



SPP *Southwest Power Pool*

*Supplemental
System Impact Study
For Transmission Service
Requested By
Central & South West Power
Marketing, Inc.*

*From Central and South West
Services to Entergy*

*For a Reserved Amount Of 290MW
From 4/1/01 To 9/30/04*

SPP Transmission Planning

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1. Executive Summary

Central and South West Power Marketing Inc. has requested a system impact study for the deferral of long-term Firm Point-to-Point transmission reservation 171555 from Central and South West Services to Entergy. The original period of the requested transaction is from 4/1/01 to 9/30/04. The deferral period of the request is from 8/1/03 to 4/1/07. The request is for a total 290 MW.

The principal objective of this study is to identify system problems and potential system modifications during the previously unstudied period from 9/30/04 to 4/1/07. The analysis in this document shows that to accommodate the deferred 290 MW transfer, upgrades will be required on the SPP transmission systems in addition to the facilities already identified.

The Network Facility Upgrades identified in SPP Facility Study SPP-2000-011, dated December 1, 2000, as being required to accommodate the request during the period from 8/1/03 to 9/30/04 are listed in **Table 1**. These Network Facility Upgrades have been reviewed and revised and are still required based on the results of SPP System Impact Study SPP-2000-011, dated October 12, 2000. The analysis results for the remaining period from 9/30/04 to 4/1/07 are shown in **Table 2** and **Table 3**.

2. Introduction

Central and South West Power Marketing Inc. has requested an impact study for the deferral of transmission reservation 171555 from CSWS control area with a sink of EES for 290 MW during the period of 8/1/03 to 4/1/07. SPP previously studied the requested service with an original reservation period of 4/1/01 to 9/30/04. Due to the delay in construction of ATC limiting network constraints identified in the 2001, 2002, and 2003 Summer Peaks, contiguous service could not be provided until October 1, 2003 therefore the customer has requested the service to be deferred until October 1, 2003, under Section 15.5 of the SPP OATT.

The principal objective of this study is to identify any restraints on the SPP Regional Tariff System during the deferral period that may limit the transfer to less than 290 MW. Using the documented analysis performed in the previous System Impact Study, the facility upgrade requirements still applicable for the period of the deferred request from 8/1/03 to 9/30/04 are listed in **Table 1**. These Network Facility Upgrades and Estimated Engineering and Construction Costs were reviewed and revised.

A steady-state contingency analyses (PSS/E function ACCC) was conducted to determine the impact of the 290 MW transfer on transmission line loading and transmission bus voltages for outages of single and selected multiple transmission lines and transformers on the SPP system for the previously unstudied deferral period from 9/30/04 to 4/1/07. The results of the analysis can be found in **Table 2** and **Table 3**.

3. Study Methodology

A. Description

An analysis was conducted to determine the impact of the 290MW transfer on the SPP system for the previously unstudied deferral period from 9/30/04 to 4/1/07. The steady-state analysis was done to ensure current SPP Criteria and NERC Planning Standards requirements are fulfilled. The Southwest Power Pool (SPP) conforms to the NERC Planning Standards, which provide the strictest requirements, related to thermal overloads with a contingency. It requires that all facilities be within emergency ratings after a contingency.

B. Model Updates

SPP used four seasonal models to study the 290MW request. The SPP 2001 Series Cases 2003 Spring Peak, 2004/05 Winter Peak, 2006 Summer Peak, and 2006/07 Winter Peak were used to study the impact of the 290MW transfer on the SPP system during the previously unstudied transaction period of 9/30/04 to 4/1/07. The 2003 Spring Peak model is representative of the 2005 and 2006 Spring Peaks.

The chosen base case models were modified to reflect the most current modeling information. The cases were modified to reflect future firm transfers during the request period that were not already included in the January 2001 base case series models.

C. Transfer Analysis

Using the created models and the ACCC function of PSS/E, single and select double contingency outages were analyzed. Then full AC solution was used to obtain the most accurate results possible. Any facility overloaded, using MVA ratings, in the transfer case and not overloaded in the base case was flagged. The PSS/E options chosen to conduct the Impact Study analysis can be found in Appendix A.

4. Study Results

A. Study Analysis Results

The results of the previous System Impact Study and Facility Study, dated October 12, 2000 and December 1, 2000 respectively, were used to determine the Facility Upgrades required for the transaction period from 8/1/03 to 9/30/04. The revised SPP Facility upgrades still required are listed in Table 1. For the Rayburn Country Electric Cooperative's Jacksonville to Overton 138kV line, the transmission customer is responsible for obtaining arrangements for construction upgrades on the facility per Section 21.1 of the SPP OATT.

For the transaction period from 9/30/04 to 4/1/07, the results of the impact study analysis show that facilities overloads occur due to the 290MW transfer in all of the studied models. The SPP Facilities overloaded by the transfer are listed in Table 2. The Non-SPP Facility Overloads are listed in Table 3.

Table 1 – Revised SPP Network Facility Upgrade requirements from previous System Impact Study and Facility Study for the transmission request deferral period from October 1, 2003 to September 30, 2004.

NETWORK SYSTEM IMPROVEMENT	ENGINEERING & CONSTRUCTION COSTS (\$ 2000)	ENGINEERING & CONSTRUCTION LEAD TIME	REQUIRED DATE (M/D/Y)
Longwood - Noram 138kV: Reconductor To 1590MCM by AEPW	1,800,000	Fifteen (15) Months	6/1/2004
Hope - Patmos 115kV: Reconductor To 1272MCM by AEPW	2,100,000	Eighteen (18) Months	6/1/2004
Hawkins - Hawkins REC 69kV: Reconductor To 795MCM and Replace Jumpers by AEPW	386,000	Twelve (12) Months	6/1/2004
Quitman - North Mineola 69kV: Replace Bus by AEPW	40,000	Nine (9) Months	6/1/2004
Beaver – Eureka Springs 161kV: Reset Relays & CTs, Replace Metering By SWPA	22,500	Eight (8) Months	6/1/2004
Beaver – Eureka Springs 161kV Reconductor To 1590MCM By AEPW	515,000	Twelve (12) Months	6/1/2004
Rock Hill - Tatum 138kV: Reconductor 5.76 miles To 1272MCM & Reset Rock Hill CTs by AEPW	1,800,000	Eighteen (18) Months	6/1/2004
IPC Jefferson – Lieberman 138kV: Reconductor 0.65 miles To 795MCM & Replace Lieberman Switches by AEPW	153,967	Thirty (30) Months	6/1/2004
Subtotal	\$6,817,467		

Table 2- SPP Facility overloads caused by the 290 MW CSWS to EES transfer during the transmission request deferral period of September 30, 2004 to April 1, 2007.

Study Year	From-To Area(s)	Branch Over 100% Rate B	RATE B <MVA>	Base Case %Loading	Transfer Case %Loading	Outaged Branch That Caused Overload	Initial Limit, Available Solution and Cost, or Previous Assignment
03SR	SWPA-AEPW	BROKEN BOW TO BETHEL, 138KV 52814 BRKN BW4 138 to 54054 BETHEL 4 138 CKT 1	95.6	91.4	103.3	PITTSBURG TO VALLIANT, 345KV 54033 PITTSB-7 345 to 54037 VALIANT7 345 CKT1	Reset 400/5 CTs at Broken Bow By SWPA
04WP		NONE					
06SP	AEPW-AEPW	WALLACE LAKE TO SOUTH SHREVEPORT, 138KV 53461 WALLAKE4 138 to 53446 S SHV 4 138 CKT 1	209	91.1	103.0	DOLET HILLS 345/230KV XFRM 50045 DOLHILL7 345 to 50046 DOLHILL6 230 CKT1	Dolet Hills Operating Directive
06SP	AEPW-AEPW	HALLSVILLE TO LONGVIEW HEIGHTS, 69KV 53541 HALLSVL269.0 to 53567 LONGVHT269.0 CKT 1	48	92.1	102.3	MARSHAL TO MARSHAL AUTO, 69KV 53570 MARSHAL269.0 to 53623 MARAUTO269.0 CKT1	Rebuild 7.07 miles of 4/0 ACSR with 795 ACSR
06SP	AEPW-AEPW	HAWKINS TO BIGSANDY, 69KV 53543 HAWKINS269.0 to 53515 BIGSN DY269.0 CKT 1	85	98.7	100.8	NORTH MINEOLA 138/69KV XFRM 53580 NMINEOL269.0 to 53581 NMINEOL4 138 CKT1	Rebuild 5.5 miles of 477 ACSR with 1272 ACSR.
06SP	AEPW-AEPW	OAK HILL #2 TO KNOX LEE, 138KV 53586 OAK2HIL4 138 to 53557 KNOXLEE4 138 CKT 1	210	98.4	103.1	KNOX LEE TO MONROE CORNERS REC, 138KV 53557 KNOXLEE4 138 to 53574 MONROCR4 138 CKT1	Replace wavetraps @ Knoxlee
06SP	AEPW-AEPW	OAK HILL #2 TO KNOX LEE, 138KV 53586 OAK2HIL4 138 to 53557 KNOXLEE4 138 CKT 1	210	95.7	100.4	KILGORE REC TO MONROE CORNERS REC, 138KV 53555 KILGORR4 138 to 53574 MONROCR4 138 CKT1	"
06WP		NONE					

Table 3- Non SPP Facility overloads caused by the 290 MW CSWS to EES transfer during the transmission request deferral period of September 30, 2004 to April 1, 2007.

Study Year	From-To Area(s)	Branch Over 100% Rate B	RATE B <MVA>	Base Case %Loading	Transfer Case %Loading	Outaged Branch That Caused Overload
03G	CELE-EES	50024 CARROLL4 138 to 99167 3RINGLD 115 CKT 1	125	94.5	107.6	99294 7ELDEHV 345 to 99295 8ELDEHV 500 CKT1
03G	EES-EES	99167 3RINGLD 115 to 99168 3SAILES 115 CKT 1	115	96.9	111.1	99294 7ELDEHV 345 to 99295 8ELDEHV 500 CKT1
03G	EES-EES	97480 L558T485 138 to 97484 4HUNTSVL 138 CKT 1	206	89.6	100.2	97454 4WALDEN 138 to 97514 4GRIMES 138 CKT1
03G	EES-EES	97487 4MT.ZION 138 to 97480 L558T485 138 CKT 1	206	93.3	104.0	"
03G	EES-EES	97514 4GRIMES 138 to 97487 4MT.ZION 138 CKT 1	206	96.7	107.4	"
03G	EES-EES	99179 3ADA 11 115 to 99168 3SAILES 115 CKT 1	115	97.5	100.1	99308 3MAG-E 115 to 99310 3MCNEIL 115 CKT1
04WP	CELE-EES	50024 CARROLL4 138 to 99167 3RINGLD 115 CKT 1	125	95.8	106.4	50027 CLARN 6 230 to 50126 MESSICK6 230 CKT1
04WP	EES-EES	99167 3RINGLD 115 to 99168 3SAILES 115 CKT 1	115	96.6	108.0	50027 CLARN 6 230 to 50126 MESSICK6 230 CKT1
04WP	EES-EES	99179 3ADA 11 115 to 99168 3SAILES 115 CKT 1	115	98.0	100.2	99249 3EMERSN 115 to 99288 3KERLIN* 115 CKT1
04WP	EES-EES	99179 3ADA 11 115 to 99170 3MINDEN 115 CKT 1	115	99.4	102.0	99171 3SPRINGH 115 to 99280 3TAYLOR 115 CKT1
04WP	EES-EES	99263 3LEWIS # 115 to 99230 3COUCH 115 CKT 1	159	99.7	112.7	54033 PITTSB-7 345 to 55224 MUSKOGEE7 345 CKT1
04WP	EES-EES	99303 3PATMOS# 115 to 99263 3LEWIS # 115 CKT 1	159	92.9	100.5	99230 3COUCH 115 to 99310 3MCNEIL 115 CKT1
04WP	EES-EES	99389 4MURFRE 138 to 99387 3MURF-S 115 CKT 1	60	97.6	112.4	99333 8SHERID 500 to 99402 8HSEHV 500 CKT1
06SP	RCEC-RCEC	53549 JACKSNV4 138 to 53588 OVERTON4 138 CKT 1	235	98.6	108.0	53526 CROCKET7 345 to 53637 TENRUSK7 345 CKT1
06SP	CELE-EES	50024 CARROLL4 138 to 99167 3RINGLD 115 CKT 1	125	94.0	104.4	50023 CARROLL6 230 to 50126 MESSICK6 230 CKT1
06SP	CELE-EES	50057 FISHER 4 138 to 99115 3FISHER 115 CKT 1	83	95.4	100.8	99112 3WINFLD 115 to 99113 6WINFLD 230 CKT1
06SP	EES-CELE	99115 3FISHER 115 to 50057 FISHER 4 138 CKT 1	83	95.4	100.8	99113 6WINFLD 230 to 99116 6MONTGY 230 CKT1
06SP	EES-CELE	99167 3RINGLD 115 to 50024 CARROLL4 138 CKT 1	125	99.4	105.6	99171 3SPRINGH 115 to 99280 3TAYLOR 115 CKT1
06SP	EES-EES	99167 3RINGLD 115 to 99168 3SAILES 115 CKT 1	115	99.3	112.1	99294 7ELDEHV 345 to 99295 8ELDEHV 500 CKT1
06SP	EES-EES	99179 3ADA 11 115 to 99168 3SAILES 115 CKT 1	115	99.7	101.6	99309 8MCNEIL 500 to 99310 3MCNEIL 115 CKT1
06SP	EES-EES	99263 3LEWIS # 115 to 99230 3COUCH 115 CKT 1	159	99.9	113.4	53376 POTLATC3 115 to 53383 HOPE 3 115 CKT1
06SP	EES-EES	99264 3MAG-DW 115 to 99230 3COUCH 115 CKT 1	108	98.0	102.6	99230 3COUCH 115 to 99310 3MCNEIL 115 CKT1
06SP	EES-EES	99303 3PATMOS# 115 to 99263 3LEWIS # 115 CKT 1	159	99.8	113.1	99267 3MAG-W 115 to 99310 3MCNEIL 115 CKT1
06SP	EES-EES	99389 4MURFRE 138 to 99387 3MURF-S 115 CKT 1	60	100.0	123.0	99294 7ELDEHV 345 to 99295 8ELDEHV 500 CKT1
06SP	EES-SWPA	99825 5MIDWAY# 161 to 52660 BULL SH5 161 CKT 1	162	99.5	100.6	52660 BULL SH5 161 to 96081 5GAINES 161 CKT1
06WP	CELE-EES	50024 CARROLL4 138 to 99167 3RINGLD 115 CKT 1	125	97.3	104.5	99112 3WINFLD 115 to 99113 6WINFLD 230 CKT1
06WP	EES-EES	99167 3RINGLD 115 to 99168 3SAILES 115 CKT 1	115	99.2	107.0	99112 3WINFLD 115 to 99113 6WINFLD 230 CKT1
06WP	EES-EES	99168 3SAILES 115 to 99179 3ADA 11 115 CKT 1	115	99.2	101.6	99264 3MAG-DW 115 to 99280 3TAYLOR 115 CKT1
06WP	EES-EES	99179 3ADA 11 115 to 99170 3MINDEN 115 CKT 1	115	99.9	102.3	99230 3COUCH 115 to 99264 3MAG-DW 115 CKT1
06WP	EES-EES	99263 3LEWIS # 115 to 99230 3COUCH 115 CKT 1	159	99.8	113.7	50027 CLARN 6 230 to 50126 MESSICK6 230 CKT1
06WP	EES-EES	99303 3PATMOS# 115 to 99263 3LEWIS # 115 CKT 1	159	96.6	111.5	50045 DOLHILL7 345 to 53454 SW SHV 7 345 CKT1
06WP	EES-EES	99389 4MURFRE 138 to 99387 3MURF-S 115 CKT 1	60	98.4	113.2	99402 8HSEHV 500 to 99403 8HSEHV 115 CKT1

5. Conclusion

The results of the study show that before the 290MW transfer can take place system improvements will need to be completed. The facilities identified in the previous System Impact Study and Facility Study as being required for the deferred request period of October 1, 2003 to September 30, 2004 in **Table 1** are still required. In addition, the overloaded facilities identified in the system impact analysis for the deferred request period from September 30, 2004 to April 1, 2007 in **Table 2** are required to be upgraded by the customer.

The final cost assignment of facilities and ATC granted to CSWPMI will be determined upon the completion of a revised facility study.

Appendix A

PSS/E CHOICES IN RUNNING LOAD FLOW PROGRAM AND ACCC

BASE CASES:

Solutions - Fixed slope decoupled Newton-Raphson solution (FDNS)

1. Tap adjustment – Stepping
2. Area interchange control – Tie lines only
3. Var limits – Apply immediately
4. Solution options - Phase shift adjustment
 - Flat start
 - Lock DC taps
 - Lock switched shunts

ACCC CASES:

Solutions – AC contingency checking (ACCC)

1. MW mismatch tolerance –1.0
2. Contingency case rating – Rate B
3. Percent of rating – 100
4. Output code – Summary
5. Min flow change in overload report – 1mw
6. Excl'd cases w/ no overloads form report – YES
7. Exclude interfaces from report – NO
8. Perform voltage limit check – YES
9. Elements in available capacity table – 60000
10. Cutoff threshold for available capacity table – 99999.0
11. Min. contng. case Vltg chng for report – 0.02
12. Sorted output – None

Newton Solution:

1. Tap adjustment – Stepping
2. Area interchange control – Tie lines only
3. Var limits - Apply automatically
4. Solution options - Phase shift adjustment
 - Flat start
 - Lock DC taps
 - Lock switched shunts