	COFFEY COUNTY NO. 4 VERNON - GREEN 69KV	45	106.1	107.1	LACYGNE - WOLF CREEK 345KV	0	May be relieved due to Westar Operating Procedure 1304 Overload of the Athens to Wolf Creek 69 kV Line	
05FA	SWPA	AEPW	BEAVER - EUREKA SPRINGS 161KV	263	97.6	101.7	Multiple Outage Contingency: FLINT CREEK - SUB 383 - MONETT 345KV	149	SWPA Reconnect CT's to 1000:5 Tap on Bkrs 42, 32, & half or 22. Replace metering & reset relays for Line 2 & Line 3. AEPW Replace Wavetrap & Metering CT Jumpers	\$ 67,500
05FA	EMDE	SWPA	NEOSHO - SUB 184 - NEOSHO SOUTH JCT. 161KV	157	20.6	109.1	Multiple Outage Contingency: FLINT CREEK - SUB 383 - MONETT 345KV	225	Solution Undetermined	
05FA	SWPA	EMDE	NEOSHO - SUB 184 - NEOSHO SOUTH JCT. 161KV	157	13.8	108.7	BROOKLINE - SUB 383 - MONETT 345KV	227	Solution Undetermined	
05FA	EMDE	SWPA	NEOSHO - SUB 184 - NEOSHO SOUTH JCT. 161KV	157	37.0	105.0	NEOSHO 161/69KV TRANSFORMER	232	Solution Undetermined	
05FA	EMDE	SWPA	NEOSHO - SUB 184 - NEOSHO SOUTH JCT. 161KV	157	18.2	105.4	SUB 292 - TIPTON FORD - SUB 389 - JOPLIN SOUTHWEST 161KV	234	Solution Undetermined	
05FA	EMDE	SWPA	NEOSHO - SUB 184 - NEOSHO SOUTH JCT. 161KV	130	12.2	107.3	AVOCA - EAST ROGERS 161KV	235	Solution Undetermined	
05FA	EMDE	SWPA	JANE - NEOSHO - SUB 184 161KV	218	26.9	102.7	Base Case	241	Solution Undetermined	
07SP	WERE	WERE	166TH STREET - JARBALO JUNCTION SWITCHING STATION 115KV	97	100.8	100.9	Base Case	0	May be relieved due to Westar Operating Procedure 1202 Overload of the Jarbalo to Jaggard 115kV Line	
07SP	WERE	WERE	AUBURN ROAD - JEFFREY ENERGY CENTER 230KV	565	108.9	109.3	MIDLAND JUNCTION - PENTAGON 115KV	0	May be relieved due to Westar Operating Procedure 400 Outage of the Jeffrey Energy Center to Hoyt 345kV Line	
07SP	WERE	WERE	AUBURN ROAD 230/115KV TRANSFORMER	308	118.1	118.3	HOYT - JEFFREY ENERGY CENTER 345KV	0	May be relieved due to Westar Operating Procedure 400 Outage of the Jeffrey Energy Center to Hoyt 345kV Line	
07SP	WERE	WERE	AUBURN ROAD 230/115KV TRANSFORMER	308	117.3	117.6	HOYT - JEFFREY ENERGY CENTER 345KV	0	May be relieved due to Westar Operating Procedure 400 Outage of the Jeffrey Energy Center to Hoyt 345kV Line	
07SP	AEPW	AEPW	CHAMBER SPRINGS - FARMINGTON AECC 161KV	353	106.9	107.1	Rebuild 10.24 miles with 2156 ACSR, replace Chamber Springs wavetrap, & replace Farmington AECC bus.	0		\$ 6,400,000
07SP	GRDA	GRDA	CLAREMORE 161/69KV TRANSFORMER CKT 1	84	109.9	110.2	DYESS - SOUTH SPRINGDALE 161KV	0	See Previous Upgrade Specified	
07SP	GRDA	GRDA	CLAREMORE 161/69KV TRANSFORMER CKT 2	84	110.2	110.5	CLAREMORE 161/69KV TRANSFORMER CKT 2	0	See Previous Upgrade Specified	
07SP	WERE	WERE	COUNTY LINE 115/69KV TRANSFORMER	66	101.8	101.9	CLAREMORE 161/69KV TRANSFORMER CKT 1	0	May be relieved due to Westar Operating Procedure 803 Outage of the Hoyt to Stranger 345 kV line	
07SP	AEPW	AEPW	DYESS - SOUTH SPRINGDALE 161KV	313	113.2	113.3	HOYT - STRANGER CREEK 345KV	0	Rebuild 3.95 miles of 1272 AAC with 2156 ACSR. Replace South Springdale Circuit Switcher & Jumpers	\$ 2,200,000
07SP	AEPW	ENTR	EUREKA SPRINGS - OSAGE CREEK (AECC) 161KV	223	101.3	103.1	CHAMBER SPRINGS - FARMINGTON AECC 161KV	0	Solution Undetermined	
07SP	AEPW	ENTR	EUREKA SPRINGS - OSAGE CREEK (AECC) 161KV	223	100.3	102.1	BULL SHOALS - BULL SHOALS HES 161KV	0	Solution Undetermined	
07SP	WERE	WERE	GILL ENERGY CENTER EAST - OATVILLE 69KV	72	112.2	112.3	BULL SHOALS HES - FLIPPIN 161KV	0	Solution Undetermined	
07SP	WERE	WERE	LAWRENCE HILL 230/115KV TRANSFORMER	308	112.3	112.4	GILL ENERGY CENTER EAST - MACARTHUR 69KV	0	Replace disconnect switches at Gill 69 kV (use 800 A), Replace line switch at Oatville 69 kV (use 800 A).	\$ 45,000
07SP	WERE	WERE	LAWRENCE HILL 230/115KV TRANSFORMER	308	112.1	112.2	LAWRENCE HILL - MIDLAND JCT 230KV CKT 1	0	May be relieved due to Westar Transmission Operating Directive 901 Outage of the Lawrence Hill-Midland JCT 230kV Line	
07SP	WERE	WERE	LAWRENCE HILL 230/115KV TRANSFORMER	308	112.1	112.2	MIDLAND JUNCTION 230/115KV TRANSFORMER CKT 1	0	May be relieved due to Westar Transmission Operating Directive 615 Loss of the Midland Junction 230/115kV Transformer	
07SP	WERE	WERE	LAWRENCE HILL 230/115KV TRANSFORMER	308	110.2	110.3	LAWRENCE HILL - MIDLAND JCT 230KV CKT 1	0	May be relieved due to Westar Transmission Operating Directive 901 Outage of the Lawrence Hill-Midland JCT 230kV Line	

SPP-2003-253-1 Option 1
 Table 1.1 - SPP Facility Overloads Caused or Impacted
 by 250 MW Transfer

Southwest Power Pool
 System Impact Study

Study Case	From Area	To Area	Monitored Branch Overload	Rating <MVA>	BC % Loading	TC % Loading	Outaged Branch Causing Overload	ATC (MW)	Solution	Cost
07SP	AEPW	AEPW	LONGWOOD - OAK PAN-HARR REC 138KV	209	100.8	100.9	Multiple Outage Contingency: LONGWOOD - SW SHREVEPORT 345KV DIANA - SW SHREVEPORT 345KV	0	Rebuild 1.8 miles of 666 ACSR with 1590 ACSR.	\$ 750,000
07SP	WERE	WERE	MIDLAND JUNCTION 230/115KV TRANSFORMER	308	100.7	100.8	LAWRENCE HILL 230/115KV TRANSFORMER CKT 1	0	May be relieved due to Westar Transmission Operating Directive 631 Loss of the Lawrence Hill 230/115KV Transformer	
07SP	EMDE	EMDE	SUB 110 - ORONOJO JCT. - SUB 432 - JOPLIN OAKLAND NORTH 161KV	214	96.8	90.8	SUB 292 - TIPTON FORD - SUB 389 - JOPLIN SOUTHWEST 161KV	71	At 100 MW the loading is 101.3% and the facility is relieved by additional 50 MW, Reconstruct and replace 1.4 miles of 556 ACSR with Bundled 556 ACSR.	\$ 800,000
07SP	SWPA	SPRM	BROOKLINE - SPRINGFIELD 161KV	323	98.9	102.8	BROOKLINE - JUNCTION 161KV	71	Replace disconnect switches at Springfield.	\$ 60,000
07SP	SWPA	AEPW	BEAVER - EUREKA SPRINGS 161KV	263	95.6	102.1	Multiple Outage Contingency: FLINT CREEK - SUB 383 - MONETT 345KV BROOKLINE - SUB 383 - MONETT 345KV	169	See Previous Upgrade Specified	
07SP	SWPA	AECI	CARTHAGE - REEDS 69KV	36	90.7	102.9	CARTHAGE - SUB 382 - LARUSSEL 161KV	191	AECI third party line. No SWPA upgrades required.	
07SP	AEPW	AEPW	CANTON TAP (RAYBURN) - GLENN PINE (RAYBURN) 138KV	235	100.9	101.0	COFFEE (RAYBURN) - JACKSONVILLE (SWE-RC-ETEC) 138KV	250	Invalid Contingency	
07SP	SWPA	AECI	DONIPHAN 161/69KV TRANSFORMER CKT 1	18.75	158.7	158.8	DONIPHAN 161/69KV TRANSFORMER CKT 2	250	Local area problem. Transformer is owned by AECI.	
07SP	SWPA	SWPA	SPRINGFIELD 161/69KV TRANSFORMER CKT 3	25	126.3	131.6	SPRINGFIELD 161/69KV TRANSFORMER CKT 1	250	An outage of Springfield transformer #1 overloads transformer #3. If this situation were to occur, SWPA would open either the high or low side breaker on transformer #3 to remove the overload. This does not introduce any other overloads.	
07SP	SWPA	SWPA	SPRINGFIELD 161/69KV TRANSFORMER CKT 3	25	116.1	120.2	SPRINGFIELD 161/69KV TRANSFORMER CKT 1	250	An outage of Springfield transformer #1 overloads transformer #3. If this situation were to occur, SWPA would open either the high or low side breaker on transformer #3 to remove the overload. This does not introduce any other overloads.	
07WP	SWPA	SWPA	NORFORK 161/69KV TRANSFORMER CKT 1	25	116.5	116.6	NORFORK 161/69KV TRANSFORMER CKT 2	0	Replace Norfolk Transformer	\$ 1,300,000
07WP	SWPA	SWPA	NORFORK 161/69KV TRANSFORMER CKT 1	25	102.9	103.0	NORFORK - WEST PLAINS 161KV CKT 1	0	See Previous Upgrade Specified	
07WP	SWPA	SWPA	NORFORK 161/69KV TRANSFORMER CKT 1	25	102.7	102.8	NORFORK - WEST PLAINS 161KV CKT 1	0	See Previous Upgrade Specified	
07WP	SWPA	AEPW	BEAVER - EUREKA SPRINGS 161KV	263	98.8	104.6	Multiple Outage Contingency: FLINT CREEK - SUB 383 - MONETT 345KV BROOKLINE - SUB 383 - MONETT 345KV	51	See Previous Upgrade Specified	
07WP	SWPA	AECI	CARTHAGE - REEDS 69KV	43	96.6	102.6	CARTHAGE - SUB 382 - LARUSSEL 161KV	141	AECI third party line. No SWPA upgrades required.	
07WP	EMDE	AECI	NEOSHO 161/69KV TRANSFORMER	84	55.6	103.6	NEOSHO - SUB 184 - NEOSHO SOUTH JCT. 161KV CKT 1	233	No EMDE Upgrades required Third Party Transformer	
07WP	AECI	EMDE	NEOSHO 161/69KV TRANSFORMER	84	53.7	101.5	NEOSHO - SUB 184 - NEOSHO SOUTH JCT. 161KV CKT 1	242	No EMDE Upgrades required Third Party Transformer	
07WP	SWPA	AEPW	BEAVER - EUREKA SPRINGS 161KV	227	94.8	100.1	Base Case	246	See Previous Upgrade Specified	
07WP	SWPA	AECI	DONIPHAN 161/69KV TRANSFORMER CKT 1	18.75	156.1	156.5	DONIPHAN 161/69KV TRANSFORMER CKT 2	250	Local area problem. Transformer is owned by AECI.	
10SP	WERE	WERE	166TH STREET - JARBALO JUNCTION SWITCHING STATION 115KV	97	112.0	112.1	MIDLAND JUNCTION - PENTAGON 115KV	0	May be relieved due to Westar Operating Procedure 1202 Overload of the Jarbalo to Jaggard 115kV Line	
10SP	WERE	WERE	166TH STREET - JARBALO JUNCTION SWITCHING STATION 115KV	97	108.0	108.2	CRAIG - STRANGER CREEK 345KV	0	Overload of the Jarbalo to Jaggard 115kV Line or 800 Outage of the Stranger Creek to Craig 345 kV Line	
10SP	WERE	WERE	166TH STREET - JARBALO JUNCTION SWITCHING STATION 115KV	97	103.6	103.8	EUDORA TOWNSHIP - WAKARUSA JUNCTION SWITCHING STATION 115KV	0	May be relieved due to Westar Operating Procedure 1202 Overload of the Jarbalo to Jaggard 115kV Line	
10SP	WERE	WERE	166TH STREET - JARBALO JUNCTION SWITCHING STATION 115KV	97	100.8	100.9	CAPTAIN JUNCTION - EUDORA TOWNSHIP 115KV	0	Overload of the Jarbalo to Jaggard 115kV Line	
10SP	WERE	WERE	ABILENE ENERGY CENTER - EAST ABILENE 115KV	68	177.7	177.8	EAST MANHATTAN 230/115KV TRANSFORMER CKT 1	0	May be relieved due to Westar Operating Procedure 633 Outage of the East Manhattan 230-115kV Transformer	
10SP	WERE	WERE	ABILENE ENERGY CENTER - EAST ABILENE 115KV	92	154.7	154.8	EAST MANHATTAN 230/115KV TRANSFORMER CKT 1	0	May be relieved due to Westar Operating Procedure 633 Outage of the East Manhattan 230-115kV Transformer	
10SP	WERE	WERE	ABILENE ENERGY CENTER - NORTHVIEW 115KV	68	156.5	156.6	EAST MANHATTAN 230/115KV TRANSFORMER CKT 1	0	May be relieved due to Westar Operating Procedure 633 Outage of the East Manhattan 230-115kV Transformer	
10SP	WERE	WERE	ABILENE ENERGY CENTER - NORTHVIEW 115KV	92	136.6	136.7	EAST MANHATTAN 230/115KV TRANSFORMER CKT 1	0	Outage of the East Manhattan 230-115kV Transformer	
10SP	AECI	SWPA	ASHERVILLE - IDALIA 161KV	206	101.1	101.2	GREEN FOREST - HARVIEL E. 161KV	0	Reconductor line with 954 ACSR.	\$ 6,600,000
10SP	AECI	SWPA	ASHERVILLE - IDALIA 161KV	206	101.0	101.1	HARVIEL E. - ST FRANCIS 161KV	0	See Previous Upgrade Specified	
10SP	SWPA	SPRM	BROOKLINE - SPRINGFIELD 161KV	323	102.9	107.2	BROOKLINE - JUNCTION 161KV	0	See Previous Upgrade Specified	
10SP	SWPA	AECI	CARTHAGE - REEDS 69KV	36	101.7	102.5	SUB 292 - TIPTON FORD - SUB 383 - MONETT 161KV	0	AECI third party line. No SWPA upgrades required.	
10SP	AEPW	AEPW	CHAMBER SPRINGS - FARMINGTON AECC 161KV	353	123.0	123.1	DYESS - SOUTH SPRINGDALE 161KV	0	See Previous Upgrade Specified	
10SP	AEPW	AEPW	CHAMBER SPRINGS - FARMINGTON AECC 161KV	353	104.9	105.0	EAST FAYETTEVILLE REC - SOUTH SPRINGDALE 161KV	0	See Previous Upgrade Specified	
10SP	WERE	WERE	CHAPMAN - EAST ABILENE 115KV	68	170.8	170.9	EAST MANHATTAN 230/115KV TRANSFORMER CKT 1	0	May be relieved due to Westar Operating Procedure 633 Outage of the East Manhattan 230-115kV Transformer	
10SP	WERE	WERE	CHAPMAN - EAST ABILENE 115KV	92	149.2	149.3	EAST MANHATTAN 230/115KV TRANSFORMER CKT 1	0	May be relieved due to Westar Operating Procedure 633 Outage of the East Manhattan 230-115kV Transformer	
10SP	WERE	WERE	CHAPMAN - WEST JUNCTION CITY JUNCTION (WEST) 115KV	68	151.2	151.3	EAST MANHATTAN 230/115KV TRANSFORMER CKT 1	0	May be relieved due to Westar Operating Procedure 633 Outage of the East Manhattan 230-115kV Transformer	
10SP	GRDA	GRDA	CLAREMORE 161/69KV TRANSFORMER CKT 1	84	112.0	112.3	CLAREMORE 161/69KV TRANSFORMER CKT 2	0	See Previous Upgrade Specified	
10SP	GRDA	GRDA	CLAREMORE 161/69KV TRANSFORMER CKT 2	84	112.4	112.6	CLAREMORE 161/69KV TRANSFORMER CKT 1	0	See Previous Upgrade Specified	

SPP-2003-253-1 Option 1
 Table 1.1 - SPP Facility Overloads Caused or Impacted
 by 250 MW Transfer

Southwest Power Pool
 System Impact Study

Study Case	From Area	To Area	Monitored Branch Overload	Rating <MVA>	BC % Loading	TC % Loading	Outaged Branch Causing Overload	ATC (MW)	Solution	Cost
10SP	GRDA	GRDA	COLLINSVILLE 161/69KV TRANSFORMER CKT 1	50	100.3	100.6	COLLINSVILLE 161/69KV TRANSFORMER CKT 2	0	Solution Undetermined	
10SP	AEPW	AEPW	DYESS - ELM SPRINGS REC 161KV	312	108.7	109.0	DYESS - TONTITOWN 161KV	0	Terminal Equipment Limited, Solution Undetermined	
10SP	AEPW	AEPW	DYESS - ELM SPRINGS REC 161KV	312	100.2	100.5	CHAMBER SPRINGS - FARMINGTON AECC 161KV	0	Terminal Equipment Limited, Solution Undetermined	
10SP	AEPW	AEPW	DYESS - SOUTH SPRINGDALE 161KV	313	130.9	131.0	CHAMBER SPRINGS - FARMINGTON AECC 161KV	0	See Previous Upgrade Specified	
10SP	AEPW	AEPW	DYESS - SOUTH SPRINGDALE 161KV	313	108.3	108.4	FARMINGTON AECC - SOUTH FAYETTEVILLE 161KV	0	See Previous Upgrade Specified	
10SP	AEPW	AEPW	EAST FAYETTEVILLE REC - SOUTH SPRINGDALE 161KV	313	108.0	108.1	CHAMBER SPRINGS - FARMINGTON AECC 161KV	0	Replace Jumpers @ South Springdale, Circuit Switcher @ S. Springdale, & Switch @ E. Fayetteville	\$ 100,000
10SP	ENTR	AEPW	EUREKA SPRINGS - OSAGE CREEK (AECC) 161KV	223	110.0	111.8	BULL SHOALS - BULL SHOALS HES 161KV	0	Rebuild 5.34 miles of 866 ACSR with 1590 ACSR. Replace wavetraps jumpers @ Eureka Springs	\$ 2,400,000
10SP	ENTR	AEPW	EUREKA SPRINGS - OSAGE CREEK (AECC) 161KV	223	108.7	110.5	BULL SHOALS HES - FLIPPIN 161KV	0	See Previous Upgrade Specified	
10SP	ENTR	AEPW	EUREKA SPRINGS - OSAGE CREEK (AECC) 161KV	223	105.6	107.5	FLIPPIN - SUMMIT 161KV	0	See Previous Upgrade Specified	
10SP	ENTR	AEPW	EUREKA SPRINGS - OSAGE CREEK (AECC) 161KV	223	102.9	105.1	BEE BRANCH (AECC) - QUITMAN 161KV	0	See Previous Upgrade Specified	
10SP	ENTR	AEPW	EUREKA SPRINGS - OSAGE CREEK (AECC) 161KV	223	102.3	104.2	HARRISON-EAST - SUMMIT 161KV	0	See Previous Upgrade Specified	
10SP	AEPW	AEPW	FARMINGTON AECC - SOUTH FAYETTEVILLE 161KV	313	113.2	113.3	DYESS - SOUTH SPRINGDALE 161KV	0	Loading Exceeds Conductor Emergency Rating of 353 MVA, Solution Undetermined	
10SP	AEPW	AEPW	FLINT CREEK - GENTRY REC 161KV	305	102.8	104.1	Base Case	0	Rebuild 1.09 miles of 2-397.5 ACSR with 2156 ACSR. Replace Flint Creek wavetraps & jumpers	\$ 450,000
10SP	AEPW	AEPW	FLINT CREEK - GENTRY REC 161KV	353	102.7	103.8	LOWELL - TONTITOWN 161KV	0	See Previous Upgrade Specified	
10SP	AEPW	AEPW	FLINT CREEK - GENTRY REC 161KV	353	101.0	102.5	FLINT CREEK - TONTITOWN 161KV	0	See Previous Upgrade Specified	
10SP	AEPW	AEPW	FLINT CREEK - GENTRY REC 161KV	353	100.2	101.4	LOWELL - ROGERS 161KV	0	See Previous Upgrade Specified	
10SP	WERE	WERE	GILL ENERGY CENTER EAST - OATVILLE 69KV	72	111.9	112.0	GILL ENERGY CENTER EAST - MACARTHUR 69KV	0	See Previous Upgrade Specified	
10SP	SPRM	SPRM	JAMES RIVER - TWIN OAKS 69KV	108	100.6	100.8	JAMES RIVER - SOUTH HIGHWAY 65 69KV	0	Solution Undetermined	
10SP	SPRM	SPRM	KICKAPOO - SUNSET 69KV	108	105.8	105.9	JAMES RIVER - TWIN OAKS 69KV	0	Solution Undetermined	
10SP	WERE	WERE	LABETTE SWITCHING STATION - NEOSHO 69KV	36	108.1	108.2	NEOSHO - ORDANANCE JUNCTION 69KV	0	May be relieved due to Westar Operating Procedure	
10SP	WERE	WERE	LABETTE SWITCHING STATION - NEOSHO 69KV	36	100.9	101.0	ORDANANCE JUNCTION - PARSONS 69KV	0	May be relieved due to Westar Operating Procedure	
10SP	WERE	WERE	LAWRENCE HILL 230/115KV TRANSFORMER	308	110.0	110.2	LAWRENCE HILL - MIDLAND JCT 230KV CKT 1	0	May be relieved due to Westar Transmission Operating Directive 901 Outage of the Lawrence Hill-Midland JCT 230kV Line	
10SP	WERE	WERE	LAWRENCE HILL 230/115KV TRANSFORMER	308	110.0	110.1	MIDLAND JUNCTION 230/115KV TRANSFORMER CKT 1	0	May be relieved due to Westar Transmission Operating Directive 615 Loss of the Midland Junction 230/115kV Transformer	
10SP	WERE	WERE	LAWRENCE HILL 230/115KV TRANSFORMER	308	107.8	108.0	LAWRENCE HILL - MIDLAND JCT 230KV CKT 1	0	May be relieved due to Westar Transmission Operating Directive 901 Outage of the Lawrence Hill-Midland JCT 230kV Line	
10SP	WERE	WERE	LAWRENCE HILL 230/115KV TRANSFORMER	308	107.8	107.9	MIDLAND JUNCTION 230/115KV TRANSFORMER CKT 1	0	May be relieved due to Westar Transmission Operating Directive 615 Loss of the Midland Junction 230/115kV Transformer	
10SP	AEPW	AEPW	LONGWOOD - OAK PAN-HARR REC 138KV	209	105.7	105.8	Multiple Outage Contingency: LONGWOOD - SW SHREVEPORT 345KV DIANA - SW SHREVEPORT 345KV	0	See Previous Upgrade Specified	
10SP	WERE	WERE	NEOSHO 138/69KV TRANSFORMER A CKT 1	20	106.0	108.6	NEOSHO 138/69KV TRANSFORMER NEC CKT 1	0	May be relieved due to Westar Transmission Operating Directive 621 Outage of the Neosho SES #3 138/69 kV Main Transformer	
10SP	WERE	WERE	NEOSHO 138/69KV TRANSFORMER A CKT 1	20	104.8	107.4	NEOSHO 138/69KV TRANSFORMER NEC CKT 1	0	May be relieved due to Westar Transmission Operating Directive 621 Outage of the Neosho SES #3 138/69 kV Main Transformer	
10SP	WERE	WERE	NEOSHO 138/69KV TRANSFORMER B CKT 1	17	105.9	108.5	NEOSHO 138/69KV TRANSFORMER NEC CKT 1	0	May be relieved due to Westar Transmission Operating Directive 621 Outage of the Neosho SES #3 138/69 kV Main Transformer	
10SP	WERE	WERE	NEOSHO 138/69KV TRANSFORMER B CKT 1	17	104.9	107.5	NEOSHO 138/69KV TRANSFORMER NEC CKT 1	0	May be relieved due to Westar Transmission Operating Directive 621 Outage of the Neosho SES #3 138/69 kV Main Transformer	
10SP	WERE	WERE	NEOSHO 138/69KV TRANSFORMER C CKT 2	17	105.9	108.5	NEOSHO 138/69KV TRANSFORMER NEC CKT 1	0	May be relieved due to Westar Transmission Operating Directive 621 Outage of the Neosho SES #3 138/69 kV Main Transformer	
10SP	WERE	WERE	NEOSHO 138/69KV TRANSFORMER C CKT 2	17	104.9	107.5	NEOSHO 138/69KV TRANSFORMER NEC CKT 1	0	May be relieved due to Westar Transmission Operating Directive 621 Outage of the Neosho SES #3 138/69 kV Main Transformer	
10SP	SWPA	SWPA	NIXA 161/69KV TRANSFORMER CKT 1	25	192.3	192.5	NIXA 161/69KV TRANSFORMER CKT 2	0	Solution Undetermined	
10SP	SWPA	SWPA	NIXA 161/69KV TRANSFORMER CKT 1	25	174.1	174.3	NIXA 161/69KV TRANSFORMER CKT 2	0	Solution Undetermined	
10SP	SWPA	SWPA	NIXA 161/69KV TRANSFORMER CKT 2	25	201.6	201.8	NIXA 161/69KV TRANSFORMER CKT 1	0	Solution Undetermined	
10SP	SWPA	SWPA	NIXA 161/69KV TRANSFORMER CKT 2	25	174.4	174.5	NIXA 161/69KV TRANSFORMER CKT 1	0	Solution Undetermined	
10SP	EMDE	EMDE	SUB 376 - MONETT CITY SOUTH - SUB 416 - MONETT CITY EAST 69KV	27	111.3	111.9	Base Case	0	Solution Undetermined	
10SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST - SUB EXPLORER SPRING CITY TAP 69KV	39	101.7	102.0	SUB 184 - NEOSHO SOUTH JCT. - SUB 314 - NEOSHO LINDE 69KV	0	Solution Undetermined	
10SP	WERE	WERE	WEST JUNCTION CITY - WEST JUNCTION CITY JUNCTION (WEST) 115KV	141	159.1	159.2	EAST MANHATTAN 230/115KV TRANSFORMER CKT 1	0	May be relieved due to Westar Operating Procedure 633 Outage of the East Manhattan 230-115kV Transformer	
10SP	SWPA	SPRM	BROOKLINE - SPRINGFIELD 161KV	323	98.6	103.6	SOUTHWEST - SOUTHWEST DISPOSAL 161KV	71	See Previous Upgrade Specified	
10SP	SWPA	SPRM	BROOKLINE - SPRINGFIELD 161KV	323	97.7	102.8	BATTLEFIELD - SOUTHWEST DISPOSAL 161KV	112	See Previous Upgrade Specified	

SPP-2003-253-1 Option 1
 Table 1.1 - SPP Facility Overloads Caused or Impacted
 by 250 MW Transfer

Southwest Power Pool
 System Impact Study

Study Case	From Area	To Area	Monitored Branch Overload	Rating <MVA>	BC % Loading	TC % Loading	Outaged Branch Causing Overload	ATC (MW)	Solution	Cost
10SP	EMDE	EMDE	SUB 110 - ORONOJO JCT. - SUB 432 - JOPLIN OAKLAND NORTH 161KV	214	99.2	95.1	SUB 292 - TIPTON FORD - SUB 389 - JOPLIN SOUTHWEST 161KV	136	At 200 MW the loading is 101.4% and the facility is relieved by additional 50 MW. See Previous Upgrade Specified	
10SP	SWPA	SWPA	SPRINGFIELD 161/69KV TRANSFORMER CKT 1	80	97.5	101.6	BROOKLINE - JUNCTION 161KV	152	Replace 25/25MVA transformer #3 with 80MVA unit to eliminate overload of both 25MVA #3 and 80MVA #1 transformers.	\$ 1,300,000
10SP	AEPW	AEPW	EAST CENTERTON - GENTRY REC 161KV	353	99.3	100.4	LOWELL - TONTITOWN 161KV	155	Rebuild 19.16 miles of 2-397.5 ACSR with 2156 ACSR. Replace East Centerton Wavetrap & jumpers	\$ 8,000,000
10SP	SWPA	AECI	CARTHAGE - REEDS 69KV	36	91.5	104.5	CARTHAGE - SUB 382 - LARUSSEL 161KV	164	AECI third party line. No SWPA upgrades required.	
10SP	SWPA	AEPW	BEAVER - EUREKA SPRINGS 161KV	263	95.0	101.5	Multiple Outage Contingency: FLINT CREEK - SUB 383 - MONETT 345KV BROOKLINE - SUB 383 - MONETT 345KV	193	See Previous Upgrade Specified	
10SP	AEPW	AEPW	EAST CENTERTON - GENTRY REC 161KV	305	98.9	100.2	Base Case	220	See Previous Upgrade Specified	
10SP	EMDE	EMDE	SUB 435 - NOEL SOUTHWEST 161/69KV TRANSFORMER	75	52.5	103.1	JANE - NEOSHO - SUB 184 161KV	235	Solution Undetermined	
10SP	EMDE	EMDE	SUB 435 - NOEL SOUTHWEST 161/69KV TRANSFORMER	75	54.0	102.1	JANE - NEOSHO - SUB 184 161KV	239	Solution Undetermined	
10SP	EMDE	AECI	NEOSHO 161/69KV TRANSFORMER	84	50.5	100.9	NEOSHO - SUB 184 - NEOSHO SOUTH JCT. 161KV CKT 1	245	No EMDE Upgrades required Third Party Transformer	
10SP	AEPW	AEPW	BLUE CIRCLE - CATOOSA 69KV	72	110.0	110.1	LYNN LANE TAP - LYNN LANE WEST TAP 138KV	250	Invalid Contingency	
10SP	SPS	SPS	LE-LVTN3 115/69KV TRANSFORMER	100	128.1	128.2	CUNNINGHAM STATION - SNANT3 115KV	250	Invalid Contingency	
10WP	WERE	WERE	166TH STREET - JARBALO JUNCTION SWITCHING STATION 115KV	97	102.5	102.6	MIDLAND JUNCTION - PENTAGON 115KV	0	May be relieved due to Westar Operating Procedure 1202 Overload of the Jarbalo to Jaggard 115kV Line	
10WP	SWPA	AEPW	BEAVER - EUREKA SPRINGS 161KV	263	98.7	105.4	Multiple Outage Contingency: FLINT CREEK - SUB 383 - MONETT 345KV BROOKLINE - SUB 383 - MONETT 345KV	48	See Previous Upgrade Specified	
10WP	SWPA	AECI	CARTHAGE - REEDS 69KV	43	97.3	108.2	CARTHAGE - SUB 382 - LARUSSEL 161KV	62	AECI third party line. No SWPA upgrades required.	
10WP	SWPA	AEPW	BEAVER - EUREKA SPRINGS 161KV	227	95.5	101.7	Base Case	182	See Previous Upgrade Specified	
10WP	EMDE	AECI	NEOSHO 161/69KV TRANSFORMER	84	58.2	103.8	NEOSHO - SUB 184 - NEOSHO SOUTH JCT. 161KV CKT 1	229	No EMDE Upgrades required Third Party Transformer	
10WP	AECI	EMDE	NEOSHO 161/69KV TRANSFORMER	84	56.0	101.3	NEOSHO - SUB 184 - NEOSHO SOUTH JCT. 161KV CKT 1	243	No EMDE Upgrades required Third Party Transformer	
10WP	SWPA	AECI	DONIPHAN 161/69KV TRANSFORMER CKT 1	18.75	167.1	167.2	DONIPHAN 161/69KV TRANSFORMER CKT 2	250	Local area problem. Transformer is owned by AECI.	
Total Estimated Cost									\$ 31,722,500	

SPP-2003-253-1 Option 1
 Table 2.1 - Non-SPP Facility Overloads
 Caused or Impacted by 250 MW Transfer

Southwest Power Pool
 System Impact Study

Study Case	From Area	To Area	Monitored Branch Overload	Rating <MVA>	BC % Loading	TC % Loading	Outaged Branch Causing Overload	Comments
05AP			NONE IDENTIFIED					
05G	AECI	AECI	96089 5JAMESV 161 to 96673 2JAMESV 69 CKT 1	56	101.8	102.7	96089 5JAMESV 161 to 96673 2JAMESV 69 CKT 2	
05G	AECI	AECI	96089 5JAMESV 161 to 96673 2JAMESV 69 CKT 2	56	105.5	106.5	96089 5JAMESV 161 to 96673 2JAMESV 69 CKT 1	
05SH			NONE IDENTIFIED					
05FA			NONE IDENTIFIED					
07SP	AECI	AECI	96071 5CLINTN 161 WND 2 CLINTN3 3	56	100.0	100.7	96071 5CLINTN 161 to 96692 2CLINTN 69.0 to 96693 1CLINTN113.8 CKT 1	
07SP	AECI	AECI	96089 5JAMESV 161 WND 2 JAMESV1 1	84	106.6	108.7	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV24.16 CKT 2	
07SP	AECI	AECI	96089 5JAMESV 161 WND 2 JAMESV2 2	84	107.2	109.3	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV14.16 CKT 1	
07SP	AECI	AECI	96119 5SULLVN 161 WND 2 SULLV32 2	50	119.9	120.7	96119 5SULLVN 161 to 97152 2SULVN3 69.0 to 97147 1SULLV31 CKT 1	
07SP	AECI	AECI	96123 5WPLAIN 161 WND 2 WESTPL2 2	56	117.2	119.0	96123 5WPLAIN 161 to 97123 2WSTPL3 69.0 to 97119 1WESTPL2 CKT 1	
07SP	AECI	AECI	96124 5HOLDEN 161 WND 2 HOLDEN 1	56	113.2	113.3	96071 5CLINTN 161 to 96124 5HOLDEN 161 CKT 1	
07SP	AECI	AECI	96126 5MOBTAP 161 to 96120 5THMHIL 161 CKT 1	372	105.8	105.9	Multiple Outage Contingency: 96049 7THOMHL 345 to 96044 7MCCRED 345 CKT 1 96044 7MCCRED 345 to 96043 7KINGDM 345 CKT 1	
07SP	AECI	AECI	96129 5WSHBRN 161 WND 2 WSHBRN1 1	56	98.8	101.9	52680 BEAVER 5 161 to 53136 EUREKA 5 161 CKT 1	
07SP	AECI	AECI	96673 2JAMESV 69.0 WND 1 JAMESV1 1	84	102.9	104.8	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV24.16 CKT 2	
07SP	AECI	AECI	96673 2JAMESV 69.0 WND 1 JAMESV2 2	84	103.1	104.8	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV14.16 CKT 1	
07SP	AECI	AECI	96692 2CLINTN 69.0 to 96701 2GAINES 69.0 CKT 1	36	129.4	130.2	Multiple Outage Contingency: 96071 5CLINTN 161 to 96108 5OSCEOL 161 CKT 1 96108 5OSCEOL161 to 52698 STOCKTN5 161 CKT 1	
07SP	AECI	AECI	96692 2CLINTN 69.0 to 96701 2GAINES 69.0 CKT 1	36	123.1	123.7	96108 5OSCEOL 161 to 96811 2OSCEOL 69.0 to 96812 1OSCEOLA CKT 1	
07SP	AECI	AECI	96692 2CLINTN 69.0 WND 1 CLINTN3 3	56	100.6	101.2	96071 5CLINTN 161 to 96692 2CLINTN 69.0 to 96693 1CLINTN113.8 CKT 1	
07SP	AECI	AECI	96701 2GAINES 69.0 to 96810 2MTZION 69.0 CKT 1	36	112.1	113.0	Multiple Outage Contingency: 96071 5CLINTN 161 to 96108 5OSCEOL 161 CKT 1 96108 5OSCEOL161 to 52698 STOCKTN5 161 CKT 1	
07SP	AECI	AECI	96701 2GAINES 69.0 to 96810 2MTZION 69.0 CKT 1	36	105.8	106.4	96108 5OSCEOL 161 to 96811 2OSCEOL 69.0 to 96812 1OSCEOLA CKT 1	
07SP	SWPA	AECI	52640 DONIPHNS 161 to 97201 2DONIPH 69 CKT 1	18.75	158.7	158.8	52640 DONIPHNS 161 to 97201 2DONIPH 69 CKT 2	Local area problem. Transformer is owned by AECI.
07SP	SWPA	AECI	52690 CARTHG 2 69 to 96751 2REEDS 69 CKT 1	36	90.7	102.9	52688 CARTHAG5 161 to 59479 LAR382 5 161 CKT 1	Third Party Line Owned By AECI
07SP	SWPA	SPRM	52692 SPRGFLD5 161 to 59969 BRKLINE 5 161 CKT 1	323	98.9	102.8	59955 JUNCTN 5 161 to 59969 BRKLINE 5 161 CKT 1	Third Party Line Owned By AECI
07SP	AEPW	ENTR	53136 EUREKA 5 161 to 99832 5OSAGE # 161 CKT 1	223	101.3	103.1	52660 BULL SH5 161 to 99802 5BULLSH* 161 CKT 1	Less Than 3% Impact
07SP	AEPW	ENTR	53136 EUREKA 5 161 to 99832 5OSAGE # 161 CKT 1	223	100.3	102.1	99802 5BULLSH* 161 to 99809 5FLIPN 161 CKT 1	"
07SP	NPPD	NPPD	64755 BROKENB7 115 to 64756 BROKENBG 69 CKT 2	35	180.5	180.7	64755 BROKENB7 115 to 64756 BROKENBG 69 CKT 1	
07SP	AECI	AECI	96096 5MARIES 161 to 97184 2MARIES 69 CKT 2	25	101.0	101.1	96096 5MARIES 161 to 97184 2MARIES 69 CKT 3	
07SP	AECI	AECI	96126 5MOBTAP 161 to 96120 5THMHIL 161 CKT 1	372	104.1	104.2	96044 7MCCRED 345 to 96049 7THOMHL 345 CKT 1	
07SP	AECI	AECI	96654 2MILO 69 to 96802 2CLARK 69 CKT 1	36	113.0	113.8	52690 CARTHG 2 69 to 96649 2JASPER 69 CKT 1	
07SP	AECI	AECI	96692 2CLINTN 69 to 96701 2GAINES 69 CKT 1	36	120.0	122.2	96071 5CLINTN 161 to 96108 5OSCEOL 161 CKT 1	
07SP	AECI	AECI	96701 2GAINES 69 to 96810 2MTZION 69 CKT 1	36	107.0	109.2	96071 5CLINTN 161 to 96108 5OSCEOL 161 CKT 1	
07WP	EMDE	AECI	59471 NEO184 5 161 WND 2 NEOSHO 1	84	55.6	103.6	52686 NEO SPA5 161 to 59471 NEO184 5 161 CKT 1	Third Party Transformer
07WP	AECI	AECI	96081 5GAINES 161 WND 2 GAINESVL 1	56	101.0	101.1	52648 NORFORK5 161 to 96123 5WPLAIN 161 CKT 1	
07WP	AECI	AECI	96123 5WPLAIN 161 WND 2 WESTPL1 1	56	115.8	115.9	96123 5WPLAIN 161 to 97123 2WSTPL3 69.0 to 97120 1WESTPL2 CKT 2	
07WP	AECI	AECI	96123 5WPLAIN 161 WND 2 WESTPL2 2	56	123.8	124.0	96123 5WPLAIN 161 to 97123 2WSTPL3 69.0 to 97119 1WESTPL2 CKT 1	
07WP	AECI	EMDE	96748 2NEOSAC 69.0 WND 1 NEOSHO 1	84	53.7	101.5	52686 NEO SPA5 161 to 59471 NEO184 5 161 CKT 1	Third Party Transformer
07WP	SWPA	AECI	52640 DONIPHNS 161 to 97201 2DONIPH 69 CKT 1	18.75	156.1	156.5	52640 DONIPHNS 161 to 97201 2DONIPH 69 CKT 2	Local area problem. Transformer is owned by AECI.
07WP	SWPA	AECI	52690 CARTHG 2 69 to 96751 2REEDS 69 CKT 1	43	96.6	102.6	52688 CARTHAG5 161 to 59479 LAR382 5 161 CKT 1	Third Party Line Owned By AECI
10SP	AMRN	AMRN	31408 OVERTON 345 WND 1 1	300	104.5	104.6	96043 7KINGDM 345 to 96090 5KINGDM 161 CKT 1	
10SP	AMRN	AMRN	31408 OVERTON 345 WND 1 1	300	104.4	104.5	96043 7KINGDM 345 to 96044 7MCCRED 345 CKT 1	
10SP	AMRN	AMRN	31409 OVERTON 161 WND 2 1	300	101.8	101.9	96043 7KINGDM 345 to 96090 5KINGDM 161 CKT 1	
10SP	AMRN	AMRN	31409 OVERTON 161 WND 2 1	300	101.7	101.8	96043 7KINGDM 345 to 96044 7MCCRED 345 CKT 1	
10SP	EMDE	AECI	59471 NEO184 5 161 WND 2 NEOSHO 1	84	50.5	100.9	52686 NEO SPA5 161 to 59471 NEO184 5 161 CKT 1	Third Party Transformer
10SP	AECI	AECI	96071 5CLINTN 161 WND 2 CLINTN3 3	56	106.1	106.8	96071 5CLINTN 161 to 96692 2CLINTN 69.0 to 96693 1CLINTN113.8 CKT 1	
10SP	AECI	AECI	96074 5CUBA 161 WND 2 CUBA 1	56	101.9	102.0	96112 5SALEM 161 to 97027 2SALEM3 69.0 to 97029 1SALEM31 CKT 1	
10SP	AECI	AECI	96074 5CUBA 161 WND 2 CUBA 1	56	101.7	101.8	96112 5SALEM 161 to 97027 2SALEM3 69.0 to 97030 1SALEM32 CKT 2	
10SP	AECI	AECI	96079 5FREDTN 161 WND 2 FREDTOWN 1	50	101.9	102.0	97274 5WWEAST 161 to 97278 2WWEAST 69.0 CKT 1	
10SP	AECI	AECI	96089 5JAMESV 161 WND 2 JAMESV1 1	84	114.1	114.7	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV24.16 CKT 2	
10SP	AECI	AECI	96089 5JAMESV 161 WND 2 JAMESV2 2	84	113.2	113.8	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV14.16 CKT 1	

SPP-2003-253-1 Option 1
 Table 2.1 - Non-SPP Facility Overloads
 Caused or Impacted by 250 MW Transfer

Southwest Power Pool
 System Impact Study

Study Case	From Area	To Area	Monitored Branch Overload	Rating <MVA>	BC % Loading	TC % Loading	Outaged Branch Causing Overload	Comments
10SP	AECI	AECI	96108 5OSCEOL 161 to 96071 5CLINTN 161 CKT 1	123	98.2	100.6	Multiple Outage Contingency: 96555 5GRAVOI 161 to 96552 5EDMONS 161 CKT 1 96555 5GRAVOI 161 to 96057 5BARNET 161 CKT 1	
10SP	AECI	AECI	96108 5OSCEOL 161 WND 2 OSCEOLA 1	56	102.6	103.3	96701 2GAINES 69.0 to 96810 2MTZION 69.0 CKT 1	
10SP	AECI	AECI	96108 5OSCEOL 161 WND 2 OSCEOLA 1	56	100.6	101.2	52698 STOCKTN5 161 to 96108 5OSCEOL 161 CKT 1	
10SP	AECI	AECI	96124 5HOLDEN 161 WND 2 HOLDEN 1	56	121.9	122.1	96071 5CLINTN 161 to 96124 5HOLDEN 161 CKT 1	
10SP	AECI	AECI	96126 5MOBTAP 161 to 96120 5THMHIL 161 CKT 1	372	108.8	109.0	Multiple Outage Contingency: 96049 7THOMHL 345 to 96044 7MCCRED 345 CKT 1 96044 7MCCRED 345 to 96043 7KINGDM 345 CKT 1	
10SP	AECI	AECI	96129 5WSHBRN 161 WND 2 WSHBRN1 1	56	100.7	104.6	52680 BEAVER 5 161 to 53136 EUREKA 5 161 CKT 1	
10SP	AECI	AECI	96673 2JAMESV 69.0 WND 1 JAMESV1 1	84	109.3	109.9	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV24.16 CKT 2	
10SP	AECI	AECI	96673 2JAMESV 69.0 WND 1 JAMESV2 2	84	108.3	108.9	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV14.16 CKT 1	
10SP	AECI	AECI	96692 2CLINTN 69.0 to 96701 2GAINES 69.0 CKT 1	36	135.7	136.6	Multiple Outage Contingency: 96071 5CLINTN 161 to 96108 5OSCEOL 161 CKT 1 96108 5OSCEOL161 to 52698 STOCKTN5 161 CKT 1	
10SP	AECI	AECI	96692 2CLINTN 69.0 to 96701 2GAINES 69.0 CKT 1	36	129.6	130.1	96108 5OSCEOL 161 to 96811 2OSCEOL 69.0 to 96812 1OSCEOLA CKT 1	
10SP	AECI	AECI	96692 2CLINTN 69.0 WND 1 CLINTN3 3	56	106.4	107.1	96071 5CLINTN 161 to 96692 2CLINTN 69.0 to 96693 1CLINTN113.8 CKT 1	
10SP	AECI	AECI	96701 2GAINES 69.0 to 96810 2MTZION 69.0 CKT 1	36	117.1	117.9	Multiple Outage Contingency: 96071 5CLINTN 161 to 96108 5OSCEOL 161 CKT 1 96108 5OSCEOL161 to 52698 STOCKTN5 161 CKT 1	
10SP	AECI	AECI	96701 2GAINES 69.0 to 96810 2MTZION 69.0 CKT 1	36	110.9	111.4	96108 5OSCEOL 161 to 96811 2OSCEOL 69.0 to 96812 1OSCEOLA CKT 1	
10SP	AECI	AECI	96763 2WSHBRN 69.0 WND 1 WSHBRN1 1	56	96.5	100.8	52680 BEAVER 5 161 to 53136 EUREKA 5 161 CKT 1	
10SP	AECI	AECI	96811 2OSCEOL 69.0 WND 1 OSCEOLA 1	56	102.0	102.6	96701 2GAINES 69.0 to 96810 2MTZION 69.0 CKT 1	
10SP	AMRN	AMRN	31408*OVERTON 345 WND 1	300	100.7	100.8	Multiple Outage Contingency: 31221 MOBERLY 161 to 58062 SALSBRV5161 CKT 1 31221 MOBERLY 161 to 96126 5MOBTAP 161 CKT 1	
10SP	SWPA	AECI	52690 CARTHG 2 69 to 96751 2REEDS 69 CKT 1	36	91.5	104.5	52688 CARTHAG5 161 to 59479 LAR382 5 161 CKT 1	Third Party Line Owned By AECI
10SP	SWPA	AECI	52690 CARTHG 2 69 to 96751 2REEDS 69 CKT 1	36	101.7	102.5	59472 TIP292 5 161 to 59480 MON383 5 161 CKT 1	Third Party Line Owned By AECI
10SP	SWPA	SPRM	52692 SPRGFLD5 161 to 59969 BRKLINE 5 161 CKT 1	323	102.9	107.2	59955 JUNCTN 5 161 to 59969 BRKLINE 5 161 CKT 1	Third Party Line Owned By AECI
10SP	SWPA	SPRM	52692 SPRGFLD5 161 to 59969 BRKLINE 5 161 CKT 1	323	98.6	103.6	59954 SWPS 5 161 to 59960 SWDISP 5 161 CKT 1	Third Party Line Owned By AECI
10SP	SWPA	SPRM	52692 SPRGFLD5 161 to 59969 BRKLINE 5 161 CKT 1	323	97.7	102.8	59959 BATFLD 5 161 to 59960 SWDISP 5 161 CKT 1	Third Party Line Owned By AECI
10SP	AECI	SWPA	96056 5ASHRVL 161 to 52634 IDALIA 5 161 CKT 1	206	101.1	101.2	96073 5HARVELE 161 to 96084 5GRNFRT 161 CKT 1	
10SP	AECI	SWPA	96056 5ASHRVL 161 to 52634 IDALIA 5 161 CKT 1	206	101.0	101.1	96073 5HARVELE 161 to 96114 5STFRAN 161 CKT 1	
10SP	AECI	AECI	96096 5MARIES 161 to 97184 2MARIES 69 CKT 1	25	103.3	103.4	96096 5MARIES 161 to 97184 2MARIES 69 CKT 3	
10SP	AECI	AECI	96096 5MARIES 161 to 97184 2MARIES 69 CKT 2	25	103.8	103.9	96096 5MARIES 161 to 97184 2MARIES 69 CKT 3	
10SP	AECI	AECI	96108*5OSCEOL 161 WND 2 OSCEOLA 1	56	101.4	102.2	Multiple Outage Contingency: 96555 5GRAVOI 161 to 96552 5EDMONS 161 CKT 1 96555 5GRAVOI 161 to 96057 5BARNET 161 CKT 1	
10SP	AECI	AECI	96108*5OSCEOL 161 WND 2 OSCEOLA 1	56	99.4	100.4	Multiple Outage Contingency: 96563 5SUNNRIS 161 to 96086 5GRNVTP 161 CKT 1 96086 5GRNVTP 161 to 97062 5LAKEVW 161 CKT 1	
10SP	AECI	AECI	96126 5MOBTAP 161 to 96120 5THMHIL 161 CKT 1	372	106.7	106.8	96044 7MCCRED 345 to 96049 7THOMHL 345 CKT 1	
10SP	AECI	AECI	96647 2BLLMYTP 69 to 96654 2MILO 69 CKT 1	36	100.3	101.0	52690 CARTHG 2 69 to 96649 2JASPER 69 CKT 1	
10SP	AECI	AECI	96654 2MILO 69 to 96802 2CLARK 69 CKT 1	36	122.5	123.2	52690 CARTHG 2 69 to 96649 2JASPER 69 CKT 1	
10SP	AECI	AECI	96654 2MILO 69 to 96802 2CLARK 69 CKT 1	36	105.5	106.3	96649 2JASPER 69 to 96651 2LAMAR 69 CKT 1	
10SP	AECI	AECI	96692 2CLINTN 69 to 96701 2GAINES 69 CKT 1	36	123.6	125.6	96071 5CLINTN 161 to 96108 5OSCEOL 161 CKT 1	
10SP	AECI	AECI	96699 2ELYNTN 69 to 96705 2PECULR 69 CKT 1	36	99.7	100.8	59207 ARCHIE 5 161 to 59240 ADRIAN 5 161 CKT 1	
10SP	AECI	AECI	96701 2GAINES 69 to 96810 2MTZION 69 CKT 1	36	109.6	111.4	96071 5CLINTN 161 to 96108 5OSCEOL 161 CKT 1	
10SP	AECI	AECI	96709 1SHARSVL 69 to 96699 2ELYNTN 69 CKT 1	36	100.1	101.2	59207 ARCHIE 5 161 to 59240 ADRIAN 5 161 CKT 1	
10SP	AECI	AECI	96720 2GRETNA 69 to 96725 2REEDSP 69 CKT 1	51	105.0	105.2	52674 TABLE R2 69 to 96735 2T.ROCK 69 CKT 1	
10SP	ENTR	AEPW	99832 5OSAGE # 161 to 53136 EUREKA 5 161 CKT 1	223	110.0	111.8	52660 BULL SH5 161 to 99802 5BULLSH* 161 CKT 1	Less Than 3% Impact
10SP	ENTR	AEPW	99832 5OSAGE # 161 to 53136 EUREKA 5 161 CKT 1	223	108.7	110.5	99802 5BULLSH* 161 to 99809 5FLIPN 161 CKT 1	"
10SP	ENTR	AEPW	99832 5OSAGE # 161 to 53136 EUREKA 5 161 CKT 1	223	105.6	107.5	99809 5FLIPN 161 to 99837 5SUMMIT 161 CKT 1	"
10SP	ENTR	AEPW	99832 5OSAGE # 161 to 53136 EUREKA 5 161 CKT 1	223	102.9	105.1	99519 5QUITMN 161 to 99799 5BEE BR 161 CKT 1	"
10SP	ENTR	AEPW	99832 5OSAGE # 161 to 53136 EUREKA 5 161 CKT 1	223	102.3	104.2	99811 5HARR-E 161 to 99837 5SUMMIT 161 CKT 1	"
10WP	AMRN	AMRN	31408 OVERTON 345 to 31409 OVERTON 161 CKT 1	300	105.2	105.3	96049 7THOMHL 345 to 96120 5THMHIL 161 to 96164 1THILL3 CKT 1	
10WP	EMDE	AECI	59471 NEO184 5 161 WND 2 NEOSHO 1	84	58.2	103.8	52686 NEO SPA5 161 to 59471 NEO184 5 161 CKT 1	Third Party Transformer
10WP	AECI	AECI	96063 5CALIF 161 WND 2 CALI 1	56	100.5	100.6	30026 APCH TP 161 to 30233 CALIF 161 CKT 1	

SPP-2003-253-1 Option 1
 Table 2.1 - Non-SPP Facility Overloads
 Caused or Impacted by 250 MW Transfer

Southwest Power Pool
 System Impact Study

Study Case	From Area	To Area	Monitored Branch Overload	Rating <MVA>	BC % Loading	TC % Loading	Outaged Branch Causing Overload	Comments
10WP	AECI	AECI	96074 5CUBA 161 WND 2 CUBA 1	56	104.5	104.6	96112 5SALEM 161 to 97027 2SALEM3 69.0 to 97029 1SALEM31 CKT 1	
10WP	AECI	AECI	96074 5CUBA 161 WND 2 CUBA 1	56	104.3	104.4	96112 5SALEM 161 to 97027 2SALEM3 69.0 to 97030 1SALEM32 CKT 2	
10WP	AECI	AECI	96123 5WPLAIN 161 WND 2 WESTPL2 2	56	109.2	109.5	96123 5WPLAIN 161 to 97123 2WSTPL3 69.0 to 97119 1WESTPL2 CKT 1	
10WP	AECI	AECI	96124 5HOLDEN 161 WND 2 HOLDEN 1	56	122.4	122.6	96071 5CLINTN 161 to 96124 5HOLDEN 161 CKT 1	
10WP	AECI	AECI	96126 5MOBTAP 161 to 96120 5THMHIL 161 CKT 1	386	100.9	101.0	Multiple Outage Contingency: 96049 7THOMHL 345 to 96044 7MCCRED 345 CKT 1 96044 7MCCRED 345 to 96043 7KINGDM 345 CKT 1	
10WP	AECI	AECI	96692 2CLINTN 69.0 to 96701 2GAINES 69.0 CKT 1	43	110.5	111.1	Multiple Outage Contingency: 96071 5CLINTN 161 to 96108 5OSCEOL 161 CKT 1 96108 5OSCEOL 161 to 52698 STOCKTN5 161 CKT 1	
10WP	AECI	AECI	96692 2CLINTN 69.0 to 96701 2GAINES 69.0 CKT 1	43	105.8	106.3	96108 5OSCEOL 161 to 96811 2OSCEOL 69.0 to 96812 1OSCEOLA CKT 1	
10WP	AECI	EMDE	96748 2NEOSAC 69.0 WND 1 NEOSHO 1	84	56.0	101.3	52686 NEO SPA5 161 to 59471 NEO184 5 161 CKT 1	Third Party Transformer
10WP	AMRN	AMRN	31408 OVERTON 345 to 31409 OVERTON 161 CKT 1	300	112.4	112.6	96043 7KINGDM 345 to 96090 5KINGDM 161 CKT 1	
10WP	AMRN	AMRN	31408 OVERTON 345 to 31409 OVERTON 161 CKT 1	300	112.4	112.5	96043 7KINGDM 345 to 96044 7MCCRED 345 CKT 1	
10WP	AMRN	AMRN	31408 OVERTON 345 to 31409 OVERTON 161 CKT 1	300	101.8	101.9	96120 5THMHIL 161 to 96126 5MOBTAP 161 CKT 1	
10WP	AMRN	AMRN	31408 OVERTON 345 to 31409 OVERTON 161 CKT 1	300	101.3	101.4	96090 5KINGDM 161 to 96519 5MLRSBG 161 CKT 1	
10WP	AMRN	AMRN	31408 OVERTON 345 to 31409 OVERTON 161 CKT 1	300	100.3	100.4	96061 5BOONE 161 to 96519 5MLRSBG 161 CKT 1	
10WP	SWPA	AECI	52640 DONIPH5 161 to 97201 2DONIPH 69 CKT 1	18.75	167.1	167.2	52640 DONIPH5 161 to 97201 2DONIPH 69 CKT 2	Local area problem. Transformer is owned by AECI.
10WP	SWPA	AECI	52690 CARTHG 2 69 to 96751 2REEDS 69 CKT 1	43	97.3	108.2	52688 CARTHAG5 161 to 59479 LAR382 5 161 CKT 1	Third Party Line Owned By AECI
10WP	NPPD	NPPD	64726 ALBION 7 115 to 64727 ALBION 9 34.5 CKT 2	11	109.5	109.6	64726 ALBION 7 115 to 64727 ALBION 9 34.5 CKT 1	
10WP	AECI	AECI	96692 2CLINTN 69 to 96701 2GAINES 69 CKT 1	43	98.1	100.1	96071 5CLINTN 161 to 96108 5OSCEOL 161 CKT 1	
10WP	AECI	AECI	96751 2REEDS 69 to 96659 2BOWRML 69 CKT 1	43	91.4	102.3	52688 CARTHAG5 161 to 59479 LAR382 5 161 CKT 1	

SPP-2003-253-1 Option 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 Overload	Rating <MVA>	BC % Loading	TC % Loading	Outaged Branch Causing Overload	ATC (MW)	Solution	Cost
							Multiple Outage Contingency: 53140 FLINTCR7 345 to 59481 MON383 7 345 CKT 1 59481 MON383 7 345 to 59984 BRKLINE 7 345 CKT 1			
05AP	EMDE	SWPA	59471 NEO184 5 161 to 52686 NEO SPA5 161 CKT 1	157	31.0	115.7		205	Solution Undetermined	
05AP	EMDE	SWPA	59471 NEO184 5 161 to 52686 NEO SPA5 161 CKT 1	157	24.4	115.2	59471 NEO184 5 161 to 96748 2NEOSAC 69.0 to 96761 1NEOSHO CKT	208	Solution Undetermined	
05AP	EMDE	SWPA	59471 NEO184 5 161 to 52686 NEO SPA5 161 CKT 1	157	29.8	114.0	53929 DELWARE7 345 to 53955 N.E.S.-7 345 CKT 1	209	Solution Undetermined	
05AP	EMDE	SWPA	59471 NEO184 5 161 to 52686 NEO SPA5 161 CKT 1	157	30.6	114.0	53135 EROGERS5 161 to 53191 AVOCA--5 161 CKT 1	209	Solution Undetermined	
05AP	EMDE	SWPA	59471 NEO184 5 161 to 52686 NEO SPA5 161 CKT 1	157	14.1	117.6	59496 NOL435 5 161 to 59692 JANE 51 61 CKT 1	215	Solution Undetermined	
05AP	SWPA	SPRM	52694 SPRGFLD2 69 to 59911 GOLDEN 2 69 CKT 1	72	101.7	102.8	52694 SPRGFLD2 69 to 59911 GOLDEN 2 69 CKT 2	250	Incorrect Rating, Emergency Rating 95 MVA	
05AP	SWPA	SPRM	52694 SPRGFLD2 69 to 59911 GOLDEN 2 69 CKT 2	72	101.7	102.8	52694 SPRGFLD2 69 to 59911 GOLDEN 2 69 CKT 1	250	Incorrect Rating, Emergency Rating 95 MVA	
05G			NONE IDENTIFIED					250		
05SH	GRDA	GRDA	54451 CLARMR 5 161 to 54479 CLARMR 2 69 CKT 2	84	100.2	100.6	54451 CLARMR 5 161 to 54479 CLARMR 2 69 CKT 1	0	See Previous Upgrade Specified	
05SH	GRDA	GRDA	54451 CLARMR 5 161 to 54479 CLARMR 2 69 CKT 1	84	99.9	100.3	54451 CLARMR 5 161 to 54479 CLARMR 2 69 CKT 2	52	Add 3rd 161/69 KV Transformer	\$ 1,250,000
05SH	EMDE	EMDE	59561 NOL443 2 69 to 59566 AND322 2 69 CKT 1	49	43.2	104.8	59471 NEO184 5 161 to 59692 JANE 51 61 CKT 1	231	Solution Undetermined	
05SH	EMDE	SWPA	59471 NEO184 5 161 to 59692JANE 5161 CKT 1	218	29.4	104.9	Base Case	234	Solution Undetermined	
							Multiple Outage Contingency: 53140 FLINTCR7 345 to 59481 MON383 7 345 CKT 1 59481 MON383 7 345 to 59984 BRKLINE 7 345 CKT 1			
05SH	EMDE	SWPA	59471 NEO184 5 161 to 52686 NEO SPA5 161 CKT 1	157	22.0	105.3		236	Solution Undetermined	
05SH	EMDE	SWPA	59471 NEO184 5 161 to 52686 NEO SPA5 161 CKT 1	157	9.8	105.3	59471 NEO184 5 161 to 96748 2NEOSAC 69.0 to 96761 1NEOSHO CKT	236	Solution Undetermined	
05SH	EMDE	SWPA	59471 NEO184 5 161 to 52686 NEO SPA5 161 CKT 1	157	32.2	103.4	59472 TIP292 5 161 to 59483 JOP389 5 161 CKT 1	238	Solution Undetermined	
05SH	EMDE	SWPA	59471 NEO184 5 161 to 52686 NEO SPA5 161 CKT 1	157	19.9	102.1	53135 EROGERS5 161 to 53191 AVOCA--5 161 CKT 1	244	Solution Undetermined	
05SH	EMDE	SWPA	59471 NEO184 5 161 to 52686 NEO SPA5 161 CKT 1	130	20.6	102.0	Base Case	244	Solution Undetermined	
05SH	EMDE	SWPA	59471 NEO184 5 161 to 52686 NEO SPA5 161 CKT 1	157	19.9	100.2	53929 DELWARE7 345 to 53955 N.E.S.-7 345 CKT 1	249	Solution Undetermined	
05FA	WERE	WERE	57631 CC4VERN2 69 to 57623 ATHENS 2 69 CKT 1	45	104.8	105.8	56797 WOLFCKR7 345 to 57981 LACYGNE7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 1304 Overload of the Athens to Wolf Creek 69 kV Line	
05FA	OKGE	OKGE	54721 IMO 269.0 to 54722 CLEVETP269.0 CKT 1	36	116.0	116.1	54730 SO4TH2 269.0 to 54731 SO4TH4 4 138 to 55758 SO4TH 1113.2 CKT	0	Possible Invalid Contingency	
05FA	WERE	WERE	57636 GREEN 2 69 to 57631 CC4VERN2 69 CKT 1	45	106.1	107.1	56797 WOLFCKR7 345 to 57981 LACYGNE7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 1304 Overload of the Athens to Wolf Creek 69 kV Line	
05FA	SWPA	AEPW	52680 BEAVER 5 161 to 53136 EUREKA 5 161 CKT 1	263	97.6	101.7	Multiple Outage Contingency: 53140 FLINTCR7 345 to 59481 MON383 7 345 CKT 1 59481 MON383 7 345 to 59984 BRKLINE 7 345 CKT 1	149	SWPA Reconnect CT's to 1000:5 Tap on Bkrs 42, 32, & half or 22. Replace metering & reset relays for Line 2 & Line 3. AEPW Replace Wavetrap & Metering CT Jumpers	\$ 67,500
05FA	EMDE	SWPA	59471 NEO184 5 161 to 52686 NEO SPA5 161 CKT 1	157	20.6	109.1	53140 FLINTCR7 345 to 59481 MON383 7 345 CKT 1	225	Solution Undetermined	
05FA	SWPA	EMDE	52686 NEO SPA5 161 to 59471 NEO184 5 161 CKT 1	157	13.8	108.7	59481 MON383 7 345 to 59984 BRKLINE 7 345 CKT 1	227	Solution Undetermined	
05FA	EMDE	SWPA	59471 NEO184 5 161 to 52686 NEO SPA5 161 CKT 1	157	37.0	105.0	59472 TIP292 5 161 to 59483 JOP389 5 161 CKT 1	232	Solution Undetermined	
05FA	EMDE	SWPA	59471 NEO184 5 161 to 52686 NEO SPA5 161 CKT 1	157	18.2	105.4	53135 EROGERS5 161 to 53191 AVOCA--5 161 CKT 1	234	Solution Undetermined	
05FA	EMDE	SWPA	59471 NEO184 5 161 to 52686 NEO SPA5 161 CKT 1	130	12.2	107.3	Base Case	235	Solution Undetermined	
05FA	EMDE	SWPA	59471 NEO184 5 161 to 59692JANE 5161 CKT 1	218	26.9	102.7	Base Case	241	Solution Undetermined	
07SP	WERE	WERE	57244 JARBALO3 115 to 57233 166TH 3 115 CKT 1	97	100.8	100.9	57252 MIDLAND3 115 to 57261 PENTAGN3 115 CKT 1	0	May be relieved due to Westar Operating Procedure 1202 Overload of the Jarbalo to Jaggard 115kV Line	
07SP	WERE	WERE	56851 AUBURN 6 230 to 56852 JEC 6 230 CKT 1	565	108.9	109.3	56765 HOYT 7 345 to 56766 JEC N 7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 400 Outage of the Jeffrey Energy Center to Hoyt 345kV Line	
07SP	WERE	WERE	56851 AUBURN 6 230 WND 1 AUBRN77X 1	308	118.1	118.3	56765 HOYT 7 345 to 56766 JEC N 7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 400 Outage of the Jeffrey Energy Center to Hoyt 345kV Line	
07SP	WERE	WERE	57151 AUBURN 3 115 WND 2 AUBRN77X 1	308	117.3	117.6	56765 HOYT 7 345 to 56766 JEC N 7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 400 Outage of the Jeffrey Energy Center to Hoyt 345kV Line	
07SP	AEPW	AEPW	53195 FARMGTN5 161 to 53154 CHAMSPR5 161 CKT 1	353	106.9	107.1	53131 DYESS 5 161 to 53159 SOSPRDL5 161 CKT 1	0	Rebuild 10.24 miles with 2156 ACSR, replace Chamber Springs wavetrap, & replace Farmington AECC bus.	\$ 6,400,000
07SP	GRDA	GRDA	54451 CLARMR 5 161 to 54479 CLARMR 2 69 CKT 1	84	109.9	110.2	54451 CLARMR 5 161 to 54479 CLARMR 2 69 CKT 2	0	See Previous Upgrade Specified	
07SP	GRDA	GRDA	54451 CLARMR 5 161 to 54479 CLARMR 2 69 CKT 2	84	110.2	110.5	54451 CLARMR 5 161 to 54479 CLARMR 2 69 CKT 1	0	See Previous Upgrade Specified	
07SP	WERE	WERE	57153 COLINE 3 115 WND 1 COLINE5X 1	66	101.8	101.9	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 Outage of the Hoyt to Stranger 345 kV line	
07SP	AEPW	AEPW	53159 SOSPRDL5 161 to 53131 DYESS 5 161 CKT 1	313	113.2	113.3	53154 CHAMSPR5 161 to 53195 FARMGTN5 161 CKT 1	0	Rebuild 3.95 miles of 1272 AAC with 2156 ACSR. Replace South Springdale Circuit Switcher & Jumpers	\$ 2,200,000
07SP	AEPW	ENTR	53136 EUREKA 5 161 to 99832 5OSAGE # 161 CKT 1	223	101.3	103.1	52660 BULL SH5 161 to 99802 5BULLSH* 161 CKT 1	0	Solution Undetermined	
07SP	AEPW	ENTR	53136 EUREKA 5 161 to 99832 5OSAGE # 161 CKT 1	223	100.3	102.1	99802 5BULLSH* 161 to 99809 5FLIPN 161 CKT 1	0	Solution Undetermined	
07SP	WERE	WERE	57795 GILL E 2 69 to 57825 OATVILL2 69 CKT 1	72	112.2	112.3	57795 GILL E 2 69 to 57813 MACARTH2 69 CKT 1	0	Replace disconnect switches at Gill 69 kV (use 800 A.), Replace line switch at Oatville 69 kV (use 800 A.).	\$ 45,000
07SP	WERE	WERE	56853 LAWHILL6 230 WND 1 LAWHL29X 1	308	112.3	112.4	56853 LAWHILL6 230 to 56855 MIDLAND6 230 CKT 1	0	May be relieved due to Westar Transmission Operating Directive 901 Outage of the Lawrence Hill-Midland JCT 230kV Line	
07SP	WERE	WERE	56853 LAWHILL6 230 WND 1 LAWHL29X 1	308	112.1	112.2	56855 MIDLAND6 230 to 57252 MIDLAND3 115 to 56884 MIDLAND118.0 CKT 1	0	May be relieved due to Westar Transmission Operating Directive 615 Loss of the Midland Junction 230/115kV Transformer	

SPP-2003-253-1 Option 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 Overload	Rating <MVA>	BC % Loading	TC % Loading	Outaged Branch Causing Overload	ATC (MW)	Solution	Cost
07SP	WERE	WERE	57250 LWRNCHL3 115 WND 2 LAHWL29X 1	308	110.2	110.3	56853 LAWHILL6 230 to 56855 MIDLAND6 230 CKT 1	0	May be relieved due to Westar Transmission Operating Directive 901 Outage of the Lawrence Hill-Midland JCT 230kV Line	
07SP	AEPW	AEPW	53457 OAKPH 4 138 to 53423 LONGWD 4 138 CKT 1	209	100.8	100.9	Multiple Outage Contingency: 53454 SW SHV 7 345 to 53424 LONGWD 7 345 CKT 1 53454 SW SHV 7 345 to 53528 DIANA 7 345 CKT 1	0	Rebuild 1.8 miles of 666 ACSR with 1590 ACSR.	\$ 750,000
07SP	WERE	WERE	56855 MIDLAND6 230 WND 1 MIDJ126X 1	308	100.7	100.8	56853 LAWHILL6 230 to 57250 LWRNCHL3 115 to 56882 LAWHILL113.8 CKT 1	0	May be relieved due to Westar Transmission Operating Directive 631 Loss of the Lawrence Hill 230/115kV Transformer	
07SP	EMDE	EMDE	59467 ORO110 5 161 to 59494 OAK432 5 161 CKT 1	214	96.8	90.8	59472 TIP292 5 161 to 59483 JOP389 5 161 CKT1	71	At 100 MW the loading is 101.3% and the facility is relieved by additional 50 MW, Reconstruct and replace 1.4 miles of 556 ACSR with Bundled 556 ACSR.	\$ 800,000
07SP	SWPA	SPRM	52692 SPRGFLD5 161 to 59969 BRKLINE 5 161 CKT 1	323	98.9	102.8	59955 JUNCTN 5 161 to 59969 BRKLINE 5 161 CKT 1	71	Replace disconnect switches at Springfield.	\$ 60,000
07SP	SWPA	AEPW	52680 BEAVER 5 161 to 53136 EUREKA 5 161 CKT 1	263	95.6	102.1	Multiple Outage Contingency: 53140 FLINTCR7 345 to 59481 MON383 7 345 CKT 1 59481 MON383 7 345 to 59984 BRKLINE 7 345 CKT 1	169	See Previous Upgrade Specified	
07SP	SWPA	AECI	52690 CARTHG 2 69 to 96751 2REEDS 69 CKT 1	36	90.7	102.9	52688 CARTHAG5 161 to 59479 LAR382 5 161 CKT 1	191	AECI third party line. No SWPA upgrades required.	
07SP	AEPW	AEPW	53691 GLENPIN4 138 to 53687 CANTONT4 138 CKT 1	235	100.9	101.0	53549 JACKSNV4 138 to 53689 COFFEE 4 138 CKT 1	250	Invalid Contingency	
07SP	SWPA	AECI	52640 DONIPHNS 161 to 97201 2DONIPH 69 CKT 1	18.75	158.7	158.8	52640 DONIPHNS 161 to 97201 2DONIPH 69 CKT 2	250	Local area problem. Transformer is owned by AECI.	
07SP	SWPA	SWPA	52692 SPRGFLD5 161 WND 2 SPF X3 1	25	126.3	131.6	52692 SPRGFLD5 161 to 52694 SPRGFLD269.0 to 52691 SPF X1 113.8 CKT 1	250	An outage of Springfield transformer #1 overloads transformer #3. If this situation were to occur, SWPA would open either the high or low side breaker on transformer #3 to remove the overload. This does not introduce any other overloads.	
07SP	SWPA	SWPA	52694 SPRGFLD269.0 WND 1 SPF X3 1	25	116.1	120.2	52692 SPRGFLD5 161 to 52694 SPRGFLD269.0 to 52691 SPF X1 113.8 CKT 1	250	An outage of Springfield transformer #1 overloads transformer #3. If this situation were to occur, SWPA would open either the high or low side breaker on transformer #3 to remove the overload. This does not introduce any other overloads.	
07WP	SWPA	SWPA	52650 NORFORK269.0 WND 1 NFK X1 1	25	116.5	116.6	52648 NORFORK5 161 to 52650 NORFORK269.0 to 52651 NFK X2 113.8 CKT 1	0	Replace Norfork Transformer	\$ 1,300,000
07WP	SWPA	SWPA	52648 NORFORK5 161 WND 2 NFK X1 1	25	102.9	103.0	52648 NORFORK5 161 to 96123 SWPLAIN 161 CKT 1	0	See Previous Upgrade Specified	
07WP	SWPA	SWPA	52650 NORFORK269.0 WND 1 NFK X1 1	25	102.7	102.8	52648 NORFORK5 161 to 96123 SWPLAIN 161 CKT 1	0	See Previous Upgrade Specified	
07WP	SWPA	AEPW	52680 BEAVER 5 161 to 53136 EUREKA 5 161 CKT 1	263	98.8	104.6	Multiple Outage Contingency: 53140 FLINTCR7 345 to 59481 MON383 7 345 CKT 1 59481 MON383 7 345 to 59984 BRKLINE 7 345 CKT 1	51	See Previous Upgrade Specified	
07WP	SWPA	AECI	52690 CARTHG 2 69 to 96751 2REEDS 69 CKT 1	43	96.6	102.6	52688 CARTHAG5 161 to 59479 LAR382 5 161 CKT 1	141	AECI third party line. No SWPA upgrades required.	
07WP	EMDE	AECI	59471 NEO184 5 161 WND 2 NEOSHO 1	84	55.6	103.6	52686 NEO SPA5 161 to 59471 NEO184 5 161 CKT 1	233	No EMDE Upgrades required Third Party Transformer	
07WP	AECI	EMDE	96748 2NEOSAC 69.0 WND 1 NEOSHO 1	84	53.7	101.5	52686 NEO SPA5 161 to 59471 NEO184 5 161 CKT 1	242	No EMDE Upgrades required Third Party Transformer	
07WP	SWPA	AEPW	52680 BEAVER 5 161 to 53136 EUREKA 5 161 CKT 1	227	94.8	100.1	Base Case	246	See Previous Upgrade Specified	
07WP	SWPA	AECI	52640 DONIPHNS 161 to 97201 2DONIPH 69 CKT 1	18.75	156.1	156.5	52640 DONIPHNS 161 to 97201 2DONIPH 69 CKT 2	250	Local area problem. Transformer is owned by AECI.	
10SP	WERE	WERE	57244 JARBALO3 115 to 57233 166TH 3 115 CKT 1	97	112.0	112.1	57252 MIDLAND3 115 to 57261 PENTAGN3 115 CKT 1	0	May be relieved due to Westar Operating Procedure 1202 Overload of the Jarbalo to Jaggard 115kV Line	
10SP	WERE	WERE	57244 JARBALO3 115 to 57233 166TH 3 115 CKT 1	97	108.0	108.2	56772 STRANGR7 345 to 57977 CRAIG 7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 1202 Overload of the Jarbalo to Jaggard 115kV Line or 800 Outage of the Stranger Creek to Craig 345 kV Line	
10SP	WERE	WERE	57244 JARBALO3 115 to 57233 166TH 3 115 CKT 1	97	103.6	103.8	57240 EUDORA 3 115 to 57277 WAKARUS3 115 CKT 1	0	May be relieved due to Westar Operating Procedure 1202 Overload of the Jarbalo to Jaggard 115kV Line	
10SP	WERE	WERE	57244 JARBALO3 115 to 57233 166TH 3 115 CKT 1	97	100.8	100.9	57235 CAPTAIN3 115 to 57240 EUDORA 3 115 CKT 1	0	May be relieved due to Westar Operating Procedure 1202 Overload of the Jarbalo to Jaggard 115kV Line	
10SP	WERE	WERE	57365 EABILEN3 115 to 57361 AEC 3 115 CKT 1	68	177.7	177.8	56861 EMANHAT6 230 to 57326 EMANHAT3 115 to 56888 EMANHAT118.0 CKT 1	0	May be relieved due to Westar Operating Procedure 633 Outage of the East Manhattan 230-115kV Transformer	
10SP	WERE	WERE	57365 EABILEN3 115 to 57361 AEC 3 115 CKT 2	92	154.7	154.8	56861 EMANHAT6 230 to 57326 EMANHAT3 115 to 56888 EMANHAT118.0 CKT 1	0	May be relieved due to Westar Operating Procedure 633 Outage of the East Manhattan 230-115kV Transformer	
10SP	WERE	WERE	57361 AEC 3 115 to 57371 NORTHVW3 115 CKT 1	68	156.5	156.6	56861 EMANHAT6 230 to 57326 EMANHAT3 115 to 56888 EMANHAT118.0 CKT 1	0	May be relieved due to Westar Operating Procedure 633 Outage of the East Manhattan 230-115kV Transformer	
10SP	WERE	WERE	57361 AEC 3 115 to 57371 NORTHVW3 115 CKT 2	92	136.6	136.7	56861 EMANHAT6 230 to 57326 EMANHAT3 115 to 56888 EMANHAT118.0 CKT 1	0	May be relieved due to Westar Operating Procedure 633 Outage of the East Manhattan 230-115kV Transformer	
10SP	AECI	SWPA	96056 SASHRVL 161 to 52634 IDALIA 5 161 CKT 1	206	101.1	101.2	96073 SHARVELE 161 to 96084 5GRNFR1 161 CKT 1	0	Reconductor line with 954 ACSR.	\$ 6,600,000
10SP	AECI	SWPA	96056 SASHRVL 161 to 52634 IDALIA 5 161 CKT 1	206	101.0	101.1	96073 SHARVELE 161 to 96114 5STFRAN 161 CKT 1	0	See Previous Upgrade Specified	
10SP	SWPA	SPRM	52692 SPRGFLD5 161 to 59969 BRKLINE 5 161 CKT 1	323	102.9	107.2	59955 JUNCTN 5 161 to 59969 BRKLINE 5 161 CKT 1	0	See Previous Upgrade Specified	
10SP	SWPA	AECI	52690 CARTHG 2 69 to 96751 2REEDS 69 CKT 1	36	101.7	102.5	59472 TIP292 5 161 to 59480 MON383 5 161 CKT 1	0	AECI third party line. No SWPA upgrades required.	
10SP	AEPW	AEPW	53195 FARMGTN5 161 to 53154 CHAMSPR5 161 CKT 1	353	123.0	123.1	53131 DYESS 5 161 to 53159 SOSPRDL5 161 CKT 1	0	See Previous Upgrade Specified	
10SP	AEPW	AEPW	53195 FARMGTN5 161 to 53154 CHAMSPR5 161 CKT 1	353	104.9	105.0	53159 SOSPRDL5 161 to 53193 EFAYTVL5 161 CKT 1	0	See Previous Upgrade Specified	
10SP	WERE	WERE	57362 CHAPMAN3 115 to 57365 EABILEN3 115 CKT 1	68	170.8	170.9	56861 EMANHAT6 230 to 57326 EMANHAT3 115 to 56888 EMANHAT118.0 CKT 1	0	May be relieved due to Westar Operating Procedure 633 Outage of the East Manhattan 230-115kV Transformer	

SPP-2003-253-1 Option 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 Overload	Rating <MVA>	BC % Loading	TC % Loading	Outaged Branch Causing Overload	ATC (MW)	Solution	Cost
10SP	WERE	WERE	57362 CHAPMAN3 115 to 57365 EABILEN3 115 CKT 2	92	149.2	149.3	56861 EMANHAT6 230 to 57326 EMANHAT3 115 to 56888 EMANHAT118.0 CKT 1	0	May be relieved due to Westar Operating Procedure 633 Outage of the East Manhattan 230-115kV Transformer	
10SP	WERE	WERE	57344 WJCTYVW3 115 to 57362 CHAPMAN3 115 CKT 1	68	151.2	151.3	56861 EMANHAT6 230 to 57326 EMANHAT3 115 to 56888 EMANHAT118.0 CKT 1	0	May be relieved due to Westar Operating Procedure 633 Outage of the East Manhattan 230-115kV Transformer	
10SP	GRDA	GRDA	54451 CLARMR 5 161 to 54479 CLARMR 2 69 CKT 1	84	112.0	112.3	54451 CLARMR 5 161 to 54479 CLARMR 2 69 CKT 2	0	See Previous Upgrade Specified	
10SP	GRDA	GRDA	54451 CLARMR 5 161 to 54479 CLARMR 2 69 CKT 2	84	112.4	112.6	54451 CLARMR 5 161 to 54479 CLARMR 2 69 CKT 1	0	See Previous Upgrade Specified	
10SP	GRDA	GRDA	54427 COLINS 5 161 to 54476 COLNSGR2 69 CKT 1	50	100.3	100.6	54427 COLINS 5 161 to 54476 COLNSGR2 69 CKT 2	0	Solution Undetermined	
10SP	AEPW	AEPW	53194 ELMSPRR5 161 to 53131 DYESS 5 161 CKT 1	312	108.7	109.0	53131 DYESS 5 161 to 53170 TONTITN5 161 CKT 1	0	Terminal Equipment Limited, Solution Undetermined	
10SP	AEPW	AEPW	53131 DYESS 5 161 to 53194 ELMSPRR5 161 CKT 1	312	100.2	100.5	53154 CHAMSPR5 161 to 53195 FARMGTN5 161 CKT 1	0	Terminal Equipment Limited, Solution Undetermined	
10SP	AEPW	AEPW	53159 SOSPRDL5 161 to 53131 DYESS 5 161 CKT 1	313	130.9	131.0	53154 CHAMSPR5 161 to 53195 FARMGTN5 161 CKT 1	0	See Previous Upgrade Specified	
10SP	AEPW	AEPW	53159 SOSPRDL5 161 to 53131 DYESS 5 161 CKT 1	313	108.3	108.4	53157 SFAYTVL5 161 to 53195 FARMGTN5 161 CKT 1	0	See Previous Upgrade Specified	
10SP	AEPW	AEPW	53193 EFAYTVL5 161 to 53159 SOSPRDL5 161 CKT 1	313	108.0	108.1	53154 CHAMSPR5 161 to 53195 FARMGTN5 161 CKT 1	0	Replace Jumpers @ South Springdale, Circuit Switcher @ S. Springdale, & Switch @ E. Fayetteville	\$ 100,000
10SP	ENTR	AEPW	99832 SOSAGE # 161 to 53136 EUREKA 5 161 CKT 1	223	110.0	111.8	52660 BULL SH5 161 to 99802 5BULLSH* 161 CKT 1	0	Rebuild 5.34 miles of 666 ACSR with 1590 ACSR. Replace wavetrapp jumpers @ Eureka Springs	\$ 2,400,000
10SP	ENTR	AEPW	99832 SOSAGE # 161 to 53136 EUREKA 5 161 CKT 1	223	108.7	110.5	99802 5BULLSH* 161 to 99809 5FLIPN 161 CKT 1	0	See Previous Upgrade Specified	
10SP	ENTR	AEPW	99832 SOSAGE # 161 to 53136 EUREKA 5 161 CKT 1	223	105.6	107.5	99809 5FLIPN 161 to 99837 5SUMMIT 161 CKT 1	0	See Previous Upgrade Specified	
10SP	ENTR	AEPW	99832 SOSAGE # 161 to 53136 EUREKA 5 161 CKT 1	223	102.9	105.1	99519 5QUITMN 161 to 99799 5BEE BR 161 CKT 1	0	See Previous Upgrade Specified	
10SP	ENTR	AEPW	99832 SOSAGE # 161 to 53136 EUREKA 5 161 CKT 1	223	102.3	104.2	99811 5HARR-E 161 to 99837 5SUMMIT 161 CKT 1	0	See Previous Upgrade Specified	
10SP	AEPW	AEPW	53157 SFAYTVL5 161 to 53195 FARMGTN5 161 CKT 1	313	113.2	113.3	53131 DYESS 5 161 to 53159 SOSPRDL5 161 CKT 1	0	Loading Exceeds Conductor Emergency Rating of 353 MVA, Solution Undetermined	
10SP	AEPW	AEPW	53187 GENTRYR5 161 to 53139 FLINTCR5 161 CKT 1	305	102.8	104.1	Base Case	0	Rebuild 1.09 miles of 2-397.5 ACSR with 2156 ACSR. Replace Flint Creek wavetrapp & jumpers	\$ 450,000
10SP	AEPW	AEPW	53187 GENTRYR5 161 to 53139 FLINTCR5 161 CKT 1	353	102.7	103.8	53144 LOWELL 5 161 to 53170 TONTITN5 161 CKT 1	0	See Previous Upgrade Specified	
10SP	AEPW	AEPW	53187 GENTRYR5 161 to 53139 FLINTCR5 161 CKT 1	353	101.0	102.5	53139 FLINTCR5 161 to 53170 TONTITN5 161 CKT 1	0	See Previous Upgrade Specified	
10SP	AEPW	AEPW	53187 GENTRYR5 161 to 53139 FLINTCR5 161 CKT 1	353	100.2	101.4	53144 LOWELL 5 161 to 53152 ROGERS 5 161 CKT 1	0	See Previous Upgrade Specified	
10SP	WERE	WERE	57795 GILL E 2 69 to 57825 OATVILL2 69 CKT 1	72	111.9	112.0	57795 GILL E 2 69 to 57813 MACARTH2 69 CKT 1	0	See Previous Upgrade Specified	
10SP	SPRM	SPRM	59933 TWINOAK2 69 to 59904 JRPS 2 69 CKT 1	108	100.6	100.8	59904 JRPS 2 69 to 59908 S HY65 2 69 CKT 1	0	Solution Undetermined	
10SP	SPRM	SPRM	59906 KICKAPO2 69 to 59907 SUNSET 2 69 CKT 1	108	105.8	105.9	59904 JRPS 2 69 to 59933 TWINOAK2 69 CKT 1	0	Solution Undetermined	
10SP	WERE	WERE	57696 LABETT2 69 to 57768 NEOSHO 2 69 CKT 1	36	108.1	108.2	57703 ORDNJCT2 69 to 57768 NEOSHO 2 69 CKT 1	0	May be relieved due to Westar Operating Procedure	
10SP	WERE	WERE	57696 LABETT2 69 to 57768 NEOSHO 2 69 CKT 1	36	100.9	101.0	57703 ORDNJCT2 69 to 57704 PARSONS2 69 CKT 1	0	May be relieved due to Westar Operating Procedure	
10SP	WERE	WERE	56853 LAWHILL6 230 WND 1 LAHWL29X 1	308	110.0	110.2	56853 LAWHILL6 230 to 56855 MIDLAND6 230 CKT 1	0	May be relieved due to Westar Transmission Operating Directive 901 Outage of the Lawrence Hill-Midland JCT 230kV Line	
10SP	WERE	WERE	56853 LAWHILL6 230 WND 1 LAHWL29X 1	308	110.0	110.1	56855 MIDLAND6 230 to 57252 MIDLAND3 115 to 56884 MIDLAND118.0 CKT 1	0	May be relieved due to Westar Transmission Operating Directive 615 Loss of the Midland Junction 230/115kV Transformer	
10SP	WERE	WERE	57250 LWRNCHL3 115 WND 2 LAHWL29X 1	308	107.8	108.0	56853 LAWHILL6 230 to 56855 MIDLAND6 230 CKT 1	0	May be relieved due to Westar Transmission Operating Directive 901 Outage of the Lawrence Hill-Midland JCT 230kV Line	
10SP	WERE	WERE	57250 LWRNCHL3 115 WND 2 LAHWL29X 1	308	107.8	107.9	56855 MIDLAND6 230 to 57252 MIDLAND3 115 to 56884 MIDLAND118.0 CKT 1	0	May be relieved due to Westar Transmission Operating Directive 615 Loss of the Midland Junction 230/115kV Transformer	
10SP	AEPW	AEPW	53457 OAKPH 4 138 to 53423 LONGWD 4 138 CKT 1	209	105.7	105.8	Multiple Outage Contingency: 53454 SW SHV 7 345 to 53424 LONGWD 7 345 CKT 1 53454 SW SHV 7 345 to 53528 DIANA 7 345 CKT 1	0	See Previous Upgrade Specified	
10SP	WERE	WERE	57021 NEOSHO 4 138 WND 1 NEOSH2AX 1	20	106.0	108.6	57021 NEOSHO 4 138 to 57768 NEOSHO 269.0 to 56711 NEC U3 12.0 CKT 1	0	May be relieved due to Westar Transmission Operating Directive 621 Outage of the Neosho SES #3 138/69 kV Main Transformer	
10SP	WERE	WERE	57768 NEOSHO 269.0 WND 2 NEOSH2AX 1	20	104.8	107.4	57021 NEOSHO 4 138 to 57768 NEOSHO 269.0 to 56711 NEC U3 12.0 CKT 1	0	May be relieved due to Westar Transmission Operating Directive 621 Outage of the Neosho SES #3 138/69 kV Main Transformer	
10SP	WERE	WERE	57021 NEOSHO 4 138 WND 1 NEOSH2BX 1	17	105.9	108.5	57021 NEOSHO 4 138 to 57768 NEOSHO 269.0 to 56711 NEC U3 12.0 CKT 1	0	May be relieved due to Westar Transmission Operating Directive 621 Outage of the Neosho SES #3 138/69 kV Main Transformer	
10SP	WERE	WERE	57768 NEOSHO 269.0 WND 2 NEOSH2BX 1	17	104.9	107.5	57021 NEOSHO 4 138 to 57768 NEOSHO 269.0 to 56711 NEC U3 12.0 CKT 1	0	May be relieved due to Westar Transmission Operating Directive 621 Outage of the Neosho SES #3 138/69 kV Main Transformer	
10SP	WERE	WERE	57021 NEOSHO 4 138 WND 1 NEOSH2CX 2	17	105.9	108.5	57021 NEOSHO 4 138 to 57768 NEOSHO 269.0 to 56711 NEC U3 12.0 CKT 1	0	May be relieved due to Westar Transmission Operating Directive 621 Outage of the Neosho SES #3 138/69 kV Main Transformer	
10SP	WERE	WERE	57768 NEOSHO 269.0 WND 2 NEOSH2CX 2	17	104.9	107.5	57021 NEOSHO 4 138 to 57768 NEOSHO 269.0 to 56711 NEC U3 12.0 CKT 1	0	May be relieved due to Westar Transmission Operating Directive 621 Outage of the Neosho SES #3 138/69 kV Main Transformer	
10SP	SWPA	SWPA	52696 NIXA 5 161 WND 2 NIXA X1 1	25	192.3	192.5	52696 NIXA 5 161 to 52701 NIXA 269.0 to 52699 NIXA X2 113.8 CKT	0	Solution Undetermined	

SPP-2003-253-1 Option 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 Overload	Rating <MVA>	BC % Loading	TC % Loading	Outaged Branch Causing Overload	ATC (MW)	Solution	Cost
10SP	SWPA	SWPA	52701 NIXA 269.0 WND 1 NXA X1 1	25	174.1	174.3	52696 NIXA 5 161 to 52701 NIXA 269.0 to 52699 NIXA X2 113.8 CKT	0	Solution Undetermined	
10SP	SWPA	SWPA	52696 NIXA 5 161 WND 2 NIXA X2 1	25	201.6	201.8	52696 NIXA 5 161 to 52701 NIXA 269.0 to 52697 NIXA X1 113.8 CKT	0	Solution Undetermined	
10SP	SWPA	SWPA	52701 NIXA 269.0 WND 1 NIXA X2 1	25	174.4	174.5	52696 NIXA 5 161 to 52701 NIXA 269.0 to 52697 NIXA X1 113.8 CKT	0	Solution Undetermined	
10SP	EMDE	EMDE	59400 MON376J269 to 59402 MON416J269 CKT1	27	111.3	111.9	Base Case	0	Solution Undetermined	
10SP	EMDE	EMDE	59438 EXP449T2 69 to 59592 JOP389 2 69 CKT	39	101.7	102.0	59543 NEO184 2 69 to 59563 LIN314 2 69 CKT	0	Solution Undetermined	
10SP	WERE	WERE	57342 WJCCTY 3 115 to 57344 WJCCTYW3 115 CKT 1	141	159.1	159.2	56861 EMANHAT6 230 to 57326 EMANHAT3 115 to 56888 EMANHAT118.0 CKT 1	0	May be relieved due to Westar Operating Procedure 633 Outage of the East Manhattan 230-115kV Transformer	
10SP	SWPA	SPRM	52692 SPRGFLD5 161 to 59969 BRKLINE 5 161 CKT	323	98.6	103.6	59954 SWPS 5 161 to 59960 SWDISP 5 161 CKT 1	71	See Previous Upgrade Specified	
10SP	SWPA	SPRM	52692 SPRGFLD5 161 to 59969 BRKLINE 5 161 CKT	323	97.7	102.8	59959 BATFLD 5 161 to 59960 SWDISP 5 161 CKT	112	See Previous Upgrade Specified	
10SP	EMDE	EMDE	59494 OAK432 5 161 to 59467 ORO110 5 161 CKT 1	214	99.2	95.1	59472 TIP292 5 161 to 59483 JOP389 5 161 CKT1	136	At 200 MW the loading is 101.4% and the facility is relieved by additional 50 MW. See Previous Upgrade Specified	
10SP	SWPA	SWPA	52692 SPRGFLD5 161 WND 2 SPF X1 1	80	97.5	101.6	59955 JUNCTN 5 161 to 59969 BRKLINE 5 161 CKT 1	152	Replace 25/25MVA transformer #3 with 80MVA unit to eliminate overload of both 25MVA #3 and 80MVA #1 transformers.	\$ 1,300,000
10SP	AEPW	AEPW	53133 ECNTRTN5 161 to 53187 GENTRYR5 161 CKT 1	353	99.3	100.4	53144 LOWELL 5 161 to 53170 TONTITN5 161 CKT 1	155	Rebuild 19.16 miles of 2-397.5 ACSR with 2156 ACSR. Replace East Centerton Wavetrap & jumpers	\$ 8,000,000
10SP	SWPA	AECI	52690 CARTHG 2 69 to 96751 2REEDS 69 CKT	36	91.5	104.5	52688 CARTHAG5 161 to 59479 LAR382 5 161 CKT	164	AECI third party line. No SWPA upgrades required.	
10SP	SWPA	AEPW	52680 BEAVER 5 161 to 53136 EUREKA 5 161 CKT 1	263	95.0	101.5	53140 FLINTCR7 345 to 59481 MON383 7 345 CKT 1	193	Multiple Outage Contingency: See Previous Upgrade Specified	
10SP	AEPW	AEPW	53133 ECNTRTN5 161 to 53187 GENTRYR5 161 CKT	305	98.9	100.2	59481 MON383 7 345 to 59984 BRKLINE 7 345 CKT 1	220	Base Case See Previous Upgrade Specified	
10SP	EMDE	EMDE	59496 NOL435 5 161 WND 1 NOEL 1	75	52.5	103.1	59471 NEO184 5 161 to 59692 JANE 5161.0 CKT	235	Solution Undetermined	
10SP	EMDE	EMDE	59610 NOL435 269.0 WND 2 NOEL 1	75	54.0	102.1	59471 NEO184 5 161 to 59692 JANE 5161.0 CKT	239	Solution Undetermined	
10SP	EMDE	AECI	59471 NEO184 5 161 WND 2 NEOSHO 1	84	50.5	100.9	52686 NEO SPA5 161 to 59471 NEO184 5 161 CKT	245	No EMDE Upgrades required Third Party Transformer	
10SP	AEPW	AEPW	53806 BCIRCLE2 69 to 53811 CATOOSA2 69 CKT	72	110.0	110.1	53782 LLAN WT4 138 to 53816 LLANETP4 138 CKT	250	Invalid Contingency	
10SP	SPS	SPS	52354 LE-LVTN3 115 to 52442 LE-LOVP2 69 CKT	100	128.1	128.2	52208 CUNNINH3 115 to 52358 SNANT3 115 CKT 1	250	Invalid Contingency	
10WP	WERE	WERE	57244 JARBALO3 115 to 57233 166TH 3 115 CKT 1	97	102.5	102.6	57252 MIDLAND3 115 to 57261 PENTAGN3 115 CKT 1	0	May be relieved due to Westar Operating Procedure 1202 Overload of the Jarbalo to Jaggard 115kV Line	
10WP	SWPA	AEPW	52680 BEAVER 5 161 to 53136 EUREKA 5 161 CKT 1	263	98.7	105.4	53140 FLINTCR7 345 to 59481 MON383 7 345 CKT 1	48	Multiple Outage Contingency: See Previous Upgrade Specified	
10WP	SWPA	AECI	52690 CARTHG 2 69 to 96751 2REEDS 69 CKT	43	97.3	108.2	52688 CARTHAG5 161 to 59479 LAR382 5 161 CKT	62	AECI third party line. No SWPA upgrades required.	
10WP	SWPA	AEPW	52680 BEAVER 5 161 to 53136 EUREKA 5 161 CKT 1	227	95.5	101.7	52686 NEO SPA5 161 to 59471 NEO184 5 161 CKT	182	Base Case See Previous Upgrade Specified	
10WP	EMDE	AECI	59471 NEO184 5 161 WND 2 NEOSHO 1	84	58.2	103.8	52686 NEO SPA5 161 to 59471 NEO184 5 161 CKT	229	No EMDE Upgrades required Third Party Transformer	
10WP	AECI	EMDE	96748 2NEOSAC 69.0 WND 1 NEOSHO 1	84	56.0	101.3	52686 NEO SPA5 161 to 59471 NEO184 5 161 CKT	243	No EMDE Upgrades required Third Party Transformer	
10WP	SWPA	AECI	52640 DONIPH5 161 to 97201 2DONIPH 69 CKT 1	18.75	167.1	167.2	52640 DONIPH5 161 to 97201 2DONIPH 69 CKT 2	250	Local area problem. Transformer is owned by AECI.	
Total Estimated Cost									\$ 31,722,500	

SPP-2003-253-1 Option 2
 Table 1.2 - SPP Facility Overloads Caused or Impacted
 by 250 MW Transfer

Southwest Power Pool
 System Impact Study

Study Case	From Area	To Area	Monitored Branch Overload	Rating <MVA>	BC % Loading	TC % Loading	Outaged Branch Causing Overload	ATC (MW)	Solution	Cost
05AP	SWPA	SPRM	GOLDEN WEST - SPRINGFIELD 69KV CKT 1	72	101.7	102.7	GOLDEN WEST - SPRINGFIELD 69KV CKT 2	250	Incorrect Rating, Emergency Rating 95 MVA	
05AP	SWPA	SPRM	GOLDEN WEST - SPRINGFIELD 69KV CKT 2	72	101.7	102.7	GOLDEN WEST - SPRINGFIELD 69KV CKT 1	250	Incorrect Rating, Emergency Rating 95 MVA	
05G	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	118.3	118.4	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 Outage of the Hoyt to Stranger 345 kV line	
05G	EMDE	SWPA	CARTHAGE - SUB 109 - ATLAS JCT. 161KV	167	90.6	103.5	SUB 292 - TIPTON FORD - SUB 389 - JOPLIN SOUTHWEST 161KV	46	At 100 MW the loading is 105.6%, Replace 600 Amp disconnect switches May Require Additional Upgrades	\$ 60,000
05SH	EMDE	SWPA	CARTHAGE - SUB 109 - ATLAS JCT. 161KV	167	88.7	113.1	SUB 292 - TIPTON FORD - SUB 389 - JOPLIN SOUTHWEST 161KV	43	At 100 MW the loading is 115.1%, See Previous Upgrade Specified	
05SH	EMDE	EMDE	SUB 110 - ORONOJO JCT. - SUB 432 - JOPLIN OAKLAND NORTH 161KV	214	91.3	109.0	SUB 292 - TIPTON FORD - SUB 389 - JOPLIN SOUTHWEST 161KV	47	At 100 MW the loading is 109.7%, Reconstruct and replace 1.4 miles of 556 ACSR with Bundled 556 ACSR.	\$ 800,000
05SH	EMDE	EMDE	SUB 110 - ORONOJO JCT. - SUB 432 - JOPLIN OAKLAND NORTH 161KV	214	87.1	105.2	SUB 349 - ASBURY - SUB 421 - PURCELL SOUTHWEST 161KV	77	See Previous Upgrade Specified	
05SH	EMDE	SWPA	CARTHAGE - SUB 109 - ATLAS JCT. 161KV	167	80.0	104.6	SUB 349 - ASBURY - SUB 421 - PURCELL SOUTHWEST 161KV	84	See Previous Upgrade Specified	
05SH	EMDE	EMDE	SUB 109 - ATLAS JCT. - SUB 432 - JOPLIN OAKLAND NORTH 161KV	214	84.6	102.2	SUB 292 - TIPTON FORD - SUB 389 - JOPLIN SOUTHWEST 161KV	84	At 100 MW the loading is 102.9%, Solution Undetermined	
05SH	EMDE	EMDE	SUB 110 - ORONOJO JCT. - SUB 432 - JOPLIN OAKLAND NORTH 161KV	214	85.3	103.4	SUB 395 - CARTHAGE SOUTHWEST - SUB 421 - PURCELL SOUTHWEST 161KV	87	See Previous Upgrade Specified	
05SH	EMDE	SWPA	CARTHAGE - SUB 109 - ATLAS JCT. 161KV	167	77.5	102.1	SUB 395 - CARTHAGE SOUTHWEST - SUB 421 - PURCELL SOUTHWEST 161KV	94	See Previous Upgrade Specified	
05SH	EMDE	EMDE	SUB 110 - ORONOJO JCT. - SUB 432 - JOPLIN OAKLAND NORTH 161KV	214	82.3	100.5	CARTHAGE - SUB 395 - CARTHAGE SOUTHWEST 161KV	192	See Previous Upgrade Specified	
05FA	EMDE	SWPA	CARTHAGE - SUB 109 - ATLAS JCT. 161KV	167	100.7	101.9	SUB 349 - ASBURY - SUB 421 - PURCELL SOUTHWEST 161KV	0	See Previous Upgrade Specified	
07SP	WERE	WERE	166TH STREET - JARBALO JUNCTION SWITCHING STATION 115KV	97	100.8	100.9	MIDLAND JUNCTION - PENTAGON 115KV	0	May be relieved due to Westar Operating Procedure 1202 Overload of the Jarballo to Jaggard 115kV Line	
07SP	OKGE	OKGE	AHLOSO TAP - PARKLN 69KV	72	124.8	124.9	PARKLN - VALLY VIEW 69KV	0	Replace Switch @ Aholoso Tap & Breaker disconnect switch @ Park Lane Sub	\$ 300,000
07SP	WERE	WERE	AUBURN ROAD - JEFFREY ENERGY CENTER 230KV	565	108.9	109.3	HOYT - JEFFREY ENERGY CENTER 345KV	0	May be relieved due to Westar Operating Procedure 400 Outage of the Jeffrey Energy Center to Hoyt 345kV Line	
07SP	WERE	WERE	AUBURN ROAD 230/115KV TRANSFORMER	308	118.1	118.3	HOYT - JEFFREY ENERGY CENTER 345KV	0	May be relieved due to Westar Operating Procedure 400 Outage of the Jeffrey Energy Center to Hoyt 345kV Line	
07SP	WERE	WERE	AUBURN ROAD 230/115KV TRANSFORMER	308	117.3	117.6	HOYT - JEFFREY ENERGY CENTER 345KV	0	May be relieved due to Westar Operating Procedure 400 Outage of the Jeffrey Energy Center to Hoyt 345kV Line	
07SP	SWPA	AECI	CARTHAGE - REEDS 69KV	36	109.2	109.3	CARTHAGE - JASPER 69KV	0	AECI third party line. No SWPA upgrades required.	
07SP	SWPA	AECI	CARTHAGE - REEDS 69KV	36	103.5	103.7	JASPER - LAMAR 69KV	0	AECI third party line. No SWPA upgrades required.	
07SP	SWPA	AECI	CARTHAGE - REEDS 69KV	36	101.7	102.1	SUB 446 - CHESAPEAKE 161/69KV TRANSFORMER	0	AECI third party line. No SWPA upgrades required.	
07SP	SWPA	AECI	CARTHAGE - REEDS 69KV	36	100.9	101.6	BEAVER - EUREKA SPRINGS 161KV	0	AECI third party line. No SWPA upgrades required.	
07SP	AEPW	AEPW	CHAMBER SPRINGS - FARMINGTON AECC 161KV	353	106.9	107.0	DYESS - SOUTH SPRINGDALE 161KV	0	Rebuild 10.24 miles with 2156 ACSR, replace Chamber Springs wavetrap, & replace Farmington AECC bus.	\$ 6,400,000
07SP	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	102.1	102.2	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 Outage of the Hoyt to Stranger 345 kV line	
07SP	AEPW	ENTR	EUREKA SPRINGS - OSAGE CREEK (AECC) 161KV	223	104.4	104.7	HARRISON SOUTH AECC - HARRISON-EAST 161KV	0	Solution Undetermined	
07SP	AEPW	ENTR	EUREKA SPRINGS - OSAGE CREEK (AECC) 161KV	223	101.3	101.9	BULL SHOALS - BULL SHOALS HES 161KV	0	Solution Undetermined	
07SP	AEPW	ENTR	EUREKA SPRINGS - OSAGE CREEK (AECC) 161KV	223	100.3	100.9	BULL SHOALS HES - FLEPPIN 161KV	0	Solution Undetermined	
07SP	WERE	WERE	GATZ - GOLDEN PLAINS JUNCTION 69KV	32	120.5	121.2	MID AM JUNCTION - MUD CREEK JUNCTION 69KV	0	May be relieved due to Westar Operating Procedure 1301 Outage of the Halstead to Newton 69 kV line	
07SP	WERE	WERE	GATZ - GOLDEN PLAINS JUNCTION 69KV	32	120.5	121.2	HALSTEAD - MUD CREEK JUNCTION 69KV	0	May be relieved due to Westar Operating Procedure 1301 Outage of the Halstead to Newton 69 kV line	
07SP	WERE	WERE	GATZ - GOLDEN PLAINS JUNCTION 69KV	32	119.5	120.2	MID AM JUNCTION - NEWTON 69KV	0	May be relieved due to Westar Operating Procedure 1301 Outage of the Halstead to Newton 69 kV line	
07SP	SPS	SPS	HALE CO INTERCHANGE 115/69KV TRANSFORMER CKT 1	46	132.6	132.7	HALE CO INTERCHANGE 115/69KV TRANSFORMER CKT 2	0	May be relieved due to Xcel Energy Operating Guide for Outage of Hale Co Interchange 115/69 kV Transformer	
07SP	SPS	SPS	HALE CO INTERCHANGE 115/69KV TRANSFORMER CKT 2	46	133.1	133.2	HALE CO INTERCHANGE 115/69KV TRANSFORMER CKT 1	0	May be relieved due to Xcel Energy Operating Guide for Outage of Hale Co Interchange 115/69 kV Transformer	
07SP	WERE	WERE	LAWRENCE HILL 230/115KV TRANSFORMER	308	112.1	112.2	MIDLAND JUNCTION 230/115KV TRANSFORMER CKT 1	0	May be relieved due to Westar Transmission Operating Directive 615 Loss of the Midland Junction 230/115kV Transformer	
07SP	WERE	WERE	LAWRENCE HILL 230/115KV TRANSFORMER	308	110.2	110.3	LAWRENCE HILL - MIDLAND JCT 230KV CKT 1	0	May be relieved due to Westar Transmission Operating Directive 901 Outage of the Lawrence Hill-Midland JCT 230kV Line	
07SP	WERE	WERE	LAWRENCE HILL 230/115KV TRANSFORMER	308	110.1	110.2	MIDLAND JUNCTION 230/115KV TRANSFORMER CKT 1	0	May be relieved due to Westar Transmission Operating Directive 615 Loss of the Midland Junction 230/115kV Transformer	
07SP	AEPW	AEPW	MARSHALL 138/69KV TRANSFORMER CKT 1	107	124.2	124.3	MARSHALL 138/69KV TRANSFORMER CKT 2	0	Replace 755 ACAR Strain Bus.	\$ 25,000
07SP	AEPW	AEPW	MARSHALL 138/69KV TRANSFORMER CKT 2	107	125.3	125.4	MARSHALL 138/69KV TRANSFORMER CKT 1	0	Replace 755 ACAR Strain Bus.	\$ 25,000
07SP	AEPW	AEPW	MARSHALL 138/69KV TRANSFORMER CKT 2	107	124.1	124.2	MARSHALL 138/69KV TRANSFORMER CKT 1	0	See Previous Upgrade Specified	
07SP	WERE	WERE	MIDLAND JUNCTION 230/115KV TRANSFORMER	308	100.7	100.8	LAWRENCE HILL 230/115KV TRANSFORMER CKT 1	0	May be relieved due to Westar Transmission Operating Directive 631 Loss of the Lawrence Hill 230/115kV Transformer	
07SP	SWPA	SWPA	NIXA 161/69KV TRANSFORMER CKT 2	25	188.2	188.3	NIXA 161/69KV TRANSFORMER CKT 1	0	Solution Undetermined	
07SP	AEPW	AEPW	RED POINT 138/69KV TRANSFORMER CKT 1	46	123.7	124.0	RED POINT 138/69KV TRANSFORMER CKT 2	0	Solution Undetermined	
07SP	AEPW	AEPW	RED POINT 138/69KV TRANSFORMER CKT 1	46	118.5	118.6	RED POINT 138/69KV TRANSFORMER CKT 2	0	Solution Undetermined	
07SP	AEPW	AEPW	RED POINT 138/69KV TRANSFORMER CKT 2	46	123.7	123.9	RED POINT 138/69KV TRANSFORMER CKT 1	0	Solution Undetermined	
07SP	AEPW	AEPW	RED POINT 138/69KV TRANSFORMER CKT 2	46	118.5	118.6	RED POINT 138/69KV TRANSFORMER CKT 1	0	Solution Undetermined	
07SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST 161/69KV TRANSFORMER	75	100.8	108.2	SUB 292 - TIPTON FORD - SUB 389 - JOPLIN SOUTHWEST 161KV	0	At 150 MW the loading is 108.6%, Replace 161/69 KV Transformer with a 150 MVA Transformer.	\$ 1,565,000

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 Table 1.2 - SPP Facility Overloads Caused or Impacted
 by 250 MW Transfer

Southwest Power Pool
 System Impact Study

Study Case	From Area	To Area	Monitored Branch Overload	Rating <MVA>	BC % Loading	TC % Loading	Outaged Branch Causing Overload	ATC (MW)	Solution	Cost
07SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST 161/69KV TRANSFORMER	75	100.6	108.1	SUB 292 - TIPTON FORD - SUB 389 - JOPLIN SOUTHWEST 161KV	0	At 150 MW the loading is 108.5%. See Previous Upgrade Specified	
07SP	EMDE	EMDE	SUB 110 - ORONOGO JCT. - SUB 432 - JOPLIN OAKLAND NORTH 161KV	214	96.8	124.8	SUB 292 - TIPTON FORD - SUB 389 - JOPLIN SOUTHWEST 161KV	18	See Previous Upgrade Specified	
07SP	EMDE	SWPA	CARTHAGE - SUB 109 - ATLAS JCT. 161KV	167	87.4	126.2	SUB 292 - TIPTON FORD - SUB 389 - JOPLIN SOUTHWEST 161KV	48	See Previous Upgrade Specified	
07SP	EMDE	EMDE	SUB 393 - REINMILLER 161/69/12.5KV TRANSFORMER	75	96.1	105.3	SUB 292 - TIPTON FORD - SUB 389 - JOPLIN SOUTHWEST 161KV	56	Replace 161/69 KV Transformer with a 150 MVA Transformer.	\$ 1,730,000
07SP	EMDE	EMDE	SUB 109 - ATLAS JCT. - SUB 432 - JOPLIN OAKLAND NORTH 161KV	214	88.4	116.4	SUB 292 - TIPTON FORD - SUB 389 - JOPLIN SOUTHWEST 161KV	64	Solution Undetermined	
07SP	EMDE	EMDE	SUB 393 - REINMILLER 161/69/12.5KV TRANSFORMER	75	95.4	104.4	SUB 292 - TIPTON FORD - SUB 389 - JOPLIN SOUTHWEST 161KV	67	See Previous Upgrade Specified	
07SP	EMDE	EMDE	SUB 110 - ORONOGO JCT. - SUB 432 - JOPLIN OAKLAND NORTH 161KV	214	88.7	115.8	SUB 349 - ASBURY - SUB 421 - PURCELL SOUTHWEST 161KV	68	See Previous Upgrade Specified	
07SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST 161/69KV TRANSFORMER	75	98.4	101.8	SUB 389 - JOPLIN SOUTHWEST - SUB 422 - JOPLIN 24TH & CONNECTICUT 161KV	72	At 150 MW the loading is 102.8%. See Previous Upgrade Specified	
07SP	SWPA	SPRM	BROOKLINE - SPRINGFIELD 161KV	323	98.9	102.6	BROOKLINE - JUNCTION 161KV	76	Replace disconnect switches at Springfield.	\$ 60,000
07SP	EMDE	EMDE	SUB 110 - ORONOGO JCT. - SUB 432 - JOPLIN OAKLAND NORTH 161KV	214	86.4	113.3	SUB 395 - CARTHAGE SOUTHWEST - SUB 421 - PURCELL SOUTHWEST 161KV	81	See Previous Upgrade Specified	
07SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST 161/69KV TRANSFORMER	75	97.9	101.2	SUB 389 - JOPLIN SOUTHWEST - SUB 422 - JOPLIN 24TH & CONNECTICUT 161KV	89	At 150 MW the loading is 102.2%. See Previous Upgrade Specified	
07SP	EMDE	EMDE	SUB 110 - ORONOGO JCT. - SUB 432 - JOPLIN OAKLAND NORTH 161KV	214	82.7	109.6	CARTHAGE - SUB 395 - CARTHAGE SOUTHWEST 161KV NORTHEAST STATION - OWASSO SOUTH 138KV OWASSO SOUTH - PORT OF CATOOSA TAP 138KV CATOOSA - PORT OF CATOOSA TAP 138KV PORT OF CATOOSA - PORT OF CATOOSA TAP 138KV CLOSE PORT OF CATOOSA - TERRA NITROGEN 138KV MOVE 100% LOAD FROM OWASSO SOUTH TO OWASSO NORTH	106	See Previous Upgrade Specified	
07SP	AEPW	AEPW	TERRA NITROGEN TAP - VERDIGRIS 138KV	151	99.6	100.4		125	Loading Exceeds Conductor Emergency Rating of 151 MVA, Solution Undetermined	
07SP	EMDE	SWPA	NEOSHO - SUB 292 - TIPTON FORD 161KV	157	88.1	101.8	SUB 292 - TIPTON FORD - SUB 383 - MONETT 161KV	129	Solution Undetermined	
07SP	EMDE	SWPA	CARTHAGE - SUB 109 - ATLAS JCT. 161KV	167	72.9	109.7	SUB 349 - ASBURY - SUB 421 - PURCELL SOUTHWEST 161KV	135	See Previous Upgrade Specified	
07SP	EMDE	EMDE	SUB 109 - ATLAS JCT. - SUB 432 - JOPLIN OAKLAND NORTH 161KV	214	80.3	107.3	SUB 349 - ASBURY - SUB 421 - PURCELL SOUTHWEST 161KV	136	Solution Undetermined	
07SP	SWPA	AECI	CARTHAGE - REEDS 69KV	36	90.7	105.9	CARTHAGE - SUB 382 - LARUSSEL 161KV	153	AECI third party line. No SWPA upgrades required.	
07SP	EMDE	EMDE	SUB 109 - ATLAS JCT. - SUB 432 - JOPLIN OAKLAND NORTH 161KV	214	78.0	104.9	SUB 395 - CARTHAGE SOUTHWEST - SUB 421 - PURCELL SOUTHWEST 161KV	204	Solution Undetermined	
07SP	EMDE	SWPA	CARTHAGE - SUB 109 - ATLAS JCT. 161KV	167	69.7	106.3	SUB 395 - CARTHAGE SOUTHWEST - SUB 421 - PURCELL SOUTHWEST 161KV	208	See Previous Upgrade Specified	
07SP	EMDE	EMDE	SUB 110 - ORONOGO JCT. - SUB 167 - RIVERTON 161KV	214	74.5	103.4	SUB 145 - JOPLIN WEST 7TH - SUB 439 - STATELINE 161KV	219	Solution Undetermined	
07SP	EMDE	EMDE	SUB 110 - ORONOGO JCT. - SUB 432 - JOPLIN OAKLAND NORTH 161KV	214	76.8	101.8	SUB 292 - TIPTON FORD - SUB 383 - MONETT 161KV	232	See Previous Upgrade Specified	
07SP	EMDE	EMDE	SUB 109 - ATLAS JCT. - SUB 432 - JOPLIN OAKLAND NORTH 161KV	214	74.3	101.1	CARTHAGE - SUB 395 - CARTHAGE SOUTHWEST 161KV	239	Solution Undetermined	
07SP	EMDE	SWPA	CARTHAGE - SUB 109 - ATLAS JCT. 161KV	167	64.6	101.1	CARTHAGE - SUB 395 - CARTHAGE SOUTHWEST 161KV	243	See Previous Upgrade Specified	
07SP	WERE	WERE	27TH & CROCO - TECUMSEH HILL 115KV CKT 1	68	105.6	105.7	27TH & CROCO - TECUMSEH HILL 115KV CKT 2	250	Invalid Contingency	
07SP	AEPW	AEPW	CANTON TAP (RAYBURN) - GLENN PINE (RAYBURN) 138KV	235	100.9	101.0	COFFEE (RAYBURN) - JACKSONVILLE (SWE-RC-ETEC) 138KV	250	Invalid Contingency	
07WP	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	108.5	108.6	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 Outage of the Hoyt to Stranger 345 kV line	
07WP	WERE	WERE	CIRCLEVILLE - KING HILL N.M. COOP 115KV	92	102.7	102.8	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 Outage of the Hoyt to Stranger 345 kV line	
07WP	WERE	WERE	KELLY - KING HILL N.M. COOP 115KV	92	100.5	100.6	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 Outage of the Hoyt to Stranger 345 kV line	
07WP	SWPA	AECI	CARTHAGE - REEDS 69KV	43	96.6	105.2	CARTHAGE - SUB 382 - LARUSSEL 161KV	99	AECI third party line. No SWPA upgrades required.	
07WP	EMDE	SWPA	CARTHAGE - SUB 109 - ATLAS JCT. 161KV	207	89.5	109.4	SUB 292 - TIPTON FORD - SUB 389 - JOPLIN SOUTHWEST 161KV	153	At 200 MW the loading is 109.9%. See Previous Upgrade Specified	
07WP	SWPA	AEPW	BEAVER - EUREKA SPRINGS 161KV	263	98.8	100.3	Multiple Outage Contingency: FLINT CREEK - SUB 383 - MONETT 345KV BROOKLINE - SUB 383 - MONETT 345KV	206	SWPA Reconnect CT's to 1000:5 Tap on Bkrs 42, 32, & half of 22. Replace metering & reset relays for Line 2 & Line 3. AEPW Replace Wavetrap & Metering CT Jumpers	\$ 67,500
10SP	WERE	WERE	166TH STREET - JARBALO JUNCTION SWITCHING STATION 115KV	97	103.6	103.7	EUDORA TOWNSHIP - WAKARUSA JUNCTION SWITCHING STATION 115KV	0	May be relieved due to Westar Operating Procedure 1202 Overload of the Jarbalo to Jaggard 115kV Line	
10SP	WERE	WERE	166TH STREET - JARBALO JUNCTION SWITCHING STATION 115KV	97	100.8	100.9	CAPTAIN JUNCTION - EUDORA TOWNSHIP 115KV	0	Overload of the Jarbalo to Jaggard 115kV Line	
10SP	AECI	SWPA	ASHERVILLE - IDALIA 161KV	206	101.1	101.3	GREEN FOREST - HARVIEL E. 161KV	0	Reconductor line with 954 ACSR.	\$ 6,600,000
10SP	AECI	SWPA	ASHERVILLE - IDALIA 161KV	206	101.0	101.2	HARVIEL E. - ST FRANCIS 161KV	0	See Previous Upgrade Specified	
10SP	SWPA	SPRM	BROOKLINE - SPRINGFIELD 161KV	323	102.9	107.0	BROOKLINE - JUNCTION 161KV	0	See Previous Upgrade Specified	
10SP	SWPA	AECI	CARTHAGE - REEDS 69KV	36	113.3	113.9	CARTHAGE - JASPER 69KV	0	AECI third party line. No SWPA upgrades required.	
10SP	SWPA	AECI	CARTHAGE - REEDS 69KV	36	107.3	107.9	JASPER - LAMAR 69KV	0	AECI third party line. No SWPA upgrades required.	
10SP	SWPA	AECI	CARTHAGE - REEDS 69KV	36	106.7	106.8	SUB 124 - AURORA H.T. - SUB 355 - AURORA WEST 69KV	0	AECI third party line. No SWPA upgrades required.	
10SP	SWPA	AECI	CARTHAGE - REEDS 69KV	36	105.9	106.8	SUB 446 - CHESAPEAKE 161/69KV TRANSFORMER	0	AECI third party line. No SWPA upgrades required.	
10SP	AEPW	AEPW	CHAMBER SPRINGS - FARMINGTON AECC 161KV	353	123.0	123.1	DYESS - SOUTH SPRINGDALE 161KV	0	See Previous Upgrade Specified	
10SP	AEPW	AEPW	CHAMBER SPRINGS - FARMINGTON AECC 161KV	353	104.9	105.0	EAST FAYETTEVILLE REC - SOUTH SPRINGDALE 161KV	0	See Previous Upgrade Specified	
10SP	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	100.3	100.4	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 Outage of the Hoyt to Stranger 345 kV line	
10SP	GRDA	GRDA	COLLINSVILLE 161/69KV TRANSFORMER CKT 1	50	100.3	100.5	COLLINSVILLE 161/69KV TRANSFORMER CKT 2	0	Solution Undetermined	
10SP	AEPW	AEPW	DYESS - ELM SPRINGS REC 161KV	312	108.7	109.1	DYESS - TONITTOWN 161KV	0	Terminal Equipment Limited, Solution Undetermined	
10SP	AEPW	AEPW	DYESS - ELM SPRINGS REC 161KV	312	100.2	100.5	CHAMBER SPRINGS - FARMINGTON AECC 161KV	0	Terminal Equipment Limited, Solution Undetermined	
10SP	AEPW	AEPW	DYESS - SOUTH SPRINGDALE 161KV	313	130.9	131.0	CHAMBER SPRINGS - FARMINGTON AECC 161KV	0	Rebuild 3.95 miles of 1272 AAC with 2156 ACSR. Replace South Springdale Circuit Switcher & Jumpers	\$ 2,200,000
10SP	ENTR	AEPW	EUREKA SPRINGS - OSAGE CREEK (AECC) 161KV	223	118.8	119.2	HARRISON SOUTH AECC - HARRISON-EAST 161KV	0	Rebuild 5.34 miles of 666 ACSR with 1590 ACSR. Replace wavetrap jumpers @ Eureka Springs	\$ 2,400,000
10SP	ENTR	AEPW	EUREKA SPRINGS - OSAGE CREEK (AECC) 161KV	223	110.0	110.7	BULL SHOALS - BULL SHOALS HES 161KV	0	See Previous Upgrade Specified	
10SP	ENTR	AEPW	EUREKA SPRINGS - OSAGE CREEK (AECC) 161KV	223	110.0	110.3	HARRISON SOUTH AECC - HARRISON-WEST 161KV	0	See Previous Upgrade Specified	
10SP	ENTR	AEPW	EUREKA SPRINGS - OSAGE CREEK (AECC) 161KV	223	108.7	109.5	BULL SHOALS HES - FLIPPIN 161KV	0	See Previous Upgrade Specified	

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 by 250 MW Transfer

Southwest Power Pool
 System Impact Study

Study Case	From Area	To Area	Monitored Branch Overload	Rating <MVA>	BC % Loading	TC % Loading	Outaged Branch Causing Overload	ATC (MW)	Solution	Cost
10SP	ENTR	AEPW	EUREKA SPRINGS - OSAGE CREEK (AECC) 161KV	223	105.6	106.4	FLIPPIN - SUMMIT 161KV	0	See Previous Upgrade Specified	
10SP	AEPW	AEPW	FARMINGTON AECC - SOUTH FAYETTEVILLE 161KV	313	113.2	113.3	DYESS - SOUTH SPRINGDALE 161KV	0	Loading Exceeds Conductor Emergency Rating of 353 MVA, Solution Undetermined	
10SP	AEPW	AEPW	FLINT CREEK - GENTRY REC 161KV	305	102.8	103.2	Base Case	0	Rebuild 1.09 miles of 2-397.5 ACSR with 2156 ACSR. Replace Flint Creek wavetraps & jumpers	\$ 450,000
10SP	AEPW	AEPW	FLINT CREEK - GENTRY REC 161KV	353	102.7	103.2	LOWELL - TONTITOWN 161KV	0	See Previous Upgrade Specified	
10SP	AEPW	AEPW	FLINT CREEK - GENTRY REC 161KV	353	101.0	101.5	FLINT CREEK - TONTITOWN 161KV	0	See Previous Upgrade Specified	
10SP	AEPW	AEPW	FLINT CREEK - GENTRY REC 161KV	353	100.2	100.7	LOWELL - ROGERS 161KV	0	See Previous Upgrade Specified	
10SP	SPRM	SPRM	JAMES RIVER - TWIN OAKS 69KV	108	100.6	100.9	JAMES RIVER - SOUTH HIGHWAY 65 69KV	0	Solution Undetermined	
10SP	SPRM	SPRM	KICKAPOO - SUNSET 69KV	108	105.8	105.9	JAMES RIVER - TWIN OAKS 69KV	0	Solution Undetermined	
10SP	WERE	WERE	LAWRENCE HILL 230/115KV TRANSFORMER	308	110.0	110.1	MIDLAND JUNCTION 230/115KV TRANSFORMER CKT 1	0	May be relieved due to Westar Transmission Operating Directive 615 Loss of the Midland Junction 230/115KV Transformer	
10SP	WERE	WERE	LAWRENCE HILL 230/115KV TRANSFORMER	308	110.0	110.1	LAWRENCE HILL - MIDLAND JCT 230KV CKT 1	0	May be relieved due to Westar Transmission Operating Directive 901 Outage of the Lawrence Hill-Midland JCT 230KV Line	
10SP	WERE	WERE	LAWRENCE HILL 230/115KV TRANSFORMER	308	107.8	107.9	MIDLAND JUNCTION 230/115KV TRANSFORMER CKT 1	0	May be relieved due to Westar Transmission Operating Directive 615 Loss of the Midland Junction 230/115KV Transformer	
10SP	WERE	WERE	LAWRENCE HILL 230/115KV TRANSFORMER	308	107.8	107.9	LAWRENCE HILL - MIDLAND JCT 230KV CKT 1	0	May be relieved due to Westar Transmission Operating Directive 901 Outage of the Lawrence Hill-Midland JCT 230KV Line	
10SP	SWPA	SWPA	NIXA 161/69KV TRANSFORMER CKT 1	25	192.3	192.4	NIXA 161/69KV TRANSFORMER CKT 2	0	Solution Undetermined	
10SP	SWPA	SWPA	NIXA 161/69KV TRANSFORMER CKT 2	25	201.6	201.9	NIXA 161/69KV TRANSFORMER CKT 1	0	Solution Undetermined	
10SP	SWPA	SWPA	NIXA 161/69KV TRANSFORMER CKT 2	25	174.4	174.5	NIXA 161/69KV TRANSFORMER CKT 1	0	Solution Undetermined	
10SP	EMDE	EMDE	SUB 258 - GATEWAY SOUTH - SUB 59 - JOPLIN 26TH ST. 69KV	65	101.5	105.1	SUB 389 - JOPLIN SOUTHWEST - SUB 422 - JOPLIN 24TH & CONNECTICUT 161KV	0	At 200 MW the loading is 106.9%, Solution Undetermined	
10SP	EMDE	EMDE	SUB 376 - MONETT CITY SOUTH - SUB 416 - MONETT CITY EAST 69KV	27	111.3	112.3	Base Case	0	Solution Undetermined	
10SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST 161/69KV TRANSFORMER	75	107.2	116.5	SUB 292 - TIPTON FORD - SUB 389 - JOPLIN SOUTHWEST 161KV	0	See Previous Upgrade Specified	
10SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST 161/69KV TRANSFORMER	75	107.0	116.2	SUB 292 - TIPTON FORD - SUB 389 - JOPLIN SOUTHWEST 161KV	0	See Previous Upgrade Specified	
10SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST 161/69KV TRANSFORMER	75	105.5	110.1	SUB 389 - JOPLIN SOUTHWEST - SUB 422 - JOPLIN 24TH & CONNECTICUT 161KV	0	See Previous Upgrade Specified	
10SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST 161/69KV TRANSFORMER	75	104.8	109.4	SUB 389 - JOPLIN SOUTHWEST - SUB 422 - JOPLIN 24TH & CONNECTICUT 161KV	0	See Previous Upgrade Specified	
10SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST 161/69KV TRANSFORMER	75	100.9	105.5	SUB 391 - JOPLIN SOUTHWEST - SUB 422 - JOPLIN 24TH & CONNECTICUT 161KV	0	See Previous Upgrade Specified	
10SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST 161/69KV TRANSFORMER	75	100.4	104.9	SUB 391 - JOPLIN SOUTHWEST - SUB 422 - JOPLIN 24TH & CONNECTICUT 161KV	0	See Previous Upgrade Specified	
10SP	EMDE	EMDE	SUB 393 - REINMILLER 161/69/12.5KV TRANSFORMER	75	100.8	111.7	SUB 292 - TIPTON FORD - SUB 389 - JOPLIN SOUTHWEST 161KV	0	See Previous Upgrade Specified	
10SP	AECI	SWPA	TABLE ROCK - TABLE ROCK 69KV	51	102.7	102.9	GRETN - REEDS SPRING 69KV	0	Solution Undetermined	
10SP	AEPW	AEPW	TERRA NITROGEN TAP - VERDIGRIS 138KV	151	100.8	101.6	NORTHEAST STATION - OWASSO SOUTH 138KV OWASSO SOUTH - PORT OF CATOOSA TAP 138KV CATOOSA - PORT OF CATOOSA TAP 138KV PORT OF CATOOSA - PORT OF CATOOSA TAP 138KV CLOSE PORT OF CATOOSA - TERRA NITROGEN 138KV	0	Loading Exceeds Conductor Emergency Rating of 151 MVA, Solution Undetermined	
10SP	EMDE	EMDE	SUB 393 - REINMILLER 161/69/12.5KV TRANSFORMER	75	99.7	110.6	MOVE 100% LOAD FROM OWASSO SOUTH TO OWASSO NORTH	9	See Previous Upgrade Specified	
10SP	EMDE	EMDE	SUB 110 - ORONOJO JCT. - SUB 432 - JOPLIN OAKLAND NORTH 161KV	214	99.2	129.1	SUB 292 - TIPTON FORD - SUB 389 - JOPLIN SOUTHWEST 161KV	11	See Previous Upgrade Specified	
10SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST - SUB EXPLORER SPRING CITY TAP 69KV	39	101.7	102.0	SUB 184 - NEOSHO SOUTH JCT. - SUB 314 - NEOSHO LINDE 69KV	50	Transfer has Negative Response on Facility for First 50 MW, Solution Undetermined	
10SP	SWPA	SPRM	BROOKLINE - SPRINGFIELD 161KV	323	98.6	103.5	SUB 292 - TIPTON FORD - SUB 389 - JOPLIN SOUTHWEST 161KV	73	See Previous Upgrade Specified	
10SP	EMDE	SWPA	CARTHAGE - SUB 109 - ATLAS JCT. 161KV	167	88.0	129.8	SUB 292 - TIPTON FORD - SUB 389 - JOPLIN SOUTHWEST 161KV	75	At 200 MW the loading is 130.4%, See Previous Upgrade Specified	
10SP	EMDE	EMDE	SUB 109 - ATLAS JCT. - SUB 432 - JOPLIN OAKLAND NORTH 161KV	214	90.2	120.0	SUB 292 - TIPTON FORD - SUB 389 - JOPLIN SOUTHWEST 161KV	83	Solution Undetermined	
10SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST 161/69KV TRANSFORMER	75	98.2	104.1	SUB 145 - JOPLIN WEST 7TH - SUB 439 - STATELINE 161KV	83	See Previous Upgrade Specified	
10SP	SWPA	EMDE	NEOSHO - SUB 292 - TIPTON FORD 161KV	157	94.4	110.1	SUB 292 - TIPTON FORD - SUB 389 - MONETT 161KV	84	At 200 MW the loading is 111.2%, Solution Undetermined	
10SP	EMDE	EMDE	SUB 110 - ORONOJO JCT. - SUB 432 - JOPLIN OAKLAND NORTH 161KV	214	90.4	118.5	SUB 349 - ASBURY - SUB 421 - PURCELL SOUTHWEST 161KV	88	See Previous Upgrade Specified	
10SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST 161/69KV TRANSFORMER	75	97.9	103.7	SUB 145 - JOPLIN WEST 7TH - SUB 439 - STATELINE 161KV	91	See Previous Upgrade Specified	
10SP	EMDE	EMDE	SUB 110 - ORONOJO JCT. - SUB 432 - JOPLIN OAKLAND NORTH 161KV	214	87.8	115.8	SUB 395 - CARTHAGE SOUTHWEST - SUB 421 - PURCELL SOUTHWEST 161KV	103	See Previous Upgrade Specified	
10SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST 161/69KV TRANSFORMER	75	98.2	103.5	SUB 145 - JOPLIN WEST 7TH 161/69KV TRANSFORMER	111	See Previous Upgrade Specified	
10SP	SWPA	SPRM	BROOKLINE - SPRINGFIELD 161KV	323	97.7	102.7	BATTLEFIELD - SOUTHWEST DISPOSAL 161KV	115	See Previous Upgrade Specified	
10SP	EMDE	EMDE	SUB 110 - ORONOJO JCT. - SUB 432 - JOPLIN OAKLAND NORTH 161KV	214	83.5	111.6	CARTHAGE - SUB 395 - CARTHAGE SOUTHWEST 161KV	128	See Previous Upgrade Specified	
10SP	SWPA	AECI	CARTHAGE - REEDS 69KV	36	91.5	107.7	CARTHAGE - SUB 382 - LARUSSEL 161KV	132	AECI third party line. No SWPA upgrades required.	
10SP	EMDE	EMDE	SUB 109 - ATLAS JCT. - SUB 432 - JOPLIN OAKLAND NORTH 161KV	214	81.4	109.4	SUB 349 - ASBURY - SUB 421 - PURCELL SOUTHWEST 161KV	141	Solution Undetermined	
10SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST 161/69KV TRANSFORMER	75	97.6	102.7	SUB 145 - JOPLIN WEST 7TH 161/69KV TRANSFORMER	143	See Previous Upgrade Specified	
10SP	EMDE	SWPA	CARTHAGE - SUB 109 - ATLAS JCT. 161KV	167	72.2	110.8	SUB 349 - ASBURY - SUB 421 - PURCELL SOUTHWEST 161KV	147	See Previous Upgrade Specified	
10SP	AECI	EMDE	BILLINGS - SUB 446 - CHESAPEAKE 69KV	36	113.0	113.5	SUB 124 - AURORA H.T. - SUB 437 - MARIONVILLE NORTHWEST 69KV	150	Transfer has Negative Response on Facility for First 150 MW, Solution Undetermined	
10SP	EMDE	EMDE	SUB 109 - ATLAS JCT. - SUB 432 - JOPLIN OAKLAND NORTH 161KV	214	78.8	106.7	SUB 395 - CARTHAGE SOUTHWEST - SUB 421 - PURCELL SOUTHWEST 161KV	158	Solution Undetermined	
10SP	EMDE	EMDE	CARTHAGE - SUB 109 - ATLAS JCT. 161KV	167	68.6	107.1	SUB 395 - CARTHAGE SOUTHWEST - SUB 421 - PURCELL SOUTHWEST 161KV	165	See Previous Upgrade Specified	
10SP	EMDE	EMDE	SUB 110 - ORONOJO JCT. - SUB 167 - RIVERTON 161KV	214	79.3	108.2	SUB 145 - JOPLIN WEST 7TH - SUB 439 - STATELINE 161KV	165	Solution Undetermined	
10SP	SWPA	SWPA	SPRINGFIELD 161/69KV TRANSFORMER CKT 1	80	97.5	101.3	BROOKLINE - JUNCTION 161KV	165	Replace 25/25MVA transformer #3 with 80MVA unit to eliminate overload of both 25MVA #3 and 80MVA #1 transformers.	\$ 1,300,000
10SP	EMDE	EMDE	SUB 110 - ORONOJO JCT. - SUB 432 - JOPLIN OAKLAND NORTH 161KV	214	79.8	104.7	NEOSHO - SUB 292 - TIPTON FORD 161KV	167	See Previous Upgrade Specified	

SPP-2003-253-1 Option 2
 Table 1.2 - SPP Facility Overloads Caused or Impacted
 by 250 MW Transfer

Southwest Power Pool
 System Impact Study

Study Case	From Area	To Area	Monitored Branch Overload	Rating <MVA>	BC % Loading	TC % Loading	Outaged Branch Causing Overload	ATC (MW)	Solution	Cost
10SP	EMDE	EMDE	SUB 131 - DIAMOND JCT. - SUB 362 - SARCOXIE SOUTHWEST 69KV	38	94.6	99.8	SUB 383 - MONETT 161/69KV TRANSFORMER	183	At 200 MW the loading is 100.4% and the facility is relieved by additional 50 MW. Reconductor 1/0 Copper with 336 ACSR.	\$ 1,230,000
10SP	EMDE	EMDE	SUB 109 - ATLAS JCT. - SUB 432 - JOPLIN OAKLAND NORTH 161KV	214	74.5	102.5	CARTHAGE - SUB 395 - CARTHAGE SOUTHWEST 161KV	187	Solution Undetermined	
10SP	EMDE	SWPA	CARTHAGE - SUB 109 - ATLAS JCT. 161KV	167	62.7	101.3	CARTHAGE - SUB 395 - CARTHAGE SOUTHWEST 161KV	194	See Previous Upgrade Specified	
10SP	EMDE	EMDE	SUB 109 - ATLAS JCT. - SUB 432 - JOPLIN OAKLAND NORTH 161KV	175	73.0	101.6	Base Case	194	Solution Undetermined	
10SP	EMDE	EMDE	SUB 145 - JOPLIN WEST 7TH - SUB 439 - STATELINE 161KV	268	87.4	98.9	SUB 292 - TIPTON FORD - SUB 389 - JOPLIN SOUTHWEST 161KV	198	At 200 MW the loading is 100.1% and the facility is relieved by additional 50 MW. Solution Undetermined	
10SP	AEPW	AEPW	CHAMBER SPRINGS - TONTITOWN 161KV	244	100.2	100.8	TONTITOWN 345/161KV TRANSFORMER	250	Close Normally Opened 2% Reactors to be installed on Chamber Springs to Tontitown 161 kV line	
10SP	AEPW	AEPW	CHAMBER SPRINGS - TONTITOWN 161KV	244	100.2	100.8	CHAMBER SPRINGS - TONTITOWN 345KV	250	Close Normally Opened 2% Reactors to be installed on Chamber Springs to Tontitown 161 kV line	
10WP	WERE	WERE	166TH STREET - JARBALO JUNCTION SWITCHING STATION 115KV	97	102.5	102.6	MIDLAND JUNCTION - PENTAGON 115KV	0	May be relieved due to Westar Operating Procedure 1202 Overload of the Jarbalo to Jaggard 115kV Line	
10WP	SWPA	AECI	CARTHAGE - REEDS 69KV	43	104.6	105.4	CARTHAGE - JASPER 69KV	0	AECI third party line. No SWPA upgrades required.	
10WP	SWPA	AECI	CARTHAGE - REEDS 69KV	43	100.0	100.4	JASPER - LAMAR 69KV	0	AECI third party line. No SWPA upgrades required.	
10WP	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	115.9	116.0	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 Outage of the Hoyt to Stranger 345 kV line	
10WP	WERE	WERE	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV	97	100.4	100.5	IATAN - ST JOE 345KV	0	Rebuild 15.50-mile line (1192.5 kmil 45/7 ACSR, 223 MVA, 245 MVA), Replace CTs and Wave Trap (2000 A.)	\$ 5,800,000
10WP	WERE	WERE	CIRCLEVILLE - KING HILL N.M. COOP 115KV	92	109.6	109.7	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 Outage of the Hoyt to Stranger 345 kV line	
10WP	WERE	WERE	KELLY - KING HILL N.M. COOP 115KV	92	107.4	107.5	HOYT - STRANGER CREEK 345KV	0	May be relieved due to Westar Operating Procedure 803 Outage of the Hoyt to Stranger 345 kV line	
10WP	SWPA	SWPA	NIXA 161/69KV TRANSFORMER CKT 2	25	143.7	143.8	NIXA 161/69KV TRANSFORMER CKT 1	0	Solution Undetermined	
10WP	SWPA	SWPA	NORFORK 161/69KV TRANSFORMER CKT 2	25	101.8	102.1	NORFORK 161/69KV TRANSFORMER CKT 1	0	Replace Norfolk Transformer	\$ 1,300,000
10WP	SWPA	AECI	CARTHAGE - REEDS 69KV	43	97.3	110.7	CARTHAGE - SUB 382 - LARUSSEL 161KV	50	AECI third party line. No SWPA upgrades required.	
10WP	EMDE	SWPA	CARTHAGE - SUB 109 - ATLAS JCT. 161KV	207	89.5	121.8	SUB 292 - TIPTON FORD - SUB 389 - JOPLIN SOUTHWEST 161KV	92	See Previous Upgrade Specified	
							Multiple Outage Contingency:			
10WP	SWPA	AEPW	BEAVER - EUREKA SPRINGS 161KV	263	98.7	101.0	FLINT CREEK - SUB 383 - MONETT 345KV	137	See Previous Upgrade Specified	
10WP	GRDA	GRDA	MIAMI - MIAMI EAST NEO 69KV	56	91.6	102.5	BROOKLINE - SUB 383 - MONETT 345KV	192	Solution Undetermined	
10WP	EMDE	EMDE	SUB 393 - REINMILLER 161/69/12.5KV TRANSFORMER	75	94.1	102.9	SUB 292 - TIPTON FORD - SUB 389 - JOPLIN SOUTHWEST 161KV	206	See Previous Upgrade Specified	
10WP	EMDE	SWPA	CARTHAGE - SUB 109 - ATLAS JCT. 161KV	207	75.5	106.0	SUB 292 - TIPTON FORD - SUB 389 - JOPLIN SOUTHWEST 161KV	220	See Previous Upgrade Specified	
10WP	EMDE	EMDE	SUB 393 - REINMILLER 161/69/12.5KV TRANSFORMER	75	93.0	101.9	SUB 292 - TIPTON FORD - SUB 389 - JOPLIN SOUTHWEST 161KV	222	See Previous Upgrade Specified	
10WP	EMDE	SWPA	CARTHAGE - SUB 109 - ATLAS JCT. 161KV	207	70.7	101.2	SUB 395 - CARTHAGE SOUTHWEST - SUB 421 - PURCELL SOUTHWEST 161KV	244	See Previous Upgrade Specified	
							Total Estimated Cost		\$ 32,312,500	

SPP-2003-253-1 Option 2
 Table 2.2 - Non-SPP Facility Overloads
 Caused or Impacted by 250 MW Transfer

Southwest Power Pool
 System Impact Study

Study Case	From Area	To Area	Monitored Branch Overload	Rating <MVA>	BC % Loading	TC % Loading	Outaged Branch Causing Overload	Comments
05AP			NONE IDENTIFIED					
05G	SWPA	AECI	52640 DONIPHNS 161 to 97201 2DONIPH 69 CKT 1	18.75	135.7	135.8	52640 DONIPHNS 161 to 97201 2DONIPH 69 CKT 2	Local area problem. Transformer is owned by AECI.
05G	AECI	AECI	96089 5JAMESV 161 to 96673 2JAMESV 69 CKT 1	56	101.8	102.4	96089 5JAMESV 161 to 96673 2JAMESV 69 CKT 2	
05G	AECI	AECI	96089 5JAMESV 161 to 96673 2JAMESV 69 CKT 2	56	105.5	106.1	96089 5JAMESV 161 to 96673 2JAMESV 69 CKT 1	
05SH	AECI	AMRN	96079 5FREDTN 161 to 30583 FRED TAP 161 CKT 1	56	101.1	101.2	Multiple Outage Contingency: 96038 7ESSEX 345 96046 7NEWMAD 345 1 96054 7WWEAST 345 96038 7ESSEX 345 1 30974 LUTESVIL 345 96054 7WWEAST 345 1	
05SH	AECI	AECI	96126 5MOBTAP 161 to 96120 5THMHIL 161 CKT 1	372	102.4	102.5	Multiple Outage Contingency: 96049 7THOMHL 345 to 96044 7MCCRED 345 CKT 1 96044 7MCCRED 345 to 96043 7KINGDM 345 CKT 1	
05SH	AECI	AECI	96126 5MOBTAP 161 to 96120 5THMHIL 161 CKT 1	372	101.0	101.1	96044 7MCCRED 345 to 96049 7THOMHL 345 CKT 1	
05FA			NONE IDENTIFIED					
07SP	AECI	AMRN	96059 5BIG CK 161 to 31941 WAREN TN 161 CKT 1	227	104.1	104.2	Multiple Outage Contingency: 30102 BELLEAU 345 31747 SIOUX 345 1 30102 BELLEAU 345 30535 ENON 345 1 30535 ENON 345 31230 MONTGMRY 345 1	
07SP	AECI	AECI	96071 5CLINTN 161 WND 2 CLINTN3 3	56	100.0	100.8	96071 5CLINTN 161 to 96692 2CLINTN 69.0 to 96693 1CLINTN113.8 CKT 1	
07SP	AECI	AMRN	96079 5FREDTN 161 to 30583 FRED TAP 161 CKT 1	56	120.6	120.7	Multiple Outage Contingency: 96038 7ESSEX 345 96046 7NEWMAD 345 1 96054 7WWEAST 345 96038 7ESSEX 345 1 30974 LUTESVIL 345 96054 7WWEAST 345 1	
07SP	AECI	AMRN	96079 5FREDTN 161 to 30583 FRED TAP 161 CKT 1	56	118.2	118.4	Multiple Outage Contingency: 96038 7ESSEX 345 96054 7WWEAST 345 1 30974 LUTESVIL 345 96054 7WWEAST 345 1	
07SP	AECI	AECI	96089 5JAMESV 161 WND 2 JAMESV1 1	84	106.6	108.6	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV24.16 CKT 2	
07SP	AECI	AECI	96089 5JAMESV 161 WND 2 JAMESV2 2	84	107.2	109.1	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV14.16 CKT 1	
07SP	AECI	AECI	96108 5OSCEOL 161 WND 2 OSCEOLA 1	56	106.3	107.2	96692 2CLINTN 69.0 to 96701 2GAINES 69.0 CKT 1	
07SP	AECI	AECI	96112 5SALEM 161 WND 2 SALEM3 2	56	114.4	114.5	96112 5SALEM 161 to 97027 2SALEM3 69.0 to 97029 1SALEM31 CKT 1	
07SP	AECI	AECI	96119 5SULLVN 161 WND 2 SULLIV32 2	50	119.9	120.8	96119 5SULLVN 161 to 97152 2SULLVN3 69.0 to 97147 1SULLV31 CKT 1	
07SP	AECI	AECI	96123 5WPLAIN 161 WND 2 WESTPL2 2	56	117.2	118.9	96123 5WPLAIN 161 to 97123 2WSTPL3 69.0 to 97119 1WESTPL2 CKT 1	
07SP	AECI	AECI	96124 5HOLDEN 161 WND 2 HOLDEN 1	56	113.2	113.3	96071 5CLINTN 161 to 96124 5HOLDEN 161 CKT 1	
07SP	AECI	AECI	96126 5MOBTAP 161 to 96120 5THMHIL 161 CKT 1	372	105.8	106.0	Multiple Outage Contingency: 96049 7THOMHL 345 to 96044 7MCCRED 345 CKT 1 96044 7MCCRED 345 to 96043 7KINGDM 345 CKT 1	
07SP	AECI	AECI	96137 4BRISTOW 138 WND 2 BRISTOW 1	56	105.9	106.0	96137 4BRISTOW 138 to 96889 2BRISTOW69.0 to 96892 1BRISTOW CKT 2	
07SP	AECI	AECI	96137 4BRISTOW 138 WND 2 BRISTOW 2	56	105.9	106.0	96137 4BRISTOW 138 to 96889 2BRISTOW69.0 to 96891 1BRISTOW CKT 1	
07SP	AECI	AECI	96673 2JAMESV 69.0 WND 1 JAMESV1 1	84	102.9	104.6	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV24.16 CKT 2	
07SP	AECI	AECI	96673 2JAMESV 69.0 WND 1 JAMESV2 2	84	103.1	104.6	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV14.16 CKT 1	
07SP	AECI	AECI	96692 2CLINTN 69.0 to 96701 2GAINES 69.0 CKT 1	36	129.4	130.6	Multiple Outage Contingency: 96071 5CLINTN 161 to 96108 5OSCEOL 161 CKT 1 96108 5OSCEOL 161 to 52698 STOCKTN5 161 CKT 1	
07SP	AECI	AECI	96692 2CLINTN 69.0 to 96701 2GAINES 69.0 CKT 1	36	123.1	124.1	96108 5OSCEOL 161 to 96811 2OSCEOL 69.0 to 96812 1OSCEOLA CKT 1	
07SP	AECI	AECI	96692 2CLINTN 69.0 WND 1 CLINTN3 3	56	100.6	101.3	96071 5CLINTN 161 to 96692 2CLINTN 69.0 to 96693 1CLINTN113.8 CKT 1	
07SP	AECI	AECI	96701 2GAINES 69.0 to 96810 2MTZION 69.0 CKT 1	36	112.1	113.3	Multiple Outage Contingency: 96071 5CLINTN 161 to 96108 5OSCEOL 161 CKT 1 96108 5OSCEOL 161 to 52698 STOCKTN5 161 CKT 1	
07SP	AECI	AECI	96701 2GAINES 69.0 to 96810 2MTZION 69.0 CKT 1	36	105.8	106.8	96108 5OSCEOL 161 to 96811 2OSCEOL 69.0 to 96812 1OSCEOLA CKT 1	
07SP	AECI	AECI	96811 2OSCEOL 69.0 WND 1 OSCEOLA 1	56	105.4	106.0	96692 2CLINTN 69.0 to 96701 2GAINES 69.0 CKT 1	
07SP	AECI	AECI	96889 2BRISTOW69.0 WND 1 BRISTOW 1	56	100.3	100.7	96137 4BRISTOW 138 to 96889 2BRISTOW69.0 to 96892 1BRISTOW CKT 2	
07SP	AECI	AECI	96889 2BRISTOW69.0 WND 1 BRISTOW 2	56	100.3	100.7	96137 4BRISTOW 138 to 96889 2BRISTOW69.0 to 96891 1BRISTOW CKT 1	
07SP	AECI	AECI	97274 5WWEAST 161 to 97278 2WWEAST 69.0 CKT 1	56	105.3	105.4	96079 5FREDTN 161 to 97267 2MARQUA 69.0 to 97261 1FREDTWN13.8 CKT 1	
07SP	AMRN	AMRN	31890 VIAD 1 34.5 to 30282 CAPE GIR 161 CKT 1	84	143.4	143.5	30282 CAPE GIR 161 to 31890 VIAD 1 34.5 CKT 99	
07SP	SWPA	AECI	52690 CARTHG 2 69 to 96751 2REEDS 69 CKT 1	36	109.2	109.3	52690 CARTHG 2 69 to 96649 2JASPER 69 CKT 1	Third Party Line Owned By AECI
07SP	SWPA	AECI	52690 CARTHG 2 69 to 96751 2REEDS 69 CKT 1	36	90.7	105.9	52688 CARTHAG5 161 to 59479 LAR382 5 161 CKT 1	Third Party Line Owned By AECI
07SP	SWPA	AECI	52690 CARTHG 2 69 to 96751 2REEDS 69 CKT 1	36	103.5	103.7	96649 2JASPER 69 to 96651 2LAMAR 69 CKT 1	Third Party Line Owned By AECI
07SP	SWPA	AECI	52690 CARTHG 2 69 to 96751 2REEDS 69 CKT 1	36	101.7	102.1	59499 CPK446 5 161 to 59618 CPK446 269.0 to 59721 CPK446 112.5 CKT 1	Third Party Line Owned By AECI

SPP-2003-253-1 Option 2
 Table 2.2 - Non-SPP Facility Overloads
 Caused or Impacted by 250 MW Transfer

Southwest Power Pool
 System Impact Study

Study Case	From Area	To Area	Monitored Branch Overload	Rating <MVA>	BC % Loading	TC % Loading	Outaged Branch Causing Overload	Comments	
07SP	SWPA	AECI	52690 CARTHG 2 69 to 96751 2REEDS 69 CKT 1	36	100.9	101.6	52680 BEAVER 5 161 to 53136 EUREKA 5 161 CKT 1	Third Party Line Owned By AECI	
07SP	SWPA	SPRM	52692 SPRGFLD5 161 to 59969 BRKLINE 5 161 CKT 1	323	98.9	102.6	59955 JUNCTN 5 161 to 59969 BRKLINE 5 161 CKT 1	Third Party Line Owned By AECI	
07SP	AEPW	ENTR	53136 EUREKA 5 161 to 99832 5OSAGE # 161 CKT 1	223	104.4	104.7	99797 5HARR-S 161 to 99811 5HARR-E 161 CKT 1	Less Than 3% Impact	
07SP	AEPW	ENTR	53136 EUREKA 5 161 to 99832 5OSAGE # 161 CKT 1	223	101.3	101.9	52660 BULL SH5 161 to 99802 5BULLSH* 161 CKT 1	"	
07SP	AEPW	ENTR	53136 EUREKA 5 161 to 99832 5OSAGE # 161 CKT 1	223	100.3	100.9	99802 5BULLSH* 161 to 99809 5FLIPN 161 CKT 1	"	
07SP	MIPU	MIPU	59303 CLINTON2 69 to 59301 CLNTPLT2 69 CKT 1	78	107.6	107.7	59302 CLNTGRN2 69 to 59303 CLINTON2 69 CKT 1		
07SP	MIPU	MIPU	59303 CLINTON2 69 to 59302 CLNTGRN2 69 CKT 1	78	103.8	103.9	59301 CLNTPLT2 69 to 59303 CLINTON2 69 CKT 1		
07SP	NPPD	NPPD	64855 HOLDREG7 115 to 64856 HOLDREG9 34.5 CKT 1	35	111.7	111.8	64855 HOLDREG7 115 to 64856 HOLDREG9 34.5 CKT 2		
07SP	NPPD	NPPD	64855 HOLDREG7 115 to 64856 HOLDREG9 34.5 CKT 2	35	111.7	111.8	64855 HOLDREG7 115 to 64856 HOLDREG9 34.5 CKT 1		
07SP	AECI	AMRN	96079 5FREDTN 161 to 30583 FRED TAP 161 CKT 1	56	112.3	112.4	96054 7WWEAST 345 to 97274 5WWEAST 161 CKT 1		
07SP	AECI	AECI	96096 5MARIES 161 to 97184 2MARIES 69 CKT 1	25	100.5	100.6	96096 5MARIES 161 to 97184 2MARIES 69 CKT 3		
07SP	AECI	AECI	96096 5MARIES 161 to 97184 2MARIES 69 CKT 2	25	101.0	101.1	96096 5MARIES 161 to 97184 2MARIES 69 CKT 3		
07SP	AECI	AECI	96126 5MOBTAP 161 to 96120 5THMHIL 161 CKT 1	372	104.1	104.3	96044 7MCCRED 345 to 96049 7THOMHL 345 CKT 1		
07SP	AECI	AECI	96654 2MILO 69 to 96802 2CLARK 69 CKT 1	36	113.0	114.0	52690 CARTHG 2 69 to 96649 2JASPER 69 CKT 1		
07SP	AECI	AECI	96692 2CLINTN 69 to 96701 2GAINES 69 CKT 1	36	120.0	122.7	96071 5CLINTN 161 to 96108 5OSCEOL 161 CKT 1		
07SP	AECI	AECI	96701 2GAINES 69 to 96810 2MTZION 69 CKT 1	36	107.0	109.7	96071 5CLINTN 161 to 96108 5OSCEOL 161 CKT 1		
07SP	AECI	AECI	96751 2REEDS 69 to 96659 2BOWRML 69 CKT 1	36	102.1	102.2	52690 CARTHG 2 69 to 96649 2JASPER 69 CKT 1		
07WP	AMRN	AMRN	31408 OVERTON 345 WND 1	1	300	101.3	101.4	96043 7KINGDM 345 to 96090 5KINGDM 161 CKT 1	
07WP	AMRN	AMRN	31408 OVERTON 345 WND 1	1	300	101.3	101.4	96043 7KINGDM 345 to 96044 7MCCRED 345 CKT 1	
07WP	AECI	AECI	96123 5WPLAIN 161 WND 2 WESTPL1	1	56	115.8	115.9	96123 5WPLAIN 161 to 97123 2WSTPL3 69.0 to 97120 1WESTPL2 CKT 2	
07WP	AECI	AECI	96123 5WPLAIN 161 WND 2 WESTPL2	2	56	123.8	123.9	96123 5WPLAIN 161 to 97123 2WSTPL3 69.0 to 97119 1WESTPL2 CKT 1	
07WP	SWPA	AECI	52640 DONIPHNS 161 to 97201 2DONIPH 69 CKT 1	18.75	156.1	156.5	52640 DONIPHNS 161 to 97201 2DONIPH 69 CKT 2	Local area problem. Transformer is owned by AECI.	
07WP	SWPA	AECI	52690 CARTHG 2 69 to 96751 2REEDS 69 CKT 1	43	96.6	105.2	52688 CARTHAG5 161 to 59479 LAR382 5 161 CKT 1	Third Party Line Owned By AECI	
10SP	AMRN	AMRN	31408 OVERTON 345 WND 1	1	300	104.5	104.7	96043 7KINGDM 345 to 96090 5KINGDM 161 CKT 1	
10SP	AMRN	AMRN	31408 OVERTON 345 WND 1	1	300	104.4	104.6	96043 7KINGDM 345 to 96044 7MCCRED 345 CKT 1	
10SP	AMRN	AMRN	31409 OVERTON 161 WND 2	1	300	101.8	102.0	96043 7KINGDM 345 to 96090 5KINGDM 161 CKT 1	
10SP	AMRN	AMRN	31409 OVERTON 161 WND 2	1	300	101.7	101.9	96043 7KINGDM 345 to 96044 7MCCRED 345 CKT 1	
10SP	AECI	AMRN	96059 5BIG CK 161 to 31941 WARENTH 161 CKT 1	227	104.4	104.5	Multiple Outage Contingency: 30102 BELLEAU 345 31747 SIOUX 345 1 30102 BELLEAU 345 30535 ENON 345 1 30535 ENON 345 31230 MONTGMRY 345 1		
10SP	AECI	AECI	96071 5CLINTN 161 WND 2 CLINTN3	3	56	106.1	106.9	96071 5CLINTN 161 to 96692 2CLINTN 69.0 to 96693 1CLINTN113.8 CKT 1	
10SP	AECI	AECI	96074 5CUBA 161 WND 2 CUBA	1	56	101.9	102.1	96112 5SALEM 161 to 97027 2SALEM3 69.0 to 97029 1SALEM31 CKT 1	
10SP	AECI	AECI	96074 5CUBA 161 WND 2 CUBA	1	56	101.7	101.9	96112 5SALEM 161 to 97027 2SALEM3 69.0 to 97030 1SALEM32 CKT 2	
10SP	AECI	AMRN	96079 5FREDTN 161 to 30583 FRED TAP 161 CKT 1	56	119.2	119.3	Multiple Outage Contingency: 96038 7ESSEX 345 96046 7NEWMAD 345 1 96054 7WWEAST 345 96038 7ESSEX 345 1 30974 LUTESVIL 345 96054 7WWEAST 345 1		
10SP	AECI	AMRN	96079 5FREDTN 161 to 30583 FRED TAP 161 CKT 1	56	117.6	117.7	Multiple Outage Contingency: 96038 7ESSEX 345 96054 7WWEAST 345 1 30974 LUTESVIL 345 96054 7WWEAST 345 1		
10SP	AECI	AECI	96079 5FREDTN 161 WND 2 FREDTOWN	1	50	101.9	102.0	97274 5WWEAST 161 to 97278 2WWEAST 69.0 CKT 1	
10SP	AECI	AECI	96080 5FTWOOD 161 WND 2 FTWOOD2	2	75	101.1	102.5	96080 5FTWOOD 161 to 97055 2FTWOOD 69.0 to 97053 1FTWOOD1 CKT 1	
10SP	AECI	AECI	96089 5JAMESV 161 WND 2 JAMESV1	1	84	114.1	114.4	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV24.16 CKT 2	
10SP	AECI	AECI	96089 5JAMESV 161 WND 2 JAMESV2	2	84	113.2	113.3	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV14.16 CKT 1	
10SP	AECI	AECI	96108 5OSCEOL 161 to 96071 5CLINTN 161 CKT 1	123	98.2	100.8	Multiple Outage Contingency: 96555 5GRAVOI 161 to 96552 5EDMONS 161 CKT 1 96555 5GRAVOI 161 to 96057 5BARNET 161 CKT 1		
10SP	AECI	AECI	96108 5OSCEOL 161 WND 2 OSCEOLA	1	56	102.6	103.6	96701 2GAINES 69.0 to 96810 2MTZION 69.0 CKT 1	
10SP	AECI	AECI	96108 5OSCEOL 161 WND 2 OSCEOLA	1	56	100.6	101.4	52698 STCKTNS5 161 to 96108 5OSCEOL 161 CKT 1	
10SP	AECI	AECI	96112 5SALEM 161 WND 2 SALEM3	1	56	119.0	119.1	96112 5SALEM 161 to 97027 2SALEM3 69.0 to 97030 1SALEM32 CKT 2	
10SP	AECI	AECI	96112 5SALEM 161 WND 2 SALEM3	2	56	118.5	118.6	96112 5SALEM 161 to 97027 2SALEM3 69.0 to 97029 1SALEM31 CKT 1	
10SP	AECI	AECI	96124 5HOLDEN 161 WND 2 HOLDEN	1	56	121.9	122.1	96071 5CLINTN 161 to 96124 5HOLDEN 161 CKT 1	
10SP	AECI	AECI	96126 5MOBTAP 161 to 96120 5THMHIL 161 CKT 1	372	108.8	109.0	Multiple Outage Contingency: 96049 7THOMHL 345 to 96044 7MCCRED 345 CKT 1 96044 7MCCRED 345 to 96043 7KINGDM 345 CKT 1		
10SP	AECI	AECI	96129 5WSHBRN 161 WND 2 WSHBRN1	1	56	100.7	101.8	52680 BEAVER 5 161 to 53136 EUREKA 5 161 CKT 1	

SPP-2003-253-1 Option 2
 Table 2.2 - Non-SPP Facility Overloads
 Caused or Impacted by 250 MW Transfer

Southwest Power Pool
 System Impact Study

Study Case	From Area	To Area	Monitored Branch Overload	Rating <MVA>	BC % Loading	TC % Loading	Outaged Branch Causing Overload	Comments
10SP	AECI	AECI	96673 2JAMESV 69.0 WND 1 JAMESV1 1	84	109.3	109.6	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV24.16 CKT 2	
10SP	AECI	AECI	96673 2JAMESV 69.0 WND 1 JAMESV2 2	84	108.3	108.4	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV14.16 CKT 1	
10SP	AECI	AECI	96692 2CLINTN 69.0 to 96701 2GAINES 69.0 CKT 1	36	135.7	137.0	Multiple Outage Contingency: 96071 5CLINTN 161 to 96108 5OSCEOL 161 CKT 1 96108 5OSCEOL161 to 52698 STOCKTN5 161 CKT 1	
10SP	AECI	AECI	96692 2CLINTN 69.0 to 96701 2GAINES 69.0 CKT 1	36	129.6	130.5	96108 5OSCEOL 161 to 96811 2OSCEOL 69.0 to 96812 1OSCEOLA CKT 1	
10SP	AECI	AECI	96692 2CLINTN 69.0 WND 1 CLINTN3 3	56	106.4	107.2	96071 5CLINTN 161 to 96692 2CLINTN 69.0 to 96693 1CLINTN113.8 CKT 1	
10SP	AECI	AECI	96701 2GAINES 69.0 to 96810 2MTZION 69.0 CKT 1	36	117.1	118.4	Multiple Outage Contingency: 96071 5CLINTN 161 to 96108 5OSCEOL 161 CKT 1 96108 5OSCEOL161 to 52698 STOCKTN5 161 CKT 1	
10SP	AECI	AECI	96701 2GAINES 69.0 to 96810 2MTZION 69.0 CKT 1	36	110.9	111.8	96108 5OSCEOL 161 to 96811 2OSCEOL 69.0 to 96812 1OSCEOLA CKT 1	
10SP	AECI	AECI	96811 2OSCEOL 69.0 WND 1 OSCEOLA 1	56	111.1	111.2	96692 2CLINTN 69.0 to 96701 2GAINES 69.0 CKT 1	
10SP	AECI	AECI	96811 2OSCEOL 69.0 WND 1 OSCEOLA 1	56	102.0	102.8	96701 2GAINES 69.0 to 96810 2MTZION 69.0 CKT 1	
10SP	AECI	AECI	97274 5WWEAST 161 to 97278 2WWEAST 69.0 CKT 1	56	109.0	109.1	96079 5FREDTN 161 to 97267 2MARQUA 69.0 to 97261 1FREDTWN13.8 CKT 1	
10SP	AMRN	AMRN	31408*OVERTON 345 WND 1	300	100.7	100.9	Multiple Outage Contingency: 31221 MOBERLY 161 to 58062 SALSBR5161 CKT 1 31221 MOBERLY 161 to 96126 5MOBTAP 161 CKT 1	
10SP	SWPA	AECI	52690 CARTHG 2 69 to 96751 2REEDS 69 CKT 1	36	113.3	113.9	52690 CARTHG 2 69 to 96649 2JASPER 69 CKT 1	Third Party Line Owned By AECI
10SP	SWPA	AECI	52690 CARTHG 2 69 to 96751 2REEDS 69 CKT 1	36	107.3	107.9	96649 2JASPER 69 to 96651 2LAMAR 69 CKT 1	Third Party Line Owned By AECI
10SP	SWPA	AECI	52690 CARTHG 2 69 to 96751 2REEDS 69 CKT 1	36	91.5	107.7	52688 CARTHAG5 161 to 59479 LAR382 5 161 CKT 1	Third Party Line Owned By AECI
10SP	SWPA	AECI	52690 CARTHG 2 69 to 96751 2REEDS 69 CKT 1	36	106.7	106.8	59537 AUR124 2 69 to 59578 AUR355 2 69 CKT 1	Third Party Line Owned By AECI
10SP	SWPA	AECI	52690 CARTHG 2 69 to 96751 2REEDS 69 CKT 1	36	105.9	106.8	59499 CPK446 5 161 to 59618 CPK446 269.0 to 59721 CPK446 112.5 CKT 1	Third Party Line Owned By AECI
10SP	SWPA	SPRM	52692 SPRGFLD5 161 to 59969 BRKLINE 5 161 CKT 1	323	102.9	107.0	59955 JUNCTN 5 161 to 59969 BRKLINE 5 161 CKT 1	Third Party Line Owned By AECI
10SP	SWPA	SPRM	52692 SPRGFLD5 161 to 59969 BRKLINE 5 161 CKT 1	323	98.6	103.5	59954 SWPS 5 161 to 59960 SWDISP 5 161 CKT 1	Third Party Line Owned By AECI
10SP	SWPA	SPRM	52692 SPRGFLD5 161 to 59969 BRKLINE 5 161 CKT 1	323	97.7	102.7	59959 BATFLD 5 161 to 59960 SWDISP 5 161 CKT 1	Third Party Line Owned By AECI
10SP	MEC	MEC	64062 DMOINES5 161 to 64051 SEPOLK 5 161 CKT 1	223	107.9	108.0	64051 SEPOLK 5 161 to 64062 DMOINES5 161 CKT 2	
10SP	AECI	SWPA	96056 5ASHRVL 161 to 52634 IDALIA 5 161 CKT 1	206	101.1	101.3	96073 5HARVELE 161 to 96084 5GRNFRT 161 CKT 1	
10SP	AECI	SWPA	96056 5ASHRVL 161 to 52634 IDALIA 5 161 CKT 1	206	101.0	101.2	96073 5HARVELE 161 to 96114 5STRFRAN 161 CKT 1	
10SP	AECI	AECI	96071 5CLINTN 161 to 96124 5HOLDEN 161 CKT 1	227	99.4	100.1	57995 MONTROSS5 161 to 96071 5CLINTN 161 CKT 1	
10SP	AECI	AMRN	96079 5FREDTN 161 to 30583 FRED TAP 161 CKT 1	56	115.1	115.2	96054 7WWEAST 345 to 97274 5WWEAST 161 CKT 1	Less Than 3% Impact
10SP	AECI	AECI	96096 5MARIES 161 to 97184 2MARIES 69 CKT 1	25	103.3	103.4	96096 5MARIES 161 to 97184 2MARIES 69 CKT 3	
10SP	AECI	AECI	96096 5MARIES 161 to 97184 2MARIES 69 CKT 2	25	103.8	104.0	96096 5MARIES 161 to 97184 2MARIES 69 CKT 3	
10SP	AECI	AECI	96108*5OSCEOL 161 WND 2 OSCEOLA 1	56	101.4	102.3	Multiple Outage Contingency: 96555 5GRAVOI 161 to 96552 5EDMONS 161 CKT 1 96555 5GRAVOI 161 to 96057 5BARNET 161 CKT 1	
10SP	AECI	AECI	96108*5OSCEOL 161 WND 2 OSCEOLA 1	56	99.4	100.4	Multiple Outage Contingency: 96563 5SUNRIS 161 to 96086 5GRNVTP 161 CKT 1 96086 5GRNVTP 161 to 97062 5LAKEVW 161 CKT 1	
10SP	AECI	AECI	96124 5HOLDEN 161 to 96071 5CLINTN 161 CKT 1	227	106.0	106.1	96110 5PITTSV 161 to 96124 5HOLDEN 161 CKT 1	
10SP	AECI	AECI	96126 5MOBTAP 161 to 96120 5THMHIL 161 CKT 1	372	106.7	106.9	96044 7MCCRED 345 to 96049 7THOMHL 345 CKT 1	
10SP	AECI	AECI	96647 2BLMYTP 69 to 96654 2MILO 69 CKT 1	36	100.3	101.3	52690 CARTHG 2 69 to 96649 2JASPER 69 CKT 1	
10SP	AECI	AECI	96654 2MILO 69 to 96802 2CLARK 69 CKT 1	36	122.5	123.5	52690 CARTHG 2 69 to 96649 2JASPER 69 CKT 1	
10SP	AECI	AECI	96654 2MILO 69 to 96802 2CLARK 69 CKT 1	36	105.5	106.5	96649 2JASPER 69 to 96651 2LAMAR 69 CKT 1	
10SP	AECI	EMDE	96658 2BILLNG 69 to 59618 CPK446 2 69 CKT 1	36	113.0	113.5	59537 AUR124 2 69 to 59611 MAR437 2 69 CKT 1	
10SP	AECI	AECI	96692 2CLINTN 69 to 96701 2GAINES 69 CKT 1	36	123.6	125.8	96071 5CLINTN 161 to 96108 5OSCEOL 161 CKT 1	
10SP	AECI	AECI	96699 2ELYNTP 69 to 96705 2PECULR 69 CKT 1	36	99.7	100.8	59207 ARCHIE 5 161 to 59240 ADRIAN 5 161 CKT 1	
10SP	AECI	AECI	96701 2GAINES 69 to 96810 2MTZION 69 CKT 1	36	109.6	111.6	96071 5CLINTN 161 to 96108 5OSCEOL 161 CKT 1	
10SP	AECI	AECI	96709 1SHARSVL 69 to 96699 2ELYNTP 69 CKT 1	36	100.1	101.5	59207 ARCHIE 5 161 to 59240 ADRIAN 5 161 CKT 1	
10SP	AECI	AECI	96720 2GRETNA 69 to 96725 2REEDSP 69 CKT 1	51	105.0	105.1	52674 TABLE R2 69 to 96735 2T.ROCK 69 CKT 1	
10SP	AECI	SWPA	96735 2T.ROCK 69 to 52674 TABLE R2 69 CKT 1	51	102.7	102.9	96720 2GRETNA 69 to 96725 2REEDSP 69 CKT 1	
10SP	AECI	AECI	96751 2REEDS 69 to 96659 2BOWRML 69 CKT 1	36	105.7	106.3	52690 CARTHG 2 69 to 96649 2JASPER 69 CKT 1	
10SP	AECI	AECI	96751 2REEDS 69 to 96659 2BOWRML 69 CKT 1	36	99.8	100.3	96649 2JASPER 69 to 96651 2LAMAR 69 CKT 1	
10SP	AECI	AECI	96751 2REEDS 69 to 96659 2BOWRML 69 CKT 1	36	83.9	100.0	52688 CARTHAG5 161 to 59479 LAR382 5 161 CKT 1	
10SP	AECI	AECI	97274*5WWEAST 161 97278 2WWEAST 69.0 1	56	103.1	103.2	Multiple Outage Contingency: 96038 7ESSEX 345 96075 5ESSEX 161 96147 1ESSEX CKT 1 96075 5ESSEX 161 to 52634 IDALIA 5161 CKT 1	
10SP	ENTR	AEPW	99832 5OSAGE # 161 to 53136 EUREKA 5 161 CKT 1	223	118.8	119.2	99797 5HARR-S 161 to 99811 5HARR-E 161 CKT 1	Less Than 3% Impact
10SP	ENTR	AEPW	99832 5OSAGE # 161 to 53136 EUREKA 5 161 CKT 1	223	110.0	110.7	52660 BULL SH5 161 to 99802 5BULLSH* 161 CKT 1	

SPP-2003-253-1 Option 2
 Table 2.2 - Non-SPP Facility Overloads
 Caused or Impacted by 250 MW Transfer

Southwest Power Pool
 System Impact Study

Study Case	From Area	To Area	Monitored Branch Overload	Rating <MVA>	BC % Loading	TC % Loading	Outaged Branch Causing Overload	Comments
10SP	ENTR	AEPW	99832 5OSAGE # 161 to 53136 EUREKA 5 161 CKT 1	223	110.0	110.3	99797 5HARR-S 161 to 99812 5HARR-W 161 CKT 1	"
10SP	ENTR	AEPW	99832 5OSAGE # 161 to 53136 EUREKA 5 161 CKT 1	223	108.7	109.5	99802 5BULLSH* 161 to 99809 5FLIPN 161 CKT 1	"
10SP	ENTR	AEPW	99832 5OSAGE # 161 to 53136 EUREKA 5 161 CKT 1	223	105.6	106.4	99809 5FLIPN 161 to 99837 5SUMMIT 161 CKT 1	"
10WP	AMRN	AMRN	31408 OVERTON 345 to 31409 OVERTON 161 CKT 1	300	105.2	105.3	96049 7THOMHL 345 to 96120 5THMHIL 161 to 96164 1THILL3 CKT 1	
10WP	SWPA	SWPA	52650 NORFORK269.0 WND 1 NFK X2 1	25	101.8	102.1	52648 NORFORK5 161 to 52650 NORFORK269.0 to 52649 NFK X1 113.8 CKT 1	
10WP	AECI	AECI	96063 5CALIF 161 WND 2 CALI 1	56	100.5	100.7	30026 APCH TP 161 to 30233 CALIF 161 CKT 1	
10WP	AECI	AECI	96074 5CUBA 161 WND 2 CUBA 1	56	104.5	104.6	96112 5SALEM 161 to 97027 2SALEM3 69.0 to 97029 1SALEM31 CKT 1	
10WP	AECI	AECI	96074 5CUBA 161 WND 2 CUBA 1	56	104.3	104.4	96112 5SALEM 161 to 97027 2SALEM3 69.0 to 97030 1SALEM32 CKT 2	
10WP	AECI	AECI	96074 5CUBA 161 WND 2 CUBA 1	56	99.9	100.1	96096 5MARIES 161 to 97184 2MARIES 69.0 CKT 3	
10WP	AECI	AECI	96082 5GEORGE 161 WND 2 GRGTWN1 1	56	101.9	102.1	96105 5NORTON 161 to 96540 2NORTON 69.0 to 96539 1NORTON CKT 1	
10WP	AECI	AECI	96082 5GEORGE 161 WND 2 GRGTWN1 1	56	100.7	100.8	96692 2CLINTN 69.0 to 96534 2LINCLN 69.0 CKT 1	
10WP	AECI	AECI	96108 5OSCEOL 161 WND 2 OSCEOLA 1	56	101.8	102.5	96701 2GAINES 69.0 to 96810 2MTZION 69.0 CKT 1	
10WP	AECI	AECI	96112 5SALEM 161 WND 2 SALEM3 1 1	56	121.4	121.5	96112 5SALEM 161 to 97027 2SALEM3 69.0 to 97030 1SALEM32 CKT 2	
10WP	AECI	AECI	96112 5SALEM 161 WND 2 SALEM3 2 2	56	120.9	121.0	96112 5SALEM 161 to 97027 2SALEM3 69.0 to 97029 1SALEM31 CKT 1	
10WP	AECI	AECI	96122 5WILSPG 161 WND 2 WILLOWS1 1	56	99.8	101.2	96122 5WILSPG 161 to 97114 2WILSP 69.0 to 97117 1WILLWS2 CKT 2	
10WP	AECI	AECI	96123 5WPLAIN 161 WND 2 WESTPL2 2	56	109.2	109.5	96123 5WPLAIN 161 to 97123 2WSTPL3 69.0 to 97119 1WESTPL2 CKT 1	
10WP	AECI	AECI	96124 5HOLDEN 161 WND 2 HOLDEN 1	56	122.4	122.7	96071 5CLINTN 161 to 96124 5HOLDEN 161 CKT 1	
10WP	AECI	AECI	96126 5MOBTAP 161 to 96120 5THMHIL 161 CKT 1	386	100.9	101.1	Multiple Outage Contingency: 96049 7THOMHL 345 to 96044 7MCCRED 345 CKT 1 96044 7MCCRED 345 to 96043 7KINGDM 345 CKT 1	
10WP	AECI	AECI	96692 2CLINTN 69.0 to 96701 2GAINES 69.0 CKT 1	43	110.5	111.5	Multiple Outage Contingency: 96071 5CLINTN 161 to 96108 5OSCEOL 161 CKT 1 96108 5OSCEOL161 to 52698 STOCKTN5 161 CKT 1	
10WP	AECI	AECI	96692 2CLINTN 69.0 to 96701 2GAINES 69.0 CKT 1	43	105.8	106.5	96108 5OSCEOL 161 to 96811 2OSCEOL 69.0 to 96812 1OSCEOLA CKT 1	
10WP	AECI	AECI	96811 2OSCEOL 69.0 WND 1 OSCEOLA 1	56	101.6	102.1	96701 2GAINES 69.0 to 96810 2MTZION 69.0 CKT 1	
10WP	AMRN	AMRN	31408 OVERTON 345 to 31409 OVERTON 161 CKT 1	300	112.4	112.7	96043 7KINGDM 345 to 96090 5KINGDM 161 CKT 1	
10WP	AMRN	AMRN	31408 OVERTON 345 to 31409 OVERTON 161 CKT 1	300	112.4	112.6	96043 7KINGDM 345 to 96044 7MCCRED 345 CKT 1	
10WP	AMRN	AMRN	31408 OVERTON 345 to 31409 OVERTON 161 CKT 1	300	104.1	104.2	Multiple Outage Contingency: 31221 MOBERLY 161 to 58062 SALSBRYS161 CKT 1 31221 MOBERLY 161 96126 5MOBTAP 161 CKT 1	
10WP	AMRN	AMRN	31408 OVERTON 345 to 31409 OVERTON 161 CKT 1	300	101.9	102.0	Multiple Outage Contingency: 96120 5THMHIL 161 to 96126 5MOBTAP 161 CKT 1 96126 5MOBTAP 161 to 96499 5HINTON 161 CKT 1	
10WP	AMRN	AMRN	31408 OVERTON 345 to 31409 OVERTON 161 CKT 1	300	101.3	101.5	96090 5KINGDM 161 to 96519 5MLRSBG 161 CKT 1	
10WP	SWPA	AECI	52690 CARTHG 2 69 to 96751 2REEDS 69 CKT 1	43	97.3	110.7	52688 CARTHAG5 161 to 59479 LAR382 5 161 CKT 1	Third Party Line Owned By AECI
10WP	SWPA	AECI	52690 CARTHG 2 69 to 96751 2REEDS 69 CKT 1	43	104.6	105.4	52690 CARTHG 2 69 to 96649 2JASPER 69 CKT 1	Third Party Line Owned By AECI
10WP	SWPA	AECI	52690 CARTHG 2 69 to 96751 2REEDS 69 CKT 1	43	100.0	100.4	96649 2JASPER 69 to 96651 2LAMAR 69 CKT 1	Third Party Line Owned By AECI
10WP	NPPD	NPPD	64726 ALBION 7 115 to 64727 ALBION 9 34.5 CKT 2	11	109.5	109.6	64726 ALBION 7 115 to 64727 ALBION 9 34.5 CKT 1	
10WP	AECI	AECI	96692 2CLINTN 69 to 96701 2GAINES 69 CKT 1	43	98.1	100.3	96071 5CLINTN 161 to 96108 5OSCEOL 161 CKT 1	
10WP	AECI	AECI	96751 2REEDS 69 to 96659 2BOWRML 69 CKT 1	43	91.4	104.8	52688 CARTHAG5 161 to 59479 LAR382 5 161 CKT 1	

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 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 Overload	Rating <MVA>	BC % Loading	TC % Loading	Outaged Branch Causing Overload	ATC (MW)	Solution	Cost
05AP	SWPA	SPRM	52694 SPRGFLD2 69 to 59911 GOLDEN 2 69 CKT 1	72	101.7	102.7	52694 SPRGFLD2 69 to 59911 GOLDEN 2 69 CKT 1	250	Incorrect Rating, Emergency Rating 95 MVA	
05AP	SWPA	SPRM	52694 SPRGFLD2 69 to 59911 GOLDEN 2 69 CKT 2	72	101.7	102.7	52694 SPRGFLD2 69 to 59911 GOLDEN 2 69 CKT 1	250	Incorrect Rating, Emergency Rating 95 MVA	
05G	WERE	WERE	57165 HTI JCT3 115 to 57152 CIRCLVL3 115 CKT 1	97	118.3	118.4	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 Outage of the Hoyt to Stranger 345 kv line	
05G	EMDE	SWPA	59466 ATL109 5 161 to 52688 CARTHAG5 161 CKT 1	167	90.6	103.5	59472 TIP292 5 161 to 59483 JOP389 5 161 CKT 1	46	At 100 MW the loading is 105.6%, Replace 600 Amp disconnect switches May Require Additional Upgrades	\$ 60,000
05SH	EMDE	SWPA	59466 ATL109 5 161 to 52688 CARTHAG5 161 CKT 1	167	88.7	113.1	59472 TIP292 5 161 to 59483 JOP389 5 161 CKT 1	43	At 100 MW the loading is 115.1%, See Previous Upgrade Specified	
05SH	EMDE	EMDE	59467 ORO110 5 161 to 59494 OAK432 5 161 CKT 1	214	91.3	109.0	59472 TIP292 5 161 to 59483 JOP389 5 161 CKT 1	47	At 100 MW the loading is 109.7%, Reconstruct and replace 1.4 miles of 556 ACSR with Bundled 556 ACSR.	\$ 800,000
05SH	EMDE	EMDE	59467 ORO110 5 161 to 59494 OAK432 5 161 CKT 2	214	87.1	105.2	59476 ASB349 5 161 to 59491 PUR421 5 161 CKT 1	77	See Previous Upgrade Specified	
05SH	EMDE	SWPA	59466 ATL109 5 161 to 52688 CARTHAG5 161 CKT 1	167	80.0	104.6	59476 ASB349 5 161 to 59491 PUR421 5 161 CKT 2	84	See Previous Upgrade Specified	
05SH	EMDE	EMDE	59494 OAK432 5 161 to 59466 ATL109 5 161 CKT 1	214	84.6	102.2	59472 TIP292 5 161 to 59483 JOP389 5 161 CKT 1	84	At 100 MW the loading is 102.9%, Solution Undetermined	
05SH	EMDE	EMDE	59467 ORO110 5 161 to 59494 OAK432 5 161 CKT 1	214	85.3	103.4	59485 CAR395 5 161 to 59491 PUR421 5 161 CKT 1	87	See Previous Upgrade Specified	
05SH	EMDE	SWPA	59466 ATL109 5 161 to 52688 CARTHAG5 161 CKT 1	167	77.5	102.1	59485 CAR395 5 161 to 59491 PUR421 5 161 CKT 2	94	See Previous Upgrade Specified	
05SH	EMDE	EMDE	59467 ORO110 5 161 to 59494 OAK432 5 161 CKT 2	214	82.3	100.5	52688 CARTHAG5 161 to 59485 CAR395 5 161 CKT 1	192	See Previous Upgrade Specified	
05FA	EMDE	SWPA	59466 ATL109 5 161 to 52688 CARTHAG5 161 CKT 1	167	100.7	101.9	59476 ASB349 5 161 to 59491 PUR421 5 161 CKT 1	0	See Previous Upgrade Specified	
07SP	WERE	WERE	57244 JARBALO3 115 to 57233 166TH 3 115 CKT 1	97	100.8	100.9	57252 MIDLAND3 115 to 57261 PENTAGN3 115 CKT 1	0	May be relieved due to Westar Operating Procedure 1202 Overload of the Jarbalo to Jaggard 115kV Line	
07SP	OKGE	OKGE	55187 AHLOSTP2 69 to 55177 PARKLN 2 69 CKT 1	72	124.8	124.9	55177 PARKLN 2 69 to 55182 VALLYVU2 69 CKT 1	0	Replace Switch @ Aholoso Tap & Breaker disconnect switch @ Park Lane Sub	\$ 300,000
07SP	WERE	WERE	56851 AUBURN 6 230 to 56852 JEC 6 230 CKT 1	565	108.9	109.3	56765 HOYT 7 345 to 56766 JEC N 7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 400 Outage of the Jeffrey Energy Center to Hoyt 345kV Line	
07SP	WERE	WERE	56851 AUBURN 6 230 WND 1 AUBRN77X 1	308	118.1	118.3	56765 HOYT 7 345 to 56766 JEC N 7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 400 Outage of the Jeffrey Energy Center to Hoyt 345kV Line	
07SP	WERE	WERE	57151 AUBURN 3 115 WND 2 AUBRN77X 1	308	117.3	117.6	56765 HOYT 7 345 to 56766 JEC N 7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 400 Outage of the Jeffrey Energy Center to Hoyt 345kV Line	
07SP	SWPA	AECI	52690 CARTHG 2 69 to 96751 2REEDS 69 CKT 1	36	109.2	109.3	52690 CARTHG 2 69 to 96649 2JASPER 69 CKT 1	0	AECI third party line. No SWPA upgrades required.	
07SP	SWPA	AECI	52690 CARTHG 2 69 to 96751 2REEDS 69 CKT 1	36	103.5	103.7	96649 2JASPER 69 to 96651 2LAMAR 69 CKT 1	0	AECI third party line. No SWPA upgrades required.	
07SP	SWPA	AECI	52690 CARTHG 2 69 to 96751 2REEDS 69 CKT 1	36	101.7	102.1	59499 CPK446 5 161 to 59618 CPK446 269.0 to 59721 CPK446 112.5 CKT	0	AECI third party line. No SWPA upgrades required.	
07SP	SWPA	AECI	52690 CARTHG 2 69 to 96751 2REEDS 69 CKT 1	36	100.9	101.6	52680 BEAVER 5 161 to 53136 EUREKA 5 161 CKT 1	0	AECI third party line. No SWPA upgrades required.	
07SP	AEPW	AEPW	53195 FARMGTN5 161 to 53154 CHAMSPR5 161 CKT 1	353	106.9	107.0	53131 DYESS 5 161 to 53159 SOSPRDL5 161 CKT 1	0	Rebuild 10.24 miles with 2156 ACSR, replace Chamber Springs wavetrap, & replace Farmington AEC bus.	\$ 6,400,000
07SP	WERE	WERE	57165 HTI JCT3 115 to 57152 CIRCLVL3 115 CKT 1	97	102.1	102.2	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 Outage of the Hoyt to Stranger 345 kv line	
07SP	AEPW	ENTR	53136 EUREKA 5 161 to 99832 5OSAGE # 161 CKT 1	223	104.4	104.7	99797 5HARR-S 161 to 99811 5HARR-E 161 CKT 1	0	Solution Undetermined	
07SP	AEPW	ENTR	53136 EUREKA 5 161 to 99832 5OSAGE # 161 CKT 2	223	101.3	101.9	52660 BULL SH5 161 to 99802 5BULLSH* 161 CKT 1	0	Solution Undetermined	
07SP	AEPW	ENTR	53136 EUREKA 5 161 to 99832 5OSAGE # 161 CKT 3	223	100.3	100.9	99802 5BULLSH* 161 to 99809 5FLIPN 161 CKT 1	0	Solution Undetermined	
07SP	WERE	WERE	57735 GOLDPLJ2 69 to 57733 GATZ 2 69 CKT 1	32	120.5	121.2	57741 MID AMJ2 69 to 57744 MUDCRKJ2 69 CKT 1	0	May be relieved due to Westar Operating Procedure 1301 Outage of the Halstead to Newton 69 kv line	
07SP	WERE	WERE	57735 GOLDPLJ2 69 to 57733 GATZ 2 69 CKT 1	32	120.5	121.2	57736 HALSTED2 69 to 57744 MUDCRKJ2 69 CKT 1	0	May be relieved due to Westar Operating Procedure 1301 Outage of the Halstead to Newton 69 kv line	
07SP	WERE	WERE	57735 GOLDPLJ2 69 to 57733 GATZ 2 69 CKT 1	32	119.5	120.2	57741 MID AMJ2 69 to 57745 NEWTON 2 69 CKT 1	0	May be relieved due to Westar Operating Procedure 1301 Outage of the Halstead to Newton 69 kv line	
07SP	SPS	SPS	51402 HALECO3 115 to 51401 HALECO2 69 CKT 1	46	132.6	132.7	51401 HALECO2 69 to 51402 HALECO3 115 CKT 2	0	May be relieved due to Xcel Energy Operating Guide for Outage of Hale Co Interchange 115/69 kv Transformer	
07SP	SPS	SPS	51402 HALECO3 115 to 51401 HALECO2 69 CKT 2	46	133.1	133.2	51401 HALECO2 69 to 51402 HALECO3 115 CKT 1	0	May be relieved due to Xcel Energy Operating Guide for Outage of Hale Co Interchange 115/69 kv Transformer	
07SP	WERE	WERE	56853 LAWHILL6 230 WND 1 LAWHL29X 1	308	112.1	112.2	56855 MIDLAND6 230 to 57252 MIDLAND3 115 to 56884 MIDLAND118.0 CKT 1	0	May be relieved due to Westar Transmission Operating Directive 615 Loss of the Midland Junction 230/115kV Transformer	
07SP	WERE	WERE	57250 LWRNCHL3 115 WND 2 LAWHL29X 1	308	110.2	110.3	56853 LAWHILL6 230 to 56855 MIDLAND6 230 CKT 1	0	May be relieved due to Westar Transmission Operating Directive 901 Outage of the Lawrence Hill-Midland JCT 230kV Line	
07SP	WERE	WERE	57250 LWRNCHL3 115 WND 2 LAWHL29X 1	308	110.1	110.2	56855 MIDLAND6 230 to 57252 MIDLAND3 115 to 56884 MIDLAND118.0 CKT 1	0	May be relieved due to Westar Transmission Operating Directive 615 Loss of the Midland Junction 230/115kV Transformer	
07SP	AEPW	AEPW	53623 MARAUTO0269.0 WND 1	1	107	124.2	53571 MARSHL-4 138 to 53623 MARAUTO0269.0 to 53653 MRSH4#2112.5 CKT 1	0	Replace 755 ACAR Strain Bus.	\$ 25,000
07SP	AEPW	AEPW	53571 MARSHL-4 138 WND 2	2	107	125.3	53571 MARSHL-4 138 to 53623 MARAUTO0269.0 to 53652 MRSH4#1112.5 CKT 1	0	Replace 755 ACAR Strain Bus.	\$ 25,000
07SP	AEPW	AEPW	53623 MARAUTO0269.0 WND 1	2	107	124.1	53571 MARSHL-4 138 to 53623 MARAUTO0269.0 to 53652 MRSH4#1112.5 CKT 1	0	See Previous Upgrade Specified	
07SP	WERE	WERE	56855 MIDLAND6 230 WND 1 MIDJ126X 1	308	100.7	100.8	56853 LAWHILL6 230 to 57250 LWRNCHL3 115 to 56882 LAWHILL113.8 CKT 1	0	May be relieved due to Westar Transmission Operating Directive 631 Loss of the Lawrence Hill 230/115kV Transformer	
07SP	SWPA	SWPA	52696 NIXA 5 161 WND 2 NXA X2 1	25	188.2	188.3	52696 NIXA 5 161 to 52701 NIXA 269.0 to 52697 NIXA X1 113.8 CKT	0	Solution Undetermined	
07SP	AEPW	AEPW	53441 RDPOINT4 138 WND 2	46	123.7	124.0	53440 RDPOINT269.0 to 53441 RDPOINT4 138 to 53485 RDPT2-1 13.2 CKT 1	0	Solution Undetermined	

SPP-2003-253-1 Option 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 Overload	Rating <MVA>	BC % Loading	TC % Loading	Outaged Branch Causing Overload	ATC (MW)	Solution	Cost
07SP	AEPW	AEPW	53440 RDPOINT269.0 WND 1	1	46	118.5	53440 RDPOINT269.0 to 53441 RDPOINT4 138 to 53485 RDPT2-1 13.2 CKT	0	Solution Undetermined	
07SP	AEPW	AEPW	53441 RDPOINT4 138 WND 2	2	46	123.7	53440 RDPOINT269.0 to 53441 RDPOINT4 138 to 53484 RDPT1-1 13.2 CKT	0	Solution Undetermined	
07SP	AEPW	AEPW	53440 RDPOINT269.0 WND 1	2	46	118.5	53440 RDPOINT269.0 to 53441 RDPOINT4 138 to 53484 RDPT1-1 13.2 CKT	0	Solution Undetermined	
07SP	EMDE	EMDE	59483 JOP389 5 161 WND 1 JOPLINSW	1	75	100.8	59472 TIP292 5 161 to 59483 JOP389 5 161 CKT 1	0	At 150 MW the loading is 108.6%, Replace 161/69 KV Transformer with a 150 MVA Transformer.	\$ 1,565,000
07SP	EMDE	EMDE	59592 JOP389 269.0 WND 2 JOPLINSW	1	75	100.6	59472 TIP292 5 161 to 59483 JOP389 5 161 CKT 1	0	At 150 MW the loading is 108.5%, See Previous Upgrade Specified	
07SP	EMDE	EMDE	59467 ORO110 5 161 to 59494 OAK432 5 161 CKT		214	96.8	59472 TIP292 5 161 to 59483 JOP389 5 161 CKT	18	See Previous Upgrade Specified	
07SP	EMDE	SWPA	59466 ATL109 5 161 to 52688 CARTHAG5 161 CKT		167	87.4	59472 TIP292 5 161 to 59483 JOP389 5 161 CKT	48	See Previous Upgrade Specified	
07SP	EMDE	EMDE	59500 RNM393 5 161 WND 1 REINMILL	1	75	96.1	59472 TIP292 5 161 to 59483 JOP389 5 161 CKT 1	56	Replace 161/69 KV Transformer with a 150 MVA Transformer.	\$ 1,730,000
07SP	EMDE	EMDE	59494 OAK432 5 161 to 59466 ATL109 5 161 CKT		214	88.4	59472 TIP292 5 161 to 59483 JOP389 5 161 CKT	64	Solution Undetermined	
07SP	EMDE	EMDE	59595 RNM393 269.0 WND 2 REINMILL	1	75	95.4	59472 TIP292 5 161 to 59483 JOP389 5 161 CKT	67	See Previous Upgrade Specified	
07SP	EMDE	EMDE	59467 ORO110 5 161 to 59494 OAK432 5 161 CKT		214	88.7	59476 ASB349 5 161 to 59491 PUR421 5 161 CKT	68	See Previous Upgrade Specified	
07SP	EMDE	EMDE	59483 JOP389 5 161 WND 1 JOPLINSW	1	75	98.4	59483 JOP389 5 161 to 59607 JOP422 5 161 CKT 1	72	At 150 MW the loading is 102.8%, See Previous Upgrade Specified	
07SP	SWPA	SPRM	52692 SPRGFLD5 161 to 59969 BRKLN 5 161 CKT		323	98.9	59955 JUNCTN 5 161 to 59969 BRKLN 5 161 CKT	76	Replace disconnect switches at Springfield.	\$ 60,000
07SP	EMDE	EMDE	59467 ORO110 5 161 to 59494 OAK432 5 161 CKT		214	86.4	59485 CAR395 5 161 to 59491 PUR421 5 161 CKT	81	See Previous Upgrade Specified	
07SP	EMDE	EMDE	59592 JOP389 269.0 WND 2 JOPLINSW	1	75	97.9	59483 JOP389 5 161 to 59607 JOP422 5 161 CKT 1	98	At 150 MW the loading is 102.2%, See Previous Upgrade Specified	
07SP	EMDE	EMDE	59467 ORO110 5 161 to 59494 OAK432 5 161 CKT		214	82.7	52688 CARTHAG5 161 to 59485 CAR395 5 161 CKT 53857 OWASO2_4138 to 53945 N.E.S.-4138 CKT 53855 PCATSAT4138 to 53857 OWASO2_4138 CKT 53802 CATOOSA4138 to 53855 PCATSAT4138 CKT 53736 PCATOSA4138 to 53855 PCATSAT4138 CKT CLOSE 53734 TER-NIT4138 to 53736 PCATOSA4138 CKT MOVE 100% LOAD FROM 53857 OWASO2_4138 to 53737 OWASO1_4138	106	See Previous Upgrade Specified	
07SP	AEPW	AEPW	53869 VERDIGS4 138 to 53849 TERNITP4 138 CKT 1		151	99.6	59472 TIP292 5 161 to 59483 JOP389 5 161 CKT	125	Loading Exceeds Conductor Emergency Rating of 151 MVA, Solution Undetermined	
07SP	EMDE	SWPA	59472 TIP292 5 161 to 52686 NEO SPA5 161 CKT		157	88.1	59472 TIP292 5 161 to 59483 JOP389 5 161 CKT	129	Solution Undetermined	
07SP	EMDE	SWPA	59466 ATL109 5 161 to 52688 CARTHAG5 161 CKT		167	72.9	59476 ASB349 5 161 to 59491 PUR421 5 161 CKT	135	See Previous Upgrade Specified	
07SP	EMDE	EMDE	59494 OAK432 5 161 to 59466 ATL109 5 161 CKT		214	80.3	59476 ASB349 5 161 to 59491 PUR421 5 161 CKT	136	Solution Undetermined	
07SP	SWPA	AECI	52690 CARTHG 2 69 to 96751 2REEDS 69 CKT		36	90.7	52688 CARTHAG5 161 to 59479 LAR382 5 161 CKT	153	AECI third party line. No SWPA upgrades required.	
07SP	EMDE	EMDE	59494 OAK432 5 161 to 59466 ATL109 5 161 CKT		214	78.0	59485 CAR395 5 161 to 59491 PUR421 5 161 CKT	204	Solution Undetermined	
07SP	EMDE	SWPA	59466 ATL109 5 161 to 52688 CARTHAG5 161 CKT		167	69.7	59485 CAR395 5 161 to 59491 PUR421 5 161 CKT	208	See Previous Upgrade Specified	
07SP	EMDE	EMDE	59469 RIV167 5 161 to 59467 ORO110 5 161 CKT		214	74.5	59470 JOP145 5 161 to 59498 STL439 5 161 CKT	219	Solution Undetermined	
07SP	EMDE	EMDE	59467 ORO110 5 161 to 59494 OAK432 5 161 CKT		214	76.8	59472 TIP292 5 161 to 59483 JOP389 5 161 CKT	232	See Previous Upgrade Specified	
07SP	EMDE	EMDE	59494 OAK432 5 161 to 59466 ATL109 5 161 CKT		214	74.3	52688 CARTHAG5 161 to 59485 CAR395 5 161 CKT	239	Solution Undetermined	
07SP	EMDE	SWPA	59466 ATL109 5 161 to 52688 CARTHAG5 161 CKT		167	64.6	52688 CARTHAG5 161 to 59485 CAR395 5 161 CKT	243	See Previous Upgrade Specified	
07SP	WERE	WERE	57187 27CROCO3 115 to 57182 TECHILE3 115 CKT		68	105.6	57182 TECHILE3 115 to 57187 27CROCO3 115 CKT	250	Invalid Contingency	
07SP	AEPW	AEPW	53691 GLENPIN4 138 to 53687 CANTONT4 138 CKT		235	100.9	53549 JACKSNV4 138 to 53689 COFFEE 4 138 CKT	250	Invalid Contingency	
07WP	WERE	WERE	57165 HTI JCT3 115 to 57152 CIRCLVL3 115 CKT 1		97	108.5	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 Outage of the Hoyt to Stranger 345 kV line	
07WP	WERE	WERE	57152 CIRCLVL3 115 to 57331 KING HL3 115 CKT 1		92	102.7	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 Outage of the Hoyt to Stranger 345 kV line	
07WP	WERE	WERE	57331 KING HL3 115 to 57217 KELLY 3 115 CKT 1		92	100.5	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 Outage of the Hoyt to Stranger 345 kV line	
07WP	SWPA	AECI	52690 CARTHG 2 69 to 96751 2REEDS 69 CKT 1		43	96.6	52688 CARTHAG5 161 to 59479 LAR382 5 161 CKT	99	AECI third party line. No SWPA upgrades required.	
07WP	EMDE	SWPA	59466 ATL109 5 161 to 52688 CARTHAG5 161 CKT 1		207	89.5	59472 TIP292 5 161 to 59483 JOP389 5 161 CKT 1	153	At 200 MW the loading is 109.9%, See Previous Upgrade Specified	
07WP	SWPA	AEPW	52680 BEAVER 5 161 to 53136 EUREKA 5 161 CKT 1		263	98.8	53140 FLINTCR7 345 to 59481 MON383 7 345 CKT 1 59481 MON383 7 345 to 59984 BRKLN 7 345 CKT 1	206	SWPA Reconnect CT's to 1000:5 Tap on Bkrs 42, 32, & half or 22. Replace metering & reset relays for Line 2 & Line 3. AEPW Replace Wavetrap & Metering CT Jumpers	\$ 67,500
10SP	WERE	WERE	57244 JARBALO3 115 to 57233 166TH 3 115 CKT 1		97	103.6	57240 EUDORA 3 115 to 57277 WAKARUS3 115 CKT 1	0	May be relieved due to Westar Operating Procedure 1202 Overload of the Jarbalo to Jaggard 115kV Line	
10SP	WERE	WERE	57244 JARBALO3 115 to 57233 166TH 3 115 CKT 1		97	100.8	57235 CAPTAIN3 115 to 57240 EUDORA 3 115 CKT 1	0	May be relieved due to Westar Operating Procedure 1202 Overload of the Jarbalo to Jaggard 115kV Line	
10SP	AECI	SWPA	96056 SASHRVL 161 to 52634 IDALIA 5 161 CKT		206	101.1	96073 5HARVELE 161 to 96084 5GRNFR1 161 CKT	0	Reconductor line with 954 ACSR.	\$ 6,600,000
10SP	AECI	SWPA	96056 SASHRVL 161 to 52634 IDALIA 5 161 CKT		206	101.0	96073 5HARVELE 161 to 96114 5STFRAN 161 CKT	0	See Previous Upgrade Specified	
10SP	SWPA	SPRM	52692 SPRGFLD5 161 to 59969 BRKLN 5 161 CKT		323	102.9	59955 JUNCTN 5 161 to 59969 BRKLN 5 161 CKT	0	See Previous Upgrade Specified	
10SP	SWPA	AECI	52690 CARTHG 2 69 to 96751 2REEDS 69 CKT		36	113.3	52690 CARTHG 2 69 to 96649 2JASPER 69 CKT	0	AECI third party line. No SWPA upgrades required.	
10SP	SWPA	AECI	52690 CARTHG 2 69 to 96751 2REEDS 69 CKT		36	107.3	96649 2JASPER 69 to 96651 2LAMAR 69 CKT 1	0	AECI third party line. No SWPA upgrades required.	
10SP	SWPA	AECI	52690 CARTHG 2 69 to 96751 2REEDS 69 CKT		36	106.7	59537 AUR124 2 69 to 59578 AUR355 2 69 CKT	0	AECI third party line. No SWPA upgrades required.	
10SP	SWPA	AECI	52690 CARTHG 2 69 to 96751 2REEDS 69 CKT		36	105.9	59499 CPK446 5 161 to 59618 CPK446 269.0 to 59721 CPK446 112.5 CKT	0	AECI third party line. No SWPA upgrades required.	
10SP	AEPW	AEPW	53195 FARMGTN5 161 to 53154 CHAMSPR5 161 CKT 1		353	123.0	53131 DYESS 5 161 to 53159 SOSPRDL5 161 CKT	0	See Previous Upgrade Specified	
10SP	AEPW	AEPW	53195 FARMGTN5 161 to 53154 CHAMSPR5 161 CKT 1		353	104.9	53159 SOSPRDL5 161 to 53193 EFPYTVL5 161 CKT	0	See Previous Upgrade Specified	

SPP-2003-253-1 Option 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 Overload	Rating <MVA>	BC % Loading	TC % Loading	Outaged Branch Causing Overload	ATC (MW)	Solution	Cost
10SP	WERE	WERE	57165 HTI JCT3 115 to 57152 CIRCLVL3 115 CKT 1	97	100.3	100.4	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 Outage of the Hoyt to Stranger 345 kV line	
10SP	GRDA	GRDA	54427 COLINS 5 161 to 54476 COLNSGR2 69 CKT 1	50	100.3	100.5	54427 COLINS 5 161 to 54476 COLNSGR2 69 CKT 2	0	Solution Undetermined	
10SP	AEPW	AEPW	53194 ELMSPRR5 161 to 53131 DYESS 5 161 CKT 1	312	108.7	109.1	53131 DYESS 5 161 to 53170 TONTITN5 161 CKT 1	0	Terminal Equipment Limited, Solution Undetermined	
10SP	AEPW	AEPW	53131 DYESS 5 161 to 53194 ELMSPRR5 161 CKT 1	312	100.2	100.5	53154 CHAMSPR5 161 to 53195 FARMGTN5 161 CKT 1	0	Terminal Equipment Limited, Solution Undetermined	
10SP	AEPW	AEPW	53159 SOSPRDL5 161 to 53131 DYESS 5 161 CKT 1	313	130.9	131.0	53154 CHAMSPR5 161 to 53195 FARMGTN5 161 CKT 1	0	Rebuild 3.95 miles of 1272 AAC with 2156 ACSR. Replace South Springdale Circuit Switcher & Jumpers	\$ 2,200,000
10SP	ENTR	AEPW	99832 5OSAGE # 161 to 53136 EUREKA 5 161 CKT 1	223	118.8	119.2	99797 5HARR-S 161 to 99811 5HARR-E 161 CKT 1	0	Rebuild 5.34 miles of 666 ACSR with 1590 ACSR. Replace wavetrap jumpers @ Eureka Springs	\$ 2,400,000
10SP	ENTR	AEPW	99832 5OSAGE # 161 to 53136 EUREKA 5 161 CKT 1	223	110.0	110.7	52660 BULL SH5 161 to 99802 5BULLSH* 161 CKT 1	0	See Previous Upgrade Specified	
10SP	ENTR	AEPW	99832 5OSAGE # 161 to 53136 EUREKA 5 161 CKT 1	223	110.0	110.3	99797 5HARR-S 161 to 99812 5HARR-W 161 CKT 1	0	See Previous Upgrade Specified	
10SP	ENTR	AEPW	99832 5OSAGE # 161 to 53136 EUREKA 5 161 CKT 1	223	108.7	109.5	99802 5BULLSH* 161 to 99809 5FLIPN 161 CKT 1	0	See Previous Upgrade Specified	
10SP	ENTR	AEPW	99832 5OSAGE # 161 to 53136 EUREKA 5 161 CKT 1	223	105.6	106.4	99809 5FLIPN 161 to 99837 5SUMMIT 161 CKT 1	0	See Previous Upgrade Specified	
10SP	AEPW	AEPW	53157 SFAYTVL5 161 to 53195 FARMGTN5 161 CKT 1	313	113.2	113.3	53131 DYESS 5 161 to 53159 SOSPRDL5 161 CKT 1	0	Loading Exceeds Conductor Emergency Rating of 353 MVA, Solution Undetermined	
10SP	AEPW	AEPW	53187 GENTRYR5 161 to 53139 FLINTCR5 161 CKT 1	305	102.8	103.2	Base Case	0	Rebuild 1.09 miles of 2-397.5 ACSR with 2156 ACSR. Replace Flint Creek wavetrap & jumpers	\$ 450,000
10SP	AEPW	AEPW	53187 GENTRYR5 161 to 53139 FLINTCR5 161 CKT 1	353	102.7	103.2	53144 LOWELL 5 161 to 53170 TONTITN5 161 CKT 1	0	See Previous Upgrade Specified	
10SP	AEPW	AEPW	53187 GENTRYR5 161 to 53139 FLINTCR5 161 CKT 1	353	101.0	101.5	53139 FLINTCR5 161 to 53170 TONTITN5 161 CKT 1	0	See Previous Upgrade Specified	
10SP	AEPW	AEPW	53187 GENTRYR5 161 to 53139 FLINTCR5 161 CKT 1	353	100.2	100.7	53144 LOWELL 5 161 to 53152 ROGERS 5 161 CKT 1	0	See Previous Upgrade Specified	
10SP	SPRM	SPRM	59933 TWINOAK2 69 to 59904 JRPS 2 69 CKT 1	108	100.6	100.9	59904 JRPS 2 69 to 59908 S HY65 2 69 CKT 1	0	Solution Undetermined	
10SP	SPRM	SPRM	59906 KICKAPO2 69 to 59907 SUNSET 2 69 CKT 1	108	105.8	105.9	59904 JRPS 2 69 to 59933 TWINOAK2 69 CKT 1	0	Solution Undetermined	
10SP	WERE	WERE	56853 LAWHILL6 230 WND 1 LAWHL29X 1	308	110.0	110.1	56855 MIDLAND6 230 to 57252 MIDLAND3 115 to 56884 MIDLAND118.0 CKT 1	0	May be relieved due to Westar Transmission Operating Directive 615 Loss of the Midland Junction 230/115kV Transformer	
10SP	WERE	WERE	56853 LAWHILL6 230 WND 1 LAWHL29X 1	308	110.0	110.1	56853 LAWHILL6 230 to 56855 MIDLAND6 230 CKT 1	0	May be relieved due to Westar Transmission Operating Directive 901 Outage of the Lawrence Hill-Midland JCT 230kV Line	
10SP	WERE	WERE	57250 LWRNCHL3 115 WND 2 LAWHL29X 1	308	107.8	107.9	56855 MIDLAND6 230 to 57252 MIDLAND3 115 to 56884 MIDLAND118.0 CKT 1	0	May be relieved due to Westar Transmission Operating Directive 615 Loss of the Midland Junction 230/115kV Transformer	
10SP	WERE	WERE	57250 LWRNCHL3 115 WND 2 LAWHL29X 1	308	107.8	107.9	56853 LAWHILL6 230 to 56855 MIDLAND6 230 CKT 1	0	May be relieved due to Westar Transmission Operating Directive 901 Outage of the Lawrence Hill-Midland JCT 230kV Line	
10SP	SWPA	SWPA	52696 NIXA 5 161 WND 2 NXA X1 1	25	192.3	192.4	52696 NIXA 5 161 to 52701 NIXA 269.0 to 52699 NXA X2 113.8 CKT	0	Solution Undetermined	
10SP	SWPA	SWPA	52696 NIXA 5 161 WND 2 NXA X2 1	25	201.6	201.9	52696 NIXA 5 161 to 52701 NIXA 269.0 to 52697 NXA X1 113.8 CKT	0	Solution Undetermined	
10SP	SWPA	SWPA	52701 NIXA 269.0 WND 1 NXA X2 1	25	174.4	174.5	52696 NIXA 5 161 to 52701 NIXA 269.0 to 52697 NXA X1 113.8 CKT	0	Solution Undetermined	
10SP	EMDE	EMDE	59525 JOP 59 2 69 to 59551 GAT258 2 69 CKT 1	65	101.5	105.1	59483 JOP389 5 161 to 59607 JOP422 5 161 CKT 1	0	At 200 MW the loading is 106.9%, Solution Undetermined	
10SP	EMDE	EMDE	59400 MON376J269 to 59402 MON416J269 CKT1	27	111.3	112.3	Base Case	0	Solution Undetermined	
10SP	EMDE	EMDE	59483 JOP389 5 161 WND 1 JOPLINSW 1	75	107.2	116.5	59472 TIP292 5 161 to 59483 JOP389 5 161 CKT 1	0	See Previous Upgrade Specified	
10SP	EMDE	EMDE	59592 JOP389 269.0 WND 2 JOPLINSW 1	75	107.0	116.2	59472 TIP292 5 161 to 59483 JOP389 5 161 CKT 1	0	See Previous Upgrade Specified	
10SP	EMDE	EMDE	59483 JOP389 5 161 WND 1 JOPLINSW 1	75	105.5	110.1	59483 JOP389 5 161 to 59607 JOP422 5 161 CKT 1	0	See Previous Upgrade Specified	
10SP	EMDE	EMDE	59592 JOP389 269.0 WND 2 JOPLINSW 1	75	104.8	109.4	59483 JOP389 5 161 to 59607 JOP422 5 161 CKT 1	0	See Previous Upgrade Specified	
10SP	EMDE	EMDE	59483 JOP389 5 161 WND 1 JOPLINSW 1	75	100.9	105.5	59593 JOP391 5 161 to 59607 JOP422 5 161 CKT 1	0	See Previous Upgrade Specified	
10SP	EMDE	EMDE	59592 JOP389 269.0 WND 2 JOPLINSW 1	75	100.4	104.9	59593 JOP391 5 161 to 59607 JOP422 5 161 CKT 1	0	See Previous Upgrade Specified	
10SP	EMDE	EMDE	59500 RNM393 5 161 WND 1 REINMILL 1	75	100.8	111.7	59472 TIP292 5 161 to 59483 JOP389 5 161 CKT 1	0	See Previous Upgrade Specified	
10SP	AECI	SWPA	96735 2T.ROCK 69 to 52674 TABLE R2 69 CKT 1	51	102.7	102.9	96720 2GRETNA 69 to 96725 2REEDSP 69 CKT 1	0	Solution Undetermined	
10SP	AEPW	AEPW	53869 VERDIGS4 138 to 53849 TERNITP4 138 CKT 1	151	100.8	101.6	53857 OWASO2 4138 to 53945 N.E.S.-4138 CKT 1 53855 PCATSAT4138 to 53857 OWASO2 4138 CKT 1 53802 CATOOSA4138 to 53855 PCATSAT4138 CKT 1 53736 PCATOSA4138 to 53855 PCATSAT4138 CKT 1 CLOSE 53734 TER-NIT4138 to 53736 PCATOSA4138 CKT 1 MOVE 100% LOAD FROM 53857 OWASO2 4138 to 53737 OWASO1 4138	0	Loading Exceeds Conductor Emergency Rating of 151 MVA, Solution Undetermined	
10SP	EMDE	EMDE	59595 RNM393 269.0 WND 2 REINMILL 1	75	99.7	110.6	59472 TIP292 5 161 to 59483 JOP389 5 161 CKT 1	9	See Previous Upgrade Specified	
10SP	EMDE	EMDE	59494 OAK432 5 161 to 59467 ORO110 5 161 CKT 1	214	99.2	129.1	59472 TIP292 5 161 to 59483 JOP389 5 161 CKT 1	11	See Previous Upgrade Specified	
10SP	EMDE	EMDE	59438 EXP449T2 69 to 59592 JOP389 2 69 CKT 1	39	101.7	102.0	59543 NEO184 2 69 to 59563 LIN314 2 69 CKT 1	50	Transfer has Negative Response on Facility for First 50 MW, Solution Undetermined	
10SP	SWPA	SPRM	52692 SPRGFLD5 161 to 59969 BRKLINE 5 161 CKT 1	323	98.6	103.5	59954 SWPS 5 161 to 59960 SWDISP 5 161 CKT 1	73	See Previous Upgrade Specified	
10SP	EMDE	SWPA	59466 ATL109 5 161 to 52688 CARTHAG5 161 CKT 1	167	88.0	129.8	59472 TIP292 5 161 to 59483 JOP389 5 161 CKT 1	75	At 200 MW the loading is 130.4%, See Previous Upgrade Specified	
10SP	EMDE	EMDE	59494 OAK432 5 161 to 59466 ATL109 5 161 CKT 1	214	90.2	120.0	59472 TIP292 5 161 to 59483 JOP389 5 161 CKT 1	83	Solution Undetermined	
10SP	EMDE	EMDE	59483 JOP389 5 161 WND 1 JOPLINSW 1	75	98.2	104.1	59470 JOP145 5 161 to 59498 STL439 5 161 CKT 1	83	See Previous Upgrade Specified	
10SP	SWPA	EMDE	52686 NEO SPA5 161 to 59472 TIP292 5 161 CKT 1	157	94.4	110.1	59472 TIP292 5 161 to 59480 MON383 5 161 CKT 1	84	At 200 MW the loading is 111.2%, Solution Undetermined	
10SP	EMDE	EMDE	59494 OAK432 5 161 to 59467 ORO110 5 161 CKT 1	214	90.4	118.5	59476 ASB349 5 161 to 59491 PUR421 5 161 CKT 1	88	See Previous Upgrade Specified	
10SP	EMDE	EMDE	59592 JOP389 269.0 WND 2 JOPLINSW 1	75	97.9	103.7	59470 JOP145 5 161 to 59498 STL439 5 161 CKT 1	91	See Previous Upgrade Specified	

SPP-2003-253-1 Option 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 Overload	Rating <MVA>	BC % Loading	TC % Loading	Outaged Branch Causing Overload	ATC (MW)	Solution	Cost
10SP	EMDE	EMDE	59494 OAK432 5 161 to 59467 ORO110 5 161 CKT	214	87.8	115.8	59485 CAR395 5 161 to 59491 PUR421 5 161 CKT	103	See Previous Upgrade Specified	
10SP	EMDE	EMDE	59483 JOP389 5 161 WND 1 JOPLINSW 1	75	98.2	103.5	59470 JOP145 5 161 to 59539 JOP145 269.0 to 59707 JOP145 112.5 CKT	111	See Previous Upgrade Specified	
10SP	SWPA	SPRM	52692 SPRGFLD5 161 to 59969 BRKLINE 5 161 CKT	323	97.7	102.7	59959 BATFLD 5 161 to 59960 SWDISP 5 161 CKT 1	115	See Previous Upgrade Specified	
10SP	EMDE	EMDE	59494 OAK432 5 161 to 59467 ORO110 5 161 CKT	214	83.5	111.6	52688 CARTHAG5 161 to 59485 CAR395 5 161 CKT	128	See Previous Upgrade Specified	
10SP	SWPA	AECI	52690 CARTHG 2 69 to 96751 2REEDS 69 CKT 1	36	91.5	107.7	52688 CARTHAG5 161 to 59479 LAR382 5 161 CKT	132	AECI third party line. No SWPA upgrades required.	
10SP	EMDE	EMDE	59494 OAK432 5 161 to 59466 ATL109 5 161 CKT	214	81.4	109.4	59476 ASB349 5 161 to 59491 PUR421 5 161 CKT	141	Solution Undetermined	
10SP	EMDE	EMDE	59592 JOP389 269.0 WND 2 JOPLINSW 1	75	97.6	102.7	59470 JOP145 5 161 to 59539 JOP145 269.0 to 59707 JOP145 112.5 CKT	143	See Previous Upgrade Specified	
10SP	EMDE	SWPA	59466 ATL109 5 161 to 52688 CARTHAG5 161 CKT	167	72.2	110.8	59476 ASB349 5 161 to 59491 PUR421 5 161 CKT	147	See Previous Upgrade Specified	
10SP	AECI	EMDE	96658 2BILLNG 69 to 59618 CPK446 2 69 CKT 1	36	113.0	113.5	59537 AUR124 2 69 to 59611 MAR437 2 69 CKT 1	150	Transfer has Negative Response on Facility for First 150 MW, Solution Undetermined	
10SP	EMDE	EMDE	59494 OAK432 5 161 to 59466 ATL109 5 161 CKT	214	78.8	106.7	59485 CAR395 5 161 to 59491 PUR421 5 161 CKT	158	Solution Undetermined	
10SP	EMDE	SWPA	59466 ATL109 5 161 to 52688 CARTHAG5 161 CKT	167	68.6	107.1	59485 CAR395 5 161 to 59491 PUR421 5 161 CKT	165	See Previous Upgrade Specified	
10SP	EMDE	EMDE	59469 RIV167 5 161 to 59467 ORO110 5 161 CKT	214	79.3	108.2	59470 JOP145 5 161 to 59498 STL439 5 161 CKT	165	Solution Undetermined	
10SP	SWPA	SWPA	52692 SPRGFLD5 161 WND 2 SPF X1 1	80	97.5	101.3	59955 JUNCTN 5 161 to 59969 BRKLINE 5 161 CKT 1	165	Replace 25/25MVA transformer #3 with 80MVA unit to eliminate overload of both 25MVA #3 and 80MVA #1 transformers.	\$ 1,300,000
10SP	EMDE	EMDE	59494 OAK432 5 161 to 59467 ORO110 5 161 CKT	214	79.8	104.7	52686 NEO SPA5 161 to 59472 TIP292 5 161 CKT	167	See Previous Upgrade Specified	
10SP	EMDE	EMDE	59538 DIA131 269.0 to 59582 SAR362T269.0 CKT 1	38	94.6	99.8	59480 MON383 5 161 to 59591 MON383 269.0 to 59712 MON383 112.5 CKT 1	183	At 200 MW the loading is 100.4% and the facility is relieved by additional 50 MW, Reconnector 1/0 Copper with 336 ACSR.	\$ 1,230,000
10SP	EMDE	EMDE	59494 OAK432 5 161 to 59466 ATL109 5 161 CKT	214	74.5	102.5	52688 CARTHAG5 161 to 59485 CAR395 5 161 CKT	187	Solution Undetermined	
10SP	EMDE	SWPA	59466 ATL109 5 161 to 52688 CARTHAG5 161 CKT	167	62.7	101.3	52688 CARTHAG5 161 to 59485 CAR395 5 161 CKT	194	See Previous Upgrade Specified	
10SP	EMDE	EMDE	59494 OAK432 5 161 to 59466 ATL109 5 161 CKT	175	73.0	101.6	Base Case	194	Solution Undetermined	
10SP	EMDE	EMDE	59498 STL439 5 161 to 59470 JOP145 5 161 CKT 1	268	87.4	98.9	59472 TIP292 5 161 to 59483 JOP389 5 161 CKT 1	198	At 200 MW the loading is 100.1% and the facility is relieved by additional 50 MW, Solution Undetermined	
10SP	AEPW	AEPW	53170 TONTITN5 161 to 53154 CHAMSPR5 161 CKT 1	244	100.2	100.8	53170 TONTITN5 161 to 53176 TONTITN7 345 CKT 1	250	Close Normally Opened 2% Reactors to be installed on Chamber Springs to Tontitown 161 kV line	
10SP	AEPW	AEPW	53170 TONTITN5 161 to 53154 CHAMSPR5 161 CKT 1	244	100.2	100.8	53155 CHAMSPR7 345 to 53176 TONTITN7 345 CKT 1	250	Close Normally Opened 2% Reactors to be installed on Chamber Springs to Tontitown 161 kV line	
10WP	WERE	WERE	57244 JARBALO3 115 to 57233 166TH 3 115 CKT 1	97	102.5	102.6	57252 MIDLAND3 115 to 57261 PENTAGN3 115 CKT 1	0	May be relieved due to Westar Operating Procedure 1202 Overload of the Jarbalo to Jaggard 115kV Line	
10WP	SWPA	AECI	52690 CARTHG 2 69 to 96751 2REEDS 69 CKT 1	43	104.6	105.4	52690 CARTHG 2 69 to 96649 2JASPER 69 CKT 1	0	AECI third party line. No SWPA upgrades required.	
10WP	SWPA	AECI	52690 CARTHG 2 69 to 96751 2REEDS 69 CKT 1	43	100.0	100.4	96649 2JASPER 69 to 96651 2LAMAR 69 CKT 1	0	AECI third party line. No SWPA upgrades required.	
10WP	WERE	WERE	57165 HTI JCT3 115 to 57152 CIRCLVL3 115 CKT 1	97	115.9	116.0	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 Outage of the Hoyt to Stranger 345 kV line	
10WP	WERE	WERE	57165 HTI JCT3 115 to 57152 CIRCLVL3 115 CKT 1	97	100.4	100.5	57982 IATAN 7 345 to 59199 ST JOE 3 345 CKT 1	0	Rebuild 15.50-mile line (1192.5 kcmil 45/7 ACSR, 223 MVA, 245 MVA), Replace CTs and Wave Trap (2000 A.)	\$ 5,800,000
10WP	WERE	WERE	57152 CIRCLVL3 115 to 57331 KING HL3 115 CKT 1	92	109.6	109.7	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 Outage of the Hoyt to Stranger 345 kV line	
10WP	WERE	WERE	57331 KING HL3 115 to 57217 KELLY 3 115 CKT 1	92	107.4	107.5	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 803 Outage of the Hoyt to Stranger 345 kV line	
10WP	SWPA	SWPA	52696 NIXA 5 161 WND 2 NXA X2 1	25	143.7	143.8	52696 NIXA 5 161 to 52701 NIXA 269.0 to 52697 NIXA X1 113.8 CKT	0	Solution Undetermined	
10WP	SWPA	SWPA	52650 NORFORK269.0 WND 1 NFK X2 1	25	101.8	102.1	52648 NORFORK5 161 to 52650 NORFORK269.0 to 52649 NFK X1 113.8 CKT	0	Replace Norfolk Transformer	\$ 1,300,000
10WP	SWPA	AECI	52690 CARTHG 2 69 to 96751 2REEDS 69 CKT 1	43	97.3	110.7	52688 CARTHAG5 161 to 59479 LAR382 5 161 CKT	50	AECI third party line. No SWPA upgrades required.	
10WP	EMDE	SWPA	59466 ATL109 5 161 to 52688 CARTHAG5 161 CKT	207	89.5	121.8	59472 TIP292 5 161 to 59483 JOP389 5 161 CKT	92	See Previous Upgrade Specified	
10WP	SWPA	AEPW	52680 BEAVER 5 161 to 53136 EUREKA 5 161 CKT 1	263	98.7	101.0	Multiple Outage Contingency: 53140 FLINTCR7 345 to 59481 MON383 7 345 CKT 1	137	See Previous Upgrade Specified	
10WP	GRDA	GRDA	54430 MIAMI 2 69 to 54436 MIAENEO2 69 CKT 1	56	91.6	102.5	59481 MON383 7 345 to 59984 BRKLINE 7 345 CKT 1	192	Solution Undetermined	
10WP	EMDE	EMDE	59500 RNM393 5 161 WND 1 REINMILL 1	75	94.1	102.9	59472 TIP292 5 161 to 59483 JOP389 5 161 CKT	206	See Previous Upgrade Specified	
10WP	EMDE	SWPA	59466 ATL109 5 161 to 52688 CARTHAG5 161 CKT	207	75.5	106.0	59476 ASB349 5 161 to 59491 PUR421 5 161 CKT	220	See Previous Upgrade Specified	
10WP	EMDE	EMDE	59595 RNM393 269.0 WND 2 REINMILL 1	75	93.0	101.9	59472 TIP292 5 161 to 59483 JOP389 5 161 CKT	222	See Previous Upgrade Specified	
10WP	EMDE	SWPA	59466 ATL109 5 161 to 52688 CARTHAG5 161 CKT	207	70.7	101.2	59485 CAR395 5 161 to 59491 PUR421 5 161 CKT	244	See Previous Upgrade Specified	
									Total Estimated Cost	\$ 32,312,500