# Screening Study SPP-LTSR-2013-001

For OASIS Request #78485338

MAINTAINED BY SPP Engineering, SPP Transmission Service Studies August 5, 2013

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# **Executive Summary**

American Electric Power has requested a Screening Study to determine the impacts on SPP facilities due to the Long Term Service Requests for 200 MW. The service type requested for this screening study is Long Term Service Request (LTSR). OASIS# 78485338 was studied as one request from 1/1/2016 to 1/1/2026.

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 OKGE to CSWS. 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 1/1/2016 to 1/1/2026.

The service was modeled from OKGE to CSWS. 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

American Electric Power has requested a screening study to determine the impacts on SPP facilities for the Long Term Service Requests for 200 MW.

The purpose of the LTSR Option Screening Study is to provide the Eligible Customer with an <u>approximation</u> of the transmission remediation costs of each potential LTSR and a reasonable <u>cost differential</u> 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 OKGE to CSWS. 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 four seasonal models to study the OKGE to CSWS 200 MW request for the requested service period. The following SPP Transmission Expansion Plan 2012 Build 1



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

2014/15 Winter Peak (14WP) 2018 Summer Peak (18SP) 2018/19 Winter Peak (18WP) 2023 Summer Peak (23SP) 2023/24 Winter Peak (23WP)

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 2012 Series Cases. Scenario 5 includes transmission not already included in the SPP 2012 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 200 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 200 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 200 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:
- Tap adjustment:
- Area interchange control:
- VAR limits:
- Solution options:

Fixed slope decoupled Newton-Raphson solution (FDNS) Stepping Tie lines and loads Apply immediately

AC contingency checking (ACCC)

X Phase shift adjustment

- \_ Flat start
- \_ Lock DC taps

0.5

100

3 MW

YES

NO

YES

60000

None

Stepping

Rate A

Summary

\_ Lock switched shunts

#### ACCC CASES for system intact:

- Solutions:
- MW mismatch tolerance:
- Contingency case rating:
- Percent of rating:
- Output code:
- Min flow change in overload report:
- Excld cases w/ no overloads form report:
- Exclude interfaces from report:
- Perform voltage limit check:
- Elements in available capacity table:
- Cutoff threshold for available capacity table: 99999.0
- Min. contng. case Vltg chng for report: 0.02
- Sorted output:
- Newton Solution:
- Tap adjustment:
- Area interchange control:
- VAR limits:
- Solution options:

X Phase shift adjustment

Tie lines and loads

Apply automatically

- Flat start
- \_ Lock DC taps
- \_ Lock switched shunts

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

- Solutions: AC contingency c
  MW mismatch tolerance: 0.5
- Contingency case rating:
- Percent of rating:
- Output code:

AC contingency checking (ACCC) 0.5 Rate B 100 Summary



- Min flow change in overload report:
- Excld cases w/ no overloads form report: YES
- Exclude interfaces from report:
- Perform voltage limit check:
- Elements in available capacity table:
- Cutoff threshold for available capacity table: 99999.0
- Min. contng. case Vltg chng for report: 0.02
- Sorted output:
- Newton Solution:
- Tap adjustment:
- Area interchange control:
- VAR limits:
- Solution options:

Stepping Tie lines and loads Apply automatically

X Phase shift adjustment

\_ Flat start

3mw

NO

YES

60000

None

- \_ 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 • YES Perform voltage limit check: • 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 • Apply automatically Var limits: 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	14WP	SPS	SPS	AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY INTERCHANGE 230KV CKT 1	101.1	3.27%	BORDER 7345.00 - WOODWARD DISTRICT EHV 345KV CKT 1	Potter to Tolk 345 kV	Build 111 mile 345 kV line from Potter to Tolk. Further study analysis will be performed with regard to the SPS North- South Stability Limit to determine whether its rating may be increased based on approved SPP Expansion Plan Network
5	14WP	SPS	SPS	AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY	101.1	3.27%	BORDER 7345.00 - WOODWARD DISTRICT EHV 345KV CKT 1 BORDER 7345.00 - WOODWARD DISTRICT EHV	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). Build new 345 kV Transmission Line from new Cherry County 345 kV Substation to new 345 kV Holt County Substation.
5	14WP	SPS	SPS	INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY	101.1	3.27%	345KV CKT 1 BORDER 7345.00 - WOODWARD DISTRICT EHV	Cherry Co - Holt Co 345 kV Ckt1	(Estimated 146 miles).
5	14WP	SPS	SPS	INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY	101.1	3.27%	345KV CKT 1 BORDER 7345.00 - WOODWARD DISTRICT EHV	Cherry Co 345 kV Terminal Upgrades	Build new Cherry County 345 kV Substation.
5	14WP	SPS	SPS	INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY	101.1	3.27%	345KV CKT 1 BORDER 7345.00 - WOODWARD DISTRICT EHV	Cimarron - Mathewson 345 kV Ckt 1 Accelerate	Build new 16 mile 345 kV line from Mathweson to Cimarron.
5	14WP	SPS	SPS	INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY	101.1	3.27%	345KV CKT 1 BORDER 7345.00 - WOODWARD DISTRICT EHV	Elk City 345/230 kV	Expand Elk City substation (or build new station). Install a 345/230 kV 675 MVA transformer at Elk City.
5	14WP	SPS	SPS	INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY	101.1	3.27%	345KV CKT 1 BORDER 7345.00 - WOODWARD DISTRICT EHV	Elk City to Gracemont 345kV AEPW	Build new 46.5 mile 345 kV line from Elk City to Gracemont (AEP portion).
5	14WP	SPS	SPS	INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY	101.1	3.27%	345KV CKT 1 BORDER 7345.00 - WOODWARD DISTRICT EHV	Elk City to Gracemont 345kV OKGE	Build new 46.5 mile 345 kV line from Elk City to Gracemont (OGE portion).           Build a new 86 mile double circuit 345 kV line with at least 3000 A capacity from the Thistle 345 kV substation to the new
5	14WP	SPS	SPS	INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY	101.1	3.27%	345KV CKT 1 BORDER 7345.00 - WOODWARD DISTRICT EHV	Line - Clark County - Thistle 345 kV dbl Ckt	Clark County substation. Build a new 345 kV substation at Thistle with a ring bus and necessary terminal equipment. Build a new 92 mile double circuit 345 kV line with at least 3000 A capacity from the Woodward District EHV substation to
5	14WP	SPS	SPS	INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY	101.1	3.27%	345KV CKT 1 BORDER 7345.00 - WOODWARD DISTRICT EHV	Line - Hitchland - Woodward 345 kV dbl Ckt OKGE	the SPS interception from the Hitchland substation. Upgrade the Woodward District EHV substation with the necessaryBuild 30 mile double circuit 345 kV line with at least 3000 A capacity from the Hitchland substation to the OGE
5	14WP	SPS	SPS	INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY	101.1	3.27%	345KV CKT 1 BORDER 7345.00 - WOODWARD DISTRICT EHV	Line - Hitchland - Woodward 345 kV dbl Ckt SPS	interception point from the Woodward District EHV substation. Upgrade the Hitchland substation with the necessaryBuild a new 36 mile double circuit 345 kV line with at least 3000 A capacity from the Spearville substation to the new Clark
5	14WP	SPS	SPS	INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY	101.1	3.27%	345KV CKT 1 BORDER 7345.00 - WOODWARD DISTRICT EHV	Line - Spearville - Clark County 345 kV dbl Ckt	County substation. Build the Clark County 345 kV substation with a ring bus and necessary terminal equipment.Build a new 78 mile double circuit 345 kV line with at least 3000 A capacity from the Wichita substation to the new Thistle
5	14WP	SPS	SPS	INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY	101.1	3.27%	345KV CKT 1 BORDER 7345.00 - WOODWARD DISTRICT EHV	Line - Thistle - Wichita 345 kV dbl Ckt PW	345 kV substation.           Upgrade the Wichita substation with the necessary breakers and terminal equipment to accommodate two new 345 kV
5	14WP	SPS	SPS	INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY	101.1	3.27%	345KV CKT 1 BORDER 7345.00 - WOODWARD DISTRICT EHV	Line - Thistle - Wichita 345 kV dbl Ckt WERE	circuits from the new Thistle 345 kV substation Build a new 79 mile double circuit 345 kV line with at least 3000 A capacity from the Woodward District EHV substation to
5	14WP	SPS	SPS	INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY	101.1	3.27%	345KV CKT 1 BORDER 7345.00 - WOODWARD DISTRICT EHV	Line - Thistle - Woodward 345 kV dbl Ckt OKGE	the Kansas/Oklahoma state border towards the Thistle substation. Upgrade the Woodward Distric EHV substation withBuild a new 30 mile double circuit 345 kV line with at least 3000 A capacity from the Thistle substation to the
5	14WP	SPS	SPS	INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY	101.1	3.27%	345KV CKT 1 BORDER 7345.00 - WOODWARD DISTRICT EHV	Line - Thistle - Woodward 345 kV dbl Ckt PW	Kansas/Oklahoma state border towards the Woodward District EHV substation.
5	14WP	SPS	SPS	INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY	101.1	3.27%	345KV CKT 1 BORDER 7345.00 - WOODWARD DISTRICT EHV	Line - Tuco - Woodward 345 kV line OKGE	Build new 345 kV line from Woodward EHV to Border - Project costs now include Border reactor substation           Build new 345 kV line from Tuco to OGE Border station near TX/OK Stateline. Install line reactor outside Border station
5	14WP	SPS	SPS	INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY	101.1	3.27%	345KV CKT 1 BORDER 7345.00 - WOODWARD DISTRICT EHV	Line - Tuco - Woodward 345 kV line SPS	and line reactors at Tuco. Build new 345 kV line from Tuco to OGE Border station near TX/OK Stateline. Install line reactor outside Border station
5	14WP	SPS	SPS	INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY	101.1	3.27%	345KV CKT 1 BORDER 7345.00 - WOODWARD DISTRICT EHV	Line - Tuco - Woodward 345 kV line SPS	and line reactors at Tuco.
5	14WP	SPS	SPS	INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY	101.1	3.27%	345KV CKT 1 BORDER 7345.00 - WOODWARD DISTRICT EHV	Mathewson - Tatonga 345 kV Ckt 2 Accelerate	Build new 61 mile Tatonga - Mathewson 345 kV line.           Build new Mathewson 345 kV substation at the intersection of the Woodring-Cimarron and the existing Northwest -
5	14WP	SPS	SPS	INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY	101.1	3.27%	345KV CKT 1 BORDER 7345.00 - WOODWARD DISTRICT EHV	Mathewson 345 kV Accelerate	Tatonga 345 kV lines.
5	14WP	SPS	SPS	INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY	101.1	3.27%	345KV CKT 1 BORDER 7345.00 - WOODWARD DISTRICT EHV	Tatonga - Woodward EHV 345 kV Ckt 2 Accelerate	Build new 49-mile Woodward EHV - Tatonga 345 kV Ckt 2 line.
5	14WP	SPS	SPS	INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY	101.1	3.27%	345KV CKT 1 BORDER 7345.00 - WOODWARD DISTRICT EHV	XFR - Thistle 345/138 kV	Install a 400 MVA 345/138 kV transformer at the new 345 kV Thistle substation.
5	14WP	SPS	SPS	INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY	101.1	3.27%	345KV CKT 1 BORDER 7345.00 - G12-038 TAP 345.00 345KV CKT	XFR - Thistle 345/138 kV	Install a 400 MVA 345/138 kV transformer at the new 345 kV Thistle substation. Build 111 mile 345 kV line from Potter to Tolk. Further study analysis will be performed with regard to the SPS North-
5	14WP	SPS	SPS	INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY	101.2	3.27%	1 BORDER 7345.00 - G12-038 TAP 345.00 345KV CKT	Potter to Tolk 345 kV	South Stability Limit to determine whether its rating may be increased based on approved SPP Expansion Plan Network
5	14WP	SPS	SPS	INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY	101.2	3.27%	1 BORDER 7345.00 - G12-038 TAP 345.00 345KV CKT	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).Build new 345 kV Transmission Line from new Cherry County 345 kV Substation to new 345 kV Holt County Substation.
5	14WP	SPS	SPS	INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY	101.2	3.27%	1 BORDER 7345.00 - G12-038 TAP 345.00 345KV CKT	Cherry Co - Holt Co 345 kV Ckt1	(Estimated 146 miles).
5	14WP	SPS	SPS	INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY	101.2	3.27%	1 BORDER 7345.00 - G12-038 TAP 345.00 345KV CKT	Cherry Co 345 kV Terminal Upgrades	Build new Cherry County 345 kV Substation.
5	14WP	SPS	SPS	INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY	101.2	3.27%	BORDER 7345.00 - G12-038 TAP 345.00 345KV CKT	Cimarron - Mathewson 345 kV Ckt 1 Accelerate	Build new 16 mile 345 kV line from Mathweson to Cimarron.
5	14WP	SPS	SPS	INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY	101.2	3.27%	BORDER 7345.00 - G12-038 TAP 345.00 345KV CKT	Elk City 345/230 kV	Expand Elk City substation (or build new station). Install a 345/230 kV 675 MVA transformer at Elk City.
5	14WP	SPS	SPS	INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY	101.2	3.27%	BORDER 7345.00 - G12-038 TAP 345.00 345KV CKT	Elk City to Gracemont 345kV AEPW	Build new 46.5 mile 345 kV line from Elk City to Gracemont (AEP portion).
5	14WP	SPS	SPS	INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY	101.2	3.27%	BORDER 7345.00 - G12-038 TAP 345.00 345KV CKT	Elk City to Gracemont 345kV OKGE	Build new 46.5 mile 345 kV line from Elk City to Gracemont (OGE portion). Build a new 86 mile double circuit 345 kV line with at least 3000 A capacity from the Thistle 345 kV substation to the new
5	14WP	SPS	SPS	INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY	101.2	3.27%	BORDER 7345.00 - G12-038 TAP 345.00 345KV CKT	Line - Clark County - Thistle 345 kV dbl Ckt	Clark County substation. Build a new 345 kV substation at Thistle with a ring bus and necessary terminal equipment. Build a new 92 mile double circuit 345 kV line with at least 3000 A capacity from the Woodward District EHV substation to
5	14WP	SPS	SPS	INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY	101.2	3.27%	BORDER 7345.00 - G12-038 TAP 345.00 345KV CKT	Line - Hitchland - Woodward 345 kV dbl Ckt OKGE	the SPS interception from the Hitchland substation. Upgrade the Woodward District EHV substation with the necessary Build 30 mile double circuit 345 kV line with at least 3000 A capacity from the Hitchland substation to the OGE interception point from the Woodward District EHV substation. Upgrade the Hitchland substation with the necessary
		SPS	SPS	INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY	101.2	3.27%	BORDER 7345.00 - G12-038 TAP 345.00 345KV CKT	Line - Hitchland - Woodward 345 kV dbl Ckt SPS Line - Spearville - Clark County 345 kV dbl Ckt	Build a new 36 mile double circuit 345 kV line with at least 3000 A capacity from the Spearville substation to the new Clark
5	14WP	000	000		101.2	2 270/	1		County substation. Build the Clark County 245 W substation with a ring bus and personany terminal equipment
5	14WP	SPS	SPS	INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY	101.2	3.27%	1 BORDER 7345.00 - G12-038 TAP 345.00 345KV CKT		County substation. Build the Clark County 345 kV substation with a ring bus and necessary terminal equipment. Build a new 78 mile double circuit 345 kV line with at least 3000 A capacity from the Wichita substation to the new Thistle
5	14WP 14WP	SPS	SPS	INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY	101.2	3.27%	1 BORDER 7345.00 - G12-038 TAP 345.00 345KV CKT 1 BORDER 7345.00 - G12-038 TAP 345.00 345KV CKT	Line - Thistle - Wichita 345 kV dbl Ckt PW	Build a new 78 mile double circuit 345 kV line with at least 3000 A capacity from the Wichita substation to the new Thistle 345 kV substation.         Upgrade the Wichita substation with the necessary breakers and terminal equipment to accommodate two new 345 kV
	14WP 14WP 14WP	SPS SPS	SPS SPS	INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY	101.2 101.2	3.27% 3.27%	1	Line - Thistle - Wichita 345 kV dbl Ckt PW Line - Thistle - Wichita 345 kV dbl Ckt WERE	Build a new 78 mile double circuit 345 kV line with at least 3000 A capacity from the Wichita substation to the new Thistle 345 kV substation.         Upgrade the Wichita substation with the necessary breakers and terminal equipment to accommodate two new 345 kV circuits from the new Thistle 345 kV substation         Build a new 79 mile double circuit 345 kV line with at least 3000 A capacity from the Woodward District EHV substation to
5	14WP 14WP 14WP 14WP	SPS SPS SPS	SPS SPS SPS	INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY	101.2 101.2 101.2	3.27% 3.27% 3.27%	1 BORDER 7345.00 - G12-038 TAP 345.00 345KV CKT 1	Line - Thistle - Wichita 345 kV dbl Ckt PW Line - Thistle - Wichita 345 kV dbl Ckt WERE Line - Thistle - Woodward 345 kV dbl Ckt OKGE	Build a new 78 mile double circuit 345 kV line with at least 3000 A capacity from the Wichita substation to the new Thistle 345 kV substation.         Upgrade the Wichita substation with the necessary breakers and terminal equipment to accommodate two new 345 kV circuits from the new Thistle 345 kV substation         Build a new 79 mile double circuit 345 kV line with at least 3000 A capacity from the Woodward District EHV substation to the Kansas/Oklahoma state border towards the Thistle substation. Upgrade the Woodward Distric EHV substation with Build a new 30 mile double circuit 345 kV line with at least 3000 A capacity from the Thistle substation to the
5 5 5 5	14WP 14WP 14WP 14WP 14WP	SPS SPS SPS SPS	SPS SPS SPS SPS	INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY INTERCHANGE 230KV CKT 1	101.2 101.2 101.2 101.2	3.27% 3.27% 3.27% 3.27%	1 BORDER 7345.00 - G12-038 TAP 345.00 345KV CKT 1 BORDER 7345.00 - G12-038 TAP 345.00 345KV CKT 1	Line - Thistle - Wichita 345 kV dbl Ckt PW Line - Thistle - Wichita 345 kV dbl Ckt WERE Line - Thistle - Woodward 345 kV dbl Ckt OKGE Line - Thistle - Woodward 345 kV dbl Ckt PW	Build a new 78 mile double circuit 345 kV line with at least 3000 A capacity from the Wichita substation to the new Thistle 345 kV substation.         Upgrade the Wichita substation with the necessary breakers and terminal equipment to accommodate two new 345 kV circuits from the new Thistle 345 kV substation         Build a new 79 mile double circuit 345 kV line with at least 3000 A capacity from the Woodward District EHV substation to the Kansas/Oklahoma state border towards the Thistle substation. Upgrade the Woodward District EHV substation with Build a new 30 mile double circuit 345 kV line with at least 3000 A capacity from the Thistle substation to the Kansas/Oklahoma state border towards the Woodward District EHV substation to the Kansas/Oklahoma state border towards the Woodward District EHV substation.
5 5 5 5 5 5	14WP 14WP 14WP 14WP 14WP 14WP	SPS SPS SPS SPS SPS	SPS SPS SPS SPS SPS	INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY INTERCHANGE 230KV CKT 1	101.2 101.2 101.2 101.2 101.2	3.27% 3.27% 3.27% 3.27% 3.27%	1         BORDER       7345.00 - G12-038 TAP 345.00 345KV CKT         1         BORDER       7345.00 - G12-038 TAP 345.00 345KV CKT         1         BORDER       7345.00 - G12-038 TAP 345.00 345KV CKT         1	Line - Thistle - Wichita 345 kV dbl Ckt PW Line - Thistle - Wichita 345 kV dbl Ckt WERE Line - Thistle - Woodward 345 kV dbl Ckt OKGE Line - Thistle - Woodward 345 kV dbl Ckt PW Line - Tuco - Woodward 345 kV line OKGE	Build a new 78 mile double circuit 345 kV line with at least 3000 A capacity from the Wichita substation to the new Thistle 345 kV substation.         Upgrade the Wichita substation with the necessary breakers and terminal equipment to accommodate two new 345 kV circuits from the new Thistle 345 kV substation         Build a new 79 mile double circuit 345 kV line with at least 3000 A capacity from the Woodward District EHV substation to the Kansas/Oklahoma state border towards the Thistle substation. Upgrade the Woodward Distric EHV substation with Build a new 30 mile double circuit 345 kV line with at least 3000 A capacity from the Thistle substation to the Kansas/Oklahoma state border towards the Woodward District EHV substation to the Sansas/Oklahoma state border towards the Woodward District EHV substation to the Build new 345 kV line from Woodward EHV to Border - Project costs now include Border reactor substation         Build new 345 kV line from Tuco to OGE Border station near TX/OK Stateline. Install line reactor outside Border station
5 5 5 5	14WP 14WP 14WP 14WP 14WP 14WP 14WP	SPS SPS SPS SPS SPS SPS	SPS SPS SPS SPS SPS SPS	INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY INTERCHANGE 230KV CKT 1	101.2 101.2 101.2 101.2 101.2 101.2 101.2	3.27% 3.27% 3.27% 3.27% 3.27% 3.27%	1         BORDER       7345.00 - G12-038 TAP 345.00 345KV CKT         1       1         BORDER       7345.00 - G12-038 TAP 345.00 345KV CKT         1       1         BORDER       7345.00 - G12-038 TAP 345.00 345KV CKT         1       1         BORDER       7345.00 - G12-038 TAP 345.00 345KV CKT         1       1	Line - Thistle - Wichita 345 kV dbl Ckt PW Line - Thistle - Wichita 345 kV dbl Ckt WERE Line - Thistle - Woodward 345 kV dbl Ckt OKGE Line - Thistle - Woodward 345 kV dbl Ckt PW Line - Tuco - Woodward 345 kV line OKGE Line - Tuco - Woodward 345 kV line SPS	Build a new 78 mile double circuit 345 kV line with at least 3000 A capacity from the Wichita substation to the new Thistle 345 kV substation.         Upgrade the Wichita substation with the necessary breakers and terminal equipment to accommodate two new 345 kV circuits from the new Thistle 345 kV substation         Build a new 79 mile double circuit 345 kV line with at least 3000 A capacity from the Woodward District EHV substation to the Kansas/Oklahoma state border towards the Thistle substation. Upgrade the Woodward District EHV substation with         Build a new 30 mile double circuit 345 kV line with at least 3000 A capacity from the Thistle substation to the Kansas/Oklahoma state border towards the Thistle substation. Upgrade the Woodward District EHV substation to the Kansas/Oklahoma state border towards the Woodward District EHV substation.         Build new 30 mile double circuit 345 kV line with at least 3000 A capacity from the Thistle substation to the Kansas/Oklahoma state border towards the Woodward District EHV substation to the Kansas/Oklahoma state border towards the Woodward District EHV substation.         Build new 345 kV line from Woodward EHV to Border - Project costs now include Border reactor substation         Build new 345 kV line from Tuco to OGE Border station near TX/OK Stateline. Install line reactor outside Border station and line reactors at Tuco.         Build new 345 kV line from Tuco to OGE Border station near TX/OK Stateline. Install line reactor outside Border station
5 5 5 5 5 5	14WP 14WP 14WP 14WP 14WP 14WP 14WP 14WP	SPS SPS SPS SPS SPS SPS SPS	SPS SPS SPS SPS SPS SPS SPS	INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY INTERCHANGE 230KV CKT 1	101.2 101.2 101.2 101.2 101.2 101.2 101.2	3.27% 3.27% 3.27% 3.27% 3.27% 3.27% 3.27%	1         BORDER       7345.00 - G12-038 TAP 345.00 345KV CKT         1         BORDER       7345.00 - G12-038 TAP 345.00 345KV CKT         1         BORDER       7345.00 - G12-038 TAP 345.00 345KV CKT         1         BORDER       7345.00 - G12-038 TAP 345.00 345KV CKT         1         BORDER       7345.00 - G12-038 TAP 345.00 345KV CKT         1       1         BORDER       7345.00 - G12-038 TAP 345.00 345KV CKT         1       1	Line - Thistle - Wichita 345 kV dbl Ckt PW Line - Thistle - Wichita 345 kV dbl Ckt WERE Line - Thistle - Woodward 345 kV dbl Ckt OKGE Line - Thistle - Woodward 345 kV dbl Ckt PW Line - Tuco - Woodward 345 kV line OKGE Line - Tuco - Woodward 345 kV line SPS Line - Tuco - Woodward 345 kV line SPS	Build a new 78 mile double circuit 345 kV line with at least 3000 A capacity from the Wichita substation to the new Thistle 345 kV substation.         Upgrade the Wichita substation with the necessary breakers and terminal equipment to accommodate two new 345 kV circuits from the new Thistle 345 kV substation         Build a new 79 mile double circuit 345 kV line with at least 3000 A capacity from the Woodward District EHV substation to the Kansas/Oklahoma state border towards the Thistle substation. Upgrade the Woodward Distric EHV substation with         Build a new 30 mile double circuit 345 kV line with at least 3000 A capacity from the Thistle substation to the Kansas/Oklahoma state border towards the Thistle substation. Upgrade the Woodward Distric EHV substation with         Build a new 30 mile double circuit 345 kV line with at least 3000 A capacity from the Thistle substation to the Kansas/Oklahoma state border towards the View of Comparison of the Kansas/Oklahoma state border towards the Woodward District EHV substation.         Build new 345 kV line from Woodward EHV to Border - Project costs now include Border reactor substation         Build new 345 kV line from Tuco to OGE Border station near TX/OK Stateline. Install line reactor outside Border station and line reactors at Tuco.         Build new 345 kV line from Tuco to OGE Border station near TX/OK Stateline. Install line reactor outside Border station and line reactors at Tuco.
5 5 5 5 5 5 5 5 5 5	14WP 14WP 14WP 14WP 14WP 14WP 14WP 14WP	SPS SPS SPS SPS SPS SPS SPS SPS	SPS SPS SPS SPS SPS SPS SPS SPS	INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY INTERCHANGE 230KV CKT 1	101.2 101.2 101.2 101.2 101.2 101.2 101.2 101.2 101.2	3.27% 3.27% 3.27% 3.27% 3.27% 3.27% 3.27% 3.27%	1         BORDER       7345.00 - G12-038 TAP 345.00 345KV CKT         1       1         BORDER       7345.00 - G12-038 TAP 345.00 345KV CKT         1       1         BORDER       7345.00 - G12-038 TAP 345.00 345KV CKT         1       1         BORDER       7345.00 - G12-038 TAP 345.00 345KV CKT         1       1         BORDER       7345.00 - G12-038 TAP 345.00 345KV CKT         1       1         BORDER       7345.00 - G12-038 TAP 345.00 345KV CKT         1       1         BORDER       7345.00 - G12-038 TAP 345.00 345KV CKT         1       1	Line - Thistle - Wichita 345 kV dbl Ckt PW Line - Thistle - Wichita 345 kV dbl Ckt WERE Line - Thistle - Woodward 345 kV dbl Ckt OKGE Line - Thistle - Woodward 345 kV dbl Ckt PW Line - Tuco - Woodward 345 kV line OKGE Line - Tuco - Woodward 345 kV line SPS Line - Tuco - Woodward 345 kV line SPS Mathewson - Tatonga 345 kV Ckt 2 Accelerate	Build a new 78 mile double circuit 345 kV line with at least 3000 A capacity from the Wichita substation to the new Thistle 345 kV substation.         Upgrade the Wichita substation with the necessary breakers and terminal equipment to accommodate two new 345 kV circuits from the new Thistle 345 kV substation         Build a new 79 mile double circuit 345 kV line with at least 3000 A capacity from the Woodward District EHV substation to the Kansas/Oklahoma state border towards the Thistle substation. Upgrade the Woodward District EHV substation with Build a new 30 mile double circuit 345 kV line with at least 3000 A capacity from the Thistle substation to the Kansas/Oklahoma state border towards the Woodward District EHV substation to the Kansas/Oklahoma state border towards the Woodward District EHV substation.         Build new 345 kV line from Woodward EHV to Border - Project costs now include Border reactor substation         Build new 345 kV line from Tuco to OGE Border station near TX/OK Stateline. Install line reactor outside Border station and line reactors at Tuco.         Build new 345 kV line from Tuco to OGE Border station near TX/OK Stateline. Install line reactor outside Border station and line reactors at Tuco.         Build new 61 mile Tatonga - Mathewson 345 kV line.         Build new Mathewson 345 kV substation at the intersection of the Woodring-Cimarron and the existing Northwest -
5 5 5 5 5 5 5 5 5 5 5 5 5 5	14WP 14WP 14WP 14WP 14WP 14WP 14WP 14WP	SPS SPS SPS SPS SPS SPS SPS SPS SPS	SPS SPS SPS SPS SPS SPS SPS SPS SPS	INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY INTERCHANGE 230KV CKT 1	101.2 101.2 101.2 101.2 101.2 101.2 101.2 101.2 101.2	3.27% 3.27% 3.27% 3.27% 3.27% 3.27% 3.27% 3.27% 3.27%	1         BORDER       7345.00 - G12-038 TAP 345.00 345KV CKT         1       1         BORDER       7345.00 - G12-038 TAP 345.00 345KV CKT         1       1         BORDER       7345.00 - G12-038 TAP 345.00 345KV CKT         1       1         BORDER       7345.00 - G12-038 TAP 345.00 345KV CKT         1       1         BORDER       7345.00 - G12-038 TAP 345.00 345KV CKT         1       1         BORDER       7345.00 - G12-038 TAP 345.00 345KV CKT         1       1         BORDER       7345.00 - G12-038 TAP 345.00 345KV CKT         1       1         BORDER       7345.00 - G12-038 TAP 345.00 345KV CKT         1       1	Line - Thistle - Wichita 345 kV dbl Ckt PW Line - Thistle - Wichita 345 kV dbl Ckt WERE Line - Thistle - Woodward 345 kV dbl Ckt OKGE Line - Thistle - Woodward 345 kV dbl Ckt PW Line - Tuco - Woodward 345 kV line OKGE Line - Tuco - Woodward 345 kV line SPS Line - Tuco - Woodward 345 kV line SPS Mathewson - Tatonga 345 kV Ckt 2 Accelerate Mathewson 345 kV Accelerate	Build a new 78 mile double circuit 345 kV line with at least 3000 A capacity from the Wichita substation to the new Thistle 345 kV substation.         Upgrade the Wichita substation with the necessary breakers and terminal equipment to accommodate two new 345 kV circuits from the new Thistle 345 kV substation         Build a new 79 mile double circuit 345 kV line with at least 3000 A capacity from the Woodward District EHV substation to the Kansas/Oklahoma state border towards the Thistle substation. Upgrade the Woodward District EHV substation with Build a new 30 mile double circuit 345 kV line with at least 3000 A capacity from the Thistle substation to the Kansas/Oklahoma state border towards the Thistle substation. Upgrade the Woodward District EHV substation with Build a new 30 mile double circuit 345 kV line with at least 3000 A capacity from the Thistle substation to the Kansas/Oklahoma state border towards the Woodward District EHV substation.         Build new 345 kV line from Woodward EHV to Border - Project costs now include Border reactor substation and line reactors at Tuco.         Build new 345 kV line from Tuco to OGE Border station near TX/OK Stateline. Install line reactor outside Border station and line reactors at Tuco.         Build new 61 mile Tatonga - Mathewson 345 kV line.         Build new Mathewson 345 kV substation at the intersection of the Woodring-Cimarron and the existing Northwest - Tatonga 345 kV lines.
5 5 5 5 5 5 5 5 5 5	14WP 14WP 14WP 14WP 14WP 14WP 14WP 14WP	SPS SPS SPS SPS SPS SPS SPS SPS	SPS SPS SPS SPS SPS SPS SPS SPS	INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY INTERCHANGE 230KV CKT 1	101.2 101.2 101.2 101.2 101.2 101.2 101.2 101.2 101.2	3.27% 3.27% 3.27% 3.27% 3.27% 3.27% 3.27% 3.27%	1         BORDER       7345.00 - G12-038 TAP 345.00 345KV CKT         1       1         BORDER       7345.00 - G12-038 TAP 345.00 345KV CKT         1       1         BORDER       7345.00 - G12-038 TAP 345.00 345KV CKT         1       1         BORDER       7345.00 - G12-038 TAP 345.00 345KV CKT         1       1         BORDER       7345.00 - G12-038 TAP 345.00 345KV CKT         1       1         BORDER       7345.00 - G12-038 TAP 345.00 345KV CKT         1       1         BORDER       7345.00 - G12-038 TAP 345.00 345KV CKT         1       1         BORDER       7345.00 - G12-038 TAP 345.00 345KV CKT         1       1         BORDER       7345.00 - G12-038 TAP 345.00 345KV CKT         1       1	Line - Thistle - Wichita 345 kV dbl Ckt PW Line - Thistle - Wichita 345 kV dbl Ckt WERE Line - Thistle - Woodward 345 kV dbl Ckt OKGE Line - Thistle - Woodward 345 kV dbl Ckt PW Line - Tuco - Woodward 345 kV line OKGE Line - Tuco - Woodward 345 kV line SPS Line - Tuco - Woodward 345 kV line SPS Mathewson - Tatonga 345 kV Ckt 2 Accelerate	Build a new 78 mile double circuit 345 kV line with at least 3000 A capacity from the Wichita substation to the new Thistle 345 kV substation.         Upgrade the Wichita substation with the necessary breakers and terminal equipment to accommodate two new 345 kV circuits from the new Thistle 345 kV substation         Build a new 79 mile double circuit 345 kV line with at least 3000 A capacity from the Woodward District EHV substation to the Kansas/Oklahoma state border towards the Thistle substation. Upgrade the Woodward District EHV substation with Build a new 30 mile double circuit 345 kV line with at least 3000 A capacity from the Thistle substation to the Kansas/Oklahoma state border towards the Woodward District EHV substation to the Kansas/Oklahoma state border towards the Woodward District EHV substation.         Build new 345 kV line from Woodward EHV to Border - Project costs now include Border reactor substation         Build new 345 kV line from Tuco to OGE Border station near TX/OK Stateline. Install line reactor outside Border station and line reactors at Tuco.         Build new 345 kV line from Tuco to OGE Border station near TX/OK Stateline. Install line reactor outside Border station and line reactors at Tuco.         Build new 61 mile Tatonga - Mathewson 345 kV line.         Build new Mathewson 345 kV substation at the intersection of the Woodring-Cimarron and the existing Northwest -

Scenario	Season	From Area	To Area	Monitored Branch Over 100% Rate B	Transfer Case % Loading	TDF (%)	Outaged Branch Causing Overload	Upgrade Name	Solution
5	14WP	SPS	SPS	AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY INTERCHANGE 230KV CKT 1	113.2	3.27%	G12-038 TAP 345.00 - TUCO INTERCHANGE 345KV CKT 1 G12-038 TAP 345.00 - TUCO INTERCHANGE 345KV	Potter to Tolk 345 kV	Build 111 mile 345 kV line from Potter to Tolk. Further study analysis will be performed with regard to the SPS North- South Stability Limit to determine whether its rating may be increased based on approved SPP Expansion Plan Network
5	14WP	SPS	SPS	AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY	113.2	3.27%	CKT 1 G12-038 TAP 345.00 - TUCO INTERCHANGE 345KV	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). Build new 345 kV Transmission Line from new Cherry County 345 kV Substation to new 345 kV Holt County Substation.
5	14WP	SPS	SPS	INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY	113.2	3.27%	CKT 1 G12-038 TAP 345.00 - TUCO INTERCHANGE 345KV	Cherry Co - Holt Co 345 kV Ckt1	(Estimated 146 miles).
5	14WP	SPS	SPS	INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY	113.2	3.27%	CKT 1 G12-038 TAP 345.00 - TUCO INTERCHANGE 345KV CKT 1	Cherry Co 345 kV Terminal Upgrades	Build new Cherry County 345 kV Substation.
5	14WP 14WP	SPS SPS	SPS SPS	INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY INTERCHANGE 230KV CKT 1	113.2 113.2	3.27% 3.27%	G12-038 TAP 345.00 - TUCO INTERCHANGE 345KV CKT 1	Cimarron - Mathewson 345 kV Ckt 1 Accelerate Elk City 345/230 kV	Build new 16 mile 345 kV line from Mathweson to Cimarron. Expand Elk City substation (or build new station). Install a 345/230 kV 675 MVA transformer at Elk City.
5	14WP	SPS	SPS	AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY INTERCHANGE 230KV CKT 1	113.2	3.27%	G12-038 TAP 345.00 - TUCO INTERCHANGE 345KV CKT 1	Elk City to Gracemont 345kV AEPW	Build new 46.5 mile 345 kV line from Elk City to Gracemont (AEP portion).
5	14WP	SPS	SPS	AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY INTERCHANGE 230KV CKT 1	113.2	3.27%	G12-038 TAP 345.00 - TUCO INTERCHANGE 345KV CKT 1	Elk City to Gracemont 345kV OKGE	Build new 46.5 mile 345 kV line from Elk City to Gracemont (OGE portion).
5	14WP	SPS	SPS	AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY INTERCHANGE 230KV CKT 1	113.2	3.27%	G12-038 TAP 345.00 - TUCO INTERCHANGE 345KV CKT 1	Line - Clark County - Thistle 345 kV dbl Ckt	Build a new 86 mile double circuit 345 kV line with at least 3000 A capacity from the Thistle 345 kV substation to the new Clark County substation. Build a new 345 kV substation at Thistle with a ring bus and necessary terminal equipment.
5	14WP	SPS	SPS	AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY INTERCHANGE 230KV CKT 1	113.2	3.27%	G12-038 TAP 345.00 - TUCO INTERCHANGE 345KV CKT 1	Line - Hitchland - Woodward 345 kV dbl Ckt OKGE	Build a new 92 mile double circuit 345 kV line with at least 3000 A capacity from the Woodward District EHV substation to the SPS interception from the Hitchland substation. Upgrade the Woodward District EHV substation with the necessary
5	14WP	SPS	SPS	AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY	113.2	3.27%	G12-038 TAP 345.00 - TUCO INTERCHANGE 345KV CKT 1 G12-038 TAP 345.00 - TUCO INTERCHANGE 345KV	Line - Hitchland - Woodward 345 kV dbl Ckt SPS	Build 30 mile double circuit 345 kV line with at least 3000 A capacity from the Hitchland substation to the OGE interception point from the Woodward District EHV substation. Upgrade the Hitchland substation with the necessary Build a new 36 mile double circuit 345 kV line with at least 3000 A capacity from the Spearville substation to the new Clark
5	14WP	SPS	SPS	INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY	113.2	3.27%	CKT 1 G12-038 TAP 345.00 - TUCO INTERCHANGE 345KV	Line - Spearville - Clark County 345 kV dbl Ckt	County substation. Build the Clark County 345 kV substation with a ring bus and necessary terminal equipment. Build a new 78 mile double circuit 345 kV line with at least 3000 A capacity from the Wichita substation to the new Thistle
5	14WP	SPS	SPS	INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY	113.2	3.27%	CKT 1 G12-038 TAP 345.00 - TUCO INTERCHANGE 345KV	Line - Thistle - Wichita 345 kV dbl Ckt PW	345 kV substation. Upgrade the Wichita substation with the necessary breakers and terminal equipment to accommodate two new 345 kV
5	14WP	SPS	SPS	INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY	113.2	3.27%	CKT 1 G12-038 TAP 345.00 - TUCO INTERCHANGE 345KV	Line - Thistle - Wichita 345 kV dbl Ckt WERE	circuits from the new Thistle 345 kV substation Build a new 79 mile double circuit 345 kV line with at least 3000 A capacity from the Woodward District EHV substation to
5	14WP	SPS	SPS	INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY	113.2	3.27%	CKT 1 G12-038 TAP 345.00 - TUCO INTERCHANGE 345KV	Line - Thistle - Woodward 345 kV dbl Ckt OKGE	the Kansas/Oklahoma state border towards the Thistle substation. Upgrade the Woodward Distric EHV substation with Build a new 30 mile double circuit 345 kV line with at least 3000 A capacity from the Thistle substation to the
5	14WP 14WP	SPS SPS	SPS SPS	INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY INTERCHANGE 230KV CKT 1	<u>113.2</u> 113.2	3.27% 3.27%	CKT 1 G12-038 TAP 345.00 - TUCO INTERCHANGE 345KV CKT 1	Line - Thistle - Woodward 345 kV dbl Ckt PW Line - Tuco - Woodward 345 kV line OKGE	Kansas/Oklahoma state border towards the Woodward District EHV substation. Build new 345 kV line from Woodward EHV to Border - Project costs now include Border reactor substation
5	14WP	SPS	SPS	AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY INTERCHANGE 230KV CKT 1	113.2	3.27%	G12-038 TAP 345.00 - TUCO INTERCHANGE 345KV CKT 1	Line - Tuco - Woodward 345 kV line SPS	Build new 345 kV line from Tuco to OGE Border station near TX/OK Stateline. Install line reactor outside Border station and line reactors at Tuco.
5	14WP	SPS	SPS	AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY INTERCHANGE 230KV CKT 1	113.2	3.27%	G12-038 TAP 345.00 - TUCO INTERCHANGE 345KV CKT 1	Line - Tuco - Woodward 345 kV line SPS	Build new 345 kV line from Tuco to OGE Border station near TX/OK Stateline. Install line reactor outside Border station and line reactors at Tuco.
5	14WP	SPS	SPS	AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY INTERCHANGE 230KV CKT 1	113.2	3.27%	G12-038 TAP 345.00 - TUCO INTERCHANGE 345KV CKT 1	Mathewson - Tatonga 345 kV Ckt 2 Accelerate	Build new 61 mile Tatonga - Mathewson 345 kV line.
5	14WP	SPS	SPS	AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY INTERCHANGE 230KV CKT 1	113.2	3.27%	G12-038 TAP 345.00 - TUCO INTERCHANGE 345KV CKT 1	Mathewson 345 kV Accelerate	Build new Mathewson 345 kV substation at the intersection of the Woodring-Cimarron and the existing Northwest - Tatonga 345 kV lines.
5	14WP	SPS	SPS	AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY	113.2	3.27%	G12-038 TAP 345.00 - TUCO INTERCHANGE 345KV CKT 1 G12-038 TAP 345.00 - TUCO INTERCHANGE 345KV	Tatonga - Woodward EHV 345 kV Ckt 2 Accelerate	Build new 49-mile Woodward EHV - Tatonga 345 kV Ckt 2 line.
5	14WP	SPS	SPS	INTERCHANGE 230KV CKT 1 AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY	113.2	3.27%	CKT 1 G12-038 TAP 345.00 - TUCO INTERCHANGE 345KV	XFR - Thistle 345/138 kV	Install a 400 MVA 345/138 kV transformer at the new 345 kV Thistle substation.
5	14WP	SPS	SPS	INTERCHANGE 230KV CKT 1	113.2	3.27%	CKT 1	XFR - Thistle 345/138 kV	Install a 400 MVA 345/138 kV transformer at the new 345 kV Thistle substation. Build Messick 500/230 kV station. Connect to Carrol, Clarence, and Western Kraft 230 kV lines. Install 500/230 kV 675
5	18SP	AEPW		ARSENAL HILL - RAINES 138KV CKT 1	108.6	21.55%	LIEBERMAN - LONGWOOD 138KV CKT 1	Messick 500/230 kV Transformer Ckt 1	MVA transformer. This upgrade is contingent upon approval from Cleco Power LLC. Build Messick 500/230 kV station. Connect to Carrol, Clarence, and Western Kraft 230 kV lines. Install 500/230 kV 675
5	18SP	AEPW	AEPW	ARSENAL HILL - RAINES 138KV CKT 1	123.6	23.81%		Messick 500/230 kV Transformer Ckt 1 BARTLESVILLE COMANCHE - MOUND ROAD 138KV CKT	MVA transformer. This upgrade is contingent upon approval from Cleco Power LLC.
5	14WP 14WP			BARTLESVILLE COMANCHE - MOUND ROAD 138KV CKT 1 BARTLESVILLE COMANCHE - MOUND ROAD 138KV CKT 1	<u>111.5</u> 115.8	3.54% 3.70%	4REMNGTON 138.00 - FAIRFAX 138KV CKT 1 COFFEYVILLE FARMLAND - DELAWARE 138KV CKT 1	BARTLESVILLE COMANCHE - MOUND ROAD 138KV CKT	Rebuild 3.8 miles with 1533.3 ACSR/TW Rebuild 3.8 miles with 1533.3 ACSR/TW
5	14WP			BARTLESVILLE COMANCHE - MOUND ROAD 138KV CKT 1	115.8	3.70%	DELAWARE (DELAWARE) 345/138/13.8KV TRANSFORMER CKT 1	BARTLESVILLE COMANCHE - MOUND ROAD 138KV CKT 1	Rebuild 3.8 miles with 1533.3 ACSR/TW
5	23SP			BARTLESVILLE COMANCHE - MOUND ROAD 138KV CKT 1	110.4	3.83%	TRANSFORMER CKT 1	BARTLESVILLE COMANCHE - MOUND ROAD 138KV CKT 1	Rebuild 3.8 miles with 1533.3 ACSR/TW
5	23SP	AEPW	AEPW	BARTLESVILLE COMANCHE - MOUND ROAD 138KV CKT 1	110.5	3.83%	COFFEYVILLE FARMLAND - DELAWARE 138KV CKT 1	BARTLESVILLE COMANCHE - MOUND ROAD 138KV CKT 1	Rebuild 3.8 miles with 1533.3 ACSR/TW
5	14WP	WERE	WERE	BENTON - WICHITA 345KV CKT 1	100.3	17.65%	RENFROW7 345.00 - VIOLA 7 345.00 345KV CKT 1	Viola - Rose Hill 345 kV	Build new 35 mile line from Viola to Rose Hill 345 kV
5	14WP	WERE	WERE	BENTON - WICHITA 345KV CKT 1	100.3	17.65%	RENFROW7 345.00 - VIOLA 7 345.00 345KV CKT 1	Viola - Clearwater 138kV Ckt1	Build new 138kV line between new Viola substation 345/138 kV transformer and existing Clearwater 138 kV substation.
5	14WP	WERE	WERE	BENTON - WICHITA 345KV CKT 1	100.3	17.65%	RENFROW7 345.00 - VIOLA 7 345.00 345KV CKT 1	Viola - Gill 138kV Ckt1	Build new 138kV line between new Viola substation 345/138 kV transformer and existing Gill 138 kV substation.
5	14WP	WERE	WERE	BENTON - WICHITA 345KV CKT 1	100.3	17.65%	RENFROW7 345.00 - VIOLA 7 345.00 345KV CKT 1	Viola 345/138kV Transformer Ckt 1	Install new 345/138 kV transformer at Viola substation
5	14WP	WERE		BENTON - WICHITA 345KV CKT 1	104.6	17.28%	HUNTERS7 345.00 - WOODRING 345KV CKT 1	Viola - Rose Hill 345 kV	Build new 35 mile line from Viola to Rose Hill 345 kV
5	14WP	WERE		BENTON - WICHITA 345KV CKT 1	104.6	17.28%	HUNTERS7 345.00 - WOODRING 345KV CKT 1	Viola - Clearwater 138kV Ckt1	Build new 138kV line between new Viola substation 345/138 kV transformer and existing Clearwater 138 kV substation.
5	14WP 14WP	WERE	WERE WERE	BENTON - WICHITA 345KV CKT 1 BENTON - WICHITA 345KV CKT 1	104.6 104.6	17.28%	HUNTERS7 345.00 - WOODRING 345KV CKT 1 HUNTERS7 345.00 - WOODRING 345KV CKT 1	Viola - Gill 138kV Ckt1 Viola 345/138kV Transformer Ckt 1	Build new 138kV line between new Viola substation 345/138 kV transformer and existing Gill 138 kV substation.
5	14WP	WERE		BENTON - WICHITA 345KV CKT 1	104.0	15.14%	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Viola - Rose Hill 345 kV	Build new 35 mile line from Viola to Rose Hill 345 kV
5	14WP	WERE		BENTON - WICHITA 345KV CKT 1	106.8	15.14%	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Viola - Clearwater 138kV Ckt1	Build new 138kV line between new Viola substation 345/138 kV transformer and existing Clearwater 138 kV substation.
5	14WP	WERE	WERE	BENTON - WICHITA 345KV CKT 1	106.8	15.14%	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Viola - Gill 138kV Ckt1	Build new 138kV line between new Viola substation 345/138 kV transformer and existing Gill 138 kV substation.
5	14WP	WERE	WERE	BENTON - WICHITA 345KV CKT 1	106.8	15.14%	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1	Viola 345/138kV Transformer Ckt 1	Install new 345/138 kV transformer at Viola substation
5	18SP	WERE	WERE	BENTON - WICHITA 345KV CKT 1	100.8	12.25%	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	Viola - Rose Hill 345 kV	Build new 35 mile line from Viola to Rose Hill 345 kV
5	18SP	WERE	WERE	BENTON - WICHITA 345KV CKT 1	100.8	12.25%	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	Viola - Clearwater 138kV Ckt1	Build new 138kV line between new Viola substation 345/138 kV transformer and existing Clearwater 138 kV substation.
5	18SP	WERE	WERE	BENTON - WICHITA 345KV CKT 1	100.8	12.25%	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	Viola - Gill 138kV Ckt1	Build new 138kV line between new Viola substation 345/138 kV transformer and existing Gill 138 kV substation.
5	18SP	WERE		BENTON - WICHITA 345KV CKT 1	100.8	12.25%	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	Viola 345/138kV Transformer Ckt 1	Install new 345/138 kV transformer at Viola substation
5	18SP	WERE	WERE	BENTON - WICHITA 345KV CKT 1	101.1	12.44%	SPP-WERE-90	Viola - Rose Hill 345 kV	Build new 35 mile line from Viola to Rose Hill 345 kV

Outaged Branch Causing	TDF (%)	Transfer Case % Loading	Monitored Branch Over 100% Rate B	To Area	From Area	Season	Scenario
SPP-WERE-90	12.44%	101.1	BENTON - WICHITA 345KV CKT 1	WERE	WERE	18SP	5
SPP-WERE-90	12.44%	101.1	BENTON - WICHITA 345KV CKT 1	WERE	WERE	18SP	5
SPP-WERE-90	12.44%	101.1	BENTON - WICHITA 345KV CKT 1	WERE	WERE	18SP	5
WRTOD400	12.26%	101.2	BENTON - WICHITA 345KV CKT 1	WERE	WERE	18SP	5
WRTOD400	12.26%	101.2	BENTON - WICHITA 345KV CKT 1	WERE	WERE	18SP	5
WRTOD400	12.26%	101.2	BENTON - WICHITA 345KV CKT 1	WERE	WERE	18SP	5
WRTOD400	12.26%	101.2	BENTON - WICHITA 345KV CKT 1	WERE	WERE	18SP	5
SPP-WERE-91	12.44%	102.0	BENTON - WICHITA 345KV CKT 1	WERE	WERE	18SP	5
SPP-WERE-91	12.44%	102.0	BENTON - WICHITA 345KV CKT 1	WERE	WERE	18SP	5
SPP-WERE-91	12.44%	102.0	BENTON - WICHITA 345KV CKT 1	WERE	WERE	18SP	5
SPP-WERE-91	12.44%	102.0	BENTON - WICHITA 345KV CKT 1	WERE	WERE	18SP	5
RENFROW7 345.00 - VIOLA 7 3	13.74%	112.5	BENTON - WICHITA 345KV CKT 1	WERE	WERE	18SP	5
RENFROW7 345.00 - VIOLA 7 3	13.74%	112.5	BENTON - WICHITA 345KV CKT 1	WERE	WERE	18SP	5
RENFROW7 345.00 - VIOLA 7 3	13.74%	112.5	BENTON - WICHITA 345KV CKT 1	WERE	WERE	18SP	5
RENFROW7 345.00 - VIOLA 7 3	13.74%	112.5	BENTON - WICHITA 345KV CKT 1	WERE	WERE	18SP	5
HUNTERS7 345.00 - WOODRII	13.49%	114.9	BENTON - WICHITA 345KV CKT 1	WERE	WERE	18SP	5
HUNTERS7 345.00 - WOODRII	13.49%	114.9	BENTON - WICHITA 345KV CKT 1	WERE	WERE	18SP	5
HUNTERS7 345.00 - WOODRII	13.49%	114.9	BENTON - WICHITA 345KV CKT 1	WERE	WERE	18SP	5
HUNTERS7 345.00 - WOODRII	13.49%	114.9	BENTON - WICHITA 345KV CKT 1	WERE	WERE	18SP	5
GEN532751 1-WOLF CREEK GENE UNIT 1	11.77%	118.3	BENTON - WICHITA 345KV CKT 1	WERE	WERE	18SP	5
GEN532751 1-WOLF CREEK GENE UNIT 1	11.77%	118.3	BENTON - WICHITA 345KV CKT 1	WERE	WERE	18SP	5
GEN532751 1-WOLF CREEK GENE UNIT 1	11.77%	118.3	BENTON - WICHITA 345KV CKT 1	WERE	WERE	18SP	5
GEN532751 1-WOLF CREEK GENE UNIT 1	11.77%	118.3	BENTON - WICHITA 345KV CKT 1	WERE	WERE	18SP	5
GEN532751 1-WOLF CREEK GENE UNIT 1	14.93%	100.3	BENTON - WICHITA 345KV CKT 1	WERE	WERE	18WP	5
GEN532751 1-WOLF CREEK GENE UNIT 1	14.93%	100.3	BENTON - WICHITA 345KV CKT 1	WERE	WERE	18WP	5
GEN532751 1-WOLF CREEK GENE UNIT 1	14.93%	100.3	BENTON - WICHITA 345KV CKT 1	WERE	WERE	18WP	5
GEN532751 1-WOLF CREEK GENE UNIT 1	14.93%	100.3	BENTON - WICHITA 345KV CKT 1	WERE	WERE	18WP	5
RENFROW7 345.00 - VIOLA 7 3	13.88%	102.5	BENTON - WICHITA 345KV CKT 1	WERE	WERE	23SP	5
RENFROW7 345.00 - VIOLA 7 3	13.88%	102.5	BENTON - WICHITA 345KV CKT 1	WERE	WERE	23SP	5
RENFROW7 345.00 - VIOLA 7 3	13.88%	102.5	BENTON - WICHITA 345KV CKT 1	WERE	WERE	23SP	5
RENFROW7 345.00 - VIOLA 7 3	13.88%	102.5	BENTON - WICHITA 345KV CKT 1	WERE	WERE	23SP	5
HUNTERS7 345.00 - WOODRII	13.65%	105.3	BENTON - WICHITA 345KV CKT 1	WERE	WERE	23SP	5
HUNTERS7 345.00 - WOODRII	13.65%	105.3	BENTON - WICHITA 345KV CKT 1	WERE	WERE	23SP	5
HUNTERS7 345.00 - WOODRII	13.65%	105.3	BENTON - WICHITA 345KV CKT 1	WERE	WERE	23SP	5
HUNTERS7 345.00 - WOODRII	13.65%	105.3	BENTON - WICHITA 345KV CKT 1	WERE	WERE	23SP	5
GEN532751 1-WOLF CREEK GENE UNIT 1	12.65%	115.2	BENTON - WICHITA 345KV CKT 1	WERE	WERE	23SP	5
GEN532751 1-WOLF CREEK GENE UNIT 1	12.65%	115.2	BENTON - WICHITA 345KV CKT 1	WERE	WERE	23SP	5
GEN532751 1-WOLF CREEK GENE UNIT 1	12.65%	115.2	BENTON - WICHITA 345KV CKT 1	WERE	WERE	23SP	5
GEN532751 1-WOLF CREEK GENE UNIT 1	12.65%	115.2	BENTON - WICHITA 345KV CKT 1	WERE	WERE	23SP	5
PITTSBURG - VALLIANT 34	4.51%	110.2	BETHEL - BROKEN BOW 138KV CKT 1	SWPA	AEPW	18WP	5
PITTSBURG - VALLIANT 34	4.51%	110.2	BETHEL - BROKEN BOW 138KV CKT 1	SWPA	AEPW	18WP	5
PITTSBURG - VALLIANT 34	4.51%	110.2	BETHEL - BROKEN BOW 138KV CKT 1	SWPA	AEPW	18WP	5
PITTSBURG - VALLIANT 34	4.51%	110.2	BETHEL - BROKEN BOW 138KV CKT 1	SWPA	AEPW	18WP	5
PITTSBURG - VALLIANT 34	4.51%	110.2	BETHEL - BROKEN BOW 138KV CKT 1	SWPA	AEPW	18WP	5
PITTSBURG - VALLIANT 34	4.51%	110.2	BETHEL - BROKEN BOW 138KV CKT 1	SWPA	AEPW	18WP	5
PITTSBURG - VALLIANT 34	4.51%	110.2	BETHEL - BROKEN BOW 138KV CKT 1	SWPA	AEPW	18WP	5
PITTSBURG - VALLIANT 34	4.51%	115.4	BETHEL - NASHOBA 138KV CKT 1	AEPW	AEPW	18WP	5
PITTSBURG - VALLIANT 34	4.51%	115.4	BETHEL - NASHOBA 138KV CKT 1	AEPW	AEPW	18WP	5

g Overload	Upgrade Name	Solution
0	Viola - Clearwater 138kV Ckt1	Build new 138kV line between new Viola substation 345/138 kV transformer and existing Clearwater 138 kV substation.
0	Viola - Gill 138kV Ckt1	Build new 138kV line between new Viola substation 345/138 kV transformer and existing Gill 138 kV substation.
0	Viola 345/138kV Transformer Ckt 1	Install new 345/138 kV transformer at Viola substation
	Viola - Rose Hill 345 kV	Build new 35 mile line from Viola to Rose Hill 345 kV
	Viola - Clearwater 138kV Ckt1	Build new 138kV line between new Viola substation 345/138 kV transformer and existing Clearwater 138 kV substation.
	Viola - Gill 138kV Ckt1	Build new 138kV line between new Viola substation 345/138 kV transformer and existing Gill 138 kV substation.
	Viola 345/138kV Transformer Ckt 1	Install new 345/138 kV transformer at Viola substation
1	Viola - Rose Hill 345 kV	Build new 35 mile line from Viola to Rose Hill 345 kV
1	Viola - Clearwater 138kV Ckt1	Build new 138kV line between new Viola substation 345/138 kV transformer and existing Clearwater 138 kV substation.
1	Viola - Gill 138kV Ckt1	Build new 138kV line between new Viola substation 345/138 kV transformer and existing Gill 138 kV substation.
1	Viola 345/138kV Transformer Ckt 1	Install new 345/138 kV transformer at Viola substation
345.00 345KV CKT 1	Viola - Rose Hill 345 kV	Build new 35 mile line from Viola to Rose Hill 345 kV
345.00 345KV CKT 1	Viola - Clearwater 138kV Ckt1	Build new 138kV line between new Viola substation 345/138 kV transformer and existing Clearwater 138 kV substation.
345.00 345KV CKT 1	Viola - Gill 138kV Ckt1	Build new 138kV line between new Viola substation 345/138 kV transformer and existing Gill 138 kV substation.
345.00 345KV CKT 1	Viola 345/138kV Transformer Ckt 1	Install new 345/138 kV transformer at Viola substation
ING 345KV CKT 1	Viola - Rose Hill 345 kV	Build new 35 mile line from Viola to Rose Hill 345 kV
ING 345KV CKT 1	Viola - Clearwater 138kV Ckt1	Build new 138kV line between new Viola substation 345/138 kV transformer and existing Clearwater 138 kV substation.
ING 345KV CKT 1	Viola - Gill 138kV Ckt1	Build new 138kV line between new Viola substation 345/138 kV transformer and existing Gill 138 kV substation.
ING 345KV CKT 1 JERATING STATION	Viola 345/138kV Transformer Ckt 1	Install new 345/138 kV transformer at Viola substation
VERATING STATION	Viola - Rose Hill 345 kV	Build new 35 mile line from Viola to Rose Hill 345 kV
ERATING STATION	Viola - Clearwater 138kV Ckt1	Build new 138kV line between new Viola substation 345/138 kV transformer and existing Clearwater 138 kV substation.
ERATING STATION	Viola - Gill 138kV Ckt1	Build new 138kV line between new Viola substation 345/138 kV transformer and existing Gill 138 kV substation.
ERATING STATION	Viola 345/138kV Transformer Ckt 1	Install new 345/138 kV transformer at Viola substation
ERATING STATION	Viola - Rose Hill 345 kV	Build new 35 mile line from Viola to Rose Hill 345 kV
IERATING STATION	Viola - Clearwater 138kV Ckt1	Build new 138kV line between new Viola substation 345/138 kV transformer and existing Clearwater 138 kV substation.
IERATING STATION	Viola - Gill 138kV Ckt1	Build new 138kV line between new Viola substation 345/138 kV transformer and existing Gill 138 kV substation.
	Viola 345/138kV Transformer Ckt 1	Install new 345/138 kV transformer at Viola substation
345.00 345KV CKT 1	Viola - Rose Hill 345 kV	Build new 35 mile line from Viola to Rose Hill 345 kV
345.00 345KV CKT 1	Viola - Clearwater 138kV Ckt1	Build new 138kV line between new Viola substation 345/138 kV transformer and existing Clearwater 138 kV substation.
345.00 345KV CKT 1	Viola - Gill 138kV Ckt1	Build new 138kV line between new Viola substation 345/138 kV transformer and existing Gill 138 kV substation.
345.00 345KV CKT 1	Viola 345/138kV Transformer Ckt 1	Install new 345/138 kV transformer at Viola substation
ING 345KV CKT 1	Viola - Rose Hill 345 kV	Build new 35 mile line from Viola to Rose Hill 345 kV
ING 345KV CKT 1	Viola - Clearwater 138kV Ckt1	Build new 138kV line between new Viola substation 345/138 kV transformer and existing Clearwater 138 kV substation.
ING 345KV CKT 1	Viola - Gill 138kV Ckt1 Viola 345/138kV Transformer Ckt 1	Build new 138kV line between new Viola substation 345/138 kV transformer and existing Gill 138 kV substation.
VERATING STATION	Viola - Rose Hill 345 kV	Build new 35 mile line from Viola to Rose Hill 345 kV
ERATING STATION	Viola - Clearwater 138kV Ckt1	Build new 138kV line between new Viola substation 345/138 kV transformer and existing Clearwater 138 kV substation.
ERATING STATION	Viola - Gill 138kV Ckt1	Build new 138kV line between new Viola substation 345/138 kV transformer and existing Gill 138 kV substation.
VERATING STATION	Viola 345/138kV Transformer Ckt 1	Install new 345/138 kV transformer at Viola substation
345KV CKT 1	ENOWILT - LONE OAK 138KV CKT 1	Rebuild 0.32 miles of 3/0 CWC with 1272 ACSR. Replace jumpers @ Lone Oak
345KV CKT 1	BETHEL - BROKEN BOW 138KV CKT 1	Rebuild 9.19 miles of 3/0 Copperweld with 1272 ACSR
345KV CKT 1	BETHEL - NASHOBA 138KV CKT 1	Rebuild 22.43 miles of 3/0 Copperweld with 1272 ACSR
345KV CKT 1	CLAYTON - NASHOBA 138KV CKT 1	Rebuild 11.57 miles of 3/0 CWC with 1272 ACSR
345KV CKT 1	CLAYTON - SARDIS 138KV CKT 1	Rebuild 1.46 miles of 3/0 CWC with 1272 ACSR
345KV CKT 1	ENOWILT - SARDIS 138KV CKT 1	Rebuild 13.8 miles of 3/0 CWC with 1272 ACSR
345KV CKT 1	BROKEN BOW - CRAIG JUNCTION 138KV CKT 1	Rebuild 11.63
345KV CKT 1	ENOWILT - LONE OAK 138KV CKT 1	Rebuild 0.32 miles of 3/0 CWC with 1272 ACSR. Replace jumpers @ Lone Oak
345KV CKT 1	BETHEL - BROKEN BOW 138KV CKT 1	Rebuild 9.19 miles of 3/0 Copperweld with 1272 ACSR

Scenario	Season	From Area	To Area	Monitored Branch Over 100% Rate B	Transfer Case % Loading	TDF (%)	Outaged Branch Causing Overload	Upgrade Name	Solution
5	18WP	AEPW	AEPW	BETHEL - NASHOBA 138KV CKT 1	115.4	4.51%	PITTSBURG - VALLIANT 345KV CKT 1	BETHEL - NASHOBA 138KV CKT 1	Rebuild 22.43 miles of 3/0 Copperweld with 1272 ACSR
5	18WP	AEPW	AEPW	BETHEL - NASHOBA 138KV CKT 1	115.4	4.51%	PITTSBURG - VALLIANT 345KV CKT 1	CLAYTON - NASHOBA 138KV CKT 1	Rebuild 11.57 miles of 3/0 CWC with 1272 ACSR
5	18WP	AEPW	AEPW	BETHEL - NASHOBA 138KV CKT 1	115.4	4.51%	PITTSBURG - VALLIANT 345KV CKT 1	CLAYTON - SARDIS 138KV CKT 1	Rebuild 1.46 miles of 3/0 CWC with 1272 ACSR
5	18WP	AEPW	AEPW	BETHEL - NASHOBA 138KV CKT 1	115.4	4.51%	PITTSBURG - VALLIANT 345KV CKT 1	ENOWILT - SARDIS 138KV CKT 1	Rebuild 13.8 miles of 3/0 CWC with 1272 ACSR
5	18WP	AEPW	AEPW	BETHEL - NASHOBA 138KV CKT 1	115.4	4.51%	PITTSBURG - VALLIANT 345KV CKT 1	BROKEN BOW - CRAIG JUNCTION 138KV CKT 1	Rebuild 11.63
5	18WP	SWPA	AEPW	BROKEN BOW - CRAIG JUNCTION 138KV CKT 1	100.5	3.41%	CRAIG JUNCTION - MOUNTAIN RIVER 138KV CKT 1	ENOWILT - LONE OAK 138KV CKT 1	Rebuild 0.32 miles of 3/0 CWC with 1272 ACSR. Replace jumpers @ Lone Oak
5	18WP	SWPA	AEPW	BROKEN BOW - CRAIG JUNCTION 138KV CKT 1	100.5	3.41%	CRAIG JUNCTION - MOUNTAIN RIVER 138KV CKT 1	BETHEL - BROKEN BOW 138KV CKT 1	Rebuild 9.19 miles of 3/0 Copperweld with 1272 ACSR
5	18WP	SWPA	AEPW	BROKEN BOW - CRAIG JUNCTION 138KV CKT 1	100.5	3.41%	CRAIG JUNCTION - MOUNTAIN RIVER 138KV CKT 1	BETHEL - NASHOBA 138KV CKT 1	Rebuild 22.43 miles of 3/0 Copperweld with 1272 ACSR
5	18WP	SWPA	AEPW	BROKEN BOW - CRAIG JUNCTION 138KV CKT 1	100.5	3.41%	CRAIG JUNCTION - MOUNTAIN RIVER 138KV CKT 1	CLAYTON - NASHOBA 138KV CKT 1	Rebuild 11.57 miles of 3/0 CWC with 1272 ACSR
5	18WP	SWPA	AEPW	BROKEN BOW - CRAIG JUNCTION 138KV CKT 1	100.5	3.41%	CRAIG JUNCTION - MOUNTAIN RIVER 138KV CKT 1	CLAYTON - SARDIS 138KV CKT 1	Rebuild 1.46 miles of 3/0 CWC with 1272 ACSR
5	18WP	SWPA	AEPW	BROKEN BOW - CRAIG JUNCTION 138KV CKT 1	100.5	3.41%	CRAIG JUNCTION - MOUNTAIN RIVER 138KV CKT 1	ENOWILT - SARDIS 138KV CKT 1	Rebuild 13.8 miles of 3/0 CWC with 1272 ACSR
5	18WP	SWPA	AEPW	BROKEN BOW - CRAIG JUNCTION 138KV CKT 1	100.5	3.41%	CRAIG JUNCTION - MOUNTAIN RIVER 138KV CKT 1	BROKEN BOW - CRAIG JUNCTION 138KV CKT 1	Rebuild 11.63
5	18WP	SWPA	AEPW	BROKEN BOW - CRAIG JUNCTION 138KV CKT 1	102.5	3.41%	BBDAMTP4 - MOUNTAIN RIVER 138KV CKT 1	ENOWILT - LONE OAK 138KV CKT 1	Rebuild 0.32 miles of 3/0 CWC with 1272 ACSR. Replace jumpers @ Lone Oak
5	18WP	SWPA	AEPW	BROKEN BOW - CRAIG JUNCTION 138KV CKT 1	102.5	3.41%	BBDAMTP4 - MOUNTAIN RIVER 138KV CKT 1	BETHEL - BROKEN BOW 138KV CKT 1	Rebuild 9.19 miles of 3/0 Copperweld with 1272 ACSR
5	18WP	SWPA	AEPW	BROKEN BOW - CRAIG JUNCTION 138KV CKT 1	102.5	3.41%	BBDAMTP4 - MOUNTAIN RIVER 138KV CKT 1	BETHEL - NASHOBA 138KV CKT 1	Rebuild 22.43 miles of 3/0 Copperweld with 1272 ACSR
5	18WP	SWPA	AEPW	BROKEN BOW - CRAIG JUNCTION 138KV CKT 1	102.5	3.41%	BBDAMTP4 - MOUNTAIN RIVER 138KV CKT 1	CLAYTON - NASHOBA 138KV CKT 1	Rebuild 11.57 miles of 3/0 CWC with 1272 ACSR
5	18WP	SWPA	AEPW	BROKEN BOW - CRAIG JUNCTION 138KV CKT 1	102.5	3.41%	BBDAMTP4 - MOUNTAIN RIVER 138KV CKT 1	CLAYTON - SARDIS 138KV CKT 1	Rebuild 1.46 miles of 3/0 CWC with 1272 ACSR
5	18WP	SWPA	AEPW	BROKEN BOW - CRAIG JUNCTION 138KV CKT 1	102.5	3.41%	BBDAMTP4 - MOUNTAIN RIVER 138KV CKT 1	ENOWILT - SARDIS 138KV CKT 1	Rebuild 13.8 miles of 3/0 CWC with 1272 ACSR
5	18WP	SWPA	AEPW	BROKEN BOW - CRAIG JUNCTION 138KV CKT 1	102.5	3.41%	BBDAMTP4 - MOUNTAIN RIVER 138KV CKT 1	BROKEN BOW - CRAIG JUNCTION 138KV CKT 1	Rebuild 11.63
5	18SP	WERE	WERE	CHISHOLM - MAIZEE 4 138.00 138KV CKT 1	129.3	4.27%	BENTON - WICHITA 345KV CKT 1	CHISHOLM - MAIZE 138KV CKT 1 #1	Upgrade disconnect switches, wavetrap, breaker, jumpers
5	18SP	WERE	WERE	CHISHOLM - MAIZEE 4 138.00 138KV CKT 1	129.3	4.27%	BENTON - WICHITA 345KV CKT 1	CHISHOLM - MAIZE 138KV CKT 1 #2	Rebuild 7.25 miles
5	18SP	WERE	WERE	CHISHOLM - MAIZEE 4 138.00 138KV CKT 1	129.3	4.27%	BENTON - WICHITA 345KV CKT 1	Viola - Clearwater 138kV Ckt1	Build new 138kV line between new Viola substation 345/138 kV transformer and existing Clearwater 138 kV substation.
5	18SP	WERE	WERE	CHISHOLM - MAIZEE 4 138.00 138KV CKT 1	129.3	4.27%	BENTON - WICHITA 345KV CKT 1	Viola - Gill 138kV Ckt1	Build new 138kV line between new Viola substation 345/138 kV transformer and existing Gill 138 kV substation.
5	18SP	WERE	WERE	CHISHOLM - MAIZEE 4 138.00 138KV CKT 1	129.3	4.27%	BENTON - WICHITA 345KV CKT 1	Viola - Rose Hill 345 kV	Build new 35 mile line from Viola to Rose Hill 345 kV
5	18SP	WERE	WERE	CHISHOLM - MAIZEE 4 138.00 138KV CKT 1	129.3	4.27%	BENTON - WICHITA 345KV CKT 1	Viola 345/138kV Transformer Ckt 1	Install new 345/138 kV transformer at Viola substation
5	23SP	WERE	WERE	CHISHOLM - MAIZEE 4 138.00 138KV CKT 1	131.4	4.64%	BENTON - WICHITA 345KV CKT 1	CHISHOLM - MAIZE 138KV CKT 1 #1	Upgrade disconnect switches, wavetrap, breaker, jumpers
5	23SP	WERE	WERE	CHISHOLM - MAIZEE 4 138.00 138KV CKT 1	131.4	4.64%	BENTON - WICHITA 345KV CKT 1	CHISHOLM - MAIZE 138KV CKT 1 #2	Rebuild 7.25 miles
5	23SP	WERE	WERE	CHISHOLM - MAIZEE 4 138.00 138KV CKT 1	131.4	4.64%	BENTON - WICHITA 345KV CKT 1	Viola - Clearwater 138kV Ckt1	Build new 138kV line between new Viola substation 345/138 kV transformer and existing Clearwater 138 kV substation.
5	23SP	WERE	WERE	CHISHOLM - MAIZEE 4 138.00 138KV CKT 1	131.4	4.64%	BENTON - WICHITA 345KV CKT 1	Viola - Gill 138kV Ckt1	Build new 138kV line between new Viola substation 345/138 kV transformer and existing Gill 138 kV substation.
5	23SP	WERE	WERE	CHISHOLM - MAIZEE 4 138.00 138KV CKT 1	131.4	4.64%	BENTON - WICHITA 345KV CKT 1	Viola - Rose Hill 345 kV	Build new 35 mile line from Viola to Rose Hill 345 kV
5	23SP	WERE	WERE	CHISHOLM - MAIZEE 4 138.00 138KV CKT 1	131.4	4.64%	BENTON - WICHITA 345KV CKT 1	Viola 345/138kV Transformer Ckt 1	Install new 345/138 kV transformer at Viola substation
5	14WP	OKGE	OKGE	CIMARRON - DRAPER LAKE 345KV CKT 1	102.4	12.14%	GRACEMONT - MINCO 345KV CKT 1	CIMARRON - DRAPER LAKE 345KV CKT 1	Increase capacity of Draper Lake CT and Cimarron wave trap
5	14WP	OKGE	OKGE	CIMARRON - DRAPER LAKE 345KV CKT 1	103.7	13.88%	ARCADIA - SEMINOLE 345KV CKT 1	CIMARRON - DRAPER LAKE 345KV CKT 1	Increase capacity of Draper Lake CT and Cimarron wave trap
5	18WP	OKGE	OKGE	CIMARRON - DRAPER LAKE 345KV CKT 1	101.5	11.65%	GRACEMONT - LAWTON EASTSIDE 345KV CKT 1	CIMARRON - DRAPER LAKE 345KV CKT 1	Increase capacity of Draper Lake CT and Cimarron wave trap
5	18WP	OKGE	OKGE	CIMARRON - DRAPER LAKE 345KV CKT 1	101.6	10.99%	GRACEMONT - MINCO 345KV CKT 1	CIMARRON - DRAPER LAKE 345KV CKT 1	Increase capacity of Draper Lake CT and Cimarron wave trap
5	18WP	OKGE	OKGE	CIMARRON - DRAPER LAKE 345KV CKT 1	106.1	13.25%	ARCADIA - SEMINOLE 345KV CKT 1	CIMARRON - DRAPER LAKE 345KV CKT 1	Increase capacity of Draper Lake CT and Cimarron wave trap
5	23WP	OKGE	OKGE	CIMARRON - DRAPER LAKE 345KV CKT 1	100.1	10.80%	ROSE HILL - WOLF CREEK 345KV CKT 1	CIMARRON - DRAPER LAKE 345KV CKT 1	Increase capacity of Draper Lake CT and Cimarron wave trap
5	23WP	OKGE	OKGE	CIMARRON - DRAPER LAKE 345KV CKT 1	100.6	10.77%	BASE CASE	CIMARRON - DRAPER LAKE 345KV CKT 1	Increase capacity of Draper Lake CT and Cimarron wave trap
5	23WP	OKGE	OKGE	CIMARRON - DRAPER LAKE 345KV CKT 1	101.6	10.77%	QUANEX TAP - QUANEXS5 161.00 161KV CKT 1	CIMARRON - DRAPER LAKE 345KV CKT 1	Increase capacity of Draper Lake CT and Cimarron wave trap
5	23WP	OKGE	OKGE	CIMARRON - DRAPER LAKE 345KV CKT 1	102.1	10.83%	HOYT - STRANGER CREEK 345KV CKT 1	CIMARRON - DRAPER LAKE 345KV CKT 1	Increase capacity of Draper Lake CT and Cimarron wave trap
5	23WP	OKGE	OKGE	CIMARRON - DRAPER LAKE 345KV CKT 1	102.6	10.83%	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	CIMARRON - DRAPER LAKE 345KV CKT 1	Increase capacity of Draper Lake CT and Cimarron wave trap
5	23WP	OKGE	OKGE	CIMARRON - DRAPER LAKE 345KV CKT 1	103.4	10.78%	OGE3TERM12	CIMARRON - DRAPER LAKE 345KV CKT 1	Increase capacity of Draper Lake CT and Cimarron wave trap
5	23WP	OKGE	OKGE	CIMARRON - DRAPER LAKE 345KV CKT 1	103.5	10.80%	OGE3TERM14	CIMARRON - DRAPER LAKE 345KV CKT 1	Increase capacity of Draper Lake CT and Cimarron wave trap
5	23WP	OKGE	OKGE	CIMARRON - DRAPER LAKE 345KV CKT 1	104.6	11.15%	SPP-AEPW-32	CIMARRON - DRAPER LAKE 345KV CKT 1	Increase capacity of Draper Lake CT and Cimarron wave trap
5	23WP	OKGE	OKGE	CIMARRON - DRAPER LAKE 345KV CKT 1	115.3	11.06%	GRACEMONT - LAWTON EASTSIDE 345KV CKT 1	CIMARRON - DRAPER LAKE 345KV CKT 1	Increase capacity of Draper Lake CT and Cimarron wave trap
5	23WP	OKGE	OKGE	CIMARRON - DRAPER LAKE 345KV CKT 1	116.1	10.57%	GRACEMONT - MINCO 345KV CKT 1	CIMARRON - DRAPER LAKE 345KV CKT 1	Increase capacity of Draper Lake CT and Cimarron wave trap
5	23WP	OKGE	OKGE	CIMARRON - DRAPER LAKE 345KV CKT 1	120.3	12.01%	ARCADIA - SEMINOLE 345KV CKT 1	CIMARRON - DRAPER LAKE 345KV CKT 1	Increase capacity of Draper Lake CT and Cimarron wave trap
5	18WP	OKGE	OKGE	CIMARRON - SARA 138KV CKT 1	101.3	4.00%	CIMARRON - DRAPER LAKE 345KV CKT 1	CIMARRON - SARA 138KV CKT 1	Rebuild 9.56

Scenario	Season	From Area	To Area	Monitored Branch Over 100% Rate B	Transfer Case % Loading	TDF (%)	Outaged Branch Causing Overload	Upgrade Name	Solution
5	18WP	AEPW	AEPW	CLAYTON - NASHOBA 138KV CKT 1	117.0	4.51%	PITTSBURG - VALLIANT 345KV CKT 1	ENOWILT - LONE OAK 138KV CKT 1	Rebuild 0.32 miles of 3/0 CWC with 1272 ACSR. Replace jumpers @ Lone Oak
5	18WP	AEPW	AEPW	CLAYTON - NASHOBA 138KV CKT 1	117.0	4.51%	PITTSBURG - VALLIANT 345KV CKT 1	BETHEL - BROKEN BOW 138KV CKT 1	Rebuild 9.19 miles of 3/0 Copperweld with 1272 ACSR
5	18WP	AEPW	AEPW	CLAYTON - NASHOBA 138KV CKT 1	117.0	4.51%	PITTSBURG - VALLIANT 345KV CKT 1	BETHEL - NASHOBA 138KV CKT 1	Rebuild 22.43 miles of 3/0 Copperweld with 1272 ACSR
5	18WP	AEPW	AEPW	CLAYTON - NASHOBA 138KV CKT 1	117.0	4.51%	PITTSBURG - VALLIANT 345KV CKT 1	CLAYTON - NASHOBA 138KV CKT 1	Rebuild 11.57 miles of 3/0 CWC with 1272 ACSR
5	18WP	AEPW	AEPW	CLAYTON - NASHOBA 138KV CKT 1	117.0	4.51%	PITTSBURG - VALLIANT 345KV CKT 1	CLAYTON - SARDIS 138KV CKT 1	Rebuild 1.46 miles of 3/0 CWC with 1272 ACSR
5	18WP	AEPW	AEPW	CLAYTON - NASHOBA 138KV CKT 1	117.0	4.51%	PITTSBURG - VALLIANT 345KV CKT 1	ENOWILT - SARDIS 138KV CKT 1	Rebuild 13.8 miles of 3/0 CWC with 1272 ACSR
5	18WP	AEPW	AEPW	CLAYTON - NASHOBA 138KV CKT 1	117.0	4.51%	PITTSBURG - VALLIANT 345KV CKT 1	BROKEN BOW - CRAIG JUNCTION 138KV CKT 1	Rebuild 11.63
5	18WP	AEPW	AEPW	CLAYTON - SARDIS 138KV CKT 1	119.3	4.51%	PITTSBURG - VALLIANT 345KV CKT 1	ENOWILT - LONE OAK 138KV CKT 1	Rebuild 0.32 miles of 3/0 CWC with 1272 ACSR. Replace jumpers @ Lone Oak
5	18WP	AEPW	AEPW	CLAYTON - SARDIS 138KV CKT 1	119.3	4.51%	PITTSBURG - VALLIANT 345KV CKT 1	BETHEL - BROKEN BOW 138KV CKT 1	Rebuild 9.19 miles of 3/0 Copperweld with 1272 ACSR
5	18WP	AEPW	AEPW	CLAYTON - SARDIS 138KV CKT 1	119.3	4.51%	PITTSBURG - VALLIANT 345KV CKT 1	BETHEL - NASHOBA 138KV CKT 1	Rebuild 22.43 miles of 3/0 Copperweld with 1272 ACSR
5	18WP	AEPW	AEPW	CLAYTON - SARDIS 138KV CKT 1	119.3	4.51%	PITTSBURG - VALLIANT 345KV CKT 1	CLAYTON - NASHOBA 138KV CKT 1	Rebuild 11.57 miles of 3/0 CWC with 1272 ACSR
5	18WP	AEPW	AEPW	CLAYTON - SARDIS 138KV CKT 1	119.3	4.51%	PITTSBURG - VALLIANT 345KV CKT 1	CLAYTON - SARDIS 138KV CKT 1	Rebuild 1.46 miles of 3/0 CWC with 1272 ACSR
5	18WP	AEPW	AEPW	CLAYTON - SARDIS 138KV CKT 1	119.3	4.51%	PITTSBURG - VALLIANT 345KV CKT 1	ENOWILT - SARDIS 138KV CKT 1	Rebuild 13.8 miles of 3/0 CWC with 1272 ACSR
5	18WP	AEPW	AEPW	CLAYTON - SARDIS 138KV CKT 1	119.3	4.51%	PITTSBURG - VALLIANT 345KV CKT 1	BROKEN BOW - CRAIG JUNCTION 138KV CKT 1	Rebuild 11.63
5	14WP	WFEC	WFEC	DOVER SW - OKEENE 138KV CKT 1	103.3	3.86%	NORTHWEST - TATONGA7 345.00 345KV CKT 1	Line - Clark County - Thistle 345 kV dbl Ckt	Build a new 86 mile double circuit 345 kV line with at least 3000 A capacity from the Thistle 345 kV substation to the new Clark County substation. Build a new 345 kV substation at Thistle with a ring bus and necessary terminal equipment.
5	14WP	WFEC	WFEC	DOVER SW - OKEENE 138KV CKT 1	103.3	3.86%	NORTHWEST - TATONGA7 345.00 345KV CKT 1	Line - Hitchland - Woodward 345 kV dbl Ckt OKGE	Build a new 92 mile double circuit 345 kV line with at least 3000 A capacity from the Woodward District EHV substation to the SPS interception from the Hitchland substation. Upgrade the Woodward District EHV substation with the necessary
5	14WP	WFEC	WFEC	DOVER SW - OKEENE 138KV CKT 1	103.3	3.86%	NORTHWEST - TATONGA7 345.00 345KV CKT 1	Line - Hitchland - Woodward 345 kV dbl Ckt SPS	Build 30 mile double circuit 345 kV line with at least 3000 A capacity from the Hitchland substation to the OGE interception point from the Woodward District EHV substation. Upgrade the Hitchland substation with the necessary
5	14WP	WFEC	WFEC	DOVER SW - OKEENE 138KV CKT 1	103.3	3.86%	NORTHWEST - TATONGA7 345.00 345KV CKT 1	Line - Spearville - Clark County 345 kV dbl Ckt	Build a new 36 mile double circuit 345 kV line with at least 3000 A capacity from the Spearville substation to the new Clark County substation. Build the Clark County 345 kV substation with a ring bus and necessary terminal equipment.
5	14WP	WFEC	WFEC	DOVER SW - OKEENE 138KV CKT 1	103.3	3.86%	NORTHWEST - TATONGA7 345.00 345KV CKT 1	Line - Thistle - Wichita 345 kV dbl Ckt PW	Build a new 78 mile double circuit 345 kV line with at least 3000 A capacity from the Wichita substation to the new Thistle 345 kV substation.
5	14WP	WFEC	WFEC	DOVER SW - OKEENE 138KV CKT 1	103.3	3.86%	NORTHWEST - TATONGA7 345.00 345KV CKT 1	Line - Thistle - Wichita 345 kV dbl Ckt WERE	Upgrade the Wichita substation with the necessary breakers and terminal equipment to accommodate two new 345 kV circuits from the new Thistle 345 kV substation
5	14WP	WFEC	WFEC	DOVER SW - OKEENE 138KV CKT 1	103.3	3.86%	NORTHWEST - TATONGA7 345.00 345KV CKT 1	Line - Thistle - Woodward 345 kV dbl Ckt OKGE	Build a new 79 mile double circuit 345 kV line with at least 3000 A capacity from the Woodward District EHV substation to the Kansas/Oklahoma state border towards the Thistle substation. Upgrade the Woodward Distric EHV substation with
5	14WP	WFEC	WFEC	DOVER SW - OKEENE 138KV CKT 1	103.3	3.86%	NORTHWEST - TATONGA7 345.00 345KV CKT 1	Line - Thistle - Woodward 345 kV dbl Ckt PW	Build a new 30 mile double circuit 345 kV line with at least 3000 A capacity from the Thistle substation to the Kansas/Oklahoma state border towards the Woodward District EHV substation.
5	14WP	WFEC	WFEC	DOVER SW - OKEENE 138KV CKT 1	103.3	3.86%	NORTHWEST - TATONGA7 345.00 345KV CKT 1	Line - Tuco - Woodward 345 kV line OKGE	Build new 345 kV line from Woodward EHV to Border - Project costs now include Border reactor substation
5	14WP	WFEC	WFEC	DOVER SW - OKEENE 138KV CKT 1	103.3	3.86%	NORTHWEST - TATONGA7 345.00 345KV CKT 1	Line - Tuco - Woodward 345 kV line SPS	Build new 345 kV line from Tuco to OGE Border station near TX/OK Stateline. Install line reactor outside Border station and line reactors at Tuco.
5	14WP	WFEC	WFEC	DOVER SW - OKEENE 138KV CKT 1	103.3	3.86%	NORTHWEST - TATONGA7 345.00 345KV CKT 1	XFR - Thistle 345/138 kV	Install a 400 MVA 345/138 kV transformer at the new 345 kV Thistle substation.
5	14WP	OKGE	OKGE	EL RENO - ROMAN NOSE 138KV CKT 1	106.9	4.45%	NORTHWEST - TATONGA7 345.00 345KV CKT 1	Mathewson - Tatonga 345 kV Ckt 2 Accelerate	Build new 61 mile Tatonga - Mathewson 345 kV line.
5	14WP	OKGE	OKGE	EL RENO - ROMAN NOSE 138KV CKT 1	106.9	4.45%	NORTHWEST - TATONGA7 345.00 345KV CKT 1	Cimarron - Mathewson 345 kV Ckt 1 Accelerate	Build new 16 mile 345 kV line from Mathweson to Cimarron.
5	14WP	OKGE	OKGE	EL RENO - ROMAN NOSE 138KV CKT 1	106.9	4.45%	NORTHWEST - TATONGA7 345.00 345KV CKT 1	Mathewson 345 kV Accelerate	Build new Mathewson 345 kV substation at the intersection of the Woodring-Cimarron and the existing Northwest - Tatonga 345 kV lines.
5	14WP	OKGE	OKGE	EL RENO - ROMAN NOSE 138KV CKT 1	106.9	4.45%	NORTHWEST - TATONGA7 345.00 345KV CKT 1	Tatonga - Woodward EHV 345 kV Ckt 2 Accelerate	Build new 49-mile Woodward EHV - Tatonga 345 kV Ckt 2 line.
5	18SP	OKGE	OKGE	EL RENO - ROMAN NOSE 138KV CKT 1	102.1	4.22%	TATONGA7 345.00 - WOODWARD DISTRICT EHV 345KV CKT 1 TATONGA7 345.00 - WOODWARD DISTRICT EHV	Mathewson - Tatonga 345 kV Ckt 2 Accelerate	Build new 61 mile Tatonga - Mathewson 345 kV line.
5	18SP	OKGE	OKGE	EL RENO - ROMAN NOSE 138KV CKT 1	102.1	4.22%	TATONGA7 345.00 - WOODWARD DISTRICT EHV 345KV CKT 1 TATONGA7 345.00 - WOODWARD DISTRICT EHV	Cimarron - Mathewson 345 kV Ckt 1 Accelerate	Build new 16 mile 345 kV line from Mathweson to Cimarron.
5	18SP	OKGE	OKGE	EL RENO - ROMAN NOSE 138KV CKT 1	102.1	4.22%	345KV CKT 1	Mathewson 345 kV Accelerate	Build new Mathewson 345 kV substation at the intersection of the Woodring-Cimarron and the existing Northwest - Tatonga 345 kV lines.
5	18SP	OKGE	OKGE	EL RENO - ROMAN NOSE 138KV CKT 1	102.1	4.22%	TATONGA7 345.00 - WOODWARD DISTRICT EHV 345KV CKT 1	Tatonga - Woodward EHV 345 kV Ckt 2 Accelerate	Build new 49-mile Woodward EHV - Tatonga 345 kV Ckt 2 line.
5	18SP	OKGE	OKGE	EL RENO - ROMAN NOSE 138KV CKT 1	118.6	4.22%	NORTHWEST - TATONGA7 345.00 345KV CKT 1	Mathewson - Tatonga 345 kV Ckt 2 Accelerate	Build new 61 mile Tatonga - Mathewson 345 kV line.
5	18SP	OKGE	OKGE	EL RENO - ROMAN NOSE 138KV CKT 1	118.6	4.22%	NORTHWEST - TATONGA7 345.00 345KV CKT 1	Cimarron - Mathewson 345 kV Ckt 1 Accelerate	Build new 16 mile 345 kV line from Mathweson to Cimarron.
5	18SP	OKGE	OKGE	EL RENO - ROMAN NOSE 138KV CKT 1	118.6	4.22%	NORTHWEST - TATONGA7 345.00 345KV CKT 1	Mathewson 345 kV Accelerate	Build new Mathewson 345 kV substation at the intersection of the Woodring-Cimarron and the existing Northwest - Tatonga 345 kV lines.
5	18SP	OKGE	OKGE	EL RENO - ROMAN NOSE 138KV CKT 1	118.6	4.22%	NORTHWEST - TATONGA7 345.00 345KV CKT 1	Tatonga - Woodward EHV 345 kV Ckt 2 Accelerate	Build new 49-mile Woodward EHV - Tatonga 345 kV Ckt 2 line.
5	18SP	AEPW	AEPW	ENOWILT - LONE OAK 138KV CKT 1	101.1	4.52%	PITTSBURG - VALLIANT 345KV CKT 1	ENOWILT - LONE OAK 138KV CKT 1	Rebuild 0.32 miles of 3/0 CWC with 1272 ACSR. Replace jumpers @ Lone Oak
5	18SP	AEPW	AEPW	ENOWILT - LONE OAK 138KV CKT 1	101.1	4.52%	PITTSBURG - VALLIANT 345KV CKT 1	BETHEL - BROKEN BOW 138KV CKT 1	Rebuild 9.19 miles of 3/0 Copperweld with 1272 ACSR
5	18SP	AEPW	AEPW	ENOWILT - LONE OAK 138KV CKT 1	101.1	4.52%	PITTSBURG - VALLIANT 345KV CKT 1	BETHEL - NASHOBA 138KV CKT 1	Rebuild 22.43 miles of 3/0 Copperweld with 1272 ACSR
5	18SP	AEPW	AEPW	ENOWILT - LONE OAK 138KV CKT 1	101.1	4.52%	PITTSBURG - VALLIANT 345KV CKT 1	CLAYTON - NASHOBA 138KV CKT 1	Rebuild 11.57 miles of 3/0 CWC with 1272 ACSR
5	18SP	AEPW	AEPW	ENOWILT - LONE OAK 138KV CKT 1	101.1	4.52%	PITTSBURG - VALLIANT 345KV CKT 1	CLAYTON - SARDIS 138KV CKT 1	Rebuild 1.46 miles of 3/0 CWC with 1272 ACSR
5	18SP	AEPW	AEPW	ENOWILT - LONE OAK 138KV CKT 1	101.1	4.52%	PITTSBURG - VALLIANT 345KV CKT 1	ENOWILT - SARDIS 138KV CKT 1	Rebuild 13.8 miles of 3/0 CWC with 1272 ACSR
5	18SP	AEPW	AEPW	ENOWILT - LONE OAK 138KV CKT 1	101.1	4.52%	PITTSBURG - VALLIANT 345KV CKT 1	BROKEN BOW - CRAIG JUNCTION 138KV CKT 1	Rebuild 11.63
5	18WP	AEPW	AEPW	ENOWILT - LONE OAK 138KV CKT 1	124.0	4.51%	PITTSBURG - VALLIANT 345KV CKT 1	ENOWILT - LONE OAK 138KV CKT 1	Rebuild 0.32 miles of 3/0 CWC with 1272 ACSR. Replace jumpers @ Lone Oak
5	18WP	AEPW	AEPW	ENOWILT - LONE OAK 138KV CKT 1	124.0	4.51%	PITTSBURG - VALLIANT 345KV CKT 1	BETHEL - BROKEN BOW 138KV CKT 1	Rebuild 9.19 miles of 3/0 Copperweld with 1272 ACSR
5	18WP	AEPW	AEPW	ENOWILT - LONE OAK 138KV CKT 1	124.0	4.51%	PITTSBURG - VALLIANT 345KV CKT 1	BETHEL - NASHOBA 138KV CKT 1	Rebuild 22.43 miles of 3/0 Copperweld with 1272 ACSR
5	18WP	AEPW	AEPW	ENOWILT - LONE OAK 138KV CKT 1	124.0	4.51%	PITTSBURG - VALLIANT 345KV CKT 1	CLAYTON - NASHOBA 138KV CKT 1	Rebuild 11.57 miles of 3/0 CWC with 1272 ACSR

Scenario	Season	From Area	To Area	Monitored Branch Over 100% Rate B	Transfer Case % Loading	TDF (%)	Outaged Branch Causing Overload	Upgrade Name	Solution
5	18WP	AEPW	AEPW	ENOWILT - LONE OAK 138KV CKT 1	124.0	4.51%	PITTSBURG - VALLIANT 345KV CKT 1	CLAYTON - SARDIS 138KV CKT 1	Rebuild 1.46 miles of 3/0 CWC with 1272 ACSR
5	18WP	AEPW	AEPW	ENOWILT - LONE OAK 138KV CKT 1	124.0	4.51%	PITTSBURG - VALLIANT 345KV CKT 1	ENOWILT - SARDIS 138KV CKT 1	Rebuild 13.8 miles of 3/0 CWC with 1272 ACSR
5	18WP	AEPW	AEPW	ENOWILT - LONE OAK 138KV CKT 1	124.0	4.51%	PITTSBURG - VALLIANT 345KV CKT 1	BROKEN BOW - CRAIG JUNCTION 138KV CKT 1	Rebuild 11.63
5	18WP	AEPW	AEPW	ENOWILT - SARDIS 138KV CKT 1	123.1	4.51%	PITTSBURG - VALLIANT 345KV CKT 1	ENOWILT - LONE OAK 138KV CKT 1	Rebuild 0.32 miles of 3/0 CWC with 1272 ACSR. Replace jumpers @ Lone Oak
5	18WP	AEPW	AEPW	ENOWILT - SARDIS 138KV CKT 1	123.1	4.51%	PITTSBURG - VALLIANT 345KV CKT 1	BETHEL - BROKEN BOW 138KV CKT 1	Rebuild 9.19 miles of 3/0 Copperweld with 1272 ACSR
5	18WP	AEPW	AEPW	ENOWILT - SARDIS 138KV CKT 1	123.1	4.51%	PITTSBURG - VALLIANT 345KV CKT 1	BETHEL - NASHOBA 138KV CKT 1	Rebuild 22.43 miles of 3/0 Copperweld with 1272 ACSR
5	18WP	AEPW	AEPW	ENOWILT - SARDIS 138KV CKT 1	123.1	4.51%	PITTSBURG - VALLIANT 345KV CKT 1	CLAYTON - NASHOBA 138KV CKT 1	Rebuild 11.57 miles of 3/0 CWC with 1272 ACSR
5	18WP	AEPW	AEPW	ENOWILT - SARDIS 138KV CKT 1	123.1	4.51%	PITTSBURG - VALLIANT 345KV CKT 1	CLAYTON - SARDIS 138KV CKT 1	Rebuild 1.46 miles of 3/0 CWC with 1272 ACSR
5	18WP	AEPW	AEPW	ENOWILT - SARDIS 138KV CKT 1	123.1	4.51%	PITTSBURG - VALLIANT 345KV CKT 1	ENOWILT - SARDIS 138KV CKT 1	Rebuild 13.8 miles of 3/0 CWC with 1272 ACSR
5	18WP	AEPW	AEPW	ENOWILT - SARDIS 138KV CKT 1	123.1	4.51%	PITTSBURG - VALLIANT 345KV CKT 1	BROKEN BOW - CRAIG JUNCTION 138KV CKT 1	Rebuild 11.63
5	18SP	WERE	WERE	EVANS ENERGY CENTER NORTH - MAIZEW 4 138.00 138KV CKT 1	133.6	4.27%	BENTON - WICHITA 345KV CKT 1	EVANS ENERGY CENTER NORTH - MAIZE 138KV CKT 1 #1	Upgrade disconnect switches, wavetrap, breaker, jumpers
5	18SP	WERE	WERE	EVANS ENERGY CENTER NORTH - MAIZEW 4 138.00 138KV CKT 1	133.6	4.27%	BENTON - WICHITA 345KV CKT 1	EVANS ENERGY CENTER NORTH - MAIZE 138KV CKT 1 #2	Rebuild 4.8 miles
5	18SP	WERE	WERE	EVANS ENERGY CENTER NORTH - MAIZEW 4 138.00 138KV CKT 1	133.6	4.27%	BENTON - WICHITA 345KV CKT 1	Viola - Clearwater 138kV Ckt1	Build new 138kV line between new Viola substation 345/138 kV transformer and existing Clearwater 138 kV substation.
5	18SP	WERE	WERE	EVANS ENERGY CENTER NORTH - MAIZEW 4 138.00 138KV CKT 1	133.6	4.27%	BENTON - WICHITA 345KV CKT 1	Viola - Gill 138kV Ckt1	Build new 138kV line between new Viola substation 345/138 kV transformer and existing Gill 138 kV substation.
5	18SP	WERE	WERE	EVANS ENERGY CENTER NORTH - MAIZEW 4 138.00 138KV CKT 1	133.6	4.27%	BENTON - WICHITA 345KV CKT 1	Viola - Rose Hill 345 kV	Build new 35 mile line from Viola to Rose Hill 345 kV
5	18SP	WERE	WERE	EVANS ENERGY CENTER NORTH - MAIZEW 4 138.00 138KV CKT 1	133.6	4.27%	BENTON - WICHITA 345KV CKT 1	Viola 345/138kV Transformer Ckt 1	Install new 345/138 kV transformer at Viola substation
5	23SP	WERE	WERE	EVANS ENERGY CENTER NORTH - MAIZEW 4 138.00 138KV CKT 1	136.3	4.64%	BENTON - WICHITA 345KV CKT 1	EVANS ENERGY CENTER NORTH - MAIZE 138KV CKT 1 #1	Upgrade disconnect switches, wavetrap, breaker, jumpers
5	23SP	WERE	WERE	EVANS ENERGY CENTER NORTH - MAIZEW 4 138.00 138KV CKT 1	136.3	4.64%	BENTON - WICHITA 345KV CKT 1	EVANS ENERGY CENTER NORTH - MAIZE 138KV CKT 1 #2	Rebuild 4.8 miles
5	23SP	WERE	WERE	EVANS ENERGY CENTER NORTH - MAIZEW 4 138.00 138KV CKT 1	136.3	4.64%	BENTON - WICHITA 345KV CKT 1	Viola - Clearwater 138kV Ckt1	Build new 138kV line between new Viola substation 345/138 kV transformer and existing Clearwater 138 kV substation.
5	23SP	WERE	WERE	EVANS ENERGY CENTER NORTH - MAIZEW 4 138.00 138KV CKT 1	136.3	4.64%	BENTON - WICHITA 345KV CKT 1	Viola - Gill 138kV Ckt1	Build new 138kV line between new Viola substation 345/138 kV transformer and existing Gill 138 kV substation.
5	23SP	WERE	WERE	EVANS ENERGY CENTER NORTH - MAIZEW 4 138.00 138KV CKT 1	136.3	4.64%	BENTON - WICHITA 345KV CKT 1	Viola - Rose Hill 345 kV	Build new 35 mile line from Viola to Rose Hill 345 kV
5	23SP	WERE	WERE	EVANS ENERGY CENTER NORTH - MAIZEW 4 138.00 138KV CKT 1	136.3	4.64%	BENTON - WICHITA 345KV CKT 1	Viola 345/138kV Transformer Ckt 1	Install new 345/138 kV transformer at Viola substation
5	23WP	GRDA	AEPW	FLINT CREEK - SILOAM SPRINGS TAP 345KV CKT 1	100.5	22.32%	7JASPER 345.00 - BLACKBERRY 345KV CKT 1	FLINT CREEK - SILOAM SPRINGS TAP 345KV CKT 1 AEPW	Replace Terminal Equipment
5	23WP	GRDA	AEPW	FLINT CREEK - SILOAM SPRINGS TAP 345KV CKT 1	105.9	27.78%	CHAMBER SPRINGS - CLARKSVILLE 345KV CKT 1	FLINT CREEK - SILOAM SPRINGS TAP 345KV CKT 1 AEPW	Replace Terminal Equipment
5	18SP	OKGE	WFEC	FPL SWITCH - MOORELAND 138KV CKT 1	116.4	10.23%	NORTHWEST - TATONGA7 345.00 345KV CKT 1	Mathewson - Tatonga 345 kV Ckt 2 Accelerate	Build new 61 mile Tatonga - Mathewson 345 kV line.
5	18SP	OKGE	WFEC	FPL SWITCH - MOORELAND 138KV CKT 1	116.4	10.23%	NORTHWEST - TATONGA7 345.00 345KV CKT 1	Cimarron - Mathewson 345 kV Ckt 1 Accelerate	Build new 16 mile 345 kV line from Mathweson to Cimarron.
5	18SP	OKGE	WFEC	FPL SWITCH - MOORELAND 138KV CKT 1	116.4	10.23%	NORTHWEST - TATONGA7 345.00 345KV CKT 1	Mathewson 345 kV Accelerate	Build new Mathewson 345 kV substation at the intersection of the Woodring-Cimarron and the existing Northwest - Tatonga 345 kV lines.
5	18SP	OKGE	WFEC	FPL SWITCH - MOORELAND 138KV CKT 1	116.4	10.23%	NORTHWEST - TATONGA7 345.00 345KV CKT 1	Tatonga - Woodward EHV 345 kV Ckt 2 Accelerate	Build new 49-mile Woodward EHV - Tatonga 345 kV Ckt 2 line.
5	18WP	OKGE	WFEC	FPL SWITCH - MOORELAND 138KV CKT 1	101.4	7.25%	G12-038 TAP 345.00 - TUCO INTERCHANGE 345KV CKT 1	Mathewson - Tatonga 345 kV Ckt 2 Accelerate	Build new 61 mile Tatonga - Mathewson 345 kV line.
5	18WP	OKGE	WFEC	FPL SWITCH - MOORELAND 138KV CKT 1	101.4	7.25%	G12-038 TAP 345.00 - TUCO INTERCHANGE 345KV CKT 1	Cimarron - Mathewson 345 kV Ckt 1 Accelerate	Build new 16 mile 345 kV line from Mathweson to Cimarron.
5	18WP	OKGE	WFEC	FPL SWITCH - MOORELAND 138KV CKT 1	101.4	7.25%	G12-038 TAP 345.00 - TUCO INTERCHANGE 345KV CKT 1	Mathewson 345 kV Accelerate	Build new Mathewson 345 kV substation at the intersection of the Woodring-Cimarron and the existing Northwest - Tatonga 345 kV lines.
5	18WP	OKGE	WFEC	FPL SWITCH - MOORELAND 138KV CKT 1	101.4	7.25%	G12-038 TAP 345.00 - TUCO INTERCHANGE 345KV CKT 1	Tatonga - Woodward EHV 345 kV Ckt 2 Accelerate	Build new 49-mile Woodward EHV - Tatonga 345 kV Ckt 2 line.
5	18WP	OKGE	WFEC	FPL SWITCH - MOORELAND 138KV CKT 1	106.7	10.42%	TATONGA7 345.00 - WOODWARD DISTRICT EHV 345KV CKT 1	Mathewson - Tatonga 345 kV Ckt 2 Accelerate	Build new 61 mile Tatonga - Mathewson 345 kV line.
5	18WP	OKGE	WFEC	FPL SWITCH - MOORELAND 138KV CKT 1	106.7	10.42%	TATONGA7 345.00 - WOODWARD DISTRICT EHV 345KV CKT 1	Cimarron - Mathewson 345 kV Ckt 1 Accelerate	Build new 16 mile 345 kV line from Mathweson to Cimarron.
5	18WP	OKGE	WFEC	FPL SWITCH - MOORELAND 138KV CKT 1	106.7	10.42%	TATONGA7 345.00 - WOODWARD DISTRICT EHV 345KV CKT 1	Mathewson 345 kV Accelerate	Build new Mathewson 345 kV substation at the intersection of the Woodring-Cimarron and the existing Northwest - Tatonga 345 kV lines.
5	18WP	OKGE	WFEC	FPL SWITCH - MOORELAND 138KV CKT 1	106.7	10.42%	TATONGA7 345.00 - WOODWARD DISTRICT EHV 345KV CKT 1	Tatonga - Woodward EHV 345 kV Ckt 2 Accelerate	Build new 49-mile Woodward EHV - Tatonga 345 kV Ckt 2 line.
5	18WP	OKGE	WFEC	FPL SWITCH - MOORELAND 138KV CKT 1	129.6	10.42%	NORTHWEST - TATONGA7 345.00 345KV CKT 1	Mathewson - Tatonga 345 kV Ckt 2 Accelerate	Build new 61 mile Tatonga - Mathewson 345 kV line.
5	18WP	OKGE	WFEC	FPL SWITCH - MOORELAND 138KV CKT 1	129.6	10.42%	NORTHWEST - TATONGA7 345.00 345KV CKT 1	Cimarron - Mathewson 345 kV Ckt 1 Accelerate	Build new 16 mile 345 kV line from Mathweson to Cimarron.
5	18WP	OKGE	WFEC	FPL SWITCH - MOORELAND 138KV CKT 1	129.6	10.42%	NORTHWEST - TATONGA7 345.00 345KV CKT 1	Mathewson 345 kV Accelerate	Build new Mathewson 345 kV substation at the intersection of the Woodring-Cimarron and the existing Northwest - Tatonga 345 kV lines.
5	18WP	OKGE	WFEC	FPL SWITCH - MOORELAND 138KV CKT 1	129.6	10.42%	NORTHWEST - TATONGA7 345.00 345KV CKT 1	Tatonga - Woodward EHV 345 kV Ckt 2 Accelerate	Build new 49-mile Woodward EHV - Tatonga 345 kV Ckt 2 line.
5	18SP	OKGE	OKGE	FPL SWITCH - WOODWARD 138KV CKT 1	102.6	6.92%	BASE CASE	Mathewson - Tatonga 345 kV Ckt 2 Accelerate	Build new 61 mile Tatonga - Mathewson 345 kV line.
5	18SP	OKGE	OKGE	FPL SWITCH - WOODWARD 138KV CKT 1	102.6	6.92%	BASE CASE	Cimarron - Mathewson 345 kV Ckt 1 Accelerate	Build new 16 mile 345 kV line from Mathweson to Cimarron.
5	18SP	OKGE	OKGE	FPL SWITCH - WOODWARD 138KV CKT 1	102.6	6.92%	BASE CASE	Mathewson 345 kV Accelerate	Build new Mathewson 345 kV substation at the intersection of the Woodring-Cimarron and the existing Northwest - Tatonga 345 kV lines.
5	18SP	OKGE	OKGE	FPL SWITCH - WOODWARD 138KV CKT 1	102.6	6.92%	BASE CASE	Tatonga - Woodward EHV 345 kV Ckt 2 Accelerate	Build new 49-mile Woodward EHV - Tatonga 345 kV Ckt 2 line.
5	18SP	OKGE	OKGE	FPL SWITCH - WOODWARD 138KV CKT 1	122.5	7.81%	WOODWARD (WOODWRD2) 138/69/13.2KV TRANSFORMER CKT 1	Mathewson - Tatonga 345 kV Ckt 2 Accelerate	Build new 61 mile Tatonga - Mathewson 345 kV line.
5	18SP	OKGE	OKGE	FPL SWITCH - WOODWARD 138KV CKT 1	122.5	7.81%	WOODWARD (WOODWRD2) 138/69/13.2KV TRANSFORMER CKT 1	Cimarron - Mathewson 345 kV Ckt 1 Accelerate	Build new 16 mile 345 kV line from Mathweson to Cimarron.
5	18SP	OKGE	OKGE	FPL SWITCH - WOODWARD 138KV CKT 1	122.5	7.81%	WOODWARD (WOODWRD2) 138/69/13.2KV TRANSFORMER CKT 1	Mathewson 345 kV Accelerate	Build new Mathewson 345 kV substation at the intersection of the Woodring-Cimarron and the existing Northwest - Tatonga 345 kV lines.
			OKGE	FPL SWITCH - WOODWARD 138KV CKT 1	122.5	7.81%	WOODWARD (WOODWRD2) 138/69/13.2KV TRANSFORMER CKT 1	Tatonga - Woodward EHV 345 kV Ckt 2 Accelerate	Build new 49-mile Woodward EHV - Tatonga 345 kV Ckt 2 line.

Outaged Branch Causin	TDF (%)	Transfer Case % Loading	Monitored Branch Over 100% Rate B	To Area	From Area	Season	Scenario
TATONGA7 345.00 - WOODWA 345KV CKT 1	10.23%	126.5	FPL SWITCH - WOODWARD 138KV CKT 1	OKGE	OKGE	18SP	5
TATONGA7 345.00 - WOODWA 345KV CKT 1	10.23%	126.5	FPL SWITCH - WOODWARD 138KV CKT 1	OKGE	OKGE	18SP	5
TATONGA7 345.00 - WOODWA 345KV CKT 1	10.23%	126.5	FPL SWITCH - WOODWARD 138KV CKT 1	OKGE	OKGE	18SP	5
TATONGA7 345.00 - WOODWA 345KV CKT 1	10.23%	126.5	FPL SWITCH - WOODWARD 138KV CKT 1	OKGE	OKGE	18SP	5
NORTHWEST - TATONGA7 34	10.23%	165.7	FPL SWITCH - WOODWARD 138KV CKT 1	OKGE	OKGE	18SP	5
NORTHWEST - TATONGA7 34	10.23%	165.7	FPL SWITCH - WOODWARD 138KV CKT 1	OKGE	OKGE	18SP	5
NORTHWEST - TATONGA7 34	10.23%	165.7	FPL SWITCH - WOODWARD 138KV CKT 1	OKGE	OKGE	18SP	5
NORTHWEST - TATONGA7 34	10.23%	165.7	FPL SWITCH - WOODWARD 138KV CKT 1	OKGE	OKGE	18SP	5
WOODWARD (WOODWRD2) TRANSFORMER C	7.95%	113.5	FPL SWITCH - WOODWARD 138KV CKT 1	OKGE	OKGE	18WP	5
WOODWARD (WOODWRD2) TRANSFORMER C	7.95%	113.5	FPL SWITCH - WOODWARD 138KV CKT 1	OKGE	OKGE	18WP	5
WOODWARD (WOODWRD2) TRANSFORMER C	7.95%	113.5	FPL SWITCH - WOODWARD 138KV CKT 1	OKGE	OKGE	18WP	5
WOODWARD (WOODWRD2) TRANSFORMER C	7.95%	113.5	FPL SWITCH - WOODWARD 138KV CKT 1	OKGE	OKGE	18WP	5
TATONGA7 345.00 - WOODWA 345KV CKT 1	10.42%	120.3	FPL SWITCH - WOODWARD 138KV CKT 1	OKGE	OKGE	18WP	5
TATONGA7 345.00 - WOODWA 345KV CKT 1	10.42%	120.3	FPL SWITCH - WOODWARD 138KV CKT 1	OKGE	OKGE	18WP	5
TATONGA7 345.00 - WOODWA			FPL SWITCH - WOODWARD 138KV CKT 1				
345KV CKT 1 TATONGA7 345.00 - WOODWA	10.42%	120.3		OKGE	OKGE	18WP	5
345KV CKT 1	10.42%	120.3	FPL SWITCH - WOODWARD 138KV CKT 1		OKGE	18WP	5
NORTHWEST - TATONGA7 34	10.42%	153.9	FPL SWITCH - WOODWARD 138KV CKT 1	OKGE	OKGE	18WP	5
NORTHWEST - TATONGA7 34	10.42%	153.9	FPL SWITCH - WOODWARD 138KV CKT 1	OKGE	OKGE	18WP	5
NORTHWEST - TATONGA7 34	10.42%	153.9	FPL SWITCH - WOODWARD 138KV CKT 1	OKGE	OKGE	18WP	5
NORTHWEST - TATONGA7 34	10.42%	153.9	FPL SWITCH - WOODWARD 138KV CKT 1	OKGE	OKGE	18WP	5
GRACEMONT - MINCO 34	6.60%	101.9	FRANKLIN SW - MIDWEST TAP 138KV CKT 1	WFEC	OKGE	23SP	5
HAMMETT2 - MEEKER 1	5.04%	104.5	FRANKLIN SW - MIDWEST TAP 138KV CKT 1	WFEC	OKGE	23SP	5
HAMMETT TAP - HAMMETT	5.04%	107.4	FRANKLIN SW - MIDWEST TAP 138KV CKT 1	WFEC	OKGE	23SP	5
LACYGNE - NEOSHO 34	7.23%	105.9	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	14WP	5
LACYGNE - NEOSHO 34	7.23%	105.9	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	14WP	5
LACYGNE - NEOSHO 34	7.23%	105.9	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	14WP	5
LACYGNE - NEOSHO 34	7.23%	105.9	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	14WP	5
LACYGNE - NEOSHO 34	7.23%	105.9	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	14WP	5
DOLET HILLS - SOUTHWEST SH CKT 1	7.03%	106.3	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	14WP	5
DOLET HILLS - SOUTHWEST SH CKT 1	7.03%	106.3	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	14WP	5
DOLET HILLS - SOUTHWEST SH CKT 1	7.03%	106.3	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	14WP	5
DOLET HILLS - SOUTHWEST SH CKT 1	7.03%	106.3	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	14WP	5
DOLET HILLS - SOUTHWEST SH CKT 1	7.03%		FT SMITH - MUSKOGEE 345KV CKT 1	OKGE		14WP	
		106.3			OKGE		5
ROSE HILL - WOLF CREEK	7.35%	107.4	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	14WP	5
ROSE HILL - WOLF CREEK	7.35%	107.4	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	14WP	5
ROSE HILL - WOLF CREEK	7.35%	107.4	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	14WP	5
ROSE HILL - WOLF CREEK	7.35%	107.4	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	14WP	5
ROSE HILL - WOLF CREEK	7.35%	107.4	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	14WP	5
BASE CASE	7.32%	108.0	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	14WP	5
BASE CASE	7.32%	108.0	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	14WP	5
BASE CASE	7.32%	108.0	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	14WP	5
BASE CASE	7.32%	108.0	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	14WP	5
BASE CASE 15TH & FULTON TAP - TULSA S	7.32%	108.0	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	14WP	5
CKT 1	7.32%	109.1	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	14WP	5
15TH & FULTON TAP - TULSA S CKT 1	7.32%	109.1	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	14WP	5
15TH & FULTON TAP - TULSA S CKT 1	7.32%	109.1	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	14WP	5
15TH & FULTON TAP - TULSA S CKT 1	7.32%	109.1	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	14WP	5
15TH & FULTON TAP - TULSA S CKT 1	7.32%	109.1	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	14WP	5

ıg Overload	Upgrade Name	Solution
ARD DISTRICT EHV	Mathewson - Tatonga 345 kV Ckt 2 Accelerate	Build new 61 mile Tatonga - Mathewson 345 kV line.
ARD DISTRICT EHV	Cimarron - Mathewson 345 kV Ckt 1 Accelerate	Build new 16 mile 345 kV line from Mathweson to Cimarron.
ARD DISTRICT EHV	Mathewson 345 kV Accelerate	Build new Nathewson 345 kV substation at the intersection of the Woodring-Cimarron and the existing Northwest - Tatonga 345 kV lines.
ARD DISTRICT EHV	Tatonga - Woodward EHV 345 kV Ckt 2 Accelerate	Build new 49-mile Woodward EHV - Tatonga 345 kV Ckt 2 line.
45.00 345KV CKT 1	Mathewson - Tatonga 345 kV Ckt 2 Accelerate	Build new 61 mile Tatonga - Mathewson 345 kV line.
45.00 345KV CKT 1	Cimarron - Mathewson 345 kV Ckt 1 Accelerate	Build new 16 mile 345 kV line from Mathweson to Cimarron.
45.00 345KV CKT 1	Mathewson 345 kV Accelerate	Build new Mathewson 345 kV substation at the intersection of the Woodring-Cimarron and the existing Northwest - Tatonga 345 kV lines.
45.00 345KV CKT 1	Tatonga - Woodward EHV 345 kV Ckt 2 Accelerate	Build new 49-mile Woodward EHV - Tatonga 345 kV Ckt 2 line.
) 138/69/13.2KV CKT 1	Mathewson - Tatonga 345 kV Ckt 2 Accelerate	Build new 61 mile Tatonga - Mathewson 345 kV line.
) 138/69/13.2KV CKT 1	Cimarron - Mathewson 345 kV Ckt 1 Accelerate	Build new 16 mile 345 kV line from Mathweson to Cimarron.
) 138/69/13.2KV CKT 1	Mathewson 345 kV Accelerate	Build new Mathewson 345 kV substation at the intersection of the Woodring-Cimarron and the existing Northwest - Tatonga 345 kV lines.
) 138/69/13.2KV CKT 1	Tatonga - Woodward EHV 345 kV Ckt 2 Accelerate	Build new 49-mile Woodward EHV - Tatonga 345 kV Ckt 2 line.
ARD DISTRICT EHV	Mathewson - Tatonga 345 kV Ckt 2 Accelerate	Build new 61 mile Tatonga - Mathewson 345 kV line.
ARD DISTRICT EHV	Cimarron - Mathewson 345 kV Ckt 1 Accelerate	Build new 16 mile 345 kV line from Mathweson to Cimarron.
ARD DISTRICT EHV	Mathewson 345 kV Accelerate	Build new Mathewson 345 kV substation at the intersection of the Woodring-Cimarron and the existing Northwest - Tatonga 345 kV lines.
ARD DISTRICT EHV	Tatonga - Woodward EHV 345 kV Ckt 2 Accelerate	Build new 49-mile Woodward EHV - Tatonga 345 kV Ckt 2 line.
45.00 345KV CKT 1	Mathewson - Tatonga 345 kV Ckt 2 Accelerate	Build new 61 mile Tatonga - Mathewson 345 kV line.
45.00 345KV CKT 1	Cimarron - Mathewson 345 kV Ckt 1 Accelerate	Build new 16 mile 345 kV line from Mathweson to Cimarron.
45.00 345KV CKT 1	Mathewson 345 kV Accelerate	Build new Mathewson 345 kV substation at the intersection of the Woodring-Cimarron and the existing Northwest - Tatonga 345 kV lines.
45.00 345KV CKT 1	Tatonga - Woodward EHV 345 kV Ckt 2 Accelerate	Build new 49-mile Woodward EHV - Tatonga 345 kV Ckt 2 line.
45KV CKT 1	FRANKLIN SW - MIDWEST TAP 138KV CKT 1	Replace Terminal Equipment
38KV CKT 1	FRANKLIN SW - MIDWEST TAP 138KV CKT 1	Replace Terminal Equipment
2 138KV CKT 1	FRANKLIN SW - MIDWEST TAP 138KV CKT 1	Replace Terminal Equipment
45KV CKT 1	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
45KV CKT 1	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps
45KV CKT 1	Muskogee - VBI 345 kV with 345/161 kV bus tie near VBI	Build 70.95 mile 345 kV line plus two new 345/161 kV bus ties near VBI sub and 10 miles of 161 kV line
45KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
45KV CKT 1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
IREVEPORT 345KV	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
IREVEPORT 345KV	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps
IREVEPORT 345KV	Muskogee - VBI 345 kV with 345/161 kV bus tie near VBI	Build 70.95 mile 345 kV line plus two new 345/161 kV bus ties near VBI sub and 10 miles of 161 kV line
IREVEPORT 345KV	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
IREVEPORT 345KV	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
( 345KV CKT 1	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
( 345KV CKT 1	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps
( 345KV CKT 1	Muskogee - VBI 345 kV with 345/161 kV bus tie near VBI	Build 70.95 mile 345 kV line plus two new 345/161 kV bus ties near VBI sub and 10 miles of 161 kV line
( 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
( 345KV CKT 1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps
	Muskogee - VBI 345 kV with 345/161 kV bus tie near VBI	Build 70.95 mile 345 kV line plus two new 345/161 kV bus ties near VBI sub and 10 miles of 161 kV line
	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
OUTHEAST 138KV	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
OUTHEAST 138KV	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps
OUTHEAST 138KV	Muskogee - VBI 345 kV with 345/161 kV bus tie near VBI	Build 70.95 mile 345 kV line plus two new 345/161 kV bus ties near VBI sub and 10 miles of 161 kV line
OUTHEAST 138KV	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
OUTHEAST 138KV	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line

Scenario	Season	From Area To Area	Monitored Branch Over 100% Rate B	Transfer Case % Loading	TDF (%)	Outaged Branch Causing Overload	Upgrade Name	Solution
5	14WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	109.2	7.32%	LACYGNE - WEST GARDNER 345KV CKT 1	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
5	14WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	109.2	7.32%	LACYGNE - WEST GARDNER 345KV CKT 1	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps
5	14WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	109.2	7.32%	LACYGNE - WEST GARDNER 345KV CKT 1	Muskogee - VBI 345 kV with 345/161 kV bus tie near VBI	Build 70.95 mile 345 kV line plus two new 345/161 kV bus ties near VBI sub and 10 miles of 161 kV line
5	14WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	109.2	7.32%	LACYGNE - WEST GARDNER 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	14WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	109.2	7.32%	LACYGNE - WEST GARDNER 345KV CKT 1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5	14WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	109.9	7.37%	HOYT - STRANGER CREEK 345KV CKT 1	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
5	14WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	109.9	7.37%	HOYT - STRANGER CREEK 345KV CKT 1	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps
5	14WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	109.9	7.37%	HOYT - STRANGER CREEK 345KV CKT 1	Muskogee - VBI 345 kV with 345/161 kV bus tie near VBI	Build 70.95 mile 345 kV line plus two new 345/161 kV bus ties near VBI sub and 10 miles of 161 kV line
5	14WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	109.9	7.37%	HOYT - STRANGER CREEK 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	14WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	109.9	7.37%	HOYT - STRANGER CREEK 345KV CKT 1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5	14WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	111.2	7.35%	LACYGNE - STILWELL 345KV CKT 1	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
5	14WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	111.2	7.35%	LACYGNE - STILWELL 345KV CKT 1	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps
5	14WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	111.2	7.35%	LACYGNE - STILWELL 345KV CKT 1	Muskogee - VBI 345 kV with 345/161 kV bus tie near VBI	Build 70.95 mile 345 kV line plus two new 345/161 kV bus ties near VBI sub and 10 miles of 161 kV line
5	14WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	111.2	7.35%	LACYGNE - STILWELL 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	14WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	111.2	7.35%	LACYGNE - STILWELL 345KV CKT 1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5	14WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	112.3	7.58%	OVERTON-TRF	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
5	14WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	112.3	7.58%	OVERTON-TRF	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps
5	14WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	112.3	7.58%	OVERTON-TRF	Muskogee - VBI 345 kV with 345/161 kV bus tie near VBI	Build 70.95 mile 345 kV line plus two new 345/161 kV bus ties near VBI sub and 10 miles of 161 kV line
5	14WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	112.3	7.58%	OVERTON-TRF	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	14WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	112.3	7.58%	OVERTON-TRF	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5	14WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	116.5	7.18%	SPP-AEPW-32	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
5	14WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	116.5	7.18%	SPP-AEPW-32	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps
5	14WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	116.5	7.18%	SPP-AEPW-32	Muskogee - VBI 345 kV with 345/161 kV bus tie near VBI	Build 70.95 mile 345 kV line plus two new 345/161 kV bus ties near VBI sub and 10 miles of 161 kV line
5	14WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	116.5	7.18%	SPP-AEPW-32	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	14WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	116.5	7.18%	SPP-AEPW-32	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5	14WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	117.1	10.14%	SPP-AEPW-01	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
5	14WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	117.1	10.14%	SPP-AEPW-01	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps
5	14WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	117.1	10.14%	SPP-AEPW-01	Muskogee - VBI 345 kV with 345/161 kV bus tie near VBI	Build 70.95 mile 345 kV line plus two new 345/161 kV bus ties near VBI sub and 10 miles of 161 kV line
5	14WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	117.1	10.14%	SPP-AEPW-01	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	14WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	117.1	10.14%	SPP-AEPW-01	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5	14WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	117.2	7.32%	GEN336153 1-WATERFORD UNIT#3	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
5	14WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	117.2	7.32%	GEN336153 1-WATERFORD UNIT#3	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps
5	14WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	117.2	7.32%	GEN336153 1-WATERFORD UNIT#3	Muskogee - VBI 345 kV with 345/161 kV bus tie near VBI	Build 70.95 mile 345 kV line plus two new 345/161 kV bus ties near VBI sub and 10 miles of 161 kV line
5	14WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	117.2	7.32%	GEN336153 1-WATERFORD UNIT#3	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	14WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	117.2	7.32%	GEN336153 1-WATERFORD UNIT#3	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5	14WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	120.4	7.32%	GEN336821 1-GRAND GULF UNIT	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
5	14WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	120.4	7.32%	GEN336821 1-GRAND GULF UNIT	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps
5	14WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	120.4	7.32%	GEN336821 1-GRAND GULF UNIT	Muskogee - VBI 345 kV with 345/161 kV bus tie near VBI	Build 70.95 mile 345 kV line plus two new 345/161 kV bus ties near VBI sub and 10 miles of 161 kV line
5	14WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	120.4	7.32%	GEN336821 1-GRAND GULF UNIT	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	14WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	120.4	7.32%	GEN336821 1-GRAND GULF UNIT	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5	14WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	120.4	10.51%	PITTSBURG - VALLIANT 345KV CKT 1	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
5	14WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	120.4	10.51%	PITTSBURG - VALLIANT 345KV CKT 1	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps
5	14WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	120.4	10.51%	PITTSBURG - VALLIANT 345KV CKT 1	Muskogee - VBI 345 kV with 345/161 kV bus tie near VBI	Build 70.95 mile 345 kV line plus two new 345/161 kV bus ties near VBI sub and 10 miles of 161 kV line
5	14WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	120.4	10.51%	PITTSBURG - VALLIANT 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	14WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	120.4	10.51%	PITTSBURG - VALLIANT 345KV CKT 1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5	18SP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	105.8	8.81%	LACYGNE - NEOSHO 345KV CKT 1	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
5	18SP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	105.8	8.81%	LACYGNE - NEOSHO 345KV CKT 1	Muskogee - VBI 345 kV with 345/161 kV bus tie near VBI	Build 70.95 mile 345 kV line plus two new 345/161 kV bus ties near VBI sub and 10 miles of 161 kV line
5	18SP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	105.8	8.81%	LACYGNE - NEOSHO 345KV CKT 1	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps

Outaged Branch Causing	TDF (%)	Transfer Case % Loading	Monitored Branch Over 100% Rate B	To Area	From Area	Season	Scenario
LACYGNE - NEOSHO 34	8.81%	105.8	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18SP	5
LACYGNE - NEOSHO 34 DOLET HILLS - SOUTHWEST SHI	8.81%	105.8	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18SP	5
CKT 1	8.56%	106.1	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18SP	5
DOLET HILLS - SOUTHWEST SHI CKT 1	8.56%	106.1	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18SP	5
DOLET HILLS - SOUTHWEST SHI CKT 1	8.56%	106.1	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18SP	5
DOLET HILLS - SOUTHWEST SHI CKT 1	8.56%	106.1	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18SP	5
DOLET HILLS - SOUTHWEST SHI CKT 1	8.56%	106.1	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18SP	5
ROSE HILL - WOLF CREEK	8.92%	107.5	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18SP	5
ROSE HILL - WOLF CREEK	8.92%	107.5	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18SP	5
ROSE HILL - WOLF CREEK	8.92%	107.5	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18SP	5
ROSE HILL - WOLF CREEK	8.92%	107.5	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18SP	5
ROSE HILL - WOLF CREEK	8.92%	107.5	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18SP	5
BASE CASE	8.89%	108.2	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18SP	5
BASE CASE	8.89%	108.2	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18SP	5
BASE CASE	8.89%	108.2	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18SP	5
BASE CASE	8.89%	108.2	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18SP	5
BASE CASE	8.89%	108.2	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18SP	5
MCCREDIE - THOMAS HILL	8.91%	108.8	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18SP	5
MCCREDIE - THOMAS HILL	8.91%	108.8	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18SP	5
MCCREDIE - THOMAS HILL	8.91%	108.8	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18SP	5
MCCREDIE - THOMAS HILL	8.91%	108.8	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18SP	5
MCCREDIE - THOMAS HILL	8.91%	108.8	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18SP	5
LACYGNE - WEST GARDNEF	8.89%	109.3	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18SP	5
LACYGNE - WEST GARDNEF	8.89%	109.3	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18SP	5
LACYGNE - WEST GARDNEF	8.89%	109.3	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18SP	5
LACYGNE - WEST GARDNEF	8.89%	109.3	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18SP	5
LACYGNE - WEST GARDNEF	8.89%	109.3	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18SP	5
15TH & FULTON TAP - TULSA SC CKT 1	8.89%	109.9	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18SP	5
15TH & FULTON TAP - TULSA SC CKT 1	8.89%	109.9	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18SP	5
15TH & FULTON TAP - TULSA SC CKT 1	8.89%	109.9	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18SP	5
15TH & FULTON TAP - TULSA SC CKT 1	8.89%	109.9	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18SP	5
15TH & FULTON TAP - TULSA SC CKT 1	8.89%	109.9	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18SP	5
HOYT - STRANGER CREEK	8.95%	110.2	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18SP	5
HOYT - STRANGER CREEK	8.95%	110.2	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18SP	5
HOYT - STRANGER CREEK	8.95%	110.2	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18SP	5
HOYT - STRANGER CREEK	8.95%	110.2	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18SP	5
HOYT - STRANGER CREEK	8.95%	110.2	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18SP	5
LACYGNE - STILWELL 34	8.92%	110.7	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18SP	5
LACYGNE - STILWELL 34	8.92%	110.7	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18SP	5
LACYGNE - STILWELL 34	8.92%	110.7	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18SP	5
LACYGNE - STILWELL 34	8.92%	110.7	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18SP	5
LACYGNE - STILWELL 34	8.92%	110.7	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18SP	5
HOYT - JEFFREY ENERGY CEN	8.95%	111.0	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18SP	5
HOYT - JEFFREY ENERGY CEN	8.95%	111.0	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18SP	5
HOYT - JEFFREY ENERGY CEN	8.95%	111.0	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18SP	5
HOYT - JEFFREY ENERGY CEN	8.95%	111.0	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18SP	5
HOYT - JEFFREY ENERGY CEN	8.95%	111.0	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18SP	5
Al03	9.18%	112.9	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18SP	5

ng Overload	Upgrade Name	Solution
45KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
45KV CKT 1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
IREVEPORT 345KV	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
IREVEPORT 345KV	Muskogee - VBI 345 kV with 345/161 kV bus tie near VBI	Build 70.95 mile 345 kV line plus two new 345/161 kV bus ties near VBI sub and 10 miles of 161 kV line
IREVEPORT 345KV	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps
IREVEPORT 345KV	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
IREVEPORT 345KV	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
( 345KV CKT 1	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
( 345KV CKT 1	Muskogee - VBI 345 kV with 345/161 kV bus tie near VBI	Build 70.95 mile 345 kV line plus two new 345/161 kV bus ties near VBI sub and 10 miles of 161 kV line
( 345KV CKT 1	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps
( 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
( 345KV CKT 1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
	Muskogee - VBI 345 kV with 345/161 kV bus tie near VBI	Build 70.95 mile 345 kV line plus two new 345/161 kV bus ties near VBI sub and 10 miles of 161 kV line
	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps
	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
L 345KV CKT 1	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
L 345KV CKT 1	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps
L 345KV CKT 1	Muskogee - VBI 345 kV with 345/161 kV bus tie near VBI	Build 70.95 mile 345 kV line plus two new 345/161 kV bus ties near VBI sub and 10 miles of 161 kV line
L 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
L 345KV CKT 1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
R 345KV CKT 1	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
R 345KV CKT 1	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps
R 345KV CKT 1	Muskogee - VBI 345 kV with 345/161 kV bus tie near VBI	Build 70.95 mile 345 kV line plus two new 345/161 kV bus ties near VBI sub and 10 miles of 161 kV line
R 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
R 345KV CKT 1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
OUTHEAST 138KV	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
OUTHEAST 138KV	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps
OUTHEAST 138KV	Muskogee - VBI 345 kV with 345/161 kV bus tie near VBI	Build 70.95 mile 345 kV line plus two new 345/161 kV bus ties near VBI sub and 10 miles of 161 kV line
OUTHEAST 138KV	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
OUTHEAST 138KV	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
K 345KV CKT 1	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
K 345KV CKT 1	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps
K 345KV CKT 1	Muskogee - VBI 345 kV with 345/161 kV bus tie near VBI	Build 70.95 mile 345 kV line plus two new 345/161 kV bus ties near VBI sub and 10 miles of 161 kV line
K 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
K 345KV CKT 1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
45KV CKT 1	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
45KV CKT 1	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps
45KV CKT 1	Muskogee - VBI 345 kV with 345/161 kV bus tie near VBI	Build 70.95 mile 345 kV line plus two new 345/161 kV bus ties near VBI sub and 10 miles of 161 kV line
45KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
45KV CKT 1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
NTER 345KV CKT 1	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
NTER 345KV CKT 1	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps
NTER 345KV CKT 1	Muskogee - VBI 345 kV with 345/161 kV bus tie near VBI	Build 70.95 mile 345 kV line plus two new 345/161 kV bus ties near VBI sub and 10 miles of 161 kV line
NTER 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
NTER 345KV CKT 1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO

Scenario	Season	From Area To Area	Monitored Branch Over 100% Rate B	Transfer Case % Loading	TDF (%)	Outaged Branch Causing Overload	Upgrade Name	Solution
5	18SP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	112.9	9.18%	AI03	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps
5	18SP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	112.9	9.18%	AI03	Muskogee - VBI 345 kV with 345/161 kV bus tie near VBI	Build 70.95 mile 345 kV line plus two new 345/161 kV bus ties near VBI sub and 10 miles of 161 kV line
5	18SP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	112.9	9.18%	AI03	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	18SP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	112.9	9.18%	AI03	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5	18SP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	116.0	11.20%	SPP-AEPW-01	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
5	18SP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	116.0	11.20%	SPP-AEPW-01	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps
5	18SP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	116.0	11.20%	SPP-AEPW-01	Muskogee - VBI 345 kV with 345/161 kV bus tie near VBI	Build 70.95 mile 345 kV line plus two new 345/161 kV bus ties near VBI sub and 10 miles of 161 kV line
5	18SP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	116.0	11.20%	SPP-AEPW-01	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	18SP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	116.0	11.20%	SPP-AEPW-01	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5	18SP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	116.5	8.77%	SPP-AEPW-32	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
5	18SP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	116.5	8.77%	SPP-AEPW-32	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps
5	18SP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	116.5	8.77%	SPP-AEPW-32	Muskogee - VBI 345 kV with 345/161 kV bus tie near VBI	Build 70.95 mile 345 kV line plus two new 345/161 kV bus ties near VBI sub and 10 miles of 161 kV line
5	18SP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	116.5	8.77%	SPP-AEPW-32	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	18SP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	116.5	8.77%	SPP-AEPW-32	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5	18SP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	117.4	8.89%	GEN336153 1-WATERFORD UNIT#3	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
5	18SP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	117.4	8.89%	GEN336153 1-WATERFORD UNIT#3	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps
5	18SP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	117.4	8.89%	GEN336153 1-WATERFORD UNIT#3	Muskogee - VBI 345 kV with 345/161 kV bus tie near VBI	Build 70.95 mile 345 kV line plus two new 345/161 kV bus ties near VBI sub and 10 miles of 161 kV line
5	18SP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	117.4	8.89%	GEN336153 1-WATERFORD UNIT#3	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	18SP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	117.4	8.89%	GEN336153 1-WATERFORD UNIT#3	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5	18SP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	118.2	8.87%	CHAMBER SPRINGS - CLARKSVILLE 345KV CKT 1	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
5	18SP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	118.2	8.87%	CHAMBER SPRINGS - CLARKSVILLE 345KV CKT 1	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps
5	18SP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	118.2	8.87%	CHAMBER SPRINGS - CLARKSVILLE 345KV CKT 1	Muskogee - VBI 345 kV with 345/161 kV bus tie near VBI	Build 70.95 mile 345 kV line plus two new 345/161 kV bus ties near VBI sub and 10 miles of 161 kV line
5	18SP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	118.2	8.87%	CHAMBER SPRINGS - CLARKSVILLE 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	18SP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	118.2	8.87%	CHAMBER SPRINGS - CLARKSVILLE 345KV CKT 1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5	18SP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	119.9	11.64%	PITTSBURG - VALLIANT 345KV CKT 1	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
5	18SP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	119.9	11.64%	PITTSBURG - VALLIANT 345KV CKT 1	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps
5	18SP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	119.9	11.64%	PITTSBURG - VALLIANT 345KV CKT 1	Muskogee - VBI 345 kV with 345/161 kV bus tie near VBI	Build 70.95 mile 345 kV line plus two new 345/161 kV bus ties near VBI sub and 10 miles of 161 kV line
5	18SP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	119.9	11.64%	PITTSBURG - VALLIANT 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	18SP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	119.9	11.64%	PITTSBURG - VALLIANT 345KV CKT 1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5	18WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	106.2	8.05%	LACYGNE - NEOSHO 345KV CKT 1	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
5	18WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	106.2	8.05%	LACYGNE - NEOSHO 345KV CKT 1	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps
5	18WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	106.2	8.05%	LACYGNE - NEOSHO 345KV CKT 1	Muskogee - VBI 345 kV with 345/161 kV bus tie near VBI	Build 70.95 mile 345 kV line plus two new 345/161 kV bus ties near VBI sub and 10 miles of 161 kV line
5	18WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	106.2	8.05%	LACYGNE - NEOSHO 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	18WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	106.2	8.05%	LACYGNE - NEOSHO 345KV CKT 1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5	18WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	107.0	7.84%	DOLET HILLS - SOUTHWEST SHREVEPORT 345KV CKT 1	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
5	18WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	107.0	7.84%	DOLET HILLS - SOUTHWEST SHREVEPORT 345KV CKT 1	Muskogee - VBI 345 kV with 345/161 kV bus tie near VBI	Build 70.95 mile 345 kV line plus two new 345/161 kV bus ties near VBI sub and 10 miles of 161 kV line
5	18WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	107.0	7.84%	DOLET HILLS - SOUTHWEST SHREVEPORT 345KV CKT 1	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps
5	18WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	107.0	7.84%	DOLET HILLS - SOUTHWEST SHREVEPORT 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	18WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	107.0	7.84%	DOLET HILLS - SOUTHWEST SHREVEPORT 345KV CKT 1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5	18WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	108.0	8.16%	ROSE HILL - WOLF CREEK 345KV CKT 1	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
5	18WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	108.0	8.16%	ROSE HILL - WOLF CREEK 345KV CKT 1	Muskogee - VBI 345 kV with 345/161 kV bus tie near VBI	Build 70.95 mile 345 kV line plus two new 345/161 kV bus ties near VBI sub and 10 miles of 161 kV line
5	18WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	108.0	8.16%	ROSE HILL - WOLF CREEK 345KV CKT 1	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps
5	18WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	108.0	8.16%	ROSE HILL - WOLF CREEK 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	18WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	108.0	8.16%	ROSE HILL - WOLF CREEK 345KV CKT 1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5	18WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	108.7	8.13%	BASE CASE	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
5	18WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	108.7	8.13%	BASE CASE	Muskogee - VBI 345 kV with 345/161 kV bus tie near VBI	Build 70.95 mile 345 kV line plus two new 345/161 kV bus ties near VBI sub and 10 miles of 161 kV line
5	18WP	OKGE OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	108.7	8.13%	BASE CASE	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps
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Outaged Branch Causing	TDF (%)	Transfer Case % Loading	Monitored Branch Over 100% Rate B	To Area	From Area	Season	Scenario
BASE CASE	8.13%	108.7	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18WP	5
LACYGNE - WEST GARDNER	8.13%	109.8	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18WP	5
LACYGNE - WEST GARDNER	8.13%	109.8	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18WP	5
LACYGNE - WEST GARDNER	8.13%	109.8	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18WP	5
LACYGNE - WEST GARDNER	8.13%	109.8	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18WP	5
LACYGNE - WEST GARDNER 15TH & FULTON TAP - TULSA SC	8.13%	109.8	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18WP	5
CKT 1 15TH & FULTON TAP - TULSA SC	8.13%	110.0	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18WP	5
CKT 1 15TH & FULTON TAP - TULSA SC 2017	8.13%	110.0	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18WP	5
CKT 1 15TH & FULTON TAP - TULSA SC	8.13%	110.0	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18WP	5
CKT 1 15TH & FULTON TAP - TULSA SC	8.13%	110.0	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18WP	5
CKT 1	8.13%	110.0	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18WP	5
HOYT - STRANGER CREEK	8.19%	110.3	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18WP	5
HOYT - STRANGER CREEK	8.19%	110.3	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18WP	5
HOYT - STRANGER CREEK	8.19%	110.3	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18WP	5
HOYT - STRANGER CREEK	8.19%	110.3	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18WP	5
HOYT - STRANGER CREEK	8.19%	110.3	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18WP	5
HOYT - JEFFREY ENERGY CEN	8.19%	110.8	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18WP	5
HOYT - JEFFREY ENERGY CEN	8.19%	110.8	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18WP	5
HOYT - JEFFREY ENERGY CEN	8.19%	110.8	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18WP	5
HOYT - JEFFREY ENERGY CEN	8.19%	110.8	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18WP	5
HOYT - JEFFREY ENERGY CEN	8.19%	110.8	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18WP	5
LACYGNE - STILWELL 34	8.16%	111.3	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18WP	5
LACYGNE - STILWELL 34	8.16%	111.3	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18WP	5
LACYGNE - STILWELL 34	8.16%	111.3	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18WP	5
LACYGNE - STILWELL 34	8.16%	111.3	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18WP	5
LACYGNE - STILWELL 34	8.16%	111.3	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18WP	5
AI03	8.40%	113.1	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18WP	5
A103	8.40%	113.1	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18WP	5
AI03	8.40%	113.1	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18WP	5
AI03	8.40%	113.1	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18WP	5
AI03	8.40%	113.1	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18WP	5
SPP-AEPW-32	8.01%	117.4	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18WP	5
SPP-AEPW-32	8.01%	117.4	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18WP	5
SPP-AEPW-32	8.01%	117.4	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18WP	5
SPP-AEPW-32	8.01%	117.4	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18WP	5
SPP-AEPW-32	8.01%	117.4	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18WP	5
SPP-AEPW-01	10.61%	120.4	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18WP	5
SPP-AEPW-01	10.61%	120.4	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18WP	5
SPP-AEPW-01	10.61%	120.4	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18WP	5
SPP-AEPW-01	10.61%	120.4	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18WP	5
SPP-AEPW-01	10.61%	120.4	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18WP	5
GEN336153 1-WATERFOR	8.13%	120.4	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18WP	5
GEN336153 1-WATERFOR	8.13%	120.4	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18WP	5
GEN336153 1-WATERFOR	8.13%	120.4	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18WP	5
GEN336153 1-WATERFOR	8.13%	120.4	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18WP	5
GEN336153 1-WATERFOR	8.13%	120.4	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18WP	5
PITTSBURG - VALLIANT 34	11.03%	124.9	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18WP	5
PITTSBURG - VALLIANT 34	11.03%	124.9	FT SMITH - MUSKOGEE 345KV CKT 1	OKGE	OKGE	18WP	5

ng Overload	Upgrade Name	Solution
	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
R 345KV CKT 1	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
R 345KV CKT 1	Muskogee - VBI 345 kV with 345/161 kV bus tie near VBI	Build 70.95 mile 345 kV line plus two new 345/161 kV bus ties near VBI sub and 10 miles of 161 kV line
R 345KV CKT 1	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps
R 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
R 345KV CKT 1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
OUTHEAST 138KV	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
SOUTHEAST 138KV	Muskogee - VBI 345 kV with 345/161 kV bus tie near VBI	Build 70.95 mile 345 kV line plus two new 345/161 kV bus ties near VBI sub and 10 miles of 161 kV line
OUTHEAST 138KV	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps
SOUTHEAST 138KV	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
OUTHEAST 138KV	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
K 345KV CKT 1	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
K 345KV CKT 1	Muskogee - VBI 345 kV with 345/161 kV bus tie near VBI	Build 70.95 mile 345 kV line plus two new 345/161 kV bus ties near VBI sub and 10 miles of 161 kV line
K 345KV CKT 1	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps
K 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
K 345KV CKT 1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
NTER 345KV CKT 1	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
NTER 345KV CKT 1	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps
NTER 345KV CKT 1	Muskogee - VBI 345 kV with 345/161 kV bus tie near VBI	Build 70.95 mile 345 kV line plus two new 345/161 kV bus ties near VBI sub and 10 miles of 161 kV line
NTER 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
NTER 345KV CKT 1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
45KV CKT 1	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
45KV CKT 1	Muskogee - VBI 345 kV with 345/161 kV bus tie near VBI	Build 70.95 mile 345 kV line plus two new 345/161 kV bus ties near VBI sub and 10 miles of 161 kV line
45KV CKT 1	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps
45KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
45KV CKT 1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
	Muskogee - VBI 345 kV with 345/161 kV bus tie near VBI	Build 70.95 mile 345 kV line plus two new 345/161 kV bus ties near VBI sub and 10 miles of 161 kV line
	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps
	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
2	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
2	Muskogee - VBI 345 kV with 345/161 kV bus tie near VBI	Build 70.95 mile 345 kV line plus two new 345/161 kV bus ties near VBI sub and 10 miles of 161 kV line
2	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps
2	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
2	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
1	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
1	Muskogee - VBI 345 kV with 345/161 kV bus tie near VBI	Build 70.95 mile 345 kV line plus two new 345/161 kV bus ties near VBI sub and 10 miles of 161 kV line
1	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps
1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
ORD UNIT#3	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
ORD UNIT#3	Muskogee - VBI 345 kV with 345/161 kV bus tie near VBI	Build 70.95 mile 345 kV line plus two new 345/161 kV bus ties near VBI sub and 10 miles of 161 kV line
ORD UNIT#3	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps
ORD UNIT#3	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
ORD UNIT#3	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
345KV CKT 1	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
345KV CKT 1	Muskogee - VBI 345 kV with 345/161 kV bus tie near VBI	Build 70.95 mile 345 kV line plus two new 345/161 kV bus ties near VBI sub and 10 miles of 161 kV line

5 1 5 1 5 2 5 2	18WP 18WP	OKGE		-	Loading			Upgrade Name	Solution
5 1 5 2 5 2	18WP		OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	124.9	11.03%	PITTSBURG - VALLIANT 345KV CKT 1	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps
5 2 5 2		OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	124.9	11.03%	PITTSBURG - VALLIANT 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5 2	18WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	124.9	11.03%	PITTSBURG - VALLIANT 345KV CKT 1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	124.1	3.94%	CHAMBER SPRINGS - CLARKSVILLE 345KV CKT 1	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
_	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	124.1	3.94%	CHAMBER SPRINGS - CLARKSVILLE 345KV CKT 1	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps
5 2	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	124.1	3.94%	CHAMBER SPRINGS - CLARKSVILLE 345KV CKT 1	Muskogee - VBI 345 kV with 345/161 kV bus tie near VBI	Build 70.95 mile 345 kV line plus two new 345/161 kV bus ties near VBI sub and 10 miles of 161 kV line
5 2	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	124.1	3.94%	CHAMBER SPRINGS - CLARKSVILLE 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5 2	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	124.1	3.94%	CHAMBER SPRINGS - CLARKSVILLE 345KV CKT 1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5 2	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	126.9	3.13%	PITTSBURG - VALLIANT 345KV CKT 1	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
5 2	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	126.9	3.13%	PITTSBURG - VALLIANT 345KV CKT 1	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps
5 2	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	126.9	3.13%	PITTSBURG - VALLIANT 345KV CKT 1	Muskogee - VBI 345 kV with 345/161 kV bus tie near VBI	Build 70.95 mile 345 kV line plus two new 345/161 kV bus ties near VBI sub and 10 miles of 161 kV line
5 2	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	126.9	3.13%	PITTSBURG - VALLIANT 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5 2	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	126.9	3.13%	PITTSBURG - VALLIANT 345KV CKT 1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
	14WP		OKGE	FT SMITH (FTSMITH1) 500/345/13.8KV TRANSFORMER CKT 1	103.6	7.24%	FT SMITH (FTSMITH5) 345/161/13.8KV TRANSFORMER CKT 5	FT SMITH (FTSMITH1) 500/345/13.8KV TRANSFORMER CKT 1	Install 2nd 500/345 kV bus tie in Ft. Smith Sub
	18SP	OKGE		FT SMITH (FTSMITH1) 500/345/13.8KV TRANSFORMER CKT 1	102.8	8.73%	FT SMITH (FTSMITH5) 345/161/13.8KV TRANSFORMER CKT 5	FT SMITH (FTSMITH1) 500/345/13.8KV TRANSFORMER CKT 1	Install 2nd 500/345 kV bus tie in Ft. Smith Sub
		OKGE		FT SMITH (FTSMITH1) 500/345/13.8KV TRANSFORMER CKT 1	104.0	7.99%	FT SMITH (FTSMITH5) 345/161/13.8KV TRANSFORMER CKT 5	FT SMITH (FTSMITH1) 500/345/13.8KV TRANSFORMER CKT 1	Install 2nd 500/345 kV bus tie in Ft. Smith Sub
	14WP	OKGE		FT SMITH (FTSMITH5) 345/161/13.8KV TRANSFORMER CKT 5	117.6	5.12%	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
	18SP		OKGE	FT SMITH (FTSMITH5) 345/161/13.8KV TRANSFORMER CKT 5	122.8	6.45%	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
	18WP	OKGE	OKGE	FT SMITH (FTSMITH5) 345/161/13.8KV TRANSFORMER CKT 5	122.8	5.90%	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
		WFEC	OKGE	GLASS MOUNTAIN - MOORELAND 138KV CKT 1	120.5	3.07%	CEDARDALE - MOORELAND 138KV CKT 1	GLASS MOUNTAIN - MOORELAND 138KV CKT 1	Reset CT
	14WP								
	14WP	WFEC	OKGE	GLASS MOUNTAIN - MOORELAND 138KV CKT 1	108.3	3.07%	CEDARDALE - MOORELAND 138KV CKT 1	Cimarron - Mathewson 345 kV Ckt 1 Accelerate	Build new 16 mile 345 kV line from Mathweson to Cimarron.
			OKGE	GLASS MOUNTAIN - MOORELAND 138KV CKT 1	108.3	3.07%	CEDARDALE - MOORELAND 138KV CKT 1	Mathewson - Tatonga 345 kV Ckt 2 Accelerate	Build new 61 mile Tatonga - Mathewson 345 kV line. Build new Mathewson 345 kV substation at the intersection of the Woodring-Cimarron and the existing Northwest -
	14WP	WFEC	OKGE	GLASS MOUNTAIN - MOORELAND 138KV CKT 1	108.3	3.07%	CEDARDALE - MOORELAND 138KV CKT 1	Mathewson 345 kV Accelerate	Tatonga 345 kV lines.
		WFEC	OKGE	GLASS MOUNTAIN - MOORELAND 138KV CKT 1	108.3	3.07%	CEDARDALE - MOORELAND 138KV CKT 1 TATONGA7 345.00 - WOODWARD DISTRICT EHV	Tatonga - Woodward EHV 345 kV Ckt 2 Accelerate	Build new 49-mile Woodward EHV - Tatonga 345 kV Ckt 2 line.
	14WP	WFEC	OKGE	GLASS MOUNTAIN - MOORELAND 138KV CKT 1	111.9	3.90%	345KV CKT 1 TATONGA7 345.00 - WOODWARD DISTRICT EHV	GLASS MOUNTAIN - MOORELAND 138KV CKT 1	Reset CT
5 1	14WP	WFEC	OKGE	GLASS MOUNTAIN - MOORELAND 138KV CKT 1	111.9	3.90%	345KV CKT 1 TATONGA7 345.00 - WOODWARD DISTRICT EHV	Cimarron - Mathewson 345 kV Ckt 1 Accelerate	Build new 16 mile 345 kV line from Mathweson to Cimarron.
5 1	14WP	WFEC	OKGE	GLASS MOUNTAIN - MOORELAND 138KV CKT 1	111.9	3.90%	345KV CKT 1 TATONGA7 345.00 - WOODWARD DISTRICT EHV	Mathewson - Tatonga 345 kV Ckt 2 Accelerate	Build new 61 mile Tatonga - Mathewson 345 kV line. Build new Mathewson 345 kV substation at the intersection of the Woodring-Cimarron and the existing Northwest -
5 1	14WP	WFEC	OKGE	GLASS MOUNTAIN - MOORELAND 138KV CKT 1	111.9	3.90%	345KV CKT 1 TATONGA7 345.00 - WOODWARD DISTRICT EHV	Mathewson 345 kV Accelerate	Tatonga 345 kV lines.
5 1	14WP	WFEC	OKGE	GLASS MOUNTAIN - MOORELAND 138KV CKT 1	111.9	3.90%	345KV CKT 1	Tatonga - Woodward EHV 345 kV Ckt 2 Accelerate	Build new 49-mile Woodward EHV - Tatonga 345 kV Ckt 2 line.
5 1	14WP	WFEC	OKGE	GLASS MOUNTAIN - MOORELAND 138KV CKT 1	128.9	3.90%	NORTHWEST - TATONGA7 345.00 345KV CKT 1	GLASS MOUNTAIN - MOORELAND 138KV CKT 1	Reset CT
5 1	14WP	WFEC	OKGE	GLASS MOUNTAIN - MOORELAND 138KV CKT 1	128.9	3.90%	NORTHWEST - TATONGA7 345.00 345KV CKT 1	Cimarron - Mathewson 345 kV Ckt 1 Accelerate	Build new 16 mile 345 kV line from Mathweson to Cimarron.
5 1	14WP	WFEC	OKGE	GLASS MOUNTAIN - MOORELAND 138KV CKT 1	128.9	3.90%	NORTHWEST - TATONGA7 345.00 345KV CKT 1	Mathewson - Tatonga 345 kV Ckt 2 Accelerate	Build new 61 mile Tatonga - Mathewson 345 kV line. Build new Mathewson 345 kV substation at the intersection of the Woodring-Cimarron and the existing Northwest -
5 1	14WP	WFEC	OKGE	GLASS MOUNTAIN - MOORELAND 138KV CKT 1	128.9	3.90%	NORTHWEST - TATONGA7 345.00 345KV CKT 1	Mathewson 345 kV Accelerate	Tatonga 345 kV lines.
51	14WP	WFEC	OKGE	GLASS MOUNTAIN - MOORELAND 138KV CKT 1	128.9	3.90%	NORTHWEST - TATONGA7 345.00 345KV CKT 1 TATONGA7 345.00 - WOODWARD DISTRICT EHV	Tatonga - Woodward EHV 345 kV Ckt 2 Accelerate	Build new 49-mile Woodward EHV - Tatonga 345 kV Ckt 2 line.
	18SP	WFEC	OKGE	GLASS MOUNTAIN - MOORELAND 138KV CKT 1	103.9	3.34%	345KV CKT 1 TATONGA7 345.00 - WOODWARD DISTRICT EHV	GLASS MOUNTAIN - MOORELAND 138KV CKT 1	Reset CT
	18SP	WFEC	OKGE	GLASS MOUNTAIN - MOORELAND 138KV CKT 1	103.9	3.34%	345KV CKT 1 TATONGA7 345.00 - WOODWARD DISTRICT EHV	Cimarron - Mathewson 345 kV Ckt 1 Accelerate	Build new 16 mile 345 kV line from Mathweson to Cimarron.
	18SP	WFEC	OKGE	GLASS MOUNTAIN - MOORELAND 138KV CKT 1	103.9	3.34%	345KV CKT 1 TATONGA7 345.00 - WOODWARD DISTRICT EHV	Mathewson - Tatonga 345 kV Ckt 2 Accelerate	Build new 61 mile Tatonga - Mathewson 345 kV line. Build new Mathewson 345 kV substation at the intersection of the Woodring-Cimarron and the existing Northwest -
5 1	18SP	WFEC	OKGE	GLASS MOUNTAIN - MOORELAND 138KV CKT 1	103.9	3.34%	345KV CKT 1 TATONGA7 345.00 - WOODWARD DISTRICT EHV	Mathewson 345 kV Accelerate	Tatonga 345 kV lines.
5 1	18SP	WFEC	OKGE	GLASS MOUNTAIN - MOORELAND 138KV CKT 1	103.9	3.34%	345KV CKT 1	Tatonga - Woodward EHV 345 kV Ckt 2 Accelerate	Build new 49-mile Woodward EHV - Tatonga 345 kV Ckt 2 line.
5	18SP	WFEC	OKGE	GLASS MOUNTAIN - MOORELAND 138KV CKT 1	119.9	3.34%	NORTHWEST - TATONGA7 345.00 345KV CKT 1	GLASS MOUNTAIN - MOORELAND 138KV CKT 1	Reset CT
5	18SP	WFEC	OKGE	GLASS MOUNTAIN - MOORELAND 138KV CKT 1	119.9	3.34%	NORTHWEST - TATONGA7 345.00 345KV CKT 1	Cimarron - Mathewson 345 kV Ckt 1 Accelerate	Build new 16 mile 345 kV line from Mathweson to Cimarron.
5	18SP	WFEC	OKGE	GLASS MOUNTAIN - MOORELAND 138KV CKT 1	119.9	3.34%	NORTHWEST - TATONGA7 345.00 345KV CKT 1	Mathewson - Tatonga 345 kV Ckt 2 Accelerate	Build new 61 mile Tatonga - Mathewson 345 kV line.
5 1	18SP	WFEC	OKGE	GLASS MOUNTAIN - MOORELAND 138KV CKT 1	119.9	3.34%	NORTHWEST - TATONGA7 345.00 345KV CKT 1	Mathewson 345 kV Accelerate	Build new Mathewson 345 kV substation at the intersection of the Woodring-Cimarron and the existing Northwest - Tatonga 345 kV lines.
5	18SP	WFEC	OKGE	GLASS MOUNTAIN - MOORELAND 138KV CKT 1	119.9	3.34%	NORTHWEST - TATONGA7 345.00 345KV CKT 1	Tatonga - Woodward EHV 345 kV Ckt 2 Accelerate	Build new 49-mile Woodward EHV - Tatonga 345 kV Ckt 2 line.
5 1	18WP	WFEC	OKGE	GLASS MOUNTAIN - MOORELAND 138KV CKT 1	107.6	3.68%	NORTHWEST - TATONGA7 345.00 345KV CKT 1	GLASS MOUNTAIN - MOORELAND 138KV CKT 1	Reset CT
5 1	18WP	WFEC	OKGE	GLASS MOUNTAIN - MOORELAND 138KV CKT 1	107.6	3.68%	NORTHWEST - TATONGA7 345.00 345KV CKT 1	Cimarron - Mathewson 345 kV Ckt 1 Accelerate	Build new 16 mile 345 kV line from Mathweson to Cimarron.
5 1	18WP	WFEC	OKGE	GLASS MOUNTAIN - MOORELAND 138KV CKT 1	107.6	3.68%	NORTHWEST - TATONGA7 345.00 345KV CKT 1	Mathewson - Tatonga 345 kV Ckt 2 Accelerate	Build new 61 mile Tatonga - Mathewson 345 kV line.
		WFEC	OKGE	GLASS MOUNTAIN - MOORELAND 138KV CKT 1	107.6	3.68%	NORTHWEST - TATONGA7 345.00 345KV CKT 1	Mathewson 345 kV Accelerate	Build new Mathewson 345 kV substation at the intersection of the Woodring-Cimarron and the existing Northwest - Tatonga 345 kV lines.

Outaged Branch Causing	TDF (%)	Transfer Case % Loading	Monitored Branch Over 100% Rate B	To Area	From Area	Season	Scenario
NORTHWEST - TATONGA7 345 G12-038 TAP 345.00 - TUCO INTE	3.68%	107.6	GLASS MOUNTAIN - MOORELAND 138KV CKT 1	OKGE	WFEC	18WP	5
CKT 1	5.04%	102.9	GRACEMONT - LAWTON EASTSIDE 345KV CKT 1	AEPW	OKGE	18WP	5
SPP-SWPS-01	6.09%	105.8	GRACEMONT - LAWTON EASTSIDE 345KV CKT 1	AEPW	OKGE	23WP	5
OKLAUNION - TUCO INTERCHAN	6.09%	105.8	GRACEMONT - LAWTON EASTSIDE 345KV CKT 1	AEPW	OKGE	23WP	5
LACYGNE - NEOSHO 345	4.12%	108.4	GRAND ISLAND - SWEETWATER 345KV CKT 1	NPPD	NPPD	14WP	5
LACYGNE - NEOSHO 345	4.12%	108.4	GRAND ISLAND - SWEETWATER 345KV CKT 1	NPPD	NPPD	14WP	5
LACYGNE - NEOSHO 345	4.12%	108.4	GRAND ISLAND - SWEETWATER 345KV CKT 1	NPPD	NPPD	14WP	5
LACYGNE - NEOSHO 345	4.12%	108.4	GRAND ISLAND - SWEETWATER 345KV CKT 1	NPPD	NPPD	14WP	5
BASE CASE	4.15%	109.1	GRAND ISLAND - SWEETWATER 345KV CKT 1	NPPD	NPPD	14WP	5
BASE CASE	4.15%	109.1	GRAND ISLAND - SWEETWATER 345KV CKT 1	NPPD	NPPD	14WP	5
BASE CASE	4.15%	109.1	GRAND ISLAND - SWEETWATER 345KV CKT 1	NPPD	NPPD	14WP	5
BASE CASE	4.15%	109.1	GRAND ISLAND - SWEETWATER 345KV CKT 1	NPPD	NPPD	14WP	5
LACYGNE - WEST GARDNER	4.15%	109.9	GRAND ISLAND - SWEETWATER 345KV CKT 1	NPPD	NPPD	14WP	5
LACYGNE - WEST GARDNER	4.15%	109.9	GRAND ISLAND - SWEETWATER 345KV CKT 1	NPPD	NPPD	14WP	5
LACYGNE - WEST GARDNER	4.15%	109.9	GRAND ISLAND - SWEETWATER 345KV CKT 1	NPPD	NPPD	14WP	5
LACYGNE - WEST GARDNER	4.15%	109.9	GRAND ISLAND - SWEETWATER 345KV CKT 1	NPPD	NPPD	14WP	5
NORTH PLATTE 115/34.5KV TRAN	4.15%	110.3	GRAND ISLAND - SWEETWATER 345KV CKT 1	NPPD	NPPD	14WP	5
NORTH PLATTE 115/34.5KV TRAN	4.15%	110.3	GRAND ISLAND - SWEETWATER 345KV CKT 1	NPPD	NPPD	14WP	5
NORTH PLATTE 115/34.5KV TRAN	4.15%	110.3	GRAND ISLAND - SWEETWATER 345KV CKT 1	NPPD	NPPD	14WP	5
NORTH PLATTE 115/34.5KV TRAN	4.15%	110.3	GRAND ISLAND - SWEETWATER 345KV CKT 1	NPPD	NPPD	14WP	5
LN-1090	4.21%	111.2	GRAND ISLAND - SWEETWATER 345KV CKT 1	NPPD	NPPD	14WP	5
LN-1090	4.21%	111.2	GRAND ISLAND - SWEETWATER 345KV CKT 1	NPPD	NPPD	14WP	5
LN-1090	4.21%	111.2	GRAND ISLAND - SWEETWATER 345KV CKT 1	NPPD	NPPD	14WP	5
LN-1090	4.21%	111.2	GRAND ISLAND - SWEETWATER 345KV CKT 1	NPPD	NPPD	14WP	5
SPP-AEPW-32	4.47%	112.6	GRAND ISLAND - SWEETWATER 345KV CKT 1	NPPD	NPPD	14WP	5
SPP-AEPW-32	4.47%	112.6	GRAND ISLAND - SWEETWATER 345KV CKT 1	NPPD	NPPD	14WP	5
SPP-AEPW-32	4.47%	112.6	GRAND ISLAND - SWEETWATER 345KV CKT 1	NPPD	NPPD	14WP	5
SPP-AEPW-32	4.47%	112.6	GRAND ISLAND - SWEETWATER 345KV CKT 1	NPPD	NPPD	14WP	5
HOYT - STRANGER CREEK	4.25%	113.1	GRAND ISLAND - SWEETWATER 345KV CKT 1	NPPD	NPPD	14WP	5
HOYT - STRANGER CREEK (	4.25%	113.1	GRAND ISLAND - SWEETWATER 345KV CKT 1	NPPD	NPPD	14WP	5
HOYT - STRANGER CREEK (	4.25%	113.1	GRAND ISLAND - SWEETWATER 345KV CKT 1	NPPD	NPPD	14WP	5
HOYT - STRANGER CREEK 3	4.25%	113.1	GRAND ISLAND - SWEETWATER 345KV CKT 1	NPPD	NPPD	14WP	5
MOORE - PAULINE 345K	5.17%	129.7	GRAND ISLAND - SWEETWATER 345KV CKT 1	NPPD	NPPD	14WP	5
MOORE - PAULINE 345K	5.17%	129.7	GRAND ISLAND - SWEETWATER 345KV CKT 1	NPPD	NPPD	14WP	5
MOORE - PAULINE 345K	5.17%	129.7	GRAND ISLAND - SWEETWATER 345KV CKT 1	NPPD	NPPD	14WP	5
MOORE - PAULINE 345K	5.17%	129.7	GRAND ISLAND - SWEETWATER 345KV CKT 1	NPPD	NPPD	14WP	5
AXTELL - SWEETWATER 34	3.70%	133.2	GRAND ISLAND - SWEETWATER 345KV CKT 1	NPPD	NPPD	14WP	5
AXTELL - SWEETWATER 34	3.70%	133.2	GRAND ISLAND - SWEETWATER 345KV CKT 1	NPPD	NPPD	14WP	5
AXTELL - SWEETWATER 34	3.70%	133.2	GRAND ISLAND - SWEETWATER 345KV CKT 1	NPPD	NPPD	14WP	5
AXTELL - SWEETWATER 34	3.70%	133.2	GRAND ISLAND - SWEETWATER 345KV CKT 1	NPPD	NPPD	14WP	5
AXTELL - PAULINE 345k	5.73%	141.3	GRAND ISLAND - SWEETWATER 345KV CKT 1	NPPD	NPPD	14WP	5
AXTELL - PAULINE 345k	5.73%	141.3	GRAND ISLAND - SWEETWATER 345KV CKT 1	NPPD	NPPD	14WP	5
AXTELL - PAULINE 345K	5.73%	141.3	GRAND ISLAND - SWEETWATER 345KV CKT 1	NPPD	NPPD	14WP	5
AXTELL - PAULINE 345k	5.73%	141.3	GRAND ISLAND - SWEETWATER 345KV CKT 1	NPPD	NPPD	14WP	5
AXTELL - PAULINE 345k	5.15%	103.7	GRAND ISLAND - SWEETWATER 345KV CKT 1	NPPD	NPPD	18SP	5
AXTELL - PAULINE 345K	5.15%	103.7	GRAND ISLAND - SWEETWATER 345KV CKT 1	NPPD	NPPD	18SP	5
	0.1070	100.7				1001	<u> </u>
AXTELL - PAULINE 345K	5.15%	103.7	GRAND ISLAND - SWEETWATER 345KV CKT 1	NPPD	NPPD	18SP	5

ng Overload	Upgrade Name	Solution
45.00 345KV CKT 1	Tatonga - Woodward EHV 345 kV Ckt 2 Accelerate	Build new 49-mile Woodward EHV - Tatonga 345 kV Ckt 2 line.
ERCHANGE 345KV	GRACEMONT - LAWTON EASTSIDE 345KV CKT 1	Replace Terminal Equipment
1	GRACEMONT - LAWTON EASTSIDE 345KV CKT 1	Replace Terminal Equipment
ANGE 345KV CKT 1	GRACEMONT - LAWTON EASTSIDE 345KV CKT 1	Replace Terminal Equipment
45KV CKT 1	GRAND ISLAND - SWEETWATER 345KV CKT 2	Build 63.4 mile second circuit
45KV CKT 1	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).
45KV 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).
45KV CKT 1	Cherry Co 345 kV Terminal Upgrades	Build new Cherry County 345 kV Substation.
	GRAND ISLAND - SWEETWATER 345KV CKT 2	Build 63.4 mile second circuit
	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).
	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).
	Cherry Co 345 kV Terminal Upgrades	Build new Cherry County 345 kV Substation.
R 345KV CKT 1	GRAND ISLAND - SWEETWATER 345KV CKT 2	Build 63.4 mile second circuit
R 345KV CKT 1	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).
R 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).
R 345KV CKT 1	Cherry Co 345 kV Terminal Upgrades	Build new Cherry County 345 kV Substation.
ANSFORMER CKT 1	GRAND ISLAND - SWEETWATER 345KV CKT 2	Build 63.4 mile second circuit
ANSFORMER CKT 1	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).
ANSFORMER 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).
ANSFORMER CKT 1	Cherry Co 345 kV Terminal Upgrades	Build new Cherry County 345 kV Substation.
	GRAND ISLAND - SWEETWATER 345KV CKT 2	Build 63.4 mile second circuit
	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).
	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).
	Cherry Co 345 kV Terminal Upgrades	Build new Cherry County 345 kV Substation.
2	GRAND ISLAND - SWEETWATER 345KV CKT 2	Build 63.4 mile second circuit
2	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).
2	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).
2	Cherry Co 345 kV Terminal Upgrades	Build new Cherry County 345 kV Substation.
K 345KV CKT 1	GRAND ISLAND - SWEETWATER 345KV CKT 2	Build 63.4 mile second circuit
K 345KV CKT 1	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). Build new 345 kV Transmission Line from new Cherry County 345 kV Substation to new 345 kV Holt County Substation.
K 345KV CKT 1	Cherry Co - Holt Co 345 kV Ckt1	(Estimated 146 miles).
K 345KV CKT 1	Cherry Co 345 kV Terminal Upgrades	Build new Cherry County 345 kV Substation.
5KV CKT 1	GRAND ISLAND - SWEETWATER 345KV CKT 2	Build 63.4 mile second circuit
5KV CKT 1	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). Build new 345 kV Transmission Line from new Cherry County 345 kV Substation to new 345 kV Holt County Substation.
5KV CKT 1	Cherry Co - Holt Co 345 kV Ckt1	(Estimated 146 miles).
5KV CKT 1	Cherry Co 345 kV Terminal Upgrades	Build new Cherry County 345 kV Substation.
345KV CKT 1	GRAND ISLAND - SWEETWATER 345KV CKT 2	Build 63.4 mile second circuit
345KV CKT 1	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). Build new 345 kV Transmission Line from new Cherry County 345 kV Substation to new 345 kV Holt County Substation.
345KV CKT 1	Cherry Co - Holt Co 345 kV Ckt1	(Estimated 146 miles).
345KV CKT 1	Cherry Co 345 kV Terminal Upgrades	Build new Cherry County 345 kV Substation.
5KV CKT 1	GRAND ISLAND - SWEETWATER 345KV CKT 2	Build 63.4 mile second circuit
5KV CKT 1	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). Build new 345 kV Transmission Line from new Cherry County 345 kV Substation to new 345 kV Holt County Substation.
5KV CKT 1	Cherry Co - Holt Co 345 kV Ckt1	(Estimated 146 miles).
5KV CKT 1	Cherry Co 345 kV Terminal Upgrades	Build new Cherry County 345 kV Substation.
5KV CKT 1	GRAND ISLAND - SWEETWATER 345KV CKT 2	Build 63.4 mile second circuit
5KV CKT 1	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). Build new 345 kV Transmission Line from new Cherry County 345 kV Substation to new 345 kV Holt County Substation.
5KV CKT 1	Cherry Co - Holt Co 345 kV Ckt1	(Estimated 146 miles).
5KV CKT 1	Cherry Co 345 kV Terminal Upgrades	Build new Cherry County 345 kV Substation.

Scenario	Season	From Area	To Area	Monitored Branch Over 100% Rate B	Transfer Case % Loading	TDF (%)	Outaged Branch Causing
5	18WP	NPPD	NPPD	GRAND ISLAND - SWEETWATER 345KV CKT 1	106.7	4.29%	CHERRYC3 345.00 - HOLT.CO3 1
5	18WP	NPPD	NPPD	GRAND ISLAND - SWEETWATER 345KV CKT 1	106.7	4.29%	CHERRYC3 345.00 - HOLT.CO3
5	18WP	NPPD	NPPD	GRAND ISLAND - SWEETWATER 345KV CKT 1	106.7	4.29%	CHERRYC3 345.00 - HOLT.CO3
5	18WP	NPPD	NPPD	GRAND ISLAND - SWEETWATER 345KV CKT 1	106.7	4.29%	CHERRYC3 345.00 - HOLT.CO3
5	18WP	NPPD	NPPD	GRAND ISLAND - SWEETWATER 345KV CKT 1	107.5	4.29%	CHERRYC3 345.00 - GERALI STATION 345KV CH
5	18WP	NPPD	NPPD	GRAND ISLAND - SWEETWATER 345KV CKT 1	107.5	4.29%	CHERRYC3 345.00 - GERALI STATION 345KV CH
5	18WP	NPPD	NPPD	GRAND ISLAND - SWEETWATER 345KV CKT 1	107.5	4.29%	CHERRYC3 345.00 - GERALI STATION 345KV CH
5	18WP	NPPD	NPPD	GRAND ISLAND - SWEETWATER 345KV CKT 1	107.5	4.29%	CHERRYC3 345.00 - GERALI STATION 345KV CF
5	18WP	NPPD	NPPD	GRAND ISLAND - SWEETWATER 345KV CKT 1	113.2	5.11%	AXTELL - PAULINE 345k
5	18WP	NPPD	NPPD	GRAND ISLAND - SWEETWATER 345KV CKT 1	113.2	5.11%	AXTELL - PAULINE 345k
5	18WP	NPPD	NPPD	GRAND ISLAND - SWEETWATER 345KV CKT 1	113.2	5.11%	AXTELL - PAULINE 345k
5	18WP	NPPD	NPPD	GRAND ISLAND - SWEETWATER 345KV CKT 1	113.2	5.11%	AXTELL - PAULINE 345k
5	23SP	NPPD	NPPD	GRAND ISLAND - SWEETWATER 345KV CKT 1	102.0	3.68%	AXTELL - PAULINE 345k
5	23SP	NPPD	NPPD	GRAND ISLAND - SWEETWATER 345KV CKT 1	102.0	3.68%	AXTELL - PAULINE 345k
5	23SP	NPPD	NPPD	GRAND ISLAND - SWEETWATER 345KV CKT 1	102.0	3.68%	AXTELL - PAULINE 345k
5	23SP	NPPD	NPPD	GRAND ISLAND - SWEETWATER 345KV CKT 1	102.0	3.68%	AXTELL - PAULINE 345k
5	23WP	NPPD	NPPD	GRAND ISLAND - SWEETWATER 345KV CKT 1	107.5	3.64%	CHERRYC3 345.00 - HOLT.CO3 1
5	23WP	NPPD	NPPD	GRAND ISLAND - SWEETWATER 345KV CKT 1	107.5	3.64%	CHERRYC3 345.00 - HOLT.CO3 1
5	23WP	NPPD	NPPD	GRAND ISLAND - SWEETWATER 345KV CKT 1	107.5	3.64%	CHERRYC3 345.00 - HOLT.CO3 1
5	23WP	NPPD	NPPD	GRAND ISLAND - SWEETWATER 345KV CKT 1	107.5	3.64%	CHERRYC3 345.00 - HOLT.CO3 1
5	23WP	NPPD	NPPD	GRAND ISLAND - SWEETWATER 345KV CKT 1	108.1	3.64%	CHERRYC3 345.00 - GERALI STATION 345KV CH
5	23WP	NPPD	NPPD	GRAND ISLAND - SWEETWATER 345KV CKT 1	108.1	3.64%	CHERRYC3 345.00 - GERALI STATION 345KV CH
5	23WP	NPPD	NPPD	GRAND ISLAND - SWEETWATER 345KV CKT 1	108.1	3.64%	CHERRYC3 345.00 - GERALI STATION 345KV CH
5	23WP	NPPD	NPPD	GRAND ISLAND - SWEETWATER 345KV CKT 1	108.1	3.64%	CHERRYC3 345.00 - GERALI STATION 345KV CH
5	23WP	NPPD	NPPD	GRAND ISLAND - SWEETWATER 345KV CKT 1	110.9	4.20%	AXTELL - PAULINE 345k
5	23WP	NPPD	NPPD	GRAND ISLAND - SWEETWATER 345KV CKT 1	110.9	4.20%	AXTELL - PAULINE 345k
5	23WP	NPPD	NPPD	GRAND ISLAND - SWEETWATER 345KV CKT 1	110.9	4.20%	AXTELL - PAULINE 345k
5	23WP	NPPD	NPPD	GRAND ISLAND - SWEETWATER 345KV CKT 1	110.9	4.20%	AXTELL - PAULINE 345k
5	18SP	GRDA	GRDA	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1	100.1	3.35%	7JASPER 345.00 - MORGAN
5	18SP	GRDA	GRDA	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1	100.1	3.35%	7JASPER 345.00 - MORGAN
5	18SP	GRDA	GRDA	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1	103.5	3.37%	7JASPER 345.00 - BLACKBER
5	18SP	GRDA	GRDA	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1	103.5	3.37%	7JASPER 345.00 - BLACKBER
5	18WP	GRDA	GRDA	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1	104.1	3.11%	7JASPER 345.00 - MORGAN
5	18WP	GRDA	GRDA	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1	104.1	3.11%	7JASPER 345.00 - MORGAN
5	18WP	GRDA	GRDA	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1	107.4	3.12%	7JASPER 345.00 - BLACKBER
5	18WP	GRDA	GRDA	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1	107.4	3.12%	7JASPER 345.00 - BLACKBER
5	23WP	GRDA	GRDA	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1	113.1	23.64%	7JASPER 345.00 - MORGAN
5	23WP	GRDA	GRDA	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1	113.1	23.64%	7JASPER 345.00 - MORGAN
5	23WP	GRDA	GRDA	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1	116.9	23.55%	7JASPER 345.00 - BLACKBER
5	23WP	GRDA	GRDA	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1	116.9	23.55%	7JASPER 345.00 - BLACKBER
5	23WP	GRDA	GRDA	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1	126.5	29.94%	CHAMBER SPRINGS - CLARKSVI
5	23WP	GRDA	GRDA	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1	126.5	29.94%	CHAMBER SPRINGS - CLARKSVI
5	18SP	GRDA	OKGE	HIGHWAY 59 - TAHLEQUAH 161KV CKT 1	113.5	3.04%	FT SMITH - MUSKOGEE 34
5	18SP	GRDA	OKGE	HIGHWAY 59 - TAHLEQUAH 161KV CKT 1	113.5	3.04%	FT SMITH - MUSKOGEE 34
5	18SP	GRDA	OKGE	HIGHWAY 59 - TAHLEQUAH 161KV CKT 1	113.5	3.04%	FT SMITH - MUSKOGEE 34
5	18SP	GRDA	OKGE	HIGHWAY 59 - TAHLEQUAH 161KV CKT 1	113.5	3.04%	FT SMITH - MUSKOGEE 34
	18SP	GRDA	OKGE	HIGHWAY 59 - TAHLEQUAH 161KV CKT 1	113.5	3.04%	FT SMITH - MUSKOGEE 34
5							

g Overload	Upgrade Name	Solution
345.00 345KV CKT	GRAND ISLAND - SWEETWATER 345KV CKT 2	Build 63.4 mile second circuit
345.00 345KV CKT	Cherry Co - Gentleman 345 kV Ckt1	Build 05.4 The second circuit Build new 345 kV Transmission Line from GGS 345 kV Substation to a new Cherry County 345 kV Substation (76 miles).
345.00 345KV CKT	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).
345.00 345KV CKT	Cherry Co 345 kV Terminal Upgrades	Build new Cherry County 345 kV Substation.
LD GENTLEMAN CKT 1	GRAND ISLAND - SWEETWATER 345KV CKT 2	Build 63.4 mile second circuit
LD GENTLEMAN CKT 1	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).
LD GENTLEMAN 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).
LD GENTLEMAN CKT 1	Cherry Co 345 kV Terminal Upgrades	Build new Cherry County 345 kV Substation.
5KV CKT 1	GRAND ISLAND - SWEETWATER 345KV CKT 2	Build 63.4 mile second circuit
5KV CKT 1	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).
5KV 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).
5KV CKT 1	Cherry Co 345 kV Terminal Upgrades	Build new Cherry County 345 kV Substation.
5KV CKT 1	GRAND ISLAND - SWEETWATER 345KV CKT 2	Build 63.4 mile second circuit
5KV CKT 1	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).
5KV 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).
5KV CKT 1 345.00 345KV CKT	Cherry Co 345 kV Terminal Upgrades	Build new Cherry County 345 kV Substation.
345.00 345KV CKT	GRAND ISLAND - SWEETWATER 345KV CKT 2	Build 63.4 mile second circuit
345.00 345KV CKT	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). Build new 345 kV Transmission Line from new Cherry County 345 kV Substation to new 345 kV Holt County Substation.
345.00 345KV CKT	Cherry Co - Holt Co 345 kV Ckt1	(Estimated 146 miles).
LD GENTLEMAN	Cherry Co 345 kV Terminal Upgrades	Build new Cherry County 345 kV Substation.
CKT 1 LD GENTLEMAN	GRAND ISLAND - SWEETWATER 345KV CKT 2	Build 63.4 mile second circuit
CKT 1 LD GENTLEMAN	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). Build new 345 kV Transmission Line from new Cherry County 345 kV Substation to new 345 kV Holt County Substation.
CKT 1 LD GENTLEMAN	Cherry Co - Holt Co 345 kV Ckt1	(Estimated 146 miles).
СКТ 1	Cherry Co 345 kV Terminal Upgrades	Build new Cherry County 345 kV Substation.
5KV CKT 1	GRAND ISLAND - SWEETWATER 345KV CKT 2	Build 63.4 mile second circuit
5KV CKT 1	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). Build new 345 kV Transmission Line from new Cherry County 345 kV Substation to new 345 kV Holt County Substation.
5KV CKT 1	Cherry Co - Holt Co 345 kV Ckt1	(Estimated 146 miles).
5KV CKT 1	Cherry Co 345 kV Terminal Upgrades	Build new Cherry County 345 kV Substation.
N 345KV CKT 1	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1 #2	Replace Terminal Equipment
N 345KV CKT 1	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1 #1	Add new pole to increase line clearance
RRY 345KV CKT 1	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1 #2	Replace Terminal Equipment
RRY 345KV CKT 1	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1 #1	Add new pole to increase line clearance
N 345KV CKT 1	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1 #2	Replace Terminal Equipment
N 345KV CKT 1	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1 #1	Add new pole to increase line clearance
RRY 345KV CKT 1	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1 #2	Replace Terminal Equipment
RRY 345KV CKT 1	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1 #1	Add new pole to increase line clearance
N 345KV CKT 1	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1 #2	Replace Terminal Equipment
N 345KV CKT 1 RRY 345KV CKT 1	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1 #1	Add new pole to increase line clearance
RRY 345KV CKT 1	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1 #2 GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1 #1	Replace Terminal Equipment Add new pole to increase line clearance
	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1 #1	
VILLE 345KV CKT 1	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1 #2	Replace Terminal Equipment           Add new pole to increase line clearance
345KV CKT 1	Muskogee - VBI 345 kV with 345/161 kV bus tie near VBI	Build 70.95 mile 345 kV line plus two new 345/161 kV bus ties near VBI sub and 10 miles of 161 kV line
345KV CKT 1	ADABELL - VBI 161KV CKT 1	Replace existing 800 amp wave trap with 1200 amp in VBI sub
345KV CKT 1	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
345KV CKT 1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
345KV CKT 1	Muskogee - VBI 345 kV with 345/161 kV bus tie near VBI	Build 70.95 mile 345 kV line plus two new 345/161 kV bus ties near VBI sub and 10 miles of 161 kV line

Outaged Branch Causing	TDF (%)	Transfer Case % Loading	Monitored Branch Over 100% Rate B	To Area	From Area	Season	Scenario
FT SMITH - MUSKOGEE 3	3.04%	119.6	HIGHWAY 59 - VBI 161KV CKT 1	OKGE	OKGE	18SP	5
FT SMITH - MUSKOGEE 3	3.04%	119.6	HIGHWAY 59 - VBI 161KV CKT 1	OKGE	OKGE	18SP	5
FT SMITH - MUSKOGEE 3	3.04%	119.6	HIGHWAY 59 - VBI 161KV CKT 1	OKGE	OKGE	18SP	5
FT SMITH - MUSKOGEE 3	3.04%	119.6	HIGHWAY 59 - VBI 161KV CKT 1	OKGE	OKGE	18SP	5
SPP-SWPS-04	3.57%	103.9	HITCHLAND INTERCHANGE (H TP80148301) 230/115/13.2KV TRANSFORMER CKT 1	SPS	SPS	18SP	5
POTTER COUNTY INTERCHANG 345/230/13.2KV TRANSFO	3.57%	111.4	HITCHLAND INTERCHANGE (H TP80148301) 230/115/13.2KV TRANSFORMER CKT 1	SPS	SPS	18SP	5
SPP-SWPS-04	3.56%	100.4	HITCHLAND INTERCHANGE (H TP80148301) 230/115/13.2KV TRANSFORMER CKT 1	SPS	SPS	18WP	5
POTTER COUNTY INTERCHANG 345/230/13.2KV TRANSFO	3.56%	109.5	HITCHLAND INTERCHANGE (H TP80148301) 230/115/13.2KV TRANSFORMER CKT 1	SPS	SPS	18WP	5
SPP-SWPS-04	3.79%	121.9	HITCHLAND INTERCHANGE (H TP80148301) 230/115/13.2KV TRANSFORMER CKT 1	SPS	SPS	23SP	5
SPP-SWPS-K3	3.12%	129.2	HITCHLAND INTERCHANGE (H TP80148301) 230/115/13.2KV TRANSFORMER CKT 1	SPS	SPS	23SP	5
POTTER COUNTY INTERCHANG 345/230/13.2KV TRANSFO	3.79%	130.0	HITCHLAND INTERCHANGE (H TP80148301) 230/115/13.2KV TRANSFORMER CKT 1	SPS	SPS	23SP	5
POTTER COUNTY INTERCHANG 345/230/13.2KV TRANSFO	3.05%	107.4	HITCHLAND INTERCHANGE (H TP80148301) 230/115/13.2KV TRANSFORMER CKT 1	SPS	SPS	23WP	5
LACYGNE - STILWELL 34	4.22%	107.4	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	14WP	5
LACYGNE - STILWELL 34	4.22%	101.4	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	14WP	5
LACYGNE - STILWELL 34	4.22%	101.4	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	14WP	5
LACYGNE - STILWELL 34	4.22%	101.4	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	14WP	5
LACYGNE - STILWELL 34	4.22%	101.4	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	14WP	5
SWISSVALE - WEST GARDNE	5.39%	111.1	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	14WP	5
SWISSVALE - WEST GARDNE	5.39%	111.1	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	14WP	5
SWISSVALE - WEST GARDNE	5.39%	111.1	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	14WP	5
SWISSVALE - WEST GARDNE	5.39%	111.1	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	14WP	5
SWISSVALE - WEST GARDNE JEFFREY ENERGY CENTER - N	5.39%	111.1	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	14WP	5
345KV CKT 1	3.78%	111.1	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	14WP	5
JEFFREY ENERGY CENTER - N 345KV CKT 1	3.78%	111.1	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	14WP	5
JEFFREY ENERGY CENTER - N 345KV CKT 1	3.78%	111.1	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	14WP	5
JEFFREY ENERGY CENTER - N 345KV CKT 1	3.78%	111.1	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	14WP	5
JEFFREY ENERGY CENTER - N 345KV CKT 1	3.78%	111.1	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	14WP	5
AUBURN ROAD - JEFFREY ENER CKT 1	4.46%	111.9	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	14WP	5
AUBURN ROAD - JEFFREY ENER CKT 1	4.46%	111.9	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	14WP	5
AUBURN ROAD - JEFFREY ENER CKT 1	4.46%	111.9	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	14WP	5
AUBURN ROAD - JEFFREY ENER CKT 1	4.46%	111.9	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	14WP	5
AUBURN ROAD - JEFFREY ENER CKT 1							
	4.46%	111.9	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	14WP	5
LACYGNE - NEOSHO 34	4.36%	101.7	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	18SP	5
LACYGNE - NEOSHO 34	4.36%	101.7	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	18SP	5
LACYGNE - NEOSHO 34	4.36%	101.7	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	18SP	5
LACYGNE - NEOSHO 34	4.36%	101.7	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	18SP	5
LACYGNE - NEOSHO 34	4.36%	101.7	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	18SP	5
ROSE HILL - WOLF CREEK	4.59%	102.7	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	18SP	5
ROSE HILL - WOLF CREEK	4.59%	102.7	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	18SP	5
	4.59%	102.7	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	18SP	5
ROSE HILL - WOLF CREEK	4.59%	102.7	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	18SP	5
ROSE HILL - WOLF CREEK		102.7	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	18SP	5
	4.59%	102.7					5
ROSE HILL - WOLF CREEK	4.59% 4.67%	102.7	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	18SP	
ROSE HILL - WOLF CREEK ROSE HILL - WOLF CREEK				WERE WERE	WERE WERE	18SP 18SP	5
ROSE HILL - WOLF CREEK ROSE HILL - WOLF CREEK BENTON - WOLF CREEK 3	4.67%	103.0	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1				5 5
ROSE HILL - WOLF CREEK ROSE HILL - WOLF CREEK BENTON - WOLF CREEK 3 BENTON - WOLF CREEK 3	4.67% 4.67%	103.0 103.0	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1 HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	18SP	
ROSE HILL - WOLF CREEK ROSE HILL - WOLF CREEK BENTON - WOLF CREEK 3 BENTON - WOLF CREEK 3 BENTON - WOLF CREEK 3	4.67% 4.67% 4.67%	103.0 103.0 103.0	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1 HOYT - JEFFREY ENERGY CENTER 345KV CKT 1 HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	18SP 18SP	5

g Overload	Upgrade Name	Solution		
345KV CKT 1	ADABELL - VBI 161KV CKT 1	Replace existing 800 amp wave trap with 1200 amp in VBI sub		
345KV CKT 1	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO		
345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate		
345KV CKT 1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line		
4	HITCHLAND INTERCHANGE () 230/115/13.2KV TRANSFORMER CKT 2	Build a second 230/115/13.2 kV transformer at Hitchland.		
GE (WAUK 90343-A) DRMER CKT 1	HITCHLAND INTERCHANGE () 230/115/13.2KV TRANSFORMER CKT 2	Build a second 230/115/13.2 kV transformer at Hitchland.		
4	HITCHLAND INTERCHANGE () 230/115/13.2KV TRANSFORMER CKT 2	Build a second 230/115/13.2 kV transformer at Hitchland.		
GE (WAUK 90343-A) PRMER CKT 1	HITCHLAND INTERCHANGE () 230/115/13.2KV TRANSFORMER CKT 2	Build a second 230/115/13.2 kV transformer at Hitchland.		
4	HITCHLAND INTERCHANGE () 230/115/13.2KV TRANSFORMER CKT 2	Build a second 230/115/13.2 kV transformer at Hitchland.		
31	HITCHLAND INTERCHANGE () 230/115/13.2KV TRANSFORMER CKT 2	Build a second 230/115/13.2 kV transformer at Hitchland.		
GE (WAUK 90343-A) PRMER CKT 1	HITCHLAND INTERCHANGE () 230/115/13.2KV TRANSFORMER CKT 2	Build a second 230/115/13.2 kV transformer at Hitchland.		
GE (WAUK 90343-A) DRMER CKT 1	HITCHLAND INTERCHANGE () 230/115/13.2KV TRANSFORMER CKT 2	Build a second 230/115/13.2 kV transformer at Hitchland.		
45KV CKT 1	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV		
45KV CKT 1	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC (Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.		
45KV CKT 1	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV		
45KV CKT 1	Lacygne - Mariosa 345KV AMRN	Indeterminate		
45KV CKT 1	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa		
ER 345KV CKT 1	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC		
ER 345KV CKT 1	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	(Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.		
ER 345KV CKT 1	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV		
ER 345KV CKT 1	Lacygne - Mariosa 345KV AMRN	Indeterminate		
ER 345KV CKT 1 MORRIS COUNTY	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa		
MORRIS COUNTY	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC		
MORRIS COUNTY	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	(Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.		
MORRIS COUNTY	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV		
MORRIS COUNTY	Lacygne - Mariosa 345KV AMRN	Indeterminate		
RGY CENTER 230KV	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa		
RGY CENTER 230KV	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC		
RGY CENTER 230KV	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	(Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.		
RGY CENTER 230KV	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV		
RGY CENTER 230KV	Lacygne - Mariosa 345KV AMRN	Indeterminate		
	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa		
I5KV CKT 1	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC		
I5KV CKT 1	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	(Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.		
I5KV CKT 1	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV		
I5KV CKT 1	Lacygne - Mariosa 345KV AMRN	Indeterminate		
I5KV CKT 1	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa		
345KV CKT 1	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC		
345KV CKT 1	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	(Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.		
345KV CKT 1	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV		
345KV CKT 1	Lacygne - Mariosa 345KV AMRN	Indeterminate		
345KV CKT 1	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa		
345KV CKT 1	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC		
345KV CKT 1	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	(Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.		
345KV CKT 1	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV		
345KV CKT 1	Lacygne - Mariosa 345KV AMRN	Indeterminate		
345KV CKT 1 1X) 345/115/14.4KV	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa		
CKT 1	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV		

Scenario	Season	From Area To Area	Monitored Branch Over 100% Rate B	Transfer Case % Loading	TDF (%)	Outaged Branch Causing Overload	Upgrade Name	Solution
5	18SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	103.6	4.51%	STRANGER CREEK (STRANGER 1X) 345/115/14.4KV TRANSFORMER CKT 1	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC (Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.
5	18SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	103.6	4.51%	STRANGER CREEK (STRANGER 1X) 345/115/14.4KV TRANSFORMER CKT 1	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV
5	18SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	103.6	4.51%	STRANGER CREEK (STRANGER 1X) 345/115/14.4KV TRANSFORMER CKT 1	Lacygne - Mariosa 345KV AMRN	Indeterminate
5	18SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	103.6	4.51%	STRANGER CREEK (STRANGER 1X) 345/115/14.4KV TRANSFORMER CKT 1	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa
5	18SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	103.6	4.51%	TECUMSEH ENERGY CENTER - TECUMSEH HILL 115KV CKT 1	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV
5	18SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	103.6	4.51%	TECUMSEH ENERGY CENTER - TECUMSEH HILL 115KV CKT 1	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC (Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.
5	18SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	103.6	4.51%	TECUMSEH ENERGY CENTER - TECUMSEH HILL 115KV CKT 1	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV
5	18SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	103.6	4.51%	TECUMSEH ENERGY CENTER - TECUMSEH HILL 115KV CKT 1	Lacygne - Mariosa 345KV AMRN	Indeterminate
5	18SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	103.6	4.51%	TECUMSEH ENERGY CENTER - TECUMSEH HILL 115KV CKT 1	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa
5	18SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	103.7	4.47%	MCCREDIE - THOMAS HILL 345KV CKT 1	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV
5	18SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	103.7	4.47%	MCCREDIE - THOMAS HILL 345KV CKT 1	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC (Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.
5	18SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	103.7	4.47%	MCCREDIE - THOMAS HILL 345KV CKT 1	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV
5	18SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	103.7	4.47%	MCCREDIE - THOMAS HILL 345KV CKT 1	Lacygne - Mariosa 345KV AMRN	Indeterminate
5	18SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	103.7	4.47%	MCCREDIE - THOMAS HILL 345KV CKT 1	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa
5	18SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	103.7	4.49%	EVANS ENERGY CENTER NORTH - SEDGWICK COUNTY NO. 12 COLWICH 138KV CKT 1	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV
5	18SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	103.7	4.49%	EVANS ENERGY CENTER NORTH - SEDGWICK COUNTY NO. 12 COLWICH 138KV CKT 1	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC (Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.
5	18SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	103.7	4.49%	EVANS ENERGY CENTER NORTH - SEDGWICK COUNTY NO. 12 COLWICH 138KV CKT 1	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV
5	18SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	103.7	4.49%	EVANS ENERGY CENTER NORTH - SEDGWICK COUNTY NO. 12 COLWICH 138KV CKT 1	Lacygne - Mariosa 345KV AMRN	Indeterminate
5	18SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	103.7	4.49%	EVANS ENERGY CENTER NORTH - SEDGWICK COUNTY NO. 12 COLWICH 138KV CKT 1	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa
5	18SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	104.1	4.49%	BASE CASE	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV
5	18SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	104.1	4.49%	BASE CASE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC (Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.
5	18SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	104.1	4.49%	BASE CASE	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV
5	18SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	104.1	4.49%	BASE CASE	Lacygne - Mariosa 345KV AMRN	Indeterminate
5	18SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	104.1	4.49%	BASE CASE	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa
5	18SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	104.4	4.49%	ABILENE ENERGY CENTER 115/34.5KV TRANSFORMER CKT 1	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV
5	18SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	104.4	4.49%	ABILENE ENERGY CENTER 115/34.5KV TRANSFORMER CKT 1	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC (Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.
5	18SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	104.4	4.49%	ABILENE ENERGY CENTER 115/34.5KV TRANSFORMER CKT 1	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV
5			HOYT - JEFFREY ENERGY CENTER 345KV CKT 1			ABILENE ENERGY CENTER 115/34.5KV TRANSFORMER CKT 1		
5	18SP			104.4	4.49%	ABILENE ENERGY CENTER 115/34.5KV TRANSFORMER CKT 1	Lacygne - Mariosa 345KV AMRN	Indeterminate
5	18SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	104.4	4.49%	EUDORA TOWNSHIP - WAKARUSA JUNCTION	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa
5	18SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	104.5	4.51%	SWITCHING STATION 115KV CKT 1 EUDORA TOWNSHIP - WAKARUSA JUNCTION	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC
5	18SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	104.5	4.51%	SWITCHING STATION 115KV CKT 1 EUDORA TOWNSHIP - WAKARUSA JUNCTION	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	(Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.
5	18SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	104.5	4.51%	SWITCHING STATION 115KV CKT 1 EUDORA TOWNSHIP - WAKARUSA JUNCTION	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV
5	18SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	104.5	4.51%	SWITCHING STATION 115KV CKT 1 EUDORA TOWNSHIP - WAKARUSA JUNCTION	Lacygne - Mariosa 345KV AMRN	Indeterminate
5	18SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	104.5	4.51%	SWITCHING STATION 115KV CKT 1 EVANS ENERGY CENTER SOUTH - LAKERIDGE	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa
5	18SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	104.6	4.50%	138KV CKT 1 EVANS ENERGY CENTER SOUTH - LAKERIDGE	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV           Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC
5	18SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	104.6	4.50%	138KV CKT 1 EVANS ENERGY CENTER SOUTH - LAKERIDGE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	(Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.
5	18SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	104.6	4.50%	138KV CKT 1 EVANS ENERGY CENTER SOUTH - LAKERIDGE	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV
5	18SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	104.6	4.50%	138KV CKT 1 EVANS ENERGY CENTER SOUTH - LAKERIDGE	Lacygne - Mariosa 345KV AMRN	Indeterminate
5	18SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	104.6	4.50%	138KV CKT 1	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa
5	18SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	104.6	4.51%	MIDLAND JUNCTION - PENTAGON 115KV CKT 1	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC
5	18SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	104.6	4.51%	MIDLAND JUNCTION - PENTAGON 115KV CKT 1	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	(Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.
5	18SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	104.6	4.51%	MIDLAND JUNCTION - PENTAGON 115KV CKT 1	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV
5	18SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	104.6	4.51%	MIDLAND JUNCTION - PENTAGON 115KV CKT 1	Lacygne - Mariosa 345KV AMRN	Indeterminate
5	18SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	104.6	4.51%	MIDLAND JUNCTION - PENTAGON 115KV CKT 1 COWSKIN (COWSKN1X) 138/69/13.2KV	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa
5	18SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	104.8	4.49%	TRANSFORMER CKT 1 COWSKIN (COWSKN1X) 138/69/13.2KV	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC
5	18SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	104.8	4.49%	TRANSFORMER CKT 1 COWSKIN (COWSKN1X) 138/69/13.2KV	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	(Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.
5	18SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	104.8	4.49%	TRANSFORMER CKT 1 COWSKIN (COWSKN1X) 138/69/13.2KV	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV
5	18SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	104.8	4.49%	TRANSFORMER CKT 1	Lacygne - Mariosa 345KV AMRN	Indeterminate

5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	18SP 18SP 18SP 18SP 18SP 18SP 18SP 18SP	WERE WERE WERE WERE WERE WERE WERE WERE	WERE WERE WERE WERE WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1 HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	Loading 104.8 104.9 104.9 104.9 104.9 104.9	4.49% 4.38% 4.38% 4.38% 4.38% 4.38%	COWSKIN (COWSKN1X) 13 TRANSFORMER CF SUMMIT (SUMMIT1X) 345/230/14.4 CKT 1 SUMMIT (SUMMIT1X) 345/230/14.4 CKT 1 SUMMIT (SUMMIT1X) 345/230/14.4 CKT 1 SUMMIT (SUMMIT1X) 345/230/14.4 CKT 1
5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	18SP 18SP 18SP 18SP 18SP 18SP 18SP 18SP	WERE WERE WERE WERE WERE WERE	WERE WERE WERE WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1 HOYT - JEFFREY ENERGY CENTER 345KV CKT 1 HOYT - JEFFREY ENERGY CENTER 345KV CKT 1 HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	104.9 104.9 104.9 104.9	4.38% 4.38% 4.38%	CKT 1 SUMMIT (SUMMIT1X) 345/230/14.4 CKT 1 SUMMIT (SUMMIT1X) 345/230/14.4 CKT 1 SUMMIT (SUMMIT1X) 345/230/14.4 CKT 1 SUMMIT (SUMMIT1X) 345/230/14.4
5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	18SP 18SP 18SP 18SP 18SP 18SP 18SP 18SP	WERE WERE WERE WERE WERE	WERE WERE WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1 HOYT - JEFFREY ENERGY CENTER 345KV CKT 1 HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	104.9 104.9 104.9	4.38% 4.38%	CKT 1 SUMMIT (SUMMIT1X) 345/230/14.4 CKT 1 SUMMIT (SUMMIT1X) 345/230/14.4 CKT 1 SUMMIT (SUMMIT1X) 345/230/14.4
5 5 5 5 5 5 5 5 5 5 5 5	18SP 18SP 18SP 18SP 18SP 18SP 18SP	WERE WERE WERE WERE	WERE WERE WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1 HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	104.9 104.9	4.38%	CKT 1 SUMMIT (SUMMIT1X) 345/230/14.4 CKT 1 SUMMIT (SUMMIT1X) 345/230/14.4
5 5 5 5 5 5 5 5 5 5	18SP 18SP 18SP 18SP 18SP 18SP	WERE WERE WERE WERE	WERE WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	104.9		CKT 1 SUMMIT (SUMMIT1X) 345/230/14.4
5 5 5 5 5 5 5 5 5	18SP 18SP 18SP 18SP 18SP	WERE WERE WERE	WERE			4.38%	
5 5 5 5 5 5 5	18SP 18SP 18SP 18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1			
5 5 5 5 5 5	18SP 18SP 18SP	WERE			105.1	4.52%	MIDLAND JUNCTION (MIDJ126X TRANSFORMER CH
5 5 5 5	18SP 18SP		WEDE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	105.1	4.52%	MIDLAND JUNCTION (MIDJ126X TRANSFORMER CP
5 5 5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	105.1	4.52%	MIDLAND JUNCTION (MIDJ126X TRANSFORMER CP
5			WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	105.1	4.52%	MIDLAND JUNCTION (MIDJ126X TRANSFORMER CF
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	105.1	4.52%	MIDLAND JUNCTION (MIDJ126X TRANSFORMER CF
		WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	105.1	4.52%	LAWRENCE HILL - MIDLAND JUNC
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	105.1	4.52%	LAWRENCE HILL - MIDLAND JUNC
<u></u>	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	105.1	4.52%	LAWRENCE HILL - MIDLAND JUNC
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	105.1	4.52%	LAWRENCE HILL - MIDLAND JUNC
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	105.1	4.52%	LAWRENCE HILL - MIDLAND JUNC
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	105.1	4.49%	EAST MANHATTAN (EMANHT3X TRANSFORMER CH
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	105.1	4.49%	EAST MANHATTAN (EMANHT3X TRANSFORMER CH
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	105.1	4.49%	EAST MANHATTAN (EMANHT3X TRANSFORMER CH
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	105.1	4.49%	EAST MANHATTAN (EMANHT3X TRANSFORMER CH
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	105.1	4.49%	EAST MANHATTAN (EMANHT3X TRANSFORMER CH
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	105.3	4.53%	AUBURN ROAD - INDIAN HILLS
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	105.3	4.53%	AUBURN ROAD - INDIAN HILLS
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	105.3	4.53%	AUBURN ROAD - INDIAN HILLS
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	105.3	4.53%	AUBURN ROAD - INDIAN HILLS
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	105.3	4.53%	AUBURN ROAD - INDIAN HILLS
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	105.4	4.53%	AUBURN ROAD - SHERWOD
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	105.4	4.53%	AUBURN ROAD - SHERWOD
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	105.4	4.53%	AUBURN ROAD - SHERWOD
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	105.4	4.53%	AUBURN ROAD - SHERWOD
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	105.4	4.53%	AUBURN ROAD - SHERWOD
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	105.4	4.52%	LAWRENCE HILL (LAWHL29X) TRANSFORMER CH
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	105.4	4.52%	LAWRENCE HILL (LAWHL29X) TRANSFORMER CH
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	105.4	4.52%	LAWRENCE HILL (LAWHL29X) TRANSFORMER CH
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	105.4	4.52%	LAWRENCE HILL (LAWHL29X) TRANSFORMER CH
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	105.4	4.52%	LAWRENCE HILL (LAWHL29X) TRANSFORMER CH
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	105.7	4.59%	SPP-MIPU-05
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	105.7	4.59%	SPP-MIPU-05
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	105.7	4.59%	SPP-MIPU-05
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	105.7	4.59%	SPP-MIPU-05
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	105.7	4.59%	SPP-MIPU-05
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	106.3	4.49%	LACYGNE - WEST GARDNER
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	106.3	4.49%	LACYGNE - WEST GARDNER
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	106.3	4.49%	LACYGNE - WEST GARDNER
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	106.3	4.49%	LACYGNE - WEST GARDNER
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	106.3	4.49%	LACYGNE - WEST GARDNER
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	106.7	4.64%	SPP-WERE-85
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	106.7	4.64%	SPP-WERE-85

g Overload	Upgrade Name	Solution
38/69/13.2KV CKT 1	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa
4KV TRANSFORMER	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV
4KV TRANSFORMER	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC (Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.
4KV TRANSFORMER	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV
4KV TRANSFORMER	Lacygne - Mariosa 345KV AMRN	Indeterminate
4KV TRANSFORMER	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa
X) 230/115/18.0KV CKT 1	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV
X) 230/115/18.0KV CKT 1	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC (Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.
X) 230/115/18.0KV CKT 1	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV
X) 230/115/18.0KV CKT 1	Lacygne - Mariosa 345KV AMRN	Indeterminate
X) 230/115/18.0KV CKT 1	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa
CTION 230KV CKT 1	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV
CTION 230KV CKT 1	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC (Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.
CTION 230KV CKT 1	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV
CTION 230KV CKT 1	Lacygne - Mariosa 345KV AMRN	Indeterminate
CTION 230KV CKT 1	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa
X) 230/115/18.0KV CKT 1	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV
X) 230/115/18.0KV CKT 1	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC (Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.
X) 230/115/18.0KV CKT 1	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV
X) 230/115/18.0KV CKT 1	Lacygne - Mariosa 345KV AMRN	Indeterminate
X) 230/115/18.0KV CKT 1	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa
LS 115KV CKT 1	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV
LS 115KV CKT 1	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC (Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.
LS 115KV CKT 1	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV
LS 115KV CKT 1	Lacygne - Mariosa 345KV AMRN	Indeterminate
LS 115KV CKT 1	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa
D 115KV CKT 1	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV
D 115KV CKT 1	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC (Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.
D 115KV CKT 1	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV
D 115KV CKT 1	Lacygne - Mariosa 345KV AMRN	Indeterminate
D 115KV CKT 1	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa
.) 230/115/13.8KV CKT 1	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV
.) 230/115/13.8KV CKT 1	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC (Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.
.) 230/115/13.8KV CKT 1	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV
) 230/115/13.8KV CKT 1	Lacygne - Mariosa 345KV AMRN	Indeterminate
) 230/115/13.8KV CKT 1	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa
5	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV
5	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC (Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.
5	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV
5	Lacygne - Mariosa 345KV AMRN	Indeterminate
5	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa
R 345KV CKT 1	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV
R 345KV CKT 1	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC (Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.
R 345KV CKT 1	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV
R 345KV CKT 1	Lacygne - Mariosa 345KV AMRN	Indeterminate
R 345KV CKT 1	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa
5	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV
5	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC (Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.

Scenario	Season	From Area	To Area	Monitored Branch Over 100% Rate B	Transfer Case % Loading	TDF (%)	Outaged Branch Causing
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	106.7	4.64%	SPP-WERE-85
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	106.7	4.64%	SPP-WERE-85
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	106.7	4.64%	SPP-WERE-85
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	107.0	4.71%	SPP-AEPW-32
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	107.0	4.71%	SPP-AEPW-32
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	107.0	4.71%	SPP-AEPW-32
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	107.0	4.71%	SPP-AEPW-32
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	107.0	4.71%	SPP-AEPW-32
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	107.6	3.32%	JEFFREY ENERGY CENTER - SUM
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	107.6	3.32%	JEFFREY ENERGY CENTER - SUN
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	107.6	3.32%	JEFFREY ENERGY CENTER - SUM
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	107.6	3.32%	JEFFREY ENERGY CENTER - SUM
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	107.6	3.32%	JEFFREY ENERGY CENTER - SUM
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	109.4	4.28%	EAST MANHATTAN - JEFFREY E 230KV CKT 1
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	109.4	4.28%	EAST MANHATTAN - JEFFREY E 230KV CKT 1
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	109.4	4.28%	EAST MANHATTAN - JEFFREY E 230KV CKT 1
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	109.4	4.28%	EAST MANHATTAN - JEFFREY E 230KV CKT 1
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	109.4	4.28%	EAST MANHATTAN - JEFFREY E 230KV CKT 1
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	109.5	4.52%	AUBURN ROAD (AUBRN77X) 2 TRANSFORMER CK
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	109.5	4.52%	AUBURN ROAD (AUBRN77X) 2 TRANSFORMER CK
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	109.5	4.52%	AUBURN ROAD (AUBRN77X) 2 TRANSFORMER CK
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	109.5	4.52%	AUBURN ROAD (AUBRN77X) 2 TRANSFORMER CK
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	109.5	4.52%	AUBURN ROAD (AUBRN77X) 2 TRANSFORMER CK
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	109.6	4.57%	LACYGNE - STILWELL 345
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	109.6	4.57%	LACYGNE - STILWELL 345
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	109.6	4.57%	LACYGNE - STILWELL 345
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	109.6	4.57%	LACYGNE - STILWELL 345
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	109.6	4.57%	LACYGNE - STILWELL 345
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	117.6	4.06%	JEFFREY ENERGY CENTER - M 345KV CKT 1
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	117.6	4.06%	JEFFREY ENERGY CENTER - M 345KV CKT 1
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	117.6	4.06%	JEFFREY ENERGY CENTER - M 345KV CKT 1
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	117.6	4.06%	JEFFREY ENERGY CENTER - M 345KV CKT 1
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	117.6	4.06%	JEFFREY ENERGY CENTER - M 345KV CKT 1
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	118.5	5.75%	SWISSVALE - WEST GARDNEF
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	118.5	5.75%	SWISSVALE - WEST GARDNEF
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	118.5	5.75%	SWISSVALE - WEST GARDNEF
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	118.5	5.75%	SWISSVALE - WEST GARDNEF
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	118.5	5.75%	SWISSVALE - WEST GARDNEF
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	120.8	4.81%	AUBURN ROAD - JEFFREY ENERC CKT 1
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	120.8	4.81%	AUBURN ROAD - JEFFREY ENERC CKT 1
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	120.8	4.81%	AUBURN ROAD - JEFFREY ENERC CKT 1
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	120.8	4.81%	AUBURN ROAD - JEFFREY ENERC CKT 1
5	18SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	120.8	4.81%	AUBURN ROAD - JEFFREY ENERC CKT 1
5	23SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	105.6	3.10%	ROSE HILL - WOLF CREEK 3
5	23SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	105.6	3.10%	ROSE HILL - WOLF CREEK 3
5	23SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	105.6	3.10%	ROSE HILL - WOLF CREEK 3
5	235P	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	105.6	3.10%	ROSE HILL - WOLF CREEK 3
5	23SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	105.6	3.10%	ROSE HILL - WOLF CREEK 3

ig Overload	Upgrade Name	Solution
5	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV
5	Lacygne - Mariosa 345KV AMRN	Indeterminate
5	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa
2	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV
2	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC (Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.
2	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV
2	Lacygne - Mariosa 345KV AMRN	Indeterminate
2	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa
JMMIT 345KV CKT 1	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV
JMMIT 345KV CKT 1	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC (Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.
JMMIT 345KV CKT 1	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV
JMMIT 345KV CKT 1	Lacygne - Mariosa 345KV AMRN	Indeterminate
JMMIT 345KV CKT 1	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa
ENERGY CENTER		Build approximately 181 miles of 345kV from KCPE Eacygne - AWKN Wahosa Build 14.2 miles of new 345 kV
ENERGY CENTER	latan - Jeffrey Energy Center 345 kV KACP HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC (Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.
ENERGY CENTER	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV
ENERGY CENTER	Lacygne - Mariosa 345KV AMRN	Indeterminate
ENERGY CENTER	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa
) 230/115/13.8KV CKT 1	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV
) 230/115/13.8KV CKT 1	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC (Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.
) 230/115/13.8KV CKT 1	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV
) 230/115/13.8KV CKT 1	Lacygne - Mariosa 345KV AMRN	Indeterminate
) 230/115/13.8KV CKT 1	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa
45KV CKT 1	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV
45KV CKT 1	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC (Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.
45KV CKT 1	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV
45KV CKT 1	Lacygne - Mariosa 345KV AMRN	Indeterminate
45KV CKT 1	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa
MORRIS COUNTY	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV
MORRIS COUNTY	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC (Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.
MORRIS COUNTY	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV
MORRIS COUNTY	Lacygne - Mariosa 345KV AMRN	Indeterminate
MORRIS COUNTY	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa
ER 345KV CKT 1	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV
ER 345KV CKT 1	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC (Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.
ER 345KV CKT 1	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV
ER 345KV CKT 1	· •	Indeterminate
	Lacygne - Mariosa 345KV AMRN	
ER 345KV CKT 1 RGY CENTER 230KV	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa
RGY CENTER 230KV	latan - Jeffrey Energy Center 345 kV KACP HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	Build 14.2 miles of new 345 kV Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC (Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.
RGY CENTER 230KV	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV
RGY CENTER 230KV	Lacygne - Mariosa 345KV AMRN	Indeterminate
RGY CENTER 230KV	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa
( 345KV CKT 1	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV
( 345KV CKT 1	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC (Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.
( 345KV CKT 1	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV
( 345KV CKT 1	Lacygne - Mariosa 345KV AMRN	Indeterminate
( 345KV CKT 1	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa
	Labygrid Mariosa JHJIV INAUF	Durid approximatory for miles of 040KV from KOFE Lacyyrie - Alvinti Manusa

Outaged Branch Causing	TDF (%)	Transfer Case % Loading	Monitored Branch Over 100% Rate B	To Area	From Area	Season	Scenario
BENTON - WOLF CREEK 3	3.18%	105.9	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	23SP	5
BENTON - WOLF CREEK 3	3.18%	105.9	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	23SP	5
BENTON - WOLF CREEK 3	3.18%	105.9	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	23SP	5
BENTON - WOLF CREEK 3	3.18%	105.9	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	23SP	5
BENTON - WOLF CREEK 3 STRANGER CREEK (STRANGER	3.18%	105.9	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	23SP	5
TRANSFORMER C STRANGER CREEK (STRANGER	3.05%	106.2	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	23SP	5
TRANSFORMER CREEK (STRANGER STRANGER CREEK (STRANGER	3.05%	106.2	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	23SP	5
TRANSFORMER C	3.05%	106.2	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	23SP	5
STRANGER CREEK (STRANGER TRANSFORMER C	3.05%	106.2	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	23SP	5
STRANGER CREEK (STRANGER TRANSFORMER C	3.05%	106.2	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	23SP	5
MCCREDIE - THOMAS HILL	3.04%	106.4	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	23SP	5
MCCREDIE - THOMAS HILL	3.04%	106.4	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	23SP	5
MCCREDIE - THOMAS HILL	3.04%	106.4	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	23SP	5
MCCREDIE - THOMAS HILL	3.04%	106.4	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	23SP	5
MCCREDIE - THOMAS HILL	3.04%	106.4	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	23SP	5
EVANS ENERGY CENTER NOR COUNTY NO. 12 COLWICH	3.05%	106.4	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	23SP	5
EVANS ENERGY CENTER NOR COUNTY NO. 12 COLWICH	3.05%	106.4	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	23SP	5
EVANS ENERGY CENTER NOR COUNTY NO. 12 COLWICH	3.05%	106.4	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	23SP	5
EVANS ENERGY CENTER NOR COUNTY NO. 12 COLWICH	3.05%	106.4	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	23SP	5
EVANS ENERGY CENTER NOR COUNTY NO. 12 COLWICH	3.05%	106.4	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	23SP	5
TECUMSEH ENERGY CENTER - 115KV CKT 1	3.05%	106.4	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	23SP	5
TECUMSEH ENERGY CENTER - 115KV CKT 1	3.05%	106.4	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	23SP	5
TECUMSEH ENERGY CENTER - 115KV CKT 1	3.05%	106.4	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	23SP	5
TECUMSEH ENERGY CENTER - 115KV CKT 1	3.05%	106.4	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	23SP	5
TECUMSEH ENERGY CENTER - 115KV CKT 1	3.05%	106.4	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	23SP	5
BASE CASE	3.04%	106.9	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	23SP	5
BASE CASE	3.04%	106.9	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	23SP	5
BASE CASE	3.04%	106.9	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	23SP	5
BASE CASE	3.04%	106.9	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	23SP	5
BASE CASE	3.04%	106.9	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	23SP	5
ABILENE ENERGY CENTER TRANSFORMER C	3.04%	107.2	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	23SP	5
ABILENE ENERGY CENTER TRANSFORMER C	3.04%	107.2	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	23SP	5
ABILENE ENERGY CENTER TRANSFORMER C	3.04%	107.2	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	23SP	5
ABILENE ENERGY CENTER TRANSFORMER C	3.04%	107.2	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	23SP	5
	3.04%	107.2	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	23SP	5
ABILENE ENERGY CENTER						23SP	5
ABILENE ENERGY CENTER TRANSFORMER C EUDORA TOWNSHIP - WAKAR		107.3		WERE	WERE		
ABILENE ENERGY CENTER TRANSFORMER C EUDORA TOWNSHIP - WAKAR SWITCHING STATION 11 EUDORA TOWNSHIP - WAKAR	3.06%	107.3	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	23SP	
ABILENE ENERGY CENTER TRANSFORMER C EUDORA TOWNSHIP - WAKAR SWITCHING STATION 11 EUDORA TOWNSHIP - WAKAR SWITCHING STATION 11 EUDORA TOWNSHIP - WAKAR	3.06% 3.06%	107.3	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1 HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE	WERE	23SP	5
ABILENE ENERGY CENTER TRANSFORMER C EUDORA TOWNSHIP - WAKAR SWITCHING STATION 11 EUDORA TOWNSHIP - WAKAR SWITCHING STATION 11 EUDORA TOWNSHIP - WAKAR SWITCHING STATION 11	3.06% 3.06% 3.06%	107.3 107.3	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1 HOYT - JEFFREY ENERGY CENTER 345KV CKT 1 HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE WERE	WERE	23SP	5
ABILENE ENERGY CENTER TRANSFORMER C EUDORA TOWNSHIP - WAKAR SWITCHING STATION 11 EUDORA TOWNSHIP - WAKAR SWITCHING STATION 11 EUDORA TOWNSHIP - WAKAR SWITCHING STATION 11 EUDORA TOWNSHIP - WAKAR	3.06% 3.06% 3.06% 3.06%	107.3 107.3 107.3	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1 HOYT - JEFFREY ENERGY CENTER 345KV CKT 1 HOYT - JEFFREY ENERGY CENTER 345KV CKT 1 HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE WERE WERE	WERE WERE WERE	23SP 23SP	5 5 5
ABILENE ENERGY CENTER TRANSFORMER C EUDORA TOWNSHIP - WAKAR SWITCHING STATION 11 EUDORA TOWNSHIP - WAKAR SWITCHING STATION 11 EVANS ENERGY CENTER SOU	3.06% 3.06% 3.06% 3.06%	107.3 107.3 107.3 107.3	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1 HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE WERE WERE WERE	WERE WERE WERE WERE	23SP 23SP 23SP	5 5 5 5
ABILENE ENERGY CENTER TRANSFORMER C EUDORA TOWNSHIP - WAKAR SWITCHING STATION 11 EUDORA TOWNSHIP - WAKAR SWITCHING STATION 11 EVANS ENERGY CENTER SOU 138KV CKT 1	3.06% 3.06% 3.06% 3.06% 3.06% 3.05%	107.3 107.3 107.3 107.3 107.4	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1 HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE WERE WERE WERE	WERE WERE WERE WERE	23SP 23SP 23SP 23SP	5 5 5 5 5 5
ABILENE ENERGY CENTER TRANSFORMER C EUDORA TOWNSHIP - WAKAR SWITCHING STATION 11 EUDORA TOWNSHIP - WAKAR SWITCHING STATION 11 EVANS ENERGY CENTER SOU 138KV CKT 1 EVANS ENERGY CENTER SOU	3.06% 3.06% 3.06% 3.06% 3.06% 3.05% 3.05%	107.3 107.3 107.3 107.3 107.4 107.4	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1 HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE WERE WERE WERE WERE	WERE WERE WERE WERE WERE	23SP 23SP 23SP 23SP 23SP 23SP	5 5 5 5 5 5 5
ABILENE ENERGY CENTER TRANSFORMER C EUDORA TOWNSHIP - WAKAR SWITCHING STATION 11 EUDORA TOWNSHIP - WAKAR SWITCHING STATION 11 EVANS ENERGY CENTER SOU 138KV CKT 1 EVANS ENERGY CENTER SOU 138KV CKT 1	3.06% 3.06% 3.06% 3.06% 3.06% 3.05% 3.05% 3.05%	107.3 107.3 107.3 107.3 107.4 107.4 107.4	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1 HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE WERE WERE WERE WERE	WERE WERE WERE WERE WERE	23SP 23SP 23SP 23SP 23SP 23SP	5 5 5 5 5 5 5 5
ABILENE ENERGY CENTER TRANSFORMER C EUDORA TOWNSHIP - WAKAR SWITCHING STATION 11 EUDORA TOWNSHIP - WAKAR SWITCHING STATION 11 EVANS ENERGY CENTER SOU 138KV CKT 1 EVANS ENERGY CENTER SOU 138KV CKT 1 EVANS ENERGY CENTER SOU 138KV CKT 1 EVANS ENERGY CENTER SOU 138KV CKT 1	3.06% 3.06% 3.06% 3.06% 3.05% 3.05% 3.05% 3.05%	107.3 107.3 107.3 107.3 107.4 107.4 107.4 107.4	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1 HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE WERE WERE WERE WERE WERE	WERE WERE WERE WERE WERE WERE	23SP 23SP 23SP 23SP 23SP 23SP 23SP 23SP	5 5 5 5 5 5 5 5 5
ABILENE ENERGY CENTER TRANSFORMER C EUDORA TOWNSHIP - WAKAR SWITCHING STATION 111 EUDORA TOWNSHIP - WAKAR SWITCHING STATION 111 EVANS ENERGY CENTER SOU 138KV CKT 1 EVANS ENERGY CENTER SOU 138KV CKT 1 EVANS ENERGY CENTER SOU 138KV CKT 1 EVANS ENERGY CENTER SOU 138KV CKT 1	3.06% 3.06% 3.06% 3.06% 3.06% 3.05% 3.05% 3.05% 3.05% 3.05%	107.3         107.3         107.3         107.3         107.4         107.4         107.4         107.4         107.4         107.4         107.4	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1 HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE WERE WERE WERE WERE WERE WERE	WERE WERE WERE WERE WERE WERE WERE	23SP 23SP 23SP 23SP 23SP 23SP 23SP 23SP	5 5 5 5 5 5 5 5 5 5
ABILENE ENERGY CENTER TRANSFORMER C EUDORA TOWNSHIP - WAKAR SWITCHING STATION 11 EUDORA TOWNSHIP - WAKAR SWITCHING STATION 11 EVANS ENERGY CENTER SOU 138KV CKT 1 EVANS ENERGY CENTER SOU 138KV CKT 1 EVANS ENERGY CENTER SOU 138KV CKT 1 EVANS ENERGY CENTER SOU 138KV CKT 1	3.06% 3.06% 3.06% 3.06% 3.05% 3.05% 3.05% 3.05%	107.3 107.3 107.3 107.3 107.4 107.4 107.4 107.4	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1 HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	WERE WERE WERE WERE WERE WERE	WERE WERE WERE WERE WERE WERE	23SP 23SP 23SP 23SP 23SP 23SP 23SP 23SP	5 5 5 5 5 5 5 5 5

ng Overload	Upgrade Name	Solution			
345KV CKT 1	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV			
345KV CKT 1	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC (Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.			
345KV CKT 1	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV			
345KV CKT 1	Lacygne - Mariosa 345KV AMRN	Indeterminate			
345KV CKT 1	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa			
1X) 345/115/14.4KV CKT 1	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV			
1X) 345/115/14.4KV CKT 1 1X) 345/115/14.4KV	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC (Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.			
CKT 1 1X) 345/115/14.4KV	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV			
CKT 1 1X) 345/115/14.4KV	Lacygne - Mariosa 345KV AMRN	Indeterminate			
CKT 1	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa			
_ 345KV CKT 1	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC			
L 345KV CKT 1	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	(Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.			
_ 345KV CKT 1	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV			
_ 345KV CKT 1	Lacygne - Mariosa 345KV AMRN	Indeterminate			
_ 345KV CKT 1 RTH - SEDGWICK	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa			
1 138KV CKT 1 RTH - SEDGWICK	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC			
I 138KV CKT 1 RTH - SEDGWICK	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	(Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.			
I 138KV CKT 1 RTH - SEDGWICK	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV			
1 138KV CKT 1 RTH - SEDGWICK	Lacygne - Mariosa 345KV AMRN	Indeterminate			
138KV CKT 1 - TECUMSEH HILL	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa			
- TECUMSEH HILL	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV			
	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC (Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.			
- TECUMSEH HILL	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV			
- TECUMSEH HILL	Lacygne - Mariosa 345KV AMRN	Indeterminate			
	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa			
	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV			
	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC (Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.			
	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV			
	Lacygne - Mariosa 345KV AMRN	Indeterminate			
	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa			
ER 115/34.5KV CKT 1	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV			
ER 115/34.5KV CKT 1	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC (Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.			
ER 115/34.5KV CKT 1	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV			
ER 115/34.5KV CKT 1	Lacygne - Mariosa 345KV AMRN	Indeterminate			
ER 115/34.5KV CKT 1	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa			
RUSA JUNCTION 15KV CKT 1	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV			
RUSA JUNCTION 15KV CKT 1	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC (Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.			
RUSA JUNCTION 15KV CKT 1	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV			
RUSA JUNCTION 15KV CKT 1	Lacygne - Mariosa 345KV AMRN	Indeterminate			
RUSA JUNCTION 15KV CKT 1	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa			
JTH - LAKERIDGE	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV			
JTH - LAKERIDGE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC (Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.			
JTH - LAKERIDGE	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV			
JTH - LAKERIDGE	Lacygne - Mariosa 345KV AMRN	Indeterminate			
JTH - LAKERIDGE	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa			
GON 115KV CKT 1	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV			
GON 115KV CKT 1	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC (Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.			
GON 115KV CKT 1	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV			

Scenario	Season	From Area	To Area	Monitored Branch Over 100% Rate B	Transfer Case % Loading	TDF (%)	Outaged Branch Causing
5	23SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	107.4	3.06%	MIDLAND JUNCTION - PENTAG
5	23SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	107.4	3.06%	MIDLAND JUNCTION - PENTAG COWSKIN (COWSKN1X) 13
5	23SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	107.6	3.04%	TRANSFORMER CH COWSKIN (COWSKN1X) 13
5	23SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	107.6	3.04%	TRANSFORMER CH COWSKIN (COWSKN1X) 13
5	23SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	107.6	3.04%	TRANSFORMER CH COWSKIN (COWSKN1X) 13
5	23SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	107.6	3.04%	TRANSFORMER CH
5	23SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	107.6	3.04%	COWSKIN (COWSKN1X) 13 TRANSFORMER CI
5	23SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	107.9	3.06%	MIDLAND JUNCTION (MIDJ126X TRANSFORMER CI
5	23SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	107.9	3.06%	MIDLAND JUNCTION (MIDJ126× TRANSFORMER CI
5	23SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	107.9	3.06%	MIDLAND JUNCTION (MIDJ126X TRANSFORMER CI
5	23SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	107.9	3.06%	MIDLAND JUNCTION (MIDJ126X TRANSFORMER CH
5	23SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	107.9	3.06%	MIDLAND JUNCTION (MIDJ126X TRANSFORMER CH
5	23SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	108.0	3.06%	LAWRENCE HILL - MIDLAND JUNC
5	23SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	108.0	3.06%	LAWRENCE HILL - MIDLAND JUNC
5	23SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	108.0	3.06%	LAWRENCE HILL - MIDLAND JUNC
5	23SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	108.0	3.06%	LAWRENCE HILL - MIDLAND JUNC
5	23SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	108.0	3.06%	LAWRENCE HILL - MIDLAND JUNC
5	23SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	108.2	3.07%	AUBURN ROAD - INDIAN HILL
5	23SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	108.2	3.07%	AUBURN ROAD - INDIAN HILL
	235P		WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	108.2	3.07%	AUBURN ROAD - INDIAN HILL
5		WERE					
5	23SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	108.2	3.07%	AUBURN ROAD - INDIAN HILL
5	23SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	108.2	3.07%	AUBURN ROAD - INDIAN HILL
5	23SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	108.2	3.07%	AUBURN ROAD - SHERWOD
5	23SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	108.2	3.07%	AUBURN ROAD - SHERWOD
5	23SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	108.2	3.07%	AUBURN ROAD - SHERWOD
5	23SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	108.2	3.07%	AUBURN ROAD - SHERWOD
5	23SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	108.2	3.07%	AUBURN ROAD - SHERWOD EAST MANHATTAN (EMANHT3X
5	23SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	108.2	3.04%	TRANSFORMER CH EAST MANHATTAN (EMANHT3X
5	23SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	108.2	3.04%	TRANSFORMER CH EAST MANHATTAN (EMANHT3X
5	23SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	108.2	3.04%	TRANSFORMER CH EAST MANHATTAN (EMANHT3X
5	23SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	108.2	3.04%	TRANSFORMER CH EAST MANHATTAN (EMANHT3X
5	23SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	108.2	3.04%	TRANSFORMER CH LAWRENCE HILL (LAWHL29X)
5	23SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	108.4	3.06%	TRANSFORMER CI LAWRENCE HILL (LAWHL29X)
5	23SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	108.4	3.06%	TRANSFORMER CI LAWRENCE HILL (LAWHL29X)
5	23SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	108.4	3.06%	TRANSFORMER CI
5	23SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	108.4	3.06%	LAWRENCE HILL (LAWHL29X) TRANSFORMER CI
5	23SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	108.4	3.06%	LAWRENCE HILL (LAWHL29X) TRANSFORMER CI
5	23SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	108.7	3.05%	SPP-MIPU-05
5	23SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	108.7	3.05%	SPP-MIPU-05
5	23SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	108.7	3.05%	SPP-MIPU-05
5	23SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	108.7	3.05%	SPP-MIPU-05
5	23SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	108.7	3.05%	SPP-MIPU-05
5	23SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	109.5	3.13%	SPP-WERE-85
5	23SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	109.5	3.13%	SPP-WERE-85
5	23SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	109.5	3.13%	SPP-WERE-85
5	235P	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	109.5	3.13%	SPP-WERE-85
5	23SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	109.5	3.13%	SPP-WERE-85
5	23SP	WERE	WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	109.7	3.17%	SPP-AEPW-32

ıg Overload	Upgrade Name	Solution
GON 115KV CKT 1	Lacygne - Mariosa 345KV AMRN	Indeterminate
GON 115KV CKT 1	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa
138/69/13.2KV CKT 1	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV
38/69/13.2KV CKT 1	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC (Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.
38/69/13.2KV CKT 1	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV
38/69/13.2KV CKT 1	Lacygne - Mariosa 345KV AMRN	Indeterminate
38/69/13.2KV CKT 1	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa
6X) 230/115/18.0KV		
CKT 1 SX) 230/115/18.0KV	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC
CKT 1 (X) 230/115/18.0KV	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	(Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.
CKT 1 SX) 230/115/18.0KV	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV
CKT 1 (X) 230/115/18.0KV	Lacygne - Mariosa 345KV AMRN	Indeterminate
	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa
ICTION 230KV CKT 1	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC (Station 1) substation will include remarked of 245k) (carrier equipment and installation of new fiber antio relay panels)
ICTION 230KV CKT 1	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1 latan - Jeffrey Energy Center 345 kV WERE	(Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels. Build 56.8 miles of new 345 kV
ICTION 230KV CKT 1	Lacygne - Mariosa 345KV AMRN	Indeterminate
ICTION 230KV CKT 1	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa
		Build 14.2 miles of new 345 kV
LS 115KV CKT 1 LS 115KV CKT 1	latan - Jeffrey Energy Center 345 kV KACP HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC (Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.
LS 115KV CKT 1	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV
LS 115KV CKT 1	Lacygne - Mariosa 345KV AMRN	Indeterminate
LS 115KV CKT 1	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa
D 115KV CKT 1	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV
D 115KV CKT 1	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC (Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.
D 115KV CKT 1	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV
D 115KV CKT 1	Lacygne - Mariosa 345KV AMRN	Indeterminate
D 115KV CKT 1	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa
3X) 230/115/18.0KV		Build 14.2 miles of new 345 kV
CKT 1 3X) 230/115/18.0KV	latan - Jeffrey Energy Center 345 kV KACP	Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC
CKT 1 3X) 230/115/18.0KV	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	(Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.
CKT 1 3X) 230/115/18.0KV	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV
CKT 1 3X) 230/115/18.0KV	Lacygne - Mariosa 345KV AMRN	Indeterminate
CKT 1 () 230/115/13.8KV	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa
CKT 1 () 230/115/13.8KV	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC
CKT 1 () 230/115/13.8KV	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	(Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.
CKT 1 () 230/115/13.8KV	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV
CKT 1 () 230/115/13.8KV	Lacygne - Mariosa 345KV AMRN	Indeterminate
CKT 1	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa
5	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC
5	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	(Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.
5	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV
5	Lacygne - Mariosa 345KV AMRN	
> _	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa
5	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC
5	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	(Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.
5	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV
5	Lacygne - Mariosa 345KV AMRN	Indeterminate
5	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa
2	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV

Scenario	Season	From Area To Area	Monitored Branch Over 100% Rate B	Transfer Case % Loading	TDF (%)	Outaged Branch Causing Overload	Upgrade Name	Solution
5	23SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	109.7	3.17%	SPP-AEPW-32	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC (Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.
5	23SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	109.7	3.17%	SPP-AEPW-32	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV
5	23SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	109.7	3.17%	SPP-AEPW-32	Lacygne - Mariosa 345KV AMRN	Indeterminate
5	23SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	109.7	3.17%		Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa
5	23SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	112.8	3.05%	AUBURN ROAD (AUBRN77X) 230/115/13.8KV TRANSFORMER CKT 1	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV
5	23SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	112.8	3.05%	AUBURN ROAD (AUBRN77X) 230/115/13.8KV TRANSFORMER CKT 1	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC (Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.
5	23SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	112.8	3.05%	AUBURN ROAD (AUBRN77X) 230/115/13.8KV TRANSFORMER CKT 1 AUBURN ROAD (AUBRN77X) 230/115/13.8KV	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV
5	23SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	112.8	3.05%	TRANSFORMER CKT 1 AUBURN ROAD (AUBRN77X) 230/115/13.8KV	Lacygne - Mariosa 345KV AMRN	Indeterminate
5	23SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	112.8	3.05%	TRANSFORMER CKT 1 EMPORIA ENERGY CENTER - SWISSVALE 345KV	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa
5	23SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	120.8	3.79%	CKT 1 EMPORIA ENERGY CENTER - SWISSVALE 345KV	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC
5	23SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	120.8	3.79%	CKT 1 EMPORIA ENERGY CENTER - SWISSVALE 345KV	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	(Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.
5	23SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	120.8	3.79%	CKT 1 EMPORIA ENERGY CENTER - SWISSVALE 345KV	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV
5	23SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	120.8	3.79%	CKT 1 EMPORIA ENERGY CENTER - SWISSVALE 345KV	Lacygne - Mariosa 345KV AMRN	Indeterminate
5	23SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	120.8	3.79%	CKT 1	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa
5	23SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	122.1	4.11%	SWISSVALE - WEST GARDNER 345KV CKT 1	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC
5	23SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	122.1	4.11%	SWISSVALE - WEST GARDNER 345KV CKT 1	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	(Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.
5	23SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	122.1	4.11%	SWISSVALE - WEST GARDNER 345KV CKT 1	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV
5	23SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	122.1	4.11%	SWISSVALE - WEST GARDNER 345KV CKT 1	Lacygne - Mariosa 345KV AMRN	Indeterminate
5	23SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	122.1	4.11%	SWISSVALE - WEST GARDNER 345KV CKT 1 AUBURN ROAD - JEFFREY ENERGY CENTER 230KV	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa
5	23SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	123.6	3.32%	CKT 1 AUBURN ROAD - JEFFREY ENERGY CENTER 230KV	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV
5	23SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	123.6	3.32%	CKT 1 AUBURN ROAD - JEFFREY ENERGY CENTER 230KV	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC (Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.
5	23SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	123.6	3.32%	CKT 1 AUBURN ROAD - JEFFREY ENERGY CENTER 230KV	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV
5	23SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	123.6	3.32%	CKT 1 AUBURN ROAD - JEFFREY ENERGY CENTER 230KV	Lacygne - Mariosa 345KV AMRN	Indeterminate
5	23SP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	123.6	3.32%	CKT 1 AUBURN ROAD - JEFFREY ENERGY CENTER 230KV	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa
5	23WP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	100.7	4.19%	CKT 1 AUBURN ROAD - JEFFREY ENERGY CENTER 230KV	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC
5	23WP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	100.7	4.19%	CKT 1 AUBURN ROAD - JEFFREY ENERGY CENTER 230KV	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	(Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.
5	23WP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	100.7	4.19%	CKT 1 AUBURN ROAD - JEFFREY ENERGY CENTER 230KV	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV
5	23WP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	100.7	4.19%	CKT 1 AUBURN ROAD - JEFFREY ENERGY CENTER 230KV	Lacygne - Mariosa 345KV AMRN	Indeterminate
5	23WP	WERE WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	100.7	4.19%	CKT 1	Lacygne - Mariosa 345KV KACP KNOX LEE - SOUTH TEXAS EASTMAN 138KV CKT 1	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa
5	18SP	AEPW AEPW	KNOX LEE - SOUTH TEXAS EASTMAN 138KV CKT 1	105.5	30.31%	EASTON REC - KNOX LEE 138KV CKT 1	Accelerate KNOX LEE - SOUTH TEXAS EASTMAN 138KV CKT 1	Rebuild 5.5 miles with 1533.3 ACSR/TW
5	18SP	AEPW AEPW	KNOX LEE - SOUTH TEXAS EASTMAN 138KV CKT 1	106.6	30.31%	EASTON REC - PIRKEY 138KV CKT 1	Accelerate	Rebuild 5.5 miles with 1533.3 ACSR/TW Build Messick 500/230 kV station. Connect to Carrol, Clarence, and Western Kraft 230 kV lines. Install 500/230 kV 675
5	18SP	AEPW AEPW	LIEBERMAN - LONGWOOD 138KV CKT 1	105.3	14.89%	ARSENAL HILL - RAINES 138KV CKT 1	Messick 500/230 kV Transformer Ckt 1	MVA transformer. This upgrade is contingent upon approval from Cleco Power LLC. Build Messick 500/230 kV station. Connect to Carrol, Clarence, and Western Kraft 230 kV lines. Install 500/230 kV 675
5	18SP	AEPW AEPW	LIEBERMAN - LONGWOOD 138KV CKT 1	110.4	14.89%	NORAM - RAINES 138KV CKT 1	Messick 500/230 kV Transformer Ckt 1	MVA transformer. This upgrade is contingent upon approval from Cleco Power LLC. Build Messick 500/230 kV station. Connect to Carrol, Clarence, and Western Kraft 230 kV lines. Install 500/230 kV 675
5	18SP	AEPW AEPW	LIEBERMAN - LONGWOOD 138KV CKT 1	111.0	14.89%	LONGWOOD - NORAM 138KV CKT 1	Messick 500/230 kV Transformer Ckt 1	MVA transformer. This upgrade is contingent upon approval from Cleco Power LLC. Build Messick 500/230 kV station. Connect to Carrol, Clarence, and Western Kraft 230 kV lines. Install 500/230 kV 675
5	18SP	AEPW AEPW	LONGWOOD - NORAM 138KV CKT 1	108.1	21.55%	LIEBERMAN - LONGWOOD 138KV CKT 1	Messick 500/230 kV Transformer Ckt 1	MVA transformer. This upgrade is contingent upon approval from Cleco Power LLC. Build Messick 500/230 kV station. Connect to Carrol, Clarence, and Western Kraft 230 kV lines. Install 500/230 kV 675
5	18SP	AEPW AEPW	LONGWOOD - NORAM 138KV CKT 1	121.2	23.81%	SPP-AEPW-05	Messick 500/230 kV Transformer Ckt 1	MVA transformer. This upgrade is contingent upon approval from Cleco Power LLC. Build Messick 500/230 kV station. Connect to Carrol, Clarence, and Western Kraft 230 kV lines. Install 500/230 kV 675
5	18SP	AEPW AEPW	LONGWOOD - OAK PAN-HARR REC 138KV CKT 1 LONGWOOD (LONGWOOD) 345/138/13.2KV	101.3	7.14%	SPP-AEPW-05	Messick 500/230 kV Transformer Ckt 1	MVA transformer. This upgrade is contingent upon approval from Cleco Power LLC. Build Messick 500/230 kV station. Connect to Carrol, Clarence, and Western Kraft 230 kV lines. Install 500/230 kV 675
5	18SP	AEPW AEPW	TRANSFORMER CKT 1	103.6	33.50%	SPP-AEPW-05	Messick 500/230 kV Transformer Ckt 1	MVA transformer. This upgrade is contingent upon approval from Cleco Power LLC.
5	18WP	AEPW AEPW	LYDIA - VALLIANT 345KV CKT 1	117.7	42.04%	NORTHWEST TEXARKANA - VALLIANT 345KV CKT 1	ADABELL - VBI 161KV CKT 1	Replace existing 800 amp wave trap with 1200 amp in VBI sub
5	18WP	AEPW AEPW	LYDIA - VALLIANT 345KV CKT 1	117.7	42.04%	NORTHWEST TEXARKANA - VALLIANT 345KV CKT 1	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa
5	18WP	AEPW AEPW	LYDIA - VALLIANT 345KV CKT 1	117.7	42.04%	NORTHWEST TEXARKANA - VALLIANT 345KV CKT 1	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
5	18WP	AEPW AEPW	LYDIA - VALLIANT 345KV CKT 1	117.7	42.04%	NORTHWEST TEXARKANA - VALLIANT 345KV CKT 1	Lacygne - Mariosa 345KV AMRN	Indeterminate
5	18WP	AEPW AEPW	LYDIA - VALLIANT 345KV CKT 1	117.7	42.04%	NORTHWEST TEXARKANA - VALLIANT 345KV CKT 1	Muskogee - VBI 345 kV with 345/161 kV bus tie near VBI	Build 70.95 mile 345 kV line plus two new 345/161 kV bus ties near VBI sub and 10 miles of 161 kV line
5	18WP	AEPW AEPW	LYDIA - VALLIANT 345KV CKT 1	117.7	42.04%	NORTHWEST TEXARKANA - VALLIANT 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	18WP	AEPW AEPW	LYDIA - VALLIANT 345KV CKT 1	117.7	42.04%	NORTHWEST TEXARKANA - VALLIANT 345KV CKT 1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5	23WP	AEPW AEPW	LYDIA - VALLIANT 345KV CKT 1	105.8	15.58%	NORTHWEST TEXARKANA - VALLIANT 345KV CKT 1	ADABELL - VBI 161KV CKT 1	Replace existing 800 amp wave trap with 1200 amp in VBI sub
5	23WP	AEPW AEPW	LYDIA - VALLIANT 345KV CKT 1	105.8	15.58%	NORTHWEST TEXARKANA - VALLIANT 345KV CKT 1	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa
5	23WP	AEPW AEPW	LYDIA - VALLIANT 345KV CKT 1	105.8	15.58%	NORTHWEST TEXARKANA - VALLIANT 345KV CKT 1	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO

Scenario	Season	From Area	To Area	Monitored Branch Over 100% Rate B	Transfer Case % Loading	TDF (%)	Outaged Branch Causing
5	23WP	AEPW	AEPW	LYDIA - VALLIANT 345KV CKT 1	105.8	15.58%	NORTHWEST TEXARKANA - VALL
5	23WP	AEPW	AEPW	LYDIA - VALLIANT 345KV CKT 1	105.8	15.58%	NORTHWEST TEXARKANA - VALL
5	23WP	AEPW	AEPW	LYDIA - VALLIANT 345KV CKT 1	105.8	15.58%	NORTHWEST TEXARKANA - VALL
5	23WP	AEPW	AEPW	LYDIA - VALLIANT 345KV CKT 1	105.8	15.58%	NORTHWEST TEXARKANA - VALL
5	18SP	WERE	WERE	MAIZE - MAIZEE 4 138.00 138KV CKT 1	103.3	4.27%	BENTON - WICHITA 345
5	18SP	WERE	WERE	MAIZE - MAIZEE 4 138.00 138KV CKT 1	103.3	4.27%	BENTON - WICHITA 345
5	18SP	WERE	WERE	MAIZE - MAIZEE 4 138.00 138KV CKT 1	103.3	4.27%	BENTON - WICHITA 345
5	18SP	WERE	WERE	MAIZE - MAIZEE 4 138.00 138KV CKT 1	103.3	4.27%	BENTON - WICHITA 345
5	23SP	WERE	WERE	MAIZE - MAIZEE 4 138.00 138KV CKT 1	105.0	4.64%	BENTON - WICHITA 345
5	23SP	WERE	WERE	MAIZE - MAIZEE 4 138.00 138KV CKT 1	105.0	4.64%	BENTON - WICHITA 345
5	23SP	WERE	WERE	MAIZE - MAIZEE 4 138.00 138KV CKT 1	105.0	4.64%	BENTON - WICHITA 345
5	23SP	WERE	WERE	MAIZE - MAIZEE 4 138.00 138KV CKT 1	105.0	4.64%	BENTON - WICHITA 345
5	18SP	WERE	WERE	MAIZE - MAIZEW 4 138.00 138KV CKT 1	106.8	4.27%	BENTON - WICHITA 345
5	18SP	WERE	WERE	MAIZE - MAIZEW 4 138.00 138KV CKT 1	106.8	4.27%	BENTON - WICHITA 345
5	18SP	WERE	WERE	MAIZE - MAIZEW 4 138.00 138KV CKT 1	106.8	4.27%	BENTON - WICHITA 345
5	18SP	WERE	WERE	MAIZE - MAIZEW 4 138.00 138KV CKT 1	106.8	4.27%	BENTON - WICHITA 345k
5	23SP	WERE	WERE	MAIZE - MAIZEW 4 138.00 138KV CKT 1	108.9	4.64%	BENTON - WICHITA 345
5	23SP	WERE	WERE	MAIZE - MAIZEW 4 138.00 138KV CKT 1	108.9	4.64%	BENTON - WICHITA 345
5	23SP	WERE	WERE	MAIZE - MAIZEW 4 138.00 138KV CKT 1	108.9	4.64%	BENTON - WICHITA 345
5	23SP	WERE	WERE	MAIZE - MAIZEW 4 138.00 138KV CKT 1	108.9	4.64%	BENTON - WICHITA 345
5	18SP	SUNC	SUNC	MULLERGREN - SPEARVILLE 230KV CKT 1	105.8	4.20%	POST ROCK - SPEARVILLE
5	23SP	SUNC	SUNC	MULLERGREN - SPEARVILLE 230KV CKT 1	106.8	3.45%	POST ROCK - SPEARVILLE
5	23WP	WERE	EMDE	NEOSHO - SUB 452 - RIVERTON 161KV CKT 1	105.1	3.47%	7JASPER 345.00 - BLACKBER
5	23WP	WERE	EMDE	NEOSHO - SUB 452 - RIVERTON 161KV CKT 1	105.1	3.47%	7JASPER 345.00 - BLACKBER
5	23WP	WERE	EMDE	NEOSHO - SUB 452 - RIVERTON 161KV CKT 1	105.1	3.47%	7JASPER 345.00 - BLACKBER
5	23WP	WERE	EMDE	NEOSHO - SUB 452 - RIVERTON 161KV CKT 1	105.1	3.47%	7JASPER 345.00 - BLACKBER
5	23WP	WERE	EMDE	NEOSHO - SUB 452 - RIVERTON 161KV CKT 1	105.1	3.47%	7JASPER 345.00 - BLACKBER
5	23WP	WERE	EMDE	NEOSHO - SUB 452 - RIVERTON 161KV CKT 1	105.1	3.47%	7JASPER 345.00 - BLACKBER
5	23WP	WERE	EMDE	NEOSHO - SUB 452 - RIVERTON 161KV CKT 1	105.1	3.47%	7JASPER 345.00 - BLACKBER
5	23WP	WERE	EMDE	NEOSHO - SUB 452 - RIVERTON 161KV CKT 1	108.1	4.18%	BLACKBERRY - NEOSHO 3
5	23WP	WERE	EMDE	NEOSHO - SUB 452 - RIVERTON 161KV CKT 1	108.1	4.18%	BLACKBERRY - NEOSHO 3
5	23WP	WERE	EMDE	NEOSHO - SUB 452 - RIVERTON 161KV CKT 1	108.1	4.18%	BLACKBERRY - NEOSHO 3
5	23WP	WERE	EMDE	NEOSHO - SUB 452 - RIVERTON 161KV CKT 1	108.1	4.18%	BLACKBERRY - NEOSHO 3
5	23WP	WERE	EMDE	NEOSHO - SUB 452 - RIVERTON 161KV CKT 1	108.1	4.18%	BLACKBERRY - NEOSHO 3
5	23WP	WERE	EMDE	NEOSHO - SUB 452 - RIVERTON 161KV CKT 1	108.1	4.18%	BLACKBERRY - NEOSHO 3
_	23WP	WERE	EMDE	NEOSHO - SUB 452 - RIVERTON 161KV CKT 1	108.1	4.18%	BLACKBERRY - NEOSHO 3
5							
5	18SP	AEPW	AEPW	NORAM - RAINES 138KV CKT 1	106.9	21.55%	LIEBERMAN - LONGWOOD
	18SP 18SP	AEPW AEPW	AEPW AEPW	NORAM - RAINES 138KV CKT 1	106.9 120.1	21.55% 23.81%	
5							SPP-AEPW-05
5	18SP	AEPW	AEPW	NORAM - RAINES 138KV CKT 1 NORTH NEW BOSTON - NW TEXARKANA-BANN T 138KV CKT 1 NORTH NEW BOSTON - NW TEXARKANA-BANN T 138KV CKT 1	120.1	23.81%	SPP-AEPW-05 SPP-AEPW-04
5 5 5	18SP 18SP	AEPW AEPW	AEPW AEPW	NORAM - RAINES 138KV CKT 1 NORTH NEW BOSTON - NW TEXARKANA-BANN T 138KV CKT 1 NORTH NEW BOSTON - NW TEXARKANA-BANN T 138KV CKT 1 NORTHWEST (NORTWST2) 345/138/13.8KV TRANSFORMER CKT 1	120.1 106.2	23.81% 3.21%	SPP-AEPW-05 SPP-AEPW-04 PATTERSON - SOUTH FOREMAN NORTHWEST (NORTWST3) 34 TRANSFORMER CH
5 5 5 5	18SP 18SP 18SP	AEPW AEPW AEPW	AEPW AEPW AEPW	NORAM - RAINES 138KV CKT 1 NORTH NEW BOSTON - NW TEXARKANA-BANN T 138KV CKT 1 NORTH NEW BOSTON - NW TEXARKANA-BANN T 138KV CKT 1 NORTHWEST (NORTWST2) 345/138/13.8KV	120.1 106.2 110.6	23.81% 3.21% 3.92%	SPP-AEPW-05 SPP-AEPW-04 PATTERSON - SOUTH FOREMAN NORTHWEST (NORTWST3) 34 TRANSFORMER CH NORTHWEST (NORTWST2) 34
5 5 5 5 5	18SP 18SP 18SP 18SP 14WP	AEPW AEPW AEPW OKGE	AEPW AEPW AEPW OKGE	NORAM - RAINES 138KV CKT 1 NORTH NEW BOSTON - NW TEXARKANA-BANN T 138KV CKT 1 NORTH NEW BOSTON - NW TEXARKANA-BANN T 138KV CKT 1 NORTHWEST (NORTWST2) 345/138/13.8KV TRANSFORMER CKT 1 NORTHWEST (NORTWST3) 345/138/13.8KV	120.1 106.2 110.6 113.9	23.81% 3.21% 3.92% 3.10%	SPP-AEPW-05 SPP-AEPW-04 PATTERSON - SOUTH FOREMAN NORTHWEST (NORTWST3) 3- TRANSFORMER CF NORTHWEST (NORTWST2) 3- TRANSFORMER CF
5 5 5 5 5 5 5	18SP 18SP 18SP 14WP 14WP	AEPW AEPW AEPW OKGE OKGE	AEPW AEPW AEPW OKGE OKGE	NORAM - RAINES 138KV CKT 1 NORTH NEW BOSTON - NW TEXARKANA-BANN T 138KV CKT 1 NORTH NEW BOSTON - NW TEXARKANA-BANN T 138KV CKT 1 NORTHWEST (NORTWST2) 345/138/13.8KV TRANSFORMER CKT 1 NORTHWEST (NORTWST3) 345/138/13.8KV TRANSFORMER CKT 1	120.1 106.2 110.6 113.9 104.4	23.81% 3.21% 3.92% 3.10% 3.01%	SPP-AEPW-05 SPP-AEPW-04 PATTERSON - SOUTH FOREMAN NORTHWEST (NORTWST3) 34 TRANSFORMER CH NORTHWEST (NORTWST2) 34 TRANSFORMER CH PITTSBURG - SEMINOLE 34
5 5 5 5 5 5 5 5	18SP 18SP 18SP 14WP 14WP 18SP	AEPW AEPW OKGE OKGE OKGE	AEPW AEPW AEPW OKGE OKGE	NORAM - RAINES 138KV CKT 1 NORTH NEW BOSTON - NW TEXARKANA-BANN T 138KV CKT 1 NORTH NEW BOSTON - NW TEXARKANA-BANN T 138KV CKT 1 NORTHWEST (NORTWST2) 345/138/13.8KV TRANSFORMER CKT 1 NORTHWEST (NORTWST3) 345/138/13.8KV TRANSFORMER CKT 1 PARK LANE - SEMINOLE 138KV CKT 1	120.1 106.2 110.6 113.9 104.4 102.0	23.81% 3.21% 3.92% 3.10% 3.01% 3.24%	LIEBERMAN - LONGWOOD - SPP-AEPW-05 SPP-AEPW-04 PATTERSON - SOUTH FOREMAN NORTHWEST (NORTWST3) 3- TRANSFORMER CF NORTHWEST (NORTWST2) 3- TRANSFORMER CF PITTSBURG - SEMINOLE 3- PITTSBURG - SEMINOLE 3- PITTSBURG - SEMINOLE 3-
5 5 5 5 5 5 5 5 5	18SP 18SP 18SP 14WP 14WP 18SP 18SP	AEPW AEPW OKGE OKGE OKGE	AEPW AEPW OKGE OKGE OKGE	NORAM - RAINES 138KV CKT 1 NORTH NEW BOSTON - NW TEXARKANA-BANN T 138KV CKT 1 NORTH NEW BOSTON - NW TEXARKANA-BANN T 138KV CKT 1 NORTHWEST (NORTWST2) 345/138/13.8KV TRANSFORMER CKT 1 NORTHWEST (NORTWST3) 345/138/13.8KV TRANSFORMER CKT 1 PARK LANE - SEMINOLE 138KV CKT 1 PARK LANE - SEMINOLE 138KV CKT 1	120.1 106.2 110.6 113.9 104.4 102.0 102.0	23.81% 3.21% 3.92% 3.10% 3.01% 3.24% 3.24%	SPP-AEPW-05 SPP-AEPW-04 PATTERSON - SOUTH FOREMAN NORTHWEST (NORTWST3) 34 TRANSFORMER CH NORTHWEST (NORTWST2) 34 TRANSFORMER CH PITTSBURG - SEMINOLE 34 PITTSBURG - SEMINOLE 34
5 5 5 5 5 5 5 5 5 5 5	18SP 18SP 18SP 14WP 14WP 18SP 18SP 18SP	AEPW AEPW OKGE OKGE OKGE OKGE	AEPW AEPW OKGE OKGE OKGE OKGE	NORAM - RAINES 138KV CKT 1 NORTH NEW BOSTON - NW TEXARKANA-BANN T 138KV CKT 1 NORTH NEW BOSTON - NW TEXARKANA-BANN T 138KV CKT 1 NORTHWEST (NORTWST2) 345/138/13.8KV TRANSFORMER CKT 1 NORTHWEST (NORTWST3) 345/138/13.8KV TRANSFORMER CKT 1 PARK LANE - SEMINOLE 138KV CKT 1 PARK LANE - SEMINOLE 138KV CKT 1 PARK LANE - SEMINOLE 138KV CKT 1	120.1 106.2 110.6 113.9 104.4 102.0 102.0 102.0	23.81% 3.21% 3.92% 3.10% 3.01% 3.24% 3.24% 3.24%	SPP-AEPW-05 SPP-AEPW-04 PATTERSON - SOUTH FOREMAN NORTHWEST (NORTWST3) 34 TRANSFORMER CF NORTHWEST (NORTWST2) 34 TRANSFORMER CF PITTSBURG - SEMINOLE 34 PITTSBURG - SEMINOLE 34

ıg Overload	Upgrade Name	Solution
LIANT 345KV CKT 1	Lacygne - Mariosa 345KV AMRN	Indeterminate
LIANT 345KV CKT 1	Muskogee - VBI 345 kV with 345/161 kV bus tie near VBI	Build 70.95 mile 345 kV line plus two new 345/161 kV bus ties near VBI sub and 10 miles of 161 kV line
LIANT 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
LIANT 345KV CKT 1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5KV CKT 1	Viola - Rose Hill 345 kV	Build new 35 mile line from Viola to Rose Hill 345 kV
5KV CKT 1	Viola - Clearwater 138kV Ckt1	Build new 138kV line between new Viola substation 345/138 kV transformer and existing Clearwater 138 kV substation.
5KV CKT 1	Viola - Gill 138kV Ckt1	Build new 138kV line between new Viola substation 345/138 kV transformer and existing Gill 138 kV substation.
5KV CKT 1	Viola 345/138kV Transformer Ckt 1	Install new 345/138 kV transformer at Viola substation
5KV CKT 1	Viola - Rose Hill 345 kV	Build new 35 mile line from Viola to Rose Hill 345 kV
5KV CKT 1	Viola - Clearwater 138kV Ckt1	Build new 138kV line between new Viola substation 345/138 kV transformer and existing Clearwater 138 kV substation.
5KV CKT 1	Viola - Gill 138kV Ckt1	Build new 138kV line between new Viola substation 345/138 kV transformer and existing Gill 138 kV substation.
5KV CKT 1	Viola 345/138kV Transformer Ckt 1	Install new 345/138 kV transformer at Viola substation
5KV CKT 1	Viola - Rose Hill 345 kV	Build new 35 mile line from Viola to Rose Hill 345 kV
5KV CKT 1	Viola - Clearwater 138kV Ckt1	Build new 138kV line between new Viola substation 345/138 kV transformer and existing Clearwater 138 kV substation.
5KV CKT 1	Viola - Gill 138kV Ckt1	Build new 138kV line between new Viola substation 345/138 kV transformer and existing Gill 138 kV substation.
5KV CKT 1	Viola 345/138kV Transformer Ckt 1	Install new 345/138 kV transformer at Viola substation
5KV CKT 1	Viola - Rose Hill 345 kV	Build new 35 mile line from Viola to Rose Hill 345 kV
5KV CKT 1	Viola - Clearwater 138kV Ckt1	Build new 138kV line between new Viola substation 345/138 kV transformer and existing Clearwater 138 kV substation.
5KV CKT 1	Viola - Gill 138kV Ckt1	Build new 138kV line between new Viola substation 345/138 kV transformer and existing Gill 138 kV substation.
5KV CKT 1	Viola 345/138kV Transformer Ckt 1	Install new 345/138 kV transformer at Viola substation
E 345KV CKT 1	MULLERGREN - SPEARVILLE 230KV CKT 1	Rebuild 65 miles
E 345KV CKT 1	MULLERGREN - SPEARVILLE 230KV CKT 1	Rebuild 65 miles
RRY 345KV CKT 1	ADABELL - VBI 161KV CKT 1	Replace existing 800 amp wave trap with 1200 amp in VBI sub
RRY 345KV CKT 1	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa
RRY 345KV CKT 1	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
RRY 345KV CKT 1	Lacygne - Mariosa 345KV AMRN	Indeterminate
RRY 345KV CKT 1	Muskogee - VBI 345 kV with 345/161 kV bus tie near VBI	Build 70.95 mile 345 kV line plus two new 345/161 kV bus ties near VBI sub and 10 miles of 161 kV line
RRY 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
RRY 345KV CKT 1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
345KV CKT 1	ADABELL - VBI 161KV CKT 1	Replace existing 800 amp wave trap with 1200 amp in VBI sub
345KV CKT 1	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa
345KV CKT 1	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
345KV CKT 1	Lacygne - Mariosa 345KV AMRN	Indeterminate
345KV CKT 1	Muskogee - VBI 345 kV with 345/161 kV bus tie near VBI	Build 70.95 mile 345 kV line plus two new 345/161 kV bus ties near VBI sub and 10 miles of 161 kV line
345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
345KV CKT 1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
) 138KV CKT 1	Messick 500/230 kV Transformer Ckt 1	Build Messick 500/230 kV station. Connect to Carrol, Clarence, and Western Kraft 230 kV lines. Install 500/230 kV 675 MVA transformer. This upgrade is contingent upon approval from Cleco Power LLC.
5	Messick 500/230 kV Transformer Ckt 1	Build Messick 500/230 kV station. Connect to Carrol, Clarence, and Western Kraft 230 kV lines. Install 500/230 kV 675 MVA transformer. This upgrade is contingent upon approval from Cleco Power LLC.
4	NORTH NEW BOSTON - NW TEXARKANA-BANN T 138KV CKT 1	Rebuild 14.19 miles to 1533.6 ACSR/TW 54/19
N REC 138KV CKT 1 345/138/13.8KV	NORTH NEW BOSTON - NW TEXARKANA-BANN T 138KV CKT 1 NORTHWEST 345/138/13.8KV TRANSFORMER CKT 3 Accelerated	Rebuild 14.19 miles to 1533.6 ACSR/TW 54/19 Install third 345/138 kV Bus Tie in Northwest Sub
CKT 1 345/138/13.8KV CKT 1	NORTHWEST 345/138/13.8KV TRANSFORMER CKT 3 Accelerated	Install third 345/138 kV Bus Tie in Northwest Sub
345KV CKT 1	Muskogee - VBI 345 kV with 345/161 kV bus tie near VBI	Build 70.95 mile 345 kV line plus two new 345/161 kV bus ties near VBI sub and 10 miles of 161 kV line
345KV CKT 1	ADABELL - VBI 161KV CKT 1	Replace existing 800 amp wave trap with 1200 amp in VBI sub
345KV CKT 1	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
345KV CKT 1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
AX 138KV CKT 1	PAWHUSKA TAP - WEST PAWHUSKA 138KV CKT 1	Rebuild 5.98

Scenario	Season	From Area	To Area	Monitored Branch Over 100% Rate B	Transfer Case % Loading	TDF (%)	Outaged Branch Causing
5	14WP	GMO	GMO	PECULIAR - PLEASANT HILL 345KV CKT 1	101.8	3.45%	HAWTHORN - ST JOE 345
5	14WP	GMO	GMO	PECULIAR - PLEASANT HILL 345KV CKT 1	114.5	3.58%	EASTOWN7 345.00 - IATAN
5	18WP	OKGE	AEPW	PITTSBURG - SEMINOLE 345KV CKT 1	101.0	20.61%	CANADIAN RIVER - MUSKOGE
5	18WP	OKGE	AEPW	PITTSBURG - SEMINOLE 345KV CKT 1	101.0	20.61%	CANADIAN RIVER - MUSKOGE
5	18WP	OKGE	AEPW	PITTSBURG - SEMINOLE 345KV CKT 1	101.0	20.61%	CANADIAN RIVER - MUSKOGE
5	18WP	OKGE	AEPW	PITTSBURG - SEMINOLE 345KV CKT 1	101.0	20.61%	CANADIAN RIVER - MUSKOGE
5	18WP	OKGE	AEPW	PITTSBURG - SEMINOLE 345KV CKT 1	101.0	20.61%	CANADIAN RIVER - MUSKOGE
5	18WP	AEPW	AEPW	PITTSBURG - VALLIANT 345KV CKT 1	111.2	33.65%	HUGO - VALLIANT 345K
5	18WP	AEPW	AEPW	PITTSBURG - VALLIANT 345KV CKT 1	111.5	35.64%	HUGO - SUNNYSIDE 345
5	14WP	OKGE	OKGE	ROMAN NOSE - SOUTHARD 138KV CKT 1	111.6	4.45%	NORTHWEST - TATONGA7 345
5	14WP	OKGE	OKGE	ROMAN NOSE - SOUTHARD 138KV CKT 1	111.6	4.45%	NORTHWEST - TATONGA7 345
5	14WP	OKGE	OKGE	ROMAN NOSE - SOUTHARD 138KV CKT 1	111.6	4.45%	NORTHWEST - TATONGA7 345
5	14WP	OKGE	OKGE	ROMAN NOSE - SOUTHARD 138KV CKT 1	111.6	4.45%	NORTHWEST - TATONGA7 345
5	18SP	OKGE	OKGE	ROMAN NOSE - SOUTHARD 138KV CKT 1	109.4	4.22%	TATONGA7 345.00 - WOODWAF 345KV CKT 1
5	18SP	OKGE	OKGE	ROMAN NOSE - SOUTHARD 138KV CKT 1	109.4	4.22%	TATONGA7 345.00 - WOODWAF 345KV CKT 1
5	18SP	OKGE	OKGE	ROMAN NOSE - SOUTHARD 138KV CKT 1	109.4	4.22%	TATONGA7 345.00 - WOODWAF 345KV CKT 1
5	18SP	OKGE	OKGE	ROMAN NOSE - SOUTHARD 138KV CKT 1	109.4	4.22%	TATONGA7 345.00 - WOODWAF 345KV CKT 1
5	18SP	OKGE	OKGE	ROMAN NOSE - SOUTHARD 138KV CKT 1	126.0	4.22%	NORTHWEST - TATONGA7 345
5	18SP	OKGE	OKGE	ROMAN NOSE - SOUTHARD 138KV CKT 1	126.0	4.22%	NORTHWEST - TATONGA7 345
5	18SP	OKGE	OKGE	ROMAN NOSE - SOUTHARD 138KV CKT 1	126.0	4.22%	NORTHWEST - TATONGA7 345
5	18SP	OKGE	OKGE	ROMAN NOSE - SOUTHARD 138KV CKT 1	126.0	4.22%	NORTHWEST - TATONGA7 345
5	18WP	OKGE	OKGE	ROMAN NOSE - SOUTHARD 138KV CKT 1	104.4	4.21%	NORTHWEST - TATONGA7 345
5	18WP	OKGE	OKGE	ROMAN NOSE - SOUTHARD 138KV CKT 1	104.4	4.21%	NORTHWEST - TATONGA7 345
5	18WP	OKGE	OKGE	ROMAN NOSE - SOUTHARD 138KV CKT 1	104.4	4.21%	NORTHWEST - TATONGA7 345
5	18WP	OKGE	OKGE	ROMAN NOSE - SOUTHARD 138KV CKT 1	104.4	4.21%	NORTHWEST - TATONGA7 345
5	23SP	AEPW	AEPW	SHIDLER - WEST PAWHUSKA 138KV CKT 1	104.5	3.17%	4REMNGTON 138.00 - FAIRFA
5	18SP	AEPW	AEPW	SOUTHWEST SHREVEPORT - WESTERN ELECTRIC T 138KV CKT 1	100.9	13.68%	NEW PROSPEST - ROCK HILL
5	23SP	WFEC	AEPW	SOUTHWESTERN STATION - WASHITA 138KV CKT 1	112.9	21.73%	ANADARKO - GRACMNT4 138
5	23SP	WFEC	AEPW	SOUTHWESTERN STATION - WASHITA 138KV CKT 1	115.1	20.49%	BASE CASE
5	23SP	WFEC	AEPW	SOUTHWESTERN STATION - WASHITA 138KV CKT 1	132.0	20.60%	GRACEMONT - LAWTON EASTS
5	14WP			SPSNORTH_STH	128.0	5.90%	BASE CASE
5	14WP			SPSNORTH_STH	128.0	5.90%	BASE CASE
5	14WP			SPSNORTH STH	128.0	5.90%	BASE CASE
5	14WP			 SPSNORTH_STH	128.0	5.90%	BASE CASE
5	14WP				128.0	5.90%	BASE CASE
5	14WP				128.0	5.90%	BASE CASE
5	14WP			SPSNORTH STH	128.0	5.90%	BASE CASE
5	14WP			SPSNORTH STH	128.0	5.90%	BASE CASE
5	14WP			SPSNORTH STH	128.0	5.90%	BASE CASE
5	14WP			SPSNORTH STH	128.0	5.90%	BASE CASE
5	14WP			SPSNORTH_STH	128.0	5.90%	BASE CASE
5	14WP			SPSNORTH_STH	128.0	5.90%	BASE CASE
5	14WP			SPSNORTH_STH	128.0	5.90%	BASE CASE
5	14WP			SPSNORTH_STH	128.0	5.90%	BASE CASE
5	14WP			SPSNORTH_STH	128.0	5.90%	BASE CASE
				SPSNORTH_STH			
5	14WP			SPSNORTH_STH	128.0	5.90%	BASE CASE BASE CASE
5	14WP				128.0	5.90%	DAGE CAGE

ng Overload	Upgrade Name	Solution
45KV CKT 1	IATAN - NASHUA 345KV CKT 1	Tap Nashua 345kV bus in Hawthorn - St. Joseph 345 kV line. Build new 345 kV line from latan to Nashua,Add Nashua 345/161 kV
N 345KV CKT 1	IATAN - NASHUA 345KV CKT 1	Tap Nashua 345kV bus in Hawthorn - St. Joseph 345 kV line. Build new 345 kV line from latan to Nashua,Add Nashua 345/161 kV
EE 345KV CKT 1	Muskogee - VBI 345 kV with 345/161 kV bus tie near VBI	Build 70.95 mile 345 kV line plus two new 345/161 kV bus ties near VBI sub and 10 miles of 161 kV line
EE 345KV CKT 1	ADABELL - VBI 161KV CKT 1	Replace existing 800 amp wave trap with 1200 amp in VBI sub
EE 345KV CKT 1	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
GEE 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
EE 345KV CKT 1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5KV CKT 1	PITTSBURG - VALLIANT 345KV CKT 1	Replace wavetrap and associated equipment at Pittsburg
45KV CKT 1	PITTSBURG - VALLIANT 345KV CKT 1	Replace wavetrap and associated equipment at Pittsburg
45.00 345KV CKT 1	Mathewson - Tatonga 345 kV Ckt 2 Accelerate	Build new 61 mile Tatonga - Mathewson 345 kV line.
45.00 345KV CKT 1	Cimarron - Mathewson 345 kV Ckt 1 Accelerate	Build new 16 mile 345 kV line from Mathweson to Cimarron.
45.00 345KV CKT 1	Mathewson 345 kV Accelerate	Build new Mathewson 345 kV substation at the intersection of the Woodring-Cimarron and the existing Northwest - Tatonga 345 kV lines.
45.00 345KV CKT 1	Tatonga - Woodward EHV 345 kV Ckt 2 Accelerate	Build new 49-mile Woodward EHV - Tatonga 345 kV Ckt 2 line.
ARD DISTRICT EHV 1	Mathewson - Tatonga 345 kV Ckt 2 Accelerate	Build new 61 mile Tatonga - Mathewson 345 kV line.
ARD DISTRICT EHV 1	Cimarron - Mathewson 345 kV Ckt 1 Accelerate	Build new 16 mile 345 kV line from Mathweson to Cimarron.
ARD DISTRICT EHV 1	Mathewson 345 kV Accelerate	Build new Mathewson 345 kV substation at the intersection of the Woodring-Cimarron and the existing Northwest - Tatonga 345 kV lines.
ARD DISTRICT EHV I	Tatonga - Woodward EHV 345 kV Ckt 2 Accelerate	Build new 49-mile Woodward EHV - Tatonga 345 kV Ckt 2 line.
45.00 345KV CKT 1	Mathewson - Tatonga 345 kV Ckt 2 Accelerate	Build new 61 mile Tatonga - Mathewson 345 kV line.
45.00 345KV CKT 1	Cimarron - Mathewson 345 kV Ckt 1 Accelerate	Build new 16 mile 345 kV line from Mathweson to Cimarron.
45.00 345KV CKT 1	Mathewson 345 kV Accelerate	Build new Mathewson 345 kV substation at the intersection of the Woodring-Cimarron and the existing Northwest - Tatonga 345 kV lines.
45.00 345KV CKT 1	Tatonga - Woodward EHV 345 kV Ckt 2 Accelerate	Build new 49-mile Woodward EHV - Tatonga 345 kV Ckt 2 line.
45.00 345KV CKT 1	Mathewson - Tatonga 345 kV Ckt 2 Accelerate	Build new 61 mile Tatonga - Mathewson 345 kV line.
45.00 345KV CKT 1	Cimarron - Mathewson 345 kV Ckt 1 Accelerate	Build new 16 mile 345 kV line from Mathweson to Cimarron. Build new Mathewson 345 kV substation at the intersection of the Woodring-Cimarron and the existing Northwest -
45.00 345KV CKT 1	Mathewson 345 kV Accelerate	Tatonga 345 kV lines.
45.00 345KV CKT 1	Tatonga - Woodward EHV 345 kV Ckt 2 Accelerate	Build new 49-mile Woodward EHV - Tatonga 345 kV Ckt 2 line.
FAX 138KV CKT 1	SHIDLER - WEST PAWHUSKA 138KV CKT 1 SOUTHWEST SHREVEPORT - WESTERN ELECTRIC T	Rebuild 16.11
LL 138KV CKT 1	138KV CKT 1	Rebuild 2.9 miles
38.00 138KV CKT 1	SOUTHWESTERN STATION - WASHITA 138KV CKT 2	Add Second 138 kV line
	SOUTHWESTERN STATION - WASHITA 138KV CKT 2	Add Second 138 kV line
SIDE 345KV CKT 1	SOUTHWESTERN STATION - WASHITA 138KV CKT 2	Add Second 138 kV line Build 111 mile 345 kV line from Potter to Tolk. Further study analysis will be performed with regard to the SPS North-
	Potter to Tolk 345 kV	South Stability Limit to determine whether its rating may be increased based on approved SPP Expansion Plan Network
	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). Build new 345 kV Transmission Line from new Cherry County 345 kV Substation to new 345 kV Holt County Substation.
	Cherry Co - Holt Co 345 kV Ckt1	(Estimated 146 miles).
	Cherry Co 345 kV Terminal Upgrades	Build new Cherry County 345 kV Substation.
	Cimarron - Mathewson 345 kV Ckt 1 Accelerate	Build new 16 mile 345 kV line from Mathweson to Cimarron.
	Elk City 345/230 kV	Expand Elk City substation (or build new station). Install a 345/230 kV 675 MVA transformer at Elk City.
	Elk City to Gracemont 345kV AEPW	Build new 46.5 mile 345 kV line from Elk City to Gracemont (AEP portion).
	Elk City to Gracemont 345kV OKGE	Build new 46.5 mile 345 kV line from Elk City to Gracemont (OGE portion). Build a new 86 mile double circuit 345 kV line with at least 3000 A capacity from the Thistle 345 kV substation to the new
	Line - Clark County - Thistle 345 kV dbl Ckt	Clark County substation. Build a new 345 kV substation at Thistle with a ring bus and necessary terminal equipment. Build a new 92 mile double circuit 345 kV line with at least 3000 A capacity from the Woodward District EHV substation to
	Line - Hitchland - Woodward 345 kV dbl Ckt OKGE	the SPS interception from the Hitchland substation. Upgrade the Woodward District EHV substation with the necessary Build 30 mile double circuit 345 kV line with at least 3000 A capacity from the Hitchland substation to the OGE
	Line - Hitchland - Woodward 345 kV dbl Ckt SPS	interception point from the Woodward District EHV substation. Upgrade the Hitchland substation with the necessary Build a new 36 mile double circuit 345 kV line with at least 3000 A capacity from the Spearville substation to the new Clark
	Line - Spearville - Clark County 345 kV dbl Ckt	County substation. Build the Clark County 345 kV substation with a ring bus and necessary terminal equipment. Build a new 78 mile double circuit 345 kV line with at least 3000 A capacity from the Wichita substation to the new Thistle
	Line - Thistle - Wichita 345 kV dbl Ckt WEPE	345 kV substation. Upgrade the Wichita substation with the necessary breakers and terminal equipment to accommodate two new 345 kV
	Line - Thistle - Wichita 345 kV dbl Ckt WERE	circuits from the new Thistle 345 kV substation Build a new 79 mile double circuit 345 kV line with at least 3000 A capacity from the Woodward District EHV substation to the Kapaca (Oklahama state border towards the Thistle substation – Liperade the Woodward District EHV substation with
	Line - Thistle - Woodward 345 kV dbl Ckt OKGE Line - Thistle - Woodward 345 kV dbl Ckt PW	the Kansas/Oklahoma state border towards the Thistle substation. Upgrade the Woodward Distric EHV substation with Build a new 30 mile double circuit 345 kV line with at least 3000 A capacity from the Thistle substation to the Kansas/Oklahoma state border towards the Woodward District EHV substation.
	Line - Tuco - Woodward 345 kV line OKGE	Build new 345 kV line from Woodward EHV to Border - Project costs now include Border reactor substation
	Line - Tuco - Woodward 345 kV line SPS	Build new 345 kV line from Tuco to OGE Border station near TX/OK Stateline. Install line reactor outside Border station and line reactors at Tuco.

Scenario	Season From Area To Area	Monitored Branch Over 100% Rate B	Transfer Case % Loading	TDF (%)	Outaged Branch Causing Overload	Upgrade Name	Solution
5	14WP	SPSNORTH_STH	128.0	5.90%	BASE CASE	Line - Tuco - Woodward 345 kV line SPS	Build new 345 kV line from Tuco to OGE Border station near TX/OK Stateline. Install line reactor outside Border station and line reactors at Tuco.
5	14WP	SPSNORTH_STH	128.0	5.90%	BASE CASE	Mathewson - Tatonga 345 kV Ckt 2 Accelerate	Build new 61 mile Tatonga - Mathewson 345 kV line. Build new Mathewson 345 kV substation at the intersection of the Woodring-Cimarron and the existing Northwest -
5	14WP	SPSNORTH_STH	128.0	5.90%	BASE CASE	Mathewson 345 kV Accelerate	Tatonga 345 kV lines.
5	14WP	SPSNORTH_STH	128.0	5.90%	BASE CASE	Tatonga - Woodward EHV 345 kV Ckt 2 Accelerate	Build new 49-mile Woodward EHV - Tatonga 345 kV Ckt 2 line.
5	14WP	SPSNORTH_STH	128.0	5.90%	BASE CASE	XFR - Thistle 345/138 kV	Install a 400 MVA 345/138 kV transformer at the new 345 kV Thistle substation.
5	14WP	SPSNORTH_STH	128.0	5.90%	BASE CASE	XFR - Thistle 345/138 kV	Install a 400 MVA 345/138 kV transformer at the new 345 kV Thistle substation.
5	18WP	SPSNORTH_STX	130.5	5.64%	BASE CASE	Potter to Tolk 345 kV	Build 111 mile 345 kV line from Potter to Tolk. Further study analysis will be performed with regard to the SPS North- South Stability Limit to determine whether its rating may be increased based on approved SPP Expansion Plan Network
5	18WP	SPSNORTH_STX	130.5	5.64%	BASE CASE	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).
5	18WP	SPSNORTH_STX	130.5	5.64%	BASE CASE	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	18WP	SPSNORTH_STX	130.5	5.64%	BASE CASE	Cherry Co 345 kV Terminal Upgrades	Build new Cherry County 345 kV Substation.
5	18WP	SPSNORTH STX	130.5	5.64%	BASE CASE	Cimarron - Mathewson 345 kV Ckt 1 Accelerate	Build new 16 mile 345 kV line from Mathweson to Cimarron.
5	18WP	SPSNORTH STX	130.5	5.64%	BASE CASE	Elk City 345/230 kV	Expand Elk City substation (or build new station). Install a 345/230 kV 675 MVA transformer at Elk City.
5	18WP	SPSNORTH STX	130.5	5.64%	BASE CASE	Elk City to Gracemont 345kV AEPW	Build new 46.5 mile 345 kV line from Elk City to Gracemont (AEP portion).
5	18WP	SPSNORTH STX	130.5	5.64%	BASE CASE	Elk City to Gracemont 345kV OKGE	Build new 46.5 mile 345 kV line from Elk City to Gracemont (OGE portion).
	18WP	SPSNORTH_STX	130.5	5.64%	BASE CASE	Line - Clark County - Thistle 345 kV dbl Ckt	Build new 46.5 mile 345 kV line from Eik City to Gracemont (OGE portion). Build a new 86 mile double circuit 345 kV line with at least 3000 A capacity from the Thistle 345 kV substation to the new Clark County substation. Build a new 345 kV substation at Thistle with a ring bus and necessary terminal equipment.
5							Build a new 92 mile double circuit 345 kV line with at least 3000 A capacity from the Woodward District EHV substation to
5	18WP	SPSNORTH_STX	130.5	5.64%	BASE CASE	Line - Hitchland - Woodward 345 kV dbl Ckt OKGE	the SPS interception from the Hitchland substation. Upgrade the Woodward District EHV substation with the necessary Build 30 mile double circuit 345 kV line with at least 3000 A capacity from the Hitchland substation to the OGE
5	18WP	SPSNORTH_STX	130.5	5.64%	BASE CASE	Line - Hitchland - Woodward 345 kV dbl Ckt SPS	interception point from the Woodward District EHV substation. Upgrade the Hitchland substation with the necessary Build a new 36 mile double circuit 345 kV line with at least 3000 A capacity from the Spearville substation to the new Clark
5	18WP	SPSNORTH_STX	130.5	5.64%	BASE CASE	Line - Spearville - Clark County 345 kV dbl Ckt	County substation. Build the Clark County 345 kV substation with a ring bus and necessary terminal equipment. Build a new 78 mile double circuit 345 kV line with at least 3000 A capacity from the Wichita substation to the new Thistle
5	18WP	SPSNORTH_STX	130.5	5.64%	BASE CASE	Line - Thistle - Wichita 345 kV dbl Ckt PW	345 kV substation. Upgrade the Wichita substation with the necessary breakers and terminal equipment to accommodate two new 345 kV
5	18WP	SPSNORTH_STX	130.5	5.64%	BASE CASE	Line - Thistle - Wichita 345 kV dbl Ckt WERE	circuits from the new Thistle 345 kV substation Build a new 79 mile double circuit 345 kV line with at least 3000 A capacity from the Woodward District EHV substation to
5	18WP	SPSNORTH_STX	130.5	5.64%	BASE CASE	Line - Thistle - Woodward 345 kV dbl Ckt OKGE	the Kansas/Oklahoma state border towards the Thistle substation. Upgrade the Woodward Distric EHV substation with Build a new 30 mile double circuit 345 kV line with at least 3000 A capacity from the Thistle substation to the
5	18WP	SPSNORTH_STX	130.5	5.64%	BASE CASE	Line - Thistle - Woodward 345 kV dbl Ckt PW	Kansas/Oklahoma state border towards the Woodward District EHV substation.
5	18WP	SPSNORTH_STX	130.5	5.64%	BASE CASE	Line - Tuco - Woodward 345 kV line OKGE	Build new 345 kV line from Woodward EHV to Border - Project costs now include Border reactor substation Build new 345 kV line from Tuco to OGE Border station near TX/OK Stateline. Install line reactor outside Border station
5	18WP	SPSNORTH_STX	130.5	5.64%	BASE CASE	Line - Tuco - Woodward 345 kV line SPS	and line reactors at Tuco. Build new 345 kV line from Tuco to OGE Border station near TX/OK Stateline. Install line reactor outside Border station
5	18WP	SPSNORTH_STX	130.5	5.64%	BASE CASE	Line - Tuco - Woodward 345 kV line SPS	and line reactors at Tuco.
5	18WP	SPSNORTH_STX	130.5	5.64%	BASE CASE	Mathewson - Tatonga 345 kV Ckt 2 Accelerate	Build new 61 mile Tatonga - Mathewson 345 kV line.
5	18WP	SPSNORTH_STX	130.5	5.64%	BASE CASE	Mathewson 345 kV Accelerate	Build new Mathewson 345 kV substation at the intersection of the Woodring-Cimarron and the existing Northwest - Tatonga 345 kV lines.
5	18WP	SPSNORTH_STX	130.5	5.64%	BASE CASE	Tatonga - Woodward EHV 345 kV Ckt 2 Accelerate	Build new 49-mile Woodward EHV - Tatonga 345 kV Ckt 2 line.
5	18WP	SPSNORTH_STX	130.5	5.64%	BASE CASE	XFR - Thistle 345/138 kV	Install a 400 MVA 345/138 kV transformer at the new 345 kV Thistle substation.
5	18WP	SPSNORTH_STX	130.5	5.64%	BASE CASE	XFR - Thistle 345/138 kV	Install a 400 MVA 345/138 kV transformer at the new 345 kV Thistle substation.
5	23WP	SPSNORTH_STX	128.4	5.14%	BASE CASE	Potter to Tolk 345 kV	Build 111 mile 345 kV line from Potter to Tolk. Further study analysis will be performed with regard to the SPS North- South Stability Limit to determine whether its rating may be increased based on approved SPP Expansion Plan Network
5	23WP	SPSNORTH STX	128.4	5.14%	BASE CASE	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).
5	23WP	SPSNORTH STX	128.4	5.14%	BASE CASE	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	23WP	SPSNORTH STX	128.4	5.14%	BASE CASE	Cherry Co 345 kV Terminal Upgrades	Build new Cherry County 345 kV Substation.
5	23WP	SPSNORTH STX	128.4	5.14%	BASE CASE	Cimarron - Mathewson 345 kV Ckt 1 Accelerate	Build new 16 mile 345 kV line from Mathweson to Cimarron.
5	23WP	SPSNORTH_STX	128.4	5.14%	BASE CASE	Elk City 345/230 kV	Expand Elk City substation (or build new station). Install a 345/230 kV 675 MVA transformer at Elk City.
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5	23WP	SPSNORTH_STX	128.4	5.14%	BASE CASE	Elk City to Gracemont 345kV AEPW	Build new 46.5 mile 345 kV line from Elk City to Gracemont (AEP portion).
5	23WP	SPSNORTH_STX	128.4	5.14%	BASE CASE	Elk City to Gracemont 345kV OKGE	Build new 46.5 mile 345 kV line from Elk City to Gracemont (OGE portion).           Build a new 86 mile double circuit 345 kV line with at least 3000 A capacity from the Thistle 345 kV substation to the new
5	23WP	SPSNORTH_STX	128.4	5.14%	BASE CASE	Line - Clark County - Thistle 345 kV dbl Ckt	Clark County substation. Build a new 345 kV substation at Thistle with a ring bus and necessary terminal equipment. Build a new 92 mile double circuit 345 kV line with at least 3000 A capacity from the Woodward District EHV substation to
5	23WP	SPSNORTH_STX	128.4	5.14%	BASE CASE	Line - Hitchland - Woodward 345 kV dbl Ckt OKGE	the SPS interception from the Hitchland substation. Upgrade the Woodward District EHV substation with the necessaryBuild 30 mile double circuit 345 kV line with at least 3000 A capacity from the Hitchland substation to the OGE
5	23WP	SPSNORTH_STX	128.4	5.14%	BASE CASE	Line - Hitchland - Woodward 345 kV dbl Ckt SPS	interception point from the Woodward District EHV substation. Upgrade the Hitchland substation with the necessary Build a new 36 mile double circuit 345 kV line with at least 3000 A capacity from the Spearville substation to the new Clark
5	23WP	SPSNORTH_STX	128.4	5.14%	BASE CASE	Line - Spearville - Clark County 345 kV dbl Ckt	County substation. Build the Clark County 345 kV substation with a ring bus and necessary terminal equipment. Build a new 78 mile double circuit 345 kV line with at least 3000 A capacity from the Wichita substation to the new Thistle
5	23WP	SPSNORTH_STX	128.4	5.14%	BASE CASE	Line - Thistle - Wichita 345 kV dbl Ckt PW	345 kV substation. Upgrade the Wichita substation with the necessary breakers and terminal equipment to accommodate two new 345 kV
5	23WP	SPSNORTH_STX	128.4	5.14%	BASE CASE	Line - Thistle - Wichita 345 kV dbl Ckt WERE	circuits from the new Thistle 345 kV substation Build a new 79 mile double circuit 345 kV line with at least 3000 A capacity from the Woodward District EHV substation to
5	23WP	SPSNORTH_STX	128.4	5.14%	BASE CASE	Line - Thistle - Woodward 345 kV dbl Ckt OKGE	the Kansas/Oklahoma state border towards the Thistle substation. Upgrade the Woodward District EHV substation with Build a new 30 mile double circuit 345 kV line with at least 3000 A capacity from the Thistle substation to the
5	23WP	SPSNORTH_STX	128.4	5.14%	BASE CASE	Line - Thistle - Woodward 345 kV dbl Ckt PW	Build a new 30 mile double circuit 345 kV line with at least 3000 A capacity from the Thistle substation to the Kansas/Oklahoma state border towards the Woodward District EHV substation.
5	23WP	SPSNORTH_STX	128.4	5.14%	BASE CASE	Line - Tuco - Woodward 345 kV line OKGE	Build new 345 kV line from Woodward EHV to Border - Project costs now include Border reactor substation
	23WP	SPSNORTH STX	128.4	5.14%	BASE CASE	Line - Tuco - Woodward 345 kV line SPS	Build new 345 kV line from Tuco to OGE Border station near TX/OK Stateline. Install line reactor outside Border station and line reactors at Tuco.

Scenario	Season	From Area To Area Monitored Branch Over 100% Rate B	Transfer Case % Loading	TDF (%)	Outaged Branch Causing Overload	Upgrade Name	Solution	
5	23WP	SPSNORTH_STX	128.4	5.14%	BASE CASE	Line - Tuco - Woodward 345 kV line SPS	Build new 345 kV line from Tuco to OGE Border station near TX/OK Stateline. Install line reactor outside Border station and line reactors at Tuco.	
5	23WP	SPSNORTH_STX	128.4	5.14%	BASE CASE	Mathewson - Tatonga 345 kV Ckt 2 Accelerate	Build new 61 mile Tatonga - Mathewson 345 kV line.	
5	23WP	SPSNORTH_STX	128.4	5.14%	BASE CASE	Mathewson 345 kV Accelerate	Build new Mathewson 345 kV substation at the intersection of the Woodring-Cimarron and the existing Northwest - Tatonga 345 kV lines.	
5	23WP	SPSNORTH_STX	128.4	5.14%	BASE CASE	Tatonga - Woodward EHV 345 kV Ckt 2 Accelerate	Build new 49-mile Woodward EHV - Tatonga 345 kV Ckt 2 line.	
5	23WP	SPSNORTH_STX	128.4	5.14%	BASE CASE	XFR - Thistle 345/138 kV	Install a 400 MVA 345/138 kV transformer at the new 345 kV Thistle substation.	
5	23WP	SPSNORTH_STX	128.4	5.14%	BASE CASE	XFR - Thistle 345/138 kV	Install a 400 MVA 345/138 kV transformer at the new 345 kV Thistle substation.	
5	18WP	SWISHER COUNTY INTERCHANGE - TUCO INTERCHANGE 230KV CKT 1	105.6	3.59%	G12-038 TAP 345.00 - TUCO INTERCHANGE 345KV CKT 1	Potter to Tolk 345 kV	Build 111 mile 345 kV line from Potter to Tolk. Further study analysis will be performed with regard to the SPS North- South Stability Limit to determine whether its rating may be increased based on approved SPP Expansion Plan Network	
5	18WP	SWISHER COUNTY INTERCHANGE - TUCO INTERCHANGE 230KV CKT 1	105.6	3.59%	G12-038 TAP 345.00 - TUCO INTERCHANGE 345KV CKT 1	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).	
5	18WP	SWISHER COUNTY INTERCHANGE - TUCO INTERCHANGE 230KV CKT 1	105.6	3.59%	G12-038 TAP 345.00 - TUCO INTERCHANGE 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	18WP	SWISHER COUNTY INTERCHANGE - TUCO INTERCHANGE 230KV CKT 1	105.6	3.59%	G12-038 TAP 345.00 - TUCO INTERCHANGE 345KV CKT 1	Cherry Co 345 kV Terminal Upgrades	Build new Cherry County 345 kV Substation.	
5	18WP	SWISHER COUNTY INTERCHANGE - TUCO INTERCHANGE 230KV CKT 1	105.6	3.59%	G12-038 TAP 345.00 - TUCO INTERCHANGE 345KV CKT 1	Cimarron - Mathewson 345 kV Ckt 1 Accelerate	Build new 16 mile 345 kV line from Mathweson to Cimarron.	
5	18WP	SWISHER COUNTY INTERCHANGE - TUCO INTERCHANGE 230KV CKT 1	105.6	3.59%	G12-038 TAP 345.00 - TUCO INTERCHANGE 345KV CKT 1	Elk City 345/230 kV	Expand Elk City substation (or build new station). Install a 345/230 kV 675 MVA transformer at Elk City.	
5	18WP	SWISHER COUNTY INTERCHANGE - TUCO INTERCHANGE 230KV CKT 1	105.6	3.59%	G12-038 TAP 345.00 - TUCO INTERCHANGE 345KV CKT 1	Elk City to Gracemont 345kV AEPW	Build new 46.5 mile 345 kV line from Elk City to Gracemont (AEP portion).	
5	18WP	SWISHER COUNTY INTERCHANGE - TUCO INTERCHANGE 230KV CKT 1	105.6	3.59%	G12-038 TAP 345.00 - TUCO INTERCHANGE 345KV CKT 1	Elk City to Gracemont 345kV OKGE	Build new 46.5 mile 345 kV line from Elk City to Gracemont (OGE portion).	
5	18WP	SWISHER COUNTY INTERCHANGE - TUCO INTERCHANGE 230KV CKT 1	105.6	3.59%	G12-038 TAP 345.00 - TUCO INTERCHANGE 345KV CKT 1	Line - Clark County - Thistle 345 kV dbl Ckt	Build a new 86 mile double circuit 345 kV line with at least 3000 A capacity from the Thistle 345 kV substation to the new Clark County substation. Build a new 345 kV substation at Thistle with a ring bus and necessary terminal equipment.	
5	18WP	SWISHER COUNTY INTERCHANGE - TUCO INTERCHANGE 230KV CKT 1	105.6	3.59%	G12-038 TAP 345.00 - TUCO INTERCHANGE 345KV CKT 1	Line - Hitchland - Woodward 345 kV dbl Ckt OKGE	Build a new 92 mile double circuit 345 kV line with at least 3000 A capacity from the Woodward District EHV substation to the SPS interception from the Hitchland substation. Upgrade the Woodward District EHV substation with the necessary	
5	18WP	SWISHER COUNTY INTERCHANGE - TUCO INTERCHANGE 230KV CKT 1	105.6	3.59%	G12-038 TAP 345.00 - TUCO INTERCHANGE 345KV CKT 1	Line - Hitchland - Woodward 345 kV dbl Ckt SPS	Build 30 mile double circuit 345 kV line with at least 3000 A capacity from the Hitchland substation to the OGE interception point from the Woodward District EHV substation. Upgrade the Hitchland substation with the necessary	
5	18WP	SWISHER COUNTY INTERCHANGE - TUCO INTERCHANGE 230KV CKT 1	105.6	3.59%	G12-038 TAP 345.00 - TUCO INTERCHANGE 345KV CKT 1	Line - Spearville - Clark County 345 kV dbl Ckt	Build a new 36 mile double circuit 345 kV line with at least 3000 A capacity from the Spearville substation to the new Clark County substation. Build the Clark County 345 kV substation with a ring bus and necessary terminal equipment.	
5	18WP	SWISHER COUNTY INTERCHANGE - TUCO INTERCHANGE 230KV CKT 1	105.6	3.59%	G12-038 TAP 345.00 - TUCO INTERCHANGE 345KV CKT 1	Line - Thistle - Wichita 345 kV dbl Ckt PW	Build a new 78 mile double circuit 345 kV line with at least 3000 A capacity from the Wichita substation to the new Thistle 345 kV substation.	
5	18WP	SWISHER COUNTY INTERCHANGE - TUCO INTERCHANGE 230KV CKT 1	105.6	3.59%	G12-038 TAP 345.00 - TUCO INTERCHANGE 345KV CKT 1	Line - Thistle - Wichita 345 kV dbl Ckt WERE	Upgrade the Wichita substation with the necessary breakers and terminal equipment to accommodate two new 345 kV circuits from the new Thistle 345 kV substation	
5	18WP	SWISHER COUNTY INTERCHANGE - TUCO INTERCHANGE 230KV CKT 1	105.6	3.59%	G12-038 TAP 345.00 - TUCO INTERCHANGE 345KV CKT 1	Line - Thistle - Woodward 345 kV dbl Ckt OKGE	Build a new 79 mile double circuit 345 kV line with at least 3000 A capacity from the Woodward District EHV substation to the Kansas/Oklahoma state border towards the Thistle substation. Upgrade the Woodward Distric EHV substation with	
5	18WP	SWISHER COUNTY INTERCHANGE - TUCO INTERCHANGE 230KV CKT 1	105.6	3.59%	G12-038 TAP 345.00 - TUCO INTERCHANGE 345KV CKT 1	Line - Thistle - Woodward 345 kV dbl Ckt PW	Build a new 30 mile double circuit 345 kV line with at least 3000 A capacity from the Thistle substation to the Kansas/Oklahoma state border towards the Woodward District EHV substation.	
5	18WP	SWISHER COUNTY INTERCHANGE - TUCO INTERCHANGE 230KV CKT 1	105.6	3.59%	G12-038 TAP 345.00 - TUCO INTERCHANGE 345KV CKT 1	Line - Tuco - Woodward 345 kV line OKGE	Build new 345 kV line from Woodward EHV to Border - Project costs now include Border reactor substation	
5	18WP	SWISHER COUNTY INTERCHANGE - TUCO	105.6	3.59%	G12-038 TAP 345.00 - TUCO INTERCHANGE 345KV CKT 1	Line - Tuco - Woodward 345 kV line SPS	Build new 345 kV line from Tuco to OGE Border station near TX/OK Stateline. Install line reactor outside Border station and line reactors at Tuco.	
5	18WP	SWISHER COUNTY INTERCHANGE - TUCO INTERCHANGE 230KV CKT 1	105.6	3.59%	G12-038 TAP 345.00 - TUCO INTERCHANGE 345KV CKT 1	Line - Tuco - Woodward 345 kV line SPS	Build new 345 kV line from Tuco to OGE Border station near TX/OK Stateline. Install line reactor outside Border station and line reactors at Tuco.	
5	18WP	SWISHER COUNTY INTERCHANGE - TUCO INTERCHANGE 230KV CKT 1	105.6	3.59%	G12-038 TAP 345.00 - TUCO INTERCHANGE 345KV CKT 1	Mathewson - Tatonga 345 kV Ckt 2 Accelerate	Build new 61 mile Tatonga - Mathewson 345 kV line.	
5	18WP	SWISHER COUNTY INTERCHANGE - TUCO INTERCHANGE 230KV CKT 1	105.6	3.59%	G12-038 TAP 345.00 - TUCO INTERCHANGE 345KV	Mathewson 345 kV Accelerate	Build new Mathewson 345 kV substation at the intersection of the Woodring-Cimarron and the existing Northwest -	
5		SWISHER COUNTY INTERCHANGE - TUCO			CKT 1 G12-038 TAP 345.00 - TUCO INTERCHANGE 345KV		Tatonga 345 kV lines.	
5	18WP	INTERCHANGE 230KV CKT 1 SWISHER COUNTY INTERCHANGE - TUCO	105.6	3.59%	CKT 1 G12-038 TAP 345.00 - TUCO INTERCHANGE 345KV	Tatonga - Woodward EHV 345 kV Ckt 2 Accelerate	Build new 49-mile Woodward EHV - Tatonga 345 kV Ckt 2 line.	
5	18WP	INTERCHANGE 230KV CKT 1 SWISHER COUNTY INTERCHANGE - TUCO	105.6	3.59%	CKT 1 G12-038 TAP 345.00 - TUCO INTERCHANGE 345KV	XFR - Thistle 345/138 kV	Install a 400 MVA 345/138 kV transformer at the new 345 kV Thistle substation.	
5	18WP		105.6	3.59%		XFR - Thistle 345/138 kV	Install a 400 MVA 345/138 kV transformer at the new 345 kV Thistle substation.	
5	14WP	SWISSVALE - WEST GARDNER 345KV CKT 1	108.6	6.80%	HOYT - STRANGER CREEK 345KV CKT 1	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV           Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC	
5	14WP	SWISSVALE - WEST GARDNER 345KV CKT 1	108.6	6.80%	HOYT - STRANGER CREEK 345KV CKT 1	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	(Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.	
5	14WP	SWISSVALE - WEST GARDNER 345KV CKT 1	108.6	6.80%	HOYT - STRANGER CREEK 345KV CKT 1	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV	
5	14WP	SWISSVALE - WEST GARDNER 345KV CKT 1	108.6	6.80%	HOYT - STRANGER CREEK 345KV CKT 1	Lacygne - Mariosa 345KV AMRN		
5	14WP	SWISSVALE - WEST GARDNER 345KV CKT 1	108.6	6.80%	HOYT - STRANGER CREEK 345KV CKT 1	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa	
5	23SP	SWISSVALE - WEST GARDNER 345KV CKT 1	103.8	5.67%	HOYT - STRANGER CREEK 345KV CKT 1	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV           Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC	
5	23SP	SWISSVALE - WEST GARDNER 345KV CKT 1	103.8	5.67%	HOYT - STRANGER CREEK 345KV CKT 1	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	(Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.	
5	23SP	SWISSVALE - WEST GARDNER 345KV CKT 1	103.8	5.67%	HOYT - STRANGER CREEK 345KV CKT 1	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV	
5	23SP	SWISSVALE - WEST GARDNER 345KV CKT 1	103.8	5.67%	HOYT - STRANGER CREEK 345KV CKT 1	Lacygne - Mariosa 345KV AMRN	Indeterminate	
5	23SP	SWISSVALE - WEST GARDNER 345KV CKT 1	103.8	5.67%	HOYT - STRANGER CREEK 345KV CKT 1	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa	
5	23SP	SWISSVALE - WEST GARDNER 345KV CKT 1	104.3	5.35%	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC	
5	23SP	SWISSVALE - WEST GARDNER 345KV CKT 1	104.3	5.35%	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	(Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.	
5	23SP	SWISSVALE - WEST GARDNER 345KV CKT 1	104.3	5.35%	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV	
5	23SP	SWISSVALE - WEST GARDNER 345KV CKT 1	104.3	5.35%	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	Lacygne - Mariosa 345KV AMRN	Indeterminate	
5	23SP	SWISSVALE - WEST GARDNER 345KV CKT 1	104.3	5.35%	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa	
5	23SP	SWISSVALE - WEST GARDNER 345KV CKT 1	105.0	5.37%	WRTOD400	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV           Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield wire. Substation work at JEC	
5	23SP	SWISSVALE - WEST GARDNER 345KV CKT 1	105.0	5.37%	WRTOD400	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	(Station 1) substation will include removal of 345kV carrier equipment and installation of new fiber optic relay panels.	
5	23SP	SWISSVALE - WEST GARDNER 345KV CKT 1	105.0	5.37%	WRTOD400	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV	

Scenario	Season	From Area	To Area	Monitored Branch Over 100% Rate B	Transfer Case % Loading	TDF (%)	Outaged Branch Causing Overload	Upgrade Name	Solution	
5	23SP			SWISSVALE - WEST GARDNER 345KV CKT 1	105.0	5.37%	WRTOD400	Lacygne - Mariosa 345KV AMRN	Indeterminate	
5	23SP			SWISSVALE - WEST GARDNER 345KV CKT 1	105.0	5.37%	WRTOD400	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa	
5	14WP			WICHITA (WICHT12X) 345/138/13.8KV TRANSFORMER CKT 1	109.4	5.09%	BENTON - WICHITA 345KV CKT 1	Viola - Rose Hill 345 kV	Build new 35 mile line from Viola to Rose Hill 345 kV	
5	14WP			WICHITA (WICHT12X) 345/138/13.8KV TRANSFORMER CKT	109.4	5.09%	BENTON - WICHITA 345KV CKT 1	Viola - Clearwater 138kV Ckt1	Build new 138kV line between new Viola substation 345/138 kV transformer and existing Clearwater 138 kV substation	
5	14WP			WICHITA (WICHT12X) 345/138/13.8KV TRANSFORMER CKT	109.4	5.09%	BENTON - WICHITA 345KV CKT 1	Viola - Gill 138kV Ckt1	Build new 138kV line between new Viola substation 345/138 kV transformer and existing Gill 138 kV substation.	
5	14WP			WICHITA (WICHT12X) 345/138/13.8KV TRANSFORMER CKT 1	109.4	5.09%	BENTON - WICHITA 345KV CKT 1	Viola 345/138kV Transformer Ckt 1	Install new 345/138 kV transformer at Viola substation	
5	18WP			WICHITA (WICHT12X) 345/138/13.8KV TRANSFORMER CKT 1	107.0	5.02%	BENTON - WICHITA 345KV CKT 1	Viola - Rose Hill 345 kV	Build new 35 mile line from Viola to Rose Hill 345 kV	
5	18WP			WICHITA (WICHT12X) 345/138/13.8KV TRANSFORMER CKT 1	107.0	5.02%	BENTON - WICHITA 345KV CKT 1	Viola - Clearwater 138kV Ckt1	Build new 138kV line between new Viola substation 345/138 kV transformer and existing Clearwater 138 kV substati	
5	18WP			WICHITA (WICHT12X) 345/138/13.8KV TRANSFORMER CKT	107.0	5.02%	BENTON - WICHITA 345KV CKT 1	Viola - Gill 138kV Ckt1	Build new 138kV line between new Viola substation 345/138 kV transformer and existing Gill 138 kV substation.	
5	18WP			WICHITA (WICHT12X) 345/138/13.8KV TRANSFORMER CKT 1	107.0	5.02%	BENTON - WICHITA 345KV CKT 1	Viola 345/138kV Transformer Ckt 1	Install new 345/138 kV transformer at Viola substation	
5	23WP			WICHITA (WICHT12X) 345/138/13.8KV TRANSFORMER CKT 1	106.3	4.08%	BENTON - WICHITA 345KV CKT 1	Viola - Rose Hill 345 kV	Build new 35 mile line from Viola to Rose Hill 345 kV	
5	23WP			WICHITA (WICHT12X) 345/138/13.8KV TRANSFORMER CKT 1	106.3	4.08%	BENTON - WICHITA 345KV CKT 1	Viola - Clearwater 138kV Ckt1	Build new 138kV line between new Viola substation 345/138 kV transformer and existing Clearwater 138 kV substat	
5	23WP			WICHITA (WICHT12X) 345/138/13.8KV TRANSFORMER CKT 1	106.3	4.08%	BENTON - WICHITA 345KV CKT 1	Viola - Gill 138kV Ckt1	Build new 138kV line between new Viola substation 345/138 kV transformer and existing Gill 138 kV substation.	
5	23WP			WICHITA (WICHT12X) 345/138/13.8KV TRANSFORMER CKT 1	106.3	4.08%	BENTON - WICHITA 345KV CKT 1	Viola 345/138kV Transformer Ckt 1	Install new 345/138 kV transformer at Viola substation	
5	18SP			WOODWARD (WOODWRD2) 138/69/13.2KV TRANSFORMER CKT 1	106.9	3.29%	FPL SWITCH - MOORELAND 138KV CKT 1	Mathewson - Tatonga 345 kV Ckt 2 Accelerate	Build new 61 mile Tatonga - Mathewson 345 kV line.	
5	18SP			WOODWARD (WOODWRD2) 138/69/13.2KV TRANSFORMER CKT 1	106.9	3.29%	FPL SWITCH - MOORELAND 138KV CKT 1	Cimarron - Mathewson 345 kV Ckt 1 Accelerate	Build new 16 mile 345 kV line from Mathweson to Cimarron.	
5	18SP			WOODWARD (WOODWRD2) 138/69/13.2KV TRANSFORMER CKT 1	106.9	3.29%	FPL SWITCH - MOORELAND 138KV CKT 1	Mathewson 345 kV Accelerate	Build new Mathewson 345 kV substation at the intersection of the Woodring-Cimarron and the existing Northwest Tatonga 345 kV lines.	
5	18SP			WOODWARD (WOODWRD2) 138/69/13.2KV TRANSFORMER CKT 1	106.9	3.29%	FPL SWITCH - MOORELAND 138KV CKT 1	Tatonga - Woodward EHV 345 kV Ckt 2 Accelerate	Build new 49-mile Woodward EHV - Tatonga 345 kV Ckt 2 line.	
5	18WP			WOODWARD (WOODWRD2) 138/69/13.2KV TRANSFORMER CKT 1	106.3	3.35%	FPL SWITCH - MOORELAND 138KV CKT 1	Mathewson - Tatonga 345 kV Ckt 2 Accelerate	Build new 61 mile Tatonga - Mathewson 345 kV line.	
5	18WP			WOODWARD (WOODWRD2) 138/69/13.2KV TRANSFORMER CKT 1	106.3	3.35%	FPL SWITCH - MOORELAND 138KV CKT 1	Cimarron - Mathewson 345 kV Ckt 1 Accelerate	Build new 16 mile 345 kV line from Mathweson to Cimarron.	
5	18WP			WOODWARD (WOODWRD2) 138/69/13.2KV TRANSFORMER CKT 1	106.3	3.35%	FPL SWITCH - MOORELAND 138KV CKT 1	Mathewson 345 kV Accelerate	Build new Mathewson 345 kV substation at the intersection of the Woodring-Cimarron and the existing Northwest Tatonga 345 kV lines.	
5	18WP			WOODWARD (WOODWRD2) 138/69/13.2KV TRANSFORMER CKT 1	106.3	3.35%	FPL SWITCH - MOORELAND 138KV CKT 1	Tatonga - Woodward EHV 345 kV Ckt 2 Accelerate	Build new 49-mile Woodward EHV - Tatonga 345 kV Ckt 2 line.	

Scenario	Season	Area	Monitored Bus with Violation	Transfer Case Voltage (PU)	Outaged Branch Causing Overload	Upgrade Name	Solution
			No Voltage Limitation				

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Transmission Owner	Upgrade	Solution	Earliest Date Upgrade Required (DUN)	Estimated Date of Upgrade Completion (EOC)	Estimated Engineering & Construction Cost
AEPW	BROKEN BOW - CRAIG JUNCTION 138KV CKT 1	Rebuild 11.63 miles	10/1/2015	6/1/2018	\$ 11,630,000
OKGE	CIMARRON - SARA 138KV CKT 1	Rebuild 9.56 miles	10/1/2015	6/1/2018	\$ 9,560,000
AEPW	SOUTHWEST SHREVEPORT - WESTERN ELECTRIC T 138KV CKT 1	Rebuild 2.9 miles	10/1/2015	6/1/2018	\$ 2,900,000

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

Transmission Owner	Upgrade	of the following upgrades. Cost is not assignable to the transmission customer. Solution	Earliest Date Upgrade Required (DUN)	Estimated Date of Upgrade Completion (EOC)	Estimated Engineering & Construction Cost
AEPW	BARTLESVILLE COMANCHE - MOUND ROAD 138KV CKT 1	Rebuild 3.8 miles with 1533.3 ACSR/TW	10/1/2014	6/1/2017	\$ 4,750,000
AEPW	BETHEL - BROKEN BOW 138KV CKT 1	Rebuild 9.19 miles of 3/0 Copperweld with 1272 ACSR	10/1/2015	6/1/2018	\$ 9,190,000
AEPW	BETHEL - NASHOBA 138KV CKT 1	Rebuild 22.43 miles of 3/0 Copperweld with 1272 ACSR	10/1/2015	6/1/2018	\$ 22,430,000
AEPW	CLAYTON - NASHOBA 138KV CKT 1	Rebuild 11.57 miles of 3/0 CWC with 1272 ACSR	10/1/2015	6/1/2018	\$ 11,570,000
AEPW	CLAYTON - SARDIS 138KV CKT 1	Rebuild 1.46 miles of 3/0 CWC with 1272 ACSR	10/1/2015	6/1/2018	\$ 1,460,000
AEPW	ENOWILT - LONE OAK 138KV CKT 1	Rebuild 0.32 miles of 3/0 CWC with 1272 ACSR. Replace jumpers @ Lone Oak	10/1/2015	6/1/2017	\$ 625,000
AEPW	ENOWILT - SARDIS 138KV CKT 1	Rebuild 13.8 miles of 3/0 CWC with 1272 ACSR	10/1/2015	6/1/2018	\$ 13,800,000
AEPW	FLINT CREEK - SILOAM SPRINGS TAP 345KV CKT 1 AEPW	Replace Terminal Equipment	6/1/2019	6/1/2019	\$ 1,220,000
AEPW	GRACEMONT - LAWTON EASTSIDE 345KV CKT 1	Replace Terminal Equipment	10/1/2019	10/1/2019	\$ 305,000
AEPW	KNOX LEE - SOUTH TEXAS EASTMAN 138KV CKT 1 Accelerate	Rebuild 5.5 miles with 1533.3 ACSR/TW	6/1/2015	6/1/2018	\$ 7,150,000
AEPW	NORTH NEW BOSTON - NW TEXARKANA-BANN T 138KV CKT 1	Rebuild 14.19 miles to 1533.6 ACSR/TW 54/19	6/1/2015	6/1/2017	\$ 17,028,000
AEPW	PAWHUSKA TAP - WEST PAWHUSKA 138KV CKT 1	Rebuild 5.98	6/1/2015	6/1/2018	\$ 4,544,800
AEPW	PITTSBURG - VALLIANT 345KV CKT 1	Replace wavetrap and associated equipment at Pittsburg	10/1/2015	6/1/2017	\$ 303,750
AEPW	SHIDLER - WEST PAWHUSKA 138KV CKT 1	Rebuild 16.11	6/1/2015	6/1/2018	\$ 12,243,600
AMRN	Lacygne - Mariosa 345KV AMRN	Indeterminate	10/1/2014	6/1/2019	+, ,
EES	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO	6/1/2014	6/1/2019	\$ 12,000,000
EES	VBI - Arkansas Nuclear One 345kV EES	Indeterminate	6/1/2014	6/1/2019	+,,
GRDA	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1 #1	Add new pole to increase line clearance	6/1/2015	6/1/2016	\$ 350,000
GRDA	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1 #2	Replace Terminal Equipment	6/1/2015	6/1/2016	\$ 3,300,000
KACP	latan - Jeffrey Energy Center 345 kV KACP	Build 14.2 miles of new 345 kV	10/1/2014	6/1/2019	\$ 14,089,880
KACP	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa	10/1/2014	6/1/2019	\$ 275,120,000
MKEC	MULLERGREN - SPEARVILLE 230KV CKT 1	Rebuild 65 miles	6/1/2014	6/1/2019	\$ 36,107,610
NPPD	GRAND ISLAND - SWEETWATER 345KV CKT 2	Build 63.4 mile second circuit	10/1/2014	6/1/2019	\$ 96,288,750
OKGE	ADABELL - VBI 161KV CKT 1	Replace existing 800 amp wave trap with 1200 amp in VBI sub	6/1/2014	6/1/2016	\$ 150,000
OKGE	CIMARRON - DRAPER LAKE 345KV CKT 1	Increase capacity of Draper Lake CT and Cimarron wave trap	10/1/2015	6/1/2016	\$ 150,000
OKGE	Cimarron - Mathewson 345 kV Ckt 1 Accelerate	Build new 16 mile 345 kV line from Mathweson to Cimarron.	10/1/2014	6/1/2015	\$ 32,780,617
OKGE	FT SMITH (FTSMITH1) 500/345/13.8KV TRANSFORMER CKT 1	Install 2nd 500/345 kV bus tie in Ft. Smith Sub	6/1/2014	6/1/2018	\$ 14,500,000
OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps	6/1/2014	6/1/2015	\$ 1,800,000
OKGE	Mathewson - Tatonga 345 kV Ckt 2 Accelerate	Build new 61 mile Tatonga - Mathewson 345 kV line.	10/1/2014	6/1/2015	\$ 82,139,900
		Build new Mathewson 345 kV substation at the intersection of the Woodring-Cimarron and	10/ 1/2014	0/1/2010	φ 02,100,000
OKGE	Mathewson 345 kV Accelerate	the existing Northwest - Tatonga 345 kV lines. Build 70.95 mile 345 kV line plus two new 345/161 kV bus ties near VBI sub and 10 miles or	10/1/2014	6/1/2015	\$ 20,169,602
OKGE	Muskogee - VBI 345 kV with 345/161 kV bus tie near VBI	161 kV line	6/1/2014	6/1/2019	\$ 129,000,000
OKGE	NORTHWEST 345/138/13.8KV TRANSFORMER CKT 3 Accelerated	Install third 345/138 kV Bus Tie in Northwest Sub	10/1/2014	6/1/2015	\$ 129,000,000
OKGE	Tatonga - Woodward EHV 345 kV Ckt 2 Accelerate	Build new 49-mile Woodward EHV - Tatonga 345 kV Ckt 2 line.	10/1/2014	6/1/2015	\$ 71,876,622
OKGE	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line	6/1/2014	6/1/2019	\$ 119,355,000
		Build 111 mile 345 kV line from Potter to Tolk. Further study analysis will be performed with regard to the SPS North-South Stability Limit to determine whether its rating may be	h		
SPS	Potter to Tolk 345 kV	increased based on approved SPP Expansion Plan Network Upgrades scheduled t	10/1/2014	6/1/2019	\$ 131,324,100
WERE	CHISHOLM - MAIZE 138KV CKT 1 #1	Upgrade disconnect switches, wavetrap, breaker, jumpers	6/1/2015	6/1/2016	\$ 1,575,000
WERE	CHISHOLM - MAIZE 138KV CKT 1 #2	Rebuild 7.25 miles	6/1/2015	6/1/2017	\$ 7,141,250
WERE	EVANS ENERGY CENTER NORTH - MAIZE 138KV CKT 1 #1	Upgrade disconnect switches, wavetrap, breaker, jumpers	6/1/2015	6/1/2016	\$ 1,575,000
WERE	EVANS ENERGY CENTER NORTH - MAIZE 138KV CKT 1 #2	Rebuild 4.8 miles           Rebuild the JEC - Hoyt 345kV line as a single circuit with new conductor, poles, and shield	6/1/2015	6/1/2017	\$ 4,728,000
		wire. Substation work at JEC (Station 1) substation will include removal of 345kV carrier	10/1/00/1	04/00/7	¢ 40.000.440
WERE	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	equipment and installation of new fiber optic relay panels. Substation	10/1/2014	6/1/2017	\$ 49,623,119
WERE	latan - Jeffrey Energy Center 345 kV WERE	Build 56.8 miles of new 345 kV	10/1/2014	6/1/2019	\$ 128,776,067
WERE	Viola - Rose Hill 345 kV	Build new 35 mile line from Viola to Rose Hill 345 kV	10/1/2014	6/1/2019	\$ 68,950,000
WFEC	FRANKLIN SW - MIDWEST TAP 138KV CKT 1	Replace Terminal Equipment	6/1/2019	6/1/2019	\$ 225,000
WFEC	GLASS MOUNTAIN - MOORELAND 138KV CKT 1	Reset CT	10/1/2014	6/1/2016	\$ 225,000
WFEC	SOUTHWESTERN STATION - WASHITA 138KV CKT 2	Add Second 138 kV line	6/1/2014	6/1/2017	\$ 2,260,000

Transmission Owner	Upgrade Solution		Earliest Date Upgrade Required (DUN)	Estimated Date of Upgrade Completion (EOC)
		Build Messick 500/230 kV station. Connect to Carrol, Clarence, and Western Kraft 230 kV		
AEPW	Messick 500/230 kV Transformer Ckt 1	lines. Install 500/230 kV 675 MVA transformer. This upgrade is contingent upon approval	10/1/2014	12/31/2015
ITCGP	Line - Clark County - Thistle 345 kV dbl Ckt	Build a new 86 mile double circuit 345 kV line with at least 3000 A capacity from the Thistle 345 kV substation to the new Clark County substation. Build a new 345 kV substation at	10/1/2014	1/1/2015
ITCGP	Line - Spearville - Clark County 345 kV dbl Ckt	Build a new 36 mile double circuit 345 kV line with at least 3000 A capacity from the Spearville substation to the new Clark County substation. Build the Clark County 345 kV	10/1/2014	1/1/2015
ITCGP	XFR - Thistle 345/138 kV	Install a 400 MVA 345/138 kV transformer at the new 345 kV Thistle substation.	10/1/2014	1/1/2015
КАСР	IATAN - NASHUA 345KV CKT 1	Tap Nashua 345kV bus in Hawthorn - St. Joseph 345 kV line. Build new 345 kV line from latan to Nashua,Add Nashua 345/161 kV	10/1/2014	6/1/2015
OKGE	Line - Thistle - Woodward 345 kV dbl Ckt OKGE	Build a new 79 mile double circuit 345 kV line with at least 3000 A capacity from the Woodward District EHV substation to the Kansas/Oklahoma state border towards the	10/1/2014	1/1/2015
PW	Line - Thistle - Wichita 345 kV dbl Ckt PW	Build a new 78 mile double circuit 345 kV line with at least 3000 A capacity from the Wichita substation to the new Thistle 345 kV substation.	10/1/2014	1/1/2015
PW	Line - Thistle - Woodward 345 kV dbl Ckt PW	Build a new 30 mile double circuit 345 kV line with at least 3000 A capacity from the Thistle substation to the Kansas/Oklahoma state border towards the Woodward District EHV	10/1/2014	1/1/2015
WERE	Line - Thistle - Wichita 345 kV dbl Ckt WERE	Upgrade the Wichita substation with the necessary breakers and terminal equipment to accommodate two new 345 kV circuits from the new Thistle 345 kV substation	10/1/2014	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.

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)
		Expand Elk City substation (or build new station). Install a 345/230 kV 675 MVA transformer		
AEPW	Elk City 345/230 kV	at Elk City.	10/1/2014	3/1/2018
AEPW	Elk City to Gracemont 345kV AEPW	Build new 46.5 mile 345 kV line from Elk City to Gracemont (AEP portion).	10/1/2014	3/1/2018
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).	10/1/2014	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).	10/1/2014	1/1/2018
NPPD	Cherry Co 345 kV Terminal Upgrades	Build new Cherry County 345 kV Substation.	10/1/2014	1/1/2018
OKGE	Elk City to Gracemont 345kV OKGE	Build new 46.5 mile 345 kV line from Elk City to Gracemont (OGE portion).	10/1/2014	3/1/2018
SPS	HITCHLAND INTERCHANGE () 230/115/13.2KV TRANSFORMER CKT 2	Build a second 230/115/13.2 kV transformer at Hitchland.	6/1/2015	6/1/2019
WERE	Viola - Clearwater 138kV Ckt1	Build new 138kV line between new Viola substation 345/138 kV transformer and existing Clearwater 138 kV substation.	10/1/2014	6/1/2017
WERE	Viola - Gill 138kV Ckt1	Build new 138kV line between new Viola substation 345/138 kV transformer and existing Gill 138 kV substation.	10/1/2014	6/1/2017
WERE	Viola - Rose Hill 345 kV	Build new 35 mile line from Viola to Rose Hill 345 kV	10/1/2014	6/1/2019
WERE	Viola 345/138kV Transformer Ckt 1	Install new 345/138 kV transformer at Viola substation	10/1/2014	6/1/2017