



# **SPP** *Southwest Power Pool*

*System Impact Study  
SPP-2003-067-1  
For Transmission Service  
Requested By  
Empire District Electric Co.*

*From WPEK To EDE*

*For a Reserved Amount Of  
30MW From 6/1/2003 To 6/1/2018*

*SPP Engineering, Tariff Studies*

## **System Impact Study**

Empire District Electric Co. has requested a system impact study for Network transmission service from WPEK to EDE for 30 MW. The period of the service requested is from 6/1/2003 to 6/1/2018. The OASIS reservation number is 489391. 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 WPEK to EDE request was studied to determine the facility upgrades required based on the actual queue position of the request with only those higher priority requests in Facility Study mode included in the models. Higher priority requests still in study mode that have not gone to facility study mode were not included in the 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 WPEK to EDE 30 MW request.

Nine seasonal models were used to study the WPEK to EDE 30 MW request for the requested service period with consideration of the elapsed request period. The SPP 2003 Series Cases 2003 Fall Peak (03FA), 2003/04 Winter Peak (03WP), 2004 April Min (04AP), 2004 Spring Peak (04G), 2004 Summer Peak (04SP), 2004 Fall Peak (04FA), 2004/05 Winter Peak (04WP), 2009 Summer Peak (09SP), and 2009/10 Winter Peak (09WP) were used to study the impact of the 30 MW request on the SPP system during a the requested service period of 6/1/2003 to 6/1/2018. 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 option to convert MVA branch ratings to estimated MW ratings was used to partially compensate for reactive loading.

With only the higher priority requests that have signed Facility Study Agreements included in the models, the study results of the WPEK to EDE 30 MW 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. 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 WPEK to EDE transfer

Study Year	From Area - To Area	Branch Over 100% Rate B	Rate B	Outaged Branch Causing Overload	ATC	Solution	Estimated Cost
03FA	WERE-WERE	AUBURN RD - SOUTH GAGE (WEST) 115KV CKT 1	75	HOYT - JEFFERY ENERGY CENTER 345KV	14	May be relieved due to Westar Transmission Operating Directive 400, Outage of Hoyt - Jeffery Energy Center 345KV Line	\$ -
03FA	WERE-WERE	CIRCLE - MOUNDRIDGE 115KV	92	FINNEY STA - POTTER COUNTY INTRCHNG 345KV	0	May be relieved due to Westar Transmission Operating Directive 1201, Overload of the Circle to Moundridge 115KV Line	\$ -
03FA	WERE-WERE	GATZ - GOLDEN PLAINS JUNCTION 69KV	32	HALSTEAD NORTH - MOUNDRIDGE 138KV	0	None - Local area problem within Newton division	\$ -
03FA	WERE-WERE	GOLDEN PLAINS JUNCTION - HESSTON 69KV	32	HALSTEAD NORTH - MOUNDRIDGE 138KV	0	None - Local area problem within Newton division	\$ -
03WP	WERE-WERE	AUBURN RD - SOUTH GAGE (WEST) 115KV CKT 1	75	HOYT - JEFFERY ENERGY CENTER 345KV	0	May be relieved due to Westar Transmission Operating Directive 400, Outage of Hoyt - Jeffery Energy Center 345KV Line	\$ -
03WP	WERE-WERE	AUBURN RD - SOUTH GAGE (WEST) 115KV CKT 2	97	HOYT - JEFFERY ENERGY CENTER 345KV	0	May be relieved due to Westar Transmission Operating Directive 400, Outage of Hoyt - Jeffery Energy Center 345KV Line	\$ -
04G	WERE-WERE	ATHENS SWI STA - COFFEY COUNTY NO. 4 69KV	43	BENTON - WOLF CREEK 345KV	0	May be relieved due to Westar Transmission Operating Directive 1304, Overload of the Athens to Wolf Creek 69 kV Line	\$ -
04G	WERE-WERE	AUBURN RD - SOUTH GAGE (WEST) 115KV CKT 1	75	HOYT - JEFFERY ENERGY CENTER 345KV	0	May be relieved due to Westar Transmission Operating Directive 400, Outage of Hoyt - Jeffery Energy Center 345KV Line	\$ -
04G	WERE-WERE	COFFEY COUNTY NO. 4 VERNON - GREEN 69KV	43	BENTON - WOLF CREEK 345KV	0	May be relieved due to Westar Transmission Operating Directive 1304, Overload of the Athens to Wolf Creek 69 kV Line	\$ -
04SP	SWPS-SWPS	CANYON EAST - OSAGE SWI STA 115KV	99	BUSHLAND INTRCHNG - DEAF SMITH INTRCHNG 230KV	0	Rebuild 13 miles of 115 kV circuit with 397 ACSR on T-0-102 structures.	\$ 1,910,000
04SP	AEPW-AEPW	CHAMBER SPRINGS - TONTITOWN 161KV	247	FLINT CREEK - TONTITOWN 161KV	0	Rebuild 12 miles with 2156MCM ACSR. Replace Chamber Springs wavetrapp & reset relays.	\$ 7,200,000
04SP	OKGE-OKGE	FT SMITH 500/161KV TRANSFORMER	475	FT SMITH 345/161KV TRANSFORMER	0	Convert Ft. Smith 161kv to 1-1/2 breaker design and install 2nd 500-161kv transformer bank.	\$ 7,000,000
04SP	SWPS-SWPS	HAPPY INTRCHNG - PALODU 115KV	98	AMARILLO S INTRCHNG - SWISHER CO INTRCHNG 230KV	22	Rebuild 24 miles of 115 kV circuit with 397 ACSR on T-0-102 structures.	\$ 3,130,000
04SP	SWPS-SWPS	PALODU - RANDALL COUNTY INTRCHNG 115KV	99	AMARILLO S INTRCHNG - SWISHER CO INTRCHNG 230KV	0	Rebuild 9 miles of 115 kV circuit with 397 ACSR on T-0-102 structures.	\$ 1,170,000
09SP	SWPA-SPRM	BROOKLINE - SPRINGFIELD 161KV	308	SOUTHWEST - SOUTHWEST DISPOSAL 161KV	0	Replace disconnect switches at Springfield.	\$ 60,000
09SP	SWPS-SWPS	CANYON EAST - OSAGE SWI STA 115KV	99	BUSHLAND INTRCHNG - DEAF SMITH INTRCHNG 230KV	0	See Previous	\$ -
09SP	AEPW-AEPW	CHAMBER SPRINGS - FARMINGTON AECC 161KV	335	CHAMBER SPRINGS - TONTITOWN 161KV	0	Replace Farmington switch 8839	\$ 60,000
09SP	AEPW-AEPW	CHAMBER SPRINGS - TONTITOWN 161KV	247	EAST CENTERTON - GENTRY REC 161KV	0	See Previous	\$ -
09SP	OKGE-OKGE	CIMARRON - WOODRING 345KV	717	NORTHWEST - SPRING CREEK 345KV	0	Replace CTs by OKGE	\$ -
09SP	KACP-KACP	COLLEGE - CRAIG 161KV	330	MOONLIGHT - WEST GARDNER 161KV	0	Reconductor 4 miles with 1192.5 ACSS, 558 normal/emergency rating and upgrade breaker.	\$ 700,000
09SP	AEPW-AEPW	EAST CENTERTON - GENTRY REC 161KV	353	LOWELL - ROGERS 161KV	0	Rebuild 19.16 miles of 2-397.5 ACSR with 2156 ACSR. Replace East Centerton Wavetrapp & jumpers	\$ 8,000,000
09SP	AEPW-AEPW	FLINT CREEK - GENTRY REC 161KV	354	EAST ROGERS 161/69KV TRANSFORMER	0	Rebuild 1.09 miles of 2-397.5 ACSR with 2156 ACSR. Replace Flint Creek wavetrapp & jumpers	\$ 450,000
09SP	OKGE-OKGE	FT SMITH 345/161KV TRANSFORMER	489	FT SMITH 500/161KV TRANSFORMER	0	See Previous	\$ -
09SP	OKGE-OKGE	FT SMITH 500/161KV TRANSFORMER	475	FT SMITH 345/161KV TRANSFORMER	0	See Previous	\$ -
09SP	WERE-WERE	GILL ENERGY CENTER EAST - OATVILLE 69KV	71	GILL ENERGY CENTER EAST - MACARTHUR 69KV	0	Replace disconnect switches at Gill 69 kV (use 800 A.), Replace line switch at Oatville 69 kV (use 800 A.).	\$ 45,000
09SP	SWPS-SWPS	HAPPY INTRCHNG - PALODU 115KV	99	AMARILLO S INTRCHNG - SWISHER CO INTRCHNG 230KV	0	See Previous	\$ -
09SP	SWPS-SWPS	MANHTP3 - OSAGE SWI STA 115KV	158	AMARILLO S INTRCHNG - NICHOLS STA 230KV	0	Solution Undetermined	N/A

**Table 1 - continued** – SPP facility overloads identified for the WPEK to EDE transfer

Study Year	From Area - To Area	Branch Over 100% Rate B	Rate B	Outaged Branch Causing Overload	ATC	Solution	Estimated Cost
09SP	AEPW-AEPW	ORU WEST TAP - RIVERSIDE STA 138KV CKT 1	304	Multiple Outage Contingency with Load Changes Riverside Sta - Oru East Tap 138kV Oru East Tap - Oru East 138kV Oru East Tap - Warren Tap 138kV Warren Tap - 81St & Yale South 138kV Warren Tap - 96Th & Yale 138kV 81St & Yale South - Warren West 138kV Move 100% Load From Oru East to Oru West Move 100% Load From 81St & Yale South to 81St & Yale Move 100% Load From Warren West to Warren Medical	0	Replace wavetrap jumpers @ Riverside	\$ 10,000
09SP	SWPS-SWPS	PALODU - RANDALL COUNTY INTRCHNG 115KV	99	AMARILLO S INTRCHNG - SWISHER CO INTRCHNG 230KV	0	See Previous	\$ -
09SP	SWPS-SWPS	RANDALL CO INTRCHNG 230/115KV TRANSFORMER	259	AMARILLO S INTRCHNG - NICHOLS STA 230KV	0	Open Amarillo South 230/115KV Transformer to Relieve Facility	\$ -
09SP	MIDW-WEPL	SEWARD 115/69KV TRANSFORMER	44	HEIZER 230/115KV TRANSFORMER	0	Solution Undetermined	N/A
09WP	WERE-WERE	ATHENS SWI STA - COFFEY COUNTY NO. 4 69KV	43	BENTON - WOLF CREEK 345KV	0	May be relieved due to Westar Transmission Operating Directive 1304, Overload of the Athens to Wolf Creek 69 kV Line	\$ -
09WP	AEPW-AEPW	CHAMBER SPRINGS - TONTITOWN 161KV	247	FLINT CREEK - TONTITOWN 161KV	0	See Previous	\$ -
09WP	WERE-WERE	COFFEY COUNTY NO. 4 VERNON - GREEN 69KV	43	BENTON - WOLF CREEK 345KV	0	May be relieved due to Westar Transmission Operating Directive 1304, Overload of the Athens to Wolf Creek 69 kV Line	\$ -
Total Estimated Cost							\$29,735,000