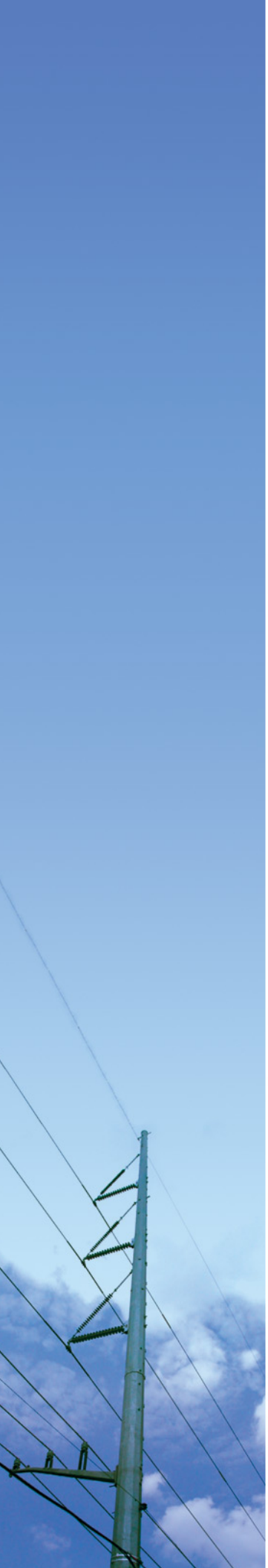

Screening Study
SPP-LTSR-2011-015

For OASIS Request #76209468

MAINTAINED BY
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SPP Southwest Power Pool

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Executive Summary

Sunflower Electric Power Corporation has requested a Screening Study to determine the impacts on SPP facilities due to the Long Term Service Requests for 50 MW. The service type requested for this screening study is Long Term Service Request (LTSR). OASIS# 76209468 was studied as one request from 1/1/2013 to 1/1/2043.

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 OPPD to SECI. 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 1/1/2013 to 1/1/2043.

The service was modeled from OPPD to SECI. 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

Sunflower Electric Power Corporation has requested a screening study to determine the impacts on SPP facilities for the Long Term Service Requests for 50 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 NPPD to SECI. 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 NPPD to SECI 50 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 50 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 50 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 50 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:

  X 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
- Excld 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:

  X 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
- Excld 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:

  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
- Excld 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: 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	17SP	SUNC	SUNC	CLIFTON - CONCORDIA 115KV CKT 1	103.0	34.3%	ELM CREEK - NORTHWEST MANHATTAN 230KV CKT 1	CLIFTON - CONCORDIA 115KV CKT 1	Rebuild 23.4 mile line
5	13SP	MEC	MEC	COUNCIL BLUFFS - RIVER BEND 161KV CKT 1	101.7	4.2%	SPP-2006-001	Line - Nebraska City - Maryville 345 kV (OPPD)	Build a new 11.2 mile 345 kV line with at least 3000 A capacity from the Nebraska City substation to the Missouri/Nebraska state border towards KCPL's Maryville substation. Upgrade the Nebraska City substation with the necessary breakers and terminal equipment.
5	13SP	MEC	MEC	COUNCIL BLUFFS - RIVER BEND 161KV CKT 1	101.7	4.2%	LN-FAIRPORT	Line - Nebraska City - Maryville 345 kV (OPPD)	Build a new 11.2 mile 345 kV line with at least 3000 A capacity from the Nebraska City substation to the Missouri/Nebraska state border towards KCPL's Maryville substation. Upgrade the Nebraska City substation with the necessary breakers and terminal equipment.
5	17SP	SUNC	SUNC	CUDAHY - G08-79T 115.00 115KV CKT 1	101.5	4.2%	SPP-SUNC-14	CIMARRON RIVER PLANT - G08-79T 115KV CKT 1	Construct approximately 47 miles of new 115kV.
5	22SP	SUNC	SUNC	CUDAHY - G08-79T 115.00 115KV CKT 1	103.7	16.0%	SPP-SUNC-14	CIMARRON RIVER PLANT - G08-79T 115KV CKT 1	Construct approximately 47 miles of new 115kV.
0	22SP	WERE	WERE	EAST MANHATTAN (EMANHT3X) 230/115/18.0KV TRANSFORMER CKT 1	102.4	9.1%	EAST MANHATTAN - NORTHWEST MANHATTAN 230KV CKT 1	UNIONRG3 115.00 - CHAPMAN 115KV CKT 1 Accelerate	Build 24 mile 115 kV line
5	17SP	MIDW	MIDW	HAYS PLANT - SOUTH HAYS 115KV CKT 1	117.7	4.0%	KNOLL 230 - POSTROCK6 230.00 230KV CKT 1	HAYS PLANT - SOUTH HAYS 115KV CKT 1 #2	Rebuild 3.25 miles
5	17SP	MIDW	MIDW	HAYS PLANT - SOUTH HAYS 115KV CKT 1	111.5	5.4%	KNOLL 230 (KNOLL T1) 230/115/11.49KV TRANSFORMER CKT 1	HAYS PLANT - SOUTH HAYS 115KV CKT 1 #2	Rebuild 3.25 miles
5	22SP	MIDW	MIDW	HAYS PLANT - SOUTH HAYS 115KV CKT 1	113.9	3.9%	KNOLL 230 (KNOLL T1) 230/115/11.49KV TRANSFORMER CKT 1	HAYS PLANT - SOUTH HAYS 115KV CKT 1 #2	Rebuild 3.25 miles
0	22SP	OPPD	OPPD	JUNCTION 205 - SUB 901 69KV CKT 1	108.2	38.6%	SUB 901 - SUB 912 69KV CKT 1	JUNCTION 205 - SUB 901 69KV CKT 1	Increase line clearances to allow the use of a higher conductor rating
0	22SP	OPPD	OPPD	JUNCTION 205 - SUB 910 69KV CKT 1	108.2	38.6%	SUB 901 - SUB 912 69KV CKT 1	JUNCTION 205 - SUB 901 69KV CKT 1	Increase line clearances to allow the use of a higher conductor rating
5	17SP	SUNC	SUNC	MULLERGREN - SPEARVILLE 230KV CKT 1	105.2	5.8%	POST ROCK (POSTROCK T1) 345/230/13.8KV TRANSFORMER CKT 1	Spearville - Mullergren 345kV Dbl CKT	Build approximately 74 miles of double 345kV Spearville - Mullergren
5	17SP	SUNC	SUNC	MULLERGREN - SPEARVILLE 230KV CKT 1	105.2	5.8%	POST ROCK (POSTROCK T1) 345/230/13.8KV TRANSFORMER CKT 1	Circle - Reno 345kV Dbl CKT	Build approximately 6 miles of double 345kV Circle - Reno
5	17SP	SUNC	SUNC	MULLERGREN - SPEARVILLE 230KV CKT 1	105.2	5.8%	POST ROCK (POSTROCK T1) 345/230/13.8KV TRANSFORMER CKT 1	Mullergren - Circle 345kV Dbl CKT MKEC	Build ownership of approximately 79 miles of double 345kV Mullergren - Circle
5	17SP	SUNC	SUNC	MULLERGREN - SPEARVILLE 230KV CKT 1	105.2	5.8%	POST ROCK (POSTROCK T1) 345/230/13.8KV TRANSFORMER CKT 1	Mullergren - Circle 345kV Dbl CKT WERE	Build ownership of approximately 79 miles of double 345kV Mullergren - Circle
5	17SP	SUNC	SUNC	MULLERGREN - SPEARVILLE 230KV CKT 1	105.2	5.8%	POST ROCK (POSTROCK T1) 345/230/13.8KV TRANSFORMER CKT 1	Line - Comanche County - Medicine Lodge 345 kV dbl ckt	Build a new 55 mile double circuit 345 kV line
5	17SP	SUNC	SUNC	MULLERGREN - SPEARVILLE 230KV CKT 1	105.2	5.8%	POST ROCK (POSTROCK T1) 345/230/13.8KV TRANSFORMER CKT 1	Line - Hitchland - Woodward 345 kV dbl ckt OKGE	Build a new 60.5 mile double circuit 345 kV line
5	17SP	SUNC	SUNC	MULLERGREN - SPEARVILLE 230KV CKT 1	105.2	5.8%	POST ROCK (POSTROCK T1) 345/230/13.8KV TRANSFORMER CKT 1	Line - Hitchland - Woodward 345 kV dbl ckt SPS	Build a new 60.5 mile double circuit 345 kV line
5	17SP	SUNC	SUNC	MULLERGREN - SPEARVILLE 230KV CKT 1	105.2	5.8%	POST ROCK (POSTROCK T1) 345/230/13.8KV TRANSFORMER CKT 1	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.
5	17SP	SUNC	SUNC	MULLERGREN - SPEARVILLE 230KV CKT 1	105.2	5.8%	POST ROCK (POSTROCK T1) 345/230/13.8KV TRANSFORMER CKT 1	Line - Medicine Lodge - Wichita 345 kV dbl ckt WERE	Build a new 35 mile double circuit 345 kV line
5	17SP	SUNC	SUNC	MULLERGREN - SPEARVILLE 230KV CKT 1	105.2	5.8%	POST ROCK (POSTROCK T1) 345/230/13.8KV TRANSFORMER CKT 1	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.
5	17SP	SUNC	SUNC	MULLERGREN - SPEARVILLE 230KV CKT 1	105.2	5.8%	POST ROCK (POSTROCK T1) 345/230/13.8KV TRANSFORMER CKT 1	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.
5	17SP	SUNC	SUNC	MULLERGREN - SPEARVILLE 230KV CKT 1	105.2	5.8%	POST ROCK (POSTROCK T1) 345/230/13.8KV TRANSFORMER CKT 1	Line - Spearville - Comanche County 345 kV dbl ckt MKEC	Build a new 27.5 mile double circuit 345 kV line
5	17SP	SUNC	SUNC	MULLERGREN - SPEARVILLE 230KV CKT 1	105.2	5.8%	POST ROCK (POSTROCK T1) 345/230/13.8KV TRANSFORMER CKT 1	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.
5	17SP	SUNC	SUNC	MULLERGREN - SPEARVILLE 230KV CKT 1	105.2	5.8%	POST ROCK (POSTROCK T1) 345/230/13.8KV TRANSFORMER CKT 1	TUCO - WOODWARD 345 KV CKT 1 OKGE	Build new 345 kV line from Woodward EHV to Tuco
5	17SP	SUNC	SUNC	MULLERGREN - SPEARVILLE 230KV CKT 1	105.2	5.8%	POST ROCK (POSTROCK T1) 345/230/13.8KV TRANSFORMER CKT 1	TUCO - WOODWARD 345 KV CKT 1 SPS	Build new 345 kV line from Woodward EHV to Tuco
5	17SP	SUNC	SUNC	MULLERGREN - SPEARVILLE 230KV CKT 1	105.2	5.8%	POST ROCK (POSTROCK T1) 345/230/13.8KV TRANSFORMER CKT 1	XFR - Medicine Lodge 345/138 kV	Install a 400 MVA 345/138 kV transformer at the new 345 kV Medicine Lodge substation.
5	17SP	SUNC	SUNC	MULLERGREN - SPEARVILLE 230KV CKT 1	105.2	5.8%	POST ROCK (POSTROCK T1) 345/230/13.8KV TRANSFORMER CKT 1	Tatonga - Mathewson - Cimmaron 345kV Ckt 2	Build approximately 77 miles of 345 kV
0	22SP	OPPD	OPPD	SUB 907 - SUB 919 69KV CKT 1	110.2	3.5%	SUB 1250 - SUB 919 69KV CKT 1	SUB 907 - SUB 919 69KV CKT 1	Increase clearance. At least 77 MVA rating
0	22SP	OPPD	OPPD	SUB 907 - SUB 919 69KV CKT 1	110.1	3.5%	SUB 1250 (S1250 T1) 161/69/13.8KV TRANSFORMER CKT 1	SUB 907 - SUB 919 69KV CKT 1	Increase clearance. At least 77 MVA rating
5	13WP	MIDW	SUNC	HEIZER - MULLERGREN 115KV CKT 1	103.2	3.2%	MULLERGREN (MULGREN6) 230/115/13.8KV TRANSFORMER CKT 1	Line - Comanche County - Medicine Lodge 345 kV dbl ckt	Build a new 55 mile double circuit 345 kV line
5	13WP	MIDW	SUNC	HEIZER - MULLERGREN 115KV CKT 1	103.2	3.2%	MULLERGREN (MULGREN6) 230/115/13.8KV TRANSFORMER CKT 1	Line - Hitchland - Woodward 345 kV dbl ckt OKGE	Build a new 60.5 mile double circuit 345 kV line
5	13WP	MIDW	SUNC	HEIZER - MULLERGREN 115KV CKT 1	103.2	3.2%	MULLERGREN (MULGREN6) 230/115/13.8KV TRANSFORMER CKT 1	Line - Hitchland - Woodward 345 kV dbl ckt SPS	Build a new 60.5 mile double circuit 345 kV line
5	13WP	MIDW	SUNC	HEIZER - MULLERGREN 115KV CKT 1	103.2	3.2%	MULLERGREN (MULGREN6) 230/115/13.8KV TRANSFORMER CKT 1	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.
5	13WP	MIDW	SUNC	HEIZER - MULLERGREN 115KV CKT 1	103.2	3.2%	MULLERGREN (MULGREN6) 230/115/13.8KV TRANSFORMER CKT 1	Line - Medicine Lodge - Wichita 345 kV dbl ckt WERE	Build a new 35 mile double circuit 345 kV line
5	13WP	MIDW	SUNC	HEIZER - MULLERGREN 115KV CKT 1	103.2	3.2%	MULLERGREN (MULGREN6) 230/115/13.8KV TRANSFORMER CKT 1	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.
5	13WP	MIDW	SUNC	HEIZER - MULLERGREN 115KV CKT 1	103.2	3.2%	MULLERGREN (MULGREN6) 230/115/13.8KV TRANSFORMER CKT 1	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.
5	13WP	MIDW	SUNC	HEIZER - MULLERGREN 115KV CKT 1	103.2	3.2%	MULLERGREN (MULGREN6) 230/115/13.8KV TRANSFORMER CKT 1	Line - Spearville - Comanche County 345 kV dbl ckt MKEC	Build a new 27.5 mile double circuit 345 kV line
5	13WP	MIDW	SUNC	HEIZER - MULLERGREN 115KV CKT 1	103.2	3.2%	MULLERGREN (MULGREN6) 230/115/13.8KV TRANSFORMER CKT 1	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.
5	13WP	MIDW	SUNC	HEIZER - MULLERGREN 115KV CKT 1	103.2	3.2%	MULLERGREN (MULGREN6) 230/115/13.8KV TRANSFORMER CKT 1	TUCO - WOODWARD 345 KV CKT 1 OKGE	Build new 345 kV line from Woodward EHV to Tuco
5	13WP	MIDW	SUNC	HEIZER - MULLERGREN 115KV CKT 1	103.2	3.2%	MULLERGREN (MULGREN6) 230/115/13.8KV TRANSFORMER CKT 1	TUCO - WOODWARD 345 KV CKT 1 SPS	Build new 345 kV line from Woodward EHV to Tuco
5	13WP	MIDW	SUNC	HEIZER - MULLERGREN 115KV CKT 1	103.2	3.2%	MULLERGREN (MULGREN6) 230/115/13.8KV TRANSFORMER CKT 1	XFR - Medicine Lodge 345/138 kV	Install a 400 MVA 345/138 kV transformer at the new 345 kV Medicine Lodge substation.

Scenario	Season	Area	Monitored Bus with Violation	Transfer Case Voltage (PU)	Outaged Branch Causing Overload	Upgrade Name	Solution
5	12WP	WERE	11TH & HALSTEAD 69KV	0.872891	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	14TH & LORRAINE 69KV	0.871816	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	17TH & HALSTEAD JUNCTION 69KV	0.873601	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	17TH & HUXMAN JUNCTION 69KV	0.872309	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	17TH & PLUM JUNCTION 69KV	0.871663	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	18TH & PLUM 69KV	0.871578	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	2ND & ELM 69KV	0.891086	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	3RD & VAN BUREN 115KV	0.887724	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	3RD & VAN BUREN 69KV	0.889731	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	43RD & LORRAINE 115KV	0.885562	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	ABILENE ENERGY CENTER 115KV	0.913692	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	SUNC	ALEXANDER 115KV	0.87	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Priority Project	
5	12WP	WERE	BENTON 345KV	0.909773	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	BPU - CITY OF MCPHERSON JOHNS-MANVILLE 115KV	0.872881	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	BPU - CITY OF MCPHERSON PLANT 115KV	0.876451	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	BURRTON 69KV	0.913297	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	CANAL 69KV	0.924673	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	CESSNA AIRCRAFT 69KV	0.872676	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	CESSNA AIRCRAFT JUNCTION 69KV	0.872698	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	CIRCLE 115KV	0.884794	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	CIRCLE 230KV	0.855123	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	CITIES SERVICE 69KV	0.883533	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	CLAY CENTER JUNCTION 115KV	0.912578	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Device - Northwest Manhattan Cap 115 kV	
5	12WP	WERE	CLAY CENTER JUNCTION 115KV	0.912578	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	UNIONRG3 115.00 - CHAPMAN 115KV CKT 1 Accelerate	
5	12WP	WERE	CLAYCTRJ3 115.00 115KV	0.907929	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Device - Northwest Manhattan Cap 115 kV	
5	12WP	WERE	CLAYCTRJ3 115.00 115KV	0.907929	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	UNIONRG3 115.00 - CHAPMAN 115KV CKT 1 Accelerate	
5	12WP	WERE	CLEARWATER 138KV	0.905896	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	COLEMAN 69KV	0.917917	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	CRAWFORD 115KV	0.894135	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	DAVIS 115KV	0.891065	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	DAVIS 69KV	0.895256	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	E & MADISON JUNCTION 69KV	0.890308	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	

5	12WP	WERE	EAST ABILENE 115KV	0.91768	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Device - Northwest Manhattan Cap 115 kV	
5	12WP	WERE	EAST ABILENE 115KV	0.91768	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	UNIONRG3 115.00 - CHAPMAN 115KV CKT 1 Accelerate	
5	12WP	WERE	EAST MCPHERSON 230KV	0.868939	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	EAST MCPHERSON SWITCHING STATION 115KV	0.874344	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	MIDW	EDWARDS 115KV	0.875035	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Priority Project	
5	12WP	WERE	EMPORIA ENERGY CENTER 345KV	0.875035	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	EXIDE 115KV	0.875035	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	EXIDE JUNCTION 115KV	0.875035	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	F & MONROE 69KV	0.840055	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	SUNC	FLATRDG3 138KV	0.840055	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Priority Project	
5	12WP	WERE	FLORENCE JUNCTION 115KV	0.840055	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	G07-25 345.00 345KV	0.870358	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	G10_057 230.00 230KV	0.870358	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	G10-05 345.00 345KV	0.870358	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	GILL ENERGY CENTER 69KV	0.870358	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	GILL ENERGY CENTER EAST 138KV	0.870358	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	GILL ENERGY CENTER EAST 69KV	0.87885	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	GILL ENERGY CENTER SOUTH 138KV	0.87885	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	GILL ENERGY CENTER WEST 69KV	0.87885	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	GLENDALE 69KV	0.87885	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	GREDE 69KV	0.87885	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	HALSTEAD 69KV	0.882229	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	HALSTEAD NORTH BUS 138KV	0.882229	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	HALSTEAD SOUTH BUS 138KV	0.882229	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	SUNC	HARPER 138KV	0.882229	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Priority Project	
5	12WP	WERE	HAYSVILLE 69KV	0.870414	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	HAYSVILLE JUNCTION 69KV	0.870414	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	MIDW	HEIZER 6 230.00 230KV	0.840055	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Priority Project	
5	12WP	WERE	HILLSBORO 115KV	0.874845	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Iatan - Jeffrey Energy Center 345 kV KACP	
5	12WP	WERE	HILLSBORO 115KV	0.874845	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Iatan - Jeffrey Energy Center 345 kV WERE	
5	12WP	WERE	HOOVER NORTH 138KV	0.874845	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	HOOVER NORTH 69KV	0.874845	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	HOOVER SOUTH 69KV	0.874845	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	MIDW	HUNTSVILLE 115KV	0.870358	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Priority Project	

5	12WP	WERE	HUTCHINSON ENERGY CENTER 115KV	0.890125	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	HUTCHINSON ENERGY CENTER 69KV	0.890125	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	HUTCHINSON ENERGY CENTER UNIT 4 115KV	0.890125	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	HUTCHINSON GAS TURBINE STATION 69KV	0.890125	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	HYDRALIC JCT NORTH 69KV	0.882587	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	HYDRALIC JCT SOUTH 69KV	0.882587	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	HYDRALIC NORTH 69KV	0.882587	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	HYDRO-PHILLIPS 69KV	0.882587	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	INTERSTATE 138KV	0.882587	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	MIDW	KINSLEY 115KV	0.87885	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Priority Project	
5	12WP	MIDW	KNOLL 230 230KV	0.882229	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Priority Project	
5	12WP	MIDW	KNOLL 230 230KV	0.882229	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Priority Project	
5	12WP	WERE	LANG 345KV	0.862733	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	LIN 69KV	0.862733	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	LYONS 115KV	0.871313	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	MACARTHUR 69KV	0.871313	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	MAPLE STREET JUNCTION 69KV	0.871313	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	MASCOT 69KV	0.871313	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	MCDOWELL CREEK 230KV	0.871313	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	MEAD 69KV	0.87211	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	MEADOWLARK 115KV	0.87211	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	SUNC	MEDICINE LODGE 115KV	0.87211	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Priority Project	
5	12WP	SUNC	MEDICINE LODGE 138KV	0.874261	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Priority Project	
5	12WP	WERE	MIDLAND 69KV	0.874261	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	MIDWEST IRON 69KV	0.874261	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	MIDWEST IRON JUNCTION 69KV	0.878576	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	SUNC	MILAN 4 138KV	0.878576	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Priority Project	
5	12WP	SUNC	MILAN TAP 138KV	0.87	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Priority Project	
5	12WP	WERE	MORRIS COUNTY 230KV	0.939789	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	MOSSMAN 69KV	0.92113	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	MOUNDRIDGE 115KV	0.904388	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	MOUNDRIDGE 138KV	0.908422	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	SUNC	MULLERGREN 230KV	0.81	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Priority Project	
5	12WP	WERE	MWIRNJ22 69.000 69KV	0.895136	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	

5	12WP	WERE	NEW CITIES SERVICE 115KV	0.887468	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	NEW CITIES SERVICE 69KV	0.88363	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	SUNC	NINNESC3 115.00 115KV	0.85	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Priority Project	
5	12WP	WERE	NORTH AMERICAN PHILIPS 115KV	0.891287	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	NORTH AMERICAN PHILIPS JUNCTION (NORTH) 115KV	0.890582	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	NORTH AMERICAN PHILIPS JUNCTION (SOUTH) 115KV	0.89091	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	NORTH STREET 115KV	0.900405	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	NORTHVIEW 115KV	0.905523	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	OAKLAWN 69KV	0.921852	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	OATVILLE 69KV	0.915565	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	OLIVER 69KV	0.920761	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	OSAGE 69KV	0.916227	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	MIDW	PAWNEE 115KV	0.870414	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Priority Project	
5	12WP	MIDW	PAWNEE-EDWARDS_JCT 115KV	0.874845	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Priority Project	
5	12WP	WERE	PHILLIP2 69.000 69KV	0.917555	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	PLAZA 69KV	0.919593	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	MIDW	POST ROCK 345KV	0.890125	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Priority Project	
5	12WP	MIDW	POSTROCK6 230.00 230KV	0.882587	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Priority Project	
5	12WP	MIDW	POSTROCK6 230.00 230KV	0.882587	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Priority Project	
5	12WP	SUNC	PRATT 115KV	0.86	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Priority Project	
5	12WP	WERE	REFINRY3 115.00 115KV	0.875239	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	RENO COUNTY 115KV	0.896576	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	RENO COUNTY 345KV	0.896576	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	MIDW	RICE_CO 115KV	0.864097	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Priority Project	
5	12WP	MIDW	RICECO 230.00 230KV	0.862733	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Priority Project	
5	12WP	MIDW	RICECO 230.00 230KV	0.862733	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Priority Project	
5	12WP	WERE	RIPLEY 69KV	0.929249	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	RIVERSIDE 69KV	0.920716	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	ROSE HILL 345KV	0.919029	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	RUTAN 69KV	0.922056	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	SALINA MAIN 115KV	0.897568	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	SALINE COUNTY 115KV	0.892079	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	SANDHILL ARK VALLEY CO-OP D.P. 115KV	0.884225	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	SANDHILL ARK VALLEY CO-OP D.P. JUNCTION 115KV	0.884233	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	

5	12WP	SUNC	SAWYER 3 115.00 115KV	0.86	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Priority Project	
5	12WP	WERE	SCHILLING 115KV	0.892158	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	SEDGWICK COUNTY NO. 1 CHENEY 69KV	0.898151	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	SEDGWICK COUNTY NO. 8 CRAIG 69KV	0.902075	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	SENECA 69KV	0.914878	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	SEVENTEENTH (17TH) 69KV	0.924394	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	SEVENTEENTH (17TH) TAP 69KV	0.921913	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	SHERIDEN 69KV	0.918753	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	MIDW	SMKYP1 6 230.00 230KV	0.871313	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Priority Project	
5	12WP	MIDW	SMKYP2 6 230.00 230KV	0.87211	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Priority Project	
5	12WP	WERE	SMOKY HILL 115KV	0.889623	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	MIDW	SOUTH HAYS 230KV	0.874261	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Priority Project	
5	12WP	MIDW	SOUTH HAYS 230KV	0.874261	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Priority Project	
5	12WP	WERE	SOUTHGATE 115KV	0.890306	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	SPRING CREEK JUNCTION 115KV	0.911558	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	SUNC	ST JOHN 115KV	0.85	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Priority Project	
5	12WP	MIDW	ST_JOHN 115KV	0.878576	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Priority Project	
5	12WP	WERE	SUMMIT 115KV	0.893461	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	SUMMIT 230KV	0.887274	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	SUMMIT 345KV	0.912293	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	SUMNERCO 345.00 345KV	0.938529	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	SUNC	SUN CITY 115KV	0.87	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Priority Project	
5	12WP	WERE	TCHOPE 3 115.00 115KV	0.890641	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	TCRILEY 3 115.00 115KV	0.905859	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	TOWER 33 115KV	0.88748	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	TWENTY-FIRST 69KV	0.924154	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	TYLER 69KV	0.917256	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	UNIONRG3 115.00 115KV	0.891691	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	UNIONRG6 230.00 230KV	0.909967	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	VISTA PARK 69KV	0.923171	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	VULCAN 69KV	0.911731	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	WACO 138KV	0.921348	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	WASSALL 69KV	0.921619	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	WATERWORKS 1 (CITY OF WICHITA) 69KV	0.919911	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	

5	12WP	WERE	WATERWORKS 2 (CITY OF WICHITA) 69KV	0.919551	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	WEBSTER 69KV	0.920325	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	WEST MCPHERSON 115KV	0.87811	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	WHEATLAND 115KV	0.871836	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	WICHITA 345KV	0.912469	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	WOLF CREEK 345KV	0.962266	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	YODER ROAD JUNCTION 69KV	0.895139	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	WERE	AUBURN ROAD 230KV	0.946388	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Line - Spearville - Post Rock-Axtell 345 kV	
5	12WP	MIDW	SMOKYHL6 230.00 230KV	0.868469	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Prioity Project	

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 custom

Transmission Owner	Upgrade	Solution	Earliest Date Upgrade Required (DUN)	Estimated Date of Upgrade Completion (EOC)	Estimated Engineering & Construction Cost
MKEC	CLIFTON - CONCORDIA 115KV CKT 1	Rebuild 23.4 mile line	10/1/2012	6/1/2016	$ 13,150,800
MIDW	HAYS PLANT - SOUTH HAYS 115KV CKT 1 #2	Rebuild 3.25 miles	6/1/2012	6/1/2015	$ 2,500,000
WERE	UNIONRG3 115.00 - CHAPMAN 115KV CKT 1 Accelerate	Build new 24 mile 115 kV line	10/1/2012	6/1/2015	$ 23,640,000
WERE	Mullergren - Circle 345kV Dbl CKT WERE	Build ownership of approximately 79 miles of double 345kV Mullergren - Circ	6/1/2012	6/1/2017	$ 66,000,000
MKEC	Mullergren - Circle 345kV Dbl CKT MKEC	Build ownership of approximately 79 miles of double 345kV Mullergren - Circ	6/1/2012	6/1/2017	$ 66,000,000
MKEC	Spearville - Mullergren 345kV Dbl CKT	Build approximately 74 miles of double 345kV Spearville - Mullergre	6/1/2012	6/1/2017	$ 124,000,000
MKEC	CIMARRON RIVER PLANT - G08-79T 115KV CKT 1	Construct approximately 47 miles of new 115kV	6/1/2012	6/1/2016	$ 26,437,500
WERE	Circle - Reno 345kV Dbl CKT	Build approximately 6 miles of double 345kV Circle - Ren	10/1/2012	6/1/2018	$ 4,056,582
OKGE	Tatonga - Mathewson - Cimmaron 345kV Ckt 2	Build approximately 77 miles of 345 kV	6/1/2012	6/1/2018	$ 135,090,118
OPPD	JUNCTION 205 - SUB 901 69KV CKT 1	Increase line clearances to allow the use of a higher conductor ratir	6/1/2018	6/1/2018	$ 105,000
OPPD	JUNCTION 205 - SUB 910 69KV CKT 1	Increase line clearances to allow the use of a higher conductor ratir	6/1/2018	6/1/2018	$ 251,000

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 dbl ck	Build a new 55 mile double circuit 345 kV lin	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 lin	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 lin	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 lin	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 lin	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 custom

Transmission Owner	Upgrade	Solution	Earliest Date Upgrade Required (DUN)	Estimated Date of Upgrade Completion (EOC)
ITCGP	Line - Post Rock - Axtell 345 kV	Build new 345 kV line from Wolf to interception point of Axtell to Wolf line (Kansas Border). Includes line reactor.	10/1/2012	6/1/2013
ITCGP	Line - Spearville - Post Rock 345 kV	Build new 345 kV line from Knoll to interception point of Spearville to Knoll line. Updated for approved route mileage; reflect addition of reactor at Post Rock (40Mvar)	10/1/2012	10/1/2012
ITCGP	XFR - Post Rock 345/230 kV	Build Post Rock substation to include a 600 MVA 345/230 kV auto transformer with 345 kV ring bus configuration	10/1/2012	10/1/2012
NPPD	Line - NPPD - Axtell - Kansas Border 345 kV	Build new 345 kV line from Axtell to interception point of Axtell to Wolf line (Kansa Border). Includes substation expansion at Axtell and line reactor.	10/1/2012	6/1/2013
OPPD	Line - Nebraska City - Maryville 345 kV (OPPD		6/1/2013	6/1/2017
MIPU	Line - Nebraska City - Maryville 345 kV (GMO)	Build a new 345 kV substation at Maryville with a ring bus and necessary terminal equipment. Build a new 65 mile 345 kV line with at least 3000 A capacity from the new Maryville substation to the Missouri/Nebraska state border towards OPPD's Neb Cty sub	6/1/2013	6/1/2017

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)
WERE	Device - Northwest Manhattan Cap 115 kV	Install 1 stage of 14.4 MVAR	10/1/2012	6/1/2014
OPPD	SUB 907 - SUB 919 69KV CKT 1	Increase clearance. At least 77 MVA rating	6/1/2018	6/1/2018