SPP Southwest Power Pool

System Impact Study SPP-2003-187-1 For Transmission Service Requested By Reliant Energy Services, Inc.

From AEPW To ERCOTE

For a Redirected Amount Of 44MW From 6/1/2004 To 6/1/2005

SPP Engineering, Tariff Studies

System Impact Study

Reliant Energy Services, Inc. has requested a system impact study for long-term Firm Point-to-Point transmission service from AEPW to ERCOTE for 44 MW. The period of the service requested is from 6/1/2004 to 6/1/2005. The OASIS reservation number is 545822. This is a request to redirect the previously confirmed OASIS reservation 515925. Oasis Reservation 515925 is a 44 MW transfer from CLEC to ERCOTE. 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 AEPW to ERCOTE 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 AEPW to ERCOTE request for redirected service.

Three seasonal models were used to study the AEPW to ERCOTE request for the requested service period. The SPP 2003 Series Cases 2004 Summer Peak (04SP), 2004 Fall Peak (04FA), and 2004/05 Winter Peak (04WP) were used to study the impact of the request on the SPP system during the requested service period of 6/1/2004 to 6/1/2005. 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 AEPW to ERCOTE 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 AEPW to ERCOTE transfer as a redirect of CLEC to ERCOTE service

Study Case	From Area - To Area	Branch Overload	Rating <MW>	Pre Transfer Loading	AEPW to ERCOTE %TDF	CLEC to ERCOTE %TDF	Outaged Branch Causing Overload	ATC <MW>	Solution	Estimated Cost
04SP	AEPW-AEPW	53133 ECNTRTN5 161 53187 GENTRYR5 161 1	353	371	0.637	N/A	53139 FLINTCR5 161 53170 TONTITN5 161 1	0	Rebuild 19.16 miles of 2-397.5 ACSR with 2156 ACSR. Replace East Centerton Wavetrap & jumpers	$ 8,000,000
04SP	AEPW-AEPW	53139 FLINTCR5 161 53170 TONTITN5 161 1	311	349	0.782	N/A	53155 CHAMSPR7 345 53756 CLARKSV7 345 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	53154 CHAMSPR5 161 53170 TONTITN5 161 1	247	315	2.338	N/A	53154 CHAMSPR5 161 53195 FARMGTN5 161 1	0	Rebuild 12 miles with 2156MCM ACSR. Replace Chamber Springs wavetrap & reset relays.	$ 7,200,000
04SP	AEPW-AEPW	54023 OKMULGE4 138 54049 EC.HEN-4 138 1	104	129	4.212	0.942	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	104	124	4.212	0.942	54023 OKMULGE4 138 54057 KELCO 4 138 1	0	Replace Weleetka Wavetrap	$ 40,000
04SP	GRRD-GRRD	54447 TAHLQH 2 69 54455 TAHLQH 5 161 2	78	79	0.122	0.016	54447 TAHLQH 2 69 54455 TAHLQH 5 161 1	0	Add 3rd 161/69 KV Transformer	$ 1,400,000
04SP	OKGE-OKGE	54941 HSL 4 138 54973 RENO 4 138 1	287	302	0.547	0.119	54941 HSL 4 138 54966 MIDWAY 4 138 1	0	Replace switches & ct's at Horseshoe Lake in 2004 at OKGE expense.	
04SP	OKGE-WFEC	54946 MIDWEST4 138 55917 FRNKLNS4 138 1	187	209	0.442	0.117	56026 PHAROAH4 138 56084 WETUMKA4 138 1	0	Replace 800 amp wavetrap with 2000 amp wavetrap at Franklin Switch and 795ACSR jumpers with 1590ACSR, connectors	$ 24,000
04SP	OKGE-OKGE	55177 PARKLN 2 69 55187 AHLOSTP2 69 1	72	81	0.439	0.191	55177 PARKLN 2 69 55182 VALLYVU2 69 1	0	Solution Undetermined	
04SP	OKGE-OKGE	55221 MUSKOGE2 69 55222 MUSKOGE5 161 1	41	42	0.112	N/A	55221 MUSKOGE2 69 55222 MUSKOGE5 161 3	0	Replace the existing 2- 41MVA 161/69 kV transformers with 1-100MVA in approximately 2005 at OKGE expense.	
04SP	OKGE-OKGE	55221 MUSKOGE2 69 55222 MUSKOGE5 161 2	41	43	0.116	N/A	55221 MUSKOGE2 69 55222 MUSKOGE5 161 3	0	Replace the existing 2- 41MVA 161/69 kV transformers with 1-100MVA in approximately 2005 at OKGE expense.	
04SP	OKGE-OKGE	55237 TIBBENS2 69 55246 BEELINE2 69 1	66	70	0.435	0.110	55241 BLUEBEL2 69 55242 BLUEBEL4 138 1	0	Possible Expediting of OKGE Planned Upgrade	
04SP	WFEC-WFEC	55802 ACME 2 69 56095 WNORMAN2 69 1	38	49	0.112	0.034	55841 CANADNS2 69 55842 CANADNS4 138 1	0	Acme Sub > West Norman: Upgrade from 3/0 to 795 ACSR	$ 525,000
04SP	WERE-WERE	56851 AUBURN 6 230 *B016 AUBRN77X 1 1	304	304	0.077	N/A	56852 JEC 6 230 56861 EMANHAT6 230 1	0	May be relieved due to WERE Operating Guide 900 - Outage of East Manhattan - Jeffrey Energy Center 230kV Line	
04SP	WERE-WERE	56853 LAWHILL6 230 *B101 LAWHL29X 1 1	298	329	0.146	N/A	56853 LAWHILL6 230 56855 MIDLAND6 230 1	0	May be relieved due to WERE Operating Guide 901 - Outage of Lawrence Hill - Midland Junction 230kV Line	
04SP	OKGE-OKGE	54852 SLVRLAK4 138 54854 PANTHER4 138 1	286	311	0.554	0.293	54873 LONEOAK4 138 54879 NORTWST4 138 1	50	Upgrade completed by OKGE. Rate A/B = 478/478MVA	
04FA	WERE-WERE	57039 ELPASO 4 138 57046 GILL S 4 138 1	210	265	0.167	N/A	57040 EVANS N4 138 57041 EVANS S4 138 1	0	Solution Undetermined	
04FA	WERE-WERE	57152 CIRCLVL3 115 57165 HTI JCT3 115 1	95	108	0.183	N/A	56765 HOYT 7 345 56772 STRANGR7 345 1	0	May be relieved due to WERE Operating Guide 803 - Outage of Hoyt - Stranger 345kV Line	
04FA	WERE-WERE	57152 CIRCLVL3 115 57331 KING HL3 115 1	90	96	0.183	N/A	56765 HOYT 7 345 56772 STRANGR7 345 1	0	May be relieved due to WERE Operating Guide 803 - Outage of Hoyt - Stranger 345kV Line	
04FA	WERE-WERE	57217 KELLY 3 115 57331 KING HL3 115 1	89	91	0.183	N/A	56765 HOYT 7 345 56772 STRANGR7 345 1	0	May be relieved due to WERE Operating Guide 803 - Outage of Hoyt - Stranger 345kV Line	
04FA	SWPA-AEPW	52814 BRKN BW4 138 54015 CRAIGJT4 138 1	107	105	3.882	N/A	54015 CRAIGJT4 138 56004 MTRIVER4 138 1	38	Rebuild 7.66 miles of 3/0 CW CU with 795 ACSR	$ 2,700,000

Table 1 - continued – SPP facility overloads identified for the AEPW to ERCOTE transfer as a redirect of CLEC to ERCOTE service

Study Case	From Area - To Area	Branch Overload	Rating <MW>	Pre Transfer Loading	AEPW to ERCOTE %TDF	CLEC to ERCOTE %TDF	Outaged Branch Causing Overload	ATC <MW>	Solution	Estimated Cost
04FA	OKGE-OKGE	54852 SLVRLAK4 138 54854 PANTHER4 138 1	286	319	0.498	0.286	54873 LONEOAK4 138 54879 NORTWST4 138 1	50	Upgrade completed by OKGE. Rate A/B = 478/478MVA	
04WP	AEPW-AEPW	54023 OKMULGE4 138 54049 EC.HEN-4 138 1	105	117	4.209	0.916	54023 OKMULGE4 138 54057 KELCO 4 138 1	0	See Previous Upgrade Specified for Facility	
04WP	AEPW-AEPW	54028 WELETK4 138 54049 EC.HEN-4 138 1	104	111	4.209	0.916	54023 OKMULGE4 138 54057 KELCO 4 138 1	0	See Previous Upgrade Specified for Facility	
04WP	WFEC-WFEC	55976 LIL AXE2 69 56011 NOBLE 2 69 1	26	28	0.082	0.029	56022 PAOLI 2 69 56023 PAOLI 4 138 1	0	Solution Undetermined	
04WP	WERE-WERE	57039 ELPASO 4 138 57046 GILL S 4 138 1	210	245	0.187	N/A	57040 EVANS N4 138 57041 EVANS S4 138 1	0	Solution Undetermined	
04WP	WERE-WERE	57152 CIRCLVL3 115 57165 HTI JCT3 115 1	95	103	0.258	N/A	57982 IATAN 7 345 59199 ST JOE 3 345 1	0	Rebuild 15.50-mile line (1192.5 kcmil 45/7 ACSR, 223 MVA, 245 MVA), Replace CTs and Wave Trap (2000 A.)	$ 5,800,000
04WP	WERE-WERE	57152 CIRCLVL3 115 57331 KING HL3 115 1	90	92	0.258	N/A	57982 IATAN 7 345 59199 ST JOE 3 345 1	0	Rebuild 15.15 mile line with 1192.5 kcmil ACSR.	$ 3,200,000
04WP	WERE-WERE	57217 KELLY 3 115 57331 KING HL3 115 1	89	101	0.209	N/A	56765 HOYT 7 345 56772 STRANGR7 345 1	0	May be relieved due to WERE Operating Guide 803 - Outage of Hoyt - Stranger 345kV Line	
04WP	OKGE-OKGE	54852 SLVRLAK4 138 54854 PANTHER4 138 1	286	310	0.552	0.287	54873 LONEOAK4 138 54879 NORTWST4 138 1	50	Upgrade completed by OKGE. Rate A/B = 478/478MVA	
									Total Estimated Cost	$ 37,129,000

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