



SPP

*Southwest
Power Pool*

***System Impact Study SPP-2002-171
For Transmission Service
Requested By
Calpine Energy Services L.P.***

From CSWS to WR

***For a Reserved Amount Of 200MW
From 9/15/02
To 10/15/02***

SPP Transmission Planning

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1. Executive Summary

Calpine Energy Services L.P. has requested a system impact study for Monthly Firm transmission service from CSWS to WR. The period of the transaction is from 9/15/02 to 10/15/02. The request is for reservation 413058 for the amount of 200MW.

The 200MW transaction from CSWS to WR has a positive response on the following flowgates:

- Cooper to St. Joe, Cooper to Fairport (COOPER_S),
- Dolet Hills Transformer, Eldorado Transformer (DOLXFRELDXFR),
- Kildare to Creswell, Woodring to Wichita (KILCREWOOWIC),
- La Cygne to Stilwell, La Cygne to West Gardner (LACSTILACWGR),
- N.W. Texarkana to Patterson, Lydia to Valliant (NWTPATLYDVAL), and
- St. Joe to Hawthorne, Lake Rd. to Nashua, Iatan to Stranger Creek (STJLAKIATSTR).

To provide the ATC that is 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 any upgrades to the system that would relieve these flowgates.

Redispatch was looked at as an option to relieving the impact on these flowgates caused by the 200MW transfer.

Redispatch of Customer specified units will not simultaneously relieve all of the flowgates impacted by the 200MW CSWS to WR transfer. Therefore, the request for monthly service from CSWS to WR will be refused.

2. Introduction

Calpine Energy Services L.P. has requested an impact study for transmission service from CSWS to WR.

The Cooper to St. Joe, Cooper to Fairport flowgate (COOPER_S) has been identified as a limiting constraint for the CSWS to WR transfer. For this flowgate, the Cooper to St. Joe, 345kV line is monitored during the loss of the Cooper to Fairport, 345kV line. It has been determined that the 200MW transfer from CSWS to WR will cause the Cooper to St. Joe line to overload should the loss of the Cooper to Fairport line occur.

The Dolet Hills Transformer, Eldorado Transformer flowgate (DOLXFRELDXFR) has been identified as a limiting constraint for the CSWS to WR transfer. For this flowgate, the Dolet Hills Transformer is monitored during the loss of the Eldorado Transformer. It has been determined that the 200MW transfer from CSWS to WR will cause the Dolet Hills Transformer to overload should the loss of the Eldorado Transformer occur.

The Kildare to Creswell, Woodring to Wichita flowgate (KILCREWOOWIC) has been identified as a limiting constraint for the CSWS to WR transfer. For this flowgate, the Kildare to Creswell, 138kV line is monitored during the loss of the Woodring to Wichita, 345kV line. It has been determined that the 200MW transfer from CSWS to WR will cause the Kildare to Creswell line to overload should the loss of the Woodring to Wichita line occur.

The La Cygne to Stillwell, La Cygne to West Gardner flowgate has been identified as a limiting constraint for the CSWS to WR transfer. For this flowgate, the La Cygne to Stillwell, 345kV line is monitored during the loss of the La Cygne to West Gardner, 345kV line. It has been determined that the 200MW transfer from CSWS to WR will cause the La Cygne to Stillwell line to overload should the loss of the La Cygne to West Gardner line occur.

The N.W. Texarkana to Patterson, Lydia to Valliant flowgate (NWTPATLYDVAL) has been identified as a limiting constraint for the CSWS to WR transfer. For this flowgate, the N.W. Texarkana to Patterson, 138kV line is monitored during the loss of the Lydia to Valliant, 345kV line. It has been determined that the 200MW transfer from CSWS to WR will cause the N.W. Texarkana to Patterson line to overload should the loss of the Lydia to Valliant line occur.

The St. Joe to Hawthorne, Lake Rd. to Nashua, Iatan to Stranger Creek flowgate (STJLAKIATSTR) has been identified as a limiting constraint for the CSWS to WR transfer. For this flowgate, the St. Joe to Hawthorne, 345kV line is monitored during the loss of the Lake Rd. to Nashua, 161kV line and the Iatan to Stranger Creek, 345kV line. It has been determined that the 200MW transfer from CSWS to WR will cause the St. Joe to Hawthorne line to overload should the loss of the Lake Rd. to Nashua line and the Iatan to Stranger Creek line occur.

There are no facility upgrades available to relieve these flowgates 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 constrained flowgates are included in the flowgate list. The SPP ATC Calculator is used to determine response factors for the time period of the reservation.

B. Model Updates

The 2002 Southwest Power Pool Summer Peak and Fall models were used for the study. These models were 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 sensitivity factor of the transfer on each constraint is also determined.

The product of the transfer amount and the sensitivity factor is the impact of a transfer on a limiting flowgate that must be relieved. With multiple flowgates affected by a transfer, relief of the largest impact will also provide relief of smaller impacts.

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

NERC calculates shift factors on specified facilities for all generation units over 20MW in the Eastern Interconnection. These generation shift factors were reviewed for impacts on the constrained flowgates for the redispatch assessment. The Customer requested that the Gill and Evans Energy Center units be used in conjunction with the Oneta units. Units with negative impacts will reduce flows when unit output is increased. The generators with positive impacts will increase flows when unit output is increased and reduce flows

when unit output is decreased. The units are identified on the NERC GSF Viewer as follows:

- Gill Energy Center units—WR_GEC U1 12.5_1, WR_GEC U2 12.5_1, WR_GEC U3 14.4_1, and WR_GEC U4 14.4_1
- Evans Energy Center units—WR_EEC GT1 13.8_1, WR_EEC GT2 13.8_1, WR_EEC GT3 18.8_1, WR_EEC U1 16.0_1 and WR_EEC U2 24.0_1
- Oneta Energy Center units—CSWS_OECGT1-118.0_1, CSWS_OECGT1-218.0_1, CSWS_OECGT2-118.0_1, CSWS_OECGT2-218.0_1, CSWS_OECSTM-118.0_1, and CSWS_OECSTM-218.0_1

The products of the sensitivity factors generated by the SPP ATC Calculator and the transfer amount result in the impact of the transfer on flowgates. For the constrained flowgates, the following impacts were calculated:

- COOPER_S = 15MW
- DOLXFRELDXFR = 20.2MW
- KILCREWOOWIC = 19.6MW
- LACSTILACWGR = 31.4MW
- NWTPATLYDVAL = 11.8MW
- STJLAKIATSTR = 22MW

As seen in the following tables generated by the NERC GSF Viewer, this pairing of generators will not simultaneously provide for the relief of these impacts. With any Gill or Evans Energy Center unit as the source and any Oneta Energy Center unit as the sink, the sensitivity factor for that unit pair ranges from negative to near zero to positive for the different flowgates. To relieve the impact on both the LACSTILACWGR flowgate and the KILCREWOOWIC flowgate would require simultaneously increment and decrement on the same unit---increasing generation at Gill or Evans and decreasing generation at Oneta for LACSTILACWGR and decreasing generation at Gill or Evans and increasing generation at Oneta for KILCREWOOWIC. It is not possible for the same dispatch to provide the relief necessary for this transfer.

The generation sensitivity factors for these generation pairs are displayed in the following tables. Only one unit from each unit family is displayed.

Table 1: Generation Shift Factor for Oneta units (decrease) and Gill or Evans units (increase) for COOPER_S Flowgate

Report Criteria		
Report Type:	Transaction Pair	
Limiting Flowgate:	COOPER_S (From->To) : 6009 Source: WR_GEC U1 12.5_1 Sink: CSWS_OECGT1-118.0_1	
Options:		
	Source	Sink
WR_GEC U1 12.5_1	CSWS_OECGT1-118.0_1	-3.3

Table 2 Generation Shift Factor for Oneta units (decrease) and Gill or Evans units (increase) for DOLXFRELDXFR Flowgate

Report Criteria		
Report Type:	Transaction Pair	
Limiting Flowgate:	OTDF_DoIXfrEldXfr (From->To) : 5090 Source: WR_GEC U1 12.5_1 Sink: CSWS_OECGT1-118.0_1	
Options:		
	Source	Sink
WR_GEC U1 12.5_1	CSWS_OECGT1-118.0_1	-0.7

Table 3 Generation Shift Factor for Oneta units (decrease) and Gill or Evans units (increase) for KILCREWOOVIC Flowgate

Report Criteria		
Report Type:	Transaction Pair	
Limiting Flowgate:	OTDF_KilCreWooWic (From->To) : 5021 Source: WR_GEC U1 12.5_1 Sink: CSWS_OECGT1-118.0_1	
Options:		
	Source	Sink
WR_GEC U1 12.5_1		CSWS_OECGT1-118.0_1
		Factor
		-13.8

Table 4 Generation Shift Factor for Oneta units (decrease) and Gill or Evans units (increase) for LACSTILACWGR Flowgate

Report Criteria		
Report Type:	Transaction Pair	
Limiting Flowgate:	OTDF_LacStiLacWgr (From->To) : 5023 Source: WR_GEC U1 12.5_1 Sink: CSWS_OECGT1-118.0_1	
Options:		
	Source	Sink
WR_GEC U1 12.5_1		CSWS_OECGT1-118.0_1
		Factor
		5.5

Table 5 Generation Shift Factor for Oneta units (decrease) and Gill or Evans units (increase) for NWTPTALYDVAL Flowgate

Report Criteria		
Report Type:	Transaction Pair	
Limiting Flowgate:	OTDF_NwtPatLydVal (From->To) : 5042 Source: WR_GEC U1 12.5_1 Sink: CSWS_OECGT1-118.0_1	
Options:		
	Source	Sink
WR_GEC U1 12.5_1		CSWS_OECGT1-118.0_1
		Factor
		0.3

Table 6 Generation Shift Factor for Oneta units (decrease) and Gill or Evans units (increase) for STJLAKIATSTR Flowgate

Report Criteria		
Report Type:	Transaction Pair	
Limiting Flowgate:	OTDF_StjLaklatStr (From->To) : 5050 Source: WR_GEC U1 12.5_1 Sink: CSWS_OECGT1-118.0_1	
Options:		
	Source	Sink
WR_GEC U1 12.5_1		CSWS_OECGT1-118.0_1
		Factor
		-2.8

5. Conclusion

The Customer requested specific generators be used in the analysis of this request. Redispatch of those units will not simultaneously relieve all of the flowgates impacted by the 200MW CSWS to WR transfer. Therefore, the request for monthly service from CSWS to WR will be refused.