



# **SPP** *Southwest Power Pool*

*Preliminary  
System Impact Study  
SPP-2004-185/200-1P  
For Transmission Service  
Requested By  
American Electric Power Marketing*

*From WFECA to AEPW*

*For a Reserved Amount Of 120MW  
From 11/1/2005  
To 11/1/2006*

*SPP Engineering, Tariff Studies*

## **System Impact Study**

American Electric Power Marketing has requested system impact studies for long-term Firm Point-to-Point transmission service from WFEC to AEPW for 120 MW and to designate a New Network Resource in the WFEC Control Area for 120 MW to serve Network Load in the AEPW Control Area. The period of the services requested is from 11/1/2005 to 11/1/2006. The OASIS reservation number and study number is 795005 and SPP-2004-185 for the Point-to-Point service. The OASIS reservation number and study number is 798927 and SPP-2004-200 for the new Network Resource designation. These two studies were combined for preliminary study purposes. 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 services.

This study was performed for the WFEC to AEPW requests in order to provide preliminary results identifying facility upgrades that may be required for the requested services. The requested services were modeled as a transfer from the specified source in the WFEC Control Area to marginally dispatched units in the AEPW 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 services. The preliminary study is performed by monitoring each facility at 90% of its rating.

Eight seasonal models were used to study the WFEC to AEPW requests 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), 2005/06 Winter Peak (05WP), Summer Peak (07SP), and 2007/08 Winter Peak (07WP) were used to study the impact of the requests on the SPP system during the requested service period of 11/1/2005 to 11/1/2006. 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. The cases include a proposed 3 mile 138 kV line from WFEC Washita to AEPW Southwest Station. From the eight 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 (including 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 (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 WFEC to AEPW requests. 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 WFEC 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
05AP		NONE IDENTIFIED						120		
05G		NONE IDENTIFIED						120		
05SP	WFEC-WFEC	55810 ANADARK2 69 55814 ANADARK4 138 1	112	96.3	103.1	6.3870	55814 ANADARK4 138 55923 GEORGIA4 138 1	65	Solution Undetermined	TBD
05SP	WFEC-WFEC	55810 ANADARK2 69 55870 CYRIL 2 69 1	61	86.6	92.7	3.0990	55814 ANADARK4 138 55923 GEORGIA4 138 1	120	Reconductor 13 miles of 336MCM ACSR with 795MCM.	\$2,626,000
05SP	AEPW-AEPW	53446 S SHV 4 138 53455 SW SHVT4 138 1	209	88.6	90.6	3.5130	53464 Western Electric Tap 53453 SW Shreveport 138 kV 53464 Western Electric Tap 53450 Stonewall 138 kV 53464 Western Electric Tap 53463 Western Electric 138 kV	120	Replace South Shreveport wavetrapp	\$40,000
05SH	GRRD-AEPW	54438 CATSAGR5 161 53802 CATOOSA4 138 2	150	88.3	91.5	3.8970	54438 CATSAGR5 161 53802 CATOOSA4 138 1	120	None - GRDA Mitigation Plan	
05SH	GRRD-AEPW	54438 CATSAGR5 161 53802 CATOOSA4 138 1	150	88.1	91.2	3.8860	54438 CATSAGR5 161 53802 CATOOSA4 138 2	120	None - GRDA Mitigation Plan	
05SH	WFEC-WFEC	55810 ANADARK2 69 55814 ANADARK4 138 1	112	84.3	92.1	7.2750	55814 ANADARK4 138 55923 GEORGIA4 138 1	120	Solution Undetermined	TBD
05FA		NONE IDENTIFIED						120		
05WP	WFEC-WFEC	55810 ANADARK2 69 55814 ANADARK4 138 1	111	88.7	95.3	6.0760	55814 ANADARK4 138 55923 GEORGIA4 138 1	120	Solution Undetermined	TBD
07SP	WFEC-WFEC	55810 ANADARK2 69 55814 ANADARK4 138 1	111	89.4	96.2	6.3140	55814 ANADARK4 138 55923 GEORGIA4 138 1	120	Solution Undetermined	TBD
07SP	WFEC-WFEC	55814 ANADARK4 138 55923 GEORGIA4 138 1	130	84.5	90.8	6.8310	Base Case	120	Solution Undetermined	TBD
07SP	AEPW-AEPW	53446 S SHV 4 138 53455 SW SHVT4 138 1	209	91.7	93.7	3.4110	53464 Western Electric Tap 53453 SW Shreveport 138 kV 53464 Western Electric Tap 53450 Stonewall 138 kV 53464 Western Electric Tap 53463 Western Electric 138 kV	120	See Previous Upgrade Specified For Facility	TBD
07SP	WFEC-WFEC	55810 ANADARK2 69 55870 CYRIL 2 69 1	61	93.8	100.0	3.1540	55814 ANADARK4 138 55923 GEORGIA4 138 1	120	See Previous Upgrade Specified For Facility	TBD
07WP		NONE IDENTIFIED						120		
									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	\$2,666,000
									Total Cost with Facilities Monitored @ 100% Loading	\$-

**Table 2 – SPP facility overloads identified for the WFEC 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
05AP		NONE IDENTIFIED						120		
05G		NONE IDENTIFIED						120		
05SP	AEPW-OKGE	53756 CLARKSV7 345 55224 MUSKOGEE7 345 1	895	89.5	90.8	9.6160	53794 R.S.S.-7 345 55224 MUSKOGEE7 345 1	120	Increase CTR at Muskogee to 2000-5 amps.	\$5,000
05SP	AEPW-AEPW	54108 CARNEG-4 138 54126 HOB-JCT4 138 1	141	88.2	91.4	3.7120	<b>54119 O.K.U.-7 345 51534 Tuco 345</b> <b>51534 Tuco 345 51533 Tuco 230</b>	120	Solution Undetermined	TBD
05SP	AEPW-AEPW	54117 FTCOBNG4 138 54140 S.W.S.-4 138 1	150	87.7	90.6	3.7120	54119 O.K.U.-7 345 51534 Tuco 345 51534 Tuco 345 51533 Tuco 230	120	Rebuild 14.37 miles of 397 ACSR with 1272 ACSR.	\$7,200,000
05SP	WFEC-WFEC	55810 ANADARK2 69 55814 ANADARK4 138 1	112	92.6	99.5	6.3870	55814 ANADARK4 138 55923 GEORGIA4 138 1	120	Solution Undetermined	TBD
05SH	GRRD-AEPW	54438 CATSAGR5 161 53802 CATOOSA4 138 2	150	104.1	107.2	3.8970	54438 CATSAGR5 161 53802 CATOOSA4 138 1	120	None - GRDA Mitigation Plan	
05SH	GRRD-AEPW	54438 CATSAGR5 161 53802 CATOOSA4 138 1	150	103.8	106.9	3.8860	54438 CATSAGR5 161 53802 CATOOSA4 138 2	120	None - GRDA Mitigation Plan	
05FA		NONE IDENTIFIED						120		
05WP		NONE IDENTIFIED						120		
07SP	AEPW-OKGE	53756 CLARKSV7 345 55224 MUSKOGEE7 345 1	894	91.9	93.2	9.6030	53794 R.S.S.-7 345 55224 MUSKOGEE7 345 1	120	See Previous Upgrade Specified For Facility	TBD
07SP	WFEC-WFEC	55810 ANADARK2 69 55870 CYRIL 2 69 1	61	88.5	94.6	3.0990	55814 ANADARK4 138 55923 GEORGIA4 138 1	120	See Previous Upgrade Specified For Facility in Scenario 1	TBD
07SP	WFEC-WFEC	55810 ANADARK2 69 55814 ANADARK4 138 1	112	84.2	91.0	6.3870	55814 ANADARK4 138 55923 GEORGIA4 138 1	120	Solution Undetermined	TBD
07SP	AEPW-AEPW	54108 CARNEG-4 138 54126 HOB-JCT4 138 1	141	89.3	92.4	3.7130	54119 O.K.U.-7 345 51534 Tuco 345 51534 Tuco 345 51533 Tuco 230	120	Solution Undetermined	TBD
07SP	AEPW-AEPW	54108 CARNEG-4 138 54117 FTCOBNG4 138 1	150	87.7	90.6	3.7130	54119 O.K.U.-7 345 51534 Tuco 345 51534 Tuco 345 51533 Tuco 230	120	Solution Undetermined	TBD
07SP	AEPW-AEPW	54117 FTCOBNG4 138 54140 S.W.S.-4 138 1	150	88.8	91.8	3.7130	54119 O.K.U.-7 345 51534 Tuco 345 51534 Tuco 345 51533 Tuco 230	120	See Previous Upgrade Specified For Facility	TBD
07SP	AEPW-AEPW	53783 LLAN ET4 138 53791 MAYO--N4 138 1	230	89.0	91.8	5.4250	Unit:54205 RSS2 -1 22.0 Id:1	120	Solution Undetermined	TBD
07WP		NONE IDENTIFIED						120		
									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	\$7,205,000
									Total Cost with Facilities Monitored @ 100% Loading	\$-

**Table 3 – SPP facility overloads identified for the WFEC 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
05AP		NONE IDENTIFIED						120		
05G		NONE IDENTIFIED						120		
05SP	AEPW-AEPW	54108 CARNEG-4 138 54126 HOB-JCT4 138 1	141	87.9	91.1	3.7120	54119 O.K.U.-7 345 51534 Tuco 345 51534 Tuco 345 51533 Tuco 230	120	Solution Undetermined	TBD
05SP	AEPW-AEPW	54117 FTCOBNG4 138 54140 S.W.S.-4 138 1	150	87.3	90.3	3.7120	54119 O.K.U.-7 345 51534 Tuco 345 51534 Tuco 345 51533 Tuco 230	120	See Previous Upgrade Specified For Facility in Scenario 2	TBD
05SH	GRRD-AEPW	54438 CATSAGR5 161 53802 CATOOSA4 138 2	150	99.9	103.1	3.8970	54438 CATSAGR5 161 53802 CATOOSA4 138 1	120	None - GRDA Mitigation Plan	TBD
05SH	GRRD-AEPW	54438 CATSAGR5 161 53802 CATOOSA4 138 1	150	99.6	102.7	3.8860	54438 CATSAGR5 161 53802 CATOOSA4 138 2	120	None - GRDA Mitigation Plan	TBD
05FA		NONE IDENTIFIED						120		
05WP		NONE IDENTIFIED						120		
07SP	WFEC-WFEC	55810 ANADARK2 69 55870 CYRIL 2 69 1	61	90.2	96.3	3.1280	55814 ANADARK4 138 55923 GEORGIA4 138 1	120	See Previous Upgrade Specified For Facility in Scenario 1	TBD
07SP	WFEC-WFEC	55810 ANADARK2 69 55814 ANADARK4 138 1	112	84.1	90.9	6.3480	55814 ANADARK4 138 55923 GEORGIA4 138 1	120	Solution Undetermined	TBD
07SP	AEPW-AEPW	54108 CARNEG-4 138 54126 HOB-JCT4 138 1	141	88.4	91.5	3.6560	Unit:51441 TOLK 1 124.0 Id:1	120	Solution Undetermined	TBD
07SP	AEPW-AEPW	54117 FTCOBNG4 138 54140 S.W.S.-4 138 1	150	88.0	90.9	3.6560	Unit:51441 TOLK 1 124.0 Id:1	120	See Previous Upgrade Specified For Facility in Scenario 2	TBD
07WP		NONE IDENTIFIED						120		
									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	\$-

## **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