



SPP *Southwest Power Pool*

***System Impact Study
SPP-2003-276-1P
For Transmission Service
Requested By
City Power & Light Independence, MO***

From OPPD to INDN

***For an Amount Of 50 MW From
6/1/2009
To 6/1/2049***

SPP Engineering, Tariff Studies

System Impact Study

City Power & Light Independence has requested a system impact study for long-term Firm Point-to-Point transmission service from OPPD to INDN for 50 MW. The period of the service requested is from 6/1/2009 to 6/1/2049. The OASIS reservation number is 624705. The principal objective of this study is to identify system constraints on the SPP Regional Tariff System and adjacent Third Party transmission systems along with potential system facility upgrades that may be necessary to provide the requested service.

This study was performed for the OPPD to INDN request in order to provide preliminary results identifying facility upgrades that may be required for the requested service. The preliminary study is performed with only confirmed reservations included in the models. The models do not include any reservations, even those with a higher priority, that are still in study mode. The results of the transfer analysis are documented in Tables 1 and 2 of the report. The results given in Table 1 include upgrades of SPP facilities that may be assigned to higher priority requests. The results given in Table 2 include upgrades of Third Party facilities that may be assigned to higher priority requests. If a facility identified for the OPPD to INDN study is also identified for a study with higher priority, the facility will be assigned to the request with the highest priority. If the higher priority customer does not take service, the facility would then be assigned to the OPPD to INDN request. The primary purpose of this preliminary study is to provide the customer with an estimated cost of the facility upgrades that may be required in order to accommodate the requested service.

Four seasonal models were used to study the OPPD to INDN request for the requested service period. The SPP 2004 Series Cases 2007 Summer Peak (07SP), 2007/08 Winter Peak (07WP), 2010 Summer Peak (10SP), and 2010/11 Winter Peak (10WP) were used to study the impact of the request on the SPP system during the requested service period of 6/1/2009 to 6/1/2049. The chosen base case models were modified to reflect the most current modeling information. The cases were modified to reflect firm transfers during the requested service period that were not already included in the January 2004 base case series models. The scenario studied includes confirmed East to West transfers not already included in the January 2004 base case series models, SPS Importing, and the Lamar HVDC Tie flowing from Lamar to SPS.

PTI's MUST First Contingency Incremental Transfer Capability (FCITC) DC analysis was used to study the request. The MUST options chosen to conduct the System Impact Study analysis can be found in Appendix A. The MUST option to convert MVA branch ratings to estimated MW ratings was used to partially compensate for reactive loading.

The study results of the OPPD to INDN transfer show that limiting constraints exist. Due to the limiting constraints identified, the Transmission Service Request cannot be granted. Any solutions, upgrades, and costs provided in the preliminary System Impact Study are planning estimates only. The final ATC and upgrades required may vary from these results due to the status of higher priority requests, unknown facility upgrades and proposed transmission plans that will be identified during the facility study process, and the final results of the full AC analysis.

SPP will also review the possibility of curtailment of previously confirmed service and/or the redispatch of units as an option for relieving the additional impacts on the SPP facilities caused by the OPPD to INDN request. It is the responsibility of the customer to reach an agreement with the applicable party concerning the curtailment of confirmed service and the redispatch of units. The curtailment and redispatch requirements would be called upon prior to implementing NERC TLR Level 5a. These options will be evaluated as part of the Facility Study. Execution of a Facility Study Agreement is now required to maintain queue position. The final upgrade solutions, cost assignments and available redispatch and curtailment options will be determined upon the completion of the facility study.

Table 1 – SPP facility overloads identified for the OPPD to INDN transfer.

| Study Case | From Area - From Area | Branch Overload | Rating <MW> | Pre Transfer Loading | %TDF | Outaged Branch Causing Overload | Solution | Estimated Cost |
|------------|-----------------------|---|-------------|----------------------|--------|---|--|----------------|
| 07SP | WERE-WERE | 57182 TECHILE3 115 57187 27CROCO3 115 1 | 67 | 72 | 0.1070 | 57182 TECHILE3 115 57187 27CROCO3 115 2 | Invalid Contingency | TBD |
| 07SP | WERE-WERE | 56851 AUBURN 6 230 56852 JEC 6 230 1 | 565 | 605 | 0.7720 | 56765 HOYT 7 345 56766 JEC N 7 345 1 | May be relieved due to Westar Operating Procedure 400 - Outage of the Jeffrey Energy Center to Hoyt 345kV Line | TBD |
| 07WP | WERE-WERE | 56851 AUBURN 6 230 56852 JEC 6 230 1 | 565 | 573 | 0.9910 | 56765 HOYT 7 345 56766 JEC N 7 345 1 | May be relieved due to Westar Operating Procedure 400 - Outage of the Jeffrey Energy Center to Hoyt 345kV Line | TBD |
| 10SP | WERE-WERE | 57182 TECHILE3 115 57187 27CROCO3 115 1 | 68 | 84 | 0.1060 | 57182 TECHILE3 115 57187 27CROCO3 115 2 | Invalid Contingency | TBD |
| 10SP | WERE-WERE | 57160 41CALIF3 115 57188 27CROCJ3 115 1 | 68 | 68 | 0.1050 | 57160 41CALIF3 115 57188 27CROCJ3 115 2 | Invalid Contingency | TBD |
| 10SP | AEPW-AEPW | 53142 HUNTING2 69 53202 MIDLREA2 69 1 | 36 | 39 | 0.0370 | 55262 AES 5 161 55264 TARBY 5 161 1 | Solution Undetermined | TBD |
| 10SP | INDN-INDN | 59808 ECKLES 5 161 96110 5PITTSV 161 1 | 227 | 234 | 0.7370 | 96071 5CLINTN 161 96124 5HOLDEN 161 1 | Solution Undetermined | TBD |
| 10SP | WERE-WERE | 57233 166TH 3 115 57244 JARBALO3 115 1 | 97 | 111 | 2.0430 | 57977 CRAIG 7 345 56772 STRANGR7 345 1 | May be relieved due to Westar Operating Procedure 800 - Outage of the Stranger Creek to Craig 345 kV Line | TBD |
| 10SP | WERE-WERE | 57361 AEC 3 115 57365 EABILEN3 115 1 | 68 | 75 | 0.1310 | 57326 EMANHAT3 115 *B240 EMANHT3X 1 1 | May be relieved due to Westar Operating Procedure 0633 - Outage of the East Manhattan 230-115kV Transformer | TBD |
| 10SP | WERE-WERE | 57362 CHAPMAN3 115 57365 EABILEN3 115 1 | 68 | 71 | 0.1310 | 57326 EMANHAT3 115 *B240 EMANHT3X 1 1 | May be relieved due to Westar Operating Procedure 0633 - Outage of the East Manhattan 230-115kV Transformer | TBD |
| 10SP | SWPA-SWPA | 52634 IDALIA 5 161 96056 5ASHRVL 161 1 | 206 | 217 | 0.2280 | 96073 5SHARVELE 161 96114 5STFRAN 161 1 | Reconductor line with 954 ACSR | \$ 6,600,000 |
| 10SP | WERE-WERE | 56851 AUBURN 6 230 56852 JEC 6 230 1 | 564 | 592 | 0.7770 | 56765 HOYT 7 345 56766 JEC N 7 345 1 | May be relieved due to Westar Operating Procedure 400 - Outage of the Jeffrey Energy Center to Hoyt 345kV Line | TBD |
| 10SP | WERE-WERE | 57180 TEC E 3 115 57182 TECHILE3 115 1 | 233 | 254 | 0.3630 | 56765 HOYT 7 345 56772 STRANGR7 345 1 | May be relieved due to Westar Operating Procedure 803 - Outage of the Hoyt to Stranger 345 kV line | TBD |
| 10SP | SWPA-SWPA | 52618 JONESBO5 161 99755 5JONES 161 1 | 211 | 228 | 0.2140 | 52600 N MADRD5 161 52610 KENNETT5 161 1 | Change the ratio on the metering CTs to 1200/5 and adjust the meters | \$ 2,000 |
| 10SP | WERE-WERE | 57153 COLINE 3 115 57182 TECHILE3 115 1 | 106 | 124 | 0.2720 | 57180 TEC E 3 115 57182 TECHILE3 115 1 | May be relieved due to Westar Operating Procedure 1203 - Outage of the Tecumseh Energy Center (TEC) to Tecumseh Hill 115 kV Line | TBD |
| 10WP | WERE-WERE | 57233 166TH 3 115 57244 JARBALO3 115 1 | 97 | 101 | 2.1520 | 57977 CRAIG 7 345 56772 STRANGR7 345 1 | May be relieved due to Westar Operating Procedure 800 - Outage of the Stranger Creek to Craig 345 kV Line | TBD |
| | | | | | | | This cost may be significantly higher due to additional facilities whose solutions will be determined during the Facility Study process. | |
| | | | | | | | Total Estimated Cost of Known Solutions | \$ 6,602,000 |

Table 2 – Third Party facility overloads identified for the OPPD to INDN transfer.

| Study Case | From Area - To Area | Branch Overload | Rating <MW> | Pre Transfer Loading | %TDF | Outaged Branch Causing Overload | Solution | Estimated Cost |
|--|---------------------|--|-------------|----------------------|--------|---|-----------------------|----------------|
| 07SP | ENTR-ENTR | 99802 5BULLSH* 161 99809 5FLIPN 161 1 | 162 | 167 | 0.3900 | 99519 5QUITMN 161 99799 5BEE BR 161 1 | Solution Undetermined | TBD |
| 07SP | AECI-AECI | 96110 5PITTSV 161 96124 5HOLDEN 161 1 | 227 | 230 | 0.5590 | 96071 5CLINTN 161 96124 5HOLDEN 161 1 | Solution Undetermined | TBD |
| 07SP | AECI-AECI | 96124 5HOLDEN 161 *B304 HOLDEN 1 1 | 56 | 67 | 0.6510 | 96110 5PITTSV 161 96124 5HOLDEN 161 1 | Solution Undetermined | TBD |
| 07SP | AECI-AECI | 96120 5THMHIL 161 96126 5MOBTAP 161 1 | 372 | 384 | 0.9100 | 96044 7MCCRED 345 96049 7THOMHL 345 1 | Solution Undetermined | TBD |
| 07SP | MIPU-AECI | 59242 CLINTON5 161 96071 5CLINTN 161 1 | 100 | 103 | 0.1380 | 59307 NEVPLT 2 69 59308 NEVADA 2 69 1 | Solution Undetermined | TBD |
| 07SP | AECI-AECI | 96123 5WPLAIN 161 *B516 WESTPL2 1 2 | 56 | 63 | 0.0570 | 96123 5WPLAIN 161 *B515 WESTPL1 1 1 | Solution Undetermined | TBD |
| 07SP | AECI-AECI | 96079 5FREDTN 161 *B254 FREDTOWN 1 1 | 50 | 51 | 0.0550 | 97274 5WWEAST 161 97278 2WWEAST 69 1 | Solution Undetermined | TBD |
| 07SP | AECI-AECI | 96120 5THMHIL 161 96126 5MOBTAP 161 1 | 372 | 391 | 0.9170 | Aeci-M tl10 | Solution Undetermined | TBD |
| 07SP | MEC-MEC | 64220 WRIGHT 5 161 64646 WRI MID8 69 1 | 83 | 113 | 0.0910 | 63719 HOPE 5 161 64648 HOPE MD8 69 1 | Solution Undetermined | TBD |
| 07WP | AECI-AECI | 96123 5WPLAIN 161 *B519 WESTPL2 1 2 | 56 | 65 | 0.0590 | 96123 5WPLAIN 161 *B518 WESTPL1 1 1 | Solution Undetermined | TBD |
| 07WP | AECI-AECI | 5680 :THMMOBTH OMCC | 335 | 374 | 1.4520 | Conti ngency o f FI owGate 5680 | Solution Undetermined | TBD |
| 10SP | ENTR-ENTR | 99802 5BULLSH* 161 99809 5FLIPN 161 1 | 161 | 201 | 0.4060 | 99519 5QUITMN 161 99799 5BEE BR 161 1 | Solution Undetermined | TBD |
| 10SP | ENTR-ENTR | 99809 5FLIPN 161 99837 5SUMMIT 161 1 | 162 | 184 | 0.4060 | 99519 5QUITMN 161 99799 5BEE BR 161 1 | Solution Undetermined | TBD |
| 10SP | ENTR-ENTR | 99811 5HARR-E 161 99837 5SUMMIT 161 1 | 162 | 165 | 0.4060 | 99519 5QUITMN 161 99799 5BEE BR 161 1 | Solution Undetermined | TBD |
| 10SP | INDN-AECI | 59808 ECKLES 5 161 96110 5PITTSV 161 1 | 227 | 234 | 0.7370 | 96071 5CLINTN 161 96124 5HOLDEN 161 1 | Solution Undetermined | TBD |
| 10SP | AECI-AECI | 96110 5PITTSV 161 96124 5HOLDEN 161 1 | 227 | 245 | 0.5540 | 96071 5CLINTN 161 96124 5HOLDEN 161 1 | Solution Undetermined | TBD |
| 10SP | SWPA-AECI | 52624 IDALIA 5 161 96056 5ASHRVL 161 1 | 206 | 217 | 0.2280 | 96073 5HARVELE 161 96114 5STFRAN 161 1 | Solution Undetermined | TBD |
| 10SP | AECI-AECI | 96124 5HOLDEN 161 *B307 HOLDEN 1 1 | 56 | 72 | 0.6480 | 96110 5PITTSV 161 96124 5HOLDEN 161 1 | Solution Undetermined | TBD |
| 10SP | SWPA-ENTR | 52618 JONESBO5 161 99755 5JONES 161 1 | 211 | 228 | 0.2140 | 52600 N MADRD5 161 52610 KENNETT5 161 1 | Solution Undetermined | TBD |
| 10SP | AECI-AECI | 96120 5THMHIL 161 96126 5MOBTAP 161 1 | 372 | 397 | 0.9410 | 96044 7MCCRED 345 96049 7THOMHL 345 1 | Solution Undetermined | TBD |
| 10SP | MIPU-AECI | 59242 CLINTON5 161 96071 5CLINTN 161 1 | 100 | 111 | 0.1350 | 59307 NEVPLT 2 69 59308 NEVADA 2 69 1 | Solution Undetermined | TBD |
| 10SP | AECI-AECI | 96079 5FREDTN 161 *B255 FREDTOWN 1 1 | 50 | 53 | 0.0560 | 97274 5WWEAST 161 97278 2WWEAST 69 1 | Solution Undetermined | TBD |
| 10SP | ENTR-ENTR | 99824 5MELBRN 161 99834 5SAGE * 161 1 | 148 | 148 | 0.3740 | 56751 WCGS U1 25 56797 WOLFCRK7 345 1 | Solution Undetermined | TBD |
| 10SP | AECI-AECI | 96074 5CUBA 161 *B227 CUBA 1 1 | 53 | 55 | 0.0590 | 30154 BLAND 345 96041 7FRANKS 345 1 | Solution Undetermined | TBD |
| 10SP | AECI-AECI | 96074 5CUBA 161 *B227 CUBA 1 1 | 53 | 55 | 0.0540 | AMRN17 2OF2 | Solution Undetermined | TBD |
| 10SP | AECI-AECI | 96597 5ENON 161 96602 5LAKEST 161 1 | 205 | 208 | 0.2880 | 30880 KISKER T 138 96599 4KISKER 138 1 | Solution Undetermined | TBD |
| 10SP | AECI-AECI | 96120 5THMHIL 161 96126 5MOBTAP 161 1 | 372 | 404 | 0.9470 | Aeci-M tl10 | Solution Undetermined | TBD |
| 10SP | AECI-AECI | 96142 4SULVN 138 *B487 SULLIV33 1 1 | 100 | 103 | 0.3090 | SERCW- 7 | Solution Undetermined | TBD |
| 10SP | AECI-AECI | 96119 5SULLVN 161 *B487 SULLIV33 1 1 | 100 | 103 | 0.3090 | Aeci-M tl08 | Solution Undetermined | TBD |
| 10SP | MEC-MEC | 64220 WRIGHT 5 161 64646 WRI MID8 69 1 | 83 | 122 | 0.0940 | 63719 HOPE 5 161 64648 HOPE MD8 69 1 | Solution Undetermined | TBD |
| 10WP | ENTR-ENTR | 99802 5BULLSH* 161 99809 5FLIPN 161 1 | 162 | 163 | 0.4310 | 99519 5QUITMN 161 99799 5BEE BR 161 1 | Solution Undetermined | TBD |
| 10WP | ENTR-ENTR | 99824 5MELBRN 161 99834 5SAGE * 161 1 | 143 | 144 | 0.3410 | 99742 8DELL 5 500 99818 8ISES 5 500 1 | Solution Undetermined | TBD |
| 10WP | AECI-AECI | 96124 5HOLDEN 161 *B288 HOLDEN 1 1 | 56 | 71 | 0.6840 | 96110 5PITTSV 161 96124 5HOLDEN 161 1 | Solution Undetermined | TBD |
| 10WP | AECI-AECI | 96123 5WPLAIN 161 *B493 WESTPL2 1 2 | 56 | 63 | 0.0610 | 96123 5WPLAIN 161 *B492 WESTPL1 1 1 | Solution Undetermined | TBD |
| 10WP | AECI-AECI | 96057 5BARNET 161 *B163 BARNETT 1 1 | 52 | 53 | 0.2370 | 30233 CALIF 161 96063 5CALIF 161 1 | Solution Undetermined | TBD |
| 10WP | AECI-AECI | 96063 5CALIF 161 *B181 CALI 1 1 | 51 | 55 | 0.1290 | 30026 APCH TP 161 30233 CALIF 161 1 | Solution Undetermined | TBD |
| 10WP | AECI-AECI | 96074 5CUBA 161 *B226 CUBA 1 1 | 52 | 55 | 0.0640 | 30154 BLAND 345 96041 7FRANKS 345 1 | Solution Undetermined | TBD |
| 10WP | AECI-AECI | 96074 5CUBA 161 *B226 CUBA 1 1 | 52 | 55 | 0.0590 | SERCW- 9 | Solution Undetermined | TBD |
| 10WP | AECI-AECI | 96120 5THMHIL 161 96126 5MOBTAP 161 1 | 385 | 385 | 1.4250 | SERCW- 10 | Solution Undetermined | TBD |
| 10WP | MEC-MEC | 64220 WRIGHT 5 161 64646 WRI MID8 69 1 | 83 | 100 | 0.0950 | 63719 HOPE 5 161 64648 HOPE MD8 69 1 | Solution Undetermined | TBD |
| This cost may be significantly higher due to additional facilities whose solutions will be determined during the Facility Study process. | | | | | | | | |
| Total Estimated Cost of Known Solutions | | | | | | | | \$ - |

Appendix A

MUST CHOICES IN RUNNING FCITC DC ANALYSIS

CONSTRAINTS/CONTINGENCY INPUT OPTIONS

1. AC Mismatch Tolerance – 2 MW
2. Base Case Rating – Rate A
3. Base Case % of Rating – 100%
4. Contingency Case Rating – Rate B
5. Contingency Case % of Rating – 100%
6. Base Case Load Flow – PSS/E
7. Convert branch ratings to estimated MW ratings – Yes
8. Contingency ID Reporting – Labels
9. Maximum number of contingencies to process - 50000

MUST CALCULATION OPTIONS

1. Phase Shifters Model for DC Linear Analysis – Constant flow for Base Case and Contingencies
2. Report Base Case Violations with FCITC – Yes
3. Maximum number of violations to report in FCITC table - 50000
4. Distribution Factor (OTDF and PTDF) Cutoff – 0.0
5. Maximum times to report the same elements - 10
6. Apply Distribution Factor to Contingency Analysis – Yes
7. Apply Distribution Factor to FCITC Reports – Yes
8. Minimum Contingency Case flow change – 1 MW
9. Minimum Contingency Case Distribution Factor change – 0.0
10. Minimum Distribution Factor for Transfer Sensitivity Analysis – 0.0