



# **SPP** *Southwest Power Pool*

***System Impact Study SPP-2002-206  
For Transmission Service  
Requested By  
Cargill - Alliant  
From OPPD To ERCOTN  
For a Reserved Amount Of 100 MW  
From 1/1/03  
To 1/1/04***

***SPP Coordinated Planning***

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## **1. Executive Summary**

Cargill - Alliant has requested a system impact study for long-term Firm Point-to-Point transmission service from OPPD to ERCOTN. The period of the transaction is from 1/1/03 to 1/1/04. The request is for OASIS reservation 437155 and 437176 for a total amount of 100 MW.

The principal objective of this study is to identify system problems and potential system modifications necessary to facilitate the additional 100 MW transfer while maintaining system reliability. Analysis was conducted for the requested service period above and for the remaining planning horizon from 1/1/04 to 4/1/09. The additional evaluation of the planning horizon was conducted to determine any future constraints that may limit the renewal of service.

New overloads caused by the 100 MW transfer were identified along with determining the impact of the transfer on any previously assigned and identified facilities.

The OPPD – ERCOTN 100 MW transfer causes new facility overloads on the SPP transmission system, as well as increasing the loading on previously identified facilities. To provide the 100 MW of service requested, upgrades must be completed for those facilities that limit the ATC to less than 100 MW.

## **2. Introduction**

Cargill - Alliant has requested an impact study for transmission service from OPPD – ERCOTN.

The principal objective of this study is to identify the restraints on the SPP Regional Tariff System that may limit the transfer to less than 100 MW. This study includes steady-state contingency analyses (PSS/E function ACCC) and Available Transfer Capability (ATC) analyses for the requested service period and the remaining planning horizon.

The steady-state analyses consider the impact of the 100 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.

### **3. Study Methodology**

#### **A. Description**

Two analyses were conducted to determine the impact of the 100 MW transfer on the system. The first analysis was conducted to identify any new overloads caused by the 100 MW transfer. The second analysis was done to ensure that available capacity exists on previously identified circuits. Both analyses were performed on the models available for the requested service period and all remaining models available from the 2002-planning horizon.

The first analysis was to study the steady-state analysis impact of the 100 MW transfer on the SPP system. The second step was to study Available Transfer Capability (ATC) of the facilities identified in the steady-state analysis impact. 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.

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

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

SPP used eleven seasonal models to study the OPPD – ERCOTN 100 MW transfers for their requested service periods and the remaining planning horizon. The SPP 2002 Series Cases 2002/03 Winter Peak, 2003 April Minimum, 2003 Spring Peak, 2003 Summer Peak, 2003 Fall Peak, 2003/04 Winter Peak and 2004 Spring Peak were used to study the impact of the 200 MW transfer on the SPP system during the requested service period of 1/1/03 to 1/1/05. The SPP 2002 Series 2005 Summer Peak, 2005/06 Winter Peak, 2008 Summer Peak and 2008/09 Winter Peak were used to study the impact of the 200 MW transfer on the SPP system during the remaining planning horizon from 1/1/04 to 4/1/09. The Spring Peak models apply to April and May, the Summer Peak models apply to June through September, the Fall Peak models apply to October and November, and the Winter Peak models apply to December through March.

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 requested service period that were not already included in the January 2002 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**

Tables 1, 2, and 3 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 estimated ATC value using interpolation if calculated, any SPP identification or assignment of the event, and any solutions received from the transmission owners.

Table 1 shows the new SPP facility overloads caused by the 100 MW transfer. Available solutions are given in the table.

Table 2 documents overloads on Non SPP Regional Tariff participants' transmission systems caused by the 100 MW transfer.

Table 3 documents the 100 MW transfer impact on previously assigned and identified SPP facilities. Available solutions are given in the table.

Tables 1a and 3a of Appendix B documents the modeling representation of the events identified in Tables 1 and 3 respectively to include bus numbers and bus names.

**Table 1** – SPP Facility Overloads caused by the OPPD – ERCOTN 100 MW Transfer

Study Year	From Area - To Area	Branch Over 100% Rate B	Rate B	BC % Loading	TC % Loading	Outaged Branch Causing Overload	ATC (MW)	Comment
02WP		none				none		
03A		none				none		
03G	WERE-WERE	Exide Junction - Summit 115kV	181	99.4	100.2	East McPherson - Summit 230kV	71	solution undetermined
03G	WERE-WERE	North American Philips Junction (South) - West McPherson 115 kV	68	98.4	100.1	East McPherson - Summit 230kV	92	solution undetermined
03SP	AEPW-AEPW	Pittsburg - Lone Star South 138KV	197	100.0	100.1	CHAPEL HILL REC - WELSH REC 138KV	0	solution undetermined
03FA		none				none		
03WP		none				none		
04G		none				none		
05SP		none				none		
05WP		none				none		
08SP		none				none		
08WP		none				none		

**Table 2** – Non - SPP Facility Overloads caused by the OPPD – ERCOTN 100 MW MW Transfer

Study Year	From Area - To Area	Branch Over 100% Rate B	Rate B	BC % Loading	TC % Loading	Outaged Branch Causing Overload
03SP	EES-EES	99769 5PARAG 161 to 99768 5PARA-S# 161 CKT 1	148	99.8	100.1	99762 5NEW-AB 161 to 99763 5NEW-IN 161 CKT1
08SP	EES-EES	98107 8RICHARD 500 to 98430 8WEBRE 500 CKT 1	1732	99.9	100.1	50045 DOLHILL7 345 to 50046 DOLHILL6 230 CKT1
08SP	AECI-AECI	96108 5OSCEOL 161 to 96071 5CLINTN 161 CKT 1	123	98.6	100.6	56793 NEOSHO 7 345 to 57981 LACYGNE7 345 CKT1
08SP	EES-EES	98107 8RICHARD 500 to 98430 8WEBRE 500 CKT 1	1732	99.9	100.1	98302 4LA STA 138 to 98411 4WILBT 138 CKT1
08SP	EES-EES	98107 8RICHARD 500 to 98430 8WEBRE 500 CKT 1	1732	100.0	100.2	50070 FRONTST6 230 to 98652 6MICHO 230 CKT1
08SP	EES-EES	99798 5BATEVL 161 to 99808 5CUSHMN 161 CKT 1	148	100.0	100.1	53139 FLINTCR5 161 to 53701 FLINTCR121.0 CKT1
08SP	EES-EES	98107 8RICHARD 500 to 98430 8WEBRE 500 CKT 1	1732	100.0	100.2	50009 BVISTA 4 138 to 50206 WAXLAKE4 138 CKT1
08SP	OPPD-OPPD	65420 S1220 5 161 to 65411 S1211 5 161 CKT 1	277	99.2	100.6	65411 S1211 5 161 to 65499 S1299 5 161 CKT1
08SP	EES-EES	98107 8RICHARD 500 to 98430 8WEBRE 500 CKT 1	1732	99.9	100.1	98248 4WGLEN 138 to 98251 4ADDIS 138 CKT1



**Table 3 – Previously Identified SPP Facilities Impacted by the OPD – ERCOTN 100 MW Transfer**

Study Year	From Area - To Area	Branch Over 100% Rate B	Rate B	BC % Loading	TC % Loading	Branch Over 100% Rate B	ATC (MW)	Comment
02WP	WERE-WERE	EAST STREET 115 KV - WEST EMPORIA 115 KV	92	107.1	107.9	MORRIS COUNTY 115 KV - WEST EMPORIA 115 KV	0	Solution Undetermined
02WP	WERE-WERE	WEST JUNCTION CITY JUNCTION (EAST) 115 KV - WEST JUNCTION CITY JUNCTION (WEST) 115 KV	141	101.0	101.7	JEFFREY ENERGY CENTER 345 KV - SUMMIT 345 KV	0	Reconductor or redispatch.
02WP	WERE-WERE	NORTH AMERICAN PHILIPS JUNCTION (SOUTH) 115 KV - WEST MCPHERSON 115 KV	68	102.9	104.5	EAST MCPHERSON 230 KV - SUMMIT 230 KV	0	Solution Undetermined
02WP	WFEC-WFEC	ACME - FRANKLIN SW	34	158.1	158.7	CANADIAN SW 69/138	0	Solution Undetermined
02WP	WFEC-WFEC	ACME - FRANKLIN SW	34	158.1	158.7	CANADIAN SW 69/138	0	Solution Undetermined
02WP	WFEC-WFEC	ACME - WEST NORMAN	38	102.5	103.3	Canadian - Goolsby 69KV	0	Solution Undetermined
02WP	WFEC-WFEC	ACME - FRANKLIN SW	34	116.1	117.1	GOLDSBY - OKLAHOMA UNIVERSITY SW	0	Upgrade planned for 12/1/05
02WP	WFEC-WFEC	Goldsby - Oklahoma University SW	34	116.0	117.0	ACME - FRANKLIN SW	0	Solution Undetermined
02WP	WFEC-WFEC	Goldsby - Oklahoma University SW	34	100.8	101.9	Acme - West Norman 69kV	0	Solution Undetermined
02WP	WFEC-WFEC	Little Axe - Noble 69kV	26	117.7	118.2	Paoli 138/69kV Transformer	0	Solution Undetermined
02WP	WFEC-WFEC	Goldsby - Oklahoma University SW	34	143.3	144.2	Franklin SW 138/69kV Transformer	0	Solution Undetermined
02WP	WFEC-WFEC	Paoli 138/69kV Transformer	42	152.6	153.9	Canadian SW - Noble 69kV	0	Solution Undetermined
02WP	WFEC-WFEC	Paoli 138/69kV Transformer	42	112.2	113.9	CANADIAN SW 69/138	0	Solution Undetermined
03FA	WERE-WERE	ANZIO 115 KV - FORT JUNCTION SWITCHING STATION 115 KV	92	102.3	103.0	WEST JUNCTION CITY JUNCTION 115 KV - WEST JUNCTION CITY JUNCTION (EAST) 115 KV	0	Solution Undetermined
03FA	WERE-WERE	WEST JUNCTION CITY JUNCTION (EAST) 115 KV - WEST JUNCTION CITY JUNCTION (WEST) 115 KV	141	104.0	104.9	JEFFREY ENERGY CENTER 345 KV - SUMMIT 345 KV	0	Reconductor or redispatch.
03FA	WERE-WERE	Exide Junction - Summit 115kV	181	104.0	104.9	EAST MCPHERSON 230 KV - SUMMIT 230 KV	0	Solution Undetermined
03FA	WERE-WERE	Exide Junction - Summit 115kV	181	102.8	103.0	Northview - Summit 115kV	0	Solution Undetermined
03FA	WERE-WERE	NORTH AMERICAN PHILIPS JUNCTION (SOUTH) 115 KV - WEST MCPHERSON 115 KV	68	98.3	103.0	EAST MCPHERSON 230 KV - SUMMIT 230 KV	36	Solution Undetermined
03FA	WERE-WERE	Mead - Plaza 69kV	72	106.7	107.0	Evans Energy Center North - Evans Energy Center South 138kV	0	Solution Undetermined
03FA	WFEC-WFEC	ACME - FRANKLIN SW	34	127.6	128.2	CANADIAN SW 69/138	0	Solution Undetermined
03FA	WFEC-WFEC	Goldsby - Oklahoma University SW	34	114.3	115.4	Franklin SW 138/69kV Transformer	0	Solution Undetermined
03FA	WFEC-WFEC	Paoli 138/69kV Transformer	42	115.8	117.3	Canadian SW - Noble 69kV	0	Solution Undetermined
03G	WERE-WERE	KEENE 115 KV - SOUTH ALMA 115 KV	68	102.1	102.6	JEFFREY ENERGY CENTER 230 KV - EAST MANHATTAN 230 KV	0	Solution Undetermined
03G	WERE-WERE	EAST STREET 115 KV - WEST EMPORIA 115 KV	92	114.9	115.6	MORRIS COUNTY 115 KV - WEST EMPORIA 115 KV	0	Solution Undetermined
03G	WERE-WERE	ANZIO 115 KV - FORT JUNCTION SWITCHING STATION 115 KV	92	111.6	112.3	WEST JUNCTION CITY JUNCTION 115 KV - WEST JUNCTION CITY JUNCTION (EAST) 115 KV	0	Solution Undetermined
03G	WERE-WERE	WEST JUNCTION CITY JUNCTION (EAST) 115 KV - WEST JUNCTION CITY JUNCTION (WEST) 115 KV	141	109.4	110.3	JEFFREY ENERGY CENTER 345 KV - SUMMIT 345 KV	0	Reconductor or redispatch.
03G	WERE-WERE	NORTH AMERICAN PHILIPS JUNCTION (SOUTH) 115 KV - WEST MCPHERSON 115 KV	68	98.4	100.1	EAST MCPHERSON 230 KV - SUMMIT 230 KV	92	Solution Undetermined
03G	WERE-WERE	EXIDE JUNCTION 115 KV - SUMMIT 115 KV	181	99.4	100.2	EAST MCPHERSON 230 KV - SUMMIT 230 KV	71	Solution Undetermined
03G	WERE-WERE	COFFEY COUNTY NO. 4 VERNON 69 KV - ATHENS SWITCHING STATION 69 KV	45	101.7	102.5	BENTON 345 KV - WOLF CREEK 345 KV	100	Westar Transmission Operating Directive 1304.

**Table 3 continued** – Previously Identified SPP Facilities Impacted by the OPPD – ERCOTN 100 MW Transfer

Study Year	From Area - To Area	Branch Over 100% Rate B	Rate B	BC % Loading	TC % Loading	Branch Over 100% Rate B	ATC (MW)	Comment
03G	WERE-WERE	COFFEY COUNTY NO. 4 VERNON 69 KV -ATHENS SWITCHING STATION 69 KV	45	101.5	102.3	ROSE HILL 345 KV - WOLF CREEK 345 KV	100	Westar Transmission Operating Directive 1304.
03G	WERE-WERE	COFFEY COUNTY NO. 4 VERNON 69 KV - Green 69 KV	45	103.1	103.8	BENTON 345 KV - WOLF CREEK 345 KV	100	Westar Transmission Operating Directive 1304.
03G	WERE-WERE	COFFEY COUNTY NO. 4 VERNON 69 KV - Green 69 KV	45	102.9	103.7	ROSE HILL 345 KV - WOLF CREEK 345 KV	100	Westar Transmission Operating Directive 1304.
03G	WERE-WERE	Mead - Plaza 69kV	72	114.9	115.1	Evans Energy Center North - Evans Energy Center South 138kV	0	Solution Undetermined
03G	WFEC-WFEC	ACME - FRANKLIN SW	34	123.8	125.0	CANADIAN SW 69/138	0	Solution Undetermined
03G	WFEC-WFEC	Goldsby - Oklahoma University SW	34	111.8	113.1	Franklin SW 138/69kV Transformer	0	Solution Undetermined
03SP	AEPW-AEPW	Fitzhugh 161/69kV Transformer #2	111	102.8	103.1	Fitzhugh 161/69kV Transformer #1	0	Solution Undetermined
03SP	AEPW-AEPW	LONE STAR SOUTH 138KV - PITTSBURG 138KV	197	100.0	100.1	CHAPEL HILL REC - WELSH REC	0	Solution Undetermined
03SP	OKGE-OKGE	Draper 345/138KV Transformer 1	493	103.2	103.4	DRAPER LAKE 345/138 kv	0	Solution Undetermined
03SP	OKGE-OKGE	TINKER #4 138 - TINKER #2 138	100	110.4	110.5	HORSESHOE LAKE 138 - MIDWAY 138	0	Excluded Per OKGE
03SP	OKGE-OKGE	ADA OC PUMP TAP - LULA 69	48	102.5	102.7	VALLY VIEW TAP 69 - VALLY VIEW 69	0	Solution Undetermined
03SP	OKGE-OKGE	TIBBENS 69 - BEELINE 69	66	103.5	104.3	BLUEBELL 69/138	0	Solution Undetermined
03SP	WERE-WERE	Jarbalo Jct Sw. Sta. - 166th Street 115kV	97	102.6	102.9	Midland Junction - Pentagon 115kV	100	Transmission Operating Directive 1202.
03SP	WERE-WERE	Ripley - Chisholm 69 KV	128	119.9	120.0	Evans Energy Center North - SEDGWICK COUNTY NO. 4 ANDALE 69 KV	0	Solution Undetermined
03SP	WFEC-WFEC	ACME - FRANKLIN SW	34	163.3	163.9	CANADIAN SW 69/138	0	Solution Undetermined
03SP	WFEC-WFEC	ACME - FRANKLIN SW	34	124.9	125.9	GOLDSBY - OKLAHOMA UNIVERSITY SW	0	Upgrade planned for 12/1/05
03SP	WFEC-WFEC	Goldsby - Oklahoma University SW	34	123.7	124.7	ACME - FRANKLIN SW	0	Solution Undetermined
03SP	WFEC-WFEC	Goldsby - Oklahoma University SW	34	111.5	112.6	Acme - West Norman 69kV	0	Solution Undetermined
03SP	WFEC-WFEC	Goldsby - Oklahoma University SW	34	139.6	140.6	Franklin SW 138/69kV Transformer	0	Solution Undetermined
03SP	WFEC-WFEC	Paoli 138/69kV Transformer	42	100.1	101.7	CANADIAN SW 69/138	0	Solution Undetermined
03SP	KACP-KACP	Hawthorne - Randolph 161kV	293	107.9	108.0	Levee - Neast 161kV	0	Solution Undetermined
03SP	KACP-KACP	Hawthorne - Randolph 161kV	293	104.5	104.5	Chouteu - Neast 5 161 KV	0	Solution Undetermined
03SP	KACP-KACP	Avondale - Randolph 161kV	293	100.8	100.9	Levee - Neast 161kV	0	Solution Undetermined
03SP	WFEC-WFEC	ACME - WEST NORMAN	38	116.4	117.2	Canadian - Goolsby 69KV	0	Solution Undetermined
03WP	WERE-WERE	WEST JUNCTION CITY JUNCTION (EAST) 115 KV - WEST JUNCTION CITY JUNCTION (WEST) 115 KV	141	103.1	104.1	JEFFREY ENERGY CENTER 345 KV - SUMMIT 345 KV	0	Reconductor or redispatch.
03WP	WERE-WERE	Exide Junction - Summit 115kV	181	99.8	100.6	EAST MCPHERSON 230 KV - SUMMIT 230 KV	27	Solution Undetermined
03WP	WERE-WERE	NORTH AMERICAN PHILIPS JUNCTION (SOUTH) 115 KV - WEST MCPHERSON 115 KV	68	100.6	102.3	EAST MCPHERSON 230 KV - SUMMIT 230 KV	0	Solution Undetermined
03WP	WFEC-WFEC	ACME - FRANKLIN SW	34	153.7	154.7	CANADIAN SW 69/138	0	Solution Undetermined
03WP	WFEC-WFEC	ACME - WEST NORMAN	38	99.4	100.2	Canadian - Goolsby 69KV	78	Solution Undetermined

**Table 3 continued** – Previously Identified SPP Facilities Impacted by the OPPD – ERCOTN 100 MW Transfer

Study Year	From Area - To Area	Branch Over 100% Rate B	Rate B	BC % Loading	TC % Loading	Branch Over 100% Rate B	ATC (MW)	Comment
03WP	WFEC-WFEC	ACME - FRANKLIN SW	34	112.5	113.5	GOLDSBY - OKLAHOMA UNIVERSITY SW	0	Upgrade planned for 12/1/05
03WP	WFEC-WFEC	Goldsby - Oklahoma University SW	34	111.9	112.9	ACME - FRANKLIN SW	0	Solution Undetermined
03WP	WFEC-WFEC	Little Axe - Noble 69kV	26	115.1	115.8	Paoli 138/69kV Transformer	0	Solution Undetermined
03WP	WFEC-WFEC	Goldsby - Oklahoma University SW	34	139.6	140.5	Franklin SW 138/69kV Transformer	0	Solution Undetermined
03WP	WFEC-WFEC	Paoli 138/69kV Transformer	42	152.3	153.8	Canadian SW - Noble 69kV	0	Solution Undetermined
03WP	WFEC-WFEC	Paoli 138/69kV Transformer	42	114.5	114.6	CANADIAN SW 69/138	0	Solution Undetermined
04G	WERE-WERE	ANZIO 115 KV - FORT JUNCTION SWITCHING STATION 115 KV	92	101.2	102.0	WEST JUNCTION CITY 115 KV - WEST JUNCTION CITY JUNCTION (EAST) 115 KV	0	Solution Undetermined
04G	WERE-WERE	WEST JUNCTION CITY JUNCTION (EAST) 115 KV - WEST JUNCTION CITY JUNCTION (WEST) 115 KV	141	100.7	101.7	JEFFREY ENERGY CENTER 345 KV - SUMMIT 345 KV	0	Reconductor or redispatch.
04G	WERE-WERE	Exide Junction - Summit 115kV	181	104.8	105.0	Northview - Summit 115kV	0	Solution Undetermined
04G	WERE-WERE	EXIDE JUNCTION 115 KV - SUMMIT 115 KV	181	99.8	100.6	EAST MCPHERSON 230 KV - SUMMIT 230 KV	23	Solution Undetermined
04G	WERE-WERE	COFFEY COUNTY NO. 4 VERNON 69 KV - Green 69 KV	45	99.8	100.6	BENTON 345 KV - WOLF CREEK 345 KV	100	Westar Transmission Operating Directive 1304.
04G	WERE-WERE	COFFEY COUNTY NO. 4 VERNON 69 KV - Green 69 KV	45	99.7	100.5	ROSE HILL 345 KV - WOLF CREEK 345 KV	100	Westar Transmission Operating Directive 1304.
04G	WFEC-WFEC	ACME - FRANKLIN SW	34	120.5	121.6	CANADIAN SW 69/138	0	Solution Undetermined
04G	WFEC-WFEC	Goldsby - Oklahoma University SW	34	108.5	109.5	Franklin SW 138/69kV Transformer	0	Solution Undetermined
05SP	AEPW-AEPW	Fitzhugh 161/69kV Transformer #2	111	104.4	104.7	Fitzhugh 161/69kV Transformer #1	0	Solution Undetermined
05SP	AEPW-AEPW	LONE STAR SOUTH 138KV - WILKES 138KV	316	100.6	100.9	WELSH REC - WILKES 138KV	0	Solution Undetermined
05SP	AEPW-AEPW	LONE STAR SOUTH 138KV - PITTSBURG 138KV	197	118.1	118.2	CHAPEL HILL REC - WELSH REC	0	Solution Undetermined
05SP	AEPW-AEPW	LONE STAR SOUTH 138KV - PITTSBURG 138KV	197	107.0	107.1	CHAPEL HILL REC - PETTY 138 KV	0	Solution Undetermined
05SP	AEPW-AEPW	BROKEN ARROW 101ST NORTH - ONETA 138KV	210	103.4	103.5	BROKEN ARROW NORTH - NORTH TAP - ONETA 138KV	0	Replace Wavetrap; \$30000
05SP	OKGE-OKGE	Draper 345/138KV Transformer 1	493	105.3	105.5	DRAPER LAKE 345/138 kv	0	Solution Undetermined
05SP	OKGE-OKGE	TINKER #4 138 - TINKER #2 138	100	114.6	114.7	HORSESHOE LAKE 138 - MIDWAY 138	0	Excluded Per OKGE
05SP	OKGE-OKGE	ADA OC PUMP TAP - LULA 69	48	110.8	110.9	VALLY VIEW TAP 69 - VALLY VIEW 69	0	Solution Undetermined
05SP	OKGE-OKGE	TIBBENS 69 - BEELINE 69	66	105.4	106.2	BLUEBELL 69/138	0	Solution Undetermined
05SP	WERE-WERE	Jarbalo Jct Sw. Sta. - 166th Street 115kV	97	108.1	108.4	Midland Junction - Pentagon 115kV	100	Transmission Operating Directive 1202.
05SP	WFEC-WFEC	FRANKLIN SW 69/138	70	105.9	106.2	CANADIAN SW 69/138	0	Replace 70 MVA Auto with 112 MVA autotransformer (100 MVA base Rating), Upgrade 138 and 69 KV buswork and switches.
05SP	WFEC-WFEC	Little Axe - Noble 69kV	26	118.4	118.5	Paoli 138/69kV Transformer	0	Solution Undetermined
05WP	WERE-WERE	ANZIO 115 KV - FORT JUNCTION SWITCHING STATION 115 KV	92	100.9	101.5	WEST JUNCTION CITY 115 KV - WEST JUNCTION CITY JUNCTION (EAST) 115 KV	0	Solution Undetermined
05WP	WERE-WERE	WEST JUNCTION CITY JUNCTION (EAST) 115 KV - WEST JUNCTION CITY JUNCTION (WEST) 115 KV	141	103.8	104.7	JEFFREY ENERGY CENTER 345 KV - SUMMIT 345 KV	0	Reconductor or redispatch.
05WP	WERE-WERE	NORTH AMERICAN PHILIPS JUNCTION (SOUTH) 115 KV - WEST MCPHERSON 115 KV	68	102.6	104.4	EAST MCPHERSON 230 KV - SUMMIT 230 KV	0	Solution Undetermined

**Table 3 continued** – Previously Identified SPP Facilities Impacted by the OPPD – ERCOTN 100 MW Transfer

Study Year	From Area - To Area	Branch Over 100% Rate B	Rate B	BC % Loading	TC % Loading	Branch Over 100% Rate B	ATC (MW)	Comment
05WP	WFEC-WFEC	Little Axe - Noble 69kV	26	106.2	107.1	Paoli 138/69kV Transformer	0	Solution Undetermined
08SP	AEPW-AEPW	Fitzhugh 161/69kV Transformer #1	111	107.5	107.7	Fitzhugh 161/69kV Transformer #2	0	Solution Undetermined
08SP	AEPW-AEPW	LONE STAR SOUTH 138KV - WILKES 138KV	316	102.5	102.7	WELSH REC - WILKES 138KV	0	Solution Undetermined
08SP	AEPW-AEPW	LONE STAR SOUTH 138KV - WILKES 138KV	316	101.5	101.7	CHAPEL HILL REC - WELSH REC	0	Solution Undetermined
08SP	AEPW-AEPW	LONE STAR SOUTH 138KV - PITTSBURG 138KV	197	115.8	115.8	CHAPEL HILL REC - PETTY 138 KV	0	Solution Undetermined
08SP	AEPW-AEPW	BROKEN ARROW 101ST NORTH - ONETA 138KV	210	123.4	123.6	BROKEN ARROW NORTH - NORTH TAP - ONETA 138KV	0	Replace Wavetrap; \$30000
08SP	AEPW-AEPW	BROKEN ARROW 101ST NORTH - ONETA 138KV	210	104.2	104.3	East Centerton 345/161kV	0	Solution Undetermined
08SP	AEPW-AEPW	BROKEN ARROW 101ST NORTH - ONETA 138KV	210	104.2	104.3	East Centerton - Flint Creek 345kV	0	Solution Undetermined
08SP	AEPW-AEPW	BROKEN ARROW 101ST NORTH - ONETA 138KV	210	104.2	104.3	Keystone - Silver City 138 KV	0	Solution Undetermined
08SP	AEPW-AEPW	BROKEN ARROW 101ST NORTH - ONETA 138KV	210	103.9	104.0	Cromwell - Wewoka 138 KV	0	Solution Undetermined
08SP	AEPW-AEPW	BROKEN ARROW 101ST NORTH - ONETA 138KV	210	103.5	103.6	Bluebell - Bristow 138 KV	0	Solution Undetermined
08SP	AEPW-AEPW	Valley Timber - Hugo 69kV	48	106.5	106.7	Allen Natural Gas Tap - Tupelo 138 kv	0	Solution Undetermined
08SP	OKGE-OKGE	Draper 345/138KV Transformer 1	493	107.2	107.5	DRAPER LAKE 345/138 kv	0	Solution Undetermined
08SP	OKGE-OKGE	Draper 345/138KV Transformer 2	493	107.2	107.5	DRAPER LAKE 345/138 kv	0	Solution Undetermined
08SP	OKGE-OKGE	TINKER #4 138 - TINKER #2 138	100	139.7	140.0	HORSESHOE LAKE 138 - MIDWAY 138	0	Excluded Per OKGE
08SP	OKGE-OKGE	TINKER #4 138 - TINKER #2 138	100	119.4	119.5	Midway - NE 10th 138kV	0	Excluded Per OKGE
08SP	OKGE-OKGE	ADA OC PUMP TAP - LULA 69	48	121.3	121.5	VALLY VIEW TAP 69 - VALLY VIEW 69	0	Solution Undetermined
08SP	OKGE-OKGE	ADA OC PUMP TAP - LULA 69	48	121.3	121.5	VALLY VIEW TAP 69 - VALLY VIEW 69	0	Solution Undetermined
08SP	OKGE-OKGE	TIBBENS 69 - BEELINE 69	66	107.5	108.2	BLUEBELL 69/138	0	Solution Undetermined
08SP	OKGE-OKGE	3RDST 161 - ARKOMA 161	335	103.4	103.8	FT SMITH 161 - COLONY 161	0	Solution Undetermined
08SP	WERE-WERE	Jarbalo Jct Sw. Sta. - 166th Street 115kV	97	114.3	114.6	Midland Junction - Pentagon 115kV	100	Transmission Operating Directive 1202.
08SP	WERE-WERE	HUTCHINSON GAS TURBINE STATION - HUTCHINSON GAS TURBINE 69KV	130	184.1	184.2	Circle - Hutchinson Gas Turbine Station 115kV	0	Solution Undetermined
08SP	WERE-WERE	HUTCHINSON GAS TURBINE STATION - HUTCHINSON GAS TURBINE 69KV	43	103.0	106.5	El Paso - Farber 138 kV	0	Solution Undetermined
08SP	WFEC-OKGE	FRANKLIN SW - MIDWEST TAP 138	215	109.6	110.9	CROMWELL - WETUMKA4 138	0	Solution Undetermined
08SP	WFEC-OKGE	FRANKLIN SW - MIDWEST TAP 138	215	109.5	110.7	PHAROAH - WETUMKA4 138	0	Solution Undetermined
08SP	WFEC-OKGE	FRANKLIN SW - MIDWEST TAP 138	215	100.1	100.6	Hollywood - Midwest 138 kv	0	Solution Undetermined
08SP	WFEC-WFEC	FRANKLIN SW 69/138	70	110.5	111.0	CANADIAN SW 69/138	0	Replace 70 MVA Auto with 112 MVA autotransformer (100 MVA base Rating), Upgrade 138 and 69 KV buswork and switches.
08WP	WERE-WERE	Mead - Plaza 69kV	72	110.2	110.4	Evans Energy Center North - Evans Energy Center South 138kV	0	Solution Undetermined

## **5. Conclusion**

The OPPD – ERCOTN 100 MW transfer causes new facility overloads on the SPP transmission system, as well as increasing the loading on previously identified facilities. To provide the 100 MW of service requested, upgrades must be completed for those facilities given in Tables 1 and 3 that limit the ATC to less than 100 MW.

The final cost assignment of facilities and ATC to Cargill - Alliant will be determined upon the completion of a 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 – 0.5
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

## **Appendix B**

**Table 1a** – Model Data for Previously Identified SPP Facilities Impacted by the OPPD to ERCOTN 100 MW Transfer

Study Year	From Area - To Area	Branch Over 100% Rate B	Rate B	BC % Loading	TC % Loading	Outaged Branch Causing Overload	ATC (MW)	Comment
02WP		none				none	100	
03A		none				none	100	
03G	WERE-WERE	57381 SUMMIT 3 115 to 57368 EXIDE J3 115 CKT 1	181	99.4	100.2	56872 EMCIPHER6 230 to 56873 SUMMIT 6 230 CKT1	71	Solution Undetermined
03G	WERE-WERE	57374 SPHILPJ3 115 to 57438 WMCPHER3 115 CKT 1	68	98.3	100.1	56872 EMCIPHER6 230 to 56873 SUMMIT 6 230 CKT1	92	Solution Undetermined
03SP	AEPW-AEPW	53311 PITTSB_4 138 to 53276 LSSOUTH4 138 CKT 1	197	99.9	100.0	53521 CHAPELH4 138 to 53622 WELSHRE4 138 CKT1	0	Solution Undetermined
03FA		none				none	100	
03WP		none				none	100	
04G		none				none	100	
05SP		none				none	100	
05WP		none				none	100	
08SP		none				none	100	
08WP		none				none	100	

**Table 3a**– Model Data for Previously Identified SPP Facilities Impacted by the OPPD to ERCOTN 100 MW Transfer

Study Year	From Area - To Area	Branch Over 100% Rate B	Rate B	BC % Loading	TC % Loading	Outaged Branch Causing Overload	ATC (MW)	Comment
02WP	WERE-WERE	57301 EAST ST3 115 to 57309 WEMPOR13 115 CKT 1	92	107.1	107.9	57305 MORRIS 3 115 to 57309 WEMPOR13 115 CKT1	0	Solution Undetermined
02WP	WERE-WERE	57343 WJCCTYE3 115 to 57342 WJCCTY 3 115 CKT 1	141	101.0	101.7	56766 JEC N 7 345 to 56773 SUMMIT 7 345 CKT1	0	Reconductor or redispatch.
02WP	WERE-WERE	57374 SPHILPJ3 115 to 57438 WMCIPHER3 115 CKT 1	68	102.9	104.5	56872 EMCIPHER6 230 to 56873 SUMMIT 6 230 CKT1	0	Solution Undetermined
02WP	WFEC-WFEC	55802 ACME 269.0 to 55916 FRNKLSN269.0 CKT 1	34	158.1	158.7	55841 CANADNS269.0 to 55842 CANADNS4 138 CKT1	0	Solution Undetermined
02WP	WFEC-WFEC	55802 ACME 269.0 to 55916 FRNKLSN269.0 CKT 1	34	158.1	158.7	55841 CANADNS269.0 to 55842 CANADNS4 138 CKT1	0	Solution Undetermined
02WP	WFEC-WFEC	55802 ACME 269.0 to 56095 WNORMAN269.0 CKT 1	38	102.5	103.3	55841 CANADNS269.0 to 55924 GOLDSBY269.0 CKT1	0	Solution Undetermined
02WP	WFEC-WFEC	55916 FRNKLSN269.0 to 55802 ACME 269.0 CKT 1	34	116.1	117.1	55924 GOLDSBY269.0 to 56018 OU SW 269.0 CKT1	0	Upgrade planned for 12/1/05
02WP	WFEC-WFEC	55924 GOLDSBY269.0 to 56018 OU SW 269.0 CKT 1	34	116.0	117.0	55802 ACME 269.0 to 55916 FRNKLSN269.0 CKT1	0	Solution Undetermined
02WP	WFEC-WFEC	55924 GOLDSBY269.0 to 56018 OU SW 269.0 CKT 1	34	100.8	101.9	55802 ACME 269.0 to 56095 WNORMAN269.0 CKT1	0	Solution Undetermined
02WP	WFEC-WFEC	55976 LIL AXE269.0 to 56011 NOBLE 269.0 CKT 1	26	117.7	118.2	56022 PAOLI 269.0 to 56023 PAOLI 4 138 CKT1	0	Solution Undetermined
02WP	WFEC-WFEC	56018 OU SW 269.0 to 55924 GOLDSBY269.0 CKT 1	34	143.3	144.2	55916 FRNKLSN269.0 to 55917 FRNKLSN4 138 CKT1	0	Solution Undetermined
02WP	WFEC-WFEC	56023 PAOLI 4 138 to 56022 PAOLI 269.0 CKT 1	42	152.6	153.9	55841 CANADNS269.0 to 56011 NOBLE 269.0 CKT1	0	Solution Undetermined
02WP	WFEC-WFEC	56023 PAOLI 4 138 to 56022 PAOLI 269.0 CKT 1	42	112.2	113.9	55841 CANADNS269.0 to 55842 CANADNS4 138 CKT1	0	Solution Undetermined
03FA	WERE-WERE	57321 ANZIO 3 115 to 57328 FT JCT 3 115 CKT 1	92	102.3	103.0	57342 WJCCTY 3 115 to 57343 WJCCTYE3 115 CKT1	0	Solution Undetermined
03FA	WERE-WERE	57343 WJCCTYE3 115 to 57342 WJCCTY 3 115 CKT 1	141	104.0	104.9	56766 JEC N 7 345 to 56773 SUMMIT 7 345 CKT1	0	Reconductor or redispatch.
03FA	WERE-WERE	57368 EXIDE J3 115 to 57381 SUMMIT 3 115 CKT 1	181	104.0	104.9	56872 EMCIPHER6 230 to 56873 SUMMIT 6 230 CKT1	0	Solution Undetermined
03FA	WERE-WERE	57368 EXIDE J3 115 to 57381 SUMMIT 3 115 CKT 1	181	102.8	103.0	57371 NORTHVVW3 115 to 57381 SUMMIT 3 115 CKT1	0	Solution Undetermined
03FA	WERE-WERE	57374 SPHILPJ3 115 to 57438 WMCIPHER3 115 CKT 1	68	98.3	103.0	56872 EMCIPHER6 230 to 56873 SUMMIT 6 230 CKT1	36	Solution Undetermined
03FA	WERE-WERE	57815 MEAD 269.0 to 57829 PLAZA 269.0 CKT 1	72	106.7	107.0	57040 EVANS N4 138 to 57041 EVANS S4 138 CKT1	0	Solution Undetermined
03FA	WFEC-WFEC	55802 ACME 269.0 to 55916 FRNKLSN269.0 CKT 1	34	127.6	128.2	55841 CANADNS269.0 to 55842 CANADNS4 138 CKT1	0	Solution Undetermined
03FA	WFEC-WFEC	55924 GOLDSBY269.0 to 56018 OU SW 269.0 CKT 1	34	114.3	115.4	55916 FRNKLSN269.0 to 55917 FRNKLSN4 138 CKT1	0	Solution Undetermined
03FA	WFEC-WFEC	56023 PAOLI 4 138 to 56022 PAOLI 269.0 CKT 1	42	115.8	117.3	55841 CANADNS269.0 to 56011 NOBLE 269.0 CKT1	0	Solution Undetermined
03G	WERE-WERE	57167 KEENE 3 115 to 57339 S ALMA 3 115 CKT 1	68	102.1	102.6	56852 JEC 6 230 to 56861 EMANHAT6 230 CKT1	0	Solution Undetermined
03G	WERE-WERE	57301 EAST ST3 115 to 57309 WEMPOR13 115 CKT 1	92	114.9	115.6	57305 MORRIS 3 115 to 57309 WEMPOR13 115 CKT1	0	Solution Undetermined
03G	WERE-WERE	57321 ANZIO 3 115 to 57328 FT JCT 3 115 CKT 1	92	111.6	112.3	57342 WJCCTY 3 115 to 57343 WJCCTYE3 115 CKT1	0	Solution Undetermined
03G	WERE-WERE	57343 WJCCTYE3 115 to 57342 WJCCTY 3 115 CKT 1	141	109.4	110.3	56766 JEC N 7 345 to 56773 SUMMIT 7 345 CKT1	0	Reconductor or redispatch.
03G	WERE-WERE	57374 SPHILPJ3 115 to 57438 WMCIPHER3 115 CKT 1	68	98.4	100.1	56872 EMCIPHER6 230 to 56873 SUMMIT 6 230 CKT1	92	Solution Undetermined
03G	WERE-WERE	57381 SUMMIT 3 115 to 57368 EXIDE J3 115 CKT 1	181	99.4	100.2	56872 EMCIPHER6 230 to 56873 SUMMIT 6 230 CKT1	71	Solution Undetermined
03G	WERE-WERE	57631 CC4VERN269.0 to 57623 ATHENS 269.0 CKT 1	45	101.7	102.5	56791 BENTON 7 345 to 56797 WOLFCKR7 345 CKT1	100	Westar Transmission Operating Directive 1304.
03G	WERE-WERE	57631 CC4VERN269.0 to 57623 ATHENS 269.0 CKT 1	45	101.5	102.3	56794 ROSEHIL7 345 to 56797 WOLFCKR7 345 CKT1	100	Westar Transmission Operating Directive 1304.
03G	WERE-WERE	57636 GREEN 269.0 to 57631 CC4VERN269.0 CKT 1	45	103.1	103.8	56791 BENTON 7 345 to 56797 WOLFCKR7 345 CKT1	100	Westar Transmission Operating Directive 1304.
03G	WERE-WERE	57636 GREEN 269.0 to 57631 CC4VERN269.0 CKT 1	45	102.9	103.7	56794 ROSEHIL7 345 to 56797 WOLFCKR7 345 CKT1	100	Westar Transmission Operating Directive 1304.
03G	WERE-WERE	57815 MEAD 269.0 to 57829 PLAZA 269.0 CKT 1	72	114.9	115.1	57040 EVANS N4 138 to 57041 EVANS S4 138 CKT1	0	Solution Undetermined



**Table 3a continued**– Model Data for Previously Identified SPP Facilities Impacted by the OPD to ERCOTN 100 MW Transfer

Study Year	From Area - To Area	Branch Over 100% Rate B	Rate B	BC % Loading	TC % Loading	Outaged Branch Causing Overload	ATC (MW)	Comment
03G	WFEC-WFEC	55802 ACME 269.0 to 55916 FRNKLS269.0 CKT 1	34	123.8	125.0	55841 CANADNS269.0 to 55842 CANADNS4 138 CKT1	0	Solution Undetermined
03G	WFEC-WFEC	55924 GOLDSBY269.0 to 56018 OU SW 269.0 CKT 1	34	111.8	113.1	55916 FRNKLS269.0 to 55917 FRNKLS4 138 CKT1	0	Solution Undetermined
03SP	AEPW-AEPW	53203 FITZHUG269.0 to 53208 FITZHUG5 161 CKT 2	111	102.8	103.1	53203 FITZHUG269.0 to 53208 FITZHUG5 161 CKT1	0	Solution Undetermined
03SP	AEPW-AEPW	53311 PITTSB_4 138 to 53276 LSSOUTH4 138 CKT 1	197	100.0	100.1	53521 CHAPELH4 138 to 53622 WELSHRE4 138 CKT1	0	Solution Undetermined
03SP	OKGE-OKGE	54934 DRAPER 7 345 to 54933 DRAPER 4 138 CKT 1	493	103.2	103.4	54933 DRAPER 4 138 to 54934 DRAPER 7 345 CKT2	0	Solution Undetermined
03SP	OKGE-OKGE	54988 TINKER44 138 to 54990 TINKER24 138 CKT 1	100	110.4	110.5	54941 HSL 4 138 to 54966 MIDWAY 4 138 CKT1	0	Excluded Per OKGE
03SP	OKGE-OKGE	55190 AOCPT 269.0 to 55191 LULA 269.0 CKT 1	48	102.5	102.7	55181 VALYVUT269.0 to 55182 VALLYVU269.0 CKT1	0	Solution Undetermined
03SP	OKGE-OKGE	55237 TIBBENS269.0 to 55246 BEELINE269.0 CKT 1	66	103.5	104.3	55241 BLUEBEL269.0 to 55242 BLUEBEL4 138 CKT1	0	Solution Undetermined
03SP	WERE-WERE	57244 JARBALO3 115 to 57233 166TH 3 115 CKT 1	97	102.6	102.9	57252 MIDLAND3 115 to 57261 PENTAGN3 115 CKT1	100	Transmission Operating Directive 1202.
03SP	WERE-WERE	57832 RIPLEYM269.0 to 57786 CHISHLM269.0 CKT 1	128	119.9	120.0	57040 EVANS N4 138 to 57065 SG12COL4 138 CKT1	0	Solution Undetermined
03SP	WFEC-WFEC	55802 ACME 269.0 to 55916 FRNKLS269.0 CKT 1	34	163.3	163.9	55841 CANADNS269.0 to 55842 CANADNS4 138 CKT1	0	Solution Undetermined
03SP	WFEC-WFEC	55916 FRNKLS269.0 to 55802 ACME 269.0 CKT 1	34	124.9	125.9	55924 GOLDSBY269.0 to 56018 OU SW 269.0 CKT1	0	Upgrade planned for 12/1/05
03SP	WFEC-WFEC	55924 GOLDSBY269.0 to 56018 OU SW 269.0 CKT 1	34	123.7	124.7	55802 ACME 269.0 to 55916 FRNKLS269.0 CKT1	0	Solution Undetermined
03SP	WFEC-WFEC	55924 GOLDSBY269.0 to 56018 OU SW 269.0 CKT 1	34	111.5	112.6	55802 ACME 269.0 to 56095 WNORMAN269.0 CKT1	0	Solution Undetermined
03SP	WFEC-WFEC	56018 OU SW 269.0 to 55924 GOLDSBY269.0 CKT 1	34	139.6	140.6	55916 FRNKLS269.0 to 55917 FRNKLS4 138 CKT1	0	Solution Undetermined
03SP	WFEC-WFEC	56023 PAOLI 4 138 to 56022 PAOLI 269.0 CKT 1	42	100.1	101.7	55841 CANADNS269.0 to 55842 CANADNS4 138 CKT1	0	Solution Undetermined
03SP	KACP-KACP	58027 RANDLPH5 161 to 57973 HAWTHRN5 161 CKT 1	293	107.9	108.0	57976 LEVEE 5 161 to 57985 NEAST 5 161 CKT1	0	Solution Undetermined
03SP	KACP-KACP	58027 RANDLPH5 161 to 57973 HAWTHRN5 161 CKT 1	293	104.5	104.5	57985 NEAST 5 161 to 58011 CHOUTEU5 161 CKT1	0	Solution Undetermined
03SP	KACP-KACP	58015 AVONDAL5 161 to 58027 RANDLPH5 161 CKT 1	293	100.8	100.9	57976 LEVEE 5 161 to 57985 NEAST 5 161 CKT1	0	Solution Undetermined
03SP	WFEC-WFEC	56095 WNORMAN269.0 to 55802 ACME 269.0 CKT 1	38	116.4	117.2	55841 CANADNS269.0 to 55924 GOLDSBY269.0 CKT1	0	Solution Undetermined
03WP	WERE-WERE	57342 WJCCTY 3 115 to 57343 WJCCTYE3 115 CKT 1	141	103.1	104.1	56766 JEC N 7 345 to 56773 SUMMIT 7 345 CKT1	0	Reconductor or redispatch.
03WP	WERE-WERE	57368 EXIDE J3 115 to 57381 SUMMIT 3 115 CKT 1	181	99.8	100.6	56872 EMCIPHER6 230 to 56873 SUMMIT 6 230 CKT1	27	Solution Undetermined
03WP	WERE-WERE	57374 SPHILPJ3 115 to 57438 WMCPHER3 115 CKT 1	68	100.6	102.3	56872 EMCIPHER6 230 to 56873 SUMMIT 6 230 CKT1	0	Solution Undetermined
03WP	WFEC-WFEC	55802 ACME 269.0 to 55916 FRNKLS269.0 CKT 1	34	153.7	154.7	55841 CANADNS269.0 to 55842 CANADNS4 138 CKT1	0	Solution Undetermined
03WP	WFEC-WFEC	55802 ACME 269.0 to 56095 WNORMAN269.0 CKT 1	38	99.4	100.2	55841 CANADNS269.0 to 55924 GOLDSBY269.0 CKT1	78	Solution Undetermined
03WP	WFEC-WFEC	55916 FRNKLS269.0 to 55802 ACME 269.0 CKT 1	34	112.5	113.5	55924 GOLDSBY269.0 to 56018 OU SW 269.0 CKT1	0	Upgrade planned for 12/1/05
03WP	WFEC-WFEC	55924 GOLDSBY269.0 to 56018 OU SW 269.0 CKT 1	34	111.9	112.9	55802 ACME 269.0 to 55916 FRNKLS269.0 CKT1	0	Solution Undetermined
03WP	WFEC-WFEC	55976 LIL AXE269.0 to 56011 NOBLE 269.0 CKT 1	26	115.1	115.8	56022 PAOLI 269.0 to 56023 PAOLI 4 138 CKT1	0	Solution Undetermined
03WP	WFEC-WFEC	56018 OU SW 269.0 to 55924 GOLDSBY269.0 CKT 1	34	139.6	140.5	55916 FRNKLS269.0 to 55917 FRNKLS4 138 CKT1	0	Solution Undetermined
03WP	WFEC-WFEC	56023 PAOLI 4 138 to 56022 PAOLI 269.0 CKT 1	42	152.3	153.8	55841 CANADNS269.0 to 56011 NOBLE 269.0 CKT1	0	Solution Undetermined
03WP	WFEC-WFEC	56023 PAOLI 4 138 to 56022 PAOLI 269.0 CKT 1	42	114.5	114.6	55841 CANADNS269.0 to 55842 CANADNS4 138 CKT1	0	Solution Undetermined
04G	WERE-WERE	57321 ANZIO 3 115 to 57328 FT JCT 3 115 CKT 1	92	101.2	102.0	57342 WJCCTY 3 115 to 57343 WJCCTYE3 115 CKT1	0	Solution Undetermined
04G	WERE-WERE	57343 WJCCTYE3 115 to 57342 WJCCTY 3 115 CKT 1	141	100.7	101.7	56766 JEC N 7 345 to 56773 SUMMIT 7 345 CKT1	0	Reconductor or redispatch.

**Table 3a continued**– Model Data for Previously Identified SPP Facilities Impacted by the OPPD to ERCOTN 100 MW Transfer

Study Year	From Area - To Area	Branch Over 100% Rate B	Rate B	BC % Loading	TC % Loading	Outaged Branch Causing Overload	ATC (MW)	Comment
04G	WERE-WERE	57368 EXIDE J3 115 to 57381 SUMMIT 3 115 CKT 1	181	104.8	105.0	57371 NORTHVV3 115 to 57381 SUMMIT 3 115 CKT1	0	Solution Undetermined
04G	WERE-WERE	57381 SUMMIT 3 115 to 57368 EXIDE J3 115 CKT 1	181	99.8	100.6	56872 EMCIPHER6 230 to 56873 SUMMIT 6 230 CKT1	23	Solution Undetermined
04G	WERE-WERE	57636 GREEN 269.0 to 57631 CC4VERN269.0 CKT 1	45	99.8	100.6	56791 BENTON 7 345 to 56797 WOLFCRK7 345 CKT1	100	Westar Transmission Operating Directive 1304.
04G	WERE-WERE	57636 GREEN 269.0 to 57631 CC4VERN269.0 CKT 1	45	99.7	100.5	56794 ROSEHIL7 345 to 56797 WOLFCRK7 345 CKT1	100	Westar Transmission Operating Directive 1304.
04G	WFEC-WFEC	55802 ACME 269.0 to 55916 FRNKLS269.0 CKT 1	34	120.5	121.6	55841 CANADNS269.0 to 55842 CANADNS4 138 CKT1	0	Solution Undetermined
04G	WFEC-WFEC	55924 GOLDSBY269.0 to 56018 OU SW 269.0 CKT 1	34	108.5	109.5	55916 FRNKLS269.0 to 55917 FRNKLS4 138 CKT1	0	Solution Undetermined
05SP	AEPW-AEPW	53203 FITZHUG269.0 to 53208 FITZHUG5 161 CKT 2	111	104.4	104.7	53203 FITZHUG269.0 to 53208 FITZHUG5 161 CKT1	0	Solution Undetermined
05SP	AEPW-AEPW	53276 LSSOUTH4 138 to 53619 WILKES 4 138 CKT 1	316	100.6	100.9	53619 WILKES 4 138 to 53622 WELSHRE4 138 CKT1	0	Solution Undetermined
05SP	AEPW-AEPW	53311 PITTSB_4 138 to 53276 LSSOUTH4 138 CKT 1	197	118.1	118.2	53521 CHAPELH4 138 to 53622 WELSHRE4 138 CKT1	0	Solution Undetermined
05SP	AEPW-AEPW	53311 PITTSB_4 138 to 53276 LSSOUTH4 138 CKT 1	197	107.0	107.1	53308 PETTY 4 138 to 53521 CHAPELH4 138 CKT1	0	Solution Undetermined
05SP	AEPW-AEPW	53818 ONETA--4 138 to 53781 BA101-N4 138 CKT 1	210	103.4	103.5	53797 BANNTAP4 138 to 53818 ONETA--4 138 CKT1	0	Replace Wavetrap; \$30000
05SP	OKGE-OKGE	54934 DRAPER 7 345 to 54933 DRAPER 4 138 CKT 1	493	105.3	105.5	54933 DRAPER 4 138 to 54934 DRAPER 7 345 CKT2	0	Solution Undetermined
05SP	OKGE-OKGE	54988 TINKER44 138 to 54990 TINKER24 138 CKT 1	100	114.6	114.7	54941 HSL 4 138 to 54966 MIDWAY 4 138 CKT1	0	Excluded Per OKGE
05SP	OKGE-OKGE	55190 AOCPT 269.0 to 55191 LULA 269.0 CKT 1	48	110.8	110.9	55181 VALYVUT269.0 to 55182 VALLYVU269.0 CKT1	0	Solution Undetermined
05SP	OKGE-OKGE	55237 TIBBENS269.0 to 55246 BEELINE269.0 CKT 1	66	105.4	106.2	55241 BLUEBEL269.0 to 55242 BLUEBEL4 138 CKT1	0	Solution Undetermined
05SP	WERE-WERE	57244 JARBALO3 115 to 57233 166TH 3 115 CKT 1	97	108.1	108.4	57252 MIDLAND3 115 to 57261 PENTAGN3 115 CKT1	100	Transmission Operating Directive 1202.
05SP	WFEC-WFEC	55916 FRNKLS269.0 to 55917 FRNKLS4 138 CKT 1	70	105.9	106.2	55841 CANADNS269.0 to 55842 CANADNS4 138 CKT1	0	Replace 70 MVA Auto with 112 MVA autotransformer (100 MVA base Rating), Upgrade 138 and 69 KV buswork and switches.
05SP	WFEC-WFEC	55976 LIL AXE269.0 to 56011 NOBLE 269.0 CKT 1	26	118.4	118.5	56022 PAOLI 269.0 to 56023 PAOLI 4 138 CKT1	0	Solution Undetermined
05WP	WERE-WERE	57321 ANZIO 3 115 to 57328 FT JCT 3 115 CKT 1	92	100.9	101.5	57342 WJCCTY 3 115 to 57343 WJCCTYE3 115 CKT1	0	Solution Undetermined
05WP	WERE-WERE	57343 WJCCTYE3 115 to 57342 WJCCTY 3 115 CKT 1	141	103.8	104.7	56766 JEC N 7 345 to 56773 SUMMIT 7 345 CKT1	0	Reconductor or redispatch.
05WP	WERE-WERE	57374 SPHILPJ3 115 to 57438 WMCIPHER3 115 CKT 1	68	102.6	104.4	56872 EMCIPHER6 230 to 56873 SUMMIT 6 230 CKT1	0	Solution Undetermined
05WP	WFEC-WFEC	55976 LIL AXE269.0 to 56011 NOBLE 269.0 CKT 1	26	106.2	107.1	56022 PAOLI 269.0 to 56023 PAOLI 4 138 CKT1	0	Solution Undetermined
08SP	AEPW-AEPW	53203 FITZHUG269.0 to 53208 FITZHUG5 161 CKT 1	111	107.5	107.7	53203 FITZHUG269.0 to 53208 FITZHUG5 161 CKT2	0	Solution Undetermined
08SP	AEPW-AEPW	53276 LSSOUTH4 138 to 53619 WILKES 4 138 CKT 1	316	102.5	102.7	53619 WILKES 4 138 to 53622 WELSHRE4 138 CKT1	0	Solution Undetermined
08SP	AEPW-AEPW	53276 LSSOUTH4 138 to 53619 WILKES 4 138 CKT 1	316	101.5	101.7	53521 CHAPELH4 138 to 53622 WELSHRE4 138 CKT1	0	Solution Undetermined
08SP	AEPW-AEPW	53311 PITTSB_4 138 to 53276 LSSOUTH4 138 CKT 1	197	115.8	115.8	53308 PETTY 4 138 to 53521 CHAPELH4 138 CKT1	0	Solution Undetermined
08SP	AEPW-AEPW	53818 ONETA--4 138 to 53781 BA101-N4 138 CKT 1	210	123.4	123.6	53797 BANNTAP4 138 to 53818 ONETA--4 138 CKT1	0	Replace Wavetrap; \$30000
08SP	AEPW-AEPW	53818 ONETA--4 138 to 53781 BA101-N4 138 CKT 1	210	104.2	104.3	53133 ECNTRTN5 161 to 53172 ECNTRTN7 345 CKT1	0	Solution Undetermined
08SP	AEPW-AEPW	53818 ONETA--4 138 to 53781 BA101-N4 138 CKT 1	210	104.2	104.3	53140 FLINTCR7 345 to 53172 ECNTRTN7 345 CKT1	0	Solution Undetermined
08SP	AEPW-AEPW	53818 ONETA--4 138 to 53781 BA101-N4 138 CKT 1	210	104.2	104.3	52810 KEYSTON4 138 to 96140 4SILVCTY 138 CKT1	0	Solution Undetermined
08SP	AEPW-AEPW	53818 ONETA--4 138 to 53781 BA101-N4 138 CKT 1	210	103.9	104.0	55869 CROMWEL4 138 to 56094 WEWOKA 4 138 CKT1	0	Solution Undetermined
08SP	AEPW-AEPW	53818 ONETA--4 138 to 53781 BA101-N4 138 CKT 1	210	103.5	103.6	55035 BRISTOW4 138 to 55242 BLUEBEL4 138 CKT1	0	Solution Undetermined
08SP	AEPW-AEPW	54019 VALYTIM269.0 to 54018 HUGO---269.0 CKT 1	48	106.5	106.7	52800 TUPELO 4 138 to 54006 ALLENGT4 138 CKT1	0	Solution Undetermined

**Table 3a continued**– Model Data for Previously Identified SPP Facilities Impacted by the OPPD to ERCOTN 100 MW Transfer

Study Year	From Area - To Area	Branch Over 100% Rate B	Rate B	BC % Loading	TC % Loading	Outaged Branch Causing Overload	ATC (MW)	Comment
08SP	OKGE-OKGE	54934 DRAPER 7 345 to 54933 DRAPER 4 138 CKT 1	493	107.2	107.5	54933 DRAPER 4 138 to 54934 DRAPER 7 345 CKT2	0	Solution Undetermined
08SP	OKGE-OKGE	54934 DRAPER 7 345 to 54933 DRAPER 4 138 CKT 2	493	107.2	107.5	54934 DRAPER 7 345 to 54933 DRAPER 4 138 CKT1	0	Solution Undetermined
08SP	OKGE-OKGE	54988 TINKER44 138 to 54990 TINKER24 138 CKT 1	100	139.7	140.0	54941 HSL 4 138 to 54966 MIDWAY 4 138 CKT1	0	Excluded Per OKGE
08SP	OKGE-OKGE	54990 TINKER24 138 to 54988 TINKER44 138 CKT 1	100	119.4	119.5	54964 NE10TH 4 138 to 54966 MIDWAY 4 138 CKT1	0	Excluded Per OKGE
08SP	OKGE-OKGE	55190 AOCPT 269.0 to 55191 LULA 269.0 CKT 1	48	121.3	121.5	55181 VALYVUT269.0 to 55182 VALLYVU269.0 CKT1	0	Solution Undetermined
08SP	OKGE-OKGE	55190 AOCPT 269.0 to 55191 LULA 269.0 CKT 1	48	121.3	121.5	55181 VALYVUT269.0 to 55182 VALLYVU269.0 CKT1	0	Solution Undetermined
08SP	OKGE-OKGE	55237 TIBBENS269.0 to 55246 BEELINE269.0 CKT 1	66	107.5	108.2	55241 BLUEBEL269.0 to 55242 BLUEBEL4 138 CKT1	0	Solution Undetermined
08SP	OKGE-OKGE	55308 3RDST 5 161 to 55306 ARKOMA 5 161 CKT 1	335	103.4	103.8	55300 FTSMITH5 161 to 55345 COLONY 5 161 CKT1	0	Solution Undetermined
08SP	WERE-WERE	57244 JARBALO3 115 to 57233 166TH 3 115 CKT 1	97	114.3	114.6	57252 MIDLAND3 115 to 57261 PENTAGN3 115 CKT1	100	Transmission Operating Directive 1202.
08SP	WERE-WERE	57514 HEC GT 269.0 to 57513 HEC 269.0 CKT 1	130	184.1	184.2	57413 CIRCLE 3 115 to 57421 HEC GT 3 115 CKT1	0	Solution Undetermined
08SP	WERE-WERE	57558 TIMBJCT269.0 to 57561 WINFLD 269.0 CKT 1	43	103.0	106.5	57039 ELPASO 4 138 to 57042 FARBER 4 138 CKT1	0	Solution Undetermined
08SP	WFEC-OKGE	55917 FRNKLNS4 138 to 54946 MIDWEST4 138 CKT 1	215	109.6	110.9	55869 CROMWEL4 138 to 56084 WETUMKA4 138 CKT1	0	Solution Undetermined
08SP	WFEC-OKGE	55917 FRNKLNS4 138 to 54946 MIDWEST4 138 CKT 1	215	109.5	110.7	56026 PHAROAH4 138 to 56084 WETUMKA4 138 CKT1	0	Solution Undetermined
08SP	WFEC-OKGE	55917 FRNKLNS4 138 to 54946 MIDWEST4 138 CKT 1	215	100.1	100.6	54946 MIDWEST4 138 to 54953 HOLLYWD4 138 CKT1	0	Solution Undetermined
08SP	WFEC-WFEC	55917 FRNKLNS4 138 to 55916 FRNKLNS269.0 CKT 1	70	110.5	111.0	55841 CANADNS269.0 to 55842 CANADNS4 138 CKT1	0	Replace 70 MVA Auto with 112 MVA autotrformer (100 MVA base Rating), Upgrade 138 and 69 KV buswork and switches.
08WP	WERE-WERE	57815 MEAD 269.0 to 57829 PLAZA 269.0 CKT 1	72	110.2	110.4	57040 EVANS N4 138 to 57041 EVANS S4 138 CKT1	0	Solution Undetermined