



**SPP**

*Southwest  
Power Pool*

***System Impact Study***

***SPP-2014-020***

***For Transmission Service***

***Requested By:***

***WRGS***

***From DOGWOOD.KELSON to***

***KACY***

***For a Reserved Amount Of***

***50 MW***

***For 2/1/2015 – 1/30/2016***

## **1. Executive Summary**

WRGS has requested a system impact study for monthly firm transmission service from DOGWOOD.KELSON to KACY. The period of the transaction is from 2/1/2015 00:00 CST to 1/30/2016 00:00 CST. The request is for reservation 80394046.

The 50 MW transaction from MPS has an impact on the following flowgates with no AFC: PENMUN87TCRA, HAWXFRHAWXFR, CRALENGRECED, GRESHWNAVTER, and GREMETPENMUN. 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**

WRGS has requested a system impact study for transmission service from DOGWOOD.KELSON to KACY.

There are 5 constrained flowgates that require relief in order for this reservation to be accepted. The flowgates and the explanations are as follows:

- PENMUN87TCRA: Pentagon – Mund 115 kV line for the loss of the 87<sup>th</sup> Street – Craig 345 kV line
- HAWXFRHAWXFR: Hawthorn 345/161 kV transformer #1 for the loss of the Hawthorn 345/161 kV transformer #2
- CRALENGRECED: Craig – Lenexa 161 kV line for the loss of the Greenwood – Cedar Creek 161 kV line
- GRESHWNAVTER: Greenwood – Shawnee 161 kV line for the loss of the Navy – Terrace 161 kV line
- GREMETPENMUN: Greenwood – Metro 161 kV line for the loss of the Pentagon – Mund 115 kV line

### **3. Study Methodology**

#### **A. Description**

Southwest Power Pool used Transmission Adequacy & Reliability Assessment (TARA) to obtain possible unit pairings that would relieve the constraint. TARA 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 2014 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 Transmission Adequacy & Reliability Assessment (TARA), 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 TARA is the amount of redispatch necessary to relieve the impact on the affected flowgate.

## 4. Study Results

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

**Table 1**

Flowgate	Duration	Sensitivity %	Impact MW
5407 : PENMUN87TCRA	2/1/2015 - 2/1/2016	6.6%	3
5497 : HAWXFRHAWXFR	7/1/2015 - 8/1/2015	7.7%	4
5498 : CRALENGRECED	7/1/2015 - 10/1/2015	12.2%	6
5559 : GRESHWNAVTER	6/1/2015 - 10/1/2015	32.6%	16
5560 : GREMETPENMUN	5/1/2015 - 6/1/2015	30.1%	15

Table 2 displays a list of generator pairs that are possible relief options for each flowgates in question and the amount of redispatch capacity needed.

**Table 2**

5407 : PENMUN87TCRA			
Increment	Decrement	Sensitivity %	Redispatch MW
Nearman	Lawrence EC	16.6%	18
Quindaro	Lawrence EC	16.2%	19
Nearman	TEC	14.5%	21
Nearman	Iatan	14.2%	21
Quindaro	TEC	14.0%	21
Quindaro	Iatan	13.8%	22
Northeast	Lawrence EC	11.4%	26
Northeast	TEC	9.2%	33
Northeast	Iatan	9.0%	33

5497 : HAWXFRHAWXFR			
Increment	Decrement	Sensitivity %	Redispatch MW
Hawthorn	Lake Road	37.6%	11
Hawthorn	Nebraska City	35.1%	11
Hawthorn	Cass County	34.8%	11
Northeast	Lake Road	31.2%	13
Northeast	Nebraska City	28.7%	14
Northeast	Cass County	28.4%	14
Quindaro	Lake Road	23.6%	17
Nearman	Lake Road	23.2%	17
Quindaro	Nebraska City	21.1%	19
Quindaro	Cass County	20.8%	19
Nearman	Nebraska City	20.7%	19
Nearman	Cass County	20.5%	20

<b>5498 : CRALENGRECED</b>			
<b>Increment</b>	<b>Decrement</b>	<b>Sensitivity %</b>	<b>Redispatch MW</b>
Nearman	West Gardner	30.0%	20
Quindaro	West Gardner	29.8%	20
Nearman	Emporia EC	25.6%	23
Nearman	Lacygne	25.5%	23
Quindaro	Emporia EC	25.4%	24
Quindaro	Lacygne	25.4%	24
Northeast	West Gardner	18.6%	32
Hawthorn	West Gardner	15.4%	39
Northeast	Emporia EC	14.1%	42
Northeast	Lacygne	14.1%	43

<b>5559 : GRESHNAVTER</b>			
<b>Increment</b>	<b>Decrement</b>	<b>Sensitivity %</b>	<b>Redispatch MW</b>
Quindaro	West Gardner	36.0%	44
Quindaro	Lacygne	35.1%	46
Quindaro	South Harper	35.1%	46
Nearman	West Gardner	31.3%	51
Nearman	Lacygne	30.4%	53
Nearman	South Harper	30.3%	53

<b>5560 : GREMETPENMUN</b>			
<b>Increment</b>	<b>Decrement</b>	<b>Sensitivity %</b>	<b>Redispatch MW</b>
Nearman	West Gardner	39.5%	38
Nearman	Lawrence EC	37.2%	40
Nearman	Lacygne	37.1%	40
Nearman	Emporia EC	37.0%	41
Quindaro	West Gardner	35.4%	42
Quindaro	Lawrence EC	33.1%	45
Quindaro	Lacygne	33.0%	45
Quindaro	Emporia EC	32.9%	46

## **5. Conclusion**

Generation redispatch options were studied in order to relieve the necessary constraints. 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, agreement to the redispatch costs must be presented to Southwest Power Pool. Noncompliance with this guideline will result in the refusal of the reservation.