SPP Southwest Power Pool

System Impact Study For Transmission Service Requested By Duke Energy Trading and Marketing

From Oklahoma Gas & Electric to Entergy

For a Reserved Amount Of 450MW From 1/1/02 To 1/1/06

SPP Transmission Planning

SPP IMPACT STUDY (#SPP-2000-137)
April 4, 2001

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1. Executive Summary

Duke Energy Trading and Marketing has requested a system impact study for long-term Firm Point-to-Point transmission service from Oklahoma Gas & Electric to Entergy. The period of the transaction is from 1/1/02 to 1/1/06. This is a 450MW request for OASIS Reservation 224115.

The principal objective of this study is to identify system problems and potential system modifications necessary to facilitate the additional 450MW transfer while maintaining system reliability. New overloads caused by the 450MW transfer were identified along with monitoring any previously assigned facilities that were further overloaded by the transfer.

The 450MW transfer analysis includes higher priority requests over reservation 224115. Three transfers in particular that were recently studied by SPP are included in the models, along with the other higher priority transmission requests. In addition, the proposed transmission projects assigned to the three transmission requests are also included in the study models. The 450MW transfer analysis results are dependent on the completion of any upgrades or major transmission projects assigned to previous transmission customers. The completed System Impact Studies for the three higher priority transmission requests mentioned above are:

- System Impact Study SPP-2000-108 for transmission request 212202, 670MW from AEPW to EES. The transmission projects proposed in the study are the Pittsburg to NW Texarkana to McNeil 500KV transmission line and the Dolet Hills to Coushatta 345kV transmission line. The details of these transmission lines are given in Table 1. These lines are included to relieve the facilities that are overloaded due to the 670MW transfer from AEPW to EES and to improve system reliability.

- System Impact Study SPP-2000-109 for transmission request 212203, 670MW from AEPW to AMRN. The transmission project proposed for this study is the Callaway to Montrose to La Cygne 345kV transmission line. The details of this line are given in Table 2. This line is included to expand the firm contract path capacity between SPP and AMRN and to improve system reliability. This is necessary to provide the capacity needed for the 670MW transfer from AEPW to AMRN.

- System Impact Study SPP-2000-129 for transmission requests 221104, 221106, 221107, and 221109-221114, totaling 750MW from OKGE to EES. The transmission project proposed for this study is the Muskogee to Arkansas Nuclear One 500kV transmission line. The details of this line are given in Table 3. This line is included to relieve overloaded facilities caused by the 750MW transfer from OKGE to EES and to improve system reliability.

In addition to the new transmission projects, overloaded facilities are required to be upgraded for the three studies listed above. The facilities that require upgrades are given in Tables 4, 5, and 6 for each of the three requests.

Using the updated models, an analysis was performed to determine the impact of the 450MW transfer on all SPP and Non-SPP facilities.

2. Introduction

Duke Energy Trading and Marketing has requested an impact study for transmission service from OKGE control area with a sink of EES.

The principal objective of this study is to identify the restraints on the SPP Regional Tariff System that may limit the transfer too less than 450MW and to propose additional transmission projects that will relieve the overloads caused by the transfer.

The transfer from OKGE to EES causes new facility overloads, as well as impacts facilities that have previously been assigned to other customers. The previously assigned facilities were removed, and it was determined which additional facilities would require upgrading to allow the 450MW transfer. These required upgrades assigned to SPP-2000-137 are contingent upon the completion of the previously assigned upgrades as well as the construction of the proposed transmission line projects studied in the three previous System Impact Studies.

This study includes a steady-state contingency analysis (PSS/E function ACCC) which considers the impact of the 450MW transfer on transmission line loading and transmission bus voltages for outages of single and selected multiple transmission lines and transformers on the SPP system.

3. Study Methodology

A. Description

The analysis was performed to determine the impact of the 450MW transfer on facilities assigned to previous transmission customers, along with any new facilities that were overloaded by the transfer.

The steady-state analysis of the impact of the 450MW on SPP and Non-SPP facilities was done to ensure current SPP Criteria and NERC Planning Standards requirements are fulfilled. The Southwest Power Pool (SPP) conforms to the NERC Planning Standards, which provide the strictest requirements, related to thermal overloads with a contingency. It requires that all facilities be within emergency ratings after a contingency.

B. Model Updates

SPP used three seasonal models to study the 450MW request. The SPP 2000 Series Cases 2001 Spring Peak, 2004 Summer Peak, and 2004/2005Winter Peak were used to study the impact of the 450MW transfer on the SPP system during the transaction period of 1/1/02 to 1/1/06. The 2001 Spring Peak model is representative of the Spring Peak throughout the length of the reservation.

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 request period that were not already included in the January 2000 base case series models.

Included in these models, but not limited to, are the previously studied transfers with proposed transmission line projects:

System Impact Study	OASIS Reservation #	MW	Path	Proposed Transmission Project
SPP-2000-108	212202	670	AEPW to EES	Pittsburg - NW Texarkana - McNeil 500kV line Dolet Hills - Coushatta 345kV line
SPP-2000-109	212203	670	AEPW to AMRN	Callaway - Montrose - La Cygne 345kV line
SPP-2000-129	221104,221106-07,221109-15	750	OKGE to EES	Muskogee - Arkansas Nuclear One 500kV line

C. Transfer Analysis

Using the created models and the ACCC function of PSS\E, single and select double contingency outages were analyzed. Then full AC solution was used to obtain the most accurate results possible. Any facility overloaded, using MVA ratings, in the transfer case and not overloaded in the base case was flagged. The PSS/E options chosen to conduct the Impact Study analysis can be found in Appendix A.

4. Study Results

The 450MW transfer impacts facilities assigned to previous transmission customers. Due to the delay in construction of four previously assigned facility upgrades, the ATC is zero during the 2002 Summer months without considering the two 670MW transfers and 750MW transfer and the addition of lines proposed for those transfers. For the 2003 Summer months, the ATC is zero due to the delay in construction of one facility, the IPC Jefferson to Lieberman 138kV line. These facilities limit the 450MW transfer to zero in the 2002 and 2003 summer months irregardless of the acceptance of the two 670MW transfers and 750MW transfer. The limiting facilities are listed below:

Previous Reservation Assignment / Network System Improvement	Engineering & Construction Lead Time	Estimated In Service Date
150680 / IPC Jefferson - Lieberman 138kV: Reconductor 26.35 miles To 795MCM & Replace Jumpers & Wavetrap By AEPW		
171555 / IPC Jefferson - Lieberman 138kV: Reconductor 0.65 miles To 795MCM & Replace Lieberman Switches by AEPW	30 Months	6/1/04
150680 / Cherokee REC - Tatum 138kV: Reconductor To 1272MCM by AEPW	18 Months	6/1/03
150680 / Rock Hill - Tatum 138kV: Reconductor 0.81 miles To 1272MCM & Replace Wavetrap by AEPW		
171555 / Rock Hill - Tatum 138kV: Reconductor 5.76 miles To 1272MCM & Reset Rock Hill CTs by AEPW	18 Months	6/1/03
150680 / Tipton Ford - Monett 161kV: Reconductor To 795MCM by EDE	18 Months	6/1/03

The 450MW transfer analysis models include the three before mentioned transmission requests and other higher priority requests. The transmission projects proposed for the three previous impact studies are also included. Details of these transmission line projects are given in Tables 1, 2, and 3 of the report. The analysis results for the 450MW transfer are dependant upon the construction of these proposed transmission lines. The additional facility upgrades assigned to the three previous transmission requests are listed in Tables 4, 5, and 6 of the report. These upgrades required for the three before mentioned transmission requests must be completed in order to provide the capacity needed for the 450MW transfer.

The 450MW transfer from OKGE to EES impacted several SPP and Non-SPP facilities. The facility overloads identified on the SPP Regional Tariff participants' transmission systems are shown in Table 7. Several of these facilities have been assigned to previous transmission customers. The facility overloads identified on Non SPP Regional Tariff participants' transmission systems are shown in Table 8. After removing all of the previously assigned facilities from Table 7, the remaining facility overloads that will require upgrades are documented in Table 9.

Table 1 - Transmission Project Additions Proposed in SPP System Impact Study SPP-2000-108

Project	Length	R	X	B	Rate A	Rate B
Pittsburg to NW Texarkana, 500kV						
PITTSB-8 500 TO NWTXARK8 500	140 miles	0.00232	0.0317	3.067	1732	1732
NW Texarkana to McNeil, 500kV						
NWTXARK8 500 TO NWXARK8 500	65 miles	0.00108	0.01471	1.424	1732	1732
Dolet Hills to Coushatta, 500kV						
DOLHILL7 345 TO CHOUSHT7 345	28 miles	0.00148	0.01352	0.23423	1011	1176

Table 2 - Transmission Project Additions Proposed in SPP System Impact Study SPP-2000-109

Project	Length	R	X	B	Rate A	Rate B
Callaway to Montrose, 345kV						
CALAWY 1 345 to MONTROS7 345	127 miles	0.00599	0.06208	1.08224	1060	1426
Montrose to La Cygne, 345kV						
MONTROS7 345 to LACYGNE7 345	43 miles	0.00203	0.02102	0.36643	1060	1426

Table 3 – Transmission Project Addition Proposed in SPP System Impact Study SPP-2000-129

Project	Length	R	X	B	Rate A	Rate B
Muskogee to Arkansas Nuclear One						
MSKGE8 500 to 8ANO 500	122 miles	0.00202	0.02762	2.67267	1732	1732

Table 4 – Upgrades Assigned to SPP System Impact Study SPP-2000-108

Study Year	From Area To Area	Branch Over 100% Rate B	RATEB	Outaged Branch That Caused Overload	Initial Limit, Available Solution and Cost, or Previous Assignment
04SP	OKGE-OKGE	**PECAN CREEK 345/161KV TRANSFORMER** 55235 PECAN7 345 to 55234 PECAN5 161 CKT 1	369	**MUSKOGEE TO FORT SMITH, 345KV** 55224 MSKGE7 345 to 55302 FTSMI7 345 CKT1	Add Second 369MVA 345/161KV Bus-Tie Transformer $3,500,000
04SP	AEPW-SWPA	**EUREKA SPRINGS TO BEAVER 161KV** 53136 EUREKA 5 to 52680 BEAVER 5 1	274	"	SWPA Upgrade – Reconductor 5.98 miles with 1590MCM ACSR Conductor $2,385,000
04SP	EMDE-EMDE	**MONETT TO AURORA HT 161KV** 59480 MON383 5 to 59468 AUR124 5 1	157	**NW TEXARKANA TO MCNEIL, 500KV** 53125 NWTXARK8 500 to 17543 8MCNEIL 500 CKT1	For 1999-015 2005SP Taken Out By EMDE

Table 5 – Upgrades Assigned to SPP System Impact Study SPP-2000-109

Study Year	From Area To Area	Branch Over 100% Rate B	RATEB	Outaged Branch That Caused Overload	Initial Limit, Available Solution and Cost, or Previous Assignment
		LOWELL REC TO ROGERS, 69KV		**FLINT CREEK TO GENTRY REC, 161KV**	
04SP	AEPW-AEPW	53200 LOWELLR269.0 to 53152 ROGERS 269.0 CKT 1	72	53139 FLINTCR5 161 to 53187 GENTRYR5 161 CKT1	350cu Breaker
		ONETA TO BROKEN ARROW 101ST NORTH, 138KV		**RIVERSIDE STATION AUTO TO RIVERSIDE STATION, 138KV**	
04SP	AEPW-AEPW	53818 ONETA--4 138 to 53781 BA101-N4 138 CKT 1	210	53785 RSSAUTO4 138 to 53795 R.S.S.-4 138 CKT1	Replace Wavetraps
		KANSAS TO COLCORD TAP, 69KV		**ZENA TAP TO JAY, 69KV**	
04SP	GRRD-GRRD	54515 KANSAS 269.0 to 54629 COLCOTP269.0 CKT 1	41	54467 ZENA TP269.0 to 54520 JAY GR 269.0 CKT1	Solution Not Available
		CONTINENTAL TAP TO CHILOCCO, 69KV		**KILDARE TAP TO WHITE EAGLE, 138KV**	
04SP	OKGE-OKGE	54745 CONTT269.0 to 54744 CHLOC269.0 CKT 1	111	54760 KILDR4 138 to 54761 WHEGL4 138 CKT1	Solution Not Available
		CLINTON TO MONTROSE, 161KV		**WEST GARDNER TO LACYGNE, 345KV**	
04SP	AECI-KACP	96071 5CLINTN 161 to 57995 MONTROS5 161 CKT 1	370	57965 W.GRDNR7 345 to 57981 LACYGNE7 345 CKT1	100.0% Owned by KACP 12.48mi Initial Limit Terminal Equipment
		NORFORK 161/69KV TR		**NORFORT TO WEST PLAINS, 161KV**	
04SP	SWPA-SWPA	52648 NORFORK5 161 to 52650 NORFORK269.0 CKT 1	25	52648 NORFORK5 161 to 96123 5WPLAIN 161 CKT1	Solution Not Available
		SOUTH COFFEEVILLE TO DEARING 138KV		**DELAWARE TO NEOSHO 345KV**	
04SP	AEPW-WERE	53972 SCOFVLE4 to 56832 DEARING4 1	210	53929 DELWARE7 to 56756 NEOSHO 7 1	Solution Not Available
		CHEROKEE REC TO KNOX LEE 138KV		**Multiple Outage Contingency** **SW SHREVEPORT to DIANA 345KV** 53454 SW SHV 7 to 53528 DIANA 7 CKT1 **SW SHREVEPORT to LONGWOOD 345KV**	
04SP	AEPW-AEPW	53522 CHEROKE4 to 53557 KNOXLEE4 1	303	53454 SW SHV 7 to 53424 LONGWD 7 CKT1	Solution Not Available
		TATUM TO CHEROKEE REC 138KV		**Multiple Outage Contingency** **SW SHREVEPORT to DIANA 345KV** 53454 SW SHV 7 to 53528 DIANA 7 CKT1 **SW SHREVEPORT to LONGWOOD 345KV**	
04SP	AEPW-AEPW	53611 TATUM 4 to 53522 CHEROKE4 1	287	53454 SW SHV 7 to 53424 LONGWD 7 CKT1	Solution Not Available
		ROGERS TO LOWELL REC, 69KV		**DYESS TO EAST ROGERS, 161KV**	
04WP	AEPW-AEPW	53152 ROGERS 269.0 to 53200 LOWELLR269.0 CKT 1	72	53131 DYESS 5 161 to 53135 EROGERS5 161 CKT1	350cu Breaker
		AFTON 161/69KV TR		**MIAMI TO AFTON, 161KV**	
04WP	GRRD-GRRD	54432 AFTON 5 161 to 54433 AFTON 269.0 CKT 1	50	54431 MIAMI 5 161 to 54432 AFTON 5 161 CKT1	Solution Not Available
		NORFORK 161/69KV TR		**NORFORK TO WEST PLAINS, 161KV**	
04WP	SWPA-SWPA	52648 NORFORK5 161 to 52650 NORFORK269.0 CKT 1	25	52648 NORFORK5 161 to 96123 5WPLAIN 161 CKT1	Solution Not Available
		SOUTH COFFEEVILLE TO DEARING 138KV		**DELAWARE TO NEOSHO 345KV**	
04WP	AEPW-WERE	53972 SCOFVLE4 to 56832 DEARING4 1	210	53929 DELWARE7 to 56756 NEOSHO 7 1	Solution Not Available

Table 6 - Upgrades Assigned to SPP System Impact Study SPP-2000-129

Study Year	From Area To Area	Branch Over 100% Rate B	RATEB	Outaged Branch That Caused Overload	Initial Limit, Available Solution and Cost, or Previous Assignment
01SR	OKGE-OKGE	**DRAPER LAKE 345/138KV TRANSFORMER** 54934 DRAPR7 345 to 54933 DRAPR4 138 CKT 1	493	**DRAPER LAKE 345/138KV TRANSFORMER** 54933 DRAPR4 138 to 54934 DRAPR7 345 CKT2	Modify Draper sub, convert to Breaker and one-half scheme, and add 3rd 493 MVA transformer $8,000,000
01SR	OKGE-OKGE	**DRAPER LAKE 345/138KV TRANSFORMER** 54933 DRAPR4 138 to 54934 DRAPR7 345 CKT2	493	**DRAPER LAKE 345/138KV TRANSFORMER** 54934 DRAPR7 345 to 54933 DRAPR4 138 CKT 1	See Above
01SR	OKGE-OKGE	**DRAPER LAKE TO THUNDERBIRD, 345KV** 54934 DRAPR7 345 to 54998 THNDER 7 345 CKT 1	717	**THUNDERBIRD TO SEMINOLE, 345KV** 54998 THNDER 7 345 to 55045 SEMNL7 345 CKT1	Replace Relays and 1200 Amp CTs at Draper $50,000
01SR	OKGE-OKGE	**THUNDERBIRD TO SEMINOLE, 345KV** 54998 THNDER 7 345 to 55045 SEMNL7 345 CKT1	717	**DRAPER LAKE TO THUNDERBIRD, 345KV** 54934 DRAPR7 345 to 54998 THNDER 7 345 CKT 1	Replace Relays and 1200 Amp CTs at Seminole $50,000
04SP	AEPW-AEPW	**GRANIS TO DEQUEEN, 69KV** 53348 GRANIS 269.0 to 53257 DEQUEEN269.0 CKT 1	44	**MENA 4 TO CRAIG JUNCTION, 138KV** 53340 MENA 4 138 to 54015 CRAIGJT4 138 CKT1	Solution Not Available
04SP	AEPW-AEPW	**FERNDALE LAKE TAP TO PITTSBURG, 69KV** 53531 FERNDTP269.0 to 53310 PITTSB_269.0 CKT 1	72	**HOPEWELL REC TO WINFIELD, 69KV** 53262 HOPEWEL269.0 to 53335 WINFIEL269.0 CKT1	Solution Not Available
04SP	OKGE-OKGE	**CHILOCCO TAP TO THREE SANDS, 69KV** 54744 CHLOC269.0 to 54762 THREE269.0 CKT 1	57	**KILDARE TAP TO WHITE EAGLE, 138KV** 54760 KILDR4 138 to 54761 WHEGL4 138 CKT1	Solution Not Available
04SP	OKGE-OKGE	**TINKER NO. 4 TO TINKER 2, 138KV** 54988 TNKR44 138 to 54990 TNKR24 138 CKT 1	100	**NE 10TH TO MIDWAY, 138KV** 54964 NE10 4 138 to 54966 MIDWY4 138 CKT1	Initial Estimate Cable Relay Protected Replace one mile 138kV UG Cable $1,000,000
04SP	OKGE-OKGE	**SPRINGDALE TAP TO RUSSET,T 138KV** 55172 SPRIN4 138 to 55120 RUSET4 138 CKT 1	96	**ARBUCKLE TO MILL CREEK TAP, 138KV** 55117 ARB 4 138 to 55121 MILLC4 138 CKT1	Replace 400A wavetrap & relays @ Russett $50,000
04SP	OKGE-OKGE	**HARDEN CITY TO AHLOSO TAP, 69KV** 55186 HARDN269.0 to 55187 AHLOT269.0 CKT 1	52	**VALLEY VIEW TAP TO VALLEY VIEW, 69KV** 55181 VLVUT269.0 to 55182 VALVU269.0 CKT1	Solution Not Available
04SP	OKGE-OKGE	**DRAPER LAKE 345/138KV TRANSFORMER** 54934 DRAPR7 345 to 54933 DRAPR4 138 CKT 1	493	**CIMARRON TO DRAPER LAKE, 345KV** 54901 CMARN7 345 to 54934 DRAPR7 345 CKT1	See Previous
04SP	OKGE-OKGE	**DRAPER LAKE 345/138KV TRANSFORMER** 54934 DRAPR7 345 to 54933 DRAPR4 138 CKT 2	493	**CIMARRON TO DRAPER LAKE, 345KV** 54901 CMARN7 345 to 54934 DRAPR7 345 CKT1	See Previous
04SP	OKGE-OKGE	**DRAPER LAKE TO THUNDERBIRD, 345KV** 54934 DRAPR7 345 to 54998 THNDER 7 345 CKT 1	717	**DRAPER TO SEMINOLE, 345KV** 54934 DRAPR7 345 to 55045 SEMNL7 345 CKT3	See Previous

Table 6 continued - Upgrades Assigned to SPP System Impact Study SPP-2000-129

Study Year	From Area To Area	Branch Over 100% Rate B	RATEB	Outaged Branch That Caused Overload	Initial Limit, Available Solution and Cost, or Previous Assignment
04SP	OKGE-OKGE	**DRAPER LAKE TO THUNDERBIRD, 345KV** 54934 DRAPR7 345 to 54998 THNDER 7 345 CKT 1	717	**THUNDERBIRD TO SEMINOLE, 345KV** 54998 THNDER 7 345 to 55045 SEMNL7 345 CKT1	See Previous
04SP	OKGE-OKGE	**THUNDERBIRD TO SEMINOLE, 345KV** 54998 THNDER 7 345 to 55045 SEMNL7 345 CKT1	717	**DRAPER LAKE TO THUNDERBIRD, 345KV** 54934 DRAPR7 345 to 54998 THNDER 7 345 CKT 1	See Previous
04SP	WERE-WERE	**MIDLAND JUNCTION 161/115 KV TRANSFORMER** 56946 MIDLAND3 115 to 56807 MIDLAND5 161 CKT 1	183	**HOYT TO STRANGER CREEK, 345KV** 56752 HOYT 7 345 to 56758 STRANGR7 345 CKT1	Solution Not Available
04SP	WERE-WERE	**GOLDEN PLAINS JUNCTION TO HESSTON, 69KV** 57289 GOLDPLJ269.0 to 57291 HESSTON269.0 CKT 1	32	**CHISHOLM TO EVANS ENERGY CENTER, 138KV** 56856 CHISHLM4 138 to 56860 EVANS 4 138 CKT1	Solution Not Available
04SP	WFEC-WFEC	**FRANKLIN SW TO ACME, 69KV** 55916 FRNKLNS269.0 to 55802 ACME 269.0 CKT 1	34	**GOLDSBY TO OKLAHOMA UNIVERSITY SW, 69KV** 55924 GOLDSBY269.0 to 56018 OU SW 269.0 CKT1	Solution Not Available
04SP	WFEC-WFEC	**GOLDSBY TO OKLAHOMA UNIVERSITY SW, 69KV** 55924 GOLDSBY269.0 to 56018 OU SW 269.0 CKT 1	34	**FRANKLIN SW TO ACME, 69KV** 55916 FRNKLNS269.0 to 55802 ACME 269.0 CKT 1	Solution Not Available
04SP	AEPW-AEPW	**TATUM TO ROCK HILL, 138KV** 53611 TATUM 4 138 to 53598 ROKHILL4 138 CKT 1	287	**Multiple Outage Contingency** **SW SHREVEPORT TO DIANA, 345KV** 53454 SW SHV 7 to 53528 DIANA 7 CKT1 **SW SHREVEPORT TO LONGWOOD, 345KV** 53454 SW SHV 7 to 53424 LONGWD 7 CKT1	Solution Not Available
04WP	OKGE-OKGE	**DRAPER LAKE 345/138KV TRANSFORMER** 54934 DRAPR7 345 to 54933 DRAPR4 138 CKT 1	493	**DRAPER LAKE 345/138KV TRANSFORMER** 54933 DRAPR4 138 to 54934 DRAPR7 345 CKT2	See Previous
04WP	OKGE-OKGE	**DRAPER LAKE 345/138KV TRANSFORMER** 54933 DRAPR4 138 to 54934 DRAPR7 345 CKT2	493	**DRAPER LAKE 345/138KV TRANSFORMER** 54934 DRAPR7 345 to 54933 DRAPR4 138 CKT 1	See Previous
04WP	OKGE-OKGE	**DRAPER LAKE TO THUNDERBIRD, 345KV** 54934 DRAPR7 345 to 54998 THNDER 7 345 CKT 1	717	**DRAPER TO SEMINOLE, 345KV** 54934 DRAPR7 345 to 55045 SEMNL7 345 CKT3	See Previous
04WP	OKGE-OKGE	**DRAPER LAKE TO THUNDERBIRD, 345KV** 54934 DRAPR7 345 to 54998 THNDER 7 345 CKT 1	717	**THUNDERBIRD TO SEMINOLE, 345KV** 54998 THNDER 7 345 to 55045 SEMNL7 345 CKT1	See Previous
04WP	OKGE-OKGE	**THUNDERBIRD TO SEMINOLE, 345KV** 54998 THNDER 7 345 to 55045 SEMNL7 345 CKT1	717	**DRAPER LAKE TO THUNDERBIRD, 345KV** 54934 DRAPR7 345 to 54998 THNDER 7 345 CKT 1	See Previous

Table 6 continued - Upgrades Assigned to SPP System Impact Study SPP-2000-129

Study Year	From Area To Area	Branch Over 100% Rate B	RATEB	Outaged Branch That Caused Overload	Initial Limit, Available Solution and Cost, or Previous Assignment
04WP	OKGE-OKGE	**TINKER NO. 4 TO TINKER 2, 138KV** 54988 TNKR44 138 to 54990 TNKR24 138 CKT 1	100	**POST ROAD TAP TO SE15TH, 138KV** 54965 POST 4 138 to 54993 SE15 4 138 CKT1	See Previous
04WP	OKGE-OKGE	**ETNA TO BRANCH, 69KV** 55318 ETNA 269.0 to 55313 BRNCH269.0 CKT 1	48	**BONANZA TO HACKETT, 161KV** 53126 BONANZA5 161 to 53196 HACKETT5 161 CKT1	Initial Estimate Rebuild and Reconductor 7.38miles of 267ACSR with 477ACSR, $2,767,000
04WP	WFEC-OKGE	**CANADIAN SW TO CANADIAN, 138KV** 55842 CANADNS4 138 to 54947 CANDN4 138 CKT 1	70	**MIDWEST TAP TO FRANKLIN SW, 138KV** 54946 MDWST4 138 to 55917 FRNKLNS4 138 CKT1	Solution Not Available
04WP	WFEC-WFEC	**FRANKLIN SW 138/69KV TRANSFORMER** 55917 FRNKLNS4 138 to 55916 FRNKLNS269.0 CKT 1	70	**CANADIAN SW 138/69KV TRANSFORMER** 55841 CANADNS269.0 to 55842 CANADNS4 138 CKT1	Solution Not Available
06SP	AEPW-AEPW	**WINFIELD TO ADORA REC, 69KV** 53335 WINFIEL269.0 to 53243 ADORA 269.0 CKT 1	85	**PITTSBURG TO FERNDALE LAKE TAP, 69KV** 53310 PITTSB 269.0 to 53531 FERNDTP269.0 CKT1	See Above
06SP	AEPW-AEPW	**FULTON TO HOPE, 115KV** 53374 FULTON 3 115 to 53383 HOPE 3 115 CKT 1	239	**ASHDOWN TO PATTERSON, 115KV** 53225 ASHDWNR3 115 to 53305 PATTERS3 115 CKT1	Replace circuit switcher & CTs at Hope $80,000
06SP	AEPW-AEPW	**OAK HILL #2 TO KNOX LEE, 138KV** 53586 OAK2HIL4 138 to 53557 KNOXLEE4 138 CKT 1	210	**KNOX LEE TO MONROE CORNERS REC, 138KV** 53557 KNOXLEE4 138 to 53574 MONROCR4 138 CKT1	Solution Not Available
06SP	OKGE-OKGE	**DRAPER LAKE 345/138KV TRANSFORMER** 54934 DRAPR7 345 to 54933 DRAPR4 138 CKT 1	493	**CIMARRON TO DRAPER LAKE, 345KV** 54901 CMARN7 345 to 54934 DRAPR7 345 CKT1	See Previous
06SP	OKGE-OKGE	**DRAPER LAKE 345/138KV TRANSFORMER** 54934 DRAPR7 345 to 54933 DRAPR4 138 CKT 2	493	**CIMARRON TO DRAPER LAKE, 345KV** 54901 CMARN7 345 to 54934 DRAPR7 345 CKT1	See Previous
06SP	OKGE-OKGE	**DRAPER LAKE TO THUNDERBIRD, 345KV** 54934 DRAPR7 345 to 54998 THNDER 7 345 CKT 1	717	**DRAPER TO SEMINOLE, 345KV** 54934 DRAPR7 345 to 55045 SEMNL7 345 CKT3	See Previous
06SP	OKGE-OKGE	**DRAPER LAKE TO THUNDERBIRD, 345KV** 54934 DRAPR7 345 to 54998 THNDER 7 345 CKT 1	717	**THUNDERBIRD TO SEMINOLE, 345KV** 54998 THNDER 7 345 to 55045 SEMNL7 345 CKT1	See Previous
06SP	OKGE-OKGE	**THUNDERBIRD TO SEMINOLE, 345KV** 54998 THNDER 7 345 to 55045 SEMNL7 345 CKT1	717	**DRAPER LAKE TO THUNDERBIRD, 345KV** 54934 DRAPR7 345 to 54998 THNDER 7 345 CKT 1	See Previous
06SP	OKGE-OKGE	**TINKER NO. 4 TO TINKER 2, 138KV** 54988 TNKR44 138 to 54990 TNKR24 138 CKT 1	100	**DRAPER LAKE TO MIDWEST, 138KV** 54933 DRAPR4 138 to 54946 MDWST4 138 CKT1	See Previous

Table 6 continued - Upgrades Assigned to SPP System Impact Study SPP-2000-129

Study Year	From Area To Area	Branch Over 100% Rate B	RATEB	Outaged Branch That Caused Overload	Initial Limit, Available Solution and Cost, or Previous Assignment
06SP	OKGE-OKGE	**SEMINOLE TO MAUD TAP, 345KV** 55044 SEMNL4 138 to 55055 MAUD 4 138 CKT 1	214	**SEMINOLE TO MAUD TAP, 345KV** 55044 SEMNL4 138 to 55055 MAUD 4 138 CKT2	Solution Not Available
06SP	OKGE-OKGE	**SPRINGDALE TAP TO RUSSETT, 138KV** 55172 SPRIN4 138 to 55120 RUSET4 138 CKT 1	96	**ARBUCKLE TO MILL CREEK TAP, 138KV** 55117 ARB 4 138 to 55121 MILLC4 138 CKT1	See Previous
06SP	OKGE-OKGE	**PARK LANE TO SEMINOLE, 138KV** 55178 PRKLN4 138 to 55044 SEMNL4 138 CKT 1	287	**SEMINOLE TO VANOSS TAP, 138KV** 55044 SEMNL4 138 to 55174 VANOS4 138 CKT1	Replace relays and 1200 Amp CTs at Park Lane and Seminole $100,000
06SP	OKGE-OKGE	**A OC PUMP TAP TO ADA OC PUMP, 69KV** 55190 AOCPT269.0 to 55189 AOCPA269.0 CKT 1	52	**PARKLANE TO AHLOSO TAP, 69KV** 55177 PRKLN269.0 to 55187 AHLOT269.0 CKT1	Solution Not Available
06SP	WERE-WERE	**GILL ENERGY CENTER TO OATVILLE, 69 KV** 57347 GILL 269.0 to 57374 OATVILL269.0 CKT 1	72	**HOOVER TO HOOVER NORTH, 69 KV** 56865 HOOVER 4 138 to 57355 HOOV-NO269.0 CKT3	Solution Not Available
06SP	WERE-WERE	**OATVILLE TO MACARTHUR, 69KV** 57374 OATVILL269.0 to 57364 MACARTH269.0 CKT 1	72	**GILL ENERGY CENTER TO MACARTHUR, 69KV** 57347 GILL 269.0 to 57364 MACARTH269.0 CKT1	Solution Not Available
06SP	OKGE-OKGE	**MUSKOGEE 500/345KV TRANSFORMER** 55231 MSKGE8 500 to 55224 MSKGE7 345 CKT 1	896	**MUSKOGEE TO FORT SMITH, 345KV** 55224 MSKGE7 345 to 55302 FTSMI7 345 CKT1	Solution Not Available
06WP	CESW-CESW	**NW TEXARKANA 500/345KV TRANSFORMER** 53125 NWTXARK8 500 to 53301 NWTXARK7 345 CKT 1	896	**PITTSBURG TO NW TEXARKANA, 500KV** 52819 PITTSB-8 500 to 53125 NWTXARK8 500 CKT1	Solution Not Available
06WP	AEPW-AEPW	**FULTON TO HOPE, 115KV** 53374 FULTON 3 115 to 53383 HOPE 3 115 CKT 1	239	**HOPE TAP TO NW HOPE, 115KV** 53376 HOPETAP3 115 to 53379 NWHOPE 3 115 CKT1	See Previous
06WP	AEPW-AEPW	**FERNDALE LAKE TAP TO PITTSBURG, 69KV** 53531 FERNDTP269.0 to 53310 PITTSB_269.0 CKT 1	72	**ADORA TO WINFIELD, 69KV** 53243 ADORA 269.0 to 53335 WINFIEL269.0 CKT1	Solution Not Available
06WP	AEPW-AEPW	**IDABEL TO HUGO TAP, 138KV** 54011 IDABEL-4 138 to 54014 HUGOTAP4 138 CKT 1	186	**BROKEN BOW TO DOMINAN4, 138KV** 55834 BROKNBW4 138 to 55878 DOMINAN4 138 CKT1	Solution Not Available
06WP	OKGE-OKGE	**DRAPER LAKE 345/138KV TRANSFORMER** 54934 DRAPR7 345 to 54933 DRAPR4 138 CKT 1	493	**DRAPER LAKE 345/138KV TRANSFORMER** 54933 DRAPR4 138 to 54934 DRAPR7 345 CKT2	See Previous
06WP	OKGE-OKGE	**DRAPER LAKE 345/138KV TRANSFORMER** 54933 DRAPR4 138 to 54934 DRAPR7 345 CKT2	493	**DRAPER LAKE 345/138KV TRANSFORMER** 54934 DRAPR7 345 to 54933 DRAPR4 138 CKT 1	See Previous

Table 6 continued - Upgrades Assigned to SPP System Impact Study SPP-2000-129

Study Year	From Area To Area	Branch Over 100% Rate B	RATEB	Outaged Branch That Caused Overload	Initial Limit, Available Solution and Cost, or Previous Assignment
		DRAPER LAKE TO THUNDERBIRD, 345KV		**THUNDERBIRD TO SEMINOLE, 345KV**	
06WP	OKGE-OKGE	54934 DRAPR7 345 to 54998 THNDER 7 345 CKT 1	717	54998 THNDER 7 345 to 55045 SEMNL7 345 CKT1	See Previous
		THUNDERBIRD TO SEMINOLE, 345KV		**DRAPER LAKE TO THUNDERBIRD, 345KV**	
06WP	OKGE-OKGE	54998 THNDER 7 345 to 55045 SEMNL7 345 CKT1	717	54934 DRAPR7 345 to 54998 THNDER 7 345 CKT 1	See Previous
		TINKER NO. 4 TO TINKER 2, 138KV		**HORSESHOE LAKE TO MIDWAY, 138KV**	
06WP	OKGE-OKGE	54990 TNKR24 138 to 54988 TNKR44 138 CKT 1	100	54941 HSL 4 138 to 54966 MIDWY4 138 CKT1	See Previous

Table 7 – SPP Facility Overloads Caused by 450MW Transfer From OKGE to EES

Study Year	From Area To Area	Branch Over 100% Rate B	RATEB	BC % I Loading	TC % I Loading	Outaged Branch That Caused Overload	Initial Limit, Available Solution and Cost, or Previous Assignment
01SR	AEPW-AEPW	**DIERKS TO SOUTH DIERKS, 69KV** 53259 DIERKS 269.0 to 53317 SDIERKS269.0 CKT 1	72	99.1	102.2	**WICKES REC TO DEQUEEN, 69KV** 53242 WICKES 269.0 to 53257 DEQUEEN269.0 CKT1	Assigned to SPP-2000-086 2001SR Replace Dierks breaker & jumpers
01SR	SWPA-SWPA	**ROBERT S. KERR TO VAN BUREN, 161KV** 52782 RS KERR5 161 to 52722 VAN BUR5 161 CKT 1	167	98.7	102.9	**BONZT5 TO AES COGEN, 161KV** 55261 BONZT5 161 to 55262 AES 5 161 CKT1	Replace 161-kV Disconnect Switches 31,33,35,&37 with 1200A Switches $105,000
04SP	AECI-KACP	**CLINTON TO MONTROSE, 161KV** 96071 5CLINTN 161 to 57995 MONTROS5 161 CKT 1	370	100.0	101.6	**STILWELL TO PLEASANT HILL, 345KV** 57968 STILWEL7 345 to 59200 PHILL 7 345 CKT1	Assigned to SPP-2000-109 2004SP - Initial Limit Terminal Equipment
04SP	AEPW-AEPW	**ROGERS TO LOWELL REC, 69KV** 53152 ROGERS 269.0 to 53200 LOWELLR269.0 CKT 1	72	100.0	100.9	**EAST CENTERTON TO GENTRY REC, 161KV** 53133 ECNTRTN5 161 to 53187 GENTRYR5 161 CKT1	Assigned to SPP-2000-109 2004SP - 350cu Breaker
04SP	AEPW-AEPW	**BANN TO ALUMAX TAP, 138KV** 53250 BANN 4 138 to 53245 ALUMXT 4 138 CKT 1	261	99.6	100.7	**NW TEXARKANA-BANN T TO NORTHWEST TEXARKANA, 138KV** 53299 NWT-BNT4 138 to 53300 NWTXARK4 138 CKT1	Solution Not Available
04SP	AEPW-AEPW	**PATTERSON TO SOUTH NASHVILLE, 138KV** 53306 PATTERS4 138 to 53321 SNASHVL4 138 CKT 1	105	97.6	104.3	**NW TEXARKANA TO MCNEIL, 500KV** 53125 NWTXARK8 500 to 17543 8MCNEIL 500 CKT1	Assigned to SPP-2000-043 2004SP
04SP	AEPW-AEPW	**SOUTH SHREVEPORT TO FORBING TAP, 69KV** 53445 S SHV 269.0 to 53406 FORBNGT269.0 CKT 1	95	99.3	100.3	**BROADMOOR TO FORT HUMBUG, 69KV** 53394 BROADMR269.0 to 53408 FTHUMBG269.0 CKT1	Assigned to SPP-2000-043 2004SP Replace 500 CU jumpers @ S. Shreveport
04SP	AEPW-AEPW	**IPC JEFFERSON TO LIEBERMAN, 138KV** 53548 IPCJEFF4 138 to 53420 LIEBERM4 138 CKT 1	115	95.7	101.1	**NW TEXARKANA TO MCNEIL, 500KV** 53125 NWTXARK8 500 to 17543 8MCNEIL 500 CKT1	Assigned to SPP-2000-011 2001SP Replace switches @ Lieberman. Reconductor .65 miles of 397 ACSR with 795 ACSR
04SP	AEPW-AEPW	**SABINE MINING CO. T TO SOUTHEAST MARSHALL, 138KV** 53602 SABMINT4 138 to 53605 SEMRSHL4 138 CKT 1	287	99.3	101.6	**LONGWOOD TO WILKES, 345KV** 53424 LONGWD 7 345 to 53620 WILKES 7 345 CKT1	Assigned to SPP-2000-044 2004SP Replace 2-1200A Circuit switchers & 1-1200A switch @ SE Marshall & 1-1200A switch @ Sabine Mining Tap

Table 7 continued – SPP Facility Overloads Caused by 450MW Transfer From OKGE to EES

Study Year	From Area To Area	Branch Over 100% Rate B	RATEB	BC % I Loading	TC % I Loading	Outaged Branch That Caused Overload	Initial Limit, Available Solution and Cost, or Previous Assignment
		EUREKA SPRINGS TO BEAVER, 161KV				**REEDS SPRING TO AEC REEDS SPRING, 161KV**	
04SP	AEPW-SWPA	53136 EUREKA 5 161 to 52680 BEAVER 5 161 CKT 1	274	100.0	103.9	59473 RDS295 5 161 to 59492 RDS424 5 161 CKT1	Assigned to SPP-2000-108 2004SP
		COFFEYVILLE TAP TO DEARING, 138KV				**WOODRING TO WICHITA, 345 KV**	
04SP	AEPW-WERE	53972 SCOFVLE4 138 to 56832 DEARING4 138 CKT 1	143	98.5	103.2	54715 WDRNG7 345 to 56761 WICHITA7 345 CKT1	Assigned to 1999-010 2005WP - Switch Replacements and Reset CTs $48,065
		KILDARE TAP TO WHITE EAGLE, 138KV				**OSAGE TO CONTINENTAL TAP, 69KV**	
04SP	OKGE-OKGE	54760 KILDR4 138 to 54761 WHEGL4 138 CKT1	222	98.1	102.9	54742 OSAGE269.0 to 54745 CONTT269.0 CKT1	Solution Not Available
		SPRINGDALE TAP TO RUSSET,T 138KV				**RUSSETT TO MILL CREEK TAP, 138KV**	
04SP	OKGE-OKGE	55172 SPRIN4 138 to 55120 RUSET4 138 CKT 1	96	94.7	102.0	55120 RUSET4 138 to 55121 MILLC4 138 CKT1	Assigned to SPP-2000-129 2004SP Replace 400A wavetrap & relays @ Russett $50,000
		A OC PUMP TAP TO ADA OC PUMP, 69KV				**PARK LANE TO AHLOSO TAP, 69KV**	
04SP	OKGE-OKGE	55190 AOCPT269.0 to 55189 AOCPA269.0 CKT 1	52	99.0	105.5	55177 PRKLN269.0 to 55187 AHLOT269.0 CKT1	Assigned to SPP-2000-129 2006SP Solution Not Available
		MUSKOGEE, 500/345KV TRANSFORMER				**NW TEXARKANA TO MCNEIL, 500KV**	
04SP	OKGE-OKGE	55231 MSKGE8 500 to 55224 MSKGE7 345 CKT 1	896	93.9	103.9	53125 NWTXARK8 500 to 17543 8MCNEIL 500 CKT1	Solution Not Available
		BROKEN BOW TO CRAIG JUNCTION, 138KV				**BBDAMTP4 TO MOUNTAIN RIVER, 138KV**	
04SP	SWPA-AEPW	52814 BRKN BW4 138 to 54015 CRAIGJT4 138 CKT 1	107	92.3	101.7	55823 BBDAMTP4 138 to 56004 MTRIVER4 138 CKT1	Solution Not Available
		GLENCOE TO NORFORK, 161KV				**NEWPORT-INDUSTRIA TO NEWPORT, 161KV**	
04SP	SWPA-SWPA	52646 GLENCOE5 161 to 52648 NORFORK5 161 CKT 1	112	99.1	101.6	17821 5NEW-IN 161 to 17822 5NEWPO 161 CKT1	Solution Not Available
		HOYT TO HOYT HTI SWITCHING JUNCTION, 115 KV				**CLIFTON TO GREENLEAF, 115KV**	
04SP	WERE-WERE	56893 HOYT 3 115 to 56895 HTI JCT3 115 CKT 1	92	99.7	101.1	58756 CLIFTON3 115 to 58765 GRNLEAF3 115 CKT1	Solution Not Available
		HALSTEAD TO MUD CREEK JUNCTION, 69KV				**MOUNDRIDGE 138/69KV TRANSFORMER**	
04SP	WERE-WERE	57290 HALSTED269.0 to 57297 MUDCRKJ269.0 CKT 1	59	100.0	100.3	56843 MOUND 4 138 to 57295 MOUND 269.0 CKT1	Solution Not Available

Table 7 continued – SPP Facility Overloads Caused by 450MW Transfer From OKGE to EES

Study Year	From Area To Area	Branch Over 100% Rate B	RATEB	BC % I Loading	TC % I Loading	Outaged Branch That Caused Overload	Initial Limit, Available Solution and Cost, or Previous Assignment
04SP	WERE-WERE	**GILL ENERGY CENTER TO OATVILLE, 69KV** 57347 GILL 269.0 to 57374 OATVILL269.0 CKT 1	72	99.8	100.3	**GILL ENERGY CENTER TO MACARTHUR, 69KV** 57347 GILL 269.0 to 57364 MACARTH269.0 CKT1	Assigned to SPP-2000-129 2006SP
04SP	AEPW-AEPW	**NORTH MARSHALL TO WOODLAWN, 69KV** 53579 NMARSHL269.0 to 53621 WOODLWN269.0 CKT 1	59	99.1	101.7	**Multiple Outage Contingency** **SW SHREVEPORT TO DIANA, 345KV** 53454 SW SHV 7 to 53528 DIANA 7 CKT1 **SW SHREVEPORT TO LONGWOOD, 345KV** 53454 SW SHV 7 to 53424 LONGWD 7 CKT1	Solution Not Available
04WP	AEPW-AEPW	**PATTERSON TO SOUTH NASHVILLE, 138KV** 53306 PATTERS4 138 to 53321 SNASHVL4 138 CKT 1	105	98.9	105.2	**NW TEXARKANA TO MCNEIL, 500KV** 53125 NWTXARK8 500 to 17543 8MCNEIL 500 CKT1	Assigned to SPP-2000-043 2004SP Solution Not Available
04WP	AEPW-AEPW	**BARTLESVILLE SOUTHEAST TO NORTH BARTLESVILLE, 138KV** 53940 BV-SE--4 138 to 53935 NBVILLE4 138 CKT 1	210	99.2	102.2	**DELWARE TO NORTHEAST STATION, 345KV** 53929 DELWARE7 345 to 53955 N.E.S.-7 345 CKT1	Assigned to SPP-2000-129 2006WP
04WP	AEPW-SWPA	**EUREKA SPRINGS TO BEAVER, 161KV** 53136 EUREKA 5 161 to 52680 BEAVER 5 161 CKT 1	287	98.5	101.4	**CLINTON-WEST TO CLINTON, 161KV** 17856 5CLIN-W# 161 to 17857 5CLINTON 161 CKT1	Assigned to SPP-2000-108 2004SP
04WP	AEPW-WERE	**COFFEYVILLE TAP TO DEARING, 138KV** 53972 SCOFVLE4 138 to 56832 DEARING4 138 CKT 1	143	97.3	102.0	**WOODRING TO WICHITA, 345KV** 54715 WDRNG7 345 to 56761 WICHITA7 345 CKT1	Assigned to 1999-010 2005WP - Switch Replacements and Reset CTs $48,065
04WP	OKGE-OKGE	**MUSKOGEE, 500/345KV TRANSFORMER** 55231 MSKGE8 500 to 55224 MSKGE7 345 CKT 1	896	95.1	105.2	**MUSKOGEE TO FORT SMITH, 345KV** 55224 MSKGE7 345 to 55302 FTSMI7 345 CKT1	Solution Not Available
04WP	OKGE-OKGE	**ETNA TO BRANCH, 69KV** 55318 ETNA 269.0 to 55313 BRNCH269.0 CKT 1	48	98.9	101.3	**CLARKSVILLE TO OZARK, 161KV** 52714 CLARKSV5 161 to 52716 OZARK H5 161 CKT1	Assigned to SPP-2000-129 2004WP

Table 7 continued – SPP Facility Overloads Caused by 450MW Transfer From OKGE to EES

Study Year	From Area To Area	Branch Over 100% Rate B	RATEB	BC % I Loading	TC % I Loading	Outaged Branch That Caused Overload	Initial Limit, Available Solution and Cost, or Previous Assignment
		EUREKA SPRINGS TO BEAVER, 161KV				**GORE TO WEBBERS FALLS, 161KV**	
04WP	SWPA-AEPW	53136 EUREKA 5 161 to 52680 BEAVER 5 161 CKT 1	287	100.0	103.6	52752 GORE 5 161 to 52754 WEBFALL5 161 CKT1	Assigned to SPP-2000-108 2004SP
		HOYT TO HOYT HTI SWITCHING JUNCTION, 115 KV				**EAST MANHATTAN TO JEFFREY ENERGY CENTER, 230KV**	
04WP	WERE-WERE	56893 HOYT 3 115 to 56895 HTI JCT3 115 CKT 1	92	99.8	100.9	56788 EMANHAT6 230 to 56790 JEC 6 230 CKT1	Solution Not Available

Table 8 – Non SPP Facilities Overloaded by 450MW Transfer From OKGE to EES

Study Year	From Area To Area	Branch Over 100% Rate B	RATEB	BC % I Loading	TC % I Loading	Outaged Branch That Caused Overload
01SR	EES-EES	16503 4WALDEN 138 to 16518 4APRIL 138 CKT 1	206	95.7	100.9	16534 4MT.ZION 138 to 16556 4GRIMES 138 CKT1
01SR	EES-EES	16528 4L558T48 138 to 16532 4HUNTSVL 138 CKT 1	206	99.3	104.8	16556 4GRIMES 138 to 16566 4MAG AND 138 CKT1
01SR	EES-EES	16534 4MT.ZION 138 to 16528 4L558T48 138 CKT 1	206	99.6	106.0	53125 NWTXARK8 500 to 17543 8MCNEIL 500 CKT1
01SR	EES-EES	16556 4GRIMES 138 to 16503 4WALDEN 138 CKT 1	206	99.6	104.7	16528 4L558T48 138 to 16534 4MT.ZION 138 CKT1
01SR	EES-EES	16556 4GRIMES 138 to 16534 4MT.ZION 138 CKT 1	206	99.7	105.2	50045 DOLHILL7 345 to 53454 SW SHV 7 345 CKT1
01SR	EES-EES	16618 4NEWTONB 138 to 17917 4HLYSPG 138 CKT 1	112	97.0	100.8	16686 8HARTBRG 500 to 50002 CHOUSHT8 500 CKT1
01SR	EES-EES	16677 4TOLEDO 138 to 16657 4LEACH 138 CKT 1	144.6	97.1	100.5	53526 CROCKET7 345 to 54061 TENASKA7 345 CKT1
01SR	EES-EES	17430 3STERL 115 to 17539 3MERIDN# 115 CKT 1	68	99.9	100.1	17430 3STERL 115 to 17480 3CROS-N 115 CKT1
01SR	EES-EES	17503 3MAG-DW 115 to 17478 3COUCH 115 CKT 1	108	97.6	100.3	17542 3MAG-E 115 to 17544 3MCNEIL 115 CKT1
01SR	EES-EES	17516 3STEPHN 115 to 17536 3CAMD-S# 115 CKT 1	96	99.0	100.1	17482 3CAMDMG 115 to 17514 3SMACKO 115 CKT1
01SR	EES-EES	17544 3MCNEIL 115 to 17516 3STEPHN 115 CKT 1	96	99.0	101.4	17512 3RISON 115 to 17569 3WOODW 115 CKT1
04SP	EES-EES	16528 4L558T48 138 to 16532 4HUNTSVL 138 CKT 1	206	94.9	100.7	16503 4WALDEN 138 to 16556 4GRIMES 138 CKT1
04SP	EES-EES	16534 4MT.ZION 138 to 16528 4L558T48 138 CKT 1	206	99.4	105.1	16503 4WALDEN 138 to 16518 4APRIL 138 CKT1
04SP	EES-EES	16555 7GRIMES 345 to 16556 4GRIMES 138 CKT 1	525	99.3	104.0	16555 7GRIMES 345 to 16556 4GRIMES 138 CKT2
04SP	EES-EES	16555 7GRIMES 345 to 16556 4GRIMES 138 CKT 2	525	99.3	104.0	16555 7GRIMES 345 to 16556 4GRIMES 138 CKT1
04SP	EES-EES	16556 4GRIMES 138 to 16503 4WALDEN 138 CKT 1	206	95.7	100.7	16534 4MT.ZION 138 to 16556 4GRIMES 138 CKT1
04SP	EES-EES	16556 4GRIMES 138 to 16534 4MT.ZION 138 CKT 1	206	100.0	105.2	16551 4NAVSOTA 138 to 16552 4SOTA 138 CKT1
04SP	EES-EES	16618 4NEWTONB 138 to 17917 4HLYSPG 138 CKT 1	112	99.0	102.5	16686 8HARTBRG 500 to 50002 CHOUSHT8 500 CKT1
04SP	EES-EES	17539 3MERIDN# 115 to 17521 3CROS-S* 115 CKT 1	68	99.7	100.3	17550 3GLENDL 115 to 17628 3PNBRG# 115 CKT1
04SP	EES-EES	17544 3MCNEIL 115 to 17516 3STEPHN 115 CKT 1	96	99.6	101.8	17482 3CAMDMG 115 to 17514 3SMACKO 115 CKT1
04SP	EES-EES	17875 5MIDWAY# 161 to 17877 5MT HOM 161 CKT 1	162	97.7	104.0	52648 NORFORK5 161 to 52660 BULL SH5 161 CKT1
04SP	EES-EES	17935 8P HILL 500 to 17632 8ANO 500 CKT 1	1732	96.4	101.1	17632 8ANO 500 to 17701 8MABEL 500 CKT1
04SP	MIPU-AECI	59217 WINDSR 5 161 to 96071 5CLINTN 161 CKT 1	123	99.9	101.9	59205 BLSPE 5 161 to 59227 OAKGRV 5 161 CKT1
04WP	EES-EES	17175 3PLUM PT 115 to 17174 3HN LAK 115 CKT 1	120	98.6	100.7	17432 8STERL 500 to 17530 8ELDEHV 500 CKT1
04WP	EES-EES	17513 3SHULER 115 to 17538 3CALH-N* 115 CKT 1	120	98.2	100.4	17528 3ELDEHV 115 to 17530 8ELDEHV 500 CKT1
04WP	EES-EES	17516 3STEPHN 115 to 17544 3MCNEIL 115 CKT 1	96	100.0	101.7	17478 3COUCH 115 to 17502 3LEWIS # 115 CKT1

Table 9 – Upgrades Required for 450MW Transfer

Study Year	From Area To Area	Branch Over 100% Rate B	RATEB	BC % I Loading	TC % I Loading	Outaged Branch That Caused Overload	Initial Limit, Available Solution and Cost, or Previous Assignment
01SR	SWPA-SWPA	**ROBERT S. KERR TO VAN BUREN, 161KV** 52782 RS KERR5 161 to 52722 VAN BUR5 161 CKT 1	167	98.7	102.9	**BONZT5 TO AES COGEN, 161KV** 55261 BONZT5 161 to 55262 AES 5 161 CKT1	Replace 161-kV Disconnect Switches 31,33,35,&37 with 1200A Switches $105,000
04SP	AEPW-AEPW	**BANN TO ALUMAX TAP, 138KV** 53250 BANN 4 138 to 53245 ALUMXT 4 138 CKT 1	261	99.6	100.7	**NW TEXARKANA-BANN T TO NORTHWEST TEXARKANA, 138KV** 53299 NWT-BNT4 138 to 53300 NWTXARK4 138 CKT1	Reconductor 0.67 miles of 1024 ACAR with 1590 ACSR. $233,000
04SP	OKGE-OKGE	**KILDARE TAP TO WHITE EAGLE, 138KV** 54760 KILDR4 138 to 54761 WHEGL4 138 CKT1	222	98.1	102.9	**OSAGE TO CONTINENTAL TAP, 69KV** 54742 OSAGE269.0 to 54745 CONTT269.0 CKT1	Initial Estimate Replace 800 Amp trap at White Eagle $25,000
04SP	OKGE-OKGE	**MUSKOGEE, 500/345KV TRANSFORMER** 55231 MSKGE8 500 to 55224 MSKGE7 345 CKT 1	896	93.9	103.9	**NW TEXARKANA TO MCNEIL, 500KV** 53125 NWTXARK8 500 to 17543 8MCNEIL 500 CKT1	Solution Not Available
04SP	SWPA-AEPW	**BROKEN BOW TO CRAIG JUNCTION, 138KV** 52814 BRKN BW4 138 to 54015 CRAIGJT4 138 CKT 1	107	92.3	101.7	**BBDAMTP4 TO MOUNTAIN RIVER, 138KV** 55823 BBDAMTP4 138 to 56004 MTRIVER4 138 CKT1	Solution Not Available
04SP	SWPA-SWPA	**GLENCOE TO NORFORK, 161KV** 52646 GLENCOE5 161 to 52648 NORFORK5 161 CKT 1	112	99.1	101.6	**NEWPORT-INDUSTRIA TO NEWPORT, 161KV** 17821 5NEW-IN 161 to 17822 5NEWPO 161 CKT1	Solution Not Available
04SP	WERE-WERE	**HOYT TO HOYT HTI SWITCHING JUNCTION, 115 KV** 56893 HOYT 3 115 to 56895 HTI JCT3 115 CKT 1	92	99.7	101.1	**CLIFTON TO GREENLEAF, 115KV** 58756 CLIFTON3 115 to 58765 GRNLEAF3 115 CKT1	Solution Not Available
04SP	WERE-WERE	**HALSTEAD TO MUD CREEK JUNCTION, 69KV** 57290 HALSTED269.0 to 57297 MUDCRKJ269.0 CKT 1	59	100.0	100.3	**MOUNDRIDGE 138/69KV TRANSFORMER** 56843 MOUND 4 138 to 57295 MOUND 269.0 CKT1	Solution Not Available
04SP	AEPW-AEPW	**NORTH MARSHALL TO WOODLAWN, 69KV** 53579 NMARSHL269.0 to 53621 WOODLWN269.0 CKT 1	59	99.1	101.7	**Multiple Outage Contingency** **SW SHREVEPORT TO DIANA, 345KV** 53454 SW SHV 7 to 53528 DIANA 7 CKT1 **SW SHREVEPORT TO LONGWOOD, 345KV** 53454 SW SHV 7 to 53424 LONGWD 7 CKT1	Solution Not Available
04WP	OKGE-OKGE	**MUSKOGEE, 500/345KV TRANSFORMER** 55231 MSKGE8 500 to 55224 MSKGE7 345 CKT 1	896	95.1	105.2	**MUSKOGEE TO FORT SMITH, 345KV** 55224 MSKGE7 345 to 55302 FTSMI7 345 CKT1	Solution Not Available
04WP	WERE-WERE	**HOYT TO HOYT HTI SWITCHING JUNCTION, 115 KV** 56893 HOYT 3 115 to 56895 HTI JCT3 115 CKT 1	92	99.8	100.9	**EAST MANHATTAN TO JEFFREY ENERGY CENTER, 230KV** 56788 EMANHAT6 230 to 56790 JEC 6 230 CKT1	Solution Not Available

5. Conclusion

The results of the study show that before the 450MW transfer from OKGE to EES can take place system improvements will be needed.

1. The study of the 450MW transfer is contingent on the outcome of the three previous studies that were discussed. These are SPP System Impact Studies SPP-2000-108, SPP-2000-109, and SPP-2000-129.

   - SPP-2000-108 is the study of OASIS Reservation 212202 requesting 670MW from AEPW to EES. The transmission projects proposed for this study are the Pittsburg to NW Texarkana to McNeil 500KV transmission line and the Dolet Hills to Coushatta 345kV transmission line.

   - SPP-2000-109 is the study of OASIS Reservation 212203 requesting 670MW from AEPW to AMRN. The transmission project proposed for this study is the Callaway to Montrose to La Cygne 345kV transmission line.

   - SPP-2000-129 is the study of OASIS Reservations 221104, 221106-07, and 221109-14 requesting a total of 750MW from OKGE to EES. The transmission project proposed for this study is the Muskogee to Arkansas Nuclear One 500kV transmission line.

   The study of the 450MW from OKGE to EES assumes that these transfers will exist and the construction of the proposed transmission lines will be completed.

2. As shown in Table 9, the 450MW transfer from OKGE to EES causes overloads on facilities that have not been previously assigned. These new overloads must be relieved in order to provide the capacity needed for the transaction.

The 450MW transfer from OKGE to EES, requested by Duke Energy Trading and Marketing is dependant on the completion of the additions and upgrades from the three previous studies that are listed in Tables 1 through 6, along with any remaining facilities that have been previously assigned to other customers. The transfer is also dependant on the completion of the upgrades to the remaining facilities overloaded by the 450MW transfer, which are given in Table 9.

The final cost assignment of facilities and ATC to Duke Energy Trading and Marketing will be determined upon the completion of a facility study.

Appendix A

PSS/E CHOICES IN RUNNING LOAD FLOW PROGRAM AND ACCC

BASE CASES:
Solutions - Fixed slope decoupled Newton-Raphson solution (FDNS)
1. Tap adjustment – Stepping
2. Area interchange control – Tie lines only
3. Var limits – Apply immediately
4. Solution options - X Phase shift adjustment
   _ Flat start
   _ Lock DC taps
   _ Lock switched shunts

ACCC CASES:
Solutions – AC contingency checking (ACCC)
1. MW mismatch tolerance –1.0
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