



***System Impact Study SPP-2001-227b
For Transmission Service
Requested By
Western Resources Generation
Services***

***From Western Resources to Ameren
For a Reserved Amount Of 100MW
From 1/1/02
To 1/1/03***

SPP Transmission Planning

Table of Contents

1. EXECUTIVE SUMMARY	3
2. INTRODUCTION	4
3. STUDY METHODOLOGY	5
A. DESCRIPTION.....	5
B. MODEL UPDATES.....	5
C. TRANSFER ANALYSIS	5
4. STUDY RESULTS.....	6
A. STUDY ANALYSIS RESULTS	6
TABLE 1 – SPP FACILITY OVERLOADS CAUSED BY THE WR TO AMRN 100MW TRANSFER.....	7
TABLE 2 – NON - SPP FACILITY OVERLOADS CAUSED BY THE WR TO AMRN 100MW TRANSFER	7
TABLE 3 – PREVIOUSLY ASSIGNED AND IDENTIFIED SPP FACILITIES IMPACTED BY THE WR TO AMRN 100MW TRANSFER.	8
TABLE 4 – CONFIRMED TRANSFERS AVAILABLE FOR CURTAILMENT	8
5. CONCLUSION	9
APPENDIX A	10

1. Executive Summary

Western Resources Generation Services has requested a system impact study for long-term Firm Point-to-Point transmission service from Western Resources to Ameren. The period of the transaction is from 1/1/02 to 1/1/03. The request is for OASIS reservations 263443 and 263444 for a total of 100MW.

The principal objective of this study is to identify system problems and potential system modifications necessary to facilitate the additional 100MW transfer while maintaining system reliability.

New overloads caused by the 100MW transfer were identified along with determining the impact of the transfer on any previously assigned and identified facilities.

The previously studied 100MW renewal from WR to EES was included in the models for this analysis. The WR to EES transfer was studied in System Impact Study SPP-2001-211. The status of the WR to EES transfer impacts the facilities assigned to the WR to AMRN 100MW transfer.

The 100MW transfer from WR to AMRN causes new overloads in the WR control area. The Hoyt Hti Switching Junction to Circleville 115kV line was identified as the limiting constraint for the WR to AMRN transfer for the 2002 Spring, 2002 Summer and 2002/2003 Winter. It was determined that structural upgrades could be completed by the 2002 Summer that would relieve the additional loading on the line caused by the WR to AMRN transfer. This provides the additional capacity needed for the 2002 Summer and 2002/2003 Winter. However, due to the in-service date of these upgrades, this line is limited to an ATC of 12MW during the 2002 Spring months. The curtailment of confirmed transmission service was looked at as an option for relieving the loading of the line for the 2002 Spring months.

2. Introduction

Western Resources Generation Services has requested an impact study for transmission service from WR to AMRN.

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 100MW. 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 100MW 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 100MW.

3. Study Methodology

A. Description

Two analyses were conducted to determine the impact of the 100MW transfer on the system. The first analysis was conducted to identify any new overloads caused by the 100MW 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 100MW 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 five seasonal models to study the 100MW request. The SPP 2001 Series Cases 2001/02 Winter Peak, 2002 Spring, 2002 Summer Peak, 2002 Fall, and 2002/03 Winter Peak were used to study the impact of the 100MW transfer on the SPP system during the transaction period of 1/1/02 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 100MW transfer. Upgrades associated with these new overloads can be directly assigned to the WR to AMRN 100MW transfer.

Table 2 documents overloads on Non SPP Regional Tariff participants' transmission systems caused by the 100MW transfer.

Table 3 documents the 100MW transfer impact on previously assigned and identified facilities.

Table 4 documents the available confirmed reservations that, when curtailed, would relieve the additional loading on the Hoyt Hti Switching Junction to Circleville 115kV line caused by the WR to AMRN 100MW transfer. Curtailing these transfers during an outage would provide the 1.2MW of relief needed on the Hoyt Hti Switching Junction to Circleville 115kV line.

Table 1 – SPP Facility Overloads caused by the WR to AMRN 100MW Transfer

Study Year	From Area - To Area	Branch Over 100% Rate B	Rate B	BC % Loading	TC % Loading	Outaged Branch Causing Overload	ATC (MW)	Assignment
01WP	WERE-WERE	WEST JUNCTION CITY (EAST) TO WEST JUNCTION CITY, 115KV 57343 WJCCTYE3 115 to 57342 WJCCTY 3 115 CKT 1	141	99.3	100.5	JEFFERY ENERGY CENTER NORTH TO SUMMIT, 345KV 56766 JEC N 7 345 to 56773 SUMMIT 7 345 CKT1	100	Transmission Operating Directive 402
02G	WERE-WERE	HOYT HTI SWITCHING JUNCTION TO CIRCLEVILLE, 115KV 57165 HTI JCT3 115 to 57152 CIRCLVL3 115 CKT 1	92	99.8	101.6	IATAN TO ST. JOE, 345KV 57982 IATAN 7 345 to 69702 ST JOE 3 345 CKT1	12	Structural Upgrading, Rate B = 97MVA Est. In-Service Date 6/1/02
02SP	WERE-WERE	HOYT HTI SWITCHING JUNCTION TO CIRCLEVILLE, 115KV 57165 HTI JCT3 115 to 57152 CIRCLVL3 115 CKT 1	92	99.8	100.5	JEFFERY ENERGY CENTER TO EAST MANHATTAN, 230KV 56852 JEC 6 230 to 56861 EMANHAT6 230 CKT1	100	Structural Upgrading, Rate B = 97MVA Est. In-Service Date 6/1/02
02SP	WERE-WERE	CRAIG JUNCTION TO TIMBERLANE, 115KV 57237 CRAIG J3 115 to 57273 TIMBRLN3 115 CKT 1	92	100.0	100.5	EAST SAAP JUNCTION TO MOONLIGHT JUNCTION SWITCHING, 115KV 57239 ESAAPJ 3 115 to 57255 MOONLTJ3 115 CKT1	100	Spring Hill 161-115 KV Transformer Will Be Replaced Prior To 2002 SP
02SP	WERE-WERE	43RD & LORRAINE TO HUTCHINSON ENERGY CENTER , 69KV 57512 43LORAN269.0 to 57513 HEC 269.0 CKT 1	85	96.3	101.5	CIRCLE TO DAVIS, 115KV 57413 CIRCLE 3 115 to 57415 DAVIS 3 115 CKT1	100	Transmission Operating Directive 1205
02SP	WERE-WERE	GILL ENERGY CENTER EAST TO OATVILLE, 69KV 57795 GILL E 269.0 to 57825 OATVILL269.0 CKT 1	72	94.4	116.2	HOOVER NORTH 138/69KV TR 57049 HOOVERN4 138 to 57805 HOOVERN269.0 CKT3	100	Local Area Problem
02WP	WERE-WERE	HOYT HTI SWITCHING JUNCTION TO CIRCLEVILLE, 115KV 57165 HTI JCT3 115 to 57152 CIRCLVL3 115 CKT 1	92	97.2	101.4	CONCORDIA 230/115KV TR 58757 CONCORD3 115 to 58758 CONCORD6 230 CKT1	100	Structural Upgrading, Rate B = 97MVA Est. In-Service Date 6/1/02

Table 2 – Non - SPP Facility Overloads caused by the WR to AMRN 100MW Transfer

Study Year	From Area - To Area	Branch Over 100% Rate B	Rate B	BC % Loading	TC % Loading	Outaged Branch Causing Overload
01WP	AMRN-AMRN	31408 OVERTON 345 to 31409 OVERTON 161 CKT 1	300	99.7	100.2	31221 MOBERLY 161 to 96120 5THMHIL 161 CKT1
02G		NONE				NONE
02SP		NONE				NONE
02FA		NONE				NONE
02WP		NONE				NONE

Table 3 – Previously Assigned and Identified SPP Facilities Impacted by the WR to AMRN 100MW Transfer.

Study Year	From Area - To Area	Branch Over 100% Rate B	Rate B	BC % Loading	TC % Loading	Outaged Branch Causing Overload	Assignment
01WP		NONE				NONE	
02G	WERE-WERE	GOLDEN PLAINS JUNCTION TO HESSTON, 69KV 57735 GOLDPLJ269.0 to 57737 HESSTON269.0 CKT 1	32	99.5	100.8	MID AM JUNCTION TO MUD CREEK JUNCTION, 69KV 57741 MID AMJ269.0 to 57744 MUDCRKJ269.0 CKT1	LOCAL AREA PROBLEM
02SP		NONE				NONE	
02FA	WERE-WERE	HOYT TO HOYT HTI SWITCHING JUNCTION, 115KV 57163 HOYT 3 115 to 57165 HTI JCT3 115 CKT 1	92	100.2	101.0	CLIFTON TO CONCORDIA, 115KV 58756 CLIFTON3 115 to 58757 CONCORD3 115 CKT1	Assigned to SPP-2001-211
02WP		NONE				NONE	

Table 4 – Confirmed Transfers Available for Curtailment

OASIS Reservation	Customer	POR	POD	Begin Date	End Date	Amount (MW)	% Response on Hoyt Hti Switching to Circleville 115kV line	Dates Curtailment Needed	Amount of Curtailment Needed (MW) for 1.2MW relief on Hoyt Hti Switching to Circleville 115kV line
260470	WRGS	WR	EES	11/1/2001	11/1/2002	50	1.70%	4/1/02 - 6/1/02	50
260471	WRGS	WR	EES	11/1/2001	11/1/2002	50	1.70%	4/1/02 - 6/1/02	25
						(Total) 100			(Total) 75

5. Conclusion

The WR to AMRN 100MW transfer causes new overloads in the Western Resources control area, as well as increasing the loading on previously identified facilities.

The acceptance of the WR to AMRN 100MW request is dependant on the following:

- ÷! Upgrades must be completed for the Hoyt to Hoyt Hti Switching Junction 115kV line assigned to the previously studied WR to EES 100MW transfer (SPP-2001-211). The required in-service date of this upgrade is the fall of 2002.
- ÷! Upgrades must be completed for the Hoyt Hti Switching Junction to Circleville 115kV line assigned to this study. These upgrades must be completed by the summer of 2002.
- ÷! Western Resources agrees to curtail the previously confirmed WR to EES transfer, if needed, to relieve the loading on the Hoyt Hti Switching Junction to Circleville 115kV line. This curtailment would only be needed for the spring of 2002. Without the availability of this curtailment, the WR to AMRN transfer will be limited to an ATC of 12MW due to the loading of the Hoyt Hti Switching Junction to Circleville 115kV line during the spring of 2002.

The final cost assignment of facilities and ATC granted to WRGS will be determined upon the completion of a facility study.

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