



***Attachment AA***  
***Flowgate Upgrade Request Study***

***Requested By:***  
***Westar Energy***

***For Flowgates:***  
***WdrCimSprNrw, BvsNbvNesDel, LacNeoLacSti,***  
***CreKilWicWoo, KilCreWooWic, PitSemPitSun,***  
***ScoDeaDelNeo, ValHugValLyd, and HppValPitVal***

***And Supplementary For Flowgates:***  
***CroXfrTenLeb, MidFrnPhaWet, CorCorSwsAna,***  
***SwsAnaSwsFtc, ValLydEldLon, ElkXfrTucOku,***  
***and NwtPatLydVal***

**SPP ENGINEERING DEPARTMENT,  
PLANNING SECTION**

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## **Introduction**

In accordance with the Southwest Power Pool (SPP) Open Access Transmission Tariff (OATT) Attachment AA (Transmission Service Prepayment), Westar Energy has requested a upgrade request study for the following flowgates: WdrCimSprNrw, BvsNbvNesDel, LacNeoLacSti, CreKilWicWoo, KilCreWooWic, PitSemPitSun, ScoDeaDelNeo, ValHugValLyd, and HppValPitVal.

It must be noted that removal of an existing limit does not guarantee an increase in Available Transfer Capability (ATC) for a particular commercial path (POR/POD) for a particular timeframe. The increase would depend on the next limiting facility, which may not be listed in this document. Removal of an existing limit does not guarantee approval of a transmission service request.

## **Study Methodology**

Analysis of the requested flowgates was conducted using the SPP monthly firm AFC calculation MS Access database engine as a starting point, and per SPP Criteria 4 REGIONAL CALCULATION OF AVAILABLE TRANSFER CAPABILITY. However, a transmission distribution (TDF) cutoff of 5% (rather than 3%) was utilized for analyzing prior refused monthly firm service, to match the North American Electric Reliability Council (NERC) Transmission Loading Relief (TLR) Procedure cutoff. Flowgate upgrade data was solicited from the Transmission Owners (TOs).

## **Requested Flowgate Analysis**

### **1. WdrCimSprNrw**

The Woodring-Cimarron 345 kV line for an outage of the Oneok/Spring Creek-NW Station 345 kV line OTDF flowgate may be upgraded from an emergency summer rating of 956 MVA to 1195 MVA of for an estimated cost of \$650,000 with a lead-time requirement of 18 months. The current limit is based on breakers and disconnect switches at Cimarron. The next limit would be wavetraps, breakers, CTs, and relays at Cimarron and Woodring. This flowgate was recently upgraded from 717 to the current limit of 956 MVA. Neglecting other limiting flowgates and using a conservative monthly firm price of \$730, the upgraded flowgate could support increased revenues of about \$174,000 per month. For summers 2004 and 2005 the flowgate is not currently found to be a negative limit to any SPP commercial paths. Based on calculations using current data, the flowgate may have not been a negative limit contributing to any refusals of monthly firm service for the period May 2003-May 2004. The flowgate may also be upgraded further to 1541 MVA for \$2,500,000 with a lead-time requirement of 18 months.

The cost of this facility is greater than the deposited amount. SPP does not currently have other customers requesting to upgrade this facility. Therefore this facility will not be upgraded due to lack of sufficient funds.

## **2. BvsNbvNesDel**

The Bartlesville SE-N. Bartlesville 138 kV line for an outage of the (Northeastern) N.E.S.-Delaware 345 kV line OTDF flowgate may be upgraded from an emergency summer rating of 210 MVA to 235 MVA for an estimated cost of \$47,000 with a lead-time requirement of 9 months. The current limit is based on a wavetrap at Bartlesville SE. The next limit would be the Bartlesville SE-N. Bartlesville 138 kV line conductor. Neglecting other limiting flowgates and using a conservative monthly firm price of \$730, the upgraded flowgate could support increased revenues of about \$18,000 per month. For summers 2004 and 2005 the flowgate is currently found to be a negative limit to 217 and 0 commercial paths, respectively. Based on calculations using current data, the flowgate may have been a negative limit contributing to refusals of monthly firm service of about \$17,268,000 for the period May 2003-May 2004.

SPP has experienced TLR on this facility within the past two years. Based on the projection of additional transmission service revenue and reduced TLR, SPP recommends approval of the requested upgrade by the customer with an estimated cost of \$47,000.

## **3. LacNeoLacSti**

The LaCygne-Neosho 345 kV line for an outage of the LaCygne-Stilwell 345 kV line OTDF flowgate is scheduled to be upgraded in Fall 2004 from an emergency summer rating of 1075 MVA to 1159 MVA for an estimated cost to the TO of \$190,000. The current limit is based on a wavetraps and relays at Neosha. The next limit would be the conductor. Neglecting other limiting flowgates and using a conservative monthly firm price of \$730, the upgraded flowgate could support increased revenues of about \$61,000 per month. For summers 2004 and 2005 the flowgate is not currently found to be a negative limit to any SPP commercial paths. Based on calculations using current data, the flowgate may have not been a negative limit contributing to any refusals of monthly firm service for the period May 2003-May 2004. This same upgrade would apply to LacNeoLanWic.

SPP has experienced TLR on this facility within the past two years. Because this facility is scheduled for an upgrade to the conductor limit it will not be recommended for additional upgrade at this time.

## **4. CreKilWicWoo and KilCreWooWic**

These two flowgates are the same facility monitored in different directions. The analysis below shows the directional results.

The Creswell-Kildare 138 kV line for an outage of the Wichita-Woodring 345 kV line OTDF flowgate may be upgraded from an emergency summer rating of 171 MVA to 287 MVA for an estimated cost of \$6,220,000 with a lead-time requirement of 24 months. The current limit is based on Creswell-Kildare 138 kV line conductor, and a wavetrap, breaker and CT at Creswell. The next limit would be disconnect switches and bus work at Creswell. Neglecting other limiting flowgates and using a conservative monthly firm price of \$730, the upgraded flowgate

could support increased revenues of about \$85,000 per month. For summers 2004 and 2005 the flowgate is currently found to be a negative limit to 196 and 0 commercial paths, respectively. Based on calculations using current data, the flowgate may have been a negative limit contributing to refusals of monthly firm service of about \$3,639,000 for the period May 2003-May 2004.

The Kildare-Creswell 138 kV line for an outage of the Woodring-Wichita 345 kV line OTDF flowgate may be upgraded from an emergency summer rating of 171 MVA to 287 MVA for an estimated cost of \$6,220,000 with a lead-time requirement of 24 months. Neglecting other limiting flowgates and using a conservative monthly firm price of \$730, the upgraded flowgate could support increased revenues of about \$85,000 per month. For summers 2004 and 2005 the flowgate is currently found to be a negative limit to 242 and 252 commercial paths, respectively. Based on calculations using current data, the flowgate may have been a negative limit contributing to refusals of monthly firm service of about \$19,983,000 for the period May 2003-May 2004.

The cost of this facility is greater than the deposited amount. SPP does not currently have other customers requesting to upgrade this facility. Therefore this facility will not be upgraded due to lack of sufficient funds.

#### **5. PitSemPitSun**

The Pittsburg-Seminole 345 kV line for an outage of the Pittsburg-Sunnyside 345 kV line OTDF flowgate is scheduled to be upgraded by November 2004 from an emergency summer rating of 717 MVA to 956 MVA at cost to the TO. The current limit is based on a wavetrapped and CT at Seminole. The next limit would be the terminal equipment, breaker, and disconnect switches at Seminole, and a wavetrapped at Pittsburg. Neglecting other limiting flowgates and using a conservative monthly firm price of \$730, the upgraded flowgate could support increased revenues of about \$174,000 per month. For summers 2004 and 2005 the flowgate is currently found to be a negative limit to 352 and 384 commercial paths, respectively. Based on calculations using current data, the flowgate may have been a negative limit contributing to refusals of monthly firm service of about \$9,019,000 for the period May 2003-May 2004. The flowgate may also be upgraded further to 1176 MVA for \$500,000 with a lead-time requirement of 18 months.

This facility will not be recommended for upgrade at this time under Attachment AA because of the current construction to improve the rating.

#### **6. ScoDeaDelNeo**

The S. Coffeyville-Dearing 138 kV line for an outage of the Delaware-Neosho 345 kV line OTDF flowgate may be upgraded from an emergency summer rating of 210 MVA to 232 MVA for an estimated cost of \$10,000 with a lead-time requirement of 5 months. The current limit is based on a wavetrapped at Dearing. The next limit would be the S. Coffeyville-Dearing 138 kV line conductor. Neglecting other limiting flowgates and using a conservative monthly firm price of \$730, the upgraded flowgate could support increased revenues of about \$16,000 per month. For

summers 2004 and 2005 the flowgate is currently found to be a negative limit to 232 and 279 commercial paths, respectively. Based on calculations using current data, the flowgate may have been a negative limit contributing to refusals of monthly firm service of about \$20,152,000 for the period May 2003-May 2004.

This facility will be recommended for upgrade. In addition to being a limitation for transmission service it has experienced TLR. The estimated cost for this facility is \$10,000.

### **7. ValHugValLyd**

The Valliant-Hugo PS 138 kV line for an outage of the Valliant-Lydia 345 kV line OTDF flowgate may be upgraded from an emergency summer rating of 210 MVA to 227 MVA for an estimated cost of \$47,000 with a lead-time requirement of 9 months. The current limit is based on a wavetrapped at Valliant. The next limit would be the Valliant-Hugo PS 138 kV line conductor. Neglecting other limiting flowgates and using a conservative monthly firm price of \$730, the upgraded flowgate could support increased revenues of about \$12,000 per month. For summers 2004 and 2005 the flowgate is currently found to be a negative limit to 209 and 217 commercial paths, respectively. Based on calculations using current data, the flowgate may have been a negative limit contributing to refusals of monthly firm service of about \$89,000 for the period May 2003-May 2004.

This facility is projected to provide additional service adequate to cover the cost of the upgrade over a relatively short period of time. The flowgate is recommended for upgrade at a cost of \$47,000.

### **8. HppValPitVal**

The Hugo PS-Valliant 138 kV line for an outage of the Pittsburg-Valliant 345 kV line OTDF flowgate may be upgraded from an emergency summer rating of 287 MVA to 315 MVA for an estimated cost of \$142,000 with a lead-time requirement of 12 months. The current limit is based on disconnect switches, breaker jumpers, wavetrapped, and CTs at Valliant. The next limit would be the Hugo PS-Valliant 138 kV line conductor. Neglecting other limiting flowgates and using a conservative monthly firm price of \$730, the upgraded flowgate could support increased revenues of about \$20,000 per month. For summers 2004 and 2005 the flowgate is currently found to be a negative limit to 247 and 257 commercial paths, respectively. Based on calculations using current data, the flowgate may have been a negative limit contributing to refusals of monthly firm service of about \$772,000 for the period May 2003-May 2004.

This facility will be recommended for upgrade. In addition to being a limitation for transmission service it has experienced TLR. The flowgate is recommended for upgrade at a cost of \$142,000.

## **Supplemental Flowgate Analysis**

In addition to the requested flowgates, SPP has assessed the following flowgates and the improvement to the market and SPP.

### **1. CroXfrTenLeb**

The Crockett 345/138 kV transformer for an outage of the Tenaska-LeBrock 345 kV line OTDF flowgate may be upgraded from an emergency summer rating of 210 MVA to 330 MVA for an estimated cost of \$12,000 with a lead-time requirement of 4 months. The current limit is based on a CT at Crockett. The next limit would be the Crockett 345/138 kV transformer. Neglecting other limiting flowgates and using a conservative monthly firm price of \$730, the upgraded flowgate could support increased revenues of about \$88,000 per month. For summers 2004 and 2005 the flowgate is not currently found to be a negative limit to any SPP commercial paths. Based on calculations using current data, the flowgate may have not been a negative limit contributing to any refusals of monthly firm service for the period May 2003-May 2004.

This facility will be recommended for upgrade. It is recognized as a limitation for transmission service. The flowgate is recommended for upgrade at a cost of \$12,000.

### **2. MidFrnPhaWet**

The Midwest-Franklin 138 kV line for an outage of the Pharaoh-Wetumka 138 kV line OTDF flowgate may be upgraded from an emergency summer rating of 215 MVA to 286 MVA for an estimated cost of \$24,000 with a lead-time requirement of 6 months. The current limit is based on a wavetrap at Franklin. The next limit would be two breakers and disconnect switches at Franklin. Neglecting other limiting flowgates and using a conservative monthly firm price of \$730, the upgraded flowgate could support increased revenues of about \$52,000 per month. For summers 2004 and 2005 the flowgate is currently found to be a negative limit to 86 and 0 commercial paths, respectively. Based on calculations using current data, the flowgate may have been a negative limit contributing to refusals of monthly firm service of about \$618,000 for the period May 2003-May 2004.

This facility will be recommended for upgrade. It is recognized as a limitation for transmission service. The flowgate is recommended for upgrade at a cost of \$24,000.

### **3. CorCorSwsAna**

The Cornville-Cornville Tap 138 kV line for an outage of the Southwestern PS-Anadarko 138 kV line OTDF flowgate may be upgraded from an emergency summer rating of 105 MVA to 143 MVA for an estimated cost of \$47,000 with a lead-time requirement of 9 months. The current limit is based on a wavetrap at Cornville. The next limit would be the Cornville Sub Switches. Neglecting other limiting flowgates and using a conservative monthly firm price of \$730, the upgraded flowgate could support increased revenues of about \$28,000 per month. For summers 2004 and 2005 the flowgate is currently found to be a negative limit to 54 and 54 commercial paths, respectively. Based on calculations using current data, the flowgate may have been a

negative limit contributing to refusals of monthly firm service of about \$2,348,000 for the period May 2003-May 2004.

This facility will be recommended for upgrade. It is recognized as a limitation for transmission service. The flowgate is recommended for upgrade at a cost of \$47,000.

#### **4. SwsAnaSwsFtc**

The Southwestern PS-Anadarko 138 kV line for an outage of the Southwestern PS-Ft. Cobb 138 kV line OTDF flowgate may be upgraded from an emergency summer rating of 210 MVA to 235 MVA for an estimated cost of \$47,000 with a lead-time requirement of 9 months. The current limit is based on a wavetrap at Southwestern PS. The next limit would be the Southwestern PS-Anadarko 138 kV conductor. Neglecting other limiting flowgates and using a conservative monthly firm price of \$730, the upgraded flowgate could support increased revenues of about \$18,000 per month. For summers 2004 and 2005 the flowgate is currently found to be a negative limit to 59 and 61 commercial paths, respectively. Based on calculations using current data, the flowgate may have been a negative limit contributing to refusals of monthly firm service of about \$2,348,000 for the period May 2003-May 2004.

This facility will be recommended for upgrade. It is recognized as a limitation for transmission service. The flowgate is recommended for upgrade at a cost of \$47,000.

#### **5. ValLydEldLon**

The Valliant-Lydia 345 kV line for an outage of the Eldorado-Longwood 345 kV line OTDF flowgate may be upgraded from an emergency summer rating of 956 MVA to 1176 MVA for an estimated cost of \$99,000 with a lead-time requirement of 12 months. The current limit is based on disconnect switches and relays at Valliant. The next limit would be the Valliant-Lydia 345 kV line conductor. Neglecting other limiting flowgates and using a conservative monthly firm price of \$730, the upgraded flowgate could support increased revenues of about \$52,000 per month. For summers 2004 and 2005 the flowgate is not currently found to be a negative limit to any SPP commercial paths. Based on calculations using current data, the flowgate may have not been a negative limit contributing to any refusals of monthly firm service for the period May 2003-May 2004.

This facility will be recommended for upgrade. It is recognized as a limitation for transmission service. The flowgate is recommended for upgrade at a cost of \$99,000.

#### **6. ElkXfrTucOku**

The Elk City 230/138 kV transformer for an outage of the Tuco-Oklaunion 345 kV line OTDF flowgate may be upgraded from an emergency summer rating of 263 MVA to 287 MVA for an estimated cost of \$80,000 with a lead-time requirement of 9 months. The current limit is based on a metering CT on the Elk City 230/138 kV transformer. The next limit would be the switches and breakers on the lowside of the transformer. Neglecting other limiting flowgates and using a conservative monthly firm price of \$730, the upgraded flowgate could support increased

revenues of about \$18,000 per month. For summers 2004 and 2005 the flowgate is currently found to be a negative limit to 237 and 262 commercial paths, respectively. Based on calculations using current data, the flowgate may have been a negative limit contributing to refusals of monthly firm service of about \$2,279,000 for the period May 2003-May 2004.

The cost of this facility is greater than the deposited amount. SPP does not currently have other customers requesting to upgrade this facility. Therefore this facility will not be upgraded due to lack of sufficient funds.

## **7. NwtPatLydVal**

The N.W. Texarkana-Patterson 138 kV line for an outage of the Lydia-Valliant 345 kV line OTDF flowgate may be upgraded from an emergency summer rating of 261 MVA to 268 MVA for an estimated cost of \$7,250,000 with a lead-time requirement of 15 months. The current limit is based on the N.W. Texarkana-Patterson 138 kV line conductor, and disconnect switches and breaker at Patterson. The next limit would be the N.W. Texarkana wavetrapp jumpers. Neglecting other limiting flowgates and using a conservative monthly firm price of \$730, the upgraded flowgate could support increased revenues of about \$5,000 per month. For summers 2004 and 2005 the flowgate is currently found to be a negative limit to 173 and 180 commercial paths, respectively. Based on calculations using current data, the flowgate may have been a negative limit contributing to refusals of monthly firm service of about \$7,879,000 for the period May 2003-May 2004.

The cost of this facility is greater than the deposited amount. SPP does not currently have other customers requesting to upgrade this facility. Therefore this facility will not be upgraded due to lack of sufficient funds.

## Analysis Summary Table

| <b>Flowgate</b>      | <b>Cost of 1st Upgrade</b> | <b>Monthly Revenue</b> | <b>Neg. Paths</b> |              | <b>Contributing Refusals</b> |
|----------------------|----------------------------|------------------------|-------------------|--------------|------------------------------|
|                      |                            |                        | <b>2004S</b>      | <b>2005S</b> |                              |
| <b>Requested:</b>    |                            |                        |                   |              |                              |
| WdrCimSprNrw         | \$ 650,000                 | \$ 174,000             | 0                 | 0            | \$ -                         |
| BvsNbvNesDel         | \$ 47,000                  | \$ 18,000              | 217               | 0            | \$ 17,268,000                |
| LacNeoLacSti         | \$ -                       | \$ 88,000              | 0                 | 0            | \$ -                         |
| CreKilWicWoo         | \$ 6,220,000               | \$ 15,000              | 196               | 0            | \$ 3,690,000                 |
| KilCreWooWic         | \$ 6,220,000               | \$ 15,000              | 242               | 252          | \$ 19,983,000                |
| PitSemPitSun         | \$ -                       | \$ 174,000             | 352               | 384          | \$ 6,095,000                 |
| ScoDeaDelNeo         | \$ 10,000                  | \$ 7,000               | 232               | 279          | \$ 20,152,000                |
| ValHugValLyd         | \$ 47,000                  | \$ 12,000              | 209               | 217          | \$ 89,000                    |
| HppValPitVal         | \$ 142,000                 | \$ 20,000              | 247               | 257          | \$ 772,000                   |
| <b>Supplemental:</b> |                            |                        |                   |              |                              |
| CroXfrTenLeb         | \$ 12,000                  | \$ 88,000              | 0                 | 0            | \$ -                         |
| MidFrnPhaWet         | \$ 24,000                  | \$ 52,000              | 172               | 184          | \$ 618,000                   |
| CorCorSwsAna         | \$ 47,000                  | \$ 9,000               | 54                | 54           | \$ 2,348,000                 |
| SwsAnaSwsFtc         | \$ 47,000                  | \$ 18,000              | 59                | 61           | \$ 2,348,000                 |
| ValLydEldLon         | \$ 99,000                  | \$ 110,000             | 0                 | 0            | \$ -                         |
| ElkXfrTucOku         | \$ 80,000                  | \$ 18,000              | 237               | 262          | \$ 2,279,000                 |
| NwtPatLydVal         | \$ 7,250,000               | \$ 5,000               | 173               | 180          | \$ 7,879,000                 |

## Recommended Projects Table

| <u>Flowgate</u>      | <u>Facility to Upgrade</u>                                    | <u>Owner</u> | <u>Est. Cost</u> | <u>Lead-time Months</u> |
|----------------------|---------------------------------------------------------------|--------------|------------------|-------------------------|
| <b>Requested:</b>    |                                                               |              |                  |                         |
| BvsNbvNesDel         | Bartlesville SE: wavetrapped                                  | AEPW         | \$ 47,000        | 9                       |
| ScoDeaDelNeo         | Dearing: wavetrapped                                          | WR           | \$ 10,000        | 5                       |
| ValHugValLyd         | Valliant: wavetrapped                                         | AEPW         | \$ 47,000        | 9                       |
| HppValPitVal         | Valliant: switches, breaker jumpers, wavetrapped, & reset CTs | AEPW         | \$ 142,000       | 12                      |
| <b>Supplemental:</b> |                                                               |              |                  |                         |
| CroXfrTenLeb         | Crockett: reset metering CT                                   | AEPW         | \$ 12,000        | 4                       |
| MidFrnPhaWet         | Franklin: wavetrapped                                         | WFEC         | \$ 24,000        | 6                       |
| CorCorSwsAna         | Cornville: wavetrapped                                        | AEPW         | \$ 47,000        | 9                       |
| SwsAnaSwsFtc         | Southwestern PS: wavetrapped                                  | AEPW         | \$ 47,000        | 9                       |
| ValLydEldLon         | Valliant: switches and reset relays                           | AEPW         | \$ 99,000        | 12                      |
|                      |                                                               |              | <u>\$475,000</u> |                         |