SPP Southwest Power Pool

System Impact Study for Transmission Service Request from Western Resources Co. to Ameren

SPP Transmission Planning

SPP IMPACT STUDY (#SPP-2000-010)
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1. Executive Summary

Western Resources Co. has requested a system impact study for long-term Firm Point-to-Point transmission service from Western Resources Co. to Ameren. The period of the transaction is from 1/1/01 to 1/1/02. The request is for two reservations (168969; 168970), totaling 100 MW.

The principal objective of this study is to identify system problems and potential system modifications necessary to facilitate the additional 100 MW transfer while maintaining system reliability. The analysis in this document shows that to accommodate an additional 100 MW transfer, upgrades will be required on the SPP transmission systems. A summary of the overloads and suggested upgrades can be found in Table No. 1.

The SPP and effected member companies shall use due diligence to coordinate the addition of necessary facilities or transmission system upgrades to provide the requested transmission service. Western Resources Co. is to compensate SPP for such costs pursuant to the terms of section 27 of the SPP Open Access Transmission Tariff. Expedited procedures for new facilities are available to Western Resources Co. per section 19.8 of the SPP Open Access Transmission Service Tariff.

Engineering and construction of any new facilities or modifications will not start until after a transmission service agreement and/or construction agreement is in place and effected member companies receives the appropriate authorization to proceed from the SPP after they receive authorization from the transmission customer.

2. Introduction

Western Resources Co. has requested an impact study for transmission service from WR control area with a sink of TVA.

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 100 MW. This study includes steady-state contingency analysis (PSS/E function ACCC) and Available Transfer Capability (ATC Linear) analysis.

The steady-state analysis considers the impact of the 100 MW 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 100 MW.

3. Study Methodology

A. Description

This study was done in two different parts. The first part was to study the steady-state analysis impacts caused on the SPP system from the 100 MW transfer identified and the second part was to study Available Transfer Capability (ATC). The SPP base case models were modified to reflect the most current modeling information.

The steady-state analysis part was done to ensure current SPP Criteria and NERC Planning Standards requirements are fulfilled.

The Southwest Power Pool (SPP) meets the NERC Planning Standards, Table No. 1, which provides the strictest requirements related to thermal overloads with a contingency. It requires that all facilities be within emergency ratings after a contingency.

The ATC study portion was done using the requirements specified in the current SPP Criteria related to determination of ATC. The linear analysis was first performed using PTI's MUST FCITC activity. The results were AC verified and validated.

When facilities were identified as being overloaded the facility owners were asked to review and confirm the validity of the limit. During this review the transmission providers would use available mitigation plans.

B. Model Updates

SPP built six models for each season representative of the system with and without the requested transfers. Cases for year 2000/01 Winter Peak, 2001 April Minimum, 2001 Spring Peak, 2001 Summer Peak, 2001 Fall Peak, and 2001/02 Winter Peak were included. These cases were modified to reflect future firm transfers not already included in the January 2000 base case series.

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, which overloaded using MVA ratings in the transfer case and was not overloaded in the base case, was flagged.

Shown in Table No. 1 are the outages that caused overloads and have not been previously identified with a mitigation plan. The upgrades needed to solve the overloading problems in the appropriate year cases are provided. Western Resources has excluded limits that fall under a set of established Operating Directives. Western Resources has provided SPP with an updated list of the established Operating Directives.

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

4. Study Results
A. PSSE ACCC

1. Table No. 1: WERE TO AMRN Transmission Service Study – 100 MW

Study Year	Load flow case description (opened branch(es))	Overloaded lines	FROM TO	RATE B % load	Available ATC MW	Solutions
00 WP	All Studied Contingencies	NONE		-----		
01 AP	All Studied Contingencies	NONE		-----		
01 SR	All Studied Contingencies	NONE		-----		
01 SP	EAST CENTERTON TO GENTRYR5 161 KV 53133 [ECNTRTN5] TO 53187 [GENTRYR5] CKT 1	DYESS TO EAST ROGERS 161 KV 53131 DYESS 5 TO 53135 EROGERS5 CKT 1	CESW CESW	245MVA 100.1%	95	Reconductor
01 FA	All Studied Contingencies	NONE		-----		
01 WP	EAST MCPHERSON TO SUMMIT 230 KV 56789 [EMCPHER6] TO BUS 56795 [SUMMIT 6] CKT 1	EXIDE JUNCTION TO SUMMIT 115 KV 57022 EXIDE J3 57034 SUMMIT 3 CKT 1	WERE WERE	181MVA 100.7%	41	New Pole Structures

B. MUST - Available Transfer Capability

ATC studies were run. The purpose of these studies was to ensure that the desired power 100 MW transfer could be accomplished while maintaining system reliability.

The MUST results for the study did not identify any new facilities that were not previously identified in the ACCC analysis in **Section 4. A**.

5. Conclusion

Before the 100 MW transfer from WERE to AMRN can take place, system improvements to correct problems caused by the transfer (listed in Table No. 1) need to be completed.