



SPP *Southwest
Power Pool*

*Preliminary
System Impact Study
SPP-2004-101-1P
For The Designation of a New
Network Resource
Requested By
American Electric Power*

From AEPW to AEPW

*For a Reserved Amount Of 107 MW
From 10/1/2004
To 10/1/2005*

SPP Engineering, Tariff Studies

System Impact Study

American Electric Power has requested a system impact study to designate a New Network Resource in the AEPW Control Area for 107 MW to serve Network Load in the AEPW Control Area. The period of the service requested is from 10/1/2004 to 10/1/2005. The AEPW OASIS reservation number is 669575. 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.

This study was performed for the AEPW to AEPW request in order to provide preliminary results identifying facility upgrades that may be required for the requested service. The preliminary study is performed with only confirmed reservations included in the models. The models do not include any reservations, even those with a higher priority, that are still in study mode. The results of the transfer analyses are documented in Tables 1, 2, and 3 of the report. Table 1 summarizes the results of the Scenario 1 system impact analysis. Table 2 summarizes the results of the Scenario 2 system impact analysis. Table 3 summarizes the results of the Scenario 3 system impact analysis. The results given in Tables 1, 2, and 3 include upgrades that may be assigned to higher priority requests. If a facility identified for the AEPW to AEPW study is also identified for a study with higher priority, the facility will be assigned to the request with the highest priority. If the higher priority customer does not take service, the facility would then be assigned to the AEPW to AEPW request. The primary purpose of this preliminary study is to provide the customer with an estimated cost of the facility upgrades that may be required in order to accommodate the requested service. The preliminary study is performed by monitoring each facility at 90% of its rating. This is done to provide an estimate of possible overloads that may be assigned to the customer if requests with higher priority are accepted.

Six seasonal models were used to study the AEPW to AEPW request for the requested service period. The SPP 2004 Series Cases Update 2, 2004 Fall Peak (04FA), 2004/05 Winter Peak (04WP), 2005 April Minimum (05AP), 2005 Spring Peak (05G), 2005 Summer Peak (05SP), and 2005 Summer Shoulder (05SH) were used to study the impact of the request on the SPP system during the requested service period of 10/1/2004 to 10/1/2005. 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 2004 base case series models. From the six seasonal models, three system scenarios were developed. Scenario 1 includes confirmed West to East transfers not already included in the January 2004 base case series models, SPS Exporting, and the Lamar HVDC Tie flowing from SPS to Lamar, and ERCOT exporting. Scenario 2 includes confirmed East to West transfers not already included in the January 2004 base case series models, SPS Importing, and the Lamar HVDC Tie flowing from Lamar to SPS, and ERCOT importing. Scenario 3 includes confirmed West to East transfers not already included in the January 2004 base case series models, SPS Importing, and the Lamar HVDC Tie flowing from Lamar to SPS, and ERCOT importing.

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.

These study results are preliminary estimates only and are not intended for use in final determination of the granting of service. 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. Any solutions, upgrades, and costs provided in the preliminary 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.

SPP will also review the possibility of curtailment of previously confirmed service and/or the redispatch of units as an option for relieving the additional impacts on the SPP facilities caused by the AEPW to AEPW request. It is the responsibility of the customer to reach an agreement with the applicable party concerning the curtailment of confirmed service and the redispatch of units. The curtailment and redispatch requirements would be called upon prior to implementing NERC TLR Level 5a. These options 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, cost assignments and available redispatch and curtailment options will be determined upon the completion of the facility study.

Table 1 – SPP facility overloads identified for the AEPW to AEPW transfer using Scenario 1

Study Case	From Area - To Area	Branch Overload	Rating <MW>	BC % Loading	TC % Loading	%TDF	Outaged Branch Causing Overload	ATC <MW>	Solution	Estimated Cost
04FA	WFEC-WFEC	55846 CARTERJ2 69 55876 DILL JT2 69 1	24	84.7	102.7	4.0760	56001 MORWODS4 138 54121 ELKCTY-4 138 1	91	Current WFEC Work Plan to Reconductor from 4/0 to 795 - Complete by 2004 Winter	
04FA	OKGE-OKGE	54861 MUSTANG4 138 54896 MORGAN 4 138 1	284	88.0	92.0	10.6750	54863 HAYMAKR4 138 54898 CIMARON4 138 1	107	OKGE Project to Increase CTR at Mustang sub at OGE's expense. Estimated In-Service Date 6/1/2005.	
04FA	OKGE-OKGE	54894 CZECHAL4 138 54898 CIMARON4 138 1	378	89.2	91.5	8.1100	54902 MCCLAIN4 138 54929 PLVALLY4 138 1	107	Change sw. to 2000A at czech hall. Increase trap an CTR to 2000A at cimaron sub. May require changing relays.	\$ 150,000
04WP	OKGE-OKGE	54861 MUSTANG4 138 54896 MORGAN 4 138 1	284	93.9	97.0	8.2750	54902 MCCLAIN4 138 54929 PLVALLY4 138 1	107	See Previous Upgrade Specified For Facility	
04WP	WFEC-AEPW	55897 ELKCITY2 69 54122 ELKCTY-2 69 1	38	84.6	96.8	4.3590	54096 HINTON 4 138 54821 JENSEN 4 138 1	107	Elk(AEPW)>Elk WFEC: Upgrade 4/0 to 795 ACSR	\$ 414,000
04WP	WFEC-WFEC	55846 CARTERJ2 69 55876 DILL JT2 69 1	24	77.1	96.6	4.3590	54096 HINTON 4 138 54821 JENSEN 4 138 1	107	Current WFEC Work Plan to Reconductor from 4/0 to 795 - Complete by 2004 Winter	
05AP	WFEC-AEPW	55897 ELKCITY2 69 54122 ELKCTY-2 69 1	38	88.5	100.1	4.0840	56001 MORWODS4 138 54121 ELKCTY-4 138 1	106	See Previous Upgrade Specified For Facility	
05AP	WFEC-WFEC	55846 CARTERJ2 69 55876 DILL JT2 69 1	24	70.9	90.9	4.3940	54152 WTH_JCT4 138 54160 WTH_SE 4 138 1	107	Current WFEC Work Plan to Reconductor from 4/0 to 795 - Complete by 2004 Winter	
05G	WFEC-WFEC	55846 CARTERJ2 69 55876 DILL JT2 69 1	24	96.9	115.4	4.0750	56001 MORWODS4 138 54121 ELKCTY-4 138 1	18	Current WFEC Work Plan to Reconductor from 4/0 to 795 - Complete by 2004 Winter	
05G	WFEC-AEPW	55897 ELKCITY2 69 54122 ELKCTY-2 69 1	38	82.4	94.0	4.0750	56001 MORWODS4 138 54121 ELKCTY-4 138 1	107	See Previous Upgrade Specified For Facility	
05SP	WFEC-OKGE	55917 FRNKLNS4 138 54946 MIDWEST4 138 1	184	105.4	109.1	6.3990	55814 ANADARK4 138 56031 POCASET4 138 1	0	Replace 800 amp wavetrap with 2000 amp wavetrap at Franklin Switch and 795ACSR jumpers with 1590ACSR connectors	\$ 24,000
05SP	OKGE-OKGE	55235 PECANCK7 345 *B423 PECANCK1 1 1	362	91.5	92.7	3.9830	55224 MUSKOGEE7 345 55302 FTSMITH7 345 1	107	Add 2nd 345/161 kV 369MVA transformer.	\$ 3,000,000
05SP	OKGE-OKGE	55009 MCELROY4 138 55011 STILWTR4 138 1	219	90.8	92.4	3.1590	54880 NORTWST7 345 54881 SPRNGCK7 345 1	107	Solution Undetermined	TBD
05SP	OKGE-OKGE	55234 PECANCK5 161 *B423 PECANCK1 1 1	365	90.7	91.9	3.9830	55224 MUSKOGEE7 345 55302 FTSMITH7 345 1	107	See Previous Upgrade Specified For Facility	
05SP	WFEC-AEPW	55897 ELKCITY2 69 54122 ELKCTY-2 69 1	39	88.1	100.6	4.5280	54096 HINTON 4 138 54821 JENSEN 4 138 1	102	See Previous Upgrade Specified For Facility	
05SH	OKGE-OKGE	54861 MUSTANG4 138 54896 MORGAN 4 138 1	284	97.9	101.1	8.4420	54902 MCCLAIN4 138 54929 PLVALLY4 138 1	70	See Previous Upgrade Specified For Facility	
05SH	WFEC-AEPW	55897 ELKCITY2 69 54122 ELKCTY-2 69 1	38	80.7	93.2	4.4760	54096 HINTON 4 138 54821 JENSEN 4 138 1	107	See Previous Upgrade Specified For Facility	
									This cost may be significantly higher due to additional facilities whose solutions will be determined during the Facility Study process	\$*
									Total Cost with Facilities Monitored @ 90% Loading	\$ 3,588,000
									Total Cost with Facilities Monitored @ 100% Loading	\$ 438,000

Table 2 – SPP facility overloads identified for the AEPW to AEPW transfer using Scenario 2

Study Case	From Area - To Area	Branch Overload	Rating <MW>	BC % Loading	TC % Loading	%TDF	Outaged Branch Causing Overload	ATC <MW>	Solution	Estimated Cost
04FA	OKGE-OKGE	54861 MUSTANG4 138 54896 MORGAN 4 138 1	284	96.5	99.5	8.1100	54902 MCCLAIN4 138 54929 PLVALLY4 138 1	107	See Previous Upgrade Specified For Facility in Table 1	
04FA	GRRD-AEPW	54438 CATSAGR5 161 53802 CATOOSA4 138 2	149	90.4	93.5	4.3900	54438 CATSAGR5 161 53802 CATOOSA4 138 1	107	None - GRDA Mitigation Plan	
04FA	GRRD-AEPW	54438 CATSAGR5 161 53802 CATOOSA4 138 1	149	90.1	93.3	4.3770	54438 CATSAGR5 161 53802 CATOOSA4 138 2	107	None - GRDA Mitigation Plan	
04WP		NONE IDENTIFIED						107		
05AP		NONE IDENTIFIED						107		
05G		NONE IDENTIFIED						107		
05SP	WFEC-OKGE	55917 FRNKLNS4 138 54946 MIDWEST4 138 1	185	88.8	92.5	6.3990	56059 SUNSHIN4 138 56072 TUTTLE 4 138 1	107	See Previous Upgrade Specified For Facility in Table 1	
05SP	AEPW-AEPW	54023 OKMULGE4 138 54049 EC.HEN-4 138 1	104	71.1	91.1	19.4020	54023 OKMULGE4 138 54057 KELCO 4 138 1	107	Replace Okmulgee Wavetrap	\$ 40,000
05SH	GRRD-AEPW	54438 CATSAGR5 161 53802 CATOOSA4 138 1	148	97.4	100.2	3.9230	54438 CATSAGR5 161 53802 CATOOSA4 138 2	99	None - GRDA Mitigation Plan	
05SH	GRRD-AEPW	54438 CATSAGR5 161 53802 CATOOSA4 138 2	148	97.6	100.5	3.9350	54438 CATSAGR5 161 53802 CATOOSA4 138 1	89	None - GRDA Mitigation Plan	
05SH	OKGE-OKGE	54861 MUSTANG4 138 54896 MORGAN 4 138 1	284	90.5	93.7	8.4420	54902 MCCLAIN4 138 54929 PLVALLY4 138 1	107	See Previous Upgrade Specified For Facility in Table 1	
									This cost may be significantly higher due to additional facilities whose solutions will be determined during the Facility Study process	\$*
									Total Cost with Facilities Monitored @ 90% Loading	\$ 40,000
									Total Cost with Facilities Monitored @ 100% Loading	\$ -

Table 3 – SPP facility overloads identified for the AEPW to AEPW transfer using Scenario 3

Study Case	From Area - To Area	Branch Overload	Rating <MW>	BC % Loading	TC % Loading	%TDF	Outaged Branch Causing Overload	ATC <MW>	Solution	Estimated Cost
04FA	OKGE-OKGE	54861 MUSTANG4 138 54896 MORGAN 4 138 1	284	97.4	100.4	8.1100	54902 MCCLAIN4 138 54929 PLVALLY4 138 1	93	See Previous Upgrade Specified For Facility in Table 1	
04WP	OKGE-OKGE	54861 MUSTANG4 138 54896 MORGAN 4 138 1	284	87.5	90.6	8.2750	54902 MCCLAIN4 138 54929 PLVALLY4 138 1	107	See Previous Upgrade Specified For Facility in Table 1	
05AP		NONE IDENTIFIED						107		
05G		NONE IDENTIFIED						107		
05SP	WFEC-OKGE	55917 FRNKLNS4 138 54946 MIDWEST4 138 1	185	102.3	106.0	6.3990	55814 ANADARK4 138 56031 POCASET4 138 1	0	See Previous Upgrade Specified For Facility in Table 1	
05SP	AEPW-AEPW	54023 OKMULGE4 138 54049 EC.HEN-4 138 1	104	84.6	104.7	19.4020	54017 HENRYET4 138 54057 KELCO 4 138 1	82	Replace Okmulgee Wavetrap	\$ 40,000
05SP	AEPW-AEPW	54028 WELETK4 138 54049 EC.HEN-4 138 1	104	80.2	100.2	19.4020	54017 HENRYET4 138 54057 KELCO 4 138 1	106	Replace Weleetka Wavetrap	\$ 40,000
05SH	OKGE-OKGE	54861 MUSTANG4 138 54896 MORGAN 4 138 1	284	91.2	94.3	8.4420	54902 MCCLAIN4 138 54929 PLVALLY4 138 1	107	See Previous Upgrade Specified For Facility in Table 1	
									This cost may be significantly higher due to additional facilities whose solutions will be determined during the Facility Study process	\$*
									Total Cost with Facilities Monitored @ 90% Loading	\$ 40,000
									Total Cost with Facilities Monitored @ 100% Loading	\$ 80,000

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 – 90%
4. Contingency Case Rating – Rate B
5. Contingency Case % of Rating – 90%
6. Base Case Load Flow – Do not solve AC
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 – 0.03
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