



***System Impact Study SPP-2001-368  
For Transmission Service  
Requested By  
Southwestern Public Service  
Company***

***From SPS to BLKW***

***For a Reserved Amount Of 50MW  
From 1/1/02  
To 3/1/12***

***SPP Transmission Planning***

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## **1. Executive Summary**

Southwestern Public Service Company has requested a system impact study for long-term Firm Point-to-Point transmission service from SPS to BLKW. The period of the transaction is from 1/1/02 to 3/1/12. The request is for OASIS reservation 320900 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 study shows that there are no constraints that limit the SPS to BLKW 50MW transfer.

## **2. Introduction**

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

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 analysis considers 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**

The SPP 2001 Series Cases 2001/02 Winter Peak, 2002 Spring, 2002 Summer Peak, 2002/03 Winter Peak, 2003 Spring, 2004 Summer Peak, 2004 Winter Peak, 2006 Summer Peak, 2006 Winter Peak, and 2010 Summer Peak were used to study the impact of the 50MW transfer on the SPP system during the transaction period of 1/01/02 to 1/1/03.

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 SPS to BLKW 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.

**Table 1** – SPP Facility Overloads caused by the SPS to BLKW 50MW Transfer

Study Year	From Area - To Area	Branch Over 100% Rate B	Rate B	BC % Loading	TC % Loading	Outaged Branch Causing Overload	ATC (MW)
01WP		NONE				NONE	50
02G		NONE				NONE	50
02SP		NONE				NONE	50
02FA		NONE				NONE	50
02WP		NONE				NONE	50
03G		NONE				NONE	50
04SP		NONE				NONE	50
04WP		NONE				NONE	50
06SP		NONE				NONE	50
06WP		NONE				NONE	50
10SP		NONE				NONE	50

**Table 2** – Non - SPP Facility Overloads caused by the SPS to BLKW 50MW Transfer

Study Year	From Area - To Area	Branch Over 100% Rate B	Rate B	BC % Loading	TC % Loading	Outaged Branch Causing Overload	ATC (MW)
01WP		NONE				NONE	50
02G		NONE				NONE	50
02SP		NONE				NONE	50
02FA		NONE				NONE	50
02WP		NONE				NONE	50
03G		NONE				NONE	50
04SP		NONE				NONE	50
04WP		NONE				NONE	50
06SP		NONE				NONE	50
06WP		NONE				NONE	50
10SP		NONE				NONE	50

**Table 3** – Previously Assigned and Identified SPP Facilities Impacted by the SPS to BLKW 50MW Transfer.

Study Year	From Area - To Area	Branch Over 100% Rate B	Rate B	BC % Loading	TC % Loading	Outaged Branch Causing Overload	ATC (MW)
01WP		NONE				NONE	50
02G		NONE				NONE	50
02SP		NONE				NONE	50
02FA		NONE				NONE	50
02WP		NONE				NONE	50
03G		NONE				NONE	50
04SP		NONE				NONE	50
04WP		NONE				NONE	50
06SP		NONE				NONE	50
06WP		NONE				NONE	50
10SP		NONE				NONE	50



## **5. Conclusion**

SPP found no facilities to restrict the requested SPS to BLKW 50MW reservation; therefore, it 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 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