



SPP *Southwest Power Pool*

***System Impact Study SPP-2002-155
For Transmission Service
Requested By
Calpine Energy Services L.P.***

From AEPW To WFEC

***For a Reserved Amount Of
50MW From 6/1/2004 To 6/1/2006
100MW From 6/1/2006 To 6/1/2007
200MW From 6/1/2007 To 6/1/2009***

SPP Coordinated Planning

System Impact Study

Calpine Energy Services L.P. (CALP) has requested a system impact study for long-term Firm Point-to-Point transmission service from AEPW to WFEC. The request is for OASIS reservations 388973 for an amount of 50 MW from 6/1/2004 to 6/1/2009, 388974 for an amount of 50 MW from 6/1/2006 to 6/1/2009, and 388975 and 388976 for an amount of 100MW from 6/1/2007 to 6/1/2009.

The principal objective of this study is to identify constraints on the SPP Regional Tariff System and potential facility upgrades that may be necessary to facilitate the additional 200 MW of service requested.

The AEPW to WFEC transfer was studied to determine the facility upgrades required based on the actual queue position of the request with only those higher priority requests in Facility Study mode included in the models. Higher priority requests still in study that have not gone to facility study were not included in the models. These results are documented in Table 1 of the report. The results given in Table 1 include upgrades that may be assigned to higher priority requests. The results of this study give the customer an estimated cost of facility upgrades that may be required in order to accommodate the 200 MW AEPW to WFEC transfer.

SPP used four seasonal models to study the AEPW to WFEC 200 MW transfer for the requested service period. The SPP 2002 Series Cases 2005 Summer Peak, 2005/06 Winter Peak, 2008 Summer Peak and 2008/2009 Winter Peak were used to study the impact of the 200 MW transfer on the SPP system during the requested service period of 6/1/2004 to 6/1/2009. The Spring Peak models apply to April and May, the Summer Peak models apply to June through September, the Fall Peak models apply to October and November, and the Winter Peak models apply to December through March. The chosen base case models were modified to reflect the most current modeling information. The cases were modified to reflect firm transfers during the requested service period that were not already included in the January 2002 base case series models.

With only the higher priority requests that have signed Facility Study Agreements included in the models, the study results of the AEPW to WFEC 200 MW show that limiting constraints exist. Due to the number of limiting constraints identified, the Transmission Service Request cannot be granted. These results do not include an evaluation of potential constraints in the planning horizon beyond the reservation period that may limit the right to renew service. The upgrades and cost provided in the System Impact Study are planning estimates only. The final ATC and upgrades required may vary from these results due to the status of higher priority requests, unknown facility upgrades that will be identified during the facility study process, and the final results of the full AC analysis. Execution of a Facility Study Agreement is now required to maintain queue position. The final upgrade solutions and cost assignments will be determined upon the completion of the facility study.

Table 1 – SPP facility upgrades identified for the AEPW to WFEC transfer

Study Year	From Area - To Area	Branch Over 100% Rate B	Rate B	Outaged Branch Causing Overload	ATC	Solution	Estimated Cost
05SP	GRRD-GRRD	Afton 161/69kV Transformer	50	Miami - Afton 161kV	0	Replace 50 MVA Transformer with 84 MVA unit	\$ 833,000
05SP	AEPW-AEPW	Blue Circle - Catoosa 69kV	72	Lynn Lane West Tap - Lynn Lane Tap 138kV	0	Solution Undetermined	Not Available
05SP	AEPW-AEPW	Broken Arrow 101St North - Oneta 138kV	210	Riverside Station Auto 138/345kV Transformer	0	Replace wavetrap	\$ 30,000
05SP	SWPA-EES	Bull Shoals - Midway 161kV	162	Ises - Morefield 161kV	0	Replace disconnect switches, metering CTs and wave trap at Bull Shoals	\$ 150,000
05SP	AEPW-AEPW	Carson South 138/13.8kV Transformer	33	Carson Tap - Union Avenue 138kV	0	Solution Undetermined	Not Available
05SP	AEPW-AEPW	Carson-Center 138/13.8kV Transformer	33	Carson South - Tulsa Power Station 138kV	0	Solution Undetermined	Not Available
05SP	SWPA-EES	Carthage - Reed Springs 69kV	36	Carthage - Jasper 69kV	0	Third Party Facility	\$ -
05SP	AEPW-AEPW	Catoosa 138/69kV Transformer	55	Lynn Lane West Tap - Lynn Lane Tap 138kV	0	Solution Undetermined	Not Available
05SP	AEPW-AEPW	Chamber Springs - Farmington Aecc 161kV	335	Chamber Springs - Tontitown 161kV	0	Replace Farmington switch	\$ 60,000
05SP	AEPW-AEPW	Chamber Springs - Tontitown 161kV	244	Muskogee - Ft Smith 345kV	0	Rebuild 12 miles with 2156ACSR	\$ 7,200,000
05SP	WERE-WERE	Circleville - Hoyt Hti Switching Junction 115kV	97	Iatan - St Joe 345kV	0	Replace 82 structures	\$ 742,000
05SP	GRRD-GRRD	Claremore 161/69kV Transformer ckt 1	84	Claremore 161/69kV Transformer Ckt 2	0	Solution Undetermined	Not Available
05SP	GRRD-GRRD	Claremore 161/69kV Transformer ckt 2	84	Claremore 161/69kV Transformer Ckt 1	0	Solution Undetermined	Not Available
05SP	AEPW-WFEC	Cornville - Corn Tap 138kV	105	Southwest Station - Anadarko 138kV	0	Solution Undetermined	Not Available
05SP	AEPW-AEPW	Denver Center 138/13.8kV Transformer	33	Denver Tap - 46Th Street East 138kV	0	Solution Undetermined	Not Available
05SP	OKGE-OKGE	Draper Lake 138/345kV Transformer ckt 1	493	Draper Lake 138/345kV Transformer Ckt 2	0	May be relieved due to OKGE Operating Guide	Not Available
05SP	OKGE-OKGE	Draper Lake 138/345kV Transformer ckt 2	493	Draper Lake 138/345kV Transformer Ckt 1	0	May be relieved due to OKGE Operating Guide	Not Available
05SP	AEPW-AEPW	East Centerton - Gentry Rec 161kV	353	Flint Creek - Tontitown 161kV	0	Rebuild 19.16 miles of 2-397.5 ACSR with 2156 ACSR	\$ 8,000,000
05SP	AEPW-AEPW	Elm Springs Rec - Tontitown 161kV	306	Dyess - Tontitown 161kV	0	Replace Switch and Elm Springs Strain Bus	\$ 100,000
05SP	AEPW-AEPW	Flint Creek - Gentry Rec 161kV	353	Flint Creek - Tontitown 161kV	0	Rebuild 1.09 miles of 2-397.5 ACSR with 2156 ACSR.	\$ 400,000
05SP	AEPW-AEPW	Flint Creek - Tontitown 161kV	312	Chamber Springs - Tontitown 161kV	0	Replace switch and jumpers	\$ 45,000
05SP	MIDW-WEPL	Seward 69/115kV Transformer	44	Heizer 115/230kV Transformer	0	Solution Undetermined	Not Available
05SP	AEPW-WFEC	Southwest Station - Anadarko 138kV	203	Anadrk6 13.8/138kV Transformer	0	Replace bus, jumpers, switches, supports and foundations at Anadarko Switch Station	\$ 450,000
05SP	SWPA-SPRM	Springfield - Brookline 161kV	323	Junction - Brookline 161kV	0	Solution Undetermined	Not Available
05SP	GRRD-GRRD	Tahlequah 69/161kV Transformer ckt 1	78	Tahlequah 69/161kV Transformer Ckt 2	8	Solution Undetermined	Not Available
05SP	GRRD-GRRD	Tahlequah 69/161kV Transformer ckt 2	78	Tahlequah 69/161kV Transformer Ckt 1	0	Solution Undetermined	Not Available
05SP	OKGE-OKGE	Tinker #4 - Tinker #2 138kV	100	Horseshoe Lake - Midway 138kV	0	Invalid Overload	\$ -
05WP	AEPW-AEPW	Catoosa 138/69kV Transformer	55	Lynn Lane West Tap - Lynn Lane Tap 138kV	0	See Previous	See Previous
05WP	AEPW-AEPW	Chamber Springs - Tontitown 161kV	275	Chamber Springs - Farmington Aecc 161kV	5	See Previous	See Previous
05WP	WERE-WERE	Circleville - Hoyt Hti Switching Junction 115kV	97	Iatan - St Joe 345kV	0	See Previous	See Previous
05WP	AEPW-AEPW	Denver Center 138/13.8kV Transformer	33	Denver Tap - 46Th Street East 138kV	0	See Previous	See Previous
05WP	WERE-WERE	El Paso - Gill Energy Center South 138kV	210	Evans Energy Ctr Nth - Evans Energy Ctr Sth 138kV	0	Solution Undetermined	Not Available
08SP	GRRD-GRRD	412Sub - Kansas Tap 161kV	338	Flint Creek - Grda1 345kV	0	Reconductor 9.7 miles with 1590MCM ACSR	\$ 1,488,000
08SP	GRRD-GRRD	Afton 161/69kV Transformer	50	Miami - Afton 161kV	0	See Previous	See Previous

Table 1 - continued – SPP facility upgrades identified for the AEPW to WFEC transfer

Study Year	From Area - To Area	Branch Over 100% Rate B	Rate B	Outaged Branch Causing Overload	ATC	Solution	Estimated Cost
08SP	WFEC-WFEC	Anadarko - Cyril 69kV	61	Anadarko - Georgia 138kV	4	Reconductor 13 miles of 336MCM ACSR with 795MCM	\$ 2,626,000
08SP	AEPW-AEPW	Blue Circle - Catoosa 69kV	72	Lynn Lane West Tap - Lynn Lane Tap 138kV	0	See Previous	See Previous
08SP	AEPW-OKGE	Bonanza - Bonanza Tap 161kV	177	Aes - Tarby 161kV	81	Rebuild 0.06 miles of 397.5 ACSR with 795MCM ACSR	\$ 50,000
08SP	AEPW-AEPW	Broken Arrow 101St North - Oneta 138kV	210	Mayo South - 41St & 161St East 138kV	0	See Previous	See Previous
08SP	AEPW-AEPW	Broken Arrow 81St - Broken Arrow 101St Nth 138kV	235	Riverside Station Auto 138/345kV Transformer	0	Rebuild 2.05 miles of 795 ACSR with 1590 ACSR	\$ 1,100,000
08SP	AEPW-AEPW	Broken Arrow Nth - Nth Tap - Oneta 138kV	235	Broken Arrow 101St North - Oneta 138kV	0	Solution Undetermined	Not Available
08SP	AEPW-AEPW	Broken Arrow Nth - Sth Tap - Lynn Lane Tap 138kV	235	Tulsa North - Northeast Station 345kV	0	Rebuild 4.63 miles of 795 ACSR with 1590 ACSR	\$ 2,600,000
08SP	AEPW-AEPW	Broken Arrow North - South Tap - Oneta 138kV	235	Delaware - Northeast Station 345kV	0	Rebuild 4.31 miles of 795 ACSR with 1590 ACSR.	\$ 2,370,500
08SP	SWPA-EES	Bull Shoals - Midway 161kV	162	Ises - Morefield 161kV	0	See Previous	See Previous
08SP	AEPW-AEPW	Carson-Center 138/13.8kV Transformer	33	Carson South - Tulsa Power Station 138kV	0	See Previous	See Previous
08SP	WFEC-WFEC	Carter Jct - Dill Jct 69kV	26	Pine Ridge - Washita 69kV	0	Solution Undetermined	Not Available
08SP	WFEC-WFEC	Carter Jct - Lake Creek 69kV	26	Elk City 138/69kV Transformer	0	Solution Undetermined	Not Available
08SP	SWPA-EES	Carthage - Jasper 69kV	47	Milo - Clark 69kV	0	Third Party Facility	\$ -
08SP	SWPA-EES	Carthage - Reed Springs 69kV	36	Sub 124 - Aurora H.T. - Sub 383 - Monett 161kV	0	See Previous	See Previous
08SP	AEPW-AEPW	Catoosa 138/69kV Transformer	55	Lynn Lane West Tap - Lynn Lane Tap 138kV	0	See Previous	See Previous
08SP	AEPW-AEPW	Chamber Springs - Tontitown 161kV	244	Muskogee - Ft Smith 345kV	0	See Previous	See Previous
08SP	AEPW-AEPW	Chamber Springs 161/345kV Transformer	660	Flint Creek - Grda1 345kV	0	Install 2nd 345/161 kV Auto-transformer	\$ 4,000,000
08SP	WERE-WERE	Circleville - Hoyt Hti Switching Junction 115kV	97	Iatan - St Joe 345kV	0	See Previous	See Previous
08SP	GRRD-GRRD	Claremore 161/69kV Transformer ckt 1	84	Claremore 161/69kV Transformer Ckt 2	0	See Previous	See Previous
08SP	GRRD-GRRD	Claremore 161/69kV Transformer ckt 2	84	Claremore 161/69kV Transformer Ckt 1	0	See Previous	See Previous
08SP	AEPW-WERE	Coffeyville Tap - Dearing 138kV	210	Delaware - Neosho 345kV	0	Replace wave trap to increase rating to conductor rating (2000 A)	\$ 20,000
08SP	WFEC-WFEC	Comanche - Walters 69kV	38	Comanche - Lawton Disposal Tap 69kV	89	Solution Undetermined	Not Available
08SP	WERE-WERE	County Line - Tecumseh Hill 115kV	106	Tecumseh Energy Center - Tecumseh Hill 115kV	0	May be relieved due to Westar Transmission Operating Directive 1203	Not Available
08SP	SWPS-SWPS	Curry County - Roosevelt County 115kV ckt 2	161	Oasis Interchange 115/230kV Transformer Ckt 1	0	Solution Undetermined	Not Available
08SP	AEPW-AEPW	Denver Center 138/13.8kV Transformer	33	Denver Tap - 46Th Street East 138kV	0	See Previous	See Previous
08SP	OKGE-OKGE	Draper Lake 138/345kV Transformer ckt 1	493	Draper Lake 138/345kV Transformer Ckt 2	0	See Previous	See Previous
08SP	OKGE-OKGE	Draper Lake 138/345kV Transformer ckt 2	493	Draper Lake 138/345kV Transformer Ckt 1	0	See Previous	See Previous
08SP	AEPW-AEPW	East Centerton - Gentry Rec 161kV	353	Flint Creek - East Centerton 345kV	0	See Previous	See Previous
08SP	INDN-AECI	Eckles 5 - PITTSV 161kV	163	Clinton - Holden 161kV	99	Solution Undetermined	Not Available
08SP	AEPW-WFEC	Elk City - Elk City 69kV	39	Pine Ridge - Washita 69kV	0	Solution Undetermined	Not Available
08SP	AEPW-AEPW	Elm Springs Rec - Tontitown 161kV	306	Dyess - Tontitown 161kV	0	See Previous	See Previous
08SP	AEPW-AEPW	Flint Creek - Gentry Rec 161kV	353	Flint Creek - East Centerton 345kV	0	See Previous	See Previous
08SP	AEPW-AEPW	Flint Creek - Tontitown 161kV	312	Chamber Springs - Clarksville 345kV	0	See Previous	See Previous
08SP	WFEC-WFEC	Franklin Sw 69/138kV Transformer	70	Canadian Sw 69/138kV Transformer	126	Solution Undetermined	Not Available
08SP	AEPW-AEPW	Fulton - Hope 115kV	174	Fulton 138/115kV Transformer	0	Solution Undetermined	Not Available

Table 1 - continued – SPP facility upgrades identified for the AEPW to WFEC transfer

Study Year	From Area - To Area	Branch Over 100% Rate B	Rate B	Outaged Branch Causing Overload	ATC	Solution	Estimated Cost
08SP	AEPW-EES	Fulton - Patmos 115kV	174	Oec 7 345/18kV Transformer	33	Using 1590MCM ACSR, reconductor 7.1 miles	\$ 2,300,000
08SP	AEPW-AEPW	Fulton 138/115kV Transformer	184	Fulton - Hope 115kV	0	Solution Undetermined	Not Available
08SP	GRRD-GRRD	Kerr - 412Sub 161kV	338	Flint Creek - Grda1 345kV	0	Reconductor 12.5 miles with 1590MCM ACSR.	\$ 1,918,000
08SP	OKGE-WFEC	Knobhill - Mooreland 138kV	59	Cleveland Tap - South 4Th St 69kV	3	Solution Undetermined	Not Available
08SP	WFEC-WFEC	Lindsay Sw - Wallville 69kV	26	Fletcher - Marlow Jct 69kV	0	Solution Undetermined	Not Available
08SP	OKGE-WFEC	Midwest Tap - Franklin Sw 138kV	215	Anadarko - Pocassett 138kV	0	Replace 600A metering CTs with 1200A	\$ 55,000
08SP	SWPA-SWPA	Norfolk 161/69kV Transformer	25	Norfolk - West Plains 161kV	0	Replace Norfolk Transformer by SWPA In-Service Date 6/1/2005	Not Available
08SP	SWPS-SWPS	Northeast Hereford 115/69kV Transformer	84	Hereford Interchange - Deaf Smith Interchange 115kV	0	Solution Undetermined	Not Available
08SP	OKGE-OKGE	Pecan Creek 161/345kV Transformer	369	Muskogee - Ft Smith 345kV	0	Add 2nd 345/161 kV 369MVA transformer.	\$ 3,000,000
08SP	WEPL-WEPL	Phillipsburg - Smith Center 115kV	40	Knoll - Summit 230kV	0	Solution Undetermined	Not Available
08SP	AEPW-AEPW	Rock Hill - Tatum 138kV	209	Longwood - Wilkes 345kV	11	Reconductor 0.81 mi 666MCM to 1272 ACSR - Reconductor other 5.76 mi of 795 ACSR with 1272 ACSR. Reset CTs and relay settings @ Rock Hill	\$ 342,970
08SP	WFEC-WFEC	Russell 69/138kV Transformer	25	Anadarko - Paradise 138kV	0	Solution Undetermined	Not Available
08SP	MIDW-WEPL	Seward 69/115kV Transformer	44	Heizer 115/230kV Transformer	0	See Previous	See Previous
08SP	AEPW-AEPW	South Fayetteville - Farmington Aecc 161kV	313	Chamber Springs - Tontitown 161kV	0	Solution Undetermined	Not Available
08SP	SWPA-SPRM	Springfield - Brookline 161kV	323	Junction - Brookline 161kV	0	See Previous	See Previous
08SP	EMDE-AECI	Sub 446 - Chesapeake - 2MTVRN 69kV	36	Sub 124 - Aurora H.T. - Sub 355 - Aurora West 69kV	0	Solution Undetermined	Not Available
08SP	GRRD-GRRD	Tahlequah 69/161kV Transformer ckt 1	78	Tahlequah 69/161kV Transformer Ckt 2	0	See Previous	See Previous
08SP	GRRD-GRRD	Tahlequah 69/161kV Transformer ckt 2	78	Tahlequah 69/161kV Transformer Ckt 1	0	See Previous	See Previous
08SP	OKGE-OKGE	Tibbens - Beeline 69kV	66	Bluebell 69/138kV Transformer	182	OKGE upgrade scheduled 6/1/2004	Not Available
08SP	OKGE-OKGE	Tinker #4 - Tinker #2 138kV	100	Horseshoe Lake - Midway 138kV	0	See Previous	See Previous
08WP	GRRD-GRRD	Afton 161/69kV Transformer	50	Miami - Afton 161kV	0	See Previous	See Previous
08WP	WFEC-WFEC	Carter Jct - Lake Creek 69kV	26	Elk City 138/69kV Transformer	0	See Previous	See Previous
08WP	AEPW-AEPW	Catoosa 138/69kV Transformer	55	Lynn Lane West Tap - Lynn Lane Tap 138kV	0	See Previous	See Previous
08WP	AEPW-AEPW	Chamber Springs - Tontitown 161kV	275	Chamber Springs - Farmington Aecc 161kV	0	See Previous	See Previous
08WP	WERE-WERE	Circleville - Hoyt Hti Switching Junction 115kV	97	East Manhattan - Concordia 230kV	0	See Previous	See Previous
08WP	WERE-WERE	Circleville - King Hill N.M. Coop 115kV	92	Iatan - St Joe 345kV	0	May be relieved due to Westar Transmission Operating Directive 803	Not Available
08WP	AEPW-WERE	Coffeyville Tap - Dearing 138kV	210	Delaware - Neosho 345kV	189	See Previous	See Previous
08WP	WERE-WERE	El Paso - Gill Energy Center South 138kV	210	Evans Energy Ctr Nth - Evans Energy Ctr Sth 138kV	0	See Previous	See Previous
08WP	WERE-WERE	Mead - Plaza 69kV	72	Evans Energy Ctr Nth - Evans Energy Ctr Sth 138kV	0	Solution Undetermined	Not Available
08WP	SWPA-SWPA	Norfolk 161/69kV Transformer	25	Norfolk - West Plains 161kV	0	See Previous	See Previous
08WP	OKGE-OKGE	Pecan Creek 161/345kV Transformer	369	Muskogee - Ft Smith 345kV	19	See Previous	See Previous
Total (Excludes Costs Not Available)							\$ 39,880,470