



SPP *Southwest Power Pool*

***System Impact Study
SPP-2004-072-1
For The Designation of a New
Network Resource
Requested By
Oklahoma Municipal Power
Authority***

From ERCOTN To AEPW

***For a Reserved Amount Of 29 MW
From 8/1/04
To 7/1/06***

SPP Engineering, Tariff Studies

Table of Contents

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

ATTACHMENT: *SPP-2004-072-1 Tables*

1. Executive Summary

Oklahoma Municipal Power Authority (OMPA) has requested a system impact study to designate a New Network Resource in the ERCOT Control Area for 29 MW to be received at the ERCOTN HVDC Tie to serve Network Load in the AEPW Control Area. AEP Transmission Planning has requested SPP Tariff Studies to perform the study on their behalf. The period of the service is from 8/1/04 to 7/1/06. The AEPW OASIS reservation number is 669555. OMPA also requested two optional studies to be performed. Since the results of the two optional studies were not significantly different from the results for the requested 29 MW study, SPP does not see any benefit in reporting the results. The optional studies were for 29 MW and 54 MW and involved redispatch of resources not designated to serve the Network Load in the AEPW Control Area, therefore, service would not be granted based upon these optional studies.

The principal objective of this study is to identify current system limitations using AC analyses and to determine the system upgrades necessary to provide the requested service. The ERCOTN to AEPW 29 MW transfer was studied using three System Scenarios. Assuming a 29 MW increase in HVDC Tie capacity with the expanded capacity operated at a unity power factor, the service was modeled from the ERCOTN HVDC Tie to the Network Load in the AEPW Control Area. The three scenarios were studied to capture worst case system limitations dependent on the bias of the transmission system. Analysis was conducted for the requested service period above and for the remaining planning horizon from 7/1/06 to 4/1/11. The additional evaluation of the planning horizon was conducted to determine any future constraints that may limit the renewal of service.

The study results of the additional 29 MW show that limiting AC system constraints exist. Tables 1.1, 1.2, and 1.3 list the AEP 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 AEP 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-AEP 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-AEP voltage violations caused or impacted by the transfer modeled, using Scenarios 1, 2, and 3, respectively. Tables 5.1, 5.2, and 5.3 list the AEP facility overloads caused or impacted by modeling the selected upgrades to be assigned, using Scenario 1 and 3, respectively. Tables 6.1, 6.2, and 6.3 list the Non-AEP facility overloads caused or impacted by modeling the selected upgrades to be assigned, using Scenario 1 and 3, respectively. Selected solutions, with known engineering and construction costs, are provided for the AEP and Non-AEP Facility Overloads and Voltage violations found in the Tables.

The ATC for the ERCOTN to AEPW request is 0 MW. The service requires the capacity of the ERCOTN HVDC Tie to be expanded. The estimated in-service date of the expansion is 1/1/2007. In addition to the expansion of the HVDC Tie, the service requires the acceleration of future AEP plans to build a new Snyder to Altus 138 kV line and a terminal equipment upgrade. The total estimated engineering and construction cost required in order to provide the requested service has not been determined. Third Party limitations and upgrades were also identified and will need to be addressed before the service can be accepted. A Facility Study may now be conducted to summarize the operating limits and to determine the financial characteristics associated with the requested service.

2. Introduction

Oklahoma Municipal Power Authority (OMPA) has requested a System Impact Study to designate a New Network Resource in the ERCOT Control Area for 29 MW to be received at the ERCOTN HVDC Tie to serve Network Load in the AEPW 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 ERCOTN to AEPW 29 MW request was studied using three System Scenarios. The three scenarios were studied to capture worst case system limitations dependent on the bias of the transmission system. Assuming a 29 MW increase in HVDC Tie capacity, with the expanded capacity operated at a unity power factor, the service was modeled from the ERCOTN HVDC Tie to the Network Load in the AEPW Control Area. In order to correctly model the Generation to Load transfer, 29 MW of Network load and 29 MW of existing marginally dispatched Network Resources were removed from the base cases.

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, AECl, 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 AECl, 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 ten seasonal models to study the ERCOTN to AEPW 29 MW transfer for the requested service period and the remaining planning horizon. The SPP 2004 Series Cases Update 4 2005 April Minimum (05AP), 2005 Spring Peak (05G), 2005 Summer Peak (05SP), 2005 Summer Shoulder (05SH), 2005 Fall Peak (05FA), 2005/06 Winter Peak (05WP), 2007 Summer Peak (07SP), and 2007/08 Winter Peak (07WP) were used to study the impact of the 29 MW transfer on the system during the requested service period of 8/1/04 to 7/1/06. The SPP 2004 Series Update 4 2010 Summer Peak (10SP), and 2010/11 Winter Peak (10WP) were used to study the impact of the 29 MW transfer on the system during the remaining planning horizon from 7/1/06 to 4/1/11.

The chosen base case models were modified to reflect the most current modeling information. From the ten seasonal models, three 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 net 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 net importing and SPS importing from an outside control area and importing from the planned Lamar HVDC Tie. The third scenario includes SWPP OASIS transmission requests not already included in the SPP 2004

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 planned Lamar HVDC Tie. The system scenarios were developed to minimize counter flows to the transfers studied.

The expanded portion of the ERCOTN DC tie was modeled with a unity power factor.

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 caused or impacted by the transfer. The PSS/E options chosen to conduct the analysis can be found in Appendix A.

D. Upgrade Analysis

Using the 2005 April Min, 2005 Spring Peak, 2005 Summer Shoulder, 2005 Fall Peak, 2007 Summer Peak, 2007/08 Winter Peak, 2010 Summer Peak, and 2010/11 Winter Peak cases, both with and without the assigned upgrades modeled, and with and without the 29 MW transfer, the PSS/E Activity ACCC was run on the cases and compared to determine the facility overloads caused or impacted by the assigned upgrades. The contingency set used included subsets of facilities in AEPW, OKGE, SPS, and WFEC, while monitoring the whole SPP and First-tier Non-SPP control area footprint. The 3% transfer distribution cutoff was applied to SPP facilities identified. The PSS/E options chosen to conduct the analysis can be found in Appendix A.

4. Study Results

A. Study Analysis Results

The attached Tables contain the steady-state analysis results of the System Impact Study. The Tables are in the attached workbook *SPP-2004-072-1 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 29 MW transfer or selected upgrades, 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 AEP 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 AEP 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-AEP 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-AEP 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 5.1, 5.2, and 5.3 list the AEP facility overloads caused or impacted by modeling the selected upgrades to be assigned using Scenario 1 and 3, respectively. Tables 6.1, 6.2, and 6.3 list the Non-AEP facility overloads caused or impacted by modeling the selected upgrades to be assigned using Scenario 1 and 3, respectively.

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 ATC for the ERCOTN to AEPW request is 0 MW. The service requires the capacity of the ERCOTN HVDC Tie to be expanded. The estimated in-service date of the expansion is 1/1/2007. In addition to the expansion of the HVDC Tie, the service requires the acceleration of future AEP plans to build a new Snyder to Altus 138 kV line and a terminal equipment upgrade. The total estimated engineering and construction cost required in order to provide the requested service has not been determined. Third Party limitations and upgrades were also identified and will need to be addressed before the service can be accepted. A Facility Study may now be conducted to summarize the operating limits and to determine the financial characteristics associated with the requested service.

Appendix A

PSS/E CHOICES IN RUNNING LOAD FLOW PROGRAM AND ACCC

BASE CASES:

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

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

ACCC CASES:

Solutions – AC contingency checking (ACCC)

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

Newton Solution:

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

SPP-2004-072-1
 Table 1.1 - AEP 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
05AP			NONE IDENTIFIED						29		
05G			NONE IDENTIFIED						29		
05SP	OMPA	AEPW	COMANCHE TAP - OMPA-DUNCAN 840 138KV	117	101.1	110.9	39.8	CORNVILLE - RUSH SPRINGS NATURAL GAS TAP 138KV	29	Incorrect Rating, New Emergency Rating 164 MVA	
05SP	AEPW	OMPA	COMANCHE TAP - OMPA-DUNCAN 840 138KV	117	91.6	101.3	38.9	RUSH SPRINGS NATURAL GAS TAP - RUSH SPRINGS TAP 138KV	29	*	
05SH			NONE IDENTIFIED						29		
05FA			NONE IDENTIFIED						29		
05WP			NONE IDENTIFIED						29		
07SP	AEPW	OMPA	COMANCHE TAP - OMPA-DUNCAN 840 138KV	117	104.7	114.3	38.8	CORNVILLE - RUSH SPRINGS NATURAL GAS TAP 138KV	29	Incorrect Rating, New Emergency Rating 164 MVA	
07SP	AEPW	OMPA	COMANCHE TAP - OMPA-DUNCAN 840 138KV	117	95.2	104.7	38.1	RUSH SPRINGS NATURAL GAS TAP - RUSH SPRINGS TAP 138KV	29	*	
07SP	AEPW	OMPA	COMANCHE TAP - OMPA-DUNCAN 840 138KV	117	90.7	100.1	37.9	OMPA-MARLOW - RUSH SPRINGS TAP 138KV	29	*	
07WP			NONE IDENTIFIED						29		
10SP	AEPW	AEPW	SNYDER - TIPTON & HEADERICK 69KV	53	97.7	109.8	22.1	HOBART JUNCTION - TAMARAC TAP 138KV	6	Relieved or Impact Removed by Selected Upgrades	
10SP	AEPW	OMPA	COMANCHE TAP - OMPA-DUNCAN 840 138KV	117	113.2	123.1	40.1	CORNVILLE - RUSH SPRINGS NATURAL GAS TAP 138KV	29	Incorrect Rating, New Emergency Rating 164 MVA	
10SP	AEPW	OMPA	COMANCHE TAP - OMPA-DUNCAN 840 138KV	117	103.5	113.2	39.1	RUSH SPRINGS NATURAL GAS TAP - RUSH SPRINGS TAP 138KV	29	*	
10SP	AEPW	OMPA	COMANCHE TAP - OMPA-DUNCAN 840 138KV	117	99.2	108.8	38.7	OMPA-MARLOW - RUSH SPRINGS TAP 138KV	29	*	
10WP			NONE IDENTIFIED						29		
										Total Estimated Engineering and Construction Cost	\$0

SPP-2004-072-1
 Table 2.1 - AEP 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
05AP		NONE IDENTIFIED				29		
05G		NONE IDENTIFIED				29		
05SP		NONE IDENTIFIED				29		
05SH		NONE IDENTIFIED				29		
05FA		NONE IDENTIFIED				29		
05WP		NONE IDENTIFIED				29		
07SP	OMPA	56202 OMALTUS4 138	0.9145	0.8922	OPEN LINE FROM BUS 54126 HOB-JCT4 138 TO BUS 54158 TAMARTP4 138 CKT1	26	Accelerate in service date of AEPW future plan to Build new 138 kV line from Snyder to Altus Jct, AEPW Estimated Cost is \$14,000,000	TBD
07SP	AEPW	54158 TAMARTP4 138	0.9155	0.8934	OPEN LINE FROM BUS 54126 HOB-JCT4 138 TO BUS 54158 TAMARTP4 138 CKT1	29	Not a Load Serving Bus	
07SP	AEPW	54103 ALTUSJT4 138	0.9176	0.8957	OPEN LINE FROM BUS 54126 HOB-JCT4 138 TO BUS 54158 TAMARTP4 138 CKT1	29	Not a Load Serving Bus	
07SP	AEPW	54111 ALTUSTP4 138	0.9166	0.8948	OPEN LINE FROM BUS 54126 HOB-JCT4 138 TO BUS 54158 TAMARTP4 138 CKT1	29	Not a Load Serving Bus	
07WP		NONE IDENTIFIED				29		
10SP	OMPA	56202 OMALTUS4 138	0.8979	0.8733	OPEN LINE FROM BUS 54126 HOB-JCT4 138 TO BUS 54158 TAMARTP4 138 CKT1	24	See Previous Upgrade Specified for Facility	
10SP	AEPW	54276 JERICO3 115	0.8918	0.8693	OPEN LINE FROM BUS 50932 KIRBY3 115 TO BUS 54276 JERICO3 115 CKT1	26	AEP Plans to add 3.6 MVAR cap banks at Clarendon and at Memphis by 6/1/2005	
10SP	AEPW	54277 JERIC2WT69.0	0.8918	0.8693	OPEN LINE FROM BUS 50932 KIRBY3 115 TO BUS 54276 JERICO3 115 CKT1	26	"	
10SP	AEPW	54278 CLARDON269.0	0.8822	0.8598	OPEN LINE FROM BUS 54277 JERIC2WT69.0 TO BUS 54278 CLARDON269.0 CKT1	26	"	
10SP	AEPW	54278 CLARDON269.0	0.8911	0.8687	OPEN LINE FROM BUS 50932 KIRBY3 115 TO BUS 54276 JERICO3 115 CKT1	26	"	
10SP	AEPW	54279 CLARREA269.0	0.8837	0.8613	OPEN LINE FROM BUS 54277 JERIC2WT69.0 TO BUS 54278 CLARDON269.0 CKT1	26	"	
10SP	AEPW	54279 CLARREA269.0	0.8925	0.8701	OPEN LINE FROM BUS 50932 KIRBY3 115 TO BUS 54276 JERICO3 115 CKT1	26	"	
10SP	AEPW	54280 HEDLEY 269.0	0.8974	0.8754	OPEN LINE FROM BUS 54277 JERIC2WT69.0 TO BUS 54278 CLARDON269.0 CKT1	26	"	
10SP	AEPW	54280 HEDLEY 269.0	0.9052	0.8832	OPEN LINE FROM BUS 50932 KIRBY3 115 TO BUS 54276 JERICO3 115 CKT1	26	"	
10SP	AEPW	54277 JERIC2WT69.0	0.8916	0.8697	OPEN LINE FROM BUS 54276 JERICO3 115 TO BUS 54277 JERIC2WT69.0 TO BUS 54303 JH2TERT 14.4 CKT1	27	"	
10SP	AEPW	54278 CLARDON269.0	0.8909	0.8691	OPEN LINE FROM BUS 54276 JERICO3 115 TO BUS 54277 JERIC2WT69.0 TO BUS 54303 JH2TERT 14.4 CKT1	27	"	
10SP	AEPW	54279 CLARREA269.0	0.8923	0.8705	OPEN LINE FROM BUS 54276 JERICO3 115 TO BUS 54277 JERIC2WT69.0 TO BUS 54303 JH2TERT 14.4 CKT1	27	"	
10SP	AEPW	54281 NMEMREA269.0	0.9078	0.8861	OPEN LINE FROM BUS 54277 JERIC2WT69.0 TO BUS 54278 CLARDON269.0 CKT1	27	"	
10SP	AEPW	54281 NMEMREA269.0	0.9150	0.8933	OPEN LINE FROM BUS 50932 KIRBY3 115 TO BUS 54276 JERICO3 115 CKT1	27	"	
10SP	AEPW	54275 NWMEMPH269.0	0.9104	0.8888	OPEN LINE FROM BUS 54277 JERIC2WT69.0 TO BUS 54278 CLARDON269.0 CKT1	27	"	
10SP	AEPW	54275 NWMEMPH269.0	0.9174	0.8958	OPEN LINE FROM BUS 50932 KIRBY3 115 TO BUS 54276 JERICO3 115 CKT1	27	"	
10SP	AEPW	54282 MEMPHIS269.0	0.9112	0.8896	OPEN LINE FROM BUS 54277 JERIC2WT69.0 TO BUS 54278 CLARDON269.0 CKT1	27	"	
10SP	AEPW	54282 MEMPHIS269.0	0.9181	0.8965	OPEN LINE FROM BUS 50932 KIRBY3 115 TO BUS 54276 JERICO3 115 CKT1	27	"	
10SP	AEPW	54280 HEDLEY 269.0	0.9050	0.8836	OPEN LINE FROM BUS 54276 JERICO3 115 TO BUS 54277 JERIC2WT69.0 TO BUS 54303 JH2TERT 14.4 CKT1	27	"	
10SP	AEPW	54281 NMEMREA269.0	0.9148	0.8937	OPEN LINE FROM BUS 54276 JERICO3 115 TO BUS 54277 JERIC2WT69.0 TO BUS 54303 JH2TERT 14.4 CKT1	28	"	
10SP	AEPW	54275 NWMEMPH269.0	0.9172	0.8962	OPEN LINE FROM BUS 54276 JERICO3 115 TO BUS 54277 JERIC2WT69.0 TO BUS 54303 JH2TERT 14.4 CKT1	28	"	
10SP	AEPW	54282 MEMPHIS269.0	0.9179	0.8969	OPEN LINE FROM BUS 54276 JERICO3 115 TO BUS 54277 JERIC2WT69.0 TO BUS 54303 JH2TERT 14.4 CKT1	28	"	
10SP	AEPW	54158 TAMARTP4 138	0.8990	0.8747	OPEN LINE FROM BUS 54126 HOB-JCT4 138 TO BUS 54158 TAMARTP4 138 CKT1	29	Not a Load Serving Bus	
10SP	AEPW	54103 ALTUSJT4 138	0.9013	0.8771	OPEN LINE FROM BUS 54126 HOB-JCT4 138 TO BUS 54158 TAMARTP4 138 CKT1	29	Not a Load Serving Bus	
10SP	AEPW	54111 ALTUSTP4 138	0.9004	0.8763	OPEN LINE FROM BUS 54126 HOB-JCT4 138 TO BUS 54158 TAMARTP4 138 CKT1	29	Not a Load Serving Bus	
10WP		NONE IDENTIFIED				29		
Total Estimated Engineering and Construction Cost								TBD

SPP-2004-072-1
 Table 3.1 - Non-AEP 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
05AP			NONE IDENTIFIED						29		
05G			NONE IDENTIFIED						29		
05SP	AEPW	WFEC	54122 ELKCTY-2 69 to 55897 ELKCITY2 69 CKT 1	39	114.0	117.1	4.2	54126 HOB-JCT4 138 to 54158 TAMARTP4 138 CKT 1	0	WFEC plans this line to be upgraded by 12/05. Relieved by WFEC temporarily increased ratings and/or operator guides for summer 2005.	
05SP	AEPW	WFEC	54122 ELKCTY-2 69 to 55897 ELKCITY2 69 CKT 1	39	108.1	110.4	3.0	54109 CL-AFTP4 138 to 54121 ELKCTY-4 138 CKT 1	0	"	
05SH			NONE IDENTIFIED						29		
05FA			NONE IDENTIFIED						29		
05WP			NONE IDENTIFIED						29		
07SP	AEPW	WFEC	54122 ELKCTY-2 69 to 55897 ELKCITY2 69 CKT 1	39	118.7	122.0	4.4	54126 HOB-JCT4 138 to 54158 TAMARTP4 138 CKT 1	0	WFEC plans this line to be upgraded by 12/05. Relieved by WFEC temporarily increased ratings and/or operator guides for summer 2005.	
07WP			NONE IDENTIFIED						29		
10SP	WFEC	OKGE	54946 MIDWEST4 138 to 55917 FRNKLNS4 138 CKT 1	191	110.6	111.1	3.3	54946 MIDWEST4 138 to 54953 HOLLYWD4 138 CKT 1	0	Upgrade to be Completed by WFEC by 10/1/05 for SPP OATT Attachment AA	
10SP	WFEC	OKGE	54946 MIDWEST4 138 to 55917 FRNKLNS4 138 CKT 1	191	106.5	107.0	3.3	REMOVE UNIT 1 FROM BUS 54208 [SWS3-1 24.000] DISPATCH	0	"	
10SP	WFEC	OKGE	54946 MIDWEST4 138 to 55917 FRNKLNS4 138 CKT 1	191	105.3	105.8	3.6	54933 DRAPER 4 138 to 54949 SOONRTP4 138 CKT 1	0	"	
10SP	WFEC	OKGE	54946 MIDWEST4 138 to 55917 FRNKLNS4 138 CKT 1	191	104.6	105.3	4.8	54947 CANADN-4 138 to 55842 CANADNS4 138 CKT 1	0	"	
								OKGEIMTL-27			
10SP	WFEC	OKGE	54946 MIDWEST4 138 to 55917 FRNKLNS4 138 CKT 1	191	104.4	105.2	5.3	54947 CANADN-4138 54948 CEDARLN4138 CKT 1 54947 CANADN-4138 55097 WLNUTCK4138 CKT 1 55842 CANADNS4138 54947 CANADN-4138 CKT 1	0	"	
10WP			NONE IDENTIFIED						29		
Total Estimated Engineering and Construction 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
05AP		NONE IDENTIFIED				29		
05G		NONE IDENTIFIED				29		
05SP		NONE IDENTIFIED				29		
05SH		NONE IDENTIFIED				29		
05FA		NONE IDENTIFIED				29		
05WP		NONE IDENTIFIED				29		
07SP	WFEC	56043 RUSSELL4 138	0.9184	0.8976	OPEN LINE FROM BUS 54126 HOB-JCT4 138 TO BUS 54158 TAMARTP4 138 CKT1	29	Not a Load Serving Bus	
07WP		NONE IDENTIFIED				29		
10SP	WFEC	56043 RUSSELL4 138	0.9029	0.8799	OPEN LINE FROM BUS 54126 HOB-JCT4 138 TO BUS 54158 TAMARTP4 138 CKT1	29	Not a Load Serving Bus	
10WP		NONE IDENTIFIED				29		
Total Estimated Engineering and Construction Cos								\$0

SPP-2004-072-1
 Table 5.1 - AEP Facility Overloads
 Caused or Impacted by Selected Upgrades
 using Scenario 1

Southwest Power Pool
 System Impact Study

Study Case	From Area	To Area	Monitored Branch Overload	Rate <MVA>	BC Without Upgrades %Loading	BC With Upgrades %Loading	TC Without Upgrades %Loading	TC With Upgrades %Loading	Outaged Branch Causing Overload	Solution	Estimated Cost
05AP			NONE IDENTIFIED								
05G			NONE IDENTIFIED								
05SH			NONE IDENTIFIED								
05FA			NONE IDENTIFIED								
07SP			NONE IDENTIFIED								
07WP			NONE IDENTIFIED								
10SP			NONE IDENTIFIED								
10WP			NONE IDENTIFIED								
Total Estimated Engineering and Construction Cos											\$0

SPP-2004-072-1
 Table 6.1 - Non-AEP Facility Overloads
 Caused or Impacted by Selected Upgrades
 using Scenario 1

Southwest Power Pool
 System Impact Study

Study Case	From Area	To Area	Monitored Branch Overload	Rate <MVA>	BC Without Upgrades %Loading	BC With Upgrades %Loading	TC Without Upgrades %Loading	TC With Upgrades %Loading	Outaged Branch Causing Overload	Solution	Estimated Cost
05AP			NONE IDENTIFIED								
05G			NONE IDENTIFIED								
05SH	WFEC	WFEC	56042 RUSSELL2 69 to 56043 RUSSELL4 138 CKT 1	42	102.2	111.9	99.6	110.6	56024 PARADSE4 138 to 55814 ANADARK4 138 CKT 1	WFEC proposes the possibility of assigning costs associated with the need for a larger Autotransformer than what is required for WFEC own needs.	TBD
05SH	WFEC	WFEC	56042 RUSSELL2 69 to 56043 RUSSELL4 138 CKT 1	42	92.7	100.2	<100	<100	54121 ELKCTY-4 138 to 54122 ELKCTY-269.0 to 54156 ELKC4-1 13.8 CKT	"	
05FA			NONE IDENTIFIED								
07SP	WFEC	WFEC	56042 RUSSELL2 69 to 56043 RUSSELL4 138 CKT 1	42	119.4	132.1	115.3	130.9	56024 PARADSE4 138 to 55814 ANADARK4 138 CKT 1	See Previous Upgrade Specified for Facility	
07SP	WFEC	WFEC	56042 RUSSELL2 69 to 56043 RUSSELL4 138 CKT 1	42	108.2	118.2	103.2	117.8	54121 ELKCTY-4 138 to 54122 ELKCTY-269.0 to 54156 ELKC4-1 13.8 CKT	"	
07SP	WFEC	WFEC	56042 RUSSELL2 69 to 56043 RUSSELL4 138 CKT 1	42	102.6	111.7	101.4	111.3	56024 PARADSE4 138 to 56052 SNYDER 4 138 CKT 1	"	
07SP	WFEC	WFEC	56042 RUSSELL2 69 to 56043 RUSSELL4 138 CKT 1	42	102.7	111.7	101.4	111.3	56051 SNYDER 2 69 to 56052 SNYDER 4 138 CKT 1	"	
07SP	WFEC	WFEC	56042 RUSSELL2 69 to 56043 RUSSELL4 138 CKT 1	42	91.5	100.4	<100	<100	54122 ELKCTY-2 69 to 55897 ELKCITY2 69 CKT 1	"	
07WP			NONE IDENTIFIED								
10SP	WFEC	WFEC	56042 RUSSELL2 69 to 56043 RUSSELL4 138 CKT 1	42	119.7	136.5	115.4	134.0	56024 PARADSE4 138 to 55814 ANADARK4 138 CKT 1	See Previous Upgrade Specified for Facility	
10SP	WFEC	WFEC	56042 RUSSELL2 69 to 56043 RUSSELL4 138 CKT 1	42	105.6	120.4	100.8	118.0	54121 ELKCTY-4 138 to 54122 ELKCTY-269.0 to 54156 ELKC4-1 13.8 CKT	"	
10SP	WFEC	WFEC	56042 RUSSELL2 69 to 56043 RUSSELL4 138 CKT 1	42	106.1	116.6	101.8	116.3	56024 PARADSE4 138 to 56052 SNYDER 4 138 CKT 1	"	
10SP	WFEC	WFEC	56042 RUSSELL2 69 to 56043 RUSSELL4 138 CKT 1	42	106.1	116.6	101.8	116.3	56051 SNYDER 2 69 to 56052 SNYDER 4 138 CKT 1	"	
10SP	WFEC	WFEC	56042 RUSSELL2 69 to 56043 RUSSELL4 138 CKT 1	42	94.2	102.9	89.3	102.6	54122 ELKCTY-2 69 to 55897 ELKCITY2 69 CKT 1	"	
10WP	WFEC	WFEC	56042 RUSSELL2 69 to 56043 RUSSELL4 138 CKT 1	42	92.7	101.8	90.9	100.1	56024 PARADSE4 138 to 55814 ANADARK4 138 CKT 1	"	
Total Estimated Engineering and Construction Costs											TBD

SPP-2004-072-1
 Table 1.2 - AEP 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
05AP			NONE IDENTIFIED						29		
05G			NONE IDENTIFIED						29		
05SP	AEPW	AEPW	SNYDER - TIPTON & HEADERICK 69KV	53	98.6	109.1	19.2	HOBART JUNCTION - TAMARAC TAP 138KV	4	Relieved or Impact Removed by Selected Upgrades	
05SP	OMPA	AEPW	COMANCHE TAP - OMPA-DUNCAN 840 138KV	117	97.4	107.3	39.8	CORNVILLE - RUSH SPRINGS NATURAL GAS TAP 138KV	29	Incorrect Rating, New Emergency Rating 164 MVA	
05SH			NONE IDENTIFIED						29		
05FA			NONE IDENTIFIED						29		
05WP			NONE IDENTIFIED						29		
07SP	AEPW	AEPW	SNYDER - TIPTON & HEADERICK 69KV	53	104.9	116.0	20.1	HOBART JUNCTION - TAMARAC TAP 138KV	0	Relieved or Impact Removed by Selected Upgrades	
07SP	AEPW	OMPA	COMANCHE TAP - OMPA-DUNCAN 840 138KV	117	100.3	109.9	39.0	CORNVILLE - RUSH SPRINGS NATURAL GAS TAP 138KV	29	Incorrect Rating, New Emergency Rating 164 MVA	
07SP	AEPW	OMPA	COMANCHE TAP - OMPA-DUNCAN 840 138KV	117	90.8	100.2	38.1	RUSH SPRINGS NATURAL GAS TAP - RUSH SPRINGS TAP 138KV	29	*	
07WP			NONE IDENTIFIED						29		
10SP	AEPW	AEPW	SNYDER - TIPTON & HEADERICK 69KV	53	115.4	127.0	21.2	HOBART JUNCTION - TAMARAC TAP 138KV	0	Relieved or Impact Removed by Selected Upgrades	
10SP	OMPA	AEPW	ALTUS JUNCTION - OMPA-ALTUS PARK 69KV	44	97.0	103.8	10.3	HOBART JUNCTION - TAMARAC TAP 138KV	13	Relieved or Impact Removed by Selected Upgrades	
10SP	OMPA	AEPW	COMANCHE TAP - OMPA-DUNCAN 840 138KV	117	108.6	118.6	40.1	CORNVILLE - RUSH SPRINGS NATURAL GAS TAP 138KV	29	Incorrect Rating, New Emergency Rating 164 MVA	
10SP	AEPW	OMPA	COMANCHE TAP - OMPA-DUNCAN 840 138KV	117	98.8	108.6	39.3	RUSH SPRINGS NATURAL GAS TAP - RUSH SPRINGS TAP 138KV	29	*	
10SP	AEPW	OMPA	COMANCHE TAP - OMPA-DUNCAN 840 138KV	117	94.6	104.2	39.0	OMPA-MARLOW - RUSH SPRINGS TAP 138KV	29	*	
10WP			NONE IDENTIFIED						29		
Total Estimated Engineering and Construction Cost											\$0

SPP-2004-072-1
 Table 2.2 - AEP 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
05AP		NONE IDENTIFIED				29		
05G		NONE IDENTIFIED				29		
05SP		NONE IDENTIFIED				29		
05SH		NONE IDENTIFIED				29		
05FA		NONE IDENTIFIED				29		
05WP		NONE IDENTIFIED				29		
07SP		NONE IDENTIFIED				29		
07WP		NONE IDENTIFIED				29		
10SP	OMPA	56202 OMALTUS4 138	0.9037	0.8802	OPEN LINE FROM BUS 54126 HOB-JCT4 138 TO BUS 54158 TAMARTP4 138 CKT1	25	See Previous Upgrade Specified for Facility in Table 2.1	
10SP	AEPW	54158 TAMARTP4 138	0.9049	0.8816	OPEN LINE FROM BUS 54126 HOB-JCT4 138 TO BUS 54158 TAMARTP4 138 CKT1	29	Not a Load Serving Bus	
10SP	AEPW	54103 ALTUSJT4 138	0.9066	0.8835	OPEN LINE FROM BUS 54126 HOB-JCT4 138 TO BUS 54158 TAMARTP4 138 CKT1	29	Not a Load Serving Bus	
10SP	AEPW	54111 ALTUSTP4 138	0.9062	0.8832	OPEN LINE FROM BUS 54126 HOB-JCT4 138 TO BUS 54158 TAMARTP4 138 CKT1	29	Not a Load Serving Bus	
10WP		NONE IDENTIFIED				29		
Total Estimated Engineering and Construction Cos								\$0

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
05AP			NONE IDENTIFIED						29		
05G			NONE IDENTIFIED						29		
05SP	WFEC	OKGE	54946 MIDWEST4 138 to 55917 FRNKLNS4 138 CKT 1	191	109.8	110.3	3.4	56026 PHAROAH4 138 to 56084 WETUMKA4 138 CKT 1	0	Upgrade to be Completed by WFEC by 10/1/05 for SPP OATT Attachment AA	
05SP	WFEC	OKGE	54946 MIDWEST4 138 to 55917 FRNKLNS4 138 CKT 1	191	108.5	109.0	3.4	55869 CROMWEL4 138 to 56084 WETUMKA4 138 CKT 1	0	"	
05SP	WFEC	OKGE	54946 MIDWEST4 138 to 55917 FRNKLNS4 138 CKT 1	191	107.4	107.9	3.4	55869 CROMWEL4 138 to 56094 WEWOKA 4 138 CKT 1	0	"	
05SH	WFEC	OKGE	54946 MIDWEST4 138 to 55917 FRNKLNS4 138 CKT 1	191	103.7	104.2	3.4	55869 CROMWEL4 138 to 56084 WETUMKA4 138 CKT 1	0	Upgrade to be Completed by WFEC by 10/1/05 for SPP OATT Attachment AA	
05SH	WFEC	OKGE	54946 MIDWEST4 138 to 55917 FRNKLNS4 138 CKT 1	191	103.6	104.1	3.4	56026 PHAROAH4 138 to 56084 WETUMKA4 138 CKT 1	0	"	
05SH	WFEC	OKGE	54946 MIDWEST4 138 to 55917 FRNKLNS4 138 CKT 1	191	101.2	101.7	3.4	55869 CROMWEL4 138 to 56094 WEWOKA 4 138 CKT 1	0	"	
05FA			NONE IDENTIFIED						29		
05WP			NONE IDENTIFIED						29		
07SP	WFEC	OKGE	54946 MIDWEST4 138 to 55917 FRNKLNS4 138 CKT 1	191	113.1	113.6	3.4	56026 PHAROAH4 138 to 56084 WETUMKA4 138 CKT 1	0	Upgrade to be Completed by WFEC by 10/1/05 for SPP OATT Attachment AA	
07SP	WFEC	OKGE	54946 MIDWEST4 138 to 55917 FRNKLNS4 138 CKT 1	191	111.8	112.3	3.4	55869 CROMWEL4 138 to 56084 WETUMKA4 138 CKT 1	0	"	
07SP	WFEC	OKGE	54946 MIDWEST4 138 to 55917 FRNKLNS4 138 CKT 1	191	110.6	111.1	3.4	55869 CROMWEL4 138 to 56094 WEWOKA 4 138 CKT 1	0	"	
07SP	WFEC	OKGE	54946 MIDWEST4 138 to 55917 FRNKLNS4 138 CKT 1	191	105.1	105.6	3.2	54946 MIDWEST4 138 to 54953 HOLLYWD4 138 CKT 1	0	"	
07SP	WFEC	OKGE	54946 MIDWEST4 138 to 55917 FRNKLNS4 138 CKT 1	191	100.1	100.7	4.0	REMOVE UNIT 1 FROM BUS 54208 [SWS3-1 24.000] DISPATCH	0	"	
07WP			NONE IDENTIFIED						29		
10SP	WFEC	OKGE	54946 MIDWEST4 138 to 55917 FRNKLNS4 138 CKT 1	191	118.8	119.3	3.4	56026 PHAROAH4 138 to 56084 WETUMKA4 138 CKT 1	0	Upgrade to be Completed by WFEC by 10/1/05 for SPP OATT Attachment AA	
10SP	WFEC	OKGE	54946 MIDWEST4 138 to 55917 FRNKLNS4 138 CKT 1	191	117.4	117.9	3.4	55869 CROMWEL4 138 to 56084 WETUMKA4 138 CKT 1	0	"	
10SP	WFEC	OKGE	54946 MIDWEST4 138 to 55917 FRNKLNS4 138 CKT 1	191	116.1	116.7	3.4	55869 CROMWEL4 138 to 56094 WEWOKA 4 138 CKT 1	0	"	
10SP	WFEC	OKGE	54946 MIDWEST4 138 to 55917 FRNKLNS4 138 CKT 1	191	115.6	116.1	3.3	54946 MIDWEST4 138 to 54953 HOLLYWD4 138 CKT 1	0	"	
10SP	WFEC	OKGE	54946 MIDWEST4 138 to 55917 FRNKLNS4 138 CKT 1	191	112.4	112.9	3.3	REMOVE UNIT 1 FROM BUS 54208 [SWS3-1 24.000] DISPATCH	0	"	
10SP	WFEC	WFEC	55863 COMANCH2 69 to 56086 WALTERS2 69 CKT 1	38	99.5	102.6	4.1	54099 COMANC-2 69 to 54187 L-DISTP2 69 CKT 1	29	Invalid Contingency	
10WP			NONE IDENTIFIED						29		
Total Estimated Engineering and Construction 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
05AP		NONE IDENTIFIED				29		
05G		NONE IDENTIFIED				29		
05SP		NONE IDENTIFIED				29		
05SH		NONE IDENTIFIED				29		
05FA		NONE IDENTIFIED				29		
05WP		NONE IDENTIFIED				29		
07SP		NONE IDENTIFIED				29		
07WP		NONE IDENTIFIED				29		
10SP	WFEC	56043 RUSSELL4 138	0.9097	0.8879	OPEN LINE FROM BUS 54126 HOB-JCT4 138 TO BUS 54158 TAMARTP4 138 CKT1	29	Not a Load Serving Bus	
10WP		NONE IDENTIFIED				29		
Total Estimated Engineering and Construction Cost								\$0

Study Case	From Area	To Area	Monitored Branch Overload	Rate <MVA>	BC Without Upgrades %Loading	BC With Upgrades %Loading	TC Without Upgrades %Loading	TC With Upgrades %Loading	Outaged Branch Causing Overload	Solution	Estimated Cost
05AP			NONE IDENTIFIED								
05FA			NONE IDENTIFIED								
05G			NONE IDENTIFIED								
05SH			NONE IDENTIFIED								
07SP	AEPW	AEPW	CACHE - SNYDER 138KV	105	71.3	100.9	74.9	105.9	CARNEGIE - FORT COBB 138KV	Accelerate in service date of AEPW future plan to Replace wavetrap @ Snyder, upgrade required due to new 138 kV line from Snyder to Altus, AEPW Estimated Cost is \$45,000	TBD
07SP	AEPW	AEPW	CACHE - SNYDER 138KV	105	71.3	100.7	74.9	105.9	FORT COBB - SOUTHWEST STATION 138KV	See Previous Upgrade Specified for Facility	
07SP	AEPW	AEPW	CACHE - SNYDER 138KV	105	<100	<100	73.7	104.2	CARNEGIE - HOBART JUNCTION 138KV	"	
07SP	AEPW	AEPW	CACHE - SNYDER 138KV	105	<100	<100	69.4	102.9	OKLAUNION - TUCO INTERCHANGE 345KV	"	
07SP	AEPW	AEPW	CACHE - SNYDER 138KV	105	<100	<100	69.4	102.8	TUCO INTERCHANGE 345/230KV TRANSFORMER	"	
07SP	AEPW	AEPW	CACHE - SNYDER 138KV	105	<100	<100	69.8	100.2	HOBART JUNCTION - TAMARAC TAP 138KV	"	
07WP			NONE IDENTIFIED								
10SP	AEPW	AEPW	CACHE - SNYDER 138KV	105	75.8	107.0	79.3	112.1	FORT COBB - SOUTHWEST STATION 138KV	See Previous Upgrade Specified for Facility	
10SP	AEPW	AEPW	CACHE - SNYDER 138KV	105	75.7	106.9	79.3	112.1	CARNEGIE - FORT COBB 138KV	"	
10SP	AEPW	AEPW	CACHE - SNYDER 138KV	105	71.6	106.0	74.9	111.2	OKLAUNION - TUCO INTERCHANGE 345KV	"	
10SP	AEPW	AEPW	CACHE - SNYDER 138KV	105	71.5	105.9	74.8	111.1	TUCO INTERCHANGE 345/230KV TRANSFORMER	"	
10SP	AEPW	AEPW	CACHE - SNYDER 138KV	105	74.5	105.1	78.0	110.2	CARNEGIE - HOBART JUNCTION 138KV	"	
10SP	AEPW	AEPW	CACHE - SNYDER 138KV	105	69.9	100.3	74.7	107.0	HOBART JUNCTION - TAMARAC TAP 138KV	"	
10SP	AEPW	AEPW	HOBART JUNCTION - TAMARAC TAP 138KV	105	<100	<100	98.4	102.1	LAWTON 112TH & WEST GORE - LAWTON AIRGAS TAP 138KV	Invalid Contingency	
10WP			NONE IDENTIFIED								
Total Estimated Engineering and Construction Cost											TBD

SPP-2004-072-1
 Table 6.2 - Non-AEP Facility Overloads
 Caused or Impacted by Selected Upgrades
 using Scenario 2

Southwest Power Pool
 System Impact Study

Study Case	From Area	To Area	Monitored Branch Overload	Rate <MVA>	BC Without Upgrades %Loading	BC With Upgrades %Loading	TC Without Upgrades %Loading	TC With Upgrades %Loading	Outaged Branch Causing Overload	Solution	Estimated Cost
05AP			NONE IDENTIFIED								
05G			NONE IDENTIFIED								
05SH	WFEC	WFEC	56042 RUSSELL2 69 to 56043 RUSSELL4 138 CKT 1	42	94.2	107.3	93.5	106.9	56024 PARADSE4 138 to 55814 ANADARK4 138 CKT 1	See Previous Upgrade Specified for Facility in Table 6.1	
05FA			NONE IDENTIFIED								
07SP	AEPW	WFEC	54111 ALTUSTP4 138 to 56043 RUSSELL4 138 CKT 1	72	95.9	100.1	<100	<100	56024 PARADSE4 138 to 55814 ANADARK4 138 CKT 1	Loadings Shown are With and Without a proposed 70 MVA Russell Autotransformer, The limit is WFEC's CTs at Russell, Solution Undetermined	TBD
07SP	WFEC	WFEC	56042 RUSSELL2 69 to 56043 RUSSELL4 138 CKT 1	42	109.1	128.7	105.1	127.6	56024 PARADSE4 138 to 55814 ANADARK4 138 CKT 1	See Previous Upgrade Specified for Facility in Table 6.1	
07SP	WFEC	WFEC	56042 RUSSELL2 69 to 56043 RUSSELL4 138 CKT 1	42	92.4	107.0	91.7	106.7	56024 PARADSE4 138 to 56052 SNYDER 4 138 CKT 1	"	
07SP	WFEC	WFEC	56042 RUSSELL2 69 to 56043 RUSSELL4 138 CKT 1	42	92.4	107.0	91.7	106.7	56051 SNYDER 2 69 to 56052 SNYDER 4 138 CKT 1	"	
07SP	WFEC	WFEC	56042 RUSSELL2 69 to 56043 RUSSELL4 138 CKT 1	42	88.4	102.6	85.1	102.8	54121 ELKCTY-4 138 to 54122 ELKCTY-269.0 to 54156 ELKC4-1 13.8 CKT	"	
07WP			NONE IDENTIFIED								
10SP	AEPW	WFEC	54111 ALTUSTP4 138 to 56043 RUSSELL4 138 CKT 1	72	100.3	106.5	97.9	103.2	56024 PARADSE4 138 to 55814 ANADARK4 138 CKT 1	Loadings Shown are With and Without a proposed 70 MVA Russell Autotransformer, The limit is WFEC's CTs at Russell, Solution Undetermined	TBD
10SP	WFEC	WFEC	56042 RUSSELL2 69 to 56043 RUSSELL4 138 CKT 1	42	111.8	133.5	107.8	130.9	56024 PARADSE4 138 to 55814 ANADARK4 138 CKT 1	See Previous Upgrade Specified for Facility in Table 6.1	
10SP	WFEC	WFEC	56042 RUSSELL2 69 to 56043 RUSSELL4 138 CKT 1	42	96.9	114.5	92.8	114.4	56024 PARADSE4 138 to 56052 SNYDER 4 138 CKT 1	"	
10SP	WFEC	WFEC	56042 RUSSELL2 69 to 56043 RUSSELL4 138 CKT 1	42	97.0	114.5	92.8	114.4	56051 SNYDER 2 69 to 56052 SNYDER 4 138 CKT 1	"	
10SP	WFEC	WFEC	56042 RUSSELL2 69 to 56043 RUSSELL4 138 CKT 1	42	88.8	107.9	85.0	105.2	54121 ELKCTY-4 138 to 54122 ELKCTY-269.0 to 54156 ELKC4-1 13.8 CKT	"	
10WP			NONE IDENTIFIED								
Total Estimated Engineering and Construction Cost											TBD

SPP-2004-072-1
 Table 1.3 - AEP 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
05AP			NONE IDENTIFIED						29		
05FA			NONE IDENTIFIED						29		
05G			NONE IDENTIFIED						29		
05SH			NONE IDENTIFIED						29		
05SP	AEPW	AEPW	SNYDER - TIPTON & HEADERICK 69KV	53	98.1	108.0	18.1	HOBART JUNCTION - TAMARAC TAP 138KV	6	Relieved or Impact Removed by Selected Upgrades	
05SP	OMPA	AEPW	COMANCHE TAP - OMPA-DUNCAN 840 138KV	117	96.9	106.8	39.8	CORNVILLE - RUSH SPRINGS NATURAL GAS TAP 138KV	29	Incorrect Rating, New Emergency Rating 164 MVA	
05WP			NONE IDENTIFIED						29		
07SP	AEPW	AEPW	SNYDER - TIPTON & HEADERICK 69KV	53	103.5	114.5	20.1	HOBART JUNCTION - TAMARAC TAP 138KV	0	Relieved or Impact Removed by Selected Upgrades	
07SP	AEPW	OMPA	COMANCHE TAP - OMPA-DUNCAN 840 138KV	117	99.8	109.5	39.2	CORNVILLE - RUSH SPRINGS NATURAL GAS TAP 138KV	29	Incorrect Rating, New Emergency Rating 164 MVA	
07WP			NONE IDENTIFIED						29		
10SP	AEPW	AEPW	SNYDER - TIPTON & HEADERICK 69KV	53	113.5	125.2	21.4	HOBART JUNCTION - TAMARAC TAP 138KV	0	Relieved or Impact Removed by Selected Upgrades	
10SP	AEPW	AEPW	HOBART JUNCTION - TAMARAC TAP 138KV	105	97.7	103.1	19.6	ANADARKO - PARADISE 138KV	12	Relieved or Impact Removed by Selected Upgrades	
10SP	OMPA	AEPW	ALTUS JUNCTION - OMPA-ALTUS PARK 69KV	44	94.8	101.6	10.4	HOBART JUNCTION - TAMARAC TAP 138KV	22	Relieved or Impact Removed by Selected Upgrades	
10SP	AEPW	AEPW	HOBART JUNCTION - TAMARAC TAP 138KV	105	94.6	101.3	24.3	SNYDER - TIPTON & HEADERICK 69KV	23	Relieved or Impact Removed by Selected Upgrades	
10SP	AEPW	AEPW	HOBART JUNCTION - TAMARAC TAP 138KV	105	94.3	101.1	24.3	TIPTON & HEADERICK - TIPTON TAP 69KV	24	"	
10SP	AEPW	AEPW	HOBART JUNCTION - TAMARAC TAP 138KV	105	94.7	100.9	22.6	LAWTON 112TH & WEST GORE - LAWTON AIRGAS TAP 138KV	25	"	
10SP	OMPA	AEPW	COMANCHE TAP - OMPA-DUNCAN 840 138KV	117	108.2	118.1	40.1	CORNVILLE - RUSH SPRINGS NATURAL GAS TAP 138KV	29	Incorrect Rating, New Emergency Rating 164 MVA	
10SP	AEPW	OMPA	COMANCHE TAP - OMPA-DUNCAN 840 138KV	117	98.4	108.1	39.1	RUSH SPRINGS NATURAL GAS TAP - RUSH SPRINGS TAP 138KV	29	"	
10SP	AEPW	OMPA	COMANCHE TAP - OMPA-DUNCAN 840 138KV	117	94.1	103.8	39.0	OMPA-MARLOW - RUSH SPRINGS TAP 138KV	29	"	
10WP			NONE IDENTIFIED						29		
Total Estimated Engineering and Construction 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
05AP		NONE IDENTIFIED				29		
05G		NONE IDENTIFIED				29		
05SP		NONE IDENTIFIED				29		
05SH		NONE IDENTIFIED				29		
05FA		NONE IDENTIFIED				29		
05WP		NONE IDENTIFIED				29		
07SP		NONE IDENTIFIED				29		
07WP		NONE IDENTIFIED				29		
10SP	OMPA	56202 OMALTUS4 138	0.9050	0.8798	OPEN LINE FROM BUS 54126 HOB-JCT4 138 TO BUS 54158 TAMARTP4 138 CKT1	23	See Previous Upgrade Specified for Facility in Table 2.1	
10SP	AEPW	54158 TAMARTP4 138	0.9062	0.8812	OPEN LINE FROM BUS 54126 HOB-JCT4 138 TO BUS 54158 TAMARTP4 138 CKT1	29	Not a Load Serving Bus	
10SP	AEPW	54103 ALTUSJT4 138	0.9078	0.8831	OPEN LINE FROM BUS 54126 HOB-JCT4 138 TO BUS 54158 TAMARTP4 138 CKT1	29	Not a Load Serving Bus	
10SP	AEPW	54111 ALTUSTP4 138	0.9075	0.8828	OPEN LINE FROM BUS 54126 HOB-JCT4 138 TO BUS 54158 TAMARTP4 138 CKT1	29	Not a Load Serving Bus	
10WP		NONE IDENTIFIED				29		
Total Estimated Engineering and Construction Cos								\$0

SPP-2004-072-1
 Table 3.3 - Non-AEP 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
05AP			NONE IDENTIFIED						29		
05G			NONE IDENTIFIED						29		
05SP	WFEC	OKGE	54946 MIDWEST4 138 to 55917 FRNKLNS4 138 CKT 1	191.0	106.2	106.7	3.3056	56026 PHAROAH4 138 to 56084 WETUMKA4 138 CKT 1	0	Upgrade to be Completed by WFEC by 10/1/05 for SPP OATT Attachment AA	
05SP	WFEC	OKGE	54946 MIDWEST4 138 to 55917 FRNKLNS4 138 CKT 1	191.0	105.0	105.5	3.3017	55869 CROMWEL4 138 to 56084 WETUMKA4 138 CKT 1	0	"	
05SP	WFEC	OKGE	54946 MIDWEST4 138 to 55917 FRNKLNS4 138 CKT 1	191.0	103.8	104.3	3.305	55869 CROMWEL4 138 to 56094 WEWOKA 4 138 CKT 1	0	"	
05SP	AEPW	WFEC	54122 ELKCTY-2 69 to 55897 ELKCITY2 69 CKT 1	39.0	100.8	104.0	4.3034	54126 HOB-JCT4 138 to 54158 TAMARTP4 138 CKT 1	0	WFEC plans this line to be upgraded by 12/05. Relieved by WFEC temporarily increased ratings and/or operator guides for summer 2005.	
05SH	WFEC	OKGE	54946 MIDWEST4 138 to 55917 FRNKLNS4 138 CKT 1	191.0	100.1	100.6	3.3148	55869 CROMWEL4 138 to 56084 WETUMKA4 138 CKT 1	0	Upgrade to be Completed by WFEC by 10/1/05 for SPP OATT Attachment AA	
05SH	WFEC	OKGE	54946 MIDWEST4 138 to 55917 FRNKLNS4 138 CKT 1	191.0	100.0	100.5	3.3142	56026 PHAROAH4 138 to 56084 WETUMKA4 138 CKT 1	1	"	
05FA			NONE IDENTIFIED						29		
05WP			NONE IDENTIFIED						29		
07SP	AEPW	WFEC	54122 ELKCTY-2 69 to 55897 ELKCITY2 69 CKT 1	39.0	104.4	107.8	4.554	54126 HOB-JCT4 138 to 54158 TAMARTP4 138 CKT 1	0	WFEC plans this line to be upgraded by 12/05. May be relieved by WFEC temporarily increased ratings and/or operator guides for summer 2005.	
07SP	WFEC	OKGE	54946 MIDWEST4 138 to 55917 FRNKLNS4 138 CKT 1	191.0	109.4	109.9	3.3227	56026 PHAROAH4 138 to 56084 WETUMKA4 138 CKT 1	0	Upgrade to be Completed by WFEC by 10/1/05 for SPP OATT Attachment AA	
07SP	WFEC	OKGE	54946 MIDWEST4 138 to 55917 FRNKLNS4 138 CKT 1	191.0	108.1	108.6	3.3181	55869 CROMWEL4 138 to 56084 WETUMKA4 138 CKT 1	0	"	
07SP	WFEC	OKGE	54946 MIDWEST4 138 to 55917 FRNKLNS4 138 CKT 1	191.0	106.9	107.4	3.3247	55869 CROMWEL4 138 to 56094 WEWOKA 4 138 CKT 1	0	"	
07SP	WFEC	OKGE	54946 MIDWEST4 138 to 55917 FRNKLNS4 138 CKT 1	191.0	104.3	104.7	3.1502	54946 MIDWEST4 138 to 54953 HOLLYWD4 138 CKT 1	0	"	
07SP	WFEC	OKGE	54946 MIDWEST4 138 to 55917 FRNKLNS4 138 CKT 1	191.0	100.7	101.2	3.2931	REMOVE UNIT 1 FROM BUS 54208 [SWS3-1 24.000] DISPATCH	0	"	
07WP			NONE IDENTIFIED						29		
10SP	WFEC	OKGE	54946 MIDWEST4 138 to 55917 FRNKLNS4 138 CKT 1	191.0	115.1	115.6	3.2272	54946 MIDWEST4 138 to 54953 HOLLYWD4 138 CKT 1	0	Upgrade to be Completed by WFEC by 10/1/05 for SPP OATT Attachment AA	
10SP	WFEC	OKGE	54946 MIDWEST4 138 to 55917 FRNKLNS4 138 CKT 1	191.0	114.9	115.4	3.3412	56026 PHAROAH4 138 to 56084 WETUMKA4 138 CKT 1	0	"	
10SP	WFEC	OKGE	54946 MIDWEST4 138 to 55917 FRNKLNS4 138 CKT 1	191.0	113.6	114.1	3.3366	55869 CROMWEL4 138 to 56084 WETUMKA4 138 CKT 1	0	"	
10SP	WFEC	OKGE	54946 MIDWEST4 138 to 55917 FRNKLNS4 138 CKT 1	191.0	112.7	113.3	3.9517	REMOVE UNIT 1 FROM BUS 54208 [SWS3-1 24.000] DISPATCH	0	"	
10SP	WFEC	OKGE	54946 MIDWEST4 138 to 55917 FRNKLNS4 138 CKT 1	191.0	112.3	112.8	3.3405	55869 CROMWEL4 138 to 56094 WEWOKA 4 138 CKT 1	0	"	
10WP			NONE IDENTIFIED						29		
Total Estimated Engineering and Construction 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
05AP		NONE IDENTIFIED				29		
05G		NONE IDENTIFIED				29		
05SP		NONE IDENTIFIED				29		
05SH		NONE IDENTIFIED				29		
05FA		NONE IDENTIFIED				29		
05WP		NONE IDENTIFIED				29		
07SP		NONE IDENTIFIED				29		
07WP		NONE IDENTIFIED				29		
10SP	WFEC	56043 RUSSELL4 138	0.9110	0.8875	OPEN LINE FROM BUS 54126 HOB-JCT4 138 TO BUS 54158 TAMARTP4 138 CKT1	29	Not a Load Serving Bus	
10WP		NONE IDENTIFIED				29		
Total Estimated Engineering and Construction Cost								\$0

SPP-2004-072-1
 Table 5.3 - AEP Facility Overloads
 Caused or Impacted by Selected Upgrades
 using Scenario 3

Southwest Power Pool
 System Impact Study

Study Case	From Area	To Area	Monitored Branch Overload	Rate <MVA>	BC Without Upgrades %Loading	BC With Upgrades %Loading	TC Without Upgrades %Loading	TC With Upgrades %Loading	Outaged Branch Causing Overload	Solution	Estimated Cost
05AP			NONE IDENTIFIED								
05FA			NONE IDENTIFIED								
05G			NONE IDENTIFIED								
05SH			NONE IDENTIFIED								
07SP			NONE IDENTIFIED								
07WP			NONE IDENTIFIED								
10SP	AEPW	AEPW	CACHE - SNYDER 138KV	105	<100	<100	69.2	102.6	OKLAUNION - TUCO INTERCHANGE 345KV	See Previous Upgrade Specified for Facility in Table 5.2	
10SP	AEPW	AEPW	CACHE - SNYDER 138KV	105	<100	<100	69.2	102.5	TUCO INTERCHANGE 345/230KV TRANSFORMER	"	
10SP	AEPW	AEPW	CACHE - SNYDER 138KV	105	<100	<100	70.6	101.5	HOBART JUNCTION - TAMARAC TAP 138KV	"	
10SP	AEPW	AEPW	CACHE - SNYDER 138KV	105	<100	<100	71.6	100.9	FORT COBB - SOUTHWEST STATION 138KV	"	
10SP	AEPW	AEPW	CACHE - SNYDER 138KV	105	<100	<100	71.6	100.9	CARNEGIE - FORT COBB 138KV	"	
10SP	AEPW	AEPW	HOBART JUNCTION - TAMARAC TAP 138KV	105	<100	<100	100.9	104.2	LAWTON 112TH & WEST GORE - LAWTON AIRGAS TAP 138KV	Invalid Contingency	
10SP	AEPW	AEPW	HOBART JUNCTION - TAMARAC TAP 138KV	105	<100	<100	99.2	101.3	CACHE - LAWTON AIRGAS TAP 138KV	Invalid Contingency	
10WP			NONE IDENTIFIED								
Total Estimated Engineering and Construction Cost											\$0

SPP-2004-072-1
 Table 6.3 - Non-AEP Facility Overloads
 Caused or Impacted by Selected Upgrades
 using Scenario 3

Southwest Power Pool
 System Impact Study

Study Case	From Area	To Area	Monitored Branch Overload	Rate <MVA>	BC Without Upgrades %Loading	BC With Upgrades %Loading	TC Without Upgrades %Loading	TC With Upgrades %Loading	Outaged Branch Causing Overload	Solution	Estimated Cost
05AP			NONE IDENTIFIED								
05G			NONE IDENTIFIED								
05SH	WFEC	WFEC	56042 RUSSELL2 69 to 56043 RUSSELL4 138 CKT 1	42	92.9	105.4	93.3	103.8	56024 PARADSE4 138 to 55814 ANADARK4 138 CKT 1	See Previous Upgrade Specified for Facility in Table 6.1	
05FA			NONE IDENTIFIED								
07SP	AEPW	WFEC	54111 ALTUSTP4 138 to 56043 RUSSELL4 138 CKT 1	72	96.9	101.0	<100	<100	56024 PARADSE4 138 to 55814 ANADARK4 138 CKT 1	Loadings Shown are With and Without a proposed 70 MVA Russell Autotransformer, The limit is WFEC's CTs at Russell, Solution Undetermined	TBD
07SP	WFEC	WFEC	56042 RUSSELL2 69 to 56043 RUSSELL4 138 CKT 1	42	108.9	126.8	104.9	125.6	56024 PARADSE4 138 to 55814 ANADARK4 138 CKT 1	See Previous Upgrade Specified for Facility in Table 6.1	
07SP	WFEC	WFEC	56042 RUSSELL2 69 to 56043 RUSSELL4 138 CKT 1	42	92.3	106.1	91.6	104.8	56024 PARADSE4 138 to 56052 SNYDER 4 138 CKT 1	"	
07SP	WFEC	WFEC	56042 RUSSELL2 69 to 56043 RUSSELL4 138 CKT 1	42	92.3	105.0	91.6	104.8	56051 SNYDER 2 69 to 56052 SNYDER 4 138 CKT 1	"	
07SP	WFEC	WFEC	56042 RUSSELL2 69 to 56043 RUSSELL4 138 CKT 1	42	89.2	102.0	85.0	102.0	54121 ELKCTY-4 138 to 54122 ELKCTY-269.0 to 54156 ELKC4-1 13.8 CKT	"	
07WP			NONE IDENTIFIED								
10SP	AEPW	WFEC	54111 ALTUSTP4 138 to 56043 RUSSELL4 138 CKT 1	72	101.4	106.7	98.2	103.5	56024 PARADSE4 138 to 55814 ANADARK4 138 CKT 1	Loadings Shown are With and Without a proposed 70 MVA Russell Autotransformer, The limit is WFEC's CTs at Russell, Solution Undetermined	TBD
10SP	WFEC	WFEC	56042 RUSSELL2 69 to 56043 RUSSELL4 138 CKT 1	42	110.5	131.3	107.0	129.2	56024 PARADSE4 138 to 55814 ANADARK4 138 CKT 1	See Previous Upgrade Specified for Facility in Table 6.1	
10SP	WFEC	WFEC	56042 RUSSELL2 69 to 56043 RUSSELL4 138 CKT 1	42	96.4	111.5	92.2	111.4	56024 PARADSE4 138 to 56052 SNYDER 4 138 CKT 1	"	
10SP	WFEC	WFEC	56042 RUSSELL2 69 to 56043 RUSSELL4 138 CKT 1	42	96.4	111.5	92.2	111.3	56051 SNYDER 2 69 to 56052 SNYDER 4 138 CKT 1	"	
10SP	WFEC	WFEC	56042 RUSSELL2 69 to 56043 RUSSELL4 138 CKT 1	42	89.1	107.6	85.2	104.9	54121 ELKCTY-4 138 to 54122 ELKCTY-269.0 to 54156 ELKC4-1 13.8 CKT	"	
10WP			NONE IDENTIFIED								
Total Estimated Engineering and Construction Cost											TBD

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
05AP			NONE IDENTIFIED						29		
05G			NONE IDENTIFIED						29		
05SP	OMPA	AEPW	54157 COMMTAP4 138 to 56204 OMDUNCN4 138 CKT 1	117	101.1	110.9	39.8	54112 CORNVIL4 138 to 54155 RUSHNGT4 138 CKT 1	29	Incorrect Rating, New Emergency Rating 164 MVA	
05SP	AEPW	OMPA	54157 COMMTAP4 138 to 56204 OMDUNCN4 138 CKT 1	117	91.6	101.3	38.9	54154 RUSHSPT4 138 to 54155 RUSHNGT4 138 CKT 1	29	*	
05SH			NONE IDENTIFIED						29		
05FA			NONE IDENTIFIED						29		
05WP			NONE IDENTIFIED						29		
07SP	AEPW	OMPA	54157 COMMTAP4 138 to 56204 OMDUNCN4 138 CKT 1	117	104.7	114.3	38.8	54112 CORNVIL4 138 to 54155 RUSHNGT4 138 CKT 1	29	Incorrect Rating, New Emergency Rating 164 MVA	
07SP	AEPW	OMPA	54157 COMMTAP4 138 to 56204 OMDUNCN4 138 CKT 1	117	95.2	104.7	38.1	54154 RUSHSPT4 138 to 54155 RUSHNGT4 138 CKT 1	29	*	
07SP	AEPW	OMPA	54157 COMMTAP4 138 to 56204 OMDUNCN4 138 CKT 1	117	90.7	100.1	37.9	54154 RUSHSPT4 138 to 56207 OMMARLO4 138 CKT 1	29	*	
07WP			NONE IDENTIFIED						29		
10SP	AEPW	AEPW	54125 HEADRIK2 69 to 54138 SNYDER-2 69 CKT 1	53	97.7	109.8	22.1	54126 HOB-JCT4 138 to 54158 TAMARTP4 138 CKT 1	6	Relieved or Impact Removed by Selected Upgrades	
10SP	AEPW	OMPA	54157 COMMTAP4 138 to 56204 OMDUNCN4 138 CKT 1	117	113.2	123.1	40.1	54112 CORNVIL4 138 to 54155 RUSHNGT4 138 CKT 1	29	Incorrect Rating, New Emergency Rating 164 MVA	
10SP	AEPW	OMPA	54157 COMMTAP4 138 to 56204 OMDUNCN4 138 CKT 1	117	103.5	113.2	39.1	54154 RUSHSPT4 138 to 54155 RUSHNGT4 138 CKT 1	29	*	
10SP	AEPW	OMPA	54157 COMMTAP4 138 to 56204 OMDUNCN4 138 CKT 1	117	99.2	108.8	38.7	54154 RUSHSPT4 138 to 56207 OMMARLO4 138 CKT 1	29	*	
10WP			NONE IDENTIFIED						29		

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
05AP			NONE IDENTIFIED						29		
05G			NONE IDENTIFIED						29		
05SP	AEPW	AEPW	54125 HEADRIK2 69 to 54138 SNYDER-2 69 CKT 1	53	98.6	109.1	19.2	54126 HOB-JCT4 138 to 54158 TAMARTP4 138 CKT 1	4	Relieved or Impact Removed by Selected Upgrades	
05SP	OMPA	AEPW	54157 COMMTAP4 138 to 56204 OMDUNCN4 138 CKT 1	117	97.4	107.3	39.8	54112 CORNVIL4 138 to 54155 RUSHNGT4 138 CKT 1	29	Incorrect Rating, New Emergency Rating 164 MVA	
05SH			NONE IDENTIFIED						29		
05FA			NONE IDENTIFIED						29		
05WP			NONE IDENTIFIED						29		
07SP	AEPW	AEPW	54125 HEADRIK2 69 to 54138 SNYDER-2 69 CKT 1	53	104.9	116.0	20.1	54126 HOB-JCT4 138 to 54158 TAMARTP4 138 CKT 1	0	Relieved or Impact Removed by Selected Upgrades	
07SP	AEPW	OMPA	54157 COMMTAP4 138 to 56204 OMDUNCN4 138 CKT 1	117	100.3	109.9	39.0	54112 CORNVIL4 138 to 54155 RUSHNGT4 138 CKT 1	29	Incorrect Rating, New Emergency Rating 164 MVA	
07SP	AEPW	OMPA	54157 COMMTAP4 138 to 56204 OMDUNCN4 138 CKT 1	117	90.8	100.2	38.1	54154 RUSHSPT4 138 to 54155 RUSHNGT4 138 CKT 1	29	*	
07WP			NONE IDENTIFIED						29		
10SP	AEPW	AEPW	54125 HEADRIK2 69 to 54138 SNYDER-2 69 CKT 1	53	115.4	127.0	21.2	54126 HOB-JCT4 138 to 54158 TAMARTP4 138 CKT 1	0	Relieved or Impact Removed by Selected Upgrades	
10SP	OMPA	AEPW	54104 ALTUSJT2 69 to 56245 OMPARK-2 69 CKT 1	44	97.0	103.8	10.3	54126 HOB-JCT4 138 to 54158 TAMARTP4 138 CKT 1	13	Relieved or Impact Removed by Selected Upgrades	
10SP	OMPA	AEPW	54157 COMMTAP4 138 to 56204 OMDUNCN4 138 CKT 1	117	108.6	118.6	40.1	54112 CORNVIL4 138 to 54155 RUSHNGT4 138 CKT 1	29	Incorrect Rating, New Emergency Rating 164 MVA	
10SP	AEPW	OMPA	54157 COMMTAP4 138 to 56204 OMDUNCN4 138 CKT 1	117	98.8	108.6	39.3	54154 RUSHSPT4 138 to 54155 RUSHNGT4 138 CKT 1	29	*	
10SP	AEPW	OMPA	54157 COMMTAP4 138 to 56204 OMDUNCN4 138 CKT 1	117	94.6	104.2	39.0	54154 RUSHSPT4 138 to 56207 OMMARLO4 138 CKT 1	29	*	
10WP			NONE IDENTIFIED						29		

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
05AP			NONE IDENTIFIED						29		
05FA			NONE IDENTIFIED						29		
05G			NONE IDENTIFIED						29		
05SH			NONE IDENTIFIED						29		
05SP	AEPW	AEPW	54125 HEADRIK2 69 to 54138 SNYDER-2 69 CKT 1	53	98.1	108.0	18.1	54126 HOB-JCT4 138 to 54158 TAMARTP4 138 CKT 1	6	Relieved or Impact Removed by Selected Upgrades	
05SP	OMPA	AEPW	54157 COMMTAP4 138 to 56204 OMDUNCN4 138 CKT 1	117	96.9	106.8	39.8	54112 CORNVIL4 138 to 54155 RUSHNGT4 138 CKT 1	29	Incorrect Rating, New Emergency Rating 164 MVA	
05WP			NONE IDENTIFIED						29		
07SP	AEPW	AEPW	54125 HEADRIK2 69 to 54138 SNYDER-2 69 CKT 1	53	103.5	114.5	20.1	54126 HOB-JCT4 138 to 54158 TAMARTP4 138 CKT 1	0	Relieved or Impact Removed by Selected Upgrades	
07SP	AEPW	OMPA	54157 COMMTAP4 138 to 56204 OMDUNCN4 138 CKT 1	117	99.8	109.5	39.2	54112 CORNVIL4 138 to 54155 RUSHNGT4 138 CKT 1	29	Incorrect Rating, New Emergency Rating 164 MVA	
07WP			NONE IDENTIFIED						29		
10SP	AEPW	AEPW	54125 HEADRIK2 69 to 54138 SNYDER-2 69 CKT 1	53	113.5	125.2	21.4	54126 HOB-JCT4 138 to 54158 TAMARTP4 138 CKT 1	0	Relieved or Impact Removed by Selected Upgrades	
10SP	AEPW	AEPW	54126 HOB-JCT4 138 to 54158 TAMARTP4 138 CKT 1	105	97.7	103.1	19.6	55814 ANADARK4 138 to 56024 PARADSE4 138 CKT 1	12	Relieved or Impact Removed by Selected Upgrades	
10SP	OMPA	AEPW	54104 ALTUSJT2 69 to 56245 OMPARK-2 69 CKT 1	44	94.8	101.6	10.4	54126 HOB-JCT4 138 to 54158 TAMARTP4 138 CKT 1	22	Relieved or Impact Removed by Selected Upgrades	
10SP	AEPW	AEPW	54126 HOB-JCT4 138 to 54158 TAMARTP4 138 CKT 1	105	94.6	101.3	24.3	54125 HEADRIK2 69 to 54138 SNYDER-2 69 CKT 1	23	Relieved or Impact Removed by Selected Upgrades	
10SP	AEPW	AEPW	54126 HOB-JCT4 138 to 54158 TAMARTP4 138 CKT 1	105	94.3	101.1	24.3	54125 HEADRIK2 69 to 54135 TIPTN T2 69 CKT 1	24	"	
10SP	AEPW	AEPW	54126 HOB-JCT4 138 to 54158 TAMARTP4 138 CKT 1	105	94.7	100.9	22.6	54151 112GORE4 138 to 54173 LAIRGST4 138 CKT 1	25	"	
10SP	OMPA	AEPW	54157 COMMTAP4 138 to 56204 OMDUNCN4 138 CKT 1	117	108.2	118.1	40.1	54112 CORNVIL4 138 to 54155 RUSHNGT4 138 CKT 1	29	Incorrect Rating, New Emergency Rating 164 MVA	
10SP	AEPW	OMPA	54157 COMMTAP4 138 to 56204 OMDUNCN4 138 CKT 1	117	98.4	108.1	39.1	54154 RUSHSPT4 138 to 54155 RUSHNGT4 138 CKT 1	29	"	
10SP	AEPW	OMPA	54157 COMMTAP4 138 to 56204 OMDUNCN4 138 CKT 1	117	94.1	103.8	39.0	54154 RUSHSPT4 138 to 56207 OMMARLO4 138 CKT 1	29	"	
10WP			NONE IDENTIFIED						29		