SPP Southwest Power Pool

System Impact Study SPP-2001-285
For Transmission Service
Requested By
Kansas City Board of Public Utilities

From SPA To KACY

For a Reserved Amount Of 38 MW
From 1/1/02
To 7/1/07

SPP Tariff Studies

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1. Executive Summary

Kansas City Board of Public Utilities (KBPU) has requested a system impact study for long-term Firm Point-to-Point transmission service from SPA to KACY. The period of the transaction is from 1/1/02 to 7/1/07. The request is for OASIS reservation 293046 for an amount of 38 MW.

This study is a revision to previous studies conducted for this service where the most limiting facility was the La Cygne to Stillwell 345 kV line for outage of the La Cygne to West Gardner 345 kV line. The principal objective of this study is to identify current system limitations using AC analyses and to determine system upgrades necessary to provide the requested service.

The SPA to KACY 38 MW transfer causes new facility overloads on the SPP transmission system, as well as increasing the loading on previously overloaded facilities. Tables 1, 2, 3 and 4 summarize the results of the system impact study. Table 1 lists the SPP Facility Overloads caused or impacted by the requested service and includes solutions with engineering and construction costs to alleviate the limiting facilities. Table 2 includes Non - SPP Facility Overloads caused or impacted by the requested service. Tables 3 and 4 lists the SPP and Non - SPP Facility Overloads, respectively, caused or impacted by modeling the selected upgrades to be assigned. Solutions with engineering and construction costs are provided for the SPP Facility Overloads listed in Table 3. Excluding any third party requirements, the total engineering and construction costs to provide the requested service may be determined by summing the total costs shown in Tables 1 and 3. For Non-SPP third-party facilities listed in Tables 2 and 4, the facility limitations will be mitigated in accordance with Section 21 of the Transmission Provider's OATT.

The total engineering and construction cost required to provide the requested service is $27,891,500. The ATC is determined to be zero until the assigned upgrades are constructed. The estimated in-service date of the facilities is 3/1/2006. 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

Kansas City Board of Public Utilities (KBPU) has requested an impact study for transmission service from SPA to KACY. The principal objective of this study is to identify the restraints on the SPP Regional Tariff System that may limit the transfer to less than 38 MW 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 38 MW transfer on transmission line loading and transmission bus voltages for outages of single and selected multiple transmission lines and transformers on the SPP systems and Non - SPP systems.

3. Study Methodology

A. Description

The system impact analysis was conducted to determine the steady-state impact of the 38 MW transfer on the SPP and Non - SPP systems. The steady-state analysis was done to ensure current SPP Criteria and NERC Planning Standards requirements are fulfilled. The Southwest Power Pool conforms to the NERC Planning Standards, which provide the strictest requirements, related to voltage violations and thermal overloads during normal conditions and during a contingency. It requires that all facilities be within normal operating ratings for normal system conditions and within emergency ratings after a contingency.

B. Model Updates

SPP used 10 seasonal models to study the SPA to KACY 38 MW transfer for the requested service period. The SPP 2003 Series Cases 2003 Summer Peak through 2009/10 Winter Peak were used to study the impact of the 38 MW transfer on the SPP system during the requested service period of 1/1/02 to 7/1/07.

The chosen base case models were modified to reflect the most current modeling information. The cases were modified to reflect future firm transfers during the requested service period that were not already included in the January 2003 base case series models.

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 2009 Summer Peak and 2009/10 Winter Peak cases both with and without the assigned upgrades modeled, 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 PSS/E options chosen to conduct the analysis can be found in Appendix A.

4. Study Results

A. Study Analysis Results

Tables 1, 2, 3, and 4 contain the steady-state analysis results of the System Impact Study. The Tables are in the attached workbook *SPP-2001-285 Tables*. The tables identify the seasonal case in which the event occurred, the facility control area location, applicable ratings of the overload, the loading percentage with and without the studied transfer and assigned upgrades modeled, 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.

Table 1 lists the SPP Facility Overloads caused or impacted by the 38 MW transfer. Solutions with engineering and construction costs are provided in the table.

Table 2 lists overloads on Non - SPP Regional Tariff participants' transmission systems caused or impacted by the 38 MW transfer. Comments are provided in the table.

Table 3 lists additional SPP Facility Overloads caused or impacted by modeling the assigned upgrades from Table 1. Solutions with engineering and construction costs are provided in the table.

Table 4 lists additional Non - SPP facility overloads caused or impacted by modeling the assigned upgrades from Table 1. Comments are provided in the table.

Tables 1a and 3a document the modeling representation of the events identified in Tables 1 and 3 respectively to include bus numbers and bus names.

5. Conclusion

The SPA to KACY 38 MW transfer causes new facility overloads on the SPP transmission system, as well as increasing the loading on previously overloaded facilities. The total engineering and construction cost required to provide the requested service is $27,891,500. The ATC is determined to be zero until the assigned upgrades are constructed. The estimated in-service date of the facilities is 3/1/2006. 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 - X 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. Excld 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 - X Phase shift adjustment
   _ Flat start
   _ Lock DC taps
   _ Lock switched shunts

Study Year	From Area	To Area	Monitored Branch Over 100% Rate B	Rate	BC % Loading	TC % Loading	ATC (MW)	Outaged Branch Causing Overload	Solution	Cost
03SP	WERE	WERE	AUBURN ROAD - JEFFREY ENERGY CENTER 230KV	565	112.1	112.2	0	HOYT - JEFFERY ENERGY CENTER 345KV CKT 1	Westar Transmission Operating Directive 400, Outage of the Jeffrey Energy Center to Hoyt 345 kV line	-
03SP	AEPW	AEPW	CHAMBER SPRINGS - TONTITOWN 161KV	247	123.9	124.1	0	CHAMBER SPRINGS - FARMINGTON AECC 161KV CKT 1	345 kV Project: Build 20 mile Flint Creek - East Centerton 345 kV line with East Centerton 345/161 kV auto transformer	20,200,000
03SP	AEPW	AEPW	CHAMBER SPRINGS - TONTITOWN 161KV	247	118.1	118.2	0	FLINT CREEK - TONTITOWN 161KV CKT 1	Relieved or Impact Removed by Selected Upgrades to be Assigned Modeled in 09SP	-
03SP	AEPW	AEPW	CHAMBER SPRINGS - TONTITOWN 161KV	247	112.7	112.9	0	FARMINGTON AECC - SOUTH FAYETTEVILLE 161KV CKT 1	"	-
03SP	AEPW	AEPW	DYESS - EAST ROGERS 161KV	244	107.5	107.8	0	FLINT CREEK - GENTRY REC 161KV CKT 1	AEPW Planned Tontitown Project	-
03SP	AEPW	AEPW	DYESS - EAST ROGERS 161KV	244	105.6	105.9	0	EAST CENTERTON - GENTRY REC 161KV CKT 1	AEPW Planned Tontitown Project	-
03SP	AEPW	AEPW	EAST CENTERTON - GENTRY REC 161KV	353	106.4	106.5	0	FLINT CREEK - TONTITOWN 161KV CKT 1	Relieved or Impact Removed by Selected Upgrades to be Assigned Modeled in 09SP	-
03SP	AEPW	AEPW	EAST CENTERTON - GENTRY REC 161KV	305	104.9	105.1	0	Base Case	"	-
03SP	AEPW	AEPW	EAST CENTERTON - GENTRY REC 161KV	353	103.9	104.1	0	DYESS - EAST ROGERS 161KV CKT 1	"	-
03SP	AEPW	AEPW	FLINT CREEK - GENTRY REC 161KV	354	108.3	108.4	0	FLINT CREEK - TONTITOWN 161KV CKT 1	Relieved or Impact Removed by Selected Upgrades to be Assigned Modeled in 09SP	-
03SP	AEPW	AEPW	FLINT CREEK - GENTRY REC 161KV	304	107.8	108.0	0	Base Case	"	-
03SP	AEPW	AEPW	FLINT CREEK - GENTRY REC 161KV	354	105.8	106.1	0	DYESS - EAST ROGERS 161KV CKT 1	"	-
03SP	AEPW	AEPW	FLINT CREEK - GENTRY REC 161KV	354	100.9	101.0	0	CHAMBER SPRINGS - FARMINGTON AECC 161KV CKT 1	"	-
03SP	AEPW	AEPW	FLINT CREEK - GENTRY REC 161KV	354	100.7	100.9	0	Multiple Outage Contingency: Monett - Brookline 345kV Flint Creek - Monett 345kV	"	-
03SP	WERE	WERE	LAWRENCE HILL 230/115/13.8KV TRANSFORMER	308	106.8	107.2	0	MIDLAND JCT 230/115/118.0KV TRANSFORMER	Westar Transmission Operating Directive 615, Loss of the Midland Junction 230/115 kV transformer	-
03SP	WERE	WERE	LAWRENCE HILL 230/115/13.8KV TRANSFORMER	308	107.0	107.2	0	LAWRENCE HILL - MIDLAND JCT 230KV	Westar Transmission Operating Directive 901, Outage of the Lawrence Hill-Midland Junction 230kV Line	-
03SP	MIPU	KACP	MARTIN CITY - SOUTHTOWN 161KV	167	117.7	119.6	0	LACYGNE - WEST GARDNER 345KV CKT 1	Updated Rating 224 MVA	-
03SP	MIPU	KACP	MARTIN CITY - SOUTHTOWN 161KV	167	116.2	118.1	0	HICKMAN - STILWELL 161KV CKT 1	"	-
03SP	MIPU	KACP	MARTIN CITY - SOUTHTOWN 161KV	167	103.7	105.6	0	HICKMAN - SOUTHTOWN 161KV CKT 1	"	-
03SP	MIPU	KACP	MARTIN CITY - SOUTHTOWN 161KV	167	100.3	102.1	0	ANTIOCH - STILWELL 161KV CKT 1	"	-
03SP	EMDE	EMDE	SUB 110 - ORONOGO JCT. - SUB 432 - JOPLIN OAKLAND NORTH 161KV	214	99.7	100.1	33	SUB 292 - TIPTON FORD - SUB 389 - JOPLIN SOUTHWEST 161KV CKT 1	Overloaded Facility Not Impacted by Transfer in the 04SP and 09SP, which better represents a deferral period of 3/1/2006 to 9/1/2011.	-
03SP	WERE	WERE	STULL SWITCHING STATION - TECUMSEH HILL 115KV	92	99.2	100.1	34	HOYT - STRANGER CREEK 345KV CKT 1	Westar Transmission Operating Directive 803, Outage of the Hoyt to Stranger 345 kV line	-
03SP	MIPU	KACP	MARTIN CITY - SOUTHTOWN 161KV	167	98.3	100.1	36	ANTIOCH - OXFORD 161KV CKT 1	Updated Rating 224 MVA	-
03FA	WERE	WERE	AUBURN ROAD - JEFFREY ENERGY CENTER 230KV	565	104.8	105.0	0	HOYT - JEFFERY ENERGY CENTER 345KV CKT 1	Westar Transmission Operating Directive 400, Outage of the Jeffrey Energy Center to Hoyt 345 kV line	-
03WP	WERE	WERE	AUBURN ROAD - JEFFREY ENERGY CENTER 230KV	565	101.7	101.9	0	HOYT - JEFFERY ENERGY CENTER 345KV CKT 1	Westar Transmission Operating Directive 400, Outage of the Jeffrey Energy Center to Hoyt 345 kV line	-
04G	WERE	WERE	AUBURN ROAD - JEFFREY ENERGY CENTER 230KV	565	105.2	105.3	0	HOYT - JEFFERY ENERGY CENTER 345KV CKT 1	Westar Transmission Operating Directive 400, Outage of the Jeffrey Energy Center to Hoyt 345 kV line	-
04SP	WERE	WERE	AUBURN ROAD - JEFFREY ENERGY CENTER 230KV	565	115.8	116.0	0	HOYT - JEFFERY ENERGY CENTER 345KV CKT 1	Westar Transmission Operating Directive 400, Outage of the Jeffrey Energy Center to Hoyt 345 kV line	-
04SP	AEPW	AEPW	CHAMBER SPRINGS - TONTITOWN 161KV	247	137.2	137.5	0	CHAMBER SPRINGS - FARMINGTON AECC 161KV CKT 1	Relieved or Impact Removed by Selected Upgrades to be Assigned Modeled in 09SP	-
04SP	AEPW	AEPW	CHAMBER SPRINGS - TONTITOWN 161KV	247	129.9	130.2	0	FLINT CREEK - TONTITOWN 161KV CKT 1	"	-
04SP	AEPW	AEPW	CHAMBER SPRINGS - TONTITOWN 161KV	247	125.1	125.4	0	FARMINGTON AECC - SOUTH FAYETTEVILLE 161KV CKT 1	"	-
04SP	AEPW	AEPW	CHAMBER SPRINGS - TONTITOWN 161KV	247	106.4	106.7	0	FLINT CREEK - GENTRY REC 161KV CKT 1	"	-
04SP	AEPW	AEPW	CHAMBER SPRINGS - TONTITOWN 161KV	247	105.6	105.9	0	EAST CENTERTON - GENTRY REC 161KV CKT 1	"	-
04SP	OKGE	OKGE	CONTINENTAL BLACKS - OSAGE 69KV	96	100.8	101.3	0	KILDARE - WHITE EAGLE 138KV CKT 1	Replace Wavetrap and increase CT ratio.	30,000
04SP	AEPW	AEPW	EAST CENTERTON - GENTRY REC 161KV	353	108.9	109.0	0	FLINT CREEK - TONTITOWN 161KV CKT 1	Relieved or Impact Removed by Selected Upgrades to be Assigned Modeled in 09SP	-
04SP	AEPW	AEPW	FLINT CREEK - GENTRY REC 161KV	354	111.0	111.1	0	FLINT CREEK - TONTITOWN 161KV CKT 1	Relieved or Impact Removed by Selected Upgrades to be Assigned Modeled in 09SP	-
04SP	AEPW	AEPW	FLINT CREEK - GENTRY REC 161KV	354	101.6	101.8	0	LOWELL - TONTITOWN 161KV CKT 1	"	-
04SP	AEPW	AEPW	FLINT CREEK - TONTITOWN 161KV	312	112.8	113.0	0	CHAMBER SPRINGS 345/161KV TRANSFORMER CKT 1	Relieved or Impact Removed by Selected Upgrades to be Assigned Modeled in 09SP	-
04SP	AEPW	AEPW	FLINT CREEK - TONTITOWN 161KV	312	112.8	113.0	0	CHAMBER SPRINGS - CLARKSVILLE 345KV CKT 1	"	-
04SP	WERE	WERE	GRANT JCT - MAHANNA 69KV	101	132.8	133.3	0	HALSTEAD SOUTH - SEDGWICK COUNTY NO. 12 COLWICH 138KV CKT 1	Relieved or Impact Removed by Selected Upgrades to be Assigned Modeled in 09SP	-
04SP	WERE	WERE	GRANT JCT - RIPLEY 69KV	108	141.6	142.1	0	HALSTEAD SOUTH - SEDGWICK COUNTY NO. 12 COLWICH 138KV CKT 1	Relieved or Impact Removed by Selected Upgrades to be Assigned Modeled in 09SP	-
04SP	WERE	WERE	LAWRENCE HILL 230/115/13.8KV TRANSFORMER	308	114.5	114.8	0	MIDLAND JCT 230/115/118.0KV TRANSFORMER	Westar Transmission Operating Directive 615, Loss of the Midland Junction 230/115 kV transformer	-
04SP	WERE	WERE	LAWRENCE HILL 230/115/13.8KV TRANSFORMER	308	114.5	114.8	0	LAWRENCE HILL - MIDLAND JCT 230KV	Westar Transmission Operating Directive 901, Outage of the Lawrence Hill-Midland Junction 230kV Line	-
04SP	WERE	WERE	MAHANNA - NEWTON 69KV	101	127.1	127.5	0	HALSTEAD SOUTH - SEDGWICK COUNTY NO. 12 COLWICH 138KV CKT 1	Relieved or Impact Removed by Selected Upgrades to be Assigned Modeled in 09SP	-

Study Year	From Area	To Area	Monitored Branch Over 100% Rate B	Rate	BC % Loading	TC % Loading	ATC (MW)	Outaged Branch Causing Overload	Solution	Cost
04SP	MIPU	KACP	MARTIN CITY - SOUTHTOWN 161KV	167	111.0	112.9	0	HICKMAN - STILWELL 161KV CKT 1	Updated Rating 224 MVA	-
04SP	MIPU	KACP	MARTIN CITY - SOUTHTOWN 161KV	167	111.0	112.9	0	LACYGNE - WEST GARDNER 345KV CKT 1	"	-
04SP	WERE	WERE	MIDLAND JCT 230/115/18KV TRANSFORMER	308	102.3	102.6	0	LAWRENCE HILL 230/115/13.8KV TRANSFORMER	Westar Transmission Operating Directive 631, Loss of the Lawrence Hill 230/115kV Transformer	-
04SP	MIPU	KACP	MARTIN CITY - SOUTHTOWN 161KV	167	98.7	100.6	26	HICKMAN - SOUTHTOWN 161KV CKT 1	Updated Rating 224 MVA	-
04FA	WERE	WERE	AUBURN ROAD - JEFFREY ENERGY CENTER 230KV	565	102.9	103.0	0	HOYT - JEFFERY ENERGY CENTER 345KV CKT 1	Westar Transmission Operating Directive 400, Outage of the Jeffrey Energy Center to Hoyt 345 kV line	-
04FA	EMDE	SWPA	CARTHAGE - SUB 109 - ATLAS JCT. 161KV	167	102.3	103.0	0	SUB 292 - TIPTON FORD - SUB 389 - JOPLIN SOUTHWEST 161KV CKT 1	Impact Removed by Selected Upgrades to be Assigned.	-
04WP	WERE	WERE	AUBURN ROAD - JEFFREY ENERGY CENTER 230KV	565	103.5	103.6	0	HOYT - JEFFERY ENERGY CENTER 345KV CKT 1	Westar Transmission Operating Directive 400, Outage of the Jeffrey Energy Center to Hoyt 345 kV line	-
04WP	AEPW	AEPW	CHAMBER SPRINGS - TONTITOWN 161KV	275	100.7	100.9	0	CHAMBER SPRINGS - FARMINGTON AECC 161KV CKT 1	Relieved or Impact Removed by Selected Upgrades to be Assigned Modeled in 09WP	-
09SP	AECI	GRRD	2VIAN - GORE 69KV	47	108.6	109.6	0	Multiple Outage Contingency Liberty Tap - Van Buren 161kV Liberty Tap - Sallisaw 161kV Gore - Sallisaw 161kV	Rebuild 7.9 miles with 795MCM ACSR	1,304,000
09SP	AECI	GRRD	2VIAN - GORE 69KV	47	105.8	106.6	0	SALLISAW 161/69KV TRANSFORMER CKT 1	See Previous	See Previous
09SP	WERE	WERE	AUBURN ROAD - JEFFREY ENERGY CENTER 230KV	565	111.6	111.7	0	HOYT - JEFFERY ENERGY CENTER 345KV CKT 1	Westar Transmission Operating Directive 400, Outage of the Jeffrey Energy Center to Hoyt 345 kV line	-
09SP	WERE	WERE	AUBURN ROAD 230/115/13.8KV TRANSFORMER	308	120.4	120.6	0	HOYT - JEFFERY ENERGY CENTER 345KV	Westar Transmission Operating Directive 400, Outage of the Jeffrey Energy Center to Hoyt 345 kV line	-
09SP	AEPW	AEPW	CHAMBER SPRINGS - FARMINGTON AECC 161KV	335	121.6	121.7	0	CHAMBER SPRINGS - TONTITOWN 161KV CKT 1	Impact Removed by Selected Upgrades to be Assigned.	-
09SP	AEPW	AEPW	CHAMBER SPRINGS - FARMINGTON AECC 161KV	335	112.6	112.7	0	FLINT CREEK - GENTRY REC 161KV CKT 1	Relieved by Selected Upgrades to be Assigned	-
09SP	AEPW	AEPW	CHAMBER SPRINGS - FARMINGTON AECC 161KV	335	101.3	101.5	0	FLINT CREEK - GRDA1 345KV CKT 1	"	-
09SP	AEPW	AEPW	CHAMBER SPRINGS - TONTITOWN 161KV	244	173.3	173.6	0	CHAMBER SPRINGS - FARMINGTON AECC 161KV CKT 1	Impact Removed by Selected Upgrades to be Assigned.	-
09SP	AEPW	AEPW	CHAMBER SPRINGS - TONTITOWN 161KV	244	161.3	161.5	0	FLINT CREEK - TONTITOWN 161KV CKT 1	"	-
09SP	AEPW	AEPW	CHAMBER SPRINGS - TONTITOWN 161KV	244	156.0	156.3	0	FARMINGTON AECC - SOUTH FAYETTEVILLE 161KV CKT 1	"	-
09SP	AEPW	AEPW	CHAMBER SPRINGS - TONTITOWN 161KV	244	135.6	135.9	0	FLINT CREEK - GENTRY REC 161KV CKT 1	Relieved by Selected Upgrades to be Assigned	-
09SP	AEPW	AEPW	CHAMBER SPRINGS - TONTITOWN 161KV	244	134.1	134.3	0	EAST CENTERTON - GENTRY REC 161KV CKT 1	"	-
09SP	OKGE	OKGE	CONTINENTAL BLACKS - OSAGE 69KV	96	110.7	111.3	0	KILDARE - WHITE EAGLE 138KV CKT 1	See Previous	See Previous
09SP	AEPW	AEPW	EAST CENTERTON - GENTRY REC 161KV	353	132.5	132.7	0	FLINT CREEK - TONTITOWN 161KV CKT 1	Relieved by Selected Upgrades to be Assigned	-
09SP	AEPW	AEPW	EAST CENTERTON - GENTRY REC 161KV	353	119.4	119.6	0	LOWELL - TONTITOWN 161KV CKT 1	"	-
09SP	AEPW	AEPW	EAST CENTERTON - GENTRY REC 161KV	353	116.9	117.1	0	CHAMBER SPRINGS - FARMINGTON AECC 161KV CKT 1	"	-
09SP	AEPW	AEPW	EAST CENTERTON - GENTRY REC 161KV	353	116.5	116.8	0	LOWELL - ROGERS 161KV CKT 1	"	-
09SP	AEPW	AEPW	EAST CENTERTON - GENTRY REC 161KV	353	113.9	114.1	0	CHAMBER SPRINGS - TONTITOWN 161KV CKT 1	"	-
09SP	ENTR	AEPW	EUREKA SPRINGS - OSAGE 161KV	244	103.5	103.7	0	5BEE BR - 5QUITMN 161KV CKT 1	Rebuild 5.34 miles of 666 ACSR with 1590 ACSR. Replace wavetrap jumpers @ Eureka Springs	2,400,000
09SP	ENTR	AEPW	EUREKA SPRINGS - OSAGE 161KV	210	102.1	102.3	0	Base Case	See Previous	See Previous
09SP	ENTR	AEPW	EUREKA SPRINGS - OSAGE 161KV	244	100.8	101.0	0	5BEE BR - 5CLINTN 161KV CKT 1	See Previous	See Previous
09SP	WERE	WERE	FARMER'S CONSUMER CO-OP - WAKARUSA JCT SS 115KV	92	101.0	101.5	0	SOUTHWEST LAWRENCE - WAKARUSA JCT SS 115KV CKT 1	Rebuild 1.53-mile line	390,000
09SP	AEPW	AEPW	FARMINGTON AECC - SOUTH FAYETTEVILLE 161KV	313	108.7	108.8	0	CHAMBER SPRINGS - TONTITOWN 161KV CKT 1	Relieved by Selected Upgrades to be Assigned	-
09SP	AEPW	AEPW	FLINT CREEK - GENTRY REC 161KV	354	135.3	135.5	0	FLINT CREEK - TONTITOWN 161KV CKT 1	Relieved by Selected Upgrades to be Assigned	-
09SP	AEPW	AEPW	FLINT CREEK - GENTRY REC 161KV	354	122.3	122.5	0	LOWELL - TONTITOWN 161KV CKT 1	"	-
09SP	AEPW	AEPW	FLINT CREEK - GENTRY REC 161KV	354	119.8	120.0	0	CHAMBER SPRINGS - FARMINGTON AECC 161KV CKT 1	"	-
09SP	AEPW	AEPW	FLINT CREEK - GENTRY REC 161KV	354	119.4	119.7	0	LOWELL - ROGERS 161KV CKT 1	"	-
09SP	AEPW	AEPW	FLINT CREEK - GENTRY REC 161KV	354	116.8	117.0	0	CHAMBER SPRINGS - TONTITOWN 161KV CKT 1	"	-
09SP	AEPW	AEPW	FLINT CREEK - TONTITOWN 161KV	312	165.8	165.9	0	FLINT CREEK - GENTRY REC 161KV CKT 1	Relieved by Selected Upgrades to be Assigned	-
09SP	AEPW	AEPW	FLINT CREEK - TONTITOWN 161KV	312	163.3	163.5	0	EAST CENTERTON - GENTRY REC 161KV CKT 1	"	-
09SP	AEPW	AEPW	FLINT CREEK - TONTITOWN 161KV	312	139.4	139.6	0	CHAMBER SPRINGS 345/161KV TRANSFORMER CKT 1	Impact Removed by Selected Upgrades to be Assigned.	-
09SP	AEPW	AEPW	FLINT CREEK - TONTITOWN 161KV	312	139.4	139.6	0	CHAMBER SPRINGS - CLARKSVILLE 345KV CKT 1	"	-
09SP	AEPW	AEPW	FLINT CREEK - TONTITOWN 161KV	312	138.7	138.8	0	CHAMBER SPRINGS - TONTITOWN 161KV CKT 1	"	-
09SP	OKGE	OKGE	HORSESHOE LAKE - JONES TAP 138KV	287	100.2	100.4	0	90	Replace switches & ct's at Horseshoe Lake in 2004 at OKGE expense.	-
09SP	WERE	WERE	LAWRENCE HILL 230/115/13.8KV TRANSFORMER	308	114.0	114.3	0	MIDLAND JCT 230/115/118.0KV TRANSFORMER	Westar Transmission Operating Directive 615, Loss of the Midland Junction 230/115 kV transformer	-
09SP	WERE	WERE	LAWRENCE HILL 230/115/13.8KV TRANSFORMER	308	114.1	114.3	0	LAWRENCE HILL - MIDLAND JCT 230KV	Westar Transmission Operating Directive 901, Outage of the Lawrence Hill-Midland Junction 230kV Line	-
09SP	WERE	WERE	MIDLAND JCT 230/115/18KV TRANSFORMER	308	101.9	102.2	0	LAWRENCE HILL 230/115/13.8KV TRANSFORMER	Westar Transmission Operating Directive 631, Loss of the Lawrence Hill 230/115kV Transformer	-
09SP	AEPW	AEPW	ORU WEST TAP - RIVERSIDE STATION 138KV	304	114.5	114.7	0	Multiple Outage Contingency: 53795 R.S.S.-4138 to 53863 ORU ETP4138 CKT 1 53863 ORU ETP4138 to 53749 ORU E4138 CKT 1 53863 ORU ETP4138 to 53873 WARNTAP4138 CKT 1 53873 WARNTAP4138 53822 81YALES4138 CKT 1 53873 WARNTAP4138 to 53861 96YALE-4138 CKT 1 53822 81YALES4138 to 53872 WAREN-W4138 CKT 1	Replace wavetrap jumpers @ Riverside	10,000
09SP	AEPW	AEPW	ORU WEST TAP - RIVERSIDE STATION 138KV	304	103.5	103.7	0	ORU EAST TAP - RIVERSIDE STATION 138KV CKT 1	Contingency defined in exclude List	-
09SP	AEPW	AEPW	ORU WEST TAP - RIVERSIDE STATION 138KV	304	100.7	100.9	0	ORU EAST TAP - WARNREN TAP 138KV CKT 1	Contingency defined in exclude List	-

Study Year	From Area	To Area	Monitored Branch Over 100% Rate B	Rate	BC % Loading	TC % Loading	ATC (MW)	Outaged Branch Causing Overload	Solution	Cost
09SP	WERE	WERE	JARBALO JCT SS - LAWRENCE ENERGY CENTER UNIT 4 115KV	118	99.9	100.2	13	STRANGER CREEK 345/115/14.4KV TRANSFORMER	Westar Transmission Operating Directive 612, Outage of the Stranger Creek 345/115kV Transformer	-
09WP	SWPA	AEPW	BEAVER - EUREKA SPRINGS 161KV	263	101.5	102.2	0	Multiple Outage Contingency: Monett - Brookline 345kV Flint Creek - Monett 345kV	SWPA: Reconnect CT's to 1000:5 Tap on Bkrs 42, 32, & half or 22. Replace metering & reset relays for Line 2 & Line 3. AEPW: Replace Wavetrap & Metering CT Jumpers	67,500
09WP	AEPW	AEPW	CHAMBER SPRINGS - TONTITOWN 161KV	275	126.0	126.2	0	CHAMBER SPRINGS - FARMINGTON AECC 161KV CKT 1	Impact Removed by Selected Upgrades to be Assigned.	-
09WP	AEPW	AEPW	CHAMBER SPRINGS - TONTITOWN 161KV	275	118.3	118.5	0	FLINT CREEK - TONTITOWN 161KV CKT 1	"	-
09WP	AEPW	AEPW	CHAMBER SPRINGS - TONTITOWN 161KV	275	113.0	113.2	0	FARMINGTON AECC - SOUTH FAYETTEVILLE 161KV CKT 1	"	-
09WP	SWPA	SPRM	CLAY - SPRINGFIELD 161KV	167	103.3	103.7	0	Multiple Outage Contingency FRANKS TO HUBEN 345KV HUBEN TO MORGAN 345KV	Replace disconnect switches at Springfield.	200,000
09WP	AEPW	AEPW	EAST CENTERTON - GENTRY REC 161KV	368	110.3	110.5	0	FLINT CREEK - TONTITOWN 161KV CKT 1	Relieved by Selected Upgrades to be Assigned	-
09WP	AEPW	AEPW	EAST CENTERTON - GENTRY REC 161KV	368	101.9	102.0	0	LOWELL - ROGERS 161KV CKT 1	"	-
09WP	AEPW	AEPW	FLINT CREEK - GENTRY REC 161KV	368	112.3	112.4	0	FLINT CREEK - TONTITOWN 161KV CKT 1	Relieved by Selected Upgrades to be Assigned	-
09WP	AEPW	AEPW	FLINT CREEK - GENTRY REC 161KV	368	103.8	103.9	0	LOWELL - ROGERS 161KV CKT 1	"	-
09WP	AEPW	AEPW	FLINT CREEK - GENTRY REC 161KV	335	101.3	101.5	0	Base Case	"	-
09WP	AEPW	AEPW	FLINT CREEK - TONTITOWN 161KV	335	125.3	125.4	0	FLINT CREEK - GENTRY REC 161KV CKT 1	Relieved by Selected Upgrades to be Assigned	-
09WP	AEPW	AEPW	FLINT CREEK - TONTITOWN 161KV	335	124.1	124.3	0	EAST CENTERTON - GENTRY REC 161KV CKT 1	"	-
09WP	AEPW	AEPW	FLINT CREEK - TONTITOWN 161KV	335	107.5	107.6	0	CHAMBER SPRINGS - TONTITOWN 161KV CKT 1	"	-
09WP	AEPW	AEPW	FLINT CREEK - TONTITOWN 161KV	335	105.3	105.4	0	CHAMBER SPRINGS 345/161KV TRANSFORMER CKT 1	"	-
09WP	AEPW	AEPW	FLINT CREEK - TONTITOWN 161KV	335	105.3	105.4	0	CHAMBER SPRINGS - CLARKSVILLE 345KV CKT 1	"	-
09WP	AEPW	AEPW	CHAMBER SPRINGS - FARMINGTON AECC 161KV	335	99.9	100.1	18	CHAMBER SPRINGS - TONTITOWN 161KV CKT 1	Relieved by Selected Upgrades to be Assigned	-
09WP	WERE	WERE	AUBURN ROAD - JEFFREY ENERGY CENTER 230KV	565	99.9	100.1	24	HOYT - JEFFERY ENERGY CENTER 345KV CKT 1	Westar Transmission Operating Directive 400, Outage of the Jeffrey Energy Center to Hoyt 345 kV line	-
									Total Engineering & Construction Costs	24,601,500

Study Year	From Area	To Area	Monitored Branch Over 100% Rate B	Rate	BC % Loading	TC % Loading	Outaged Branch Causing Overload	Comments
03SP	KACY	KACY	58682 EVERETT2 69 to 58678 KAW 2 69 CKT 1	68	89.3	104.5	58683 OWN COR2 69 to 58686 LEVEE 2 69 CKT 1	May not be applicable for deferral period starting 3/1/200
03SP	KACY	KACY	58683 OWN COR2 69 to 58686 LEVEE 2 69 CKT 1	82	101.3	114.3	58682 EVERETT2 69 to 58692 QUIN 2 69 CKT 1	"
03SP	KACY	KACY	58683 OWN COR2 69 to 58686 LEVEE 2 69 CKT 1	82	88.3	101.7	58678 KAW 2 69 to 58682 EVERETT2 69 CKT 1	"
03SP	KACY	KACY	58692 QUIN 2 69 to 58683 OWN COR2 69 CKT 1	82	94.6	102.7	58683 OWN COR2 69 to 58692 QUIN 2 69 CKT 2	"
03SP	KACY	KACY	58692 QUIN 2 69 to 58683 OWN COR2 69 CKT 2	82	92.1	100.0	58683 OWN COR2 69 to 58692 QUIN 2 69 CKT 1	"
03SP	MIPU	KACP	59210 MARTCTY5 161 to 57993 STHTOWN5 161 CKT 1	167	117.7	119.6	57965 W.GRDNR7 345 to 57981 LACYGNE7 345 CKT 1	Updated Rating 224 MVA
03SP	MIPU	KACP	59210 MARTCTY5 161 to 57993 STHTOWN5 161 CKT 1	167	116.2	118.1	57969 STILWEL5 161 to 57994 HICKMAN5 161 CKT 1	"
03SP	MIPU	KACP	59210 MARTCTY5 161 to 57993 STHTOWN5 161 CKT 1	167	103.7	105.6	57993 STHTOWN5 161 to 57994 HICKMAN5 161 CKT 1	"
03SP	MIPU	KACP	59210 MARTCTY5 161 to 57993 STHTOWN5 161 CKT 1	167	100.3	102.1	57969 STILWEL5 161 to 58050 ANTIOCH5 161 CKT 1	"
03SP	MIPU	KACP	59210 MARTCTY5 161 to 57993 STHTOWN5 161 CKT 1	167	98.3	100.1	58046 OXFORD 5 161 to 58050 ANTIOCH5 161 CKT 1	"
03SP	MIPU	MIPU	59239 HSNVL 5 161 to 59295 HSNVL 2 69 CKT 1	63	107.9	108.0	59284 GRDVWTP2 69 to 59288 RGAFB 2 69 CKT 1	May not be applicable for deferral period starting 3/1/200
03SP	NPPD	NPPD	64728 ALDA 7 115 to 64729 ALDA 9 34.5 CKT 1	31	117.5	117.8	64728 ALDA 7 115 to 64729 ALDA 9 34.5 CKT 2	"
03SP	NPPD	NPPD	64747 BELDEN 7 115 to 64748 BELDEN 8 69 CKT 1	25	109.6	109.7	64747 BELDEN 7 115 to 64748 BELDEN 8 69 CKT 2	"
03SP	NPPD	NPPD	64747 BELDEN 7 115 to 64748 BELDEN 8 69 CKT 2	25	110.0	110.1	64747 BELDEN 7 115 to 64748 BELDEN 8 69 CKT 1	"
03SP	NPPD	NPPD	64749 BEVERLY7 115 to 64750 BEVERLY8 69 CKT 2	16	202.1	202.5	64749 BEVERLY7 115 to 64750 BEVERLY8 69 CKT 1	"
03SP	NPPD	NPPD	64855 HOLDREG7 115 to 64856 HOLDREG9 34.5 CKT 1	35	110.2	110.3	64855 HOLDREG7 115 to 64856 HOLDREG9 34.5 CKT 2	"
03SP	NPPD	NPPD	64855 HOLDREG7 115 to 64856 HOLDREG9 34.5 CKT 2	35	110.2	110.3	64855 HOLDREG7 115 to 64856 HOLDREG9 34.5 CKT 1	"
03SP	NPPD	NPPD	64876 KEARNEY7 115 to 64877 KEARNEY9 34.5 CKT 1	35	100.7	100.8	64876 KEARNEY7 115 to 64877 KEARNEY9 34.5 CKT 2	"
03SP	NPPD	NPPD	64876 KEARNEY7 115 to 64877 KEARNEY9 34.5 CKT 2	35	100.7	100.8	64876 KEARNEY7 115 to 64877 KEARNEY9 34.5 CKT 1	"
03SP	NPPD	NPPD	64953 SCHUYLR7 115 to 64954 SCHUYLR9 34.5 CKT 2	35	100.7	101.1	64953 SCHUYLR7 115 to 64954 SCHUYLR9 34.5 CKT 1	"
03SP	AECI	AECI	96089 5JAMESV 161 to 96673 2JAMESV 69 CKT 1	56	115.9	116.0	96089 5JAMESV 161 to 96673 2JAMESV 69 CKT 2	"
03SP	AECI	AECI	96089 5JAMESV 161 to 96673 2JAMESV 69 CKT 2	56	120.0	120.2	96089 5JAMESV 161 to 96673 2JAMESV 69 CKT 1	"
03SP	AECI	AECI	96119 5SULLVN 161 to 97152 2SULVN3 69 CKT 2	50	105.3	105.5	96119 5SULLVN 161 to 97152 2SULVN3 69 CKT 1	"
03SP	AECI	AECI	96124 5HOLDEN 161 to 96336 2HOLDEN 69 CKT 1	56	123.6	123.9	96110 5PITTSV 161 to 96124 5HOLDEN 161 CKT 1	"
03SP	AECI	AECI	96751 2REEDS 69 to 96659 2BOWRML 69 CKT 1	36	102.5	103.1	59468 AUR124 5 161 to 59480 MON383 5 161 CKT 1	"
03SP	AECI	AECI	96751 2REEDS 69 to 96659 2BOWRML 69 CKT 1	36	100.5	101.2	52690 CARTHG 2 69 to 96649 2JASPER 69 CKT 1	"
03SP	AECI	AECI	96943 2SILVCTY 69 to 96945 2YALE 69 CKT 1	35	110.1	110.3	96140 4SILVCTY 138 to 96141 4STILWTR 138 CKT 1	"
03FA	SUNC	SUNC	56390 PIONEER2 69 to 56379 HUGO T 2 69 CKT 1	32	105.3	106.0	56392 PIONTAP3 115 to 56442 CTUSUBL3 115 CKT 1	"
03FA	SUNC	SUNC	56390 PIONEER2 69 to 56379 HUGO T 2 69 CKT 1	32	99.5	100.3	56374 HASKELL3 115 to 56442 CTUSUBL3 115 CKT 1	"
03FA	OPPD	OPPD	65390 S1263T1T 161 to 65627 W BROCK8 69 CKT 1	53	100.2	100.5	64863 HUMBOLT5 161 to 65391 S975T4 T 161 CKT 1	"
03FA	OPPD	OPPD	65463 S1263 5 161 to 65390 S1263T1T 161 CKT 1	53	102.4	102.8	64863 HUMBOLT5 161 to 65391 S975T4 T 161 CKT 1	"
03FA	AECI	AECI	96089 5JAMESV 161 to 96673 2JAMESV 69 CKT 1	56	104.2	104.3	96089 5JAMESV 161 to 96673 2JAMESV 69 CKT 2	"
03FA	AECI	AECI	96089 5JAMESV 161 to 96673 2JAMESV 69 CKT 2	56	107.9	108.0	96089 5JAMESV 161 to 96673 2JAMESV 69 CKT 1	"
03WP	SUNC	SUNC	56390 PIONEER2 69 to 56379 HUGO T 2 69 CKT 1	32	107.6	108.6	56392 PIONTAP3 115 to 56442 CTUSUBL3 115 CKT 1	"
03WP	SUNC	SUNC	56390 PIONEER2 69 to 56379 HUGO T 2 69 CKT 1	32	104.2	104.3	Multiple Outage Contingency: 56392 PIONTAP3115 to 56442 CTUSUBL3115 CKT 1 56442 CTUSUBL3115 to 56374 HASKELL3115 CKT 1 56442 CTUSUBL3115 to 58791 SATANTA3115 CKT 1 56374 HASKELL3115 to 56467 SEWARD-3115 CKT 1 Close 56394 PRAXAIR269.0 to 56376 HELIXTP269.0 CKT 1	"
03WP	SUNC	SUNC	56391*PIONEER3 115 WND 2 PIONEER 1	50	106.2	106.7	56392 PIONTAP3115 to 56442 CTUSUBL3115 CKT 1	"
03WP	AECI	AECI	96089 5JAMESV 161 to 96673 2JAMESV 69 CKT 2	64	106.9	107.0	96089 5JAMESV 161 to 96673 2JAMESV 69 CKT 1	"
04G	AECI	AECI	96089 5JAMESV 161 to 96673 2JAMESV 69 CKT 1	56	103.9	104.0	96089 5JAMESV 161 to 96673 2JAMESV 69 CKT 2	"
04G	AECI	AECI	96089 5JAMESV 161 to 96673 2JAMESV 69 CKT 2	56	107.6	107.7	96089 5JAMESV 161 to 96673 2JAMESV 69 CKT 1	"
04G	AECI	AECI	96172 2TMHILL 69 to 96120 5THMHIL 161 CKT 2	84	121.9	122.0	96120 5THMHIL 161 to 96172 2TMHILL 69 CKT 1	"
04SP	KACY	KACY	58682 EVERETT2 69 to 58678 KAW 2 69 CKT 1	68	88.6	103.8	58683 OWN COR2 69 to 58686 LEVEE 2 69 CKT 1	"
04SP	KACY	KACY	58683 OWN COR2 69 to 58686 LEVEE 2 69 CKT 1	82	100.9	113.9	58682 EVERETT2 69 to 58692 QUIN 2 69 CKT 1	"
04SP	KACY	KACY	58683 OWN COR2 69 to 58686 LEVEE 2 69 CKT 1	82	87.9	101.7	58678 KAW 2 69 to 58682 EVERETT2 69 CKT 1	"
04SP	KACY	KACY	58692 QUIN 2 69 to 58683 OWN COR2 69 CKT 1	82	94.4	102.5	58683 OWN COR2 69 to 58692 QUIN 2 69 CKT 2	"
04SP	MIPU	KACP	59210 MARTCTY5 161 to 57993 STHTOWN5 161 CKT 1	167	111.0	112.9	57969 STILWEL5 161 to 57994 HICKMAN5 161 CKT 1	Updated Rating 224 MVA
04SP	MIPU	KACP	59210 MARTCTY5 161 to 57993 STHTOWN5 161 CKT 1	167	111.0	112.9	57965 W.GRDNR7 345 to 57981 LACYGNE7 345 CKT 1	"

Study Year	From Area	To Area	Monitored Branch Over 100% Rate B	Rate	BC % Loading	TC % Loading	Outaged Branch Causing Overload	Comments
04SP	MIPU	KACP	59210 MARTCTY5 161 to 57993 STHTOWN5 161 CKT 1	167	98.7	100.6	57993 STHTOWN5 161 to 57994 HICKMAN5 161 CKT 1	"
04SP	MIPU	MIPU	59296 HSNVLSW2 69 to 59295 HSNVL 2 69 CKT 1	53	100.3	100.4	59225 PHILL 5 161 to 59280 PHILL 2 69 CKT 1	May not be applicable for deferral period starting 3/1/200
04SP	NPPD	NPPD	64876 KEARNEY7 115 to 64877 KEARNEY9 34.5 CKT 1	35	102.0	102.1	64876 KEARNEY7 115 to 64877 KEARNEY9 34.5 CKT 2	"
04SP	AECI	AECI	96080 5FTWOOD 161 to 97055 2FTWOOD 69 CKT 1	75	100.1	100.2	96080 5FTWOOD 161 to 97055 2FTWOOD 69 CKT 2	"
04SP	AECI	AECI	96089 5JAMESV 161 to 96673 2JAMESV 69 CKT 1	56	110.4	110.5	96089 5JAMESV 161 to 96673 2JAMESV 69 CKT 2	"
04SP	AECI	AECI	96089 5JAMESV 161 to 96673 2JAMESV 69 CKT 2	56	114.4	114.5	96089 5JAMESV 161 to 96673 2JAMESV 69 CKT 1	"
04SP	AECI	AECI	96119 5SULLVN 161 to 97152 2SULVN3 69 CKT 2	50	107.1	107.2	96119 5SULLVN 161 to 97152 2SULVN3 69 CKT 1	"
04SP	AECI	AECI	96172 2TMHILL 69 to 96120 5THMHIL 161 CKT 1	84	116.9	117.0	96120 5THMHIL 161 to 96172 2TMHILL 69 CKT 2	"
04SP	AECI	AECI	96172 2TMHILL 69 to 96120 5THMHIL 161 CKT 2	84	116.0	116.1	96120 5THMHIL 161 to 96172 2TMHILL 69 CKT 1	"
04SP	AECI	AECI	96751 2REEDS 69 to 96659 2BOWRML 69 CKT 1	36	105.3	105.9	59468 AUR124 5 161 to 59480 MON383 5 161 CKT 1	"
04SP	AECI	AECI	96751 2REEDS 69 to 96659 2BOWRML 69 CKT 1	36	103.0	103.7	52690 CARTHG 2 69 to 96649 2JASPER 69 CKT 1	"
04SP	AECI	AECI	96834 2CARNEY 69 to 96833 2AGRA 69 CKT 1	36	100.8	100.9	96143 4VALLEY 138 to 96850 2VALLEY 69 CKT 1	"
04SP	AECI	AECI	96834 2CARNEY 69 to 96833 2AGRA 69 CKT 1	36	100.2	100.3	96143 4VALLEY 138 to 96844 4RAMSEY 138 CKT 1	"
04SP	AECI	AECI	96943 2SILVCTY 69 to 96945 2YALE 69 CKT 1	35	111.7	111.9	96140 4SILVCTY 138 to 96141 4STILWTR 138 CKT 1	"
04SP	AECI	AECI	96943 2SILVCTY 69 to 96945 2YALE 69 CKT 1	35	104.9	105.0	96889 2BRISTOW 69 to 96921 2BRISWES 69 CKT 1	"
04SP	AECI	AECI	96943 2SILVCTY 69 to 96945 2YALE 69 CKT 1	35	99.9	100.1	96890 2BRISTW 69 to 96921 2BRISWES 69 CKT 1	"
04FA	AECI	AECI	96089 5JAMESV 161 to 96673 2JAMESV 69 CKT 2	56	103.4	103.5	96089 5JAMESV 161 to 96673 2JAMESV 69 CKT 1	"
04WP	AECI	AECI	96063 5CALIF 161 to 96550 2CALIF 69 CKT 1	64	103.7	103.8	96057 5BARNET 161 to 96618 2BARNET 69 CKT 1	"
04WP	AECI	AECI	96123 5WPLAIN 161 to 97123 2WSTPL3 69 CKT 2	64	100.0	100.1	96123 5WPLAIN 161 to 97123 2WSTPL3 69 CKT 1	"
09SP	AMRN	IP	31320 N COULTR 230 to 32316 N COULTR 138 CKT 1	140	106.1	106.2	30213 CAHOKIA 230 to 30217 CAHOK 5 138 CKT 1	Whether Facility was Relieved or Impact was removed by Selected Upgrades was not determined.
09SP	AMRN	IP	31320 N COULTR 230 to 32316 N COULTR 138 CKT 1	140	106.1	106.2	30215 CAHOK 1 138 to 30217 CAHOK 5 138 CKT 1	"
09SP	AMRN	IP	31320 N COULTR 230 to 32316 N COULTR 138 CKT 1	140	105.3	105.5	30213 CAHOKIA 230 to 31320 N COULTR 230 CKT 1	"
09SP	KACY	KACY	58682 EVERETT2 69 to 58678 KAW 2 69 CKT 1	68	85.4	101.8	58683 OWN COR2 69 to 58686 LEVEE 2 69 CKT 1	"
09SP	KACY	KACY	58683 OWN COR2 69 to 58686 LEVEE 2 69 CKT 1	82	96.7	110.8	58682 EVERETT2 69 to 58692 QUIN 2 69 CKT 1	"
09SP	MIPU	AECI	59242 CLINTON5 161 to 96071 5CLINTN 161 CKT 1	100	112.4	112.5	59307 NEVPLT 2 69 to 59308 NEVADA 2 69 CKT 1	"
09SP	AECI	AECI	96057 5BARNET 161 to 96618 2BARNET 69 CKT 1	56	114.4	114.8	30233 CALIF 161 to 96063 5CALIF 161 CKT 1	"
09SP	AECI	AECI	96057 5BARNET 161 to 96618 2BARNET 69 CKT 1	56	104.8	105.0	96063 5CALIF 161 to 96550 2CALIF 69 CKT 1	"
09SP	AECI	AECI	96063 5CALIF 161 to 96550 2CALIF 69 CKT 1	56	106.1	106.3	96057 5BARNET 161 to 96618 2BARNET 69 CKT 1	"
09SP	AECI	AECI	96089 5JAMESV 161 to 96673 2JAMESV 69 CKT 1	56	119.4	119.5	96089 5JAMESV 161 to 96673 2JAMESV 69 CKT 2	"
09SP	AECI	AECI	96089 5JAMESV 161 to 96673 2JAMESV 69 CKT 2	56	122.8	122.9	96089 5JAMESV 161 to 96673 2JAMESV 69 CKT 1	"
09SP	AECI	AECI	96119 5SULLVN 161 to 97152 2SULVN3 69 CKT 1	56	114.2	114.3	96119 5SULLVN 161 to 97152 2SULVN3 69 CKT 2	"
09SP	AECI	AECI	96119 5SULLVN 161 to 97152 2SULVN3 69 CKT 2	50	128.3	128.4	96119 5SULLVN 161 to 97152 2SULVN3 69 CKT 1	"
09SP	AECI	AECI	96120 5THMHIL 161 to 96172 2TMHILL 69 CKT 2	84	116.5	116.6	96120 5THMHIL 161 to 96172 2TMHILL 69 CKT 1	"
09SP	AECI	AECI	96336 2HOLDEN 69 to 96124 5HOLDEN 161 CKT 1	56	143.4	143.8	96110 5PITTSV 161 to 96124 5HOLDEN 161 CKT 1	"
09SP	AECI	AECI	96336 2HOLDEN 69 to 96124 5HOLDEN 161 CKT 1	56	105.4	105.6	59808 ECKLES 5 161 to 96110 5PITTSV 161 CKT 1	"
09SP	AECI	AECI	96651 2LAMAR 69 to 96649 2JASPER 69 CKT 1	36	106.9	107.1	96654 2MILO 69 to 96802 2CLARK 69 CKT 1	"
09SP	AECI	AECI	96751 2REEDS 69 to 96659 2BOWRML 69 CKT 1	36	106.1	106.6	59468 AUR124 5 161 to 59480 MON383 5 161 CKT 1	"
09SP	AECI	AECI	96751 2REEDS 69 to 96659 2BOWRML 69 CKT 1	36	102.5	103.1	52690 CARTHG 2 69 to 96649 2JASPER 69 CKT 1	"
09SP	AECI	AECI	96751 2REEDS 69 to 96659 2BOWRML 69 CKT 1	36	102.5	102.9	59479 LAR382 5 161 to 59480 MON383 5 161 CKT 1	"
09SP	AECI	AECI	96833 2AGRA 69 to 96836 2CUSHING 69 CKT 1	44	109.6	109.8	96143 4VALLEY 138 to 96850 2VALLEY 69 CKT 1	"
09SP	AECI	AECI	96833 2AGRA 69 to 96836 2CUSHING 69 CKT 1	44	108.7	108.8	96143 4VALLEY 138 to 96844 4RAMSEY 138 CKT 1	"
09SP	AECI	AECI	96834 2CARNEY 69 to 96833 2AGRA 69 CKT 1	36	117.8	118.0	96143 4VALLEY 138 to 96850 2VALLEY 69 CKT 1	"
09SP	AECI	AECI	96834 2CARNEY 69 to 96833 2AGRA 69 CKT 1	36	116.7	116.8	96143 4VALLEY 138 to 96844 4RAMSEY 138 CKT 1	"
09SP	AECI	AECI	96890 2BRISTW 69 to 96921 2BRISWES 69 CKT 1	36	100.1	100.3	96140 4SILVCTY 138 to 96141 4STILWTR 138 CKT 1	"
09SP	AECI	AECI	96943 2SILVCTY 69 to 96945 2YALE 69 CKT 1	35	124.6	124.7	96140 4SILVCTY 138 to 96141 4STILWTR 138 CKT 1	"
09SP	AECI	AECI	96943 2SILVCTY 69 to 96945 2YALE 69 CKT 1	35	122.0	122.2	96138 4CLEVLND 138 to 96141 4STILWTR 138 CKT 1	"
09SP	AECI	AECI	96943 2SILVCTY 69 to 96945 2YALE 69 CKT 1	35	117.6	117.9	96889 2BRISTOW 69 to 96921 2BRISWES 69 CKT 1	"
09SP	AECI	AECI	96943 2SILVCTY 69 to 96945 2YALE 69 CKT 1	35	111.8	112.0	96890 2BRISTW 69 to 96921 2BRISWES 69 CKT 1	"
09SP	AECI	AECI	96943 2SILVCTY 69 to 96945 2YALE 69 CKT 1	35	102.7	102.9	96903 2KWIKSET 69 to 96910 2SHAMROK 69 CKT 1	"
09SP	AECI	AECI	96945 2YALE 69 to 96943 2SILVCTY 69 CKT 1	35	104.1	104.2	96143 4VALLEY 138 to 96850 2VALLEY 69 CKT 1	"
09SP	AECI	AECI	96945 2YALE 69 to 96943 2SILVCTY 69 CKT 1	35	103.5	103.6	96143 4VALLEY 138 to 96844 4RAMSEY 138 CKT 1	"

Study Year	From Area	To Area	Monitored Branch Over 100% Rate B	Rate	BC % Loading	TC % Loading	Outaged Branch Causing Overload	Comments
09WP	AECI	AECI	96057 5BARNET 161 to 96618 2BARNET 69 CKT 1	64	103.9	104.0	30233 CALIF 161 to 96063 5CALIF 161 CKT 1	"
09WP	AECI	AECI	96063 5CALIF 161 to 96550 2CALIF 69 CKT 1	64	100.0	100.1	96057 5BARNET 161 to 96618 2BARNET 69 CKT 1	"
09WP	AECI	AECI	96119 5SULLVN 161 to 97152 2SULVN3 69 CKT 1	64	104.0	104.1	96119 5SULLVN 161 to 97152 2SULVN3 69 CKT 2	"
09WP	AECI	AECI	96123 5WPLAIN 161 to 97123 2WSTPL3 69 CKT 1	64	100.3	100.4	96123 5WPLAIN 161 to 97123 2WSTPL3 69 CKT 2	"
09WP	AECI	AECI	96124 5HOLDEN 161 to 96336 2HOLDEN 69 CKT 1	64	116.6	116.9	96110 5PITTSV 161 to 96124 5HOLDEN 161 CKT 1	"
09WP	AECI	AECI	96751 2REEDS 69 to 96659 2BOWRML 69 CKT 1	43	104.3	104.8	59468 AUR124 5 161 to 59480 MON383 5 161 CKT 1	"
09WP	AECI	AECI	96751 2REEDS 69 to 96659 2BOWRML 69 CKT 1	43	100.2	100.8	52690 CARTHG 2 69 to 96649 2JASPER 69 CKT 1	"
09SP	ENTR	AEPW	99832 5OSAGE # 161 to 53136 EUREKA 5 161 CKT 1	244	103.5	103.7	99519 5QUITMN 161 to 99799 5BEE BR 161 CKT 1	"
09SP	ENTR	AEPW	99832 5OSAGE # 161 to 53136 EUREKA 5 161 CKT 1	210	102.1	102.3	Base Case	"
09SP	ENTR	AEPW	99832 5OSAGE # 161 to 53136 EUREKA 5 161 CKT 1	244	100.8	101.0	99799 5BEE BR 161 to 99807 5CLINTN 161 CKT 1	"

Study Year	From Area	To Area	Monitored Branch Over 100% Rate B	Rate	BC Without Upgrades %Loading	BC With Upgrades %Loading	TC Without Upgrades %Loading	TC With Upgrades %Loading	Outaged Branch Causing Overload	Solution	Cost
09SP	OKGE	OKGE	5 TRIBES - PECAN CREEK 161KV	223	104.4	105.3	102.2	103.1	AGENCY - PECAN CREEK 161KV CKT 1	May be able to increase CTR (if relays will coordinate) at Five Tribes sub.	5,000
09SP	ENTR	EMDE	5OMAHA - SUB 312 - POWERSITE 161KV	162	124.7	125.9	124.7	125.8	EUREKA SPRINGS - OSAGE 161KV CKT 1	Contingency is Invalid, Contingency Causes Voltage to Collapse at Osage, With Load removed at Osage, Facility Not Overloaded	-
09SP	ENTR	SWPA	BULL SHOALS - MIDWAY 161KV	162	118.3	118.9	118.4	119.0	5ISES 1 - 5MORFLD 161KV CKT 1	Replace disconnect switches, metering CTs and wave trap at Bull Shoals	150,000
09SP	ENTR	SWPA	BULL SHOALS - MIDWAY 161KV	162	111.5	112.2	111.7	112.4	5BATEVL - 5MORFLD 161KV	See Previous	See Previous
09SP	ENTR	SWPA	BULL SHOALS - MIDWAY 161KV	162	99.3	100.2	99.4	100.3	5BATEVL - 5CUSHMN 161KV	See Previous	See Previous
09SP	ENTR	AEPW	EUREKA SPRINGS - OSAGE 161KV	244	111.5	115.3	111.6	115.4	BULL SHOALS - BULL SHOALS 161KV CKT 1	See Table 1	See Table 1
09SP	ENTR	AEPW	EUREKA SPRINGS - OSAGE 161KV	244	110.0	113.9	110.1	114.0	5FLIPN - BULL SHOALS 161KV CKT 1	See Table 1	See Table 1
09SP	ENTR	AEPW	EUREKA SPRINGS - OSAGE 161KV	244	106.7	110.7	106.9	110.9	5FLIPN - SUMMIT 161KV CKT 1	See Table 1	See Table 1
09SP	ENTR	AEPW	EUREKA SPRINGS - OSAGE 161KV	244	103.5	107.8	103.7	108.0	5BEE BR - 5QUITMN 161KV CKT 1	See Table 1	See Table 1
09SP	ENTR	AEPW	EUREKA SPRINGS - OSAGE 161KV	244	102.8	106.9	102.9	107.0	5HARR-E - SUMMIT 161KV CKT 1	See Table 1	See Table 1
09SP	OKGE	OKGE	PECAN CREEK 345/161KV TRANSFORMER	369	108.8	109.2	107.5	108.0	CLARKSVILLE - MUSKOGEE 345KV CKT 1	Add 2nd 345/161 kV 369MVA transformer.	3,000,000
09SP	OKGE	OKGE	PECAN CREEK 345/161KV TRANSFORMER	369	108.2	108.7	106.9	107.4	FT SMITH - MUSKOGEE 345KV CKT 1	See Previous	See Previous
09SP	WFEC	SWPA	PHAROAH - WELEETKA 138KV	191	106.2	106.4	106.4	106.6	FRANKLIN - FRANKLIN SW 138KV CKT 1	WFEC: Replace wavetrap at Weleetka and replace jumpers. SWPA: Replace metering CT's at Weleetka.	135,000
09SP	EMDE	SWPA	SUB 438 - RIVERSIDE - TABLE ROCK 161KV	268	103.6	104.3	103.7	104.6	EUREKA SPRINGS - OSAGE 161KV CKT 1	Contingency is Invalid, Contingency Causes Voltage to Collapse at Osage, With Load removed at Osage, Facility Not Overloaded	-
09WP	OKGE	OKGE	5 TRIBES - PECAN CREEK 161KV	223	99.4	100.1	97.1	97.8	AGENCY - PECAN CREEK 161KV CKT 1	See Previous	See Previous
09WP	OKGE	OKGE	PECAN CREEK 345/161KV TRANSFORMER	369	103.2	103.6	101.9	102.3	FT SMITH - MUSKOGEE 345KV CKT 1	See Previous	See Previous
09WP	OKGE	OKGE	PECAN CREEK 345/161KV TRANSFORMER	369	102.8	103.1	101.5	101.8	CLARKSVILLE - MUSKOGEE 345KV CKT 1	See Previous	See Previous
										Total Engineering & Construction Costs	3,290,000

Study Year	From Area	To Area	Monitored Branch Over 100% Rate B	Rate	BC Without Upgrades %Loading	BC With Upgrades %Loading	TC Without Upgrades %Loading	TC With Upgrades %Loading	Outaged Branch Causing Overload	Comments
09SP	AMRN	IP	31320 N COULTR 230 to 32316 N COULTR 138 CKT 1	140	105.3	105.4	105.5	105.5	30213 CAHOKIA 230 to 31320 N COULTR 230 CKT 1	
09SP	MIPU	AECI	59217 WINDSR 5 161 to 96071 5CLINTN 161 CKT 1	123	115.3	115.5	115.1	115.4	59242 CLINTON5 161 to 96071 5CLINTN 161 CKT 1	
09SP	MIPU	AECI	59217 WINDSR 5 161 to 96071 5CLINTN 161 CKT 1	123	118.4	118.5	118.1	118.2	96552 5EDMONS 161 to 96555 5GRAVOI 161 CKT 1	
09SP	MIPU	AECI	59217 WINDSR 5 161 to 96071 5CLINTN 161 CKT 1	123	118.5	118.7	118.2	118.4	59228 WBURGE 5 161 to 59229 ODESSA 5 161 CKT 1	
09SP	MIPU	AECI	59217 WINDSR 5 161 to 96071 5CLINTN 161 CKT 1	123	120.3	120.5	120.1	120.3	52702 TRUMAN 5 161 to 96552 5EDMONS 161 CKT 1	
09SP	MIPU	AECI	59217 WINDSR 5 161 to 96071 5CLINTN 161 CKT 1	123	126.1	126.2	126.0	126.2	58062 SALSBRY5 161 to 58064 NORTON-5 161 CKT 1	
09SP	MEC	MEC	64096 BEACON 5 161 to 64627 BEAC MD8 69 CKT 1	90	102.8	102.8	102.8	102.9	64096 BEACON 5 161 to 64628 BEACMID8 69 CKT 2	
09SP	AECI	AECI	96119 5SULLVN 161 to 97152 2SULVN3 69 CKT 1	56	114.2	114.3	114.3	114.4	96119 5SULLVN 161 to 97152 2SULVN3 69 CKT 2	
09SP	AECI	AECI	96336 2HOLDEN 69 to 96124 5HOLDEN 161 CKT 1	56	143.4	143.5	143.8	143.9	96110 5PITTSV 161 to 96124 5HOLDEN 161 CKT 1	
09SP	AECI	AECI	96651 2LAMAR 69 to 96649 2JASPER 69 CKT 1	36	106.9	107.3	107.1	107.5	96654 2MILO 69 to 96802 2CLARK 69 CKT 1	
09SP	AECI	AECI	96751 2REEDS 69 to 96659 2BOWRML 69 CKT 1	36	102.5	102.5	102.9	103.0	59479 LAR382 5 161 to 59480 MON383 5 161 CKT 1	
09SP	AECI	AECI	96751 2REEDS 69 to 96659 2BOWRML 69 CKT 1	36	102.5	103.0	103.1	103.5	52690 CARTHG 2 69 to 96649 2JASPER 69 CKT 1	
09SP	AECI	AECI	96751 2REEDS 69 to 96659 2BOWRML 69 CKT 1	36	106.1	106.3	106.6	106.8	59468 AUR124 5 161 to 59480 MON383 5 161 CKT 1	
09SP	AECI	AECI	96833 2AGRA 69 to 96836 2CUSHING 69 CKT 1	44	109.6	109.7	109.8	109.8	96143 4VALLEY 138 to 96850 2VALLEY 69 CKT 1	
09SP	AECI	AECI	96834 2CARNEY 69 to 96833 2AGRA 69 CKT 1	36	116.7	116.7	116.8	116.9	96143 4VALLEY 138 to 96844 4RAMSEY 138 CKT 1	
09SP	AECI	AECI	96890 2BRISTW 69 to 96921 2BRISWES 69 CKT 1	36	100.1	100.3	100.3	100.6	96140 4SILVCTY 138 to 96141 4STILWTR 138 CKT 1	
09SP	AECI	AECI	96890 2BRISTW 69 to 96921 2BRISWES 69 CKT 1	36	101.1	101.2	101.1	101.2	96138 4CLEVLND 138 to 96141 4STILWTR 138 CKT 1	
09SP	AECI	AECI	96943 2SILVCTY 69 to 96945 2YALE 69 CKT 1	35	102.7	102.8	102.9	103.0	96903 2KWIKSET 69 to 96910 2SHAMROK 69 CKT 1	
09SP	AECI	AECI	96943 2SILVCTY 69 to 96945 2YALE 69 CKT 1	35	107.9	108.0	107.6	107.7	96890 2BRISTW 69 to 96903 2KWIKSET 69 CKT 1	
09SP	AECI	AECI	96943 2SILVCTY 69 to 96945 2YALE 69 CKT 1	35	111.8	111.9	112.0	112.1	96890 2BRISTW 69 to 96921 2BRISWES 69 CKT 1	
09SP	AECI	AECI	96943 2SILVCTY 69 to 96945 2YALE 69 CKT 1	35	117.6	117.7	117.9	118.0	96889 2BRISTOW 69 to 96921 2BRISWES 69 CKT 1	
09SP	AECI	AECI	96943 2SILVCTY 69 to 96945 2YALE 69 CKT 1	35	124.6	124.6	124.7	124.8	96140 4SILVCTY 138 to 96141 4STILWTR 138 CKT 1	
09SP	ENTR	ENTR	99811 5HARR-E 161 to 99831 5OMAHA * 161 CKT 1	162	112.5	113.7	112.5	113.6	53136 EUREKA 5 161 to 99832 5OSAGE # 161 CKT 1	Contingency is Invalid, Contingency Causes Voltage to Collapse at Osage, With Load removed at Osage, Facility Not Overloaded
09SP	ENTR	SWPA	99825 5MIDWAY# 161 to 52660 BULL SH5 161 CKT 1	162	99.3	100.2	99.4	100.3	99798 5BATEVL 161 to 99808 5CUSHMN 161 CKT 1	
09SP	ENTR	SWPA	99825 5MIDWAY# 161 to 52660 BULL SH5 161 CKT 1	162	111.5	112.2	111.7	112.4	99798 5BATEVL 161 to 99826 5MORFLD 161 CKT 1	
09SP	ENTR	SWPA	99825 5MIDWAY# 161 to 52660 BULL SH5 161 CKT 1	162	118.3	118.9	118.4	119.0	99817 5ISES 1 161 to 99826 5MORFLD 161 CKT 1	
09SP	ENTR	EMDE	99831 5OMAHA * 161 to 59474 OZD312 5 161 CKT 1	162	124.7	125.9	124.7	125.8	53136 EUREKA 5 161 to 99832 5OSAGE # 161 CKT 1	Contingency is Invalid, Contingency Causes Voltage to Collapse at Osage, With Load removed at Osage, Facility Not Overloaded
09SP	ENTR	AEPW	99832 5OSAGE # 161 to 53136 EUREKA 5 161 CKT 1	244	102.8	106.9	102.9	107.0	99811 5HARR-E 161 to 99837 5SUMMIT 161 CKT 1	
09SP	ENTR	AEPW	99832 5OSAGE # 161 to 53136 EUREKA 5 161 CKT 1	244	103.5	107.8	103.7	108.0	99519 5QUITMN 161 to 99799 5BEE BR 161 CKT 1	
09SP	ENTR	AEPW	99832 5OSAGE # 161 to 53136 EUREKA 5 161 CKT 1	244	106.7	110.7	106.9	110.9	99809 5FLIPN 161 to 99837 5SUMMIT 161 CKT 1	
09SP	ENTR	AEPW	99832 5OSAGE # 161 to 53136 EUREKA 5 161 CKT 1	244	110.0	113.9	110.1	114.0	99802 5BULLSH* 161 to 99809 5FLIPN 161 CKT 1	
09SP	ENTR	AEPW	99832 5OSAGE # 161 to 53136 EUREKA 5 161 CKT 1	244	111.5	115.3	111.6	115.4	52660 BULL SH5 161 to 99802 5BULLSH* 161 CKT 1	
09WP	MIPU	AECI	59217 WINDSR 5 161 to 96071 5CLINTN 161 CKT 1	131	102.2	102.3	101.8	102.0	59228 WBURGE 5 161 to 59229 ODESSA 5 161 CKT 1	
09WP	MIPU	AECI	59217 WINDSR 5 161 to 96071 5CLINTN 161 CKT 1	131	105.2	105.2	105.0	105.2	58062 SALSBRY5 161 to 58064 NORTON-5 161 CKT 1	
09WP	MIPU	AECI	59217 WINDSR 5 161 to 96071 5CLINTN 161 CKT 1	131	105.3	105.5	105.1	105.2	96552 5EDMONS 161 to 96555 5GRAVOI 161 CKT 1	
09WP	MIPU	AECI	59217 WINDSR 5 161 to 96071 5CLINTN 161 CKT 1	131	107.6	107.7	107.4	107.5	52702 TRUMAN 5 161 to 96552 5EDMONS 161 CKT 1	
09WP	OPPD	OPPD	65463 S1263 5 161 to 65390 S1263T1T 161 CKT 1	53	102.2	102.3	102.2	102.2	64863 HUMBOLT5 161 to 65480 S1280 5 161 CKT 1	
09WP	AECI	AECI	96119 5SULLVN 161 to 97152 2SULVN3 69 CKT 2	58	115.3	115.3	115.3	115.4	96119 5SULLVN 161 to 97152 2SULVN3 69 CKT 1	
09WP	AECI	AECI	96751 2REEDS 69 to 96659 2BOWRML 69 CKT 1	43	100.2	100.8	100.8	101.3	52690 CARTHG 2 69 to 96649 2JASPER 69 CKT 1	
09WP	AECI	AECI	96751 2REEDS 69 to 96659 2BOWRML 69 CKT 1	43	104.3	104.6	104.8	105.0	59468 AUR124 5 161 to 59480 MON383 5 161 CKT 1	

Study Year	From Area	To Area	Monitored Branch Over 100% Rate B	Rate	BC % Loading	TC % Loading	ATC (MW)	Outaged Branch Causing Overload	Solution	Cost
03SP	WERE	WERE	56851 AUBURN 6 230 to 56852 JEC 6 230 CKT 1	565	112.1	112.2	0	56765 HOYT 7 345 to 56766 JEC N 7 345 CKT 1	Westar Transmission Operating Directive 400, Outage of the Jeffrey Energy Center to Hoyt 345 kV line	-
03SP	AEPW	AEPW	53170 TONTITN5 161 to 53154 CHAMSPR5 161 CKT 1	247	123.9	124.1	0	53154 CHAMSPR5 161 to 53195 FARMGTN5 161 CKT 1	345 kV Project: Build 20 mile Flint Creek - East Centerton 345 kV line with East Centerton 345/161 kV auto transformer	20,200,000
03SP	AEPW	AEPW	53170 TONTITN5 161 to 53154 CHAMSPR5 161 CKT 1	247	118.1	118.2	0	53139 FLINTCR5 161 to 53170 TONTITN5 161 CKT 1	Relieved or Impact Removed by Selected Upgrades to be Assigned Modeled in 09SP	-
03SP	AEPW	AEPW	53170 TONTITN5 161 to 53154 CHAMSPR5 161 CKT 1	247	112.7	112.9	0	53157 SFAYTVL5 161 to 53195 FARMGTN5 161 CKT 1	"	-
03SP	AEPW	AEPW	53135 EROGERS5 161 to 53131 DYESS 5 161 CKT 1	244	107.5	107.8	0	53139 FLINTCR5 161 to 53187 GENTRYR5 161 CKT 1	AEPW Planned Tontitown Project	-
03SP	AEPW	AEPW	53131 DYESS 5 161 to 53135 EROGERS5 161 CKT 1	244	105.6	105.9	0	53133 ECNTRTN5 161 to 53187 GENTRYR5 161 CKT 1	AEPW Planned Tontitown Project	-
03SP	AEPW	AEPW	53133 ECNTRTN5 161 to 53187 GENTRYR5 161 CKT 1	353	106.4	106.5	0	53139 FLINTCR5 161 to 53170 TONTITN5 161 CKT 1	Relieved or Impact Removed by Selected Upgrades to be Assigned Modeled in 09SP	-
03SP	AEPW	AEPW	53187 GENTRYR5 161 to 53133 ECNTRTN5 161 CKT 1	305	104.9	105.1	0	Base Case	"	-
03SP	AEPW	AEPW	53187 GENTRYR5 161 to 53133 ECNTRTN5 161 CKT 1	353	103.9	104.1	0	53131 DYESS 5 161 to 53135 EROGERS5 161 CKT 1	"	-
03SP	AEPW	AEPW	53187 GENTRYR5 161 to 53139 FLINTCR5 161 CKT 1	354	108.3	108.4	0	53139 FLINTCR5 161 to 53170 TONTITN5 161 CKT 1	Relieved or Impact Removed by Selected Upgrades to be Assigned Modeled in 09SP	-
03SP	AEPW	AEPW	53187 GENTRYR5 161 to 53139 FLINTCR5 161 CKT 1	304	107.8	108.0	0	Base Case	"	-
03SP	AEPW	AEPW	53187 GENTRYR5 161 to 53139 FLINTCR5 161 CKT 1	354	105.8	106.1	0	53131 DYESS 5 161 to 53135 EROGERS5 161 CKT 1	"	-
03SP	AEPW	AEPW	53187 GENTRYR5 161 to 53139 FLINTCR5 161 CKT 1	354	100.9	101.0	0	53154 CHAMSPR5 161 to 53195 FARMGTN5 161 CKT 1	"	-
03SP	AEPW	AEPW	53187 GENTRYR5 161 to 53139 FLINTCR5 161 CKT 1	354	100.7	100.9	0	Multiple Outage Contingency: 59481 MON383 7 345 to 59984 BRKLNE 7 345 CKT1 53140 FLINTCR7 345 to 59481 MON383 7 345 CKT1	"	-
03SP	WERE	WERE	56853*LAWHILL6 230 LAWHL29X 1	308	106.8	107.2	0	56855 MIDLAND6230 to 57252 MIDLAND3115 to 56884 MIDLAND118.0 CKT 1	Westar Transmission Operating Directive 615, Loss of the Midland Junction 230/115 kV transformer	-
03SP	WERE	WERE	56853*LAWHILL6 230 LAWHL29X 1	308	107.0	107.2	0	56853 LAWHILL6230 to 56855 MIDLAND6230 CKT 1	Westar Transmission Operating Directive 901, Outage of the Lawrence Hill-Midland Junction 230kV Line	-
03SP	MIPU	KACP	59210 MARTCTY5 161 to 57993 STHTOWN5 161 CKT 1	167	117.7	119.6	0	57965 W.GRDNR7 345 to 57981 LACYGNE7 345 CKT 1	Updated Rating 224 MVA	-
03SP	MIPU	KACP	59210 MARTCTY5 161 to 57993 STHTOWN5 161 CKT 1	167	116.2	118.1	0	57969 STILWEL5 161 to 57994 HICKMAN5 161 CKT 1	"	-
03SP	MIPU	KACP	59210 MARTCTY5 161 to 57993 STHTOWN5 161 CKT 1	167	103.7	105.6	0	57993 STHTOWN5 161 to 57994 HICKMAN5 161 CKT 1	"	-
03SP	MIPU	KACP	59210 MARTCTY5 161 to 57993 STHTOWN5 161 CKT 1	167	100.3	102.1	0	57969 STILWEL5 161 to 58050 ANTIOCH5 161 CKT 1	"	-
03SP	EMDE	EMDE	59467 ORO110 5 161 to 59494 OAK432 5 161 CKT 1	214	99.7	100.1	33	59472 TIP292 5 161 to 59483 JOP389 5 161 CKT 1	Overloaded Facility Not Impacted by Transfer in the 04SP and 09SP, which better represents a deferral period of 6/1/2006 to 12/1/2011.	-
03SP	WERE	WERE	57182 TECHILE3 115 to 57270 STULL T3 115 CKT 1	92	99.2	100.1	34	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT 1	Westar Transmission Operating Directive 803, Outage of the Hoyt to Stranger 345 kV line	-
03SP	MIPU	KACP	59210 MARTCTY5 161 to 57993 STHTOWN5 161 CKT 1	167	98.3	100.1	36	58046 OXFORD 5 161 to 58050 ANTIOCH5 161 CKT 1	Updated Rating 224 MVA	-
03FA	WERE	WERE	56852 JEC 6 230 to 56851 AUBURN 6 230 CKT 1	565	104.8	105.0	0	56765 HOYT 7 345 to 56766 JEC N 7 345 CKT 1	Westar Transmission Operating Directive 400, Outage of the Jeffrey Energy Center to Hoyt 345 kV line	-
03WP	WERE	WERE	56852 JEC 6 230 to 56851 AUBURN 6 230 CKT 1	565	101.7	101.9	0	56765 HOYT 7 345 to 56766 JEC N 7 345 CKT 1	Westar Transmission Operating Directive 400, Outage of the Jeffrey Energy Center to Hoyt 345 kV line	-
04G	WERE	WERE	56851 AUBURN 6 230 to 56852 JEC 6 230 CKT 1	565	105.2	105.3	0	56765 HOYT 7 345 to 56766 JEC N 7 345 CKT 1	Westar Transmission Operating Directive 400, Outage of the Jeffrey Energy Center to Hoyt 345 kV line	-
04SP	WERE	WERE	56851 AUBURN 6 230 to 56852 JEC 6 230 CKT 1	565	115.8	116.0	0	56765 HOYT 7 345 to 56766 JEC N 7 345 CKT 1	Westar Transmission Operating Directive 400, Outage of the Jeffrey Energy Center to Hoyt 345 kV line	-
04SP	AEPW	AEPW	53170 TONTITN5 161 to 53154 CHAMSPR5 161 CKT 1	247	137.2	137.5	0	53154 CHAMSPR5 161 to 53195 FARMGTN5 161 CKT 1	Relieved or Impact Removed by Selected Upgrades to be Assigned Modeled in 09SP	-
04SP	AEPW	AEPW	53170 TONTITN5 161 to 53154 CHAMSPR5 161 CKT 1	247	129.9	130.2	0	53139 FLINTCR5 161 to 53170 TONTITN5 161 CKT 1	"	-
04SP	AEPW	AEPW	53170 TONTITN5 161 to 53154 CHAMSPR5 161 CKT 1	247	125.1	125.4	0	53157 SFAYTVL5 161 to 53195 FARMGTN5 161 CKT 1	"	-
04SP	AEPW	AEPW	53170 TONTITN5 161 to 53154 CHAMSPR5 161 CKT 1	247	106.4	106.7	0	53139 FLINTCR5 161 to 53187 GENTRYR5 161 CKT 1	"	-
04SP	AEPW	AEPW	53170 TONTITN5 161 to 53154 CHAMSPR5 161 CKT 1	247	105.6	105.9	0	53133 ECNTRTN5 161 to 53187 GENTRYR5 161 CKT 1	"	-
04SP	OKGE	OKGE	54742 OSAGE 2 69 to 54763 CONBLKS2 69 CKT 1	96	100.8	101.3	0	54760 KILDARE4 138 to 54761 WHEAGLE4 138 CKT 1	Replace Wavetrap and increase CT ratio.	30,000
04SP	AEPW	AEPW	53133 ECNTRTN5 161 to 53187 GENTRYR5 161 CKT 1	353	108.9	109.0	0	53139 FLINTCR5 161 to 53170 TONTITN5 161 CKT 1	Relieved or Impact Removed by Selected Upgrades to be Assigned Modeled in 09SP	-
04SP	AEPW	AEPW	53187 GENTRYR5 161 to 53139 FLINTCR5 161 CKT 1	354	111.0	111.1	0	53139 FLINTCR5 161 to 53170 TONTITN5 161 CKT 1	Relieved or Impact Removed by Selected Upgrades to be Assigned Modeled in 09SP	-
04SP	AEPW	AEPW	53187 GENTRYR5 161 to 53139 FLINTCR5 161 CKT 1	354	101.6	101.8	0	53144 LOWELL 5 161 to 53170 TONTITN5 161 CKT 1	"	-
04SP	AEPW	AEPW	53170 TONTITN5 161 to 53139 FLINTCR5 161 CKT 1	312	112.8	113.0	0	53154 CHAMSPR5 161 to 53155 CHAMSPR7 345 CKT 1	Relieved or Impact Removed by Selected Upgrades to be Assigned Modeled in 09SP	-
04SP	AEPW	AEPW	53170 TONTITN5 161 to 53139 FLINTCR5 161 CKT 1	312	112.8	113.0	0	53155 CHAMSPR7 345 to 53756 CLARKSV7 345 CKT 1	"	-
04SP	WERE	WERE	57738 MAHANNA2 69 to 57800 GRANT J2 69 CKT 1	101	132.8	133.3	0	57012 HALSTDS4 138 to 57065 SG12COL4 138 CKT 1	Relieved or Impact Removed by Selected Upgrades to be Assigned Modeled in 09SP	-
04SP	WERE	WERE	57800 GRANT J2 69 to 57832 RIPLEYM2 69 CKT 1	108	141.6	142.1	0	57012 HALSTDS4 138 to 57065 SG12COL4 138 CKT 1	Relieved or Impact Removed by Selected Upgrades to be Assigned Modeled in 09SP	-

Study Year	From Area	To Area	Monitored Branch Over 100% Rate B	Rate	BC % Loading	TC % Loading	ATC (MW)	Outaged Branch Causing Overload	Solution	Cost
04SP	WERE	WERE	56853*LAWHILL6 230 LAWHL29X 1	308	114.5	114.8	0	56855 MIDLAND6230 to 57252 MIDLAND3115 to 56884 MIDLAND118.0 CKT 1	Westar Transmission Operating Directive 615, Loss of the Midland Junction 230/115 kV transformer	-
04SP	WERE	WERE	56853*LAWHILL6 230 LAWHL29X 1	308	114.5	114.8	0	56853 LAWHILL6230 to 56855 MIDLAND6230 CKT 1	Westar Transmission Operating Directive 901, Outage of the Lawrence Hill-Midland Junction 230kV Line	-
04SP	WERE	WERE	57745 NEWTON 2 69 to 57738 MAHANNA2 69 CKT 1	101	127.1	127.5	0	57012 HALSTDS4 138 to 57065 SG12COL4 138 CKT 1	Relieved or Impact Removed by Selected Upgrades to be Assigned Modeled in 09SP	-
04SP	MIPU	KACP	59210 MARTCTY5 161 to 57993 STHTOWN5 161 CKT 1	167	111.0	112.9	0	57969 STILWEL5 161 to 57994 HICKMAN5 161 CKT 1	Updated Rating 224 MVA	-
04SP	MIPU	KACP	59210 MARTCTY5 161 to 57993 STHTOWN5 161 CKT 1	167	111.0	112.9	0	57965 W.GRDNR7 345 to 57981 LACYGNE7 345 CKT 1	"	-
04SP	WERE	WERE	56855*MIDLAND6 230 MIDJ126X 1	308	102.3	102.6	0	56853 LAWHILL6230 to 57250 LWRNCHL3115 to 56882 LAWHILL113.8 CKT 1	Westar Transmission Operating Directive 631, Loss of the Lawrence Hill 230/115kV Transformer	-
04SP	MIPU	KACP	59210 MARTCTY5 161 to 57993 STHTOWN5 161 CKT 1	167	98.7	100.6	26	57993 STHTOWN5 161 to 57994 HICKMAN5 161 CKT 1	Updated Rating 224 MVA	-
04FA	WERE	WERE	56852 JEC 6 230 to 56851 AUBURN 6 230 CKT 1	565	102.9	103.0	0	56765 HOYT 7 345 to 56766 JEC N 7 345 CKT 1	Westar Transmission Operating Directive 400, Outage of the Jeffrey Energy Center to Hoyt 345 kV line	-
04FA	EMDE	SWPA	59466 ATL109 5 161 to 52688 CARTHAG5 161 CKT 1	167	102.3	103.0	0	59472 TIP292 5 161 to 59483 JOP389 5 161 CKT 1	Impact Removed by Selected Upgrades to be Assigned.	-
04WP	WERE	WERE	56852 JEC 6 230 to 56851 AUBURN 6 230 CKT 1	565	103.5	103.6	0	56765 HOYT 7 345 to 56766 JEC N 7 345 CKT 1	Westar Transmission Operating Directive 400, Outage of the Jeffrey Energy Center to Hoyt 345 kV line	-
04WP	AEPW	AEPW	53170 TONTITN5 161 to 53154 CHAMSPR5 161 CKT 1	275	100.7	100.9	0	53154 CHAMSPR5 161 to 53195 FARMGTN5 161 CKT 1	Relieved or Impact Removed by Selected Upgrades to be Assigned Modeled in 09WP	-
09SP	AECI	GRRD	96879 2VIAN 69 to 54444 GORE GR2 69 CKT 1	47	108.6	109.6	0	Multiple Outage Contingency: 52722 VAN BUR5161 to 96867 5LBRTYTP161 CKT 1 96867 5LBRTYTP161 to 52750 SALISAW5161 CKT 1 52750 SALISAW5161 to 52752 GORE 5161 CKT 1	Rebuild 7.9 miles with 795MCM ACSR	1,304,000
09SP	AECI	GRRD	96879 2VIAN 69 to 54444 GORE GR2 69 CKT 1	47	105.8	106.6	0	52750 SALISAW5 161 to 54452 SALSWGR2 69 CKT 1	See Previous	See Previous
09SP	WERE	WERE	56851 AUBURN 6 230 to 56852 JEC 6 230 CKT 1	565	111.6	111.7	0	56765 HOYT 7 345 to 56766 JEC N 7 345 CKT 1	Westar Transmission Operating Directive 400, Outage of the Jeffrey Energy Center to Hoyt 345 kV line	-
09SP	WERE	WERE	56851*AUBURN 6 230 AUBRN77X 1	308	120.4	120.6	0	56765 HOYT 7345 to 56766 JEC N 7345 CKT 1	Westar Transmission Operating Directive 400, Outage of the Jeffrey Energy Center to Hoyt 345 kV line	-
09SP	AEPW	AEPW	53195 FARMGTN5 161 to 53154 CHAMSPR5 161 CKT 1	335	121.6	121.7	0	53154 CHAMSPR5 161 to 53170 TONTITN5 161 CKT 1	Impact Removed by Selected Upgrades to be Assigned.	-
09SP	AEPW	AEPW	53195 FARMGTN5 161 to 53154 CHAMSPR5 161 CKT 1	335	112.6	112.7	0	53139 FLINTCR5 161 to 53187 GENTRYR5 161 CKT 1	Relieved by Selected Upgrades to be Assigned	-
09SP	AEPW	AEPW	53195 FARMGTN5 161 to 53154 CHAMSPR5 161 CKT 1	335	101.3	101.5	0	53140 FLINTCR7 345 to 54450 GRDA1 7 345 CKT 1	"	-
09SP	AEPW	AEPW	53170 TONTITN5 161 to 53154 CHAMSPR5 161 CKT 1	244	173.3	173.6	0	53154 CHAMSPR5 161 to 53195 FARMGTN5 161 CKT 1	Impact Removed by Selected Upgrades to be Assigned.	-
09SP	AEPW	AEPW	53170 TONTITN5 161 to 53154 CHAMSPR5 161 CKT 1	244	161.3	161.5	0	53139 FLINTCR5 161 to 53170 TONTITN5 161 CKT 1	"	-
09SP	AEPW	AEPW	53170 TONTITN5 161 to 53154 CHAMSPR5 161 CKT 1	244	156.0	156.3	0	53157 SFAYTVL5 161 to 53195 FARMGTN5 161 CKT 1	"	-
09SP	AEPW	AEPW	53170 TONTITN5 161 to 53154 CHAMSPR5 161 CKT 1	244	135.6	135.9	0	53139 FLINTCR5 161 to 53187 GENTRYR5 161 CKT 1	Relieved by Selected Upgrades to be Assigned	-
09SP	AEPW	AEPW	53170 TONTITN5 161 to 53154 CHAMSPR5 161 CKT 1	244	134.1	134.3	0	53133 ECNTRTN5 161 to 53187 GENTRYR5 161 CKT 1	"	-
09SP	OKGE	OKGE	54742 OSAGE 2 69 to 54763 CONBLKS2 69 CKT 1	96	110.7	111.3	0	54760 KILDARE4 138 to 54761 WHEAGLE4 138 CKT 1	See Previous	See Previous
09SP	AEPW	AEPW	53133 ECNTRTN5 161 to 53187 GENTRYR5 161 CKT 1	353	132.5	132.7	0	53139 FLINTCR5 161 to 53170 TONTITN5 161 CKT 1	Relieved by Selected Upgrades to be Assigned	-
09SP	AEPW	AEPW	53133 ECNTRTN5 161 to 53187 GENTRYR5 161 CKT 1	353	119.4	119.6	0	53144 LOWELL 5 161 to 53170 TONTITN5 161 CKT 1	"	-
09SP	AEPW	AEPW	53133 ECNTRTN5 161 to 53187 GENTRYR5 161 CKT 1	353	116.9	117.1	0	53154 CHAMSPR5 161 to 53195 FARMGTN5 161 CKT 1	"	-
09SP	AEPW	AEPW	53133 ECNTRTN5 161 to 53187 GENTRYR5 161 CKT 1	353	116.5	116.8	0	53144 LOWELL 5 161 to 53152 ROGERS 5 161 CKT 1	"	-
09SP	AEPW	AEPW	53133 ECNTRTN5 161 to 53187 GENTRYR5 161 CKT 1	353	113.9	114.1	0	53154 CHAMSPR5 161 to 53170 TONTITN5 161 CKT 1	"	-
09SP	ENTR	AEPW	99832 5OSAGE # 161 to 53136 EUREKA 5 161 CKT 1	244	103.5	103.7	0	99519 5QUITMN 161 to 99799 5BEE BR 161 CKT 1	Rebuild 5.34 miles of 666 ACSR with 1590 ACSR. Replace wavetrap jumpers @ Eureka Springs	2,400,000
09SP	ENTR	AEPW	99832 5OSAGE # 161 to 53136 EUREKA 5 161 CKT 1	210	102.1	102.3	0	Base Case	See Previous	See Previous
09SP	ENTR	AEPW	99832 5OSAGE # 161 to 53136 EUREKA 5 161 CKT 1	244	100.8	101.0	0	99799 5BEE BR 161 to 99807 5CLINTN 161 CKT 1	See Previous	See Previous
09SP	WERE	WERE	57277 WAKARUS3 115 to 57236 COOP 3 115 CKT 1	92	101.0	101.5	0	57271 SWLWRNC3 115 to 57277 WAKARUS3 115 CKT 1	Rebuild 1.53-mile line	390,000
09SP	AEPW	AEPW	53195 FARMGTN5 161 to 53157 SFAYTVL5 161 CKT 1	313	108.7	108.8	0	53154 CHAMSPR5 161 to 53170 TONTITN5 161 CKT 1	Relieved by Selected Upgrades to be Assigned	-
09SP	AEPW	AEPW	53187 GENTRYR5 161 to 53139 FLINTCR5 161 CKT 1	354	135.3	135.5	0	53139 FLINTCR5 161 to 53170 TONTITN5 161 CKT 1	Relieved by Selected Upgrades to be Assigned	-
09SP	AEPW	AEPW	53187 GENTRYR5 161 to 53139 FLINTCR5 161 CKT 1	354	122.3	122.5	0	53144 LOWELL 5 161 to 53170 TONTITN5 161 CKT 1	"	-
09SP	AEPW	AEPW	53187 GENTRYR5 161 to 53139 FLINTCR5 161 CKT 1	354	119.8	120.0	0	53154 CHAMSPR5 161 to 53195 FARMGTN5 161 CKT 1	"	-
09SP	AEPW	AEPW	53187 GENTRYR5 161 to 53139 FLINTCR5 161 CKT 1	354	119.4	119.7	0	53144 LOWELL 5 161 to 53152 ROGERS 5 161 CKT 1	"	-
09SP	AEPW	AEPW	53187 GENTRYR5 161 to 53139 FLINTCR5 161 CKT 1	354	116.8	117.0	0	53154 CHAMSPR5 161 to 53170 TONTITN5 161 CKT 1	"	-
09SP	AEPW	AEPW	53170 TONTITN5 161 to 53139 FLINTCR5 161 CKT 1	312	165.8	165.9	0	53139 FLINTCR5 161 to 53187 GENTRYR5 161 CKT 1	Relieved by Selected Upgrades to be Assigned	-
09SP	AEPW	AEPW	53170 TONTITN5 161 to 53139 FLINTCR5 161 CKT 1	312	163.3	163.5	0	53133 ECNTRTN5 161 to 53187 GENTRYR5 161 CKT 1	"	-
09SP	AEPW	AEPW	53170 TONTITN5 161 to 53139 FLINTCR5 161 CKT 1	312	139.4	139.6	0	53154 CHAMSPR5 161 to 53155 CHAMSPR7 345 CKT 1	Impact Removed by Selected Upgrades to be Assigned.	-
09SP	AEPW	AEPW	53170 TONTITN5 161 to 53139 FLINTCR5 161 CKT 1	312	139.4	139.6	0	53155 CHAMSPR7 345 to 53756 CLARKSV7 345 CKT 1	"	-
09SP	AEPW	AEPW	53170 TONTITN5 161 to 53139 FLINTCR5 161 CKT 1	312	138.7	138.8	0	53154 CHAMSPR5 161 to 53170 TONTITN5 161 CKT 1	"	-
09SP	OKGE	OKGE	54840 JONESTP4 138 to 54941 HSL 4 138 CKT 1	287	100.2	100.4	0	54941 HSL 4 138 to 54973 RENO 4 138 CKT 1	Replace switches & ct's at Horseshoe Lake in 2004 at OKGE expense.	-
09SP	WERE	WERE	56853*LAWHILL6 230 LAWHL29X 1	308	114.0	114.3	0	56855 MIDLAND6230 to 57252 MIDLAND3115 to 56884 MIDLAND118.0 CKT 1	Westar Transmission Operating Directive 615, Loss of the Midland Junction 230/115 kV transformer	-
09SP	WERE	WERE	56853*LAWHILL6 230 LAWHL29X 1	308	114.1	114.3	0	56853 LAWHILL6230 to 56855 MIDLAND6230 CKT 1	Westar Transmission Operating Directive 901, Outage of the Lawrence Hill-Midland Junction 230kV Line	-

Study Year	From Area	To Area	Monitored Branch Over 100% Rate B	Rate	BC % Loading	TC % Loading	ATC (MW)	Outaged Branch Causing Overload	Solution	Cost
09SP	WERE	WERE	56855*MIDLAND6 230 MIDJ126X 1	308	101.9	102.2	0	56853 LAWHILL6230 to 57250 LWRNCHL3115 to 56882 LAWHILL113.8 CKT 1	Westar Transmission Operating Directive 631, Loss of the Lawrence Hill 230/115kV Transformer	-
09SP	AEPW	AEPW	53867 ORU-WTP4 138 to 53795 R.S.S.-4 138 CKT 1	304	114.5	114.7	0	Multiple Outage Contingency: 53795 R.S.S.-4138 to 53863 ORU ETP4138 CKT 1 53863 ORU ETP4138 to 53749 ORU E4138 CKT 1 53863 ORU ETP4138 to 53873 WARNTAP4138 CKT 1 53873 WARNTAP4138 53822 81YALES4138 CKT 1 53873 WARNTAP4138 to 53861 96YALE-4138 CKT 1 53822 81YALES4138 to 53872 WAREN-W4138 CKT 1	Replace wavetrap jumpers @ Riverside	10,000
09SP	AEPW	AEPW	53867 ORU-WTP4 138 to 53795 R.S.S.-4 138 CKT 1	304	103.5	103.7	0	53795 R.S.S.-4 138 to 53863 ORU ETP4 138 CKT 1	Contingency defined in exclude List	-
09SP	AEPW	AEPW	53867 ORU-WTP4 138 to 53795 R.S.S.-4 138 CKT 1	304	100.7	100.9	0	53863 ORU ETP4 138 to 53873 WARNTAP4 138 CKT 1	Contingency defined in exclude List	-
09SP	WERE	WERE	57244 JARBALO3 115 to 57249 LEC U4 3 115 CKT 1	118	99.9	100.2	13	56772 STRANGR7345 to 57268 STRANGR3115 to 56811 STRANGR114.4 CKT 1	Westar Transmission Operating Directive 612, Outage of the Stranger Creek 345/115kV Transformer	-
09WP	SWPA	AEPW	52680 BEAVER 5 161 to 53136 EUREKA 5 161 CKT 1	263	101.5	102.2	0	Multiple Outage Contingency: 59481 MON383 7 345 to 59984 BRKLNE 7 345 CKT1 53140 FLINTCR7 345 to 59481 MON383 7 345 CKT1	SWPA: Reconnect CT's to 1000:5 Tap on Bkrs 42, 32, & half or 22. Replace metering & reset relays for Line 2 & Line 3. AEPW: Replace Wavetrap & Metering CT Jumpers	67,500
09WP	AEPW	AEPW	53170 TONTITN5 161 to 53154 CHAMSPR5 161 CKT 1	275	126.0	126.2	0	53154 CHAMSPR5 161 to 53195 FARMGTN5 161 CKT 1	Impact Removed by Selected Upgrades to be Assigned.	-
09WP	AEPW	AEPW	53170 TONTITN5 161 to 53154 CHAMSPR5 161 CKT 1	275	118.3	118.5	0	53139 FLINTCR5 161 to 53170 TONTITN5 161 CKT 1	"	-
09WP	AEPW	AEPW	53170 TONTITN5 161 to 53154 CHAMSPR5 161 CKT 1	275	113.0	113.2	0	53157 SFAYTVL5 161 to 53195 FARMGTN5 161 CKT 1	"	-
09WP	SWPA	SPRM	52692 SPRGFLD5 161 to 59970 CLAY 5 161 CKT 1	167	103.3	103.7	0	Multiple Outage Contingency: 96041 7FRANKS 345 to 96042 7HUBEN 345 CKT 1 96042 7HUBEN 345 to 96045 7MORGAN 345 CKT 1	Replace disconnect switches at Springfield.	200,000
09WP	AEPW	AEPW	53133 ECNTRTN5 161 to 53187 GENTRYR5 161 CKT 1	368	110.3	110.5	0	53139 FLINTCR5 161 to 53170 TONTITN5 161 CKT 1	Relieved by Selected Upgrades to be Assigned	-
09WP	AEPW	AEPW	53133 ECNTRTN5 161 to 53187 GENTRYR5 161 CKT 1	368	101.9	102.0	0	53144 LOWELL 5 161 to 53152 ROGERS 5 161 CKT 1	"	-
09WP	AEPW	AEPW	53187 GENTRYR5 161 to 53139 FLINTCR5 161 CKT 1	368	112.3	112.4	0	53139 FLINTCR5 161 to 53170 TONTITN5 161 CKT 1	Relieved by Selected Upgrades to be Assigned	-
09WP	AEPW	AEPW	53187 GENTRYR5 161 to 53139 FLINTCR5 161 CKT 1	368	103.8	103.9	0	53144 LOWELL 5 161 to 53152 ROGERS 5 161 CKT 1	"	-
09WP	AEPW	AEPW	53187 GENTRYR5 161 to 53139 FLINTCR5 161 CKT 1	335	101.3	101.5	0	Base Case	"	-
09WP	AEPW	AEPW	53170 TONTITN5 161 to 53139 FLINTCR5 161 CKT 1	335	125.3	125.4	0	53139 FLINTCR5 161 to 53187 GENTRYR5 161 CKT 1	Relieved by Selected Upgrades to be Assigned	-
09WP	AEPW	AEPW	53170 TONTITN5 161 to 53139 FLINTCR5 161 CKT 1	335	124.1	124.3	0	53133 ECNTRTN5 161 to 53187 GENTRYR5 161 CKT 1	"	-
09WP	AEPW	AEPW	53170 TONTITN5 161 to 53139 FLINTCR5 161 CKT 1	335	107.5	107.6	0	53154 CHAMSPR5 161 to 53170 TONTITN5 161 CKT 1	"	-
09WP	AEPW	AEPW	53170 TONTITN5 161 to 53139 FLINTCR5 161 CKT 1	335	105.3	105.4	0	53154 CHAMSPR5 161 to 53155 CHAMSPR7 345 CKT 1	"	-
09WP	AEPW	AEPW	53170 TONTITN5 161 to 53139 FLINTCR5 161 CKT 1	335	105.3	105.4	0	53155 CHAMSPR7 345 to 53756 CLARKSV7 345 CKT 1	"	-
09WP	AEPW	AEPW	53195 FARMGTN5 161 to 53154 CHAMSPR5 161 CKT 1	335	99.9	100.1	18	53154 CHAMSPR5 161 to 53170 TONTITN5 161 CKT 1	Relieved by Selected Upgrades to be Assigned	-
09WP	WERE	WERE	56851 AUBURN 6 230 to 56852 JEC 6 230 CKT 1	565	99.9	100.1	24	56765 HOYT 7 345 to 56766 JEC N 7 345 CKT 1	Westar Transmission Operating Directive 400, Outage of the Jeffrey Energy Center to Hoyt 345 kV line	-
									Total Engineering & Construction Costs	24,601,500

Study Year	From Area	To Area	Monitored Branch Over 100% Rate B	Rate	BC Without Upgrades %Loading	BC With Upgrades %Loading	TC Without Upgrades %Loading	TC With Upgrades %Loading	Outaged Branch Causing Overload	Solution	Cost
09SP	OKGE	OKGE	55228 5TRIBES5 161 to 55234 PECANCK5 161 CKT 1	223	104.4	105.3	102.2	103.1	55230 AGENCY 5 161 to 55234 PECANCK5 161 CKT 1	May be able to increase CTR (if relays will coordinate) at Five Tribes sub.	5,000
09SP	ENTR	EMDE	99831 5OMAHA * 161 to 59474 OZD312 5 161 CKT 1	162	124.7	125.9	124.7	125.8	53136 EUREKA 5 161 to 99832 5OSAGE # 161 CKT 1	Contingency is Invalid, Contingency Causes Voltage to Collapse at Osage, With Load removed at Osage, Facility Not Overloaded	-
09SP	ENTR	SWPA	99825 5MIDWAY# 161 to 52660 BULL SH5 161 CKT 1	162	118.3	118.9	118.4	119.0	99817 5ISES 1 161 to 99826 5MORFLD 161 CKT 1	Replace disconnect switches, metering CTs and wave trap at Bull Shoals	150,000
09SP	ENTR	SWPA	99825 5MIDWAY# 161 to 52660 BULL SH5 161 CKT 1	162	111.5	112.2	111.7	112.4	99798 5BATEVL 161 to 99826 5MORFLD 161 CKT 1	See Previous	See Previous
09SP	ENTR	SWPA	99825 5MIDWAY# 161 to 52660 BULL SH5 161 CKT 1	162	99.3	100.2	99.4	100.3	99798 5BATEVL 161 to 99808 5CUSHMN 161 CKT 1	See Previous	See Previous
09SP	ENTR	AEPW	99832 5OSAGE # 161 to 53136 EUREKA 5 161 CKT 1	244	111.5	115.3	111.6	115.4	52660 BULL SH5 161 to 99802 5BULLSH* 161 CKT 1	See Table 1	See Table 1
09SP	ENTR	AEPW	99832 5OSAGE # 161 to 53136 EUREKA 5 161 CKT 1	244	110.0	113.9	110.1	114.0	99802 5BULLSH* 161 to 99809 5FLIPN 161 CKT 1	See Table 1	See Table 1
09SP	ENTR	AEPW	99832 5OSAGE # 161 to 53136 EUREKA 5 161 CKT 1	244	106.7	110.7	106.9	110.9	99809 5FLIPN 161 to 99837 5SUMMIT 161 CKT 1	See Table 1	See Table 1
09SP	ENTR	AEPW	99832 5OSAGE # 161 to 53136 EUREKA 5 161 CKT 1	244	103.5	107.8	103.7	108.0	99519 5QUITMN 161 to 99799 5BEE BR 161 CKT 1	See Table 1	See Table 1
09SP	ENTR	AEPW	99832 5OSAGE # 161 to 53136 EUREKA 5 161 CKT 1	244	102.8	106.9	102.9	107.0	99811 5HARR-E 161 to 99837 5SUMMIT 161 CKT 1	See Table 1	See Table 1
09SP	OKGE	OKGE	55235 PECANCK7 345 to 55234 PECANCK5 161 CKT 1	369	108.8	109.2	107.5	108.0	53756 CLARKSV7 345 to 55224 MUSKOGE7 345 CKT 1	Add 2nd 345/161 kV 369MVA transformer.	3,000,000
09SP	OKGE	OKGE	55235 PECANCK7 345 to 55234 PECANCK5 161 CKT 1	369	108.2	108.7	106.9	107.4	55224 MUSKOGE7 345 to 55302 FTSMITH7 345 CKT 1	See Previous	See Previous
09SP	WFEC	SWPA	56026 PHAROAH4 138 to 52792 WELEETK4 138 CKT 1	191	106.2	106.4	106.4	106.6	55913 FRANKLN4 138 to 55917 FRNKLNS4 138 CKT 1	WFEC: Replace wavetrap at Weleetka and replace jumpers. SWPA: Replace metering CT's at Weleetka.	135,000
09SP	EMDE	SWPA	59497 RVS438 5 161 to 52672 TABLE R5 161 CKT 1	268	103.6	104.3	103.7	104.6	53136 EUREKA 5 161 to 99832 5OSAGE # 161 CKT 1	Contingency is Invalid, Contingency Causes Voltage to Collapse at Osage, With Load removed at Osage, Facility Not Overloaded	-
09WP	OKGE	OKGE	55234 PECANCK5 161 to 55228 5TRIBES5 161 CKT 1	223	99.4	100.1	97.1	97.8	55230 AGENCY 5 161 to 55234 PECANCK5 161 CKT 1	See Previous	See Previous
09WP	OKGE	OKGE	55235 PECANCK7 345 to 55234 PECANCK5 161 CKT 1	369	103.2	103.6	101.9	102.3	55224 MUSKOGE7 345 to 55302 FTSMITH7 345 CKT 1	See Previous	See Previous
09WP	OKGE	OKGE	55235 PECANCK7 345 to 55234 PECANCK5 161 CKT 1	369	102.8	103.1	101.5	101.8	53756 CLARKSV7 345 to 55224 MUSKOGE7 345 CKT 1	See Previous	See Previous
										Total Engineering & Construction Costs	3,290,000