SPP Southwest Power Pool

System Impact Study SPP-2003-024
For Transmission Service
Requested By
Kansas Municipal Energy Agency (KMEA)

From SPA To WR

For a Reserved Amount Of 1MW
From 3/1/2003
To 3/1/2013

SPP Coordinated Planning

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1. Executive Summary

Kansas Municipal Energy Agency (KMEA) has requested a system impact study for long-term Firm Point-to-Point transmission service from SPA to WR. The period of the transaction is from 3/1/2003 to 3/1/2013. The request is for OASIS reservation 467767 for an amount of 1 MW.

The principal objective of this study is to identify system problems and potential system modifications necessary to facilitate the additional 1 MW transfer while maintaining system reliability.

New overloads caused by the 1 MW transfer are identified along with determining the impact of the transfer on any previously assigned and identified facilities.

The SPA to WR 1 MW transfer does not create any new overloads or additional impacts on facilities. Therefore, the service will be accepted.

2. Introduction

KMEA has requested an impact study for transmission service from SPA to WR.

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 1 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 1 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 1 MW transfer on the system. The first analysis was conducted to identify any new overloads caused by the 1 MW 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 1 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 ten seasonal models to study the SPA to WR 1 MW transfer for the requested service period. The SPP 2003 Series Cases 2003 Summer Peak, 2003 Fall Peak, 2003/04 Winter Peak, 2004 April, 2004 Spring Peak, 2004 Summer Peak, 2004 Fall Peak, 2004/05 Winter Peak, 2009 Summer Peak, and 2009/10 Winter Peak were used to study the impact of the 1 MW transfer on the SPP system during the requested service period of 3/1/2003 to 3/1/2013. 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 2003 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 documents both new SPP facility overloads and the impact on previously identified SPP Facilities caused by the 1 MW transfer. Available solutions are given in the table.

Table 2 documents overloads on Non SPP Regional Tariff participants' transmission systems caused by the 1 MW transfer.

Table 1 – SPP Facilities Impacted by the SPA to WR 1 MW Transfer

Study Year	From Area	To Area	Monitored Branch Over 100% Rate B	Rate B	BC % Loading	TC % Loading	Outaged Branch Causing Overload
03SP			None				None
03FA			None				None
03WP			None				None
04AP			None				None
04G			None				None
04SP			None				None
04FA			None				None
04WP			None				None
09SP			None				None
09WP			None				None

Table 2 – Non - SPP Facilities Impacted by the SPA to WR 1 MW Transfer

Study Year	From Area	To Area	Monitored Branch Over 100% Rate B	Rate B	BC % Loading	TC % Loading	Outaged Branch Causing Overload
03SP			None				None
03FA			None				None
03WP			None				None
04AP			None				None
04G			None				None
04SP			None				None
04FA			None				None
04WP			None				None
09SP			None				None
09WP			None				None

5. Conclusion

The SPA to WR 1 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 - X 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. Excld 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 - X Phase shift adjustment
   _ Flat start
   _ Lock DC taps
   _ Lock switched shunts