SPP Southwest Power Pool

System Impact Study SPP-2002-141 For Transmission Service Requested By Southwestern Public Service Company

From SPS To OKGE

For a Reserved Amount Of 50MW From 1/1/03 To 1/1/04

SPP Coordinated Planning

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1. Executive Summary

Southwestern Public Service Company has requested a system impact study for long-term Firm Point-to-Point transmission service from SPS to OKGE. The period of the transaction is from 1/1/03 to 1/1/04. The request is for OASIS reservation 383420 for an amount of 50 MW.

The principal objective of this study is to identify system problems and potential system modifications necessary to facilitate the additional 50 MW transfer while maintaining system reliability. Analysis was conducted for the requested service period above and for the remaining planning horizon from 1/1/04 to 4/1/09. The additional evaluation of the planning horizon was conducted to determine any future constraints that may limit the renewal of service.

Any new overloads caused by the 50 MW transfer are identified along with determining the impact of the transfer on any previously assigned and identified facilities.

Oasis request 383420 is a redirect of the previously confirmed Oasis reservation 381165. The redirected service from SPS to OKGE does not create any new overloads or additional impacts on facilities. Therefore, the service will be accepted.

2. Introduction

Southwestern Public Service Company has requested an impact study for transmission service from SPS to OKGE.

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 50 MW. This study includes steady-state contingency analyses (PSS/E function ACCC) and Available Transfer Capability (ATC) analyses for the requested service period and the remaining planning horizon.

The steady-state analyses consider the impact of the 50 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.

3. Study Methodology

A. Description

Two analyses were conducted to determine the impact of the 50 MW transfer on the system. The first analysis was conducted to identify any new overloads caused by the 50 MW transfer. The second analysis was done to ensure that available capacity exists on previously identified circuits. Both analyses were performed on the models available for the requested service period and all remaining models available from the 2002-planning horizon.

The first analysis was to study the steady-state analysis impact of the 50 MW transfer on the SPP system. The second step was to study Available Transfer Capability (ATC) of the facilities identified in the steady-state analysis. 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 eleven seasonal models to study the SPS to OKGE 50 MW transfer for the requested service period and the remaining planning horizon. The SPP 2002 Series Cases 2002/03 Winter Peak, 2003 April Minimum, 2003 Spring Peak, 2003 Summer Peak, 2003 Fall Peak, and 2003/04 Winter Peak were used to study the impact of the 50 MW transfer on the SPP system during the requested service period of 1/1/03 to 1/1/04. The SPP 2002 Series 2004 Spring Peak, 2005 Summer Peak, 2005/06 Winter Peak, 2008 Summer Peak and 2008/09 Winter Peak were used to study the impact of the 50 MW transfer on the SPP system during the remaining planning horizon from 1/1/04 to 4/1/09. The Spring Peak models apply to April and May, the Summer Peak models apply to June through September, the Fall Peak models apply to October and November, and the Winter Peak models apply to December through March.

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 requested service period that were not already included in the January 2002 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 SPP facility overloads caused by the 50 MW. Available solutions are given in the table.

Table 2 documents overloads on Non SPP Regional Tariff participants' transmission systems caused by the 50 MW.

Table 3 documents the 50 MW transfer impact on previously assigned and identified SPP facilities. Available solutions are given in the table.

Table 1a in Appendix B documents the SPP facility overloads identified in the extended planning horizon.

Table 3a in Appendix B documents the impact on previously assigned and identified SPP facilities in the extended planning horizon.

Table 1 – SPP Facility Overloads caused by the SPS to OKGE 50 MW Transfer

Study Year	From Area - To Area	Branch Over 100% Rate B	Rate B	BC % Loading	TC % Loading	Outaged Branch Causing Overload	ATC (MW)
02WP		None				None	50
03AP		None				None	50
03G		None				None	50
03SP		None				None	50
03FA		None				None	50
03WP		None				None	50

Table 2 – Non - SPP Facility Overloads caused by the SPS to OKGE 50 MW Transfer

Study Year	From Area - To Area	Branch Over 100% Rate B	Rate B	BC % Loading	TC % Loading	Outaged Branch Causing Overload
02WP		None				None
03AP		None				None
03G		None				None
03SP		None				None
03FA		None				None
03WP		None				None

Table 3 – Previously Identified SPP Facilities Impacted by the SPS to OKGE 50 MW Transfer

Study Year	From Area - To Area	Branch Over 100% Rate B	Rate B	BC % Loading	TC % Loading	Outaged Branch Causing Overload	ATC (MW)
02WP		None				None	50
03AP		None				None	50
03G		None				None	50
03SP		None				None	50
03FA		None				None	50
03WP		None				None	50

5. Conclusion

Oasis request 383420 is a redirect of the previously confirmed Oasis reservation 381165. The redirected service from SPS to OKGE does not create any new overloads or additional impacts on facilities. Therefore, the service will be accepted.

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 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 – 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. 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

Appendix B

Table 1a – SPP Facility Overloads caused by the SPS to OKGE 50 MW Transfer in the Extended Planning Horizon

Study Year	From Area - To Area	Branch Over 100% Rate B	Rate B	BC % Loading	TC % Loading	Outaged Branch Causing Overload	ATC (MW)
04G		None				None	50
05SP		None				None	50
05WP		None				None	50
08SP		None				None	50
08WP		None				None	50

Table 3a – Previously Identified SPP Facilities Impacted by the SPS to OKGE 50 MW Transfer in the Extended Planning Horizon

Study Year	From Area - To Area	Branch Over 100% Rate B	Rate B	BC % Loading	TC % Loading	Outaged Branch Causing Overload	ATC (MW)
05SP	AEPW-AEPW	53818 ONETA--4 138 to 53781 BA101-N4 138 CKT 1	210	109.0	109.1	53785 RSSAUTO4 138 to 53795 R.S.S.-4 138 CKT1	0
05SP	AEPW-WFEC	54140 S.W.S.-4 138 to 55814 ANADARK4 138 CKT 1	203	108.8	109.9	54084 VERDEN 4 138 to 54165 N29CHIC4 138 CKT1	0
05SP	AEPW-WFEC	54140 S.W.S.-4 138 to 55814 ANADARK4 138 CKT 1	203	106.3	107.3	54112 CORNVIL4 138 to 54165 N29CHIC4 138 CKT1	0
05SP	AEPW-WFEC	54140 S.W.S.-4 138 to 55814 ANADARK4 138 CKT 1	203	102.5	103.3	54099 COMANC-269.0 to 54187 L-DISTP269.0 CKT1	0
05SP	AEPW-WFEC	54140 S.W.S.-4 138 to 55814 ANADARK4 138 CKT 1	203	102.2	103.1	54187 L-DISTP269.0 to 54189 L-RLITP269.0 CKT1	0
05SP	AEPW-WFEC	54140 S.W.S.-4 138 to 55814 ANADARK4 138 CKT 1	203	102.2	103.1	54189 L-RLITP269.0 to 56211 OMWALTR269.0 CKT1	0
08SP	AEPW-AEPW	53374 FULTON 3 115 to 53373 FULTON 4 138 CKT 1	184	113.4	113.4	53374 FULTON 3 115 to 53383 HOPE 3 115 CKT1	0
08SP	AEPW-AEPW	53383 HOPE 3 115 to 53374 FULTON 3 115 CKT 1	174	122.7	122.8	53373 FULTON 4 138 to 53374 FULTON 3 115 CKT1	0
08SP	AEPW-AEPW	53781 BA101-N4 138 to 53758 BA81---4 138 CKT 1	235	100.9	101.0	53797 BANNTAP4 138 to 53818 ONETA--4 138 CKT1	0
08SP	AEPW-AEPW	53818 ONETA--4 138 to 53781 BA101-N4 138 CKT 1	210	129.6	129.7	53785 RSSAUTO4 138 to 53794 R.S.S.-7 345 CKT1	0
08SP	AEPW-AEPW	53818 ONETA--4 138 to 53781 BA101-N4 138 CKT 1	210	106.5	106.6	53133 ECNTRTN5 161 to 53172 ECNTRTN7 345 CKT1	0
08SP	AEPW-AEPW	53818 ONETA--4 138 to 53781 BA101-N4 138 CKT 1	210	106.5	106.6	53140 FLINTCR7 345 to 53172 ECNTRTN7 345 CKT1	0
08SP	AEPW-AEPW	53818 ONETA--4 138 to 53781 BA101-N4 138 CKT 1	210	106.5	106.6	55869 CROMWEL4 138 to 56094 WEWOKA 4 138 CKT1	0
08SP	OKGE-OKGE	55235 PECANCK7 345 to 55234 PECANCK5 161 CKT 1	369	105.5	105.8	53756 CLARKSV7 345 to 55224 MUSKOGE7 345 CKT1	0