



SPP *Southwest Power Pool*

***System Impact Study
SPP-2007-005
For Transmission Service
Requested By:
American Electric Power***

From EES to AEPW

***For a Reserved Amount Of
225 MW
From 06/01/07
To 01/01/08***

1. Executive Summary

American Electric Power has requested a system impact study for monthly firm transmission service from EES to AEPW. The period of the transaction is from 06/01/2007 to 01/01/2008. The request is for reservation 1223331.

The 225 MW transaction from EES to AEPW has an impact on the following flowgates with no AFC: MUSCLAMUSRSS, NESONENESTUL, FTSXFR500345, RUSDARANOFTS, WDRCIMSPRNRW, MANIPMDOLSWS, and DANMAGANOFTS. To provide the AFC necessary for this transfer, the impact on these flowgates must be relieved.

After studying many scenarios using generation redispatch, there are several feasible scenarios that will relieve the flowgate(s) in question.

2. Introduction

American Electric Power has requested a system impact study for transmission service from EES to AEPW.

There are seven constrained flowgates that require relief in order for this reservation to be accepted. The flowgates and the explanations are as follows:

- MUSCLAMUSRSS: Muskogee to Clarksville 345 kV line for the loss of Muskogee to Riverside 345 kV line
- NESONENESTUL: Northeast Station to Oneta 345 kV line for the loss of Northeast Station to Tulsa North 345 kV line
- FTSXFR500345: Fort Smith 500/161kV transformer for the loss of Fort Smith 500/345 kV transformer
- RUSDARANOFTS: Russellville to Dardanelle 161kV line for the loss of Arkansas Nuclear One to Fort Smith 500 kV line
- WDRCIMSPRNRW: Woodring to Cimarron 345 kV line for the loss of Spring Creek to Northwest Station 345 kV line.
- MANIPMDOLSWS: Mansfield to International Paper 138 kV line for the loss of Dolet Hills to S.W. Shreveport 345 kV line
- DANMAGANOFTS: Danville to Magazine 161 kV line for the loss of Arkansas Nuclear One to Fort Smith 500 kV line

3. Study Methodology

A. Description

Southwest Power Pool used Managing and Utilizing System Transmission (MUST) to obtain possible unit pairings that would relieve the constraint. MUST calculates impacts on monitored facilities for all units within the Southwest Power Pool Footprint. The SPP ATC Calculator is used to determine response factors for the time period of the reservation.

B. Model Updates

The 2006 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 the largest impact may also provide relief of smaller impacts.

Using Managing and Utilizing System Transmission (MUST), 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 MUST is the amount of redispatch necessary to relieve the impact on the affected flowgate.

4. Study Results

After studying the impacts of the request, seven flowgates require relief. The flowgates and associated amount of relief are as follows:

Table 1

Flowgates	Sensitivity (%)	Duration	Required Relief (MW)
MUSCLAMUSRSS	5.3	06/01/07 – 01/01/08	12
NESONENESTUL	4.5	06/01/07 – 01/01/08	10
FTSXFR500/345	6.3	06/01/07 – 01/01/08	14
RUSDARANOFTS	7.1	06/01/07 – 01/01/08	16
WDRCIMSPRNRW	3.8	06/01/07 – 01/01/08	9
MANIPMDOLSWS	7.6	06/01/07 – 01/01/08	17
DANMAGANOFTS	4.2	06/01/07 – 01/01/08	9

Tables 2 and 3 in conjunction display a list of generator pairs that are possible relief options for the flowgates in question.

Table 2

Source	Sink	MUSCLAMURSS Sensitivity (%)	NESONENESTUL Sensitivity (%)	FTSXFR500345 Sensitivity (%)
NES (AEPW)	Welsh (AEPW)	22.7	-	14.2
NES (AEPW)	Wilkes (AEPW)	22.5	-	15.1
NES (AEPW)	Arsenal Hill (AEPW)	-	-	16.4
NES (AEPW)	Dolet Hills (AEPW)	22.2	-	17.2
NES (AEPW)	Pirkey (AEPW)	22.5	-	15.4
RSS (AEPW)	Welsh (AEPW)	24.8	9.0	15.3
RSS (AEPW)	Wilkes (AEPW)	24.7	9.1	16.2
RSS (AEPW)	Arsenal Hill (AEPW)	-	9.3	17.5
RSS (AEPW)	Dolet Hills (AEPW)	24.4	-	18.3
RSS (AEPW)	Pirkey (AEPW)	24.6	9.2	16.6
TPS (AEPW)	Welsh (AEPW)	25.1	8.7	15.2
TPS (AEPW)	Wilkes (AEPW)	24.9	8.8	16.1
TPS (AEPW)	Arsenal Hill (AEPW)	24.7	9.0	17.4
TPS (AEPW)	Dolet Hills (AEPW)	24.6	-	18.2
TPS (AEPW)	Pirkey (AEPW)	24.9	8.8	16.4
TPS (AEPW)	SWS (AEPW)	-	10.0	-

Table 3

Source	Sink	RUSDARANOFTS Sensitivity (%)	WDRCIMSPNRW Sensitivity (%)	MANIPMDOLSWS Sensitivity (%)	DANMAGANOFTS Sensitivity (%)
Wilkes (AEPW)	SWS (AEPW)	-	-	6.3	-
Welsh (AEPW)	SWS (AEPW)	-	-	5.7	-
Welsh (AEPW)	NES (AEPW)	-	6.3	6.7	-
Wilkes (AEPW)	NES (AEPW)	-	6.1	7.3	-
Wilkes (AEPW)	RSS (AEPW)	-	2.0	7.1	-
Commanche (AEPW)	Welsh (AEPW)	6.6	12.0	-	4.1
Commanche (AEPW)	Wilkes (AEPW)	7.0	12.4	-	4.1
Commanche (AEPW)	Arsenal Hill (AEPW)	-	13.2	-	4.6
Commanche (AEPW)	Dolet Hills (AEPW)	8.2	-	-	-
Commanche (AEPW)	Pirkey (AEPW)	7.2	-	-	4.2
Commanche (AEPW)	NES (AEPW)	-	18.3	-	-
NES (AEPW)	Welsh (AEPW)	8.1	-	-	4.6
NES (AEPW)	Wilkes (AEPW)	8.6	-	-	4.9
NES (AEPW)	Arsenal Hill (AEPW)	-	-	-	5.6
NES (AEPW)	Dolet Hills (AEPW)	9.7	-	-	-
NES (AEPW)	Pirkey (AEPW)	8.8	-	-	5.3
NES (AEPW)	Knox Lee (AEPW)	7.8	-	-	5.0
RSS (AEPW)	Welsh (AEPW)	8.4	-	-	5.3
RSS (AEPW)	Wilkes (AEPW)	8.9	-	-	5.6
SWS (AEPW)	Wilkes (AEPW)	6.1	11.0	-	4.3
SWS (AEPW)	NES (AEPW)	-	17.0	-	-
SWS (AEPW)	Welch (AEPW)	5.7	10.4	-	4.0
RSS (AEPW)	Arsenal Hill (AEPW)	8.8	-	-	5.9
RSS (AEPW)	Dolet Hills (AEPW)	10.1	-	-	-
RSS (AEPW)	Pirkey (AEPW)	9.1	-	-	5.6
TPS (AEPW)	Welsh (AEPW)	8.4	-	-	5.2
TPS (AEPW)	Wilkes (AEPW)	8.9	-	-	5.5

TPS (AEPW)	Arsenal Hill (AEPW)	-	-	-	5.9
TPS (AEPW)	Dolet Hills (AEPW)	10.0	-	-	-
TPS (AEPW)	Pirkey (AEPW)	9.1	-	-	5.6

Tables 4 and 5 in conjunction display the amount of redispach capacity necessary for each generator pair.

Table 4

Source	Sink	MUSCLAMUSRSS Relief (MW)	NESONENESTUL Relief (MW)	FTSXFR500345 Relief (MW)
NES (AEPW)	Welsh (AEPW)	53	-	99
NES (AEPW)	Wilkes (AEPW)	53	-	93
NES (AEPW)	Arsenal Hill (AEPW)	-	-	85
NES (AEPW)	Dolet Hills (AEPW)	53	-	81
NES (AEPW)	Pirkey (AEPW)	53	-	91
RSS (AEPW)	Welsh (AEPW)	48	111	92
RSS (AEPW)	Wilkes (AEPW)	49	110	86
RSS (AEPW)	Arsenal Hill (AEPW)	-	108	80
RSS (AEPW)	Dolet Hills (AEPW)	49	-	77
RSS (AEPW)	Pirkey (AEPW)	49	109	84
TPS (AEPW)	Welsh (AEPW)	48	115	92
TPS (AEPW)	Wilkes (AEPW)	48	114	87
TPS (AEPW)	Arsenal Hill (AEPW)	49	111	80
TPS (AEPW)	Dolet Hills (AEPW)	49	-	77
TPS (AEPW)	Pirkey (AEPW)	48	114	85
TPS (AEPW)	SWS (AEPW)	-	100	-

Table 5

Source	Sink	RUSDARANOFTS Relief (MW)	WDRCIMSPRNRW Relief (MW)	MANIPMDOLSWS Relief (MW)	DANMAGANOFTS Relief (MW)
Wilkes (AEPW)	SWS (AEPW)	-	-	270	-
Welsh (AEPW)	SWS (AEPW)	-	-	298	-
Welsh (AEPW)	NES (AEPW)	-	143	254	-
Wilkes (AEPW)	NES (AEPW)	-	148	233	-
Wilkes (AEPW)	RSS (AEPW)	-	450	239	-
Commanche (AEPW)	Welsh (AEPW)	242	75	-	219
Commanche (AEPW)	Wilkes (AEPW)	229	73	-	219
Commanche (AEPW)	Arsenal Hill (AEPW)	-	68	-	196
Commanche (AEPW)	Dolet Hills (AEPW)	195	-	-	-
Commanche (AEPW)	Pirkey (AEPW)	222	-	-	214
Commanche (AEPW)	NES (AEPW)	-	49	-	-
NES (AEPW)	Welsh (AEPW)	198	-	-	196
NES (AEPW)	Wilkes (AEPW)	186	-	-	184
NES (AEPW)	Arsenal Hill (AEPW)	-	-	-	161
NES (AEPW)	Dolet Hills (AEPW)	165	-	-	-
NES (AEPW)	Pirkey (AEPW)	182	-	-	170
NES (AEPW)	Knox Lee (AEPW)	205	-	-	180
RSS (AEPW)	Welsh (AEPW)	190	-	-	170
RSS (AEPW)	Wilkes (AEPW)	180	-	-	161
SWS (AEPW)	Wilkes (AEPW)	262	82	-	209
SWS (AEPW)	NES (AEPW)	-	53	-	-

SWS (AEPW)	Welch (AEPW)	281	87	-	225
RSS (AEPW)	Arsenal Hill (AEPW)	182	-	-	153
RSS (AEPW)	Dolet Hills (AEPW)	158	-	-	-
RSS (AEPW)	Pirkey (AEPW)	175	-	-	161
TPS (AEPW)	Welsh (AEPW)	190	-	-	173
TPS (AEPW)	Wilkes (AEPW)	180	-	-	164
TPS (AEPW)	Arsenal Hill (AEPW)	-	-	-	153
TPS (AEPW)	Dolet Hills (AEPW)	160	-	-	-
TPS (AEPW)	Pirkey (AEPW)	176	-	-	161

5. Conclusion

Reservation curtailment and generation redispatch options were studied in order to relieve the necessary constraint. The results of this study shows that the constraints on the flowgates in question could be relieved by executing one or more of the options described in the Study Results section of this document. Before the Transmission Provider accepts the reservations, proof of the necessary relief options must be presented to Southwest Power Pool. Noncompliance with this guideline will result in the refusal of the reservation.