SPP Southwest Power Pool

System Impact Study For Network Transmission Service Requested By Grand River Dam Authority

From Grand River Dam Authority To Western Farmers Electric Cooperative

For a Reserved Amount Of 10MW From 10/1/00 To 6/1/05

SPP Transmission Planning

SPP IMPACT STUDY (#SPP-2000-104)
September 15, 2000

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1. Executive Summary

Grand River Dam Authority has requested a system impact study for long-term Firm Network transmission service from Grand River Dam Authority to the City of Lindsay, Oklahoma within Western Farmers Electric Cooperative area. The period of the transaction is from 10/1/00 to 6/1/05. The request is for OASIS number 209024.

The principal objective of this study is to identify system problems and potential system modifications necessary to facilitate the additional 10 MW transfer while maintaining system reliability. The analysis in this document shows that to accommodate an additional 10 MW transfer, no upgrades will be required on the SPP transmission systems.

2. Introduction

Grand River Dam Authority has requested an impact study for network transmission service from GRDA control area designated network resource of GRDA1 with a sink of the City of Lindsay within WFEC.

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 10 MW. This study includes two steady-state contingency analyses (PSS/E function ACCC) and Available Transfer Capability (ATC) analyses.

The steady-state analyses consider the impact of the 10 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 10 MW.

3. Study Methodology

A. Description

The study analysis was done using two steps. The first step was to study the steady-state analysis impact of the 10MW 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 ATC study portion was done using the requirements specified in the current SPP Criteria related to determination of ATC.

B. Model Updates

SPP used nine seasonal models to study the 10MW request. The SPP 2000 Series Cases 2000 Fall Peak, 2000/01 Winter Peak, 2001 April (Spring Minimum), 2001 Spring Peak, 2001 Summer Peak, 2001 Fall Peak, 2001/02 Winter Peak, 2004 Summer Peak, and 2004/05 Winter Peak were used to study the impact of the 10MW transfer on the SPP system during the transaction period of 10/01/00 to 6/1/05.

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 2000 base case series models. The 10MW transfer was then added to the nine base case models to produce the 10MW transfer cases.

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

Steady-State Analysis Results

Table 1 contains the steady state 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 loading percentage of circuit, the determined ATC value if calculated, any SPP identification or assignment of the event, and any solutions received from the transmission owners.

Table 1 shows that no new overload events were caused by the 10MW transfer. No new overloads can be directly assigned to the requested 10MW network service from GRDA to City of Lindsay.

5. Identification of Resources and Loads

Designated Network Resources	GRDA1	10MW
Load Point	City of Lindsay Substation	10MW

TABLE 1 OVERLOADS CAUSED BY 10MW TRANSFER

Study Year	OVERLOADED BRANCH(ES)	Load flow case description / (opened branch(es))	From - To	Rate B <MVA>	%LOADING	
00FA	NONE					
00WP	NONE					
01AP	NONE					
01SR	NONE					
01SP	NONE					
01FA	NONE					
01WP	NONE					
04SP	**MAID TO TAHLEQUAH 161KV** 54448 MAID 5 TO 54455 TAHLQH 5 1	**GRDA ONE TO WAGONER 161KV** 54456 [GRDA1 5] TO 54500 [WAGNOR 5] 1	GRRD-GRRD	148	100.3	GRDA has agreement with AECI to reduce Chouteau Gen.output to eliminate loads like this One.
04WP	NONE					

6. Conclusion

The results of the study show that the 10MW of Network Transmission Service from GRDA to WFEC caused no identifiable violations on the SPP transmission system.

Appendix A

PSS/E CHOICES IN RUNNING LOAD FLOW PROGRAM AND ACCC

BASE AND TRANSFER CASES:
Solutions - Fixed slope decoupled Newton-Raphson solution (FDNS)
1. Tap adjustment – Stepping
2. Area interchange control – Tie lines only
3. Var limits – Apply immediately
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