SPP Southwest Power Pool

System Impact Study SPP-2003-109 For Transmission Service Requested By: Tenaska Power Services

From CSWS to CSWS

For a Reserved Amount Of 620 and 1240 MW From 04/10/03 To 04/11/03

SPP Transmission Planning

Table of Contents

1. Executive Summary

Tenaska has requested a system impact study for Daily Firm transmission service from a source in CSWS to a sink CSWS. The period of the transaction is from 04/10/03 to 04/11/03. The request is for reservation 515572 and 515575 for the amount of 620 MW each.

The 620MW transaction from CSWS to CSWS has created new constraints on the PITSEMPITSUN and the MUSCLAMUSRSS flowgates. To provide the ATC necessary for this transfer, the impact on these flowgates must be relieved.

It has been determined that there is not sufficient time available to complete upgrades to the system that would relieve these flowgates.

After studying many scenarios using redispatch, there are feasible solutions that will relieve the flowgates in question. If Tenaska chooses a redispatch option(s), a written agreement between Tenaska and the generators must be supplied to SPP before acceptance of reservation.

2. Introduction

Tenaska has requested an impact study for transmission service from a source in CSWS to a sink in CSWS.

There are two constrained flowgates that need relief in order for this reservation to be accepted. The flowgates and their explanations are as follows:

- PITSEMPITSUN: Pittsburg to Seminole 345 KV line monitored for the loss of the Pittsburg to Sunnyside 345 KV line.

- MUSCLAMUSRSS: Muskogee to Clarksville 345 KV line monitored for the loss of the Muskogee to Riverside Station 345 KV line.

There are no facility upgrades available to relieve this flowgate that can be completed in the time period available. This impact study reviews redispatch as an option to relieving the transmission constraints.

3. Study Methodology

A. Description

Southwest Power Pool used the NERC Generator Sensitivity Factor (GSF) Viewer to obtain possible unit pairings that would relieve the constraint. The GSF viewer calculates impacts on monitored facilities for all units above 20MW in the Eastern Interconnection. The SPP ATC Calculator is used to determine response factors for the time period of the reservation.

B. Model Updates

The 2003 Southwest Power Pool model was used for the study. This model was updated to reflect the most current information available.

C. Transfer Analysis

Using the short-term calculator, the limiting constraints for the transfer are identified. The response factor of the transfer on each constraint is also determined.

The product of the transfer amount and the response factor is the impact of a transfer on a limiting flowgate that must be relieved. With multiple flowgates affected by a transfer, relief of all constraints is required.

Using the NERC Generator Sensitivity Factor (GSF) Viewer, specific generator pairs are chosen to reflect the units available for redispatch. The quotient of the amount of impact that must be relieved and the generation sensitivity factor calculated by the Viewer is the amount of redispatch necessary to relieve the impact on the affected flowgate.

4. Study Results

A 620 MW reservation from a source in CSWS to a sink in CSWS will constrain the PITESEMPITSUN flowgate by 152 MW and the MUSCLAMUSRSS flowgate by 28 MW.

A 1240 MW reservation from a source in CSWS to a sink in CSWS will constrain the PITSEMPITSUN flowgate by 350 MW and the MUSCLAMUSRSS flowgate by 132 MW.

Listed below are Generator Sensitivity Factors of generator pairs that have the greatest impact on the PITSEMPITSUN flowgate.

Source	Sink	GSF (PitSemPitSun)	GSF (MusClaMusRss)
CSWS_CALGT1-118.0_1	OKGE_MUSKOG4G18.0_1	-68.3	-5.5
CSWS_CALGT1-118.0_1	OKGE_MUSKOG5G18.0_1	-68.3	-5.5
CSWS_CALGT1-118.0_1	OKGE_MUSKOG6G24.0_1	-68.3	-5.5
CSWS_CALGT1-218.0_1	OKGE_MUSKOG6G24.0_1	-68.3	-5.5
CSWS_CALGT1-218.0_1	OKGE_MUSKOG4G18.0_1	-68.3	-5.5
CSWS_CALGT1-218.0_1	OKGE_MUSKOG5G18.0_1	-68.3	-5.5
CSWS_CALGT2-118.0_1	OKGE_MUSKOG5G18.0_1	-68.3	-5.5
CSWS_CALGT2-118.0_1	OKGE_MUSKOG6G24.0_1	-68.3	-5.5
CSWS_CALGT2-118.0_1	OKGE_MUSKOG4G18.0_1	-68.3	-5.5
CSWS_CALGT2-218.0_1	OKGE_MUSKOG4G18.0_1	-68.3	-5.5
CSWS_CALGT2-218.0_1	OKGE_MUSKOG5G18.0_1	-68.3	-5.5
CSWS_CALGT2-218.0_1	OKGE_MUSKOG6G24.0_1	-68.3	-5.5
CSWS_CALSTM 118.0_1	OKGE_MUSKOG6G24.0_1	-68.3	-5.5
CSWS_CALSTM 118.0_1	OKGE_MUSKOG4G18.0_1	-68.3	-5.5
CSWS_CALSTM 118.0_1	OKGE_MUSKOG5G18.0_1	-68.3	-5.5
CSWS_CALSTM 218.0_1	OKGE_MUSKOG5G18.0_1	-68.3	-5.5
CSWS_CALSTM 218.0_1	OKGE_MUSKOG6G24.0_1	-68.3	-5.5
CSWS_CALSTM 218.0_1	OKGE_MUSKOG4G18.0_1	-68.3	-5.5
CSWS_CO-GEN3 18.0_G	OKGE_MUSKOG4G18.0_1	-62.9	-6.8
CSWS_CO-GEN3 18.0_G	OKGE_MUSKOG5G18.0_1	-62.9	-6.8
CSWS_CO-GEN3 18.0_G	OKGE_MUSKOG6G24.0_1	-62.9	-6.8
CSWS_CO-GEN4 13.8_S	OKGE_MUSKOG6G24.0_1	-62.9	-6.8
CSWS_CO-GEN4 13.8_S	OKGE_MUSKOG4G18.0_1	-62.9	-6.8
CSWS_CO-GEN4 13.8_S	OKGE_MUSKOG5G18.0_1	-62.9	-6.8
CSWS_CO-GEN5 18.0_G	OKGE_MUSKOG5G18.0_1	-62.9	-6.8
CSWS_CO-GEN5 18.0_G	OKGE_MUSKOG6G24.0_1	-62.9	-6.8
CSWS_CO-GEN5 18.0_G	OKGE_MUSKOG4G18.0_1	-62.9	-6.8
CSWS_CO-GEN6 13.8_S	OKGE_MUSKOG4G18.0_1	-62.9	-6.8
CSWS_CO-GEN6 13.8_S	OKGE_MUSKOG5G18.0_1	-62.9	-6.8
CSWS_CO-GEN6 13.8_S	OKGE_MUSKOG6G24.0_1	-62.9	-6.8
CSWS_CALGT1-118.0_1	OKGE_AES 1G13.8_1	-40.7	-4.2
CSWS_CALGT1-118.0_1	OKGE_AES 2G13.8_1	-40.7	-4.2
CSWS_CALGT1-218.0_1	OKGE_AES 1G13.8_1	-40.7	-4.2
CSWS_CALGT1-218.0_1	OKGE_AES 2G13.8_1	-40.7	-4.2
CSWS_CALGT2-118.0_1	OKGE_AES 2G13.8_1	-40.7	-4.2
CSWS_CALGT2-118.0_1	OKGE_AES 1G13.8_1	-40.7	-4.2
CSWS_CALGT2-218.0_1	OKGE_AES 1G13.8_1	-40.7	-4.2
CSWS_CALGT2-218.0_1	OKGE_AES 2G13.8_1	-40.7	-4.2
CSWS_CALSTM 118.0_1	OKGE_AES 1G13.8_1	-40.7	-4.2
CSWS_CALSTM 118.0_1	OKGE_AES 2G13.8_1	-40.7	-4.2
CSWS_CALSTM 218.0_1	OKGE_AES 2G13.8_1	-40.7	-4.2
CSWS_CALSTM 218.0_1	OKGE_AES 1G13.8_1	-40.7	-4.2
CSWS_CALGT1-118.0_1	SPA_RSK1&2 113.8_1	-39.0	-3.7
CSWS_CALGT1-118.0_1	SPA_RSK3&4 113.8_4	-39.0	-3.7
CSWS_CALGT1-118.0_1	SPA_RSK1&2 113.8_2	-39.0	-3.7
CSWS_CALGT1-118.0_1	SPA_RSK3&4 113.8_3	-39.0	-3.7
CSWS_CALGT1-218.0_1	SPA_RSK3&4 113.8_3	-39.0	-3.7
CSWS_CALGT1-218.0_1	SPA_RSK1&2 113.8_1	-39.0	-3.7

CSWS_CALGT1-218.0_1	SPA_RSK3&4 113.8_4	-39.0	-3.7
CSWS_CALGT1-218.0_1	SPA_RSK1&2 113.8_2	-39.0	-3.7
CSWS_CALGT2-118.0_1	SPA_RSK1&2 113.8_2	-39.0	-3.7
CSWS_CALGT2-118.0_1	SPA_RSK3&4 113.8_3	-39.0	-3.7
CSWS_CALGT2-118.0_1	SPA_RSK1&2 113.8_1	-39.0	-3.7
CSWS_CALGT2-118.0_1	SPA_RSK3&4 113.8_4	-39.0	-3.7
CSWS_CALGT2-218.0_1	SPA_RSK1&2 113.8_1	-39.0	-3.7
CSWS_CALGT2-218.0_1	SPA_RSK3&4 113.8_4	-39.0	-3.7
CSWS_CALGT2-218.0_1	SPA_RSK1&2 113.8_2	-39.0	-3.7
CSWS_CALGT2-218.0_1	SPA_RSK3&4 113.8_3	-39.0	-3.7
CSWS_CALSTM 118.0_1	SPA_RSK3&4 113.8_3	-39.0	-3.7
CSWS_CALSTM 118.0_1	SPA_RSK1&2 113.8_1	-39.0	-3.7
CSWS_CALSTM 118.0_1	SPA_RSK3&4 113.8_4	-39.0	-3.7
CSWS_CALSTM 118.0_1	SPA_RSK1&2 113.8_2	-39.0	-3.7
CSWS_CALSTM 218.0_1	SPA_RSK1&2 113.8_2	-39.0	-3.7
CSWS_CALSTM 218.0_1	SPA_RSK3&4 113.8_3	-39.0	-3.7
CSWS_CALSTM 218.0_1	SPA_RSK1&2 113.8_1	-39.0	-3.7
CSWS_CALSTM 218.0_1	SPA_RSK3&4 113.8_4	-39.0	-3.7
CSWS_CO-GEN3 18.0_G	OKGE_AES 1G13.8_1	-35.3	-5.5
CSWS_CO-GEN3 18.0_G	OKGE_AES 2G13.8_1	-35.3	-5.5
CSWS_CO-GEN4 13.8_S	OKGE_AES 1G13.8_1	-35.3	-5.5
CSWS_CO-GEN4 13.8_S	OKGE_AES 2G13.8_1	-35.3	-5.5
CSWS_CO-GEN5 18.0_G	OKGE_AES 2G13.8_1	-35.3	-5.5
CSWS_CO-GEN5 18.0_G	OKGE_AES 1G13.8_1	-35.3	-5.5
CSWS_CO-GEN6 13.8_S	OKGE_AES 1G13.8_1	-35.3	-5.5
CSWS_CO-GEN6 13.8_S	OKGE_AES 2G13.8_1	-35.3	-5.5
CSWS_CO-GEN3 18.0_G	SPA_RSK1&2 113.8_1	-33.6	-5.0
CSWS_CO-GEN3 18.0_G	SPA_RSK3&4 113.8_4	-33.6	-5.0
CSWS_CO-GEN3 18.0_G	SPA_RSK1&2 113.8_2	-33.6	-5.0
CSWS_CO-GEN3 18.0_G	SPA_RSK3&4 113.8_3	-33.6	-5.0
CSWS_CO-GEN4 13.8_S	SPA_RSK3&4 113.8_3	-33.6	-5.0
CSWS_CO-GEN4 13.8_S	SPA_RSK1&2 113.8_1	-33.6	-5.0
CSWS_CO-GEN4 13.8_S	SPA_RSK3&4 113.8_4	-33.6	-5.0
CSWS_CO-GEN4 13.8_S	SPA_RSK1&2 113.8_2	-33.6	-5.0
CSWS_CO-GEN5 18.0_G	SPA_RSK1&2 113.8_2	-33.6	-5.0
CSWS_CO-GEN5 18.0_G	SPA_RSK3&4 113.8_3	-33.6	-5.0
CSWS_CO-GEN5 18.0_G	SPA_RSK1&2 113.8_1	-33.6	-5.0
CSWS_CO-GEN5 18.0_G	SPA_RSK3&4 113.8_4	-33.6	-5.0
CSWS_CO-GEN6 13.8_S	SPA_RSK1&2 113.8_1	-33.6	-5.0
CSWS_CO-GEN6 13.8_S	SPA_RSK3&4 113.8_4	-33.6	-5.0
CSWS_CO-GEN6 13.8_S	SPA_RSK1&2 113.8_2	-33.6	-5.0
CSWS_CO-GEN6 13.8_S	SPA_RSK3&4 113.8_3	-33.6	-5.0

Listed below are Generator Sensitivity Factors of generator pairs that have the greatest impact on the MUSCLAMUSRSS flowgate.

Source	Sink	GSF (MusClaMusRss)	GSF (PitSemPitSun)
OKGE_SEMINL2G17.1_1	CSWS_WELSH1-118.0_1	-47.6	-6.3
OKGE_SEMINL3G20.9_1	CSWS_WELSH3-118.0_1	-47.6	-6.3
OKGE_SEMINL3G20.9_1	CSWS_WELSH1-118.0_1	-47.6	-6.3
OKGE_SEMINL2G17.1_1	CSWS_WELSH3-118.0_1	-47.6	-6.3
OKGE_SEMINL2G17.1_1	CSWS_CONGAS2 18.0_1	-47.1	-6.3
OKGE_SEMINL3G20.9_1	CSWS_CONGAS1 18.0_1	-47.1	-6.3
OKGE_SEMINL2G17.1_1	CSWS_CONSTM1 13.8_1	-47.1	-6.3
OKGE_SEMINL3G20.9_1	CSWS_CONGAS2 18.0_1	-47.1	-6.3
OKGE_SEMINL2G17.1_1	CSWS_CONGAS1 18.0_1	-47.1	-6.3
OKGE_SEMINL3G20.9_1	CSWS_CONSTM1 13.8_1	-47.1	-6.3
OKGE_SEMINL3G20.9_1	CSWS_LONSTAR269.0_1	-46.3	-6.2
OKGE_SEMINL2G17.1_1	CSWS_LONSTAR269.0_1	-46.3	-6.2
OKGE_SEMINL2G17.1_1	CSWS_WILKE2-121.0_1	-46.1	-6.2
OKGE_SEMINL3G20.9_1	CSWS_WILKE2-121.0_1	-46.1	-6.2
OKGE_SEMINL3G20.9_1	CSWS_WILKE3-122.0_1	-45.9	-6.2
OKGE_SEMINL2G17.1_1	CSWS_WILKE3-122.0_1	-45.9	-6.2
OKGE_TINKER5G13.8_1	CSWS_WELSH1-118.0_1	-39.5	-8.9
OKGE_TINKER5G13.8_2	CSWS_WELSH3-118.0_1	-39.5	-8.9
OKGE_TINKER5G13.8_2	CSWS_WELSH1-118.0_1	-39.5	-8.9
OKGE_TINKER5G13.8_1	CSWS_WELSH3-118.0_1	-39.5	-8.9
MCLN_DUKE 118.0_1	CSWS_WELSH3-118.0_1	-39.2	-8.7
MCLN_DUKE 318.0_1	CSWS_WELSH1-118.0_1	-39.2	-8.7
MCLN_DUKE 118.0_1	CSWS_WELSH1-118.0_1	-39.2	-8.7
MCLN_DUKE 218.0_1	CSWS_WELSH3-118.0_1	-39.2	-8.7
MCLN_DUKE 218.0_1	CSWS_WELSH1-118.0_1	-39.2	-8.7
MCLN_DUKE 318.0_1	CSWS_WELSH3-118.0_1	-39.2	-8.7
OKGE_TINKER5G13.8_1	CSWS_CONGAS2 18.0_1	-39.0	-8.9
OKGE_TINKER5G13.8_2	CSWS_CONGAS1 18.0_1	-39.0	-8.9
OKGE_TINKER5G13.8_1	CSWS_CONSTM1 13.8_1	-39.0	-8.9
OKGE_TINKER5G13.8_2	CSWS_CONGAS2 18.0_1	-39.0	-8.9
OKGE_TINKER5G13.8_1	CSWS_CONGAS1 18.0_1	-39.0	-8.9
OKGE_TINKER5G13.8_2	CSWS_CONSTM1 13.8_1	-39.0	-8.9
MCLN_DUKE 118.0_1	CSWS_CONGAS1 18.0_1	-38.7	-8.7
MCLN_DUKE 218.0_1	CSWS_CONSTM1 13.8_1	-38.7	-8.7
MCLN_DUKE 318.0_1	CSWS_CONGAS2 18.0_1	-38.7	-8.7
MCLN_DUKE 118.0_1	CSWS_CONGAS2 18.0_1	-38.7	-8.7
MCLN_DUKE 218.0_1	CSWS_CONGAS1 18.0_1	-38.7	-8.7
MCLN_DUKE 318.0_1	CSWS_CONSTM1 13.8_1	-38.7	-8.7
MCLN_DUKE 118.0_1	CSWS_CONSTM1 13.8_1	-38.7	-8.7
MCLN_DUKE 218.0_1	CSWS_CONGAS2 18.0_1	-38.7	-8.7
MCLN_DUKE 318.0_1	CSWS_CONGAS1 18.0_1	-38.7	-8.7
OKGE_SMITH 1G13.8_1	CSWS_WELSH3-118.0_1	-38.6	-9.2
OKGE_SMITH 1G13.8_1	CSWS_WELSH1-118.0_1	-38.6	-9.2
OKGE_MUSTNG4G20.9_1	CSWS_WELSH3-118.0_1	-38.5	-9.3
OKGE_MUSTNG4G20.9_1	CSWS_WELSH1-118.0_1	-38.5	-9.3
OKGE_TINKER5G13.8_2	CSWS_LONSTAR269.0_1	-38.2	-8.8
OKGE_TINKER5G13.8_1	CSWS_LONSTAR269.0_1	-38.2	-8.8
OKGE_SMITH 1G13.8_1	CSWS_CONSTM1 13.8_1	-38.1	-9.2
OKGE_SMITH 1G13.8_1	CSWS_CONGAS1 18.0_1	-38.1	-9.2
OKGE_SMITH 1G13.8_1	CSWS_CONGAS2 18.0_1	-38.1	-9.2
OKGE_MUSTNG4G20.9_1	CSWS_CONGAS1 18.0_1	-38.0	-9.2
OKGE_MUSTNG4G20.9_1	CSWS_CONGAS2 18.0_1	-38.0	-9.2
OKGE_TINKER5G13.8_1	CSWS_WILKE2-121.0_1	-38.0	-8.8
OKGE_TINKER5G13.8_2	CSWS_WILKE1-120.0_1	-38.0	-8.8
OKGE_MUSTNG4G20.9_1	CSWS_CONSTM1 13.8_1	-38.0	-9.2
OKGE_TINKER5G13.8_2	CSWS_WILKE2-121.0_1	-38.0	-8.8
MCLN_DUKE 118.0_1	CSWS_LONSTAR269.0_1	-37.9	-8.6
MCLN_DUKE 218.0_1	CSWS_LONSTAR269.0_1	-37.9	-8.6
MCLN_DUKE 318.0_1	CSWS_LONSTAR269.0_1	-37.9	-8.6
OKGE_TINKER5G13.8_2	CSWS_WILKE3-122.0_1	-37.8	-8.8
OKGE_TINKER5G13.8_1	CSWS_WILKE3-122.0_1	-37.8	-8.8
MCLN_DUKE 218.0_1	CSWS_WILKE2-121.0_1	-37.7	-8.6
MCLN_DUKE 318.0_1	CSWS_WILKE2-121.0_1	-37.7	-8.6

MCLN_DUKE 118.0_1	CSWS_WILKE2-121.0_1	-37.7	-8.6
MCLN_DUKE 118.0_1	CSWS_WILKE3-122.0_1	-37.5	-8.6
MCLN_DUKE 218.0_1	CSWS_WILKE3-122.0_1	-37.5	-8.6
MCLN_DUKE 318.0_1	CSWS_WILKE3-122.0_1	-37.5	-8.6
OKGE_SMITH 1G13.8_1	CSWS_LONSTAR269.0_1	-37.3	-9.1
OKGE_MUSTNG4G20.9_1	CSWS_LONSTAR269.0_1	-37.2	-9.1
OKGE_SMITH 1G13.8_1	CSWS_WILKE2-121.0_1	-37.1	-9.1
OKGE_MUSTNG4G20.9_1	CSWS_WILKE2-121.0_1	-37.0	-9.1
OKGE_SMITH 1G13.8_1	CSWS_WILKE3-122.0_1	-36.9	-9.1
OKGE_MUSTNG4G20.9_1	CSWS_WILKE3-122.0_1	-36.8	-9.1

5. Conclusion

Redispatch options were investigated in this study to relieve the constraints necessary. The results of the study showed that the constraints on the flowgates in question could be relieved via redispatch. Therefore, the request for daily service from a source in CSWS to a sink in CSWS will be accepted if appropriate redispatch options are obtained by Tenaska and communicated to SPP as previously described.