



SPP *Southwest Power Pool*

***System Impact Study
SPP-2004-027-1
For The Designation of a Network
Resource
Requested By
Midwest Energy

For a Reserved Amount of 10 MW
From 5/1/2004
To 8/1/2005***

SPP Engineering, Tariff Studies

Table of Contents

1. EXECUTIVE SUMMARY	3
2. INTRODUCTION	5
3. STUDY METHODOLOGY.....	6
A. DESCRIPTION	6
B. MODEL UPDATES	6
C. TRANSFER ANALYSIS	6
D. UPGRADE ANALYSIS	6
4. STUDY RESULTS	7
A. STUDY ANALYSIS RESULTS.....	7
5. CONCLUSION	8
APPENDIX A	9

ATTACHMENT: *SPP-2004-027-1 Tables*

1. Executive Summary

Midwest Energy has requested a system impact study to designate a Network Resource in the West Plains Control Area for 10 MW to serve network load. The period of the service requested is from 5/1/2004 to 8/1/2005. The request is for OASIS reservation number 650815.

The principal objective of this study is to identify system problems and potential system modifications necessary to facilitate the additional 10 MW request while maintaining system reliability.

The service was modeled from the source in WPEK to the designated load. The new source location causes new facility overloads on the SPP and Non-SPP transmission system, as well as increasing the loading on previously overloaded facilities. Tables 1.1, 2.1 and 3.1 summarize the results of the system impact analyses for the new source location for Scenario 1. Table 1.1 lists SPP facility overloads identified. Table 2.1 lists SPP voltage violations identified. Table 3.1 lists Non-SPP facility overloads identified. Tables 1.2, 2.2 and 3.2 summarize the results of the system impact analyses for the new source location for Scenario 2. Table 1.2 lists SPP facility overloads identified. Table 2.2 lists SPP voltage violations identified. Table 3.2 lists Non-SPP facility overloads identified.

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

Two facilities were identified that limit the right to renew the requested service beginning in the 2010 Summer. The Northview - Summit 115KV line and the Greensburg – Judson Large 115kV line were identified as being impacted by the renewal of the requested service in the 2010 Summer Peak case.

Facilities were identified that limit the ATC to 0 MW for the requested period of service. For some facilities, implementing the upgrade is not possible to accommodate the requested term for the service. Redispatch was evaluated as an option to relieve the impacted facilities. Table 4 lists the facilities limiting the ATC to 0 MW and the maximum amount of relief needed for each facility. Generation shift factors and applicable relief pairs are documented in Tables 5 and 6, respectively. SPP will work with the customer and the applicable party to reach an agreement concerning the curtailment of confirmed service and the redispatch of units. The curtailment or redispatch requirements would be called upon prior to implementing NERC TLR Level 5a. If no redispatch or curtailment of service option is identified for the facilities with an ATC of 0 MW, transmission upgrades will be needed to mitigate the limiting constraints. The start date of the requested service may be delayed until the upgrades of the limiting facilities are completed. The final ATC, upgrade solutions, cost assignments, complete evaluation of renewal rights, and available redispatch and curtailment options will be determined upon the completion of the facility study.

The customer has the option to retain the queue position of the requested service and proceed with the facility study or to withdraw the request for service and reenter the queue as part of the

first aggregate study. If the customer wishes to retain the current queue position, the request will be studied independently and all facilities identified will be assigned to this request. If the customer chooses to participate in the first aggregate study beginning 6/1/2005, the customer must withdraw this request for service and reenter the aggregate queue prior to the 6/1/2005 deadline.

2. Introduction

Midwest Energy has requested a system impact study to designate a Network Resource in the WPEK Control Area for 10 MW to serve network load. The principal objective of this study is to identify the restraints on the SPP Regional Tariff System that may limit the requested service.

This study includes steady-state contingency analyses (PSS/E function ACCC) and Available Transfer Capability (ATC) analyses. The steady-state analyses consider the impact of the 10 MW requests on transmission line loading and transmission bus voltages for system intact and system outages of single and selected multiple transmission lines and transformers on the SPP systems and first tier Non - SPP systems.

3. Study Methodology

A. Description

The system impact analysis was conducted to determine the steady-state impact of the 10 MW transfer on the SPP and first tier Non - SPP systems. The steady-state analysis was done to ensure current SPP Criteria and NERC Planning Standards requirements are fulfilled. The Southwest Power Pool conforms to the NERC Planning Standards, which provide the strictest requirements, related to voltage violations and thermal overloads during normal conditions and during a contingency. It requires that all facilities be within normal operating ratings for normal system conditions and within emergency ratings after a contingency.

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

B. Model Updates

SPP used eleven seasonal models to study the WPEK to WR 10 MW transfer for the requested service period. The SPP 2004 Series Cases 2004/05 Winter Peak (04WP), 2005 April Minimum (05AP), 2005 Spring Peak (05G), 2005 Summer Peak (05SP), and 2005 Summer Shoulder (05SH) were used to study the impact of 10 MW transfer on the system during the requested service period of 5/1/2004 to 8/1/2005. The 2005 Fall Peak (05FA), 2005/06 Winter Peak (05WP), 2007 Summer Peak (07SP), 2007/08 Winter Peak (07WP), 2010 Summer Peak (10SP), and 2010/11 Winter Peak (10WP) modes were used to evaluate renewal rights of the requested service.

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

C. Transfer Analysis

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

D. Upgrade Analysis

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

4. Study Results

A. Study Analysis Results

Tables 1.1, 2.1, 3.1, 1.2, 2.2, and 3.2 contain the steady-state analysis results of the System Impact Study. The Tables are in the attached workbook *SPP-2004-027-1 Tables*. The tables identify the seasonal case in which the event occurred, the facility control area location, applicable ratings of the overloaded facility, the loading percentage with and without the 10 MW transfer, and the estimated ATC value if calculated. Comments are provided in the tables to document any SPP or Non - SPP identification or assignment of the event, existing mitigations plans or criteria to disregard the event as a limiting constraint, upgrades and costs to mitigate a limiting constraint, or any specific study procedures associated with modeling an event.

Table 1.1 lists the SPP Facility Overloads caused or impacted by the 10 MW transfer for Scenario 1. Solutions with engineering and construction costs are provided in the tables.

Table 2.1 lists voltage violations on first tier Non - SPP Regional Tariff participants' transmission systems caused or impacted by the 10 MW transfer for Scenario 1.

Table 3.1 lists overloads on first tier Non - SPP Regional Tariff participants' transmission systems caused or impacted by the 10 MW transfer for Scenario 1.

Table 1.2 lists the SPP Facility Overloads caused or impacted by the 10 MW transfer for Scenario 2. Solutions with engineering and construction costs are provided in the tables.

Table 2.2 lists voltage violations on first tier Non - SPP Regional Tariff participants' transmission systems caused or impacted by the 10 MW transfer for Scenario 2.

Table 3.2 lists overloads on first tier Non - SPP Regional Tariff participants' transmission systems caused or impacted by the 10 MW transfer for Scenario 2.

Table 4 lists the facilities limiting the ATC to 0 MW.

Table 5 lists the generation shift factors for each facility limiting the ATC to 0 MW.

Table 6 lists applicable relief pairs with the redispatch amount required to relieve the impact of the transfer on each facility.

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

5. Conclusion

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

Two facilities were identified that limit the right to renew the requested service beginning in the 2010 Summer. The Northview - Summit 115KV line and the Greensburg – Judson Large 115kV line were identified as being impacted by the renewal of the requested service in the 2010 Summer Peak case.

Facilities were identified that limit the ATC to 0 MW for the requested period of service. For some facilities, implementing the upgrade is not possible to accommodate the requested term for the service. Redispatch was evaluated as an option to relieve the impacted facilities. Table 4 lists the facilities limiting the ATC to 0 MW and the maximum amount of relief needed for each facility. Generation shift factors and applicable relief pairs are documented in Tables 5 and 6, respectively. SPP will work with the customer and the applicable party to reach an agreement concerning the curtailment of confirmed service and the redispatch of units. The curtailment or redispatch requirements would be called upon prior to implementing NERC TLR Level 5a. If no redispatch or curtailment of service option is identified for the facilities with an ATC of 0 MW, transmission upgrades will be needed to mitigate the limiting constraints. The start date of the requested service may be delayed until the upgrades of the limiting facilities are completed. The final ATC, upgrade solutions, cost assignments, complete evaluation of renewal rights, and available redispatch and curtailment options will be determined upon the completion of the facility study.

The customer has the option to retain the queue position of the requested service and proceed with the facility study or to withdraw the request for service and reenter the queue as part of the first aggregate study. If the customer wishes to retain the current queue position, the request will be studied independently and all facilities identified will be assigned to this request. If the customer chooses to participate in the first aggregate study beginning 6/1/2005, the customer must withdraw this request for service and reenter the aggregate queue prior to the 6/1/2005 deadline.

Appendix A

PSS/E CHOICES IN RUNNING LOAD FLOW PROGRAM AND ACCC

BASE CASES:

Solutions - Fixed slope decoupled Newton-Raphson solution (FDNS)

1. Tap adjustment – Stepping
2. Area interchange control – Tie lines only
3. Var limits – Apply immediately
4. Solution options - Phase shift adjustment
 - Flat start
 - Lock DC taps
 - Lock switched shunts

ACCC CASES:

Solutions – AC contingency checking (ACCC)

1. MW mismatch tolerance – 0.5
2. Contingency case rating – Rate B
3. Percent of rating – 100
4. Output code – Summary
5. Min flow change in overload report – 1mw
6. Excl'd cases w/ no overloads form report – YES
7. Exclude interfaces from report – NO
8. Perform voltage limit check – YES
9. Elements in available capacity table – 60000
10. Cutoff threshold for available capacity table – 99999.0
11. Min. contng. case Vltg chng for report – 0.02
12. Sorted output – None

Newton Solution:

1. Tap adjustment – Stepping
2. Area interchange control – Tie lines only
3. Var limits - Apply automatically
4. Solution options - Phase shift adjustment
 - Flat start
 - Lock DC taps
 - Lock switched shunts

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

Southwest Power Pool
System Impact Study

Study Case	From Area	To Area	Monitored Branch Over 100% Rate B	Rate <MVA>	BC % Loading	TC % Loading	Outaged Branch Causing Overload	ATC (MW)	Solution	Estimated Cost
04WP	WERE	WERE	FT JUNCTION SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 1	68	113.7	114.2	WERE Double Contingency FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 2 FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 3	10	Invalid Contingency	
05AP			None Identified					10		
05G	WERE	WERE	FT JUNCTION SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 1	68	142	142.6	WERE Double Contingency FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 2 FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 3	10	Invalid Contingency	
05G	WERE	WERE	FT JUNCTION SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 2	92	108.3	108.8	WERE Double Contingency FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 1 FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 3	10	Invalid Contingency	
05SH	WERE	WERE	FT JUNCTION SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 1	68	154.4	155.1	WERE Double Contingency FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 2 FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 3	10	Invalid Contingency	
05SH	WERE	WERE	FT JUNCTION SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 2	92	117.5	118	WERE Double Contingency FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 1 FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 3	10	Invalid Contingency	
05SP	WERE	WERE	FT JUNCTION SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 1	68	121.8	122.4	WERE Double Contingency FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 2 FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 3	10	Invalid Contingency	
05FA	WERE	WERE	FT JUNCTION SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 1	68	135	135.7	WERE Double Contingency FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 2 FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 3	10	Invalid Contingency	
05FA	WERE	WERE	FT JUNCTION SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 2	92	102.9	103.5	WERE Double Contingency FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 1 FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 3	10	Invalid Contingency	
05WP	WERE	WERE	FT JUNCTION SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 1	68	125.6	126.2	WERE Double Contingency FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 2 FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 3	10	Invalid Contingency	
07SP	WERE	WERE	FT JUNCTION SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 1	68	126.2	126.8	WERE Double Contingency FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 2 FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 3	10	Invalid Contingency	
07WP	WERE	WERE	FT JUNCTION SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 1	68	133.3	133.9	WERE Double Contingency FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 2 FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 3	10	Invalid Contingency	
07WP	WERE	WERE	FT JUNCTION SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 2	92	101.6	102.1	WERE Double Contingency FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 1 FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 3	10	Invalid Contingency	
10SP	WERE	WERE	FT JUNCTION SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 1	68	121.2	121.8	WERE Double Contingency FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 2 FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 3	10	Invalid Contingency	
10WP	WERE	WERE	FT JUNCTION SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 1	68	142.5	143.2	WERE Double Contingency FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 2 FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 3	10	Invalid Contingency	
10WP	WERE	WERE	FT JUNCTION SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 2	92	108.6	109.2	WERE Double Contingency FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 1 FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 3	10	Invalid Contingency	
Total Estimated Engineering and Construction Cost										\$0

Table 2.1 - SPP Voltage Violations

Caused or Impacted by the Transfer Using Scenario 1

Study Case	Area	Monitored Bus with Violation	BC Voltage (PU)	TC Voltage (PU)	Outaged Branch Causing Voltage Violation	ATC (MW)	Solution	Estimated Cost
04WP		NONE IDENTIFIED				10		
05AP		NONE IDENTIFIED				10		
05G		NONE IDENTIFIED				10		
05SP		NONE IDENTIFIED				10		
05SH		NONE IDENTIFIED				10		
05FA		NONE IDENTIFIED				10		
05WP		NONE IDENTIFIED				10		
07SP		NONE IDENTIFIED				10		
07WP		NONE IDENTIFIED				10		
10SP		NONE IDENTIFIED				10		
10WP		NONE IDENTIFIED				10		
Total Estimated Engineering and Construction Cost								\$0

SPP-2004-027-1

Southwest Power Pool
System Impact Study

Table 3.1 - Non-SPP Facility Overloads

Caused or Impacted by the Transfer Using Scenario 1

Study Case	From Area	To Area	Monitored Branch Over 100% Rate B	Rate <MVA>	BC % Loading	TC % Loading	Outaged Branch Causing Overload	Comments
04WP			NONE IDENTIFIED					
05AP			NONE IDENTIFIED					
05G			NONE IDENTIFIED					
05SH			NONE IDENTIFIED					
05SP			NONE IDENTIFIED					
05FA			NONE IDENTIFIED					
05WP			NONE IDENTIFIED					
07SP			NONE IDENTIFIED					
07WP			NONE IDENTIFIED					
10SP			NONE IDENTIFIED					
10WP	WEPL	WEPL	58764 GRNBURG3 115 to 58771 JUD-LRG3 115 CKT 1	80	97.9	101.7	58779 MULGREN6 230 to 58795 SPEARVL6 230 CKT 1	Limits rollover rights beginning 12/1/2010

SPP-2004-027-1
 Table 1.2 - SPP Facility Overloads
 Caused or Impacted by the Transfer Using Scenario 2

Southwest Power Pool
 System Impact Study

Study Case	From Area	To Area	Monitored Branch Over 100% Rate B	Rate <MVA>	BC % Loading	TC % Loading	Outaged Branch Causing Overload	ATC (MW)	Solution	Estimated Cost
04WP	WERE	WERE	FT JUNCTION SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 1	68	145.4	145.9	WERE Double Contingency FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 2 FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 3	10	Invalid Contingency	
04WP	WERE	WERE	FT JUNCTION SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 2	92	110.9	111.4	WERE Double Contingency FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 1 FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 3	10	Invalid Contingency	
04WP	WERE	WERE	NORTH AMERICAN PHILIPS JUNCTION (SOUTH) - WEST MCPHERSON 115KV CKT 1	68	104.7	106.2	EAST MCPHERSON - SUMMIT 230KV	0	Tear down double circuit, build single circuit with 1192.5 ACSR. Estimated lead time is 12 months.	\$ 7,800,000
05AP			None Identified							
05G	WERE	WERE	FORT JCT SWI STA - WEST JCT CITY JCT (EAST) 115KV CKT 1	68	105.7	106.3	FORT JCT SWI STA - WEST JCT CITY JCT (EAST) 115KV CKT 2	10	Invalid Contingency	
05G	WERE	WERE	FT JUNCTION SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 1	68	161.1	161.7	WERE Double Contingency FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 2 FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 3	10	Invalid Contingency	
05G	WERE	WERE	FT JUNCTION SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 2	92	122.9	123.3	WERE Double Contingency FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 1 FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 3	10	Invalid Contingency	
05G	WERE	WERE	NORTH AMERICAN PHILIPS - NORTH AMERICAN PHILIPS JUNCTION (SOUTH) 115KV	160	101.2	102.5	EAST MCPHERSON - SUMMIT 230KV	0	Rebuild 0.88 miles and reconductor with 1192.5 ACSR. Estimated lead time is 5 months.	\$ 417,200
05G	WERE	WERE	NORTH AMERICAN PHILIPS JUNCTION (SOUTH) - WEST MCPHERSON 115KV CKT 1	68	109.3	110.7	EAST MCPHERSON - SUMMIT 230KV	0	See Previous Upgrade Identified for Facility	
05G	WERE	WERE	WEST JUNCTION CITY - WEST JUNCTION CITY JUNCTION (EAST) 115KV	141	102.2	102.7	JEFFREY ENERGY CENTER - SUMMIT 345KV	10	Relieved due to Westar Operating Procedure 402 - Outage of the Jeffrey Energy Center to Summit 345 kV Line	
05G	WERE	WERE	WEST JUNCTION CITY - WEST JUNCTION CITY JUNCTION (EAST) 115KV	141	102.1	102.5	SUMMIT 345/230/14.4KV TRANSFORMER	10	Relieved due to Westar Operating Procedure 617 - Outage of the Summit 345/230KV Transformer	
05SH	WERE	WERE	ANZIO - FORT JUNCTION SWITCHING STATION 115KV	92	114.4	115.0	WEST JCT CITY - WEST JCT CITY JCT (EAST) 115KV	10	Relieved due to Westar Operating Procedure 1217 - Outage of the Fort Junction to West Junction City 115KV Line	
05SH	WERE	WERE	ANZIO - FORT JUNCTION SWITCHING STATION 115KV	92	114.4	115.0	Multiple Contingency Outage FORT JCT SWI STA - WEST JCT CITY JCT (EAST) 115KV CKT 1 FORT JCT SWI STA - WEST JCT CITY JCT (EAST) 115KV CKT 2 WEST JUNCTION CITY - WEST JUNCTION CITY JCT (EAST) 115KV	10	Relieved due to Westar Operating Procedure 1217 - Outage of the Fort Junction to West Junction City 115KV Line	
05SH	WERE	WERE	ANZIO - FORT JUNCTION SWITCHING STATION 115KV	92	114.4	115.0	Multiple Contingency Outage FORT JCT SWI STA - WEST JCT CITY JCT (EAST) 115KV CKT 1 FORT JCT SWI STA - WEST JCT CITY JCT (EAST) 115KV CKT 2	10	Relieved due to Westar Operating Procedure 1217 - Outage of the Fort Junction to West Junction City 115KV Line	
05SH	WERE	WERE	EAST STREET - WEST EMPORIA 115KV	92	99.9	100.5	MORRIS COUNTY - WEST EMPORIA 115KV	10	Relieved due to Westar Operating Procedure 1209 - Outage of the Morris to West Emporia 115KV Line	
05SH	WERE	WERE	EXIDE JUNCTION - NORTH AMERICAN PHILIPS 115KV	196	100.5	101.3	EAST MCPHERSON - SUMMIT 230KV	0	Rebuild and reconductor 0.34 miles with 1192 ACSR. Estimated lead time is 5 months.	\$ 95,200
05SH	WERE	WERE	EXIDE JUNCTION - SUMMIT 115KV	196	105.5	106.3	EAST MCPHERSON - SUMMIT 230KV	0	Rebuild and reconductor 4.94 miles with 1192 ACSR. Estimated lead time is 7 months.	\$ 1,100,000
05SH	WERE	WERE	EXIDE JUNCTION - SUMMIT 115KV	196	103.4	103.9	NORTHVIEW - SUMMIT 115KV	0	See Previous Upgrade Identified for Facility	
05SH	WERE	WERE	FORT JCT SWI STA - WEST JCT CITY JCT (EAST) 115KV CKT 1	68	120.7	121.6	FORT JCT SWI STA - WEST JCT CITY JCT (EAST) 115KV CKT 2	10	Invalid Contingency	
05SH	WERE	WERE	FORT JCT SWI STA - WEST JCT CITY JCT (EAST) 115KV CKT 1	68	109.2	109.8	JEFFREY ENERGY CENTER - SUMMIT 345KV	10	Relieved due to Westar Operating Procedure 402 - Outage of the Jeffrey Energy Center to Summit 345 kV Line	
05SH	WERE	WERE	FORT JCT SWI STA - WEST JCT CITY JCT (EAST) 115KV CKT 1	68	109.0	109.6	SUMMIT 345/230/14.4KV TRANSFORMER	10	Relieved due to Westar Operating Procedure 617 - Outage of the Summit 345/230KV Transformer	
05SH	WERE	WERE	FT JUNCTION SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 1	68	105.3	105.8	JEFFREY ENERGY CENTER - SUMMIT 345KV	10	Relieved due to Westar Operating Procedure 402 - Outage of the Jeffrey Energy Center to Summit 345 kV Line	
05SH	WERE	WERE	FT JUNCTION SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 1	68	105.1	105.6	SUMMIT 345/230/14.4KV TRANSFORMER	10	Relieved due to Westar Operating Procedure 617 - Outage of the Summit 345/230KV Transformer	
05SH	WERE	WERE	FT JUNCTION SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 1	68	102.3	103.0	FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 2	10	Invalid Contingency	
05SH	WERE	WERE	NORTH AMERICAN PHILIPS - NORTH AMERICAN PHILIPS JUNCTION (SOUTH) 115KV	160	100.5	102.1	EAST MCPHERSON - SUMMIT 230KV	0	See Previous Upgrade Identified for Facility	
05SH	WERE	WERE	NORTH AMERICAN PHILIPS JUNCTION (SOUTH) - WEST MCPHERSON 115KV CKT 1	68	108.5	110.2	EAST MCPHERSON - SUMMIT 230KV	0	See Previous Upgrade Identified for Facility	
05SH	WERE	WERE	WEST JUNCTION CITY - WEST JUNCTION CITY JUNCTION (EAST) 115KV	141	115.0	115.6	JEFFREY ENERGY CENTER - SUMMIT 345KV	10	Relieved due to Westar Operating Procedure 402 - Outage of the Jeffrey Energy Center to Summit 345 kV Line	
05SH	WERE	WERE	WEST JUNCTION CITY - WEST JUNCTION CITY JUNCTION (EAST) 115KV	141	114.8	115.4	SUMMIT 345/230/14.4KV TRANSFORMER	10	Relieved due to Westar Operating Procedure 617 - Outage of the Summit 345/230KV Transformer	
05SH	WERE	WERE	WEST JUNCTION CITY - WEST JUNCTION CITY JUNCTION (EAST) 115KV	141	114.8	115.4	SUMMIT 345/230/14.4KV TRANSFORMER	10	Relieved due to Westar Operating Procedure 1213 - Outage of the Circle to Hutchinson Energy Center 115KV Line	
05SP	WERE	WERE	CIRCLE - SANDHILL ARK VALLEY CO-OP D.P. JUNCTION 115KV	68	117.1	117.6	CIRCLE - HUTCHINSON ENERGY CENTER 115KV	10	Relieved due to Westar Operating Procedure 1209 - Outage of the Morris to West Emporia 115KV Line	
05SP	WERE	WERE	EAST STREET - WEST EMPORIA 115KV	92	106.5	107.0	MORRIS COUNTY - WEST EMPORIA 115KV	10	Relieved due to Westar Operating Procedure 625 - Outage of the Morris 230/115KV Transformer	
05SP	WERE	WERE	EAST STREET - WEST EMPORIA 115KV	92	104.7	105.2	MORRIS COUNTY 230/115/13.8KV TRANSFORMER	10	Relieved due to Westar Operating Procedure 625 - Outage of the Morris 230/115KV Transformer	
05SP	WERE	WERE	FT JUNCTION SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 1	68	151.6	152.3	WERE Double Contingency FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 2 FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 3	10	Invalid Contingency	
05SP	WERE	WERE	FT JUNCTION SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 2	92	115.4	116.0	WERE Double Contingency FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 1 FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 3	10	Invalid Contingency	
05FA	WERE	WERE	EXIDE JUNCTION - SUMMIT 115KV	196	102.8	103.6	EAST MCPHERSON - SUMMIT 230KV	0	See Previous Upgrade Identified for Facility	
05FA	WERE	WERE	FORT JCT SWI STA - WEST JCT CITY JCT (EAST) 115KV CKT 1	68	102.8	103.4	FORT JCT SWI STA - WEST JCT CITY JCT (EAST) 115KV CKT 2	10	Invalid Contingency	
05FA	WERE	WERE	FORT JCT SWI STA - WEST JCT CITY JCT (EAST) 115KV CKT 1	68	102.7	103.3	JEFFREY ENERGY CENTER - SUMMIT 345KV	10	Relieved due to Westar Operating Procedure 402 - Outage of the Jeffrey Energy Center to Summit 345 kV Line	
05FA	WERE	WERE	FORT JCT SWI STA - WEST JCT CITY JCT (EAST) 115KV CKT 1	68	102.2	102.8	SUMMIT 345/230/14.4KV TRANSFORMER	10	Relieved due to Westar Operating Procedure 617 - Outage of the Summit 345/230KV Transformer	
05FA	WERE	WERE	FT JUNCTION SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 1	68	153.8	154.5	WERE Double Contingency FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 2 FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 3	10	Invalid Contingency	
05FA	WERE	WERE	FT JUNCTION SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 2	92	117.3	117.8	WERE Double Contingency FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 1 FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 3	10	Invalid Contingency	
05FA	WERE	WERE	NORTH AMERICAN PHILIPS - NORTH AMERICAN PHILIPS JUNCTION (SOUTH) 115KV	160	106.0	107.7	EAST MCPHERSON - SUMMIT 230KV	0	See Previous Upgrade Identified for Facility	
05FA	WERE	WERE	NORTH AMERICAN PHILIPS JUNCTION (SOUTH) - WEST MCPHERSON 115KV CKT 1	68	114.5	116.2	EAST MCPHERSON - SUMMIT 230KV	0	See Previous Upgrade Identified for Facility	
05FA	WERE	WERE	NORTH AMERICAN PHILIPS JUNCTION (SOUTH) - WEST MCPHERSON 115KV CKT 2	92	99.9	101.4	EAST MCPHERSON - SUMMIT 230KV	1	See Previous Upgrade Identified for Facility	
05FA	WERE	WERE	WEST JUNCTION CITY - WEST JUNCTION CITY JUNCTION (EAST) 115KV	141	108.1	108.8	JEFFREY ENERGY CENTER - SUMMIT 345KV	10	Relieved due to Westar Operating Procedure 402 - Outage of the Jeffrey Energy Center to Summit 345 kV Line	

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

Southwest Power Pool
 System Impact Study

05FA	WERE	WERE	WEST JUNCTION CITY - WEST JUNCTION CITY JUNCTION (EAST) 115KV	141	107.6	108.2	SUMMIT 345/230/14.4KV TRANSFORMER	10	Relieved due to Westar Operating Procedure 617 - Outage of the Summit 345/230KV Transformer	
							WERE Double Contingency			
05WP	WERE	WERE	FT JUNCTION SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 1	68	140.0	140.7	FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 2 FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 3	10	Invalid Contingency	
							WERE Double Contingency			
05WP	WERE	WERE	FT JUNCTION SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 2	92	106.8	107.3	FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 1 FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 3	10	Invalid Contingency	
05WP	WERE	WERE	NORTH AMERICAN PHILIPS JUNCTION (SOUTH) - WEST MCPHERSON 115KV CKT 1	68	102.6	104.3	EAST MCPHERSON - SUMMIT 230KV	0	See Previous Upgrade Identified for Facility	
07SP	WERE	WERE	EAST STREET - WEST EMPORIA 115KV	92	107.5	108.0	MORRIS COUNTY 230/115/13.8KV TRANSFORMER	10	Relieved due to Westar Operating Procedure 625 - Outage of the Morris 230/115KV Transformer	
07SP	WERE	WERE	EAST STREET - WEST EMPORIA 115KV	92	107.1	107.5	MORRIS COUNTY - WEST EMPORIA 115KV	10	Relieved due to Westar Operating Procedure 1209 - Outage of the Morris to West Emporia 115KV Line	
							WERE Double Contingency			
07SP	WERE	WERE	FT JUNCTION SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 1	68	153.9	154.5	FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 2 FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 3	10	Invalid Contingency	
							WERE Double Contingency			
07SP	WERE	WERE	FT JUNCTION SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 2	92	117.1	117.6	FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 1 FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 3	10	Invalid Contingency	
							WERE Double Contingency			
07WP	WERE	WERE	FT JUNCTION SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 1	68	147.6	148.3	FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 2 FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 3	10	Invalid Contingency	
							WERE Double Contingency			
07WP	WERE	WERE	FT JUNCTION SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 2	92	112.5	113.1	FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 1 FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 3	10	Invalid Contingency	
							WERE Double Contingency			
10SP	WERE	WERE	EAST MANHATTAN 230/115/18.0KV TRANSFORMER	308	101.1	101.3	SUMMIT 345/230/14.4KV TRANSFORMER	10	WERE conversion of Morris - McDowell 115KV line to 230KV line relieves overload. Estimated In-Service 2006.	
10SP	WERE	WERE	EAST MANHATTAN 230/115/18.0KV TRANSFORMER	308	101.0	101.1	JEFFREY ENERGY CENTER - SUMMIT 345KV	10	WERE conversion of Morris - McDowell 115KV line to 230KV line relieves overload. Estimated In-Service 2006.	
10SP	WERE	WERE	EAST STREET - WEST EMPORIA 115KV	92	120.8	121.3	MORRIS COUNTY 230/115/13.8KV TRANSFORMER	10	Relieved due to Westar Operating Procedure 625 - Outage of the Morris 230/115KV Transformer	
10SP	WERE	WERE	EAST STREET - WEST EMPORIA 115KV	92	116.1	116.5	MORRIS COUNTY - WEST EMPORIA 115KV	10	Relieved due to Westar Operating Procedure 1209 - Outage of the Morris to West Emporia 115KV Line	
10SP	WERE	WERE	EXIDE JUNCTION - SUMMIT 115KV	196	103.4	103.9	NORTHVIEW - SUMMIT 115KV	0	See Previous Upgrade Identified for Facility	
							WERE Double Contingency			
10SP	WERE	WERE	FT JUNCTION SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 1	68	165.3	166.1	FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 2 FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 3	10	Invalid Contingency	
							WERE Double Contingency			
10SP	WERE	WERE	FT JUNCTION SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 2	92	125.9	126.4	FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 1 FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 3	10	Invalid Contingency	
10SP	WERE	WERE	NORTHVIEW - SUMMIT 115KV	181	101.8	102.3	EXIDE JUNCTION - SUMMIT 115KV	0	Limits rollover rights beginning 6/1/2010	
10WP	WERE	WERE	FORT JCT SWI STA - WEST JCT CITY JCT (EAST) 115KV CKT 1	68	101.0	101.7	FORT JCT SWI STA - WEST JCT CITY JCT (EAST) 115KV CKT 2	10	Invalid Contingency	
							WERE Double Contingency			
10WP	WERE	WERE	FT JUNCTION SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 1	68	159.7	160.4	FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 2 FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 3	10	Invalid Contingency	
							WERE Double Contingency			
10WP	WERE	WERE	FT JUNCTION SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 2	92	121.7	122.3	FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 1 FT JCT SWI STA - MCDOWELL CREEK SWI STA 115KV CKT 3	10	Invalid Contingency	
10WP	WERE	WERE	NORTH AMERICAN PHILIPS JUNCTION (SOUTH) - WEST MCPHERSON 115KV CKT 1	68	103.7	105.5	EAST MCPHERSON - SUMMIT 230KV	0	See Previous Upgrade Identified for Facility	
10WP	WERE	WERE	WEST JUNCTION CITY - WEST JUNCTION CITY JUNCTION (EAST) 115KV	141	102.9	103.5	SUMMIT 345/230/14.4KV TRANSFORMER	10	Relieved due to Westar Operating Procedure 617 - Outage of the Summit 345/230KV Transformer	
									Total Estimated Engineering and Construction Cost	\$ 9,412,400

SPP-2004-027-1

Southwest Power Pool
System Impact Study

Table 3.2 - Non-SPP Facility Overloads
Caused or Impacted by the Transfer Using Scenario 2

Study Case	From Area	To Area	Monitored Branch Over 100% Rate B	Rate <MVA>	BC % Loading	TC % Loading	Outaged Branch Causing Overload	Comments
04WP			NONE IDENTIFIED					
05AP			NONE IDENTIFIED					
05G			NONE IDENTIFIED					
05SH			NONE IDENTIFIED					
05SP			NONE IDENTIFIED					
05FA			NONE IDENTIFIED					
05WP			NONE IDENTIFIED					
07SP			NONE IDENTIFIED					
07WP			NONE IDENTIFIED					
10SP			NONE IDENTIFIED					
10WP			NONE IDENTIFIED					

	Monitored Brance for Facility	Outaged Brance for Facility	Maximum Relief Needed for Facility (MW)
Limiting Facility 1	NORTH AMERICAN PHILIPS JUNCTION (SOUTH) - WEST MCPHERSON 115KV CKT 1	EAST MCPHERSON - SUMMIT 230KV	1.2
Limiting Facility 2	NORTH AMERICAN PHILIPS JUNCTION (SOUTH) - WEST MCPHERSON 115KV CKT 2	EAST MCPHERSON - SUMMIT 230KV	1.3
Limiting Facility 3	NORTH AMERICAN PHILIPS - NORTH AMERICAN PHILIPS JUNCTION (SOUTH) 115KV	EAST MCPHERSON - SUMMIT 230KV	2.6
Limiting Facility 4	EXIDE JUNCTION - SUMMIT 115KV	EAST MCPHERSON - SUMMIT 230KV	1.6
Limiting Facility 5	EXIDE JUNCTION - NORTH AMERICAN PHILIPS 115KV	EAST MCPHERSON - SUMMIT 230KV	1.5

Table 5 - Generation Shift Factors for Facilities
Limiting the ATC to OMW

Source	Sink	GSF - Limiting Element 1	GSF - Limiting Element 2	GSF - Limiting Element 3	GSF - Limiting Element 4	GSF - Limiting Element 5
WERE_MCPH PLT12.5	Swing	-0.24874	-0.28615	-0.5349	-0.30578	-0.30578
WERE_MCPHGT1 13.8	Swing	-0.24874	-0.28615	-0.5349	-0.30578	-0.30578
WERE_MCPHGT2 13.8	Swing	-0.24874	-0.28615	-0.5349	-0.30578	-0.30578
WERE_MCPHGT3 13.8	Swing	-0.24874	-0.28615	-0.5349	-0.30578	-0.30578
WERE_MCPHGT4 13.8	Swing	-0.24315	-0.27972	-0.52287	-0.29876	-0.29876
WERE_HEC U4 18.0	Swing	-0.19739	-0.22707	-0.42446	-0.24163	-0.24163
WERE_HEC GT3 13.8	Swing	-0.19738	-0.22707	-0.42445	-0.24163	-0.24163
WERE_HEC GT4 13.8	Swing	-0.19738	-0.22707	-0.42445	-0.24163	-0.24163
WERE_HEC GT2 13.8	Swing	-0.19723	-0.2269	-0.42413	-0.24144	-0.24144
WERE_HEC U1 14.4	Swing	-0.19707	-0.22671	-0.42378	-0.24123	-0.24123
WERE_HEC U2 14.4	Swing	-0.19707	-0.22671	-0.42378	-0.24123	-0.24123
WERE_HEC U3 14.4	Swing	-0.19707	-0.22671	-0.42378	-0.24123	-0.24123
WERE_HEC GT1 13.8	Swing	-0.19707	-0.22671	-0.42379	-0.24124	-0.24124
WERE_LEC U3 14.4	Swing	0.01008	0.0116	0.02169	0.00947	0.00947
WERE_LEC U4 14.4	Swing	0.01009	0.0116	0.02169	0.00946	0.00946
WERE_LEC U5 24.0	Swing	0.01055	0.01214	0.0227	0.00997	0.00997
WERE_TEC U7 14.4	Swing	0.01231	0.01416	0.02647	0.00854	0.00854
WERE_TEC U8 16.0	Swing	0.01231	0.01416	0.02647	0.00854	0.00854
WERE_TEC GT 13.8	Swing	0.01253	0.01442	0.02695	0.00833	0.00833
WERE_JEC U1 26.0	Swing	0.01641	0.01888	0.0353	0.01638	0.01638
WERE_JEC U2 26.0	Swing	0.01697	0.01953	0.0365	0.02338	0.02338
WERE_JEC U3 26.0	Swing	0.01697	0.01953	0.0365	0.02338	0.02338

Table 6 - Applicable Relief Pairs and
Redispatch Amount Required

Southwest Power Pool
System Impact Study

Source	Sink	Limiting Facility 1		Limiting Facility 2		Limiting Facility 3		Limiting Facility 4		Limiting Facility 5	
		Factor	Redispatch Amount (MW)	Factor	Redispatch Amount (MW)	Factor	Redispatch Amount (MW)	Factor	Redispatch Amount (MW)	Factor	Redispatch Amount (MW)
WERE_MCPH PLT12.5	WERE_JEC U1 26.0	-0.26515	5	-0.30503	4	-0.57020	5	-0.32216	5	-0.32216	5
WERE_HEC U4 18.0	WERE_LEC U3 14.4	-0.20747	6	-0.23867	5	-0.44615	6	-0.25110	6	-0.25110	6
WERE_MCPHGT4 13.8	WERE_TEC U7 14.4	-0.25546	5	-0.29388	4	-0.54934	5	-0.30730	5	-0.30730	5
WERE_HEC U1 14.4	WERE_JEC U2 26.0	-0.21404	6	-0.24624	5	-0.46028	6	-0.26461	6	-0.26461	6

Factor = Source GSF Referenced to System Swing - Sink GSF Referenced to System Swing

Redispatch Amount = Relief Amount / Factor

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

Southwest Power Pool
System Impact Study

Study Case	From Area	To Area	Monitored Branch Over 100% Rate B	Rate <MVA>	BC % Loading	TC % Loading	Outaged Branch Causing Overload	ATC (MW)	Solution	Estimated Cost
04WP	WERE	WERE	57328 FT JCT 3 115 57335*MCDOWEL3 115 1	68	113.7	114.2	57328 FT JCT 3115 57335 MCDOWEL3115 CKT 2 57328 FT JCT 3115 57335 MCDOWEL3115 CKT 3	10	Invalid Contingency	
05AP			None Identified					10		
05G	WERE	WERE	57328 FT JCT 3 115 57335*MCDOWEL3 115 1	68	142	142.6	57328 FT JCT 3115 57335 MCDOWEL3115 CKT 2 57328 FT JCT 3115 57335 MCDOWEL3115 CKT 3	10	Invalid Contingency	
05G	WERE	WERE	57328 FT JCT 3 115 57335*MCDOWEL3 115 2	92	108.3	108.8	57328 FT JCT 3115 57335 MCDOWEL3115 CKT 1 57328 FT JCT 3115 57335 MCDOWEL3115 CKT 3	10	Invalid Contingency	
05SH	WERE	WERE	57328 FT JCT 3 115 57335*MCDOWEL3 115 1	68	154.4	155.1	57328 FT JCT 3115 57335 MCDOWEL3115 CKT 2 57328 FT JCT 3115 57335 MCDOWEL3115 CKT 3	10	Invalid Contingency	
05SH	WERE	WERE	57328 FT JCT 3 115 57335*MCDOWEL3 115 2	92	117.5	118	57328 FT JCT 3115 57335 MCDOWEL3115 CKT 1 57328 FT JCT 3115 57335 MCDOWEL3115 CKT 3	10	Invalid Contingency	
05SP	WERE	WERE	57328 FT JCT 3 115 57335*MCDOWEL3 115 1	68	121.8	122.4	57328 FT JCT 3115 57335 MCDOWEL3115 CKT 2 57328 FT JCT 3115 57335 MCDOWEL3115 CKT 3	10	Invalid Contingency	
05FA	WERE	WERE	57328 FT JCT 3 115 57335*MCDOWEL3 115 1	68	135	135.7	57328 FT JCT 3115 57335 MCDOWEL3115 CKT 1 57328 FT JCT 3115 57335 MCDOWEL3115 CKT 3	10	Invalid Contingency	
05FA	WERE	WERE	57328 FT JCT 3 115 57335*MCDOWEL3 115 2	92	102.9	103.5	57328 FT JCT 3115 57335 MCDOWEL3115 CKT 1 57328 FT JCT 3115 57335 MCDOWEL3115 CKT 3	10	Invalid Contingency	
05WP	WERE	WERE	57328 FT JCT 3 115 57335*MCDOWEL3 115 1	68	125.6	126.2	57328 FT JCT 3115 57335 MCDOWEL3115 CKT 2 57328 FT JCT 3115 57335 MCDOWEL3115 CKT 3	10	Invalid Contingency	
07SP	WERE	WERE	57328 FT JCT 3 115 57335*MCDOWEL3 115 1	68	126.2	126.8	57328 FT JCT 3115 57335 MCDOWEL3115 CKT 2 57328 FT JCT 3115 57335 MCDOWEL3115 CKT 3	10	Invalid Contingency	
07WP	WERE	WERE	57328 FT JCT 3 115 57335*MCDOWEL3 115 1	68	133.3	133.9	57328 FT JCT 3115 57335 MCDOWEL3115 CKT 2 57328 FT JCT 3115 57335 MCDOWEL3115 CKT 3	10	Invalid Contingency	
07WP	WERE	WERE	57328 FT JCT 3 115 57335*MCDOWEL3 115 2	92	101.6	102.1	57328 FT JCT 3115 57335 MCDOWEL3115 CKT 1 57328 FT JCT 3115 57335 MCDOWEL3115 CKT 3	10	Invalid Contingency	
10SP	WERE	WERE	57328 FT JCT 3 115 57335*MCDOWEL3 115 1	68	121.2	121.8	57328 FT JCT 3115 57335 MCDOWEL3115 CKT 2 57328 FT JCT 3115 57335 MCDOWEL3115 CKT 3	10	Invalid Contingency	
10WP	WERE	WERE	57328 FT JCT 3 115 57335*MCDOWEL3 115 1	68	142.5	143.2	57328 FT JCT 3115 57335 MCDOWEL3115 CKT 2 57328 FT JCT 3115 57335 MCDOWEL3115 CKT 3	10	Invalid Contingency	
10WP	WERE	WERE	57328 FT JCT 3 115 57335*MCDOWEL3 115 2	92	108.6	109.2	57328 FT JCT 3115 57335 MCDOWEL3115 CKT 1 57328 FT JCT 3115 57335 MCDOWEL3115 CKT 3	10	Invalid Contingency	
									Total Estimated Engineering and Construction Cos'	\$0

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

Southwest Power Pool
System Impact Study

Study Case	From Area	To Area	Monitored Branch Over 100% Rate B	Rate <MVA>	BC % Loading	TC % Loading	Outaged Branch Causing Overload	ATC (MW)	Solution	Estimated Cost
04WP	WERE	WERE	57328 FT JCT 3 115 to 57335 MCDOWEL3 115 1	68	145.4	145.9	57328 FT JCT 3 115 to 57335 MCDOWEL3115 CKT 2 57328 FT JCT 3 115 to 57335 MCDOWEL3115 CKT 3	10	Invalid Contingency	
04WP	WERE	WERE	57328 FT JCT 3 115 to 57335 MCDOWEL3 115 2	92	110.9	111.4	57328 FT JCT 3 115 to 57335 MCDOWEL3115 CKT 1 57328 FT JCT 3 115 to 57335 MCDOWEL3115 CKT 3	10	Invalid Contingency	
04WP	WERE	WERE	57374 SPHILPJ3 115 to 57438 WMPHER3 115 CKT 1	68	104.7	106.2	56872 EMCPHER6 230 to 56873 SUMMIT 6 230 CKT 1	0	Tear down double circuit, build single circuit with 1192.5 ACSR. Estimated lead time is 12 months.	\$ 7,800,000
05AP			None Identified							
05G	WERE	WERE	57328 FT JCT 3 115 to 57343 WJCCTYE3 115 CKT 1	68	105.7	106.3	57328 FT JCT 3 115 to 57343 WJCCTYE3 115 CKT 2	10	Invalid Contingency	
05G	WERE	WERE	57328 FT JCT 3 115 to 57335 MCDOWEL3 115 1	68	161.1	161.7	57328 FT JCT 3 115 to 57335 MCDOWEL3115 CKT 2 57328 FT JCT 3 115 to 57335 MCDOWEL3115 CKT 3	10	Invalid Contingency	
05G	WERE	WERE	57328 FT JCT 3 115 to 57335 MCDOWEL3 115 2	92	122.9	123.3	57328 FT JCT 3 115 to 57335 MCDOWEL3115 CKT 1 57328 FT JCT 3 115 to 57335 MCDOWEL3115 CKT 3	10	Invalid Contingency	
05G	WERE	WERE	57372 PHILIPS3 115 to 57374 SPHILPJ3 115 CKT 1	160	101.2	102.5	56872 EMCPHER6 230 to 56873 SUMMIT 6 230 CKT 1	0	Rebuild 0.88 miles and reconductor with 1192.5 ACSR. Estimated lead time is 5 months.	\$ 417,200
05G	WERE	WERE	57374 SPHILPJ3 115 to 57438 WMPHER3 115 CKT 1	68	109.3	110.7	56872 EMCPHER6 230 to 56873 SUMMIT 6 230 CKT 1	0	See Previous Upgrade Identified for Facility	
05G	WERE	WERE	57343 WJCCTYE3 115 to 57342 WJCCTY 3 115 CKT 1	141	102.2	102.7	56766 JEC N 7 345 to 56773 SUMMIT 7 345 CKT 1	10	Relieved due to Westar Operating Procedure 402 - Outage of the Jeffrey Energy Center to Summit 345 kV Line	
05G	WERE	WERE	57343 WJCCTYE3 115 to 57342 WJCCTY 3 115 CKT 1	141	102.1	102.5	56773 SUMMIT 7 345 to 56873 SUMMIT 6 230 to 56813 SUMMIT 114.4 CKT 1	10	Relieved due to Westar Operating Procedure 617 - Outage of the Summit 345/230kV Transformer	
05SH	WERE	WERE	57321 ANZIO 3 115 to 57328 FT JCT 3 115 CKT 1	92	114.4	115.0	57342 WJCCTY 3 115 to 57343 WJCCTYE3 115 CKT 1	10	Relieved due to Westar Operating Procedure 1217 - Outage of the Fort Junction to West Junction City 115kV Line	
05SH	WERE	WERE	57321 ANZIO 3 115 to 57328 FT JCT 3 115 CKT 1	92	114.4	115.0	57328 FT JCT 3 115 to 57343 WJCCTYE3115 CKT 1 57343 WJCCTY3115 57342 WJCCTY3115 CKT 1	10	Relieved due to Westar Operating Procedure 1217 - Outage of the Fort Junction to West Junction City 115kV Line	
05SH	WERE	WERE	57321 ANZIO 3 115 to 57328 FT JCT 3 115 CKT 1	92	114.4	115.0	57328 FT JCT 3 115 to 57343 WJCCTYE3115 CKT 1 57328 FT JCT 3 115 to 57343 WJCCTYE3115 CKT 2	10	Relieved due to Westar Operating Procedure 1217 - Outage of the Fort Junction to West Junction City 115kV Line	
05SH	WERE	WERE	57309 WEMPOR3 115 to 57301 EAST ST3 115 CKT 1	92	99.9	100.5	57305 MORRIS 3 115 to 57309 WEMPOR3 115 CKT 1	10	Relieved due to Westar Operating Procedure 1209 - Outage of the Morris to West Emporia 115kV Line	
05SH	WERE	WERE	57368 EXIDE J3 115 to 57372 PHILIPS3 115 CKT 1	196	100.5	101.3	56872 EMCPHER6 230 to 56873 SUMMIT 6 230 CKT 1	0	Rebuild and reconductor 0.34 miles with 1192 ACSR. Estimated lead time is 5 months.	\$ 95,200
05SH	WERE	WERE	57368 EXIDE J3 115 to 57381 SUMMIT 3 115 CKT 1	196	105.5	106.3	56872 EMCPHER6 230 to 56873 SUMMIT 6 230 CKT 1	0	Rebuild and reconductor 4.94 miles with 1192 ACSR. Estimated lead time is 7 months.	\$ 1,100,000
05SH	WERE	WERE	57368 EXIDE J3 115 to 57381 SUMMIT 3 115 CKT 1	196	103.4	103.9	57371 NORTHVW3 115 to 57381 SUMMIT 3 115 CKT 1	0	See Previous Upgrade Identified for Facility	
05SH	WERE	WERE	57328 FT JCT 3 115 to 57343 WJCCTYE3 115 CKT 1	68	120.7	121.6	57328 FT JCT 3 115 to 57343 WJCCTYE3 115 CKT 2	10	Invalid Contingency	
05SH	WERE	WERE	57328 FT JCT 3 115 to 57343 WJCCTYE3 115 CKT 1	68	109.2	109.8	56766 JEC N 7 345 to 56773 SUMMIT 7 345 CKT 1	10	Relieved due to Westar Operating Procedure 402 - Outage of the Jeffrey Energy Center to Summit 345 kV Line	
05SH	WERE	WERE	57328 FT JCT 3 115 to 57343 WJCCTYE3 115 CKT 1	68	109.0	109.6	56773 SUMMIT 7 345 to 56873 SUMMIT 6 230 to 56813 SUMMIT 114.4 CKT 1	10	Relieved due to Westar Operating Procedure 617 - Outage of the Summit 345/230kV Transformer	
05SH	WERE	WERE	57328 FT JCT 3 115 to 57335 MCDOWEL3 115 1	68	105.3	105.8	56766 JEC N 7 345 to 56773 SUMMIT 7 345 CKT 1	10	Relieved due to Westar Operating Procedure 402 - Outage of the Jeffrey Energy Center to Summit 345 kV Line	
05SH	WERE	WERE	57328 FT JCT 3 115 to 57335 MCDOWEL3 115 1	68	105.1	105.6	56773 SUMMIT 7 345 to 56873 SUMMIT 6 230 to 56813 SUMMIT 114.4 CKT 1	10	Relieved due to Westar Operating Procedure 617 - Outage of the Summit 345/230kV Transformer	
05SH	WERE	WERE	57328 FT JCT 3 115 to 57335 MCDOWEL3 115 1	68	102.3	103.0	57328 FT JCT 3 115 to 57335 MCDOWEL3 115 CKT 2	10	Invalid Contingency	
05SH	WERE	WERE	57372 PHILIPS3 115 to 57374 SPHILPJ3 115 CKT 1	160	100.5	102.1	56872 EMCPHER6 230 to 56873 SUMMIT 6 230 CKT 1	0	See Previous Upgrade Identified for Facility	
05SH	WERE	WERE	57374 SPHILPJ3 115 to 57438 WMPHER3 115 CKT 1	68	108.5	110.2	56872 EMCPHER6 230 to 56873 SUMMIT 6 230 CKT 1	0	See Previous Upgrade Identified for Facility	
05SH	WERE	WERE	57343 WJCCTYE3 115 to 57342 WJCCTY 3 115 CKT 1	141	115.0	115.6	56766 JEC N 7 345 to 56773 SUMMIT 7 345 CKT 1	10	Relieved due to Westar Operating Procedure 402 - Outage of the Jeffrey Energy Center to Summit 345 kV Line	
05SH	WERE	WERE	57343 WJCCTYE3 115 to 57342 WJCCTY 3 115 CKT 1	141	114.8	115.4	56773 SUMMIT 7 345 to 56873 SUMMIT 6 230 to 56813 SUMMIT 114.4 CKT 1	10	Relieved due to Westar Operating Procedure 617 - Outage of the Summit 345/230kV Transformer	
05SP	WERE	WERE	57412 ARKVAL3 115 to 57413 CIRCLE 3 115 CKT 1	68	117.1	117.6	57413 CIRCLE 3 115 to 57419 HEC 3 115 CKT 1	10	Relieved due to Westar Operating Procedure 1213 - Outage of the Circle to Hutchinson Energy Center 115kV Line	
05SP	WERE	WERE	57309 WEMPOR3 115 to 57301 EAST ST3 115 CKT 1	92	106.5	107.0	57305 MORRIS 3 115 to 57309 WEMPOR3 115 CKT 1	10	Relieved due to Westar Operating Procedure 1209 - Outage of the Morris to West Emporia 115kV Line	
05SP	WERE	WERE	57309 WEMPOR3 115 to 57301 EAST ST3 115 CKT 1	92	104.7	105.2	56863 MORRIS 6 230 to 57305 MORRIS 3 115 to 56890 MORRIS 113.8 CKT 1	10	Relieved due to Westar Operating Procedure 625 - Outage of the Morris 230/115kV Transformer	
05SP	WERE	WERE	57328 FT JCT 3 115 to 57335 MCDOWEL3 115 1	68	151.6	152.3	57328 FT JCT 3 115 to 57335 MCDOWEL3115 CKT 2 57328 FT JCT 3 115 to 57335 MCDOWEL3115 CKT 3	10	Invalid Contingency	
05SP	WERE	WERE	57328 FT JCT 3 115 to 57335 MCDOWEL3 115 2	92	115.4	116.0	57328 FT JCT 3 115 to 57335 MCDOWEL3115 CKT 1 57328 FT JCT 3 115 to 57335 MCDOWEL3115 CKT 3	10	Invalid Contingency	
05FA	WERE	WERE	57368 EXIDE J3 115 to 57381 SUMMIT 3 115 CKT 1	196	102.5	103.6	56872 EMCPHER6 230 to 56873 SUMMIT 6 230 CKT 1	0	See Previous Upgrade Identified for Facility	
05FA	WERE	WERE	57328 FT JCT 3 115 to 57343 WJCCTYE3 115 CKT 1	68	102.8	103.4	57328 FT JCT 3 115 to 57343 WJCCTYE3 115 CKT 2	10	Invalid Contingency	
05FA	WERE	WERE	57328 FT JCT 3 115 to 57343 WJCCTYE3 115 CKT 1	68	102.7	103.3	56766 JEC N 7 345 to 56773 SUMMIT 7 345 CKT 1	10	Relieved due to Westar Operating Procedure 402 - Outage of the Jeffrey Energy Center to Summit 345 kV Line	
05FA	WERE	WERE	57328 FT JCT 3 115 to 57343 WJCCTYE3 115 CKT 1	68	102.2	102.8	56773 SUMMIT 7 345 to 56873 SUMMIT 6 230 to 56813 SUMMIT 114.4 CKT 1	10	Relieved due to Westar Operating Procedure 617 - Outage of the Summit 345/230kV Transformer	
05FA	WERE	WERE	57328 FT JCT 3 115 to 57335 MCDOWEL3 115 1	68	153.8	154.5	57328 FT JCT 3 115 to 57335 MCDOWEL3115 CKT 2 57328 FT JCT 3 115 to 57335 MCDOWEL3115 CKT 3	10	Invalid Contingency	
05FA	WERE	WERE	57328 FT JCT 3 115 to 57335 MCDOWEL3 115 2	92	117.3	117.8	57328 FT JCT 3 115 to 57335 MCDOWEL3115 CKT 1 57328 FT JCT 3 115 to 57335 MCDOWEL3115 CKT 3	10	Invalid Contingency	
05FA	WERE	WERE	57372 PHILIPS3 115 to 57374 SPHILPJ3 115 CKT 1	160	106.0	107.7	56872 EMCPHER6 230 to 56873 SUMMIT 6 230 CKT 1	0	See Previous Upgrade Identified for Facility	
05FA	WERE	WERE	57374 SPHILPJ3 115 to 57438 WMPHER3 115 CKT 1	68	114.5	116.2	56872 EMCPHER6 230 to 56873 SUMMIT 6 230 CKT 1	0	See Previous Upgrade Identified for Facility	
05FA	WERE	WERE	57374 SPHILPJ3 115 to 57438 WMPHER3 115 CKT 2	92	99.9	101.4	56872 EMCPHER6 230 to 56873 SUMMIT 6 230 CKT 1	1	See Previous Upgrade Identified for Facility	
05FA	WERE	WERE	57343 WJCCTYE3 115 to 57342 WJCCTY 3 115 CKT 1	141	108.1	108.8	56766 JEC N 7 345 to 56773 SUMMIT 7 345 CKT 1	10	Relieved due to Westar Operating Procedure 402 - Outage of the Jeffrey Energy Center to Summit 345 kV Line	

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

Southwest Power Pool
System Impact Study

05FA	WERE	WERE	57343 WJCCTYE3 115 to 57342 WJCCTY 3 115 CKT 1	141	107.6	108.2	56773 SUMMIT 7 345 to 56873 SUMMIT 6 230 to 56813 SUMMIT 114.4 CKT 1	10	Relieved due to Westar Operating Procedure 617 - Outage of the Summit 345/230kV Transformer	
05WP	WERE	WERE	57328 FT JCT 3 115 to 57335 MCDOWEL3 115 1	68	140.0	140.7	57328 FT JCT 3115 57335 MCDOWEL3115 CKT 2 57328 FT JCT 3115 57335 MCDOWEL3115 CKT 3	10	Invalid Contingency	
05WP	WERE	WERE	57328 FT JCT 3 115 to 57335 MCDOWEL3 115 2	92	106.8	107.3	57328 FT JCT 3115 57335 MCDOWEL3115 CKT 1 57328 FT JCT 3115 57335 MCDOWEL3115 CKT 3	10	Invalid Contingency	
05WP	WERE	WERE	57374 SPHILPJ3 115 to 57438 WMCPHER3 115 CKT 1	68	102.6	104.3	56872 EMCIPHER6 230 to 56873 SUMMIT 6 230 CKT 1	0	See Previous Upgrade Identified for Facility	
07SP	WERE	WERE	57309 WEMPOR3 115 to 57301 EAST ST3 115 CKT 1	92	107.5	108.0	56863 MORRIS 6 230 to 57305 MORRIS 3 115 to 56890 MORRIS 113.8 CKT 1	10	Relieved due to Westar Operating Procedure 625 - Outage of the Morris 230/115kV Transformer	
07SP	WERE	WERE	57309 WEMPOR3 115 to 57301 EAST ST3 115 CKT 1	92	107.1	107.5	57305 MORRIS 3 115 to 57309 WEMPOR3 115 CKT 1	10	Relieved due to Westar Operating Procedure 1209 - Outage of the Morris to West Emporia 115kV Line	
07SP	WERE	WERE	57328 FT JCT 3 115 to 57335 MCDOWEL3 115 1	68	153.9	154.5	57328 FT JCT 3115 57335 MCDOWEL3115 CKT 2 57328 FT JCT 3115 57335 MCDOWEL3115 CKT 3	10	Invalid Contingency	
07SP	WERE	WERE	57328 FT JCT 3 115 to 57335 MCDOWEL3 115 2	92	117.1	117.6	57328 FT JCT 3115 57335 MCDOWEL3115 CKT 1 57328 FT JCT 3115 57335 MCDOWEL3115 CKT 3	10	Invalid Contingency	
07WP	WERE	WERE	57328 FT JCT 3 115 to 57335 MCDOWEL3 115 1	68	147.6	148.3	57328 FT JCT 3115 57335 MCDOWEL3115 CKT 2 57328 FT JCT 3115 57335 MCDOWEL3115 CKT 3	10	Invalid Contingency	
07WP	WERE	WERE	57328 FT JCT 3 115 to 57335 MCDOWEL3 115 2	92	112.5	113.1	57328 FT JCT 3115 57335 MCDOWEL3115 CKT 1 57328 FT JCT 3115 57335 MCDOWEL3115 CKT 3	10	Invalid Contingency	
10SP	WERE	WERE	56861 EMANHAT6 230 WND 1 EMANHT3X 1	308	101.1	101.3	56773 SUMMIT 7 345 to 56873 SUMMIT 6 230 to 56813 SUMMIT 114.4 CKT 1	10	WERE conversion of Morris - McDowell 115kV line to 230kV line relieves overload. Estimated In-Service 2006.	
10SP	WERE	WERE	56861 EMANHAT6 230 WND 1 EMANHT3X 1	308	101.0	101.1	56766 JEC N 7 345 to 56773 SUMMIT 7 345 CKT 1	10	WERE conversion of Morris - McDowell 115kV line to 230kV line relieves overload. Estimated In-Service 2006.	
10SP	WERE	WERE	57309 WEMPOR3 115 to 57301 EAST ST3 115 CKT 1	92	120.8	121.3	56863 MORRIS 6 230 to 57305 MORRIS 3 115 to 56890 MORRIS 113.8 CKT 1	10	Relieved due to Westar Operating Procedure 625 - Outage of the Morris 230/115kV Transformer	
10SP	WERE	WERE	57309 WEMPOR3 115 to 57301 EAST ST3 115 CKT 1	92	116.1	116.5	57305 MORRIS 3 115 to 57309 WEMPOR3 115 CKT 1	10	Relieved due to Westar Operating Procedure 1209 - Outage of the Morris to West Emporia 115kV Line	
10SP	WERE	WERE	57368 EXIDE J3 115 to 57381 SUMMIT 3 115 CKT 1	196	103.4	103.9	57371 NORTHVW3 115 to 57381 SUMMIT 3 115 CKT 1	0	See Previous Upgrade Identified for Facility	
10SP	WERE	WERE	57328 FT JCT 3 115 to 57335 MCDOWEL3 115 1	68	165.3	166.1	57328 FT JCT 3115 57335 MCDOWEL3115 CKT 2 57328 FT JCT 3115 57335 MCDOWEL3115 CKT 3	10	Invalid Contingency	
10SP	WERE	WERE	57328 FT JCT 3 115 to 57335 MCDOWEL3 115 2	92	125.9	126.4	57328 FT JCT 3115 57335 MCDOWEL3115 CKT 1 57328 FT JCT 3115 57335 MCDOWEL3115 CKT 3	10	Invalid Contingency	
10SP	WERE	WERE	57371 NORTHVW3 115 to 57381 SUMMIT 3 115 CKT 1	181	101.8	102.3	57368 EXIDE J3 115 to 57381 SUMMIT 3 115 CKT 1	0	Limits rollover rights beginning 6/1/2010	
10WP	WERE	WERE	57328 FT JCT 3 115 to 57343 WJCCTYE3 115 CKT 1	68	101.0	101.7	57328 FT JCT 3 115 to 57343 WJCCTYE3 115 CKT 2	10	Invalid Contingency	
10WP	WERE	WERE	57328 FT JCT 3 115 to 57335 MCDOWEL3 115 1	68	159.7	160.4	57328 FT JCT 3115 57335 MCDOWEL3115 CKT 2 57328 FT JCT 3115 57335 MCDOWEL3115 CKT 3	10	Invalid Contingency	
10WP	WERE	WERE	57328 FT JCT 3 115 to 57335 MCDOWEL3 115 2	92	121.7	122.3	57328 FT JCT 3115 57335 MCDOWEL3115 CKT 1 57328 FT JCT 3115 57335 MCDOWEL3115 CKT 3	10	Invalid Contingency	
10WP	WERE	WERE	57374 SPHILPJ3 115 to 57438 WMCPHER3 115 CKT 1	68	103.7	105.5	56872 EMCIPHER6 230 to 56873 SUMMIT 6 230 CKT 1	0	See Previous Upgrade Identified for Facility	
10WP	WERE	WERE	57343 WJCCTYE3 115 to 57342 WJCCTY 3 115 CKT 1	141	102.9	103.5	56773 SUMMIT 7 345 to 56873 SUMMIT 6 230 to 56813 SUMMIT 114.4 CKT 1	10	Relieved due to Westar Operating Procedure 617 - Outage of the Summit 345/230kV Transformer	
									Total Estimated Engineering and Construction Cost	\$ 9,412,400