



SPP *Southwest Power Pool*

***System Impact Study SPP-2001-139
For Transmission Service
Requested By
Duke Energy Trading and Marketing
(DETM)
From Western Resources (WR) To
Omaha Public Power District
(OPPD)***

***For a Reserved Amount Of 640MW
From 6/1/03
To 6/1/04***

SPP Coordinated Planning

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1. Executive Summary

Duke Energy Trading and Marketing (DETM) has requested a system impact study for long-term Firm Point-to-Point transmission service from Western Resources (WR) to Omaha Public Power District (OPPD). The period of the transaction is from 6/1/03 to 6/1/04. The request is for OASIS reservation 248176 in the amount of 640MW.

The principal objective of this study is to identify system problems and potential system modifications necessary to facilitate the additional 640MW transfer while maintaining system reliability.

New overloads caused by the 640MW transfer were identified along with determining the impact of the transfer on any previously assigned and identified facilities.

Tables 1 and 2 list the new overloads caused by the 640MW transfer. Table 3 lists the previously assigned and identified facilities impacted by the 640MW transfer.

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. DETM 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 DETM 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

Duke Energy Trading and Marketing (DETM) has requested an impact study for transmission service from WR control area with a sink of OPPD.

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 640MW. 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 640MW 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 640MW.

3. Study Methodology

A. Description

Two analyses were conducted to determine the impact of the 640MW transfer on the system. The first analysis was conducted to identify any new overloads caused by the 640MW transfer. The second analysis was done to ensure that available capacity exists on previously identified circuits.

The first analysis was to study the steady-state analysis impact of the 640MW 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 six seasonal models to study the 640MW request. The SPP 2001 Series Cases: 2002 Spring Peak, 2002 Summer Peak, 2002/03 Winter Peak, 2003 Spring Peak, 2004 Summer Peak, 2004/05 Winter Peak were used to study the impact of the 640MW transfer on the SPP system during the transaction period of 6/1/03 to 6/1/04.

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

C. Transfer Analysis

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

4. Study Results

A. Study Analysis Results

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 ATC if calculated, any SPP identification or assignment of the event, and any solutions received from the transmission owners.

Table 1 shows the new facility overloads caused by the 640MW transfer. Upgrades associated with these new overloads can be directly assigned to the WR to OPPD 640MW transfer.

Table 2 documents overloads on Non SPP Regional Tariff participants' transmission systems caused by the 640MW transfer.

Table 3 documents the 640MW transfer impact on previously assigned and identified facilities.

Table 1 (page 1 of 3) – SPP Facility Overloads caused by the WR to OPPD 640MW Transfer

| Study Year | From Area - To Area | Branch Over 100% of Rate B | RATE B | BC % Loading | TC % Loading | Outaged Branch that Caused Overload | ATC |
|------------|---------------------|--|--------|--------------|--------------|--|-----|
| 02G | WERE-WERE | HOYT TO HOYT HTI SWITCHING JUNCTION, 115KV 57163 HOYT 3 115 to 57165 HTI JCT3 115 CKT 1 | 92 | 100.0 | 130.8 | CLIFTON TO GREENLEAF, 115KV 58756 CLIFTON3 115 to 58765 GRNLEAF3 115 CKT1 | 1 |
| 02G | WERE-WERE | HOYT HTI SWITCHING JCT. TO CIRCLEVILLE, 115KV 57165 HTI JCT3 115 to 57152 CIRCLVL3 115 CKT 1 | 92 | 97.9 | 128.7 | CLIFTON TO CONCORDIA, 115KV 58756 CLIFTON3 115 to 58757 CONCORD3 115 CKT1 | 44 |
| 02G | WERE-WERE | CIRCLEVILLE TO KING HILL N.M. COOP, 115KV 57152 CIRCLVL3 115 to 57331 KING HL3 115 CKT 1 | 92 | 93.9 | 135.9 | IATAN TO ST JOSEPH, 345KV 57982 IATAN 7 345 to 69702 ST JOE 3 345 CKT1 | 93 |
| 02G | WERE-WERE | KING HILL N.M. COOP TO KELLY, 115KV 57331 KING HL3 115 to 57217 KELLY 3 115 CKT 1 | 92 | 91.4 | 133.4 | IATAN TO ST JOSEPH, 345KV 57982 IATAN 7 345 to 69702 ST JOE 3 345 CKT1 | 131 |
| 02G | KACP-SJLP | IATAN TO ST JOSEPH, 345KV 57982 IATAN 7 345 to 69702 ST JOE 3 345 CKT 1 | 956 | 75.5 | 115.4 | STRANGER CREEK TO CRAIG, 345KV 56772 STRANGR7 345 to 57977 CRAIG 7 345 CKT1 | 392 |
| 02G | WERE-WERE | FORT JCT. SW. STAT. TO WEST JCT. CITY JCT. EAST 57328 FT JCT 3 115 to 57343 WJCTYE3 115 CKT 1 | 68 | 96.3 | 101.0 | JEFFREY ENERGY CENTER NORTH BUS TO SUMMIT, 345KV 56766 JEC N 7 345 to 56773 SUMMIT 7 345 CKT1 | 507 |
| 02SP | WERE-WERE | CIRCLEVILLE TO KING HILL N.M. COOP, 115KV 57152 CIRCLVL3 115 to 57331 KING HL3 115 CKT 1 | 92 | 99.8 | 142.4 | IATAN TO ST JOSEPH, 345KV 57982 IATAN 7 345 to 69702 ST JOE 3 345 CKT1 | 2 |
| 02SP | WERE-WERE | HOYT HTI SWITCHING JCT. TO CIRCLEVILLE, 115KV 57165 HTI JCT3 115 to 57152 CIRCLVL3 115 CKT 1 | 92 | 97.9 | 136.4 | COOPER TO ST JOSEPH, 345KV 64065 COOPER 3 345 to 69702 ST JOE 3 345 CKT1 | 35 |
| 02SP | WERE-WERE | HOYT TO HOYT HTI SWITCHING JUNCTION, 115KV 57163 HOYT 3 115 to 57165 HTI JCT3 115 CKT 1 | 92 | 96.5 | 141.8 | STRANGER CREEK TO IATAN, 345KV 56772 STRANGR7 345 to 57982 IATAN 7 345 CKT1 NASHUA TO LAKE ROAD SUBSTATION, 161 KV 58028 NASHUA-5 161 to 69705 LAKE RD5 161 CKT 1 | 49 |
| 02SP | WERE-WERE | KING HILL N.M. COOP TO KELLY, 115KV 57331 KING HL3 115 to 57217 KELLY 3 115 CKT 1 | 92 | 96.6 | 139.0 | IATAN TO ST JOSEPH, 345KV 57982 IATAN 7 345 to 69702 ST JOE 3 345 CKT1 | 52 |
| 02SP | WERE-WERE | AUBURN 230/115KV TRANSFORMER 56851 AUBURN 6 230 to 57151 AUBURN 3 115 CKT 1 | 308 | 99.9 | 100.1 | JEFFREY ENERGY CENTER TO EAST MANHATTAN, 230KV 56852 JEC 6 230 to 56861 EMANHAT6 230 CKT1 | 296 |
| 02SP | WERE-WERE | FARMER'S CONSUMER CO-OP TO BISMARCK JCT. SW. STAT. 57236 COOP 3 115 to 57234 BISMARCK3 115 CKT 1 | 118 | 98.8 | 101.0 | LAWRENCE HILL TO WREN, 115 KV 57250 LWRNCHL3 115 to 57280 WREN 3 115 CKT1 | 346 |
| 02SP | WERE-WERE | JARBALO JCT. SW. STATION TO 166TH, 115KV 57244 JARBALO3 115 to 57233 166TH 3 115 CKT 1 | 119 | 94.5 | 104.6 | MIDLAND JUNCTION TO PENTAGON, 115KV 57252 MIDLAND3 115 to 57261 PENTAGN3 115 CKT1 | 348 |
| 02SP | KACP-SJLP | IATAN TO ST JOSEPH, 345KV 57982 IATAN 7 345 to 69702 ST JOE 3 345 CKT 1 | 956 | 75.6 | 115.5 | STRANGER CREEK TO CRAIG, 345KV 56772 STRANGR7 345 to 57977 CRAIG 7 345 CKT1 | 391 |
| 02SP | WERE-WERE | AUBURN ROAD TO KEENE, 115 KV 57151 AUBURN 3 115 to 57167 KEENE 3 115 CKT 1 | 68 | 97.0 | 101.7 | JEFFREY ENERGY CENTER TO EAST MANHATTAN, 230KV 56852 JEC 6 230 to 56861 EMANHAT6 230 CKT1 | 409 |
| 02WP | WERE-WERE | CIRCLEVILLE TO KING HILL N.M. COOP, 115KV 57152 CIRCLVL3 115 to 57331 KING HL3 115 CKT 1 | 92 | 99.6 | 141.7 | IATAN TO ST JOSEPH, 345KV 57982 IATAN 7 345 to 69702 ST JOE 3 345 CKT1 | 6 |
| 02WP | WERE-WERE | KING HILL N.M. COOP TO KELLY, 115KV 57331 KING HL3 115 to 57217 KELLY 3 115 CKT 1 | 92 | 97.3 | 139.3 | IATAN TO ST JOSEPH, 345KV 57982 IATAN 7 345 to 69702 ST JOE 3 345 CKT1 | 41 |

Table 1 (page 2 of 3) – SPP Facility Overloads caused by the WR to OPPD 640MW Transfer

| Study Year | From Area - To Area | Branch Over 100% of Rate B | RATE B | BC % Loading | TC % Loading | Outaged Branch that Caused Overload | ATC |
|------------|---------------------|---|--------|--------------|--------------|--|-----|
| 02WP | WERE-WERE | HOYT TO HOYT HTI SWITCHING JUNCTION, 115KV 57163 HOYT 3 115 to 57165 HTI JCT3 115 CKT 1 | 92 | 91.1 | 135.0 | STRANGER CREEK TO IATAN, 345KV 56772 STRANGR7 345 to 57982 IATAN 7 345 CKT1 NASHUA TO LAKE ROAD SUBSTATION, 161 KV 58028 NASHUA-5 161 to 69705 LAKE RD5 161 CKT 1 | 130 |
| 02WP | WERE-WERE | HOYT HTI SWITCHING JCT. TO CIRCLEVILLE, 115KV 57165 HTI JCT3 115 to 57152 CIRCLVL3 115 CKT 1 | 92 | 86.8 | 130.6 | STRANGER CREEK TO IATAN, 345KV 56772 STRANGR7 345 to 57982 IATAN 7 345 CKT1 NASHUA TO LAKE ROAD SUBSTATION, 161 KV 58028 NASHUA-5 161 to 69705 LAKE RD5 161 CKT 1 | 193 |
| 02WP | WERE-WERE | NORTH AMERICAN PHILIPS JCT. S. TO WEST MCPHERSON 57374 SPHILPJ3 115 to 57438 WMCPHER3 115 CKT 1 | 68 | 95.8 | 106.7 | EAST MCPHERSON TO SUMMIT, 230KV 56872 EMCIPHER6 230 to 56873 SUMMIT 6 230 CKT1 | 246 |
| 02WP | KACP-SJLP | IATAN TO ST JOSEPH, 345KV 57982 IATAN 7 345 to 69702 ST JOE 3 345 CKT 1 | 956 | 76.4 | 116.3 | STRANGER CREEK TO CRAIG, 345KV 56772 STRANGR7 345 to 57977 CRAIG 7 345 CKT1 | 379 |
| 03G | WERE-WERE | HOYT HTI SWITCHING JCT. TO CIRCLEVILLE, 115KV 57165 HTI JCT3 115 to 57152 CIRCLVL3 115 CKT 1 | 92 | 99.2 | 129.8 | KNOB HILL TO GREENLEAF, 115KV 57332 KNOB HL3 115 to 58765 GRNLEAF3 115 CKT1 | 17 |
| 03G | WERE-WERE | KING HILL N.M. COOP TO KELLY, 115KV 57331 KING HL3 115 to 57217 KELLY 3 115 CKT 1 | 92 | 98.0 | 139.1 | IATAN TO ST JOSEPH, 345KV 57982 IATAN 7 345 to 69702 ST JOE 3 345 CKT1 | 31 |
| 03G | WERE-WERE | HOYT TO HOYT HTI SWITCHING JUNCTION, 115KV 57163 HOYT 3 115 to 57165 HTI JCT3 115 CKT 1 | 92 | 96.4 | 133.6 | COOPER TO ST JOSEPH, 345KV 64065 COOPER 3 345 to 69702 ST JOE 3 345 CKT1 | 62 |
| 03G | AEPW-AEPW | NORTHEAST STATION TO OWASSO SOUTH, 138KV 53945 N.E.S.-4 138 to 53857 OWASSOS4 138 CKT 1 | 143 | 99.9 | 100.5 | VERDIGRIS TO NORTHEAST STATION, 138KV 53869 VERDIGS4 138 to 53945 N.E.S.-4 138 CKT1 | 98 |
| 03G | WERE-WERE | CIRCLEVILLE TO KING HILL N.M. COOP, 115KV 57152 CIRCLVL3 115 to 57331 KING HL3 115 CKT 1 | 92 | 93.2 | 122.1 | EAST MANHATTAN TO CONCORDIA, 230KV 56861 EMANHAT6 230 to 58758 CONCORD6 230 CKT1 | 150 |
| 03G | KACP-SJLP | IATAN TO ST JOSEPH, 345KV 57982 IATAN 7 345 to 69702 ST JOE 3 345 CKT 1 | 956 | 80.7 | 120.7 | STRANGER CREEK TO CRAIG, 345KV 56772 STRANGR7 345 to 57977 CRAIG 7 345 CKT1 | 309 |
| 03G | WERE-WERE | JARBALO JCT. SW. STATION TO 166TH, 115KV 57244 JARBALO3 115 to 57233 166TH 3 115 CKT 1 | 119 | 83.8 | 101.7 | STRANGER CREEK TO CRAIG, 345KV 56772 STRANGR7 345 to 57977 CRAIG 7 345 CKT1 | 581 |
| 04SP | WERE-WERE | KING HILL N.M. COOP TO KELLY, 115KV 57331 KING HL3 115 to 57217 KELLY 3 115 CKT 1 | 92 | 99.5 | 142.7 | IATAN TO ST JOSEPH, 345KV 57982 IATAN 7 345 to 69702 ST JOE 3 345 CKT1 | 7 |
| 04SP | WERE-WERE | CIRCLEVILLE TO KING HILL N.M. COOP, 115KV 57152 CIRCLVL3 115 to 57331 KING HL3 115 CKT 1 | 92 | 99.3 | 129.9 | EAST MANHATTAN TO CONCORDIA, 230KV 56861 EMANHAT6 230 to 58758 CONCORD6 230 CKT1 | 15 |
| 04SP | WERE-WERE | HOYT HTI SWITCHING JCT. TO CIRCLEVILLE, 115KV 57165 HTI JCT3 115 to 57152 CIRCLVL3 115 CKT 1 | 92 | 94.7 | 139.7 | STRANGER CREEK TO IATAN, 345KV 56772 STRANGR7 345 to 57982 IATAN 7 345 CKT1 NASHUA TO LAKE ROAD SUBSTATION, 161 KV 58028 NASHUA-5 161 to 69705 LAKE RD5 161 CKT1 | 75 |

Table 1 (page 3 of 3) – SPP Facility Overloads caused by the WR to OPPD 640MW Transfer

| Study Year | From Area - To Area | Branch Over 100% of Rate B | RATE B | BC % Loading | TC % Loading | Outaged Branch that Caused Overload | ATC |
|------------|---------------------|---|--------|--------------|--------------|--|-----|
| 04SP | AEPW-EES | FULTON TO PATMOS-WEST SS, 115KV 53374 FULTON 3 115 to 99303 3PATMOS# 115 CKT 1 | 174 | 99.6 | 101.3 | IATAN TO ST JOSEPH, 345KV 57982 IATAN 7 345 to 69702 ST JOE 3 345 CKT1 | 143 |
| 04SP | WERE-WERE | AUBURN 230/115KV TRANSFORMER 56851 AUBURN 6 230 to 57151 AUBURN 3 115 CKT 1 | 308 | 99.2 | 101.7 | HOYT TO HOYT 345-115 KV TRANSFORMER MIDPOINT 56765 HOYT 7 345 to 56804 HOYT 7X1.00 CKT1 | 197 |
| 04SP | WERE-WERE | JARBALO JCT. SW. STATION TO 166TH, 115KV 57244 JARBALO3 115 to 57233 166TH 3 115 CKT 1 | 119 | 90.8 | 108.4 | STRANGER CREEK TO CRAIG, 345KV 56772 STRANGR7 345 to 57977 CRAIG 7 345 CKT1 | 334 |
| 04SP | KACP-SJLP | IATAN TO ST JOSEPH, 345KV 57982 IATAN 7 345 to 69702 ST JOE 3 345 CKT 1 | 956 | 76.7 | 116.7 | STRANGER CREEK TO CRAIG, 345KV 56772 STRANGR7 345 to 57977 CRAIG 7 345 CKT1 | 373 |
| 04SP | EMDE-EMDE | REINMILLER 161/69KV TRANSFORMER 59500 RNM393 5 161 to 59595 RNM393 269.0 CKT 1 | 75 | 99.6 | 100.2 | TIPTON FORD TO JOPLIN SOUTHWEST, 161KV 59472 TIP292 5 161 to 59483 JOP389 5 161 CKT1 | 448 |
| 04SP | WERE-WERE | 166TH TO JAGGARD JUNCTION, 115KV 57233 166TH 3 115 to 57243 JAGGARD3 115 CKT 1 | 119 | 90.6 | 100.9 | MIDLAND JUNCTION TO PENTAGON, 115KV 57252 MIDLAND3 115 to 57261 PENTAGN3 115 CKT1 | 582 |
| 04SP | AEPW-SWPA | BEAVER TO EUREKA SPRINGS, 161KV 52680 BEAVER 5 161 to 53136 EUREKA 5 161 CKT1 | 274 | 98.7 | 100.1 | MONETT TO BROOKLINE, 345KV 59481 MON383 7 345 to 59984 BRKLINE 7 345 CKT1 | 582 |
| 04WP | WERE-WERE | HOYT HTI SWITCHING JCT. TO CIRCLEVILLE, 115KV 57165 HTI JCT3 115 to 57152 CIRCLVL3 115 CKT 1 | 92 | 99.8 | 130.9 | CLIFTON TO GREENLEAF, 115KV 58756 CLIFTON3 115 to 58765 GRNLEAF3 115 CKT1 | 4 |
| 04WP | AEPW-EES | FULTON TO PATMOS-WEST SS, 115KV 53374 FULTON 3 115 to 99303 3PATMOS# 115 CKT 1 | 197 | 100.0 | 101.1 | MUSKOGEE TO FORT SMITH, 345KV 55224 MUSKOGEE7 345 to 55302 FTSMITH7 345 CKT1 | 21 |
| 04WP | WERE-WERE | CIRCLEVILLE TO KING HILL N.M. COOP, 115KV 57152 CIRCLVL3 115 to 57331 KING HL3 115 CKT 1 | 92 | 94.0 | 123.4 | EAST MANHATTAN TO CONCORDIA, 230KV 56861 EMANHAT6 230 to 58758 CONCORD6 230 CKT1 | 131 |
| 04WP | WERE-WERE | KING HILL N.M. COOP TO KELLY, 115KV 57331 KING HL3 115 to 57217 KELLY 3 115 CKT 1 | 92 | 91.6 | 121.0 | EAST MANHATTAN TO CONCORDIA, 230KV 56861 EMANHAT6 230 to 58758 CONCORD6 230 CKT1 | 183 |
| 04WP | WERE-WERE | NORTH AMERICAN PHILIPS JCT. S. TO WEST MCPHERSON 57374 SPHILPJ3 115 to 57438 WMCPHER3 115 CKT 2 | 92 | 97.8 | 105.6 | EAST MCPHERSON TO SUMMIT, 230KV 56872 EMCIPHER6 230 to 56873 SUMMIT 6 230 CKT1 | 183 |
| 04WP | KACP-SJLP | IATAN TO ST JOSEPH, 345KV 57982 IATAN 7 345 to 69702 ST JOE 3 345 CKT 1 | 956 | 80.9 | 120.7 | STRANGER CREEK TO CRAIG, 345KV 56772 STRANGR7 345 to 57977 CRAIG 7 345 CKT1 | 307 |
| 04WP | WERE-WERE | WEST JCT. CITY TO WEST JCT. CITY JUNCTION (WEST) 57342 WJCCTY 3 115 to 57344 WJCCTYW3 115 CKT 1 | 141 | 94.9 | 100.4 | SUMMIT TO SUMMIT 345-230 KV TRANSFORMER MIDPOINT 56873 SUMMIT 6 230 to 56813 SUMMIT7X1.00 CKT1 | 588 |

Table 2 (page 1 of 2) – Non - SPP Facility Overloads caused by the WR to OPPD 640MW Transfer

| Study Year | From Area - To Area | Branch Over 100% of Rate B | RATE B | BC % Loading | TC % Loading | Outaged Branch that Caused Overload | ATC |
|------------|---------------------|--|--------|--------------|--------------|---|-----|
| 02G | AMRN-AMRN | 31221 MOBERLY 161 to 31222 MOBERLY 69.0 CKT 2 | 75 | 100.0 | 101.5 | 96044 7MCCRED 345 to 96049 7THOMHL 345 CKT1 | 19 |
| 02G | SJLP-SJLP | 69703 ST JOE 5 161 to 69701 MIDWAY 5 161 CKT 1 | 164 | 90.8 | 113.4 | 64065 COOPER 3 345 to 96039 7FAIRPT 345 CKT 1 69702 ST JOE 3 345 to 96039 7FAIRPT 345 CKT 1 | 261 |
| 02G | SJLP-SJLP | 69701 MIDWAY 5 161 to 69700 MARYVLE5 161 CKT 1 | 164 | 82.9 | 105.5 | 64065 COOPER 3 345 to 96039 7FAIRPT 345 CKT 1 69702 ST JOE 3 345 to 96039 7FAIRPT 345 CKT 1 | 484 |
| 02G | OPPD-OPPD | 60032 S1263 5 161 to 60131 S1263T1T 161 CKT 1 | 53 | 93.8 | 101.4 | 60136 S975T4 T 161 to 64145 HUMBOLT5 161 CKT1 | 522 |
| 02SP | SJLP-SJLP | 69703 ST JOE 5 161 to 69701 MIDWAY 5 161 CKT 1 | 164 | 98.9 | 122.4 | 64065 COOPER 3 345 to 96039 7FAIRPT 345 CKT 1 69702 ST JOE 3 345 to 96039 7FAIRPT 345 CKT 1 | 30 |
| 02SP | MIPU-MIPU | 59225 PHILL 5 161 to 59280 PHILL 269.0 CKT 1 | 125 | 100.0 | 100.4 | 59239 HSNVL 5 161 to 59295 HSNVL 269.0 CKT1 | 56 |
| 02SP | NPPD-NPPD | 64119 GR ISLD7 115 to 64122 GR.IST5Y 230 CKT 1 | 167 | 99.8 | 101.8 | 64118 GR ISLD4 230 to 64121 GR.IST2Y 230 CKT1 | 67 |
| 02SP | AMRN-AMRN | 31391 ORGD 1 138 to 31860 TYSON 138 CKT 1 | 270 | 99.9 | 100.3 | 31051 MASON 13 345 to 31053 MASON 2 138 CKT 1 30886 LABADIE 345 to 31051 MASON 13 345 CKT 1 30886 LABADIE 345 to 31051 MASON 13 345 CKT 2 | 160 |
| 02SP | NPPD-NPPD | 64181 MAXWELL7 115 to 64039 CALAWAY7 115 CKT 1 | 105 | 99.1 | 101.9 | 64102 GENTLMN3 345 to 64282 SWEET W3 345 CKT2 | 205 |
| 02SP | OPPD-OPPD | 60009 S1217 5 161 to 60014 S1227 5 161 CKT 1 | 270 | 97.4 | 103.5 | 60003 S1201 5 161 to 60015 S1229 5 161 CKT1 | 270 |
| 02SP | MIPU-AECI | 59217 WINDSR 5 161 to 96071 5CLINTN 161 CKT 1 | 123 | 98.3 | 102.3 | 58062 SALSBR5 161 to 58064 NORTON-5 161 CKT1 | 274 |
| 02SP | SJLP-SJLP | 69701 MIDWAY 5 161 to 69700 MARYVLE5 161 CKT 1 | 164 | 87.8 | 111.2 | 64065 COOPER 3 345 to 96039 7FAIRPT 345 CKT 1 69702 ST JOE 3 345 to 96039 7FAIRPT 345 CKT 1 | 334 |
| 02SP | OPPD-OPPD | 60032 S1263 5 161 to 60131 S1263T1T 161 CKT 1 | 53 | 83.1 | 103.0 | 60136 S975T4 T 161 to 60089 S975 869.0 CKT1 | 545 |
| 02SP | OPPD-OPPD | 60042 S3455 3 345 to 60128 S3455T1T 345 CKT 1 | 560 | 90.5 | 101.3 | 60005 S1209 5 161 to 60130 S3459T3T 345 CKT1 | 563 |
| 02SP | AECI-AECI | 96120 5THMHIL 161 to 96172 2TMHILL 69 CKT 1 | 84 | 95.2 | 100.3 | 96044 7MCCRED 345 to 96049 7THOMHL 345 CKT 1 96043 7KINGDM 345 to 96044 7MCCRED 345 CKT 1 | 602 |
| 02SP | OPPD-OPPD | 60131 S1263T1T 161 to 61015 W BROCK869.0 CKT 1 | 53 | 81.2 | 100.1 | 60136 S975T4 T 161 to 64145 HUMBOLT5 161 CKT1 | 636 |
| 02WP | AECI-AECI | 96099 5MONTCT 161 to 96575 2MONTGY 69.0 CKT 1 | 56 | 99.9 | 101.0 | 96059 5BIG CK 161 to 96099 5MONTCT 161 CKT1 | 60 |
| 02WP | AMRN-AMRN | 31408 OVERTON 345 to 31409 OVERTON 161 CKT 1 | 300 | 99.9 | 100.4 | 96090 5KINGDM 161 to 96519 5MLRSBG 161 CKT1 | 131 |
| 02WP | SJLP-SJLP | 69703 ST JOE 5 161 to 69701 MIDWAY 5 161 CKT 1 | 164 | 93.9 | 116.8 | 96076 5FAIRPT 161 to 96104 5NODWAY 161 CKT1 | 171 |
| 02WP | SJLP-SJLP | 69701 MIDWAY 5 161 to 69700 MARYVLE5 161 CKT 1 | 164 | 93.8 | 116.9 | 64065 COOPER 3 345 to 96039 7FAIRPT 345 CKT 1 69702 ST JOE 3 345 to 96039 7FAIRPT 345 CKT 1 | 172 |
| 02WP | EES-EES | 99146 3STERL 115 to 99232 3CROS-N 115 CKT 1 | 80 | 100.0 | 100.1 | 99256 3HILO 1 115 to 99293 3ELDEHV 115 CKT1 | 179 |
| 02WP | AECI-AECI | 96098 5MOCITY 161 to 96154 1MOCTN2 100 CKT 2 | 34 | 97.9 | 104.3 | 96091 5LATHRP 161 to 96302 2LATHRP 69.0 CKT1 | 211 |
| 02WP | AECI-AECI | 96154 1MOCTN2 100 to 96304 2MOCITY 69.0 CKT 2 | 34 | 97.9 | 104.3 | 96091 5LATHRP 161 to 96302 2LATHRP 69.0 CKT1 | 211 |
| 02WP | EES-EES | 99146 3STERL 115 to 99232 3CROS-N 115 CKT 1 | 80 | 99.9 | 100.1 | 99318 3GLENL 115 to 99411 3PNBRG# 115 CKT1 | 220 |
| 02WP | AECI-AECI | 96098 5MOCITY 161 to 96153 1MOCTN1 100 CKT 1 | 34 | 97.3 | 104.2 | 96091 5LATHRP 161 to 96302 2LATHRP 69.0 CKT1 | 252 |
| 02WP | AECI-AECI | 96153 1MOCTN1 100 to 96304 2MOCITY 69.0 CKT 1 | 34 | 97.3 | 104.1 | 96091 5LATHRP 161 to 96302 2LATHRP 69.0 CKT1 | 256 |
| 02WP | AECI-AECI | 96087 5HICKCK 161 to 96226 2HICKRY 69.0 CKT 1 | 56 | 99.5 | 100.6 | 96087 5HICKCK 161 to 96094 5LOCUST 161 CKT1 | 300 |
| 02WP | AECI-AECI | 96090 5KINGDM 161 to 96517 2KINGDM 69.0 CKT 1 | 29 | 99.8 | 100.1 | 96061 5BOONE 161 to 96493 2BOONE 69.0 CKT1 | 411 |
| 02WP | AECI-AECI | 96071 5CLINTN 161 to 96692 2CLINTN 69.0 CKT 2 | 25 | 97.4 | 101.1 | 96071 5CLINTN 161 to 96692 2CLINTN 69.0 CKT3 | 448 |
| 02WP | AECI-AECI | 96071 5CLINTN 161 to 96692 2CLINTN 69.0 CKT 1 | 25 | 96.9 | 100.6 | 96071 5CLINTN 161 to 96692 2CLINTN 69.0 CKT3 | 531 |

Table 2 (page 1 of 2) – Non - SPP Facility Overloads caused by the WR to OPPD 640MW Transfer

| Study Year | From Area - To Area | Branch Over 100% of Rate B | RATE B | BC % Loading | TC % Loading | Outaged Branch that Caused Overload | ATC |
|------------|---------------------|--|--------|--------------|--------------|--|-----|
| 03G | SJLP-SJLP | 69703 ST JOE 5 161 to 69701 MIDWAY 5 161 CKT 1 | 164 | 97.1 | 119.7 | 64065 COOPER 3 345 to 96039 7FAIRPT 345 CKT 1 69702 ST JOE 3 345 to 96039 7FAIRPT 345 CKT 1 | 82 |
| 03G | MEC-MEC | 62467 BEACON 5 161 to 69547 BEAC MD869.0 CKT 1 | 90 | 98.3 | 102.0 | 62467 BEACON 5 161 to 62657 POWESHK5 161 CKT1 | 299 |
| 03G | OPPD-OPPD | 60032 S1263 5 161 to 60131 S1263T1T 161 CKT 1 | 53 | 96.4 | 104.0 | 60136 S975T4 T 161 to 64145 HUMBOLT5 161 CKT1 | 306 |
| 03G | SJLP-SJLP | 69701 MIDWAY 5 161 to 69700 MARYVLE5 161 CKT 1 | 164 | 89.2 | 111.8 | 64065 COOPER 3 345 to 96039 7FAIRPT 345 CKT 1 69702 ST JOE 3 345 to 96039 7FAIRPT 345 CKT 1 | 306 |
| 03G | OPPD-OPPD | 60131 S1263T1T 161 to 61015 W BROCK869.0 CKT 1 | 53 | 94.9 | 102.3 | 60136 S975T4 T 161 to 60089 S975 869.0 CKT1 | 439 |
| 03G | MIPU-MIPU | 59288 RGAFB 269.0 to 59284 GRDVWTP269.0 CKT 1 | 53 | 98.9 | 100.3 | 59225 PHILL 5 161 to 59280 PHILL 269.0 CKT1 | 495 |
| 04SP | NPPD-NPPD | 64181 MAXWELL7 115 to 64039 CALAWAY7 115 CKT 1 | 105 | 99.9 | 102.7 | 64037 C.CREEK4 230 to 64203 N.PLATT4 230 CKT1 | 27 |
| 04SP | EES-EES | 99263 3LEWIS # 115 to 99230 3COUCH 115 CKT 1 | 159 | 99.8 | 101.0 | 53232 MCNAB 3 115 to 53376 POTLATC3 115 CKT1 | 96 |
| 04SP | EES-EES | 99303 3PATMOS# 115 to 99263 3LEWIS # 115 CKT 1 | 159 | 99.8 | 100.9 | 99376 3PRESCT 115 to 99379 3EMMET * 115 CKT1 | 122 |
| 04SP | MIPU-AECI | 59217 WINDSR 5 161 to 96071 5CLINTN 161 CKT 1 | 123 | 97.8 | 104.7 | 52702 TRUMAN 5 161 to 96555 5GRAVOI 161 CKT1 | 203 |
| 04SP | SJLP-SJLP | 69701 MIDWAY 5 161 to 69700 MARYVLE5 161 CKT 1 | 164 | 92.5 | 115.9 | 96076 5FAIRPT 161 to 96104 5NODWAY 161 CKT1 | 205 |
| 04SP | SJLP-SJLP | 69703 ST JOE 5 161 to 69701 MIDWAY 5 161 CKT 1 | 164 | 88.8 | 118.7 | 69702 ST JOE 3 345 to 96039 7FAIRPT 345 CKT1 | 240 |
| 04SP | OPPD-OPPD | 60009 S1217 5 161 to 60014 S1227 5 161 CKT 1 | 270 | 97.4 | 103.5 | 60003 S1201 5 161 to 60015 S1229 5 161 CKT1 | 269 |
| 04SP | AECI-AECI | 96153 1MOCTN1 100 to 96304 2MOCITY 69.0 CKT 1 | 34 | 97.1 | 103.7 | 96091 5LATHRP 161 to 96302 2LATHRP 69.0 CKT1 | 282 |
| 04SP | AECI-AECI | 96154 1MOCTN2 100 to 96304 2MOCITY 69.0 CKT 2 | 34 | 96.9 | 102.2 | 96091 5LATHRP 161 to 96302 2LATHRP 69.0 CKT1 | 373 |
| 04SP | AECI-AECI | 96120 5THMHIL 161 to 96172 2TMHILL 69.0 CKT 2 | 84 | 95.9 | 101.0 | 96044 7MCCRED 345 to 96049 7THOMHL 345 CKT1 96043 7KINGDM 345 to 96044 7MCCRED 345 CKT1 | 515 |
| 04SP | OPPD-OPPD | 60032 S1263 5 161 to 60131 S1263T1T 161 CKT 1 | 53 | 83.6 | 103.3 | 60136 S975T4 T 161 to 64145 HUMBOLT5 161 CKT1 | 534 |
| 04SP | OPPD-OPPD | 60042 S3455 3 345 to 60128 S3455T1T 345 CKT 1 | 560 | 90.6 | 101.5 | 60005 S1209 5 161 to 60130 S3459T3T 345 CKT1 | 551 |
| 04SP | OPPD-OPPD | 61015 W BROCK869.0 to 60131 S1263T1T 161 CKT 1 | 53 | 81.7 | 100.4 | 60136 S975T4 T 161 to 60089 S975 869.0 CKT1 | 625 |
| 04SP | OPPD-OPPD | 60029 S1255 5 161 to 60128 S3455T1T 345 CKT 1 | 560 | 89.6 | 100.1 | 60005 S1209 5 161 to 60130 S3459T3T 345 CKT1 | 633 |
| 04WP | SJLP-SJLP | 69703 ST JOE 5 161 to 69701 MIDWAY 5 161 CKT 1 | 164 | 97.5 | 120.6 | 96076 5FAIRPT 161 to 96104 5NODWAY 161 CKT1 | 69 |
| 04WP | SJLP-SJLP | 69701 MIDWAY 5 161 to 69700 MARYVLE5 161 CKT 1 | 164 | 96.6 | 119.7 | 64065 COOPER 3 345 to 96039 7FAIRPT 345 CKT1 69702 ST JOE 3 345 to 96039 7FAIRPT 345 CKT1 | 94 |
| 04WP | EES-EES | 99263 3LEWIS # 115 to 99230 3COUCH 115 CKT 1 | 159 | 99.7 | 100.9 | 98107 8RICHARD 500 to 98430 8WEBRE 500 CKT1 | 157 |
| 04WP | AECI-AECI | 96090 5KINGDM 161 to 96517 2KINGDM 69.0 CKT 1 | 29 | 99.6 | 100.9 | 96061 5BOONE 161 to 96493 2BOONE 69.0 CKT1 | 189 |
| 04WP | AECI-AECI | 96090 5KINGDM 161 to 96517 2KINGDM 69.0 CKT 2 | 29 | 99.5 | 100.8 | 96061 5BOONE 161 to 96493 2BOONE 69.0 CKT1 | 245 |
| 04WP | AECI-AECI | 96098 5MOCITY 161 to 96153 1MOCTN1 100 CKT 1 | 34 | 96.0 | 105.8 | 96098 5MOCITY 161 to 96154 1MOCTN2 100 CKT2 | 261 |
| 04WP | AECI-AECI | 96153 1MOCTN1 100 to 96304 2MOCITY 69.0 CKT 1 | 34 | 96.0 | 105.7 | 96154 1MOCTN2 100 to 96304 2MOCITY 69.0 CKT2 | 263 |
| 04WP | AECI-AECI | 96082 5GEORGE 161 to 96531 2GEORGE 69.0 CKT 1 | 56 | 99.6 | 100.6 | 96057 5BARNET 161 to 96618 2BARNET 69.0 CKT1 | 281 |
| 04WP | AECI-AECI | 96098 5MOCITY 161 to 96154 1MOCTN2 100 CKT 2 | 34 | 95.5 | 105.2 | 96153 1MOCTN1 100 to 96304 2MOCITY 69.0 CKT1 | 297 |
| 04WP | AECI-AECI | 96154 1MOCTN2 100 to 96304 2MOCITY 69.0 CKT 2 | 34 | 95.5 | 105.2 | 96153 1MOCTN1 100 to 96304 2MOCITY 69.0 CKT1 | 297 |

Table 3 – Previously Assigned and Identified SPP Facilities Impacted by the WR to OPPD 640MW Transfer.

| Study Year | From Area - To Area | Branch Over 100% Rate B | Original RATE B | BC %Loading | TC %Loading | Outaged Branch That Caused Overload | ATC (MW) | Assignment |
|------------|---------------------|---|-----------------|--------------|--------------|---|----------|---------------|
| | | SUMMIT TO EXIDE JUNCTION, 115KV | | | | EAST MCPHERSON to SUMMIT, 230KV | | |
| 02WP | WERE-WERE | 57381 SUMMIT 3 115 to 57368 EXIDE J3 115 CKT 1 | 181 | 97.1 | 100.9 | 56872 EMCIPHER6 230 to 56873 SUMMIT 230 CKT 1 | 488 | 1999-017 03WP |
| | | NORTH AMERICAN PHILIPS TO NORTH AMERICAN PHILIPS JCT | | | | EAST MCPHERSON to SUMMIT, 230KV | | |
| 04WP | WERE-WERE | 57372 PHILIPS3 115 to 57374 SPHILPJ3 115 CKT 1 | 160 | 103.8 | 112.1 | 56872 EMCIPHER6 230 to 56873 SUMMIT 230 CKT 1 | 0 | FLOWGATE |

5. Conclusion

Facility restrictions exist in SPP that limit the requested WR to OPPD 640MW reservation; therefore, a Facility Study is required to determine details and cost of upgrade.

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