



# **SPP** *Southwest Power Pool*

## *System Impact Study For Network Service Requested By Empire District Electric Company*

*This Study is SPP-2002-051S (343768)  
100MW CSWS to EMDE  
9/1/02 to 9/1/03*

*Base Case Models Includes:*

*275856 and 344544-1300MW, 9/1/02 to 4/1/08*

*344546-80MW KCPL to EMDE, 9/1/02 to 4/1/08*

*344550-162MW WERE to EMDE, 9/1/02 to 4/1/08*

*Not included in this study is 318877-150MW SECI to EMDE*

### *SPP Transmission Planning*

SPP IMPACT STUDIES (#SPP-2002-051S)

May 15, 2002

# Table of Contents

<b>1. EXECUTIVE SUMMARY .....</b>	<b>3</b>
<b>2. INTRODUCTION .....</b>	<b>4</b>
<b>3. STUDY METHODOLOGY .....</b>	<b>5</b>
A. DESCRIPTION .....	5
B. MODEL UPDATES .....	5
C. TRANSFER ANALYSIS .....	5
<b>4. STUDY RESULTS.....</b>	<b>6</b>
TABLE 1 – THE EMPIRE DISTRICT COMPANY – VOLTAGE BELOW 10% OF NOMINAL. ....	7
TABLE 2 – SPP FACILITY OVERLOADS CAUSED BY THE CSWS TO EMDE 100MW TRANSFER. ....	8
TABLE 3 – NON - SPP FACILITY OVERLOADS CAUSED BY THE CSWS TO EMDE 100MW TRANSFER.....	10
TABLE 4 – PREVIOUSLY ASSIGNED AND IDENTIFIED SPP FACILITIES IMPACTED BY THE CSWS TO EMDE 100MW TRANSFER .....	11
TABLE 5 – OVERLOADED SPP FLOWGATES.....	13
<b>5. CONCLUSION .....</b>	<b>14</b>
<b>APPENDIX A.....</b>	<b>15</b>

## **1. Executive Summary**

The Empire District Electric Company has requested Transmission Service for Network Integration Transmission Service. This study addresses 343768 (CSWS-EMDE 9/1/02-9/1/03) the addition of 100MW to the network resources of EMDE.

The initial cases include requests:     344544 1300MW (9/1/02-4/1/08) extension of SPP-001-250 (275856),  
   344546 80MW (9/1/02-4/1/08) KCPL-EMDE, and  
   344550 162MW (9/1/02-9/1/03) WERE-EMDE

Request 318877 150MW SECI to EMDE cannot be studied as this time.

The principal objective of this study is to identify system constraints and potential system modifications necessary to provide the applied for Network Service while maintaining system reliability. New overloads caused by the 100MW transfer were identified along with determining the impact of the transfer on any previously assigned and identified facilities.

Table 1 list Empire District Company voltages below 10% of nominal. Tables 2 and 3 list the new overloads caused by the 100MW transfer. Table 4 lists the previously assigned and identified facilities impacted by the 100MW transfer. Table 5 lists overloaded flowgates.

The SPP and effected member companies shall use due diligence to coordinate the addition of necessary facilities or transmission system upgrades to provide the requested transmission service. OERI is to compensate SPP for such costs pursuant to the terms of section 27 of the SPP Open Access Transmission Tariff.

Expedited procedures for new facilities and upgrades are available to OERI per section 19.8 of the SPP Open Access Transmission Service Tariff.

Engineering and construction of any new facilities or modifications will not start until after a transmission service agreement and/or construction agreement is in place and effected member companies receive the appropriate authorization to proceed from the SPP after receiving authorization from the transmission customer.

## 2. Introduction

Empire District Electric Company has requested an impact study for Network Integration Transmission Service. The transmission service runs from 9/1/02 to 9/1/03.

The principal objective of the study is to identify the restraints on the SPP Regional Tariff System, which includes the Empire District Electric Company Transmission System that limit the Network Integration Transmission Service. This study includes steady-state contingency analyses (PSS/E function ACCC) and Available Transfer Capability (ATC) analyses.

The steady-state analyses consider the impact of the 100MW transfer on transmission line loading and transmission bus voltages for outages of single and selected multiple transmission lines and transformers on the SPP system.

ATC analyses show the amount of First Contingency Incremental Transfer Capabilities (FCITC) between the given study systems and what the limitations are, if any, for transferring up to 100MW.

### **3. Study Methodology**

#### **A. Description**

Two analyses were conducted to determine the impact of the 100MW transfer on the system. The first analysis was conducted to identify any new overloads caused by the 100MW transfer. The second analysis was done to ensure that available capacity exists on previously identified circuits.

The steady-state analysis and generation sensitivity 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 voltage violations and thermal overloads during normal conditions and during a contingency. It requires that all facilities be within normal operating ratings for normal system conditions and within emergency ratings after a contingency.

The second analysis was done to determine the impact of the transfer on previously assigned and identified facilities.

#### **B. Model Updates**

SPP used six seasonal models to study the Empire District Electric Company Network Integration Transmission Service. The SPP 2002 Series Cases used are as follows. The 2002 Summer Peak, 2002 Fall Peak, 2002/03 Winter Peak, 2003 April Minimum, 2003 Spring Peak and 2003 Summer Peak were used to study the impact of the Network Service on the SPP system during the transmission request period of 9/1/02 to 9/1/03.

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 2002 base case series models. The models were further adjusted to model the designated Network Resource of Empire District Electric Company designated Network Resources and Network Loads to model a 100MW transfer from the Network Resources to the Network Load. These modified models were then used in the steady-state contingency analysis.

#### ***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**

Tables 1, 2, 3, 4 and 5 contain the analysis results of the System Impact Study. The tables identify the seasonal case in which the event occurred; the emergency rating of the overloaded circuit (Rate B), the contingent loading percentage of circuit with and without the studied transfer, the ATC if calculated, any SPP identification or assignment of the event, and any solutions received from the transmission owners.

Table 1 list Empire District Company voltages below 10% of nominal.

Table 2 shows the new facility overloads caused by the 100MW transfer. Upgrades associated with these new overloads can be directly assigned to the CSWS to EMDE 100MW transfer.

Table 3 documents overloads on Non SPP Regional Tariff participants' transmission systems caused by the 100MW transfer.

Table 4 documents the 100MW transfer impact on previously assigned and identified facilities.

Table 5 documents the 100MW transfer impact on SPP flowgates which are more than 100% loaded in the transfer case.

**Table 1 – THE EMPIRE DISTRICT COMPANY – Voltage below 10% of nominal.**

CASE	BUS #	AREA 544 BUSES WITH VOLTAGES LESS THAN 0.9500 PU:	KV	V(PU) AFTER CONTINGENCY	V(PU) BEFORE CONTINGENCY	CONTINGENCY - OPEN BRANCH FROM BUS TO BUS	CR1	MITIGATION PLAN, SOLUTION
02SP	59424	SUB364 - RESCUE EXPLORER	69	0.8062	0.9613	59537 SUB124 - AURORA H.T. TO 59578 SUB355 - AURORA WEST	1	
02SP	59552	SUB 260 - LAWRENCEBURG SHELL	69	0.8576	0.9694	59537 SUB124 - AURORA H.T. TO 59578 SUB355 - AURORA WEST	1	
02SP	59553	SUB262 - ALBATROSS	69	0.8121	0.9662	59537 SUB124 - AURORA H.T. TO 59578 SUB355 - AURORA WEST	1	
02SP	59573	SUB 338 - HEATONVILLE CHEROKEE	69	0.8303	0.9673	59537 SUB124 - AURORA H.T. TO 59578 SUB355 - AURORA WEST	1	
02SP	59577	SUB351 - MOUNT VERNON EAST	69	0.7977	0.9695	59537 SUB124 - AURORA H.T. TO 59578 SUB355 - AURORA WEST	1	
02SP	59578	SUB 355 - AURORA WEST	69	0.7869	0.9903	59537 SUB124 - AURORA H.T. TO 59578 SUB355 - AURORA WEST	1	
02SP	59606	SUB 420 - MT. VERNON EAST	69	0.7960	0.9708	59537 SUB124 - AURORA H.T. TO 59578 SUB355 - AURORA WEST	1	
02SP	59570	SUB 330 - OZARK NORTHWEST	69	0.8842	0.9953	59570 SUB330 - OZARK NW TO 59604 SUB415 - BLACKHAWK JCT.	1	
02SP	59609	SUB 434 - OZARK SOUTHEAST	69	0.8887	0.9909	59570 SUB330 - OZARK NW TO 59604 SUB415 - BLACKHAWK JCT.	1	
02SP	59424	SUB364 - RESCUE EXPLORER	69	0.864	0.9613	59578 SUB355 - AURORA WEST TO 59606 SUB420 - MT. VERNON	1	
02SP	59552	SUB 260 - LAWRENCEBURG SHELL	69	0.8994	0.9694	59578 SUB355 - AURORA WEST TO 59606 SUB420 - MT. VERNON	1	
02SP	59553	SUB262 - ALBATROSS	69	0.8695	0.9662	59578 SUB355 - AURORA WEST TO 59606 SUB420 - MT. VERNON	1	
02SP	59573	SUB 338 - HEATONVILLE CHEROKEE	69	0.8815	0.9673	59578 SUB355 - AURORA WEST TO 59606 SUB420 - MT. VERNON	1	
02SP	59577	SUB351 - MOUNT VERNON EAST	69	0.8612	0.9695	59578 SUB355 - AURORA WEST TO 59606 SUB420 - MT. VERNON	1	
02SP	59606	SUB 420 - MT. VERNON EAST	69	0.8604	0.9708	59578 SUB355 - AURORA WEST TO 59606 SUB420 - MT. VERNON	1	
02SP	59425	SUB 209 - HERMITAGE	69	0.8980	0.9903	59464/59528 BOLIVAR BURNS 161/69KV TRANSFORMER	1	
02SP	59535	SUB 114 - NIXA NORTH	69	0.8884	0.9939	59604 SUB415 - BLACKHAWK JCT. TO 96673 AEC JAMESVILLE	1	
02SP	59570	SUB 330 - OZARK NORTHWEST	69	0.8815	0.9953	59604 SUB415 - BLACKHAWK JCT. TO 96673 AEC JAMESVILLE	1	
02SP	59604	SUB 415 - BLACKHAWK JCT.	69	0.8813	1.0000	59604 SUB415 - BLACKHAWK JCT. TO 96673 AEC JAMESVILLE	1	
02SP	59609	SUB 434 - OZARK SOUTHEAST	69	0.8861	0.9909	59604 SUB415 - BLACKHAWK JCT. TO 96673 AEC JAMESVILLE	1	
02FA	59424	SUB364 - RESCUE EXPLORER	69	0.8745	0.9744	59537 SUB124 - AURORA H.T. TO 59578 SUB355 - AURORA WEST	1	
02FA	59553	SUB262 - ALBATROSS	69	0.8797	0.9791	59537 SUB124 - AURORA H.T. TO 59578 SUB355 - AURORA WEST	1	
02FA	59573	SUB 338 - HEATONVILLE CHEROKEE	69	0.8921	0.9802	59537 SUB124 - AURORA H.T. TO 59578 SUB355 - AURORA WEST	1	
02FA	59577	SUB351 - MOUNT VERNON EAST	69	0.8704	0.9817	59537 SUB124 - AURORA H.T. TO 59578 SUB355 - AURORA WEST	1	
02FA	59578	SUB 355 - AURORA WEST	69	0.864	0.9974	59537 SUB124 - AURORA H.T. TO 59578 SUB355 - AURORA WEST	1	
02FA	59606	SUB 420 - MT. VERNON EAST	69	0.8693	0.9827	59537 SUB124 - AURORA H.T. TO 59578 SUB355 - AURORA WEST	1	
02WP	59568	SUB 324 - STOCKTON NORTHWEST	69	0.8616	1.003	59568 SUB324-STOCKTON NW TO 59616 SUB631-STOCKTON JT.	1	
02WP	59425	SUB 209 - HERMITAGE	69	0.8934	0.9872	59464/59528 BOLIVAR BURNS 161/69KV TRANSFORMER	1	
02WP	59434	SUB 409 - BUFFALO SOUTH	69	0.8938	0.9657	59464/59528 BOLIVAR BURNS 161/69KV TRANSFORMER	1	
03SP	59568	SUB 324 - STOCKTON NORTHWEST	69	0.8992	1.0047	59568 SUB324-STOCKTON NW TO 59616 SUB631-STOCKTON JT.	1	
03SP	59404	SUB 390-PURDY	69	0.8929	0.9534	59480/59591 MONETT 161/69KV TRANSFORMER	1	
03SP	59535	SUB 114 - NIXA NORTH	69	0.8998	0.9953	59604 SUB415 - BLACKHAWK JCT. TO 96673 AEC JAMESVILLE	1	
03SP	59570	SUB 330 - OZARK NORTHWEST	69	0.8943	0.9959	59604 SUB415 - BLACKHAWK JCT. TO 96673 AEC JAMESVILLE	1	
03SP	59604	SUB 415 - BLACKHAWK JCT.	69	0.8934	1.0007	59604 SUB415 - BLACKHAWK JCT. TO 96673 AEC JAMESVILLE	1	
03SP	59609	SUB 434 - OZARK SOUTHEAST	69	0.8999	0.9914	59604 SUB415 - BLACKHAWK JCT. TO 96673 AEC JAMESVILLE	1	

Table 2 – SPP Facility Overloads caused by the CSWS to EMDE 100MW Transfer.

Study Year	From Area - To Area	Branch Over 100% Rate B	RATE B	BC %Loading	TC %Loading	Outaged Branch That Caused Overload	ATC	Solution or Assigned Study
02SP	EMDE-EMDE	<b>AURORA HT 161/69KV TRANSFORMER</b> 59468*AUR124 5 161 TO AURORA3 XFMR MIDPT 59537*AUR124 269.0 TO AURORA3 XFMR MIDPT	41.7 41.7	98.7 99	109.7 109.2	<b>MONETT 383 161/69KV TRANSFORMER</b> 59480 MON383 5-59591 MON383 2-59712 MON383 1CKT 1 -----	10	
02SP	(GRDA) AECI-AECI	<b>BRISTOW 138/69KV TRANSFORMER</b> 96137 4BRISTOW 138 to 96889 2BRISTOW69.0 CKT 1	56	100.0	100.1	<b>BRISTOW 138/69KV TRANSFORMER</b> 96137 4BRISTOW 138 to 96889 2BRISTOW69.0 CKT2	16	
02SP	(GRDA) AECI-AECI	<b>BRISTOW 138/69KV TRANSFORMER</b> 96137 4BRISTOW 138 to 96889 2BRISTOW69.0 CKT 2	56	100.0	100.1	<b>BRISTOW 138/69KV TRANSFORMER</b> 96137 4BRISTOW 138 to 96889 2BRISTOW69.0 CKT1	16	
02SP	EMDE-EMDE	<b>ORONOGO JCT. TO JOPLIN OAKLAND NORTH, 161KV</b> 59467 ORO110 5 161 to 59494 OAK432 5 161 CKT 1	214	99.7	100.7	<b>TIPTON FORD TO JOPLIN SOUTHWEST, 161KV</b> 59472 TIP292 5 161 to 59483 JOP389 5 161 CKT1	32	
02SP	AEPW-AEPW	<b>CHEROKEE REC TO TATUM, 138KV</b> 53522 CHEROKE4 138 TO 53611 TATUM 4 138 CKT1	209	99.9	100.1	<b>SOUTHWEST SHREVEPORT to LONGWOOD, 345KV</b> 53454 SW SHV 7 345 TO 53424 LONGWD 7 345 CKT 1 <b>SOUTHWEST SHREVEPORT to DIANA, 345KV</b> 53454 SW SHV 7 345 TO 53528 DIANA 7 345 CKT 1	50	
02SP	AEPW-AEPW	<b>CHAMBER SPRINGS TO DYESS, 161KV</b> 53154 CHAMSPR5 161 to 53131 DYESS 5 161 CKT 1	244	98.1	100.2	<b>SOUTH FAYETTEVILLE TO FARMINGTON AECC, 161KV</b> 53157 SFAYTVL5 161 to 53195 FARMGTN5 161 CKT1	93	
02WP	EMDE-EMDE	<b>FAIRPLAY EAST 69/34.5KV TRANSFORMER</b> 59545*FRP217 269.0 TO FAIRPLAY 1 XFMR MIDPT	5	95	109.6	<b>STOCKTON CITY TO STOCKTON CITY, 69KV</b> 59614SK631CJ269 TO 59616 STK631J269 CKT 1	34	
02WP	EMDE-EMDE	<b>FAIRPLAY EAST 69/34.5KV TRANSFORMER</b> 59545*FRP217 269.0 TO FAIRPLAY 1 XFMR MIDPT	5	94.9	109.6	<b>AEC STOCKTON TO STOCKTON CITY, 69KV</b> 59605 STK418 269 TO 59614 SK631CJ269 CKT 1	35	
02WP	EMDE-EMDE	<b>FAIRPLAY EAST 69/34.5KV TRANSFORMER</b> 59545*FRP217 269.0 TO FAIRPLAY 1 XFMR MIDPT	5	94.9	109.5	<b>AEC STOCKTON 161/69KV TRANSFORMER</b> 59605 STK418 2-96118 5STKAEC-59719 STK418 1 CKT 1	35	
02WP	EMDE-EMDE	<b>STOCKTON NORTHWEST 69/34.5KV TRANSFORMER</b> 59568* STK324 269.0 TO STOCKTON 1 XFMR MIDPT	9.4	89	106.2	<b>FAIRPLAY EAST 69/34.5KV TRANSFORMER</b> 59545 FRP217 2-59635 FRP217 1-59717 FRP217T1 CKT 1	64	
02WP	GRRD-GRRD	<b>GRDA1 TO ARMIN, 69KV</b> 54527 GRDA1 2 69.0 TO 54612 ARMIN 269.0 CKT1	84	99.8	100.1	<b>MAID 161/69KV TRANSFORMER</b> 54426 MAID 2 69 TO 54448 MAID 5 161 CKT 1 <b>MAID 161/69KV TRANSFORMER</b> 54426 MAID 2 69 TO 54448 MAID 5 161 CKT 2	67	Chouteau Maid Operating Procedure ?
03SP	SWPA-SWPA	<b>SPRINGFIELD 161/69KV TRANSFORMER</b> 52692 SPRGFLD5 161 to 52694 SPRGFLD269.0 CKT 3	25	99.5	108.5	<b>SPRINGFIELD 161/69KV TRANSFORMER</b> 52692 SPRGFLD5 161 to 52694 SPRGFLD269.0 CKT1	5	
03SP	AEPW-AEPW	<b>DYESS TO EAST ROGERS, 161KV</b> 53131 DYESS 5 161 to 53135 EROGERS5 161 CKT 1	244	99.4	102.0	<b>FLINT CREEK TO GENTRY REC, 161KV</b> 53139 FLINTCR5 161 to 53187 GENTRYR5 161 CKT1	24	
03SP	EMDE-EMDE	<b>FAIRPLAY EAST 69/34.5KV TRANSFORMER</b> 59545*FRP217 269.0 TO FAIRPLAY 1 XFMR MIDPT	5	91.7	103.1	<b>STOCKTON CITY TO STOCKTON CITY, 69KV</b> 59614SK631CJ269 TO 59616 STK631J269 CKT 1	73	
03SP	EMDE-EMDE	<b>FAIRPLAY EAST 69/34.5KV TRANSFORMER</b> 59545*FRP217 269.0 TO FAIRPLAY 1 XFMR MIDPT	5	91.6	103.0	<b>AEC STOCKTON TO STOCKTON CITY, 69KV</b> 59605 STK418 269 TO 59614 SK631CJ269 CKT 1	74	



Table 2 cont'd.

Study Year	From Area - To Area	Branch Over 100% Rate B	RATE B	BC %Loading	TC %Loading	Outaged Branch That Caused Overload	ATC	Solution or Assigned Study
03SP	EMDE-EMDE	<b>FAIRPLAY EAST 69/34.5KV TRANSFORMER</b> 59545*FRP217 269.0 TO FAIRPLAY 1 XFMR MIDPT	5	91.6	103.0	<b>AEC STOCKTON 161/69KV TRANSFORMER</b> 59605 STK418 2-96118 5STKAEC-59719 STK418 1 CKT 1	74	
03SP	AEPW-AEPW	<b>DYESS TO EAST ROGERS, 161KV</b> 53131 DYESS 5 161 to 53135 EROGERS5 161 CKT 1	244	97.5	100.1	<b>EAST CENTERTON TO GENTRY REC, 161KV</b> 53133 ECNTRTN5 161 to 53187 GENTRYR5 161 CKT1	97	

**Table 3 – Non - SPP Facility Overloads caused by the CSWS to EMDE 100MW Transfer**

Study Year	From Area - To Area	Branch Over 100% Rate B	RATE B	BC %Loading	TC %Loading	Outaged Branch That Caused Overload
02SP	AECI-AECI	96089 5JAMESV 161 to 96673 2JAMESV 69.0 CKT 2	56	95.1	100.4	52672 TABLE R5 161 to 59497 RVS438 5 161 CKT1
02SP	AECI-AECI	96126 5MOBTAP 161 to 96120 5THMHIL 161 CKT 1	372	99.9	100.1	96044 7MCCRED 345 to 96049 7THOMHL 345 CKT1
02FA	AECI-AECI	96089 5JAMESV 161 to 96673 2JAMESV 69.0 CKT 1	56	99.4	105.7	96089 5JAMESV 161 to 96673 2JAMESV 69.0 CKT2
02WP	AMRN-AMRN	31239 MOREAU 161 to 31240 MOREAU 69.0 CKT 1	84	100.0	100.1	30102 BELLEAU 345 to 31230 MONTGMRY 345 CKT1
02WP	AMRN-AMRN	31239 MOREAU 161 to 31240 MOREAU 69.0 CKT 1	84	99.6	100.3	30532 ELDON 161 to 31400 OSAGE 138 CKT1
02WP	AMRN-AMRN	31239 MOREAU 161 to 31240 MOREAU 69.0 CKT 1	84	100.0	100.1	96064 5CAMDEN 161 to 96065 5CAMDTP 161 CKT1
02WP	AECI-AECI	96089 5JAMESV 161 to 96673 2JAMESV 69.0 CKT 2	64	98.3	103.6	96089 5JAMESV 161 to 96673 2JAMESV 69.0 CKT1
02WP	AECI-AECI	96089 5JAMESV 161 to 96673 2JAMESV 69.0 CKT 1	64	95.0	100.1	96089 5JAMESV 161 to 96673 2JAMESV 69.0 CKT2
03G	AECI-AECI	96089 5JAMESV 161 to 96673 2JAMESV 69.0 CKT 1	56	99.7	105.8	96089 5JAMESV 161 to 96673 2JAMESV 69.0 CKT2
03G	NPPD-NPPD	64893 MAXWELL7 115 to 64910 N.PLATT7 115 CKT1	201	100.0	100.1	64831 GENTLMN3 345 to 64984 SWEET W3 345 CKT 1 64831 GENTLMN3 345 to 64984 SWEET W3 345 CKT 2
03SP	SWPA-AECI	52690 CARTHG 269.0 to 96751 2REEDS 69.0 CKT 1	36	99.9	102.0	59481 MON383 7 345 to 59984 BRKLINE 7 345 CKT1
03SP	SWPA-AECI	52690 CARTHG 269.0 to 96751 2REEDS 69.0 CKT 1	36	99.8	101.8	53140 FLINTCR7 345 to 59481 MON383 7 345 CKT1
03SP	SWPA-AECI	52690 CARTHG 269.0 to 96751 2REEDS 69.0 CKT 1	36	99.8	101.7	56793 NEOSHO 7 345 to 96045 7MORGAN 345 CKT1
03SP	SWPA-AECI	52690 CARTHG 269.0 to 96751 2REEDS 69.0 CKT 1	36	98.4	100.2	59472 TIP292 5 161 to 59480 MON383 5 161 CKT1
03SP	AECI-AECI	96071 5CLINTN 161 to 96692 2CLINTN 69.0 CKT 1	25	99.8	100.9	96071 5CLINTN 161 to 96692 2CLINTN 69.0 CKT3

**Table 4 – Previously Assigned and Identified SPP Facilities Impacted by the CSWS to EMDE 100MW Transfer**

Study year	From Area - To Area	Branch Over 100% Rate B	RATE B	BC %Loading	TC %Loading	Outaged Branch That Caused Overload	ATC (MW)	Assignment
02FA	AEPW-SWPA	54015 CRAIGJT4 138 to 52814 BRKN BW4 138 CKT 1	96	100.3	100.8	55823 BBDAMTP4 138 to 56004 MTRIVER4 138 CKT1	0	2000-137
02FA	WFEC-WFEC	55802 ACME 269.0 to 55916 FRNKLNS269.0 CKT 1	34	128.6	128.6	55841 CANADNS269.0 to 55842 CANADNS4 138 CKT1	0	2000-016
02SP	AEPW-AEPW	53154 CHAMSPR5 161 to 53131 DYESS 5 161 CKT 1	244	106.2	108.3	53154 CHAMSPR5 161 to 53195 FARMGTN5 161 CKT1	0	
02SP	AEPW-AEPW	53194 ELMSPRR5 161 to 53139 FLINTCR5 161 CKT 1	312	108.8	108.9	53139 FLINTCR5 161 to 53187 GENTRYR5 161 CKT1	0	2000-011
02SP	GRRD-GRRD	54465 GRAY TP269.0 to 54428 PENZA 269.0 CKT 1	47	105.0	106.2	54514 KANSATP5 161 to 54516 KANSAS 5 161 CKT1	0	2000-004
02SP	GRRD-GRRD	54465 GRAY TP269.0 to 54428 PENZA 269.0 CKT 1	47	105.0	106.2	54515 KANSAS 269.0 to 54516 KANSAS 5 161 CKT1	0	2000-004
02SP	KACP-KACP	57968 STILWEL7 345 to 57981 LACYGNE7 345 CKT 1	1251	102.8	103.1	57965 W.GRDNR7 345 to 57981 LACYGNE7 345 CKT1	0	2000-108a
02SP	KACP-KACP	57968 STILWEL7 345 to 57981 LACYGNE7 345 CKT 1	1251	102.8	103.1	57965 W.GRDNR7 345 to 57981 LACYGNE7 345 CKT1	0	2000-086
02SP	WFEC-WFEC	55802 ACME 269.0 to 55916 FRNKLNS269.0 CKT 1	34	157.4	157.5	55841 CANADNS269.0 to 55842 CANADNS4 138 CKT1	0	2000-016
02SP	WFEC-WFEC	55802 ACME 269.0 to 55916 FRNKLNS269.0 CKT 1	34	117.9	117.9	55924 GOLDSBY269.0 to 56018 OU SW 269.0 CKT1	0	1999-017
02SP	WFEC-WFEC	55802 ACME 269.0 to 55916 FRNKLNS269.0 CKT 1	34	117.9	117.9	55924 GOLDSBY269.0 to 56018 OU SW 269.0 CKT1	0	2000-129
02SP	WFEC-WFEC	56018 OU SW 269.0 to 55924 GOLDSBY269.0 CKT 1	34	116.6	116.8	55802 ACME 269.0 to 55916 FRNKLNS269.0 CKT1	0	2000-016
02SP	WFEC-WFEC	56095 WNORMAN269.0 to 55802 ACME 269.0 CKT 1	38	110.7	110.7	55841 CANADNS269.0 to 55924 GOLDSBY269.0 CKT1	0	2000-145
02WP	WFEC-WFEC	55802 ACME 269.0 to 55916 FRNKLNS269.0 CKT 1	34	152.2	152.3	55841 CANADNS269.0 to 55842 CANADNS4 138 CKT1	0	2000-016
02WP	WFEC-WFEC	55916 FRNKLNS269.0 to 55802 ACME 269.0 CKT 1	34	109.1	109.2	55924 GOLDSBY269.0 to 56018 OU SW 269.0 CKT1	0	1999-017
02WP	WFEC-WFEC	55916 FRNKLNS269.0 to 55802 ACME 269.0 CKT 1	34	109.1	109.2	55924 GOLDSBY269.0 to 56018 OU SW 269.0 CKT1	0	2000-129
02WP	WFEC-WFEC	55924 GOLDSBY269.0 to 56018 OU SW 269.0 CKT 1	34	108.4	108.5	55802 ACME 269.0 to 55916 FRNKLNS269.0 CKT1	0	2000-016
03SP	AEPW-AEPW	53133 ECNTRTN5 161 to 53187 GENTRYR5 161 CKT 1	353	104.8	105.7	53139 FLINTCR5 161 to 53194 ELMSPRR5 161 CKT1	0	2000-086
03SP	AEPW-AEPW	53154 CHAMSPR5 161 to 53131 DYESS 5 161 CKT 1	247	112.0	114.0	53154 CHAMSPR5 161 to 53195 FARMGTN5 161 CKT1	0	
03SP	AEPW-AEPW	53154 CHAMSPR5 161 to 53131 DYESS 5 161 CKT 1	247	103.5	105.5	53157 SFAYTVL5 161 to 53195 FARMGTN5 161 CKT1	0	
03SP	AEPW-AEPW	53187 GENTRYR5 161 to 53139 FLINTCR5 161 CKT 1	353	100.1	101.7	53131 DYESS 5 161 to 53135 EROGERS5 161 CKT1	0	2000-003
03SP	AEPW-AEPW	53194 ELMSPRR5 161 to 53139 FLINTCR5 161 CKT 1	312	114.3	114.5	53139 FLINTCR5 161 to 53187 GENTRYR5 161 CKT1	0	2000-011
03SP	GRRD-GRRD	54465 GRAY TP269.0 to 54428 PENZA 269.0 CKT 1	47	106.3	107.6	54515 KANSAS 269.0 to 54516 KANSAS 5 161 CKT1	0	2000-004
03SP	GRRD-GRRD	54465 GRAY TP269.0 to 54428 PENZA 269.0 CKT 1	47	106.3	107.6	54514 KANSATP5 161 to 54516 KANSAS 5 161 CKT1	0	2000-004
03SP	KACP-KACP	57968 STILWEL7 345 to 57981 LACYGNE7 345 CKT 1	1251	104.8	105.0	57965 W.GRDNR7 345 to 57981 LACYGNE7 345 CKT1	0	2000-108a
03SP	KACP-KACP	57968 STILWEL7 345 to 57981 LACYGNE7 345 CKT 1	1251	104.8	105.0	57965 W.GRDNR7 345 to 57981 LACYGNE7 345 CKT1	0	2000-086
03SP	SWPA-AECI	52690 CARTHG 269.0 to 96751 2REEDS 69.0 CKT 1	36	109.3	110.9	59468 AUR124 5 161 to 59480 MON383 5 161 CKT1	0	
03SP	SWPA-AECI	52690 CARTHG 269.0 to 96751 2REEDS 69.0 CKT 1	36	100.8	102.3	52688 CARTHAG5 161 to 59479 LAR382 5 161 CKT1	0	2000-108a
03SP	SWPA-AECI	52690 CARTHG 269.0 to 96751 2REEDS 69.0 CKT 1	36	100.1	102.0	52680 BEAVER 5 161 to 53136 EUREKA 5 161 CKT1	0	2000-003
03SP	WERE-WERE	57151 AUBURN 3 115 to 57179 S GAGEW3 115 CKT 1	75	112.4	112.4	57151 AUBURN 3 115 to 57179 S GAGEW3 115 CKT2	0	2000-108
03SP	WFEC-WFEC	55802 ACME 269.0 to 55916 FRNKLNS269.0 CKT 1	34	157.6	157.7	55841 CANADNS269.0 to 55842 CANADNS4 138 CKT1	0	2000-016
03SP	WFEC-WFEC	56018 OU SW 269.0 to 55924 GOLDSBY269.0 CKT 1	34	117.5	117.7	55802 ACME 269.0 to 55916 FRNKLNS269.0 CKT1	0	2000-016
03SP	WFEC-WFEC	56095 WNORMAN269.0 to 55802 ACME 269.0 CKT 1	38	111.5	111.5	55841 CANADNS269.0 to 55924 GOLDSBY269.0 CKT1	0	2000-145

**Table 4 – Previously Assigned and Identified SPP Facilities Impacted by the CSWS to EMDE 100MW Transfer**

02SP	AEPW-AEPW	53522 CHEROKE4 138 to 53557 KNOXLEE4 138 CKT 1	209	105.6	105.8	53454 SW SHV 7 345 to 53424 LONGWD 7 345 CKT1 53454 SW SHV 7 345 to 53528 DIANA 7 345 CKT 1	0	2000-086
02SP	AEPW-AEPW	53522 CHEROKE4 138 to 53557 KNOXLEE4 138 CKT 1	209	105.6	105.8	53454 SW SHV 7 345 to 53424 LONGWD 7 345 CKT1 53454 SW SHV 7 345 to 53528 DIANA 7 345 CKT 1	0	2000-044
02SP	AEPW-AEPW	53473 NORAM 4 138 to 53423 LONGWD 4 138 CKT 1	234	100.5	100.6	53454 SW SHV 7 345 to 53424 LONGWD 7 345 CKT1 53454 SW SHV 7 345 to 53528 DIANA 7 345 CKT 1	0	2000-011
03SP	AEPW-AEPW	53522 CHEROKE4 138 to 53557 KNOXLEE4 138 CKT 1	209	107.6	107.8	53454 SW SHV 7 345 to 53424 LONGWD 7 345 CKT1 53454 SW SHV 7 345 to 53528 DIANA 7 345 CKT 1	0	2000-086
03SP	AEPW-AEPW	53522 CHEROKE4 138 to 53557 KNOXLEE4 138 CKT 1	209	107.6	107.8	53454 SW SHV 7 345 to 53424 LONGWD 7 345 CKT1 53454 SW SHV 7 345 to 53528 DIANA 7 345 CKT 1	0	2000-044
03SP	AEPW-AEPW	53611 TATUM 4 138 to 53522 CHEROKE4 138 CKT 1	209	101.7	101.9	53454 SW SHV 7 345 to 53424 LONGWD 7 345 CKT1 53454 SW SHV 7 345 to 53528 DIANA 7 345 CKT 1	0	2000-086
03SP	AEPW-AEPW	53423 LONGWD 4 138 to 53473 NORAM 4 138 CKT 1	234	100.7	100.9	53454 SW SHV 7 345 to 53424 LONGWD 7 345 CKT1 53454 SW SHV 7 345 to 53528 DIANA 7 345 CKT 1	0	2000-011

**Table 5** – Overloaded SPP Flowgates

Study Case	From Area - To Area	Flowgate Name	Branch Over 100% Rate B	BC % I Loading	TC % I Loading	Rate B	Outaged Branch That Caused Overload	ATC (MW)
02SP	KACP-KACP	LacStiLacWgr	57981 LACYGNE7 345 to 57968 STILWEL7 345 CKT 1	102.8	103.1	1251	57981 LACYGNE7 345 to 57965 W.GRDNR7 345 CKT1	0
03AP	KACP-KACP	StiXfrStiXfr	57968 STILWEL7 345 to 57969 STILWEL5 161 CKT 1	102.8	103.7	198	57968 STILWEL7 345 to 57969 STILWEL5 161 CKT2	0
03SP	KACP-KACP	LacStiLacWgr	57981 LACYGNE7 345 to 57968 STILWEL7 345 CKT 1	104.8	105.0	1251	57981 LACYGNE7 345 to 57965 W.GRDNR7 345 CKT1	0
03SP	AEPW-AEPW	DyeEroFliGen	53131 DYESS 5 161 to 53135 EROGERS5 161 CKT 1	99.4	102.0	244	53139 FLINTCR5 161 to 53187 GENTRYR5 161 CKT1	24

## 5. Conclusion

The Empire District Electric Company has requested Transmission Service for Network Integration Transmission Service. This study addresses 343768 (CSWS-EMDE 9/1/02-9/1/03) the addition of 100MW to the network resources of EMDE.

The initial cases include requests: 344544 1300MW (9/1/02-4/1/08) extension of SPP-2001-250 (275856),  
344546 80MW (9/1/02-4/1/08) KCPL-EMDE, and  
344550 162MW (9/1/02-9/1/03) WERE-EMDE

Request 318877 150MW SECI to EMDE cannot be studied as this time.

The previously assigned and identified facilities limit the ATC to zero due to the inability to upgrade the constraints as required. Those facilities that have an ATC of zero are given above.

2002 Summer Peak (6/1/02 – 10/1/2002) – The CSWS to EMDE transfer increases the loading on the previously overloaded La Cygne to Stilwell 345kV line. The construction lead – time for this facility is approximately 36 months.

Given the estimated in service dates of these upgrades, the ATC of the existing transmission system cannot be increased as required to provide continuous service over the reservation period.

Due to these limitations, the requested reservation 343768 (9/1/02-9/1/03) 100MW's from CSWS to EMDE will be refused.

## 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. Exclcd 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