



SPP *Southwest Power Pool*

*System Impact Study
SPP-2004-080-1
For The Designation of a New
Network Resource
Requested By
Empire District Electric Company*

*For a Reserved Amount of 100 MW
From 6/1/2008
To 6/1/2028*

SPP Engineering, Tariff Studies

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ATTACHMENT: *SPP-2004-080-1 Tables*

1. Executive Summary

Empire District Electric Company has requested a system impact study to designate a New Network Resource in the SECI Control Area for 100 MW to serve Network Load in the EDE Control Area. The period of the service requested is from 6/1/2008 to 6/1/2028. The OASIS reservation numbers are 674623 and 674624.

The principal objective of this study is to identify system problems and potential system modifications necessary to facilitate the additional 100 MW request while maintaining system reliability. The SECI to EDE 100 MW request was studied using three System Scenarios. The service was modeled by a transfer from the new designated network resource in the SECI Control Area to the Network Load in the EDE Control Area. The three scenarios were studied to capture worst case system limitations dependent on the bias of the transmission system.

The ATC and upgrades required may vary from these results due to the status of seven higher priority requests. The higher priority requests include a SECI to SPS 150 MW request, a GRDA to WR 24 MW request, a WR to WR 51 MW request, a KCPL to KCPL 500 MW request, an ERCOTN to AEPW 54 MW request, an AEPW to AEPW 107 MW request, and a SPA to EDE 6 MW request. The study was performed with the higher priority requests included in the models in addition to any determined upgrades assigned to the higher priority requests.

Per the customer, the grandfathered transmission service between Westar Energy and EDE for a capacity purchase of 162 MW from the JEC units (54 MW from three units) with a stop date of 6/1/2010 was removed from the respective study cases. If EDE decides to renew the grandfathered transmission service, SPP requires that the study be performed with the renewed transmission service modeled.

Tables 1.1, 1.2, and 1.3 list the SPP facility overloads caused or impacted by the transfer modeled, using Scenarios 1, 2, and 3, respectively. Tables 2.1, 2.2, and 2.3 list the SPP voltage violations caused or impacted by the transfer modeled, using Scenarios 1, 2, and 3, respectively. Tables 3.1, 3.2, and 3.3 list the Non-SPP facility overloads caused or impacted by the transfer modeled, using Scenarios 1, 2, and 3, respectively. Tables 4.1, 4.2, and 4.3 list the Non-SPP voltage violations caused or impacted by the transfer modeled, using Scenarios 1, 2, and 3, respectively.

The study results of the SECI to EDE 100 request show that limiting constraints exist. Due to the limiting constraints identified, the Transmission Service Request cannot be granted. Any solutions, upgrades, and costs provided in the System Impact Study are planning estimates only. 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 SECI to EDE request. These options will be evaluated as part of the Facility Study. A Facility Study Agreement has already been executed. The final ATC, upgrade solutions, cost assignments, 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 SECI Control Area for 100 MW to serve Network Load in the EDE Control Area. The principal objective of this study is to identify the restraints on the SPP Regional Tariff System that may limit the requested service and determine the least cost solutions required to alleviate the limiting facilities.

This study includes steady-state contingency analyses (PSS/E function ACCC) and Available Transfer Capability (ATC) analyses. The steady-state analyses consider the impact of the request on transmission line and transformer loadings, and bus voltages for outages of single transmission lines, transformers, and generating units, and selected multiple transmission lines and transformers on the SPP system and first tier Non - SPP systems.

The SECI to EDE 100 MW request was studied using three System Scenarios. The service was modeled from the new designated network resource in the SECI Control Area to the Network Load in the EDE Control Area. The three scenarios were studied to capture worst case system limitations dependent on the bias of the transmission system.

3. Study Methodology

A. Description

The system impact analysis was conducted to determine the steady-state impact of the requested service on the SPP and first tier Non - SPP control area 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. Normal operating ratings and emergency operating ratings monitored are Rate A and B in the SPP MDWG models, respectively. The upper bound and lower bound of the normal voltage range monitored is 105% and 95%. The upper bound and lower bound of the emergency voltage range monitored is 110% and 90%. The SPS Tuco 230 kV bus voltage is monitored at 92.5% due to pre-determined system stability limitations.

The contingency set includes all SPP control area branches and ties 69kV and above, first tier Non - SPP control area branches and ties 115 kV and above, any defined contingencies for these control areas, and generation unit outages for the SPP control areas, AECEI, and ENTR with SPP reserve share program redispatch. The monitor elements include all SPP control area branches, ties, and buses 69 kV and above, and all first tier Non – SPP control area branches and ties 69 kV and above. Voltage monitoring was performed for SPP control area buses 69 kV and above.

A 3 % transfer distribution factor (TDF) cutoff was applied to all SPP control area facilities. For first tier Non – SPP control area facilities, a 3 % TDF cutoff was applied to AECEI, AMRN, and ENTR and a 2 % TDF cutoff was applied to MEC, NPPD, and OPPD. For voltage monitoring, a 0.02 per unit change in voltage must occur due to the transfer to be considered a valid limit to the transfer.

B. Model Updates

SPP used nine seasonal models to study the SECI to EDE 100 MW request for the requested service period. The SPP 2005 Series Cases Update 2 2006 April Minimum (06AP), 2006 Spring Peak (06G), 2006 Summer Shoulder (06SH), 2006 Fall Peak (06FA), 2007 Summer Peak (07SP), 2007/08 Winter Peak (07WP), 2010 Summer Peak (10SP), 2010/11 Winter Peak (10WP), and 2015 Summer Peak (15SP) were used to study the impact of 100 MW request on the system during the requested service period of 6/1/2008 to 6/1/2028. The April Minimum model applies to April and May, the Spring Peak model applies to April and May, the Summer Peak model applies to June through September, the Summer Shoulder model applies to June through September, the Fall Peak model applies to October and November, and the Winter Peak model applies to December through March.

Per the customer, the grandfathered transmission service between Westar Energy and EDE for a capacity purchase of 162 MW from the JEC units (54 MW from three units) with a stop date of 6/1/2010 was removed from the 06AP, 06G, 06SH, 06FA, 10SP, 10WP, and 15SP models. The WR to EDE 162 MW grandfathered transmission service request was not removed from the 07SP and 07WP since two requests service periods overlap from 6/1/2008 to 6/1/2010.

The chosen base case models were modified to reflect the most current modeling information. From the nine seasonal models, three system scenarios were developed. Scenario 1 includes SWPP OASIS transmission requests not already included in the SPP 2005 Series Cases flowing in a West to East direction with ERCOT exporting and the Southwestern Public Service (SPS) Control Area exporting to outside control areas and importing from the Lamar HVDC Tie. Scenario 2 includes transmission requests not already included in the SPP 2005 Series Cases flowing in an East to West direction with ERCOT net importing and SPS importing from an outside control area and importing from the Lamar HVDC Tie. The third scenario includes SWPP OASIS transmission requests not already included in the SPP 2005 Series Cases flowing in a West to East direction with ERCOT net importing and SPS importing from an outside control area and importing from the Lamar HVDC Tie. The system scenarios were developed to minimize counter flows to the transfer studied.

C. Transfer Analysis

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

D. Upgrade Analysis

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

4. Study Results

A. Study Analysis Results

Tables 1 through 4 contain the initial steady-state analysis results of the System Impact Study. The Tables are in the attached workbook *SPP-2004-080-1 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 or voltage with and without the transfer, the percent transfer distribution factor (TDF) if applicable, and the estimated ATC value using interpolation if calculated. Comments are provided in the tables to document any SPP or Non-SPP identification or assignment of the event, existing mitigations plans or criteria to disregard the event as a limiting constraint, upgrades and costs to mitigate a limiting constraint, or any specific study procedures associated with modeling an event.

Tables 1.1, 1.2, and 1.3 list the SPP Facility Overloads caused or impacted by the transfer modeled, using Scenarios 1, 2, and 3, respectively. Tables 2.1, 2.2, and 2.3 list the SPP facility voltage violations caused or impacted by the transfer modeled, using Scenarios 1, 2, and 3, respectively. Tables 3.1, 3.2, and 3.3 list the Non-SPP Facility Overloads caused or impacted by the transfer modeled, using Scenarios 1, 2, and 3, respectively. Tables 4.1, 4.2, and 4.3 list the Non-SPP facility voltage violations caused or impacted by the transfer modeled, using Scenarios 1, 2, and 3, respectively. Solutions with engineering and construction costs are provided in the tables.

Tables 1.1a, 1.2a, and 1.3a document the modeling representation of the events identified in Tables 1.1, 1.2, and 1.3 to include bus numbers and bus names.

5. Conclusion

The study results of the SECI to EDE 100 request show that limiting constraints exist. Due to the limiting constraints identified, the Transmission Service Request cannot be granted. Any solutions, upgrades, and costs provided in the System Impact Study are planning estimates only. 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 SECI to EDE request. These options will be evaluated as part of the Facility Study. A Facility Study Agreement has already been executed. The final ATC, upgrade solutions, cost assignments, 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 from 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

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 Table 1.1 - SPP Facility Overloads
 Caused or Impacted by Transfer Using Scenario 1

Southwest Power Pool
 System Impact Study

Study Case	From Area	To Area	Monitored Branch Overload	Rate <MVA>	BC % Loading	TC % Loading	%TDF	Outaged Branch Causing Overload	ATC (MW)	Solution	Estimated Cost
06AP			NONE IDENTIFIED						100		
06G			NONE IDENTIFIED						100		
06SH	AEPW	AEPW	CHAMBER SPRINGS - TONTITOWN 161KV	244	110.9	112.4	3.6	CHAMBER SPRINGS - FARMINGTON AECC 161KV	0	AEPW Upgrade Schedule Completion Date 5/1/2007	
06SH	AEPW	AEPW	CHAMBER SPRINGS - TONTITOWN 161KV	244	98.7	100.2	3.6	FARMINGTON AECC - SOUTH FAYETTEVILLE 161KV	86	AEPW Upgrade Schedule Completion Date 5/1/2007	
06FA			NONE IDENTIFIED						100		
07SP	WERE	WERE	AUBURN ROAD - JEFFREY ENERGY CENTER 230KV	565	114.7	115.9	6.3	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	EMDE	EMDE	OZARKS - SUB 434 - OZARK SOUTHEAST 69KV	45	142.3	159.8	7.9	JAMESVILLE - SUB 415 - BLACKHAWK JCT. 69KV	0	Solution Undetermined	
07SP	EMDE	EMDE	OZARKS - SUB 434 - OZARK SOUTHEAST 69KV	45	106.4	117.8	5.1	JAMESVILLE 161/69/13.8KV TRANSFORMER	0	Solution Undetermined	
07SP	EMDE	EMDE	OZARKS - SUB 434 - OZARK SOUTHEAST 69KV	45	104.7	116.0	5.1	JAMESVILLE 161/69/13.8KV TRANSFORMER	0	Solution Undetermined	
07SP	EMDE	EMDE	OZARKS - SUB 434 - OZARK SOUTHEAST 69KV	38	103.1	113.5	4.0	BASE CASE	0	Solution Undetermined	
07SP	EMDE	EMDE	OZARKS - SUB 434 - OZARK SOUTHEAST 69KV	45	100.7	111.5	4.9	SUB 388 - DADEVILLE EAST 161KV - MORGAN	0	Solution Undetermined	
07SP	EMDE	EMDE	SUB 330 - OZARK NORTHWEST - SUB 434 - OZARK SOUTHEAST 69KV	45	110.9	124.8	6.3	JAMESVILLE - SUB 415 - BLACKHAWK JCT. 69KV	0	Solution Undetermined	
07SP	EMDE	EMDE	OZARKS 161/69/12.5KV TRANSFORMER	75	94.5	107.2	9.5	SUB 415 - BLACKHAWK JCT. - JAMESVILLE	44	Solution Undetermined	
07SP	EMDE	EMDE	OZARKS 161/69/12.5KV TRANSFORMER	75	91.4	103.2	8.8	SUB 415 - BLACKHAWK JCT. - JAMESVILLE	73	Solution Undetermined	
07SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST - SUB EXPLORER SPRING CITY TAP 69KV	39	94.3	104.6	4.0	SUB 184 - NEOSHO SOUTH JCT. - SUB 314 - NEOSHO LINDE 69KV	100	Relieved by EMDE Mitigation Plan to curtail interruptible load at Bus 59563	
07WP	WERE	WERE	AUBURN ROAD - JEFFREY ENERGY CENTER 230KV	565	105.8	107.0	6.5	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	
10SP	EMDE	EMDE	OZARKS 161/69/12.5KV TRANSFORMER	75	102.0	109.6	5.7	SUB 415 - BLACKHAWK JCT. - JAMESVILLE	0	Solution Undetermined	
10SP	EMDE	EMDE	OZARKS 161/69/12.5KV TRANSFORMER	75	106.3	114.6	6.2	SUB 415 - BLACKHAWK JCT. - JAMESVILLE	0	Solution Undetermined	
10SP	WERE	WERE	AUBURN ROAD - JEFFREY ENERGY CENTER 230KV	565	112.4	113.8	7.9	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	
10SP	EMDE	EMDE	OZARKS - SUB 434 - OZARK SOUTHEAST 69KV	45	161.0	175.9	6.7	JAMESVILLE - SUB 415 - BLACKHAWK JCT. 69KV	0	Solution Undetermined	
10SP	EMDE	EMDE	OZARKS - SUB 434 - OZARK SOUTHEAST 69KV	45	124.2	136.4	5.5	JAMESVILLE 161/69/13.8KV TRANSFORMER	0	Solution Undetermined	
10SP	EMDE	EMDE	OZARKS - SUB 434 - OZARK SOUTHEAST 69KV	45	122.2	134.5	5.5	JAMESVILLE 161/69/13.8KV TRANSFORMER	0	Solution Undetermined	
10SP	EMDE	EMDE	OZARKS - SUB 434 - OZARK SOUTHEAST 69KV	38	120.7	131.7	4.2	BASE CASE	0	Solution Undetermined	
10SP	EMDE	EMDE	OZARKS - SUB 434 - OZARK SOUTHEAST 69KV	45	115.6	128.0	5.6	SUB 221 - BILLINGS NORTHEAST - SUB 359 - REPUBLIC EAST 69KV	0	Solution Undetermined	
10SP	EMDE	AECI	BILLINGS - SUB 221 - BILLINGS NORTHEAST 69KV	36	101.1	110.0	3.2	SUB 124 - AURORA H.T. - SUB 437 - MARIONVILLE NORTHWEST 69KV	0	Solution Undetermined	
10SP	EMDE	EMDE	SUB 330 - OZARK NORTHWEST - SUB 434 - OZARK SOUTHEAST 69KV	45	120.3	130.9	4.8	JAMESVILLE - SUB 415 - BLACKHAWK JCT. 69KV	0	Solution Undetermined	
10SP	AECI	EMDE	BILLINGS - SUB 446 - CHESAPEAKE 69KV	36	116.4	125.5	3.3	SUB 124 - AURORA H.T. - SUB 437 - MARIONVILLE NORTHWEST 69KV	0	Solution Undetermined	
10SP	EMDE	EMDE	SUB 330 - OZARK NORTHWEST - SUB 415 - BLACKHAWK JCT. 69KV	45	94.8	102.5	3.5	JAMESVILLE - SUB 415 - BLACKHAWK JCT. 69KV	68	Solution Undetermined	
10SP	EMDE	EMDE	SUB 217 - FAIRPLAY EAST - SUB 368 - DADEVILLE EAST 69KV	39	89.6	103.5	5.4	SUB 368 - DADEVILLE EAST - SUB 431 - BOLIVAR SOUTH 161KV	75	Solution Undetermined	
10SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST - SUB EXPLORER SPRING CITY TAP 69KV	39	104.7	115.6	4.2	SUB 184 - NEOSHO SOUTH JCT. - SUB 314 - NEOSHO LINDE 69KV	100	Relieved by EMDE Mitigation Plan to curtail interruptible load at Bus 59563	
10WP	EMDE	EMDE	OZARKS - SUB 434 - OZARK SOUTHEAST 69KV	61	92.8	103.0	6.2	JAMESVILLE - SUB 415 - BLACKHAWK JCT. 69KV	70	Solution Undetermined	
15SP	EMDE	EMDE	OZARKS 161/69/12.5KV TRANSFORMER	75	117.6	125.8	6.1	JAMESVILLE - SUB 415 - BLACKHAWK JCT. 69KV	0	Solution Undetermined	
15SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST 161/69/12.5KV TRANSFORMER	75	110.5	124.1	10.2	SUB 184 - NEOSHO SOUTH JCT. to SUB 314 - NEOSHO LINDE	0	Replace 161/69 KV Transformer with a 150 MVA Transformer.	\$1,565,000
15SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST 161/69/12.5KV TRANSFORMER	75	100.6	113.3	9.6	SUB 56 - NEOSHO WEST to SUB 314 - NEOSHO LINDE	0	See Previous Upgrade Specified for Facility	
15SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST 161/69/12.5KV TRANSFORMER	75	105.9	113.3	5.6	SUB 145 - JOPLIN WEST 7TH to SUB 439 - STATELINE	0	See Previous Upgrade Specified for Facility	
15SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST 161/69/12.5KV TRANSFORMER	75	102.5	113.3	8.1	SUB 64 - JOPLIN 10TH ST. to SUB 145 - JOPLIN WEST 7TH	0	See Previous Upgrade Specified for Facility	
15SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST 161/69/12.5KV TRANSFORMER	75	108.4	113.3	3.7	SUB 292 - TIPTON FORD to SUB 389 - JOPLIN SOUTHWEST	0	See Previous Upgrade Specified for Facility	
15SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST 161/69/12.5KV TRANSFORMER	75	106.7	118.9	9.1	SUB 184 - NEOSHO SOUTH JCT. to SUB 314 - NEOSHO LINDE	0	See Previous Upgrade Specified for Facility	
15SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST 161/69/12.5KV TRANSFORMER	75	106.3	111.0	3.5	SUB 292 - TIPTON FORD to SUB 389 - JOPLIN SOUTHWEST	0	See Previous Upgrade Specified for Facility	
15SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST 161/69/12.5KV TRANSFORMER	75	103.9	110.8	5.2	SUB 145 - JOPLIN WEST 7TH to SUB 439 - STATELINE	0	See Previous Upgrade Specified for Facility	
15SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST 161/69/12.5KV TRANSFORMER	75	100.3	110.1	7.4	SUB 64 - JOPLIN 10TH ST. to SUB 145 - JOPLIN WEST 7TH	0	See Previous Upgrade Specified for Facility	
15SP	EMDE	EMDE	OZARKS 161/69/12.5KV TRANSFORMER	75	123.3	132.2	6.7	SUB 415 - BLACKHAWK JCT. - JAMESVILLE	0	Solution Undetermined	
15SP	SWPA	ENTR	BULL SHOALS - BULL SHOALS HES 161KV	167	105.6	108.2	4.4	EUREKA SPRINGS - OSAGE CREEK (AECC) 161 KV	0		
15SP	AECI	SWPA	SPRINGFIELD - NIXA #1 161KV	203	105.5	110.9	11.0	SOUTHWEST - BATTLEFIELD 161KV	0	Solution Undetermined	
15SP	AECI	SWPA	SPRINGFIELD - NIXA #1 161KV	203	100.2	105.6	11.0	JAMESVILLE - CLEVER 161KV	0	Solution Undetermined	
15SP	AECI	SWPA	SPRINGFIELD - NIXA #1 161KV	203	100.0	105.4	11.0	CLEVER - BATTLEFIELD 161KV	0	Solution Undetermined	
15SP	AEPW	AEPW	FLINT CREEK - TONTITOWN 161KV	353	105.1	106.0	3.1	CHAMBER SPRINGS - CLARKSVILLE 345KV	0	Rebuild 16.3 miles of 2-297 ACSR with 2156 ACSR. Replace Flint Creek wavetrap	\$8,200,000
15SP	AEPW	AEPW	FLINT CREEK - GENTRY REC 161KV	353	106.8	107.9	3.9	CHAMBER SPRINGS - CLARKSVILLE 345KV	0	Rebuild 1.09 miles of 2-397.5 ACSR with 2156 ACSR. Replace Flint Creek wavetrap & jumpers	\$450,000
15SP	AEPW	AEPW	BEN 161 - GENTRY REC 161KV	353	102.6	103.7	3.8	CHAMBER SPRINGS - CLARKSVILLE 345KV	0	Solution Undetermined	
15SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV	1076	108.4	109.5	12.6	JEFFREY ENERGY CENTER - MORRIS COUNTY 345KV	0	May be relieved due to Westar Operating Procedure 401 - Outage of the Jeffrey Energy Center to Morris 345KV Line	
15SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV	1076	108.2	109.4	12.9	AUBURN ROAD - JEFFREY ENERGY CENTER 230KV	0	May be relieved due to Westar Operating Procedure 401 - Outage of the Jeffrey Energy Center to Auburn 230KV Line	
15SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST - SUB EXPLORER SPRING CITY TAP 69KV	39	169.1	185.1	6.2	SUB 184 - NEOSHO SOUTH JCT. - SUB 314 - NEOSHO LINDE 69KV	0	Not Relieved by EMDE Mitigation Plan to curtail interruptible load at Bus 59563. Solution Undetermined.	
15SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST - SUB EXPLORER SPRING CITY TAP 69KV	39	142.3	155.4	5.1	SUB 314 - NEOSHO LINDE - SUB 56 - NEOSHO WEST 69KV	0	Not Relieved by EMDE Mitigation Plan to curtail interruptible load at Bus 59563. Solution Undetermined	
15SP	EMDE	EMDE	OZARKS - SUB 434 - OZARK SOUTHEAST 69KV	45	189.3	205.9	7.5	JAMESVILLE - SUB 415 - BLACKHAWK JCT. 69KV	0	Solution Undetermined	
15SP	EMDE	EMDE	OZARKS - SUB 434 - OZARK SOUTHEAST 69KV	45	145.4	157.3	5.3	JAMESVILLE 161/69/13.8KV TRANSFORMER	0	Solution Undetermined	
15SP	EMDE	EMDE	OZARKS - SUB 434 - OZARK SOUTHEAST 69KV	45	143.3	155.0	5.3	JAMESVILLE 161/69/13.8KV TRANSFORMER	0	Solution Undetermined	
15SP	EMDE	EMDE	OZARKS - SUB 434 - OZARK SOUTHEAST 69KV	38	141.8	153.8	4.6	BASE CASE	0	Solution Undetermined	
15SP	EMDE	EMDE	OZARKS - SUB 434 - OZARK SOUTHEAST 69KV	45	137.5	149.9	5.6	SUB 221 - BILLINGS NORTHEAST - SUB 359 - REPUBLIC EAST 69KV	0	Solution Undetermined	
15SP	EMDE	EMDE	SUB 110 - ORONOGO JCT. - SUB 167 - RIVERTON 161KV	214	100.5	103.7	6.8	SUB 145 - JOPLIN WEST 7TH - SUB 439 - STATELINE 161KV	0	Solution Undetermined	
15SP	EMDE	EMDE	SUB 375 - SENECA - SUB 56 - NEOSHO WEST 69KV	39	104.0	114.5	4.1	SUB 389 - JOPLIN SOUTHWEST - SUB EXPLORER SPRING CITY TAP 69KV	0	Solution Undetermined	
15SP	EMDE	EMDE	SUB 170 - NICHOLS ST. - SUB 345 - REPUBLIC NORTHEAST 69KV	38	111.2	126.6	5.8	SUB 221 - BILLINGS NORTHEAST - SUB 359 - REPUBLIC EAST 69KV	0	Solution Undetermined	
15SP	EMDE	EMDE	SUB 184 - NEOSHO SOUTH JCT. - SUB 314 - NEOSHO LINDE 69KV	65	102.4	112.2	6.4	SUB 389 - JOPLIN SOUTHWEST - SUB EXPLORER SPRING CITY TAP 69KV	0	Solution Undetermined	
15SP	EMDE	EMDE	SUB 217 - FAIRPLAY EAST - SUB 368 - DADEVILLE EAST 69KV	39	105.2	116.1	4.3	SUB 368 - DADEVILLE EAST - SUB 431 - BOLIVAR SOUTH 161KV	0	Solution Undetermined	
15SP	EMDE	AECI	BILLINGS - SUB 221 - BILLINGS NORTHEAST 69KV	36	118.0	128.2	3.7	SUB 124 - AURORA H.T. - SUB 437 - MARIONVILLE NORTHWEST 69KV	0	Solution Undetermined	

SPP-2004-080-1
 Table 1.1 - SPP Facility Overloads
 Caused or Impacted by Transfer Using Scenario 1

Southwest Power Pool
 System Impact Study

Study Case	From Area	To Area	Monitored Branch Overload	Rate <MVA>	BC % Loading	TC % Loading	%TDF	Outaged Branch Causing Overload	ATC (MW)	Solution	Estimated Cost
15SP	EMDE	EMDE	SUB 330 - OZARK NORTHWEST - SUB 415 - BLACKHAWK JCT. 69KV	45	111.5	120.4	4.0	JAMESVILLE - SUB 415 - BLACKHAWK JCT. 69KV	0	Solution Undetermined	
15SP	EMDE	EMDE	SUB 330 - OZARK NORTHWEST - SUB 434 - OZARK SOUTHEAST 69KV	45	141.9	153.9	5.4	JAMESVILLE - SUB 415 - BLACKHAWK JCT. 69KV	0	Solution Undetermined	
15SP	EMDE	EMDE	SUB 345 - REPUBLIC NORTHEAST - SUB 359 - REPUBLIC EAST 69KV	38	110.1	125.4	5.8	SUB 221 - BILLINGS NORTHEAST - SUB 359 - REPUBLIC EAST 69KV	0	Solution Undetermined	
15SP	AECI	EMDE	BILLINGS - SUB 446 - CHESAPEAKE 69KV	36	135.2	145.7	3.8	SUB 124 - AURORA H.T. - SUB 437 - MARIONVILLE NORTHWEST 69KV	0	Solution Undetermined	
15SP	EMDE	EMDE	OZARKS 161/69/12.5KV TRANSFORMER	75	99.5	106.2	5.0	JAMESVILLE 161/69/13.8KV TRANSFORMER	7	Solution Undetermined	
15SP	EMDE	EMDE	SUB 330 - OZARK NORTHWEST - SUB 434 - OZARK SOUTHEAST 69KV	45	99.1	106.6	3.4	JAMESVILLE 161/69/13.8KV TRANSFORMER	12	Solution Undetermined	
15SP	EMDE	EMDE	OZARKS 161/69/12.5KV TRANSFORMER	75	99.2	105.3	4.5	Table Rock - SUB 438 - RIVERSIDE	13	Solution Undetermined	
15SP	EMDE	EMDE	SUB 217 - FAIRPLAY EAST - SUB 602 - BOLIVAR PLANT 69KV	39	98.6	109.1	4.1	SUB 368 - DADEVILLE EAST - SUB 431 - BOLIVAR SOUTH 161KV	13	Solution Undetermined	
15SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST - SUB 189/12.5KV TRANSFORMER	75	97.7	109.3	8.7	SUB 314 - NEOSHO LINDE - SUB 56 - NEOSHO WEST 69KV	20	See Previous Upgrade Specified for Facility	
15SP	GRDA	GRDA	412SUB - KERR 161KV	338	99.8	100.9	4.0	FLINT CREEK - GRDA1 345KV	21	Reconductor 12.5 miles with 1590MCM ACSR	\$1,918,000
15SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST - SUB 422 - JOPLIN 24TH & CONNECTICUT 161KV	268	99.5	101.6	5.5	SUB 292 - TIPTON FORD - SUB 389 - JOPLIN SOUTHWEST 161KV	23	Solution Undetermined	
15SP	EMDE	EMDE	OZARKS 161/69/12.5KV TRANSFORMER	75	98.3	104.9	4.9	JAMESVILLE 161/69/13.8KV TRANSFORMER	25	Solution Undetermined	
15SP	EMDE	EMDE	SUB 375 - SENECA - SUB EXPLORER SPRING CITY TAP 69KV	39	97.1	106.6	3.7	SUB 184 - NEOSHO SOUTH JCT. - SUB 314 - NEOSHO LINDE 69KV	30	Solution Undetermined	
15SP	EMDE	EMDE	SUB 330 - OZARK NORTHWEST - SUB 434 - OZARK SOUTHEAST 69KV	45	97.0	104.3	3.3	JAMESVILLE 161/69/13.8KV TRANSFORMER	41	Solution Undetermined	
15SP	EMDE	AECI	JAMESVILLE - SUB 415 - BLACKHAWK JCT. 69KV	89	94.9	104.9	8.9	OZARKS - SUB 434 - OZARK SOUTHEAST 69KV	51	Solution Undetermined	
15SP	EMDE	EMDE	SUB 184 - NEOSHO SOUTH JCT. 161/69/12.5KV TRANSFORMER	46.7	93.3	105.0	5.5	SUB 389 - JOPLIN SOUTHWEST - SUB EXPLORER SPRING CITY TAP 69KV	57	Solution Undetermined	
15SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST - SUB EXPLORER SPRING CITY TAP 69KV	39	95.5	103.2	3.0	REMOVE UNIT 1 FROM BUS 59656 [S2G439 118.000] DISPATCH	58	Relieved by EMDE Mitigation Plan to curtail interruptible load at Bus 59563	
15SP	EMDE	EMDE	OZARKS 161/69/12.5KV TRANSFORMER	75	96.3	102.4	4.6	JAMESVILLE 161/69/13.8KV TRANSFORMER	61	Solution Undetermined	
15SP	EMDE	EMDE	OZARKS 161/69/12.5KV TRANSFORMER	75	96.3	102.1	4.3	SUB 124 - AURORA H.T. to SUB 438 - RIVERSIDE	64	Solution Undetermined	
15SP	AEPW	AEPW	EAST CENTERTON 161KV - BEN 161	353	99.3	100.4	3.7	CHAMBER SPRINGS - CLARKSVILLE 345KV	67	Solution Undetermined	
15SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST - SUB 439 - STATELINE 161KV CKT 1	428	98.1	100.9	12.2	SUB 389 - JOPLIN SOUTHWEST - SUB 439 - STATELINE 161KV CKT 2	67	Solution Undetermined	
15SP	EMDE	EMDE	SUB 217 - FAIRPLAY EAST - SUB 368 - DADEVILLE EAST 69KV	39	89.5	103.2	5.4	SUB 431 - BOLIVAR SOUTH - SUB 73 - BOLIVAR BURNS 161KV	77	Solution Undetermined	
15SP	EMDE	EMDE	SUB 383 - MONETT 161/69/12.5KV TRANSFORMER	150	96.0	101.1	7.7	SUB 124 - AURORA H.T. to SUB 383 - MONETT	78	Solution Undetermined	
15SP	EMDE	EMDE	OZARKS 161/69/12.5KV TRANSFORMER	75	95.1	101.3	4.6	JAMESVILLE 161/69/13.8KV TRANSFORMER	79	Solution Undetermined	
15SP	GRDA	GRDA	412SUB - KANSAS TAP 161KV	338	99.0	100.2	4.0	FLINT CREEK - GRDA1 345KV	80	Reconductor 9.7 miles with 1590MCM ACSR.	\$1,488,000
15SP	EMDE	EMDE	OZARKS 161/69/12.5KV TRANSFORMER	75	94.4	101.2	5.1	SUB 368 - DADEVILLE EAST - MORGAN	83	Solution Undetermined	
15SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST - SUB EXPLORER SPRING CITY TAP 69KV	39	92.5	100.4	3.1	SUB 375 - SENECA - SUB 56 - NEOSHO WEST 69KV	95	Not Relieved by EMDE Mitigation Plan to curtail interruptible load at Bus 59563. Solution Undetermined	
15SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST - SUB EXPLORER SPRING CITY TAP 69KV	39	95.8	103.9	3.2	SUB 145 - JOPLIN WEST 7TH - SUB 64 - JOPLIN 10TH ST. 69KV	100	Relieved by EMDE Mitigation Plan to curtail interruptible load at Bus 59563	
15SP			Contingency Solution Not Converged					HOYT - JEFFREY ENERGY CENTER 345KV	N/A	Solution Undetermined	
Total Estimated Engineering and Construction Cost											\$13,621,000

SPP-2004-080-1
 Table 2.1 - SPP Voltage Violations
 Caused or Impacted by Transfer Using Scenario 1

Southwest Power Pool
 System Impact Study

Study Case	AREA	Monitored Bus with Violation	BC Voltage (PU)	TC Voltage (PU)	Outaged Branch Causing Voltage Violation	ATC (MW)	Solution	Estimated Cost
06AP		NONE IDENTIFIED				100		
06G		NONE IDENTIFIED				100		
06SH	EMDE	59404 PUR390 269.0	0.9117	0.8870	OPEN LINE FROM BUS 59480 MON383 5 161 TO BUS 59591 MON383 269.0 TO BUS 59712 MON383 112.5 CKT1	81	Solution Undetermined	
06SH	EMDE	59570 OZK330 269.0	0.8956	0.8731	OPEN LINE FROM BUS 59604 BHJ415 269.0 TO BUS 96673 2JAMESV 69.0 CKT1	89	Solution Undetermined	
06SH	EMDE	59604 BHJ415 269.0	0.8950	0.8727	OPEN LINE FROM BUS 59604 BHJ415 269.0 TO BUS 96673 2JAMESV 69.0 CKT1	90	Solution Undetermined	
06SH	EMDE	59609 OZK434 269.0	0.9006	0.8785	OPEN LINE FROM BUS 59604 BHJ415 269.0 TO BUS 96673 2JAMESV 69.0 CKT1	90	Solution Undetermined	
06SH	EMDE	59580 REP359 269.0	0.9086	0.8868	OPEN LINE FROM BUS 59546 BIL221 269.0 TO BUS 59580 REP359 269.0 CKT1	92	Solution Undetermined	
06SH	EMDE	59535 NIX114 269.0	0.9006	0.8795	OPEN LINE FROM BUS 59604 BHJ415 269.0 TO BUS 96673 2JAMESV 69.0 CKT1	95	Solution Undetermined	
06FA		NONE IDENTIFIED				100		
07SP	EMDE	59568 STK324 269.0	0.9169	0.8929	OPEN LINE FROM BUS 59568 STK324 269.0 TO BUS 59616 STK324J269.0 CKT1	84	Solution Undetermined	
07SP	EMDE	59580 REP359 269.0	0.8840	0.8605	OPEN LINE FROM BUS 59546 BIL221 269.0 TO BUS 59580 REP359 269.0 CKT1	85	Solution Undetermined	
07SP	EMDE	59404 PUR390 269.0	0.9069	0.8840	OPEN LINE FROM BUS 59480 MON383 5 161 TO BUS 59591 MON383 269.0 TO BUS 59712 MON383 112.5 CKT1	87	Solution Undetermined	
07SP	EMDE	59576 REP345 269.0	0.9084	0.8882	OPEN LINE FROM BUS 59546 BIL221 269.0 TO BUS 59580 REP359 269.0 CKT1	99	Solution Undetermined	
07WP	EMDE	59568 STK324 269.0	0.8825	0.8467	OPEN LINE FROM BUS 59568 STK324 269.0 TO BUS 59616 STK324J269.0 CKT1	56	Solution Undetermined	
10SP	EMDE	59568 STK324 269.0	0.8962	0.8708	OPEN LINE FROM BUS 59568 STK324 269.0 TO BUS 59616 STK324J269.0 CKT1	79	Solution Undetermined	
10SP	EMDE	59580 REP359 269.0	0.8525	0.8277	OPEN LINE FROM BUS 59546 BIL221 269.0 TO BUS 59580 REP359 269.0 CKT1	81	Solution Undetermined	
10SP	EMDE	59404 PUR390 269.0	0.8827	0.8581	OPEN LINE FROM BUS 59480 MON383 5 161 TO BUS 59591 MON383 269.0 TO BUS 59712 MON383 112.5 CKT1	81	Solution Undetermined	
10SP	EMDE	59576 REP345 269.0	0.8813	0.8602	OPEN LINE FROM BUS 59546 BIL221 269.0 TO BUS 59580 REP359 269.0 CKT1	95	Solution Undetermined	
10SP	EMDE	59403 MON416 269.0	0.9118	0.8909	OPEN LINE FROM BUS 59480 MON383 5 161 TO BUS 59591 MON383 269.0 TO BUS 59712 MON383 112.5 CKT1	96	Solution Undetermined	
10SP	EMDE	59402 MON416J269.0	0.9126	0.8918	OPEN LINE FROM BUS 59480 MON383 5 161 TO BUS 59591 MON383 269.0 TO BUS 59712 MON383 112.5 CKT1	96	Solution Undetermined	
10WP	EMDE	59568 STK324 269.0	0.8711	0.8390	OPEN LINE FROM BUS 59568 STK324 269.0 TO BUS 59616 STK324J269.0 CKT1	62	Solution Undetermined	
15SP	EMDE	59580 REP359 269.0	0.8097	0.7717	OPEN LINE FROM BUS 59546 BIL221 269.0 TO BUS 59580 REP359 269.0 CKT1	53	Solution Undetermined	
15SP	EMDE	59568 STK324 269.0	0.8876	0.8510	OPEN LINE FROM BUS 59568 STK324 269.0 TO BUS 59616 STK324J269.0 CKT1	55	Solution Undetermined	
15SP	EMDE	59576 REP345 269.0	0.8460	0.8131	OPEN LINE FROM BUS 59546 BIL221 269.0 TO BUS 59580 REP359 269.0 CKT1	61	Solution Undetermined	
15SP	EMDE	59478 DAD368 5 161	0.9210	0.8881	OPEN LINE FROM BUS 59478 DAD368 5 161 TO BUS 96101 5MORGAN 161 CKT1	64	Solution Undetermined	
15SP	EMDE	59499 CPK446 5 161	0.9199	0.8936	OPEN LINE FROM BUS 59478 DAD368 5 161 TO BUS 96101 5MORGAN 161 CKT1	76	Solution Undetermined	
15SP	EMDE	59691 WIL369 269.0	0.9074	0.8845	OPEN LINE FROM BUS 59536 ASH121 269.0 TO BUS 59586 WIL445 269.0 CKT1	87	Solution Undetermined	
15SP	EMDE	59434 BUF409 269.0	0.9077	0.8851	OPEN LINE FROM BUS 59528 BOL 73 269.0 TO BUS 59575 BUF342 269.0 CKT1	88	Solution Undetermined	
15SP	EMDE	59542 NIC170 269.0	0.9170	0.8944	OPEN LINE FROM BUS 59546 BIL221 269.0 TO BUS 59580 REP359 269.0 CKT1	88	Solution Undetermined	
15SP	EMDE	59575 BUF342 269.0	0.9087	0.8862	OPEN LINE FROM BUS 59528 BOL 73 269.0 TO BUS 59575 BUF342 269.0 CKT1	89	Solution Undetermined	
15SP	EMDE	59493 BOL431 5 161	0.9349	0.8961	OPEN LINE FROM BUS 59478 DAD368 5 161 TO BUS 96101 5MORGAN 161 CKT1	90	Solution Undetermined	
15SP	EMDE	59586 WIL445 269.0	0.9141	0.8920	OPEN LINE FROM BUS 59536 ASH121 269.0 TO BUS 59586 WIL445 269.0 CKT1	90	Solution Undetermined	
15SP	EMDE	59441 EXP4502 69.0	0.9146	0.8940	OPEN LINE FROM BUS 59440 EXP450T269.0 TO BUS 59528 BOL 73 269.0 CKT1	97	Solution Undetermined	
15SP	EMDE	59605 STK418 269.0	0.9050	0.8848	OPEN LINE FROM BUS 59605 STK418 269.0 TO BUS 96118 5STKAEC 161 TO BUS 59719 STK418 112.5 CKT1	99	Solution Undetermined	
15SP	EMDE	59440 EXP450T269.0	0.9186	0.8984	OPEN LINE FROM BUS 59440 EXP450T269.0 TO BUS 59528 BOL 73 269.0 CKT1	99	Solution Undetermined	
Total Estimated Engineering and Construction Cost								\$0

Study Case	From Area	To Area	Monitored Branch Overload	Rate <MVA>	BC % Loading	TC % Loading	%TDF	Outaged Branch Causing Overload	Comments
06AP			NONE IDENTIFIED						
06G	AECI	AECI	96089 5JAMESV 161 WND 2 JAMESV1 1	56	94.2	100.4	3.5	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV213.8 CKT 2	
06G	AECI	AECI	96089 5JAMESV 161 WND 2 JAMESV2 2	56	97.7	104.2	3.7	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV113.8 CKT 1	
06G	WEPL	WEPL	58764 GRNBURG3 115 to 58771 JUD-LRG3 115 CKT 1	79.7	112.1	124.6	10.0	58779 MULGRENE6 230 to 58795 SPEARVL6 230 CKT 1	
06G	WEPL	WEPL	58764 GRNBURG3 115 to 58771 JUD-LRG3 115 CKT 1	79.7	95.8	106.6	8.6	50858 FINNEY7 345 to 50888 POTTRC7 345 CKT 1	Invalid Contingency, Outage requires curtailment of LAMAR to SPS 210 MW and SECI to SPS 150 MW Transactions
06G	WEPL	WEPL	58764 GRNBURG3 115 to 58771 JUD-LRG3 115 CKT 1	79.7	90.9	100.2	7.5	54119 O.K.U.-7 345 to 54131 L.E.S.-7 345 CKT 1	Invalid Contingency
06G	WEPL	WEPL	58773 MED-LDG3 115 to 58797 SUNCITY3 115 CKT 1	79.7	95.4	107.8	9.9	58779 MULGRENE6 230 to 58795 SPEARVL6 230 CKT 1	
06G	NPPD	NPPD	64765 CANADAY4 230 to 65022 CANADY Y 230 CKT 1	100	105.9	108.3	2.3	64759 C.CREEK4 230 to 64948 RIVERDL4 230 CKT 1	
06SH	AECI	AECI	96089 5JAMESV 161 WND 2 JAMESV1 1	56	109.8	118.4	4.8	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV213.8 CKT 2	
06SH	AECI	AECI	96089 5JAMESV 161 WND 2 JAMESV2 2	56	113.2	121.6	4.7	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV113.8 CKT 1	
06SH	AECI	AECI	96673 2JAMESV 69.0 WND 1 JAMESV1 1	56	102.0	109.2	4.0	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV213.8 CKT 2	
06SH	AECI	AECI	96673 2JAMESV 69.0 WND 1 JAMESV2 2	56	105.3	112.5	4.0	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV113.8 CKT 1	
06SH	WEPL	WEPL	58764 GRNBURG3 115 to 58771 JUD-LRG3 115 CKT 1	79.7	99.6	111.7	9.6	58779 MULGRENE6 230 to 58795 SPEARVL6 230 CKT 1	
06SH	NPPD	NPPD	64765 CANADAY4 230 to 65022 CANADY Y 230 CKT 1	100	112.3	114.7	2.4	64759 C.CREEK4 230 to 64948 RIVERDL4 230 CKT 1	
06FA	AECI	AECI	96089 5JAMESV 161 WND 2 JAMESV1 1	56	98.6	105.9	4.1	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV213.8 CKT 2	
06FA	AECI	AECI	96089 5JAMESV 161 WND 2 JAMESV2 2	56	101.5	109.0	4.2	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV113.8 CKT 1	
06FA	AECI	AECI	96673 2JAMESV 69.0 WND 1 JAMESV2 2	56	95.1	101.7	3.7	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV113.8 CKT 1	
06FA	WEPL	WEPL	58764 GRNBURG3 115 to 58771 JUD-LRG3 115 CKT 1	79.7	104.4	116.5	9.6	58779 MULGRENE6 230 to 58795 SPEARVL6 230 CKT 1	
06FA	WEPL	WEPL	58773 MED-LDG3 115 to 58797 SUNCITY3 115 CKT 1	79.7	89.1	101.2	9.6	58779 MULGRENE6 230 to 58795 SPEARVL6 230 CKT 1	
06FA	NPPD	NPPD	64765 CANADAY4 230 to 65022 CANADY Y 230 CKT 1	100	101.3	103.3	2.0	64759 C.CREEK4 230 to 64948 RIVERDL4 230 CKT 1	
07SP	WEPL	WEPL	58764 GRNBURG3 115 to 58771 JUD-LRG3 115 CKT 1	79.7	95.9	107.7	9.5	58779 MULGRENE6 230 to 58795 SPEARVL6 230 CKT 1	
07SP	NPPD	NPPD	64765 CANADAY4 230 to 65022 CANADY Y 230 CKT 1	100	114.6	117.1	2.5	64759 C.CREEK4 230 to 64948 RIVERDL4 230 CKT 1	
07WP	WEPL	WEPL	58764 GRNBURG3 115 to 58771 JUD-LRG3 115 CKT 1	79.7	120.9	133.2	9.8	58779 MULGRENE6 230 to 58795 SPEARVL6 230 CKT 1	
07WP	WEPL	WEPL	58764 GRNBURG3 115 to 58771 JUD-LRG3 115 CKT 1	79.7	99.2	111.4	9.8	50858 FINNEY7 345 to 50888 POTTRC7 345 CKT 1	Invalid Contingency, Outage requires curtailment of LAMAR to SPS 210 MW and SECI to SPS 150 MW Transactions
07WP	WEPL	WEPL	58764 GRNBURG3 115 to 58771 JUD-LRG3 115 CKT 1	79.7	97.0	106.7	7.7	54119 O.K.U.-7 345 to 54131 L.E.S.-7 345 CKT 1	Invalid Contingency
07WP	WEPL	WEPL	58764 GRNBURG3 115 to 58771 JUD-LRG3 115 CKT 1	79.7	95.8	102.9	5.7	REMOVE UNIT 1 FROM BUS 56751 [WCGS UI 25.000] DISPATCH	
07WP	WEPL	WEPL	58764 GRNBURG3 115 to 58771 JUD-LRG3 115 CKT 1	79.7	93.3	102.1	7.0	58792 SEWARD 3 115 to 58796 ST-JOHN3 115 CKT 1	
07WP	WEPL	WEPL	58773 MED-LDG3 115 to 58797 SUNCITY3 115 CKT 1	79.7	105.9	118.1	9.8	58779 MULGRENE6 230 to 58795 SPEARVL6 230 CKT 1	
07WP	NPPD	NPPD	64765 CANADAY4 230 to 65022 CANADY Y 230 CKT 1	100	108.2	110.3	2.1	64759 C.CREEK4 230 to 64948 RIVERDL4 230 CKT 1	
10SP	WEPL	WEPL	58764 GRNBURG3 115 to 58771 JUD-LRG3 115 CKT 1	79.7	97.7	109.7	9.6	58779 MULGRENE6 230 to 58795 SPEARVL6 230 CKT 1	
10SP	EMDE	AECI	59546 BIL221 2 69 to 96658 2BILLNG 69 CKT 1	36	101.1	110.0	3.2	59537 AUR124 2 69 to 59611 MAR437 2 69 CKT 1	
10SP	AECI	EMDE	59618 CPK446 2 69 to 96658 2BILLNG 69 CKT 1	36	116.4	125.5	3.3	59537 AUR124 2 69 to 59611 MAR437 2 69 CKT 1	
10WP	WEPL	WEPL	58764 GRNBURG3 115 to 58771 JUD-LRG3 115 CKT 1	79.7	115.4	127.7	9.8	58779 MULGRENE6 230 to 58795 SPEARVL6 230 CKT 1	
10WP	WEPL	WEPL	58764 GRNBURG3 115 to 58771 JUD-LRG3 115 CKT 1	79.7	95.7	107.5	9.5	50858 FINNEY7 345 to 50888 POTTRC7 345 CKT 1	Invalid Contingency, Outage requires curtailment of LAMAR to SPS 210 MW and SECI to SPS 150 MW Transactions
10WP	WEPL	WEPL	58764 GRNBURG3 115 to 58771 JUD-LRG3 115 CKT 1	79.7	91.6	101.7	8.1	54119 O.K.U.-7 345 to 54131 L.E.S.-7 345 CKT 1	Invalid Contingency
10WP	WEPL	WEPL	58773 MED-LDG3 115 to 58797 SUNCITY3 115 CKT 1	79.7	100.2	112.5	9.8	58779 MULGRENE6 230 to 58795 SPEARVL6 230 CKT 1	
10WP	AECI	AECI	96071 5CLINTN 161 to 96124 5HOLDEN 161 CKT 1	227	99.7	101.1	3.3	57995 MONTROS5 161 to 96071 5CLINTN 161 CKT 1	
15SP	AECI	AECI	96089 5JAMESV 161 WND 2 JAMESV1 1	56	108.7	114.5	3.3	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV213.8 CKT 2	
15SP	AECI	AECI	96089 5JAMESV 161 WND 2 JAMESV1 1	56	105.0	111.5	3.6	59442 OZARKS 269.0 to 59609 OZK434 269.0 CKT 1	
15SP	AECI	AECI	96089 5JAMESV 161 WND 2 JAMESV2 2	56	111.6	118.5	3.9	59442 OZARKS 269.0 to 59609 OZK434 269.0 CKT 1	
15SP	AECI	AECI	96089 5JAMESV 161 WND 2 JAMESV2 2	56	112.3	118.4	3.4	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV113.8 CKT 1	
15SP	AECI	AECI	96089 5JAMESV 161 WND 2 JAMESV2 2	56	104.1	109.5	3.1	96089 5JAMESV 161 to 96726 5RIVRDL 161 CKT 1	
15SP	AECI	AECI	96089 5JAMESV 161 WND 2 JAMESV2 2	56	98.7	104.4	3.2	59570 OZK330 269.0 to 59609 OZK434 269.0 CKT 1	
15SP	AECI	AECI	96673 2JAMESV 69.0 WND 1 JAMESV1 1	56	98.9	104.4	3.1	59442 OZARKS 269.0 to 59609 OZK434 269.0 CKT 1	
15SP	AECI	AECI	96673 2JAMESV 69.0 WND 1 JAMESV2 2	56	105.2	111.0	3.3	59442 OZARKS 269.0 to 59609 OZK434 269.0 CKT 1	
15SP	SWPA	ENTR	52660 BULL SH5 161 to 99802 5BULLSH* 161 CKT 1	167	105.6	108.2	4.4	53136 EUREKA 5 161 to 99832 5OSAGE # 161 CKT 1	

Study Case	From Area	To Area	Monitored Branch Overload	Rate <MVA>	BC % Loading	TC % Loading	%TDF	Outaged Branch Causing Overload	Comments
15SP	AECI	SWPA	52692 SPRGFLD5 161 to 96678 5NIXA-1 161 CKT 1	203	105.5	110.9	11.0	59954 SWPS 5 161 to 96661 5BTLFD 161 CKT 1	
15SP	AECI	SWPA	52692 SPRGFLD5 161 to 96678 5NIXA-1 161 CKT 1	203	100.2	105.6	11.0	96089 5JAMESV 161 to 96127 5CLEVER 161 CKT 1	
15SP	AECI	SWPA	52692 SPRGFLD5 161 to 96678 5NIXA-1 161 CKT 1	203	100.0	105.4	11.0	96127 5CLEVER 161 to 96661 5BTLFD 161 CKT 1	
15SP	WEPL	WEPL	58764 GRNBURG3 115 to 58771 JUD-LRG3 115 CKT 1	79.7	107.5	119.9	9.9	58779 MULGREN6 230 to 58795 SPEARVL6 230 CKT 1	
15SP	WEPL	WEPL	58764 GRNBURG3 115 to 58771 JUD-LRG3 115 CKT 1	79.7	90.6	102.1	9.1	50858 FINNEY7 345 to 50888 POTTRC7 345 CKT 1	Invalid Contingency, Outage requires curtailment of LAMAR to SPS 210 MW and SECI to SPS 150 MW Transactions
15SP	EMDE	AECI	59546 BIL221 2 69 to 96658 2BILLNG 69 CKT 1	36	118.0	128.2	3.7	59537 AUR124 2 69 to 59611 MAR437 2 69 CKT 1	
15SP	EMDE	AECI	59604 BHJ415 2 69 to 96673 2JAMESV 69 CKT 1	89	94.9	104.9	8.9	59442 OZARKS 2 69 to 59609 OZK434 2 69 CKT 1	
15SP	AECI	EMDE	59618 CPK446 2 69 to 96658 2BILLNG 69 CKT 1	36	135.2	145.7	3.8	59537 AUR124 2 69 to 59611 MAR437 2 69 CKT 1	
15SP	NPPD	NPPD	64909 N.PLATT4 230 to 65037 N.PLT8 Y 230 CKT 1	187	114.8	116.0	2.1	64910 N.PLATT7 115 to 65038 N.PLT9 Y 230 CKT 1	
15SP	NPPD	NPPD	64909 N.PLATT4 230 to 65037 N.PLT8 Y 230 CKT 1	187	114.8	116.0	2.1	64909 N.PLATT4 230 to 65038 N.PLT9 Y 230 CKT 1	
15SP	AECI	AECI	96071 5CLINTN 161 to 96124 5HOLDEN 161 CKT 1	227	105.6	107.2	3.4	57995 MONTROSS5 161 to 96071 5CLINTN 161 CKT 1	
15SP	AECI	AECI	96089 5JAMESV 161 to 96678 5NIXA-1 161 CKT 1	203	96.6	102.0	11.0	59954 SWPS 5 161 to 96661 5BTLFD 161 CKT 1	
15SP	AECI	AECI	96120 5THMHIL 161 to 96126 5MOBTAP 161 CKT 1	372	109.1	109.9	3.1	96044 7MCCRED 345 to 96049 7THOMHL 345 CKT 1	
15SP	ENTR	ENTR	99797 5HARR-S 161 to 99811 5HARR-E 161 CKT 1	223	138.1	140.3	4.8	53136 EUREKA 5 161 to 99832 5OSAGE # 161 CKT 1	
15SP	ENTR	ENTR	99797 5HARR-S 161 to 99812 5HARR-W 161 CKT 1	223	130.3	132.4	4.6	53136 EUREKA 5 161 to 99832 5OSAGE # 161 CKT 1	
15SP	ENTR	ENTR	99802 5BULLSH* 161 to 99809 5FLIPN 161 CKT 1	167	101.3	103.9	4.3	53136 EUREKA 5 161 to 99832 5OSAGE # 161 CKT 1	

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Table 4.1 - Non-SPP Voltage Violations

Caused or Impacted by Transfer Using Scenario 1

Southwest Power Pool

System Impact Study

Study Case	AREA	Monitored Bus with Violation	BC Voltage (PU)	TC Voltage (PU)	Outaged Branch Causing Voltage Violation	Comments
06AP		NONE IDENTIFIED				
06G		NONE IDENTIFIED				
06SH		NONE IDENTIFIED				
06FA		NONE IDENTIFIED				
07SP		NONE IDENTIFIED				
07WP		NONE IDENTIFIED				
10SP		NONE IDENTIFIED				
10WP		NONE IDENTIFIED				
15SP		NONE IDENTIFIED				

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Table 1.2 - SPP Facility Overloads
Caused or Impacted by Transfer Using Scenario 2

Southwest Power Pool
System Impact Study

Study Case	From Area	To Area	Monitored Branch Overload	Rate <MVA>	BC % Loading	TC % Loading	%TDF	Outaged Branch Causing Overload	ATC (MW)	Solution	Estimated Cost
06AP			NONE IDENTIFIED						100		
06G	SPS	SPS	HARRINGTON STATION - NICHOLS STATION 230KV CKT 1	635	98.4	100.6	14.1	HARRINGTON STATION - NICHOLS STATION 230KV CKT 2	72	Solution Undetermined	
06G	SPS	SPS	HARRINGTON STATION - NICHOLS STATION 230KV CKT 2	635	98.2	100.4	14.0	HARRINGTON STATION - NICHOLS STATION 230KV CKT 1	82	Solution Undetermined	
06SH			NONE IDENTIFIED						100		
06FA			NONE IDENTIFIED						100		
07SP	WERE	WERE	AUBURN ROAD - JEFFREY ENERGY CENTER 230KV	565	107.5	108.7	6.7	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	EMDE	EMDE	OZARKS - SUB 434 - OZARK SOUTHEAST	45	144.3	162.5	8.2	JAMESVILLE - SUB 415 - BLACKHAWK JCT. 69KV	0	Solution Undetermined	
07SP	EMDE	EMDE	OZARKS - SUB 434 - OZARK SOUTHEAST	45	107.0	118.5	5.2	JAMESVILLE 161/69/13.8KV TRANSFORMER	0	Solution Undetermined	
07SP	EMDE	EMDE	OZARKS - SUB 434 - OZARK SOUTHEAST	45	105.3	116.6	5.1	JAMESVILLE 161/69/13.8KV TRANSFORMER	0	Solution Undetermined	
07SP	EMDE	EMDE	OZARKS - SUB 434 - OZARK SOUTHEAST	38	104.4	114.7	3.9	BASE CASE	0	Solution Undetermined	
07SP	EMDE	EMDE	OZARKS - SUB 434 - OZARK SOUTHEAST	45	103.8	114.1	4.6	SUB 368 - DADEVILLE EAST 161KV - MORGAN	0	Solution Undetermined	
07SP	EMDE	EMDE	SUB 330 - OZARK NORTHWEST - SUB 434 - OZARK SOUTHEAST 69KV	45	112.5	127.2	6.6	JAMESVILLE - SUB 415 - BLACKHAWK JCT. 69KV	0	Solution Undetermined	
07SP	EMDE	EMDE	OZARKS 161/69/12.5KV TRANSFORMER	75	94.7	107.7	9.7	SUB 415 - BLACKHAWK JCT. - JAMESVILLE	40	Solution Undetermined	
07SP	EMDE	EMDE	OZARKS 161/69/12.5KV TRANSFORMER	75	91.7	103.7	9.0	SUB 415 - BLACKHAWK JCT. - JAMESVILLE	69	Solution Undetermined	
07SP	EMDE	EMDE	SUB 330 - OZARK NORTHWEST - SUB 415 - BLACKHAWK JCT. 69KV	45	90.0	102.3	5.5	JAMESVILLE - SUB 415 - BLACKHAWK JCT. 69KV	81	Solution Undetermined	
07SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST - SUB EXPLORER SPRING CITY TAP 69KV	39	94.1	104.4	4.0	SUB 184 - NEOSHO SOUTH JCT. - SUB 314 - NEOSHO LINDE 69KV	100	Relieved by EMDE Mitigation Plan to curtail interruptible load at Bus 59563	
07WP	WERE	WERE	AUBURN ROAD - JEFFREY ENERGY CENTER 230KV	565	104.8	105.9	6.3	HOYT - JEFFREY ENERGY CENTER 345KV	0	May be relieved due to Westar Operating Procedure 401 - Outage of the Jeffrey Energy Center to Hoyt 345KV Line	
07WP	EMDE	EMDE	OZARKS - SUB 434 - OZARK SOUTHEAST	61	88.7	100.4	7.2	JAMESVILLE - SUB 415 - BLACKHAWK JCT. 69KV	97	Solution Undetermined	
10SP	EMDE	EMDE	OZARKS 161/69/12.5KV TRANSFORMER	75	102.7	110.8	6.0	SUB 415 - BLACKHAWK JCT. - JAMESVILLE	0	Solution Undetermined	
10SP	EMDE	EMDE	OZARKS 161/69/12.5KV TRANSFORMER	75	107.1	115.8	6.6	SUB 415 - BLACKHAWK JCT. - JAMESVILLE	0	Solution Undetermined	
10SP	WERE	WERE	AUBURN ROAD - JEFFREY ENERGY CENTER 230KV	565	103.1	104.2	6.3	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	
10SP	EMDE	EMDE	OZARKS - SUB 434 - OZARK SOUTHEAST	45	163.5	179.3	7.1	JAMESVILLE - SUB 415 - BLACKHAWK JCT. 69KV	0	Solution Undetermined	
10SP	EMDE	EMDE	OZARKS - SUB 434 - OZARK SOUTHEAST	45	125.2	137.7	5.6	JAMESVILLE 161/69/13.8KV TRANSFORMER	0	Solution Undetermined	
10SP	EMDE	EMDE	OZARKS - SUB 434 - OZARK SOUTHEAST	45	123.3	135.7	5.6	JAMESVILLE 161/69/13.8KV TRANSFORMER	0	Solution Undetermined	
10SP	EMDE	EMDE	OZARKS - SUB 434 - OZARK SOUTHEAST	38	122.2	133.4	4.3	BASE CASE	0	Solution Undetermined	
10SP	EMDE	EMDE	OZARKS - SUB 434 - OZARK SOUTHEAST	45	116.4	129.4	5.8	SUB 221 - BILLINGS NORTHEAST - SUB 359 - REPUBLIC EAST 69KV	0	Solution Undetermined	
10SP	EMDE	AECI	BILLINGS - SUB 221 - BILLINGS NORTHEAST 69KV	36	100.3	109.2	3.2	SUB 124 - AURORA H.T. - SUB 437 - MARIONVILLE NORTHWEST 69KV	0	Solution Undetermined	
10SP	EMDE	EMDE	SUB 330 - OZARK NORTHWEST - SUB 434 - OZARK SOUTHEAST 69KV	45	122.7	134.2	5.2	JAMESVILLE - SUB 415 - BLACKHAWK JCT. 69KV	0	Solution Undetermined	
10SP	AECI	EMDE	BILLINGS - SUB 446 - CHESAPEAKE 69KV	36	115.6	124.6	3.3	SUB 124 - AURORA H.T. - SUB 437 - MARIONVILLE NORTHWEST 69KV	0	Solution Undetermined	
10SP	EMDE	EMDE	SUB 330 - OZARK NORTHWEST - SUB 415 - BLACKHAWK JCT. 69KV	45	97.1	105.8	3.9	JAMESVILLE - SUB 415 - BLACKHAWK JCT. 69KV	33	Solution Undetermined	
10SP	AECI	EMDE	BILLINGS - SUB 446 - CHESAPEAKE 69KV	36	93.4	102.3	3.2	MT VERNON - SUB 446 - CHESAPEAKE 69KV	74	Solution Undetermined	
10SP	EMDE	EMDE	SUB 217 - FAIRPLAY EAST - SUB 368 - DADEVILLE EAST 69KV	39	89.0	103.0	5.4	SUB 368 - DADEVILLE EAST - SUB 431 - BOLIVAR SOUTH 161KV	79	Solution Undetermined	
10SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST - SUB EXPLORER SPRING CITY TAP 69KV	39	104.5	115.3	4.2	SUB 184 - NEOSHO SOUTH JCT. - SUB 314 - NEOSHO LINDE 69KV	100	Relieved by EMDE Mitigation Plan to curtail interruptible load at Bus 59563	
10WP	EMDE	EMDE	OZARKS - SUB 434 - OZARK SOUTHEAST	61	94.3	106.1	7.2	JAMESVILLE - SUB 415 - BLACKHAWK JCT. 69KV	48	Solution Undetermined	
15SP	EMDE	EMDE	OZARKS 161/69/12.5KV TRANSFORMER	75	118.4	126.8	6.3	SUB 415 - BLACKHAWK JCT. - JAMESVILLE	0	Solution Undetermined	
15SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST 161/69/12.5KV TRANSFORMER	75	110.8	125.6	11.1	SUB 184 - NEOSHO SOUTH JCT. - SUB 314 - NEOSHO LINDE 69KV	0	See Previous Upgrade Specified for Facility in Scenario 1	
15SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST 161/69/12.5KV TRANSFORMER	75	100.9	114.3	10.0	SUB 56 - NEOSHO WEST - SUB 314 - NEOSHO LINDE 69KV	0	See Previous Upgrade Specified for Facility in Scenario 1	
15SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST 161/69/12.5KV TRANSFORMER	75	108.2	113.0	3.6	SUB 292 - TIPTON FORD - SUB 389 - JOPLIN SOUTHWEST	0	See Previous Upgrade Specified for Facility in Scenario 1	
15SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST 161/69/12.5KV TRANSFORMER	75	102.6	111.7	6.8	SUB 64 - JOPLIN 10TH ST. - SUB 145 - JOPLIN WEST 7TH	0	See Previous Upgrade Specified for Facility in Scenario 1	
15SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST 161/69/12.5KV TRANSFORMER	75	105.8	111.2	4.0	SUB 145 - JOPLIN WEST 7TH - SUB 439 - STATILINE	0	See Previous Upgrade Specified for Facility in Scenario 1	
15SP	EMDE	EMDE	SUB 330 - OZARK NORTHWEST to SUB 434 - OZARK SOUTHEAST	45	100.1	107.6	3.4	JAMESVILLE 161/69/13.8KV TRANSFORMER	0	Solution Undetermined	
15SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST 161/69/12.5KV TRANSFORMER	75	107.0	120.3	9.9	SUB 184 - NEOSHO SOUTH JCT. - SUB 314 - NEOSHO LINDE	0	See Previous Upgrade Specified for Facility in Scenario 1	
15SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST 161/69/12.5KV TRANSFORMER	75	106.2	110.8	3.5	SUB 292 - TIPTON FORD - SUB 389 - JOPLIN SOUTHWEST	0	See Previous Upgrade Specified for Facility in Scenario 1	
15SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST 161/69/12.5KV TRANSFORMER	75	103.8	109.0	3.9	SUB 145 - JOPLIN WEST 7TH to SUB 439 - STATILINE	0	See Previous Upgrade Specified for Facility in Scenario 1	
15SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST 161/69/12.5KV TRANSFORMER	75	100.4	108.7	6.2	SUB 64 - JOPLIN 10TH ST. to SUB 145 - JOPLIN WEST 7TH	0	See Previous Upgrade Specified for Facility in Scenario 1	
15SP	EMDE	EMDE	OZARKS 161/69/12.5KV TRANSFORMER	75	124.0	133.3	7.0	SUB 415 - BLACKHAWK JCT. - JAMESVILLE	0	Solution Undetermined	
15SP	SWPA	ENTR	BULL SHOALS - BULL SHOALS HES 161KV	167	113.2	115.8	4.4	EUREKA SPRINGS - OSAGE CREEK (AECG) 161 KV	0	Solution Undetermined	
15SP	SWPA	ENTR	BULL SHOALS - BULL SHOALS HES 161KV	167	107.2	110.3	5.2	SILVER HILL - ST JOE 161KV	0	Solution Undetermined	
15SP	SWPA	ENTR	BULL SHOALS - BULL SHOALS HES 161KV	167	106.5	109.5	5.2	EVERTON - ST JOE 161KV	0	Solution Undetermined	
15SP	SWPA	ENTR	BULL SHOALS - BULL SHOALS HES 161KV	167	104.4	107.4	5.1	HARRISON-EAST - EVERTON 161KV	0	Solution Undetermined	
15SP	AECI	SWPA	SPRINGFIELD - NIXA #1 161KV	203	102.8	108.4	11.3	SOUTHWEST - BATTLEFIELD 161KV	0	Solution Undetermined	
15SP	AECI	SWPA	SPRINGFIELD - NIXA #1 161KV	203	97.5	103.0	11.3	JAMESVILLE - CLEVER 161KV	0	Solution Undetermined	
15SP	AECI	SWPA	SPRINGFIELD - NIXA #1 161KV	203	97.3	102.9	11.3	CLEVER - BATTLEFIELD 161KV	0	Solution Undetermined	
15SP	AEPW	AEPW	FLINT CREEK - TONTITOWN 161KV	353	101.1	102.0	3.0	CHAMBER SPRINGS - CLARKSVILLE 345KV	0	See Previous Upgrade Specified for Facility in Scenario 1	
15SP	AEPW	AEPW	FLINT CREEK - GENTRY REC 161KV	353	101.4	102.4	3.8	CHAMBER SPRINGS - CLARKSVILLE 345KV	0	See Previous Upgrade Specified for Facility in Scenario 1	
15SP	WERE	WERE	AUBURN ROAD - JEFFREY ENERGY CENTER 230KV	565	117.6	119.0	7.9	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	
15SP	EMDE	EMDE	SUB 376 - MONETT CITY SOUTH to SUB 416 - MONETT CITY EAST	27	110.4	121.6	3.0	BASE CASE	0	Solution Undetermined	
15SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST - SUB EXPLORER SPRING CITY TAP 69KV	39	168.7	184.7	6.3	SUB 184 - NEOSHO SOUTH JCT. - SUB 314 - NEOSHO LINDE 69KV	0	Not Relieved by EMDE Mitigation Plan to curtail interruptible load at Bus 59563. Solution Undetermined	
15SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST - SUB EXPLORER SPRING CITY TAP 69KV	39	142.0	155.0	5.1	SUB 314 - NEOSHO LINDE - SUB 56 - NEOSHO WEST 69KV	0	Not Relieved by EMDE Mitigation Plan to curtail interruptible load at Bus 59563. Solution Undetermined	
15SP	EMDE	EMDE	OZARKS - SUB 434 - OZARK SOUTHEAST	45	191.8	209.0	7.7	JAMESVILLE - SUB 415 - BLACKHAWK JCT. 69KV	0	Solution Undetermined	

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 Table 1.2 - SPP Facility Overloads
 Caused or Impacted by Transfer Using Scenario 2

Southwest Power Pool
 System Impact Study

Study Case	From Area	To Area	Monitored Branch Overload	Rate <MVA>	BC % Loading	TC % Loading	%TDF	Outaged Branch Causing Overload	ATC (MW)	Solution	Estimated Cost
15SP	EMDE	EMDE	OZARKS - SUB 434 - OZARK SOUTHEAST	45	146.4	158.4	5.4	JAMESVILLE 161/69/13.8KV TRANSFORMER	0	Solution Undetermined	
15SP	EMDE	EMDE	OZARKS - SUB 434 - OZARK SOUTHEAST	45	144.3	156.1	5.3	JAMESVILLE 161/69/13.8KV TRANSFORMER	0	Solution Undetermined	
15SP	EMDE	EMDE	OZARKS - SUB 434 - OZARK SOUTHEAST	38	143.2	155.4	4.6	BASE CASE	0	Solution Undetermined	
15SP	EMDE	EMDE	OZARKS - SUB 434 - OZARK SOUTHEAST	45	138.2	151.2	5.8	SUB 221 - BILLINGS NORTHEAST - SUB 359 - REPUBLIC EAST 69KV	0	Solution Undetermined	
15SP	EMDE	EMDE	SUB 375 - SENECA - SUB 56 - NEOSHO WEST 69KV	39	104.1	114.1	3.9	SUB 389 - JOPLIN SOUTHWEST - SUB EXPLORER SPRING CITY TAP 69KV	0	Solution Undetermined	
15SP	EMDE	EMDE	SUB 124 - AURORA H.T. - SUB 437 - MARIONVILLE NORTHWEST 69KV	38	109.5	117.3	3.0	BILLINGS - SUB 446 - CHESAPEAKE 69KV	0	Solution Undetermined	
15SP	EMDE	EMDE	SUB 170 - NICHOLS ST. - SUB 345 - REPUBLIC NORTHEAST 69KV	38	111.1	126.8	5.9	SUB 221 - BILLINGS NORTHEAST - SUB 359 - REPUBLIC EAST 69KV	0	Solution Undetermined	
15SP	EMDE	EMDE	SUB 184 - NEOSHO SOUTH JCT. - SUB 314 - NEOSHO LINDE 69KV	65	102.6	111.8	6.0	SUB 389 - JOPLIN SOUTHWEST - SUB EXPLORER SPRING CITY TAP 69KV	0	Solution Undetermined	
15SP	EMDE	EMDE	SUB 217 - FAIRPLAY EAST - SUB 368 - DADEVILLE EAST 69KV	39	104.5	115.5	4.3	SUB 368 - DADEVILLE EAST - SUB 431 - BOLIVAR SOUTH 161KV	0	Solution Undetermined	
15SP	EMDE	AECI	BILLINGS - SUB 221 - BILLINGS NORTHEAST 69KV	36	117.3	126.9	3.5	SUB 124 - AURORA H.T. - SUB 437 - MARIONVILLE NORTHWEST 69KV	0	Solution Undetermined	
15SP	EMDE	EMDE	SUB 330 - OZARK NORTHWEST - SUB 415 - BLACKHAWK JCT. 69KV	45	113.9	123.4	4.3	JAMESVILLE - SUB 415 - BLACKHAWK JCT. 69KV	0	Solution Undetermined	
15SP	EMDE	EMDE	SUB 330 - OZARK NORTHWEST - SUB 434 - OZARK SOUTHEAST 69KV	45	144.3	156.9	5.7	JAMESVILLE - SUB 415 - BLACKHAWK JCT. 69KV	0	Solution Undetermined	
15SP	EMDE	EMDE	SUB 345 - REPUBLIC NORTHEAST - SUB 359 - REPUBLIC EAST 69KV	38	110.1	125.5	5.9	SUB 221 - BILLINGS NORTHEAST - SUB 359 - REPUBLIC EAST 69KV	0	Solution Undetermined	
15SP	AECI	EMDE	BILLINGS - SUB 446 - CHESAPEAKE 69KV	36	134.4	144.4	3.6	SUB 124 - AURORA H.T. - SUB 437 - MARIONVILLE NORTHWEST 69KV	0	Solution Undetermined	
15SP	EMDE	EMDE	OZARKS 161/69/12.5KV TRANSFORMER	75	99.4	106.1	5.0	JAMESVILLE 161/69/13.8KV TRANSFORMER	9	Solution Undetermined	
15SP	EMDE	EMDE	OZARKS 161/69/12.5KV TRANSFORMER	75	99.2	105.3	4.6	Table Rock - SUB 438 - RIVERSIDE	13	Solution Undetermined	
15SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST 161/69/12.5KV TRANSFORMER	75	98.1	110.1	9.0	SUB 56 - NEOSHO WEST - SUB 314 - NEOSHO LINDE 69KV	16	See Previous Upgrade Specified for Facility in Scenario 1	
15SP	EMDE	EMDE	SUB 217 - FAIRPLAY EAST - SUB 602 - BOLIVAR PLANT 69KV	39	98.1	108.6	4.1	SUB 368 - DADEVILLE EAST - SUB 431 - BOLIVAR SOUTH 161KV	18	Solution Undetermined	
15SP	EMDE	EMDE	SUB 330 - OZARK NORTHWEST to SUB 434 - OZARK SOUTHEAST	45	98.0	105.4	3.3	JAMESVILLE 161/69/13.8KV TRANSFORMER	27	Solution Undetermined	
15SP	EMDE	EMDE	OZARKS 161/69/12.5KV TRANSFORMER	75	98.2	104.8	5.0	JAMESVILLE 161/69/13.8KV TRANSFORMER	27	Solution Undetermined	
15SP	AEPW	OKGE	CLARKSVILLE - MUSKOGEE 345KV	986	99.8	100.5	7.3	MUSKOGEE - RIVERSIDE STATION 345KV	30	Solution Undetermined	
15SP	EMDE	EMDE	SUB 375 - SENECA - SUB EXPLORER SPRING CITY TAP 69KV	39	96.9	106.4	3.7	SUB 184 - NEOSHO SOUTH JCT. - SUB 314 - NEOSHO LINDE 69KV	33	Solution Undetermined	
15SP	EMDE	AECI	JAMESVILLE - SUB 415 - BLACKHAWK JCT. 69KV	89	96.3	106.5	9.1	OZARKS - SUB 434 - OZARK SOUTHEAST 69KV	36	Solution Undetermined	
15SP	EMDE	EMDE	SUB 184 - NEOSHO SOUTH JCT. 161/69/12.5KV TRANSFORMER	46.7	92.1	106.8	6.9	SUB 389 - JOPLIN SOUTHWEST - SUB EXPLORER SPRING CITY TAP 69KV	54	Solution Undetermined	
15SP	EMDE	EMDE	OZARKS 161/69/12.5KV TRANSFORMER	75	96.1	102.3	4.6	JAMESVILLE 161/69/13.8KV TRANSFORMER	63	Solution Undetermined	
15SP	EMDE	EMDE	OZARKS 161/69/12.5KV TRANSFORMER	75	96.3	102.1	4.4	Table Rock to SUB 438 - RIVERSIDE	63	Solution Undetermined	
15SP	EMDE	EMDE	OZARKS 161/69/12.5KV TRANSFORMER	75	95.3	102.1	5.0	SUB 368 - DADEVILLE EAST - MORGAN	69	Solution Undetermined	
15SP	EMDE	EMDE	OZARKS 161/69/12.5KV TRANSFORMER	75	95.0	101.1	4.6	JAMESVILLE 161/69/13.8KV TRANSFORMER	81	Solution Undetermined	
15SP	EMDE	EMDE	SUB 217 - FAIRPLAY EAST - SUB 368 - DADEVILLE EAST 69KV	39	88.6	102.1	5.3	SUB 431 - BOLIVAR SOUTH - SUB 73 - BOLIVAR BURNS 161KV	84	Solution Undetermined	
15SP	EMDE	EMDE	SUB 330 - OZARK NORTHWEST - SUB 434 - OZARK SOUTHEAST 69KV	45	91.8	100.3	3.8	SUB 221 - BILLINGS NORTHEAST - SUB 359 - REPUBLIC EAST 69KV	96	Solution Undetermined	
15SP	EMDE	EMDE	SUB 184 - NEOSHO SOUTH JCT. 161/69/12.5KV TRANSFORMER	46.7	87.2	100.1	6.1	SUB 389 - JOPLIN SOUTHWEST - SUB EXPLORER SPRING CITY TAP 69KV	99	Solution Undetermined	
15SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST - SUB EXPLORER SPRING CITY TAP 69KV	39	94.4	102.1	3.0	REMOVE UNIT 1 FROM BUS 59658 [54C439 118.000] DISPATCH	100	Relieved by EMDE Mitigation Plan to curtail interruptible load at Bus 59653	
15SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST - SUB EXPLORER SPRING CITY TAP 69KV	39	92.2	100.1	3.1	SUB 375 - SENECA - SUB 56 - NEOSHO WEST 69KV	100	Relieved by EMDE Mitigation Plan to curtail interruptible load at Bus 59653	
Total Estimated Engineering and Construction Cost											\$0

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 Table 2.2 - SPP Voltage Violations
 Caused or Impacted by Transfer Using Scenario 2

Southwest Power Pool
 System Impact Study

Study Case	AREA	Monitored Bus with Violation	BC Voltage (PU)	TC Voltage (PU)	Outaged Branch Causing Voltage Violation	ATC (MW)	Solution	Estimated Cost
06AP		NONE IDENTIFIED				100		
06G	SPS	50957 EASTPL6 230	0.9706	0.8972		96	Solution Undetermined	
06G	SPS	50957 EASTPL6 230	0.9706	0.8972	OPEN LINE FROM BUS 50907 HARRNG6 230 TO BUS 50957 EASTPL6 230 CKT1	96	Solution Undetermined	
06SH	EMDE	59404 PUR390 269.0	0.9151	0.8904	OPEN LINE FROM BUS 59480 MON383 5 161 TO BUS 59591 MON383 269.0 TO BUS 59712 MON383 112.5 CKT1	81	Solution Undetermined	
06SH	EMDE	59404 PUR390 269.0	0.9151	0.8904	OPEN LINE FROM BUS 59480 MON383 5 161 TO BUS 59591 MON383 269.0 TO BUS 59712 MON383 112.5 CKT1	81	Solution Undetermined	
06SH	EMDE	59604 BHJ415 269.0	0.8945	0.8723	OPEN LINE FROM BUS 59604 BHJ415 269.0 TO BUS 96673 2JAMESV 69.0 CKT1	90	Solution Undetermined	
06SH	EMDE	59604 BHJ415 269.0	0.8945	0.8723	OPEN LINE FROM BUS 59604 BHJ415 269.0 TO BUS 96673 2JAMESV 69.0 CKT1	90	Solution Undetermined	
06SH	EMDE	59570 OZK330 269.0	0.8947	0.8726	OPEN LINE FROM BUS 59604 BHJ415 269.0 TO BUS 96673 2JAMESV 69.0 CKT1	91	Solution Undetermined	
06SH	EMDE	59570 OZK330 269.0	0.8947	0.8726	OPEN LINE FROM BUS 59604 BHJ415 269.0 TO BUS 96673 2JAMESV 69.0 CKT1	91	Solution Undetermined	
06SH	EMDE	59580 REP359 269.0	0.9090	0.8871	OPEN LINE FROM BUS 59546 BIL221 269.0 TO BUS 59580 REP359 269.0 CKT1	91	Solution Undetermined	
06SH	EMDE	59580 REP359 269.0	0.9090	0.8871	OPEN LINE FROM BUS 59546 BIL221 269.0 TO BUS 59580 REP359 269.0 CKT1	91	Solution Undetermined	
06SH	EMDE	59609 OZK434 269.0	0.8994	0.8781	OPEN LINE FROM BUS 59604 BHJ415 269.0 TO BUS 96673 2JAMESV 69.0 CKT1	94	Solution Undetermined	
06SH	EMDE	59609 OZK434 269.0	0.8994	0.8781	OPEN LINE FROM BUS 59604 BHJ415 269.0 TO BUS 96673 2JAMESV 69.0 CKT1	94	Solution Undetermined	
06SH	EMDE	59535 NIX114 269.0	0.9004	0.8791	OPEN LINE FROM BUS 59604 BHJ415 269.0 TO BUS 96673 2JAMESV 69.0 CKT1	94	Solution Undetermined	
06SH	EMDE	59535 NIX114 269.0	0.9004	0.8791	OPEN LINE FROM BUS 59604 BHJ415 269.0 TO BUS 96673 2JAMESV 69.0 CKT1	94	Solution Undetermined	
06FA		NONE IDENTIFIED				100		
07SP	EMDE	59568 STK324 269.0	0.9182	0.8940	OPEN LINE FROM BUS 59568 STK324 269.0 TO BUS 59616 STK324J269.0 CKT1	83	Solution Undetermined	
07SP	EMDE	59568 STK324 269.0	0.9182	0.8940	OPEN LINE FROM BUS 59568 STK324 269.0 TO BUS 59616 STK324J269.0 CKT1	83	Solution Undetermined	
07SP	EMDE	59580 REP359 269.0	0.8839	0.8603	OPEN LINE FROM BUS 59546 BIL221 269.0 TO BUS 59580 REP359 269.0 CKT1	85	Solution Undetermined	
07SP	EMDE	59580 REP359 269.0	0.8839	0.8603	OPEN LINE FROM BUS 59546 BIL221 269.0 TO BUS 59580 REP359 269.0 CKT1	85	Solution Undetermined	
07SP	EMDE	59576 REP345 269.0	0.9084	0.8880	OPEN LINE FROM BUS 59546 BIL221 269.0 TO BUS 59580 REP359 269.0 CKT1	98	Solution Undetermined	
07SP	EMDE	59576 REP345 269.0	0.9084	0.8880	OPEN LINE FROM BUS 59546 BIL221 269.0 TO BUS 59580 REP359 269.0 CKT1	98	Solution Undetermined	
07WP	EMDE	59568 STK324 269.0	0.8841	0.8482	OPEN LINE FROM BUS 59568 STK324 269.0 TO BUS 59616 STK324J269.0 CKT1	56	Solution Undetermined	
07WP	EMDE	59568 STK324 269.0	0.8841	0.8482	OPEN LINE FROM BUS 59568 STK324 269.0 TO BUS 59616 STK324J269.0 CKT1	56	Solution Undetermined	
07WP	EMDE	59568 STK324 269.0	0.8841	0.8482	OPEN LINE FROM BUS 59568 STK324 269.0 TO BUS 59616 STK324J269.0 CKT1	56	Solution Undetermined	
07WP	SPS	51689 LUBE6 230	0.9295	0.8946	OPEN LINE FROM BUS 51689 LUBE6 230 TO BUS 51699 JONES6 230 CKT1	85	Solution Undetermined	
07WP	SPS	51689 LUBE6 230	0.9295	0.8946	OPEN LINE FROM BUS 51689 LUBE6 230 TO BUS 51699 JONES6 230 CKT1	85	Solution Undetermined	
07WP	SPS	51689 LUBE6 230	0.9295	0.8946	OPEN LINE FROM BUS 51689 LUBE6 230 TO BUS 51699 JONES6 230 CKT1	85	Solution Undetermined	
07WP	SPS	50527 LP-WADS6 230	0.9296	0.8948	OPEN LINE FROM BUS 51689 LUBE6 230 TO BUS 51699 JONES6 230 CKT1	85	Solution Undetermined	
07WP	SPS	50527 LP-WADS6 230	0.9296	0.8948	OPEN LINE FROM BUS 51689 LUBE6 230 TO BUS 51699 JONES6 230 CKT1	85	Solution Undetermined	
07WP	SPS	50527 LP-WADS6 230	0.9296	0.8948	OPEN LINE FROM BUS 51689 LUBE6 230 TO BUS 51699 JONES6 230 CKT1	85	Solution Undetermined	
07WP	EMDE	59404 PUR390 269.0	0.9203	0.8981	OPEN LINE FROM BUS 59480 MON383 5 161 TO BUS 59591 MON383 269.0 TO BUS 59712 MON383 112.5 CKT1	91	Solution Undetermined	
07WP	EMDE	59404 PUR390 269.0	0.9203	0.8981	OPEN LINE FROM BUS 59480 MON383 5 161 TO BUS 59591 MON383 269.0 TO BUS 59712 MON383 112.5 CKT1	91	Solution Undetermined	
07WP	EMDE	59404 PUR390 269.0	0.9203	0.8981	OPEN LINE FROM BUS 59480 MON383 5 161 TO BUS 59591 MON383 269.0 TO BUS 59712 MON383 112.5 CKT1	91	Solution Undetermined	
07WP	EMDE	59422 GNB347 269.0	0.9167	0.8954	OPEN LINE FROM BUS 59538 DIA131 269.0 TO BUS 59595 RNM393 269.0 CKT1	94	Solution Undetermined	
07WP	EMDE	59422 GNB347 269.0	0.9167	0.8954	OPEN LINE FROM BUS 59538 DIA131 269.0 TO BUS 59595 RNM393 269.0 CKT1	94	Solution Undetermined	
07WP	EMDE	59422 GNB347 269.0	0.9167	0.8954	OPEN LINE FROM BUS 59538 DIA131 269.0 TO BUS 59595 RNM393 269.0 CKT1	94	Solution Undetermined	
10SP	EMDE	59580 REP359 269.0	0.8543	0.8268	OPEN LINE FROM BUS 59546 BIL221 269.0 TO BUS 59580 REP359 269.0 CKT1	73	Solution Undetermined	
10SP	EMDE	59580 REP359 269.0	0.8543	0.8268	OPEN LINE FROM BUS 59546 BIL221 269.0 TO BUS 59580 REP359 269.0 CKT1	73	Solution Undetermined	
10SP	EMDE	59568 STK324 269.0	0.8988	0.8733	OPEN LINE FROM BUS 59568 STK324 269.0 TO BUS 59616 STK324J269.0 CKT1	78	Solution Undetermined	
10SP	EMDE	59568 STK324 269.0	0.8988	0.8733	OPEN LINE FROM BUS 59568 STK324 269.0 TO BUS 59616 STK324J269.0 CKT1	78	Solution Undetermined	
10SP	EMDE	59404 PUR390 269.0	0.8872	0.8630	OPEN LINE FROM BUS 59480 MON383 5 161 TO BUS 59591 MON383 269.0 TO BUS 59712 MON383 112.5 CKT1	83	Solution Undetermined	
10SP	EMDE	59404 PUR390 269.0	0.8872	0.8630	OPEN LINE FROM BUS 59480 MON383 5 161 TO BUS 59591 MON383 269.0 TO BUS 59712 MON383 112.5 CKT1	83	Solution Undetermined	
10SP	EMDE	59576 REP345 269.0	0.8830	0.8594	OPEN LINE FROM BUS 59546 BIL221 269.0 TO BUS 59580 REP359 269.0 CKT1	85	Solution Undetermined	
10SP	EMDE	59576 REP345 269.0	0.8830	0.8594	OPEN LINE FROM BUS 59546 BIL221 269.0 TO BUS 59580 REP359 269.0 CKT1	85	Solution Undetermined	
10SP	EMDE	59403 MON416 269.0	0.9162	0.8957	OPEN LINE FROM BUS 59480 MON383 5 161 TO BUS 59591 MON383 269.0 TO BUS 59712 MON383 112.5 CKT1	97	Solution Undetermined	
10SP	EMDE	59403 MON416 269.0	0.9162	0.8957	OPEN LINE FROM BUS 59480 MON383 5 161 TO BUS 59591 MON383 269.0 TO BUS 59712 MON383 112.5 CKT1	97	Solution Undetermined	
10SP	EMDE	59402 MON416J269.0	0.9169	0.8965	OPEN LINE FROM BUS 59480 MON383 5 161 TO BUS 59591 MON383 269.0 TO BUS 59712 MON383 112.5 CKT1	98	Solution Undetermined	
10SP	EMDE	59402 MON416J269.0	0.9169	0.8965	OPEN LINE FROM BUS 59480 MON383 5 161 TO BUS 59591 MON383 269.0 TO BUS 59712 MON383 112.5 CKT1	98	Solution Undetermined	
10WP	EMDE	59568 STK324 269.0	0.8778	0.8389	OPEN LINE FROM BUS 59568 STK324 269.0 TO BUS 59616 STK324J269.0 CKT1	51	Solution Undetermined	
10WP	EMDE	59568 STK324 269.0	0.8778	0.8389	OPEN LINE FROM BUS 59568 STK324 269.0 TO BUS 59616 STK324J269.0 CKT1	51	Solution Undetermined	
10WP	EMDE	59404 PUR390 269.0	0.9034	0.8817	OPEN LINE FROM BUS 59480 MON383 5 161 TO BUS 59591 MON383 269.0 TO BUS 59712 MON383 112.5 CKT1	92	Solution Undetermined	
10WP	EMDE	59404 PUR390 269.0	0.9034	0.8817	OPEN LINE FROM BUS 59480 MON383 5 161 TO BUS 59591 MON383 269.0 TO BUS 59712 MON383 112.5 CKT1	92	Solution Undetermined	
15SP	EMDE	59580 REP359 269.0	0.8103	0.7700	OPEN LINE FROM BUS 59546 BIL221 269.0 TO BUS 59580 REP359 269.0 CKT1	50	Solution Undetermined	
15SP	EMDE	59580 REP359 269.0	0.8103	0.7700	OPEN LINE FROM BUS 59546 BIL221 269.0 TO BUS 59580 REP359 269.0 CKT1	50	Solution Undetermined	
15SP	EMDE	59568 STK324 269.0	0.8899	0.8529	OPEN LINE FROM BUS 59568 STK324 269.0 TO BUS 59616 STK324J269.0 CKT1	54	Solution Undetermined	
15SP	EMDE	59568 STK324 269.0	0.8899	0.8529	OPEN LINE FROM BUS 59568 STK324 269.0 TO BUS 59616 STK324J269.0 CKT1	54	Solution Undetermined	
15SP	EMDE	59576 REP345 269.0	0.8466	0.8114	OPEN LINE FROM BUS 59546 BIL221 269.0 TO BUS 59580 REP359 269.0 CKT1	57	Solution Undetermined	
15SP	EMDE	59576 REP345 269.0	0.8466	0.8114	OPEN LINE FROM BUS 59546 BIL221 269.0 TO BUS 59580 REP359 269.0 CKT1	57	Solution Undetermined	
15SP	EMDE	59478 DAD368 5 161	0.9223	0.8894	OPEN LINE FROM BUS 59478 DAD368 5 161 TO BUS 96101 5MORGAN 161 CKT1	68	Solution Undetermined	
15SP	EMDE	59478 DAD368 5 161	0.9223	0.8894	OPEN LINE FROM BUS 59478 DAD368 5 161 TO BUS 96101 5MORGAN 161 CKT1	68	Solution Undetermined	

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 Table 2.2 - SPP Voltage Violations
 Caused or Impacted by Transfer Using Scenario 2

Southwest Power Pool
 System Impact Study

Study Case	AREA	Monitored Bus with Violation	BC Voltage (PU)	TC Voltage (PU)	Outaged Branch Causing Voltage Violation	ATC (MW)	Solution	Estimated Cost
15SP	EMDE	59542 NIC170 269.0	0.9175	0.8929	OPEN LINE FROM BUS 59546 BIL221 269.0 TO BUS 59580 REP359 269.0 CKT1	81	Solution Undetermined	
15SP	EMDE	59542 NIC170 269.0	0.9175	0.8929	OPEN LINE FROM BUS 59546 BIL221 269.0 TO BUS 59580 REP359 269.0 CKT1	81	Solution Undetermined	
15SP	EMDE	59499 CPK446 5 161	0.9215	0.8952	OPEN LINE FROM BUS 59478 DAD368 5 161 TO BUS 96101 5MORGAN 161 CKT1	82	Solution Undetermined	
15SP	EMDE	59499 CPK446 5 161	0.9215	0.8952	OPEN LINE FROM BUS 59478 DAD368 5 161 TO BUS 96101 5MORGAN 161 CKT1	82	Solution Undetermined	
15SP	EMDE	59691 WIL369 269.0	0.9085	0.8850	OPEN LINE FROM BUS 59536 ASH121 269.0 TO BUS 59586 WIL445 269.0 CKT1	85	Solution Undetermined	
15SP	EMDE	59691 WIL369 269.0	0.9085	0.8850	OPEN LINE FROM BUS 59536 ASH121 269.0 TO BUS 59586 WIL445 269.0 CKT1	85	Solution Undetermined	
15SP	EMDE	59434 BUF409 269.0	0.9092	0.8859	OPEN LINE FROM BUS 59528 BOL 73 269.0 TO BUS 59575 BUF342 269.0 CKT1	86	Solution Undetermined	
15SP	EMDE	59434 BUF409 269.0	0.9092	0.8859	OPEN LINE FROM BUS 59528 BOL 73 269.0 TO BUS 59575 BUF342 269.0 CKT1	86	Solution Undetermined	
15SP	EMDE	59575 BUF342 269.0	0.9103	0.8871	OPEN LINE FROM BUS 59528 BOL 73 269.0 TO BUS 59575 BUF342 269.0 CKT1	86	Solution Undetermined	
15SP	EMDE	59575 BUF342 269.0	0.9103	0.8871	OPEN LINE FROM BUS 59528 BOL 73 269.0 TO BUS 59575 BUF342 269.0 CKT1	86	Solution Undetermined	
15SP	EMDE	59586 WIL445 269.0	0.9152	0.8924	OPEN LINE FROM BUS 59536 ASH121 269.0 TO BUS 59586 WIL445 269.0 CKT1	88	Solution Undetermined	
15SP	EMDE	59586 WIL445 269.0	0.9152	0.8924	OPEN LINE FROM BUS 59536 ASH121 269.0 TO BUS 59586 WIL445 269.0 CKT1	88	Solution Undetermined	
15SP	EMDE	59425 HER209 269.0	0.8701	0.8476	OPEN LINE FROM BUS 59464 BOL 73 5 161 TO BUS 59528 BOL 73 269.0 TO BUS 59701 BOL 73 112.5 CKT1	89	Solution Undetermined	
15SP	EMDE	59425 HER209 269.0	0.8701	0.8476	OPEN LINE FROM BUS 59464 BOL 73 5 161 TO BUS 59528 BOL 73 269.0 TO BUS 59701 BOL 73 112.5 CKT1	89	Solution Undetermined	
15SP	EMDE	59493 BOL431 5 161	0.9360	0.8971	OPEN LINE FROM BUS 59478 DAD368 5 161 TO BUS 96101 5MORGAN 161 CKT1	93	Solution Undetermined	
15SP	EMDE	59493 BOL431 5 161	0.9360	0.8971	OPEN LINE FROM BUS 59478 DAD368 5 161 TO BUS 96101 5MORGAN 161 CKT1	93	Solution Undetermined	
15SP	EMDE	59441 EXP4502 69.0	0.9160	0.8947	OPEN LINE FROM BUS 59440 EXP450T269.0 TO BUS 59528 BOL 73 269.0 CKT1	94	Solution Undetermined	
15SP	EMDE	59441 EXP4502 69.0	0.9160	0.8947	OPEN LINE FROM BUS 59440 EXP450T269.0 TO BUS 59528 BOL 73 269.0 CKT1	94	Solution Undetermined	
15SP	EMDE	59611 MAR437 269.0	0.9040	0.8830	OPEN LINE FROM BUS 59537 AUR124 269.0 TO BUS 59611 MAR437 269.0 CKT1	95	Solution Undetermined	
15SP	EMDE	59611 MAR437 269.0	0.9040	0.8830	OPEN LINE FROM BUS 59537 AUR124 269.0 TO BUS 59611 MAR437 269.0 CKT1	95	Solution Undetermined	
15SP	EMDE	59605 STK418 269.0	0.9093	0.8884	OPEN LINE FROM BUS 59605 STK418 269.0 TO BUS 96118 5STKAEC 161 TO BUS 59719 STK418 112.5 CKT1	96	Solution Undetermined	
15SP	EMDE	59605 STK418 269.0	0.9093	0.8884	OPEN LINE FROM BUS 59605 STK418 269.0 TO BUS 96118 5STKAEC 161 TO BUS 59719 STK418 112.5 CKT1	96	Solution Undetermined	
15SP	EMDE	59440 EXP450T269.0	0.9200	0.8992	OPEN LINE FROM BUS 59440 EXP450T269.0 TO BUS 59528 BOL 73 269.0 CKT1	96	Solution Undetermined	
15SP	EMDE	59440 EXP450T269.0	0.9200	0.8992	OPEN LINE FROM BUS 59440 EXP450T269.0 TO BUS 59528 BOL 73 269.0 CKT1	96	Solution Undetermined	
15SP	EMDE	59568 STK324 269.0	0.9109	0.8902	OPEN LINE FROM BUS 59605 STK418 269.0 TO BUS 96118 5STKAEC 161 TO BUS 59719 STK418 112.5 CKT1	96	Solution Undetermined	
15SP	EMDE	59568 STK324 269.0	0.9109	0.8902	OPEN LINE FROM BUS 59605 STK418 269.0 TO BUS 96118 5STKAEC 161 TO BUS 59719 STK418 112.5 CKT1	96	Solution Undetermined	
15SP	EMDE	59616 STK324J269.0	0.9110	0.8902	OPEN LINE FROM BUS 59605 STK418 269.0 TO BUS 96118 5STKAEC 161 TO BUS 59719 STK418 112.5 CKT1	96	Solution Undetermined	
15SP	EMDE	59616 STK324J269.0	0.9110	0.8902	OPEN LINE FROM BUS 59605 STK418 269.0 TO BUS 96118 5STKAEC 161 TO BUS 59719 STK418 112.5 CKT1	96	Solution Undetermined	
15SP	EMDE	59434 BUF409 269.0	0.8915	0.8708	OPEN LINE FROM BUS 59464 BOL 73 5 161 TO BUS 59528 BOL 73 269.0 TO BUS 59701 BOL 73 112.5 CKT1	97	Solution Undetermined	
15SP	EMDE	59434 BUF409 269.0	0.8915	0.8708	OPEN LINE FROM BUS 59464 BOL 73 5 161 TO BUS 59528 BOL 73 269.0 TO BUS 59701 BOL 73 112.5 CKT1	97	Solution Undetermined	
15SP	EMDE	59575 BUF342 269.0	0.8925	0.8719	OPEN LINE FROM BUS 59464 BOL 73 5 161 TO BUS 59528 BOL 73 269.0 TO BUS 59701 BOL 73 112.5 CKT1	97	Solution Undetermined	
15SP	EMDE	59575 BUF342 269.0	0.8925	0.8719	OPEN LINE FROM BUS 59464 BOL 73 5 161 TO BUS 59528 BOL 73 269.0 TO BUS 59701 BOL 73 112.5 CKT1	97	Solution Undetermined	
Total Estimated Engineering and Construction Cost								\$0

Study Case	From Area	To Area	Monitored Branch Overload	Rate <MVA>	BC % Loading	TC % Loading	%TDF	Outaged Branch Causing Overload	Comments
06G	AECI	AECI	96089 5JAMESV 161 WND 2 JAMESV1 1	56	94.8	101.3	3.6	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV213.8 CKT 2	
06G	AECI	AECI	96089 5JAMESV 161 WND 2 JAMESV2 2	56	98.3	105.0	3.7	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV113.8 CKT 1	
06G	WEPL	WEPL	58764 GRNBURG3 115 to 58771 JUD-LRG3 115 CKT 1	79.7	95.8	106.2	8.3	50858 FINNEY7 345 to 50888 POTTRC7 345 CKT 1	Invalid Contingency, Outage requires curtailment of LAMAR to SPS 210 MW and SECI to SPS 150 MW Transactions
06G	WEPL	WEPL	58764 GRNBURG3 115 to 58771 JUD-LRG3 115 CKT 1	79.7	89.0	101.1	9.7	58779 MULGRENE6 230 to 58795 SPEARVL6 230 CKT 1	
06SH	AECI	AECI	96089 5JAMESV 161 WND 2 JAMESV1 1	56	108.5	117.2	4.9	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV213.8 CKT 2	
06SH	AECI	AECI	96089 5JAMESV 161 WND 2 JAMESV2 2	56	111.8	120.4	4.8	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV113.8 CKT 1	
06SH	AECI	AECI	96673 2JAMESV 69.0 WND 1 JAMESV1 1	56	100.7	107.9	4.0	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV213.8 CKT 2	
06SH	AECI	AECI	96673 2JAMESV 69.0 WND 1 JAMESV2 2	56	104.0	111.2	4.0	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV113.8 CKT 1	
06FA	AECI	AECI	96089 5JAMESV 161 WND 2 JAMESV1 1	56	97.5	104.8	4.0	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV213.8 CKT 2	
06FA	AECI	AECI	96089 5JAMESV 161 WND 2 JAMESV2 2	56	100.4	108.0	4.3	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV113.8 CKT 1	
06FA	AECI	AECI	96673 2JAMESV 69.0 WND 1 JAMESV2 2	56	94.0	100.7	3.7	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV113.8 CKT 1	
07SP			NONE IDENTIFIED						
07WP	WEPL	WEPL	58764 GRNBURG3 115 to 58771 JUD-LRG3 115 CKT 1	79.7	96.6	109.1	9.9	58779 MULGRENE6 230 to 58795 SPEARVL6 230 CKT 1	
07WP	WEPL	WEPL	58764 GRNBURG3 115 to 58771 JUD-LRG3 115 CKT 1	79.7	98.6	108.8	8.2	50858 FINNEY7 345 to 50888 POTTRC7 345 CKT 1	Invalid Contingency, Outage requires curtailment of LAMAR to SPS 210 MW and SECI to SPS 150 MW Transactions
07WP	WEPL	WEPL	58773 MED-LDG3 115 to 58774 MED-LDG4 138 CKT 1	65	90.0	102.4	8.1	50858 FINNEY7 345 to 50888 POTTRC7 345 CKT 1	Invalid Contingency, Outage requires curtailment of LAMAR to SPS 210 MW and SECI to SPS 150 MW Transactions
10SP	EMDE	AECI	59546 BIL221 2 69 to 96658 2BILLNG 69 CKT 1	36	100.3	109.2	3.2	59537 AUR124 2 69 to 59611 MAR437 2 69 CKT 1	
10SP	AECI	EMDE	59618 CPK446 2 69 to 96658 2BILLNG 69 CKT 1	36	115.6	124.6	3.3	59537 AUR124 2 69 to 59611 MAR437 2 69 CKT 1	
10SP	AECI	EMDE	59618 CPK446 2 69 to 96658 2BILLNG 69 CKT 1	36	93.4	102.3	3.2	59618 CPK446 2 69 to 96677 2MTRVN 69 CKT 1	
10WP	WEPL	WEPL	58764 GRNBURG3 115 to 58771 JUD-LRG3 115 CKT 1	79.7	94.7	105.0	8.2	50858 FINNEY7 345 to 50888 POTTRC7 345 CKT 1	Invalid Contingency, Outage requires curtailment of LAMAR to SPS 210 MW and SECI to SPS 150 MW Transactions
10WP	WEPL	WEPL	58764 GRNBURG3 115 to 58771 JUD-LRG3 115 CKT 1	79.7	91.1	103.8	10.2	58779 MULGRENE6 230 to 58795 SPEARVL6 230 CKT 1	
10WP	NPPD	NPPD	64765 CANADAY4 230 to 65022 CANADY Y 230 CKT 1	100	110.8	112.7	2.0	64759 C.CREEK4 230 to 64948 RIVERDL4 230 CKT 1	
10WP	NPPD	NPPD	64766 CANADAY7 115 to 65022 CANADY Y 230 CKT 1	100	114.8	116.8	2.0	64759 C.CREEK4 230 to 64948 RIVERDL4 230 CKT 1	
15SP	AECI	AECI	96089 5JAMESV 161 WND 2 JAMESV1 1	56	107.5	113.5	3.3	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV213.8 CKT 2	
15SP	AECI	AECI	96089 5JAMESV 161 WND 2 JAMESV1 1	56	104.5	111.2	3.7	59442 OZARKS 269.0 to 59609 OZK434 269.0 CKT 1	
15SP	AECI	AECI	96089 5JAMESV 161 WND 2 JAMESV2 2	56	111.1	118.1	4.0	59442 OZARKS 269.0 to 59609 OZK434 269.0 CKT 1	
15SP	AECI	AECI	96089 5JAMESV 161 WND 2 JAMESV2 2	56	111.2	117.3	3.4	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV113.8 CKT 1	
15SP	AECI	AECI	96089 5JAMESV 161 WND 2 JAMESV2 2	56	102.3	107.8	3.1	96089 5JAMESV 161 to 96726 5RIVRDL 161 CKT 1	
15SP	AECI	AECI	96089 5JAMESV 161 WND 2 JAMESV2 2	56	98.2	104.1	3.3	59570 OZK330 269.0 to 59609 OZK434 269.0 CKT 1	
15SP	AECI	AECI	96673 2JAMESV 69.0 WND 1 JAMESV1 1	56	98.4	104.1	3.2	59442 OZARKS 269.0 to 59609 OZK434 269.0 CKT 1	
15SP	AECI	AECI	96673 2JAMESV 69.0 WND 1 JAMESV2 2	56	104.6	110.6	3.4	59442 OZARKS 269.0 to 59609 OZK434 269.0 CKT 1	
15SP	SWPA	ENTR	52660 BULL SH5 161 to 99802 5BULLSH* 161 CKT 1	167	113.2	115.8	4.4	53136 EUREKA 5 161 to 99832 SOSAGE # 161 CKT 1	
15SP	SWPA	ENTR	52660 BULL SH5 161 to 99802 5BULLSH* 161 CKT 1	167	107.2	110.3	5.2	99696 SAG HILL 161 to 99860 5ST JOE 161 CKT 1	
15SP	SWPA	ENTR	52660 BULL SH5 161 to 99802 5BULLSH* 161 CKT 1	167	106.5	109.5	5.2	99843 SEVRTON 161 to 99860 5ST JOE 161 CKT 1	
15SP	SWPA	ENTR	52660 BULL SH5 161 to 99802 5BULLSH* 161 CKT 1	167	104.4	107.4	5.1	99811 SHARR-E 161 to 99843 SEVRTON 161 CKT 1	
15SP	AECI	SWPA	52692 SPRGFLD5 161 to 96678 5NIXA-1 161 CKT 1	203	102.8	108.4	11.3	59954 SWPS 5 161 to 96661 5BTLFD 161 CKT 1	
15SP	AECI	SWPA	52692 SPRGFLD5 161 to 96678 5NIXA-1 161 CKT 1	203	97.5	103.0	11.3	96089 5JAMESV 161 to 96127 5CLEVER 161 CKT 1	
15SP	AECI	SWPA	52692 SPRGFLD5 161 to 96678 5NIXA-1 161 CKT 1	203	97.3	102.9	11.3	96127 5CLEVER 161 to 96661 5BTLFD 161 CKT 1	
15SP	WEPL	WEPL	58764 GRNBURG3 115 to 58771 JUD-LRG3 115 CKT 1	79.7	90.4	100.4	8.0	50858 FINNEY7 345 to 50888 POTTRC7 345 CKT 1	Invalid Contingency, Outage requires curtailment of LAMAR to SPS 210 MW and SECI to SPS 150 MW Transactions
15SP	EMDE	AECI	59546 BIL221 2 69 to 96658 2BILLNG 69 CKT 1	36	117.3	126.9	3.5	59537 AUR124 2 69 to 59611 MAR437 2 69 CKT 1	
15SP	EMDE	AECI	59604 BHJ415 2 69 to 96673 2JAMESV 69 CKT 1	89	96.3	106.5	9.1	59442 OZARKS 2 69 to 59609 OZK434 2 69 CKT 1	
15SP	AECI	EMDE	59618 CPK446 2 69 to 96658 2BILLNG 69 CKT 1	36	134.4	144.4	3.6	59537 AUR124 2 69 to 59611 MAR437 2 69 CKT 1	
15SP	AECI	AECI	96078 5FRANKS 161 to 96080*5FTWOOD 161 1	203	101.6	103.2	3.2	96042 7HUBEN 345 96045 7MORGAN 345 CKT 196041 7FRANKS 345 96042 7HUBEN 345 CKT 1	
15SP	AECI	AECI	96120 5THMHIL 161 to 96126 5MOBTAP 161 CKT 1	372	107.3	108.2	3.3	96044 7MCCRED 345 to 96049 7THOMHL 345 CKT 1	

Study Case	From Area	To Area	Monitored Branch Overload	Rate <MVA>	BC % Loading	TC % Loading	%TDF	Outaged Branch Causing Overload	Comments
15SP	ENTR	ENTR	99696 5AG_HILL 161 to 99860 5ST_JOE 161 CKT 1	167	100.5	104.0	5.9	52660 BULL_SH5 161 to 99802 5BULLSH* 161 CKT 1	
15SP	ENTR	ENTR	99696 5AG_HILL 161 to 99860 5ST_JOE 161 CKT 1	167	98.5	102.1	5.9	99802 5BULLSH* 161 to 99809 5FLIPN 161 CKT 1	
15SP	ENTR	ENTR	99696 5AG_HILL 161 to 99860 5ST_JOE 161 CKT 1	167	97.6	101.2	6.0	53136 EUREKA 5 161 to 99832 5OSAGE # 161 CKT 1	
15SP	ENTR	ENTR	99797 5HARR-S 161 to 99811 5HARR-E 161 CKT 1	223	139.2	141.7	5.4	53136 EUREKA 5 161 to 99832 5OSAGE # 161 CKT 1	
15SP	ENTR	ENTR	99797 5HARR-S 161 to 99812 5HARR-W 161 CKT 1	223	131.4	133.7	5.2	53136 EUREKA 5 161 to 99832 5OSAGE # 161 CKT 1	
15SP	ENTR	ENTR	99802 5BULLSH* 161 to 99809 5FLIPN 161 CKT 1	167	108.9	111.5	4.4	53136 EUREKA 5 161 to 99832 5OSAGE # 161 CKT 1	
15SP	ENTR	ENTR	99802 5BULLSH* 161 to 99809 5FLIPN 161 CKT 1	167	103.3	106.3	5.1	99696 5AG_HILL 161 to 99860 5ST_JOE 161 CKT 1	
15SP	ENTR	ENTR	99802 5BULLSH* 161 to 99809 5FLIPN 161 CKT 1	167	102.5	105.5	5.1	99843 5EVRTON 161 to 99860 5ST_JOE 161 CKT 1	
15SP	ENTR	ENTR	99802 5BULLSH* 161 to 99809 5FLIPN 161 CKT 1	167	100.4	103.4	5.0	99811 5HARR-E 161 to 99843 5EVRTON 161 CKT 1	
15SP	ENTR	ENTR	99810 5GR_FOR 161 to 99812 5HARR-W 161 CKT 1	223	99.0	100.9	4.3	53136 EUREKA 5 161 to 99832 5OSAGE # 161 CKT 1	
15SP	ENTR	ENTR	99843 5EVRTON 161 to 99860 5ST_JOE 161 CKT 1	167	98.9	102.5	5.9	52660 BULL_SH5 161 to 99802 5BULLSH* 161 CKT 1	
15SP	ENTR	ENTR	99843 5EVRTON 161 to 99860 5ST_JOE 161 CKT 1	167	97.0	100.6	5.9	99802 5BULLSH* 161 to 99809 5FLIPN 161 CKT 1	

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Table 4.2 - Non-SPP Voltage Violations

Caused or Impacted by Transfer Using Scenario 2

Southwest Power Pool

System Impact Study

Study Case	AREA	Monitored Bus with Violation	BC Voltage (PU)	TC Voltage (PU)	Outaged Branch Causing Voltage Violation	Comments
06AP		NONE IDENTIFIED				
06G		NONE IDENTIFIED				
06SH		NONE IDENTIFIED				
06FA		NONE IDENTIFIED				
07SP		NONE IDENTIFIED				
07WP		NONE IDENTIFIED				
10SP		NONE IDENTIFIED				
10WP		NONE IDENTIFIED				
15SP		NONE IDENTIFIED				

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Table 1.3 - SPP Facility Overloads
Caused or Impacted by Transfer Using Scenario 3

Southwest Power Pool
System Impact Study

Study Case	From Area	To Area	Monitored Branch Overload	Rate <MVA>	BC % Loading	TC % Loading	%TDF	Outaged Branch Causing Overload	ATC (MW)	Solution	Estimated Cost
06AP			NONE IDENTIFIED						100		
06G			NONE IDENTIFIED						100		
06SH	AEPW	AEPW	CHAMBER SPRINGS - TONTITOWN 161KV	244	106.2	107.6	3.6	CHAMBER SPRINGS - FARMINGTON AECC 161KV	0	AEPW Upgrade Schedule Completion Date 5/1/2007	
06FA			NONE IDENTIFIED						100		
07SP	WERE	WERE	AUBURN ROAD - JEFFREY ENERGY CENTER 230KV	565	111.5	112.2	4.3	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	EMDE	EMDE	OZARKS - SUB 434 - OZARK SOUTHEAST	45	142.1	158.6	7.4	JAMESVILLE - SUB 415 - BLACKHAWK JCT. 69KV	0	Solution Undetermined	
07SP	EMDE	EMDE	OZARKS - SUB 434 - OZARK SOUTHEAST	45	105.9	117.3	5.1	JAMESVILLE 161/69/13.8KV TRANSFORMER	0	Solution Undetermined	
07SP	EMDE	EMDE	OZARKS - SUB 434 - OZARK SOUTHEAST	45	104.2	115.5	5.1	JAMESVILLE 161/69/13.8KV TRANSFORMER	0	Solution Undetermined	
07SP	EMDE	EMDE	OZARKS - SUB 434 - OZARK SOUTHEAST	38	102.7	113.1	4.0	BASE CASE	0	Solution Undetermined	
07SP	EMDE	EMDE	OZARKS - SUB 434 - OZARK SOUTHEAST	45	101.3	112.4	5.0	SUB 368 - DADEVILLE EAST 161KV - MORGAN	0	Solution Undetermined	
07SP	EMDE	EMDE	SUB 330 - OZARK NORTHWEST - SUB 434 - OZARK SOUTHEAST 69KV	45	110.6	123.2	5.7	JAMESVILLE - SUB 415 - BLACKHAWK JCT. 69KV	0	Solution Undetermined	
07SP	EMDE	EMDE	OZARKS 161/69/12.5KV TRANSFORMER	75	94.3	105.0	8.0	SUB 415 - BLACKHAWK JCT. - JAMESVILLE	53	Solution Undetermined	
07SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST - SUB EXPLORER SPRING CITY TAP 69KV	39	94.2	104.5	4.0	SUB 184 - NEOSHO SOUTH JCT. - SUB 314 - NEOSHO LINDE 69KV	100	Relieved by EMDE Mitigation Plan to curtail interruptible load at Bus 59563	
07WP	WERE	WERE	AUBURN ROAD - JEFFREY ENERGY CENTER 230KV	565	102.2	103.3	5.8	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	
10SP	EMDE	EMDE	OZARKS 161/69/12.5KV TRANSFORMER	75	102.4	110.3	6.0	SUB 415 - BLACKHAWK JCT. - JAMESVILLE	0	Solution Undetermined	
10SP	EMDE	EMDE	OZARKS 161/69/12.5KV TRANSFORMER	75	106.7	115.3	6.5	SUB 415 - BLACKHAWK JCT. - JAMESVILLE	0	Solution Undetermined	
10SP	WERE	WERE	AUBURN ROAD - JEFFREY ENERGY CENTER 230KV	565	108.5	109.6	6.3	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	
10SP	EMDE	EMDE	OZARKS - SUB 434 - OZARK SOUTHEAST	45	161.8	177.4	7.0	JAMESVILLE - SUB 415 - BLACKHAWK JCT. 69KV	0	Solution Undetermined	
10SP	EMDE	EMDE	OZARKS - SUB 434 - OZARK SOUTHEAST	45	124.4	137.1	5.7	JAMESVILLE 161/69/13.8KV TRANSFORMER	0	Solution Undetermined	
10SP	EMDE	EMDE	OZARKS - SUB 434 - OZARK SOUTHEAST	45	122.5	135.2	5.7	JAMESVILLE 161/69/13.8KV TRANSFORMER	0	Solution Undetermined	
10SP	EMDE	EMDE	OZARKS - SUB 434 - OZARK SOUTHEAST	38	121.1	132.2	4.2	BASE CASE	0	Solution Undetermined	
10SP	EMDE	EMDE	OZARKS - SUB 434 - OZARK SOUTHEAST	45	115.8	128.9	5.9	SUB 221 - BILLINGS NORTHEAST - SUB 359 - REPUBLIC EAST 69KV	0	Solution Undetermined	
10SP	EMDE	AECI	BILLINGS - SUB 221 - BILLINGS NORTHEAST 69KV	36	100.7	109.6	3.2	SUB 124 - AURORA H.T. - SUB 437 - MARIONVILLE NORTHWEST 69KV	0	Solution Undetermined	
10SP	EMDE	EMDE	SUB 330 - OZARK NORTHWEST - SUB 434 - OZARK SOUTHEAST 69KV	45	121.1	132.3	5.1	JAMESVILLE - SUB 415 - BLACKHAWK JCT. 69KV	0	Solution Undetermined	
10SP	AECI	EMDE	BILLINGS - SUB 446 - CHESAPEAKE 69KV	36	116.0	125.1	3.3	SUB 124 - AURORA H.T. - SUB 437 - MARIONVILLE NORTHWEST 69KV	0	Solution Undetermined	
10SP	EMDE	EMDE	SUB 330 - OZARK NORTHWEST - SUB 415 - BLACKHAWK JCT. 69KV	45	95.5	104.0	3.8	JAMESVILLE - SUB 415 - BLACKHAWK JCT. 69KV	53	Solution Undetermined	
10SP	EMDE	EMDE	SUB 217 - FAIRPLAY EAST - SUB 368 - DADEVILLE EAST 69KV	39	89.4	103.3	5.4	SUB 368 - DADEVILLE EAST - SUB 431 - BOLIVAR SOUTH 161KV	76	Solution Undetermined	
10SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST - SUB EXPLORER SPRING CITY TAP 69KV	39	104.6	115.5	4.2	SUB 184 - NEOSHO SOUTH JCT. - SUB 314 - NEOSHO LINDE 69KV	100	Relieved by EMDE Mitigation Plan to curtail interruptible load at Bus 59563	
10WP	EMDE	EMDE	OZARKS - SUB 434 - OZARK SOUTHEAST	61	92.7	104.5	7.2	JAMESVILLE - SUB 415 - BLACKHAWK JCT. 69KV	62	Solution Undetermined	
15SP	EMDE	EMDE	OZARKS 161/69/12.5KV TRANSFORMER	75	117.9	126.3	6.3	SUB 415 - BLACKHAWK JCT. - JAMESVILLE	0	Solution Undetermined	
15SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST 161/69/12.5KV TRANSFORMER	75	110.6	125.4	11.1	SUB 184 - NEOSHO SOUTH JCT. - SUB 314 - NEOSHO LINDE 69KV	0	See Previous Upgrade Specified for Facility in Scenario 1	
15SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST 161/69/12.5KV TRANSFORMER	75	100.7	114.1	10.0	SUB 56 - NEOSHO WEST - SUB 314 - NEOSHO LINDE 69KV	0	See Previous Upgrade Specified for Facility in Scenario 1	
15SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST 161/69/12.5KV TRANSFORMER	75	102.5	113.6	8.3	SUB 64 - JOPLIN 10TH ST. - SUB 145 - JOPLIN WEST 7TH	0	See Previous Upgrade Specified for Facility in Scenario 1	
15SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST 161/69/12.5KV TRANSFORMER	75	105.8	113.5	5.8	SUB 145 - JOPLIN WEST 7TH - SUB 439 - STATELINE	0	See Previous Upgrade Specified for Facility in Scenario 1	
15SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST 161/69/12.5KV TRANSFORMER	75	108.4	113.2	3.6	SUB 292 - TIPTON FORD - SUB 389 - JOPLIN SOUTHWEST	0	See Previous Upgrade Specified for Facility in Scenario 1	
15SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST 161/69/12.5KV TRANSFORMER	75	106.8	120.1	9.9	SUB 184 - NEOSHO SOUTH JCT. - SUB 314 - NEOSHO LINDE 69KV	0	See Previous Upgrade Specified for Facility in Scenario 1	
15SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST 161/69/12.5KV TRANSFORMER	75	106.4	111.0	3.5	SUB 292 - TIPTON FORD - SUB 389 - JOPLIN SOUTHWEST	0	See Previous Upgrade Specified for Facility in Scenario 1	
15SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST 161/69/12.5KV TRANSFORMER	75	103.8	110.9	5.3	SUB 145 - JOPLIN WEST 7TH - SUB 439 - STATELINE	0	See Previous Upgrade Specified for Facility in Scenario 1	
15SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST 161/69/12.5KV TRANSFORMER	75	100.3	110.4	7.6	SUB 64 - JOPLIN 10TH ST. - SUB 145 - JOPLIN WEST 7TH	0	See Previous Upgrade Specified for Facility in Scenario 1	
15SP	EMDE	EMDE	OZARKS 161/69/12.5KV TRANSFORMER	75	123.5	132.7	6.9	SUB 415 - BLACKHAWK JCT. - JAMESVILLE	0	Solution Undetermined	
15SP	SWPA	ENR	BULL SHOALS - BULL SHOALS HES 161KV	167	108.2	110.7	4.2	EUREKA SPRINGS - OSAGE CREEK (AECC) 161 KV	0	Solution Undetermined	
15SP	AECI	SWPA	SPRINGFIELD - NIXA #1 161KV	203	104.7	110.1	10.9	SOUTHWEST - BATTLEFIELD 161KV	0	Solution Undetermined	
15SP	AECI	SWPA	SPRINGFIELD - NIXA #1 161KV	203	99.4	104.7	10.9	JAMESVILLE - CLEVER 161KV	0	Solution Undetermined	
15SP	AECI	SWPA	SPRINGFIELD - NIXA #1 161KV	203	99.2	104.5	10.9	CLEVER - BATTLEFIELD 161KV	0	Solution Undetermined	
15SP	AEPW	AEPW	FLINT CREEK - TONTITOWN 161KV	353	103.6	104.5	3.1	CHAMBER SPRINGS - CLARKSVILLE 345KV	0	See Previous Upgrade Specified for Facility in Scenario 1	
15SP	AEPW	AEPW	FLINT CREEK - GENTRY REC 161KV	353	104.8	105.9	3.9	CHAMBER SPRINGS - CLARKSVILLE 345KV	0	See Previous Upgrade Specified for Facility in Scenario 1	
15SP	AEPW	AEPW	BEN 161 - GENTRY REC	353	100.6	101.7	3.8	CHAMBER SPRINGS - CLARKSVILLE 345KV	0	Solution Undetermined	
15SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV	1076	104.4	105.6	12.7	JEFFREY ENERGY CENTER - MORRIS COUNTY 345KV	0	Solution Undetermined	
15SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV	1076	103.5	104.6	12.4	AUBURN ROAD - JEFFREY ENERGY CENTER 230KV	0	May be relieved due to Westar Operating Procedure 40 - Outage of the Jeffrey Energy Center to Auburn 230kV Line	
15SP	WERE	WERE	AUBURN ROAD - JEFFREY ENERGY CENTER 230KV	565	135.5	138.0	14.3	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	
15SP	EMDE	EMDE	SUB 376 - MONETT CITY SOUTH - SUB 416 - MONETT CITY EAST	27	110.5	121.8	3.1	BASE CASE	0	Solution Undetermined	
15SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST - SUB EXPLORER SPRING CITY TAP 69KV	39	168.9	185.0	6.3	SUB 184 - NEOSHO SOUTH JCT. - SUB 314 - NEOSHO LINDE 69KV	0	Not Relieved by EMDE Mitigation Plan to curtail interruptible load at Bus 59563. Solution Undetermined	
15SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST - SUB EXPLORER SPRING CITY TAP 69KV	39	142.1	155.2	5.1	SUB 314 - NEOSHO LINDE - SUB 56 - NEOSHO WEST 69KV	0	Not Relieved by EMDE Mitigation Plan to curtail interruptible load at Bus 59563. Solution Undetermined	
15SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST - SUB EXPLORER SPRING CITY TAP 69KV	39	106.1	113.9	3.1	FLINT CREEK - SUB 392 - DECATUR SOUTH 161KV	0	Not Relieved by EMDE Mitigation Plan to curtail interruptible load at Bus 59563. Solution Undetermined	
15SP	EMDE	EMDE	OZARKS - SUB 434 - OZARK SOUTHEAST	45	189.9	206.9	7.6	JAMESVILLE - SUB 415 - BLACKHAWK JCT. 69KV	0	Solution Undetermined	
15SP	EMDE	EMDE	OZARKS - SUB 434 - OZARK SOUTHEAST	45	145.6	157.5	5.4	JAMESVILLE 161/69/13.8KV TRANSFORMER	0	Solution Undetermined	
15SP	EMDE	EMDE	OZARKS - SUB 434 - OZARK SOUTHEAST	45	143.4	155.2	5.3	JAMESVILLE 161/69/13.8KV TRANSFORMER	0	Solution Undetermined	
15SP	EMDE	EMDE	OZARKS - SUB 434 - OZARK SOUTHEAST	38	142.1	154.2	4.6	BASE CASE	0	Solution Undetermined	

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 Table 1.3 - SPP Facility Overloads
 Caused or Impacted by Transfer Using Scenario 3

Southwest Power Pool
 System Impact Study

Study Case	From Area	To Area	Monitored Branch Overload	Rate <MVA>	BC % Loading	TC % Loading	%TDF	Outaged Branch Causing Overload	ATC (MW)	Solution	Estimated Cost
15SP	EMDE	EMDE	OZARKS - SUB 434 - OZARK SOUTHEAST	45	137.5	150.4	5.8	SUB 221 - BILLINGS NORTHEAST - SUB 359 - REPUBLIC EAST 69KV	0	Solution Undetermined	
15SP	EMDE	EMDE	SUB 375 - SENECA - SUB 56 - NEOSHO WEST 69KV	39	103.7	114.2	4.1	SUB 389 - JOPLIN SOUTHWEST - SUB EXPLORER SPRING CITY TAP 69KV	0	Solution Undetermined	
15SP	EMDE	EMDE	SUB 170 - NICHOLS ST. - SUB 345 - REPUBLIC NORTHEAST 69KV	38	111.0	126.5	5.9	SUB 221 - BILLINGS NORTHEAST - SUB 359 - REPUBLIC EAST 69KV	0	Solution Undetermined	
15SP	EMDE	EMDE	SUB 184 - NEOSHO SOUTH JCT. - SUB 314 - NEOSHO LINDE 69KV	65	102.2	111.9	6.3	SUB 389 - JOPLIN SOUTHWEST - SUB EXPLORER SPRING CITY TAP 69KV	0	Solution Undetermined	
15SP	EMDE	EMDE	SUB 217 - FAIRPLAY EAST - SUB 368 - DADEVILLE EAST 69KV	39	105.3	115.9	4.1	SUB 368 - DADEVILLE EAST - SUB 431 - BOLIVAR SOUTH 161KV	0	Solution Undetermined	
15SP	EMDE	AECI	BILLINGS - SUB 221 - BILLINGS NORTHEAST 69KV	36	117.6	128.8	3.3	SUB 124 - AURORA H.T. - SUB 437 - MARIONVILLE NORTHWEST 69KV	0	Solution Undetermined	
15SP	EMDE	EMDE	SUB 330 - OZARK NORTHWEST - SUB 415 - BLACKHAWK JCT. 69KV	45	112.2	121.4	4.2	JAMESVILLE - SUB 415 - BLACKHAWK JCT. 69KV	0	Solution Undetermined	
15SP	EMDE	EMDE	SUB 330 - OZARK NORTHWEST - SUB 434 - OZARK SOUTHEAST 69KV	45	142.6	154.9	5.6	JAMESVILLE - SUB 415 - BLACKHAWK JCT. 69KV	0	Solution Undetermined	
15SP	EMDE	EMDE	SUB 345 - REPUBLIC NORTHEAST - SUB 359 - REPUBLIC EAST 69KV	38	109.9	125.2	5.8	SUB 221 - BILLINGS NORTHEAST - SUB 359 - REPUBLIC EAST 69KV	0	Solution Undetermined	
15SP	AECI	EMDE	BILLINGS - SUB 446 - CHESAPEAKE 69KV	36	134.8	144.2	3.4	SUB 124 - AURORA H.T. - SUB 437 - MARIONVILLE NORTHWEST 69KV	0	Solution Undetermined	
15SP	EMDE	EMDE	OZARKS 161/69/12.5KV TRANSFORMER	75	99.7	105.6	4.5	Table Rock - SUB 438 - RIVERSIDE	5	Solution Undetermined	
15SP	EMDE	EMDE	OZARKS 161/69/12.5KV TRANSFORMER	75	99.5	106.2	5.0	JAMESVILLE 161/69/13.8KV TRANSFORMER	7	Solution Undetermined	
15SP	EMDE	EMDE	SUB 330 - OZARK NORTHWEST - SUB 434 - OZARK SOUTHEAST	45	99.3	106.8	3.4	JAMESVILLE 161/69/13.8KV TRANSFORMER	9	Solution Undetermined	
15SP	EMDE	EMDE	SUB 217 - FAIRPLAY EAST - SUB 602 - BOLIVAR PLANT 69KV	39	99.0	108.9	3.9	SUB 368 - DADEVILLE EAST - SUB 431 - BOLIVAR SOUTH 161KV	10	Solution Undetermined	
15SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST 161/69/12.5KV TRANSFORMER	75	97.9	109.9	9.0	SUB 56 - NEOSHO WEST - SUB 314 - NEOSHO LINDE 69KV	18	See Previous Upgrade Specified for Facility in Scenario 1	
15SP	EMDE	EMDE	OZARKS 161/69/12.5KV TRANSFORMER	75	98.3	104.9	4.9	JAMESVILLE 161/69/13.8KV TRANSFORMER	25	Solution Undetermined	
15SP	EMDE	EMDE	SUB 375 - SENECA - SUB EXPLORER SPRING CITY TAP 69KV	39	97.0	106.5	3.7	SUB 184 - NEOSHO SOUTH JCT. - SUB 314 - NEOSHO LINDE 69KV	32	Solution Undetermined	
15SP	EMDE	EMDE	SUB 330 - OZARK NORTHWEST - SUB 434 - OZARK SOUTHEAST	45	97.2	104.6	3.3	JAMESVILLE 161/69/13.8KV TRANSFORMER	38	Solution Undetermined	
15SP	EMDE	AECI	JAMESVILLE - SUB 415 - BLACKHAWK JCT. 69KV	89	95.3	105.5	9.1	OZARKS - SUB 434 - OZARK SOUTHEAST	46	Solution Undetermined	
15SP	EMDE	EMDE	SUB 184 - NEOSHO SOUTH JCT. 161/69/12.5KV TRANSFORMER	46.7	93.8	105.5	5.5	SUB EXPLORER SPRING CITY TAP - SUB 389 - JOPLIN SOUTHWEST	53	Solution Undetermined	
15SP	EMDE	EMDE	OZARKS 161/69/12.5KV TRANSFORMER	75	96.7	102.4	4.2	Table Rock to SUB 438 - RIVERSIDE	57	Solution Undetermined	
15SP	EMDE	EMDE	OZARKS 161/69/12.5KV TRANSFORMER	75	96.3	102.4	4.6	JAMESVILLE 161/69/13.8KV TRANSFORMER	60	Solution Undetermined	
15SP	EMDE	EMDE	SUB 110 - ORONOJO JCT. - SUB 167 - RIVERTON 161KV	214	97.9	100.9	6.5	SUB 145 - JOPLIN WEST 7TH - SUB 439 - STATELINE 161KV	71	Solution Undetermined	
15SP	EMDE	EMDE	SUB 376 - MONETT CITY SOUTH - SUB 416 - MONETT CITY EAST	32	93.3	102.8	3.0	BASE CASE	71	Solution Undetermined	
15SP	EMDE	EMDE	OZARKS 161/69/12.5KV TRANSFORMER	75	94.8	101.5	5.0	SUB 368 - DADEVILLE EAST - MORGAN	78	Solution Undetermined	
15SP	EMDE	EMDE	OZARKS 161/69/12.5KV TRANSFORMER	75	95.2	101.3	4.6	JAMESVILLE 161/69/13.8KV TRANSFORMER	79	Solution Undetermined	
15SP	EMDE	EMDE	SUB 217 - FAIRPLAY EAST - SUB 368 - DADEVILLE EAST 69KV	39	89.4	102.0	4.9	SUB 431 - BOLIVAR SOUTH - SUB 73 - BOLIVAR BURNS 161KV	84	Solution Undetermined	
15SP	EMDE	EMDE	SUB 167 - RIVERTON 69/13.2KV TRANSFORMER	52	87.4	100.6	6.9	SUB 368 - DADEVILLE EAST - SUB 431 - BOLIVAR SOUTH 161KV	96	Solution Undetermined	
15SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST - SUB EXPLORER SPRING CITY TAP 69KV	39	92.3	100.3	3.1	SUB 375 - SENECA - SUB 56 - NEOSHO WEST 69KV	97	Not Relieved by EMDE Mitigation Plan to curtail interruptible load at Bus 59563. Solution Undetermined	
15SP	EMDE	EMDE	SUB 389 - JOPLIN SOUTHWEST - SUB EXPLORER SPRING CITY TAP 69KV	39	95.8	103.8	3.1	SUB 145 - JOPLIN WEST 7TH - SUB 64 - JOPLIN 10TH ST. 69KV	100	Relieved by EMDE Mitigation Plan to curtail interruptible load at Bus 59563	
Total Estimated Engineering and Construction Cost											\$0

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 Table 2.3 - SPP Voltage Violations
 Caused or Impacted by Transfer Using Scenario 3

Southwest Power Pool
 System Impact Study

Study Case	AREA	Monitored Bus with Violation	BC Voltage (PU)	TC Voltage (PU)	Outaged Branch Causing Voltage Violation	ATC (MW)	Solution	Estimated Cost
06AP		NONE IDENTIFIED				100		
06G		NONE IDENTIFIED				100		
06SH	EMDE	59404 PUR390 269.0	0.9131	0.8885	OPEN LINE FROM BUS 59480 MON383 5 161 TO BUS 59591 MON383 269.0 TO BUS 59712 MON383 112.5 CKT1	81	Solution Undetermined	
06SH	EMDE	59580 REP359 269.0	0.9090	0.8872	OPEN LINE FROM BUS 59546 BIL221 269.0 TO BUS 59580 REP359 269.0 CKT1	92	Solution Undetermined	
06SH	EMDE	59604 BHJ415 269.0	0.8936	0.8727	OPEN LINE FROM BUS 59604 BHJ415 269.0 TO BUS 96673 2JAMESV 69.0 CKT1	96	Solution Undetermined	
06SH	EMDE	59570 OZK330 269.0	0.8939	0.8730	OPEN LINE FROM BUS 59604 BHJ415 269.0 TO BUS 96673 2JAMESV 69.0 CKT1	96	Solution Undetermined	
06SH	EMDE	59609 OZK434 269.0	0.8987	0.8785	OPEN LINE FROM BUS 59604 BHJ415 269.0 TO BUS 96673 2JAMESV 69.0 CKT1	99	Solution Undetermined	
06FA		NONE IDENTIFIED				100		
07SP	EMDE	59580 REP359 269.0	0.8845	0.8611	OPEN LINE FROM BUS 59546 BIL221 269.0 TO BUS 59580 REP359 269.0 CKT1	86	Solution Undetermined	
07SP	EMDE	59576 REP345 269.0	0.9090	0.8888	OPEN LINE FROM BUS 59546 BIL221 269.0 TO BUS 59580 REP359 269.0 CKT1	99	Solution Undetermined	
07WP	EMDE	59568 STK324 269.0	0.8833	0.8474	OPEN LINE FROM BUS 59568 STK324 269.0 TO BUS 59616 STK324J269.0 CKT1	56	Solution Undetermined	
07WP	SPS	51689 LUBE6 230	0.9349	0.8947	OPEN LINE FROM BUS 51689 LUBE6 230 TO BUS 51699 JONES6 230 CKT1	87	Solution Undetermined	
07WP	SPS	50527 LP-WADS6 230	0.9350	0.8948	OPEN LINE FROM BUS 51689 LUBE6 230 TO BUS 51699 JONES6 230 CKT1	87	Solution Undetermined	
07WP	EMDE	59404 PUR390 269.0	0.9185	0.8971	OPEN LINE FROM BUS 59480 MON383 5 161 TO BUS 59591 MON383 269.0 TO BUS 59712 MON383 112.5 CKT1	93	Solution Undetermined	
07WP	EMDE	59422 GNB347 269.0	0.9156	0.8944	OPEN LINE FROM BUS 59538 DIA131 269.0 TO BUS 59595 RNM393 269.0 CKT1	94	Solution Undetermined	
10SP	EMDE	59580 REP359 269.0	0.8540	0.8266	OPEN LINE FROM BUS 59546 BIL221 269.0 TO BUS 59580 REP359 269.0 CKT1	73	Solution Undetermined	
10SP	EMDE	59568 STK324 269.0	0.8978	0.8724	OPEN LINE FROM BUS 59568 STK324 269.0 TO BUS 59616 STK324J269.0 CKT1	79	Solution Undetermined	
10SP	EMDE	59404 PUR390 269.0	0.8850	0.8607	OPEN LINE FROM BUS 59480 MON383 5 161 TO BUS 59591 MON383 269.0 TO BUS 59712 MON383 112.5 CKT1	82	Solution Undetermined	
10SP	EMDE	59576 REP345 269.0	0.8827	0.8591	OPEN LINE FROM BUS 59546 BIL221 269.0 TO BUS 59580 REP359 269.0 CKT1	85	Solution Undetermined	
10SP	AEPW	54278 CLARDON269.0	0.9542	0.8911	OPEN LINE FROM BUS 54277 JERIC2WT69.0 TO BUS 54278 CLARDON269.0 CKT1	86	Solution Undetermined	
10SP	AEPW	54279 CLARREA269.0	0.9547	0.8917	OPEN LINE FROM BUS 54277 JERIC2WT69.0 TO BUS 54278 CLARDON269.0 CKT1	87	Solution Undetermined	
10SP	EMDE	59403 MON416 269.0	0.9140	0.8934	OPEN LINE FROM BUS 59480 MON383 5 161 TO BUS 59591 MON383 269.0 TO BUS 59712 MON383 112.5 CKT1	97	Solution Undetermined	
10SP	EMDE	59402 MON416J269.0	0.9147	0.8942	OPEN LINE FROM BUS 59480 MON383 5 161 TO BUS 59591 MON383 269.0 TO BUS 59712 MON383 112.5 CKT1	98	Solution Undetermined	
10WP	EMDE	59568 STK324 269.0	0.8745	0.8379	OPEN LINE FROM BUS 59568 STK324 269.0 TO BUS 59616 STK324J269.0 CKT1	55	Solution Undetermined	
15SP	EMDE	59580 REP359 269.0	0.8117	0.7720	OPEN LINE FROM BUS 59546 BIL221 269.0 TO BUS 59580 REP359 269.0 CKT1	50	Solution Undetermined	
15SP	EMDE	59568 STK324 269.0	0.8899	0.8523	OPEN LINE FROM BUS 59568 STK324 269.0 TO BUS 59616 STK324J269.0 CKT1	53	Solution Undetermined	
15SP	EMDE	59576 REP345 269.0	0.8479	0.8134	OPEN LINE FROM BUS 59546 BIL221 269.0 TO BUS 59580 REP359 269.0 CKT1	58	Solution Undetermined	
15SP	EMDE	59478 DAD368 5 161	0.9229	0.8905	OPEN LINE FROM BUS 59478 DAD368 5 161 TO BUS 96101 5MORGAN 161 CKT1	71	Solution Undetermined	
15SP	EMDE	59542 NIC170 269.0	0.9187	0.8946	OPEN LINE FROM BUS 59546 BIL221 269.0 TO BUS 59580 REP359 269.0 CKT1	83	Solution Undetermined	
15SP	EMDE	59499 CPK446 5 161	0.9220	0.8961	OPEN LINE FROM BUS 59478 DAD368 5 161 TO BUS 96101 5MORGAN 161 CKT1	85	Solution Undetermined	
15SP	EMDE	59691 WIL369 269.0	0.9092	0.8861	OPEN LINE FROM BUS 59536 ASH121 269.0 TO BUS 59586 WIL445 269.0 CKT1	86	Solution Undetermined	
15SP	EMDE	59434 BUF409 269.0	0.9097	0.8870	OPEN LINE FROM BUS 59528 BOL 73 269.0 TO BUS 59575 BUF342 269.0 CKT1	88	Solution Undetermined	
15SP	EMDE	59575 BUF342 269.0	0.9108	0.8882	OPEN LINE FROM BUS 59528 BOL 73 269.0 TO BUS 59575 BUF342 269.0 CKT1	89	Solution Undetermined	
15SP	EMDE	59586 WIL445 269.0	0.9160	0.8935	OPEN LINE FROM BUS 59536 ASH121 269.0 TO BUS 59586 WIL445 269.0 CKT1	89	Solution Undetermined	
15SP	EMDE	59425 HER209 269.0	0.8702	0.8481	OPEN LINE FROM BUS 59464 BOL 73 5 161 TO BUS 59528 BOL 73 269.0 TO BUS 59701 BOL 73 112.5 CKT1	91	Solution Undetermined	
15SP	EMDE	59493 BOL431 5 161	0.9367	0.8985	OPEN LINE FROM BUS 59478 DAD368 5 161 TO BUS 96101 5MORGAN 161 CKT1	96	Solution Undetermined	
15SP	EMDE	59605 STK418 269.0	0.9077	0.8870	OPEN LINE FROM BUS 59605 STK418 269.0 TO BUS 96118 5STKAEC 161 TO BUS 59719 STK418 112.5 CKT1	96	Solution Undetermined	
15SP	EMDE	59568 STK324 269.0	0.9093	0.8888	OPEN LINE FROM BUS 59605 STK418 269.0 TO BUS 96118 5STKAEC 161 TO BUS 59719 STK418 112.5 CKT1	97	Solution Undetermined	
15SP	EMDE	59616 STK324J269.0	0.9094	0.8888	OPEN LINE FROM BUS 59605 STK418 269.0 TO BUS 96118 5STKAEC 161 TO BUS 59719 STK418 112.5 CKT1	97	Solution Undetermined	
15SP	EMDE	59441 EXP4502 69.0	0.9165	0.8960	OPEN LINE FROM BUS 59440 EXP450T269.0 TO BUS 59528 BOL 73 269.0 CKT1	97	Solution Undetermined	
15SP	EMDE	59434 BUF409 269.0	0.8916	0.8714	OPEN LINE FROM BUS 59464 BOL 73 5 161 TO BUS 59528 BOL 73 269.0 TO BUS 59701 BOL 73 112.5 CKT1	99	Solution Undetermined	
15SP	EMDE	59575 BUF342 269.0	0.8927	0.8725	OPEN LINE FROM BUS 59464 BOL 73 5 161 TO BUS 59528 BOL 73 269.0 TO BUS 59701 BOL 73 112.5 CKT1	99	Solution Undetermined	
Total Estimated Engineering and Construction Cost								\$0

Study Case	From Area	To Area	Monitored Branch Overload	Rate <MVA>	BC % Loading	TC % Loading	%TDF	Outaged Branch Causing Overload	Comments
06AP			NONE IDENTIFIED						
06G	AECI	AECI	96089 5JAMESV 161 WND 2 JAMESV1 1	56	94.4	100.7	3.5	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV213.8 CKT 2	
06G	AECI	AECI	96089 5JAMESV 161 WND 2 JAMESV2 2	56	97.9	104.5	3.7	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV113.8 CKT 1	
06G	WEPL	WEPL	58764 GRNBURG3 115 to 58771 JUD-LRG3 115 CKT 1	79.7	90.8	101.0	8.2	50858 FINNEY7 345 to 50888 POTTRC7 345 CKT 1	Invalid Contingency, Outage requires curtailment of LAMAR to SPS 210 MW and SECI to SPS 150 MW Transactions
06G	NPPD	NPPD	64765 CANADAY4 230 to 65022 CANADY Y 230 CKT 1	100	99.5	101.8	2.2	64759 C.CREEK4 230 to 64948 RIVERDL4 230 CKT 1	
06SH	AECI	AECI	96089 5JAMESV 161 WND 2 JAMESV1 1	56	109.4	118.1	4.8	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV213.8 CKT 2	
06SH	AECI	AECI	96089 5JAMESV 161 WND 2 JAMESV2 2	56	112.8	121.3	4.7	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV113.8 CKT 1	
06SH	AECI	AECI	96673 2JAMESV 69.0 WND 1 JAMESV1 1	56	101.7	108.8	4.0	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV213.8 CKT 2	
06SH	AECI	AECI	96673 2JAMESV 69.0 WND 1 JAMESV2 2	56	104.9	112.1	4.0	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV113.8 CKT 1	
06FA	AECI	AECI	96089 5JAMESV 161 WND 2 JAMESV1 1	56	98.2	105.6	4.1	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV213.8 CKT 2	
06FA	AECI	AECI	96089 5JAMESV 161 WND 2 JAMESV2 2	56	101.1	108.7	4.2	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV113.8 CKT 1	
06FA	AECI	AECI	96673 2JAMESV 69.0 WND 1 JAMESV2 2	56	94.8	101.4	3.7	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV113.8 CKT 1	
07SP	NPPD	NPPD	64765 CANADAY4 230 to 65022 CANADY Y 230 CKT 1	100	108.4	110.4	2.1	64759 C.CREEK4 230 to 64948 RIVERDL4 230 CKT 1	
07WP	WEPL	WEPL	58764 GRNBURG3 115 to 58771 JUD-LRG3 115 CKT 1	79.7	95.9	108.3	9.9	58779 MULGREN6 230 to 58795 SPEARVL6 230 CKT 1	
07WP	WEPL	WEPL	58764 GRNBURG3 115 to 58771 JUD-LRG3 115 CKT 1	79.7	96.7	106.9	8.1	50858 FINNEY7 345 to 50888 POTTRC7 345 CKT 1	Invalid Contingency, Outage requires curtailment of LAMAR to SPS 210 MW and SECI to SPS 150 MW Transactions
07WP	WEPL	WEPL	58773 MED-LDG3 115 to 58774 MED-LDG4 138 CKT 1	65	88.0	100.5	8.1	50858 FINNEY7 345 to 50888 POTTRC7 345 CKT 1	Invalid Contingency, Outage requires curtailment of LAMAR to SPS 210 MW and SECI to SPS 150 MW Transactions
10SP	EMDE	AECI	59546 BIL221 2 69 to 96658 2BILLNG 69 CKT 1	36	100.7	109.6	3.2	59537 AUR124 2 69 to 59611 MAR437 2 69 CKT 1	
10SP	AECI	EMDE	59618 CPK446 2 69 to 96658 2BILLNG 69 CKT 1	36	116.0	125.1	3.3	59537 AUR124 2 69 to 59611 MAR437 2 69 CKT 1	
10WP	WEPL	WEPL	58764 GRNBURG3 115 to 58771 JUD-LRG3 115 CKT 1	79.7	92.2	102.1	7.9	50858 FINNEY7 345 to 50888 POTTRC7 345 CKT 1	Invalid Contingency, Outage requires curtailment of LAMAR to SPS 210 MW and SECI to SPS 150 MW Transactions
10WP	WEPL	WEPL	58764 GRNBURG3 115 to 58771 JUD-LRG3 115 CKT 1	79.7	89.8	101.8	9.5	58779 MULGREN6 230 to 58795 SPEARVL6 230 CKT 1	
15SP	AECI	AECI	96089 5JAMESV 161 WND 2 JAMESV1 1	56	108.3	114.2	3.3	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV213.8 CKT 2	
15SP	AECI	AECI	96089 5JAMESV 161 WND 2 JAMESV1 1	56	104.8	111.5	3.7	59442 OZARKS 269.0 to 59609 OZK434 269.0 CKT 1	
15SP	AECI	AECI	96089 5JAMESV 161 WND 2 JAMESV2 2	56	111.4	118.5	4.0	59442 OZARKS 269.0 to 59609 OZK434 269.0 CKT 1	
15SP	AECI	AECI	96089 5JAMESV 161 WND 2 JAMESV2 2	56	112.0	118.0	3.4	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV113.8 CKT 1	
15SP	AECI	AECI	96089 5JAMESV 161 WND 2 JAMESV2 2	56	103.5	109.1	3.1	96089 5JAMESV 161 to 96726 5RIVRDL 161 CKT 1	
15SP	AECI	AECI	96089 5JAMESV 161 WND 2 JAMESV2 2	56	98.5	104.3	3.3	59570 OZK330 269.0 to 59609 OZK434 269.0 CKT 1	
15SP	AECI	AECI	96673 2JAMESV 69.0 WND 1 JAMESV1 1	56	98.8	104.6	3.2	59442 OZARKS 269.0 to 59609 OZK434 269.0 CKT 1	
15SP	AECI	AECI	96673 2JAMESV 69.0 WND 1 JAMESV2 2	56	105.0	111.1	3.4	59442 OZARKS 269.0 to 59609 OZK434 269.0 CKT 1	
15SP	SWPA	ENTR	52660 BULL SH5 161 to 99802 5BULLSH* 161 CKT 1	167	108.2	110.7	4.2	53136 EUREKA 5 161 to 99832 5OSAGE # 161 CKT 1	
15SP	AECI	SWPA	52692 SPRGFLD5 161 to 96678 5NIXA-1 161 CKT 1	203	104.7	110.1	10.9	59954 SWPS 5 161 to 96661 5BTFLD 161 CKT 1	
15SP	AECI	SWPA	52692 SPRGFLD5 161 to 96678 5NIXA-1 161 CKT 1	203	99.4	104.7	10.9	96089 5JAMESV 161 to 96127 5CLEVER 161 CKT 1	
15SP	AECI	SWPA	52692 SPRGFLD5 161 to 96678 5NIXA-1 161 CKT 1	203	99.2	104.5	10.9	96127 5CLEVER 161 to 96661 5BTFLD 161 CKT 1	
15SP	EMDE	AECI	59546 BIL221 2 69 to 96658 2BILLNG 69 CKT 1	36	117.6	126.8	3.3	59537 AUR124 2 69 to 59611 MAR437 2 69 CKT 1	
15SP	EMDE	AECI	59604 BHJ415 2 69 to 96673 2JAMESV 69 CKT 1	89	95.3	105.5	9.1	59442 OZARKS 2 69 to 59609 OZK434 2 69 CKT 1	
15SP	AECI	EMDE	59618 CPK446 2 69 to 96658 2BILLNG 69 CKT 1	36	134.8	144.2	3.4	59537 AUR124 2 69 to 59611 MAR437 2 69 CKT 1	
15SP	AECI	AECI	96071 5CLINTN 161 to 96124 5HOLDEN 161 CKT 1	227	102.4	103.9	3.5	57995 MONTROS5 161 to 96071 5CLINTN 161 CKT 1	
15SP	AECI	AECI	96089 5JAMESV 161 to 96678 5NIXA-1 161 CKT 1	203	95.8	101.2	10.9	59954 SWPS 5 161 to 96661 5BTFLD 161 CKT 1	
15SP	AECI	AECI	96120 5THMHIL 161 to 96126 5MOBTAP 161 CKT 1	372	107.3	108.1	3.0	96044 7MCCRED 345 to 96049 7THOMHL 345 CKT 1	
15SP	ENTR	ENTR	99797 5HARR-S 161 to 99811 5HARR-E 161 CKT 1	223	137.6	139.6	4.5	53136 EUREKA 5 161 to 99832 5OSAGE # 161 CKT 1	
15SP	ENTR	ENTR	99797 5HARR-S 161 to 99812 5HARR-W 161 CKT 1	223	129.8	131.8	4.3	53136 EUREKA 5 161 to 99832 5OSAGE # 161 CKT 1	
15SP	ENTR	ENTR	99802 5BULLSH* 161 to 99809 5FLIPN 161 CKT 1	167	103.9	106.4	4.1	53136 EUREKA 5 161 to 99832 5OSAGE # 161 CKT 1	

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Table 4.3 - Non-SPP Voltage Violations

Caused or Impacted by Transfer Using Scenario 3

Southwest Power Pool

System Impact Study

Study Case	AREA	Monitored Bus with Violation	BC Voltage (PU)	TC Voltage (PU)	Outaged Branch Causing Voltage Violation	Comments
06AP		NONE IDENTIFIED				
06G		NONE IDENTIFIED				
06SH		NONE IDENTIFIED				
06FA		NONE IDENTIFIED				
07SP		NONE IDENTIFIED				
07WP		NONE IDENTIFIED				
10SP		NONE IDENTIFIED				
10WP		NONE IDENTIFIED				
15SP		NONE IDENTIFIED				

Table 1.1a - Modeling Representation for Table 1.1
Includes Bus Numbers and Bus Names

Study Case	From Area	To Area	Monitored Branch Overload	Rate <MVA>	BC % Loading	TC % Loading	%TDF	Outaged Branch Causing Overload	ATC (MW)	Solution	Estimated Cost
06AP			NONE IDENTIFIED						100		
06G			NONE IDENTIFIED						100		
06SH	AEPW	AEPW	53154 CHAMSPR5 161 to 53170 TONTITNS 161 CKT 1	244	110.9	112.4	3.6	53154 CHAMSPR5 161 to 53195 FARMGTNS 161 CKT 1	0	AEPW Upgrade Schedule Completion Date 5/1/2007	
06SH	AEPW	AEPW	53154 CHAMSPR5 161 to 53170 TONTITNS 161 CKT 1	244	98.7	100.2	3.6	53157 SFAYTVL5 161 to 53195 FARMGTNS 161 CKT 1	86	AEPW Upgrade Schedule Completion Date 5/1/2007	
06FA			NONE IDENTIFIED						100		
07SP	WERE	WERE	56851 AUBURN 6 230 to 56852 JEC 6 230 CKT 1	565	114.7	115.9	6.3	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	EMDE	EMDE	59442 OZARKS 2 69 to 59609 OZK434 2 69 CKT 1	45	142.3	159.8	7.9	59604 BHJ415 2 69 to 96673 2JAMESV 69 CKT 1	0	Solution Undetermined	
07SP	EMDE	EMDE	59442 OZARKS 2 69 to 59609 OZK434 2 69 CKT 1	45	106.4	117.8	5.1	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV213.8 CKT 2	0	Solution Undetermined	
07SP	EMDE	EMDE	59442 OZARKS 2 69 to 59609 OZK434 2 69 CKT 1	45	104.7	116.0	5.1	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV113.8 CKT 1	0	Solution Undetermined	
07SP	EMDE	EMDE	59442 OZARKS 2 69 to 59609 OZK434 2 69 CKT 1	38	103.1	113.5	4.0	BASE CASE	0	Solution Undetermined	
07SP	EMDE	EMDE	59442 OZARKS 2 69 to 59609 OZK434 2 69 CKT 1	45	100.7	111.5	4.9	59478 DAD368 5 161 to 96101 5MORGAN 161 CKT 1	0	Solution Undetermined	
07SP	EMDE	EMDE	59570 OZK330 2 69 to 59609 OZK434 2 69 CKT 1	45	110.9	124.8	6.3	59604 BHJ415 2 69 to 96673 2JAMESV 69.0 CKT 1	0	Solution Undetermined	
07SP	EMDE	EMDE	59621 OZARKS 5 161 WND 1 OZARK 1	75	94.5	107.2	9.5	59604 BHJ415 2 69 to 96673 2JAMESV 69.0 CKT 1	44	Solution Undetermined	
07SP	EMDE	EMDE	59442 OZARKS 2 69 to 59609 OZK434 2 69 CKT 1	75	91.4	103.2	8.8	59604 BHJ415 2 69 to 96673 2JAMESV 69.0 CKT 1	73	Solution Undetermined	
07SP	EMDE	EMDE	59438 EXP449T2 69 to 59592 JOP389 2 69 CKT 1	39	94.3	104.6	4.0	59543 NEO184 2 69 to 59563 LIN314 2 69 CKT 1	100	Relieved by EMDE Mitigation Plan to curtail interruptible load at Bus 59563	
07WP	WERE	WERE	56851 AUBURN 6 230 to 56852 JEC 6 230 CKT 1	565	105.8	107.0	6.5	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	
10SP	EMDE	EMDE	59442 OZARKS 2 69 to 59609 OZK434 2 69 CKT 1	75	102.0	109.6	5.7	59604 BHJ415 2 69 to 96673 2JAMESV 69.0 CKT 1	0	Solution Undetermined	
10SP	EMDE	EMDE	59621 OZARKS 5 161 WND 1 OZARK 1	75	106.3	114.6	6.2	59604 BHJ415 2 69 to 96673 2JAMESV 69.0 CKT 1	0	Solution Undetermined	
10SP	WERE	WERE	56851 AUBURN 6 230 to 56852 JEC 6 230 CKT 1	565	112.4	113.8	7.9	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	
10SP	EMDE	EMDE	59442 OZARKS 2 69 to 59609 OZK434 2 69 CKT 1	45	161.0	175.9	6.7	59604 BHJ415 2 69 to 96673 2JAMESV 69 CKT 1	0	Solution Undetermined	
10SP	EMDE	EMDE	59442 OZARKS 2 69 to 59609 OZK434 2 69 CKT 1	45	124.2	136.4	5.5	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV213.8 CKT 2	0	Solution Undetermined	
10SP	EMDE	EMDE	59442 OZARKS 2 69 to 59609 OZK434 2 69 CKT 1	45	122.2	134.5	5.5	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV113.8 CKT 1	0	Solution Undetermined	
10SP	EMDE	EMDE	59442 OZARKS 2 69 to 59609 OZK434 2 69 CKT 1	38	120.7	131.7	4.2	BASE CASE	0	Solution Undetermined	
10SP	EMDE	EMDE	59442 OZARKS 2 69 to 59609 OZK434 2 69 CKT 1	45	115.6	128.0	5.6	59546 BIL221 2 69 to 59580 REP359 2 69 CKT 1	0	Solution Undetermined	
10SP	EMDE	AECI	59546 BIL221 2 69 to 96658 ZBILLNG 69 CKT 1	36	101.1	110.0	3.2	59537 AUR124 2 69 to 59611 MAR437 2 69 CKT 1	0	Solution Undetermined	
10SP	EMDE	EMDE	59570 OZK330 2 69 to 59609 OZK434 2 69 CKT 1	45	120.3	130.9	4.8	59604 BHJ415 2 69 to 96673 2JAMESV 69 CKT 1	0	Solution Undetermined	
10SP	AECI	EMDE	59618 CPK446 2 69 to 96658 ZBILLNG 69 CKT 1	36	116.4	125.5	3.3	59537 AUR124 2 69 to 59611 MAR437 2 69 CKT 1	0	Solution Undetermined	
10SP	EMDE	EMDE	59570 OZK330 2 69 to 59604 BHJ415 2 69 CKT 1	45	94.8	102.5	3.5	59604 BHJ415 2 69 to 96673 2JAMESV 69 CKT 1	68	Solution Undetermined	
10SP	EMDE	EMDE	59545 FRP217 2 69 to 59585 DAD368 2 69 CKT 1	39	89.6	103.5	5.4	59478 DAD368 5 161 to 59493 BOL431 5 161 CKT 1	75	Solution Undetermined	
10SP	EMDE	EMDE	59438 EXP449T2 69 to 59592 JOP389 2 69 CKT 1	39	104.7	115.6	4.2	59543 NEO184 2 69 to 59563 LIN314 2 69 CKT 1	100	Relieved by EMDE Mitigation Plan to curtail interruptible load at Bus 59563	
10WP	EMDE	EMDE	59442 OZARKS 2 69 to 59609 OZK434 2 69 CKT 1	61	92.8	103.0	6.2	59604 BHJ415 2 69 to 96673 2JAMESV 69 CKT 1	70	Solution Undetermined	
15SP	EMDE	EMDE	59442 OZARKS 2 69 to 59609 OZK434 2 69 CKT 1	75	117.6	125.8	6.1	59604 BHJ415 2 69 to 96673 2JAMESV 69.0 CKT 1	0	Solution Undetermined	
15SP	EMDE	EMDE	59483 JOP389 5 161 WND 1 JOPLINSW 1	75	110.5	124.1	10.2	59543 NEO184 2 69 to 59563 LIN314 2 69.0 CKT 1	0	Replace 161/69 KV Transformer with a 150 MVA Transformer.	\$1,565,000
15SP	EMDE	EMDE	59483 JOP389 5 161 WND 1 JOPLINSW 1	75	100.6	113.3	9.6	59524 NEO 56 269.0 to 59563 LIN314 269.0 CKT 1	0	See Previous Upgrade Specified for Facility	
15SP	EMDE	EMDE	59483 JOP389 5 161 WND 1 JOPLINSW 1	75	105.9	113.3	5.6	59470 JOP145 5 161 to 59498 STL439 5 161 CKT 1	0	See Previous Upgrade Specified for Facility	
15SP	EMDE	EMDE	59483 JOP389 5 161 WND 1 JOPLINSW 1	75	102.5	113.3	8.1	59526 JOP 64 269.0 to 59539 JOP145 269.0 CKT 1	0	See Previous Upgrade Specified for Facility	
15SP	EMDE	EMDE	59483 JOP389 5 161 WND 1 JOPLINSW 1	75	108.4	113.3	3.7	59472 TIP292 5 161 to 59483 JOP389 5 161 CKT 1	0	See Previous Upgrade Specified for Facility	
15SP	EMDE	EMDE	59592 JOP389 269.0 WND 2 JOPLINSW 1	75	106.7	118.9	9.1	59543 NEO184 2 69 to 59563 LIN314 269.0 CKT 1	0	See Previous Upgrade Specified for Facility	
15SP	EMDE	EMDE	59592 JOP389 269.0 WND 2 JOPLINSW 1	75	106.3	111.0	3.5	59472 TIP292 5 161 to 59483 JOP389 5 161 CKT 1	0	See Previous Upgrade Specified for Facility	
15SP	EMDE	EMDE	59592 JOP389 269.0 WND 2 JOPLINSW 1	75	103.9	110.8	5.2	59470 JOP145 5 161 to 59498 STL439 5 161 CKT 1	0	See Previous Upgrade Specified for Facility	
15SP	EMDE	EMDE	59592 JOP389 269.0 WND 2 JOPLINSW 1	75	100.3	110.1	7.4	59526 JOP 64 269.0 to 59539 JOP145 269.0 CKT 1	0	See Previous Upgrade Specified for Facility	
15SP	EMDE	EMDE	59621 OZARKS 5 161 WND 1 OZARK 1	75	123.3	132.2	6.7	59604 BHJ415 2 69 to 96673 2JAMESV 69.0 CKT 1	0	Solution Undetermined	
15SP	SWPA	ENTR	52660 BULL SH5 161 to 99802 5BULLSH* 161 CKT 1	167	105.6	108.2	4.4	53136 EUREKA 5 161 to 99832 5OSAGE # 161 CKT 1	0		
15SP	AECI	SWPA	52692 SPRGFLD5 161 to 96678 5NIXA-1 161 CKT 1	203	105.5	110.9	11.0	59954 SWPS 5 161 to 96661 5BTFLD 161 CKT 1	0	Solution Undetermined	
15SP	AECI	SWPA	52692 SPRGFLD5 161 to 96678 5NIXA-1 161 CKT 1	203	100.2	105.6	11.0	96089 5JAMESV 161 to 96127 5CLEVER 161 CKT 1	0	Solution Undetermined	
15SP	AECI	SWPA	52692 SPRGFLD5 161 to 96678 5NIXA-1 161 CKT 1	203	100.0	105.4	11.0	96127 5CLEVER 161 to 96661 5BTFLD 161 CKT 1	0	Solution Undetermined	
15SP	AEPW	AEPW	53139 FLINTCR5 161 to 53170 TONTITNS 161 CKT 1	353	105.1	106.0	3.1	53155 CHAMSPR7 345 to 53756 CLARKSV7 345 CKT 1	0	Rebuild 16.3 miles of 2-297 ACSR with 2156 ACSR. Replace Flint Creek wavetrap	\$8,200,000
15SP	AEPW	AEPW	53139 FLINTCR5 161 to 53187 GENTRYR5 161 CKT 1	353	106.8	107.9	3.9	53155 CHAMSPR7 345 to 53756 CLARKSV7 345 CKT 1	0	Rebuild 1.09 miles of 2-397.5 ACSR with 2156 ACSR. Replace Flint Creek wavetrap & jumpers	\$450,000
15SP	AEPW	AEPW	53183 BEN279_5 161 to 53187 GENTRYR5 161 CKT 1	353	102.6	103.7	3.8	53155 CHAMSPR7 345 to 53756 CLARKSV7 345 CKT 1	0	Solution Undetermined	
15SP	WERE	WERE	56765 HOYT 7 345 to 56766 JEC N 7 345 CKT 1	1076	108.4	109.5	12.6	56766 JEC N 7 345 to 56770 MORRIS 7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 401 - Outage of the Jeffrey Energy Center to Morris 345kV Line	
15SP	WERE	WERE	56765 HOYT 7 345 to 56766 JEC N 7 345 CKT 1	1076	108.2	109.4	12.9	56851 AUBURN 6 230 to 56852 JEC 6 230 CKT 1	0	May be relieved due to Westar Operating Procedure 401 - Outage of the Jeffrey Energy Center to Auburn 230kV Line	
15SP	EMDE	EMDE	59438 EXP449T2 69 to 59592 JOP389 2 69 CKT 1	39	169.1	185.1	6.2	59543 NEO184 2 69 to 59563 LIN314 2 69 CKT 1	0	Not Relieved by EMDE Mitigation Plan to curtail interruptible load at Bus 59563, Solution Undetermined	

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	Rate <MVA>	BC % Loading	TC % Loading	%TDF	Outaged Branch Causing Overload	ATC (MW)	Solution	Estimated Cost
15SP	EMDE	EMDE	59438 EXP449T2 69 to 59592 JOP389 2 69 CKT 1	39	142.3	155.4	5.1	59524 NEO 56 2 69 to 59563 LIN314 2 69 CKT 1	0	Not Relieved by EMDE Mitigation Plan to curtail interruptible load at Bus 59563. Solution Undetermined	
15SP	EMDE	EMDE	59442 OZARKS 2 69 to 59609 OZK434 2 69 CKT 1	45	189.3	205.9	7.5	59604 BHJ415 2 69 to 96673 2JAMESV 69 CKT 1	0	Solution Undetermined	
15SP	EMDE	EMDE	59442 OZARKS 2 69 to 59609 OZK434 2 69 CKT 1	45	145.4	157.3	5.3	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV213.8 CKT 2	0	Solution Undetermined	
15SP	EMDE	EMDE	59442 OZARKS 2 69 to 59609 OZK434 2 69 CKT 1	45	143.3	155.0	5.3	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV113.8 CKT 1	0	Solution Undetermined	
15SP	EMDE	EMDE	59442 OZARKS 2 69 to 59609 OZK434 2 69 CKT 1	38	141.8	153.8	4.6	BASE CASE	0	Solution Undetermined	
15SP	EMDE	EMDE	59442 OZARKS 2 69 to 59609 OZK434 2 69 CKT 1	45	137.5	149.9	5.6	59546 BIL221 2 69 to 59580 REP359 2 69 CKT 1	0	Solution Undetermined	
15SP	EMDE	EMDE	59467 ORO110 5 161 to 59469 RIV167 5 161 CKT 1	214	100.5	103.7	6.8	59470 JOP145 5 161 to 59498 STL439 5 161 CKT 1	0	Solution Undetermined	
15SP	EMDE	EMDE	59524 NEO 56 2 69 to 59589 RAC375 2 69 CKT 1	39	104.0	114.5	4.1	59438 EXP449T2 69 to 59592 JOP389 2 69 CKT 1	0	Solution Undetermined	
15SP	EMDE	EMDE	59542 NIC170 2 69 to 59576 REP345 2 69 CKT 1	38	111.2	126.6	5.8	59546 BIL221 2 69 to 59580 REP359 2 69 CKT 1	0	Solution Undetermined	
15SP	EMDE	EMDE	59543 NEO184 2 69 to 59563 LIN314 2 69 CKT 1	65	102.4	112.2	6.4	59438 EXP449T2 69 to 59592 JOP389 2 69 CKT 1	0	Solution Undetermined	
15SP	EMDE	EMDE	59545 FRP217 2 69 to 59585 DAD368 2 69 CKT 1	39	105.2	116.1	4.3	59478 DAD368 5 161 to 59493 BOL431 5 161 CKT 1	0	Solution Undetermined	
15SP	EMDE	AECI	59546 BIL221 2 69 to 96658 2BILLNG 69 CKT 1	36	118.0	128.2	3.7	59537 AUR124 2 69 to 59611 MAR437 2 69 CKT 1	0	Solution Undetermined	
15SP	EMDE	EMDE	59570 OZK330 2 69 to 59604 BHJ415 2 69 CKT 1	45	111.5	120.4	4.0	59604 BHJ415 2 69 to 96673 2JAMESV 69 CKT 1	0	Solution Undetermined	
15SP	EMDE	EMDE	59570 OZK330 2 69 to 59609 OZK434 2 69 CKT 1	45	141.9	153.9	5.4	59604 BHJ415 2 69 to 96673 2JAMESV 69 CKT 1	0	Solution Undetermined	
15SP	EMDE	EMDE	59576 REP345 2 69 to 59580 REP359 2 69 CKT 1	38	110.1	125.4	5.8	59546 BIL221 2 69 to 59580 REP359 2 69 CKT 1	0	Solution Undetermined	
15SP	AECI	EMDE	59618 CPK446 2 69 to 96658 2BILLNG 69 CKT 1	36	135.2	145.7	3.8	59537 AUR124 2 69 to 59611 MAR437 2 69 CKT 1	0	Solution Undetermined	
15SP	EMDE	EMDE	59621 OZARKS 5 161 WND 1 OZARK 1	75	99.5	106.2	5.0	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV213.8 CKT 2	7	Solution Undetermined	
15SP	EMDE	EMDE	59570 OZK330 269.0 to 59609 OZK434 269.0 CKT 1	45	99.1	106.6	3.4	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV213.8 CKT 2	12	Solution Undetermined	
15SP	EMDE	EMDE	59621 OZARKS 5 161 WND 1 OZARK 1	75	99.2	105.3	4.5	52672 TABLE R5 161 to 59497 RVS438 5 161 CKT 1	13	Solution Undetermined	
15SP	EMDE	EMDE	59545 FRP217 2 69 to 59612 BOL602 2 69 CKT 1	39	98.6	109.1	4.1	59478 DAD368 5 161 to 59493 BOL431 5 161 CKT 1	13	Solution Undetermined	
15SP	EMDE	EMDE	59592 JOP389 269.0 WND 2 JOPLINSW 1	75	97.7	109.3	8.7	59524 NEO 56 269.0 to 59563 LIN314 269.0 CKT 1	20	See Previous Upgrade Specified for Facility	
15SP	GRDA	GRDA	54435 KERR GR5 161 to 54437 412SUB 5 161 CKT 1	338	99.8	100.9	4.0	53140 FLINTCR7 345 to 54450 GRDA1 7 345 CKT 1	21	Reconductor 12.5 miles with 1590MCM ACSR	\$1,918,000
15SP	EMDE	EMDE	59483 JOP389 5 161 to 59607 JOP422 5 161 CKT 1	268	99.5	101.6	5.5	59472 TIP292 5 161 to 59483 JOP389 5 161 CKT 1	23	Solution Undetermined	
15SP	EMDE	EMDE	59621 OZARKS 5 161 WND 1 OZARK 1	75	98.3	104.9	4.9	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV113.8 CKT 1	25	Solution Undetermined	
15SP	EMDE	EMDE	59438 EXP449T2 69 to 59589 RAC375 2 69 CKT 1	39	97.1	106.6	3.7	59543 NEO184 2 69 to 59563 LIN314 2 69 CKT 1	30	Solution Undetermined	
15SP	EMDE	EMDE	59570 OZK330 269.0 to 59609 OZK434 269.0 CKT 1	45	97.0	104.3	3.3	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV113.8 CKT 1	41	Solution Undetermined	
15SP	EMDE	AECI	59604 BHJ415 2 69 to 96673 2JAMESV 69 CKT 1	89	94.9	104.9	8.9	59442 OZARKS 2 69 to 59609 OZK434 2 69 CKT 1	51	Solution Undetermined	
15SP	EMDE	EMDE	59471 NEO184 5 161 WND 1 NEOJCT1 1	46.7	93.3	105.0	5.5	59438 EXP449T269.0 to 59592 JOP389 269.0 CKT 1	57	Solution Undetermined	
15SP	EMDE	EMDE	59438 EXP449T2 69 to 59592 JOP389 2 69 CKT 1	39	95.5	103.2	3.0	REMOVE UNIT 1 FROM BUS 59656 [S2G439 118.000] DISPATCH	58	Relieved by EMDE Mitigation Plan to curtail interruptible load at Bus 59563	
15SP	EMDE	EMDE	59442 OZARKS 269.0 WND 2 OZARK 1	75	96.3	102.4	4.6	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV213.8 CKT 2	61	Solution Undetermined	
15SP	EMDE	EMDE	59442 OZARKS 269.0 WND 2 OZARK 1	75	96.3	102.1	4.3	52672 TABLE R5 161 to 59497 RVS438 5 161 CKT 1	64	Solution Undetermined	
15SP	AEPW	AEPW	53133 ECNTRTN5 161 to 53183 BEN279 5 161 CKT 1	353	99.3	100.4	3.7	53155 CHAMSPR7 345 to 53756 CLARKSV7 345 CKT 1	67	Solution Undetermined	
15SP	EMDE	EMDE	59483 JOP389 5 161 to 59498 STL439 5 161 CKT 1	428	98.1	100.9	12.2	59483 JOP389 5 161 to 59498 STL439 5 161 CKT 2	67	Solution Undetermined	
15SP	EMDE	EMDE	59545 FRP217 2 69 to 59585 DAD368 2 69 CKT 1	39	89.5	103.2	5.4	59464 BOL 73 5 161 to 59493 BOL431 5 161 CKT 1	77	Solution Undetermined	
15SP	EMDE	EMDE	59480 MON383 5 161 WND 1 MONETT 1	150	96.0	101.1	7.7	59468 AUR124 5 161 to 59480 MON383 5 161 CKT 1	78	Solution Undetermined	
15SP	EMDE	EMDE	59442 OZARKS 269.0 WND 2 OZARK 1	75	95.1	101.3	4.6	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV113.8 CKT 1	79	Solution Undetermined	
15SP	GRDA	GRDA	54437 412SUB 5 161 to 54514 KANSATP5 161 CKT 1	338	99.0	100.2	4.0	53140 FLINTCR7 345 to 54450 GRDA1 7 345 CKT 1	80	Reconductor 9.7 miles with 1590MCM ACSR.	\$1,488,000
15SP	EMDE	EMDE	59621 OZARKS 5 161 WND 1 OZARK 1	75	94.4	101.2	5.1	59478 DAD368 5 161 to 96101 5MORGAN 161 CKT 1	83	Solution Undetermined	
15SP	EMDE	EMDE	59438 EXP449T2 69 to 59592 JOP389 2 69 CKT 1	39	92.5	100.4	3.1	59524 NEO 56 2 69 to 59589 RAC375 2 69 CKT 1	95	Not Relieved by EMDE Mitigation Plan to curtail interruptible load at Bus 59563. Solution Undetermined	
15SP	EMDE	EMDE	59438 EXP449T2 69 to 59592 JOP389 2 69 CKT 1	39	95.8	103.9	3.2	59526 JOP 64 2 69 to 59539 JOP145 2 69 CKT 1	100	Relieved by EMDE Mitigation Plan to curtail interruptible load at Bus 59563	
15SP			Contingency Solution Not Converged					56765 HOYT 7 345 to 56766 JEC N 7 345 CKT 1	N/A	Solution Undetermined	

Table 1.2a - Modeling Representation for Table 1.2
Includes Bus Numbers and Bus Names

Study Case	From Area	To Area	Monitored Branch Overload	Rate <MVA>	BC % Loading	TC % Loading	%TDF	Outaged Branch Causing Overload	ATC (MW)	Solution	Estimated Cost
06AP			NONE IDENTIFIED						100		
06G	SPS	SPS	50907 HARRNG6 230 to 50915 NICHOL6 230 CKT 1	635	98.4	100.6	14.1	50907 HARRNG6 230 to 50915 NICHOL6 230 CKT 2	72	Solution Undetermined	
06G	SPS	SPS	50907 HARRNG6 230 to 50915 NICHOL6 230 CKT 2	635	98.2	100.4	14.0	50907 HARRNG6 230 to 50915 NICHOL6 230 CKT 1	82	Solution Undetermined	
06SH			NONE IDENTIFIED						100		
06FA			NONE IDENTIFIED						100		
07SP	WERE	WERE	56851 AUBURN 6 230 to 56852 JEC 6 230 CKT 1	565	107.5	108.7	6.7	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	EMDE	EMDE	59442 OZARKS 2 69 to 59609 OZK434 2 69 CKT 1	45	144.3	162.5	8.2	59604 BHJ415 2 69 to 96673 2JAMESV 69 CKT 1	0	Solution Undetermined	
07SP	EMDE	EMDE	59442 OZARKS 2 69 to 59609 OZK434 2 69 CKT 1	45	107.0	118.5	5.2	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV213.8 CKT 1	0	Solution Undetermined	
07SP	EMDE	EMDE	59442 OZARKS 2 69 to 59609 OZK434 2 69 CKT 1	45	105.3	116.6	5.1	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV113.8 CKT 1	0	Solution Undetermined	
07SP	EMDE	EMDE	59442 OZARKS 2 69 to 59609 OZK434 2 69 CKT 1	38	104.4	114.7	3.9	BASE CASE	0	Solution Undetermined	
07SP	EMDE	EMDE	59442 OZARKS 2 69 to 59609 OZK434 2 69 CKT 1	45	103.8	114.1	4.6	59478 DAD368 5 161 to 96101 5MORGAN 161 CKT 1	0	Solution Undetermined	
07SP	EMDE	EMDE	59570 OZK330 2 69 to 59609 OZK434 2 69 CKT 1	45	112.5	127.2	6.6	59604 BHJ415 2 69 to 96673 2JAMESV 69 CKT 1	0	Solution Undetermined	
07SP	EMDE	EMDE	59621 OZARKS 5 161 WND 1 OZARK 1	75	94.7	107.7	9.7	59604 BHJ415 269.0 to 96673 2JAMESV 69.0 CKT 1	40	Solution Undetermined	
07SP	EMDE	EMDE	59442 OZARKS 269.0 WND 2 OZARK 1	75	91.7	103.7	9.0	59604 BHJ415 269.0 to 96673 2JAMESV 69.0 CKT 1	69	Solution Undetermined	
07SP	EMDE	EMDE	59570 OZK330 2 69 to 59604 BHJ415 2 69 CKT 1	45	90.0	102.3	5.5	59604 BHJ415 2 69 to 96673 2JAMESV 69 CKT 1	81	Solution Undetermined	
07SP	EMDE	EMDE	59438 EXP449T2 69 to 59592 JOP389 2 69 CKT 1	39	94.1	104.4	4.0	59543 NEO184 2 69 to 59563 LIN314 2 69 CKT 1	100	Relieved by EMDE Mitigation Plan to curtail interruptible load at Bus 59563	
07WP	WERE	WERE	56851 AUBURN 6 230 to 56852 JEC 6 230 CKT 1	565	104.8	105.9	6.3	56765 HOYT 7 345 to 56766 JEC N 7 345 CKT 1	0	May be relieved due to Westar Operating Procedure 401 - Outage of the Jeffrey Energy Center to Hoyt 345kV Line	
07WP	EMDE	EMDE	59442 OZARKS 2 69 to 59609 OZK434 2 69 CKT 1	61	88.7	100.4	7.2	59604 BHJ415 2 69 to 96673 2JAMESV 69 CKT 1	97	Solution Undetermined	
10SP	EMDE	EMDE	59442 OZARKS 269.0 WND 2 OZARK 1	75	102.7	110.8	6.0	59604 BHJ415 269.0 to 96673 2JAMESV 69.0 CKT 1	0	Solution Undetermined	
10SP	EMDE	EMDE	59621 OZARKS 5 161 WND 1 OZARK 1	75	107.1	115.8	6.6	59604 BHJ415 269.0 to 96673 2JAMESV 69.0 CKT 1	0	Solution Undetermined	
10SP	WERE	WERE	56851 AUBURN 6 230 to 56852 JEC 6 230 CKT 1	565	103.1	104.2	6.3	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	
10SP	EMDE	EMDE	59442 OZARKS 2 69 to 59609 OZK434 2 69 CKT 1	45	163.5	179.3	7.1	59604 BHJ415 2 69 to 96673 2JAMESV 69 CKT 1	0		
10SP	EMDE	EMDE	59442 OZARKS 2 69 to 59609 OZK434 2 69 CKT 1	45	125.2	137.7	5.6	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV213.8 CKT 1	0	Solution Undetermined	
10SP	EMDE	EMDE	59442 OZARKS 2 69 to 59609 OZK434 2 69 CKT 1	45	123.3	135.7	5.6	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV113.8 CKT 1	0	Solution Undetermined	
10SP	EMDE	EMDE	59442 OZARKS 2 69 to 59609 OZK434 2 69 CKT 1	38	122.2	133.4	4.3	BASE CASE	0	Solution Undetermined	
10SP	EMDE	EMDE	59442 OZARKS 2 69 to 59609 OZK434 2 69 CKT 1	45	116.4	129.4	5.8	59546 BIL221 2 69 to 59580 REP359 2 69 CKT 1	0	Solution Undetermined	
10SP	EMDE	AECI	59546 BIL221 2 69 to 96658 2BILLNG 69 CKT 1	36	100.3	109.2	3.2	59537 AUR124 2 69 to 59611 MAR437 2 69 CKT 1	0	Solution Undetermined	
10SP	EMDE	EMDE	59570 OZK330 2 69 to 59609 OZK434 2 69 CKT 1	45	122.7	134.2	5.2	59604 BHJ415 2 69 to 96673 2JAMESV 69 CKT 1	0	Solution Undetermined	
10SP	AECI	EMDE	59618 CPK446 2 69 to 96658 2BILLNG 69 CKT 1	36	115.6	124.6	3.3	59537 AUR124 2 69 to 59611 MAR437 2 69 CKT 1	0	Solution Undetermined	
10SP	EMDE	EMDE	59570 OZK330 2 69 to 59604 BHJ415 2 69 CKT 1	45	97.1	105.8	3.9	59604 BHJ415 2 69 to 96673 2JAMESV 69 CKT 1	33	Solution Undetermined	
10SP	AECI	EMDE	59618 CPK446 2 69 to 96658 2BILLNG 69 CKT 1	36	93.4	102.3	3.2	59618 CPK446 2 69 to 96677 2MTVRN 69 CKT 1	74	Solution Undetermined	
10SP	EMDE	EMDE	59545 FRP217 2 69 to 59585 DAD368 2 69 CKT 1	39	89.0	103.0	5.4	59478 DAD368 5 161 to 59493 BOL431 5 161 CKT 1	79	Solution Undetermined	
10SP	EMDE	EMDE	59438 EXP449T2 69 to 59592 JOP389 2 69 CKT 1	39	104.5	115.3	4.2	59543 NEO184 2 69 to 59563 LIN314 2 69 CKT 1	100	Relieved by EMDE Mitigation Plan to curtail interruptible load at Bus 59563	
10WP	EMDE	EMDE	59442 OZARKS 2 69 to 59609 OZK434 2 69 CKT 1	61	94.3	106.1	7.2	59604 BHJ415 2 69 to 96673 2JAMESV 69 CKT 1	48	Solution Undetermined	
15SP	EMDE	EMDE	59442 OZARKS 269.0 WND 2 OZARK 1	75	118.4	126.8	6.3	59604 BHJ415 269.0 to 96673 2JAMESV 69.0 CKT 1	0	Solution Undetermined	
15SP	EMDE	EMDE	59483 JOP389 5 161 WND 1 JOPLINSW 1	75	110.8	125.6	11.1	59543 NEO184 269.0 to 59563 LIN314 269.0 CKT 1	0	See Previous Upgrade Specified for Facility in Scenario 1	
15SP	EMDE	EMDE	59483 JOP389 5 161 WND 1 JOPLINSW 1	75	100.9	114.3	10.0	59524 NEO 56 269.0 to 59563 LIN314 269.0 CKT 1	0	See Previous Upgrade Specified for Facility in Scenario 1	
15SP	EMDE	EMDE	59483 JOP389 5 161 WND 1 JOPLINSW 1	75	108.2	113.0	3.6	59472 TIP292 5 161 to 59483 JOP389 5 161 CKT 1	0	See Previous Upgrade Specified for Facility in Scenario 1	
15SP	EMDE	EMDE	59483 JOP389 5 161 WND 1 JOPLINSW 1	75	102.6	111.7	6.8	59526 JOP 64 269.0 to 59539 JOP145 269.0 CKT 1	0	See Previous Upgrade Specified for Facility in Scenario 1	
15SP	EMDE	EMDE	59483 JOP389 5 161 WND 1 JOPLINSW 1	75	105.8	111.2	4.0	59470 JOP145 5 161 to 59498 STL439 5 161 CKT 1	0	See Previous Upgrade Specified for Facility in Scenario 1	
15SP	EMDE	EMDE	59570 OZK330 269.0 to 59609 OZK434 269.0 CKT 1	45	100.1	107.6	3.4	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV213.8 CKT 1	0	Solution Undetermined	
15SP	EMDE	EMDE	59592 JOP389 269.0 WND 2 JOPLINSW 1	75	107.0	120.3	9.9	59543 NEO184 269.0 to 59563 LIN314 269.0 CKT 1	0	See Previous Upgrade Specified for Facility in Scenario 1	
15SP	EMDE	EMDE	59592 JOP389 269.0 WND 2 JOPLINSW 1	75	106.2	110.8	3.5	59472 TIP292 5 161 to 59483 JOP389 5 161 CKT 1	0	See Previous Upgrade Specified for Facility in Scenario 1	
15SP	EMDE	EMDE	59592 JOP389 269.0 WND 2 JOPLINSW 1	75	103.8	109.0	3.9	59470 JOP145 5 161 to 59498 STL439 5 161 CKT 1	0	See Previous Upgrade Specified for Facility in Scenario 1	
15SP	EMDE	EMDE	59592 JOP389 269.0 WND 2 JOPLINSW 1	75	100.4	108.7	6.2	59526 JOP 64 269.0 to 59539 JOP145 269.0 CKT 1	0	See Previous Upgrade Specified for Facility in Scenario 1	
15SP	EMDE	EMDE	59621 OZARKS 5 161 WND 1 OZARK 1	75	124.0	133.3	7.0	59604 BHJ415 269.0 to 96673 2JAMESV 69.0 CKT 1	0	Solution Undetermined	
15SP	SWPA	ENTR	52660 BULL SH5 161 to 99802 5BULLSH 161 CKT 1	167	113.2	115.8	4.4	53136 EUREKA 5 161 to 99832 5OSAGE # 161 CKT 1	0	Solution Undetermined	
15SP	SWPA	ENTR	52660 BULL SH5 161 to 99802 5BULLSH 161 CKT 1	167	107.2	110.3	5.2	99696 5AG_HILL 161 to 99860 5ST_JOE 161 CKT 1	0	Solution Undetermined	
15SP	SWPA	ENTR	52660 BULL SH5 161 to 99802 5BULLSH 161 CKT 1	167	106.5	109.5	5.2	99843 5EVTRON 161 to 99860 5ST_JOE 161 CKT 1	0	Solution Undetermined	
15SP	SWPA	ENTR	52660 BULL SH5 161 to 99802 5BULLSH 161 CKT 1	167	104.4	107.4	5.1	99811 5HARR-E 161 to 99843 5EVTRON 161 CKT 1	0	Solution Undetermined	
15SP	AECI	SWPA	52692 SPRGFLD5 161 to 96678 5NIXA-1 161 CKT 1	203	102.8	108.4	11.3	59954 SWPS 5 161 to 96661 5BTFLD 161 CKT 1	0	Solution Undetermined	
15SP	AECI	SWPA	52692 SPRGFLD5 161 to 96678 5NIXA-1 161 CKT 1	203	97.5	103.0	11.3	96089 5JAMESV 161 to 96127 5CLEVER 161 CKT 1	0	Solution Undetermined	
15SP	AECI	SWPA	52692 SPRGFLD5 161 to 96678 5NIXA-1 161 CKT 1	203	97.3	102.9	11.3	96127 5CLEVER 161 to 96661 5BTFLD 161 CKT 1	0	Solution Undetermined	
15SP	AEPW	AEPW	53139 FLINTCR5 161 to 53170 TONTITNS 161 CKT 1	353	101.1	102.0	3.0	53155 CHAMSPR7 345 to 53756 CLARKSV7 345 CKT 1	0	See Previous Upgrade Specified for Facility in Scenario 1	
15SP	AEPW	AEPW	53139 FLINTCR5 161 to 53187 GENTRYR5 161 CKT 1	353	101.4	102.4	3.8	53155 CHAMSPR7 345 to 53756 CLARKSV7 345 CKT 1	0	See Previous Upgrade Specified for Facility in Scenario 1	
15SP	WERE	WERE	56851 AUBURN 6 230 to 56852 JEC 6 230 CKT 1	565	117.6	119.0	7.9	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	
15SP	EMDE	EMDE	59400 MON376J269.0 to 59402 MON416J269.0 1	27	110.4	121.6	3.0	BASE CASE	0	Solution Undetermined	
15SP	EMDE	EMDE	59438 EXP449T2 69 to 59592 JOP389 2 69 CKT 1	39	168.7	184.7	6.3	59543 NEO184 2 69 to 59563 LIN314 2 69 CKT 1	0	Not Relieved by EMDE Mitigation Plan to curtail interruptible load at Bus 59563, Solution Undetermined	

Table 1.2a - Modeling Representation for Table 1.2
Includes Bus Numbers and Bus Names

Study Case	From Area	To Area	Monitored Branch Overload	Rate <MVA>	BC % Loading	TC % Loading	%TDF	Outaged Branch Causing Overload	ATC (MW)	Solution	Estimated Cost
15SP	EMDE	EMDE	59438 EXP449T2 69 to 59592 JOP389 2 69 CKT 1	39	142.0	155.0	5.1	59524 NEO 56 2 69 to 59563 LIN314 2 69 CKT 1	0	Not Relieved by EMDE Mitigation Plan to curtail interruptible load at Bus 59563. Solution Undetermined	
15SP	EMDE	EMDE	59442 OZARKS 2 69 to 59609 OZK434 2 69 CKT 1	45	191.8	209.0	7.7	59604 BHJ415 2 69 to 96673 2JAMESV 69 CKT 1	0	Solution Undetermined	
15SP	EMDE	EMDE	59442 OZARKS 2 69 to 59609 OZK434 2 69 CKT 1	45	146.4	158.4	5.4	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV213.8 CKT 1	0	Solution Undetermined	
15SP	EMDE	EMDE	59442 OZARKS 2 69 to 59609 OZK434 2 69 CKT 1	45	144.3	156.1	5.3	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV113.8 CKT 1	0	Solution Undetermined	
15SP	EMDE	EMDE	59442 OZARKS 2 69 to 59609 OZK434 2 69 CKT 1	38	143.2	155.4	4.6	BASE CASE	0	Solution Undetermined	
15SP	EMDE	EMDE	59442 OZARKS 2 69 to 59609 OZK434 2 69 CKT 1	45	138.2	151.2	5.8	59546 BIL221 2 69 to 59580 REP359 2 69 CKT 1	0	Solution Undetermined	
15SP	EMDE	EMDE	59524 NEO 56 2 69 to 59589 RAC375 2 69 CKT 1	39	104.1	114.1	3.9	59438 EXP449T2 69 to 59592 JOP389 2 69 CKT 1	0	Solution Undetermined	
15SP	EMDE	EMDE	59537 AUR124 2 69 to 59611 MAR437 2 69 CKT 1	38	109.5	117.3	3.0	59618 CPK446 2 69 to 96658 2BILLNG 69 CKT 1	0	Solution Undetermined	
15SP	EMDE	EMDE	59542 NIC170 2 69 to 59576 REP345 2 69 CKT 1	38	111.1	126.8	5.9	59546 BIL221 2 69 to 59580 REP359 2 69 CKT 1	0	Solution Undetermined	
15SP	EMDE	EMDE	59543 NEO184 2 69 to 59563 LIN314 2 69 CKT 1	65	102.6	111.8	6.0	59438 EXP449T2 69 to 59592 JOP389 2 69 CKT 1	0	Solution Undetermined	
15SP	EMDE	EMDE	59545 FRP217 2 69 to 59585 DAD368 2 69 CKT 1	39	104.5	115.5	4.3	59478 DAD368 5 161 to 59493 BOL431 5 161 CKT 1	0	Solution Undetermined	
15SP	EMDE	AECI	59546 BIL221 2 69 to 96658 2BILLNG 69 CKT 1	36	117.3	126.9	3.5	59537 AUR124 2 69 to 59611 MAR437 2 69 CKT 1	0	Solution Undetermined	
15SP	EMDE	EMDE	59570 OZK330 2 69 to 59604 BHJ415 2 69 CKT 1	45	113.9	123.4	4.3	59604 BHJ415 2 69 to 96673 2JAMESV 69 CKT 1	0	Solution Undetermined	
15SP	EMDE	EMDE	59570 OZK330 2 69 to 59609 OZK434 2 69 CKT 1	45	144.3	156.9	5.7	59604 BHJ415 2 69 to 96673 2JAMESV 69 CKT 1	0	Solution Undetermined	
15SP	EMDE	EMDE	59576 REP345 2 69 to 59580 REP359 2 69 CKT 1	38	110.1	125.5	5.9	59546 BIL221 2 69 to 59580 REP359 2 69 CKT 1	0	Solution Undetermined	
15SP	AECI	EMDE	59618 CPK446 2 69 to 96658 2BILLNG 69 CKT 1	36	134.4	144.4	3.6	59537 AUR124 2 69 to 59611 MAR437 2 69 CKT 1	0	Solution Undetermined	
15SP	EMDE	EMDE	59621 OZARKS 5 161 WND 1 OZARK 1	75	99.4	106.1	5.0	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV213.8 CKT 1	9	Solution Undetermined	
15SP	EMDE	EMDE	59621 OZARKS 5 161 WND 1 OZARK 1	75	99.2	105.3	4.6	52672 TABLE R5 161 to 59497 RVS438 5 161 CKT 1	13	Solution Undetermined	
15SP	EMDE	EMDE	59592 JOP389 269.0 WND 2 JOPLINSW 1	75	98.1	110.1	9.0	59524 NEO 56 269.0 to 59563 LIN314 269.0 CKT 1	16	See Previous Upgrade Specified for Facility in Scenario 1	
15SP	EMDE	EMDE	59545 FRP217 2 69 to 59612 BOL602 2 69 CKT 1	39	98.1	108.6	4.1	59478 DAD368 5 161 to 59493 BOL431 5 161 CKT 1	18	Solution Undetermined	
15SP	EMDE	EMDE	59570 OZK330 269.0 to 59609 OZK434 269.0 CKT 1	45	98.0	105.4	3.3	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV113.8 CKT 1	27	Solution Undetermined	
15SP	EMDE	EMDE	59621 OZARKS 5 161 WND 1 OZARK 1	75	98.2	104.8	5.0	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV113.8 CKT 1	27	Solution Undetermined	
15SP	AEPW	OKGE	53756 CLARKSV7 345 to 55224 MUSKOGEE7 345 CKT 1	986	99.8	100.5	7.3	53794 R.S.S.-7 345 to 55224 MUSKOGEE7 345 CKT 1	30	Solution Undetermined	
15SP	EMDE	EMDE	59438 EXP449T2 69 to 59589 RAC375 2 69 CKT 1	39	96.9	106.4	3.7	59543 NEO184 2 69 to 59563 LIN314 2 69 CKT 1	33	Solution Undetermined	
15SP	EMDE	AECI	59604 BHJ415 2 69 to 96673 2JAMESV 69 CKT 1	89	96.3	106.5	9.1	59442 OZARKS 2 69 to 59609 OZK434 2 69 CKT 1	36	Solution Undetermined	
15SP	EMDE	EMDE	59471 NEO184 5 161 WND 1 NEOJCT1 1	46.7	92.1	106.8	6.9	59438 EXP449T269.0 to 59592 JOP389 269.0 CKT 1	54	Solution Undetermined	
15SP	EMDE	EMDE	59442 OZARKS 269.0 WND 2 OZARK 1	75	96.1	102.3	4.6	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV213.8 CKT 1	63	Solution Undetermined	
15SP	EMDE	EMDE	59442 OZARKS 269.0 WND 2 OZARK 1	75	96.3	102.1	4.4	52672 TABLE R5 161 - 59497 RVS438 5 161 CKT 1	63	Solution Undetermined	
15SP	EMDE	EMDE	59621 OZARKS 5 161 WND 1 OZARK 1	75	95.3	102.1	5.0	59478 DAD368 5 161 - 96101 5MORGAN 161 CKT 1	69	Solution Undetermined	
15SP	EMDE	EMDE	59442 OZARKS 269.0 WND 2 OZARK 1	75	95.0	101.1	4.6	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV113.8 CKT 1	81	Solution Undetermined	
15SP	EMDE	EMDE	59545 FRP217 2 69 to 59585 DAD368 2 69 CKT 1	39	88.6	102.1	5.3	59464 BOL 73 5 161 to 59493 BOL431 5 161 CKT 1	84	Solution Undetermined	
15SP	EMDE	EMDE	59570 OZK330 2 69 to 59609 OZK434 2 69 CKT 1	45	91.8	100.3	3.8	59546 BIL221 2 69 to 59580 REP359 2 69 CKT 1	96	Solution Undetermined	
15SP	EMDE	EMDE	59543 NEO184 269.0 WND 2 NEOJCT1 1	46.7	87.2	100.1	6.1	59438 EXP449T269.0 to 59592 JOP389 269.0 CKT 1	99	Solution Undetermined	
15SP	EMDE	EMDE	59438 EXP449T2 69 to 59592 JOP389 2 69 CKT 1	39	94.4	102.1	3.0	REMOVE UNIT 1 FROM BUS 59658 [S4G439 118.000] DISPATCH	100	Relieved by EMDE Mitigation Plan to curtail interruptible load at Bus 59563	
15SP	EMDE	EMDE	59438 EXP449T2 69 to 59592 JOP389 2 69 CKT 1	39	92.2	100.1	3.1	59524 NEO 56 2 69 to 59589 RAC375 2 69 CKT 1	100	Relieved by EMDE Mitigation Plan to curtail interruptible load at Bus 59563	

Table 1.3a - Modeling Representation for Table 1.3
Includes Bus Numbers and Bus Names

Southwest Power Pool
System Impact Study

Study Case	From Area	To Area	Monitored Branch Overload	Rate <MVA>	BC % Loading	TC % Loading	%TDF	Outaged Branch Causing Overload	ATC (MW)	Solution	Estimated Cost
06AP			NONE IDENTIFIED						100		
06G			NONE IDENTIFIED						100		
06SH	AEPW	AEPW	53154 CHAMSPR5 161 to 53170 TONTITN5 161 CKT 1	244	106.2	107.6	3.6	53154 CHAMSPR5 161 to 53195 FARMGTN5 161 CKT 1	0	AEPW Upgrade Schedule Completion Date 5/1/2007	
06FA									100		
07SP	WERE	WERE	56851 AUBURN 6 230 to 56852 JEC 6 230 CKT 1	565	111.5	112.2	4.3	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	EMDE	EMDE	59442 OZARKS 2 69 to 59609 OZK434 2 69 CKT 1	45	142.1	158.6	7.4	59604 BHJ415 2 69 to 96673 2JAMESV 69 CKT 1	0	Solution Undetermined	
07SP	EMDE	EMDE	59442 OZARKS 2 69 to 59609 OZK434 2 69 CKT 1	45	105.9	117.3	5.1	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV213.8 CKT 2	0	Solution Undetermined	
07SP	EMDE	EMDE	59442 OZARKS 2 69 to 59609 OZK434 2 69 CKT 1	45	104.2	115.5	5.1	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV113.8 CKT 1	0	Solution Undetermined	
07SP	EMDE	EMDE	59442 OZARKS 2 69 to 59609 OZK434 2 69 CKT 1	38	102.7	113.1	4.0	BASE CASE	0	Solution Undetermined	
07SP	EMDE	EMDE	59442 OZARKS 2 69 to 59609 OZK434 2 69 CKT 1	45	101.3	112.4	5.0	59478 DAD368 5 161 to 96101 5MORGAN 161 CKT 1	0	Solution Undetermined	
07SP	EMDE	EMDE	59570 OZK330 2 69 to 59609 OZK434 2 69 CKT 1	45	110.6	123.2	5.7	59604 BHJ415 2 69 to 96673 2JAMESV 69 CKT 1	0	Solution Undetermined	
07SP	EMDE	EMDE	59621 OZARKS 5 161 WND 1 OZARK 1	75	94.3	105.0	8.0	59604 BHJ415 269.0 to 96673 2JAMESV 69.0 CKT 1	53	Solution Undetermined	
07SP	EMDE	EMDE	59438 EXP449T2 69 to 59592 JOP389 2 69 CKT 1	39	94.2	104.5	4.0	59543 NEO184 2 69 to 59563 LIN314 2 69 CKT 1	100	Relieved by EMDE Mitigation Plan to curtail interruptible load at Bus 59563	
07WP	WERE	WERE	56851 AUBURN 6 230 to 56852 JEC 6 230 CKT 1	565	102.2	103.3	5.8	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	
10SP	EMDE	EMDE	59442 OZARKS 269.0 WND 2 OZARK 1	75	102.4	110.3	6.0	59604 BHJ415 269.0 to 96673 2JAMESV 69.0 CKT 1	0	Solution Undetermined	
10SP	EMDE	EMDE	59621 OZARKS 5 161 WND 1 OZARK 1	75	106.7	115.3	6.5	59604 BHJ415 269.0 to 96673 2JAMESV 69.0 CKT 1	0	Solution Undetermined	
10SP	WERE	WERE	56851 AUBURN 6 230 to 56852 JEC 6 230 CKT 1	565	108.5	109.6	6.3	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	
10SP	EMDE	EMDE	59442 OZARKS 2 69 to 59609 OZK434 2 69 CKT 1	45	161.8	177.4	7.0	59604 BHJ415 2 69 to 96673 2JAMESV 69 CKT 1	0	Solution Undetermined	
10SP	EMDE	EMDE	59442 OZARKS 2 69 to 59609 OZK434 2 69 CKT 1	45	124.4	137.1	5.7	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV213.8 CKT 2	0	Solution Undetermined	
10SP	EMDE	EMDE	59442 OZARKS 2 69 to 59609 OZK434 2 69 CKT 1	45	122.5	135.2	5.7	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV113.8 CKT 1	0	Solution Undetermined	
10SP	EMDE	EMDE	59442 OZARKS 2 69 to 59609 OZK434 2 69 CKT 1	38	121.1	132.2	4.2	BASE CASE	0	Solution Undetermined	
10SP	EMDE	EMDE	59442 OZARKS 2 69 to 59609 OZK434 2 69 CKT 1	45	115.8	128.9	5.9	59546 BIL221 2 69 to 59580 REP359 2 69 CKT 1	0	Solution Undetermined	
10SP	EMDE	AECI	59546 BIL221 2 69 to 96658 2BILLNG 69 CKT 1	36	100.7	109.6	3.2	59537 AUR124 2 69 to 59611 MAR437 2 69 CKT 1	0	Solution Undetermined	
10SP	EMDE	EMDE	59570 OZK330 2 69 to 59609 OZK434 2 69 CKT 1	45	121.1	132.3	5.1	59604 BHJ415 2 69 to 96673 2JAMESV 69 CKT 1	0	Solution Undetermined	
10SP	AECI	EMDE	59618 CPK446 2 69 to 96658 2BILLNG 69 CKT 1	36	116.0	125.1	3.3	59537 AUR124 2 69 to 59611 MAR437 2 69 CKT 1	0	Solution Undetermined	
10SP	EMDE	EMDE	59570 OZK330 2 69 to 59604 BHJ415 2 69 CKT 1	45	95.5	104.0	3.8	59604 BHJ415 2 69 to 96673 2JAMESV 69 CKT 1	53	Solution Undetermined	
10SP	EMDE	EMDE	59545 FRP217 2 69 to 59585 DAD368 2 69 CKT 1	39	89.4	103.3	5.4	59478 DAD368 5 161 to 59493 BOL431 5 161 CKT 1	76	Solution Undetermined	
10SP	EMDE	EMDE	59438 EXP449T2 69 to 59592 JOP389 2 69 CKT 1	39	104.6	115.5	4.2	59543 NEO184 2 69 to 59563 LIN314 2 69 CKT 1	100	Relieved by EMDE Mitigation Plan to curtail interruptible load at Bus 59563	
10WP	EMDE	EMDE	59442 OZARKS 2 69 to 59609 OZK434 2 69 CKT 1	61	92.7	104.5	7.2	59604 BHJ415 2 69 to 96673 2JAMESV 69 CKT 1	62	Solution Undetermined	
15SP	EMDE	EMDE	59442 OZARKS 269.0 WND 2 OZARK 1	75	117.9	126.3	6.3	59604 BHJ415 269.0 to 96673 2JAMESV 69.0 CKT 1	0	Solution Undetermined	
15SP	EMDE	EMDE	59483 JOP389 5 161 WND 1 JOPLINSW 1	75	110.6	125.4	11.1	59543 NEO184 269.0 to 59563 LIN314 269.0 CKT 1	0	See Previous Upgrade Specified for Facility in Scenario 1	
15SP	EMDE	EMDE	59483 JOP389 5 161 WND 1 JOPLINSW 1	75	100.7	114.1	10.0	59524 NEO 56 269.0 to 59563 LIN314 269.0 CKT 1	0	See Previous Upgrade Specified for Facility in Scenario 1	
15SP	EMDE	EMDE	59483 JOP389 5 161 WND 1 JOPLINSW 1	75	102.5	113.6	8.3	59526 JOP 64 269.0 to 59539 JOP145 269.0 CKT 1	0	See Previous Upgrade Specified for Facility in Scenario 1	
15SP	EMDE	EMDE	59483 JOP389 5 161 WND 1 JOPLINSW 1	75	105.8	113.5	5.8	59470 JOP145 5 161 to 59498 STL439 5 161 CKT 1	0	See Previous Upgrade Specified for Facility in Scenario 1	
15SP	EMDE	EMDE	59483 JOP389 5 161 WND 1 JOPLINSW 1	75	108.4	113.2	3.6	59472 TIP292 5 161 to 59483 JOP389 5 161 CKT 1	0	See Previous Upgrade Specified for Facility in Scenario 1	
15SP	EMDE	EMDE	59592 JOP389 269.0 WND 2 JOPLINSW 1	75	106.8	120.1	9.9	59543 NEO184 269.0 to 59563 LIN314 269.0 CKT 1	0	See Previous Upgrade Specified for Facility in Scenario 1	
15SP	EMDE	EMDE	59592 JOP389 269.0 WND 2 JOPLINSW 1	75	106.4	111.0	3.5	59472 TIP292 5 161 to 59483 JOP389 5 161 CKT 1	0	See Previous Upgrade Specified for Facility in Scenario 1	
15SP	EMDE	EMDE	59592 JOP389 269.0 WND 2 JOPLINSW 1	75	103.8	110.9	5.3	59470 JOP145 5 161 to 59498 STL439 5 161 CKT 1	0	See Previous Upgrade Specified for Facility in Scenario 1	
15SP	EMDE	EMDE	59592 JOP389 269.0 WND 2 JOPLINSW 1	75	100.3	110.4	7.6	59526 JOP 64 269.0 to 59539 JOP145 269.0 CKT 1	0	See Previous Upgrade Specified for Facility in Scenario 1	
15SP	EMDE	EMDE	59621 OZARKS 5 161 WND 1 OZARK 1	75	123.5	132.7	6.9	59604 BHJ415 269.0 to 96673 2JAMESV 69.0 CKT 1	0	Solution Undetermined	
15SP	SWPA	ENTR	52660 BULL SH5 161 to 99802 5BULLSH* 161 CKT 1	167	108.2	110.7	4.2	53136 EUREKA 5 161 to 99832 5OSAGE # 161 CKT 1	0	Solution Undetermined	
15SP	AECI	SWPA	52692 SPRGFLD5 161 to 96678 5NIXA-1 161 CKT 1	203	104.7	110.1	10.9	59954 SWPS 5 161 to 96661 5BTLFD 161 CKT 1	0	Solution Undetermined	
15SP	AECI	SWPA	52692 SPRGFLD5 161 to 96678 5NIXA-1 161 CKT 1	203	99.4	104.7	10.9	96089 5JAMESV 161 to 96127 5CLEVER 161 CKT 1	0	Solution Undetermined	
15SP	AECI	SWPA	52692 SPRGFLD5 161 to 96678 5NIXA-1 161 CKT 1	203	99.2	104.5	10.9	96127 5CLEVER 161 to 96661 5BTLFD 161 CKT 1	0	Solution Undetermined	
15SP	AEPW	AEPW	53139 FLINTCR5 161 to 53170 TONTITN5 161 CKT 1	353	103.6	104.5	3.1	53155 CHAMSPR7 345 to 53756 CLARKSV7 345 CKT 1	0	See Previous Upgrade Specified for Facility in Scenario 1	
15SP	AEPW	AEPW	53139 FLINTCR5 161 to 53187 GENTRYR5 161 CKT 1	353	104.8	105.9	3.9	53155 CHAMSPR7 345 to 53756 CLARKSV7 345 CKT 1	0	See Previous Upgrade Specified for Facility in Scenario 1	
15SP	AEPW	AEPW	53183 BEN279 5 161 to 53187 GENTRYR5 161 CKT 1	353	100.6	101.7	3.8	53155 CHAMSPR7 345 to 53756 CLARKSV7 345 CKT 1	0	Solution Undetermined	
15SP	WERE	WERE	56765 HOYT 7 345 to 56766 JEC N 7 345 CKT 1	1076	104.4	105.6	12.7	56766 JEC N 7 345 to 56770 MORRIS 7 345 CKT 1	0	Solution Undetermined	
15SP	WERE	WERE	56765 HOYT 7 345 to 56766 JEC N 7 345 CKT 1	1076	103.5	104.6	12.4	56851 AUBURN 6 230 to 56852 JEC 6 230 CKT 1	0	May be relieved due to Westar Operating Procedure 40 - Outage of the Jeffrey Energy Center to Auburn 230kV Line	
15SP	WERE	WERE	56851 AUBURN 6 230 to 56852 JEC 6 230 CKT 1	565	135.5	138.0	14.3	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	
15SP	EMDE	EMDE	59400 MON376J269.0 59402*MON416J269.0 1	27	110.5	121.8	3.1	BASE CASE	0	Solution Undetermined	
15SP	EMDE	EMDE	59438 EXP449T2 69 to 59592 JOP389 2 69 CKT 1	39	168.9	185.0	6.3	59543 NEO184 2 69 to 59563 LIN314 2 69 CKT 1	0	Not Relieved by EMDE Mitigation Plan to curtail interruptible load at Bus 59563. Solution Undetermined	
15SP	EMDE	EMDE	59438 EXP449T2 69 to 59592 JOP389 2 69 CKT 1	39	142.1	155.2	5.1	59524 NEO 56 2 69 to 59563 LIN314 2 69 CKT 1	0	Not Relieved by EMDE Mitigation Plan to curtail interruptible load at Bus 59563. Solution Undetermined	

Table 1.3a - Modeling Representation for Table 1.3
Includes Bus Numbers and Bus Names

Southwest Power Pool
System Impact Study

Study Case	From Area	To Area	Monitored Branch Overload	Rate <MVA>	BC % Loading	TC % Loading	%TDF	Outaged Branch Causing Overload	ATC (MW)	Solution	Estimated Cost
15SP	EMDE	EMDE	59438 EXP449T2 69 to 59592 JOP389 2 69 CKT 1	39	106.1	113.9	3.1	53139 FLINTCR5 161 to 59484 DEC392 5 161 CKT 1	0	Not Relieved by EMDE Mitigation Plan to curtail interruptible load at Bus 59563, Solution Undetermined	
15SP	EMDE	EMDE	59442 OZARKS 2 69 to 59609 OZK434 2 69 CKT 1	45	189.9	206.9	7.6	59604 BHJ415 2 69 to 96673 2JAMESV 69 CKT 1	0	Solution Undetermined	
15SP	EMDE	EMDE	59442 OZARKS 2 69 to 59609 OZK434 2 69 CKT 1	45	145.6	157.5	5.4	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV213.8 CKT 2	0	Solution Undetermined	
15SP	EMDE	EMDE	59442 OZARKS 2 69 to 59609 OZK434 2 69 CKT 1	45	143.4	155.2	5.3	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV113.8 CKT 1	0	Solution Undetermined	
15SP	EMDE	EMDE	59442 OZARKS 2 69 to 59609 OZK434 2 69 CKT 1	38	142.1	154.2	4.6	BASE CASE	0	Solution Undetermined	
15SP	EMDE	EMDE	59442 OZARKS 2 69 to 59609 OZK434 2 69 CKT 1	45	137.5	150.4	5.8	59546 BIL221 2 69 to 59580 REP359 2 69 CKT 1	0	Solution Undetermined	
15SP	EMDE	EMDE	59524 NEO 56 2 69 to 59589 RAC375 2 69 CKT 1	39	103.7	114.2	4.1	59438 EXP449T2 69 to 59592 JOP389 2 69 CKT 1	0	Solution Undetermined	
15SP	EMDE	EMDE	59542 NIC170 2 69 to 59576 REP345 2 69 CKT 1	38	111.0	126.5	5.9	59546 BIL221 2 69 to 59580 REP359 2 69 CKT 1	0	Solution Undetermined	
15SP	EMDE	EMDE	59543 NEO184 2 69 to 59563 LIN314 2 69 CKT 1	65	102.2	111.9	6.3	59438 EXP449T2 69 to 59592 JOP389 2 69 CKT 1	0	Solution Undetermined	
15SP	EMDE	EMDE	59545 FRP217 2 69 to 59585 DAD368 2 69 CKT 1	39	105.3	115.9	4.1	59478 DAD368 5 161 to 59493 BOL431 5 161 CKT 1	0	Solution Undetermined	
15SP	EMDE	AECI	59546 BIL221 2 69 to 96658 2BILLNG 69 CKT 1	36	117.6	126.8	3.3	59537 AUR124 2 69 to 59611 MAR437 2 69 CKT 1	0	Solution Undetermined	
15SP	EMDE	EMDE	59570 OZK330 2 69 to 59604 BHJ415 2 69 CKT 1	45	112.2	121.4	4.2	59604 BHJ415 2 69 to 96673 2JAMESV 69 CKT 1	0	Solution Undetermined	
15SP	EMDE	EMDE	59570 OZK330 2 69 to 59609 OZK434 2 69 CKT 1	45	142.6	154.9	5.6	59604 BHJ415 2 69 to 96673 2JAMESV 69 CKT 1	0	Solution Undetermined	
15SP	EMDE	EMDE	59576 REP345 2 69 to 59580 REP359 2 69 CKT 1	38	109.9	125.2	5.8	59546 BIL221 2 69 to 59580 REP359 2 69 CKT 1	0	Solution Undetermined	
15SP	AECI	EMDE	59618 CPK446 2 69 to 96658 2BILLNG 69 CKT 1	36	134.8	144.2	3.4	59537 AUR124 2 69 to 59611 MAR437 2 69 CKT 1	0	Solution Undetermined	
15SP	EMDE	EMDE	59621 OZARKS 5 161 WND 1 OZARK 1	75	99.7	105.6	4.5	52672 TABLE R5 161 to 59497 RVS438 5 161 CKT 1	5	Solution Undetermined	
15SP	EMDE	EMDE	59621 OZARKS 5 161 WND 1 OZARK 1	75	99.5	106.2	5.0	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV213.8 CKT 2	7	Solution Undetermined	
15SP	EMDE	EMDE	59570 OZK330 269.0 to 59609 OZK434 269.0 CKT 1	45	99.3	106.8	3.4	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV213.8 CKT 2	9	Solution Undetermined	
15SP	EMDE	EMDE	59545 FRP217 2 69 to 59612 BOL602 2 69 CKT 1	39	99.0	108.9	3.9	59478 DAD368 5 161 to 59493 BOL431 5 161 CKT 1	10	Solution Undetermined	
15SP	EMDE	EMDE	59592 JOP389 269.0 WND 2 JOPLINSW 1	75	97.9	109.9	9.0	59524 NEO 56 269.0 to 59563 LIN314 269.0 CKT 1	18	See Previous Upgrade Specified for Facility in Scenario 1	
15SP	EMDE	EMDE	59621 OZARKS 5 161 WND 1 OZARK 1	75	98.3	104.9	4.9	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV113.8 CKT 1	25	Solution Undetermined	
15SP	EMDE	EMDE	59438 EXP449T2 69 to 59589 RAC375 2 69 CKT 1	39	97.0	106.5	3.7	59543 NEO184 2 69 to 59563 LIN314 2 69 CKT 1	32	Solution Undetermined	
15SP	EMDE	EMDE	59570 OZK330 269.0 to 59609 OZK434 269.0 CKT 1	45	97.2	104.6	3.3	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV113.8 CKT 1	38	Solution Undetermined	
15SP	EMDE	AECI	59604 BHJ415 2 69 to 96673 2JAMESV 69 CKT 1	89	95.3	105.5	9.1	59442 OZARKS 2 69 to 59609 OZK434 2 69 CKT 1	46	Solution Undetermined	
15SP	EMDE	EMDE	59471 NEO184 5 161 WND 1 NEOJCT1 1	46.7	93.8	105.5	5.5	59438 EXP449T2 69 to 59592 JOP389 2 69 CKT 1	53	Solution Undetermined	
15SP	EMDE	EMDE	59442 OZARKS 269.0 WND 2 OZARK 1	75	96.7	102.4	4.2	52672 TABLE R5 161 to 59497 RVS438 5 161 CKT 1	57	Solution Undetermined	
15SP	EMDE	EMDE	59442 OZARKS 269.0 WND 2 OZARK 1	75	96.3	102.4	4.6	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96675 1JAMESV213.8 CKT 2	60	Solution Undetermined	
15SP	EMDE	EMDE	59467 ORO110 5 161 to 59469 RIV167 5 161 CKT 1	214	97.9	100.9	6.5	59470 JOP145 5 161 to 59498 STL439 5 161 CKT 1	71	Solution Undetermined	
15SP	EMDE	EMDE	59400 MON376J269.0 59402*MON416J269.0 1	32	93.3	102.8	3.0	BASE CASE	71	Solution Undetermined	
15SP	EMDE	EMDE	59621 OZARKS 5 161 WND 1 OZARK 1	75	94.8	101.5	5.0	59478 DAD368 5 161 to 96101 5MORGAN 161 CKT 1	78	Solution Undetermined	
15SP	EMDE	EMDE	59442 OZARKS 269.0 WND 2 OZARK 1	75	95.2	101.3	4.6	96089 5JAMESV 161 to 96673 2JAMESV 69.0 to 96674 1JAMESV113.8 CKT 1	79	Solution Undetermined	
15SP	EMDE	EMDE	59545 FRP217 2 69 to 59585 DAD368 2 69 CKT 1	39	89.4	102.0	4.9	59464 BOL 73 5 161 to 59493 BOL431 5 161 CKT 1	84	Solution Undetermined	
15SP	EMDE	EMDE	59541 RIV167 2 69 to 59645 R8G167 1 13.2 CKT 1	52	87.4	100.6	6.9	59478 DAD368 5 161 to 59493 BOL431 5 161 CKT 1	96	Solution Undetermined	
15SP	EMDE	EMDE	59438 EXP449T2 69 to 59592 JOP389 2 69 CKT 1	39	92.3	100.3	3.1	59524 NEO 56 2 69 to 59589 RAC375 2 69 CKT 1	97	Not Relieved by EMDE Mitigation Plan to curtail interruptible load at Bus 59563, Solution Undetermined	
15SP	EMDE	EMDE	59438 EXP449T2 69 to 59592 JOP389 2 69 CKT 1	39	95.8	103.8	3.1	59526 JOP 64 2 69 to 59539 JOP145 2 69 CKT 1	100	Relieved by EMDE Mitigation Plan to curtail interruptible load at Bus 59563	