



SPP

*Southwest
Power Pool*

*System Impact Study SPP-2003-277-2
For Transmission Service
Requested By
Golden Spread Electric Coop., Inc.
(GSEC)*

From SPS To AEPW

*For a Reserved Amount Of 13MW
From 1/1/2005 To 1/1/2020*

SPP Engineering, Tariff Studies

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1. Executive Summary

Golden Spread Electric Coop., Inc. (GSEC) has requested a system impact study to designate a Network Resource in the SPS Control Area for a total of 13 MW to serve Network Load in the AEPW Control Area. The period of the service requested is from 1/1/2005 to 1/1/2020. The OASIS reservation numbers are 631456 and 631457.

The principal objective of this study is to identify current system limitations using AC analyses and to determine the system upgrades necessary to provide the requested service.

Tables 1 and 2 list the SPP Facility Overloads caused or impacted by the requested service and include solutions with engineering and construction costs to alleviate the limiting facilities. Tables 3 and 4 include Non - SPP Facility Overloads caused or impacted by the requested service. Excluding any third party requirements and additional upgrades that may be required after modeling the assigned upgrades, the total engineering and construction cost to provide the requested service is determined in Table 1. For Non-SPP third-party facilities listed in Tables 3 and 4, the facility limitations will be mitigated in accordance with Section 21 of the SWPP OATT.

It was determined through the system impact study that the SPS to AEPW 13 MW transfer does not create any new overloads or additional impacts on facilities. Therefore, the service will be accepted.

2. Introduction

Golden Spread Electric Coop., Inc. (GSEC) has requested a system impact study for Point-to-Point Service from SPS to AEPW for 13 MW. The principal objective of this study is to identify the restraints on the SPP Regional Tariff System that may limit the requested service and determine the least cost solutions required to alleviate the limiting facilities.

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 13 MW transfer and the impact of the required upgrades for service on transmission line loading and transmission bus voltages for outages of single and selected multiple transmission lines and transformers on the SPP systems and first tier Non - SPP systems.

3. Study Methodology

A. Description

The system impact analysis was conducted to determine the steady-state impact of the 50 MW transfer on the SPP and first tier Non - SPP systems. The steady-state analysis was done to ensure current SPP Criteria and NERC Planning Standards requirements are fulfilled. The Southwest Power Pool conforms to the NERC Planning Standards, which provide the strictest requirements, related to voltage violations and thermal overloads during normal conditions and during a contingency. It requires that all facilities be within normal operating ratings for normal system conditions and within emergency ratings after a contingency.

B. Model Updates

SPP used eleven seasonal models to study the SPS to AEPW 13 MW transfer for the requested service period. The SPP 2004 Series Update 2 Cases 2004/05 Winter Peak (04WP), 2005 April (05AP), 2005 Spring Peak (05G), 2005 Summer Peak (05SP), 2005 Summer Shoulder (05SH), 2005 Fall Peak (05FA), 2005/06 Winter Peak (05WP), 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 13 MW transfer on the SPP system during the requested service period of 1/1/2005 to 1/1/2020. 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 2004 base case series models.

C. Transfer Analysis

Using the selected cases both with and without the requested transfer modeled, the PSS/E Activity ACCC was run on the cases and compared to determine the facility overloads caused or impacted by the transfer. The PSS/E options chosen to conduct the analysis can be found in Appendix A.

D. Upgrade Analysis

The requested transmission service does not create any new overloads or additional impacts on facilities. Therefore, no upgrades to the system are needed and an upgrade analysis is not required.

4. Study Results

A. Study Analysis Results

Tables 1 through 4 contain the steady-state analysis results of the System Impact Study. The tables identify the seasonal case in which the event occurred, the facility control area location, applicable ratings of the overloaded facility, the loading percentage with and without the studied, and the estimated ATC value using interpolation if calculated. Comments are provided in the tables to document any SPP or Non - SPP identification or assignment of the event, existing mitigations plans or criteria to disregard the event as a limiting constraint, upgrades and costs to mitigate a limiting constraint, or any specific study procedures associated with modeling an event.

Table 1 lists the SPP Facility Overloads caused or impacted by the first transfer for 7 MW from SPS to AEPW. Solutions with engineering and construction costs are provided in the tables.

Table 2 lists the SPP Facility Overloads caused or impacted by the second transfer for 6 MW from SPS to AEPW. Solutions with engineering and construction costs are provided in the tables.

Table 3 lists overloads on fist tier Non - SPP Regional Tariff participants' transmission systems caused or impacted by the first transfer for 7 MW.

Table 4 lists overloads on fist tier Non - SPP Regional Tariff participants' transmission systems caused or impacted by the second transfer for 6 MW.

Table 1 - SPP Facility Overloads caused or impacted by the first transfer for 7 MW from SPS to AEPW

Study Case	From Area	To Area	Monitored Branch Over 100% Rate B	Rate <MVA>	BC % Loading	TC % Loading	Outaged Branch Causing Overload	ATC (MW)	Solution	Estimated Cost
04WP			None				None			
05AP			None				None			
05G			None				None			
05SP			None				None			
05SH			None				None			
05FA			None				None			
05WP			None				None			
07SP			None				None			
07WP			None				None			
10SP			None				None			
10WP			None				None			

Table 2 - SPP Facility Overloads caused or impacted by the second transfer for 6 MW from SPS to AEPW

Study Case	From Area	To Area	Monitored Branch Over 100% Rate B	Rate <MVA>	BC % Loading	TC % Loading	Outaged Branch Causing Overload	ATC (MW)	Solution	Estimated Cost
04WP			None				None			
05AP			None				None			
05G			None				None			
05SP			None				None			
05SH			None				None			
05FA			None				None			
05WP			None				None			
07SP			None				None			
07WP			None				None			
10SP			None				None			
10WP			None				None			

Table 3 - Non - SPP Regional Tariff participants' transmission systems caused or impacted by the first transfer for 7 MW

Study Case	From Area	To Area	Monitored Branch Over 100% Rate B	Rate <MVA>	BC % Loading	TC % Loading	Outaged Branch Causing Overload	ATC (MW)	Solution	Estimated Cost
04WP			None				None			
05AP			None				None			
05G			None				None			
05SP			None				None			
05SH			None				None			
05FA			None				None			
05WP			None				None			
07SP			None				None			
07WP			None				None			
10SP			None				None			
10WP			None				None			

Table 4 - Non - SPP Regional Tariff participants' transmission systems caused or impacted by the second transfer for 6 MW

Study Case	From Area	To Area	Monitored Branch Over 100% Rate B	Rate <MVA>	BC % Loading	TC % Loading	Outaged Branch Causing Overload	ATC (MW)	Solution	Estimated Cost
04WP			None				None			
05AP			None				None			
05G			None				None			
05SP			None				None			
05SH			None				None			
05FA			None				None			
05WP			None				None			
07SP			None				None			
07WP			None				None			
10SP			None				None			
10WP			None				None			

5. Conclusion

It was determined through the system impact study that the SPS to AEPW 13 MW transfer 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