



# **SPP** *Southwest Power Pool*

*Preliminary  
System Impact Study  
SPP-2004-124-1P  
For Transmission Service  
Requested By  
Exelon Generation Company, LLC*

*From AEPW to AEPW*

*For a Redirected Amount Of 31MW  
From 1/1/2005  
To 1/1/2006*

*SPP Engineering, Tariff Studies*

## **System Impact Study**

Exelon Generation Company, LLC has requested a system impact study for long-term Firm Point-to-Point transmission service from AEPW to AEPW for 31 MW. The period of the service requested is from 1/1/2005 to 1/1/2006. The OASIS reservation number is 736095. This is a request to redirect the previously confirmed OASIS reservation 547034. Oasis Reservation 547034 is a 50 MW request from ERCOTE to EES. 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 requested service was modeled as a transfer from the specified source in the AEPW 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 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.

Seven seasonal models were used to study the AEPW to AEPW request for the requested service period. The SPP 2004 Series Cases Update 2, 2004/05 Winter Peak (04WP), 2005 April Minimum (05AP), 2005 Spring Peak (05G), 2005 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 1/1/2005 to 1/1/2006. 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 seven 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. 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	AEPW-AEPW TC % Loading	AEPW-AEPW %TDF	ERCOTE-EES TC % Loading	ERCOTE-EES %TDF	Outaged Branch Causing Overload	ATC <MW>	Solution	Estimated Cost
04WP		NONE IDENTIFIED								31		
05AP		NONE IDENTIFIED								31		
05G		NONE IDENTIFIED								31		
05SP	WFEC-OKGE	55917 FRNKLNS4 138 54946 MIDWEST4 138 1	186	90.8	91.8	6.0730	N/A*	N/A*	55842 CANADNS4 138 54947 CANADN-4 138 1	31	Terminal Equipment Upgrade to be Completed by WFEC by 10/1/05 or earlier for SPP OATT Attachment AA	
05SP	WFEC-OKGE	55917 FRNKLNS4 138 54946 MIDWEST4 138 1	186	94.7	95.5	4.7570	N/A*	N/A*	Unit: 54208 SWS 38047 24.0 Id:1	31	See Previous Upgrade Specified For Facility	
05SP	OKGE-OKGE	55235 PECANCK7 345 *B423 PECANCK1 1 1	366	89.8	90.3	5.8860	89.8	3.3740	55224 MUSKOGEE7 345 55302 FTSMITH7 345 1	31	Add 2nd 345/161 kV 369MVA transformer.	\$ 3,000,000
05SP	AEPW-AEPW	53446 S SHV 4 138 53455 SW SHVT4 138 1	209	89.6	91.1	9.8300	89.6	0.8370	SPP-AEPW-30 53464 WSTRN ELEC T 53453 SW SHV 138 1 53464 WSTRN ELEC T 53450 STONEWALL 138 1 53464 WSTRN ELEC T 53463 WSTRN ELEC 138 1	31	Replace South Shreveport wavetrap	\$ 40,000
05SH	OKGE-OKGE	55234 PECANCK5 161 *B423 PECANCK1 1 1	370	94.8	95.1	4.3310	94.8	1.0710	53756 CLARKSV7 345 55224 MUSKOGEE7 345 1	31	See Previous Upgrade Specified For Facility	
05SH	OKGE-OKGE	55235 PECANCK7 345 *B423 PECANCK1 1 1	367	95.6	96.0	4.3310	95.6	1.0710	53756 CLARKSV7 345 55224 MUSKOGEE7 345 1	31	See Previous Upgrade Specified For Facility	
05FA		NONE IDENTIFIED								31		
05WP		NONE IDENTIFIED								31		
											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	\$ 3,040,000
											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 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	AEPW-AEPW TC % Loading	AEPW-AEPW %TDF	ERCOTE-EES TC % Loading	ERCOTE-EES %TDF	Outaged Branch Causing Overload	ATC <MW>	Solution	Estimated Cost
04WP		NONE IDENTIFIED								31		
05AP		NONE IDENTIFIED								31		
05G	AEPW-AEPW	54023 OKMULGE4 138 54049 EC.HEN-4 138 1	104	93.4	94.7	4.5500	N/A*	N/A*	54023 OKMULGE4 138 54057 KELCO 4 138 1	31	Replace Okmulgee Wavetrap	\$ 40,000
05G	AEPW-AEPW	54028 WELETK4 138 54049 EC.HEN-4 138 1	104	89.8	91.2	4.5500	N/A*	N/A*	54023 OKMULGE4 138 54057 KELCO 4 138 1	31	Replace Weleetka Wavetrap	\$ 40,000
05SP	WFEC-OKGE	55917 FRNKLNS4 138 54946 MIDWEST4 138 1	187	94.8	95.5	4.7570	94.8	0.0790	Unit:54208 SWS 38047 24.0 Id:1	31	See Previous Upgrade Specified For Facility in Scenario 1	
05SP	WFEC-OKGE	55917 FRNKLNS4 138 54946 MIDWEST4 138 1	187	91.2	92.2	6.0730	N/A*	N/A*	55842 CANADNS4 138 54947 CANADN-4 138 1	31	See Previous Upgrade Specified For Facility in Scenario 1	
05SH		NONE IDENTIFIED								31		
05FA		NONE IDENTIFIED								31		
05WP		NONE IDENTIFIED								31		
											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	\$ 80,000
											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 AEPW transfer using Scenario 3**

Study Case	From Area - To Area	Branch Overload	Rating <MW>	BC % Loading	AEPW-AEPW TC % Loading	AEPW-AEPW %TDF	ERCOTE-EES TC % Loading	ERCOTE-EES %TDF	Outaged Branch Causing Overload	ATC <MW>	Solution	Estimated Cost
04WP		NONE IDENTIFIED								31		
05AP		NONE IDENTIFIED								31		
05G	AEPW-AEPW	54023 OKMULGE4 138 54049 EC.HEN-4 138 1	103	113.9	115.3	4.5500	N/A*	N/A*	54023 OKMULGE4 138 54057 KELCO 4 138 1	0	Replace Okmulgee Wavetrap	\$ 40,000
05G	AEPW-AEPW	54028 WELETKA 138 54049 EC.HEN-4 138 1	103	110.4	111.7	4.5500	N/A*	N/A*	54023 OKMULGE4 138 54057 KELCO 4 138 1	0	Replace Weleetka Wavetrap	\$ 40,000
05G	SWPA-AEPW	52814 BRKN BW4 138 54015 CRAIGJT4 138 1	107	93.2	94.5	4.7110	N/A*	N/A*	55823 BBDAMTP4 138 56004 MTRIVER4 138 1	31	May be relieved by alternative switching scheme, otherwise rebuild 7.66 miles of 3/0 CW CU with 795 ACSR	\$ 2,700,000
05SP	WFEC-OKGE	55917 FRNKLNS4 138 54946 MIDWEST4 138 1	187	100.9	101.7	4.7570	N/A*	N/A*	Unit:5 4208 SWS 38047 24.0 l d:1	0	See Previous Upgrade Specified For Facility in Scenario 1	
05SP	AEPW-AEPW	54023 OKMULGE4 138 54049 EC.HEN-4 138 1	105	89.9	91.4	5.1120	N/A*	N/A*	54023 OKMULGE4 138 54057 KELCO 4 138 1	31	See Previous Upgrade Specified For Facility in Scenario 2	
05SP	WFEC-OKGE	55917 FRNKLNS4 138 54946 MIDWEST4 138 1	187	97.5	98.5	6.0730	N/A*	N/A*	55842 CANADNS4 138 54947 CANADN-4 138 1	31	See Previous Upgrade Specified For Facility in Scenario 1	
05SH	OKGE-OKGE	55234 PECANCK5 161 *B423 PECANCK1 1 1	370	90.8	91.1	4.2610	90.8	2.1600	55224 MUSKOG7 345 55302 FTSMITH7 345 1	31	See Previous Upgrade Specified For Facility in Scenario 1	
05SH	OKGE-OKGE	55235 PECANCK7 345 *B423 PECANCK1 1 1	367	91.6	91.9	4.2610	91.6	2.1600	55224 MUSKOG7 345 55302 FTSMITH7 345 1	31	See Previous Upgrade Specified For Facility in Scenario 1	
05FA		NONE IDENTIFIED								31		
05WP		NONE IDENTIFIED								31		
											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	\$ 2,700,000
											Total Cost with Facilities Monitored @ 100% Loading	\$ 80,000

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

## **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