

# Screening Study SPP-LTSR-2011-011

For OASIS Request #76120618

MAINTAINED BY  
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## **Executive Summary**

Juwi Wind LLC has requested a Screening Study to determine the impacts on SPP facilities due to the Long Term Service Requests for 135 MW. The service type requested for this screening study is Long Term Service Request (LTSR). OASIS# 76120618 was studied as one request from 12/31/2012 to 12/31/2037.

The principal objective of this study is to identify system problems and potential system modifications necessary to facilitate the LTSR request while maintaining system reliability. The LTSR request was studied using two system scenarios. The service was modeled by the transfers from WR to EES. The two scenarios were studied to capture system limitations caused or impacted by the requested service. An analysis was conducted on the planning horizon from 12/31/2012 to 12/31/2037.

The service was modeled from WR to EES. Facilities on the SPP system were identified for the requested service due to the SPP Study Methodology criteria. Tables 1 and 2 summarize the results of the screening study analysis for the transfers for the scenarios listed in the table. Table 1 lists SPP thermal transfer limitations identified. Table 2 lists SPP voltage transfer limitations identified. Table 3 lists the network upgrades required to mitigate the limitations impacted by this request.

## Introduction

Juwi Wind LLC has requested a screening study to determine the impacts on SPP facilities for the Long Term Service Requests for 135 MW.

The purpose of the LTSR Option Screening Study is to provide the Eligible Customer with an approximation of the transmission remediation costs of each potential LTSR and a reasonable cost differential between alternatives for the purpose of an Eligible Customer's ranking of its potential LTSRs. The results of the Screening Study are not binding and the Eligible Customer retains the rights to enter the Aggregate Transmission Service Study. The Screening Study results will not assess the third party impacts and upgrades required. Service will not be granted based on the Screening Study for potential LTSRs on the Transmission System. To obtain a Service Agreement, Eligible Customers must apply for service and follow the application process set forth in Parts II and III of the Tariff.

This study includes steady-state contingency analysis (PSS/E function ACCC). The steady-state analysis considers the impact of the request on transmission line and transformer loadings for outages of single transmission lines, transformers, and generating units, and selected multiple transmission lines and transformers on the SPP and first-tier third party systems.

The LTSR request was studied using two system scenarios. The service was modeled by a transfer from WR to EES. The two scenarios were studied to capture the system limitations caused or impacted by the requested service. Scenario 0 includes projected usage of transmission service included in the SPP 2011 Series Cases. Scenario 5 includes transmission service not already included in the SPP 2011 Series Cases.

## Study Methodology

### Description

The facility study analysis was conducted to determine the steady-state impact of the requested service on the SPP system. The steady-state analysis was performed to ensure current SPP Criteria and NERC Reliability Standards requirements are fulfilled. SPP conforms to NERC Reliability Standards, which provide strict requirements related to voltage violations and thermal overloads during normal conditions and during a contingency. NERC Standards require all facilities to be within normal operating ratings for normal system conditions and within emergency ratings after a contingency.

Normal operating ratings and emergency operating ratings monitored are Rate A and B in the SPP Model Development Working Group (MDWG) models, respectively. The upper bound and lower bound of the normal voltage range monitored is 105% and 95%. The upper bound and lower bound of the emergency voltage range monitored is 105% and 90%. Transmission Owner voltage monitoring criteria is used if more restrictive. The SPS Tuco 230 kV bus voltage is monitored at 92.5% due to pre-determined system stability limitations. The WERE Wolf Creek 345 kV bus voltage is monitored at 103.5% and 98.5% due to transmission operating procedure.

The contingency set includes all SPP control area branches and ties 69 kV and above; first tier non-SPP control area branches and ties 115 kV and above; any defined contingencies for these control areas; and generation unit outages for the control areas with SPP reserve share program redispatch. The monitor elements include all SPP control area branches, ties, and buses 69 kV. and above,. Voltage monitoring was performed for SPP control area buses 69 kV and above.

A 3 % transfer distribution factor (TDF) cutoff was applied to all SPP control area facilities. For voltage monitoring, a 0.02 per unit change in voltage must occur due to the transfer or modeling upgrades to be considered a valid limit to the transfer.

### Model Updates

SPP used six seasonal models to study the WR to EES 135 MW request for the requested service period. The following SPP Transmission Expansion Plan 2011 Build 2

Cases were used to study the impact of the requested service on the transmission system:

- 2012/13 Winter Peak (12WP)
- 2013 Summer Peak (13SP)
- 2013/14 Winter Peak (13WP)
- 2017 Summer Peak (17SP)
- 2017/18 Winter Peak (17WP)
- 2022 Summer Peak (22SP)

The Summer Peak models apply to June through September, and the Winter Peak models apply to December through March.

The chosen base case models were modified to reflect the current modeling information. From the six seasonal models, two system scenarios were developed. Scenario 0 includes projected usage of transmission included in the SPP 2011 Series Cases. Scenario 5 includes transmission not already included in the SPP 2011 Series Cases.

### **Transmission Request Modeling**

Network Integration Transmission Service requests are modeled as Generation to Load transfers in addition to Generation to Generation because the requested Network Integration Transmission Service is a request to serve network load with the new designated network resource, and the impacts on the Transmission System are determined accordingly. Generation to Generation transfers are accomplished by developing a post-transfer case for comparison by dispatching the request source and redispatching the request sink.

### **Transfer Analysis**

Using the selected cases both with and without the requested transfer modeled, the PSS/E Activity ACCC was run on the cases and compared to determine the facility overloads caused or impacted by the transfer. Transfer distribution factor cutoffs and voltage threshold (0.02 change) were applied to determine the impacted facilities. The PSS/E options chosen to conduct the analysis can be found in Appendix A.

## Study Results

### Study Analysis Results

Tables 1 and 2 contain the initial steady-state analysis results of the LTSR. The tables are attached to the end of this report, if applicable. The tables identify the scenario and season in which the event occurred, the transfer amount studied, the facility control area location, applicable ratings of the thermal transfer limitations and voltage transfer limitations, and the loading percentage and voltage per unit (pu).

Table 1 lists the SPP thermal transfer limitations caused or impacted by the 135 MW requested transfers for applicable scenarios. Solutions are identified for the limitations in this table.

Table 2 lists the SPP voltage transfer limitations caused or impacted by the 135 MW requested transfers for applicable scenarios. Solutions are identified for the violations in this table.

Table 3 lists the network upgrades required to mitigate the limitations caused or impacted by this request. Engineering and construction costs are provided for assigned upgrades in this table.

## **Conclusion**

The results of the screening study show that limiting constraints exist within the SPP regional transmission system for the requested transfer of 135 MW. The next steps are to WITHDRAW the request on OASIS and, if desired, enter a new OASIS request into the aggregate study queue.

The results contained in this study are for informational purposes only. Service will not be granted based on the Screening Study results. To obtain a Service Agreement, Eligible Customers must apply for service and follow the application processes set forth in Parts II and III of the Tariff and enter the Aggregate Study process. The results of the Aggregate Study may vary from the results of this screening study.

As a final step in this process, it is requested that the customer WITHDRAW the LTSR screening study request on OASIS.



## Appendix A

### PSS/E CHOICES IN RUNNING LOAD FLOW PROGRAM AND ACCC

#### BASE CASES:

- Solutions: Fixed slope decoupled Newton-Raphson solution (FDNS)
- Tap adjustment: Stepping
- Area interchange control: Tie lines and loads
- VAR limits: Apply immediately
- Solution options:
  - Phase shift adjustment
  - Flat start
  - Lock DC taps
  - Lock switched shunts

#### ACCC CASES for system intact:

- Solutions: AC contingency checking (ACCC)
- MW mismatch tolerance: 0.5
- Contingency case rating: Rate A
- Percent of rating: 100
- Output code: Summary
- Min flow change in overload report: 3 MW
- Excl'd cases w/ no overloads form report: YES
- Exclude interfaces from report: NO
- Perform voltage limit check: YES
- Elements in available capacity table: 60000
- Cutoff threshold for available capacity table: 99999.0
- Min. contng. case Vltg chng for report: 0.02
- Sorted output: None
- Newton Solution:
- Tap adjustment: Stepping
- Area interchange control: Tie lines and loads
- VAR limits: Apply automatically
- Solution options:
  - Phase shift adjustment
  - Flat start
  - Lock DC taps
  - Lock switched shunts

#### ACCC CASES for branch and transformer contingencies:

- Solutions: AC contingency checking (ACCC)
- MW mismatch tolerance: 0.5
- Contingency case rating: Rate B
- Percent of rating: 100
- Output code: Summary

- Min flow change in overload report: 3mw
- Excl'd cases w/ no overloads from report: YES
- Exclude interfaces from report: NO
- Perform voltage limit check: YES
- Elements in available capacity table: 60000
- Cutoff threshold for available capacity table: 99999.0
- Min. contng. case Vltg chng for report: 0.02
- Sorted output: None
- Newton Solution:
- Tap adjustment: Stepping
- Area interchange control: Tie lines and loads
- VAR limits: Apply automatically
- Solution options:
  - X Phase shift adjustment
  - \_ Flat start
  - \_ Lock DC taps
  - \_ Lock switched shunts

**ACCC CASES for generator contingencies (largest machine at a bus):**

- Solutions: AC contingency checking (ACCC)
- MW mismatch tolerance: 0.5
- Contingency case rating: Rate B
- Percent of rating: 100
- Output code: Summary
- Min flow change in overload report: 3mw
- Excl'd cases w/ no overloads from report: YES
- Exclude interfaces from report: NO
- Perform voltage limit check: YES
- Elements in available capacity table: 60000
- Cutoff threshold for available capacity table: 99999.0
- Min. contng. case Vltg chng for report: 0.02
- Sorted output: None
- Newton Solution:
- Tap adjustment: Stepping
- Area interchange control: Disabled
- Var limits: Apply automatically
- Solution options:
  - X Phase shift adjustment
  - \_ Flat start
  - \_ Lock DC taps
  - \_ Lock switched shunts

Scenario	Season	From Area	To Area	Monitored Branch Over 100% Rate B	Transfer Case % Loading	TDF (%)	Outaged Branch Causing Overload	Upgrade Name	Solution
5	13SP	WERE	WERE	87th STREET - STRANGER CREEK 345KV CKT 1	100.1	9.1%	IATAN - ST JOE 345KV CKT 1	IATAN - NASHUA 345KV CKT 1	Tap Nashua 345KV bus in Hawthorn - St. Joseph 345 KV line. Build new 345 KV line from Iatan to Nashua, Add Nashua 345/161 KV
5	13WP	WERE	WERE	87th STREET - STRANGER CREEK 345KV CKT 1	101.6	9.1%	IATAN - ST JOE 345KV CKT 1	IATAN - NASHUA 345KV CKT 1	Tap Nashua 345KV bus in Hawthorn - St. Joseph 345 KV line. Build new 345 KV line from Iatan to Nashua, Add Nashua 345/161 KV
5	22SP	OKGE	OKGE	ADABELL - ALCOATP 161KV CKT 1	106.7	3.5%	FT SMITH - MUSKOGEE 345KV CKT 1	Chamber Springs - Ft Smith 345 KV AEPW Chamber Springs - Ft Smith 345 KV with 345/138 KV bus tie at VBI	Build 47.5 miles of 95 mile 345 KV line Build 47.5 miles of 95 mile 345 KV line plus new 345/138 KV bus tie at VBI sub
5	22SP	OKGE	OKGE	ADABELL - ALCOATP 161KV CKT 1	106.7	3.5%	FT SMITH - MUSKOGEE 345KV CKT 1	Chamber Springs - Ft Smith 345 KV AEPW Chamber Springs - Ft Smith 345 KV with 345/138 KV bus tie at VBI	Build 47.5 miles of 95 mile 345 KV line Build 47.5 miles of 95 mile 345 KV line plus new 345/138 KV bus tie at VBI sub
5	17SP	OKGE	OKGE	ADABELL - VBI 161KV CKT 1	104.5	3.5%	FT SMITH - MUSKOGEE 345KV CKT 1	Chamber Springs - Ft Smith 345 KV AEPW Chamber Springs - Ft Smith 345 KV with 345/138 KV bus tie at VBI	Build 47.5 miles of 95 mile 345 KV line Build 47.5 miles of 95 mile 345 KV line plus new 345/138 KV bus tie at VBI sub
5	17SP	OKGE	OKGE	ADABELL - VBI 161KV CKT 1	104.5	3.5%	FT SMITH - MUSKOGEE 345KV CKT 1	Chamber Springs - Ft Smith 345 KV AEPW Chamber Springs - Ft Smith 345 KV with 345/138 KV bus tie at VBI	Build 47.5 miles of 95 mile 345 KV line Build 47.5 miles of 95 mile 345 KV line plus new 345/138 KV bus tie at VBI sub
5	22SP	OKGE	OKGE	ADABELL - VBI 161KV CKT 1	113.2	3.5%	FT SMITH - MUSKOGEE 345KV CKT 1	Chamber Springs - Ft Smith 345 KV AEPW Chamber Springs - Ft Smith 345 KV with 345/138 KV bus tie at VBI	Build 47.5 miles of 95 mile 345 KV line Build 47.5 miles of 95 mile 345 KV line plus new 345/138 KV bus tie at VBI sub
5	22SP	OKGE	OKGE	ADABELL - VBI 161KV CKT 1	113.2	3.5%	FT SMITH - MUSKOGEE 345KV CKT 1	Chamber Springs - Ft Smith 345 KV AEPW Chamber Springs - Ft Smith 345 KV with 345/138 KV bus tie at VBI	Build 47.5 miles of 95 mile 345 KV line Build 47.5 miles of 95 mile 345 KV line plus new 345/138 KV bus tie at VBI sub
5	13SP	SWPA	AECI	AKINS 161.00 - LIBERTY TAP 161KV CKT 1	122.2	4.1%	FT SMITH - MUSKOGEE 345KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Rebuild w/ 1192 ACSR.
5	17SP	SWPA	AECI	AKINS 161.00 - LIBERTY TAP 161KV CKT 1	134.9	4.2%	FT SMITH - MUSKOGEE 345KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Rebuild w/ 1192 ACSR.
5	22SP	SWPA	AECI	AKINS 161.00 - LIBERTY TAP 161KV CKT 1	150.4	4.2%	FT SMITH - MUSKOGEE 345KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Rebuild w/ 1192 ACSR.
5	22SP	SWPA	AECI	AKINS 161.00 - LIBERTY TAP 161KV CKT 1	101.7	3.3%	HIGHWAY 59 - TAHLEQUAH 161KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Rebuild w/ 1192 ACSR.
5	13SP	SWPA	SWPA	AKINS 161.00 - SALLISAW 161KV CKT 1	124.5	4.1%	FT SMITH - MUSKOGEE 345KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Rebuild w/ 1192 ACSR.
5	17SP	SWPA	SWPA	AKINS 161.00 - SALLISAW 161KV CKT 1	137.1	4.2%	FT SMITH - MUSKOGEE 345KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Rebuild w/ 1192 ACSR.
5	22SP	SWPA	SWPA	AKINS 161.00 - SALLISAW 161KV CKT 1	152.8	4.2%	FT SMITH - MUSKOGEE 345KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Rebuild w/ 1192 ACSR.
5	22SP	SWPA	SWPA	AKINS 161.00 - SALLISAW 161KV CKT 1	103.9	3.3%	HIGHWAY 59 - TAHLEQUAH 161KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Rebuild w/ 1192 ACSR.
5	13WP	AEPW	AEPW	ASHDOWN WEST - CRAIG JUNCTION 138KV CKT 1	129.9	6.7%	LYDIA - VALLIANT 345KV CKT 1	NORTHWEST TEXARKANA - VALLIANT 345KV CKT 1	Build a new 76 mile 345 KV line from Valliant to NW Texarkana with at least 3000 A capacity. Upgrade the Valliant and NW Texarkana substations with the necessary breakers and terminal equipment.
5	13WP	AEPW	AEPW	ASHDOWN WEST - CRAIG JUNCTION 138KV CKT 1	128.7	6.5%	SPP-AEPW-01	NORTHWEST TEXARKANA - VALLIANT 345KV CKT 1	Build a new 76 mile 345 KV line from Valliant to NW Texarkana with at least 3000 A capacity. Upgrade the Valliant and NW Texarkana substations with the necessary breakers and terminal equipment.
5	13SP	AEPW	AEPW	ASHDOWN WEST - PATTERSON 138KV CKT 1	110.8	6.3%	LYDIA - VALLIANT 345KV CKT 1	NORTHWEST TEXARKANA - VALLIANT 345KV CKT 1	Build a new 76 mile 345 KV line from Valliant to NW Texarkana with at least 3000 A capacity. Upgrade the Valliant and NW Texarkana substations with the necessary breakers and terminal equipment.
5	13SP	AEPW	AEPW	ASHDOWN WEST - PATTERSON 138KV CKT 1	110.2	6.3%	SPP-AEPW-01	NORTHWEST TEXARKANA - VALLIANT 345KV CKT 1	Build a new 76 mile 345 KV line from Valliant to NW Texarkana with at least 3000 A capacity. Upgrade the Valliant and NW Texarkana substations with the necessary breakers and terminal equipment.
5	13WP	AEPW	AEPW	ASHDOWN WEST - PATTERSON 138KV CKT 1	129.1	6.7%	LYDIA - VALLIANT 345KV CKT 1	NORTHWEST TEXARKANA - VALLIANT 345KV CKT 1	Build a new 76 mile 345 KV line from Valliant to NW Texarkana with at least 3000 A capacity. Upgrade the Valliant and NW Texarkana substations with the necessary breakers and terminal equipment.
5	13WP	AEPW	AEPW	ASHDOWN WEST - PATTERSON 138KV CKT 1	127.9	6.5%	SPP-AEPW-01	NORTHWEST TEXARKANA - VALLIANT 345KV CKT 1	Build a new 76 mile 345 KV line from Valliant to NW Texarkana with at least 3000 A capacity. Upgrade the Valliant and NW Texarkana substations with the necessary breakers and terminal equipment.
5	13WP	AEPW	AEPW	BROKEN BOW TAP - CRAIG JUNCTION 138KV CKT 1	122.6	4.4%	LYDIA - VALLIANT 345KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Build a new 76 mile 345 KV line from Valliant to NW Texarkana with at least 3000 A capacity. Upgrade the Valliant and NW Texarkana substations with the necessary breakers and terminal equipment.
5	13WP	AEPW	AEPW	BROKEN BOW TAP - CRAIG JUNCTION 138KV CKT 1	121.5	4.3%	SPP-AEPW-01	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Build a new 76 mile 345 KV line from Valliant to NW Texarkana with at least 3000 A capacity. Upgrade the Valliant and NW Texarkana substations with the necessary breakers and terminal equipment.
5	13WP	AEPW	AEPW	BROKEN BOW TAP - IDABEL 138KV CKT 1	127.5	4.4%	LYDIA - VALLIANT 345KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Build a new 76 mile 345 KV line from Valliant to NW Texarkana with at least 3000 A capacity. Upgrade the Valliant and NW Texarkana substations with the necessary breakers and terminal equipment.
5	13WP	AEPW	AEPW	BROKEN BOW TAP - IDABEL 138KV CKT 1	126.4	4.3%	SPP-AEPW-01	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Build a new 76 mile 345 KV line from Valliant to NW Texarkana with at least 3000 A capacity. Upgrade the Valliant and NW Texarkana substations with the necessary breakers and terminal equipment.
5	13WP	WERE	WERE	CIRCLE (CIRCLE IX) 230/115/113.8KV TRANSFORMER CKT	108.7	3.4%	RENO COUNTY - SUMMIT 345KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Build a new 55 mile double circuit 345 KV line
5	13SP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	100.8	11.4%	GEN337911 1-ARKANSAS NUCLEAR ONE UNIT #2	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Replace 1600 amp 345 KV CT in both Muskogee and Ft Smith Subs
5	17SP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	112.7	11.6%	GEN337911 1-ARKANSAS NUCLEAR ONE UNIT #2	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Replace 1600 amp 345 KV CT in both Muskogee and Ft Smith Subs
5	17SP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	109.8	11.6%	GEN337910 1-ARKANSAS NUCLEAR ONE UNIT #1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Replace 1600 amp 345 KV CT in both Muskogee and Ft Smith Subs
5	17SP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	104.5	11.6%	GEN336821 1-GRAND GULF UNIT	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Replace 1600 amp 345 KV CT in both Muskogee and Ft Smith Subs
5	17WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	102.2	9.8%	GEN337911 1-ARKANSAS NUCLEAR ONE UNIT #2	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Replace 1600 amp 345 KV CT in both Muskogee and Ft Smith Subs
5	17WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	100.2	9.8%	GEN337910 1-ARKANSAS NUCLEAR ONE UNIT #1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Replace 1600 amp 345 KV CT in both Muskogee and Ft Smith Subs
5	22SP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	120.7	11.5%	GEN337911 1-ARKANSAS NUCLEAR ONE UNIT #2	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Replace 1600 amp 345 KV CT in both Muskogee and Ft Smith Subs
5	22SP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	118.1	11.6%	GEN337910 1-ARKANSAS NUCLEAR ONE UNIT #1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Replace 1600 amp 345 KV CT in both Muskogee and Ft Smith Subs
5	22SP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	115.0	12.8%	PITTSBURG - VALLIANT 345KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Replace 1600 amp 345 KV CT in both Muskogee and Ft Smith Subs
5	22SP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	111.0	12.3%	SPP-AEPW-01	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Replace 1600 amp 345 KV CT in both Muskogee and Ft Smith Subs
5	22SP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	109.0	11.7%	A103	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Replace 1600 amp 345 KV CT in both Muskogee and Ft Smith Subs

5	22SP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	108.4	12.0%	OVERTON TRF	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Replace 1600 amp 345 kV CT in both Muskogee and Ft.Smith Subs
5	22SP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	106.0	11.4%	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Replace 1600 amp 345 kV CT in both Muskogee and Ft.Smith Subs
5	22SP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	105.4	11.6%	HOYT - STRANGER CREEK 345KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Replace 1600 amp 345 kV CT in both Muskogee and Ft.Smith Subs
5	22SP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	105.2	11.5%	15TH & FULTON TAP - TULSA SOUTHEAST 138KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Replace 1600 amp 345 kV CT in both Muskogee and Ft.Smith Subs
5	22SP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	103.8	11.5%	BASE CASE	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Replace 1600 amp 345 kV CT in both Muskogee and Ft.Smith Subs
5	22SP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	103.3	11.5%	ROSE HILL - WOLF CREEK 345KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Replace 1600 amp 345 kV CT in both Muskogee and Ft.Smith Subs
5	13SP	OKGE	OKGE	FT SMITH (FTSMITH1) 500345/13.8KV TRANSFORMER CKT 1	101.5	11.2%	FT SMITH (FTSMITH5) 345/161/13.8KV TRANSFORMER CKT 5	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Install 2nd 500/345 kV bus tie in Ft. Smith Sub
5	17SP	OKGE	OKGE	FT SMITH (FTSMITH1) 500345/13.8KV TRANSFORMER CKT 1	115.6	11.4%	FT SMITH (FTSMITH5) 345/161/13.8KV TRANSFORMER CKT 5	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Install 2nd 500/345 kV bus tie in Ft. Smith Sub
5	17SP	OKGE	OKGE	FT SMITH (FTSMITH1) 500345/13.8KV TRANSFORMER CKT 1	103.4	10.3%	GEN337911 1-ARKANSAS NUCLEAR ONE UNIT #2	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Install 2nd 500/345 kV bus tie in Ft. Smith Sub
5	17SP	OKGE	OKGE	FT SMITH (FTSMITH1) 500345/13.8KV TRANSFORMER CKT 1	102.8	10.3%	GEN337910 1-ARKANSAS NUCLEAR ONE UNIT #1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Install 2nd 500/345 kV bus tie in Ft. Smith Sub
5	17WP	OKGE	OKGE	FT SMITH (FTSMITH1) 500345/13.8KV TRANSFORMER CKT 1	104.2	9.6%	FT SMITH (FTSMITH5) 345/161/13.8KV TRANSFORMER CKT 5	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Install 2nd 500/345 kV bus tie in Ft. Smith Sub
5	17WP	OKGE	OKGE	FT SMITH (FTSMITH1) 500345/13.8KV TRANSFORMER CKT 1	101.0	8.7%	GEN337911 1-ARKANSAS NUCLEAR ONE UNIT #2	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Install 2nd 500/345 kV bus tie in Ft. Smith Sub
5	17WP	OKGE	OKGE	FT SMITH (FTSMITH1) 500345/13.8KV TRANSFORMER CKT 1	100.8	8.7%	GEN337910 1-ARKANSAS NUCLEAR ONE UNIT #1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Install 2nd 500/345 kV bus tie in Ft. Smith Sub
5	22SP	OKGE	OKGE	FT SMITH (FTSMITH1) 500345/13.8KV TRANSFORMER CKT 1	121.8	11.3%	FT SMITH (FTSMITH5) 345/161/13.8KV TRANSFORMER CKT 5	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Install 2nd 500/345 kV bus tie in Ft. Smith Sub
5	22SP	OKGE	OKGE	FT SMITH (FTSMITH1) 500345/13.8KV TRANSFORMER CKT 1	106.3	10.2%	GEN337910 1-ARKANSAS NUCLEAR ONE UNIT #1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Install 2nd 500/345 kV bus tie in Ft. Smith Sub
5	22SP	OKGE	OKGE	FT SMITH (FTSMITH1) 500345/13.8KV TRANSFORMER CKT 1	105.6	10.2%	GEN337911 1-ARKANSAS NUCLEAR ONE UNIT #2	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Install 2nd 500/345 kV bus tie in Ft. Smith Sub
5	22SP	OKGE	OKGE	FT SMITH (FTSMITH1) 500345/13.8KV TRANSFORMER CKT 1	102.3	10.2%	BASE CASE	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Install 2nd 500/345 kV bus tie in Ft. Smith Sub
5	13SP	OKGE	OKGE	FT SMITH (FTSMITH5) 345/161/13.8KV TRANSFORMER CKT 5	119.7	8.0%	FT SMITH (FTSMITH1) 500345/13.8KV TRANSFORMER CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Install 2nd 500/345 kV bus tie in Ft. Smith Sub
5	13WP	OKGE	OKGE	FT SMITH (FTSMITH5) 345/161/13.8KV TRANSFORMER CKT 5	102.1	6.9%	FT SMITH (FTSMITH1) 500345/13.8KV TRANSFORMER CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Install 2nd 500/345 kV bus tie in Ft. Smith Sub
5	17SP	OKGE	OKGE	FT SMITH (FTSMITH5) 345/161/13.8KV TRANSFORMER CKT 5	135.3	8.5%	FT SMITH (FTSMITH1) 500345/13.8KV TRANSFORMER CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Install 2nd 500/345 kV bus tie in Ft. Smith Sub
5	17WP	OKGE	OKGE	FT SMITH (FTSMITH5) 345/161/13.8KV TRANSFORMER CKT 5	119.4	7.1%	FT SMITH (FTSMITH1) 500345/13.8KV TRANSFORMER CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Install 2nd 500/345 kV bus tie in Ft. Smith Sub
5	22SP	OKGE	OKGE	FT SMITH (FTSMITH5) 345/161/13.8KV TRANSFORMER CKT 5	140.7	8.4%	FT SMITH (FTSMITH1) 500345/13.8KV TRANSFORMER CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Install 2nd 500/345 kV bus tie in Ft. Smith Sub
5	17SP	AEPW	EES	FULTON 115 - PATMOS WEST SS (AECG) 115KV CKT 1	104.8	5.1%	FT SMITH - MUSKOGEE 345KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Build 47.5 miles of 95 mile 345 kV line
5	17SP	AEPW	EES	FULTON 115 - PATMOS WEST SS (AECG) 115KV CKT 1	102.7	4.8%	GEN336821 1-GRAND GULF UNIT	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Build 47.5 miles of 95 mile 345 kV line
5	17SP	AEPW	EES	FULTON 115 - PATMOS WEST SS (AECG) 115KV CKT 1	101.4	6.0%	MC NIEL 500/115KV TRANSFORMER CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Build 47.5 miles of 95 mile 345 kV line
5	22SP	AEPW	EES	FULTON 115 - PATMOS WEST SS (AECG) 115KV CKT 1	104.7	8.8%	FT SMITH - MUSKOGEE 345KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Build 47.5 miles of 95 mile 345 kV line
5	22SP	AEPW	EES	FULTON 115 - PATMOS WEST SS (AECG) 115KV CKT 1	100.1	11.9%	MC NIEL 500/115KV TRANSFORMER CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Build 47.5 miles of 95 mile 345 kV line
5	13SP	SWPA	SWPA	GORE - MUSKOGEE TAP 161KV CKT 1	124.5	3.8%	FT SMITH - MUSKOGEE 345KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Rebuild w/ 1192 ACSR. Upgrade terminal equipment.
5	13SP	SWPA	SWPA	GORE - MUSKOGEE TAP 161KV CKT 1	124.5	3.8%	FT SMITH - MUSKOGEE 345KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Rebuild w/ 1192 ACSR. Replace wave trap.
5	13SP	SWPA	SWPA	GORE - MUSKOGEE TAP 161KV CKT 1	124.5	3.8%	FT SMITH - MUSKOGEE 345KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Rebuild w/ 1192 ACSR.
5	17SP	SWPA	SWPA	GORE - MUSKOGEE TAP 161KV CKT 1	139.3	3.7%	FT SMITH - MUSKOGEE 345KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Rebuild w/ 1192 ACSR. Upgrade terminal equipment.
5	17SP	SWPA	SWPA	GORE - MUSKOGEE TAP 161KV CKT 1	139.3	3.7%	FT SMITH - MUSKOGEE 345KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Rebuild w/ 1192 ACSR. Replace wave trap.
5	17SP	SWPA	SWPA	GORE - MUSKOGEE TAP 161KV CKT 1	139.3	3.7%	FT SMITH - MUSKOGEE 345KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Rebuild w/ 1192 ACSR.
5	17WP	SWPA	SWPA	GORE - MUSKOGEE TAP 161KV CKT 1	106.8	3.2%	FT SMITH - MUSKOGEE 345KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Rebuild w/ 1192 ACSR. Upgrade terminal equipment.
5	17WP	SWPA	SWPA	GORE - MUSKOGEE TAP 161KV CKT 1	106.8	3.2%	FT SMITH - MUSKOGEE 345KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Rebuild w/ 1192 ACSR. Replace wave trap.
5	17WP	SWPA	SWPA	GORE - MUSKOGEE TAP 161KV CKT 1	106.8	3.2%	FT SMITH - MUSKOGEE 345KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Rebuild w/ 1192 ACSR.
5	22SP	SWPA	SWPA	GORE - MUSKOGEE TAP 161KV CKT 1	153.9	3.8%	FT SMITH - MUSKOGEE 345KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Rebuild w/ 1192 ACSR. Upgrade terminal equipment.
5	22SP	SWPA	SWPA	GORE - MUSKOGEE TAP 161KV CKT 1	153.9	3.8%	FT SMITH - MUSKOGEE 345KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Rebuild w/ 1192 ACSR. Replace wave trap.
5	22SP	SWPA	SWPA	GORE - MUSKOGEE TAP 161KV CKT 1	153.9	3.8%	FT SMITH - MUSKOGEE 345KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Rebuild w/ 1192 ACSR.
5	13SP	SWPA	SWPA	GORE - SALLISAW 161KV CKT 1	125.8	3.1%	FT SMITH - MUSKOGEE 345KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Rebuild w/ 1192 ACSR. Replace wave trap.
5	17SP	SWPA	SWPA	GORE - SALLISAW 161KV CKT 1	138.0	3.2%	FT SMITH - MUSKOGEE 345KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Rebuild w/ 1192 ACSR. Replace wave trap.
5	22SP	SWPA	SWPA	GORE - SALLISAW 161KV CKT 1	153.9	3.2%	FT SMITH - MUSKOGEE 345KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Rebuild w/ 1192 ACSR. Replace wave trap.
5	13SP	GRDA	OKGE	HIGHWAY 59 - TAHLEQUAH 161KV CKT 1	120.4	4.0%	FT SMITH - MUSKOGEE 345KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	RECONDUCTOR 95.2% Ownership of 47.84 Mile Line to 795AS33
5	13SP	GRDA	OKGE	HIGHWAY 59 - TAHLEQUAH 161KV CKT 1	120.4	4.0%	FT SMITH - MUSKOGEE 345KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	RECONDUCTOR 4.8% Ownership of 47.84 Mile Line to 795K011
5	17SP	GRDA	OKGE	HIGHWAY 59 - TAHLEQUAH 161KV CKT 1	133.5	4.0%	FT SMITH - MUSKOGEE 345KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	RECONDUCTOR 95.2% Ownership of 47.84 Mile Line to 795AS33

5	17SP	GRDA	OKGE	HIGHWAY 59 - TAHLEQUAH 161KV CKT 1	113.5	4.0%	FT SMITH - MUSKOGEE 345KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	RECONDUCTOR 4.8% Ownership of 47.84 Mile Line to 795kcmil
5	17WP	GRDA	OKGE	HIGHWAY 59 - TAHLEQUAH 161KV CKT 1	118.3	3.4%	FT SMITH - MUSKOGEE 345KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	RECONDUCTOR 95.2% Ownership of 47.84 Mile Line to 795AS33
5	17WP	GRDA	OKGE	HIGHWAY 59 - TAHLEQUAH 161KV CKT 1	118.3	3.4%	FT SMITH - MUSKOGEE 345KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	RECONDUCTOR 4.8% Ownership of 47.84 Mile Line to 795kcmil
5	22SP	GRDA	OKGE	HIGHWAY 59 - TAHLEQUAH 161KV CKT 1	148.6	4.0%	FT SMITH - MUSKOGEE 345KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	RECONDUCTOR 95.2% Ownership of 47.84 Mile Line to 795AS33
5	22SP	GRDA	OKGE	HIGHWAY 59 - TAHLEQUAH 161KV CKT 1	148.6	4.0%	FT SMITH - MUSKOGEE 345KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	RECONDUCTOR 4.8% Ownership of 47.84 Mile Line to 795kcmil
5	22SP	GRDA	OKGE	HIGHWAY 59 - TAHLEQUAH 161KV CKT 1	102.3	3.1%	AKINS 161.00 - SALLISAW 161KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	RECONDUCTOR 95.2% Ownership of 47.84 Mile Line to 795AS33
5	22SP	GRDA	OKGE	HIGHWAY 59 - TAHLEQUAH 161KV CKT 1	102.3	3.1%	AKINS 161.00 - SALLISAW 161KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	RECONDUCTOR 4.8% Ownership of 47.84 Mile Line to 795kcmil
5	22SP	GRDA	OKGE	HIGHWAY 59 - TAHLEQUAH 161KV CKT 1	101.9	3.1%	AKINS 161.00 - LIBERTY TAP 161KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	RECONDUCTOR 95.2% Ownership of 47.84 Mile Line to 795AS33
5	22SP	GRDA	OKGE	HIGHWAY 59 - TAHLEQUAH 161KV CKT 1	101.9	3.1%	AKINS 161.00 - LIBERTY TAP 161KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	RECONDUCTOR 4.8% Ownership of 47.84 Mile Line to 795kcmil
5	13SP	OKGE	OKGE	HIGHWAY 59 - VBI 161KV CKT 1	127.1	4.0%	FT SMITH - MUSKOGEE 345KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Replace 600A Switch 131 in VBI Substation with 1200A and rebuild 1.12 to 795kcmil
5	17SP	OKGE	OKGE	HIGHWAY 59 - VBI 161KV CKT 1	141.4	4.0%	FT SMITH - MUSKOGEE 345KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Replace 600A Switch 131 in VBI Substation with 1200A and rebuild 1.12 to 795kcmil
5	17WP	OKGE	OKGE	HIGHWAY 59 - VBI 161KV CKT 1	126.3	3.4%	FT SMITH - MUSKOGEE 345KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Replace 600A Switch 131 in VBI Substation with 1200A and rebuild 1.12 to 795kcmil
5	22SP	OKGE	OKGE	HIGHWAY 59 - VBI 161KV CKT 1	157.7	4.0%	FT SMITH - MUSKOGEE 345KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Replace 600A Switch 131 in VBI Substation with 1200A and rebuild 1.12 to 795kcmil
5	22SP	OKGE	OKGE	HIGHWAY 59 - VBI 161KV CKT 1	106.2	3.1%	AKINS 161.00 - SALLISAW 161KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Replace 600A Switch 131 in VBI Substation with 1200A and rebuild 1.12 to 795kcmil
5	13SP	SPS	SPS	Hickland Interchange (H TB80155502) 345/230/13.2KV TRANSFORMER CKT 1	113.2	4.2%	POTTER COUNTY INTERCHANGE (WAUK 90343-A) 345/230/13.2KV TRANSFORMER CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Build a new 55 mile double circuit 345 kV line
5	13SP	SPS	SPS	Hickland Interchange (H TB80155502) 345/230/13.2KV TRANSFORMER CKT 1	113.2	4.2%	POTTER COUNTY INTERCHANGE (WAUK 90343-A) 345/230/13.2KV TRANSFORMER CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Build a new 60.5 mile double circuit 345 kV line
5	13SP	SPS	SPS	Hickland Interchange (H TB80155502) 345/230/13.2KV TRANSFORMER CKT 1	113.2	4.2%	POTTER COUNTY INTERCHANGE (WAUK 90343-A) 345/230/13.2KV TRANSFORMER CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Build a new 60.5 mile double circuit 345 kV line
5	13SP	SPS	SPS	Hickland Interchange (H TB80155502) 345/230/13.2KV TRANSFORMER CKT 1	113.2	4.2%	POTTER COUNTY INTERCHANGE (WAUK 90343-A) 345/230/13.2KV TRANSFORMER CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Build a new 35 mile double circuit 345 kV line with at least 3000 A capacity from the new Medicine Lodge 345 kV substation to the VBI interception from the Wichita substation.
5	13SP	SPS	SPS	Hickland Interchange (H TB80155502) 345/230/13.2KV TRANSFORMER CKT 1	113.2	4.2%	POTTER COUNTY INTERCHANGE (WAUK 90343-A) 345/230/13.2KV TRANSFORMER CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Build a new 35 mile double circuit 345 kV line
5	13SP	SPS	SPS	Hickland Interchange (H TB80155502) 345/230/13.2KV TRANSFORMER CKT 1	113.2	4.2%	POTTER COUNTY INTERCHANGE (WAUK 90343-A) 345/230/13.2KV TRANSFORMER CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Build a new 28.6 mile dbi ckt 345 kV line with at least 3000 A capacity from the Medicine Lodge sub to the KS/OK state border towards the Woodward District EHV sub. Install the necessary breakers and terminal equipment at the Medicine Lodge sub.
5	13SP	SPS	SPS	Hickland Interchange (H TB80155502) 345/230/13.2KV TRANSFORMER CKT 1	113.2	4.2%	POTTER COUNTY INTERCHANGE (WAUK 90343-A) 345/230/13.2KV TRANSFORMER CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Build a new 79 mile dbi ckt 345 kV line with at least 3000 A capacity from the Woodward District EHV sub to the KS/OK state border towards the Medicine Lodge sub. Upgrade the Woodward District EHV sub with the necessary breakers and terminal equipment.
5	13SP	SPS	SPS	Hickland Interchange (H TB80155502) 345/230/13.2KV TRANSFORMER CKT 1	113.2	4.2%	POTTER COUNTY INTERCHANGE (WAUK 90343-A) 345/230/13.2KV TRANSFORMER CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Build a new 27.5 mile double circuit 345 kV line
5	13SP	SPS	SPS	Hickland Interchange (H TB80155502) 345/230/13.2KV TRANSFORMER CKT 1	113.2	4.2%	POTTER COUNTY INTERCHANGE (WAUK 90343-A) 345/230/13.2KV TRANSFORMER CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Build a new 27.5 mile double circuit 345 kV line with at least 3000 A capacity from the Spearville substation to the MKEC interception point from the new Comanche County substation.
5	13SP	SPS	SPS	Hickland Interchange (H TB80155502) 345/230/13.2KV TRANSFORMER CKT 1	113.2	4.2%	POTTER COUNTY INTERCHANGE (WAUK 90343-A) 345/230/13.2KV TRANSFORMER CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Install a 400 MVA 345/138 kV transformer at the new 345 kV Medicine Lodge substation.
0	17WP	OPPD	OPPD	HUMBOLDT (S975 T4) 161/65/13.8KV TRANSFORMER CKT 1	101.4	4.0%	SUB 1263 BROCK (S1263 T1) 161/65/13.8KV TRANSFORMER CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Replace with an 84 MVA Unit
5	13WP	AEPW	AEPW	IDABEL - VALLIANT 138KV CKT 1	110.9	4.4%	LYDIA - VALLIANT 345KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Build a new 76 mile 345 kV line from Valliant to NW Texasiana with at least 3000 A capacity. Upgrade the Valliant and NW Texasiana substations with the necessary breakers and terminal equipment.
5	13WP	AEPW	AEPW	IDABEL - VALLIANT 138KV CKT 1	110.0	4.3%	SPP-AEPW-01	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Build a new 76 mile 345 kV line from Valliant to NW Texasiana with at least 3000 A capacity. Upgrade the Valliant and NW Texasiana substations with the necessary breakers and terminal equipment.
5	13WP	AEPW	AEPW	LYDIA - VALLIANT 345KV CKT 1	108.0	19.7%	GEN509403-1-PIRKEY GENERATION	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Build a new 76 mile 345 kV line from Valliant to NW Texasiana with at least 3000 A capacity. Upgrade the Valliant and NW Texasiana substations with the necessary breakers and terminal equipment.
5	13WP	AEPW	AEPW	LYDIA - VALLIANT 345KV CKT 1	106.3	19.7%	GEN509416-1-TURK GENERATION	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Build a new 76 mile 345 kV line from Valliant to NW Texasiana with at least 3000 A capacity. Upgrade the Valliant and NW Texasiana substations with the necessary breakers and terminal equipment.
5	13WP	AEPW	AEPW	LYDIA - VALLIANT 345KV CKT 1	105.2	19.7%	GEN509406-1-WELSH #3	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Build a new 76 mile 345 kV line from Valliant to NW Texasiana with at least 3000 A capacity. Upgrade the Valliant and NW Texasiana substations with the necessary breakers and terminal equipment.
5	17SP	WERE	WERE	MOCKINGBIRD HILL SWITCHING STATION - STULL SWITCHING STATION 115KV CKT 1	101.4	3.5%	HOYT - STRANGER CREEK 345KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Build 14.2 miles of new 345 kV
5	22SP	WERE	WERE	MOCKINGBIRD HILL SWITCHING STATION - STULL SWITCHING STATION 115KV CKT 1	103.0	3.4%	HOYT - STRANGER CREEK 345KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Build 14.2 miles of new 345 kV
5	13SP	GMO	GMO	PECULIAR - PLEASANT HILL 345KV CKT 1	102.1	4.3%	KCPL-OPGD#06	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Tap Nashua 345kV bus in Hawthorn - St. Joseph 345 kV line. Build new 345 kV line from Iatan to Nashua. Add Nashua 345/161 kV
5	13SP	GMO	GMO	PECULIAR - PLEASANT HILL 345KV CKT 1	101.7	4.3%	KCPL-OPGD#01	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Tap Nashua 345kV bus in Hawthorn - St. Joseph 345 kV line. Build new 345 kV line from Iatan to Nashua. Add Nashua 345/161 kV
5	22SP	AEPW	AEPW	PITTSBURG - VALLIANT 345KV CKT 1	100.4	14.9%	HUGO - SUNNYSIDE 345KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Build 36 miles of 72 mile 345 kV line
5	13SP	SPS	SPS	POTTER COUNTY INTERCHANGE (WAUK 90343-A) 345/230/13.2KV TRANSFORMER CKT 1	118.8	4.5%	Hickland Interchange (H TB80155502) 345/230/13.2KV TRANSFORMER CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Build a new 55 mile double circuit 345 kV line

5	13SP	SPS	SPS	POTTER COUNTY INTERCHANGE (WALK 90343-A) 345230/13.2KV TRANSFORMER CKT 1	118.8	4.5%	Hichland Interchange (H TB80155502) 345230/13.2KV TRANSFORMER CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Build a new 60.5 mile double circuit 345 kV line
5	13SP	SPS	SPS	POTTER COUNTY INTERCHANGE (WALK 90343-A) 345230/13.2KV TRANSFORMER CKT 1	118.8	4.5%	Hichland Interchange (H TB80155502) 345230/13.2KV TRANSFORMER CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Build a new 60.5 mile double circuit 345 kV line
5	13SP	SPS	SPS	POTTER COUNTY INTERCHANGE (WALK 90343-A) 345230/13.2KV TRANSFORMER CKT 1	118.8	4.5%	Hichland Interchange (H TB80155502) 345230/13.2KV TRANSFORMER CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Build a new 35 mile double circuit 345 kV line with at least 3000 A capacity from the new Medicine Lodge 345 kV substation to the WRR interception from the Wichita substation.
5	13SP	SPS	SPS	POTTER COUNTY INTERCHANGE (WALK 90343-A) 345230/13.2KV TRANSFORMER CKT 1	118.8	4.5%	Hichland Interchange (H TB80155502) 345230/13.2KV TRANSFORMER CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Build a new 35 mile double circuit 345 kV line
5	13SP	SPS	SPS	POTTER COUNTY INTERCHANGE (WALK 90343-A) 345230/13.2KV TRANSFORMER CKT 1	118.8	4.5%	Hichland Interchange (H TB80155502) 345230/13.2KV TRANSFORMER CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Build a new 28.6 mile dbt cu 345 kV line with at least 3000 A capacity from the Medicine Lodge sub to the KS/OK state border towards the Woodward District EHV sub. Install the necessary breakers and terminal equipment at the Medicine Lodge sub.
5	13SP	SPS	SPS	POTTER COUNTY INTERCHANGE (WALK 90343-A) 345230/13.2KV TRANSFORMER CKT 1	118.8	4.5%	Hichland Interchange (H TB80155502) 345230/13.2KV TRANSFORMER CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Build a new 79 mile dbt ckt 345 kV line with at least 3000 A capacity from the Woodward District EHV sub to the KS/OK state border towards the Medicine Lodge sub. Upgrade the Woodward District EHV sub with the necessary breakers and terminal equipment.
5	13SP	SPS	SPS	POTTER COUNTY INTERCHANGE (WALK 90343-A) 345230/13.2KV TRANSFORMER CKT 1	118.8	4.5%	Hichland Interchange (H TB80155502) 345230/13.2KV TRANSFORMER CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Build a new 27.5 mile double circuit 345 kV line
5	13SP	SPS	SPS	POTTER COUNTY INTERCHANGE (WALK 90343-A) 345230/13.2KV TRANSFORMER CKT 1	118.8	4.5%	Hichland Interchange (H TB80155502) 345230/13.2KV TRANSFORMER CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Build a new 27.5 mile double circuit 345 kV line with at least 3000 A capacity from the Spearville substation to the MKEG interception point from the new Comanche County substation.
5	13SP	SPS	SPS	POTTER COUNTY INTERCHANGE (WALK 90343-A) 345230/13.2KV TRANSFORMER CKT 1	118.8	4.5%	Hichland Interchange (H TB80155502) 345230/13.2KV TRANSFORMER CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Install a 400 MVA 345/138 kV transformer at the new 345 kV Medicine Lodge substation.
5	13WP	SPS	SPS	POTTER COUNTY INTERCHANGE (WALK 90343-A) 345230/13.2KV TRANSFORMER CKT 1	131.5	4.4%	Hichland Interchange (H TB80155502) 345230/13.2KV TRANSFORMER CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Build a new 55 mile double circuit 345 kV line
5	13WP	SPS	SPS	POTTER COUNTY INTERCHANGE (WALK 90343-A) 345230/13.2KV TRANSFORMER CKT 1	131.5	4.4%	Hichland Interchange (H TB80155502) 345230/13.2KV TRANSFORMER CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Build a new 60.5 mile double circuit 345 kV line
5	13WP	SPS	SPS	POTTER COUNTY INTERCHANGE (WALK 90343-A) 345230/13.2KV TRANSFORMER CKT 1	131.5	4.4%	Hichland Interchange (H TB80155502) 345230/13.2KV TRANSFORMER CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Build a new 35 mile double circuit 345 kV line with at least 3000 A capacity from the new Medicine Lodge 345 kV substation to the WRR interception from the Wichita substation.
5	13WP	SPS	SPS	POTTER COUNTY INTERCHANGE (WALK 90343-A) 345230/13.2KV TRANSFORMER CKT 1	131.5	4.4%	Hichland Interchange (H TB80155502) 345230/13.2KV TRANSFORMER CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Build a new 35 mile double circuit 345 kV line
5	13WP	SPS	SPS	POTTER COUNTY INTERCHANGE (WALK 90343-A) 345230/13.2KV TRANSFORMER CKT 1	131.5	4.4%	Hichland Interchange (H TB80155502) 345230/13.2KV TRANSFORMER CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Build a new 28.6 mile dbt cu 345 kV line with at least 3000 A capacity from the Medicine Lodge sub to the KS/OK state border towards the Woodward District EHV sub. Install the necessary breakers and terminal equipment at the Medicine Lodge sub.
5	13WP	SPS	SPS	POTTER COUNTY INTERCHANGE (WALK 90343-A) 345230/13.2KV TRANSFORMER CKT 1	131.5	4.4%	Hichland Interchange (H TB80155502) 345230/13.2KV TRANSFORMER CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Build a new 79 mile dbt ckt 345 kV line with at least 3000 A capacity from the Woodward District EHV sub to the KS/OK state border towards the Medicine Lodge sub. Upgrade the Woodward District EHV sub with the necessary breakers and terminal equipment.
5	13WP	SPS	SPS	POTTER COUNTY INTERCHANGE (WALK 90343-A) 345230/13.2KV TRANSFORMER CKT 1	131.5	4.4%	Hichland Interchange (H TB80155502) 345230/13.2KV TRANSFORMER CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Build a new 27.5 mile double circuit 345 kV line
5	13WP	SPS	SPS	POTTER COUNTY INTERCHANGE (WALK 90343-A) 345230/13.2KV TRANSFORMER CKT 1	131.5	4.4%	Hichland Interchange (H TB80155502) 345230/13.2KV TRANSFORMER CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Build a new 27.5 mile double circuit 345 kV line with at least 3000 A capacity from the Spearville substation to the MKEG interception point from the new Comanche County substation.
5	13WP	SPS	SPS	POTTER COUNTY INTERCHANGE (WALK 90343-A) 345230/13.2KV TRANSFORMER CKT 1	131.5	4.4%	Hichland Interchange (H TB80155502) 345230/13.2KV TRANSFORMER CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Install a 400 MVA 345/138 kV transformer at the new 345 kV Medicine Lodge substation.
5	17SP	WERE	WERE	STULL SWITCHING STATION - TECLUMSEH HILL 115KV CKT 1	107.1	3.5%	HOYT - STRANGER CREEK 345KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Build 14.2 miles of new 345 kV
5	17SP	WERE	WERE	STULL SWITCHING STATION - TECLUMSEH HILL 115KV CKT 1	107.1	3.5%	HOYT - STRANGER CREEK 345KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Build 56.8 miles of new 345 kV
5	22SP	WERE	WERE	STULL SWITCHING STATION - TECLUMSEH HILL 115KV CKT 1	108.1	3.4%	HOYT - STRANGER CREEK 345KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Build 14.2 miles of new 345 kV
5	22SP	WERE	WERE	STULL SWITCHING STATION - TECLUMSEH HILL 115KV CKT 1	108.1	3.4%	HOYT - STRANGER CREEK 345KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Build 56.8 miles of new 345 kV
5	13SP	SWPA	OKGE	VAN BUREN - VBI 161KV CKT 1	100.7	4.6%	FT SMITH - MUSKOGEE 345KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Build 47.5 miles of 95 mile 345 kV line
5	13SP	SWPA	OKGE	VAN BUREN - VBI 161KV CKT 1	100.7	4.6%	FT SMITH - MUSKOGEE 345KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Build 47.5 miles of 95 mile 345 kV line plus new 345/138 kV bus tie at VBI sub
5	17SP	SWPA	OKGE	VAN BUREN - VBI 161KV CKT 1	115.4	4.7%	FT SMITH - MUSKOGEE 345KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Build 47.5 miles of 95 mile 345 kV line
5	17SP	SWPA	OKGE	VAN BUREN - VBI 161KV CKT 1	115.4	4.7%	FT SMITH - MUSKOGEE 345KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Build 47.5 miles of 95 mile 345 kV line plus new 345/138 kV bus tie at VBI sub
5	17WP	SWPA	OKGE	VAN BUREN - VBI 161KV CKT 1	104.4	4.0%	FT SMITH - MUSKOGEE 345KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Build 47.5 miles of 95 mile 345 kV line
5	17WP	SWPA	OKGE	VAN BUREN - VBI 161KV CKT 1	104.4	4.0%	FT SMITH - MUSKOGEE 345KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Build 47.5 miles of 95 mile 345 kV line plus new 345/138 kV bus tie at VBI sub
5	22SP	SWPA	OKGE	VAN BUREN - VBI 161KV CKT 1	124.4	4.7%	FT SMITH - MUSKOGEE 345KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Build 47.5 miles of 95 mile 345 kV line
5	22SP	SWPA	OKGE	VAN BUREN - VBI 161KV CKT 1	124.4	4.7%	FT SMITH - MUSKOGEE 345KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Build 47.5 miles of 95 mile 345 kV line plus new 345/138 kV bus tie at VBI sub
5	22SP	SWPA	OKGE	VAN BUREN - VBI 161KV CKT 1	104.1	3.2%	AES - BONANZA TAP 161KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Build 47.5 miles of 95 mile 345 kV line
5	22SP	SWPA	OKGE	VAN BUREN - VBI 161KV CKT 1	104.1	3.2%	AES - BONANZA TAP 161KV CKT 1	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Build 47.5 miles of 95 mile 345 kV line plus new 345/138 kV bus tie at VBI sub

Scenario	Season	Area	Monitored Bus with Violation	Transfer Case Voltage (PU)	Outaged Branch Causing Overload	Upgrade Name	Solution
5	22SP	EMDE	SUB 124 - AURORA H.T. 161KV	0.91	AI03	Brookline – Compton Ridge 345 kV	Build approx. 30 mile 345 kV line
5	22SP	EMDE	SUB 124 - AURORA H.T. 161KV	0.91	AI03	Compton Ridge – Cox Creek 345 kV	Build approx. 120 mile 345 kV line and Operate Gobbler Knob-Cox Creek at 345 kV
5	22SP	EMDE	SUB 124 - AURORA H.T. 161KV	0.91	AI03	Compton Ridge – Osage Creek 345 kV	Build approx. 50 mile 345 kV line
5	22SP	EMDE	SUB 124 - AURORA H.T. 161KV	0.91	AI03	COMPTON RIDGE - SUB 412 - BRANSON NORTHWEST 161KV CKT 1 AECI	Indeterminate
5	22SP	EMDE	SUB 124 - AURORA H.T. 161KV	0.91	AI03	Compton Ridge 345/161 kV Transformer	Install 500 MVA, 345/161 kV transformer and Cut EDE Reeds Spring-Branson line at 50% and route in & out of Compton Ridge
5	22SP	EMDE	SUB 295 - REEDS SPRING 161KV	0.91	AI03	Brookline – Compton Ridge 345 kV	Build approx. 30 mile 345 kV line
5	22SP	EMDE	SUB 295 - REEDS SPRING 161KV	0.91	AI03	Compton Ridge – Cox Creek 345 kV	Build approx. 120 mile 345 kV line and Operate Gobbler Knob-Cox Creek at 345 kV
5	22SP	EMDE	SUB 295 - REEDS SPRING 161KV	0.91	AI03	Compton Ridge – Osage Creek 345 kV	Build approx. 50 mile 345 kV line
5	22SP	EMDE	SUB 295 - REEDS SPRING 161KV	0.91	AI03	COMPTON RIDGE - SUB 412 - BRANSON NORTHWEST 161KV CKT 1 AECI	Indeterminate
5	22SP	EMDE	SUB 295 - REEDS SPRING 161KV	0.91	AI03	Compton Ridge 345/161 kV Transformer	Install 500 MVA, 345/161 kV transformer and Cut EDE Reeds Spring-Branson line at 50% and route in & out of Compton Ridge
5	22SP	EMDE	SUB 368 - DADEVILLE EAST 161KV	0.92	AI03	Brookline – Compton Ridge 345 kV	Build approx. 30 mile 345 kV line
5	22SP	EMDE	SUB 368 - DADEVILLE EAST 161KV	0.92	AI03	Compton Ridge – Cox Creek 345 kV	Build approx. 120 mile 345 kV line and Operate Gobbler Knob-Cox Creek at 345 kV
5	22SP	EMDE	SUB 368 - DADEVILLE EAST 161KV	0.92	AI03	Compton Ridge – Osage Creek 345 kV	Build approx. 50 mile 345 kV line
5	22SP	EMDE	SUB 368 - DADEVILLE EAST 161KV	0.92	AI03	COMPTON RIDGE - SUB 412 - BRANSON NORTHWEST 161KV CKT 1 AECI	Indeterminate
5	22SP	EMDE	SUB 368 - DADEVILLE EAST 161KV	0.92	AI03	Compton Ridge 345/161 kV Transformer	Install 500 MVA, 345/161 kV transformer and Cut EDE Reeds Spring-Branson line at 50% and route in & out of Compton Ridge
5	22SP	EMDE	SUB 383 - MONETT 161KV	0.92	AI03	Brookline – Compton Ridge 345 kV	Build approx. 30 mile 345 kV line
5	22SP	EMDE	SUB 383 - MONETT 161KV	0.92	AI03	Compton Ridge – Cox Creek 345 kV	Build approx. 120 mile 345 kV line and Operate Gobbler Knob-Cox Creek at 345 kV
5	22SP	EMDE	SUB 383 - MONETT 161KV	0.92	AI03	Compton Ridge – Osage Creek 345 kV	Build approx. 50 mile 345 kV line
5	22SP	EMDE	SUB 383 - MONETT 161KV	0.92	AI03	COMPTON RIDGE - SUB 412 - BRANSON NORTHWEST 161KV CKT 1 AECI	Indeterminate
5	22SP	EMDE	SUB 383 - MONETT 161KV	0.92	AI03	Compton Ridge 345/161 kV Transformer	Install 500 MVA, 345/161 kV transformer and Cut EDE Reeds Spring-Branson line at 50% and route in & out of Compton Ridge
5	22SP	EMDE	SUB 424 - AEC REEDS SPRING 161KV	0.91	AI03	Brookline – Compton Ridge 345 kV	Build approx. 30 mile 345 kV line
5	22SP	EMDE	SUB 424 - AEC REEDS SPRING 161KV	0.91	AI03	Compton Ridge – Cox Creek 345 kV	Build approx. 120 mile 345 kV line and Operate Gobbler Knob-Cox Creek at 345 kV
5	22SP	EMDE	SUB 424 - AEC REEDS SPRING 161KV	0.91	AI03	Compton Ridge – Osage Creek 345 kV	Build approx. 50 mile 345 kV line
5	22SP	EMDE	SUB 424 - AEC REEDS SPRING 161KV	0.91	AI03	COMPTON RIDGE - SUB 412 - BRANSON NORTHWEST 161KV CKT 1 AECI	Indeterminate
5	22SP	EMDE	SUB 424 - AEC REEDS SPRING 161KV	0.91	AI03	Compton Ridge 345/161 kV Transformer	Install 500 MVA, 345/161 kV transformer and Cut EDE Reeds Spring-Branson line at 50% and route in & out of Compton Ridge
5	22SP	EMDE	SUB 446 - CHESAPEAKE 161KV	0.91	AI03	Brookline – Compton Ridge 345 kV	Build approx. 30 mile 345 kV line
5	22SP	EMDE	SUB 446 - CHESAPEAKE 161KV	0.91	AI03	Compton Ridge – Cox Creek 345 kV	Build approx. 120 mile 345 kV line and Operate Gobbler Knob-Cox Creek at 345 kV
5	22SP	EMDE	SUB 446 - CHESAPEAKE 161KV	0.91	AI03	Compton Ridge – Osage Creek 345 kV	Build approx. 50 mile 345 kV line
5	22SP	EMDE	SUB 446 - CHESAPEAKE 161KV	0.91	AI03	COMPTON RIDGE - SUB 412 - BRANSON NORTHWEST 161KV CKT 1 AECI	Indeterminate
5	22SP	EMDE	SUB 446 - CHESAPEAKE 161KV	0.91	AI03	Compton Ridge 345/161 kV Transformer	Install 500 MVA, 345/161 kV transformer and Cut EDE Reeds Spring-Branson line at 50% and route in & out of Compton Ridge





Transmission Owner	Upgrade	Solution	Earliest Date Upgrade Required (DUN)	Estimated Date of Upgrade Completion (EOC)	Estimated Engineering & Construction Cost
OPPD	HUMBOLDT (S975 T4) 161/69/13.8KV TRANSFORMER CKT 1	Replace with an 84 MVA Unit	12/1/2017	12/1/2017	\$ 2,000,000

**Construction Pending Projects - The requested service is contingent upon completion of the following upgrades. Cost is not assignable to the transmission customer.**

Transmission Owner	Upgrade	Solution	Earliest Date Upgrade Required (DUN)	Estimated Date of Upgrade Completion (EOC)	Estimated Engineering & Construction Cost
OKGE	Chamber Springs - Ft Smith 345 kV with 345/138 kV bus tie at VBI	Build 47.5 miles of 95 mile 345 kV line plus new 345/138 kV bus tie at VBI sub	6/1/2014	6/1/2017	\$ 112,337,500
AEPW	Chamber Springs - Ft Smith 345 kV AEPW	Build 47.5 miles of 95 mile 345 kV line	6/1/2014	6/1/2017	\$ 77,662,500
OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	Replace 1600 amp 345 kV CT in both Muskogee and Ft.Smith Subs	6/1/2014	6/1/2014	\$ 700,000
OKGE	FT SMITH (FTSMITH1) 500/345/13.8KV TRANSFORMER CKT 1 Accelerate	Install 2nd 500/345 kV bus tie in Ft. Smith Sub	6/1/2013	6/1/2015	\$ 3,175,358
AEPW	HIGHWAY 59 - TAHLEQUAH 161KV CKT 1 AEPW	RECONDUCTOR 95.2% Ownership of 47.84 Mile Line to 795AS3	6/1/2013	6/1/2015	\$ 45,543,680
OKGE	HIGHWAY 59 - TAHLEQUAH 161KV CKT 1 OKGE	RECONDUCTOR 4.8% Ownership of 47.84 Mile Line to 795kcmil	6/1/2013	6/1/2015	\$ 2,296,320
OKGE	HIGHWAY 59 - VBI 161KV CKT 1	Replace 600A Switch 131 in VBI Substation with 1200A and rebuild 1.12 to 795kcmil	6/1/2013	6/1/2015	\$ 1,450,000
KACP	Iatan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV	6/1/2012	6/1/2016	\$ 15,975,000
WERE	Iatan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV	6/1/2012	6/1/2016	\$ 63,900,000
SWPA	LIBERTY TAP - SALLISAW 161KV CKT 1 SWPA	Rebuild w/ 1192 ACSR.	6/1/2013	6/1/2015	\$ 6,500,000
AECI	LIBERTY TAP - SALLISAW 161KV CKT 1 AECI	Indeterminate	6/1/2013	6/1/2013	Indeterminate
SWPA	GORE - MUSKOGEE TAP 161KV CKT 1	Rebuild w/ 1192 ACSR. Upgrade terminal equipment.	6/1/2013	6/1/2015	\$ 8,000,000

**Expansion Plan Projects - The requested service is contingent upon completion of the following upgrades. Cost is not assignable to the transmission customer.**

Transmission Owner	Upgrade	Solution	Earliest Date Upgrade Required (DUN)	Estimated Date of Upgrade Completion (EOC)
KACP	IATAN - NASHUA 345KV CKT 1	Tap Nashua 345kV bus in Hawthorn - St. Joseph 345 kV line. Build new 345 kV line from Iatan to Nashua. Add Nashua 345/161 kV	10/1/2012	6/1/2015
AEPW	NORTHWEST TEXARKANA - VALLIANT 345KV CKT 1	Build a new 76 mile 345 kV line from Valliant to NW Texarkana with at least 3000 A capacity. Upgrade the Valliant and NW Texarkana substations with the necessary breakers and terminal equipment.	6/1/2013	10/1/2014
MKEC	Line - Comanche County - Medicine Lodge 345 kV dbl ckt	Build a new 55 mile double circuit 345 kV line	7/31/2011	1/1/2015
MKEC	Line - Medicine Lodge - Wichita 345 kV dbl ckt MKEC	Build a new 35 mile double circuit 345 kV line with at least 3000 A capacity from the new Medicine Lodge 345 kV substation to the WR interception from the Wichita substation.	7/31/2011	1/1/2015
MKEC	Line - Medicine Lodge - Woodward 345 kV dbl Ckt MKEC	Build a new 28.6 mile dbl ckt 345 kV line with at least 3000 A capacity from the Medicine Lodge sub to the KS/OK state border towards the Woodward District EHV sub. Install the necessary breakers and terminal equipment at the Medicine Lodge sub.	7/31/2011	1/1/2015
MKEC	Line - Spearville - Comanche County 345 kV dbl ckt MKEC	Build a new 27.5 mile double circuit 345 kV line	7/31/2011	1/1/2015
MKEC	XFR - Medicine Lodge 345/138 kV	Install a 400 MVA 345/138 kV transformer at the new 345 kV Medicine Lodge substation.	7/31/2011	1/1/2015
OKGE	Line - Hitchland - Woodward 345 kV dbl ckt OKGE	Build a new 60.5 mile double circuit 345 kV line	7/31/2011	7/1/2014
OKGE	Line - Medicine Lodge - Woodward 345 kV dbl Ckt OKGE	Build a new 79 mile dbl ckt 345 kV line with at least 3000 A capacity from the Woodward District EHV sub to the KS/OK state border towards the Medicine Lodge sub. Upgrade the Woodward District EHV sub with the necessary breakers and terminal equipment.	7/31/2011	1/1/2015
SPS	Line - Hitchland - Woodward 345 kV dbl ckt SPS	Build a new 60.5 mile double circuit 345 kV line	7/31/2011	7/1/2014
SUNC	Line - Spearville - Comanche County 345 kV dbl ckt SUNC	Build a new 27.5 mile double circuit 345 kV line with at least 3000 A capacity from the Spearville substation to the MKEC interception point from the new Comanche County substation.	7/31/2011	1/1/2015
WERE	Line - Medicine Lodge - Wichita 345 kV dbl ckt WERE	Build a new 35 mile double circuit 345 kV line	7/31/2011	1/1/2015

**Exploratory Interconnection Project between AECI Cox Creek 345kV (Thayer, Mo), AEPW Osage Creek 345 kV, EMDE Reeds Spring-Branson 161 kV, and SPRM Brookline 345kV**

Transmission Owner	UpgradeName	Solution	Earliest Date Upgrade Required (DUN)	Estimated Date of Upgrade Completion (EOC)	Estimated Engineering & Construction Cost
MULTIPLE	Brookline - Compton Ridge 345 kV	Build approx. 30 mile 345 kV line	6/1/2014	6/1/2017	Indeterminate
MULTIPLE	Compton Ridge - Cox Creek 345 kV	Build approx. 120 mile 345 kV line and Operate Gobbler Knob-Cox Creek at 345 kV	6/1/2014	6/1/2017	Indeterminate
MULTIPLE	Compton Ridge - Osage Creek 345 kV	Build approx. 50 mile 345 kV line	6/1/2014	6/1/2017	Indeterminate
MULTIPLE	Compton Ridge 345/161 kV Transformer	Install 500 MVA, 345/161 kV transformer and Cut EDE Reeds Spring-Branson line at 50% and route in & out of Compton Ridge	6/1/2014	6/1/2017	Indeterminate