SPP Southwest Power Pool

System Impact Study For Transmission Service Requested By Power Resource Group, Inc.

From AEPW to Entergy

For a Reserved Amount Of 670MW From 1/1/03 To 1/1/06

Supplemental Study

SPP Transmission Planning

SPP IMPACT STUDY (#SPP-2000-108c)
August 2, 2001

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Revised August 2, 2001 To Include Revision of Tables 1, 2 and 3.

1. Executive Summary

Power Resource Group, Inc. has requested a system impact study for long-term Firm Point-to-Point transmission service from AEPW to Entergy. The period of the transaction is from 1/1/03 to 1/1/06. The request is for one reservation (212202), totaling 670MW.

The principal objective of this study is to identify system problems and potential system modifications necessary to facilitate the additional 670MW transfer while maintaining system reliability. New overloads caused by the 670MW transfer were monitored along with any previously assigned facilities that were further overloaded by the transfer.

This study did not include reservations with higher priorities that were still in the study mode. Confirmation of those requests will impact the results of this study.

Due to the significant number of facility overloads caused by the 670MW transfer, SPP proposes the addition of a 500kV transmission line connecting from Pittsburg to NW Texarkana and then McNeil substations. Also proposed is a 345kV transmission line from Dolet Hills to tap the Mt. Olive - Hartburg 500kV line. The analysis performed in the study shows that the addition of these projects on the SPP transmission system will relieve the impacted facilities that were overloaded due to the AEPW-EES 670MW transfer.

The SPP and effected member companies shall use due diligence to coordinate the addition of necessary facilities or transmission system upgrades to provide the requested transmission service. Power Resource Group, Inc. is to compensate SPP for such costs pursuant to the terms of section 27 of the SPP Open Access Transmission Tariff. Expedited procedures for new facilities are available to Power Resource Group, Inc. per section 19.8 of the SPP Open Access Transmission Service Tariff.

Engineering and construction of any new facilities or modifications will not start until after a transmission service agreement and/or construction agreement is in place and effected member companies receives the appropriate authorization to proceed from the SPP after they receive authorization from the transmission customer.

2. Introduction

Power Resource Group, Inc. has requested an impact study for transmission service from AEPW 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 670MW and to propose additional transmission projects that will relieve the overloads caused by the transfer.

The impact of the 670MW transfer was initially studied for the system with no additional transmission projects included. After determining the numerous facilities that were impacted by the transfer, two transmission projects were proposed. These projects were then included in the models and the impact of the 670MW transfer was again studied. The results of these studies are given in the report.

This study includes a steady-state contingency analysis (PSS/E function ACCC) which considers the impact of the 670MW 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

A steady-state analysis of the impact of the 670MW 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.

An analysis was first conducted to determine the impact of the 670MW on SPP and Non-SPP facilities. Any new facilities that were overloaded or any previously assigned facilities further impacted by the transfer were documented in the report.

After the initial studies conducted on the 670MW transfer request, it was found that there were several limiting elements that restricted the AEPW to EES transfer. These overloaded facilities are listed in Table 1. Limited number of upgrades could be made each year because of reliably concerns during outages necessitated the need for new facilities. The addition of the Pittsburg-NW Texarkana-McNeil 500kV line was decided upon as an alternative to relieving each individual overload separately. This project was found to be the shortest path that provided the capability that was needed to allow the 670MW transfer. Further analysis of the Pittsburgh – NW Texarkana – McNeil 500kV line showed that with a single contingency of the Welsh to NW Texarkana 345kV line with the plant at Kiowa offline, the Welsh to Lydia 345kV line would become overloaded. To relieve this overload, the 345kV line addition from Dolet Hills to tap the Mt. Olive to Hartburg line was included in the study. The Dolet Hills tap relieves the Welsh to Lydia 345kV line with no need for reconductoring.

Branch		Length	R	X	B	Rate A	Rate B
Pittsburg – NW Texarkana	PITTSB-8 500 to NWTXARK8 500	140 miles	0.00232	0.03170	3.06700	1732	1732
NW Texarkana – McNeil	NWTXARK8 500 to 8MCNEIL 500	65 miles	0.00108	0.01471	1.42400	1732	1732
Dolet Hills – Coushatta	DOLHILL7 345 to CHOUSHT7 345	28 miles	0.00148	0.01352	0.23423	1011	1176

B. Model Updates

SPP used three seasonal models to study the 670MW request. The SPP 2001 Series Cases 2003 Spring Peak, 2004 Summer Peak, 2004/2005 Winter Peak, and 2006 Summer Peak were used to study the impact of the 670MW transfer on the SPP system during the transaction period of 1/1/03 to 1/1/06. The 2003 Spring Peak model is representative of the Spring Seasons 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 2001 base case series models.

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

A. Study Analysis Results

Tables 1 thru 3 contain the analysis results of the System Impact Study. The tables identify the seasonal case in which the event occurred; the emergency rating of the overloaded circuit (Rate B), the contingent loading percentage of circuit with and without the studied transfer, the determined ATC value if calculated, any SPP identification or assignment of the event, and any solutions received from the transmission owners.

Tables 1 and 2 contain new facility overloads caused by the 670MW transfer. Table 1 contains the facility overloads on SPP Regional Tariff participants' transmission systems. Table 2 documents overloads on Non SPP Regional Tariff participants' transmission systems. These tables show the numerous facilities, which must be relieved in order to provide the capability needed for the 670MW transfer. These facility overloads are eliminated by the addition of the two proposed transmission line projects.

Table 3 documents the 670MW transfer impact on previously assigned and identified facilities. Several of these facilities that were previously assigned are further overloaded by the 670MW transaction. Many of these have been overloaded past the new limits provided by the previously assigned upgrades. The facilities must be further upgraded to allow the 670MW transfer from AEPW to EES.

Table 1 – SPP Facility Overloads caused by the 670MW AEPW to EES transfer.

Study Year	Branch Over 100% Rate B	Rate B <MVA>	No Transfer %Loading	Transfer Case %Loading	ATC	Outaged Branch That Caused Overload	Initial Limit, Solution, or Previous Assignment
03SR	**DRAPER 345/138KV TRANSFORMER 1** 54934 DRAPER 7 to 54933 DRAPER 4 1	493	99.9	104.1	12	**DRAPER 345/138KV TRANSFORMER 2** 54933 DRAPER 4 to 54934 DRAPER 7 2	
03SR	**PECAN CREEK 345/161KV TRANSFORMER** 55235 PECANCK7 to 55234 PECANCK5 1	369	90.1	102.8	525	**MUSKOGEE TO FORT SMITH, 345KV** 55224 MUSKOGE7 to 55302 FTSMITH7 1	Add Second 369MVA 345/161KV Bus-Tie Transformer
03SR	**IPC JEFFERSON TO LIEBERMAN, 138KV** 53548 IPCJEFF4 to 53420 LIEBERM4 1	143	87.4	101.9	581	**LONGWOOD TO WILKES, 345KV** 53424 LONGWD 7 to 53620 WILKES 7 1	Assigned To 2000-086 2001SP Replace 4/0 jumpers to switches & Wavetrap at Lieberman. Reconductor 26.35 miles of 336 ACSR with 795 ACSR $6,241,585 And Assigned To 2000-011 2001SP Replace switches @ Lieberman. Reconductor .65 miles of 397 ACSR with 795 ACSR $153,967
04SP	**SOUTHWEST STATION TO ANADARKO, 138KV** 54140 S.W.S.-4 to 55814 ANADARK4 1	203	99.9	102.0	18	**CORNVILLE TO CORN TAP, 138KV** 54112 CORNVIL4 to 55867 CORN TP4 1	
04SP	**FULTON TO PATMOS, 115KV** 53374 FULTON 3 to 99303 3PATMOS# 1	174	99.2	119.2	25	**PATTERSON TO SOUTH NASHVILLE, 138KV** 53306 PATTERS4 to 53321 SNASHVL4 1	Reconductor 7.1 miles of 666 ACSR with 1272 ACSR
04SP	**PECAN CREEK 345/161KV TRANSFORMER** 55235 PECANCK7 to 55234 PECANCK5 1	369	98.7	111.3	68	**MUSKOGEE TO FORT SMITH, 345KV** 55224 MUSKOGE7 to 55302 FTSMITH7 1	Add Second 369MVA 345/161KV Bus-Tie Transformer
04SP	**MONETT TO AURORA HT, 161KV** 59480 MON383 5 to 59468 AUR124 5 1	157	99.3	105.8	69	**AURORA HT TO MONETT HT, 69KV** 59537 AUR124 2 to 59540 MON152 2 1	Reconductor 20.5 miles with 795 ACSR
04SP	**LONE STAR SOUTH TO WILKES, 138KV** 53276 LSSOUTH4 to 53619 WILKES 4 1	316	99.6	100.9	195	**WILKES TO WELSH REC, 138KV** 53619 WILKES 4 to 53622 WELSHRE4 1	
04SP	**EUREKA SPRINGS TO BEAVER DAM, 161KV** 53136 EUREKA 5 to 52680 BEAVER 5 1	274	96.0	108.4	218	**MUSKOGEE TO FORT SMITH, 345KV** 55224 MUSKOGE7 to 55302 FTSMITH7 1	Reconductor 5.98 miles of line with 1590 MCM ACSR
04SP	**SOUTH COFFEYVILLE TO DEARING, 138 KV** 53972 COFFEYT4 to 57002 DEARING4 1	210	96.4	104.0	313	**DELWARE TO NEOSHO, 345KV** 53929 DELWARE7 to 56793 NEOSHO 7 1	Replace 800A Wavetrap at Dearing
04SP	**JOPLIN SOUTHWEST 161/69KV TRANSFORMER** 59483 JOP389 5 to 59592 JOP389 2 1	75	99.7	100.3	334	**TIPTON FORD TO JOPLIN SOUTHWEST, 161KV** 59472 TIP292 5 to 59483 JOP389 5 1	
04SP	**IPC JEFFERSON TO LIEBERMAN, 138KV** 53548 IPCJEFF4 to 53420 LIEBERM4 1	143	92.9	106.1	360	**LONGWOOD TO WILKES, 345KV** 53424 LONGWD 7 to 53620 WILKES 7 1	Assigned To 2000-086 2001SP Replace 4/0 jumpers to switches & Wavetrap at Lieberman. Reconductor 26.35 miles of 336 ACSR with 795 ACSR $6,241,585 And Assigned To 2000-011 2001SP Replace switches @ Lieberman. Reconductor .65 miles of 397 ACSR with 795 ACSR $153,967
04SP	**TINKER #4 TO TINKER #2, 138KV** 54988 TINKER44 to 54990 TINKER24 1	100	97.7	101.7	389	**NE 10TH TO MIDWAY, 138KV** 54964 NE10TH 4 to 54966 MIDWAY 4 1	
04SP	**MUSKOGEE 161/69KV TRANSFORMER** 55222 MUSKOGE5 to 55221 MUSKOGE2 1	41	98.9	100.8	392	**MUSKOGEE 161/69KV TRANSFORMER** 55221 MUSKOGE2 to 55222 MUSKOGE5 3	
04SP	**WALLACE LAKE TO SOUTH SHREVEPORT, 138KV** 53461 WALLAKE4 to 53446 S SHV 4 1	209	91.7	105.3	409	**DOLET HILLS 345/230KV TRANSFORMER** 50045 DOLHILL7 to 50046 DOLHILL6 1	Reconductor 11.18 miles with 1272 ACSR
04SP	**DIAMOND JCT. TO SARCOXIE SOUTHWEST TAP, 69KV** 59538 DIA131 2 to 59582 SAR362T2 1	38	97.5	101.3	447	**MONETT 161/69KV TRANSFORMER** 59480 MON383 5 to 59591 MON383 2 1	
04SP	**NORFORK 161/69KV TRANSFORMER** 52648 NORFORK5 to 52650 NORFORK2 1	25	99.2	100.4	469	**NORFORK TO WEST PLAINS, 161KV** 52648 NORFORK5 to 96123 5WPLAIN 1	
04SP	**CHESTNUT TO ENID, 69KV** 54726 CHSTNUT2 to 54727 ENID 2 1	66	98.9	100.4	495	**CHESTNUT TO SOUTH 4TH ST, 69KV** 54726 CHSTNUT2 to 54730 SO4TH2 2 1	
04SP	**WILBURTON TO LONE OAK, 69KV** 54031 WILBURT2 to 54021 LONEOAK2 1	48	95.6	101.3	517	**EUFAULA TO STIGLER TAP, 138KV** 52774 EUFAULA4 to 54050 STIGLRT4 1	13.4mi Line Relpace Line Switch
04SP	**WALLACE LAKE TO INTERNATIONAL PAPER, 138KV** 53461 WALLAKE4 to 50090 IPAPER 4 1	209	84.4	100.1	667	**DOLET HILLS 345/230KV TRANSFORMER** 50045 DOLHILL7 to 50046 DOLHILL6 1	Conductor (6.86 miles of 666 ACSR)
04WP	**FULTON TO PATMOS, 115KV** 53374 FULTON 3 to 99303 3PATMOS# 1	197	99.1	116.7	32	**MUSKOGEE TO FORT SMITH, 345KV** 55224 MUSKOGE7 to 55302 FTSMITH7 1	Reconductor 7.1 miles of 666 ACSR with 1272 ACSR
04WP	**FERNDALE LAKE TAP TO PITTSBURG, 69KV** 53531 FERNDTP2 to 53310 PITTSB_2 1	72	100.0	100.8	38	**PERDUE TO LAKE HAWKINS, 138KV** 53590 PERDUE 4 to 53666 LHAWKIN4 1	

Table 1 continued – SPP Facility Overloads caused by the 670MW AEPW to EES transfer.

Study Year	Branch Over 100% Rate B	Rate B <MVA>	No Transfer %Loading	Transfer Case %Loading	ATC	Outaged Branch That Caused Overload	Initial Limit, Solution, or Previous Assignment
04WP	**STILWELL TO LA CYGNE, 345KV** 57968 STILWEL7 to 57981 LACYGNE7 1	1315	98.9	102.3	216	**WEST GARNER TO LA CYGNE, 345KV** 57965 W.GRDNR7 to 57981 LACYGNE7 1	Reconductor 30.8 miles to 1192 MCM ACSR
04WP	**PECAN CREEK 345/161KV TRANSFORMER** 55235 PECANCK7 to 55234 PECANCK5 1	369	93.7	106.0	343	**MUSKOGEE TO FORT SMITH, 345KV** 55224 MUSKOGE7 to 55302 FTSMITH7 1	Add Second 369MVA 345/161KV Bus-Tie Transformer
04WP	**EUREKA SPRINGS TO BEAVER DAM, 161KV** 53136 EUREKA 5 to 52680 BEAVER 5 1	287	94.3	104.6	370	**MONETT TO BROOKLINE, 345KV** 59481 MON383 7 to 59984 BRKLNE 7 1	Reconductor 5.98 miles of line with 1590 MCM ACSR
04WP	**CHIKASKIA TAP TO BRAMAN, 69KV** 54751 CHIKSTP2 to 54750 BRAMAN 2 1	38	92.7	100.6	621	**KILDARE TO WHITE EAGLE, 138KV** 54760 KILDARE4 to 54761 WHEAGLE4 1	
06SP	**JACKSONVILLE(SWEPCO-ETEC) TO OVERTON, 138KV** 53549 JACKSNV4 to 53588 OVERTON4 1	235	99.6	107.7	32	**CROCKETT TO TENASKA RUSK COUNTY, 345KV** 53526 CROCKET7 to 53637 TENRUSK7 1	Upgrade 30.8 miles for bundle (2) 795 ACSR by third party
06SP	**FULTON TO PATMOS, 115KV** 53374 FULTON 3 to 99303 3PATMOS# 1	174	98.4	119.6	52	**PITTSBURG TO SEMINOLE, 345KV** 54033 PITTSB-7 to 55045 SEMINOL7 1	Reconductor 7.1 miles of 666 ACSR with 1272 ACSR
06SP	**EAST CENTERTON TO GENTRY REC, 161KV** 53133 ECNTRTN5 to 53187 GENTRYR5 1	353	99.8	101.8	79	**LOWELL TO LELMDAL, 161KV** 53144 LOWELL 5 to 53175 LELMDAL5 1	E.Centerton 161kV Breaker & Switch Replacements. Gentry Tap 161kV Line Switch Replacement.
06SP	**KERR TO KANSAS TAP, 161KV** 54435 KERR GR5 to 54514 KANSATP5 1	328	99.6	102.7	80	**FLINT CREEK TO GRDA ONE, 345KV** 53140 FLINTCR7 to 54450 GRDA1 7 1	
06SP	**FARMINGTON AECC TO CHAMBER SPRINGS ROAD, 161KV** 53195 FARMGTN5 to 53154 CHAMSPR5 1	335	99.6	102.0	105	**CHAMBER SPRINGS ROAD TO LELMDAL, 345KV** 53155 CHAMSPR7 to 53176 LELMDAL7 1	
06SP	**COUNTY LINE 115/69 KV TRANSFORMER** 57456 COLINE 2 to 57201 COLINE3X 1	66	99.8	100.5	201	**ARNOLD TO STRANGER CREEK, 115KV** 57211 ARNOLD 3 to 57268 STRANGR3 1	
06SP	**IPC JEFFERSON TO LIEBERMAN, 138KV** 53548 IPCJEFF4 to 53420 LIEBERM4 1	143	95.6	108.9	222	**LONGWOOD TO WILKES, 345KV** 53424 LONGWD 7 to 53620 WILKES 7 1	Assigned To 2000-086 2001SP Replace 4/0 jumpers to switches & Wavetrap at Lieberman. Reconductor 26.35 miles of 336 ACSR with 795 ACSR $6,241,585 And Assigned To 2000-011 2001SP Replace switches @ Lieberman. Reconductor .65 miles of 397 ACSR with 795 ACSR $153,967
06SP	**GENTRY REC TO FLINT CREEK, 161KV** 53187 GENTRYR5 to 53139 FLINTCR5 1	353	99.3	101.3	227	**ROGERS TO LOWELL REC, 161KV** 53152 ROGERS 5 to 53200 LOWELLR5 1	Replace switch
06SP	**EUREKA SPRINGS TO BEAVER DAM, 161KV** 53136 EUREKA 5 to 52680 BEAVER 5 1	274	96.1	107.0	238	**FLINT CREEK TO MONETT, 345KV** 53140 FLINTCR7 to 59481 MON383 7 1	Reconductor 5.98 miles of line with 1590 MCM ACSR
06SP	**SNYDER TO FREDERICK JCT, 69KV** 54138 SNYDER-2 to 54123 FREDJC-2 1	26	99.7	100.5	271	**ANADARKO TO PARADISE, 138KV** 55814 ANADARK4 to 56024 PARADSE4 1	
06SP	**LELMDAL TO CHAMBER SPRINGS ROAD, 161KV** 53175 LELMDAL5 to 53154 CHAMSPR5 1	244	98.5	101.7	314	**CHAMBER SPRINGS ROAD TO LELMDAL, 345KV** 53155 CHAMSPR7 to 53176 LELMDAL7 1	
06SP	**SCROGNS TO FERNDALE LAKE TAP, 69KV** 53316 SCROGNS2 to 53531 FERNDTP2 1	85	99.3	100.5	387	**NORTH MINEOLA TO LAKE HAWKINS, 138KV** 53581 NMINEOL4 to 53666 LHAWKIN4 1	
06SP	**LARUSSEL TO SPRINGFIELD, 161KV** 59479 LAR382 5 to 52692 SPRGFLD5 1	167	97.3	101.9	397	**LARUSSELL TO MONETT, 161KV** 59479 LAR382 5 to 59480 MON383 5 1	
06SP	**WEST GARNER TO LA CYGNE, 345KV** 57965 W.GRDNR7 to 57981 LACYGNE7 1	1202	98.0	101.2	416	**STILWELL TO LA CYGNE, 345KV** 57968 STILWEL7 to 57981 LACYGNE7 1	
06SP	**MONETT TO AURORA HT, 161KV** 59480 MON383 5 to 59468 AUR124 5 1	157	96.1	102.1	436	**LARUSSELL TO MONETT, 161KV** 59479 LAR382 5 to 59480 MON383 5 1	Reconductor 20.5 miles with 795 ACSR
06SP	**WINNSBORO TO SCROGNS, 69KV** 53336 WINNSBO2 to 53316 SCROGNS2 1	72	98.3	100.5	526	**PERDUE TO LAKE HAWKINS, 138KV** 53590 PERDUE 4 to 53666 LHAWKIN4 1	
06SP	**PECAN CREEK 345/161KV TRANSFORMER** 55235 PECANCK7 to 55234 PECANCK5 1	369	94.3	101.3	544	**CLARKSVILLE to MUSKOGEE, 345KV** 53756 CLARKSV7 to 55224 MUSKOGE7 1	Add Second 369MVA 345/161KV Bus-Tie Transformer
06SP	**WALLACE LAKE TO INTERNATIONAL PAPER, 138KV** 53461 WALLAKE4 to 50090 IPAPER 4 1	209	84.5	100.7	640	**DOLET HILLS 345/230KV TRANSFORMER** 50045 DOLHILL7 to 50046 DOLHILL6 1	Conductor (6.86 miles of 666 ACSR)
06SP	**TAHLEQUAH TO HIGHWAY 59, 161KV** 54455 TAHLQH 5 to 55347 HWY59 5 1	167	80.7	100.6	650	**MUSKOGEE TO FORT SMITH, 345KV** 55224 MUSKOGE7 to 55302 FTSMITH7 1	

Table 2 – Non SPP Facility Overloads caused by the 670MW AEPW to EES transfer.

Study Year	From Area To Area	Branch Over 100% Rate B	Rate B <MVA>	No Transfer %Loading	Transfer Case %Loading	Outaged Branch That Caused Overload
03G	CELE-EES	50024 CARROLL4 138 to 99167 3RINGLD 115 CKT 1	125	94.6	104.0	50023 CARROLL6 230 to 50126 MESSICK6 230 CKT1
03G	CELE-EES	50024 CARROLL4 138 to 99167 3RINGLD 115 CKT 1	125	94.7	103.4	99294 7ELDEHV 345 to 99295 8ELDEHV 500 CKT1
03G	CELE-EES	50024 CARROLL4 138 to 99167 3RINGLD 115 CKT 1	125	94.6	102.9	53424 LONGWD 7 345 to 99294 7ELDEHV 345 CKT1
03G	EES-EES	97480 L558T485 138 to 97484 4HUNTSVL 138 CKT 1	206	90.8	102.7	97454 4WALDEN 138 to 97514 4GRIMES 138 CKT1
03G	EES-EES	97480 L558T485 138 to 97484 4HUNTSVL 138 CKT 1	206	89.2	101.0	97454 4WALDEN 138 to 97469 4APRIL 138 CKT1
03G	EES-EES	97480 L558T485 138 to 97484 4HUNTSVL 138 CKT 1	206	88.2	100.1	97469 4APRIL 138 to 97470 4LFOREST 138 CKT1
03G	EES-EES	97487 4MT.ZION 138 to 97480 L558T485 138 CKT 1	206	94.5	106.4	97454 4WALDEN 138 to 97514 4GRIMES 138 CKT1
03G	EES-EES	97487 4MT.ZION 138 to 97480 L558T485 138 CKT 1	206	92.9	104.8	97454 4WALDEN 138 to 97469 4APRIL 138 CKT1
03G	EES-EES	97487 4MT.ZION 138 to 97480 L558T485 138 CKT 1	206	91.9	103.8	97469 4APRIL 138 to 97470 4LFOREST 138 CKT1
03G	EES-EES	97514 4GRIMES 138 to 97487 4MT.ZION 138 CKT 1	206	97.8	109.8	97454 4WALDEN 138 to 97514 4GRIMES 138 CKT1
03G	EES-EES	97514 4GRIMES 138 to 97487 4MT.ZION 138 CKT 1	206	96.3	108.2	97454 4WALDEN 138 to 97469 4APRIL 138 CKT1
03G	EES-EES	97514 4GRIMES 138 to 97487 4MT.ZION 138 CKT 1	206	95.3	107.2	97469 4APRIL 138 to 97470 4LFOREST 138 CKT1
03G	EES-EES	99167 3RINGLD 115 to 99168 3SAILES 115 CKT 1	115	97.5	108.3	99294 7ELDEHV 345 to 99295 8ELDEHV 500 CKT1
03G	EES-EES	99167 3RINGLD 115 to 99168 3SAILES 115 CKT 1	115	97.4	108.1	53424 LONGWD 7 345 to 99294 7ELDEHV 345 CKT1
03G	EES-EES	99167 3RINGLD 115 to 99168 3SAILES 115 CKT 1	115	96.5	107.1	50023 CARROLL6 230 to 50126 MESSICK6 230 CKT1
04SP	CELE-EES	50024 CARROLL4 138 to 99167 3RINGLD 115 CKT 1	125	94.9	103.6	50027 CLARN 6 230 to 50126 MESSICK6 230 CKT1
04SP	CELE-EES	50024 CARROLL4 138 to 99167 3RINGLD 115 CKT 1	125	97.4	103.3	53374 FULTON 3 115 to 99303 3PATMOS# 115 CKT1
04SP	CELE-EES	50024 CARROLL4 138 to 99167 3RINGLD 115 CKT 1	125	97.2	103.0	99263 3LEWIS # 115 to 99303 3PATMOS# 115 CKT1
04SP	EES-CELE	99167 3RINGLD 115 to 50024 CARROLL4 138 CKT 1	125	97.6	101.3	99309 8MCNEIL 500 to 99310 3MCNEIL 115 CKT1
04SP	EES-CELE	99167 3RINGLD 115 to 50024 CARROLL4 138 CKT 1	125	97.1	100.5	99169 6DANVLL 230 to 99181 6GRAMBL 230 CKT1
04SP	EES-CELE	99167 3RINGLD 115 to 50024 CARROLL4 138 CKT 1	125	97.1	100.5	99169 6DANVLL 230 to 99182 3DANVLL 115 CKT1
04SP	EES-EES	97768 4HLYSPG# 138 to 97698 4JASPER 138 CKT 1	112	98.9	105.6	53526 CROCKET7 345 to 97513 7GRIMES 345 CKT1
04SP	EES-EES	97919 6VERDINE 230 to 97917 6NELSN 230 CKT 1	470	99.0	100.5	97917 6NELSN 230 to 97921 6CARLYSS 230 CKT1
04SP	EES-EES	98229 4PT HUD 138 to 98230 2PT.HUD 69.0 CKT 2	100	99.6	100.1	97301 CAJUN2 8 500 to 98430 8WEBRE 500 CKT1
04SP	EES-EES	98273 4OAKGROV 138 to 98283 T300/331 138 CKT 1	135	99.9	102.1	98235 8MCKNT 500 to 15035 8DANIEL 500 CKT1
04SP	EES-EES	99167 3RINGLD 115 to 99168 3SAILES 115 CKT 1	115	97.5	107.3	50023 CARROLL6 230 to 50126 MESSICK6 230 CKT1
04SP	EES-EES	99167 3RINGLD 115 to 99168 3SAILES 115 CKT 1	115	99.0	103.1	99163 6MTOLIV 230 to 99181 6GRAMBL 230 CKT1
04SP	EES-EES	99167 3RINGLD 115 to 99168 3SAILES 115 CKT 1	115	92.1	101.9	50027 CLARN 6 230 to 50126 MESSICK6 230 CKT1
04SP	EES-EES	99171 3SPRINGH 115 to 99280 3TAYLOR 115 CKT 1	120	95.5	103.2	99230 3COUCH 115 to 99310 3MCNEIL 115 CKT1
04SP	EES-EES	99173 3HAYNVL 115 to 99249 3EMERSN 115 CKT 1	114	99.9	100.5	99171 3SPRINGH 115 to 99280 3TAYLOR 115 CKT1
04SP	EES-EES	99230 3COUCH 115 to 99310 3MCNEIL 115 CKT 1	167	95.8	109.3	99171 3SPRINGH 115 to 99172 3SAREPT 115 CKT1
04SP	EES-EES	99230 3COUCH 115 to 99310 3MCNEIL 115 CKT 1	167	89.2	108.5	53424 LONGWD 7 345 to 99294 7ELDEHV 345 CKT1
04SP	EES-EES	99230 3COUCH 115 to 99310 3MCNEIL 115 CKT 1	167	89.2	108.4	99294 7ELDEHV 345 to 99295 8ELDEHV 500 CKT1
04SP	EES-EES	99263 3LEWIS # 115 to 99230 3COUCH 115 CKT 1	159	97.4	119.1	53615 WELSH 7 345 to 53620 WILKES 7 345 CKT1
04SP	EES-EES	99263 3LEWIS # 115 to 99230 3COUCH 115 CKT 1	159	97.0	118.9	53454 SW SHV 7 345 to 53528 DIANA 7 345 CKT1
04SP	EES-EES	99263 3LEWIS # 115 to 99230 3COUCH 115 CKT 1	159	97.2	118.4	50023 CARROLL6 230 to 50046 DOLHILL6 230 CKT1
04SP	EES-EES	99303 3PATMOS# 115 to 99263 3LEWIS # 115 CKT 1	159	99.8	121.6	99396 3ALPINE# 115 to 99397 3BISMRK 115 CKT1
04SP	EES-EES	99303 3PATMOS# 115 to 99263 3LEWIS # 115 CKT 1	159	99.3	119.9	99163 6MTOLIV 230 to 99181 6GRAMBL 230 CKT1
04SP	EES-EES	99303 3PATMOS# 115 to 99263 3LEWIS # 115 CKT 1	159	99.0	119.9	97714 6CHINA 230 to 97716 6SABINE 230 CKT1
04SP	EES-EES	99310 3MCNEIL 115 to 99230 3COUCH 115 CKT 1	167	95.8	105.1	99309 8MCNEIL 500 to 99310 3MCNEIL 115 CKT1
04SP	EES-EES	99380 3HOPE E# 115 to 99230 3COUCH 115 CKT 1	120	98.9	100.5	99349 3ARKA-N 115 to 99407 3FRIEND 115 CKT1
04SP	EES-EES	99389 4MURFRE 138 to 99387 3MURF-S 115 CKT 1	60	94.5	119.7	53526 CROCKET7 345 to 97513 7GRIMES 345 CKT1
04SP	EES-EES	99389 4MURFRE 138 to 99387 3MURF-S 115 CKT 1	60	91.3	116.0	53526 CROCKET7 345 to 53637 TENRUSK7 345 CKT1
04SP	EES-EES	99389 4MURFRE 138 to 99387 3MURF-S 115 CKT 1	60	88.4	113.4	53374 FULTON 3 115 to 99303 3PATMOS# 115 CKT1
04SP	EES-SWPA	99825 5MIDWAY# 161 to 52660 BULL SH5 161 CKT 1	162	96.9	103.8	31798 SWEETWTR 161 to 96077 5FLETCH 161 CKT1
04SP	EES-SWPA	99825 5MIDWAY# 161 to 52660 BULL SH5 161 CKT 1	162	97.0	103.6	52660 BULL SH5 161 to 96081 5GAINES 161 CKT1
04SP	EES-SWPA	99825 5MIDWAY# 161 to 52660 BULL SH5 161 CKT 1	162	96.2	103.1	31798 SWEETWTR 161 to 96122 5WILSPG 161 CKT1
04SP	EMDE-AECI	59471 NEO184 5 161 to 96748 2NEOSAC 69.0 CKT 1	56	98.4	102.0	52680 BEAVER 5 161 to 53136 EUREKA 5 161 CKT1
04SP	EMDE-AECI	59471 NEO184 5 161 to 96748 2NEOSAC 69.0 CKT 1	56	99.7	102.0	59591 MON383 269.0 to 96680 2VERONA 69.0 CKT1
04SP	EMDE-AECI	59471 NEO184 5 161 to 96748 2NEOSAC 69.0 CKT 1	56	97.9	100.6	54520 JAY GR 269.0 to 96757 2SW CTY 69.0 CKT1
04SP	MIPU-AECI	59217 WINDSR 5 161 to 96071 5CLINTN 161 CKT 1	123	99.1	104.2	59228 WBURGE 5 161 to 59229 ODESSA 5 161 CKT1
04SP	MIPU-AECI	59217 WINDSR 5161 to 96071 5CLINTN 161 CKT 1	123	96.2	101.5	52702 TRUMAN 5 161 to 96555 5GRAVOI 161 CKT1

Table 2 continued – Non SPP Facility Overloads caused by the 670MW AEPW to EES transfer.

Study Year	From Area To Area	Branch Over 100% Rate B	Rate B <MVA>	No Transfer %Loading	Transfer Case %Loading	Outaged Branch That Caused Overload
04SP	NPPD-NPPD	64181 MAXWELL7 115 to 64039 CALAWAY7 115 CKT 1	105	99.4	100.5	64102 GENTLMN3 345 to 64282 SWEET W3 345 CKT2
04SP	NPPD-NPPD	64265 ST.LIB 7 115 to 64173 LOUPCTY7 115 CKT 1	92	99.7	100.5	64181 MAXWELL7 115 to 64204 N.PLATT7 115 CKT1
04SP	SJLP-SJLP	69703 ST JOE 5 161 to 69701 MIDWAY 5 161 CKT 1	164	98.5	101.7	96039 7FAIRPT 345 to 96076 5FAIRPT 161 CKT3
04SP	SWPA-AECI	52690 CARTHG 269.0 to 96649 2JASPER 69.0 CKT 1	47	100.0	103.1	56934 MARMTNE5 161 to 58065 CNTRVIL5 161 CKT1
04SP	SWPA-AECI	52690 CARTHG 269.0 to 96649 2JASPER 69.0 CKT 1	47	99.9	103.0	57965 W.GRDNR7 345 to 57977 CRAIG 7 345 CKT1
04SP	SWPA-AECI	52690 CARTHG 269.0 to 96649 2JASPER 69.0 CKT 1	47	99.6	102.8	53929 DELWARE7 345 to 53955 N.E.S.-7 345 CKT1
04SP	SWPA-AECI	52690 CARTHG 269.0 to 96751 2REEDS 69.0 CKT 1	36	97.8	102.6	54431 MIAMI 5 161 to 54432 AFTON 5 161 CKT1
04SP	SWPA-AECI	52690 CARTHG 269.0 to 96751 2REEDS 69.0 CKT 1	36	97.7	102.3	59484 DEC392 5 161 to 59496 NOL435 5 161 CKT1
04SP	SWPA-AECI	52690 CARTHG 269.0 to 96751 2REEDS 69.0 CKT 1	36	97.7	102.2	59471 NEO184 5 161 to 59496 NOL435 5 161 CKT1
04WP	AECI-AECI	96082 5GEORGE 161 to 96531 2GEORGE 69.0 CKT 1	56	99.2	100.1	96057 5BARNET 161 to 96618 2BARNET 69.0 CKT1
04WP	AECI-AECI	96153 1MOCTN1 100 to 96304 2MOCITY 69.0 CKT 1	34	99.8	101.1	96091 5LATHRP 161 to 96302 2LATHRP 69.0 CKT1
04WP	AECI-AECI	96154 1MOCTN2 100 to 96304 2MOCITY 69.0 CKT 2	34	99.9	101.1	96091 5LATHRP 161 to 96302 2LATHRP 69.0 CKT1
04WP	AMRN-AECI	31221 MOBERLY 161 to 96120 5THMHIL 161 CKT 1	386	99.5	100.9	96044 7MCCRED 345 to 96049 7THOMHL 345 CKT1
04WP	CELE-EES	50024 CARROLL4 138 to 99167 3RINGLD 115 CKT 1	125	96.1	104.7	50027 CLARN 6 230 to 50126 MESSICK6 230 CKT1
04WP	CELE-EES	50024 CARROLL4 138 to 99167 3RINGLD 115 CKT 1	125	98.2	103.7	53374 FULTON 3 115 to 99303 3PATMOS# 115 CKT1
04WP	CELE-EES	50024 CARROLL4 138 to 99167 3RINGLD 115 CKT 1	125	97.9	103.5	99263 3LEWIS # 115 to 99303 3PATMOS# 115 CKT1
04WP	EES-CELE	99167 3RINGLD 115 to 50024 CARROLL4 138 CKT 1	125	99.1	103.3	99230 3COUCH 115 to 99264 3MAG-DW 115 CKT1
04WP	EES-CELE	99167 3RINGLD 115 to 50024 CARROLL4 138 CKT 1	125	97.4	101.0	99266 3MAG-ST 115 to 99308 3MAG-E 115 CKT1
04WP	EES-CELE	99167 3RINGLD 115 to 50024 CARROLL4 138 CKT 1	125	97.0	100.6	99266 3MAG-ST 115 to 99288 3KERLIN* 115 CKT1
04WP	EES-EES	99167 3RINGLD 115 to 99168 3SAILES 115 CKT 1	115	97.2	106.7	50027 CLARN 6 230 to 50126 MESSICK6 230 CKT1
04WP	EES-EES	99167 3RINGLD 115 to 99168 3SAILES 115 CKT 1	115	98.9	105.2	53374 FULTON 3 115 to 99303 3PATMOS# 115 CKT1
04WP	EES-EES	99167 3RINGLD 115 to 99168 3SAILES 115 CKT 1	115	98.6	105.0	99263 3LEWIS # 115 to 99303 3PATMOS# 115 CKT1
04WP	EES-EES	99230 3COUCH 115 to 99310 3MCNEIL 115 CKT 1	167	81.7	102.2	53424 LONGWD 7 345 to 99294 7ELDEHV 345 CKT1
04WP	EES-EES	99230 3COUCH 115 to 99310 3MCNEIL 115 CKT 1	167	81.7	102.1	99294 7ELDEHV 345 to 99295 8ELDEHV 500 CKT1
04WP	EES-EES	99263 3LEWIS # 115 to 99230 3COUCH 115 CKT 1	159	99.7	118.3	99230 3COUCH 115 to 99264 3MAG-DW 115 CKT1
04WP	EES-EES	99263 3LEWIS # 115 to 99230 3COUCH 115 CKT 1	159	99.0	118.2	98107 8RICHARD 500 to 98430 8WEBRE 500 CKT1
04WP	EES-EES	99263 3LEWIS # 115 to 99230 3COUCH 115 CKT 1	159	96.6	117.9	53277 LYDIA 7 345 to 53615 WELSH 7 345 CKT1
04WP	EES-EES	99264 3MAG-DW 115 to 99230 3COUCH 115 CKT 1	108	98.6	100.3	99308 3MAG-E 115 to 99310 3MCNEIL 115 CKT1
04WP	EES-EES	99303 3PATMOS# 115 to 99263 3LEWIS # 115 CKT 1	159	93.6	105.2	99230 3COUCH 115 to 99310 3MCNEIL 115 CKT1
04WP	EES-EES	99389 4MURFRE 138 to 99387 3MURF-S 115 CKT 1	60	96.9	121.6	55224 MUSKOGE7 345 to 55302 FTSMITH7 345 CKT1
04WP	EES-EES	99389 4MURFRE 138 to 99387 3MURF-S 115 CKT 1	60	93.9	115.4	99333 8SHERID 500 to 99402 8HSEHV 500 CKT1
04WP	EES-EES	99389 4MURFRE 138 to 99387 3MURF-S 115 CKT 1	60	89.0	115.4	55305 FTSMITH8 500 to 99486 8ANO 500 CKT1
04WP	SWPA-AECI	52690 CARTHG 269.0 to 96649 2JASPER 69.0 CKT 1	52	97.6	100.9	52688 CARTHAG5 161 to 59479 LAR382 5 161 CKT1
04WP	SWPA-AECI	52690 CARTHG 269.0 to 96649 2JASPER 69.0 CKT 1	52	97.5	100.6	59468 AUR124 5 161 to 59480 MON383 5 161 CKT1
04WP	SWPA-AECI	52690 CARTHG 269.0 to 96649 2JASPER 69.0 CKT 1	52	96.8	100.4	96042 7HUBEN 345 to 96045 7MORGAN 345 CKT1
04WP	SWPA-AECI	52690 CARTHG 269.0 to 96751 2REEDS 69.0 CKT 1	43	100.0	104.2	59480 MON383 5 161 to 59591 MON383 269.0 CKT1
04WP	SWPA-AECI	52690 CARTHG 269.0 to 96751 2REEDS 69.0 CKT 1	43	99.7	103.7	59969 BRKLNE 5 161 to 96101 5MORGAN 161 CKT1
04WP	SWPA-AECI	52690 CARTHG 269.0 to 96751 2REEDS 69.0 CKT 1	43	99.4	103.6	96042 7HUBEN 345 to 96088 5HUBEN 161 CKT1
06SP	AECI-AECI	96120 5THMHIL 161 to 96172 2TMHILL 69.0 CKT 2	84	99.8	101.2	96044 7MCCRED 345 to 96049 7THOMHL 345 CKT1
06SP	AMRN-AECI	31221 MOBERLY 161 to 96120 5THMHIL 161 CKT 1	372	100.0	101.5	96044 7MCCRED 345 to 96049 7THOMHL 345 CKT1
06SP	CELE-EES	50024 CARROLL4 138 to 99167 3RINGLD 115 CKT 1	125	94.2	102.9	50023 CARROLL6 230 to 50126 MESSICK6 230 CKT1
06SP	EES-CELE	99115 3FISHER 115 to 50057 FISHER 4 138 CKT 1	83	97.1	101.0	99113 6WINFLD 230 to 99116 6MONTGY 230 CKT1
06SP	EES-CELE	99167 3RINGLD 115 to 50024 CARROLL4 138 CKT 1	125	97.9	102.1	99171 3SPRINGH 115 to 99280 3TAYLOR 115 CKT1
06SP	EES-CELE	99167 3RINGLD 115 to 50024 CARROLL4 138 CKT 1	125	97.6	101.6	99266 3MAG-ST 115 to 99308 3MAG-E 115 CKT1
06SP	EES-CELE	99167 3RINGLD 115 to 50024 CARROLL4 138 CKT 1	125	96.7	100.7	99266 3MAG-ST 115 to 99288 3KERLIN* 115 CKT1
06SP	EES-EES	97514 4GRIMES 138 to 97487 4MT.ZION 138 CKT 1	206	92.2	104.2	97454 4WALDEN 138 to 97514 4GRIMES 138 CKT1
06SP	EES-EES	97514 4GRIMES 138 to 97487 4MT.ZION 138 CKT 1	206	89.0	101.0	97454 4WALDEN 138 to 97469 4APRIL 138 CKT1
06SP	EES-EES	97618 4NEWTONB 138 to 97768 4HLYSPG# 138 CKT 1	112	98.4	102.0	97691 8CYPRESS 500 to 97717 8HARTBRG 500 CKT1
06SP	EES-EES	97618 4NEWTONB 138 to 97768 4HLYSPG# 138 CKT 1	112	98.3	102.0	97690 4CYPRESS 138 to 97691 8CYPRESS 500 CKT1
06SP	EES-EES	97708 4TOLEDO 138 to 97686 4LEACH 138 CKT 1	144.6	91.2	100.4	53526 CROCKET7 345 to 97513 7GRIMES 345 CKT1
06SP	EES-EES	97768 4HLYSPG# 138 to 97698 4JASPER 138 CKT 1	112	96.3	101.8	53526 CROCKET7 345 to 53637 TENRUSK7 345 CKT1
06SP	EES-EES	99167 3RINGLD 115 to 99168 3SAILES 115 CKT 1	115	99.9	109.9	53424 LONGWD 7 345 to 99294 7ELDEHV 345 CKT1

Table 2 continued – Non SPP Facility Overloads caused by the 670MW AEPW to EES transfer.

Study Year	From Area To Area	Branch Over 100% Rate B	Rate B <MVA>	No Transfer %Loading	Transfer Case %Loading	Outaged Branch That Caused Overload
06SP	EES-EES	99167 3RINGLD 115 to 99168 3SAILES 115 CKT 1	115	92.4	102.3	50023 CARROLL6 230 to 50126 MESSICK6 230 CKT1
06SP	EES-EES	99168 3SAILES 115 to 99167 3RINGLD 115 CKT 1	115	98.0	102.8	99264 3MAG-DW 115 to 99280 3TAYLOR 115 CKT1
06SP	EES-EES	99168 3SAILES 115 to 99167 3RINGLD 115 CKT 1	115	96.9	101.9	99171 3SPRINGH 115 to 99280 3TAYLOR 115 CKT1
06SP	EES-EES	99168 3SAILES 115 to 99167 3RINGLD 115 CKT 1	115	96.7	101.5	99266 3MAG-ST 115 to 99308 3MAG-E 115 CKT1
06SP	EES-EES	99171 3SPRINGH 115 to 99280 3TAYLOR 115 CKT 1	120	99.8	101.2	99249 3EMERSN 115 to 99288 3KERLIN* 115 CKT1
06SP	EES-EES	99263 3LEWIS # 115 to 99230 3COUCH 115 CKT 1	159	97.9	120.5	53593 PIRKEY 7 345 to 53637 TENRUSK7 345 CKT1
06SP	EES-EES	99263 3LEWIS # 115 to 99230 3COUCH 115 CKT 1	159	98.5	120.1	53321 SNASHVL4 138 to 99389 4MURFRE 138 CKT1
06SP	EES-EES	99263 3LEWIS # 115 to 99230 3COUCH 115 CKT 1	159	98.5	120.1	99387 3MURF-S 115 to 99389 4MURFRE 138 CKT1
06SP	EES-EES	99264 3MAG-DW 115 to 99230 3COUCH 115 CKT 1	108	99.4	102.2	50024 CARROLL4 138 to 99167 3RINGLD 115 CKT1
06SP	EES-EES	99278 3STEPHN 115 to 99302 3CAMD-S# 115 CKT 1	96	97.6	101.0	99293 3ELDEHV 115 to 99295 8ELDEHV 500 CKT1
06SP	EES-EES	99303 3PATMOS# 115 to 99263 3LEWIS # 115 CKT 1	159	99.9	120.4	99170 3MINDEN 115 to 99172 3SAREPT 115 CKT1
06SP	EES-EES	99303 3PATMOS# 115 to 99263 3LEWIS # 115 CKT 1	159	97.5	120.3	53277 LYDIA 7 345 to 53615 WELSH 7 345 CKT1
06SP	EES-EES	99303 3PATMOS# 115 to 99263 3LEWIS # 115 CKT 1	159	98.2	118.4	99171 3SPRINGH 115 to 99172 3SAREPT 115 CKT1
06SP	EES-EES	99389 4MURFRE 138 to 99387 3MURF-S 115 CKT 1	60	95.3	123.6	53424 LONGWD 7 345 to 99294 7ELDEHV 345 CKT1
06SP	EES-EES	99389 4MURFRE 138 to 99387 3MURF-S 115 CKT 1	60	95.4	123.4	99294 7ELDEHV 345 to 99295 8ELDEHV 500 CKT1
06SP	EES-EES	99389 4MURFRE 138 to 99387 3MURF-S 115 CKT 1	60	91.0	116.3	53526 CROCKET7 345 to 97513 7GRIMES 345 CKT1
06SP	EES-SWPA	99825 5MIDWAY# 161 to 52660 BULL SH5 161 CKT 1	162	98.8	107.1	96042 7HUBEN 345 to 96045 7MORGAN 345 CKT1
06SP	EES-SWPA	99825 5MIDWAY# 161 to 52660 BULL SH5 161 CKT 1	162	98.2	106.7	55224 MUSKOGE7 345 to 55302 FTSMITH7 345 CKT1
06SP	EES-SWPA	99825 5MIDWAY# 161 to 52660 BULL SH5 161 CKT 1	162	99.6	106.6	31798 SWEETWTR 161 to 96122 5WILSPG 161 CKT1
06SP	MIPU-AECI	59217 WINDSR 5 161 to 96071 5CLINTN 161 CKT 1	123	99.9	104.1	96071 5CLINTN 161 to 96108 5OSCEOL 161 CKT1
06SP	MIPU-AECI	59217 WINDSR 5 161 to 96071 5CLINTN 161 CKT 1	123	97.3	102.5	96042 7HUBEN 345 to 96045 7MORGAN 345 CKT1
06SP	MIPU-AECI	59217 WINDSR 5 161 to 96071 5CLINTN 161 CKT 1	123	95.7	100.8	55224 MUSKOGE7 345 to 55302 FTSMITH7 345 CKT1
06SP	NPPD-NPPD	64181 MAXWELL7 115 to 64039 CALAWAY7 115 CKT 1	105	99.9	101.2	64102 GENTLMN3 345 to 64282 SWEET W3 345 CKT2
06SP	NPPD-NPPD	64181 MAXWELL7 115 to 64039 CALAWAY7 115 CKT 1	105	99.3	100.5	64037 C.CREEK4 230 to 64203 N.PLATT4 230 CKT1
06SP	SWPA-AECI	52690 CARTHG 269.0 to 96751 2REEDS 69.0 CKT 1	36	99.7	106.3	52688 CARTHAG5 161 to 59479 LAR382 5 161 CKT1
06SP	SWPA-AECI	52690 CARTHG 269.0 to 96751 2REEDS 69.0 CKT 1	36	99.7	104.6	59485 CAR395 5 161 to 59491 PUR421 5 161 CKT1
06SP	SWPA-AECI	52690 CARTHG 269.0 to 96751 2REEDS 69.0 CKT 1	36	99.2	104.1	59553 ALB262 269.0 to 59573 HTC338 269.0 CKT1

Table 3 – AEPW – EES 670MW transfer impact on previously assigned and identified SPP Facilities.

Study Year	From Area To Area	Branch Over 100% Rate B	Rate B <MVA>	No Transfer %Loading	Transfer Case %Loading	Outaged Branch That Caused Overload	Upgrades And Costs Assigned to Previous Customers	New Rate B <MVA>	% Rate B Increase	ATC	Additional Upgrades Required
04SP	KACP-KACP	**LA CYGNE TO STILWELL, 345KV** 57981 LACYGNE7 to 57968 STILWEL7 1	1202	114.7	118.5	**WEST GARNER TO LA CYGNE, 345KV** 57965 W.GRDNR7 to 57981 LACYGNE7 1	SPP Flowgate	NA	NA	0	Reconductor 30.8 miles to 1192 MCM ACSR
04SP	AEPW-AEPW	**TATUM TO CHEROKEE REC, 138KV** 53611 TATUM 4 to 53522 CHEROKE4 1	287	77.2	82.4	**TATUM TO CHEROKEE REC, 138KV** 53611 TATUM 4 to 53522 CHEROKE4 1	Assigned To 2000-086 2001 SP Reconductor 6.25 miles of 666 ACSR with 1272 ACSR, $1,300,000	287	0%	670	
04SP	AEPW-AEPW	**CHEROKEE REC TO KNOX LEE, 138KV** 53522 CHEROKE4 to 53557 KNOXLEE4 1	287	81.5	86.7	**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	Assigned To 2000-086 2001SP Reconductor 3.25 miles of 666 ACSR with 1272 ACSR, $720,000 Assigned To 2000-044 2004SP Replace 1200A switches @ Knox Lee & Cherokee Tap $55,879	287	0%	670	None
04SP	AEPW-AEPW	**IPC JEFFERSON TO LIEBERMAN, 138KV** 53548 IPCJEFF4 to 53420 LIEBERM4 1	143	92.9	106.1	**LONGWOOD TO WILKES, 345KV** 53424 LONGWD 7 to 53620 WILKES 7 1	Assigned To 2000-086 2001SP Replace 4/0 jumpers to switches & Wavetrap at Lieberman. Reconductor 26.35 miles of 336 ACSR with 795 ACSR $6,241,585 And Assigned To 2000-011 2001SP Replace switches @ Lieberman. Reconductor .65 miles of 397 ACSR with 795 ACSR $153,967	179	25%	670	None
04SP	AEPW-AEPW	**TATUM TO ROCK HILL, 138KV** 53611 TATUM 4 to 53598 ROKHILL4 1	235	92.7	99.1	**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	SPP-2000-086 01SP Reconductor 0.81 miles of 666 ACSR with 1272 ACSR. Replace 800A trap with new 2000A trap, $190,000 Additional Upgrade SPP-2000-011 New Rate B 235MVA 106.5% Overloaded, Reconductor other 5.76 miles of 795 with 1272 ACSR Cost Not Available	235	0%	670	None
04SP	AEPW-AEPW	**LONGWOOD TO NORAM, 138KV** 53423 LONGWD 4 to 53473 NORAM 4	234	101.1	106.0	**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	Assigned To 2000-011 2004SP Reconductor 4.66 miles of bundled 266 ACSR with 1590 ACSR $1,274,374	262	12%	670	None
04SP	AEPW-AEPW	**NORAM TO RAINES, 138KV** 53473 NORAM 4 to 53439 RAINES 4 1	234	99.5	104.4	**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	Assigned To 2000-043 2004SP Rebuild 5.58 miles of 2-266 ACSR with 1590 ACSR $1,447,081	268	15%	0	Rebuild 5.58 miles of 2-266 ACSR with 1590 ACSR $1,447,081
04WP	KACP-KACP	**LA CYGNE TO STILWELL, 345KV** 57981 LACYGNE7 to 57968 STILWEL7 1	1315	98.9	102.3	**WEST GARNER TO LA CYGNE, 345KV** 57965 W.GRDNR7 to 57981 LACYGNE7 1	SPP Flowgate With Operating Guide	NA	NA	0	Reconductor 30.8 miles to 1192 MCM ACSR
06SP	KACP-KACP	**LA CYGNE TO STILWELL, 345KV** 57981 LACYGNE7 to 57968 STILWEL7 1	1202	109.8	113.5	**WEST GARNER TO LA CYGNE, 345KV** 57965 W.GRDNR7 to 57981 LACYGNE7 1	SPP Flowgate With Operating Guide	NA	NA	0	Reconductor 30.8 miles to 1192 MCM ACSR
06SP	AEPW-AEPW	**ROCK HILL TO TATUM, 138KV** 53598 ROKHILL4 to 53611 TATUM 4 1	235	94.3	101.0	**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	SPP-2000-086 01SP Reconductor 0.81 miles of 666 ACSR with 1272 ACSR. Replace 800A trap with new 2000A trap, $190,000 Additional Upgrade SPP-2000-011 New Rate B 235MVA 106.5% Overloaded, Reconductor other 5.76 miles of 795 with 1272 ACSR Cost Not Available	235	0%	571	Replace two (2) circuit breakers and five (5) switches New ratings Summer 265 MVA Norm. & 309 MVA Emerg. & Winter: 311 MVA Norm. & 348 MVA Emerg.

Table 3 continued – AEPW – EES 670MW transfer impact on previously assigned and identified SPP Facilities.

Study Year	From Area To Area	Branch Over 100% Rate B	Rate B <MVA>	No Transfer %Loading	Transfer Case %Loading	Outaged Branch That Caused Overload	Upgrades And Costs Assigned to Previous Customers	New Rate B <MVA>	% Rate B Increase	ATC	Additional Upgrades Required
06SP	AEPW-AEPW	**IPC JEFFERSON TO LIEBERMAN, 138KV** 53548 IPCJEFF4 to 53420 LIEBERM4 1	143	95.6	108.9	**LONGWOOD TO WILKES, 345KV** 53424 LONGWD 7 to 53620 WILKES 7 1	Assigned To 2000-086 2001SP Replace 4/0 jumpers to switches & Wavetrap at Lieberman. Reconductor 26.35 miles of 336 ACSR with 795 ACSR $6,241,585 And Assigned To 2000-011 2001SP Replace switches @ Lieberman. Reconductor .65 miles of 397 ACSR with 795 ACSR $153,967	179	25%	670	None
06SP	AEPW-AEPW	**CHEROKEE REC TO KNOX LEE, 138KV** 53522 CHEROKE4 to 53557 KNOXLEE4 1	287	83.0	88.4	**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	Assigned To 2000-086 2001SP Reconductor 3.25 miles of 666 ACSR with 1272 ACSR, $720,000 Assigned To 2000-044 2004SP Replace 1200A switches @ Knox Lee & Cherokee Tap $55,879	287	0%	670	None
06SP	AEPW-AEPW	**TATUM TO CHEROKEE REC, 138KV** 53611 TATUM 4 to 53522 CHEROKE4 1	287	78.6	84.0	**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	Assigned To 2000-086 2001 SP Reconductor 6.25 miles of 666 ACSR with 1272 ACSR, $1,300,000	287	0%	670	None
06SP	AEPW-AEPW	**LONGWOOD TO NORAM, 138KV** 53423 LONGWD 4 to 53473 NORAM 4	234	105.3	110.3	**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	Assigned To 2000-011 2004SP Reconductor 4.66 miles of bundled 266 ACSR with 1590 ACSR $1,274,374	262	12%	670	None
06SP	AEPW-AEPW	**NORAM TO RAINES, 138KV** 53473 NORAM 4 to 53439 RAINES 4 1	234	103.7	108.7	**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	Assigned To 2000-043 2004SP Rebuild 5.58 miles of 2-266 ACSR with 1590 ACSR $1,447,081	268	15%	0	Rebuild 5.58 miles of 2-266 ACSR with 1590 ACSR $1,447,081

5. Conclusion

The results of the study show that before the 670MW transfer can take place system improvements will need to be completed. The facility upgrades assigned to previous customers (Table 3), any additional facility upgrades, and facility upgrades of new overloads (Table 1) will be required before the 670MW transmission service request can take place.

The results of the initial analysis of the transfer show that the 670MW transfer from AEPW to EES creates many new overloads in the system. In order to relieve these overloads, the Pittsburg-NW Texarkana-McNeil 500kV line and Dolet Hill tap are proposed. These projects are proposed as an effective means of providing the amount of capacity that is needed for the 670MW transfer.

The final cost assignment of facilities and ATC to Power Resource Group, Inc. 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