



***System Impact Study SPP-2001-211a
For Transmission Service
Requested By
Western Resources Generation
Services***

From Western Resources to Entergy

***For a Reserved Amount Of 100MW
From 11/1/01
To 11/1/02***

SPP Transmission Planning

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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 Entergy. The period of the transaction is from 11/1/01 to 11/1/02. The request is for OASIS reservations 260470 and 260471 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 100MW transfer from WR to EES causes new overloads in the Western Resources control area. Redispatch was looked at as an option to relieving these overloads.

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 facilities identified in this study, declined to participate in redispatching.

2. Introduction

Western Resources Generation Services has requested an impact study for transmission service from WR control area with a sink of EES.

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 four seasonal models to study the 100MW request. The SPP 2001 Series Cases 2001/02 Winter Peak, 2002 Spring, 2002 Summer Peak, and 2002 Fall were used to study the impact of the 100MW transfer on the SPP system during the transaction period of 11/01/01 to 11/1/02.

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, 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 EES 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. Available estimated in-service dates for the completion of the previously assigned upgrades are given in the table.

Table 1 – SPP Facility Overloads caused by the WR to EES 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
02G	WERE-WERE	GOLDEN PLAINS JUNCTION TO HESSTON, 69KV 57735 GOLDPLJ269.0 to 57737 HESSTON269.0 CKT 1	32	99.1	100.5	HALSTEAD TO MUD CREEK JUNCTION, 69KV 57736 HALSTED269.0 to 57744 MUDCRKJ269.0 CKT1	100	LOCAL AREA PROBLEM
02SP	WERE-WERE	WEST MCPERSON TO PHILIPS JUNCTION SOUTH, 115KV 57438 WMCPHER3 115 to 57374 SPHILPJ3 115 CKT 2	92	97.1	102.1	SUMMIT 230/115KV TR 56873 SUMMIT 6 230 to 57381 SUMMIT 3 115 CKT1	100	TRNSMISSION OPERATING DIRECTIVE 613
02SP	WERE-WERE	HUTCHINSON GAS TURBINE STATION TO HUTCHINSON ENERGY CENTER, 69KV 57514 HEC GT 269.0 to 57513 HEC 269.0 CKT 1	130	61.5	115.8	CIRCLE TO HUTCHINSON GAS TURBINE STATION, 115KV 57413 CIRCLE 3 115 to 57421 HEC GT 3 115 CKT1	100	TRANSMISSION OPERATING DIRECTIVE 1204
02SP	WERE-WERE	PENTAGON TO CRAIG JUNCTION, 115KV 57261 PENTAGN3 115 to 57237 CRAIG J3 115 CKT 1	92	99.1	100.1	EAST SAAP JUNCTION TO 95TH & WAVERLY, 115KV 57239 ESAAPJ 3 115 to 57278 WAVERLY3 115 CKT1	100	SPRING HILL 161-115 KV TRANSFORMER WILL BE REPLACED PRIOR TO 2002 SP
02FA	WERE-WERE	HOYT TO HOYT HTI SWITCHING JUNCTION, 115KV 57163 HOYT 3 115 to 57165 HTI JCT3 115 CKT 1	92	99.8	100.2	CLIFTON TO CONCORDIA, 115KV 58756 CLIFTON3 115 to 58757 CONCORD3 115 CKT1	43	REBUILD 0.79 MILES OF 115 KV LINE, H-FRAME CONSTRUCTION, 795 KCMIL ACSR, 160/160 MVA (RATING IS WAVE TRAP LIMIT.)

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

Study Year	From Area - To Area	Branch Over 100% Rate B	Rate B	BC % Loading	TC % Loading	Outaged Branch Causing Overload
01WP	EES-EES	99167 3RINGLD 115 to 99168 3SAILES 115 CKT 1	115	100.0	100.4	99294 7ELDEHV 345 to 99295 8ELDEHV 500 CKT1
01WP	EES-EES	99167 3RINGLD 115 to 99168 3SAILES 115 CKT 1	115	99.9	100.3	53424 LONGWD 7 345 to 99294 7ELDEHV 345 CKT1
02G	AECI-AECI	96120 5THMHIL 161 to 96172 2TMHILL 69.0 CKT 1	84	99.8	100.2	96044 7MCCRED 345 to 96049 7THOMHL 345 CKT1

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

Study Year	From Area - To Area	Branch Over 100% Rate B	Rate B	BC % Loading	TC % Loading	Outaged Branch That Caused Overload	Assignment	ATC (MW)
01WP		NONE				NONE		100
02G		NONE				NONE		100
02SP		NONE				NONE		100
02FA		NONE				NONE		100

5. Conclusion

The WR to EES 100MW transfer causes new overloads on SPP facilities. Due to the impact on this facility, the WR to EES transfer is limited to 43MW.

The Transmission Owners were given the opportunity to include their units for redispatch in order to provide relief on the facilities impacted by a certain transaction. The participants owning units that would relieve the overloads caused by the WR to EES transfer declined to participate in the redispatch of those units.

To provide the capacity needed for 100MW of service, upgrades must be completed for the Hoyt to Hoyt Hti Switching Junction 115kV line overloaded by the WR to EES transfer (Table 1).

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