

Screening Study SPP-LTSR-2012-001

For OASIS Request #76726245

MAINTAINED BY
SPP Engineering, SPP Transmission Service Studies
June 8, 2012

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Executive Summary

Noble Environmental Power has requested a Screening Study to determine the impacts on SPP facilities due to the Long Term Service Requests for 114 MW. The service type requested for this screening study is Long Term Service Request (LTSR). OASIS# 76726245 was studied as one request from 1/1/2014 to 1/1/2034.

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 SPS 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 1/1/2014 to 1/1/2034.

The service was modeled from SPS 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

Noble Environmental Power has requested a screening study to determine the impacts on SPP facilities for the Long Term Service Requests for 114 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 SPS 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 SPS to EES 114 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 114 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 114 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 114 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

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Table 1 - SPP Facility Thermal Transfer Limitations

Scenario	Season	From Area	To Area	Monitored Branch Over 100% Rate B	Transfer Case % Loading	TDF (%)	Outaged Branch Causing Overload	Upgrade Name	Solution
5	13WP	AEPW	AEPW	ASHDOWN WEST - CRAIG JUNCTION 138KV CKT 1	114.8	5.3%	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	13WP	AEPW	AEPW	ASHDOWN WEST - CRAIG JUNCTION 138KV CKT 1	113.8	5.2%	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	113.9	5.3%	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	13WP	AEPW	AEPW	ASHDOWN WEST - PATTERSON 138KV CKT 1	112.9	5.2%	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	17SP	WERE	WERE	BENTON - WICHITA 345KV CKT 1	100.1	10.6%	GENS2751 1-WOLF CREEK GENERATING STATION UNIT 1	BENTON - WICHITA 345KV CKT 1	Replace terminal equipment at Benton and Wichita
5	22SP	WERE	WERE	BENTON - WICHITA 345KV CKT 1	104.3	10.6%	GENS2751 1-WOLF CREEK GENERATING STATION UNIT 1	BENTON - WICHITA 345KV CKT 1	Replace terminal equipment at Benton and Wichita
5	22SP	WERE	WERE	BENTON - WICHITA 345KV CKT 1	103.8	10.7%	G08-13T 345.00 - WOODRING 345KV CKT 1	BENTON - WICHITA 345KV CKT 1	Replace terminal equipment at Benton and Wichita
5	13WP	AEPW	AEPW	BROKEN BOW TAP - CRAIG JUNCTION 138KV CKT 1	109.0	3.6%	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	BROKEN BOW TAP - CRAIG JUNCTION 138KV CKT 1	108.1	3.5%	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 - IDABEL 138KV CKT 1	113.7	3.6%	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	BROKEN BOW TAP - IDABEL 138KV CKT 1	112.8	3.5%	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	SPS	SPS	BUSHLAND INTERCHANGE - DEAF SMITH COUNTY INTERCHANGE 230KV CKT 1	105.6	6.7%	GEN25562 1-TOLK GEN #1 24 KV	Priority Projects	Priority Projects
5	13WP	SPS	SPS	BUSHLAND INTERCHANGE - DEAF SMITH COUNTY INTERCHANGE 230KV CKT 1	101.7	6.7%	GEN25561 1-TOLK GEN #1 24 KV	Priority Projects	Priority Projects
5	17SP	WERE	WERE	CHISHOLM - MAIZE 138KV CKT 1	117.6	3.8%	BENTON - WICHITA 345KV CKT 1	CHISHOLM - MAIZE 138KV CKT 1 #1	Upgrade disconnect switches, wavetraps, breaker, jumpers
5	17SP	WERE	WERE	CHISHOLM - MAIZE 138KV CKT 1	117.6	3.8%	BENTON - WICHITA 345KV CKT 1	CHISHOLM - MAIZE 138KV CKT 1 #2	Rebuild 7.25 miles
5	22SP	WERE	WERE	CHISHOLM - MAIZE 138KV CKT 1	124.2	3.8%	BENTON - WICHITA 345KV CKT 1	CHISHOLM - MAIZE 138KV CKT 1 #1	Upgrade disconnect switches, wavetraps, breaker, jumpers
5	22SP	WERE	WERE	CHISHOLM - MAIZE 138KV CKT 1	124.2	3.8%	BENTON - WICHITA 345KV CKT 1	CHISHOLM - MAIZE 138KV CKT 1 #2	Rebuild 7.25 miles
5	17SP	OKGE	OKGE	CIMARRON - DRAPER LAKE 345KV CKT 1	106.6	10.1%	HORSESHOE LAKE - SEMINOLE 345KV CKT 1	CIMARRON - DRAPER LAKE 345KV CKT 1	Replace Terminal Equipment
5	17SP	OKGE	OKGE	CIMARRON - DRAPER LAKE 345KV CKT 1	106.6	10.1%	ARGADIA - HORSESHOE LAKE 345KV CKT 1	CIMARRON - DRAPER LAKE 345KV CKT 1	Replace Terminal Equipment
5	17SP	OKGE	OKGE	CIMARRON - DRAPER LAKE 345KV CKT 1	103.3	8.6%	GRACEMONT - MINCO 345KV CKT 1	CIMARRON - DRAPER LAKE 345KV CKT 1	Replace Terminal Equipment
5	17SP	OKGE	OKGE	CIMARRON - DRAPER LAKE 345KV CKT 1	123.6	10.1%	ARGADIA - HORSESHOE LAKE 345KV CKT 1	CIMARRON - DRAPER LAKE 345KV CKT 1	Replace Terminal Equipment
5	17WP	OKGE	OKGE	CIMARRON - DRAPER LAKE 345KV CKT 1	123.6	10.1%	HORSESHOE LAKE - SEMINOLE 345KV CKT 1	CIMARRON - DRAPER LAKE 345KV CKT 1	Replace Terminal Equipment
5	17WP	OKGE	OKGE	CIMARRON - DRAPER LAKE 345KV CKT 1	116.9	8.6%	GRACEMONT - MINCO 345KV CKT 1	CIMARRON - DRAPER LAKE 345KV CKT 1	Replace Terminal Equipment
5	17WP	OKGE	OKGE	CIMARRON - DRAPER LAKE 345KV CKT 1	104.3	8.9%	OGEJERM14	CIMARRON - DRAPER LAKE 345KV CKT 1	Replace Terminal Equipment
5	17WP	OKGE	OKGE	CIMARRON - DRAPER LAKE 345KV CKT 1	103.8	8.9%	OGEJERM12	CIMARRON - DRAPER LAKE 345KV CKT 1	Replace Terminal Equipment
5	17WP	OKGE	OKGE	CIMARRON - DRAPER LAKE 345KV CKT 1	103.7	9.0%	OGEJERM10	CIMARRON - DRAPER LAKE 345KV CKT 1	Replace Terminal Equipment
5	17WP	OKGE	OKGE	CIMARRON - DRAPER LAKE 345KV CKT 1	102.5	8.9%	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	CIMARRON - DRAPER LAKE 345KV CKT 1	Replace Terminal Equipment
5	17WP	OKGE	OKGE	CIMARRON - DRAPER LAKE 345KV CKT 1	102.5	8.9%	CLEVELAND AVE - CLEVELAND TAP 69KV CKT 1	CIMARRON - DRAPER LAKE 345KV CKT 1	Replace Terminal Equipment
5	17WP	OKGE	OKGE	CIMARRON - DRAPER LAKE 345KV CKT 1	101.7	8.9%	BASE CASE	CIMARRON - DRAPER LAKE 345KV CKT 1	Replace Terminal Equipment
5	17WP	OKGE	OKGE	CIMARRON - DRAPER LAKE 345KV CKT 1	101.3	8.9%	BENTON - WICHITA 345KV CKT 1	CIMARRON - DRAPER LAKE 345KV CKT 1	Replace Terminal Equipment
5	17WP	OKGE	OKGE	CIMARRON - DRAPER LAKE 345KV CKT 1	101.2	8.9%	ROSE HILL - WOLF CREEK 345KV CKT 1	CIMARRON - DRAPER LAKE 345KV CKT 1	Replace Terminal Equipment
5	22SP	OKGE	OKGE	CIMARRON - DRAPER LAKE 345KV CKT 1	103.9	10.0%	ARGADIA - HORSESHOE LAKE 345KV CKT 1	CIMARRON - DRAPER LAKE 345KV CKT 1	Replace Terminal Equipment
5	22SP	OKGE	OKGE	CIMARRON - DRAPER LAKE 345KV CKT 1	103.9	10.0%	HORSESHOE LAKE - SEMINOLE 345KV CKT 1	CIMARRON - DRAPER LAKE 345KV CKT 1	Replace Terminal Equipment
5	22SP	OKGE	OKGE	CIMARRON - DRAPER LAKE 345KV CKT 1	101.2	10.0%	LAWTON EASTSIDE - SUNNYSIDE 345KV CKT 1	CIMARRON - DRAPER LAKE 345KV CKT 1	Replace Terminal Equipment
5	13WP	SUNC	WERE	CIRCLE - MULLERGREEN 230KV CKT 1	118.8	11.5%	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	Priority Projects	Priority Projects
5	13WP	WERE	WERE	CIRCLE (CIRCLE) 230/1513.8KV TRANSFORMER CKT 1	102.9	7.5%	CIRCLE - EAST MCPHERSON 230KV CKT 1	Priority Projects	Priority Projects
5	13WP	SUNC	WERE	CLEARWATER - MILAN TAP 138KV CKT 1	148.1	3.3%	MDW-CATB05	HARPER - MILAN TAP 138KV CKT 1 #1	Replace Wave Trap at Harper Substation
5	13WP	SUNC	WERE	CLEARWATER - MILAN TAP 138KV CKT 1	148.1	3.3%	MDW-CATB05	CLEARWATER - MILAN TAP 138KV CKT 1 MKEC	Rebuild MKEC portion of the Clearwater-Milan tap 115 kV
5	13WP	SUNC	WERE	CLEARWATER - MILAN TAP 138KV CKT 1	148.1	3.3%	MDW-CATB05	CLEARWATER - MILAN TAP 138KV CKT 1 WERE	Rebuild WERE portion of the Clearwater-Milan tap 115 kV
5	13WP	SUNC	WERE	CLEARWATER - MILAN TAP 138KV CKT 1	148.1	3.3%	MDW-CATB05	HARPER - MILAN TAP 138KV CKT 1 #2	Rebuild 22.1 miles
5	13WP	SUNC	WERE	CLEARWATER - MILAN TAP 138KV CKT 1	148.1	3.3%	MDW-CATB05	Priority Projects	Priority Projects
5	13WP	SUNC	WERE	CLEARWATER - MILAN TAP 138KV CKT 1	143.1	3.7%	SPP-SWPS-01	HARPER - MILAN TAP 138KV CKT 1 #1	Replace Wave Trap at Harper Substation
5	13WP	SUNC	WERE	CLEARWATER - MILAN TAP 138KV CKT 1	143.1	3.7%	SPP-SWPS-01	CLEARWATER - MILAN TAP 138KV CKT 1 MKEC	Rebuild MKEC portion of the Clearwater-Milan tap 115 kV
5	13WP	SUNC	WERE	CLEARWATER - MILAN TAP 138KV CKT 1	143.1	3.7%	SPP-SWPS-01	CLEARWATER - MILAN TAP 138KV CKT 1 WERE	Rebuild WERE portion of the Clearwater-Milan tap 115 kV
5	13WP	SUNC	WERE	CLEARWATER - MILAN TAP 138KV CKT 1	143.1	3.7%	SPP-SWPS-01	HARPER - MILAN TAP 138KV CKT 1 #2	Rebuild 22.1 miles
5	17SP	WERE	WERE	EVANS ENERGY CENTER NORTH - MAIZE 138KV CKT 1	121.9	3.8%	BENTON - WICHITA 345KV CKT 1	EVANS ENERGY CENTER NORTH - MAIZE 138KV CKT 1 #1	Upgrade disconnect switches, wavetraps, breaker, jumpers
5	17SP	WERE	WERE	EVANS ENERGY CENTER NORTH - MAIZE 138KV CKT 1	121.9	3.8%	BENTON - WICHITA 345KV CKT 1	EVANS ENERGY CENTER NORTH - MAIZE 138KV CKT 1 #2	Rebuild 4.8 miles
5	22SP	WERE	WERE	EVANS ENERGY CENTER NORTH - MAIZE 138KV CKT 1	129.1	3.8%	BENTON - WICHITA 345KV CKT 1	EVANS ENERGY CENTER NORTH - MAIZE 138KV CKT 1 #1	Upgrade disconnect switches, wavetraps, breaker, jumpers
5	22SP	WERE	WERE	EVANS ENERGY CENTER NORTH - MAIZE 138KV CKT 1	129.1	3.8%	BENTON - WICHITA 345KV CKT 1	EVANS ENERGY CENTER NORTH - MAIZE 138KV CKT 1 #2	Rebuild 4.8 miles
5	17SP	GRDA	AEPW	FLINT CREEK - SILOAM SPRINGS TAP 345KV CKT 1	107.9	7.1%	7JASPER 345.00 - BLACKBERRY 345KV CKT 1	FLINT CREEK - SILOAM SPRINGS TAP 345KV CKT 1 AEPW	Replace Terminal Equipment
5	17SP	GRDA	AEPW	FLINT CREEK - SILOAM SPRINGS TAP 345KV CKT 1	104.2	5.9%	CHAMBER SPRINGS - CLARKSVILLE 345KV CKT 1	FLINT CREEK - SILOAM SPRINGS TAP 345KV CKT 1	Replace Terminal Equipment
5	17WP	GRDA	AEPW	FLINT CREEK - SILOAM SPRINGS TAP 345KV CKT 1	102.4	7.3%	7JASPER 345.00 - BLACKBERRY 345KV CKT 1	FLINT CREEK - SILOAM SPRINGS TAP 345KV CKT 1 AEPW	Replace Terminal Equipment
5	22SP	GRDA	AEPW	FLINT CREEK - SILOAM SPRINGS TAP 345KV CKT 1	113.3	5.9%	CHAMBER SPRINGS - CLARKSVILLE 345KV CKT 1	FLINT CREEK - SILOAM SPRINGS TAP 345KV CKT 1 AEPW	Replace Terminal Equipment
5	22SP	GRDA	AEPW	FLINT CREEK - SILOAM SPRINGS TAP 345KV CKT 1	102.8	5.0%	GEN50084 1-FLINT CREEK	FLINT CREEK - SILOAM SPRINGS TAP 345KV CKT 1 AEPW	Replace Terminal Equipment
5	17SP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	106.2	11.6%	MUSKOGEE - NOARK 345KV CKT 1	FT SMITH - MUSKOGEE 345KV CKT 1	Replace 1600 amp 345 kV CT in both Muskogee and Ft Smith Subs
5	17SP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	106.2	11.6%	MUSKOGEE - NOARK 345KV CKT 1	Brookline - Compton Ridge 345 kV SPRM	Build approx. 50% of 30 mile 345 kV line
5	17SP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	106.2	11.6%	MUSKOGEE - NOARK 345KV CKT 1	Brookline - Compton Ridge 345 kV EMDE	Build approx. 50% of 30 mile 345 kV line
5	17SP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	106.2	11.6%	MUSKOGEE - NOARK 345KV CKT 1	Compton Ridge 345/161 kV Transformer	Install 500 MVA, 345/161 kV transformer and Cut DCR Reads Spring Branch line at 50% and route in & out of Compton Ridge
5	17SP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	106.2	11.6%	MUSKOGEE - NOARK 345KV CKT 1	Muskogee - VBI 345 kV line plus new 345/161 kV bus tie at VBI sub	Build 70.95 mile 345 kV line plus new 345/161 kV bus tie at VBI sub
5	17SP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	106.2	11.6%	MUSKOGEE - NOARK 345KV CKT 1	Turk - McNeil 345 kV AEPW	Build 54 mile 345 kV line
5	17SP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	106.2	11.6%	MUSKOGEE - NOARK 345KV CKT 1	VBI - Arkansas Nuclear One 345KV CKGE	Build 73 miles of 345KV line
5	22SP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	116.4	11.5%	MUSKOGEE - NOARK 345KV CKT 1	FT SMITH (FTSMITH1) 500/345/13.8KV TRANSFORMER CKT 1	Replace 1600 amp 345 kV CT in both Muskogee and Ft Smith Subs
5	22SP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	116.4	11.5%	MUSKOGEE - NOARK 345KV CKT 1	Brookline - Compton Ridge 345 kV SPRM	Build approx. 50% of 30 mile 345 kV line
5	22SP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	116.4	11.5%	MUSKOGEE - NOARK 345KV CKT 1	Brookline - Compton Ridge 345 kV EMDE	Build approx. 50% of 30 mile 345 kV line
5	22SP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	116.4	11.5%	MUSKOGEE - NOARK 345KV CKT 1	Compton Ridge 345/161 kV Transformer	Install 500 MVA, 345/161 kV transformer and Cut DCR Reads Spring Branch line at 50% and route in & out of Compton Ridge
5	22SP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	116.4	11.5%	MUSKOGEE - NOARK 345KV CKT 1	Muskogee - VBI 345 kV line plus new 345/161 kV bus tie at VBI sub	Build 70.95 mile 345 kV line plus new 345/161 kV bus tie at VBI sub
5	22SP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	116.4	11.5%	MUSKOGEE - NOARK 345KV CKT 1	Turk - McNeil 345 kV AEPW	Build 54 mile 345 kV line
5	22SP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	116.4	11.5%	MUSKOGEE - NOARK 345KV CKT 1	VBI - Arkansas Nuclear One 345KV CKGE	Build 73 miles of 345KV line
5	22SP	OKGE	OKGE	FT SMITH (FTSMITH1) 500/345/13.8KV TRANSFORMER CKT 1	101.8	9.6%	MUSKOGEE - NOARK 345KV CKT 1	FT SMITH (FTSMITH1) 500/345/13.8KV TRANSFORMER CKT 1	Install 2nd 500/345 kV bus tie in Ft. Smith Sub
5	22SP	OKGE	OKGE	FT SMITH (FTSMITH1) 500/345/13.8KV TRANSFORMER CKT 1	101.7	8.5%	FT SMITH (FTSMITH1) 345/161/13.8KV TRANSFORMER CKT 1	FT SMITH (FTSMITH1) 500/345/13.8KV TRANSFORMER CKT 1	Install 2nd 500/345 kV bus tie in Ft. Smith Sub
5	17SP	OKGE	OKGE	FT SMITH (FTSMITH1) 345/161/13.8KV TRANSFORMER CKT 1	111.6	6.1%	FT SMITH (FTSMITH1) 500/345/13.8KV TRANSFORMER CKT 1	FT SMITH (FTSMITH1) 500/345/13.8KV TRANSFORMER CKT 1	Install 2nd 500/345 kV bus tie in Ft. Smith Sub
5	17WP	OKGE	OKGE	FT SMITH (FTSMITH1) 345/161/13.8KV TRANSFORMER CKT 1	100.3	6.1%	FT SMITH (FTSMITH1) 500/345/13.8KV TRANSFORMER CKT 1	FT SMITH (FTSMITH1) 500/345/13.8KV TRANSFORMER CKT 1	Install 2nd 500/345 kV bus tie in Ft. Smith Sub
5	22SP	OKGE	OKGE	FT SMITH (FTSMITH1) 345/161/13.8KV TRANSFORMER CKT 1	116.0	6.1%	TRANSFORMER CKT 1	TRANSFORMER CKT 1	Install 2nd 500/345 kV bus tie in Ft. Smith Sub
5	13WP	SUNC	SUNC	G01 039AT 115.00 - GREENSBURG 115KV CKT 1	133.9	3.7%	POST ROCK - SPEARVILLE 345KV CKT 1	Priority Projects	Priority Projects
5	13WP	SUNC	SUNC	G01 039AT 115.00 - GREENSBURG 115KV CKT 1	124.6	3.2%	MULLERGREEN - SPEARVILLE 230KV CKT 1	Priority Projects	Priority Projects
5	13WP	SUNC	SUNC	G01 039AT 115.00 - GREENSBURG 115KV CKT 1	108.4	3.3%	SPP-SWPS-01	Priority Projects	Priority Projects
5	13WP	NPPD	NPPD	GRAND ISLAND - SWEETWATER 345KV CKT 1	127.0	16.0%	AXTELL - PAULINE 345KV CKT 1	Cherry Co - Gentlemen 345 kV Ckt1	Build new 345 kV Transmission Line from GGS 345 kV Substation to a new Cherry County 345 kV Substation (76 miles).
5	13WP	NPPD	NPPD	GRAND ISLAND - SWEETWATER 345KV CKT 1	127.0	16.0%	AXTELL - PAULINE 345KV CKT 1	Cherry Co - Holt Co 345 kV Ckt1	Build new 345 kV Transmission Line from new Cherry County 345 kV Substation to new 345 kV Holt County Substation. (Estimated 146 miles)
5	13WP	NPPD	NPPD	GRAND ISLAND - SWEETWATER 345KV CKT 1	127.0	16.0%	AXTELL - PAULINE 345KV CKT 1	Cherry Co 345 kV Terminal Upgrades	Build new Cherry County 345 kV Substation.
5	13WP	NPPD	NPPD	GRAND ISLAND - SWEETWATER 345KV CKT 1	127.0	16.0%	AXTELL - PAULINE 345KV CKT 1	GRAND ISLAND - SWEETWATER 345KV CKT 2	Build 63.4 mile second circuit

5	17SP	GRDA	GRDA	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1	110.2	6.0%	CHAMBER SPRINGS - CLARKSVILLE 345KV CKT 1	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1	Accelerate	Replace Terminal Equipment
5	17WP	GRDA	GRDA	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1	105.2	7.2%	ZJASPER 345.00 - BLACKBERRY 345KV CKT 1	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1	Accelerate	Replace Terminal Equipment
5	17WP	GRDA	GRDA	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1	104.4	6.1%	CHAMBER SPRINGS - CLARKSVILLE 345KV CKT 1	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1	Accelerate	Replace Terminal Equipment
5	17WP	GRDA	GRDA	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1	101.7	7.1%	ZJASPER 345.00 - MORGAN 345KV CKT 1	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1	Accelerate	Replace Terminal Equipment
5	22SP	GRDA	GRDA	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1	120.1	6.0%	CHAMBER SPRINGS - CLARKSVILLE 345KV CKT 1	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1	Accelerate	Replace Terminal Equipment
5	22SP	GRDA	GRDA	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1	107.1	5.0%	GEN509394 1-FLINT CREEK	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1	Accelerate	Replace Terminal Equipment
5	22SP	GRDA	GRDA	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1	102.2	6.6%	CLARKSVILLE - ONETA 345KV CKT 1	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1	Accelerate	Replace Terminal Equipment
5	13WP	SUNC	SUNC	GREENSBURG - SUN CITY 115KV CKT 1	133.4	3.7%	POST ROCK - SPEARVILLE 345KV CKT 1	Priority Projects		
5	13WP	SUNC	SUNC	GREENSBURG - SUN CITY 115KV CKT 1	124.4	3.2%	MULLERGREEN - SPEARVILLE 230KV CKT 1	Priority Projects		
5	13WP	SUNC	SUNC	GREENSBURG - SUN CITY 115KV CKT 1	108.1	3.3%	SPS-SWPS-01	Priority Projects		
5	13WP	SUNC	SUNC	HARPER - MILAN TAP 138KV CKT 1	165.8	3.3%	MIDW-CATB05	HARPER - MILAN TAP 138KV CKT 1 #1	Replace Wave Trap at Harper Substation	Rebuild MKEC portion of the Clearwater-Milan tap 115 kV
5	13WP	SUNC	SUNC	HARPER - MILAN TAP 138KV CKT 1	165.8	3.3%	MIDW-CATB05	CLEARWATER - MILAN TAP 138KV CKT 1 MKEC	Rebuild WERE portion of the Clearwater-Milan tap 115 kV	Rebuild 22.1 miles
5	13WP	SUNC	SUNC	HARPER - MILAN TAP 138KV CKT 1	165.8	3.3%	MIDW-CATB05	CLEARWATER - MILAN TAP 138KV CKT 1 WERE	Rebuild WERE portion of the Clearwater-Milan tap 115 kV	Rebuild 22.1 miles
5	13WP	SUNC	SUNC	HARPER - MILAN TAP 138KV CKT 1	165.8	3.3%	MIDW-CATB05	HARPER - MILAN TAP 138KV CKT 1 #2	Rebuild 22.1 miles	
5	13WP	SUNC	SUNC	HARPER - MILAN TAP 138KV CKT 1	160.5	3.7%	SPS-SWPS-01	HARPER - MILAN TAP 138KV CKT 1 #1	Replace Wave Trap at Harper Substation	
5	13WP	SUNC	SUNC	HARPER - MILAN TAP 138KV CKT 1	160.5	3.2%	SPS-SWPS-01	CLEARWATER - MILAN TAP 138KV CKT 1 MKEC	Rebuild MKEC portion of the Clearwater-Milan tap 115 kV	
5	13WP	SUNC	SUNC	HARPER - MILAN TAP 138KV CKT 1	160.5	3.7%	SPS-SWPS-01	CLEARWATER - MILAN TAP 138KV CKT 1 WERE	Rebuild WERE portion of the Clearwater-Milan tap 115 kV	
5	13WP	SUNC	SUNC	HARPER - MILAN TAP 138KV CKT 1	160.5	3.7%	SPS-SWPS-01	HARPER - MILAN TAP 138KV CKT 1 #2	Rebuild 22.1 miles	
5	13WP	SUNC	SUNC	HARPER - MILAN TAP 138KV CKT 1	160.5	3.7%	SPS-SWPS-01	Priority Projects		
5	13WP	MIDW	MIDW	HAYS PLANT - SOUTH HAYS 115KV CKT 1	126.5	3.3%	KNOLL 230 - POSTROCK#6 230.00 230KV CKT 1	HAYS PLANT - SOUTH HAYS 115KV CKT 1 #2		Rebuild 3.25 miles
5	13WP	MIDW	MIDW	HAYS PLANT - SOUTH HAYS 115KV CKT 1	126.5	3.3%	KNOLL 230 - POSTROCK#6 230.00 230KV CKT 1	Cimarron - Mathewson 345 kV Ckt 1		Build new 16 mile 345 kV line from Mathewson to Cimarron
5	13WP	MIDW	MIDW	HAYS PLANT - SOUTH HAYS 115KV CKT 1	126.5	3.3%	KNOLL 230 - POSTROCK#6 230.00 230KV CKT 1	Circle - Reno 345kV Dbl CKT		Build approximately 6 miles of double 345kV Circle - Reno
5	13WP	MIDW	MIDW	HAYS PLANT - SOUTH HAYS 115KV CKT 1	126.5	3.3%	KNOLL 230 - POSTROCK#6 230.00 230KV CKT 1	Mathewson - Tatonga 345 kV Ckt 1		Build new 61 mile Tatonga - Mathewson 345 kV line.
5	13WP	MIDW	MIDW	HAYS PLANT - SOUTH HAYS 115KV CKT 1	126.5	3.3%	KNOLL 230 - POSTROCK#6 230.00 230KV CKT 1	Mathewson 345 kV		Build new Mathewson 345 kV substation at the intersection of the Wooding-Cimarron and the existing Northwest - Tatonga 345 kV lines.
5	13WP	MIDW	MIDW	HAYS PLANT - SOUTH HAYS 115KV CKT 1	126.5	3.3%	KNOLL 230 - POSTROCK#6 230.00 230KV CKT 1	Mullergreen - Circle 345kV Dbl CKT MKEC		Build ownership of approximately 79 miles of double 345kV Mullergreen - Circle
5	13WP	MIDW	MIDW	HAYS PLANT - SOUTH HAYS 115KV CKT 1	126.5	3.3%	KNOLL 230 - POSTROCK#6 230.00 230KV CKT 1	Mullergreen - Circle 345kV Dbl CKT WERE		Build ownership of approximately 79 miles of double 345kV Mullergreen - Circle
5	13WP	MIDW	MIDW	HAYS PLANT - SOUTH HAYS 115KV CKT 1	126.5	3.3%	KNOLL 230 - POSTROCK#6 230.00 230KV CKT 1	Speanville - Mullergreen 345kV Dbl CKT		Build approximately 74 miles of double 345kV Speanville - Mullergreen
5	13WP	MIDW	MIDW	HAYS PLANT - SOUTH HAYS 115KV CKT 1	126.5	3.3%	KNOLL 230 - POSTROCK#6 230.00 230KV CKT 1	TUCO - WOODWARD 345 kV CKT 1 OKGE		Build new 345 kV line from Woodward EHV to TUCO
5	13WP	MIDW	MIDW	HAYS PLANT - SOUTH HAYS 115KV CKT 1	126.5	3.3%	KNOLL 230 - POSTROCK#6 230.00 230KV CKT 1	TUCO - WOODWARD 345 kV CKT 1 SPS		Build new 345 kV line from Woodward EHV to TUCO
5	13WP	MIDW	MIDW	HAYS PLANT - SOUTH HAYS 115KV CKT 1	126.5	3.3%	KNOLL 230 - POSTROCK#6 230.00 230KV CKT 1	Priority Projects		
5	13WP	MIDW	MIDW	HAYS PLANT - VINE STREET 115KV CKT 1	120.7	3.3%	KNOLL 230 - POSTROCK#6 230.00 230KV CKT 1	HAYS PLANT - VINE STREET 115KV CKT 1		Rebuild 0.23 miles
5	13WP	MIDW	MIDW	HAYS PLANT - VINE STREET 115KV CKT 1	120.7	3.3%	KNOLL 230 - POSTROCK#6 230.00 230KV CKT 1	Cimarron - Mathewson 345 kV Ckt 1		Build new 16 mile 345 kV line from Mathewson to Cimarron.
5	13WP	MIDW	MIDW	HAYS PLANT - VINE STREET 115KV CKT 1	120.7	3.3%	KNOLL 230 - POSTROCK#6 230.00 230KV CKT 1	Circle - Reno 345kV Dbl CKT		Build approximately 6 miles of double 345kV Circle - Reno
5	13WP	MIDW	MIDW	HAYS PLANT - VINE STREET 115KV CKT 1	120.7	3.3%	KNOLL 230 - POSTROCK#6 230.00 230KV CKT 1	Mathewson - Tatonga 345 kV Ckt 1		Build new 61 mile Tatonga - Mathewson 345 kV line.
5	13WP	MIDW	MIDW	HAYS PLANT - VINE STREET 115KV CKT 1	120.7	3.3%	KNOLL 230 - POSTROCK#6 230.00 230KV CKT 1	Mathewson 345 kV		Build new Mathewson 345 kV substation at the intersection of the Wooding-Cimarron and the existing Northwest - Tatonga 345 kV lines.
5	13WP	MIDW	MIDW	HAYS PLANT - VINE STREET 115KV CKT 1	120.7	3.3%	KNOLL 230 - POSTROCK#6 230.00 230KV CKT 1	Mullergreen - Circle 345kV Dbl CKT MKEC		Build ownership of approximately 79 miles of double 345kV Mullergreen - Circle
5	13WP	MIDW	MIDW	HAYS PLANT - VINE STREET 115KV CKT 1	120.7	3.3%	KNOLL 230 - POSTROCK#6 230.00 230KV CKT 1	Mullergreen - Circle 345kV Dbl CKT WERE		Build ownership of approximately 79 miles of double 345kV Mullergreen - Circle
5	13WP	MIDW	MIDW	HAYS PLANT - VINE STREET 115KV CKT 1	120.7	3.3%	KNOLL 230 - POSTROCK#6 230.00 230KV CKT 1	Speanville - Mullergreen 345kV Dbl CKT		Build approximately 74 miles of double 345kV Speanville - Mullergreen
5	13WP	MIDW	MIDW	HAYS PLANT - VINE STREET 115KV CKT 1	120.7	3.3%	KNOLL 230 - POSTROCK#6 230.00 230KV CKT 1	TUCO - WOODWARD 345 kV CKT 1 OKGE		Build new 345 kV line from Woodward EHV to TUCO
5	13WP	MIDW	MIDW	HAYS PLANT - VINE STREET 115KV CKT 1	120.7	3.3%	KNOLL 230 - POSTROCK#6 230.00 230KV CKT 1	TUCO - WOODWARD 345 kV CKT 1 SPS		Build new 345 kV line from Woodward EHV to TUCO
5	13WP	MIDW	MIDW	HAYS PLANT - VINE STREET 115KV CKT 1	120.7	3.3%	KNOLL 230 - POSTROCK#6 230.00 230KV CKT 1	Priority Projects		
5	13WP	OKGE	OKGE	HIGHWAY 59 - VBI 161KV CKT 1	101.5	3.4%	FT SMITH - MUSKOGEE 345KV CKT 1	HIGHWAY 59 - VBI 161KV CKT 1		Replace 600 amp switch with 1200 amp
5	13WP	SPS	SPS	Highland Interchange (H T88015552) 345/230/13.2KV TRANSFORMER CKT 1	112.1	35.5%	POTTER COUNTY INTERCHANGE (WALK 90343-A) 345/230/13.2KV TRANSFORMER CKT 1	Priority Projects		
5	13WP	SPS	SPS	HITCHLAND INTERCHANGE (H T980148301) 230/115/13.2KV TRANSFORMER CKT 1	103.8	11.9%	POTTER COUNTY INTERCHANGE (WALK 90343-A) 345/230/13.2KV TRANSFORMER CKT 1	Priority Projects		
0	22SP	SPS	SPS	HITCHLAND INTERCHANGE (H T980148301) 230/115/13.2KV TRANSFORMER CKT 1	110.9	3.2%	HITCHLAND INTERCHANGE - OCHILTREE 230KV CKT 1	Priority Projects		
0	22SP	SPS	SPS	HITCHLAND INTERCHANGE (H T980148301) 230/115/13.2KV TRANSFORMER CKT 1	110.7	3.2%	OCHILTREE 230/115KV TRANSFORMER CKT 1	Priority Projects		
5	17SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	111.8	6.3%	IATAN - JEFFREY ENERGY CENTER 345KV CKT 1	Iatan - Jeffrey Energy Center 345 kV KACP		Build 14.2 miles of new 345 kV
5	17SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	111.8	6.3%	IATAN - JEFFREY ENERGY CENTER 345KV CKT 1	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1		Rebuild 23.4 miles
5	17SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	111.8	6.3%	IATAN - JEFFREY ENERGY CENTER 345KV CKT 1	Iatan - Jeffrey Energy Center 345 kV WERE		Build 56.8 miles of new 345 kV
5	22SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	112.4	6.3%	IATAN - JEFFREY ENERGY CENTER 345KV CKT 1	Iatan - Jeffrey Energy Center 345 kV KACP		Build 14.2 miles of new 345 kV
5	22SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	112.4	6.3%	IATAN - JEFFREY ENERGY CENTER 345KV CKT 1	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1		Rebuild 23.4 miles
5	22SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	112.4	6.3%	IATAN - JEFFREY ENERGY CENTER 345KV CKT 1	Iatan - Jeffrey Energy Center 345 kV WERE		Build 56.8 miles of new 345 kV
5	13WP	MIDW	WERE	HUNTSVILLE - HUTCHINSON ENERGY CENTER 115KV CKT 1	112.8	3.2%	CIRCLE - MULLERGREEN 230KV CKT 1	Priority Projects		
5	17SP	KCPM	GMO	IATAN - ST JOE 345KV CKT 1	102.7	5.9%	IATAN - NASHUA 345KV CKT 1	Iatan - Swisvale 345KV KACP		Build approximately 32 of 64 miles of 345kV Iatan - Swisvale
5	17SP	KCPM	GMO	IATAN - ST JOE 345KV CKT 1	102.7	5.9%	IATAN - NASHUA 345KV CKT 1	Brookline - Compton Ridge 345 kV SPRM		Build approx. 50% of 30 mile 345 kV line
5	17SP	KCPM	GMO	IATAN - ST JOE 345KV CKT 1	102.7	5.9%	IATAN - NASHUA 345KV CKT 1	Brookline - Compton Ridge 345 kV EMDE		Build approx. 50% of 30 mile 345 kV line
5	17SP	KCPM	GMO	IATAN - ST JOE 345KV CKT 1	102.7	5.9%	IATAN - NASHUA 345KV CKT 1	Compton Ridge 345/161 kV Transformer		Install 500 MVA, 345/161 kV transformer and Cut EDE Reads Spring
5	17SP	KCPM	GMO	IATAN - ST JOE 345KV CKT 1	102.7	5.9%	IATAN - NASHUA 345KV CKT 1	Iatan - Jeffrey Energy Center 345 kV KACP		Build 14.2 miles of new 345 kV
5	17SP	KCPM	GMO	IATAN - ST JOE 345KV CKT 1	102.7	5.9%	IATAN - NASHUA 345KV CKT 1	Iatan - Jeffrey Energy Center 345 kV WERE		Build 56.8 miles of new 345 kV
5	17SP	KCPM	GMO	IATAN - ST JOE 345KV CKT 1	102.7	5.9%	IATAN - NASHUA 345KV CKT 1	Iatan - Swisvale 345KV WERE		Build approximately 32 of 64 miles of 345kV Iatan - Swisvale
5	17SP	KCPM	GMO	IATAN - ST JOE 345KV CKT 1	102.7	5.9%	IATAN - NASHUA 345KV CKT 1	Lacygne - Morgan 345KV MKEC		Indeterminate
5	17SP	KCPM	GMO	IATAN - ST JOE 345KV CKT 1	102.7	5.9%	IATAN - NASHUA 345KV CKT 1	Lacygne - Morgan 345KV KACP		Build approximately 146 miles of 345kV Lacygne - Morgan
5	17SP	KCPM	GMO	IATAN - ST JOE 345KV CKT 1	102.7	5.9%	IATAN - NASHUA 345KV CKT 1	Lacygne - Wolf Creek 345KV CKT 2 KACP		Build approximately 36.5 miles of 73 miles of 345kV ckt 2 Lacygne - Wolf Creek
5	17SP	KCPM	GMO	IATAN - ST JOE 345KV CKT 1	102.7	5.9%	IATAN - NASHUA 345KV CKT 1	Lacygne - Wolf Creek 345KV CKT 2 WERE		Build approximately 36.5 miles of 73 miles of 345kV ckt 2 Lacygne - Wolf Creek
5	17SP	KCPM	GMO	IATAN - ST JOE 345KV CKT 1	102.7	5.9%	IATAN - NASHUA 345KV CKT 1	Swisvale - Wolf Creek 345KV		Build approximately 50 miles of 345kV Swisvale - Wolf Creek
5	17SP	KCPM	GMO	IATAN - ST JOE 345KV CKT 1	102.7	5.9%	IATAN - NASHUA 345KV CKT 1	Turk - McNeil 345 kV AEPW		Build 54 mile 345 kV line
5	17SP	KCPM	GMO	IATAN - ST JOE 345KV CKT 1	102.7	5.9%	IATAN - NASHUA 345KV CKT 1	Wolf Creek - Wichita 345KV		Build approximately 117 miles of double 345kV Wolf Creek - Wichita
5	22SP	OKGE	GRDA	KINZE - STILLWATER KINZE 138KV CKT 1	100.4	3.1%	CLEVELAND - SCENER 345KV CKT 1	Priority Projects		
5	13WP	SUNC	SUNC	MEDICINE LODGE - SUN CITY 115KV CKT 1	131.1	3.7%	POST ROCK - SPEARVILLE 230KV CKT 1	Priority Projects		
5	13WP	SUNC	SUNC	MEDICINE LODGE - SUN CITY 115KV CKT 1	121.7	3.2%	MULLERGREEN - SPEARVILLE 230KV CKT 1	Priority Projects		
5	13WP	SUNC	SUNC	MEDICINE LODGE - SUN CITY 115KV CKT 1	105.5	3.3%	SPS-SWPS-01	Priority Projects		
5	13WP	SUNC	SUNC	MULLERGREEN - SPEARVILLE 230KV CKT 1	126.9	18.2%	POST ROCK - SPEARVILLE 345KV CKT 1	Cimarron - Mathewson 345 kV Ckt 1		Build new 16 mile 345 kV line from Mathewson to Cimarron
5	13WP	SUNC	SUNC	MULLERGREEN - SPEARVILLE 230KV CKT 1	126.9	18.2%	POST ROCK - SPEARVILLE 345KV CKT 1	Circle - Reno 345kV Dbl CKT		Build approximately 6 miles of double 345kV Circle - Reno
5	13WP	SUNC	SUNC	MULLERGREEN - SPEARVILLE 230KV CKT 1	126.9	18.2%	POST ROCK - SPEARVILLE 345KV CKT 1	Mathewson - Tatonga 345 kV Ckt 1		Build new 61 mile Tatonga - Mathewson 345 kV line.
5	13WP	SUNC	SUNC	MULLERGREEN - SPEARVILLE 230KV CKT 1	126.9	18.2%	POST ROCK - SPEARVILLE 345KV CKT 1	Mathewson 345 kV		Tatonga 345 kV lines.
5	13WP	SUNC	SUNC	MULLERGREEN - SPEARVILLE 230KV CKT 1	126.9	18.2%	POST ROCK - SPEARVILLE 345KV CKT 1	Mullergreen - Circle 345kV Dbl CKT MKEC		Build ownership of approximately 79 miles of double 345kV Mullergreen - Circle
5	13WP	SUNC	SUNC	MULLERGREEN - SPEARVILLE 230KV CKT 1	126.9	18.2%	POST ROCK - SPEARVILLE 345KV CKT 1	Mullergreen - Circle 345kV Dbl CKT WERE		Build ownership of approximately 79 miles of double 345kV Mullergreen - Circle
5	13WP	SUNC	SUNC	MULLERGREEN - SPEARVILLE 230KV CKT 1	126.9	18.2%	POST ROCK - SPEARVILLE 345KV CKT 1	Speanville - Mullergreen 345kV Dbl CKT		Build approximately 74 miles of double 345kV Speanville - Mullergreen

5	13WP	MIDW	WERE	SMOKYHL6 230.00 - SUMMITT 230KV CKT 1	100.5	7.4%	HOYT - STRANGER CREEK 345KV CKT 1	TUCO - WOODWARD 345 KV CKT 1 SPS	Build new 345 KV line from Woodward EHV to Tucco
5	13WP	MIDW	WERE	SMOKYHL8 230.00 - SUMMITT 230KV CKT 1	100.5	7.4%	HOYT - STRANGER CREEK 345KV CKT 1	Priority Projects	

Scenario	Season	Area	Monitored Bus with Violation	Transfer Case Voltage (PU)	Outaged Branch Causing Overload	Upgrade Name	Solution
			None				

Transmission Owner	Upgrade	Solution	Earliest Date Upgrade Required (DUN)	Estimated Date of Upgrade Completion (EOC)	Estimated Engineering & Construction Cost
None					

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	ADABELL - VBI 161KV CKT 1	Replace existing 800 amp wave trap with 1200 amp in VBI sub	6/1/2018	6/1/2018	\$ 150,000
OKGE	FT SMITH (FTSMITH1) 500/345/13.8KV TRANSFORMER CKT 1	Install 2nd 500/345 kv bus tie in Ft. Smith Sub	6/1/2013	6/1/2017	\$ 14,500,000
OKGE	HIGHWAY 59 - VBI 161KV CKT 1	Replace 600 amp switch with 1200 amp	6/1/2013	6/1/2018	\$ 80,000
AEFW	FLINT CREEK - SILGAM SPRINGS TAP 345KV CKT 1 AEPW	Replace Terminal Equipment	6/1/2014	6/1/2015	\$ 1,220,000
GRDA	GRDA1 - SILGAM SPRINGS TAP 345KV CKT 1 Accelerate	Replace Terminal Equipment	6/1/2014	6/1/2015	\$ 3,300,000
KACP	Iatan - Jeffrey Energy Center 345 kv KACP	Build 14.2 miles of new 345 kv	6/1/2013	6/1/2018	\$ 14,089,880
KACP	Iatan - Swissvale 345KV KACP	Build approximately 32 of 64 miles of 345KV Iatan - Swissvale	6/1/2013	6/1/2018	\$ 48,600,000
MIDW	HAYS PLANT - SOUTH HAYS 118KV CKT 1 #2	Rebuild 3.25 miles	10/1/2012	6/1/2015	\$ 2,500,000
MIDW	HAYS PLANT - VINE STREET 118KV CKT 1	Rebuild 0.23 miles	10/1/2012	6/1/2016	\$ 129,372
MKEC	HARPER - MILAN TAP 138KV CKT 1 #1	Replace Wave Trap at Harper Substation	10/1/2013	6/1/2014	\$ 225,000
MKEC	HARPER - MILAN TAP 138KV CKT 1 #2	Rebuild 22.1 miles	10/1/2012	6/1/2015	\$ 9,613,332
OKGE	CIMARRON - DRAPER LAKE 345KV CKT 1	Replace Terminal Equipment	6/1/2014	6/1/2015	\$ 150,000
OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	Replace 1600 amp 345 kv CT in both Muskogee and Ft. Smith Subs	6/1/2014	6/1/2015	\$ 700,000
WERE	BENTON - WICHITA 345KV CKT 1	Replace terminal equipment at Benton and Wichita	6/1/2018	6/1/2018	\$ 1,183,000
WERE	EVANS ENERGY CENTER NORTH - MAIZE 138KV CKT 1 #1	Upgrade disconnect switches, wavetrp, breaker, jumpers	6/1/2014	6/1/2016	\$ 1,575,000
WERE	EVANS ENERGY CENTER NORTH - MAIZE 138KV CKT 1 #2	Rebuild 4.8 miles	6/1/2014	6/1/2016	\$ 4,728,000
OKGE	VBI - Arkansas Nuclear One 345KV OKGE	Build 73 miles of 345V line	6/1/2013	6/1/2018	\$ 129,000,000
MKEC	Spearville - Mullergren 345KV DBI CKT	Build approximately 74 miles of double 345KV Spearville - Mullergren	6/1/2013	6/1/2019	\$ 124,264,151
WERE	Mullergren - Circle 345KV DBI CKT	Build ownership of approximately 79 miles of double 345KV Mullergren - Circle	6/1/2013	6/1/2019	\$ 132,000,000
OKGE	Cimarron - Mathewson 345 kv CKT 1	Build new 16 mile 345 kv line from Mathewson to Cimarron.	6/1/2014	6/1/2019	\$ 20,000,000
OKGE	Mathewson - Tatonga 345 kv Ckt 1	Build new 61 mile Tatonga - Mathewson 345 kv line.	6/1/2014	6/1/2019	\$ 60,000,000
WERE	CHISHOLM - MAIZE 138KV CKT 1 #1	Upgrade disconnect switches, wavetrp, breaker, jumpers	6/1/2014	6/1/2016	\$ 573,200
WERE	CHISHOLM - MAIZE 138KV CKT 1 #2	Rebuild 7.25 miles	6/1/2014	6/1/2016	\$ 7,141,250
OKGE	CLEARWATER - MILAN TAP 138KV CKT 1 WERE	Rebuild WERE portion of the Clearwater-Milan tap 115 kv	10/1/2012	6/1/2015	\$ 3,951,703
MKEC	CLEARWATER - MILAN TAP 138KV CKT 1 MKEC	Rebuild MKEC portion of the Clearwater-Milan tap 115 kv	10/1/2012	6/1/2015	\$ 3,150,000
KACP	Lacygne - Morgan 345KV KACP	Build approximately 146 miles of 345KV Lacygne - Morgan	10/1/2012	6/1/2018	Indeterminate
KACP	Lacygne - Wolf Creek 345KV CKT 2 KACP	Build approximately 36.5 miles of 73 miles of 345KV ckt 2 Lacygne - Wolf Creek	10/1/2012	6/1/2018	\$ 55,434,379
NPPD	GRAND ISLAND - SWEETWATER 345KV CKT 2	Build 63.4 mile second circuit	10/1/2012	6/1/2018	\$ 96,286,750
OKGE	Mathewson 345 kv	Build new Mathewson 345 kv substation at the intersection of the Woodward-Cimarron and the existing Northwest - Tatonga 345 kv lines.	6/1/2014	6/1/2017	Indeterminate
WERE	Circle - Reno 345KV DBI CKT	Build approximately 6 miles of double 345KV Circle - Reno	10/1/2012	6/1/2019	\$ 14,089,880
WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	Rebuild 23.4 miles	6/1/2013	6/1/2017	\$ 49,623,113
WERE	Iatan - Jeffrey Energy Center 345 kv WERE	Build 56.8 miles of new 345 kv	6/1/2013	6/1/2018	\$ 14,089,880
WERE	Iatan - Swissvale 345KV WERE	Build approximately 32 of 64 miles of 345KV Iatan - Swissvale	6/1/2014	6/1/2018	\$ 63,000,000
WERE	Lacygne - Wolf Creek 345KV CKT 2 WERE	Build approximately 36.5 miles of 73 miles of 345KV ckt 2 Lacygne - Wolf Creek	10/1/2012	6/1/2018	\$ 71,859,375
WERE	Wolf Creek - Wichita 345KV	Build approximately 117 miles of double 345KV Wolf Creek - Wichita	10/1/2012	6/1/2018	\$ 231,123,379
AEFW	Turk - McNeil 345 kv AEPW	Build 54 mile 345 kv line	6/1/2013	6/1/2018	\$ 72,750,000

Priority 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)
MKEC	Line - Comanche County - Medicine Lodge 345 kv dbi ckt	Build a new 55 mile double circuit 345 kv line	7/31/2011	1/1/2015
MKEC	Line - Medicine Lodge - Wichita 345 kv dbi 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 dbi Ckt MKEC	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.	7/31/2011	1/1/2015
MKEC	Line - Spearville - Comanche County 345 kv dbi 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 dbi 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 dbi Ckt OKGE	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.	7/31/2011	1/1/2015
SPS	Line - Hitchland - Woodward 345 kv dbi 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 dbi 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 dbi ckt WERE	Build a new 35 mile double circuit 345 kv line	7/31/2011	1/1/2015

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)
AEFW	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.	10/1/2012	10/1/2014
NPPD	Cherry Co - Gentleman 345 kv Ckt1	Build new 345 kv Transmission Line from GGS 345 kv Substation to a new Cherry County 345 kv Substation (76 miles).	10/1/2012	1/1/2018
NPPD	Cherry Co - Holt Co 345 kv Ckt1	Build new 345 kv Transmission Line from new Cherry County 345 kv Substation to new 345 kv Holt County Substation. (Estimated 146 miles).	10/1/2012	1/1/2018
NPPD	Cherry Co 345 kv Terminal Upgrades	Build new Cherry County 345 kv Substation.	10/1/2012	1/1/2018
SPS	TUCCO - WOODWARD 345 kv CKT 1 OKGE	Build new 345 kv line from Woodward EHV to Tuco	10/1/2012	6/1/2014
SPS	TUCCO - WOODWARD 345 kv CKT 1 SPS	Build new 345 kv line from Woodward EHV to Tuco	10/1/2012	6/1/2014

Reliability 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)
SPRM	Brookline - Compton Ridge 345 kv SPRM	Build approx. 50% of 30 mile 345 kv line	6/1/2018	6/1/2018
EMDE	Brookline - Compton Ridge 345 kv EMDE	Build approx. 50% of 30 mile 345 kv line	6/1/2013	6/1/2013
EMDE	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	6/1/2013	6/1/2018