



**SPP**

*Southwest  
Power Pool*

***System Impact Study  
SPP-2007-001  
For Transmission Service  
Requested By:  
American Electric Power***

***From EES to AEPW***

***For a Reserved Amount Of  
225 MW  
From 01/05/07  
To 06/01/07***

## **1. Executive Summary**

American Electric Power has requested a system impact study for weekly and monthly firm transmission service from EES to AEPW. The combined period of the transactions are from 01/05/2007 to 06/01/2007. The requests are for reservations 1205950, 1205955, and 1205958.

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

After studying many scenarios using curtailment of reservations and 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 five 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 345kV line for the loss of Muskogee to Riverside 345kV line
- FLCXFRFLCXFR: Flint Creek 161/345 KV transformer for the loss of the second Flint Creek 161/345 KV transformer
- RUSDARANOFTS: Russellville to Dardanelle 161kV line for the loss of Arkansas Nuclear One to Fort Smith 500kV 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 requests 1205950, 1205955, and 1205958, five flowgates require relief. The flowgates and associated amount of relief are as follows:

**Table 1**

<b>Flowgates</b>	<b>Sensitivity (%)</b>	<b>Duration</b>	<b>Required Relief (MW)</b>
MUSCLAMUSRSS	13.0	01/05/07 – 06/01/07	29
FLCXFRFLCXFR	8.0	01/05/07 – 06/01/07	18
RUSDARANOFTS	10.1	01/05/07 – 06/01/07	23
MANIPMDOLSWS	5.9	01/05/07 – 06/01/07	13
DANMAGANOFTS	5.8	01/05/07 – 06/01/07	13

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	MUSCLAMUSRSS Sensitivity (%)	FLCXFRFLCXFR Sensitivity (%)
Flint Creek (AEPW)	NES (AEPW)	-	42.5
Flint Creek (AEPW)	TPS (AEPW)	-	40.7
Flint Creek (AEPW)	RSS (AEPW)	-	40.3
Flint Creek (AEPW)	SWS (AEPW)	-	40.2
Flint Creek (AEPW)	Arsenal Hill (AEPW)	-	39.8
NES (AEPW)	Welsh (AEPW)	22.7	-
NES (AEPW)	Wilkes (AEPW)	22.5	-
NES (AEPW)	Arsenal Hill (AEPW)	-	-
NES (AEPW)	Dolet Hills (AEPW)	22.2	-
NES (AEPW)	Pirkey (AEPW)	22.5	-
RSS (AEPW)	Welsh (AEPW)	24.8	-
RSS (AEPW)	Wilkes (AEPW)	24.7	-
RSS (AEPW)	Arsenal Hill (AEPW)	-	-
RSS (AEPW)	Dolet Hills (AEPW)	24.4	-
RSS (AEPW)	Pirkey (AEPW)	24.6	-
TPS (AEPW)	Welsh (AEPW)	<b>25.1</b>	-
TPS (AEPW)	Wilkes (AEPW)	24.9	-
TPS (AEPW)	Arsenal Hill (AEPW)	24.7	-
TPS (AEPW)	Dolet Hills (AEPW)	24.6	-
TPS (AEPW)	Pirkey (AEPW)	24.9	-

**Table 3**

Source	Sink	RUSDARANOFTS Sensitivity (%)	MANIPMDOLSWS Sensitivity (%)	DANMAGANOFTS Sensitivity (%)
Wilkes (AEPW)	SWS (AEPW)	-	6.3	-
Welsh (AEPW)	SWS (AEPW)	-	5.7	-
Welch (AEPW)	NES (AEPW)	-	6.7	-
Wilkes (AEPW)	NES (AEPW)	-	7.3	-
Wilkes (AEPW)	RSS (AEPW)	-	7.1	-
Commanche (AEPW)	Welsh (AEPW)	6.6	-	4.1
Commanche (AEPW)	Wilkes (AEPW)	7.0	-	4.1
Commanche (AEPW)	Arsenal Hill (AEPW)	-	-	4.6
Commanche (AEPW)	Dolet Hills (AEPW)	8.2	-	-
Commanche (AEPW)	Pirkey (AEPW)	7.2	-	4.2
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
RSS (AEPW)	Welsh (AEPW)	8.4	-	5.3
RSS (AEPW)	Wilkes (AEPW)	8.9	-	5.6
SWS (AEPW)	Wilkes (AEPW)	6.1	-	4.3
SWS (AEPW)	Welch (AEPW)	5.7	-	4.0
NES (AEPW)	Knox Lee (AEPW)	7.8	-	5.0
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 redispatch capacity necessary for each generator pair.

**Table 4**

Source	Sink	MUSCLAMUSRSS Relief (MW)	FLCXFRFLCXFR Relief (MW)
Flint Creek (AEPW)	NES (AEPW)	-	8
Flint Creek (AEPW)	TPS (AEPW)	-	7
Flint Creek (AEPW)	RSS (AEPW)	-	7
Flint Creek (AEPW)	SWS (AEPW)	-	7
Flint Creek (AEPW)	Arsenal Hill (AEPW)	-	7
NES (AEPW)	Welsh (AEPW)	7	-
NES (AEPW)	Wilkes (AEPW)	7	-
NES (AEPW)	Arsenal Hill (AEPW)	-	-
NES (AEPW)	Dolet Hills (AEPW)	7	-
NES (AEPW)	Pirkey (AEPW)	7	-
RSS (AEPW)	Welsh (AEPW)	7	-
RSS (AEPW)	Wilkes (AEPW)	7	-
RSS (AEPW)	Arsenal Hill (AEPW)	-	-
RSS (AEPW)	Dolet Hills (AEPW)	7	-
RSS (AEPW)	Pirkey (AEPW)	7	-
TPS (AEPW)	Welsh (AEPW)	7	-
TPS (AEPW)	Wilkes (AEPW)	7	-
TPS (AEPW)	Arsenal Hill (AEPW)	7	-
TPS (AEPW)	Dolet Hills (AEPW)	7	-
TPS (AEPW)	Pirkey (AEPW)	7	-

**Table 5**

Source	Sink	RUSDARANOFTS Relief (MW)	MANIPMDOLSWS Relief (MW)	DANMAGANOFTS Relief (MW)
Wilkes (AEPW)	SWS (AEPW)	-	1	-
Welsh (AEPW)	SWS (AEPW)	-	1	-
Welch (AEPW)	NES (AEPW)	-	1	-
Wilkes (AEPW)	NES (AEPW)	-	1	-
Wilkes (AEPW)	RSS (AEPW)	-	1	-
Commanche (AEPW)	Welsh (AEPW)	2	-	1
Commanche (AEPW)	Wilkes (AEPW)	2	-	1
Commanche (AEPW)	Arsenal Hill (AEPW)	-	-	1
Commanche (AEPW)	Dolet Hills (AEPW)	2	-	-
Commanche (AEPW)	Pirkey (AEPW)	2	-	1
NES (AEPW)	Welsh (AEPW)	2	-	1

NES (AEPW)	Wilkes (AEPW)	2	-	1
NES (AEPW)	Arsenal Hill (AEPW)	-	-	1
NES (AEPW)	Dolet Hills (AEPW)	2	-	-
NES (AEPW)	Pirkey (AEPW)	2	-	1
RSS (AEPW)	Welsh (AEPW)	2	-	1
RSS (AEPW)	Wilkes (AEPW)	2	-	1
SWS (AEPW)	Wilkes (AEPW)	1	-	1
SWS (AEPW)	Welch (AEPW)	1	-	1
NES (AEPW)	Knox Lee (AEPW)	2	-	1
RSS (AEPW)	Arsenal Hill (AEPW)	2	-	1
RSS (AEPW)	Dolet Hills (AEPW)	2	-	-
RSS (AEPW)	Pirkey (AEPW)	2	-	1
TPS (AEPW)	Welsh (AEPW)	2	-	1
TPS (AEPW)	Wilkes (AEPW)	2	-	1
TPS (AEPW)	Arsenal Hill (AEPW)	-	-	1
TPS (AEPW)	Dolet Hills (AEPW)	2	-	-
TPS (AEPW)	Pirkey (AEPW)	2	-	1

## **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.