SPP Southwest Power Pool

System Impact Study SPP-2001-366 For Transmission Service Requested By Higginsville Municipal Utilities

From Southwestern Power Administration to Kansas City Power & Light

For a Reserved Amount Of 3MW From 2/1/02 To 5/31/15

SPP Transmission Planning

Table of Contents

1. Executive Summary

Higginsville Municipal Utilities has requested a system impact study for long-term Firm Point-to-Point transmission service from Southwestern Power Administration to Kansas City Power & Light. The period of the transaction is from 2/1/02 to 5/31/15. The request is for OASIS reservation 334486 for a total of 3MW.

The principal objective of this study is to identify system problems and potential system modifications necessary to facilitate the additional 3MW transfer while maintaining system reliability.

There were no new overloads caused by the 3MW transfer from SPA to KCPL.

2. Introduction

Higginsville Municipal Utilities has requested an impact study for transmission service from SPA to KCPL.

The principal objective of this study is to identify the restraints on the SPP Regional Tariff System that may limit the transfer too less than 3MW. 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 3MW 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 3MW.

3. Study Methodology

A. Description

Two analyses were conducted to determine the impact of the 3MW transfer on the system. The first analysis was conducted to identify any new overloads caused by the 3MW 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 3MW 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 3MW request. The SPP 2001 Series Cases 2001/2002 Winter Peak, 2002 Spring, 2002 Summer Peak, 2002 Fall, 2002/03 Winter Peak, 2003 Spring, 2004 Summer Peak, 2004/2005 Winter Peak, 2006 Summer Peak, 2006/2007 Winter Peak, and 2010 Summer Peak were used to study the impact of the 3MW transfer on the SPP system during the transaction period of 2/1/02 to 5/31/15.

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 3MW transfer. These new valid overloads can be directly assigned to the SPA to KCPL 3MW transfer.

Table 2 documents overloads on Non SPP Regional Tariff participants' transmission systems caused by the 3MW transfer.

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

Table 1 – SPP Facility Overloads caused by the SPA to KCPL 3MW Transfer

Study Year	From Area - To Area	Branch Over 100% RateB	RATEB	BC % I Loading	TC % I Loading	Outaged Branch That Caused Overload	ATC (MW)
01WP		NONE				NONE	3
02G		NONE				NONE	3
02SP		NONE				NONE	3
02FA		NONE				NONE	3
02WP		NONE				NONE	3
03G		NONE				NONE	3
04SP		NONE				NONE	3
04WP		NONE				NONE	3
06SP		NONE				NONE	3
06WP		NONE				NONE	3
10SP		NONE				NONE	3

Table 2 – Non - SPP Facility Overloads caused by the SPA to KCPL 3MW Transfer

Study Year	From Area - To Area	Branch Over 100% RateB	RATEB	BC % I Loading	TC % I Loading	Outaged Branch That Caused Overload	ATC (MW)
01WP		NONE				NONE	3
02G		NONE				NONE	3
02SP		NONE				NONE	3
02FA		NONE				NONE	3
02WP		NONE				NONE	3
03G		NONE				NONE	3
04SP		NONE				NONE	3
04WP		NONE				NONE	3
06SP		NONE				NONE	3
06WP		NONE				NONE	3
10SP		NONE				NONE	3

Table 3 – Previously Assigned and Identified SPP Facilities Impacted by the SPA to KCPL 3MW Transfer.

Study Year	From Area - To Area	Branch Over 100% RateB	RATEB	BC % I Loading	TC % I Loading	Outaged Branch That Caused Overload	Assignment
01WP		NONE				NONE	
02G		NONE				NONE	
02SP	KACP - KACP	LA CYGNE TO STILLWELL, 345KV 57981 LACYGNE7 345 to 57968 STILWEL7 345 CKT1	1251	100.8	100.9	LA CYGNE TO WEST GARDNER, 345KV 57981 LACYGNE7 345 to W.GRDNR7 345 CKT1	SPP Flowgate
02FA		NONE				NONE	
02WP		NONE				NONE	
03G		NONE				NONE	
04SP		NONE				NONE	
04WP		NONE				NONE	
06SP	KACP - KACP	LA CYGNE TO STILLWELL, 345KV 57981 LACYGNE7 345 to 57968 STILWEL7 345 CKT1	1251	105.3	105.4	LA CYGNE TO WEST GARDNER, 345KV 57981 LACYGNE7 345 to W.GRDNR7 345 CKT1	SPP Flowgate
06WP		NONE				NONE	
10SP		NONE				NONE	

5. Conclusion

The SPA to KCPL 3MW transfer increases the loading on the previously overloaded La Cygne to Stillwell, La Cygne to West Gardner flowgate. SPP recognizes that the 3MW EDE to KCPL grandfathered service (KCPL Oasis Reservation 70772) has a positive impact on the La Cygne to Stillwell flowgate equal to that of the requested 3MW from SPA to KCPL.

The SPA to KCPL 3MW transfer will be accepted on the condition that KCPL does not allow the previously confirmed reservation to run. With this agreement, there will be no additional impact on the La Cygne to Stillwell, La Cygne to West Gardner flowgate.

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 - 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