



*System Impact Study SPP-2002-187  
For Transmission Service  
Requested By  
Southwestern Public Service  
Company*

*From KCPL To SPS*

*For a Reserved Amount Of 75MW  
From 1/1/03  
To 1/1/04*

*SPP Coordinated Planning*

# Table of Contents

<b>1. EXECUTIVE SUMMARY .....</b>	<b>3</b>
<b>2. INTRODUCTION .....</b>	<b>4</b>
<b>3. STUDY METHODOLOGY .....</b>	<b>5</b>
<b>A. DESCRIPTION.....</b>	<b>5</b>
<b>B. MODEL UPDATES.....</b>	<b>5</b>
<b>C. TRANSFER ANALYSIS .....</b>	<b>5</b>
<b>4. STUDY RESULTS.....</b>	<b>6</b>
<b>A. STUDY ANALYSIS RESULTS .....</b>	<b>6</b>
<b>TABLE 1 – SPP FACILITY OVERLOADS CAUSED BY THE KCPL TO SPS 75 MW TRANSFER .....</b>	<b>7</b>
<b>TABLE 2 – NON - SPP FACILITY OVERLOADS CAUSED BY THE KCPL TO SPS 75 MW TRANSFER.....</b>	<b>8</b>
<b>TABLE 3 – PREVIOUSLY IDENTIFIED SPP FACILITIES IMPACTED BY THE KCPL TO SPS 75 MW TRANSFER .....</b>	<b>9</b>
<b>5. CONCLUSION .....</b>	<b>10</b>
<b>APPENDIX A .....</b>	<b>11</b>

## **1. Executive Summary**

Southwestern Public Service Company has requested a system impact study for long-term Firm Point-to-Point transmission service from KCPL to SPS. The period of the transaction is from 1/1/03 to 1/1/04. The request is for OASIS reservations 417264 and 417265 for a total amount of 75 MW.

The principal objective of this study is to identify system problems and potential system modifications necessary to facilitate the additional 75 MW transfer while maintaining system reliability. Analysis was conducted for the requested service period above and for the remaining planning horizon from 1/1/04 to 4/1/09. The additional evaluation of the planning horizon was conducted to determine any future constraints that may limit the renewal of service.

New overloads caused by the 75 MW transfer were identified along with determining the impact of the transfer on any previously assigned and identified facilities.

Oasis requests 417264 and 417265 are redirects of the previously confirmed Oasis reservations 381170 and 381171, respectively. The redirected service from KCPL to SPS does not create any new overloads or additional impacts on facilities. Therefore, the service will be accepted.

## **2. Introduction**

Southwestern Public Service Company has requested an impact study for transmission service from KCPL to SPS.

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 75 MW. This study includes steady-state contingency analyses (PSS/E function ACCC) and Available Transfer Capability (ATC) analyses for the requested service period and the remaining planning horizon.

The steady-state analyses consider the impact of the 75 MW transfer on transmission line loading and transmission bus voltages for outages of single and selected multiple transmission lines and transformers on the SPP system.

### **3. Study Methodology**

#### **A. Description**

Two analyses were conducted to determine the impact of the 75 MW transfer on the system. The first analysis was conducted to identify any new overloads caused by the 75 MW transfer. The second analysis was done to ensure that available capacity exists on previously identified circuits. Both analyses were performed on the models available for the requested service period and all remaining models available from the 2002-planning horizon.

The first analysis was to study the steady-state analysis impact of the 75 MW transfer on the SPP system. The second step was to study Available Transfer Capability (ATC) of the facilities identified in the steady-state analysis impact. The steady-state analysis was done to ensure current SPP Criteria and NERC Planning Standards requirements are fulfilled. The Southwest Power Pool (SPP) conforms to the NERC Planning Standards, which provide the strictest requirements, related to thermal overloads with a contingency. It requires that all facilities be within emergency ratings after a contingency.

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

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

SPP used eleven seasonal models to study the KCPL to SPS 75 MW transfer for the requested service period and the remaining planning horizon. The SPP 2002 Series Cases 2002/03 Winter Peak, 2003 April Minimum, 2003 Spring Peak, 2003 Summer Peak, 2003 Fall Peak, and 2003/04 Winter Peak were used to study the impact of the 75 MW transfer on the SPP system during the requested service period of 1/1/03 to 1/1/04. The SPP 2002 Series 2004 Spring Peak, 2005 Summer Peak, 2005/06 Winter Peak, 2008 Summer Peak and 2008/09 Winter Peak were used to study the impact of the 75 MW transfer on the SPP system during the remaining planning horizon from 1/1/04 to 4/1/09. The Spring Peak models apply to April and May, the Summer Peak models apply to June through September, the Fall Peak models apply to October and November, and the Winter Peak models apply to December through March.

The chosen base case models were modified to reflect the most current modeling information. The cases were modified to reflect future firm transfers during the requested service period that were not already included in the January 2002 base case series models.

#### **C. Transfer Analysis**

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

## **4. Study Results**

### **A. Study Analysis Results**

Tables 1, 2, and 3 contain the analysis results of the System Impact Study. The tables identify the seasonal case in which the event occurred; the emergency rating of the overloaded circuit (Rate B), the contingent loading percentage of circuit with and without the studied transfer, the estimated ATC value using interpolation if calculated, any SPP identification or assignment of the event, and any solutions received from the transmission owners.

Table 1 shows the new SPP facility overloads caused by the 75 MW. Available solutions are given in the table.

Table 2 documents overloads on Non SPP Regional Tariff participants' transmission systems caused by the 75 MW.

Table 3 documents the 75 MW transfer impact on previously assigned and identified SPP facilities. Available solutions are given in the table.

**Table 1** – SPP Facility Overloads caused by the KCPL to SPS 75 MW Transfer

Study Year	From Area - To Area	Branch Over 100% Rate B	Rate B	BC % Loading	TC % Loading	Outaged Branch Causing Overload
02WP		None				None
03AP		None				None
03G		None				None
03SP		None				None
03FA		None				None
03WP		None				None

**Table 2** – Non - SPP Facility Overloads caused by the KCPL to SPS 75 MW Transfer

Study Year	From Area - To Area	Branch Over 100% Rate B	Rate B	BC % Loading	TC % Loading	Outaged Branch Causing Overload
02WP		None				None
03AP		None				None
03G		None				None
03SP		None				None
03FA		None				None
03WP		None				None



**Table 3** – Previously Identified SPP Facilities Impacted by the KCPL to SPS 75 MW Transfer

Study Year	From Area - To Area	Branch Over 100% Rate B	Rate B	BC % Loading	TC % Loading	Outaged Branch Causing Overload
02WP		None				None
03AP		None				None
03G		None				None
03SP		None				None
03FA		None				None
03WP		None				None

## **5. Conclusion**

Oasis requests 417264 and 417265 are redirects of the previously confirmed Oasis reservations 381170 and 381171, respectively. The redirected service from KCPL to SPS does not create any new overloads or additional impacts on facilities. Therefore, the service will be accepted.

## **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