SPP Southwest Power Pool

System Impact Study SPP-2001-277
For Transmission Service
Requested By
Tenaska Power Service Company

From OPPD to ERCOTN

For a Reserved Amount Of 13MW
From 1/1/02
To 1/1/03

SPP Transmission Planning

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1. Executive Summary

Tenaska has requested a system impact study for long-term Firm Point-to-Point transmission service from OPPD to ERCOTN. The period of the transaction is from 1/1/02 to 1/1/03. The request is for OASIS reservation 276598, a redirect in the amount of 13MW.

The principal objective of this study is to identify system problems and potential system modifications necessary to facilitate the additional 13MW transfer while maintaining system reliability.

New overloads caused by the 13MW transfer were identified along with determining the impact of the transfer on any previously assigned and identified facilities.

The 13MW transfer causes in increase in loading on the previously overloaded Philips to South Philips 115kV, Summit to East McPherson 230kV flowgate.

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

Redispatch was looked at as an option to relieving the impact on the Philips to South Philips 115kV, Summit to East McPherson 230kV flowgate caused by the 13MW 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 Philips to South Philips 115kV, Summit to East McPherson 230kV flowgate, declined to participate in redispatching. There are no additional options available to relieve the impact on this flowgate caused by the 13MW OPPD to ERCOTN transfer.

2. Introduction

Tenaska has requested an impact study for transmission service from OPPD to ERCOTN.

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 13MW. 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 13MW 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 13MW.

3. Study Methodology

A. Description

Two analyses were conducted to determine the impact of the 13MW transfer on the system. The first analysis was conducted to identify any new overloads caused by the 13MW 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 13MW 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 13MW request. The SPP 2001 Series Cases 2001/02 Winter Peak, 2002 Summer Peak, and 2002/03 Winter Peak were used to study the impact of the 13MW 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 13MW transfer. Upgrades associated with these new overloads can be directly assigned to the OPPD to ERCOTN 13MW transfer.

Table 2 documents overloads on Non SPP Regional Tariff participants' transmission systems caused by the 13MW transfer.

Table 3 documents the 13MW transfer impact on previously assigned and identified facilities.

Table 1 – SPP Facility Overloads caused by the OPPD to ERCOTN 13MW Transfer

Study Year	From Area - To Area	Branch Over 100% Rate B	Rate B	BC % Loading	TC % Loading	Outaged Branch Causing Overload	ATC (MW)
01WP		NONE				NONE	13
02SP	SPS-SPS	RANDALL COUNTY INTERCHANGE, 230/115KV TR 51021 RANDALL6 230 to 51020 RANDALL3 115 CKT 1	225	100.0	100.1	NORTHWEST INTERCHANGE TO SUNSET, 115KV 50938 NORTHW3 115 to 50988 SUNSET3 115 CKT1	0
02WP		NONE				NONE	13

Table 2 – Non - SPP Facility Overloads caused by the OPPD to ERCOTN 13MW Transfer

Study Year	From Area - To Area	Branch Over 100% Rate B	Rate B	BC % Loading	TC % Loading	Outaged Branch Causing Overload	ATC (MW)
01WP		NONE				NONE	13
02SP		NONE				NONE	13
02WP		NONE				NONE	13

Table 3 – Previously Assigned and Identified SPP Facilities Impacted by the OPPD to ERCOTN 13MW Transfer.

Study Year	From Area - To Area	Branch Over 100% Rate B	Rate B	BC % Loading	TC % Loading	Outaged Branch Causing Overload	Assignment	ATC (MW)
01WP	WERE-WERE	NORTH AMERICAN PHILIPS TO NORTH AMERICAN PHILIPS JCT SOUTH, 115KV 57372 PHILIPS3 115 to 57374 SPHILPJ3 115 CKT 1	160	108.1	108.3	SUMMIT TO EAST MCPHERSON, 230KV 56873 SUMMIT 6 230 to 56872 EMCPHER6 230 CKT1	SPP Flowgate	0
02SP		NONE				NONE		13
02WP	WERE-WERE	NORTH AMERICAN PHILIPS TO NORTH AMERICAN PHILIPS JCT SOUTH, 115KV 57372 PHILIPS3 115 to 57374 SPHILPJ3 115 CKT 1	160	106.4	106.6	SUMMIT TO EAST MCPHERSON, 230KV 56873 SUMMIT 6 230 to 56872 EMCPHER6 230 CKT1	SPP Flowgate	0

5. Conclusion

The OPPD to ERCOTN 13MW transfer causes a new overload on an SPP facility as well as increasing the loading on a previously identified facility. The ATC is zero for the OPPD to ERCOTN request due to the following:

- 2001/2002 Winter Peak (12/1/01 – 4/1/02) – The ATC is zero due to the loading of the North American Philips To North American Philips Jct South, Summit to East McPherson flowgate. No upgrades have been assigned to this facility.

- 2002/2003 Winter Peak (12/1/02 – 4/1/03) – The ATC is zero due to the loading of the North American Philips To North American Philips Jct South, Summit to East McPherson flowgate. No upgrades have been assigned to this facility.

Facility restrictions exist in SPP that limit the requested OPPD to ERCOTN 13MW reservation to an ATC of zero. The ATC of the existing transmission system cannot be increased as required to provide continuous service over the reservation period. Therefore, the requested reservation will be refused.

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 –1.0
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