



# **SPP** *Southwest Power Pool*

## ***Available Transmission Capability Study From InterGen Redbud To OKGE and OMPA***

***SPP Engineering, Tariff Studies***

## **1. Introduction**

OKGE has requested SPP to perform an Available Transfer Capability study for a 13-month short-term ATC horizon to evaluate possible OKGE Network service from the InterGen Plant at Redbud to OKGE and OMPA. This study is a revision to the transfer studies previously performed by OKGE, which is posted on the OKGE OASIS site.

## **2. Model Updates**

Seven seasonal models were used to perform the study for the 13-month short-term ATC horizon. 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), and 2004/05 Winter Peak (04WP) were used to study transfers from Redbud to OKGE and OMPA.

The chosen base case models were modified to reflect the most current modeling information. From the seven seasonal models, three system scenarios were developed. The system scenarios were developed by selectively including directionally categorized confirmed transfers not already included in the January 2003 base case series models. Scenario 1 includes confirmed West to East transfers and confirmed transfers that result in SPS Exporting and ERCOT Exporting. Scenario 2 includes confirmed East to West transfers and confirmed transfers that result in SPS Importing and ERCOT Importing. Scenario 3 includes confirmed West to East transfers and confirmed transfers that result in SPS Importing and ERCOT Importing. The system scenarios were developed to minimize counter flows to the transfers studied.

## **4. Study Process and Transfers Studied**

PTI's MUST 6.0 FCITC DC analysis was used to perform preliminary screening of the developed System Scenarios. The initial contingency set includes all SPP facilities 69kV and above, SPP First Tier facilities 115 kV and above, and any defined contingencies for these areas. The monitor elements include all SPP and SPP First Tier facilities 69 kV and above and SPP flowgates and selective third-party flowgates. A 1% TDF cutoff was used for screening purposes, and facilities were monitored at 95% of their applicable ratings. After choosing a System Scenario to determine the worst case ATC, MUST was then used to create a contingency file of contingencies that cause loading on the monitor elements above 70% Rate B and have an OTDF greater than 1% for the studied transfers. PTI's PSS/E was then used to AC verify the ATC limits by comparing two ACCC reports using the contingency files created by MUST and cases with and without the studied transfers. A 3% TDF cutoff was applied to the AC verified results.

The Redbud to OKGE transfers studied and OKGE participation are as follows:

**03FA:** Redbud to Seminole for 1195 MW

**03WP:** Redbud to Seminole for 847 MW

**04AP:** Redbud to Muskogee and Sooner for 1200 MW (Pro Rata Scale)

**04G:** Redbud to Seminole (249 MW), Muskogee, and Sooner for 1100 MW (Pro Rata Scale for Muskogee and Sooner with Seminole Off)

**04SP:** Three transfers studied

- a. Redbud to Horseshoe Lake 809 MW
- b. Redbud to Mustang 419 MW
- c. Redbud to Horseshoe Lake and Mustang 1164 MW (Pro Rata Scale)

**04FA:** Redbud to Seminole for 1114 MW

**04WP:** Redbud to Seminole for 904 MW

The Redbud to OKGE transfers studied were selected based on available OKGE gas units on-line in each seasonal case. Due to the limited amount of gas units on line in the 2004 April Min and 2004 Spring Cases, coal fired units were scaled.

The Redbud to OMPA transfers studied and OMPA participation are as follows:

**03FA:** Redbud to SPA (44 MW), PSO (40 MW), GRDA2 (25 MW), OGE Gas Units (56 MW), MCLN (53 MW), JEC (51 MW), Kaw Hydro (10 MW) for 244 MW (Pro Rata Scale)

**03WP:** Redbud to SPA (52 MW), Mooreland Wind (40 MW), GRDA2 (25 MW), OGE Gas Units (41 MW), JEC (51 MW), Kaw Hydro (12 MW) for 207 MW (Pro Rata Scale)

**04AP:** Redbud to Mooreland Wind (40 MW), GRDA2 (25 MW), JEC (51 MW), Kaw Hydro (24 MW) for 115 MW (Pro Rata Scale)

**04G:** Redbud to SPA (78 MW), Mooreland Wind (40 MW), GRDA2 (25 MW), MCLN (104 MW), JEC (51 MW), Ponca City Gen (20), Kaw Hydro (29 MW) for 290 MW (Pro Rata Scale)

**04SP:** Two Transfers Studied

a. Redbud to OneOk (75 MW), MCLN (104 MW), and Ponca City Gen (146) for 325 MW (Pro Rata Scale)

b. Redbud to SPA (78 MW), Mooreland Wind (40 MW), GRDA2 (25 MW), OneOk (75 MW), MCLN (104 MW), JEC (51 MW), Ponca City Gen (146 MW), and Kaw Hydro (20 MW) for 429 MW (Pro Rata Scale)

**04FA:** Redbud to SPA (44 MW), Mooreland Wind (40 MW), GRDA2 (25 MW), MCLN (104 MW), JEC (51 MW), Ponca City Gen (5 MW), and Kaw Hydro (10 MW) for 243 MW (Pro Rata Scale)

**04WP:** Redbud to SPA (72 MW), Mooreland Wind (40 MW), GRDA2 (25 MW), MCLN (21 MW), JEC (51 MW), and Kaw Hydro (11 MW) for 205 MW (Pro Rata Scale)

The Redbud to OMPA transfers studied were selected based on the amount of OMPA load modeled in the OKGE control area in each seasonal case.

## **5. Study Results**

Using PTI's MUST 6.0 FCITC DC analysis, the three scenarios were screened to determine which scenario produced the worst-case ATC for the transfers studied. Scenario 3 was found to be the worst case. Using Scenario 3, the transfers were studied with and without the OneOk to Entergy 200 MW transfer to determine what effects the transfer has on ATC for the transfers to be studied. It was determined that Scenario 3 with and without the OneOK to Entergy 200 MW transfer would be used to capture the worst case ATC on identified facility limitations.

**Tables 1.1** and **1.2** list the AC verified results for the defined transfers studied from Redbud to OKGE with and without the OneOk to Entergy 200 MW transfer, respectively. **Tables 2.1** and **2.2** list the AC verified results for the defined transfers studied from Redbud to OMPA with and without the OneOk to Entergy 200 MW transfer, respectively.

The Seasonal ATC limit for the Redbud to OKGE and OMPA transfers was determined by selecting the most limiting events from Tables 1.1, 1.2, 1.3, and 1.4. The determined ATC's are summarized in **Table 3**. A 103 MW TRM was applied to the Firm ATC's for OKGE and OMPA Imports due to loss of Sooner 2. ATC's were also calculated based on existing service to OKGE and OMPA. All limitations identified for the transfers studied are documented in Tables 1.1, 1.2, 1.3, and 1.4. From these Tables, sequential limits can be determined for each seasonal case.

The Draper Transformer constraint is the most limiting event in the 2004 Summer for both the OKGE and OMPA transfers. The Draper Transformer Operating Guide was not applied. The Operating Guide requires Gas units in the Oklahoma City area to be dispatched, which conflicts with the transfers modeled to OKGE and OMPA in the Summer Peak models. In order to make the Draper Transformer Op Guide available redispatch costs would be required.

Study Case	Transfer Amount	Facility From Area	Facility To Area	Monitored Branch Overload	Rating <MVA>	PreTransfer %Loading	PostTransfer %Loading	%TDF	TTC <MW>	Outaged Branch Causing Overload
03FA	1195	OKGE	OKGE	54835 MEMRIAL4 138 to 54832 EASTERN4 138 CKT 1	191	78.3	112.5	5.5	760	54835 MEMRIAL4 138 to 54850 SKYLINE4 138 CKT 1
03FA	1195	OKGE	OKGE	54909 REDBUD 7 345 to 54908 ARCADIA7 345 CKT 1	1195	40.4	126.6	86.2	826	54908 ARCADIA7 345 to 54909 REDBUD 7 345 CKT 2
03FA	1195	OKGE	OKGE	54909 REDBUD 7 345 to 54908 ARCADIA7 345 CKT 2	1195	40.4	126.6	86.2	826	54908 ARCADIA7 345 to 54909 REDBUD 7 345 CKT 1
03FA	1195	OKGE	OKGE	54852 SLVRLAK4 138 to 54853 DVISION4 138 CKT 1	287	65.6	107.7	10.1	976	54880 NORTWST7 345 to 54901 CIMARON7 345 CKT 1
03FA	1195	OKGE	OKGE	54835 MEMRIAL4 138 to 54832 EASTERN4 138 CKT 1	191	71.6	105.0	5.3	1016	54834 KETCH 4 138 to 56173 OMFAIRF4 138 CKT 1
03FA	1195	OKGE	OKGE	54832 EASTERN4 138 to 54835 MEMRIAL4 138 CKT 1	191	67.2	104.9	6.0	1040	54907 ARCADIA4 138 to 54941 HSL 4 138 CKT 1
03FA	1195	OKGE	OKGE	54907 ARCADIA4 138 to 54941 HSL 4 138 CKT 1	287	55.6	105.8	12.0	1058	54880 NORTWST7 345 to 54908 ARCADIA7 345 CKT 1
03FA	1195	OKGE	OKGE	54832 EASTERN4 138 to 54835 MEMRIAL4 138 CKT 1	191	61.6	104.7	6.9	1065	54880 NORTWST7 345 to 54908 ARCADIA7 345 CKT 1
03FA	1195	OKGE	OKGE	54832 EASTERN4 138 to 54835 MEMRIAL4 138 CKT 1	191	67.5	100.8	5.3	1166	54850 SKYLINE4 138 to 56173 OMFAIRF4 138 CKT 1
03WP	847	OKGE	OKGE	54835 MEMRIAL4 138 to 54832 EASTERN4 138 CKT 1	191	79.8	105.0	5.7	678	54835 MEMRIAL4 138 to 54850 SKYLINE4 138 CKT 1
03WP	847	OKGE	OKGE	54909 REDBUD 7 345 to 54908 ARCADIA7 345 CKT 1	1195	44.2	105.4	86.4	772	54908 ARCADIA7 345 to 54909 REDBUD 7 345 CKT 2
03WP	847	OKGE	OKGE	54909 REDBUD 7 345 to 54908 ARCADIA7 345 CKT 2	1195	44.2	105.4	86.4	772	54908 ARCADIA7 345 to 54909 REDBUD 7 345 CKT 1
03WP	847	OKGE	OKGE	54852 SLVRLAK4 138 to 54853 DVISION4 138 CKT 1	287	69.6	100.1	10.4	843	54880 NORTWST7 345 to 54901 CIMARON7 345 CKT 1
04AP	1200	OKGE	OKGE	54909 REDBUD 7 345 to 54908 ARCADIA7 345 CKT 1	1195	33.9	106.8	72.6	1089	54908 ARCADIA7 345 to 54909 REDBUD 7 345 CKT 2
04AP	1200	OKGE	OKGE	54909 REDBUD 7 345 to 54908 ARCADIA7 345 CKT 2	1195	33.9	106.8	72.6	1089	54908 ARCADIA7 345 to 54909 REDBUD 7 345 CKT 1
04G	1200	OKGE	OKGE	54909 REDBUD 7 345 to 54908 ARCADIA7 345 CKT 1	1195	40.7	115.1	74.1	956	54908 ARCADIA7 345 to 54909 REDBUD 7 345 CKT 2
04G	1200	OKGE	OKGE	54909 REDBUD 7 345 to 54908 ARCADIA7 345 CKT 2	1195	40.7	115.1	74.1	956	54908 ARCADIA7 345 to 54909 REDBUD 7 345 CKT 1
04SP-a	809	OKGE	OKGE	54934 DRAPER 7 345 to 54933 DRAPER 4 138 CKT 1	493	100.4	121.3	12.7	0	54933 DRAPER 4 138 to 54934 DRAPER 7 345 CKT 2
04SP-a	809	OKGE	OKGE	54934 DRAPER 7 345 to 54933 DRAPER 4 138 CKT 2	493	100.4	121.3	12.7	0	54933 DRAPER 4 138 to 54934 DRAPER 7 345 CKT 1
04SP-a	809	OKGE	AEPW	55248 EXPLGLN4 138 to 53795 R.S.S.-4 138 CKT 1	291	93.5	103.6	3.6	522	53770 PRATTV-4 138 to 53827 S.S.-4 138 CKT 1
04SP-a	809	OKGE	OKGE	55248 EXPLGLN4 138 to 55247 BEELINE4 138 CKT 1	287	92.9	103.0	3.6	571	53770 PRATTV-4 138 to 53827 S.S.-4 138 CKT 1
04SP-a	809	OKGE	OKGE	54835 MEMRIAL4 138 to 54850 SKYLINE4 138 CKT 1	287	60.7	113.2	18.6	606	54833 DANFRTH4 138 to 56174 OMHAFAER4 138 CKT 1
04SP-a	809	OKGE	OKGE	54832 EASTERN4 138 to 54835 MEMRIAL4 138 CKT 1	191	54.9	114.7	14.1	610	54835 MEMRIAL4 138 to 54850 SKYLINE4 138 CKT 1
04SP-a	809	OKGE	OKGE	54880 NORTWST7 345 to 54879 NORTWST4 138 CKT 1	493	82.9	104.8	13.4	631	54879 NORTWST4 138 to 54880 NORTWST7 345 CKT 2
04SP-a	809	OKGE	OKGE	54835 MEMRIAL4 138 to 54850 SKYLINE4 138 CKT 1	287	56.4	108.9	18.6	672	54832 EASTERN4 138 to 56174 OMHAFAER4 138 CKT 1
04SP-a	809	OKGE	OKGE	54922 CLASSEN4 138 to 54921 SW 5TAP4 138 CKT 1	191	77.8	104.1	6.2	682	54861 MUSTANG4 138 to 54865 COUNCIL4 138 CKT 1
04SP-a	809	OKGE	OKGE	54941 HSL 4 138 to 54907 ARCADIA4 138 CKT 1	287	30.1	106.0	26.9	745	54833 DANFRTH4 138 to 54907 ARCADIA4 138 CKT 1
04SP-a	809	OKGE	OKGE	54832 EASTERN4 138 to 54835 MEMRIAL4 138 CKT 1	191	55.7	103.4	11.2	752	54834 KETCH 4 138 to 56173 OMFAIRF4 138 CKT 1
04SP-a	809	OKGE	OKGE	55068 SHAWNEE2 69 to 55070 MISSION2 69 CKT 1	51	50.0	102.0	3.3	779	55059 SQUIRCK4 138 to 55075 FRSTHIL4 138 CKT 1
04SP-a	809	OMPA	OKGE	56174 OMHAFAER4 138 to 54833 DANFRTH4 138 CKT 1	287	60.8	101.2	14.3	786	54835 MEMRIAL4 138 to 54850 SKYLINE4 138 CKT 1
04SP-a	809	OKGE	OKGE	54907 ARCADIA4 138 to 54941 HSL 4 138 CKT 1	287	19.4	101.5	29.1	794	54880 NORTWST7 345 to 54908 ARCADIA7 345 CKT 1
04SP-a	809	OKGE	OKGE	54832 EASTERN4 138 to 54835 MEMRIAL4 138 CKT 1	191	39.6	101.0	14.5	795	54907 ARCADIA4 138 to 54941 HSL 4 138 CKT 1
04SP-a	809	OKGE	OKGE	54908 ARCADIA7 345 to 54907 ARCADIA4 138 CKT 1	493	51.8	100.4	29.6	802	54907 ARCADIA4 138 to 54908 ARCADIA7 345 CKT 2
04SP-a	809	OKGE	OKGE	54908 ARCADIA7 345 to 54907 ARCADIA4 138 CKT 2	493	51.8	100.4	29.6	802	54907 ARCADIA4 138 to 54908 ARCADIA7 345 CKT 1
04SP-b	419	OKGE	OKGE	54934 DRAPER 7 345 to 54933 DRAPER 4 138 CKT 1	493	100.4	110.7	12.1	0	54933 DRAPER 4 138 to 54934 DRAPER 7 345 CKT 2
04SP-b	419	OKGE	OKGE	54934 DRAPER 7 345 to 54933 DRAPER 4 138 CKT 2	493	100.4	110.7	12.1	0	54933 DRAPER 4 138 to 54934 DRAPER 7 345 CKT 1
04SP-b	419	OKGE	OKGE	54870 STONWAL4 138 to 54872 REMPKTP4 138 CKT 1	191	84.1	113.9	13.6	223	54835 MEMRIAL4 138 to 54837 TENESTP4 138 CKT 1
04SP-b	419	OKGE	OKGE	54869 WESTERN4 138 to 54870 STONWAL4 138 CKT 1	191	73.7	108.1	15.7	320	54835 MEMRIAL4 138 to 54837 TENESTP4 138 CKT 1
04SP-b	419	OKGE	OKGE	54966 MIDWAY 4 138 to 54941 HSL 4 138 CKT 1	287	91.6	101.8	7.0	345	54941 HSL 4 138 to 54973 RENO 4 138 CKT 1
04SP-b	419	OKGE	OKGE	54852 SLVRLAK4 138 to 54853 DVISION4 138 CKT 1	287	67.3	102.3	23.9	392	54880 NORTWST7 345 to 54901 CIMARON7 345 CKT 1
04SP-b	419	OKGE	OKGE	54852 SLVRLAK4 138 to 54853 DVISION4 138 CKT 1	287	67.0	101.2	23.4	405	54835 MEMRIAL4 138 to 54837 TENESTP4 138 CKT 1
04SP-c	1164	OKGE	OKGE	54934 DRAPER 7 345 to 54933 DRAPER 4 138 CKT 1	493	100.4	131.6	13.2	0	54933 DRAPER 4 138 to 54934 DRAPER 7 345 CKT 2
04SP-c	1164	OKGE	OKGE	54934 DRAPER 7 345 to 54933 DRAPER 4 138 CKT 2	493	100.4	131.6	13.2	0	54933 DRAPER 4 138 to 54934 DRAPER 7 345 CKT 1
04SP-c	1164	OKGE	OKGE	54870 STONWAL4 138 to 54872 REMPKTP4 138 CKT 1	191	84.1	119.4	5.8	523	54835 MEMRIAL4 138 to 54837 TENESTP4 138 CKT 1
04SP-c	1164	OKGE	OKGE	54880 NORTWST7 345 to 54879 NORTWST4 138 CKT 1	493	82.9	117.3	14.6	579	54879 NORTWST4 138 to 54880 NORTWST7 345 CKT 2
04SP-c	1164	OKGE	OKGE	54832 EASTERN4 138 to 54835 MEMRIAL4 138 CKT 1	191	54.9	139.3	13.9	622	54835 MEMRIAL4 138 to 54850 SKYLINE4 138 CKT 1
04SP-c	1164	OKGE	AEPW	55248 EXPLGLN4 138 to 53795 R.S.S.-4 138 CKT 1	291	93.5	105.4	3.0	636	53770 PRATTV-4 138 to 53827 S.S.-4 138 CKT 1
04SP-c	1164	OKGE	OKGE	54852 SLVRLAK4 138 to 54853 DVISION4 138 CKT 1	287	67.3	125.5	14.3	654	54880 NORTWST7 345 to 54901 CIMARON7 345 CKT 1
04SP-c	1164	OKGE	OKGE	54835 MEMRIAL4 138 to 54850 SKYLINE4 138 CKT 1	287	60.7	130.0	17.1	660	54833 DANFRTH4 138 to 56174 OMHAFAER4 138 CKT 1
04SP-c	1164	OKGE	OKGE	54832 EASTERN4 138 to 54835 MEMRIAL4 138 CKT 1	191	55.7	128.1	11.9	712	54834 KETCH 4 138 to 56173 OMFAIRF4 138 CKT 1

Table 1.1  
Redbud to OKGE with OneOK to Entergy 200 MW Transfer Included

Study Case	Transfer Amount	Facility From Area	Facility To Area	Monitored Branch Overload	Rating <MVA>	PreTransfer %Loading	PostTransfer %Loading	%TDF	TTC <MW>	Outaged Branch Causing Overload
04SP-c	1164	OKGE	OKGE	54835 MEMRIAL4 138 to 54850 SKYLINE4 138 CKT 1	287	56.4	125.5	17.0	734	54832 EASTERN4 138 to 56174 OMHAFAER4 138 CKT 1
04SP-c	1164	OMPA	OKGE	56174 OMHAFAER4 138 to 54833 DANFRTH4 138 CKT 1	287	60.8	118.1	14.1	796	54835 MEMRIAL4 138 to 54850 SKYLINE4 138 CKT 1
04SP-c	1164	OKGE	OKGE	54832 EASTERN4 138 to 54835 MEMRIAL4 138 CKT 1	191	39.6	124.1	13.9	832	54907 ARCADIA4 138 to 54941 HSL 4 138 CKT 1
04SP-c	1164	OKGE	OKGE	54850 SKYLINE4 138 to 54835 MEMRIAL4 138 CKT 1	287	53.3	118.5	16.1	833	54852 SLVRLAK4 138 to 54853 DVISION4 138 CKT 1
04SP-c	1164	OKGE	OKGE	54851 QUAILCK4 138 to 54873 LONEOAK4 138 CKT 1	308	68.8	112.2	11.5	837	54854 PANTHER4 138 to 54879 NORTHWEST4 138 CKT 1
04SP-c	1164	OKGE	OKGE	54832 EASTERN4 138 to 54835 MEMRIAL4 138 CKT 1	191	48.1	120.0	11.8	840	54850 SKYLINE4 138 to 56173 OMFAIRF4 138 CKT 1
04SP-c	1164	OKGE	OKGE	54852 SLVRLAK4 138 to 54853 DVISION4 138 CKT 1	287	67.0	112.5	11.2	844	54835 MEMRIAL4 138 to 54837 TENESTP4 138 CKT 1
04SP-c	1164	OKGE	OKGE	54852 SLVRLAK4 138 to 54853 DVISION4 138 CKT 1	287	57.5	115.7	14.3	850	54835 MEMRIAL4 138 to 54850 SKYLINE4 138 CKT 1
04SP-c	1164	OKGE	OKGE	54851 QUAILCK4 138 to 54873 LONEOAK4 138 CKT 1	308	68.0	111.4	11.5	859	54852 SLVRLAK4 138 to 54854 PANTHER4 138 CKT 1
04SP-c	1164	OKGE	OKGE	54908 ARCADIA7 345 to 54907 ARCADIA4 138 CKT 1	493	51.8	117.0	27.6	861	54907 ARCADIA4 138 to 54908 ARCADIA7 345 CKT 2
04SP-c	1164	OKGE	OKGE	54908 ARCADIA7 345 to 54907 ARCADIA4 138 CKT 2	493	51.8	117.0	27.6	861	54907 ARCADIA4 138 to 54908 ARCADIA7 345 CKT 1
04SP-c	1164	OKGE	OKGE	54880 NORTHWEST7 345 to 54879 NORTHWEST4 138 CKT 2	493	76.3	108.2	13.5	865	54879 NORTHWEST4 138 to 54880 NORTHWEST7 345 CKT 1
04SP-c	1164	OKGE	OKGE	54941 HSL 4 138 to 54907 ARCADIA4 138 CKT 1	287	30.1	121.9	22.6	887	54833 DANFRTH4 138 to 54907 ARCADIA4 138 CKT 1
04SP-c	1164	OKGE	OKGE	54832 EASTERN4 138 to 54835 MEMRIAL4 138 CKT 1	191	42.9	117.8	12.3	887	54880 NORTHWEST7 345 to 54908 ARCADIA7 345 CKT 1
04SP-c	1164	OKGE	OKGE	54909 REDBUD 7 345 to 54908 ARCADIA7 345 CKT 1	1195	33.3	120.0	89.0	896	54908 ARCADIA7 345 to 54909 REDBUD 7 345 CKT 2
04SP-c	1164	OKGE	OKGE	54909 REDBUD 7 345 to 54908 ARCADIA7 345 CKT 2	1195	33.3	120.0	89.0	896	54908 ARCADIA7 345 to 54909 REDBUD 7 345 CKT 1
04SP-c	1164	OKGE	OKGE	54835 MEMRIAL4 138 to 54850 SKYLINE4 138 CKT 1	287	46.8	115.3	16.9	904	54832 EASTERN4 138 to 54835 MEMRIAL4 138 CKT 1
04SP-c	1164	OMPA	OKGE	56174 OMHAFAER4 138 to 54833 DANFRTH4 138 CKT 1	287	61.4	110.5	12.1	915	54834 KETCH 4 138 to 56173 OMFAIRF4 138 CKT 1
04SP-c	1164	OKGE	OKGE	54907 ARCADIA4 138 to 54941 HSL 4 138 CKT 1	287	19.4	119.9	24.8	934	54880 NORTHWEST7 345 to 54908 ARCADIA7 345 CKT 1
04SP-c	1164	OKGE	OMPA	54832 EASTERN4 138 to 56174 OMHAFAER4 138 CKT 1	287	53.4	110.4	14.0	952	54835 MEMRIAL4 138 to 54850 SKYLINE4 138 CKT 1
04SP-c	1164	OKGE	OKGE	54852 SLVRLAK4 138 to 54853 DVISION4 138 CKT 1	287	56.9	109.0	12.9	964	54850 SKYLINE4 138 to 54851 QUAILCK4 138 CKT 1
04SP-c	1164	OKGE	OKGE	54901 CIMARON7 345 to 54898 CIMARON4 138 CKT 2	493	73.0	104.4	13.3	1002	54898 CIMARON4 138 to 54901 CIMARON7 345 CKT 1
04SP-c	1164	OMPA	OKGE	56174 OMHAFAER4 138 to 54833 DANFRTH4 138 CKT 1	287	50.5	107.9	14.2	1004	54907 ARCADIA4 138 to 54941 HSL 4 138 CKT 1
04SP-c	1164	OKGE	OKGE	54852 SLVRLAK4 138 to 54853 DVISION4 138 CKT 1	287	58.9	106.4	11.7	1008	54898 CIMARON4 138 to 54901 CIMARON7 345 CKT 2
04SP-c	1164	OKGE	OKGE	54852 SLVRLAK4 138 to 54853 DVISION4 138 CKT 1	287	58.5	105.8	11.7	1021	54898 CIMARON4 138 to 54901 CIMARON7 345 CKT 1
04SP-c	1164	OKGE	OKGE	54901 CIMARON7 345 to 54898 CIMARON4 138 CKT 1	493	72.3	103.4	13.2	1038	54898 CIMARON4 138 to 54901 CIMARON7 345 CKT 2
04SP-c	1164	OMPA	OKGE	56174 OMHAFAER4 138 to 54833 DANFRTH4 138 CKT 1	287	56.2	105.1	12.1	1042	54850 SKYLINE4 138 to 56173 OMFAIRF4 138 CKT 1
04SP-c	1164	OMPA	OKGE	56174 OMHAFAER4 138 to 54833 DANFRTH4 138 CKT 1	287	52.6	103.7	12.6	1080	54880 NORTHWEST7 345 to 54908 ARCADIA7 345 CKT 1
04SP-c	1164	OKGE	OKGE	54835 MEMRIAL4 138 to 54850 SKYLINE4 138 CKT 1	287	51.6	103.6	12.8	1084	54849 LAKESID4 138 to 54853 DVISION4 138 CKT 1
04SP-c	1164	OKGE	OKGE	54908 ARCADIA7 345 to 54907 ARCADIA4 138 CKT 1	493	41.0	103.8	26.6	1094	54880 NORTHWEST7 345 to 54908 ARCADIA7 345 CKT 1
04SP-c	1164	OKGE	OKGE	54908 ARCADIA7 345 to 54907 ARCADIA4 138 CKT 2	493	41.0	103.8	26.6	1094	54880 NORTHWEST7 345 to 54908 ARCADIA7 345 CKT 1
04SP-c	1164	OKGE	OMPA	54832 EASTERN4 138 to 56174 OMHAFAER4 138 CKT 1	287	54.0	102.8	12.1	1096	54834 KETCH 4 138 to 56173 OMFAIRF4 138 CKT 1
04SP-c	1164	OKGE	OKGE	54907 ARCADIA4 138 to 54941 HSL 4 138 CKT 1	287	17.8	103.7	21.2	1113	54833 DANFRTH4 138 to 56174 OMHAFAER4 138 CKT 1
04SP-c	1164	OKGE	OKGE	54907 ARCADIA4 138 to 54941 HSL 4 138 CKT 1	287	16.8	102.7	21.2	1127	54832 EASTERN4 138 to 56174 OMHAFAER4 138 CKT 1
04SP-c	1164	OKGE	OKGE	54907 ARCADIA4 138 to 54941 HSL 4 138 CKT 1	287	16.0	102.5	21.3	1130	55055 MAUD 4 138 to 55075 FRSTHIL4 138 CKT 1
04SP-c	1164	OKGE	OKGE	54880 NORTHWEST7 345 to 54879 NORTHWEST4 138 CKT 1	493	68.6	100.9	13.7	1132	54880 NORTHWEST7 345 to 54901 CIMARON7 345 CKT 1
04SP-c	1164	OKGE	OKGE	54833 DANFRTH4 138 to 54907 ARCADIA4 138 CKT 1	465	53.5	100.7	18.9	1146	54880 NORTHWEST7 345 to 54908 ARCADIA7 345 CKT 1
04SP-c	1164	OKGE	OKGE	54893 XEROX 4 138 to 54896 MORGAN 4 138 CKT 1	287	39.4	100.2	15.0	1159	54863 HAYMAKR4 138 to 54898 CIMARON4 138 CKT 1
04SP-c	1164	OMPA	OKGE	56174 OMHAFAER4 138 to 54832 EASTERN4 138 CKT 1	287	43.1	100.2	14.1	1160	54907 ARCADIA4 138 to 54941 HSL 4 138 CKT 1
04FA	1114	OKGE	OKGE	54835 MEMRIAL4 138 to 54832 EASTERN4 138 CKT 1	191	93.3	125.5	5.5	231	54835 MEMRIAL4 138 to 54850 SKYLINE4 138 CKT 1
04FA	1114	OKGE	OKGE	54852 SLVRLAK4 138 to 54853 DVISION4 138 CKT 1	287	82.1	122.0	10.3	500	54880 NORTHWEST7 345 to 54901 CIMARON7 345 CKT 1
04FA	1114	OKGE	OKGE	54835 MEMRIAL4 138 to 54832 EASTERN4 138 CKT 1	191	83.1	114.5	5.4	598	54834 KETCH 4 138 to 56173 OMFAIRF4 138 CKT 1
04FA	1114	OKGE	OKGE	54835 MEMRIAL4 138 to 54850 SKYLINE4 138 CKT 1	287	88.3	110.0	5.6	603	54833 DANFRTH4 138 to 56174 OMHAFAER4 138 CKT 1
04FA	1114	OKGE	OKGE	54835 MEMRIAL4 138 to 54832 EASTERN4 138 CKT 1	191	77.9	113.4	6.1	693	54907 ARCADIA4 138 to 54941 HSL 4 138 CKT 1
04FA	1114	OKGE	OKGE	54835 MEMRIAL4 138 to 54850 SKYLINE4 138 CKT 1	287	85.8	107.4	5.6	732	54832 EASTERN4 138 to 56174 OMHAFAER4 138 CKT 1
04FA	1114	OKGE	OKGE	54835 MEMRIAL4 138 to 54832 EASTERN4 138 CKT 1	191	78.6	110.0	5.4	761	54850 SKYLINE4 138 to 56173 OMFAIRF4 138 CKT 1
04FA	1114	OKGE	OKGE	54909 REDBUD 7 345 to 54908 ARCADIA7 345 CKT 1	1195	38.1	118.8	86.6	855	54908 ARCADIA7 345 to 54909 REDBUD 7 345 CKT 2
04FA	1114	OKGE	OKGE	54909 REDBUD 7 345 to 54908 ARCADIA7 345 CKT 2	1195	38.1	118.8	86.6	855	54908 ARCADIA7 345 to 54909 REDBUD 7 345 CKT 1
04FA	1114	OKGE	OKGE	54835 MEMRIAL4 138 to 54850 SKYLINE4 138 CKT 1	287	84.8	104.4	5.1	863	54852 SLVRLAK4 138 to 54853 DVISION4 138 CKT 1
04FA	1114	OKGE	OKGE	54853 DVISION4 138 to 54852 SLVRLAK4 138 CKT 1	287	82.9	104.3	5.5	891	54835 MEMRIAL4 138 to 54850 SKYLINE4 138 CKT 1

Table 1.1  
Redbud to OKGE with OneOK to Entergy 200 MW Transfer Included

Study Case	Transfer Amount	Facility From Area	Facility To Area	Monitored Branch Overload	Rating <MVA>	PreTransfer %Loading	PostTransfer %Loading	%TDF	TTC <MW>	Outaged Branch Causing Overload
04FA	1114	OKGE	OKGE	54832 EASTERN4 138 to 54835 MEMRIAL4 138 CKT 1	191	66.2	106.6	6.9	931	54880 NORTHWEST7 345 to 54908 ARCADIA7 345 CKT 1
04FA	1114	OKGE	OKGE	54941 HSL 4 138 to 54907 ARCADIA4 138 CKT 1	287	68.4	104.7	9.3	970	54833 DANFRTH4 138 to 54907 ARCADIA4 138 CKT 1
04FA	1114	OKGE	OKGE	54941 HSL 4 138 to 54907 ARCADIA4 138 CKT 1	287	58.7	105.6	12.1	980	54880 NORTHWEST7 345 to 54908 ARCADIA7 345 CKT 1
04FA	1114	OKGE	OKGE	54835 MEMRIAL4 138 to 54850 SKYLINE4 138 CKT 1	287	80.0	101.7	5.6	1028	54832 EASTERN4 138 to 54835 MEMRIAL4 138 CKT 1
04FA	1114	OKGE	OKGE	54872 REMPKTP4 138 to 54870 STONWAL4 138 CKT 1	191	81.9	101.3	3.3	1037	54835 MEMRIAL4 138 to 54837 TENESTP4 138 CKT 1
04WP	904	OKGE	OKGE	54835 MEMRIAL4 138 to 54832 EASTERN4 138 CKT 1	191	92.7	120.7	5.9	<b>235</b>	54835 MEMRIAL4 138 to 54850 SKYLINE4 138 CKT 1
04WP	904	OKGE	OKGE	54853 DVISION4 138 to 54852 SLVRLAK4 138 CKT 1	287	87.4	121.2	10.7	336	54880 NORTHWEST7 345 to 54901 CIMARON7 345 CKT 1
04WP	904	OKGE	OKGE	54835 MEMRIAL4 138 to 54832 EASTERN4 138 CKT 1	191	83.6	110.7	5.7	547	54834 KETCH 4 138 to 56173 OMFAIRF4 138 CKT 1
04WP	904	OKGE	OKGE	54835 MEMRIAL4 138 to 54832 EASTERN4 138 CKT 1	191	79.3	109.9	6.5	612	54907 ARCADIA4 138 to 54941 HSL 4 138 CKT 1
04WP	904	OKGE	OKGE	54835 MEMRIAL4 138 to 54832 EASTERN4 138 CKT 1	191	79.8	106.9	5.7	675	54850 SKYLINE4 138 to 56173 OMFAIRF4 138 CKT 1
04WP	904	OKGE	OKGE	54835 MEMRIAL4 138 to 54850 SKYLINE4 138 CKT 1	287	84.2	103.4	6.1	744	54833 DANFRTH4 138 to 56174 OMHAFAFER4 138 CKT 1
04WP	904	OKGE	OKGE	54909 REDBUD 7 345 to 54908 ARCADIA7 345 CKT 1	1195	42.6	109.0	87.9	781	54908 ARCADIA7 345 to 54909 REDBUD 7 345 CKT 2
04WP	904	OKGE	OKGE	54909 REDBUD 7 345 to 54908 ARCADIA7 345 CKT 2	1195	42.6	109.0	87.9	781	54908 ARCADIA7 345 to 54909 REDBUD 7 345 CKT 1
04WP	904	OKGE	OKGE	54835 MEMRIAL4 138 to 54832 EASTERN4 138 CKT 1	191	68.3	102.6	7.3	835	54880 NORTHWEST7 345 to 54908 ARCADIA7 345 CKT 1
04WP	904	OKGE	OKGE	54853 DVISION4 138 to 54852 SLVRLAK4 138 CKT 1	287	82.7	101.4	5.9	838	54835 MEMRIAL4 138 to 54850 SKYLINE4 138 CKT 1
04WP	904	OKGE	OKGE	54835 MEMRIAL4 138 to 54850 SKYLINE4 138 CKT 1	287	82.1	101.3	6.1	843	54832 EASTERN4 138 to 56174 OMHAFAFER4 138 CKT 1

Table 1.1  
Redbud to OKGE with OneOK to Entergy 200 MW Transfer Included

Study Case	Transfer Amount	Facility From Area	Facility To Area	Monitored Branch Overload	Rating <MVA>	PreTransfer %Loading	PostTransfer %Loading	%TDF	TTC <MW>	Outaged Branch Causing Overload
03FA	1195	OKGE	OKGE	54835 MEMRIAL4 138 to 54832 EASTERN4 138 CKT 1	191	77.0	111.3	5.5	801	54835 MEMRIAL4 138 to 54850 SKYLINE4 138 CKT 1
03FA	1195	OKGE	OKGE	54909 REDBUD 7 345 to 54908 ARCADIAT 345 CKT 1	1195	42.1	128.4	86.3	802	54908 ARCADIAT 345 to 54909 REDBUD 7 345 CKT 2
03FA	1195	OKGE	OKGE	54909 REDBUD 7 345 to 54908 ARCADIAT 345 CKT 2	1195	42.1	128.4	86.3	802	54908 ARCADIAT 345 to 54909 REDBUD 7 345 CKT 2
03FA	1195	OKGE	OKGE	54835 MEMRIAL4 138 to 54832 EASTERN4 138 CKT 1	191	71.2	104.7	5.4	1028	54834 KETCH 4 138 to 56173 OMFAIRF4 138 CKT 1
03FA	1195	OKGE	OKGE	54832 EASTERN4 138 to 54835 MEMRIAL4 138 CKT 1	191	62.5	105.8	6.9	1035	54880 NORTHWST7 345 to 54908 ARCADIAT 345 CKT 1
03FA	1195	OKGE	OKGE	54907 ARCADIA4 138 to 54941 HSL 4 138 CKT 1	287	56.3	106.7	12.1	1037	54880 NORTHWST7 345 to 54908 ARCADIAT 345 CKT 1
03FA	1195	OKGE	OKGE	54832 EASTERN4 138 to 54835 MEMRIAL4 138 CKT 1	191	66.6	104.5	6.0	1054	54907 ARCADIA4 138 to 54941 HSL 4 138 CKT 1
03FA	1195	OKGE	OKGE	54852 SLVRLAK4 138 to 54853 DIVISION4 138 CKT 1	287	60.7	103.0	10.1	1111	54880 NORTHWST7 345 to 54901 CIMARON7 345 CKT 1
03FA	1195	OKGE	OKGE	54832 EASTERN4 138 to 54835 MEMRIAL4 138 CKT 1	191	67.0	100.5	5.4	1177	54850 SKYLINE4 138 to 56173 OMFAIRF4 138 CKT 1
03WP	847	OKGE	OKGE	54835 MEMRIAL4 138 to 54832 EASTERN4 138 CKT 1	191	78.5	103.9	5.7	717	54835 MEMRIAL4 138 to 54850 SKYLINE4 138 CKT 1
03WP	847	OKGE	OKGE	54909 REDBUD 7 345 to 54908 ARCADIAT 345 CKT 1	1195	45.9	107.2	86.5	747	54908 ARCADIAT 345 to 54909 REDBUD 7 345 CKT 2
03WP	847	OKGE	OKGE	54909 REDBUD 7 345 to 54908 ARCADIAT 345 CKT 2	1195	45.9	107.2	86.5	747	54908 ARCADIAT 345 to 54909 REDBUD 7 345 CKT 2
04AP	1200	OKGE	OKGE	54909 REDBUD 7 345 to 54908 ARCADIAT 345 CKT 1	1195	37.2	110.0	72.4	1036	54908 ARCADIAT 345 to 54909 REDBUD 7 345 CKT 2
04AP	1200	OKGE	OKGE	54909 REDBUD 7 345 to 54908 ARCADIAT 345 CKT 2	1195	37.2	110.0	72.4	1036	54908 ARCADIAT 345 to 54909 REDBUD 7 345 CKT 2
04G	1200	OKGE	OKGE	54909 REDBUD 7 345 to 54908 ARCADIAT 345 CKT 1	1195	44.1	118.4	74.0	903	54908 ARCADIAT 345 to 54909 REDBUD 7 345 CKT 2
04G	1200	OKGE	OKGE	54909 REDBUD 7 345 to 54908 ARCADIAT 345 CKT 2	1195	44.1	118.4	74.0	903	54908 ARCADIAT 345 to 54909 REDBUD 7 345 CKT 2
04SP-a	809	OKGE	OKGE	54934 DRAPER 7 345 to 54933 DRAPER 4 138 CKT 1	493	100.9	121.9	12.8	0	54933 DRAPER 4 138 to 54934 DRAPER 7 345 CKT 2
04SP-a	809	OKGE	OKGE	54934 DRAPER 7 345 to 54933 DRAPER 4 138 CKT 2	493	100.9	121.9	12.8	0	54933 DRAPER 4 138 to 54934 DRAPER 7 345 CKT 2
04SP-a	809	OKGE	AEPW	55248 EXPLGLN4 138 to 53795 R.S.S.-4 138 CKT 1	291	95.8	105.7	3.6	345	53770 PRATTV-4 138 to 53827 S.S.--4 138 CKT 1
04SP-a	809	OKGE	OKGE	55248 EXPLGLN4 138 to 55247 BEELINE4 138 CKT 1	287	95.1	105.2	3.6	394	53770 PRATTV-4 138 to 53827 S.S.--4 138 CKT 1
04SP-a	809	OKGE	OKGE	54832 EASTERN4 138 to 54835 MEMRIAL4 138 CKT 1	191	52.3	112.3	14.2	643	54835 MEMRIAL4 138 to 54850 SKYLINE4 138 CKT 1
04SP-a	809	OKGE	OKGE	54835 MEMRIAL4 138 to 54850 SKYLINE4 138 CKT 1	287	57.2	109.9	18.7	658	54833 DANFRTH4 138 to 56174 OMHAFAER4 138 CKT 1
04SP-a	809	OKGE	OKGE	54922 CLASSEN4 138 to 54921 SW 5TAP4 138 CKT 1	191	77.4	103.8	6.3	691	54861 MUSTANG4 138 to 54865 COMCOUNCIL4 138 CKT 1
04SP-a	809	OKGE	OKGE	54835 MEMRIAL4 138 to 54850 SKYLINE4 138 CKT 1	287	52.9	105.5	18.7	724	54832 EASTERN4 138 to 56174 OMHAFAER4 138 CKT 1
04SP-a	809	OKGE	OKGE	55068 SHAWNEE2 69 to 55070 MISSION2 69 CKT 1	51	53.1	105.3	3.3	727	55059 SQUIRCK4 138 to 55075 FRSTHIL4 138 CKT 1
04SP-a	809	OKGE	OKGE	54907 ARCADIA4 138 to 54941 HSL 4 138 CKT 1	287	29.2	105.2	27.0	754	54833 DANFRTH4 138 to 54907 ARCADIA4 138 CKT 1
04SP-a	809	OKGE	AEPW	55248 EXPLGLN4 138 to 53795 R.S.S.-4 138 CKT 1	291	90.7	100.6	3.6	763	53770 PRATTV-4 138 to 55242 BLUEBEL4 138 CKT 1
04SP-a	809	OKGE	OKGE	54832 EASTERN4 138 to 54835 MEMRIAL4 138 CKT 1	191	54.9	102.7	11.3	764	54834 KETCH 4 138 to 56173 OMFAIRF4 138 CKT 1
04SP-a	809	OKGE	OKGE	55071 TECUMSH2 69 to 55074 FRSTHIL2 69 CKT 1	72	64.3	101.7	3.3	773	55059 SQUIRCK4 138 to 55075 FRSTHIL4 138 CKT 1
04SP-a	809	OKGE	OKGE	54907 ARCADIA4 138 to 54941 HSL 4 138 CKT 1	287	21.1	103.1	29.1	778	54880 NORTHWST7 345 to 54908 ARCADIAT 345 CKT 1
04SP-a	809	OKGE	OKGE	54908 ARCADIAT 345 to 54907 ARCADIA4 138 CKT 1	493	51.5	100.6	29.9	799	54907 ARCADIA4 138 to 54908 ARCADIAT 345 CKT 2
04SP-a	809	OKGE	OKGE	54908 ARCADIAT 345 to 54907 ARCADIA4 138 CKT 2	493	51.5	100.6	29.9	799	54907 ARCADIA4 138 to 54908 ARCADIAT 345 CKT 2
04SP-a	809	OKGE	OKGE	54880 NORTHWST7 345 to 54879 NORTHWST4 138 CKT 1	493	78.2	100.2	13.5	800	54879 NORTHWST4 138 to 54880 NORTHWST7 345 CKT 2
04SP-a	809	OKGE	OKGE	54832 EASTERN4 138 to 54835 MEMRIAL4 138 CKT 1	191	38.6	100.1	14.5	808	54907 ARCADIA4 138 to 54941 HSL 4 138 CKT 1
04SP-b	419	OKGE	OKGE	54934 DRAPER 7 345 to 54933 DRAPER 4 138 CKT 1	493	100.9	111.2	12.1	0	54933 DRAPER 4 138 to 54934 DRAPER 7 345 CKT 2
04SP-b	419	OKGE	OKGE	54934 DRAPER 7 345 to 54933 DRAPER 4 138 CKT 2	493	100.9	111.2	12.1	0	54933 DRAPER 4 138 to 54934 DRAPER 7 345 CKT 2
04SP-b	419	OKGE	OKGE	54870 STONWAL4 138 to 54872 REMPKTP4 138 CKT 1	191	82.6	112.5	13.6	244	54835 MEMRIAL4 138 to 54837 TENESTP4 138 CKT 1
04SP-b	419	OKGE	OKGE	54966 MIDWAY 4 138 to 54941 HSL 4 138 CKT 1	287	92.5	102.8	7.0	305	54941 HSL 4 138 to 54973 RENO 4 138 CKT 1
04SP-b	419	OKGE	OKGE	54869 WESTERN4 138 to 54870 STONWAL4 138 CKT 1	191	74.1	108.6	15.7	315	54835 MEMRIAL4 138 to 54837 TENESTP4 138 CKT 1
04SP-c	1164	OKGE	OKGE	54934 DRAPER 7 345 to 54933 DRAPER 4 138 CKT 1	493	100.9	132.3	13.3	0	54933 DRAPER 4 138 to 54934 DRAPER 7 345 CKT 2
04SP-c	1164	OKGE	OKGE	54934 DRAPER 7 345 to 54933 DRAPER 4 138 CKT 2	493	100.9	132.3	13.3	0	54933 DRAPER 4 138 to 54934 DRAPER 7 345 CKT 2
04SP-c	1164	OKGE	OKGE	54870 STONWAL4 138 to 54872 REMPKTP4 138 CKT 1	191	82.6	118.2	5.8	570	54835 MEMRIAL4 138 to 54837 TENESTP4 138 CKT 1
04SP-c	1164	OKGE	OKGE	54832 EASTERN4 138 to 54835 MEMRIAL4 138 CKT 1	191	52.3	137.0	13.9	656	54835 MEMRIAL4 138 to 54850 SKYLINE4 138 CKT 1
04SP-c	1164	OKGE	OKGE	54835 MEMRIAL4 138 to 54850 SKYLINE4 138 CKT 1	287	57.2	126.8	17.2	716	54833 DANFRTH4 138 to 56174 OMHAFAER4 138 CKT 1
04SP-c	1164	OKGE	OKGE	54832 EASTERN4 138 to 54835 MEMRIAL4 138 CKT 1	191	54.9	127.5	11.9	724	54834 KETCH 4 138 to 56173 OMFAIRF4 138 CKT 1
04SP-c	1164	OKGE	OKGE	54880 NORTHWST7 345 to 54879 NORTHWST4 138 CKT 1	493	78.2	112.8	14.7	735	54879 NORTHWST4 138 to 54880 NORTHWST7 345 CKT 2
04SP-c	1164	OKGE	OKGE	54835 MEMRIAL4 138 to 54850 SKYLINE4 138 CKT 1	287	52.9	122.3	17.1	790	54832 EASTERN4 138 to 56174 OMHAFAER4 138 CKT 1
04SP-c	1164	OMPA	OKGE	56174 OMHAFAER4 138 to 54833 DANFRTH4 138 CKT 1	287	59.1	116.6	14.2	828	54835 MEMRIAL4 138 to 54850 SKYLINE4 138 CKT 1
04SP-c	1164	OKGE	OKGE	54832 EASTERN4 138 to 54835 MEMRIAL4 138 CKT 1	191	38.6	123.3	13.9	844	54907 ARCADIA4 138 to 54941 HSL 4 138 CKT 1
04SP-c	1164	OKGE	OKGE	54852 SLVRLAK4 138 to 54853 DIVISION4 138 CKT 1	287	57.8	115.9	14.3	846	54880 NORTHWST7 345 to 54901 CIMARON7 345 CKT 1
04SP-c	1164	OKGE	OKGE	54909 REDBUD 7 345 to 54908 ARCADIAT 345 CKT 1	1195	36.7	123.7	89.3	847	54908 ARCADIAT 345 to 54909 REDBUD 7 345 CKT 2
04SP-c	1164	OKGE	OKGE	54909 REDBUD 7 345 to 54908 ARCADIAT 345 CKT 2	1195	36.7	123.7	89.3	847	54908 ARCADIAT 345 to 54909 REDBUD 7 345 CKT 2

Table 1.2  
Redbud to OKGE without OneOK to Entergy 200 MW Transfer Included

Study Case	Transfer Amount	Facility From Area	Facility To Area	Monitored Branch Overload	Rating <MVA>	PreTransfer %Loading	PostTransfer %Loading	%TDF	TTC <MW>	Outaged Branch Causing Overload
04SP-c	1164	OKGE	OKGE	54832 EASTERN4 138 to 54835 MEMRIAL4 138 CKT 1	191	47.3	119.4	11.8	851	54850 SKYLINE4 138 to 56173 OMFAIRF4 138 CKT 1
04SP-c	1164	OKGE	OKGE	54832 EASTERN4 138 to 54835 MEMRIAL4 138 CKT 1	191	44.7	119.9	12.3	856	54880 NORTHWEST7 345 to 54908 ARCADIA7 345 CKT 1
04SP-c	1164	OKGE	OKGE	54908 ARCADIA7 345 to 54907 ARCADIA4 138 CKT 1	493	51.5	117.2	27.8	859	54907 ARCADIA4 138 to 54908 ARCADIA7 345 CKT 2
04SP-c	1164	OKGE	OKGE	54908 ARCADIA7 345 to 54907 ARCADIA4 138 CKT 2	493	51.5	117.2	27.8	859	54907 ARCADIA4 138 to 54908 ARCADIA7 345 CKT 1
04SP-c	1164	OKGE	OKGE	54907 ARCADIA4 138 to 54941 HSL 4 138 CKT 1	287	29.2	121.2	22.7	896	54833 DANFRTH4 138 to 54907 ARCADIA4 138 CKT 1
04SP-c	1164	OKGE	OKGE	54907 ARCADIA4 138 to 54941 HSL 4 138 CKT 1	287	21.1	121.6	24.8	914	54880 NORTHWEST7 345 to 54908 ARCADIA7 345 CKT 1
04SP-c	1164	OKGE	OKGE	54850 SKYLINE4 138 to 54835 MEMRIAL4 138 CKT 1	287	48.4	113.8	16.1	918	54852 SLVRLAK4 138 to 54853 DIVISION4 138 CKT 1
04SP-c	1164	OMPA	OKGE	56174 OMHAFAER4 138 to 54833 DANFRTH4 138 CKT 1	287	60.8	110.2	12.2	925	54834 KETCH 4 138 to 56173 OMFAIRF4 138 CKT 1
04SP-c	1164	OKGE	OKGE	54852 SLVRLAK4 138 to 54853 DIVISION4 138 CKT 1	287	63.2	109.0	11.3	936	54835 MEMRIAL4 138 to 54837 TENESTP4 138 CKT 1
04SP-c	1164	OKGE	OKGE	54852 SLVRLAK4 138 to 54853 DIVISION4 138 CKT 1	287	52.7	111.0	14.4	944	54835 MEMRIAL4 138 to 54850 SKYLINE4 138 CKT 1
04SP-c	1164	OKGE	OKGE	54851 QUAILCK4 138 to 54873 LONEOAK4 138 CKT 1	308	64.4	108.1	11.6	948	54854 PANTHER4 138 to 54879 NORTHWEST4 138 CKT 1
04SP-c	1164	OKGE	OKGE	54850 SKYLINE4 138 to 54835 MEMRIAL4 138 CKT 1	287	43.2	112.1	17.0	960	54832 EASTERN4 138 to 54835 MEMRIAL4 138 CKT 1
04SP-c	1164	OKGE	OKGE	54851 QUAILCK4 138 to 54873 LONEOAK4 138 CKT 1	308	63.6	107.2	11.5	971	54852 SLVRLAK4 138 to 54854 PANTHER4 138 CKT 1
04SP-c	1164	OKGE	OMPA	54832 EASTERN4 138 to 56174 OMHAFAER4 138 CKT 1	287	51.7	108.9	14.1	983	54835 MEMRIAL4 138 to 54850 SKYLINE4 138 CKT 1
04SP-c	1164	OMPA	OKGE	56174 OMHAFAER4 138 to 54833 DANFRTH4 138 CKT 1	287	49.7	107.4	14.2	1014	54907 ARCADIA4 138 to 54941 HSL 4 138 CKT 1
04SP-c	1164	OKGE	OKGE	54880 NORTHWEST7 345 to 54879 NORTHWEST4 138 CKT 2	493	71.9	104.0	13.6	1019	54879 NORTHWEST4 138 to 54880 NORTHWEST7 345 CKT 1
04SP-c	1164	OKGE	OKGE	54908 ARCADIA7 345 to 54907 ARCADIA4 138 CKT 1	493	43.6	106.9	26.8	1037	54880 NORTHWEST7 345 to 54908 ARCADIA7 345 CKT 1
04SP-c	1164	OKGE	OKGE	54908 ARCADIA7 345 to 54907 ARCADIA4 138 CKT 2	493	43.6	106.9	26.8	1037	54880 NORTHWEST7 345 to 54908 ARCADIA7 345 CKT 1
04SP-c	1164	OMPA	OKGE	56174 OMHAFAER4 138 to 54833 DANFRTH4 138 CKT 1	287	53.8	105.2	12.7	1047	54880 NORTHWEST7 345 to 54908 ARCADIA7 345 CKT 1
04SP-c	1164	OMPA	OKGE	56174 OMHAFAER4 138 to 54833 DANFRTH4 138 CKT 1	287	55.6	104.7	12.1	1052	54850 SKYLINE4 138 to 56173 OMFAIRF4 138 CKT 1
04SP-c	1164	OKGE	OKGE	54833 DANFRTH4 138 to 54907 ARCADIA4 138 CKT 1	465	56.9	104.6	19.0	1052	54880 NORTHWEST7 345 to 54908 ARCADIA7 345 CKT 1
04SP-c	1164	OKGE	OKGE	54901 CIMARON7 345 to 54898 CIMARON4 138 CKT 2	493	71.3	102.8	13.3	1061	54898 CIMARON4 138 to 54901 CIMARON7 345 CKT 1
04SP-c	1164	OKGE	OKGE	54852 SLVRLAK4 138 to 54853 DIVISION4 138 CKT 1	287	51.8	104.1	12.9	1072	54850 SKYLINE4 138 to 56173 OMFAIRF4 138 CKT 1
04SP-c	1164	OKGE	OKGE	54901 CIMARON7 345 to 54898 CIMARON4 138 CKT 1	493	70.6	101.8	13.2	1097	54898 CIMARON4 138 to 54901 CIMARON7 345 CKT 2
04SP-c	1164	OKGE	OKGE	54852 SLVRLAK4 138 to 54853 DIVISION4 138 CKT 1	287	54.9	102.5	11.7	1102	54898 CIMARON4 138 to 54901 CIMARON7 345 CKT 2
04SP-c	1164	OKGE	OMPA	54832 EASTERN4 138 to 56174 OMHAFAER4 138 CKT 1	287	53.4	102.5	12.1	1105	54834 KETCH 4 138 to 56173 OMFAIRF4 138 CKT 1
04SP-c	1164	OKGE	OKGE	54852 SLVRLAK4 138 to 54853 DIVISION4 138 CKT 1	287	54.9	102.3	11.7	1108	54863 HAYMAKR4 138 to 54898 CIMARON4 138 CKT 1
04SP-c	1164	OKGE	OKGE	54907 ARCADIA4 138 to 54941 HSL 4 138 CKT 1	287	16.6	102.7	21.2	1128	54833 DANFRTH4 138 to 56174 OMHAFAER4 138 CKT 1
04SP-c	1164	OKGE	OKGE	54907 ARCADIA4 138 to 54941 HSL 4 138 CKT 1	287	15.2	101.8	21.4	1140	55055 MAUD 4 138 to 55075 FRSTHIL4 138 CKT 1
04SP-c	1164	OKGE	OKGE	54907 ARCADIA4 138 to 54941 HSL 4 138 CKT 1	287	15.6	101.6	21.2	1142	54832 EASTERN4 138 to 56174 OMHAFAER4 138 CKT 1
04SP-c	1164	OKGE	OKGE	54893 XEROX 4 138 to 54896 MORGAN 4 138 CKT 1	287	39.3	100.3	15.0	1158	54863 HAYMAKR4 138 to 54898 CIMARON4 138 CKT 1
04SP-c	1164	OKGE	OKGE	54835 MEMRIAL4 138 to 54850 SKYLINE4 138 CKT 1	287	47.9	100.2	12.9	1160	54849 LAKESID4 138 to 54853 DIVISION4 138 CKT 1
04FA	1114	OKGE	OKGE	54835 MEMRIAL4 138 to 54832 EASTERN4 138 CKT 1	191	90.8	123.3	5.6	315	54835 MEMRIAL4 138 to 54850 SKYLINE4 138 CKT 1
04FA	1114	OKGE	OKGE	54835 MEMRIAL4 138 to 54832 EASTERN4 138 CKT 1	191	82.3	114.0	5.4	622	54834 KETCH 4 138 to 56173 OMFAIRF4 138 CKT 1
04FA	1114	OKGE	OKGE	54835 MEMRIAL4 138 to 54832 EASTERN4 138 CKT 1	191	76.8	112.7	6.1	721	54907 ARCADIA4 138 to 54941 HSL 4 138 CKT 1
04FA	1114	OKGE	OKGE	54852 SLVRLAK4 138 to 54853 DIVISION4 138 CKT 1	287	72.5	112.5	10.3	767	54880 NORTHWEST7 345 to 54901 CIMARON7 345 CKT 1
04FA	1114	OKGE	OKGE	54835 MEMRIAL4 138 to 54850 SKYLINE4 138 CKT 1	287	84.9	106.8	5.6	769	54833 DANFRTH4 138 to 56174 OMHAFAER4 138 CKT 1
04FA	1114	OKGE	OKGE	54835 MEMRIAL4 138 to 54832 EASTERN4 138 CKT 1	191	77.7	109.4	5.4	784	54850 SKYLINE4 138 to 56173 OMFAIRF4 138 CKT 1
04FA	1114	OKGE	OKGE	54909 REDBUD 7 345 to 54908 ARCADIA7 345 CKT 1	1195	41.4	122.5	86.9	805	54908 ARCADIA7 345 to 54909 REDBUD 7 345 CKT 2
04FA	1114	OKGE	OKGE	54909 REDBUD 7 345 to 54908 ARCADIA7 345 CKT 2	1195	41.4	122.5	86.9	805	54908 ARCADIA7 345 to 54909 REDBUD 7 345 CKT 1
04FA	1114	OKGE	OKGE	54832 EASTERN4 138 to 54835 MEMRIAL4 138 CKT 1	191	68.0	108.9	7.0	873	54880 NORTHWEST7 345 to 54908 ARCADIA7 345 CKT 1
04FA	1114	OKGE	OKGE	54835 MEMRIAL4 138 to 54850 SKYLINE4 138 CKT 1	287	82.4	104.3	5.6	897	54832 EASTERN4 138 to 56174 OMHAFAER4 138 CKT 1
04FA	1114	OKGE	OKGE	54941 HSL 4 138 to 54907 ARCADIA4 138 CKT 1	287	60.1	107.5	12.2	937	54880 NORTHWEST7 345 to 54908 ARCADIA7 345 CKT 1
04FA	1114	OKGE	OKGE	54941 HSL 4 138 to 54907 ARCADIA4 138 CKT 1	287	67.4	104.1	9.4	991	54833 DANFRTH4 138 to 54907 ARCADIA4 138 CKT 1
04FA	1114	OKGE	OKGE	54872 REMPKTP4 138 to 54870 STONWAL4 138 CKT 1	191	80.5	100.1	3.4	1109	54835 MEMRIAL4 138 to 54837 TENESTP4 138 CKT 1
04WP	904	OKGE	OKGE	54835 MEMRIAL4 138 to 54832 EASTERN4 138 CKT 1	191	90.2	118.6	6.0	311	54835 MEMRIAL4 138 to 54850 SKYLINE4 138 CKT 1
04WP	904	OKGE	OKGE	54835 MEMRIAL4 138 to 54832 EASTERN4 138 CKT 1	191	82.8	110.3	5.8	566	54834 KETCH 4 138 to 56173 OMFAIRF4 138 CKT 1
04WP	904	OKGE	OKGE	54852 SLVRLAK4 138 to 54853 DIVISION4 138 CKT 1	287	77.8	111.7	10.8	591	54880 NORTHWEST7 345 to 54901 CIMARON7 345 CKT 1
04WP	904	OKGE	OKGE	54835 MEMRIAL4 138 to 54832 EASTERN4 138 CKT 1	191	78.2	109.1	6.5	637	54907 ARCADIA4 138 to 54941 HSL 4 138 CKT 1
04WP	904	OKGE	OKGE	54835 MEMRIAL4 138 to 54832 EASTERN4 138 CKT 1	191	79.0	106.4	5.8	693	54850 SKYLINE4 138 to 56173 OMFAIRF4 138 CKT 1
04WP	904	OKGE	OKGE	54909 REDBUD 7 345 to 54908 ARCADIA7 345 CKT 1	1195	46.0	113.0	88.5	729	54908 ARCADIA7 345 to 54909 REDBUD 7 345 CKT 2
04WP	904	OKGE	OKGE	54909 REDBUD 7 345 to 54908 ARCADIA7 345 CKT 2	1195	46.0	113.0	88.5	729	54908 ARCADIA7 345 to 54909 REDBUD 7 345 CKT 1

Table 1.2  
Redbud to OKGE without OneOK to Entergy 200 MW Transfer Included

Study Case	Transfer Amount	Facility From Area	Facility To Area	Monitored Branch Overload	Rating <MVA>	PreTransfer %Loading	PostTransfer %Loading	%TDF	TTC <MW>	Outaged Branch Causing Overload
04WP	904	OKGE	OKGE	54835 MEMRIAL4 138 to 54832 EASTERN4 138 CKT 1	191	70.1	104.9	7.4	777	54880 NORTHST7 345 to 54908 ARCADIA7 345 CKT 1
04WP	904	OKGE	OKGE	54941 HSL 4 138 to 54907 ARCADIA4 138 CKT 1	287	61.8	101.9	12.7	860	54880 NORTHST7 345 to 54908 ARCADIA7 345 CKT 1
04WP	904	OKGE	OKGE	54835 MEMRIAL4 138 to 54850 SKYLINE4 138 CKT 1	287	80.9	100.3	6.2	889	54833 DANFRTH4 138 to 56174 OMHAFAFER4 138 CKT 1

Table 1.2  
Redbud to OKGE without OneOK to Entergy 200 MW Transfer Included

Study Case	Transfer Amount	Facility From Area	Facility To Area	Monitored Branch Overload	Rating <MVA>	PreTransfer %Loading	PostTransfer %Loading	%TDF	TTC <MW>	Outaged Branch Causing Overload
03FA	244			No Limits Identified					244	
03WP	207			No Limits Identified					207	
04AP	115			No Limits Identified					115	
04G	290			No Limits Identified					290	
04SP-a	325	OKGE	OKGE	54934 DRAPER 7 345 to 54933 DRAPER 4 138 CKT 1	493	100.4	104.8	6.7	0	54933 DRAPER 4 138 to 54934 DRAPER 7 345 CKT 2
04SP-a	325	OKGE	OKGE	54934 DRAPER 7 345 to 54933 DRAPER 4 138 CKT 2	493	100.4	104.8	6.7	0	54933 DRAPER 4 138 to 54934 DRAPER 7 345 CKT 1
04SP-a	325	OMPA	OKGE	56151 OMPONCA2 69 to 54742 OSAGE 2 69 CKT 1	72	86.8	123.1	8.0	118	54742 OSAGE 2 69 to 56151 OMPONCA2 69 CKT 2
04SP-a	325	OKGE	OMPA	54742 OSAGE 2 69 to 56151 OMPONCA2 69 CKT 2	72	85.9	119.3	7.4	137	54742 OSAGE 2 69 to 56151 OMPONCA2 69 CKT 1
04SP-b	429	OKGE	OKGE	54934 DRAPER 7 345 to 54933 DRAPER 4 138 CKT 1	493	100.4	104.2	4.3	0	54933 DRAPER 4 138 to 54934 DRAPER 7 345 CKT 2
04SP-b	429	OKGE	OKGE	54934 DRAPER 7 345 to 54933 DRAPER 4 138 CKT 2	493	100.4	104.2	4.3	0	54933 DRAPER 4 138 to 54934 DRAPER 7 345 CKT 1
04FA	243	OKGE	OKGE	54934 DRAPER 7 345 to 54933 DRAPER 4 138 CKT 1	493	97.1	100.7	7.3	198	54933 DRAPER 4 138 to 54934 DRAPER 7 345 CKT 2
04FA	243	OKGE	OKGE	54934 DRAPER 7 345 to 54933 DRAPER 4 138 CKT 2	493	97.1	100.7	7.3	198	54933 DRAPER 4 138 to 54934 DRAPER 7 345 CKT 1
04FA	243	OKGE	OKGE	54835 MEMRIAL4 138 to 54832 EASTERN4 138 CKT 1	191	93.3	100.8	5.9	216	54835 MEMRIAL4 138 to 54850 SKYLINE4 138 CKT 1
03WP	205			No Limits Identified					205	

Table 2.1  
Redbud to OMPA with OneOK to Entergy 200 MW Transfer Included

Study Case	Transfer Amount	Facility From Area	Facility To Area	Monitored Branch Overload	Rating <MVA>	PreTransfer %Loading	PostTransfer %Loading	%TDF	TTC <MW>	Outaged Branch Causing Overload
03FA	244			No Limits Identified					<b>244</b>	
03WP	207			No Limits Identified					<b>207</b>	
04AP	115			No Limits Identified					<b>115</b>	
04G	290			No Limits Identified					<b>290</b>	
04SPa	325	OKGE	OKGE	54934 DRAPER 7 345 to 54933 DRAPER 4 138 CKT 1	493	100.9	105.3	6.7	<b>0</b>	54933 DRAPER 4 138 to 54934 DRAPER 7 345 CKT 2
04SPa	325	OKGE	OKGE	54934 DRAPER 7 345 to 54933 DRAPER 4 138 CKT 2	493	100.9	105.3	6.7	<b>0</b>	54933 DRAPER 4 138 to 54934 DRAPER 7 345 CKT 1
04SPa	325	OMPA	OKGE	56151 OMPONCA2 69 to 54742 OSAGE 2 69 CKT 1	72	86.8	123.2	8.1	118	54742 OSAGE 2 69 to 56151 OMPONCA2 69 CKT 2
04SPa	325	OKGE	OMPA	54742 OSAGE 2 69 to 56151 OMPONCA2 69 CKT 2	72	86.0	119.4	7.4	136	54742 OSAGE 2 69 to 56151 OMPONCA2 69 CKT 1
04SPb	429	OKGE	OKGE	54934 DRAPER 7 345 to 54933 DRAPER 4 138 CKT 1	493	100.9	104.6	4.3	<b>0</b>	54933 DRAPER 4 138 to 54934 DRAPER 7 345 CKT 2
04SPb	429	OKGE	OKGE	54934 DRAPER 7 345 to 54933 DRAPER 4 138 CKT 2	493	100.9	104.6	4.3	<b>0</b>	54933 DRAPER 4 138 to 54934 DRAPER 7 345 CKT 1
04FA	243	OKGE	OKGE	54934 DRAPER 7 345 to 54933 DRAPER 4 138 CKT 1	493	97.8	101.2	6.9	<b>155</b>	54933 DRAPER 4 138 to 54934 DRAPER 7 345 CKT 2
04FA	243	OKGE	OKGE	54934 DRAPER 7 345 to 54933 DRAPER 4 138 CKT 2	493	97.8	101.2	6.9	<b>155</b>	54933 DRAPER 4 138 to 54934 DRAPER 7 345 CKT 1
03WP	205			No Limits Identified					<b>205</b>	

Season	Limiting Element	TTC <MW>	TRM	FIRM RESERVATION	Firm ATC	Non-Firm ATC
2003 Fall (October-November) Redbud to OKGE	EASTERN AVE - MEMORIAL 138KV from Table 1.1	760	103	0	657	760
2003 Winter (December-March) Redbud to OKGE	EASTERN AVE - MEMORIAL 138KV from Table 1.1	678	103	0	575	678
2004 Spring (April- May) Redbud to OKGE	ARCADIA - REDBUD 345KV CKT 1 from Table 1.2	903	103	0	800	903
2004 Summer (June-September) Redbud to OKGE	DRAPER LAKE 345/138KV TRANSFORMER CKT 1 from Table 1.1 and 1.2, Transfers a, b, and c	0	103	0	0	0
2004 Fall (October-November) Redbud to OKGE	EASTERN AVE - MEMORIAL 138KV from Table 1.1	231	103	0	128	231
2004 Winter (December-March) Redbud to OKGE	EASTERN AVE - MEMORIAL 138KV from Table 1.1	235	103	0	132	235
2003 Fall (October-November) Redbud to OMPA	No Limits Identified	244	103	56	85	188
2003 Winter (December-March) Redbud to OMPA	No Limits Identified	207	103	50	54	157
2004 Spring (April- May) Redbud to OMPA	No Limits Identified	290	103	50	137	240
2004 Summer (June-September) Redbud to OMPA	DRAPER LAKE 345/138KV TRANSFORMER CKT 1 from Table 2.1 and 2.2, Transfers a and b	0	103	50	0	0
2004 Fall (October-November) Redbud to OMPA	DRAPER LAKE 345/138KV TRANSFORMER CKT 1 from Table 2.2	155	103	50	2	105
2004 Winter (December-March) Redbud to OMPA	No Limits Identified	205	103	50	52	155