SPP Southwest Power Pool

System Impact Study SPP-2001-144
For Transmission Service
Requested By
Cinergy Services, Inc.

From WR To KACY

For a Reserved Amount Of 60MW
From 9/1/01
To 9/1/02

SPP Transmission Planning

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1. Executive Summary

Cinergy Services, Inc. has requested a system impact study for long-term Firm Point-to-Point transmission service from WR to KACY. The period of the transaction is from 9/1/01 to 9/1/02. The request is for OASIS reservation 248626 for 60MW.

The principal objective of this study is to identify system problems and potential system modifications necessary to facilitate the additional 60MW transfer while maintaining system reliability.

New overloads caused by the 60MW transfer were identified along with determining the impact of the transfer on any previously assigned and identified facilities.

The 60MW transfer causes in increase in loading on the previously overloaded La Cygne to Stillwell, La Cygne to West Gardner and Midland 161/115kV Tr, Hoyt to Stranger Creek flowgates.

It has been determined that there is not sufficient time available to complete any upgrades to the system that would relieve these flowgates.

Redispatch was looked at as an option to relieving the impact on the La Cygne to Stillwell, La Cygne to West Gardner and the Midland 161/115kV Tr, Hoyt to Stranger Creek flowgates caused by the 60MW transfer.

The Transmission Owners were given the opportunity to participate in the redispatch of their generation resources in order to relieve a system constraint caused by a transfer. Those companies owning units, which through increasing or decreasing generation will relieve the impact on the La Cygne to Stillwell, La Cygne to West Gardner and the Midland 161/115kV Tr, Hoyt to Stranger Creek flowgates, declined to participate in redispatching. There are no additional options available to relieve the impact these flowgates caused by the 60MW WR to KACY transfer.

2. Introduction

Cinergy Services, Inc. has requested an impact study for transmission service from WR control area with a sink of KACY.

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 60MW. 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 60MW 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 60MW.

3. Study Methodology

A. Description

Two analyses were conducted to determine the impact of the 60MW transfer on the system. The first analysis was conducted to identify any new overloads caused by the 60MW 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 60MW 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 three seasonal models to study the 60MW request. The SPP 2001 Series Cases 2001 Summer Peak, 2001/02 Winter Peak, and 2002 Summer Peak were used to study the impact of the 60MW transfer on the SPP system during the transaction period of 9/1/01 to 9/1/02.

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, 3 and 4 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 60MW transfer. Upgrades associated with these new overloads can be directly assigned to the WR to KACY 60MW transfer.

Table 2 documents overloads on Non SPP Regional Tariff participants' transmission systems caused by the 60MW transfer.

Table 3 documents the 60MW transfer impact on previously assigned and identified facilities.

Table 4 documents the SPP flowgates impacted by the 60MW WR to KACY transfer.

Table 1 – SPP Facility Overloads caused by the WR to KACY 60MW Transfer

Study Year	From Area - To Area	Branch Over 100% Rate B	Rate B	BC % I Loading	TC % I Loading	Outaged Branch That Caused Overload
01SP	KACP-KACP	**OLATHE EAST TO OXFORD, 161KV** 58036 OLATHEE5 161 to 58046 OXFORD 5 161 CKT 1	224	99.5	101.6	**WEST GARDNER TO LA CYGNE, 345KV** 57965 W.GRDNR7 345 to 57981 LACYGNE7 345 CKT1
01SP	WERE-WERE	**GILL ENERGY CENTER EAST TO OATVILLE, 69KV** 57795 GILL E 269.0 to 57825 OATVILL269.0 CKT 1	72	94.9	101.1	**GILL ENERGY CENTER EAST TO HAYSVILLE JUNCTION, 69KV** 57795 GILL E 269.0 to 57804 HAYSVLJ269.0 CKT1
01SP	WERE-WERE	**GILL ENERGY CENTER EAST TO MACARTHUR, 69KV** 57795 GILL E 269.0 to 57813 MACARTH269.0 CKT 1	68	94.7	100.1	**GILL ENERGY CENTER EAST TO OATVILLE, 69KV** 57795 GILL E 269.0 to 57825 OATVILL269.0 CKT1
01WP	WERE-WERE	**NONE**				**NONE**
02SP	WERE-WERE	**HOYT TO HOYT HTI SWITCHING, 115KV** 57163 HOYT 3 115 to 57165 HTI JCT3 115 CKT 1	92	100.0	100.3	**JEFFREY ENERGY CENTER NORTH TO SUMMIT, 345KV** 56766 JEC N 7 345 to 56773 SUMMIT 7 345 CKT1
02SP	WERE-WERE	**166TH TO JAGGARD JUNCTION, 115KV** 57233 166TH 3 115 to 57243 JAGGARD3 115 CKT 1	119	99.2	101.9	**CAPTAIN JUNCTION TO EUDORA, 115KV** 57235 CAPTAIN3 115 to 57240 EUDORA 3 115 CKT1
02SP	WERE-WERE	**GILL ENERGY CENTER EAST TO OATVILLE, 69KV** 57795 GILL E 269.0 to 57825 OATVILL269.0 CKT 1	72	99.7	101.3	**EVANS ENERGY CENTER TO LAKERIDGE, 138KV** 57041 EVANS S4 138 to 57053 LAKERDG4 138 CKT1
02SP	WERE-WERE	**WAKARUS JUNCTION SWITCHING STA TO FARMER'S CONSUMER CO-OP, 115KV** 57277 WAKARUS3 115 to 57236 COOP 3 115 CKT 1	92	99.4	101.2	**SOUTHWEST LAWRENCE TO WAKARUS JUNCTION SWITCHING STATION, 115KV** 57271 SWLWRNC3 115 to 57277 WAKARUS3 115 CKT1
02SP	WERE-WERE	**43RD & LORRAINE TO HUTCHINSON ENERGY CENTER, 69KV** 57512 43LORAN269.0 to 57513 HEC 269.0 CKT 1	85	99.0	106.1	**SANDHILL ARK VALLEY CO-OP TO CIRCLE, 115KV** 57412 ARKVALJ3 115 to 57413 CIRCLE 3 115 CKT1

Table 2 – Non - SPP Facility Overloads caused by the WR to KACY 60MW Transfer

Study Year	From Area - To Area	Branch Over 100% Rate B	Rate B	BC % I Loading	TC % I Loading	Outaged Branch That Caused Overload
01SP		**NONE**				**NONE**
01WP		**NONE**				**NONE**
02SP		**NONE**				**NONE**

Table 3 – Previously Assigned and Identified SPP Facilities Impacted by the WR to KACY 60MW Transfer.

Study Year	From Area - To Area	Branch Over 100% Rate B	Rate B	BC % I Loading	TC % I Loading	Outaged Branch That Caused Overload
01SP		**NONE**				**NONE**
01WP		**NONE**				**NONE**
02SP		**NONE**				**NONE**

Table 4 – SPP Flowgates Impacted by the WR to KACY 60MW Transfer.

Study Year	**From Area - To Area**	**Flowgate**	**Branch Over 100% Rate B**	**Rating**	**BC % I Loading**	**TC % I Loading**	**Outaged Branch That Caused Overload**
			Midland 161/115kV Transformer				**Hoyt to Stranger Creek, 345kV**
01WP	WERE-WERE	MidXfrHoyStr	56915 MIDLAND5 161 to 57252 MIDLAND3 115 CKT 1	183	101.6	105	56765 HOYT 7 345 to 56772 STRANGR7 345 CKT1
			La Cygne to Stilwell, 345kV				**La Cygne to West Gardner, 345kV**
02SP	KACP-KACP	LacStiLacWgr	57981 LACYGNE7 345 to 57968 STILWEL7 345 CKT 1	1243	102.4	103.1	57981 LACYGNE7 345 to 57965 W.GRDNR7 345 CKT1

5. Conclusion

The WR to KACY 60MW transfer causes an increase in loading on the La Cygne to Stillwell, La Cygne to West Gardner flowgate. For the 2002 Summer, the ATC is zero due to the impact on this flowgate. The WR to KACY request also causes an increase in loading on the Midland 161/115kV Tr, Hoyt to Stranger Creek flowgate. The ATC is zero for the 2001 Winter due to the impact on this flowgate.

The Transmission Owners were given the opportunity to include their units for redispatch in order to provide relief on the flowgates impacted by a certain transaction. The participants owning units that would relieve the La Cygne to Stillwell, La Cygne to West Gardner and the Midland 161/115kV Tr, Hoyt to Stranger Creek flowgates declined to participate in the redispatch of those units. No other options are available to provide the capacity needed for the 60MW transfer. Therefore the request for yearly service from WR to KACY must be refused due to the impact on the SPP flowgates.

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