



***System Impact Study SPP-2001-224
For Transmission Service
Requested By
Public Service Company of Colorado***

***From Omaha Public Power District
To Central Louisiana Electric
Company, Inc.***

***For a Reserved Amount Of 50MW
From 8/1/01
To 9/1/02***

SPP Transmission Planning

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1. Executive Summary

Public Service Company of Colorado has requested a system impact study for long-term Firm Point-to-Point transmission service from OPPD to CLEC. The period of the transaction is from 8/1/01 to 9/1/02. The request is for OASIS reservation 261402 for 50MW.

The principal objective of this study is to identify system problems and potential system modifications necessary to facilitate the additional 50MW transfer while maintaining system reliability.

New overloads caused by the 50MW transfer were identified along with determining the impact of the transfer on any previously assigned and identified facilities.

The OPPD to CLEC transfer impacts several facilities that have been identified as limiting constraints for previously studied transfers. Due to the inability to upgrade these limiting constraints within the reservation period using normal construction practices, the ATC is zero for the requested OPPD to CLEC 50MW transfer.

2. Introduction

Public Service Company of Colorado has requested an impact study for transmission service from OPPD control area with a sink of CLEC.

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 50MW. 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 50MW 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 shows 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 50MW.

3. Study Methodology

A. Description

Two analyses were conducted to determine the impact of the 50MW transfer on the system. The first analysis was conducted to identify any new overloads caused by the 50MW 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 50MW 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 three seasonal models to study the 50MW request. The SPP 2001 Series Cases 2001 Summer Peak, 2001/02 Winter Peak, and 2002 Summer Peak were used to study the impact of the 50MW transfer on the SPP system during the transaction period of 8/01/01 to 9/1/02.

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 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 facility overloads caused by the 50MW transfer. Upgrades associated with these new overloads can be directly assigned to the OPD to CLEC 50MW transfer.

Table 2 documents overloads on Non SPP Regional Tariff participants' transmission systems caused by the 50MW transfer.

Table 3 documents the 50MW transfer impact on previously assigned and identified facilities. Available estimated in-service dates for the completion of the previously assigned upgrades are given in the table.

Table 1 – SPP Facility Overloads caused by the OPPD to CLEC 50MW Transfer

Study Year	From Area - To Area	Branch Over 100% Rate B	RATEB	BC % Loading	TC % Loading	Outaged Branch That Caused Overload	ATC (MW)
01SP		None				None	
01WP		None				None	
02SP	WERE-WERE	JARBALO JUNCTION SWITCHING TO 166TH, 115KV 57244 JARBALO3 115 to 57233 166TH 3 115 CKT 1	119	100.0	100.1	NEW SPRING HILL TO SPRING HILL, 161/115KV TR 57267 SPRINGH3 115 to 58042 SPRGHL 5 161 CKT1	0
02SP	WERE-WERE	PENTAGON TO CRAIG JUNCTION, 115KV 57261 PENTAGN3 115 to 57237 CRAIG J3 115 CKT 1	92	99.9	100.2	CAPTAIN JUNCTION TO EUDORA TOWNSHIP, 115KV 57235 CAPTAIN3 115 to 57240 EUDORA 3 115 CKT1	10
02SP	WERE-WERE	CRAIG JUNCTION TO TIMBERLANE, 115KV 57237 CRAIG J3 115 to 57273 TIMBRLN3 115 CKT 1	92	99.9	100.2	CAPTAIN JUNCTION TO EUDORA TOWNSHIP, 115KV 57235 CAPTAIN3 115 to 57240 EUDORA 3 115 CKT1	16

Table 2 – Non - SPP Facility Overloads caused by the OPPD to CLEC 50MW Transfer

Study Year	From Area - To Area	Branch Over 100% Rate B	RATEB	BC % Loading	TC % Loading	Outaged Branch That Caused Overload	ATC (MW)
01SP	LAGN-EES	97311 GRENWD 3 115 to 98520 3HUMPHY 115 CKT 1	228	98.9	101.2	98107 8RICHARD 500 to 98430 8WEBRE 500 CKT1	23
01WP	AECI-AECI	96076 5FAIRPT 161 to 96249 2FAIRPT 69.0 CKT 2	42	99.9	100.2	96076 5FAIRPT 161 to 96249 2FAIRPT 69.0 CKT1	19
02SP	EES-EES	98160 4MEAUX 138 to 98161 2MEAUX 69.0 CKT 1	45	100.0	100.1	98160 4MEAUX 138 to 98179 4ABBVIL 138 CKT1	0
02SP	EES-EES	98160 4MEAUX 138 to 98161 2MEAUX 69.0 CKT 2	45	100.0	100.1	98160 4MEAUX 138 to 98179 4ABBVIL 138 CKT1	0

Table 3 – Previously Assigned and Identified SPP Facilities Impacted by the OPPD to CLEC 50MW Transfer.

Study Year	From Area - To Area	Branch Over 100% Rate B	Rate B	BC % Loading	TC % Loading	Multiple Outage Contingency	Assigned Study	Rate B
01SP	AEPW-AEPW	CHEROKEE REC TO KNOX LEE 138KV 53522 CHEROKE4 138 to 53557 KNOXLEE4 138 CKT 1	209	99.2	100.3	Multiple Outage Contingency SOUTHWEST SHREVEPORT to LONGWOOD, 345KV 53454 SW SHV 7 345 to 53424 LONGWD 7 345 CKT 1 SOUTHWEST SHREVEPORT to DIANA, 345KV 53454 SW SHV 7 345 to 53528 DIANA 7 345 CKT 1	Upgrade Assigned to SPP-2000-086 150680 Est. In-Service Date 4/1/2002	36
02SP	SWPA-SWPA	ROBERT S. KERR TO VAN BUREN 52782 RS KERR5 161 to 52722 VAN BUR5 161 CKT 1	167	103.7	103.9	BONANZA TAP TO AES, 161KV 55261 BONANZT5 161 to 55262 AES 5 161 CKT1	Previously Identified	0
02SP	AEPW-AEPW	TATUM TO CHEROKEE REC 138KV 53611 TATUM 4 138 to 53522 CHEROKE4 138 CKT 1	209	101.3	102.4	Multiple Outage Contingency SOUTHWEST SHREVEPORT to LONGWOOD, 345KV 53454 SW SHV 7 345 to 53424 LONGWD 7 345 CKT 1 SOUTHWEST SHREVEPORT to DIANA, 345KV 53454 SW SHV 7 345 to 53528 DIANA 7 345 CKT 1	Upgrade Assigned to SPP-2000-086 150680 Est. In-Service Date 2/1/2003	0
02SP	AEPW-AEPW	NORAM TO LONGWOOD , 138KV 53473 NORAM 4 138 to 53423 LONGWD 4 138 CKT 1	234	100.9	102.2	Multiple Outage Contingency SOUTHWEST SHREVEPORT to LONGWOOD, 345KV 53454 SW SHV 7 345 to 53424 LONGWD 7 345 CKT 1 SOUTHWEST SHREVEPORT to DIANA, 345KV 53454 SW SHV 7 345 to 53528 DIANA 7 345 CKT 1	Upgrade Assigned to SPP-2000-011 171555	0
02SP	AEPW-AEPW	NORAM TO RAINES, 138KV 53473 NORAM 4 138 to 53439 RAINES 4 138 CKT 1	234	99.4	100.7	Multiple Outage Contingency SOUTHWEST SHREVEPORT to LONGWOOD, 345KV 53454 SW SHV 7 345 to 53424 LONGWD 7 345 CKT 1 SOUTHWEST SHREVEPORT to DIANA, 345KV 53454 SW SHV 7 345 to 53528 DIANA 7 345 CKT 1	Upgrade Assigned to SPP-2000-043 194656, 194657	24
02SP	AEPW-AEPW	CHEROKEE REC TO KNOX LEE 138KV 53522 CHEROKE4 138 to 53557 KNOXLEE4 138 CKT 1	209	106.9	108.0	Multiple Outage Contingency SOUTHWEST SHREVEPORT to LONGWOOD, 345KV 53454 SW SHV 7 345 to 53424 LONGWD 7 345 CKT 1 SOUTHWEST SHREVEPORT to DIANA, 345KV 53454 SW SHV 7 345 to 53528 DIANA 7 345 CKT 1	Upgrade Assigned to SPP-2000-086 150680 Est. In-Service Date 4/1/2002	50
02SP	AEPW-AEPW	TATUM TO ROCK HILL, 138KV 53611 TATUM 4 138 to 53598 ROKHILL4 138 CKT 1	209	99.5	100.6	Multiple Outage Contingency SOUTHWEST SHREVEPORT to LONGWOOD, 345KV 53454 SW SHV 7 345 to 53424 LONGWD 7 345 CKT 1 SOUTHWEST SHREVEPORT to DIANA, 345KV 53454 SW SHV 7 345 to 53528 DIANA 7 345 CKT 1	Upgrade Assigned to SPP-2000-086 150680 Est. In-Service Date 4/1/2002	50

5. Conclusion

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

- For the 2002 Summer (6/1/02-10/1/02), the ATC is zero due the loading of the Cherokee to Tatum 138kV line, the Noram to Longwood 138kV line, and the R.S. Kerr to Van Buren 161kV line. The estimated in service date of the Cherokee to Tatum 138kV line upgrade is 2/1/2003. No in-service date is available for the Noram to Longwood upgrade. No upgrades have been assigned for the R.S. Kerr to Van Buren overload.

Given the estimated in service dates of these Upgrades, the ATC of the existing transmission system cannot be increased as required to provide continuous service over the reservation period. Therefore, the requested reservations will be refused.

Appendix A

PSS/E CHOICES IN RUNNING LOAD FLOW PROGRAM AND ACCC

BASE CASES:

Solutions - Fixed slope decoupled Newton-Raphson solution (FDNS)

1. Tap adjustment – Stepping
2. Area interchange control – Tie lines only
3. Var limits – Apply automatically
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