



SPP *Southwest
Power Pool*

***System Impact Study SPP-2001-245
For Transmission Service
Requested By
Empire District Electric Co.***

From CSWS To EDE

***For a Reserved Amount Of 100MW
From 6/1/2003
To 6/1/2013***

SPP Coordinated Planning

System Impact Study

Empire District Electric Co. has requested a system impact study for long-term Firm Point-to-Point transmission service from CSWS to EDE. The period of the transaction is from 6/1/2003 to 6/1/2013. The request is for OASIS reservation 274981 for an amount of 100 MW.

The principal objective of this study is to identify constraints on the SPP Regional Tariff System and potential facility upgrades that may be necessary to facilitate the additional 100 MW of service requested.

The CSWS to EDE transfer was first studied to determine the facility upgrades required if the request were the highest priority request in the queue. These results are documented in Table 1 of the report. The request was then studied to determine the facility upgrades required based on the actual queue position of the request with the higher priority requests still being studied included in the models. These results are documented in Table 2 of the report. Results of the two studies can then be compared to give the customer an estimated range of facility upgrades that may be required in order to accommodate the 100 MW CSWS to EDE transfer.

SPP used eight seasonal models to study the CSWS to EDE 100 MW transfer for the requested service period for each scenario. The SPP 2002 Series Cases 2003 Summer Peak, 2003 Fall Peak, 2003/04 Winter Peak, 2004 Spring Peak, 2005 Summer Peak, 2005/06 Winter Peak, 2008SP and 2008/2009 Winter Peak were used to study the impact of the 100 MW transfer on the SPP system during the requested service period of 6/1/2003 to 6/1/2013. The Spring Peak models apply to April and May, the Summer Peak models apply to June through September, the Fall Peak models apply to October and November, and the Winter Peak models apply to December through March. The chosen base case models were modified to reflect the most current modeling information. The cases were modified to reflect firm transfers during the requested service period that were not already included in the January 2002 base case series models.

With the CSWS to EDE 100 MW transfer as the highest priority request in the queue, the study results show that limiting constraints exist. By studying the request in its actual queue position with higher priority requests included, the number of constraints that limit the ATC to less than 100 MW increases. Due to the number of limiting constraints identified, the Transmission Service Request cannot be granted. These results do not include an evaluation of potential constraints in the planning horizon beyond the reservation period that may limit the right to renew service. The upgrades and cost provided in the System Impact Study are planning estimates only. The final ATC and upgrades required may vary from these results due to the status of higher priority requests, unknown facility upgrades that will be identified during the facility study process, and the final results of the full AC analysis. Execution of a Facility Study Agreement is now required to maintain queue position. The final upgrade solutions and cost assignments will be determined upon the completion of the facility study.

Table 1 – SPP facility upgrades that would be required if the CSWS to EDE request were the highest priority request in the queue

| Study Year | From Area - To Area | Branch Over 100% Rate B | Rate B | Outaged Branch Causing Overload | ATC | Solution | Estimated Cost |
|------------|---------------------|--|--------|--|-----|--|----------------|
| 03SP | WERE-WERE | 166Th Street - Jarbalo Junction Sw Station 115kV | 97 | Midland Junction - Pentagon 115kV | 0 | May be relieved due to Westar Transmission Operating Directive 1202 | Not Available |
| 03SP | WERE-WERE | Auburn Road - Jeffrey Energy Center 230kV | 565 | Hoyt - Jeffery Energy Center 345kV | 0 | May be relieved due to Westar Transmission Operating Directive 400 | Not Available |
| 03SP | WERE-WERE | Auburn Road - South Gage (West) 115kV | 75 | Hoyt - Jeffery Energy Center 345kV | 0 | May be relieved due to Westar Transmission Operating Directive 400 | Not Available |
| 03SP | WERE-WERE | Auburn Road - South Gage (West) 115kV ckt 2 | 97 | Hoyt - Jeffery Energy Center 345kV Ckt 1 | 0 | May be relieved due to Westar Transmission Operating Directive 400 | Not Available |
| 03SP | AEPW-AEPW | Big Sandy - Perdue 69kV | 85 | Perdue - Lake Hawkins 138kV | 0 | Solution Undetermined | Not Available |
| 03SP | AEPW-AEPW | Carson-Center 138/13.8kV Transformer | 33 | Carson South - Tulsa Power Station 138kV | 0 | Solution Undetermined | Not Available |
| 03SP | WFEC-WFEC | Carter Jct - Lake Creek 69kV | 26 | Elk City 138/69kV Transformer | 0 | Solution Undetermined | Not Available |
| 03SP | SWPA-EES | Carthage - Reed Springs 69kV | 36 | Stilwell - Lacygne 345kV | 11 | Third Party Facility | \$ - |
| 03SP | SWPA-SWPA | Carthage 161/69kV Transformer ckt 1 | 84 | Carthage 161/69kV Transformer Ckt 2 | 5 | Third Party Facility | \$ - |
| 03SP | AEPW-AEPW | Catoosa 138/69kV Transformer | 55 | Lynn Lane West Tap - Lynn Lane Tap 138kV | 0 | Solution Undetermined | Not Available |
| 03SP | AEPW-AEPW | Cherokee Rec - Knox Lee 138kV | 209 | Multiple Outage Contingency , Southwest Shreveport - Longwood 345kV, Southwest Shreveport to Diana 345kV | 0 | Reconductor 3.25 miles of 666 ACSR with 1272 ACSR | \$ 981,000 |
| 03SP | AEPW-AEPW | Cherokee Rec - Tatum 138kV | 209 | Multiple Outage Contingency , Southwest Shreveport - Longwood 345kV, Southwest Shreveport to Diana 345kV | 62 | Reconductor 6.25 miles of 666 ACSR with 1272 ACSR | \$ 1,641,000 |
| 03SP | GRRD-GRRD | Claremore 161/69kV Transformer ckt 1 | 84 | Claremore 161/69kV Transformer Ckt 2 | 44 | Solution Undetermined | Not Available |
| 03SP | GRRD-GRRD | Claremore 161/69kV Transformer ckt 2 | 84 | Claremore 161/69kV Transformer Ckt 1 | 7 | Solution Undetermined | Not Available |
| 03SP | AEPW-AEPW | Denver Center 138/13.8kV Transformer | 33 | Tulsa North - 46Th Street East 138kV | 0 | Solution Undetermined | Not Available |
| 03SP | AEPW-AEPW | Denver-West 138/13.8kV Transformer | 33 | Carson South - Kenosha West 138kV | 0 | Solution Undetermined | Not Available |
| 03SP | SWPA-AECI | Doniphan 161/69kV Transformer ckt 1 | 18.8 | Doniphan 161/69kV Transformer Ckt 2 | 0 | Solution Undetermined | Not Available |
| 03SP | OKGE-OKGE | Draper Lake 138/345kV Transformer ckt 1 | 493 | Draper Lake 138/345kV Transformer Ckt 2 | 82 | May be relieved due to OKGE Operating Guide | Not Available |
| 03SP | OKGE-OKGE | Draper Lake 138/345kV Transformer ckt 2 | 493 | Draper Lake 138/345kV Transformer Ckt 1 | 82 | See Previous | \$ - |
| 03SP | AEPW-AEPW | Dyess - Chamber Springs 161kV | 244 | Chamber Springs - Farmington Aecc 161kV | 0 | AEPW Planned Tontitown Project | \$ - |
| 03SP | AEPW-AEPW | Dyess - East Rogers 161kV | 244 | Flint Creek - Gentry Rec 161kV | 0 | AEPW Planned Tontitown Project | \$ - |
| 03SP | AEPW-AEPW | East Centerton - Gentry Rec 161kV | 353 | Flint Creek - Elm Springs Rec 161kV | 0 | Rebuild 19.16 miles of 2-397.5 ACSR with 2156 ACSR | \$ 8,000,000 |
| 03SP | AEPW-AEPW | Flint Creek - Gentry Rec 161kV | 353 | Flint Creek - Elm Springs Rec 161kV | 0 | Rebuild 1.09 miles of 2-397.5 ACSR with 2156 ACSR. | \$ 400,000 |
| 03SP | WERE-WERE | Gill Energy Center East - Macarthur 69kV | 68 | Gill Energy Center East - Oatville 69kV | 0 | Replace substation bus and jumpers at MacArthur 69 kV | \$ 22,000 |
| 03SP | WERE-WERE | Gill Energy Center East - Oatville 69kV | 72 | Gill Energy Center East - Macarthur 69kV | 0 | Replace disconnect switches at Gill 69 kV (use 800 A.), Replace line switch at Oatville 69 kV (use 800 A.) | \$ 45,000 |
| 03SP | AEPW-AEPW | Greggton - Lake Lamond 69kV | 107 | Diana - Perdue 138kV | 0 | Solution Undetermined | Not Available |
| 03SP | SWPA-EES | Hergett - Jonesboro 161kV | 148 | 5HRSBRG* - 5MTREE 161kV | 0 | Solution Undetermined | Not Available |
| 03SP | AEPW-AEPW | Marshall 138/69kV Transformer ckt 1 | 107 | Marshall 138/69kV Transformer Ckt 2 | 0 | Replace 755 ACAR Strain Bus | \$ 25,000 |
| 03SP | AEPW-AEPW | Marshall 138/69kV Transformer ckt 2 | 107 | Marshall 138/69kV Transformer Ckt 1 | 0 | Replace 755 ACAR Strain Bus | \$ 25,000 |
| 03SP | WERE-WERE | Mockingbird Hill Sw Station - Stull Sw Station 115kV | 92 | Hoyt - Stranger Creek 345kV | 0 | May be relieved due to Westar Transmission Operating Directive 803 | Not Available |
| 03SP | AEPW-AEPW | Pittsburg - Ferndale Lake Tap 69kV | 79 | Adora Rec - Adora T 69kV | 32 | Reset CTs @ Pittsburg | \$ 10,000 |
| 03SP | WERE-WERE | Tecumseh Hill - Stull Sw Station 115kV | 92 | Hoyt - Stranger Creek 345kV | 0 | May be relieved due to Westar Transmission Operating Directive 803 | Not Available |

Table 1 - continued – SPP facility upgrades that would be required if the CSWS to EDE request were the highest priority request in the queue

| Study Year | From Area - To Area | Branch Over 100% Rate B | Rate B | Outaged Branch Causing Overload | ATC | Solution | Estimated Cost |
|------------|---------------------|--|--------|--|-----|--|----------------|
| 03SP | OKGE-OKGE | Tinker #4 - Tinker #2 138kV | 100 | Horseshoe Lake - Midway 138kV | 0 | Invalid Overload | \$ - |
| 03FA | WERE-WERE | Auburn Road - Jeffrey Energy Center 230kV | 565 | Hoyt - Jeffery Energy Center 345kV | 0 | See Previous | See Previous |
| 03FA | WERE-WERE | Auburn Road - South Gage (West) 115kV | 75 | Hoyt - Jeffery Energy Center 345kV | 0 | See Previous | See Previous |
| 03FA | WERE-WERE | Auburn Road - South Gage (West) 115kV ckt 2 | 97 | Hoyt - Jeffery Energy Center 345kV Ckt 1 | 0 | See Previous | See Previous |
| 03FA | SWPA-EES | Bull Shoals - Midway 161kV | 162 | Norfolk - Buford Tap 161kV | 11 | Replace disconnect switches, metering CTs and wave trap at Bull Shoals | \$ 150,000 |
| 03FA | WERE-WERE | Coffey County No. 4 Vernon - Green 69kV | 45 | Wolf Creek - Lacygne 345kV | 53 | May be relieved due to Westar Transmission Operating Directive 1304 | Not Available |
| 03FA | AEPW-AEPW | Denver Center 138/13.8kV Transformer | 33 | Tulsa North - 46Th Street East 138kV | 0 | See Previous | See Previous |
| 03FA | SWPA-AECI | Doniphan 161/69kV Transformer ckt 1 | 18.8 | Doniphan 161/69kV Transformer Ckt 2 | 0 | See Previous | See Previous |
| 03FA | WERE-WERE | Tecumseh Hill - Stull Sw Station 115kV | 92 | Hoyt - Stranger Creek 345kV | 0 | See Previous | See Previous |
| 03WP | WERE-WERE | Auburn Road - Jeffrey Energy Center 230kV | 565 | Hoyt - Jeffery Energy Center 345kV | 0 | See Previous | See Previous |
| 03WP | WERE-WERE | Auburn Road - South Gage (West) 115kV | 75 | Hoyt - Jeffery Energy Center 345kV | 0 | See Previous | See Previous |
| 03WP | AEPW-AEPW | Denver Center 138/13.8kV Transformer | 33 | Tulsa North - 46Th Street East 138kV | 0 | See Previous | See Previous |
| 03WP | SWPA-AECI | Doniphan 161/69kV Transformer ckt 1 | 18.7 | Doniphan 161/69kV Transformer Ckt 2 | 0 | See Previous | See Previous |
| 03WP | WFEC-WFEC | Lexington - Paoli 69kV | 34 | Canadian Sw 69/138kV Transformer | 0 | Solution Undetermined | Not Available |
| 03WP | WFEC-WFEC | Paoli 69/138kV Transformer | 42 | Canadian Sw - Noble 69kV | 0 | Solution Undetermined | Not Available |
| 03WP | WERE-WERE | Tecumseh Hill - Stull Sw Station 115kV | 92 | Hoyt - Stranger Creek 345kV | 0 | See Previous | See Previous |
| 04G | WERE-WERE | Athens Sw Station - Coffey County No. 4 Vernon 69kV | 45 | Wolf Creek - Lacygne 345kV | 0 | May be relieved due to Westar Transmission Operating Directive 1304 | Not Available |
| 04G | WERE-WERE | Auburn Road - Jeffrey Energy Center 230kV | 565 | Hoyt - Jeffery Energy Center 345kV | 0 | See Previous | See Previous |
| 04G | WERE-WERE | Auburn Road - South Gage (West) 115kV | 75 | Hoyt - Jeffery Energy Center 345kV | 0 | See Previous | See Previous |
| 04G | WERE-WERE | Auburn Road - South Gage (West) 115kV ckt 2 | 97 | Hoyt - Jeffery Energy Center 345kV Ckt 1 | 0 | See Previous | See Previous |
| 04G | WERE-WERE | Coffey County No. 4 Vernon - Green 69kV | 45 | Wolf Creek - Lacygne 345kV | 0 | See Previous | See Previous |
| 04G | AEPW-AEPW | Denver Center 138/13.8kV Transformer | 33 | Tulsa North - 46Th Street East 138kV | 0 | See Previous | See Previous |
| 04G | WERE-WERE | Mockingbird Hill Sw Station - Stull Sw Station 115kV | 92 | Hoyt - Stranger Creek 345kV | 0 | See Previous | See Previous |
| 04G | WERE-WERE | Tecumseh Hill - Stull Sw Station 115kV | 92 | Hoyt - Stranger Creek 345kV | 0 | See Previous | See Previous |
| 05SP | WERE-WERE | 166Th Street - Jarbalo Junction Sw Station 115kV | 97 | Midland Junction - Pentagon 115kV | 0 | See Previous | See Previous |
| 05SP | GRRD-GRRD | Afton 161/69kV Transformer | 50 | Miami - Afton 161kV | 44 | Replace 50 MVA Transformer with 84 MVA unit | \$ 833,000 |
| 05SP | WERE-WERE | Auburn Road - Jeffrey Energy Center 230kV | 565 | Hoyt - Jeffery Energy Center 345kV | 0 | See Previous | See Previous |
| 05SP | AEPW-AEPW | Blue Circle - Catoosa 69kV | 72 | Lynn Lane West Tap - Lynn Lane Tap 138kV | 0 | Solution Undetermined | Not Available |
| 05SP | AECI-AECI | Bristow 138/69kV Transformer ckt 1 | 56 | Bristow 138/69kV Transformer Ckt 2 | 0 | Solution Undetermined | Not Available |
| 05SP | AECI-AECI | Bristow 138/69kV Transformer ckt 2 | 56 | Bristow 138/69kV Transformer Ckt 1 | 0 | Solution Undetermined | Not Available |
| 05SP | AEPW-AEPW | Broken Arrow 101St North - Oneta 138kV | 210 | Broken Arrow North - North Tap - Oneta 138kV | 0 | Replace wavetrapp | \$ 30,000 |
| 05SP | AEPW-AEPW | Carson-Center 138/13.8kV Transformer | 33 | Carson South - Tulsa Power Station 138kV | 0 | See Previous | See Previous |
| 05SP | SWPA-EES | Carthage - Reed Springs 69kV | 36 | Clinton - Osceola 161kV | 1 | See Previous | See Previous |
| 05SP | AEPW-AEPW | Catoosa 138/69kV Transformer | 55 | Lynn Lane West Tap - Lynn Lane Tap 138kV | 0 | See Previous | See Previous |
| 05SP | AEPW-AEPW | Chamber Springs - Farmington Aecc 161kV | 335 | Chamber Springs - Tontitown 161kV | 0 | Replace Farmington switch | \$ 60,000 |

Table 1 - continued – SPP facility upgrades that would be required if the CSWS to EDE request were the highest priority request in the queue

| Study Year | From Area - To Area | Branch Over 100% Rate B | Rate B | Outaged Branch Causing Overload | ATC | Solution | Estimated Cost |
|------------|---------------------|--|--------|--|-----|--|----------------|
| 05SP | AEPW-AEPW | Chamber Springs - Tontitown 161kV | 244 | Flint Creek - Tontitown 161kV | 0 | Rebuild 12 miles with 2156ACSR | \$ 7,200,000 |
| 05SP | AEPW-AEPW | Cherokee Rec - Knox Lee 138kV | 209 | Multiple Outage Contingency , Southwest Shreveport - Longwood 345kV, Southwest Shreveport to Diana 345kV | 0 | See Previous | See Previous |
| 05SP | AEPW-AEPW | Cherokee Rec - Tatum 138kV | 209 | Multiple Outage Contingency , Southwest Shreveport - Longwood 345kV, Southwest Shreveport to Diana 345kV | 0 | See Previous | See Previous |
| 05SP | GRRD-GRRD | Claremore 161/69kV Transformer ckt 1 | 84 | Claremore 161/69kV Transformer Ckt 2 | 0 | See Previous | See Previous |
| 05SP | GRRD-GRRD | Claremore 161/69kV Transformer ckt 2 | 84 | Claremore 161/69kV Transformer Ckt 1 | 0 | See Previous | See Previous |
| 05SP | SPRM-AECI | Clay - Logan 161kV | 185 | Multiple Outage Contingency, Franks - Huben 345kV, Huben - Morgan 345kV | 34 | Replace transmission line structures to allow operation at 100C | \$ 250,000 |
| 05SP | AEPW-AEPW | Denver Center 138/13.8kV Transformer | 33 | Tulsa North - 46Th Street East 138kV | 0 | See Previous | See Previous |
| 05SP | AEPW-AEPW | Denver-West 138/13.8kV Transformer | 33 | Carson South - Kenosha West 138kV | 0 | See Previous | See Previous |
| 05SP | OKGE-OKGE | Draper Lake 138/345kV Transformer ckt 1 | 493 | Draper Lake 138/345kV Transformer Ckt 2 | 0 | See Previous | See Previous |
| 05SP | OKGE-OKGE | Draper Lake 138/345kV Transformer ckt 2 | 493 | Draper Lake 138/345kV Transformer Ckt 1 | 0 | See Previous | See Previous |
| 05SP | AEPW-AEPW | East Centerton - Gentry Rec 161kV | 353 | Flint Creek - Tontitown 161kV | 0 | See Previous | See Previous |
| 05SP | AEPW-AEPW | Elm Springs Rec - Tontitown 161kV | 306 | Chamber Springs - Farmington Aecc 161kV | 0 | Replace Switch and Elm Springs Strain Bus | \$ 100,000 |
| 05SP | AEPW-AEPW | Flint Creek - Gentry Rec 161kV | 353 | Flint Creek - Tontitown 161kV | 0 | See Previous | See Previous |
| 05SP | AEPW-AEPW | Flint Creek - Tontitown 161kV | 312 | Chamber Springs - Tontitown 161kV | 0 | Replace switch and jumpers | \$ 45,000 |
| 05SP | WERE-WERE | Gill Energy Center East - Macarthur 69kV | 68 | Gill Energy Center East - Oatville 69kV | 0 | See Previous | See Previous |
| 05SP | WERE-WERE | Gill Energy Center East - Oatville 69kV | 72 | Gill Energy Center East - Macarthur 69kV | 0 | See Previous | See Previous |
| 05SP | AEPW-AEPW | Hallsville - Longview Heights 69kV | 48 | Marshall - Marshall Auto 69kV | 0 | Rebuild 7.07 miles of 4/0 ACSR with 795 ACSR | \$ 3,000,000 |
| 05SP | SWPA-EES | Hergett - Jonesboro 161kV | 148 | 5HR5BRG* - 5MTREE 161kV | 0 | See Previous | See Previous |
| 05SP | WERE-WERE | Lawrence Hill - Wren 115kV | 141 | Mockingbird Hill Sw Station - Southwest Lawrence 115kV | 0 | May be relieved due to Westar Transmission Operating Directive 1210 | Not Available |
| 05SP | AEPW-AEPW | Longwood - Noram 138kV | 234 | Multiple Outage Contingency , Southwest Shreveport - Longwood 345kV, Southwest Shreveport to Diana 345kV | 0 | Reconductor 4.66 miles of bundled 266 ACSR with 1590 ACSR and replace jumpers & Bus Riser jumpers | \$ 1,577,000 |
| 05SP | AEPW-AEPW | Marshall - North Marshall 69kV | 72 | Flournoy 69/138kV Transformer | 0 | Replace 350 CU bus & jumpers @ North Marshall. | \$ 23,300 |
| 05SP | AEPW-AEPW | Marshall 138/69kV Transformer ckt 1 | 107 | Marshall 138/69kV Transformer Ckt 2 | 0 | See Previous | See Previous |
| 05SP | AEPW-AEPW | Marshall 138/69kV Transformer ckt 2 | 107 | Marshall 138/69kV Transformer Ckt 1 | 0 | See Previous | See Previous |
| 05SP | WERE-WERE | Mockingbird Hill Sw Station - Stull Sw Station 115kV | 92 | Hoyt - Stranger Creek 345kV | 0 | See Previous | See Previous |
| 05SP | AEPW-AEPW | Northwest Henderson - Poynter 69kV | 72 | Evenside - Northwest Henderson 69kV | 0 | Solution Undetermined | Not Available |
| 05SP | AEPW-AEPW | Rock Hill - Tatum 138kV | 209 | Multiple Outage Contingency , Southwest Shreveport - Longwood 345kV, Southwest Shreveport to Diana 345kV | 0 | Reconductor 0.81 miles 666MCM to 1272 ACSR - Reconductor other 5.76 miles of 795 ACSR with 1272 ACSR. Reset CTs and relay settings @ Rock Hill | \$ 342,970 |
| 05SP | AEPW-WFEC | Southwest Station - Anadarko 138kV | 203 | Southwest Station - Norge Road 138kV | 0 | Replace bus, jumpers, switches, supports and foundations at Anadarko Switch Station | \$ 450,000 |
| 05SP | SWPA-SPRM | Springfield - Brookline 161kV | 323 | Southwest - Southwest Disposal 161kV | 45 | Solution Undetermined | Not Available |
| 05SP | WERE-WERE | Tecumseh Hill - Stull Sw Station 115kV | 92 | Hoyt - Stranger Creek 345kV | 0 | See Previous | See Previous |
| 05SP | OKGE-OKGE | Tinker #4 - Tinker #2 138kV | 100 | Horseshoe Lake - Midway 138kV | 0 | See Previous | See Previous |

Table 1 - continued – SPP facility upgrades that would be required if the CSWS to EDE request were the highest priority request in the queue

| Study Year | From Area - To Area | Branch Over 100% Rate B | Rate B | Outaged Branch Causing Overload | ATC | Solution | Estimated Cost |
|------------|---------------------|--|--------|--|-----|---|----------------|
| 05WP | WERE-WERE | Auburn Road - Jeffrey Energy Center 230kV | 565 | Hoyt - Jeffery Energy Center 345kV | 0 | See Previous | See Previous |
| 05WP | SWPA-EES | Carthage - Reed Springs 69kV | 43 | Sub 124 - Aurora H.T. - Sub 383 - Monett 161kV | 68 | See Previous | See Previous |
| 05WP | AEPW-AEPW | Catoosa 138/69kV Transformer | 55 | Lynn Lane West Tap - Lynn Lane Tap 138kV | 0 | See Previous | See Previous |
| 05WP | WERE-WERE | Circleville - Hoyt Hti Sw Junction 115kV | 97 | Concordia 115/230kV Transformer | 41 | Replace 82 structures | \$ 742,000 |
| 05WP | AEPW-AEPW | Denver Center 138/13.8kV Transformer | 33 | Tulsa North - 46Th Street East 138kV | 0 | See Previous | See Previous |
| 05WP | WERE-WERE | Mockingbird Hill Sw Station - Stull Sw Station 115kV | 92 | Hoyt - Stranger Creek 345kV | 0 | See Previous | See Previous |
| 05WP | WERE-WERE | Tecumseh Hill - Stull Sw Station 115kV | 92 | Hoyt - Stranger Creek 345kV | 0 | See Previous | See Previous |
| 08SP | WERE-WERE | 166Th Street - Jarbalo Junction Sw Station 115kV | 97 | Midland Junction - Pentagon 115kV | 0 | See Previous | See Previous |
| 08SP | GRRD-GRRD | 412Sub - Kansas Tap 161kV | 338 | Flint Creek - Grda1 345kV | 45 | Reconductor 9.7 miles with 1590MCM ACSR | \$ 1,488,000 |
| 08SP | WERE-WERE | Auburn Road - Indian Hills 115kV | 223 | Hoyt - Jeffery Energy Center 345kV | 0 | May be relieved due to Westar Transmission Operating Directive 400 | Not Available |
| 08SP | WERE-WERE | Auburn Road - Jeffrey Energy Center 230kV | 565 | Hoyt - Jeffery Energy Center 345kV | 0 | See Previous | See Previous |
| 08SP | AEPW-AEPW | Blue Circle - Catoosa 69kV | 72 | Lynn Lane West Tap - Lynn Lane Tap 138kV | 0 | See Previous | See Previous |
| 08SP | AECI-AECI | Bristow 138/69kV Transformer ckt 1 | 56 | Bristow 138/69kV Transformer Ckt 2 | 0 | See Previous | See Previous |
| 08SP | AECI-AECI | Bristow 138/69kV Transformer ckt 2 | 56 | Bristow 138/69kV Transformer Ckt 1 | 0 | See Previous | See Previous |
| 08SP | AEPW-AEPW | Broken Arrow 101St North - Oneta 138kV | 210 | Wekiwa - Tulsa North 345kV | 0 | See Previous | See Previous |
| 08SP | AEPW-AEPW | Broken Arrow 81St - Broken Arrow 101St North 138kV | 235 | Riverside Station Auto 138/345kV Transformer | 0 | Rebuild 2.05 miles of 795 ACSR with 1590 ACSR | \$ 1,100,000 |
| 08SP | AEPW-AEPW | Broken Arrow North - South Tap - Oneta 138kV | 235 | Tulsa North - Northeast Station 345kV | 0 | Rebuild 4.31 miles of 795 ACSR with 1590 ACSR. | \$ 2,370,500 |
| 08SP | AEPW-AEPW | Carson-Center 138/13.8kV Transformer | 33 | Carson South - Tulsa Power Station 138kV | 0 | See Previous | See Previous |
| 08SP | WFEC-WFEC | Carter Jct - Lake Creek 69kV | 26 | Elk City 138/69kV Transformer | 0 | See Previous | See Previous |
| 08SP | SWPA-EES | Carthage - Jasper 69kV | 47 | Butler - Adrian 161kV | 20 | Third Party Facility | \$ - |
| 08SP | SWPA-EES | Carthage - Reed Springs 69kV | 36 | Carthage - 2DMNDTP 69kV | 92 | See Previous | See Previous |
| 08SP | AEPW-AEPW | Catoosa 138/69kV Transformer | 55 | Lynn Lane West Tap - Lynn Lane Tap 138kV | 0 | See Previous | See Previous |
| 08SP | AEPW-AEPW | Chamber Springs - Tontitown 161kV | 244 | Chamber Springs - Farmington Aecc 161kV | 0 | See Previous | See Previous |
| 08SP | AEPW-AEPW | Chamber Springs 161/345kV Transformer | 660 | Flint Creek - Grda1 345kV | 2 | Install 2nd 345/161 kV Auto-transformer | \$ 4,000,000 |
| 08SP | AEPW-AEPW | Cherokee Rec - Knox Lee 138kV | 209 | Multiple Outage Contingency , Southwest Shreveport - Longwood 345kV, Southwest Shreveport to Diana 345kV | 0 | See Previous | See Previous |
| 08SP | AEPW-AEPW | Cherokee Rec - Tatum 138kV | 209 | Multiple Outage Contingency , Southwest Shreveport - Longwood 345kV, Southwest Shreveport to Diana 345kV | 0 | See Previous | See Previous |
| 08SP | WERE-WERE | Chisholm - Evans Energy Center North 138kV | 382 | Evans Energy Center South - Lakeridge 138kV | 0 | Solution Undetermined | Not Available |
| 08SP | GRRD-GRRD | Claremore 161/69kV Transformer ckt 1 | 84 | Claremore 161/69kV Transformer Ckt 2 | 0 | See Previous | See Previous |
| 08SP | GRRD-GRRD | Claremore 161/69kV Transformer ckt 2 | 84 | Claremore 161/69kV Transformer Ckt 1 | 0 | See Previous | See Previous |
| 08SP | WERE-WERE | County Line - Rock Creek 69kV | 41 | Stranger Creek 345/951kV Transformer Ckt 0 | 0 | Solution Undetermined | Not Available |
| 08SP | WERE-WERE | County Line - Tecumseh Hill 115kV | 106 | Tecumseh Energy Center - Tecumseh Hill 115kV | 0 | May be relieved due to Westar Transmission Operating Directive 1203 | Not Available |
| 08SP | KACP-KACP | Craig - College 161kV | 335 | Stilwell - Antioch 161kV | 0 | Solution Undetermined | Not Available |
| 08SP | AEPW-AEPW | Denver Center 138/13.8kV Transformer | 33 | Tulsa North - 46Th Street East 138kV | 0 | See Previous | See Previous |

Table 1 - continued – SPP facility upgrades that would be required if the CSWS to EDE request were the highest priority request in the queue

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|------------|---------------------|---|--------|--|-----|--|----------------|
| 08SP | AEPW-AEPW | Denver-West 138/13.8kV Transformer | 33 | Carson South - Kenosha West 138kV | 0 | See Previous | See Previous |
| 08SP | OKGE-OKGE | Draper Lake 138/345kV Transformer ckt 1 | 493 | Draper Lake 138/345kV Transformer Ckt 2 | 0 | See Previous | See Previous |
| 08SP | OKGE-OKGE | Draper Lake 138/345kV Transformer ckt 2 | 493 | Draper Lake 138/345kV Transformer Ckt 1 | 0 | See Previous | See Previous |
| 08SP | AEPW-AEPW | East Centerton - Gentry Rec 161kV | 353 | Flint Creek - East Centerton 345kV | 0 | See Previous | See Previous |
| 08SP | AEPW-AEPW | Elm Springs Rec - Tontitown 161kV | 306 | Chamber Springs - Farmington Aecc 161kV | 0 | See Previous | See Previous |
| 08SP | AEPW-AEPW | Flint Creek - Gentry Rec 161kV | 353 | Flint Creek - East Centerton 345kV | 0 | See Previous | See Previous |
| 08SP | AEPW-AEPW | Flint Creek - Tontitown 161kV | 312 | Chamber Springs - Clarksville 345kV | 0 | See Previous | See Previous |
| 08SP | AEPW-AEPW | Fulton - Hope 115kV | 174 | Fulton 138/115kV Transformer | 0 | Solution Undetermined | Not Available |
| 08SP | AEPW-EES | Fulton - Patmos 115kV | 174 | Crockett - Grimes 345kV | 0 | Using 1590MCM ACSR, reconductor 7.1 miles | \$ 2,300,000 |
| 08SP | WERE-WERE | Gill Energy Center East - Interstate 138kV | 210 | Evans Energy Center South - Lakeridge 138kV | 0 | Solution Undetermined | Not Available |
| 08SP | WERE-WERE | Gill Energy Center East - Macarthur 69kV | 68 | Gill Energy Center East - Oatville 69kV | 0 | See Previous | See Previous |
| 08SP | WERE-WERE | Gill Energy Center West - Haysville Junction 69kV | 80 | Canal 138/211kV Transformer Ckt 0 | 0 | Solution Undetermined | Not Available |
| 08SP | AEPW-AEPW | Hallsville - Longview Heights 69kV | 48 | Marshall - Marshall Auto 69kV | 0 | See Previous | See Previous |
| 08SP | SWPA-EES | Hergett - Jonesboro 161kV | 148 | 5HR5BRG* - 5MTREE 161kV | 0 | See Previous | See Previous |
| 08SP | AEPW-AEPW | Jacksonville (Swe-Rc-Etec) - Overton 138kV | 235 | Crockett - Tenaska Rusk County 345kV | 0 | Reset relays at Jacksonville & Overton | \$ 15,000 |
| 08SP | SWPA-EES | Jonesboro - Jonesboro 161kV | 223 | New Madrid - Kennett 161kV | 0 | Solution Undetermined | Not Available |
| 08SP | GRRD-GRRD | Kerr - 412Sub 161kV | 338 | Flint Creek - Grda1 345kV | 0 | Reconductor 12.5 miles with 1590MCM ACSR. | \$ 1,918,000 |
| 08SP | AEPW-AEPW | Knox Lee - Oak Hill #2 138kV | 210 | Knox Lee - Monroe Corners Rec 138kV | 0 | Replace wavetrap @ Knoxville | \$ 20,000 |
| 08SP | WERE-WERE | Lawrence Hill - Wren 115kV | 141 | Mockingbird Hill Sw Station - Southwest Lawrence 115kV | 0 | See Previous | See Previous |
| 08SP | AEPW-AEPW | Lieberman - IPC Jefferson 138kV | 136 | Longwood - Wilkes 345kV | 48 | Reconductor 26.35 miles of 336 ACSR with 795 ACSR, Replace Switches @ Lieberman, Reset Relays @ Jefferson IPC, & Reconductor 0.65 miles 397MCM to 795MCM | \$ 7,411,000 |
| 08SP | WFEC-WFEC | Lindsay Sw - Wallville 69kV | 26 | Fletcher - Marlow Jct 69kV | 0 | Solution Undetermined | Not Available |
| 08SP | AEPW-AEPW | Longwood - Noram 138kV | 234 | Multiple Outage Contingency , Southwest Shreveport - Longwood 345kV, Southwest Shreveport to Diana 345kV | 0 | See Previous | See Previous |
| 08SP | AEPW-AEPW | Marshall - North Marshall 69kV | 72 | Flournoy 69/138kV Transformer | 0 | See Previous | See Previous |
| 08SP | AEPW-AEPW | Marshall 138/69kV Transformer ckt 1 | 107 | Marshall 138/69kV Transformer Ckt 2 | 0 | See Previous | See Previous |
| 08SP | AEPW-AEPW | Marshall 138/69kV Transformer ckt 2 | 107 | Marshall 138/69kV Transformer Ckt 1 | 0 | See Previous | See Previous |
| 08SP | OKGE-WFEC | Midwest Tap - Franklin Sw 138kV | 215 | Anadarko - Pocassett 138kV | 0 | Replace 600A metering CTs with 1200A | \$ 55,000 |
| 08SP | WERE-WERE | Mockingbird Hill Sw Station - Stull Sw Station 115kV | 92 | Hoyt - Stranger Creek 345kV | 0 | See Previous | See Previous |
| 08SP | WERE-WERE | N.A. Phillips Junction (North) - Smoky Hill 115kV ckt 1 | 68 | N.A. Phillips Junction (North) - Smoky Hill 115kV Ckt 2 | 0 | Solution Undetermined | Not Available |
| 08SP | WERE-WERE | N.A. Phillips Junction (South) - West Mcpherson 115kV | 68 | East Mcpherson - Summit 230kV | 10 | May be relieved due to Westar Transmission Operating Directive 613 | Not Available |
| 08SP | AEPW-AEPW | North Marshall - Woodlawn 69kV | 51 | Flournoy 69/138kV Transformer | 63 | Replace 3/0 CU jumpers @ North Marshall | \$ 15,000 |
| 08SP | AEPW-AEPW | Northwest Henderson - Poynter 69kV | 72 | Evenside - Northwest Henderson 69kV | 0 | See Previous | See Previous |
| 08SP | OKGE-OKGE | Pecan Creek 161/345kV Transformer | 369 | Muskogee - Ft Smith 345kV | 0 | Add 2nd 345/161 kV 369MVA transformer. | \$ 3,000,000 |

Table 1 - continued – SPP facility upgrades that would be required if the CSWS to EDE request were the highest priority request in the queue

| Study Year | From Area - To Area | Branch Over 100% Rate B | Rate B | Outaged Branch Causing Overload | ATC | Solution | Estimated Cost |
|--------------------------------------|---------------------|--|--------|--|-----|---|----------------|
| 08SP | AEPW-AEPW | Raines - Noram 138kV | 234 | Multiple Outage Contingency , Southwest Shreveport - Longwood 345kV, Southwest Shreveport to Diana 345kV | 0 | Rebuild 5.58 miles of 2-266 ACSR with 1590 ACSR | \$ 2,000,000 |
| 08SP | AEPW-AEPW | Rock Hill - Tatum 138kV | 209 | Multiple Outage Contingency , Southwest Shreveport - Longwood 345kV, Southwest Shreveport to Diana 345kV | 0 | See Previous | See Previous |
| 08SP | AEPW-AEPW | South Fayetteville - Farmington Aecc 161kV | 313 | Chamber Springs - Tontitown 161kV | 0 | Solution Undetermined | Not Available |
| 08SP | WERE-WERE | SW Lawrence - Wakarusa Junction Sw Station 115kV | 92 | Ku Campus - 19Th Street Junction 115kV | 0 | Solution Undetermined | Not Available |
| 08SP | SWPA-SPRM | Springfield - Brookline 161kV | 323 | Southwest - Southwest Disposal 161kV | 0 | See Previous | See Previous |
| 08SP | EMDE-EMDE | Oronogo Jct. - Joplin Oakland North 161kV | 214 | Sub 292 - Tipton Ford - Sub 389 - Joplin Southwest 161kV | 6 | Reconstruct and replace 1.4 miles of 556 ACSR with Bundled 556 ACSR | \$ 800,000 |
| 08SP | EMDE-AECI | Sub 446 - Chesapeake - 2MTVRN 69kV | 36 | Sub 124 - Aurora H.T. - Sub 355 - Aurora West 69kV | 0 | Solution Undetermined | Not Available |
| 08SP | WERE-WERE | Tecumseh Energy Center - Tecumseh Hill 115kV | 236 | Hoyt - Stranger Creek 345kV | 0 | May be relieved due to Westar Transmission Operating Directive 803 | Not Available |
| 08SP | WERE-WERE | Tecumseh Hill - Stull Sw Station 115kV | 92 | Hoyt - Stranger Creek 345kV | 0 | See Previous | See Previous |
| 08SP | OKGE-OKGE | Tinker #4 - Tinker #2 138kV | 100 | Horseshoe Lake - Midway 138kV | 0 | See Previous | See Previous |
| 08WP | WERE-WERE | 166Th Street - Jarbalo Junction Sw Station 115kV | 97 | Midland Junction - Pentagon 115kV | 0 | See Previous | See Previous |
| 08WP | WERE-WERE | Auburn Road - Jeffrey Energy Center 230kV | 565 | Hoyt - Jeffery Energy Center 345kV | 0 | See Previous | See Previous |
| 08WP | WFEC-WFEC | Carter Jct - Lake Creek 69kV | 26 | Elk City 138/69kV Transformer | 0 | See Previous | See Previous |
| 08WP | SWPA-EES | Carthage - Reed Springs 69kV | 43 | Sub 124 - Aurora H.T. - Sub 355 - Aurora West 69kV | 32 | See Previous | See Previous |
| 08WP | AEPW-AEPW | Catoosa 138/69kV Transformer | 55 | Lynn Lane West Tap - Lynn Lane Tap 138kV | 0 | See Previous | See Previous |
| 08WP | WERE-WERE | Circleville - King Hill N.M. Coop 115kV | 92 | East Manhattan - Concordia 230kV | 12 | May be relieved due to Westar Transmission Operating Directive 803 | Not Available |
| 08WP | SPRM-AECI | Clay - Logan 161kV | 232 | Multiple Outage Contingency, Franks - Huben 345kV, Huben - Morgan 345kV | 4 | See Previous | See Previous |
| 08WP | AEPW-AEPW | Denver Center 138/13.8kV Transformer | 33 | Tulsa North - 46Th Street East 138kV | 0 | See Previous | See Previous |
| 08WP | AEPW-AEPW | Denver-West 138/13.8kV Transformer | 33 | Carson South - Kenosha West 138kV | 0 | See Previous | See Previous |
| 08WP | SWPA-AECI | Doniphan 161/69kV Transformer ckt 1 | 18.8 | Doniphan 161/69kV Transformer Ckt 2 | 0 | See Previous | See Previous |
| 08WP | AEPW-AEPW | Jacksonville (Swe-Rc-Etec) - Overton 138kV | 265 | Crockett - Tenaska Rusk County 345kV | 0 | See Previous | See Previous |
| 08WP | AEPW-AEPW | Marshall 138/69kV Transformer ckt 1 | 121 | Marshall 138/69kV Transformer Ckt 2 | 99 | See Previous | See Previous |
| 08WP | AEPW-AEPW | Marshall 138/69kV Transformer ckt 2 | 121 | Marshall 138/69kV Transformer Ckt 1 | 99 | See Previous | See Previous |
| 08WP | WERE-WERE | Mockingbird Hill Sw Station - Stull Sw Station 115kV | 92 | Hoyt - Stranger Creek 345kV | 0 | See Previous | See Previous |
| 08WP | WERE-WERE | Southwest Lawrence - Wakarusa Junction Sw Sta 115kV | 92 | Ku Campus - 19Th Street Junction 115kV | 0 | See Previous | See Previous |
| 08WP | WERE-WERE | Tecumseh Hill - Stull Sw Station 115kV | 92 | Hoyt - Stranger Creek 345kV | 0 | See Previous | See Previous |
| Total (Excludes Costs Not Available) | | | | | | | \$ 52,444,770 |

Table 2 - SPP facility upgrades required based on the actual queue position with higher priority requests included

| Study Year | From Area - To Area | Branch Over 100% Rate B | Rate B | Outaged Branch Causing Overload | ATC | Solution | Estimated Cost |
|------------|---------------------|--|--------|--|-----|--|----------------|
| 03SP | WERE-WERE | 166Th Street - Jarbalo Junction Sw Station 115kV | 97 | Midland Junction - Pentagon 115kV | 0 | May be relieved due to Westar Transmission Operating Directive 1202 | Not Available |
| 03SP | GRRD-GRRD | Afton 161/69kV Transformer | 50 | Miami - Afton 161kV | 0 | Replace 50 MVA Transformer with 84 MVA unit | \$ 833,000 |
| 03SP | WERE-WERE | Auburn Road - Jeffrey Energy Center 230kV | 565 | Hoyt - Jeffrey Energy Center 345kV | 0 | May be relieved due to Westar Transmission Operating Directive 400 | Not Available |
| 03SP | WERE-WERE | Auburn Road - South Gage (West) 115kV | 75 | Hoyt - Jeffrey Energy Center 345kV | 0 | May be relieved due to Westar Transmission Operating Directive 400 | Not Available |
| 03SP | WERE-WERE | Auburn Road - South Gage (West) 115kV ckt 2 | 97 | Hoyt - Jeffrey Energy Center 345kV Ckt 1 | 0 | May be relieved due to Westar Transmission Operating Directive 400 | Not Available |
| 03SP | AEPW-AEPW | Big Sandy - Perdue 69kV | 85 | Perdue - Lake Hawkins 138kV | 0 | Solution Undetermined | Not Available |
| 03SP | AEPW-AEPW | Blue Circle - Catoosa 69kV | 72 | Lynn Lane West Tap - Lynn Lane Tap 138kV | 0 | Solution Undetermined | Not Available |
| 03SP | AEPW-OKGE | Bonanza - Bonanza Tap 161kV | 177 | Ft Smith - ANO 500kV | 36 | Rebuild 0.06 miles of 397.5 ACSR with 795MCM ACSR | \$ 50,000 |
| 03SP | SWPA-AEPW | Broken Bow - Craig Junction 138kV | 107 | Craig Junction - Mountain River 138kV | 12 | Rebuild 7.66 miles of 3/0 CW CU with 795 ACSR | \$ 2,700,000 |
| 03SP | SWPA-EES | Bull Shoals - Midway 161kV | 162 | Bull Shoals - Flippin 161kV | 15 | Replace disconnect switches, metering CTs and wave trap at Bull Shoals | \$ 150,000 |
| 03SP | AEPW-AEPW | Carson-Center 138/13.8kV Transformer | 33 | Carson South - Tulsa Power Station 138kV | 0 | Solution Undetermined | Not Available |
| 03SP | WFEC-WFEC | Carter Jct - Lake Creek 69kV | 26 | Elk City 138/69kV Transformer | 0 | Solution Undetermined | Not Available |
| 03SP | SWPA-EES | Carthage - Jasper 69kV | 47 | Milo - Clark 69kV | 13 | Third Party Facility | \$ - |
| 03SP | SWPA-EES | Carthage - Reed Springs 69kV | 36 | #N/A | 21 | Third Party Facility | \$ - |
| 03SP | SWPA-SWPA | Carthage 161/69kV Transformer ckt 1 | 84 | Carthage 161/69kV Transformer Ckt 2 | 30 | Third Party Facility | \$ - |
| 03SP | SWPA-SWPA | Carthage 161/69kV Transformer ckt 2 | 84 | Carthage 161/69kV Transformer Ckt 1 | 13 | Transformers owned by City of Carthage and AECl | \$ - |
| 03SP | AEPW-AEPW | Catoosa 138/69kV Transformer | 55 | Lynn Lane West Tap - Lynn Lane Tap 138kV | 0 | Solution Undetermined | Not Available |
| 03SP | AEPW-AEPW | Cherokee Rec - Knox Lee 138kV | 209 | Multiple Outage Contingency , Southwest Shreveport - Longwood 345kV, Southwest Shreveport to Diana 345kV | 0 | Reconductor 3.25 miles of 666 ACSR with 1272 ACSR | \$ 981,000 |
| 03SP | AEPW-AEPW | Cherokee Rec - Tatum 138kV | 209 | Multiple Outage Contingency , Southwest Shreveport - Longwood 345kV, Southwest Shreveport to Diana 345kV | 0 | Reconductor 6.25 miles of 666 ACSR with 1272 ACSR | \$ 1,641,000 |
| 03SP | GRRD-GRRD | Claremore 161/69kV Transformer ckt 1 | 84 | Claremore 161/69kV Transformer Ckt 2 | 0 | Solution Undetermined | Not Available |
| 03SP | GRRD-GRRD | Claremore 161/69kV Transformer ckt 2 | 84 | Claremore 161/69kV Transformer Ckt 1 | 0 | Solution Undetermined | Not Available |
| 03SP | AEPW-WERE | Coffeyville Tap - Dearing 138kV | 210 | Delaware - Neosho 345kV | 0 | Replace wave trap to increase rating to conductor rating (2000 A) | \$ 20,000 |
| 03SP | WERE-WERE | Creswell - Paris 69kV | 80 | Creswell - Oak 69kV | 0 | Solution Undetermined | Not Available |
| 03SP | AEPW-AEPW | Denver Center 138/13.8kV Transformer | 33 | Tulsa North - 46Th Street East 138kV | 0 | Solution Undetermined | Not Available |
| 03SP | AEPW-AEPW | Denver-West 138/13.8kV Transformer | 33 | Carson South - Kenosha West 138kV | 0 | Solution Undetermined | Not Available |
| 03SP | SWPA-AECl | Doniphan 161/69kV Transformer ckt 1 | 18.8 | Doniphan 161/69kV Transformer Ckt 2 | 0 | Solution Undetermined | Not Available |
| 03SP | AEPW-AEPW | Dyess - Chamber Springs 161kV | 244 | Chamber Springs - Farmington Aecc 161kV | 0 | AEPW Planned Tontitown Project | \$ - |
| 03SP | AEPW-AEPW | Dyess - East Rogers 161kV | 244 | Flint Creek - Gentry Rec 161kV | 0 | AEPW Planned Tontitown Project | \$ - |
| 03SP | AEPW-AEPW | East Centerton - Gentry Rec 161kV | 353 | Flint Creek - Elm Springs Rec 161kV | 0 | Rebuild 19.16 miles of 2-397.5 ACSR with 2156 ACSR | \$ 8,000,000 |

Table 2 – continued - SPP facility upgrades required based on the actual queue position with higher priority requests included

| Study Year | From Area - To Area | Branch Over 100% Rate B | Rate B | Outaged Branch Causing Overload | ATC | Solution | Estimated Cost |
|------------|---------------------|--|--------|--|-----|--|----------------|
| 03SP | AEPW-AEPW | Flint Creek - Elm Springs Rec 161kV | 312 | Chamber Springs - Clarksville 345kV | 0 | AEPW Planned Tontitown Project | \$ - |
| 03SP | AEPW-AEPW | Flint Creek - Gentry Rec 161kV | 353 | Flint Creek - Elm Springs Rec 161kV | 0 | Rebuild 1.09 miles of 2- 397.5 ACSR with 2156 ACSR. | \$ 400,000 |
| 03SP | WERE-WERE | Gill Energy Center East - Macarthur 69kV | 68 | Gill Energy Center East - Oatville 69kV | 0 | Replace substation bus and jumpers at MacArthur 69 kV | \$ 22,000 |
| 03SP | WERE-WERE | Gill Energy Center East - Oatville 69kV | 72 | Gill Energy Center East - Macarthur 69kV | 0 | Replace disconnect switches at Gill 69 kV , Replace line switch at Oatville 69 kV | \$ 45,000 |
| 03SP | AEPW-AEPW | Greggton - Lake Lamond 69kV | 107 | Diana - Perdue 138kV | 0 | Solution Undetermined | Not Available |
| 03SP | SWPA-EES | Hergett - Jonesboro 161kV | 148 | 5HRSEBRG* - 5MTREE 161kV | 0 | Solution Undetermined | Not Available |
| 03SP | AEPW-AEPW | Lieberman - IPC Jefferson 138kV | 136 | Longwood - Wilkes 345kV | 0 | Reconductor 26.35 miles of 336 ACSR with 795 ACSR, Replace Switches @ Lieberman, Reset Relays @ Jefferson IPC, & Reconductor 0.65 miles 397MCM to 795MCM | \$ 7,411,000 |
| 03SP | AEPW-AEPW | Longwood - Noram 138kV | 234 | Multiple Outage Contingency , Southwest Shreveport - Longwood 345kV, Southwest Shreveport to Diana 345kV | 0 | Reconductor 4.66 miles of bundled 266 ACSR with 1590 ACSR and replace jumpers & Bus Riser jumpers | \$ 1,577,000 |
| 03SP | AEPW-AEPW | Marshall - North Marshall 69kV | 72 | Multiple Outage Contingency , Southwest Shreveport - Longwood 345kV, Southwest Shreveport to Diana 345kV | 58 | Replace 350 CU bus & jumpers @ North Marshall. | \$ 23,300 |
| 03SP | AEPW-AEPW | Marshall 138/69kV Transformer ckt 1 | 107 | Marshall 138/69kV Transformer Ckt 2 | 0 | Replace 755 ACAR Strain Bus | \$ 25,000 |
| 03SP | AEPW-AEPW | Marshall 138/69kV Transformer ckt 2 | 107 | Marshall 138/69kV Transformer Ckt 1 | 0 | Replace 755 ACAR Strain Bus | \$ 25,000 |
| 03SP | WERE-WERE | Mockingbird Hill Sw Station - Stull Sw Station 115kV | 92 | Hoyt - Stranger Creek 345kV | 0 | May be relieved due to Westar Transmission Operating Directive 803 | Not Available |
| 03SP | AEPW-AEPW | North Bartlesville - Bartlesville Southeast 138kV | 210 | Delaware - Northeast Station 345kV | 63 | Replace Bartlesville Southeast Wavetrap | \$ 30,000 |
| 03SP | OKGE-OKGE | Pecan Creek 161/345kV Transformer | 369 | Muskogee - Ft Smith 345kV | 0 | Add 2nd 345/161 kV 369MVA transformer. | \$ 3,000,000 |
| 03SP | AEPW-AEPW | Raines - Noram 138kV | 234 | Multiple Outage Contingency , Southwest Shreveport - Longwood 345kV, Southwest Shreveport to Diana 345kV | 0 | Rebuild 5.58 miles of 2- 266 ACSR with 1590 ACSR | \$ 2,000,000 |
| 03SP | AEPW-AEPW | Rock Hill - Tatum 138kV | 209 | Multiple Outage Contingency , Southwest Shreveport - Longwood 345kV, Southwest Shreveport to Diana 345kV | 0 | Reconductor 0.81 miles 666MCM to 1272 ACSR - Reconductor other 5.76 miles of 795 ACSR with 1272 ACSR. Reset CTs and relay settings @ Rock Hill | \$ 342,970 |
| 03SP | SWPA-SWPA | Sallisaw - Gore 161kV | 189 | Muskogee - Ft Smith 345kV | 66 | Increase clearances of approximately ten spans to allow operation of line at 100C, This will increase the line capacity to 223MVA | \$ 500,000 |
| 03SP | WERE-WERE | Tecumseh Hill - Stull Sw Station 115kV | 92 | Hoyt - Stranger Creek 345kV | 0 | May be relieved due to Westar Transmission Operating Directive 803 | Not Available |
| 03SP | OKGE-OKGE | Tinker #4 - Tinker #2 138kV | 100 | Horseshoe Lake - Midway 138kV | 0 | Invalid Overload | \$ - |
| 03FA | WERE-WERE | Athens Sw Station - Coffey County No. 4 Vernon 69kV | 45 | Wolf Creek - Lacygne 345kV | 0 | May be relieved due to Westar Transmission Operating Directive 1304 | Not Available |
| 03FA | WERE-WERE | Auburn Road - Jeffery Energy Center 230kV | 565 | Hoyt - Jeffery Energy Center 345kV | 0 | See Previous | See Previous |
| 03FA | WERE-WERE | Auburn Road - South Gage (West) 115kV | 75 | Hoyt - Jeffery Energy Center 345kV | 0 | See Previous | See Previous |
| 03FA | WERE-WERE | Auburn Road - South Gage (West) 115kV ckt 2 | 97 | Hoyt - Jeffery Energy Center 345kV Ckt 1 | 0 | See Previous | See Previous |
| 03FA | WERE-WERE | Coffey County No. 4 Vernon - Green 69kV | 45 | Wolf Creek - Lacygne 345kV | 0 | May be relieved due to Westar Transmission Operating Directive 1304 | Not Available |
| 03FA | AEPW-AEPW | Denver Center 138/13.8kV Transformer | 33 | Tulsa North - 46Th Street East 138kV | 0 | See Previous | See Previous |
| 03FA | WERE-WERE | Mockingbird Hill Sw Station - Stull Sw Station 115kV | 92 | Hoyt - Stranger Creek 345kV | 0 | See Previous | See Previous |
| 03FA | AEPW-AEPW | South Shreveport - Wallace Lake 138kV | 210 | Dolet Hills 345/230kV Transformer | 63 | Dolet Hills Operating Guide | \$ - |
| 03FA | WERE-WERE | Tecumseh Hill - Stull Sw Station 115kV | 92 | Hoyt - Stranger Creek 345kV | 0 | See Previous | See Previous |

Table 2 – continued - SPP facility upgrades required based on the actual queue position with higher priority requests included

| Study Year | From Area - To Area | Branch Over 100% Rate B | Rate B | Outaged Branch Causing Overload | ATC | Solution | Estimated Cost |
|------------|---------------------|--|--------|--|-----|--|----------------|
| 03WP | WERE-WERE | Auburn Road - Jeffrey Energy Center 230kV | 565 | Hoyt - Jeffrey Energy Center 345kV | 0 | See Previous | See Previous |
| 03WP | WERE-WERE | Auburn Road - South Gage (West) 115kV | 75 | Hoyt - Jeffrey Energy Center 345kV | 0 | See Previous | See Previous |
| 03WP | WERE-WERE | Auburn Road - South Gage (West) 115kV ckt 2 | 97 | Hoyt - Jeffrey Energy Center 345kV Ckt 1 | 0 | See Previous | See Previous |
| 03WP | SWPA-EES | Carthage - Reed Springs 69kV | 43 | Jasper - Lamar 69kV | 0 | See Previous | See Previous |
| 03WP | AEPW-WERE | Coffeyville Tap - Dearing 138kV | 210 | Delaware - Neosho 345kV | 0 | See Previous | See Previous |
| 03WP | AEPW-AEPW | Denver Center 138/13.8kV Transformer | 33 | Tulsa North - 46Th Street East 138kV | 0 | See Previous | See Previous |
| 03WP | SWPA-AECI | Doniphan 161/69kV Transformer ckt 1 | 18.8 | Doniphan 161/69kV Transformer Ckt 2 | 0 | See Previous | See Previous |
| 03WP | AEPW-AEPW | Dyess - East Rogers 161kV | 245 | Flint Creek - Gentry Rec 161kV | 55 | See Previous | See Previous |
| 03WP | WERE-WERE | Kelly - King Hill N.M. Coop 115kV | 92 | latan - St Joe 345kV | 70 | May be relieved due to Westar Transmission Operating Directive 803 | Not Available |
| 03WP | WERE-WERE | Mockingbird Hill Sw Station - Stull Sw Station 115kV | 92 | Hoyt - Stranger Creek 345kV | 0 | See Previous | See Previous |
| 03WP | WFEC-WFEC | Paoli 69/138kV Transformer | 42 | Canadian Sw - Noble 69kV | 0 | Solution Undetermined | Not Available |
| 03WP | OKGE-OKGE | Pecan Creek 161/345kV Transformer | 369 | Muskogee - Ft Smith 345kV | 0 | See Previous | See Previous |
| 03WP | AEPW-AEPW | South Shreveport - Wallace Lake 138kV | 210 | Dolet Hills 345/230kV Transformer | 71 | See Previous | See Previous |
| 03WP | WERE-WERE | Tecumseh Hill - Stull Sw Station 115kV | 92 | Hoyt - Stranger Creek 345kV | 0 | See Previous | See Previous |
| 04G | WERE-WERE | Athens Sw Station - Coffey County No. 4 Vernon 69kV | 45 | Wolf Creek - Lacygne 345kV | 0 | See Previous | See Previous |
| 04G | WERE-WERE | Auburn Road - Jeffrey Energy Center 230kV | 565 | Hoyt - Jeffrey Energy Center 345kV | 0 | See Previous | See Previous |
| 04G | WERE-WERE | Auburn Road - South Gage (West) 115kV | 75 | Hoyt - Jeffrey Energy Center 345kV | 0 | See Previous | See Previous |
| 04G | WERE-WERE | Auburn Road - South Gage (West) 115kV ckt 2 | 97 | Hoyt - Jeffrey Energy Center 345kV Ckt 1 | 0 | See Previous | See Previous |
| 04G | WERE-WERE | Circleville - King Hill N.M. Coop 115kV | 92 | latan - St Joe 345kV | 78 | May be relieved due to Westar Transmission Operating Directive 803 | Not Available |
| 04G | WERE-WERE | Coffey County No. 4 Vernon - Green 69kV | 45 | Wolf Creek - Lacygne 345kV | 0 | See Previous | See Previous |
| 04G | AEPW-AEPW | Denver Center 138/13.8kV Transformer | 33 | Tulsa North - 46Th Street East 138kV | 0 | See Previous | See Previous |
| 04G | WERE-WERE | Mockingbird Hill Sw Station - Stull Sw Station 115kV | 92 | Hoyt - Stranger Creek 345kV | 0 | See Previous | See Previous |
| 04G | OKGE-OKGE | Pecan Creek 161/345kV Transformer | 369 | Muskogee - Ft Smith 345kV | 0 | See Previous | See Previous |
| 04G | AEPW-AEPW | South Shreveport - Wallace Lake 138kV | 210 | Dolet Hills 345/230kV Transformer | 0 | See Previous | See Previous |
| 04G | WERE-WERE | Tecumseh Hill - Stull Sw Station 115kV | 92 | Hoyt - Stranger Creek 345kV | 0 | See Previous | See Previous |
| 05SP | WERE-WERE | 166Th Street - Jarbalo Junction Sw Station 115kV | 97 | Midland Junction - Pentagon 115kV | 0 | See Previous | See Previous |
| 05SP | GRRD-GRRD | Afton 161/69kV Transformer | 50 | Miami - Afton 161kV | 0 | See Previous | See Previous |
| 05SP | WERE-WERE | Auburn Road - Jeffrey Energy Center 230kV | 565 | Hoyt - Jeffrey Energy Center 345kV | 0 | See Previous | See Previous |
| 05SP | AEPW-AEPW | Blue Circle - Catoosa 69kV | 72 | Lynn Lane West Tap - Lynn Lane Tap 138kV | 0 | See Previous | See Previous |
| 05SP | AECI-AECI | Bristow 138/69kV Transformer ckt 1 | 56 | Bristow 138/69kV Transformer Ckt 2 | 0 | Solution Undetermined | Not Available |
| 05SP | AECI-AECI | Bristow 138/69kV Transformer ckt 2 | 56 | Bristow 138/69kV Transformer Ckt 1 | 0 | Solution Undetermined | Not Available |

Table 2 – continued - SPP facility upgrades required based on the actual queue position with higher priority requests included

| Study Year | From Area - To Area | Branch Over 100% Rate B | Rate B | Outaged Branch Causing Overload | ATC | Solution | Estimated Cost |
|------------|---------------------|--|--------|--|-----|---|----------------|
| 05SP | AEPW-AEPW | Broken Arrow 101St North - Oneta 138kV | 210 | Riverside Station Auto 138/345kV Transformer | 0 | Replace wavetrap | \$ 30,000 |
| 05SP | SWPA-AEPW | Broken Bow - Craig Junction 138kV | 107 | Craig Junction - Mountain River 138kV | 70 | See Previous | See Previous |
| 05SP | SWPA-EES | Bull Shoals - Midway 161kV | 162 | Fletcher 161/11kV Transformer Ckt 0 | 26 | See Previous | See Previous |
| 05SP | AEPW-AEPW | Carson-Center 138/13.8kV Transformer | 33 | Carson South - Tulsa Power Station 138kV | 0 | See Previous | See Previous |
| 05SP | SWPA-EES | Carthage - Jasper 69kV | 47 | Butler - Adrian 161kV | 30 | See Previous | See Previous |
| 05SP | AEPW-AEPW | Catoosa 138/69kV Transformer | 55 | Lynn Lane West Tap - Lynn Lane Tap 138kV | 0 | See Previous | See Previous |
| 05SP | AEPW-AEPW | Chamber Springs - Farmington Aecc 161kV | 335 | Chamber Springs - Tontitown 161kV | 0 | Replace Farmington switch | \$ 60,000 |
| 05SP | AEPW-AEPW | Chamber Springs - Tontitown 161kV | 244 | Flint Creek - Tontitown 161kV | 0 | Rebuild 12 miles with 2156ACSR | \$ 7,200,000 |
| 05SP | AEPW-AEPW | Cherokee Rec - Knox Lee 138kV | 209 | Multiple Outage Contingency , Southwest Shreveport - Longwood 345kV, Southwest Shreveport to Diana 345kV | 0 | See Previous | See Previous |
| 05SP | AEPW-AEPW | Cherokee Rec - Tatum 138kV | 209 | Multiple Outage Contingency , Southwest Shreveport - Longwood 345kV, Southwest Shreveport to Diana 345kV | 0 | See Previous | See Previous |
| 05SP | GRRD-GRRD | Claremore 161/69kV Transformer ckt 1 | 84 | Claremore 161/69kV Transformer Ckt 2 | 0 | See Previous | See Previous |
| 05SP | GRRD-GRRD | Claremore 161/69kV Transformer ckt 2 | 84 | Claremore 161/69kV Transformer Ckt 1 | 0 | See Previous | See Previous |
| 05SP | SPRM-AECI | Clay - Logan 161kV | 185 | Huben 345/161kV Transformer | 73 | Replace transmission line structures to allow operation at 100C | \$ 250,000 |
| 05SP | AEPW-WERE | Coffeyville Tap - Dearing 138kV | 210 | Delaware - Neosho 345kV | 0 | See Previous | See Previous |
| 05SP | AEPW-AEPW | Denver Center 138/13.8kV Transformer | 33 | Tulsa North - 46Th Street East 138kV | 0 | See Previous | See Previous |
| 05SP | AEPW-AEPW | Denver-West 138/13.8kV Transformer | 33 | Carson South - Kenosha West 138kV | 0 | See Previous | See Previous |
| 05SP | AEPW-AEPW | East Centerton - Gentry Rec 161kV | 353 | Flint Creek - Tontitown 161kV | 0 | See Previous | See Previous |
| 05SP | AEPW-AEPW | Elm Springs Rec - Tontitown 161kV | 306 | Chamber Springs - Farmington Aecc 161kV | 0 | Replace Switch and Elm Springs Strain Bus | \$ 100,000 |
| 05SP | AEPW-AEPW | Flint Creek - Gentry Rec 161kV | 353 | Flint Creek - Tontitown 161kV | 0 | See Previous | See Previous |
| 05SP | AEPW-AEPW | Flint Creek - Tontitown 161kV | 312 | Chamber Springs - Tontitown 161kV | 0 | Replace switch and jumpers | \$ 45,000 |
| 05SP | WERE-WERE | Gill Energy Center East - Macarthur 69kV | 68 | Gill Energy Center East - Oatville 69kV | 0 | See Previous | See Previous |
| 05SP | WERE-WERE | Gill Energy Center East - Oatville 69kV | 72 | Gill Energy Center East - Macarthur 69kV | 0 | See Previous | See Previous |
| 05SP | SWPA-SWPA | Gore - Muskogee Tap 161kV | 206 | Muskogee - Ft Smith 345kV | 88 | Reconductor 16 miles of 477 ACSR line with 795 ACSR | \$ 4,000,000 |
| 05SP | AEPW-AEPW | Hallsville - Longview Heights 69kV | 48 | Marshall - Marshall Auto 69kV | 0 | Rebuild 7.07 miles of 4/0 ACSR with 795 ACSR | \$ 3,000,000 |
| 05SP | SWPA-EES | Hergett - Jonesboro 161kV | 148 | 5HRSBRG* - 5MTREE 161kV | 0 | See Previous | See Previous |
| 05SP | AEPW-AEPW | Jacksonville (Swe-Rc-Etec) - Overton 138kV | 235 | Crockett - Tenaska Rusk County 345kV | 0 | Reset relays at Jacksonville & Overton | \$ 15,000 |
| 05SP | WERE-WERE | Lawrence Hill - Wren 115kV | 141 | Mockingbird Hill Sw Station - Southwest Lawrence 115kV | 0 | May be relieved due to Westar Transmission Operating Directive 1210 | Not Available |
| 05SP | AEPW-AEPW | Lieberman - IPC Jefferson 138kV | 136 | Longwood - Wilkes 345kV | 0 | See Previous | See Previous |
| 05SP | AEPW-AEPW | Longwood - Noram 138kV | 234 | Multiple Outage Contingency , Southwest Shreveport - Longwood 345kV, Southwest Shreveport to Diana 345kV | 0 | See Previous | See Previous |

Table 2 – continued - SPP facility upgrades required based on the actual queue position with higher priority requests included

| Study Year | From Area - To Area | Branch Over 100% Rate B | Rate B | Outaged Branch Causing Overload | ATC | Solution | Estimated Cost |
|------------|---------------------|--|--------|--|-----|---|----------------|
| 05SP | AEPW-AEPW | Marshall - North Marshall 69kV | 72 | Multiple Outage Contingency , Southwest Shreveport - Longwood 345kV, Southwest Shreveport to Diana 345kV | 0 | See Previous | See Previous |
| 05SP | AEPW-AEPW | Marshall 138/69kV Transformer ckt 1 | 107 | Marshall 138/69kV Transformer Ckt 2 | 0 | See Previous | See Previous |
| 05SP | AEPW-AEPW | Marshall 138/69kV Transformer ckt 2 | 107 | Marshall 138/69kV Transformer Ckt 1 | 0 | See Previous | See Previous |
| 05SP | OKGE-WFEC | Midwest Tap - Franklin Sw 138kV | 215 | Midwest Tap - Hollywood 138kV | 0 | Replace 600A metering CTs with 1200A | \$ 55,000 |
| 05SP | WERE-WERE | Mockingbird Hill Sw Station - Stull Sw Station 115kV | 92 | Hoyt - Stranger Creek 345kV | 0 | See Previous | See Previous |
| 05SP | AEPW-AEPW | North Bartlesville - Bartlesville Southeast 138kV | 210 | Delaware - Northeast Station 345kV | 99 | See Previous | See Previous |
| 05SP | AEPW-AEPW | North Marshall - Woodlawn 69kV | 51 | Multiple Outage Contingency , Southwest Shreveport - Longwood 345kV, Southwest Shreveport to Diana 345kV | 0 | Replace 3/0 CU jumpers @ North Marshall | \$ 15,000 |
| 05SP | AEPW-AEPW | Northwest Henderson - Poynter 69kV | 72 | Evenside - Northwest Henderson 69kV | 0 | Solution Undetermined | Not Available |
| 05SP | OKGE-OKGE | Osage - Continental Blacks 69kV | 111 | Kildare - White Eagle 138kV | 0 | Rebuild & Reconductor 0.57 Miles, replace Wavetrap and increase CT ratio | \$ 255,000 |
| 05SP | OKGE-OKGE | Pecan Creek 161/345kV Transformer | 369 | Muskogee - Ft Smith 345kV | 0 | See Previous | See Previous |
| 05SP | AEPW-AEPW | Raines - Noram 138kV | 234 | Multiple Outage Contingency , Southwest Shreveport - Longwood 345kV, Southwest Shreveport to Diana 345kV | 0 | See Previous | See Previous |
| 05SP | AEPW-AEPW | Rock Hill - Tatum 138kV | 209 | Multiple Outage Contingency , Southwest Shreveport - Longwood 345kV, Southwest Shreveport to Diana 345kV | 0 | See Previous | See Previous |
| 05SP | AEPW-AEPW | Sabine Mining Co. T - Southeast Marshall 138kV | 287 | Longwood - Wilkes 345kV | 54 | Solution Undetermined | Not Available |
| 05SP | AEPW-AEPW | South Fayetteville - Farmington Aecc 161kV | 313 | Chamber Springs - Tontitown 161kV | 81 | Solution Undetermined | Not Available |
| 05SP | AEPW-AEPW | South Shreveport - Wallace Lake 138kV | 209 | Dolet Hills 345/230kV Transformer | 46 | See Previous | See Previous |
| 05SP | WERE-WERE | SW Lawrence - Wakarusa Junction Sw Station 115kV | 92 | Ku Campus - 19Th Street Junction 115kV | 0 | Solution Undetermined | Not Available |
| 05SP | AEPW-WFEC | Southwest Station - Anadarko 138kV | 203 | Southwest Station - Norge Road 138kV | 0 | Replace bus, jumpers, switches, supports and foundations at Anadarko Switch Station | \$ 450,000 |
| 05SP | SWPA-SPRM | Springfield - Brookline 161kV | 323 | Junction - Brookline 161kV | 0 | Solution Undetermined | Not Available |
| 05SP | AECI-AECI | Stilwell - Titantic Tap 69kV | 36 | Kansas - Watts 69kV | 3 | Line Owned by GRDA - Solution Undetermined | \$ - |
| 05SP | EMDE-EMDE | Oronogo Jct. - Joplin Oakland North 161kV | 214 | Sub 292 - Tipton Ford - Sub 389 - Joplin Southwest 161kV | 22 | Reconstruct and replace 1.4 miles of 556 ACSR with Bundled 556 ACSR | \$ 800,000 |
| 05SP | WERE-WERE | Tecumseh Hill - Stull Sw Station 115kV | 92 | Hoyt - Stranger Creek 345kV | 0 | See Previous | See Previous |
| 05SP | OKGE-OKGE | Tinker #4 - Tinker #2 138kV | 100 | Horseshoe Lake - Midway 138kV | 0 | See Previous | See Previous |
| 05SP | OKGE-OKGE | VBI - Highway 59 161kV | 167 | Muskogee - Ft Smith 345kV | 37 | Replace 600A Switch 131 in VBI Sub with 1200A and rebuild 1.12 mile with 477 ACSR. | \$ 400,000 |
| 05WP | WERE-WERE | Auburn Road - Jeffrey Energy Center 230kV | 565 | Hoyt - Jeffrey Energy Center 345kV | 0 | See Previous | See Previous |
| 05WP | SWPA-EES | Carthage - Reed Springs 69kV | 43 | Neosho - Morgan 345kV | 17 | See Previous | See Previous |
| 05WP | AEPW-AEPW | Catoosa 138/69kV Transformer | 55 | Lynn Lane West Tap - Lynn Lane Tap 138kV | 0 | See Previous | See Previous |
| 05WP | AEPW-AEPW | Chamber Springs - Tontitown 161kV | 275 | Chamber Springs - Farmington Aecc 161kV | 0 | See Previous | See Previous |
| 05WP | WERE-WERE | Coffey County No. 4 Vernon - Green 69kV | 45 | Wolf Creek - Lacygne 345kV | 0 | See Previous | See Previous |

Table 2 – continued - SPP facility upgrades required based on the actual queue position with higher priority requests included

| Study Year | From Area - To Area | Branch Over 100% Rate B | Rate B | Outaged Branch Causing Overload | ATC | Solution | Estimated Cost |
|------------|---------------------|--|--------|--|-----|--|----------------|
| 05WP | AEPW-WERE | Coffeyville Tap - Dearing 138kV | 210 | Delaware - Neosho 345kV | 0 | See Previous | See Previous |
| 05WP | AEPW-AEPW | Denver Center 138/13.8kV Transformer | 33 | Tulsa North - 46Th Street East 138kV | 0 | See Previous | See Previous |
| 05WP | WERE-WERE | Mockingbird Hill Sw Station - Stull Sw Station 115kV | 92 | Hoyt - Stranger Creek 345kV | 0 | See Previous | See Previous |
| 05WP | OKGE-OKGE | Pecan Creek 161/345kV Transformer | 369 | Muskogee - Ft Smith 345kV | 0 | See Previous | See Previous |
| 05WP | AEPW-AEPW | South Shreveport - Wallace Lake 138kV | 210 | Dolet Hills 345/230kV Transformer | 0 | See Previous | See Previous |
| 05WP | WERE-WERE | Tecumseh Hill - Stull Sw Station 115kV | 92 | Hoyt - Stranger Creek 345kV | 0 | See Previous | See Previous |
| 08SP | WERE-WERE | 166Th Street - Jarbalo Junction Sw Station 115kV | 97 | Iatan - St Joe 345kV | 0 | See Previous | See Previous |
| 08SP | GRRD-GRRD | 412Sub - Kansas Tap 161kV | 338 | Flint Creek - Grda1 345kV | 0 | Reconductor 9.7 miles with 1590MCM ACSR | \$ 1,488,000 |
| 08SP | GRRD-GRRD | Afton 161/69kV Transformer | 50 | Miami - Afton 161kV | 0 | See Previous | See Previous |
| 08SP | AEPW-AEPW | Arsenal Hill - Raines 138kV | 234 | Multiple Outage Contingency , Southwest Shreveport - Longwood 345kV, Southwest Shreveport to Diana 345kV | 0 | Rebuild 5.32 miles 2-266MCM ACSR with 1590MCM ACSR | \$ 3,731,000 |
| 08SP | WERE-WERE | Auburn Road - Indian Hills 115kV | 223 | Hoyt - Jeffery Energy Center 345kV | 0 | May be relieved due to Westar Transmission Operating Directive 400 | Not Available |
| 08SP | WERE-WERE | Auburn Road - Jeffrey Energy Center 230kV | 565 | Hoyt - Jeffery Energy Center 345kV | 0 | See Previous | See Previous |
| 08SP | SWPA-AEPW | Beaver - Eureka Springs 161kV | 274 | Neosho - Morgan 345kV | 92 | AEPW Reconductor 1.25 miles with 1590ACSR SWPA Reconnect CT's; Replace metering & reset relays | \$ 537,500 |
| 08SP | AEPW-AEPW | Blue Circle - Catoosa 69kV | 72 | Lynn Lane West Tap - Lynn Lane Tap 138kV | 0 | See Previous | See Previous |
| 08SP | AECI-AECI | Bristow 138/69kV Transformer ckt 1 | 56 | Bristow 138/69kV Transformer Ckt 2 | 0 | See Previous | See Previous |
| 08SP | AECI-AECI | Bristow 138/69kV Transformer ckt 2 | 56 | Bristow 138/69kV Transformer Ckt 1 | 0 | See Previous | See Previous |
| 08SP | AEPW-AEPW | Broken Arrow 101St North - Oneta 138kV | 210 | Wekiwa - Tulsa North 345kV | 0 | See Previous | See Previous |
| 08SP | AEPW-AEPW | Broken Arrow 81St - Broken Arrow 101St North 138kV | 235 | Riverside Station Auto 138/345kV Transformer | 0 | Rebuild 2.05 miles of 795 ACSR with 1590 ACSR | \$ 1,100,000 |
| 08SP | AEPW-AEPW | Broken Arrow North - North Tap - Oneta 138kV | 235 | Riverside Station Auto 138/345kV Transformer | 0 | Solution Undetermined | Not Available |
| 08SP | AEPW-AEPW | Broken Arrow North - South Tap - Lynn Lane Tap 138kV | 235 | Tulsa North - Northeast Station 345kV | 0 | Rebuild 4.63 miles of 795 ACSR with 1590 ACSR | \$ 2,600,000 |
| 08SP | AEPW-AEPW | Broken Arrow North - South Tap - Oneta 138kV | 235 | Tulsa North - Northeast Station 345kV | 0 | Rebuild 4.31 miles of 795 ACSR with 1590 ACSR. | \$ 2,370,500 |
| 08SP | SWPA-EES | Bull Shoals - Midway 161kV | 162 | Beaver - Avoca 161kV | 2 | See Previous | See Previous |
| 08SP | AEPW-AEPW | Carson-Center 138/13.8kV Transformer | 33 | Carson South - Tulsa Power Station 138kV | 0 | See Previous | See Previous |
| 08SP | WFEC-WFEC | Carter Jct - Lake Creek 69kV | 26 | Elk City 138/69kV Transformer | 0 | See Previous | See Previous |
| 08SP | SWPA-EES | Carthage - Jasper 69kV | 47 | Carthage - Reed Springs 69kV | 38 | See Previous | See Previous |
| 08SP | SWPA-EES | Carthage - Reed Springs 69kV | 36 | Flint Creek - Sub 392 - Decatur South 161kV | 14 | See Previous | See Previous |
| 08SP | AEPW-AEPW | Catoosa 138/69kV Transformer | 55 | Lynn Lane West Tap - Lynn Lane Tap 138kV | 0 | See Previous | See Previous |
| 08SP | AEPW-AEPW | Chamber Springs - Tontitown 161kV | 244 | Flint Creek - Tontitown 161kV | 0 | See Previous | See Previous |
| 08SP | AEPW-AEPW | Chamber Springs 161/345kV Transformer | 660 | Flint Creek - Grda1 345kV | 0 | Install 2nd 345/161 kV Auto-transformer | \$ 4,000,000 |

Table 2 – continued - SPP facility upgrades required based on the actual queue position with higher priority requests included

| Study Year | From Area - To Area | Branch Over 100% Rate B | Rate B | Outaged Branch Causing Overload | ATC | Solution | Estimated Cost |
|------------|---------------------|---|--------|--|-----|--|----------------|
| 08SP | OKGE-OKGE | Cherokee PI Tap - Continental Blacks 69kV | 111 | Kildare - White Eagle 138kV | 0 | Reconstruct and replace 1.54 miles of 477AS33 conductor with 795AS33 | \$ 462,000 |
| 08SP | AEPW-AEPW | Cherokee Rec - Knox Lee 138kV | 209 | Multiple Outage Contingency , Southwest Shreveport - Longwood 345kV, Southwest Shreveport to Diana 345kV | 0 | See Previous | See Previous |
| 08SP | AEPW-AEPW | Cherokee Rec - Tatum 138kV | 209 | Multiple Outage Contingency , Southwest Shreveport - Longwood 345kV, Southwest Shreveport to Diana 345kV | 0 | See Previous | See Previous |
| 08SP | OKGE-OKGE | Chilocco - Chikaskia Tap 69kV | 57 | Kildare - White Eagle 138kV | 0 | Reconstruct and replace 11.34 miles of 00X7 copper line with 477AS33 | \$ 2,835,000 |
| 08SP | WERE-WERE | Chisholm - Evans Energy Center North 138kV | 382 | Evans Energy Center South - Lakeridge 138kV | 0 | Solution Undetermined | Not Available |
| 08SP | GRRD-GRRD | Claremore 161/69kV Transformer ckt 1 | 84 | Claremore 161/69kV Transformer Ckt 2 | 0 | See Previous | See Previous |
| 08SP | GRRD-GRRD | Claremore 161/69kV Transformer ckt 2 | 84 | Claremore 161/69kV Transformer Ckt 1 | 0 | See Previous | See Previous |
| 08SP | AEPW-WERE | Coffeyville Tap - Dearing 138kV | 210 | Delaware - Neosho 345kV | 0 | See Previous | See Previous |
| 08SP | WERE-WERE | County Line - Rock Creek 69kV | 41 | Stranger Creek 345/951kV Transformer Ckt 0 | 0 | Solution Undetermined | Not Available |
| 08SP | KACP-KACP | Craig - College 161kV | 335 | Stilwell - Antioch 161kV | 0 | Solution Undetermined | Not Available |
| 08SP | AEPW-AEPW | Denver Center 138/13.8kV Transformer | 33 | Tulsa North - 46Th Street East 138kV | 0 | See Previous | See Previous |
| 08SP | AEPW-AEPW | Denver-West 138/13.8kV Transformer | 33 | Carson South - Kenosha West 138kV | 0 | See Previous | See Previous |
| 08SP | AEPW-AEPW | East Centerton - Gentry Rec 161kV | 353 | Flint Creek - East Centerton 345kV | 0 | See Previous | See Previous |
| 08SP | AEPW-AEPW | East Rogers - Avoca 161kV | 244 | Flint Creek - Sub 383 - Monett 345kV | 0 | Solution Undetermined | Not Available |
| 08SP | AEPW-AEPW | Elm Springs Rec - Tontitown 161kV | 306 | Chamber Springs - Farmington Aecc 161kV | 0 | See Previous | See Previous |
| 08SP | AEPW-OKGE | Fixico Tap - Maud 138kV | 107 | Maud 69/138kV Transformer | 0 | Rebuild 11.83 miles of 3/0 shielded Copperweld with 795 ACSR | \$ 3,305,000 |
| 08SP | AEPW-AEPW | Flint Creek - Gentry Rec 161kV | 353 | Flint Creek - East Centerton 345kV | 0 | See Previous | See Previous |
| 08SP | AEPW-AEPW | Flint Creek - Tontitown 161kV | 312 | Chamber Springs - Clarksville 345kV | 0 | See Previous | See Previous |
| 08SP | AEPW-AEPW | Forbing Tap - South Shreveport 69kV | 95 | Broadmoor - Fort Humbug 69kV | 0 | Solution Undetermined | Not Available |
| 08SP | AEPW-AEPW | Fulton - Hope 115kV | 174 | Fulton 138/115kV Transformer | 0 | Solution Undetermined | Not Available |
| 08SP | AEPW-EES | Fulton - Patmos 115kV | 174 | McNeil 500/115kV Transformer | 0 | Using 1590MCM ACSR, reconductor 7.1 miles | \$ 2,300,000 |
| 08SP | WERE-WERE | Gill Energy Center East - Interstate 138kV | 210 | Evans Energy Center South - Lakeridge 138kV | 0 | Solution Undetermined | Not Available |
| 08SP | WERE-WERE | Gill Energy Center East - Macarthur 69kV | 68 | Gill Energy Center East - Oatville 69kV | 0 | See Previous | See Previous |
| 08SP | WERE-WERE | Gill Energy Center West - Haysville Junction 69kV | 80 | Canal 138/211kV Transformer Ckt 0 | 0 | Solution Undetermined | Not Available |
| 08SP | AEPW-AEPW | Hallsville - Longview Heights 69kV | 48 | Marshall - Marshall Auto 69kV | 0 | See Previous | See Previous |
| 08SP | SWPA-EES | Hergett - Jonesboro 161kV | 148 | 5HRBGR* - 5MTREE 161kV | 0 | See Previous | See Previous |
| 08SP | AEPW-AEPW | Jacksonville (Swe-Rc-Etec) - Overton 138kV | 235 | Crockett - Tenaska Rusk County 345kV | 0 | See Previous | See Previous |
| 08SP | GRRD-GRRD | Kerr - 412Sub 161kV | 338 | Flint Creek - Grda1 345kV | 0 | Reconductor 12.5 miles with 1590MCM ACSR. | \$ 1,918,000 |
| 08SP | AEPW-AEPW | Knox Lee - Oak Hill #2 138kV | 210 | Knox Lee - Monroe Corners Rec 138kV | 0 | Replace wavetrapp @ Knoxlee | \$ 20,000 |
| 08SP | WERE-WERE | Lawrence Hill - Wren 115kV | 141 | Mockingbird Hill Sw Station - Southwest Lawrence 115kV | 0 | See Previous | See Previous |

Table 2 – continued - SPP facility upgrades required based on the actual queue position with higher priority requests included

| Study Year | From Area - To Area | Branch Over 100% Rate B | Rate B | Outaged Branch Causing Overload | ATC | Solution | Estimated Cost |
|------------|---------------------|---|--------|--|-----|--|----------------|
| 08SP | AEPW-AEPW | Lieberman - IPC Jefferson 138kV | 136 | Longwood - Wilkes 345kV | 0 | See Previous | See Previous |
| 08SP | WFEC-WFEC | Lindsay Sw - Wallville 69kV | 26 | Fletcher - Marlow Jct 69kV | 0 | Solution Undetermined | Not Available |
| 08SP | AEPW-AEPW | Longwood - Noram 138kV | 234 | Multiple Outage Contingency , Southwest Shreveport - Longwood 345kV, Southwest Shreveport to Diana 345kV | 0 | See Previous | See Previous |
| 08SP | AEPW-AEPW | Longwood - Oak Pan-Harr Rec 138kV | 209 | Multiple Outage Contingency , Southwest Shreveport - Longwood 345kV, Southwest Shreveport to Diana 345kV | 0 | Rebuild 1.8 miles of 666 ACSR with 1590 ACSR | \$ 750,000 |
| 08SP | AEPW-AEPW | Marshall - North Marshall 69kV | 72 | Multiple Outage Contingency , Southwest Shreveport - Longwood 345kV, Southwest Shreveport to Diana 345kV | 0 | See Previous | See Previous |
| 08SP | AEPW-AEPW | Marshall 138/69kV Transformer ckt 1 | 107 | Marshall 138/69kV Transformer Ckt 2 | 0 | See Previous | See Previous |
| 08SP | AEPW-AEPW | Marshall 138/69kV Transformer ckt 2 | 107 | Marshall 138/69kV Transformer Ckt 1 | 0 | See Previous | See Previous |
| 08SP | OKGE-WFEC | Midwest Tap - Franklin Sw 138kV | 215 | Anadarko - Pocassett 138kV | 0 | See Previous | See Previous |
| 08SP | WERE-WERE | Mockingbird Hill Sw Station - Stull Sw Station 115kV | 92 | Hoyt - Stranger Creek 345kV | 0 | See Previous | See Previous |
| 08SP | OKGE-WERE | Newkirk - Creswell 138kV | 168 | Woodring - Wichita 345kV | 0 | May be relieved due to updated line ratings | Not Available |
| 08SP | WERE-WERE | N.A. Phillips Junction (North) - Smoky Hill 115kV ckt 1 | 68 | N.A. Phillips Junction (North) - Smoky Hill 115kV Ckt 2 | 0 | Solution Undetermined | Not Available |
| 08SP | WERE-WERE | N.A. Phillips Junction (South) - West Mchpherson 115kV | 68 | East Mchpherson - Summit 230kV | 0 | May be relieved due to Westar Transmission Operating Directive 613 | Not Available |
| 08SP | AEPW-AEPW | North Bartlesville - Bartlesville Southeast 138kV | 210 | Delaware - Northeast Station 345kV | 0 | See Previous | See Previous |
| 08SP | AEPW-AEPW | North Marshall - Woodlawn 69kV | 51 | Multiple Outage Contingency , Southwest Shreveport - Longwood 345kV, Southwest Shreveport to Diana 345kV | 0 | See Previous | See Previous |
| 08SP | AEPW-AEPW | Northwest Henderson - Poynter 69kV | 72 | Evenside - Northwest Henderson 69kV | 0 | See Previous | See Previous |
| 08SP | OKGE-OKGE | Osage - Continental Blacks 69kV | 111 | Kildare - White Eagle 138kV | 0 | See Previous | See Previous |
| 08SP | AEPW-AEPW | Patterson - South Nashville 138kV | 118 | Longwood - ELD EHV 345kV | 80 | Rebuild 17.72 miles of 4/0 CU with 795 ACSR | \$ 4,400,000 |
| 08SP | OKGE-OKGE | Pecan Creek 161/345kV Transformer | 369 | Muskogee - Ft Smith 345kV | 0 | See Previous | See Previous |
| 08SP | GRRD-GRRD | Pensacola - Gray Tap 69kV | 47 | Kansas Tap - Kansas 161kV | 0 | Rebuild 4/0 to 795MCM | \$ 730,000 |
| 08SP | AEPW-AEPW | Raines - Noram 138kV | 234 | Multiple Outage Contingency , Southwest Shreveport - Longwood 345kV, Southwest Shreveport to Diana 345kV | 0 | See Previous | See Previous |
| 08SP | AEPW-AEPW | Riverside Station Auto - Riverside Station 138kV | 583 | Riverside Station - Oneta 345kV | 0 | Solution Undetermined | Not Available |
| 08SP | AEPW-AEPW | Rock Hill - Tatum 138kV | 209 | Multiple Outage Contingency , Southwest Shreveport - Longwood 345kV, Southwest Shreveport to Diana 345kV | 0 | See Previous | See Previous |
| 08SP | AEPW-AEPW | Sabine Mining Co. T - Southeast Marshall 138kV | 287 | Longwood - Wilkes 345kV | 77 | See Previous | See Previous |
| 08SP | SWPA-AECI | Sallisaw - Liberty Tap 161kV | 189 | Muskogee - Ft Smith 345kV | 44 | Solution Undetermined | Not Available |
| 08SP | AEPW-AEPW | South Fayetteville - Farmington Aecc 161kV | 313 | Chamber Springs - Tontitown 161kV | 0 | See Previous | See Previous |
| 08SP | WERE-WERE | Southwest Lawrence - Wakarusa Junction Sw Sta 115kV | 92 | Ku Campus - 19Th Street Junction 115kV | 0 | See Previous | See Previous |
| 08SP | SWPA-SPRM | Springfield - Brookline 161kV | 323 | Junction - Brookline 161kV | 0 | See Previous | See Previous |
| 08SP | AECI-AECI | Stilwell - Titantic Tap 69kV | 36 | Sallisaw - Brushy 69kV | 15 | See Previous | See Previous |

Table 2 – continued - SPP facility upgrades required based on the actual queue position with higher priority requests included

| Study Year | From Area - To Area | Branch Over 100% Rate B | Rate B | Outaged Branch Causing Overload | ATC | Solution | Estimated Cost |
|--------------------------------------|---------------------|--|--------|--|-----|--|----------------|
| 08SP | EMDE-EMDE | Oronogo Jct. - Joplin Oakland North 161kV | 214 | Sub 292 - Tipton Ford - Sub 389 - Joplin Southwest 161kV | 63 | See Previous | See Previous |
| 08SP | EMDE-AECI | Sub 446 - Chesapeake - 2MTVRN 69kV | 36 | Sub 124 - Aurora H.T. - Sub 355 - Aurora West 69kV | 0 | Solution Undetermined | Not Available |
| 08SP | WERE-WERE | Tecumseh Energy Center - Tecumseh Hill 115kV | 236 | Hoyt - Stranger Creek 345kV | 0 | May be relieved due to Westar Transmission Operating Directive 803 | Not Available |
| 08SP | WERE-WERE | Tecumseh Hill - Stull Sw Station 115kV | 92 | Hoyt - Stranger Creek 345kV | 0 | See Previous | See Previous |
| 08SP | OKGE-OKGE | Tinker #4 - Tinker #2 138kV | 100 | Horseshoe Lake - Midway 138kV | 0 | See Previous | See Previous |
| 08SP | SWPA-WFEC | Weleetka - Pharoah 138kV | 191 | Franklin - Franklin Sw 138kV | 0 | Replace wavetrap at Weleetka and replace jumpers. | \$ 75,000 |
| 08WP | WERE-WERE | 166Th Street - Jarbalo Junction Sw Station 115kV | 97 | Midland Junction - Pentagon 115kV | 0 | See Previous | See Previous |
| 08WP | GRRD-GRRD | Afton 161/69kV Transformer | 50 | Miami - Afton 161kV | 74 | See Previous | See Previous |
| 08WP | WERE-WERE | Auburn Road - Jeffrey Energy Center 230kV | 565 | Hoyt - Jeffery Energy Center 345kV | 0 | See Previous | See Previous |
| 08WP | WFEC-WFEC | Carter Jct - Lake Creek 69kV | 26 | Elk City 138/69kV Transformer | 0 | See Previous | See Previous |
| 08WP | SWPA-EES | Carthage - Reed Springs 69kV | 43 | Stilwell - Lacygne 345kV | 19 | See Previous | See Previous |
| 08WP | AEPW-AEPW | Catoosa 138/69kV Transformer | 55 | Lynn Lane West Tap - Lynn Lane Tap 138kV | 0 | See Previous | See Previous |
| 08WP | AEPW-AEPW | Chamber Springs - Tontitown 161kV | 275 | Chamber Springs - Farmington Aecc 161kV | 0 | See Previous | See Previous |
| 08WP | WERE-WERE | Circleville - Hoyt Hti Sw Junction 115kV | 97 | Knob Hill - Greenleaf 115kV | 70 | Replace 82 structures | \$ 742,000 |
| 08WP | AEPW-WERE | Coffeyville Tap - Dearing 138kV | 210 | Delaware - Neosho 345kV | 0 | See Previous | See Previous |
| 08WP | AEPW-AEPW | Denver Center 138/13.8kV Transformer | 33 | Tulsa North - 46Th Street East 138kV | 0 | See Previous | See Previous |
| 08WP | AEPW-AEPW | Denver-West 138/13.8kV Transformer | 33 | Carson South - Kenosha West 138kV | 0 | See Previous | See Previous |
| 08WP | SWPA-AECI | Doniphan 161/69kV Transformer ckt 1 | 18.7 | Doniphan 161/69kV Transformer Ckt 2 | 0 | See Previous | See Previous |
| 08WP | AEPW-EES | Fulton - Patmos 115kV | 197 | Crockett - Grimes 345kV | 0 | See Previous | See Previous |
| 08WP | AEPW-AEPW | Jacksonville (Swe-Rc-Etec) - Overton 138kV | 265 | Crockett - Tenaska Rusk County 345kV | 0 | See Previous | See Previous |
| 08WP | AEPW-AEPW | Marshall 138/69kV Transformer ckt 1 | 121 | Marshall 138/69kV Transformer Ckt 2 | 0 | See Previous | See Previous |
| 08WP | AEPW-AEPW | Marshall 138/69kV Transformer ckt 2 | 121 | Marshall 138/69kV Transformer Ckt 1 | 0 | See Previous | See Previous |
| 08WP | WERE-WERE | Mockingbird Hill Sw Station - Stull Sw Station 115kV | 92 | Hoyt - Stranger Creek 345kV | 0 | See Previous | See Previous |
| 08WP | AEPW-AEPW | North Bartlesville - Bartlesville Southeast 138kV | 210 | Delaware - Northeast Station 345kV | 0 | See Previous | See Previous |
| 08WP | OKGE-OKGE | Pecan Creek 161/345kV Transformer | 369 | Muskogee - Ft Smith 345kV | 0 | See Previous | See Previous |
| 08WP | AEPW-AEPW | South Shreveport - Wallace Lake 138kV | 210 | Dolet Hills 345/230kV Transformer | 0 | See Previous | See Previous |
| 08WP | WERE-WERE | SW Lawrence - Wakarusa Junction Sw Station 115kV | 92 | Ku Campus - 19Th Street Junction 115kV | 0 | See Previous | See Previous |
| 08WP | WERE-WERE | Tecumseh Hill - Stull Sw Station 115kV | 92 | Hoyt - Stranger Creek 345kV | 0 | See Previous | See Previous |
| 08WP | KACP-KACP | West Gardner 345/161kV Transformer ckt 11 | 440 | West Gardner - Craig 345kV Ckt 1 | 45 | Solution Undetermined | Not Available |
| Total (Excludes Costs Not Available) | | | | | | | \$ 79,815,270 |