



SPP *Southwest Power Pool*

*Preliminary
System Impact Study
SPP-2004-180-1P
For Transmission Service
Requested By
Xcel Energy Marketing*

From AEPW to SPS

*For a Reserved Amount Of 150MW
From 6/1/2005
To 6/1/2006*

SPP Engineering, Tariff Studies

System Impact Study

Xcel Energy Marketing has requested a system impact study for long-term Firm Point-to-Point transmission service from AEPW to SPS for 150 MW. The period of the service requested is from 6/1/2005 to 6/1/2006. The OASIS reservation numbers are 794580, 794634, and 794645. This is a request to redirect previously confirmed OASIS reservations 381168, 381169, and 381170. Oasis Reservations 381168, 381169, and 381170 are 50 MW requests from AMRN to SPS. 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 SPS request in order to provide preliminary results identifying facility upgrades that may be required for the requested service. The requested service was modeled as a transfer from the specified source in the AEPW Control Area to marginally dispatched units in the SPS Control Area. 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 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.

Six seasonal models were used to study the AEPW to SPS request for the requested service period. The SPP 2004 Series Cases Update 2, 2005 April Minimum (05AP), 2005 Spring Peak (05G), Summer Peak (05SP), 2005 Summer Shoulder (05SH), 2005 Fall Peak (05FA), and 2005/06 Winter Peak (05WP) were used to study the impact of the request on the SPP system during the requested service period of 6/1/2005 to 6/1/2006. 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 Importing (including the Lamar HVDC Tie flowing from Lamar to SPS), and ERCOT exporting. Scenario 2 includes confirmed East to West transfers not already included in the January 2004 base case series models, SPS Importing (including 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 (including 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. Also, these results do not include third party constraints in Non-SPP control areas. Any solutions, upgrades, and costs provided in the preliminary System Impact Study are planning estimates only.

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 SPS 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 Aggregate System Impact Study. Execution of a Facility Study Agreement is not required at this time to maintain queue position. The final upgrade solutions, cost assignments, available redispatch, and curtailment options will be determined upon the completion of the Aggregate System Impact Study and Facility Study. An Aggregate System Impact Study Agreement will be tendered prior to the close of the first open season, June 1, 2005.

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

Study Case	From Area - To Area	Branch Overload	Rating <MW>	BC % Loading	TC % Loading	%TDF	Original TC% Loading	Original % TDF	Outaged Branch Causing Overload	ATC <MW>	Solution	Estimated Cost
05AP		NONE IDENTIFIED								150		
05G	AEPW-AEPW	54023 OKMULGE4 138 54049 EC.HEN-4 138 1	104	100.4	107.1	4.5770	102.8	1.6310	54023 OKMULGE4 138 54057 KELCO 4 138 1	0	Replace Okmulgee Wavetrap	\$40,000
05G	AEPW-AEPW	54028 WELETK4 138 54049 EC.HEN-4 138 1	103	96.8	103.4	4.5770	99.2	1.6310	54023 OKMULGE4 138 54057 KELCO 4 138 1	73	Replace Weleetka Wavetrap	\$40,000
05SP	WFEC-OKGE	55917 FRNKLNS4 138 54946 MIDWEST4 138 1	187	108.9	112.0	3.8560	111.7	3.4240	56026 PHAROAH4 138 56084 WETUMKA4 138 1	0	Terminal Equipment Upgrade to be Completed by WFEC by 10/1/05 or earlier for SPP OATT Attachment AA	
05SP	OKGE-OKGE	55235 PECANCK7 345 *B423 PECANCK1 1 1	366	90.3	92.3	4.9470	N/A*	N/A*	55224 MUSKOGEE7 345 55302 FTSMITH7 345 1	150	ADD 2ND 345/161 KV 369 MVA TRANSFORMER	\$3,000,000
05SH	AEPW-AEPW	54023 OKMULGE4 138 54049 EC.HEN-4 138 1	104	111.2	117.8	4.5700	113.7	1.6820	54023 OKMULGE4 138 54057 KELCO 4 138 1	0	See Previous Upgrade Specified For Facility	
05SH	AEPW-AEPW	54028 WELETK4 138 54049 EC.HEN-4 138 1	104	107.2	113.9	4.5700	109.7	1.6820	54023 OKMULGE4 138 54057 KELCO 4 138 1	0	See Previous Upgrade Specified For Facility	
05SH	WFEC-OKGE	55917 FRNKLNS4 138 54946 MIDWEST4 138 1	187	104.3	107.2	3.6310	106.9	3.2050	56026 PHAROAH4 138 56084 WETUMKA4 138 1	0	See Previous Upgrade Specified For Facility	
05SH	OKGE-OKGE	55235 PECANCK7 345 *B423 PECANCK1 1 1	367	98.1	100.1	4.7830	N/A*	N/A*	55224 MUSKOGEE7 345 55302 FTSMITH7 345 1	142	See Previous Upgrade Specified For Facility	
05SH	OKGE-OKGE	55234 PECANCK5 161 *B423 PECANCK1 1 1	370	97.2	99.2	4.7830	N/A*	N/A*	55224 MUSKOGEE7 345 55302 FTSMITH7 345 1	150	See Previous Upgrade Specified For Facility	
05FA		NONE IDENTIFIED								150		
05WP		NONE IDENTIFIED								150		
											This cost may be higher due to additional facilities whose solutions will be determined during the Facility Study process	\$*
											Total Cost with Facilities Monitored @ 90% Loading	\$3,080,000
											Total Cost with Facilities Monitored @ 100% Loading	\$3,080,000

*Original request path has negative impact on facility. No credit for positive impact removed can be given to the redirected path for this facility.

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

Study Case	From Area - To Area	Branch Overload	Rating <MW>	BC % Loading	TC % Loading	%TDF	Original TC% Loading	Original % TDF	Outaged Branch Causing Overload	ATC <MW>	Solution	Estimated Cost
05AP	AEPW-AEPW	54023 OKMULGE4 138 54049 EC.HEN-4 138 1	103	95.6	102.1	4.4810	N/A*	N/A*	54023 OKMULGE4 138 54057 KELCO 4 138 1	101	See Previous Upgrade Specified For Facility in Scenario 1	
05AP	AEPW-AEPW	54028 WELETK4 138 54049 EC.HEN-4 138 1	103	93.6	100.2	4.4810	N/A*	N/A*	54023 OKMULGE4 138 54057 KELCO 4 138 1	147	See Previous Upgrade Specified For Facility in Scenario 1	
05G	AEPW-AEPW	54023 OKMULGE4 138 54049 EC.HEN-4 138 1	103	111.8	118.5	4.5770	114.2	1.6310	54023 OKMULGE4 138 54057 KELCO 4 138 1	0	See Previous Upgrade Specified For Facility in Scenario 1	
05G	AEPW-AEPW	54028 WELETK4 138 54049 EC.HEN-4 138 1	103	108.4	115.0	4.5770	110.7	1.6310	54023 OKMULGE4 138 54057 KELCO 4 138 1	0	See Previous Upgrade Specified For Facility in Scenario 1	
05SP	WFEC-OKGE	55917 FRNKLNS4 138 54946 MIDWEST4 138 1	187	108.6	111.6	3.8560	111.3	3.4290	56026 PHAROAH4 138 56084 WETUMKA4 138 1	0	See Previous Upgrade Specified For Facility in Scenario 1	
05SP	AEPW-AEPW	54023 OKMULGE4 138 54049 EC.HEN-4 138 1	105	88.5	94.9	4.4660	N/A*	N/A*	54023 OKMULGE4 138 54057 KELCO 4 138 1	150	See Previous Upgrade Specified For Facility in Scenario 1	
05SP	AEPW-AEPW	54028 WELETK4 138 54049 EC.HEN-4 138 1	105	84.1	90.5	4.4660	N/A*	N/A*	54023 OKMULGE4 138 54057 KELCO 4 138 1	150	See Previous Upgrade Specified For Facility in Scenario 1	
05SH	AEPW-AEPW	54023 OKMULGE4 138 54049 EC.HEN-4 138 1	104	121.1	127.7	4.5700	123.6	1.7230	54023 OKMULGE4 138 54057 KELCO 4 138 1	0	See Previous Upgrade Specified For Facility in Scenario 1	
05SH	AEPW-AEPW	54028 WELETK4 138 54049 EC.HEN-4 138 1	103	117.2	123.8	4.5700	119.7	1.7230	54023 OKMULGE4 138 54057 KELCO 4 138 1	0	See Previous Upgrade Specified For Facility in Scenario 1	
05SH	WFEC-OKGE	55917 FRNKLNS4 138 54946 MIDWEST4 138 1	186	103.8	106.7	3.6310	106.4	3.2100	56026 PHAROAH4 138 56084 WETUMKA4 138 1	0	See Previous Upgrade Specified For Facility in Scenario 1	
05SH	OKGE-OKGE	55235 PECANCK7 345 *B423 PECANCK1 1 1	367	88.7	90.9	5.2660	N/A*	N/A*	54033 PITTSB-7 345 55224 MUSKOGEE7 345 1	150	May be relieved due to Oklahoma Gas and Electric Services Transmission Operating Directive for the Outage of the Muskogee/Pittsburg 345 kV line.	TBD
05SH	OKGE-OKGE	55234 PECANCK5 161 *B423 PECANCK1 1 1	370	87.9	90.1	5.2660	N/A*	N/A*	54033 PITTSB-7 345 55224 MUSKOGEE7 345 1	150	May be relieved due to Oklahoma Gas and Electric Services Transmission Operating Directive for the Outage of the Muskogee/Pittsburg 345 kV line.	TBD
05FA		NONE IDENTIFIED								150		
05WP		NONE IDENTIFIED								150		
											This cost may be higher due to additional facilities whose solutions will be determined during the Facility Study process	\$*
											Total Cost with Facilities Monitored @ 90% Loading	\$ -
											Total Cost with Facilities Monitored @ 100% Loading	\$ -

*Original request path has negative impact on facility. No credit for positive impact removed can be given to the redirected path for this facility.

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

Study Case	From Area - To Area	Branch Overload	Rating <MW>	BC % Loading	TC % Loading	%TDF	Original TC% Loading	Original % TDF	Outaged Branch Causing Overload	ATC <MW>	Solution	Estimated Cost
05AP	AEPW-AEPW	54023 OKMULGE4 138 54049 EC.HEN-4 138 1	103	95.4	101.9	4.4810	97.6	1.5400	54023 OKMULGE4 138 54057 KELCO 4 138 1	107	See Previous Upgrade Specified For Facility in Scenario 1	
05AP	AEPW-AEPW	54028 WELETK4 138 54049 EC.HEN-4 138 1	102	93.2	99.8	4.4810	95.5	1.5400	54023 OKMULGE4 138 54057 KELCO 4 138 1	150	See Previous Upgrade Specified For Facility in Scenario 1	
05G	AEPW-AEPW	54023 OKMULGE4 138 54049 EC.HEN-4 138 1	103	111.5	118.1	4.5770	113.9	1.6330	54023 OKMULGE4 138 54057 KELCO 4 138 1	0	See Previous Upgrade Specified For Facility in Scenario 1	
05G	AEPW-AEPW	54028 WELETK4 138 54049 EC.HEN-4 138 1	103	108.1	114.8	4.5770	110.5	1.6330	54023 OKMULGE4 138 54057 KELCO 4 138 1	0	See Previous Upgrade Specified For Facility in Scenario 1	
05G	WERE-WERE	56765 HOYT 7 345 56766 JEC N 7 345 1	1076	90.2	90.7	3.7130	N/A*	N/A*	56766 JEC N 7 345 56770 MORRIS 7 345 1	150	May be relieved due to Westar Operating Procedure 0400 Outage of the Jeffrey Energy Center to Hoyt 345kV Line	TBD
05SP	AEPW-AEPW	54023 OKMULGE4 138 54049 EC.HEN-4 138 1	105	87.8	94.2	4.4660	90.1	1.5800	54023 OKMULGE4 138 54057 KELCO 4 138 1	150	See Previous Upgrade Specified For Facility in Scenario 1	
05SP	WFEC-OKGE	55917 FRNKLNS4 138 54946 MIDWEST4 138 1	187	110.0	113.1	3.8560	112.8	3.4240	56026 PHAROAH4 138 56084 WETUMKA4 138 1	0	See Previous Upgrade Specified For Facility in Scenario 1	
05SH	AEPW-AEPW	54023 OKMULGE4 138 54049 EC.HEN-4 138 1	104	120.7	127.3	4.5700	123.2	1.6840	54023 OKMULGE4 138 54057 KELCO 4 138 1	0	See Previous Upgrade Specified For Facility in Scenario 1	
05SH	AEPW-AEPW	54028 WELETK4 138 54049 EC.HEN-4 138 1	103	116.8	123.4	4.5700	119.3	1.6840	54023 OKMULGE4 138 54057 KELCO 4 138 1	0	See Previous Upgrade Specified For Facility in Scenario 1	
05SH	WFEC-OKGE	55917 FRNKLNS4 138 54946 MIDWEST4 138 1	187	105.3	108.2	3.6310	107.9	3.2050	56026 PHAROAH4 138 56084 WETUMKA4 138 1	0	See Previous Upgrade Specified For Facility in Scenario 1	
05SH	OKGE-OKGE	55234 PECANCK5 161 *B423 PECANCK1 1 1	370	92.0	94.0	4.7830	N/A*	N/A*	55224 MUSKOG7 345 55302 FTSMITH7 345 1	150	See Previous Upgrade Specified For Facility in Scenario 1	
05SH	OKGE-OKGE	55235 PECANCK7 345 *B423 PECANCK1 1 1	367	92.9	94.8	4.7830	N/A*	N/A*	55224 MUSKOG7 345 55302 FTSMITH7 345 1	150	See Previous Upgrade Specified For Facility in Scenario 1	
05FA		NONE IDENTIFIED								150		
05WP		NONE IDENTIFIED								150		
											This cost may be higher due to additional facilities whose solutions will be determined during the Facility Study process	\$*
											Total Cost with Facilities Monitored @ 90% Loading	\$ -
											Total Cost with Facilities Monitored @ 100% Loading	\$ -

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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