



SPP *Southwest Power Pool*

*System Impact Study
SPP-2003-205-1
For Transmission Service
Requested By
Kansas City Power & Light*

From KCPL To WFEC

*For a Reserved Amount Of 50 MW
From 11/1/2003 To 11/1/2004*

SPP Engineering, Tariff Studies

System Impact Study

Kansas City Power & Light has requested a system impact study for long-term Firm Point-to-Point transmission service from KCPL to WFEC for 50 MW. The period of the service requested is from 11/1/2003 to 11/1/2004. The OASIS reservation number is 570797. The principal objective of this study is to identify system constraints on the SPP Regional Tariff System and potential system facility upgrades that may be necessary to provide the requested service.

The KCPL to WFEC request was studied to determine the facility upgrades required based on the actual queue position of the request. Only the higher priority requests in Facility Study mode were considered in developing the study models. The results of the transfer analysis are documented in Table 1. The results given in Table 1 include upgrades that may be assigned to higher priority requests. The results of this study gives the customer an estimated cost of the facility upgrades that may be required in order to accommodate the KCPL to WFEC request.

Six seasonal models were used to study the KCPL to WFEC request for the requested service period with consideration of the elapsed request period. The SPP 2003 Series Cases 2003 Fall Peak, 2003/04 Winter Peak, 2004 April Min (04AP), 2004 Spring Peak (04G), 2004 Summer Peak (04SP), and 2004 Fall Peak (04FA) were used to study the impact of the request on the SPP system during a the requested service period of 11/1/2003 to 11/1/2004. 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 2003 base case series models.

PTI's MUST First Contingency Incremental Transfer Capability (FCITC) DC analysis was used to study the request. The MUST options chosen to conduct the System Impact Study analysis can be found in Appendix A. The MUST option to convert MVA branch ratings to estimated MW ratings was used to partially compensate for reactive loading.

The study results of the KCPL to WFEC transfer show that limiting constraints exist. Due to the limiting constraints identified, the Transmission Service Request cannot be granted. Any solutions, upgrades, and costs 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 and proposed transmission plans that will be identified during the facility study process, and the final results of the full AC analysis. Evaluation of the right to renew for future years was not performed. Renewal rights will be evaluated as part of the facility study. 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 overloads identified for the KCPL to WFEC transfer

Study Case	From Area - To Area	Branch Overload	Rating <MW>	Pre Transfer Loading	%TDF	Outaged Branch Causing Overload	ATC <MW>	Solution	Estimated Cost
03FA	AEPW-AEPW	53824 SHEFFD-4 138 53827 S.S.---4 138 1	140	140	3.1	53769 WEKIWA-4 138 53835 WED-TAP4 138 1	0	Replace Sand Springs switch 1306, 1307, & 1308	\$ 75,000
03FA	WFEC-WFEC	55802 ACME 2 69 55916 FRNKLNS2 69 1	34	39	2.9	55841 CANADNS2 69 55842 CANADNS4 138 1	0	Acme Jct to Acme Sub: Upgrade From 3/0 To 795MCM Current work plan - Complete by 2004 Summer	
03FA	WERE-WERE	57151 AUBURN 3 115 57167 KEENE 3 115 1	68	70	0.5	56852 JEC 6 230 56861 EMANHAT6 230 1	0	May be relieved due to Westar Transmission Operating Directive 900 Outage of the JEC-East Manhattan 230kV Line	
03FA	WERE-WERE	57733 GATZ 2 69 57735 GOLDPLJ2 69 1	32	35	0.2	57736 HALSTED2 69 57744 MUDCRKJ2 69 1	0	May be relieved due to Westar Transmission Operating Directive 1301 Outage of the Halstead to Newton 69 kV line	
03FA	WERE-WERE	57735 GOLDPLJ2 69 57737 HESSTON2 69 1	32	36	0.2	57736 HALSTED2 69 57744 MUDCRKJ2 69 1	0	May be relieved due to Westar Transmission Operating Directive 1301 Outage of the Halstead to Newton 69 kV line	
03FA	AEPW-AEPW	53827 S.S.---4 138 53835 WED-TAP4 138 1	143	143	2.4	53769 WEKIWA-4 138 53824 SHEFFD-4 138 1	7	Replace Sand Springs switches 1314, 1315, & 1316	\$ 75,000
03WP	WFEC-WFEC	55802 ACME 2 69 55916 FRNKLNS2 69 1	34	48	2.9	55841 CANADNS2 69 55842 CANADNS4 138 1	0	Acme Jct to Acme Sub: Upgrade From 3/0 To 795MCM Current work plan - Complete by 2004 Summer	
03WP	WFEC-WFEC	55802 ACME 2 69 56095 WNORMAN2 69 1	38	41	2.9	55841 CANADNS2 69 55842 CANADNS4 138 1	0	Acme Sub > West Norman: Upgrade from 3/0 to 795 ACSR Current work plan - Complete by 2004 Winter	
03WP	WFEC-WFEC	55841 CANADNS2 69 56011 NOBLE 2 69 1	38	38	1.5	56022 PAOLI 2 69 56023 PAOLI 4 138 1	0	Constr new Noble Sub to Canadian Switch - 138kv - Move 12 MW off 69 system Current work plan - Complete by 2004 Winter	
03WP	WFEC-WFEC	55976 LIL AXE2 69 56011 NOBLE 2 69 1	26	28	1.5	56022 PAOLI 2 69 56023 PAOLI 4 138 1	0	Constr new Noble Sub to Canadian Switch - 138kv - Move 12 MW off 69 system Current work plan - Complete by 2004 Winter	
03WP	WFEC-WFEC	56022 PAOLI 2 69 56023 PAOLI 4 138 1	42	48	0.9	55841 CANADNS2 69 56011 NOBLE 2 69 1	0	Constr new Noble Sub to Canadian Switch - 138kv - Move 12 MW off 69 system Current work plan - Complete by 2004 Winter	
03WP	WERE-WERE	57152 CIRCLVL3 115 57165 HTI JCT3 115 1	95	97	0.1	56765 HOYT 7 345 56772 STRANGR7 345 1	0	May be relieved due to Westar Transmission Operating Directive 803 Outage of the Hoyt to Stranger 345 kV line	
03WP	WERE-WERE	57372 PHILIPS3 115 57374 SPHILPJ3 115 1	159	159	2.5	56872 EMCIPHER6 230 56873 SUMMIT 6 230 1	0	Rebuild 0.88 miles and reconductor with 1192.5 ACSR.	\$ 417,200
03WP	WERE-WERE	57374 SPHILPJ3 115 57438 WMCIPHER3 115 1	67	73	1.2	56872 EMCIPHER6 230 56873 SUMMIT 6 230 1	0	Tear down double circuit, build single circuit with 1192.5 ACSR.	\$ 7,800,000
03WP	WERE-WERE	57342 WJCCTY 3 115 57343 WJCCTYE3 115 1	141	140	1.2	56773 SUMMIT 7 345 B166 SUMMIT1X 1 1	15	May be relieved due to Westar Transmission Operating Directive 617 Outage of the Summit 345/230kV Transformer	
03WP	WFEC-WFEC	55802 ACME 2 69 55916 FRNKLNS2 69 1	27	26	1.4	Base Case	41	Acme Jct to Acme Sub: Upgrade From 3/0 To 795MCM Current work plan - Complete by 2004 Summer	
03WP	WERE-WERE	57039 ELPASO 4 138 57046 GILL S 4 138 1	210	245	0.1	57040 EVANS N4 138 57041 EVANS S4 138 1	50	Invalid Contingency	
04AP	WFEC-WFEC	55802 ACME 2 69 55916 FRNKLNS2 69 1	34	41	2.9	55841 CANADNS2 69 55842 CANADNS4 138 1	0	Acme Jct to Acme Sub: Upgrade From 3/0 To 795MCM Current work plan - Complete by 2004 Summer	
04AP	WFEC-WFEC	55802 ACME 2 69 56095 WNORMAN2 69 1	38	38	2.9	55841 CANADNS2 69 55842 CANADNS4 138 1	10	Acme Sub > West Norman: Upgrade from 3/0 to 795 ACSR Current work plan - Complete by 2004 Winter	

Table 1 - continued – SPP facility overloads identified for the KCPL to WFEC transfer

Study Case	From Area - To Area	Branch Overload	Rating <MW>	Pre Transfer Loading	%TDF	Outaged Branch Causing Overload	ATC <MW>	Solution	Estimated Cost
04G	CELE-AEPW	50090 IPAPER 4 138 53461 WALLAKE4 138 1	236	257	1.8	50045 DOLHILL7 345 53454 SW SHV 7 345 1	0	May be relieved due to Dolet Hills Operating Directive	
04G	SWPA-SWPA	52774 EUFAULA4 138 B053 EUFAULA1 1 1	105	106	2.5	52752 GORE 5 161 52790 WELEETK5 161 1	0	Replace Eufaula Transformer	\$2,000,000
04G	WFEC-WFEC	55802 ACME 2 69 55916 FRNKLNS2 69 1	34	38	2.9	55841 CANADNS2 69 55842 CANADNS4 138 1	0	Acme Jct to Acme Sub: Upgrade From 3/0 To 795MCM Current work plan - Complete by 2004 Summer	
04G	WERE-WERE	57151 AUBURN 3 115 57167 KEENE 3 115 1	68	73	0.5	56852 JEC 6 230 56861 EMANHAT6 230 1	0	May be relieved due to Westar Transmission Operating Directive 900 Outage of the JEC-East Manhattan 230kV Line	
04G	WERE-WERE	57167 KEENE 3 115 57339 S ALMA 3 115 1	68	68	0.5	56852 JEC 6 230 56861 EMANHAT6 230 1	0	May be relieved due to Westar Transmission Operating Directive 900 Outage of the JEC-East Manhattan 230kV Line	
04G	WERE-WERE	57216 KERFORD3 115 57259 NW LEAV3 115 1	68	68	0.2	57211 ARNOLD 3 115 57268 STRANGR3 115 1	0	May be relieved due to Westar Transmission Operating Directive 1200 Outage of the Arnold to Stranger Creek 115kV Line	
04G	WERE-WERE	57321 ANZIO 3 115 57328 FT JCT 3 115 1	92	94	0.6	57342 WJCCTY 3 115 57343 WJCCTYE3 115 1	0	May be relieved due to Westar Transmission Operating Directive 1217 Outage of the Fort Junction-West Junction City 115kV Line	
04G	WERE-WERE	57328 FT JCT 3 115 57343 WJCCTYE3 115 1	68	70	0.6	56773 SUMMIT 7 345 B168 SUMMIT1X 1 1	0	May be relieved due to Westar Transmission Operating Directive 617 Outage of the Summit 345/230kV Transformer	
04G	WERE-WERE	57342 WJCCTY 3 115 57343 WJCCTYE3 115 1	141	152	1.2	56773 SUMMIT 7 345 B168 SUMMIT1X 1 1	0	May be relieved due to Westar Transmission Operating Directive 617 Outage of the Summit 345/230kV Transformer	
04G	WERE-WERE	57623 ATHENS 2 69 57631 CC4VERN2 69 1	43	43	0.4	56791 BENTON 7 345 56797 WOLFCRK7 345 1	0	May be relieved due to Westar Transmission Operating Directive 1304 Overload of the Athens to Wolf Creek 69 kV Line	
04G	WERE-WERE	57631 CC4VERN2 69 57636 GREEN 2 69 1	43	45	0.4	56791 BENTON 7 345 56797 WOLFCRK7 345 1	0	May be relieved due to Westar Transmission Operating Directive 1304 Overload of the Athens to Wolf Creek 69 kV Line	
04G	WERE-WERE	57374 SPHILPJ3 115 57438 WMCPHER3 115 1	67	67	1.2	56872 EMCIPHER6 230 56873 SUMMIT 6 230 1	5	See Previous Upgrade Specified for Facility	
04G	WERE-WERE	57039 ELPASO 4 138 57046 GILL S 4 138 1	210	274	0.1	57040 EVANS N4 138 57041 EVANS S4 138 1	50	Invalid Contingency	
04SP	CELE-AEPW	50090 IPAPER 4 138 53461 WALLAKE4 138 1	208	246	1.7	50045 DOLHILL7 345 53454 SW SHV 7 345 1	0	May be relieved due to Dolet Hills Operating Directive	
04SP	AEPW-AEPW	53139 FLINTCR5 161 53170 TONTITN5 161 1	311	408	0.3	53139 FLINTCR5 161 53187 GENTRYR5 161 1	0	Rebuild 16.3 miles of 2-297 ACSR with 2156 ACSR. Replace Flint Creek wavetrap & jumpers. Replace Flint Creek switch # 1K75	\$ 8,200,000
04SP	AEPW-AEPW	53142 HUNTING2 69 53202 MIDLREA2 69 1	36	36	0.3	55262 AES 5 161 55264 TARBY 5 161 1	0	Solution Undetermined	
04SP	AEPW-GRRD	53802 CATOOSA4 138 54438 CATSAGR5 161 1	150	159	1.9	53802 CATOOSA4 138 54438 CATSAGR5 161 2	0	GRDA has mitigation plan for outage of Catoosa 161/138kV Xfr Ckts 1 or 2	
04SP	AEPW-GRRD	53802 CATOOSA4 138 54438 CATSAGR5 161 2	150	160	1.9	53802 CATOOSA4 138 54438 CATSAGR5 161 1	0	GRDA has mitigation plan for outage of Catoosa 161/138kV Xfr Ckts 1 or 2	
04SP	AEPW-AEPW	53849 TERNITP4 138 53869 VERDIGS4 138 1	149	155	0.8	53857 OWASSOS4 138 53945 N.E.S.-4 138 1	0	Solution Undetermined	
04SP	AEPW-AEPW	54023 OKMULGE4 138 54049 EC.HEN-4 138 1	105	115	3.3	54023 OKMULGE4 138 54057 KELCO 4 138 1	0	Replace Okmulgee Wavetrap	\$ 40,000
04SP	AEPW-AEPW	54028 WELETK4 138 54049 EC.HEN-4 138 1	105	110	3.3	54023 OKMULGE4 138 54057 KELCO 4 138 1	0	Replace Weleetka Wavetrap	\$ 40,000
04SP	GRRD-GRRD	54427 COLINS 5 161 54476 COLNSGR2 69 1	50	52	0.3	54427 COLINS 5 161 54476 COLNSGR2 69 2	0	Solution Undetermined	
04SP	GRRD-GRRD	54447 TAHLQH 2 69 54455 TAHLQH 5 161 2	77	78	0.1	54447 TAHLQH 2 69 54455 TAHLQH 5 161 1	0	Add 3rd 161/69 KV Transformer	\$ 1,400,000

Table 1 - continued – SPP facility overloads identified for the KCPL to WFEC transfer

Study Case	From Area - To Area	Branch Overload	Rating <MW>	Pre Transfer Loading	%TDF	Outaged Branch Causing Overload	ATC <MW>	Solution	Estimated Cost
04SP	OKGE-OKGE	54933 DRAPER 4 138 54934 DRAPER 7 345 1	490	493	7.7	54933 DRAPER 4 138 54934 DRAPER 7 345 2	0	Add third 345 - 138 kV transformer at Draper in 2008 at OKGE expense and use the operating directive until 2008.	
04SP	OKGE-OKGE	54933 DRAPER 4 138 54934 DRAPER 7 345 2	490	493	7.7	54933 DRAPER 4 138 54934 DRAPER 7 345 1	0	Add third 345 - 138 kV transformer at Draper in 2008 at OKGE expense and use the operating directive until 2008.	
04SP	OKGE-WFEC	54946 MIDWEST4 138 55917 FRNKLS4 138 1	186	204	15.8	56026 PHAROAH4 138 56084 WETUMKA4 138 1	0	Replace 800 amp wavetrapp with 2000 amp wavetrapp at Franklin Switch and 795ACSR jumpers with 1590ACSR, connectors	\$ 24,000
04SP	OKGE-OKGE	55177 PARKLN 2 69 55187 AHLOSTP2 69 1	72	77	0.3	55177 PARKLN 2 69 55182 VALLYVU2 69 1	0	Solution Undetermined	
04SP	OKGE-OKGE	55237 TIBBENS2 69 55246 BEELINE2 69 1	66	71	0.6	55241 BLUEBEL2 69 55242 BLUEBEL4 138 1	0	Construct new Tibbens Road 138/12.5kV Substation by OKGE in 2008	
04SP	OKGE-OKGE	55300 FTSMITH5 161 55305 FTSMITH8 500 1	475	477	2.0	55300 FTSMITH5 161 55302 FTSMITH7 345 1	0	Convert Ft. Smith 161kv to 1-1/2 breaker design and install 2nd 500-161kV transformer bank.	\$ 7,000,000
04SP	WFEC-WFEC	55802 ACME 2 69 56095 WNORMAN2 69 1	38	48	3.1	55841 CANADNS2 69 55842 CANADNS4 138 1	0	Acme Sub > West Norman: Upgrade from 3/0 to 795 ACSR Current work plan - Complete by 2004 Winter	
04SP	WFEC-WFEC	56022 PAOLI 2 69 56023 PAOLI 4 138 1	42	42	0.9	55841 CANADNS2 69 56011 NOBLE 2 69 1	0	Constr new Noble Sub to Canadian Switch - 138kv - Move 12 MW off 69 system Current work plan - Complete by 2004 Winter	
04SP	WERE-WERE	56851 AUBURN 6 230 B016 AUBRN77X 1 1	304	306	0.3	56765 HOYT 7 345 B089 HOYT 44X 1 1	0	May be relieved due to Westar Transmission Operating Directive 623 Outage of the Hoyt 345-115kV Transformer	
04SP	WERE-WERE	57151 AUBURN 3 115 57167 KEENE 3 115 1	68	71	0.4	56852 JEC 6 230 56861 EMANHAT6 230 1	0	May be relieved due to Westar Transmission Operating Directive 900 Outage of the JEC-East Manhattan 230kV Line	
04SP	WERE-WERE	57244 JARBALO3 115 57259 NW LEAV3 115 1	125	130	0.1	57242 HALLMRK3 115 57244 JARBALO3 115 1	0	May be relieved due to Westar Transmission Operating Directive 1216 Outage of the Jarbalo to Hallmark 115kV Line Section	
04SP	WERE-WERE	57301 EAST ST3 115 57309 WEMPOR3 115 1	91	94	0.2	57305 MORRIS 3 115 57309 WEMPOR3 115 1	0	May be relieved due to Westar Transmission Operating Directive 1209 Outage of the Morris-West Emporia 115kV Line	
04SP	WERE-WERE	57412 ARKVALJ3 115 57413 CIRCLE 3 115 1	68	80	0.2	57413 CIRCLE 3 115 57419 HEC 3 115 1	0	May be relieved due to Westar Transmission Operating Directive 1204 Outage of the Circle to Hutchinson Energy Center (HEC) GT 115 kV Line	
04SP	WERE-WERE	57412 ARKVALJ3 115 57435 3 VANBU3 115 1	68	75	0.2	57413 CIRCLE 3 115 57419 HEC 3 115 1	0	May be relieved due to Westar Transmission Operating Directive 1204 Outage of the Circle to Hutchinson Energy Center (HEC) GT 115 kV Line	
04SP	WERE-WERE	57588 CHASE 2 69 57605 WHITE J2 69 1	43	50	0.5	56991 WEAVER 4 138 B183 WEAVER2X 1 1	0	May be relieved due to Westar Transmission Operating Directive 634 Outage of the Weaver 138-69kV Transformer	
04SP	WERE-WERE	57604 WEAVER 2 69 57837 RH JCT 2 69 1	43	44	1.2	57039 ELPASO 4 138 57042 FARBER 4 138 1	0	Move Rose Hill Jct. 69 kV load to Rose Hill 345/138 kV substation. Requires new transformer bay and a new 25 MVA 138-12 kV transformer.	\$ 1,400,000
04SP	WERE-WERE	57786 CHISLM2 69 57832 RIPLEYM2 69 1	128	141	0.1	57040 EVANS N4 138 57065 SG12COL4 138 1	0	May be relieved due to Westar Transmission Operating Directive 1105 Outage of the Moundridge to Halstead 138 kV line, Gordon Evans to Halstead 138 kV line or loss of the Halstead 138 kV bus.	

Table 1 - continued – SPP facility overloads identified for the KCPL to WFEC transfer

Study Case	From Area - To Area	Branch Overload	Rating <MW>	Pre Transfer Loading	%TDF	Outaged Branch Causing Overload	ATC <MW>	Solution	Estimated Cost
04SP	WERE-WERE	57796 GILL W 2 69 B059 GEC3 GSU 1 1	136	174	0.2	57046 GILL S 4 138 B060 GILL 5X 1 1	0	May be relieved due to Westar Transmission Operating Directive 606 Outage of the Murray Gill #5 138/69kV Transformer or the Murray Gill Bus Tie breaker 138-24	
04SP	WFEC-WFEC	55802 ACME 2 69 56095 WNORMAN2 69 1	38	37	2.7	55924 GOLDSBY2 69 56018 OU SW 2 69 1	36	Acme Sub > West Norman: Upgrade from 3/0 to 795 ACSR Current work plan - Complete by 2004 Winter	
04SP	WERE-WERE	57182 TECHILE3 115 57187 27CROCO3 115 1	67	70	0.1	57182 TECHILE3 115 57187 27CROCO3 115 2	50	Invalid Contingency	
04FA	CELE-AEPW	50090 IPAPER 4 138 53461 WALLAKE4 138 1	235	269	1.6	50045 DOLHILL7 345 53454 SW SHV 7 345 1	0	May be relieved due to Dolet Hills Operating Directive	
04FA	WERE-WERE	57151 AUBURN 3 115 57167 KEENE 3 115 1	68	76	0.5	56852 JEC 6 230 56861 EMANHAT6 230 1	0	May be relieved due to Westar Transmission Operating Directive 900 Outage of the JEC-East Manhattan 230kV Line	
04FA	WERE-WERE	57152 CIRCLVL3 115 57165 HTI JCT3 115 1	95	97	0.1	56765 HOYT 7 345 56772 STRANGR7 345 1	0	May be relieved due to Westar Transmission Operating Directive 803 Outage of the Hoyt to Stranger 345 kV line	
04FA	WERE-WERE	57167 KEENE 3 115 57339 S ALMA 3 115 1	68	72	0.5	56852 JEC 6 230 56861 EMANHAT6 230 1	0	May be relieved due to Westar Transmission Operating Directive 900 Outage of the JEC-East Manhattan 230kV Line	
04FA	WERE-WERE	57301 EAST ST3 115 57309 WEMPORI3 115 1	92	97	0.7	57305 MORRIS 3 115 57309 WEMPORI3 115 1	0	May be relieved due to Westar Transmission Operating Directive 1209 Outage of the Morris-West Emporia 115kV Line	
04FA	WERE-WERE	57321 ANZIO 3 115 57328 FT JCT 3 115 1	92	100	0.6	57342 WJCCTY 3 115 57343 WJCCTYE3 115 1	0	May be relieved due to Westar Transmission Operating Directive 1217 Outage of the Fort Junction-West Junction City 115kV Line	
04FA	WERE-WERE	57328 FT JCT 3 115 57335 MCDOWEL3 115 1	68	70	0.4	56766 JEC N 7 345 56773 SUMMIT 7 345 1	0	May be relieved due to Westar Transmission Operating Directive 402 Outage of the Jeffrey Energy Center to Summit 345 kV Line	
04FA	WERE-WERE	57328 FT JCT 3 115 57343 WJCCTYE3 115 1	68	75	0.6	56773 SUMMIT 7 345 B168 SUMMIT1X 1 1	0	May be relieved due to Westar Transmission Operating Directive 617 Outage of the Summit 345/230kV Transformer	
04FA	WERE-WERE	57342 WJCCTY 3 115 57343 WJCCTYE3 115 1	141	163	1.2	56773 SUMMIT 7 345 B168 SUMMIT1X 1 1	0	May be relieved due to Westar Transmission Operating Directive 617 Outage of the Summit 345/230kV Transformer	
04FA	WERE-WERE	57368 EXIDE J3 115 57372 PHILIPS3 115 1	196	198	1.4	56872 EMCIPHER6 230 56873 SUMMIT 6 230 1	0	Rebuild and reconductor 0.34 miles with 1192 ACSR.	\$ 95,200
04FA	WERE-WERE	57368 EXIDE J3 115 57381 SUMMIT 3 115 1	196	209	1.4	56872 EMCIPHER6 230 56873 SUMMIT 6 230 1	0	Rebuild and reconductor 4.94 miles with 1192 ACSR.	\$ 1,100,000
04FA	WERE-WERE	57372 PHILIPS3 115 57374 SPHILPJ3 115 1	156	180	2.6	56872 EMCIPHER6 230 56873 SUMMIT 6 230 1	0	See Previous Upgrade Specified for Facility	
04FA	WERE-WERE	57374 SPHILPJ3 115 57438 WMCPHER3 115 1	66	83	1.2	56872 EMCIPHER6 230 56873 SUMMIT 6 230 1	0	See Previous Upgrade Specified for Facility	
04FA	WERE-WERE	57374 SPHILPJ3 115 57438 WMCPHER3 115 2	90	97	1.4	56872 EMCIPHER6 230 56873 SUMMIT 6 230 1	0	See Previous Upgrade Specified for Facility	
04FA	AEPW-AEPW	53824 SHEFFD-4 138 53827 S.S.---4 138 1	139	139	3.1	53769 WEKIWA-4 138 53835 WED-TAP4 138 1	8	See Previous Upgrade Specified for Facility	
04FA	WERE-WERE	57039 ELPASO 4 138 57046 GILL S 4 138 1	210	271	0.2	57040 EVANS N4 138 57041 EVANS S4 138 1	50	Invalid Contingency	
04FA	WERE-WERE	57786 CHISHLM2 69 57832 RIPLEYM2 69 1	128	133	0.1	57040 EVANS N4 138 57041 EVANS S4 138 1	50	Invalid Contingency	
Total Estimated Cost									\$ 29,666,400

Appendix A

MUST CHOICES IN RUNNING FCITC DC ANALYSIS

CONSTRAINTS/CONTINGENCY INPUT OPTIONS

1. AC Mismatch Tolerance – 2 MW
2. Base Case Rating – Rate A
3. Base Case % of Rating – 100%
4. Contingency Case Rating – Rate B
5. Contingency Case % of Rating – 100%
6. Base Case Load Flow – PSS/E
7. Convert branch ratings to estimated MW ratings – Yes
8. Contingency ID Reporting – Labels
9. Maximum number of contingencies to process - 50000

MUST CALCULATION OPTIONS

1. Phase Shifters Model for DC Linear Analysis – Constant flow for Base Case and Contingencies
2. Report Base Case Violations with FCITC – Yes
3. Maximum number of violations to report in FCITC table - 50000
4. Distribution Factor (OTDF and PTDF) Cutoff – 0.0
5. Maximum times to report the same elements - 10
6. Apply Distribution Factor to Contingency Analysis – Yes
7. Apply Distribution Factor to FCITC Reports – Yes
8. Minimum Contingency Case flow change – 1 MW
9. Minimum Contingency Case Distribution Factor change – 0.0
10. Minimum Distribution Factor for Transfer Sensitivity Analysis – 0.0