



SPP *Southwest Power Pool*

*System Impact Study
SPP-2003-275-2
For Transmission Service
Requested By
Kansas Municipal Energy Agency*

From GRDA To WR

*For a Reserved Amount Of 24 MW
From 5/1/2009
To 5/1/2010*

SPP Engineering, Tariff Studies

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ATTACHMENT: *SPP-2003-275-2 Tables*

1. Executive Summary

Kansas Municipal Energy Agency has requested a system impact study to renew long-term Firm Point-to-Point transmission service from GRDA to WR for 24 MW. The period of the service requested is from 5/1/2009 to 5/1/2010. The OASIS reservation numbers are 610382 and 610383.

The principal objective of this study is to identify system problems and potential system modifications necessary to facilitate the renewal of the 24 MW request while maintaining system reliability. The renewal of long-term service is being evaluated due to the FERC settlement agreement, which ended service 5/1/2009 in order to avoid additional upgrade costs. Analysis was conducted for the requested service period above and for the remaining planning horizon from 5/1/2010 to 4/1/2011. The additional evaluation of the planning horizon was conducted to determine any future constraints that may limit the future renewal of service.

With relevant revisions made to 2004 Series Update 2 cases, the requested service was studied using two System Scenarios. Tables 1.1 and 1.2 list the SPP facility overloads caused or impacted by the transfers modeled using Scenario 1 and 2, respectively. Tables 2.1 and 2.2 list the SPP voltage violations caused or impacted by the transfers modeled using Scenario 1 and 2, respectively. Tables 3.1 and 3.2 list the Non-SPP facility overloads caused or impacted by the transfers modeled using Scenario 1 and 2, respectively.

The ATC for the GRDA to WR 24 MW request is limited to zero. WR redispatch was evaluated as an option to obtain the requested service. Generation shift factors and applicable redispatch relief pairs are documented in Tables 4 and 5, respectively. Additional equivalent sources and sinks provided by KMEA may be used for redispatch after being evaluated by SPP. The redispatch requirements would be called upon prior to implementing NERC TLR Level 5a. Once the customer shows proof of a redispatch agreement with Westar Energy for redispatch to relieve the impact on the limiting constraint identified, the request will be accepted. If the customer elects not to pursue redispatch to relieve the impact on the limiting constraint identified, transmission upgrades will need to be evaluated to mitigate the limiting constraint. Renewal rights are limited to zero due to the FLINT CREEK - GENTRY REC 161KV line and the NORTH AMERICAN PHILIPS JUNCTION (SOUTH) - WEST MCPHERSON 115KV line.

2. Introduction

Kansas Municipal Energy Agency has requested a system impact study for Point-to-Point Service from GRDA to WR for 24 MW. The principal objective of this study is to identify the restraints on the SPP Regional Tariff System that may limit the requested service and determine the least cost solutions required to alleviate the limiting facilities.

This study includes steady-state contingency analyses (PSS/E function ACCC) and Available Transfer Capability (ATC) analyses. The steady-state analyses consider the impact of the 24 MW request 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 24 MW transfer 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 lower bound of the normal voltage range monitored is 95%. The lower bound of the emergency voltage range monitored is 90%.

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, and any defined contingencies for these control areas. 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 AECI, 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 four seasonal models to study the GRDA to WR 24 MW transfer for the requested service period. The SPP 2004 Series Cases Update 2 2007 Summer Peak (07SP), 2007/08 Winter Peak (07WP), 2010 Summer Peak (10SP), and 2010/11 Winter Peak (10WP) were used to study the impact of the 24 MW transfer on the system during the requested service period from 5/1/2009 to 5/1/2010 and remaining planning horizon from 5/1/2010 to 4/1/2011. The Spring Peak models apply to April and May, the Summer Peak models apply to June through September, the Fall Peak models apply to October and November, and the Winter Peak models apply to December through March.

The chosen base case models were modified to reflect the most current modeling information. From the four seasonal models, two system scenarios were developed. Scenario 1 includes SWPP OASIS transmission requests not already included in the SPP 2004 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 exporting to the planned Lamar HVDC Tie. Scenario 2 includes transmission requests not already included in the SPP 2004 Series Cases flowing in an East to West direction with ERCOT importing and SPS importing from an outside control area and exporting to the planned 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 thermal 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. WR redispatch was evaluated as an alternative solution to assigning network upgrades.

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-2003-275-2 Tables*. The tables identify the seasonal case in which the event occurred, the facility control area location, applicable ratings of the overloaded facility, the loading percentage or voltage with and without the studied 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 and 1.2 list the SPP Facility Overloads caused or impacted by the 24 MW transfer using Scenario 1 and 2, respectively. Tables 2.1 and 2.2 list the SPP facility voltage violations caused or impacted by 24 MW transfer using Scenario 1 and 2, respectively. Tables 3.1 and 3.2 list the Non-SPP facility voltage violations caused or impacted by 24 MW transfer using Scenario 1 and 2, respectively. Solutions with engineering and construction costs are provided in the tables.

Table 4 lists WR Generation Shift Factors for the NORTH AMERICAN PHILIPS JUNCTION (SOUTH) - WEST MCPHERSON 115KV line for the outage of EAST MCPHERSON - SUMMIT 230KV line identified as limiting service from 12/1/2009 to 4/1/2010 using Scenario 2. These factors are provided for WR redispatch to relieve the facility loading by 0.9 MW from 12/1/2009 to 4/1/2010.

Table 5 lists applicable relief pairs with redispatch amounts required to relieve the limiting facility by 0.9 MW from 12/1/2009 to 4/1/2010.

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

5. Conclusion

The ATC for the GRDA to WR 24 MW request is limited to zero. WR redispatch was evaluated as an option to obtain the requested service. Generation shift factors and applicable redispatch relief pairs are documented in Tables 4 and 5, respectively. Additional equivalent sources and sinks provided by KMEA may be used for redispatch after being evaluated by SPP. The redispatch requirements would be called upon prior to implementing NERC TLR Level 5a. Once the customer shows proof of a redispatch agreement with Westar Energy for redispatch to relieve the impact on the limiting constraint identified, the request will be accepted. If the customer elects not to pursue redispatch to relieve the impact on the limiting constraint identified, transmission upgrades will need to be evaluated to mitigate the limiting constraint. Renewal rights are limited to zero due to the FLINT CREEK - GENTRY REC 161KV line and the NORTH AMERICAN PHILIPS JUNCTION (SOUTH) - WEST MCPHERSON 115KV line.

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

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
07SP	WERE	WERE	AUBURN 230/115/13.8KV TRANSFORMER	308	101.1	101.4	4.8	EAST MANHATTAN - JEFFREY ENERGY CENTER 230KV	24	Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
07SP	WERE	WERE	AUBURN ROAD - KEENE 115KV	68	109.5	111.0	4.2	EAST MANHATTAN - JEFFREY ENERGY CENTER 230KV	24	Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
07SP	WERE	WERE	AUBURN ROAD - KEENE 115KV	68	105.7	107.3	4.5	EAST MANHATTAN 230/115/18.0KV TRANSFORMER	24	Westar Operating Procedure 633 - Outage of the East Manhattan 230-115kV Transformer	
07SP	WERE	WERE	KEENE - SOUTH ALMA 115KV	68	100.8	102.2	4.2	EAST MANHATTAN - JEFFREY ENERGY CENTER 230KV	24	Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
07SP	WERE	WERE	AUBURN 230/115/13.8KV TRANSFORMER	308	100.0	100.3	4.4	HOYT 345/115/14.4KV TRANSFORMER	24	Westar Operating Procedure 623 - Outage of the Hoyt 345-115kV Transformer	
07SP	WERE	WERE	AUBURN 230/115/13.8KV TRANSFORMER	308	99.9	100.3	4.6	EAST MANHATTAN - JEFFREY ENERGY CENTER 230KV	24	Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
07WP	WERE	WERE	EL PASO - GILL ENERGY CENTER SOUTH 138KV	210	109.7	110.1	3.4	EVANS ENERGY CENTER NORTH - EVANS ENERGY CENTER SOUTH 138KV	24	Invalid Contingency	
10SP	AEPW	AEPW	FLINT CREEK - GENTRY REC 161KV	353	100.0	100.3	3.0	FLINT CREEK - TONTITOWN 161KV	0	Limits Renewal Rights, Starting 6/1/2010	
10SP	WERE	WERE	AUBURN 230/115/13.8KV TRANSFORMER	308	101.9	102.3	4.9	EAST MANHATTAN - JEFFREY ENERGY CENTER 230KV	24	Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
10SP	WERE	WERE	AUBURN 230/115/13.8KV TRANSFORMER	308	100.5	100.8	4.7	EAST MANHATTAN - JEFFREY ENERGY CENTER 230KV	24	Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
10SP	WERE	WERE	AUBURN ROAD - KEENE 115KV	68	117.3	118.8	4.4	EAST MANHATTAN - JEFFREY ENERGY CENTER 230KV	24	Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
10SP	WERE	WERE	AUBURN ROAD - KEENE 115KV	68	114.5	116.2	4.9	EAST MANHATTAN 230/115/18.0KV TRANSFORMER	24	Westar Operating Procedure 633 - Outage of the East Manhattan 230-115kV Transformer	
10SP	WERE	WERE	AUBURN ROAD - KEENE 115KV CKT 2	92	102.5	103.9	5.2	EAST MANHATTAN - JEFFREY ENERGY CENTER 230KV CKT 1	24	Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
10SP	WERE	WERE	AUBURN ROAD - KEENE 115KV CKT 2	92	100.1	101.6	5.8	EAST MANHATTAN 230/115/18.0KV TRANSFORMER	24	Westar Operating Procedure 633 - Outage of the East Manhattan 230-115kV Transformer	
10SP	WERE	WERE	KEENE - SOUTH ALMA 115KV	68	107.3	108.9	4.4	EAST MANHATTAN - JEFFREY ENERGY CENTER 230KV	24	Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
10SP	WERE	WERE	KEENE - SOUTH ALMA 115KV	68	104.3	106.0	4.8	EAST MANHATTAN 230/115/18.0KV TRANSFORMER	24	Westar Operating Procedure 633 - Outage of the East Manhattan 230-115kV Transformer	
10SP	WERE	WERE	WHITE JUNCTION - CHASE 69KV	43	99.7	102.2	4.5	WEAVER 138/69/13.2KV TRANSFORMER	24	Westar Operating Procedure 634 - Outage of the Weaver 138-69kV Transformer	
10WP	WERE	WERE	AUBURN ROAD - KEENE 115KV	68	102.6	104.1	4.1	EAST MANHATTAN - JEFFREY ENERGY CENTER 230KV	24	Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
Total Estimated Cost											\$0

Table 2.1 - SPP Voltage Violations

Caused or Impacted by 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
07SP		NONE IDENTIFIED				24		
07WP		NONE IDENTIFIED				24		
10SP		NONE IDENTIFIED				24		
10WP		NONE IDENTIFIED				24		
							Total Estimated Cost	\$0

Table 3.1 - Non-SPP Facility Overloads
Caused or Impacted by Transfer using Scenario 1

Study Case	From Area	To Area	Monitored Branch Overload	Rate <MVA>	BC % Loading	TC % Loading	Outaged Branch Causing Overload	Comments
07SP			NONE IDENTIFIED					
07WP			NONE IDENTIFIED					
10SP			NONE IDENTIFIED					
10WP			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
07SP	WERE	WERE	AUBURN 230/115/13.8KV TRANSFORMER	308	101.0	101.4	4.9	EAST MANHATTAN - JEFFREY ENERGY CENTER 230KV	24	Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
07SP	WERE	WERE	AUBURN ROAD - KEENE 115KV	68	115.4	116.9	4.3	EAST MANHATTAN - JEFFREY ENERGY CENTER 230KV	24	Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
07SP	WERE	WERE	AUBURN ROAD - KEENE 115KV	68	109.2	110.8	4.5	EAST MANHATTAN 230/115/18.0KV TRANSFORMER	24	Westar Operating Procedure 633 - Outage of the East Manhattan 230-115kV Transformer	
07SP	WERE	WERE	AUBURN ROAD - KEENE 115KV CKT 2	92	100.9	102.2	5.1	EAST MANHATTAN - JEFFREY ENERGY CENTER 230KV CKT 1	24	Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
07SP	WERE	WERE	KEENE - SOUTH ALMA 115KV	68	106.7	108.2	4.3	EAST MANHATTAN - JEFFREY ENERGY CENTER 230KV	24	Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
07SP	WERE	WERE	KEENE - SOUTH ALMA 115KV	68	100.4	102.0	4.5	EAST MANHATTAN 230/115/18.0KV TRANSFORMER	24	Westar Operating Procedure 633 - Outage of the East Manhattan 230-115kV Transformer	
07SP	WERE	WERE	WHITE JUNCTION - CHASE 69KV	43	103.2	105.8	4.6	WEAVER 138/69/13.2KV TRANSFORMER	24	Westar Operating Procedure 634 - Outage of the Weaver 138-69kV Transformer	
07SP	WERE	WERE	AUBURN 230/115/13.8KV TRANSFORMER	308	99.9	100.2	4.7	EAST MANHATTAN - JEFFREY ENERGY CENTER 230KV	24	Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
07SP	GRDA	AEPW	CATOOSA 161/138KV TRANSFORMER CKT 1	150	101.4	102.8	9.0	CATOOSA 161/138KV TRANSFORMER CKT 2	24	GRDA Op Guide and Mitigation Plan	
07SP	GRDA	AEPW	CATOOSA 161/138KV TRANSFORMER CKT 2	150	101.7	103.1	9.1	CATOOSA 161/138KV TRANSFORMER CKT 1	24	GRDA Op Guide and Mitigation Plan	
07WP	WERE	WERE	EL PASO - GILL ENERGY CENTER SOUTH 138KV	210	111.4	111.8	3.5	EVANS ENERGY CENTER NORTH - EVANS ENERGY CENTER SOUTH 138KV	24	Invalid Contingency	
10SP	WERE	WERE	AUBURN 230/115/13.8KV TRANSFORMER	308	101.8	102.2	4.9	EAST MANHATTAN - JEFFREY ENERGY CENTER 230KV	24	Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
10SP	WERE	WERE	AUBURN 230/115/13.8KV TRANSFORMER	308	100.4	100.7	4.7	EAST MANHATTAN - JEFFREY ENERGY CENTER 230KV	24	Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
10SP	WERE	WERE	AUBURN ROAD - KEENE 115KV	68	123.1	124.6	4.4	EAST MANHATTAN - JEFFREY ENERGY CENTER 230KV	24	Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
10SP	WERE	WERE	AUBURN ROAD - KEENE 115KV	68	119.3	121.0	4.8	EAST MANHATTAN 230/115/18.0KV TRANSFORMER	24	Westar Operating Procedure 633 - Outage of the East Manhattan 230-115kV Transformer	
10SP	WERE	WERE	AUBURN ROAD - KEENE 115KV CKT 2	92	107.6	109.0	5.3	EAST MANHATTAN - JEFFREY ENERGY CENTER 230KV CKT 1	24	Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
10SP	WERE	WERE	AUBURN ROAD - KEENE 115KV CKT 2	92	104.3	105.8	5.7	EAST MANHATTAN 230/115/18.0KV TRANSFORMER	24	Westar Operating Procedure 633 - Outage of the East Manhattan 230-115kV Transformer	
10SP	WERE	WERE	KEENE - SOUTH ALMA 115KV	68	113.1	114.7	4.4	EAST MANHATTAN - JEFFREY ENERGY CENTER 230KV	24	Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
10SP	WERE	WERE	KEENE - SOUTH ALMA 115KV	68	109.2	110.8	4.7	EAST MANHATTAN 230/115/18.0KV TRANSFORMER	24	Westar Operating Procedure 633 - Outage of the East Manhattan 230-115kV Transformer	
10SP	WERE	WERE	WHITE JUNCTION - CHASE 69KV	43	107.7	110.3	4.7	WEAVER 138/69/13.2KV TRANSFORMER	24	Westar Operating Procedure 634 - Outage of the Weaver 138-69kV Transformer	
10SP	WERE	WERE	KEENE - SOUTH ALMA 115KV CKT 2	92	99.0	100.3	5.2	EAST MANHATTAN - JEFFREY ENERGY CENTER 230KV CKT 1	24	Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
10SP	GRDA	AEPW	CATOOSA 161/138KV TRANSFORMER CKT 1	150	99.7	101.1	8.8	CATOOSA 161/138KV TRANSFORMER CKT 2	24	GRDA Op Guide and Mitigation Plan	
10SP	GRDA	AEPW	CATOOSA 161/138KV TRANSFORMER CKT 2	150	100.0	101.4	8.8	CATOOSA 161/138KV TRANSFORMER CKT 1	24	GRDA Op Guide and Mitigation Plan	
10WP	WERE	WERE	NORTH AMERICAN PHILIPS JUNCTION (SOUTH) - WEST MCPHERSON 115KV	68	106.6	107.9	3.5	EAST MCPHERSON - SUMMIT 230KV	0	Limits Service to zero MW from 12/1/2009-4/1/2010. Impact Relieved by Westar Redispatch See Table 5. Limits Renewal Rights, Starting 12/1/2010	
10WP	WERE	WERE	AUBURN ROAD - KEENE 115KV	68	109.0	110.3	3.6	EAST MANHATTAN - JEFFREY ENERGY CENTER 230KV	24	Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
10WP	WERE	WERE	KEENE - SOUTH ALMA 115KV	68	102.8	104.0	3.6	EAST MANHATTAN - JEFFREY ENERGY CENTER 230KV	24	Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
Total Estimated Cost											\$0

Study Case	Area	Monitored Bus with Violation	BC Voltage (PU)	TC Voltage (PU)	Outaged Branch Causing Voltage Violation	ATC (MW)	Solution	Estimated Cost
07SP		NONE IDENTIFIED				24		
07WP		NONE IDENTIFIED				24		
10SP		NONE IDENTIFIED				24		
10WP		NONE IDENTIFIED				24		
Total Estimated Cost								\$ -

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

Study Case	From Area	To Area	Monitored Branch Overload	Rate <MVA>	BC % Loading	TC % Loading	Outaged Branch Causing Overload	Comments
07SP			NONE IDENTIFIED					
07WP			NONE IDENTIFIED					
10SP			NONE IDENTIFIED					
10WP			NONE IDENTIFIED					

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 Table 4 - Generation Shift Factors
 for Redispatch to Relieve Facility Impact

Southwest Power Pool
 System Impact Study

Limiting Facility: NORTH AMERICAN PHILIPS JUNCTION (SOUTH) - WEST MCPHERSON 115KV
 Line Outage for Limiting Facility: EAST MCPHERSON - SUMMIT 230KV
 Date Redispatch Needed: 12/1/09-4/1/10
 Relief Amount: 0.9 MW

Source	Sink	GSF
WERE_JEC U1 26.0	System Swing	0.01626
WERE_JEC U2 26.0	System Swing	0.01682
WERE_JEC U3 26.0	System Swing	0.01682
WERE_LEC U3 14.4	System Swing	0.00988
WERE_LEC U4 14.4	System Swing	0.00988
WERE_LEC U5 24.0	System Swing	0.01037
WERE_TEC U7 14.4	System Swing	0.01215
WERE_TEC U8 16.0	System Swing	0.01215
WERE_TEC GT 13.8	System Swing	0.01237
WERE_AEC GT1 13.8	System Swing	0.05807
WERE_HEC U1 14.4	System Swing	-0.19718
WERE_HEC U2 14.4	System Swing	-0.19718
WERE_HEC U3 14.4	System Swing	-0.19718
WERE_HEC U4 18.0	System Swing	-0.19749
WERE_HEC GT1 13.8	System Swing	-0.19718
WERE_HEC GT2 13.8	System Swing	-0.19734
WERE_HEC GT3 13.8	System Swing	-0.19749
WERE_HEC GT4 13.8	System Swing	-0.19749
WERE_MCPH PLT12.5	System Swing	-0.24886
WERE_MCPHGT1 13.8	System Swing	-0.24886
WERE_MCPHGT2 13.8	System Swing	-0.24886
WERE_MCPHGT3 13.8	System Swing	-0.24886
WERE_MCPHGT4 13.8	System Swing	-0.24327
WERE_NEC U3 12.0	System Swing	0.00141
WERE_EEC U1 16.0	System Swing	0.00033
WERE_EEC U2 24.0	System Swing	0.00033
WERE_EEC GT1 13.8	System Swing	0.00032
WERE_EEC GT2 13.8	System Swing	0.00032
WERE_EEC GT3 18.0	System Swing	0.00032
WERE_GEC U1 12.5	System Swing	-0.0018
WERE_GEC U2 12.5	System Swing	-0.0018
WERE_GEC U3 14.4	System Swing	-0.00235
WERE_GEC U4 14.4	System Swing	-0.00254
WERE_WCGS U1 25.0	System Swing	0.00272
WERE_oxford 4 138	System Swing	-0.00064
WERE_WACO 4 138	System Swing	-0.00225
WERE_6TH ST 3 115	System Swing	0.00986
WERE_WELLING269.0	System Swing	-0.00127
WERE_WINFLD 269.0	System Swing	-0.00072
WERE_AUGUSTA269.0	System Swing	0.00045
WERE_GETTY 269.0	System Swing	0.00064
WERE_BURLING269.0	System Swing	0.00272
WERE_CC2SHAR269.0	System Swing	0.00272
WERE_IOLA 269.0	System Swing	0.00169
WERE_CGENSUB269.0	System Swing	0.00146
WERE_CHANP1 269.0	System Swing	0.00146
WERE_CHANP3 269.0	System Swing	0.00146
WERE_FREDON 269.0	System Swing	0.00116
WERE_NEODESH269.0	System Swing	0.00107
WERE_ERIE 269.0	System Swing	0.00146
WERE_GIRARD 269.0	System Swing	0.00151
WERE_MULVANE269.0	System Swing	-0.00054
WERE_LYONS 3 115 (KMEA Munciple Sterling)	System Swing	-0.23212
WERE_PAWNEE 3 115 (KMEA Munciple Larned)	System Swing	-0.11453
WERE_RICE 3 115 (KMEA Munciple Ellinwood)	System Swing	-0.22409

Relief Amount = ATC (MW) Needed * GRDA to WR %Response

Table 5 - Applicable Relief Pairs
with Redispatch Amounts to Relieve Facility Impact
(Redispatch to be implemented prior to NERC TLR Level 5a)

Limiting Facility: NORTH AMERICAN PHILIPS JUNCTION (SOUTH) - WEST MCPHERSON 115KV

Line Outage for Limiting Facility: EAST MCPHERSON - SUMMIT 230KV

Date Redispatch Needed: 12/1/09-4/1/10

Relief Amount: 0.9 MW

Source	Sink	Factor	Redispatch Amount (MW)
WERE_HEC U4 18.0	WERE_JEC U1 26.0	-0.21375	4
WERE_HEC U4 18.0	WERE_JEC U2 26.0	-0.21431	4
WERE_HEC U4 18.0	WERE_JEC U3 26.0	-0.21431	4
WERE_HEC U4 18.0	WERE_LEC U4 14.4	-0.20737	4
WERE_HEC U4 18.0	WERE_LEC U5 24.0	-0.20786	4
WERE_HEC U4 18.0	WERE_TEC U8 16.0	-0.20964	4
WERE_LYONS 3 115 (KMEA Municiple Sterling)	WERE_JEC U1 26.0	-0.24838	4
WERE_LYONS 3 115 (KMEA Municiple Sterling)	WERE_JEC U2 26.0	-0.24894	4
WERE_LYONS 3 115 (KMEA Municiple Sterling)	WERE_JEC U3 26.0	-0.24894	4
WERE_LYONS 3 115 (KMEA Municiple Sterling)	WERE_LEC U4 14.4	-0.242	4
WERE_LYONS 3 115 (KMEA Municiple Sterling)	WERE_LEC U5 24.0	-0.24249	4
WERE_LYONS 3 115 (KMEA Municiple Sterling)	WERE_TEC U8 16.0	-0.24427	4
WERE_PAWNEE 3 115 (KMEA Municiple Larned)	WERE_JEC U1 26.0	-0.13079	7
WERE_PAWNEE 3 115 (KMEA Municiple Larned)	WERE_JEC U2 26.0	-0.13135	7
WERE_PAWNEE 3 115 (KMEA Municiple Larned)	WERE_JEC U3 26.0	-0.13135	7
WERE_PAWNEE 3 115 (KMEA Municiple Larned)	WERE_LEC U4 14.4	-0.12441	7
WERE_PAWNEE 3 115 (KMEA Municiple Larned)	WERE_LEC U5 24.0	-0.1249	7
WERE_PAWNEE 3 115 (KMEA Municiple Larned)	WERE_TEC U8 16.0	-0.12668	7
WERE_RICE 3 115 (KMEA Municiple Ellinwood)	WERE_JEC U1 26.0	-0.24035	4
WERE_RICE 3 115 (KMEA Municiple Ellinwood)	WERE_JEC U2 26.0	-0.24091	4
WERE_RICE 3 115 (KMEA Municiple Ellinwood)	WERE_JEC U3 26.0	-0.24091	4
WERE_RICE 3 115 (KMEA Municiple Ellinwood)	WERE_LEC U4 14.4	-0.23397	4
WERE_RICE 3 115 (KMEA Municiple Ellinwood)	WERE_LEC U5 24.0	-0.23446	4
WERE_RICE 3 115 (KMEA Municiple Ellinwood)	WERE_TEC U8 16.0	-0.23624	4

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

Transaction = Relief Amount / Factor

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
07SP	WERE	WERE	56851 AUBURN 6 230 WND 1 AUBRN77X 1	308	101.1	101.4	4.8	56852 JEC 6 230 to 56861 EMANHAT6 230 CKT 1	24	Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
07SP	WERE	WERE	57151 AUBURN 3 115 to 57167 KEENE 3 115 CKT 1	68	109.5	111.0	4.2	56852 JEC 6 230 to 56861 EMANHAT6 230 CKT 1	24	Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
07SP	WERE	WERE	57151 AUBURN 3 115 to 57167 KEENE 3 115 CKT 1	68	105.7	107.3	4.5	56861 EMANHAT6 230 to 57326 EMANHAT3 115 to 56888 EMANHAT118.0 CKT 1	24	Westar Operating Procedure 633 - Outage of the East Manhattan 230-115kV Transformer	
07SP	WERE	WERE	57167 KEENE 3 115 to 57339 S ALMA 3 115 CKT 1	68	100.8	102.2	4.2	56852 JEC 6 230 to 56861 EMANHAT6 230 CKT 1	24	Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
07SP	WERE	WERE	56851 AUBURN 6 230 WND 1 AUBRN77X 1	308	100.0	100.3	4.4	56765 HOYT 7 345 to 57163 HOYT 3 115 to 56804 HOYT 114.4 CKT 1	24	Westar Operating Procedure 623 - Outage of the Hoyt 345-115kV Transformer	
07SP	WERE	WERE	57151 AUBURN 3 115 WND 2 AUBRN77X 1	308	99.9	100.3	4.6	56852 JEC 6 230 to 56861 EMANHAT6 230 CKT 1	24	Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
07WP	WERE	WERE	57039 ELPASO 4 138 to 57046 GILL S 4 138 CKT 1	210	109.7	110.1	3.4	57040 EVANS N4 138 to 57041 EVANS S4 138 CKT 1	24	Invalid Contingency	
10SP	AEPW	AEPW	53139 FLINTCR5 161 to 53187 GENTRYR5 161 CKT 1	353	100.0	100.3	3.0	53139 FLINTCR5 161 to 53170 TONTITN5 161 CKT 1	0	Limits Renewal Rights, Starting 6/1/2010	
10SP	WERE	WERE	56851 AUBURN 6 230 WND 1 AUBRN77X 1	308	101.9	102.3	4.9	56852 JEC 6 230 to 56861 EMANHAT6 230 CKT 1	24	Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
10SP	WERE	WERE	57151 AUBURN 3 115 WND 2 AUBRN77X 1	308	100.5	100.8	4.7	56852 JEC 6 230 to 56861 EMANHAT6 230 CKT 1	24	Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
10SP	WERE	WERE	57151 AUBURN 3 115 to 57167 KEENE 3 115 CKT 1	68	117.3	118.8	4.4	56852 JEC 6 230 to 56861 EMANHAT6 230 CKT 1	24	Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
10SP	WERE	WERE	57167 KEENE 3 115 to 57151 AUBURN 3 115 CKT 1	68	114.5	116.2	4.9	56861 EMANHAT6 230 to 57326 EMANHAT3 115 to 56888 EMANHAT118.0 CKT 1	24	Westar Operating Procedure 633 - Outage of the East Manhattan 230-115kV Transformer	
10SP	WERE	WERE	57151 AUBURN 3 115 to 57167 KEENE 3 115 CKT 2	92	102.5	103.9	5.2	56852 JEC 6 230 to 56861 EMANHAT6 230 CKT 1	24	Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
10SP	WERE	WERE	57167 KEENE 3 115 to 57151 AUBURN 3 115 CKT 2	92	100.1	101.6	5.8	56861 EMANHAT6 230 to 57326 EMANHAT3 115 to 56888 EMANHAT118.0 CKT 1	24	Westar Operating Procedure 633 - Outage of the East Manhattan 230-115kV Transformer	
10SP	WERE	WERE	57167 KEENE 3 115 to 57339 S ALMA 3 115 CKT 1	68	107.3	108.9	4.4	56852 JEC 6 230 to 56861 EMANHAT6 230 CKT 1	24	Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
10SP	WERE	WERE	57167 KEENE 3 115 to 57339 S ALMA 3 115 CKT 1	68	104.3	106.0	4.8	56861 EMANHAT6 230 to 57326 EMANHAT3 115 to 56888 EMANHAT118.0 CKT 1	24	Westar Operating Procedure 633 - Outage of the East Manhattan 230-115kV Transformer	
10SP	WERE	WERE	57605 WHITE J269.0 to 57588 CHASE 269.0 CKT 1	43	99.7	102.2	4.5	56991 WEAVER 4 138 to 57604 WEAVER 269.0 to 57083 WEAVER 113.2 CKT 1	24	Westar Operating Procedure 634 - Outage of the Weaver 138-69kV Transformer	
10WP	WERE	WERE	57151 AUBURN 3 115 to 57167 KEENE 3 115 CKT 1	68	102.6	104.1	4.1	56852 JEC 6 230 to 56861 EMANHAT6 230 CKT 1	24	Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
										Total Estimated Cost	\$0

SPP-2003-275-2
 Table 1.2a - Modeling Representation for Table 1.2
 Includes Bus Numbers and Bus Names

Southwest Power Pool
 System Impact Study

Study Case	From Area	To Area	Monitored Branch Overload	Rate <MVA>	BC % Loading	TC % Loading	%TDF	Outaged Branch Causing Overload	ATC (MW)	Solution	Estimated Cost
07SP	WERE	WERE	56851 AUBURN 6 230 WND 1 AUBRN77X 1	308	101.0	101.4	4.9	56852 JEC 6 230 to 56861 EMANHAT6 230 CKT 1	24	Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
07SP	WERE	WERE	57151 AUBURN 3 115 to 57167 KEENE 3 115 CKT 1	68	115.4	116.9	4.3	56852 JEC 6 230 to 56861 EMANHAT6 230 CKT 1	24	Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
07SP	WERE	WERE	57151 AUBURN 3 115 to 57167 KEENE 3 115 CKT 1	68	109.2	110.8	4.5	56861 EMANHAT6 230 to 57326 EMANHAT3 115 to 56888 EMANHAT118.0 CKT 1	24	Westar Operating Procedure 633 - Outage of the East Manhattan 230-115kV Transformer	
07SP	WERE	WERE	57151 AUBURN 3 115 to 57167 KEENE 3 115 CKT 2	92	100.9	102.2	5.1	56852 JEC 6 230 to 56861 EMANHAT6 230 CKT 1	24	Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
07SP	WERE	WERE	57167 KEENE 3 115 to 57339 S ALMA 3 115 CKT 1	68	106.7	108.2	4.3	56852 JEC 6 230 to 56861 EMANHAT6 230 CKT 1	24	Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
07SP	WERE	WERE	57167 KEENE 3 115 to 57339 S ALMA 3 115 CKT 1	68	100.4	102.0	4.5	56861 EMANHAT6 230 to 57326 EMANHAT3 115 to 56888 EMANHAT118.0 CKT 1	24	Westar Operating Procedure 633 - Outage of the East Manhattan 230-115kV Transformer	
07SP	WERE	WERE	57605 WHITE J269.0 to 57588 CHASE 269.0 CKT 1	43	103.2	105.8	4.6	56991 WEAVER 4 138 to 57604 WEAVER 269.0 to 57083 WEAVER 113.2 CKT 1	24	Westar Operating Procedure 634 - Outage of the Weaver 138-69kV Transformer	
07SP	WERE	WERE	57151 AUBURN 3 115 WND 2 AUBRN77X 1	308	99.9	100.2	4.7	56852 JEC 6 230 to 56861 EMANHAT6 230 CKT 1	24	Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
07SP	GRDA	AEPW	53802 CATOOSA4 138 to 54438 CATSAGR5 161 CKT 1	150	101.4	102.8	9.0	53802 CATOOSA4 138 to 54438 CATSAGR5 161 CKT 2	24	GRDA Op Guide and Mitigation Plan	
07SP	GRDA	AEPW	53802 CATOOSA4 138 to 54438 CATSAGR5 161 CKT 2	150	101.7	103.1	9.1	53802 CATOOSA4 138 to 54438 CATSAGR5 161 CKT 1	24	GRDA Op Guide and Mitigation Plan	
07WP	WERE	WERE	57039 ELPASO 4 138 to 57046 GILL S 4 138 CKT 1	210	111.4	111.8	3.5	57040 EVANS N4 138 to 57041 EVANS S4 138 CKT 1	24	Invalid Contingency	
10SP	WERE	WERE	56851 AUBURN 6 230 WND 1 AUBRN77X 1	308	101.8	102.2	4.9	56852 JEC 6 230 to 56861 EMANHAT6 230 CKT 1	24	Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
10SP	WERE	WERE	57151 AUBURN 3 115 WND 2 AUBRN77X 1	308	100.4	100.7	4.7	56852 JEC 6 230 to 56861 EMANHAT6 230 CKT 1	24	Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
10SP	WERE	WERE	57151 AUBURN 3 115 to 57167 KEENE 3 115 CKT 1	68	123.1	124.6	4.4	56852 JEC 6 230 to 56861 EMANHAT6 230 CKT 1	24	Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
10SP	WERE	WERE	57167 KEENE 3 115 to 57151 AUBURN 3 115 CKT 1	68	119.3	121.0	4.8	56861 EMANHAT6 230 to 57326 EMANHAT3 115 to 56888 EMANHAT118.0 CKT 1	24	Westar Operating Procedure 633 - Outage of the East Manhattan 230-115kV Transformer	
10SP	WERE	WERE	57151 AUBURN 3 115 to 57167 KEENE 3 115 CKT 2	92	107.6	109.0	5.3	56852 JEC 6 230 to 56861 EMANHAT6 230 CKT 1	24	Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
10SP	WERE	WERE	57167 KEENE 3 115 to 57151 AUBURN 3 115 CKT 2	92	104.3	105.8	5.7	56861 EMANHAT6 230 to 57326 EMANHAT3 115 to 56888 EMANHAT118.0 CKT 1	24	Westar Operating Procedure 633 - Outage of the East Manhattan 230-115kV Transformer	
10SP	WERE	WERE	57167 KEENE 3 115 to 57339 S ALMA 3 115 CKT 1	68	113.1	114.7	4.4	56852 JEC 6 230 to 56861 EMANHAT6 230 CKT 1	24	Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
10SP	WERE	WERE	57167 KEENE 3 115 to 57339 S ALMA 3 115 CKT 1	68	109.2	110.8	4.7	56861 EMANHAT6 230 to 57326 EMANHAT3 115 to 56888 EMANHAT118.0 CKT 1	24	Westar Operating Procedure 633 - Outage of the East Manhattan 230-115kV Transformer	
10SP	WERE	WERE	57605 WHITE J269.0 to 57588 CHASE 269.0 CKT 1	43	107.7	110.3	4.7	56991 WEAVER 4 138 to 57604 WEAVER 269.0 to 57083 WEAVER 113.2 CKT 1	24	Westar Operating Procedure 634 - Outage of the Weaver 138-69kV Transformer	
10SP	WERE	WERE	57167 KEENE 3 115 to 57339 S ALMA 3 115 CKT 2	92	99.0	100.3	5.2	56852 JEC 6 230 to 56861 EMANHAT6 230 CKT 1	24	Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
10SP	GRDA	AEPW	53802 CATOOSA4 138 to 54438 CATSAGR5 161 CKT 1	150	99.7	101.1	8.8	53802 CATOOSA4 138 to 54438 CATSAGR5 161 CKT 2	24	GRDA Op Guide and Mitigation Plan	
10SP	GRDA	AEPW	53802 CATOOSA4 138 to 54438 CATSAGR5 161 CKT 2	150	100.0	101.4	8.8	53802 CATOOSA4 138 to 54438 CATSAGR5 161 CKT 1	24	GRDA Op Guide and Mitigation Plan	
10WP	WERE	WERE	57374 SPHILPJ3 115 to 57438 WMPHER3 115 CKT 1	68	106.6	107.9	3.5	56872 EMCIPHER6 230 to 56873 SUMMIT 6 230 CKT 1	0	Limits Service to zero MW from 12/1/2009-4/1/2010. Impact Relieved by Westar Redispatch See Table 5	
10WP	WERE	WERE	57151 AUBURN 3 115 to 57167 KEENE 3 115 CKT 1	68	109.0	110.3	3.6	56852 JEC 6 230 to 56861 EMANHAT6 230 CKT 1	24	Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
10WP	WERE	WERE	57167 KEENE 3 115 to 57339 S ALMA 3 115 CKT 1	68	102.8	104.0	3.6	56852 JEC 6 230 to 56861 EMANHAT6 230 CKT 1	24	Westar Operating Procedure 900 - Outage of the JEC to East Manhattan 230kV Line	
Total Estimated Cost											\$0