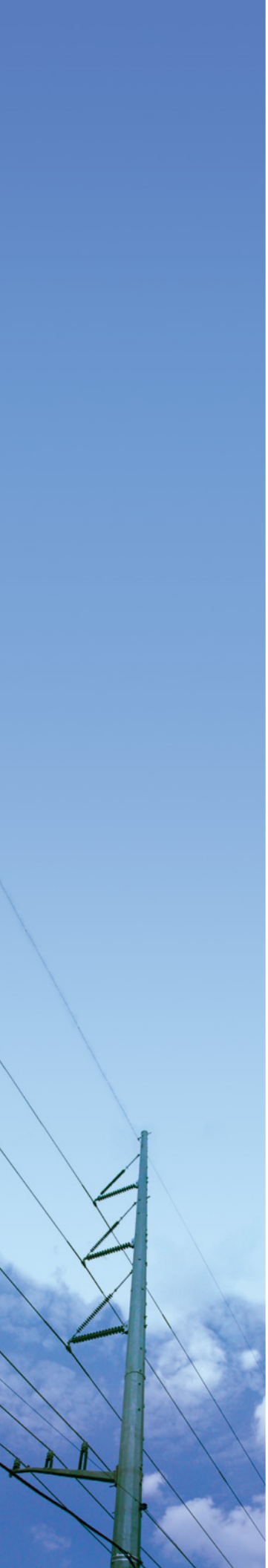

Screening Study
SPP-LTSR-2013-004

For OASIS Request #78485373

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

SPP Southwest Power Pool

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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 136 MW. The service type requested for this screening study is Long Term Service Request (LTSR). OASIS# 78485373 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 CSWS 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 CSWS 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 Power Electric has requested a screening study to determine the impacts on SPP facilities for the Long Term Service Requests for 136 MW.

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

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

The LTSR request was studied using two system scenarios. The service was modeled by a transfer from CSWS 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 CSWS to CSWS 136 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 136 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 136 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 136 MW. The next steps are to WITHDRAW the request on OASIS and, if desired, enter a new OASIS request into the aggregate study queue.

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

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

Appendix A

PSS/E CHOICES IN RUNNING LOAD FLOW PROGRAM AND ACCC

BASE CASES:

- Solutions: Fixed slope decoupled Newton-Raphson solution (FDNS)
- Tap adjustment: Stepping
- Area interchange control: Tie lines and loads
- VAR limits: Apply immediately
- Solution options:

  X Phase shift adjustment
  _ Flat start
  _ Lock DC taps
  _ Lock switched shunts

ACCC CASES for system intact:

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

  X Phase shift adjustment
  _ Flat start
  _ Lock DC taps
  _ Lock switched shunts

ACCC CASES for branch and transformer contingencies:

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

- Min flow change in overload report: 3mw
- Excld cases w/ no overloads form report: YES
- Exclude interfaces from report: NO
- Perform voltage limit check: YES
- Elements in available capacity table: 60000
- Cutoff threshold for available capacity table: 99999.0
- Min. contng. case Vltg chng for report: 0.02
- Sorted output: None
- Newton Solution:
- Tap adjustment: Stepping
- Area interchange control: Tie lines and loads
- VAR limits: Apply automatically
- Solution options:

  X Phase shift adjustment
  _ Flat start
  _ Lock DC taps
  _ Lock switched shunts

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

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

  X Phase shift adjustment
  _ Flat start
  _ Lock DC taps
  _ Lock switched shunts

Scenario	Season	From Area	To Area	Monitored Branch Over 100% Rate B	Transfer Case % Loading	TDF (%)	Outaged Branch Causing Overload	Upgrade Name	Solution
5	18SP	AEPW	AEPW	ARSENAL HILL - RAINES 138KV CKT 1	124.1	24.30%	SPP-AEPW-05	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	18SP	AEPW	AEPW	ARSENAL HILL - RAINES 138KV CKT 1	108.6	22.03%	LIEBERMAN - LONGWOOD 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	14WP	AEPW	AEPW	BARTLESVILLE COMANCHE - MOUND ROAD 138KV CKT 1	137.9	30.12%	4REMNGTON 138.00 - FAIRFAX 138KV CKT 1	BARTLESVILLE COMANCHE - MOUND ROAD 138KV CKT 1	Rebuild 3.8 miles with 1533.3 ACSR/TW
5	14WP	AEPW	AEPW	BARTLESVILLE COMANCHE - MOUND ROAD 138KV CKT 1	131.3	19.68%	COFFEYVILLE FARMLAND - DELAWARE 138KV CKT 1	BARTLESVILLE COMANCHE - MOUND ROAD 138KV CKT 1	Rebuild 3.8 miles with 1533.3 ACSR/TW
5	14WP	AEPW	AEPW	BARTLESVILLE COMANCHE - MOUND ROAD 138KV CKT 1	131.3	19.68%	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	14WP	AEPW	AEPW	BARTLESVILLE COMANCHE - MOUND ROAD 138KV CKT 1	112.7	20.29%	SPP-AEPW-39	BARTLESVILLE COMANCHE - MOUND ROAD 138KV CKT 1	Rebuild 3.8 miles with 1533.3 ACSR/TW
5	14WP	AEPW	AEPW	BARTLESVILLE COMANCHE - MOUND ROAD 138KV CKT 1	111.7	20.08%	LACYGNE - NEOSHO 345KV CKT 1	BARTLESVILLE COMANCHE - MOUND ROAD 138KV CKT 1	Rebuild 3.8 miles with 1533.3 ACSR/TW
5	14WP	AEPW	AEPW	BARTLESVILLE COMANCHE - MOUND ROAD 138KV CKT 1	111.5	19.89%	SPP-WERE-18	BARTLESVILLE COMANCHE - MOUND ROAD 138KV CKT 1	Rebuild 3.8 miles with 1533.3 ACSR/TW
5	14WP	AEPW	AEPW	BARTLESVILLE COMANCHE - MOUND ROAD 138KV CKT 1	109.4	19.95%	SPP-WERE-15	BARTLESVILLE COMANCHE - MOUND ROAD 138KV CKT 1	Rebuild 3.8 miles with 1533.3 ACSR/TW
5	14WP	AEPW	AEPW	BARTLESVILLE COMANCHE - MOUND ROAD 138KV CKT 1	108.8	20.05%	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	BARTLESVILLE COMANCHE - MOUND ROAD 138KV CKT 1	Rebuild 3.8 miles with 1533.3 ACSR/TW
5	14WP	AEPW	AEPW	BARTLESVILLE COMANCHE - MOUND ROAD 138KV CKT 1	108.7	20.05%	SHIDWFC - WEBB CITY TAP 138KV CKT 1	BARTLESVILLE COMANCHE - MOUND ROAD 138KV CKT 1	Rebuild 3.8 miles with 1533.3 ACSR/TW
5	14WP	AEPW	AEPW	BARTLESVILLE COMANCHE - MOUND ROAD 138KV CKT 1	105.9	20.05%	BASE CASE	BARTLESVILLE COMANCHE - MOUND ROAD 138KV CKT 1	Rebuild 3.8 miles with 1533.3 ACSR/TW
5	18SP	AEPW	AEPW	BARTLESVILLE COMANCHE - MOUND ROAD 138KV CKT 1	153.3	28.75%	4REMNGTON 138.00 - FAIRFAX 138KV CKT 1	BARTLESVILLE COMANCHE - MOUND ROAD 138KV CKT 1	Rebuild 3.8 miles with 1533.3 ACSR/TW
5	18SP	AEPW	AEPW	BARTLESVILLE COMANCHE - MOUND ROAD 138KV CKT 1	150.2	18.26%	COFFEYVILLE FARMLAND - DELAWARE 138KV CKT 1	BARTLESVILLE COMANCHE - MOUND ROAD 138KV CKT 1	Rebuild 3.8 miles with 1533.3 ACSR/TW
5	18SP	AEPW	AEPW	BARTLESVILLE COMANCHE - MOUND ROAD 138KV CKT 1	150.2	18.26%	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	18SP	AEPW	AEPW	BARTLESVILLE COMANCHE - MOUND ROAD 138KV CKT 1	125.1	18.38%	SPP-WERE-18	BARTLESVILLE COMANCHE - MOUND ROAD 138KV CKT 1	Rebuild 3.8 miles with 1533.3 ACSR/TW
5	18SP	AEPW	AEPW	BARTLESVILLE COMANCHE - MOUND ROAD 138KV CKT 1	124.5	18.65%	LACYGNE - NEOSHO 345KV CKT 1	BARTLESVILLE COMANCHE - MOUND ROAD 138KV CKT 1	Rebuild 3.8 miles with 1533.3 ACSR/TW
5	18SP	AEPW	AEPW	BARTLESVILLE COMANCHE - MOUND ROAD 138KV CKT 1	122.4	18.45%	SPP-WERE-15	BARTLESVILLE COMANCHE - MOUND ROAD 138KV CKT 1	Rebuild 3.8 miles with 1533.3 ACSR/TW
5	18SP	AEPW	AEPW	BARTLESVILLE COMANCHE - MOUND ROAD 138KV CKT 1	122.0	18.58%	SPP-AEPW-39	BARTLESVILLE COMANCHE - MOUND ROAD 138KV CKT 1	Rebuild 3.8 miles with 1533.3 ACSR/TW
5	18SP	AEPW	AEPW	BARTLESVILLE COMANCHE - MOUND ROAD 138KV CKT 1	120.4	18.70%	OMPA-PAWHUSKA NORTHEAST - PAWHUSKA TAP 138KV CKT 1	BARTLESVILLE COMANCHE - MOUND ROAD 138KV CKT 1	Rebuild 3.8 miles with 1533.3 ACSR/TW
5	18SP	AEPW	AEPW	BARTLESVILLE COMANCHE - MOUND ROAD 138KV CKT 1	120.0	18.70%	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	BARTLESVILLE COMANCHE - MOUND ROAD 138KV CKT 1	Rebuild 3.8 miles with 1533.3 ACSR/TW
5	18SP	AEPW	AEPW	BARTLESVILLE COMANCHE - MOUND ROAD 138KV CKT 1	116.2	18.70%	BASE CASE	BARTLESVILLE COMANCHE - MOUND ROAD 138KV CKT 1	Rebuild 3.8 miles with 1533.3 ACSR/TW
5	18WP	AEPW	AEPW	BARTLESVILLE COMANCHE - MOUND ROAD 138KV CKT 1	123.0	31.37%	4REMNGTON 138.00 - FAIRFAX 138KV CKT 1	BARTLESVILLE COMANCHE - MOUND ROAD 138KV CKT 1	Rebuild 3.8 miles with 1533.3 ACSR/TW
5	18WP	AEPW	AEPW	BARTLESVILLE COMANCHE - MOUND ROAD 138KV CKT 1	115.4	21.15%	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	18WP	AEPW	AEPW	BARTLESVILLE COMANCHE - MOUND ROAD 138KV CKT 1	115.4	21.15%	COFFEYVILLE FARMLAND - DELAWARE 138KV 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	129.9	30.17%	4REMNGTON 138.00 - FAIRFAX 138KV 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	124.3	19.77%	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	AEPW	AEPW	BARTLESVILLE COMANCHE - MOUND ROAD 138KV CKT 1	124.2	19.77%	COFFEYVILLE FARMLAND - DELAWARE 138KV 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	104.0	18.44%	SPP-AEPW-02	BARTLESVILLE COMANCHE - MOUND ROAD 138KV CKT 1	Rebuild 3.8 miles with 1533.3 ACSR/TW
5	23WP	AEPW	AEPW	BARTLESVILLE COMANCHE - MOUND ROAD 138KV CKT 1	123.6	28.84%	4REMNGTON 138.00 - FAIRFAX 138KV CKT 1	BARTLESVILLE COMANCHE - MOUND ROAD 138KV CKT 1	Rebuild 3.8 miles with 1533.3 ACSR/TW
5	23WP	AEPW	AEPW	BARTLESVILLE COMANCHE - MOUND ROAD 138KV CKT 1	119.0	18.19%	COFFEYVILLE FARMLAND - DELAWARE 138KV CKT 1	BARTLESVILLE COMANCHE - MOUND ROAD 138KV CKT 1	Rebuild 3.8 miles with 1533.3 ACSR/TW
5	23WP	AEPW	AEPW	BARTLESVILLE COMANCHE - MOUND ROAD 138KV CKT 1	118.9	18.19%	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	18WP	AEPW	SWPA	BETHEL - BROKEN BOW 138KV CKT 1	107.9	4.82%	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	SWPA	BETHEL - BROKEN BOW 138KV CKT 1	107.9	4.82%	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	SWPA	BETHEL - BROKEN BOW 138KV CKT 1	107.9	4.82%	PITTSBURG - VALLIANT 345KV CKT 1	BETHEL - NASHOBA 138KV CKT 1	Rebuild 22.43 miles of 3/0 Copperweld with 1272 ACSR
5	18WP	AEPW	SWPA	BETHEL - BROKEN BOW 138KV CKT 1	107.9	4.82%	PITTSBURG - VALLIANT 345KV CKT 1	CLAYTON - NASHOBA 138KV CKT 1	Rebuild 11.57 miles of 3/0 CWC with 1272 ACSR
5	18WP	AEPW	SWPA	BETHEL - BROKEN BOW 138KV CKT 1	107.9	4.82%	PITTSBURG - VALLIANT 345KV CKT 1	CLAYTON - SARDIS 138KV CKT 1	Rebuild 1.46 miles of 3/0 CWC with 1272 ACSR
5	18WP	AEPW	SWPA	BETHEL - BROKEN BOW 138KV CKT 1	107.9	4.82%	PITTSBURG - VALLIANT 345KV CKT 1	ENOWILT - SARDIS 138KV CKT 1	Rebuild 13.8 miles of 3/0 CWC with 1272 ACSR
5	18WP	AEPW	SWPA	BETHEL - BROKEN BOW 138KV CKT 1	107.9	4.82%	PITTSBURG - VALLIANT 345KV CKT 1	BROKEN BOW - CRAIG JUNCTION 138KV CKT 1	Rebuild 11.63
5	18WP	AEPW	AEPW	BETHEL - NASHOBA 138KV CKT 1	113.1	4.82%	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	BETHEL - NASHOBA 138KV CKT 1	113.1	4.82%	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	BETHEL - NASHOBA 138KV CKT 1	113.1	4.82%	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	113.1	4.82%	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	113.1	4.82%	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	113.1	4.82%	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	113.1	4.82%	PITTSBURG - VALLIANT 345KV CKT 1	BROKEN BOW - CRAIG JUNCTION 138KV CKT 1	Rebuild 11.63
5	23WP	AEPW	AEPW	BETHEL - NASHOBA 138KV CKT 1	102.9	6.02%	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	23WP	AEPW	AEPW	BETHEL - NASHOBA 138KV CKT 1	102.9	6.02%	PITTSBURG - VALLIANT 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	23WP	AEPW	AEPW	BETHEL - NASHOBA 138KV CKT 1	102.9	6.02%	PITTSBURG - VALLIANT 345KV CKT 1	BETHEL - NASHOBA 138KV CKT 1	Rebuild 22.43 miles of 3/0 Copperweld with 1272 ACSR
5	23WP	AEPW	AEPW	BETHEL - NASHOBA 138KV CKT 1	102.9	6.02%	PITTSBURG - VALLIANT 345KV CKT 1	CLAYTON - NASHOBA 138KV CKT 1	Rebuild 11.57 miles of 3/0 CWC with 1272 ACSR
5	23WP	AEPW	AEPW	BETHEL - NASHOBA 138KV CKT 1	102.9	6.02%	PITTSBURG - VALLIANT 345KV CKT 1	CLAYTON - SARDIS 138KV CKT 1	Rebuild 1.46 miles of 3/0 CWC with 1272 ACSR
5	23WP	AEPW	AEPW	BETHEL - NASHOBA 138KV CKT 1	102.9	6.02%	PITTSBURG - VALLIANT 345KV CKT 1	ENOWILT - SARDIS 138KV CKT 1	Rebuild 13.8 miles of 3/0 CWC with 1272 ACSR
5	23WP	AEPW	AEPW	BETHEL - NASHOBA 138KV CKT 1	102.9	6.02%	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	101.1	3.55%	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	101.1	3.55%	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	101.1	3.55%	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	101.1	3.55%	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	101.1	3.55%	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	101.1	3.55%	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	101.1	3.55%	BBDAMTP4 - MOUNTAIN RIVER 138KV CKT 1	BROKEN BOW - CRAIG JUNCTION 138KV CKT 1	Rebuild 11.63
5	14WP	OKGE	OKGE	CIMARRON - DRAPER LAKE 345KV CKT 1	101.5	10.47%	ARCADIA - SEMINOLE 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	100.8	10.26%	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	104.4	9.89%	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	100.6	9.55%	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	100.1	8.78%	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	118.9	10.94%	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	114.9	10.33%	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	113.9	9.58%	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	103.0	8.52%	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	102.0	8.47%	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	101.9	8.43%	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	101.1	8.46%	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	100.6	8.46%	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	100.6	8.37%	LACYGNE - NEOSHO 345KV CKT 1	CIMARRON - DRAPER LAKE 345KV CKT 1	Increase capacity of Draper Lake CT and Cimarron wave trap
5	18WP	AEPW	AEPW	CLAYTON - NASHOBA 138KV CKT 1	114.7	4.82%	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	114.7	4.82%	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	114.7	4.82%	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	114.7	4.82%	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	114.7	4.82%	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	114.7	4.82%	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	114.7	4.82%	PITTSBURG - VALLIANT 345KV CKT 1	BROKEN BOW - CRAIG JUNCTION 138KV CKT 1	Rebuild 11.63
5	23WP	AEPW	AEPW	CLAYTON - NASHOBA 138KV CKT 1	104.5	6.02%	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	23WP	AEPW	AEPW	CLAYTON - NASHOBA 138KV CKT 1	104.5	6.02%	PITTSBURG - VALLIANT 345KV CKT 1	BETHEL - BROKEN BOW 138KV CKT 1	Rebuild 9.19 miles of 3/0 Copperweld with 1272 ACSR
5	23WP	AEPW	AEPW	CLAYTON - NASHOBA 138KV CKT 1	104.5	6.02%	PITTSBURG - VALLIANT 345KV CKT 1	BETHEL - NASHOBA 138KV CKT 1	Rebuild 22.43 miles of 3/0 Copperweld with 1272 ACSR
5	23WP	AEPW	AEPW	CLAYTON - NASHOBA 138KV CKT 1	104.5	6.02%	PITTSBURG - VALLIANT 345KV CKT 1	CLAYTON - NASHOBA 138KV CKT 1	Rebuild 11.57 miles of 3/0 CWC with 1272 ACSR
5	23WP	AEPW	AEPW	CLAYTON - NASHOBA 138KV CKT 1	104.5	6.02%	PITTSBURG - VALLIANT 345KV CKT 1	CLAYTON - SARDIS 138KV CKT 1	Rebuild 1.46 miles of 3/0 CWC with 1272 ACSR
5	23WP	AEPW	AEPW	CLAYTON - NASHOBA 138KV CKT 1	104.5	6.02%	PITTSBURG - VALLIANT 345KV CKT 1	ENOWILT - SARDIS 138KV CKT 1	Rebuild 13.8 miles of 3/0 CWC with 1272 ACSR
5	23WP	AEPW	AEPW	CLAYTON - NASHOBA 138KV CKT 1	104.5	6.02%	PITTSBURG - VALLIANT 345KV CKT 1	BROKEN BOW - CRAIG JUNCTION 138KV CKT 1	Rebuild 11.63
5	18WP	AEPW	AEPW	CLAYTON - SARDIS 138KV CKT 1	117.0	4.82%	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	117.0	4.82%	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	117.0	4.82%	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	117.0	4.82%	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	117.0	4.82%	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	117.0	4.82%	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	117.0	4.82%	PITTSBURG - VALLIANT 345KV CKT 1	BROKEN BOW - CRAIG JUNCTION 138KV CKT 1	Rebuild 11.63
5	23WP	AEPW	AEPW	CLAYTON - SARDIS 138KV CKT 1	106.8	6.02%	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

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	AEPW	AEPW	CLAYTON - SARDIS 138KV CKT 1	106.8	6.02%	PITTSBURG - VALLIANT 345KV CKT 1	BETHEL - BROKEN BOW 138KV CKT 1	Rebuild 9.19 miles of 3/0 Copperweld with 1272 ACSR
5	23WP	AEPW	AEPW	CLAYTON - SARDIS 138KV CKT 1	106.8	6.02%	PITTSBURG - VALLIANT 345KV CKT 1	BETHEL - NASHOBA 138KV CKT 1	Rebuild 22.43 miles of 3/0 Copperweld with 1272 ACSR
5	23WP	AEPW	AEPW	CLAYTON - SARDIS 138KV CKT 1	106.8	6.02%	PITTSBURG - VALLIANT 345KV CKT 1	CLAYTON - NASHOBA 138KV CKT 1	Rebuild 11.57 miles of 3/0 CWC with 1272 ACSR
5	23WP	AEPW	AEPW	CLAYTON - SARDIS 138KV CKT 1	106.8	6.02%	PITTSBURG - VALLIANT 345KV CKT 1	CLAYTON - SARDIS 138KV CKT 1	Rebuild 1.46 miles of 3/0 CWC with 1272 ACSR
5	23WP	AEPW	AEPW	CLAYTON - SARDIS 138KV CKT 1	106.8	6.02%	PITTSBURG - VALLIANT 345KV CKT 1	ENOWILT - SARDIS 138KV CKT 1	Rebuild 13.8 miles of 3/0 CWC with 1272 ACSR
5	23WP	AEPW	AEPW	CLAYTON - SARDIS 138KV CKT 1	106.8	6.02%	PITTSBURG - VALLIANT 345KV CKT 1	BROKEN BOW - CRAIG JUNCTION 138KV CKT 1	Rebuild 11.63
5	14WP	AEPW	AEPW	DOMES - MOUND ROAD 138KV CKT 1	114.8	41.90%	4REMNGTON 138.00 - FAIRFAX 138KV CKT 1	DOMES - MOUND ROAD 138KV CKT 1	Rebuild 13.59 miles
5	14WP	AEPW	AEPW	DOMES - MOUND ROAD 138KV CKT 1	103.7	41.90%	4REMNGTON 138.00 - SHIDLER 138KV CKT 1	DOMES - MOUND ROAD 138KV CKT 1	Rebuild 13.59 miles
5	18SP	AEPW	AEPW	DOMES - MOUND ROAD 138KV CKT 1	131.2	40.48%	4REMNGTON 138.00 - FAIRFAX 138KV CKT 1	DOMES - MOUND ROAD 138KV CKT 1	Rebuild 13.59 miles
5	18SP	AEPW	AEPW	DOMES - MOUND ROAD 138KV CKT 1	117.4	40.48%	4REMNGTON 138.00 - SHIDLER 138KV CKT 1	DOMES - MOUND ROAD 138KV CKT 1	Rebuild 13.59 miles
5	18SP	AEPW	AEPW	DOMES - MOUND ROAD 138KV CKT 1	111.8	35.54%	FAIRFAX - FAXTAP4 138.00 138KV CKT 1	DOMES - MOUND ROAD 138KV CKT 1	Rebuild 13.59 miles
5	18WP	AEPW	AEPW	DOMES - MOUND ROAD 138KV CKT 1	106.5	42.56%	4REMNGTON 138.00 - FAIRFAX 138KV CKT 1	DOMES - MOUND ROAD 138KV CKT 1	Rebuild 13.59 miles
5	23SP	AEPW	AEPW	DOMES - MOUND ROAD 138KV CKT 1	122.4	41.83%	4REMNGTON 138.00 - FAIRFAX 138KV CKT 1	DOMES - MOUND ROAD 138KV CKT 1	Rebuild 13.59 miles
5	23SP	AEPW	AEPW	DOMES - MOUND ROAD 138KV CKT 1	108.5	41.83%	4REMNGTON 138.00 - SHIDLER 138KV CKT 1	DOMES - MOUND ROAD 138KV CKT 1	Rebuild 13.59 miles
5	23SP	AEPW	AEPW	DOMES - MOUND ROAD 138KV CKT 1	101.9	36.85%	FAIRFAX - FAXTAP4 138.00 138KV CKT 1	DOMES - MOUND ROAD 138KV CKT 1	Rebuild 13.59 miles
5	23WP	AEPW	AEPW	DOMES - MOUND ROAD 138KV CKT 1	104.6	41.20%	4REMNGTON 138.00 - FAIRFAX 138KV CKT 1	DOMES - MOUND ROAD 138KV CKT 1	Rebuild 13.59 miles
5	14WP	AEPW	AEPW	DOMES - PAWHUSKA TAP 138KV CKT 1	117.2	41.90%	4REMNGTON 138.00 - FAIRFAX 138KV CKT 1	DOMES - PAWHUSKA TAP 138KV CKT 1	Rebuild 5.74 miles
5	14WP	AEPW	AEPW	DOMES - PAWHUSKA TAP 138KV CKT 1	105.9	41.90%	4REMNGTON 138.00 - SHIDLER 138KV CKT 1	DOMES - PAWHUSKA TAP 138KV CKT 1	Rebuild 5.74 miles
5	14WP	AEPW	AEPW	DOMES - PAWHUSKA TAP 138KV CKT 1	101.5	36.90%	FAIRFAX - FAXTAP4 138.00 138KV CKT 1	DOMES - PAWHUSKA TAP 138KV CKT 1	Rebuild 5.74 miles
5	18SP	AEPW	AEPW	DOMES - PAWHUSKA TAP 138KV CKT 1	134.7	40.48%	4REMNGTON 138.00 - FAIRFAX 138KV CKT 1	DOMES - PAWHUSKA TAP 138KV CKT 1	Rebuild 5.74 miles
5	18SP	AEPW	AEPW	DOMES - PAWHUSKA TAP 138KV CKT 1	120.9	40.48%	4REMNGTON 138.00 - SHIDLER 138KV CKT 1	DOMES - PAWHUSKA TAP 138KV CKT 1	Rebuild 5.74 miles
5	18SP	AEPW	AEPW	DOMES - PAWHUSKA TAP 138KV CKT 1	115.3	35.54%	FAIRFAX - FAXTAP4 138.00 138KV CKT 1	DOMES - PAWHUSKA TAP 138KV CKT 1	Rebuild 5.74 miles
5	18SP	AEPW	AEPW	DOMES - PAWHUSKA TAP 138KV CKT 1	101.4	26.09%	LACYGNE - NEOSHO 345KV CKT 1	DOMES - PAWHUSKA TAP 138KV CKT 1	Rebuild 5.74 miles
5	18SP	AEPW	AEPW	DOMES - PAWHUSKA TAP 138KV CKT 1	100.5	26.13%	OMPA-PAWHUSKA NORTHEAST - PAWHUSKA TAP 138KV CKT 1	DOMES - PAWHUSKA TAP 138KV CKT 1	Rebuild 5.74 miles
5	18WP	AEPW	AEPW	DOMES - PAWHUSKA TAP 138KV CKT 1	108.9	42.56%	4REMNGTON 138.00 - FAIRFAX 138KV CKT 1	DOMES - PAWHUSKA TAP 138KV CKT 1	Rebuild 5.74 miles
5	23SP	AEPW	AEPW	DOMES - PAWHUSKA TAP 138KV CKT 1	126.2	41.83%	4REMNGTON 138.00 - FAIRFAX 138KV CKT 1	DOMES - PAWHUSKA TAP 138KV CKT 1	Rebuild 5.74 miles
5	23SP	AEPW	AEPW	DOMES - PAWHUSKA TAP 138KV CKT 1	112.3	41.83%	4REMNGTON 138.00 - SHIDLER 138KV CKT 1	DOMES - PAWHUSKA TAP 138KV CKT 1	Rebuild 5.74 miles
5	23SP	AEPW	AEPW	DOMES - PAWHUSKA TAP 138KV CKT 1	105.7	36.85%	FAIRFAX - FAXTAP4 138.00 138KV CKT 1	DOMES - PAWHUSKA TAP 138KV CKT 1	Rebuild 5.74 miles
5	23WP	AEPW	AEPW	DOMES - PAWHUSKA TAP 138KV CKT 1	107.2	41.20%	4REMNGTON 138.00 - FAIRFAX 138KV CKT 1	DOMES - PAWHUSKA TAP 138KV CKT 1	Rebuild 5.74 miles
5	18WP	AEPW	AEPW	ENOWILT - LONE OAK 138KV CKT 1	121.7	4.82%	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	121.7	4.82%	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	121.7	4.82%	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	121.7	4.82%	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 - LONE OAK 138KV CKT 1	121.7	4.82%	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	121.7	4.82%	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	121.7	4.82%	PITTSBURG - VALLIANT 345KV CKT 1	BROKEN BOW - CRAIG JUNCTION 138KV CKT 1	Rebuild 11.63
5	23WP	AEPW	AEPW	ENOWILT - LONE OAK 138KV CKT 1	111.5	6.02%	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	23WP	AEPW	AEPW	ENOWILT - LONE OAK 138KV CKT 1	111.5	6.02%	PITTSBURG - VALLIANT 345KV CKT 1	BETHEL - BROKEN BOW 138KV CKT 1	Rebuild 9.19 miles of 3/0 Copperweld with 1272 ACSR
5	23WP	AEPW	AEPW	ENOWILT - LONE OAK 138KV CKT 1	111.5	6.02%	PITTSBURG - VALLIANT 345KV CKT 1	BETHEL - NASHOBA 138KV CKT 1	Rebuild 22.43 miles of 3/0 Copperweld with 1272 ACSR
5	23WP	AEPW	AEPW	ENOWILT - LONE OAK 138KV CKT 1	111.5	6.02%	PITTSBURG - VALLIANT 345KV CKT 1	CLAYTON - NASHOBA 138KV CKT 1	Rebuild 11.57 miles of 3/0 CWC with 1272 ACSR
5	23WP	AEPW	AEPW	ENOWILT - LONE OAK 138KV CKT 1	111.5	6.02%	PITTSBURG - VALLIANT 345KV CKT 1	CLAYTON - SARDIS 138KV CKT 1	Rebuild 1.46 miles of 3/0 CWC with 1272 ACSR
5	23WP	AEPW	AEPW	ENOWILT - LONE OAK 138KV CKT 1	111.5	6.02%	PITTSBURG - VALLIANT 345KV CKT 1	ENOWILT - SARDIS 138KV CKT 1	Rebuild 13.8 miles of 3/0 CWC with 1272 ACSR
5	23WP	AEPW	AEPW	ENOWILT - LONE OAK 138KV CKT 1	111.5	6.02%	PITTSBURG - VALLIANT 345KV CKT 1	BROKEN BOW - CRAIG JUNCTION 138KV CKT 1	Rebuild 11.63
5	18WP	AEPW	AEPW	ENOWILT - SARDIS 138KV CKT 1	120.8	4.82%	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	120.8	4.82%	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	120.8	4.82%	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	120.8	4.82%	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	120.8	4.82%	PITTSBURG - VALLIANT 345KV CKT 1	CLAYTON - SARDIS 138KV CKT 1	Rebuild 1.46 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 - SARDIS 138KV CKT 1	120.8	4.82%	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	120.8	4.82%	PITTSBURG - VALLIANT 345KV CKT 1	BROKEN BOW - CRAIG JUNCTION 138KV CKT 1	Rebuild 11.63
5	23WP	AEPW	AEPW	ENOWILT - SARDIS 138KV CKT 1	110.6	6.02%	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	23WP	AEPW	AEPW	ENOWILT - SARDIS 138KV CKT 1	110.6	6.02%	PITTSBURG - VALLIANT 345KV CKT 1	BETHEL - BROKEN BOW 138KV CKT 1	Rebuild 9.19 miles of 3/0 Copperweld with 1272 ACSR
5	23WP	AEPW	AEPW	ENOWILT - SARDIS 138KV CKT 1	110.6	6.02%	PITTSBURG - VALLIANT 345KV CKT 1	BETHEL - NASHOBA 138KV CKT 1	Rebuild 22.43 miles of 3/0 Copperweld with 1272 ACSR
5	23WP	AEPW	AEPW	ENOWILT - SARDIS 138KV CKT 1	110.6	6.02%	PITTSBURG - VALLIANT 345KV CKT 1	CLAYTON - NASHOBA 138KV CKT 1	Rebuild 11.57 miles of 3/0 CWC with 1272 ACSR
5	23WP	AEPW	AEPW	ENOWILT - SARDIS 138KV CKT 1	110.6	6.02%	PITTSBURG - VALLIANT 345KV CKT 1	CLAYTON - SARDIS 138KV CKT 1	Rebuild 1.46 miles of 3/0 CWC with 1272 ACSR
5	23WP	AEPW	AEPW	ENOWILT - SARDIS 138KV CKT 1	110.6	6.02%	PITTSBURG - VALLIANT 345KV CKT 1	ENOWILT - SARDIS 138KV CKT 1	Rebuild 13.8 miles of 3/0 CWC with 1272 ACSR
5	23WP	AEPW	AEPW	ENOWILT - SARDIS 138KV CKT 1	110.6	6.02%	PITTSBURG - VALLIANT 345KV CKT 1	BROKEN BOW - CRAIG JUNCTION 138KV CKT 1	Rebuild 11.63
5	23WP	GRDA	AEPW	FLINT CREEK - SILOAM SPRINGS TAP 345KV CKT 1	101.4	4.23%	CHAMBER SPRINGS - CLARKSVILLE 345KV CKT 1	FLINT CREEK - SILOAM SPRINGS TAP 345KV CKT 1 AEPW	Replace Terminal Equipment
5	23SP	OKGE	WFEC	FRANKLIN SW - MIDWEST TAP 138KV CKT 1	107.4	3.71%	HAMMETT TAP - HAMMETT2 138KV CKT 1	FRANKLIN SW - MIDWEST TAP 138KV CKT 1	Replace Terminal Equipment
5	23SP	OKGE	WFEC	FRANKLIN SW - MIDWEST TAP 138KV CKT 1	104.5	3.71%	HAMMETT2 - MEEKER 138KV CKT 1	FRANKLIN SW - MIDWEST TAP 138KV CKT 1	Replace Terminal Equipment
5	23SP	OKGE	WFEC	FRANKLIN SW - MIDWEST TAP 138KV CKT 1	102.3	5.11%	GRACEMONT - MINCO 345KV CKT 1	FRANKLIN SW - MIDWEST TAP 138KV CKT 1	Replace Terminal Equipment
5	14WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	121.2	8.97%	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	121.2	8.97%	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	121.2	8.97%	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	121.2	8.97%	GEN336821 1-GRAND GULF UNIT	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	14WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	121.2	8.97%	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	119.5	12.20%	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	119.5	12.20%	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	119.5	12.20%	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	119.5	12.20%	PITTSBURG - VALLIANT 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	14WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	119.5	12.20%	PITTSBURG - VALLIANT 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	117.8	8.97%	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	117.8	8.97%	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	117.8	8.97%	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	117.8	8.97%	GEN336153 1-WATERFORD UNIT#3	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	14WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	117.8	8.97%	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	116.2	11.72%	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	116.2	11.72%	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	116.2	11.72%	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	116.2	11.72%	SPP-AEPW-01	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	14WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	116.2	11.72%	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	116.0	8.95%	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	116.0	8.95%	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	116.0	8.95%	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	116.0	8.95%	SPP-AEPW-32	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	14WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	116.0	8.95%	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	111.7	9.17%	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	111.7	9.17%	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	111.7	9.17%	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	111.7	9.17%	OVERTON-TRF	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	14WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	111.7	9.17%	OVERTON-TRF	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5	14WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	110.6	9.03%	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	110.6	9.03%	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	110.6	9.03%	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	110.6	9.03%	LACYGNE - STILWELL 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	14WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	110.6	9.03%	LACYGNE - STILWELL 345KV CKT 1	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	110.0	9.00%	HOYT - JEFFREY ENERGY CENTER 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	110.0	9.00%	HOYT - JEFFREY ENERGY CENTER 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	110.0	9.00%	HOYT - JEFFREY ENERGY CENTER 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	110.0	9.00%	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	14WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	110.0	9.00%	HOYT - JEFFREY ENERGY CENTER 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	109.4	9.00%	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	109.4	9.00%	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	109.4	9.00%	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	109.4	9.00%	HOYT - STRANGER CREEK 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	14WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	109.4	9.00%	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	108.6	9.00%	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	108.6	9.00%	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	108.6	9.00%	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	108.6	9.00%	LACYGNE - WEST GARDNER 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	14WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	108.6	9.00%	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	108.6	8.97%	15TH & FULTON TAP - TULSA SOUTHEAST 138KV 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	108.6	8.97%	15TH & FULTON TAP - TULSA SOUTHEAST 138KV 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	108.6	8.97%	15TH & FULTON TAP - TULSA SOUTHEAST 138KV 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	108.6	8.97%	15TH & FULTON TAP - TULSA SOUTHEAST 138KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	14WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	108.6	8.97%	15TH & FULTON TAP - TULSA SOUTHEAST 138KV CKT 1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5	14WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	107.5	8.97%	BASE CASE	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
5	14WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	107.5	8.97%	BASE CASE	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	107.5	8.97%	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	14WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	107.5	8.97%	BASE CASE	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	14WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	107.5	8.97%	BASE CASE	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5	14WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	106.8	9.00%	ROSE HILL - WOLF 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	106.8	9.00%	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	14WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	106.8	9.00%	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	14WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	106.8	9.00%	ROSE HILL - WOLF CREEK 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	14WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	106.8	9.00%	ROSE HILL - WOLF 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	105.8	8.68%	DOLET HILLS - SOUTHWEST SHREVEPORT 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	105.8	8.68%	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	14WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	105.8	8.68%	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	14WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	105.8	8.68%	DOLET HILLS - SOUTHWEST SHREVEPORT 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	14WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	105.8	8.68%	DOLET HILLS - SOUTHWEST SHREVEPORT 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	105.4	9.05%	LACYGNE - NEOSHO 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	105.4	9.05%	LACYGNE - NEOSHO 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	105.4	9.05%	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	14WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	105.4	9.05%	LACYGNE - NEOSHO 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	14WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	105.4	9.05%	LACYGNE - NEOSHO 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	119.1	13.27%	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	119.1	13.27%	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	119.1	13.27%	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	119.1	13.27%	PITTSBURG - VALLIANT 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	18SP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	119.1	13.27%	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	117.6	10.46%	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	117.6	10.46%	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	117.6	10.46%	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

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	117.6	10.46%	CHAMBER SPRINGS - CLARKSVILLE 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	18SP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	117.6	10.46%	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	117.0	10.48%	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	117.0	10.48%	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	117.0	10.48%	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	117.0	10.48%	GEN336153 1-WATERFORD UNIT#3	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	18SP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	117.0	10.48%	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	115.9	10.46%	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	115.9	10.46%	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	115.9	10.46%	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	115.9	10.46%	SPP-AEPW-32	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	18SP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	115.9	10.46%	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	115.1	12.73%	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	115.1	12.73%	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	115.1	12.73%	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	115.1	12.73%	SPP-AEPW-01	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	18SP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	115.1	12.73%	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	112.3	10.97%	AI03	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
5	18SP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	112.3	10.97%	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	112.3	10.97%	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	112.3	10.97%	AI03	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	18SP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	112.3	10.97%	AI03	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5	18SP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	110.4	10.51%	HOYT - JEFFREY ENERGY CENTER 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	110.4	10.51%	HOYT - JEFFREY ENERGY CENTER 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	110.4	10.51%	HOYT - JEFFREY ENERGY CENTER 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	110.4	10.51%	HOYT - JEFFREY ENERGY CENTER 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	110.4	10.51%	HOYT - JEFFREY ENERGY CENTER 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	110.4	10.51%	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	18SP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	110.4	10.51%	HOYT - JEFFREY ENERGY CENTER 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	110.2	10.54%	LACYGNE - STILWELL 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	110.2	10.54%	LACYGNE - STILWELL 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	110.2	10.54%	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	18SP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	110.2	10.54%	LACYGNE - STILWELL 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	18SP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	110.2	10.54%	LACYGNE - STILWELL 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	109.6	10.51%	HOYT - STRANGER CREEK 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	109.6	10.51%	HOYT - STRANGER CREEK 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	109.6	10.51%	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	18SP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	109.6	10.51%	HOYT - STRANGER CREEK 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	18SP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	109.6	10.51%	HOYT - STRANGER CREEK 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	109.4	10.48%	15TH & FULTON TAP - TULSA SOUTHEAST 138KV 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	109.4	10.48%	15TH & FULTON TAP - TULSA SOUTHEAST 138KV 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	109.4	10.48%	15TH & FULTON TAP - TULSA SOUTHEAST 138KV 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	109.4	10.48%	15TH & FULTON TAP - TULSA SOUTHEAST 138KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	18SP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	109.4	10.48%	15TH & FULTON TAP - TULSA SOUTHEAST 138KV CKT 1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5	18SP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	108.7	10.51%	LACYGNE - WEST GARDNER 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	108.7	10.51%	LACYGNE - WEST GARDNER 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	108.7	10.51%	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	18SP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	108.7	10.51%	LACYGNE - WEST GARDNER 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	18SP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	108.7	10.51%	LACYGNE - WEST GARDNER 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	107.7	10.48%	BASE CASE	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	107.7	10.48%	BASE CASE	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	107.7	10.48%	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	18SP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	107.7	10.48%	BASE CASE	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	18SP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	107.7	10.48%	BASE CASE	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5	18SP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	107.0	10.51%	ROSE HILL - WOLF CREEK 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	107.0	10.51%	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	18SP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	107.0	10.51%	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	18SP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	107.0	10.51%	ROSE HILL - WOLF CREEK 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	18SP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	107.0	10.51%	ROSE HILL - WOLF CREEK 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	105.6	10.15%	DOLET HILLS - SOUTHWEST SHREVEPORT 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	105.6	10.15%	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	18SP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	105.6	10.15%	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	18SP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	105.6	10.15%	DOLET HILLS - SOUTHWEST SHREVEPORT 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	18SP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	105.6	10.15%	DOLET HILLS - SOUTHWEST SHREVEPORT 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	105.3	10.57%	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	105.3	10.57%	LACYGNE - NEOSHO 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	105.3	10.57%	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	105.3	10.57%	LACYGNE - NEOSHO 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	18SP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	105.3	10.57%	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	124.0	12.62%	PITTSBURG - VALLIANT 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	124.0	12.62%	PITTSBURG - VALLIANT 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	124.0	12.62%	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	18WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	124.0	12.62%	PITTSBURG - VALLIANT 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	18WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	124.0	12.62%	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	119.3	12.09%	SPP-AEPW-01	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
5	18WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	119.3	12.09%	SPP-AEPW-01	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	119.3	12.09%	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	18WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	119.3	12.09%	SPP-AEPW-01	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	18WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	119.3	12.09%	SPP-AEPW-01	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5	18WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	119.2	9.65%	GEN336153 1-WATERFORD UNIT#3	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
5	18WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	119.2	9.65%	GEN336153 1-WATERFORD UNIT#3	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	119.2	9.65%	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	18WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	119.2	9.65%	GEN336153 1-WATERFORD UNIT#3	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	18WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	119.2	9.65%	GEN336153 1-WATERFORD UNIT#3	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5	18WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	116.5	9.63%	SPP-AEPW-32	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
5	18WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	116.5	9.63%	SPP-AEPW-32	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	116.5	9.63%	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	18WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	116.5	9.63%	SPP-AEPW-32	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	18WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	116.5	9.63%	SPP-AEPW-32	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5	18WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	112.4	10.11%	AI03	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
5	18WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	112.4	10.11%	AI03	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	112.4	10.11%	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	18WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	112.4	10.11%	AI03	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	18WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	112.4	10.11%	AI03	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5	18WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	110.6	9.71%	LACYGNE - STILWELL 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	110.6	9.71%	LACYGNE - STILWELL 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	110.6	9.71%	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	18WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	110.6	9.71%	LACYGNE - STILWELL 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate

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	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	110.6	9.71%	LACYGNE - STILWELL 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	110.1	9.68%	HOYT - JEFFREY ENERGY CENTER 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	110.1	9.68%	HOYT - JEFFREY ENERGY CENTER 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	110.1	9.68%	HOYT - JEFFREY ENERGY CENTER 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	110.1	9.68%	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	18WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	110.1	9.68%	HOYT - JEFFREY ENERGY CENTER 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	109.6	9.68%	HOYT - STRANGER 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	109.6	9.68%	HOYT - STRANGER 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	109.6	9.68%	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	18WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	109.6	9.68%	HOYT - STRANGER CREEK 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	18WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	109.6	9.68%	HOYT - STRANGER 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	109.2	9.65%	15TH & FULTON TAP - TULSA SOUTHEAST 138KV 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	109.2	9.65%	15TH & FULTON TAP - TULSA SOUTHEAST 138KV 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	109.2	9.65%	15TH & FULTON TAP - TULSA SOUTHEAST 138KV 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	109.2	9.65%	15TH & FULTON TAP - TULSA SOUTHEAST 138KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	18WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	109.2	9.65%	15TH & FULTON TAP - TULSA SOUTHEAST 138KV CKT 1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5	18WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	109.1	9.68%	LACYGNE - WEST GARDNER 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	109.1	9.68%	LACYGNE - WEST GARDNER 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	109.1	9.68%	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	18WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	109.1	9.68%	LACYGNE - WEST GARDNER 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	18WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	109.1	9.68%	LACYGNE - WEST GARDNER 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	9.65%	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	108.0	9.65%	BASE CASE	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	9.65%	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	108.0	9.65%	BASE CASE	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	18WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	108.0	9.65%	BASE CASE	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5	18WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	107.3	9.68%	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	107.3	9.68%	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	107.3	9.68%	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	107.3	9.68%	ROSE HILL - WOLF CREEK 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	18WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	107.3	9.68%	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	106.2	9.36%	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	106.2	9.36%	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	106.2	9.36%	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	106.2	9.36%	DOLET HILLS - SOUTHWEST SHREVEPORT 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	18WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	106.2	9.36%	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	105.6	9.74%	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	105.6	9.74%	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	105.6	9.74%	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	105.6	9.74%	LACYGNE - NEOSHO 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	18WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	105.6	9.74%	LACYGNE - NEOSHO 345KV CKT 1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	128.5	11.13%	PITTSBURG - VALLIANT 345KV CKT 1	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps
5	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	128.5	11.13%	PITTSBURG - VALLIANT 345KV CKT 1	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
5	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	128.5	11.13%	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	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	128.5	11.13%	PITTSBURG - VALLIANT 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	128.5	11.13%	PITTSBURG - VALLIANT 345KV CKT 1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	126.5	7.82%	GEN336153 1-WATERFORD UNIT#3	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps
5	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	126.5	7.82%	GEN336153 1-WATERFORD UNIT#3	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	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	126.5	7.82%	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	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	126.5	7.82%	GEN336153 1-WATERFORD UNIT#3	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	126.5	7.82%	GEN336153 1-WATERFORD UNIT#3	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	124.9	7.82%	GEN335831 1-RIVERBEND UNIT#1	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
5	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	124.9	7.82%	GEN335831 1-RIVERBEND UNIT#1	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps
5	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	124.9	7.82%	GEN335831 1-RIVERBEND UNIT#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	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	124.9	7.82%	GEN335831 1-RIVERBEND UNIT#1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	124.9	7.82%	GEN335831 1-RIVERBEND UNIT#1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	124.8	9.04%	SPP-AEPW-01	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
5	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	124.8	9.04%	SPP-AEPW-01	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps
5	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	124.8	9.04%	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	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	124.8	9.04%	SPP-AEPW-01	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	124.8	9.04%	SPP-AEPW-01	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	122.6	7.80%	SPP-AEPW-32	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
5	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	122.6	7.80%	SPP-AEPW-32	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps
5	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	122.6	7.80%	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	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	122.6	7.80%	SPP-AEPW-32	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	122.6	7.80%	SPP-AEPW-32	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	118.3	8.22%	AI03	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
5	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	118.3	8.22%	AI03	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps
5	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	118.3	8.22%	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	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	118.3	8.22%	AI03	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	118.3	8.22%	AI03	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	116.5	7.88%	LACYGNE - STILWELL 345KV CKT 1	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
5	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	116.5	7.88%	LACYGNE - STILWELL 345KV CKT 1	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps
5	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	116.5	7.88%	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	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	116.5	7.88%	LACYGNE - STILWELL 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	116.5	7.88%	LACYGNE - STILWELL 345KV CKT 1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	116.1	7.85%	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps
5	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	116.1	7.85%	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
5	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	116.1	7.85%	HOYT - JEFFREY ENERGY CENTER 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	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	116.1	7.85%	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	116.1	7.85%	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	115.5	7.85%	HOYT - STRANGER CREEK 345KV CKT 1	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
5	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	115.5	7.85%	HOYT - STRANGER CREEK 345KV CKT 1	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps
5	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	115.5	7.85%	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	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	115.5	7.85%	HOYT - STRANGER CREEK 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	115.5	7.85%	HOYT - STRANGER CREEK 345KV CKT 1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	115.1	7.82%	15TH & FULTON TAP - TULSA SOUTHEAST 138KV CKT 1	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
5	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	115.1	7.82%	15TH & FULTON TAP - TULSA SOUTHEAST 138KV CKT 1	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps
5	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	115.1	7.82%	15TH & FULTON TAP - TULSA SOUTHEAST 138KV 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	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	115.1	7.82%	15TH & FULTON TAP - TULSA SOUTHEAST 138KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	115.1	7.82%	15TH & FULTON TAP - TULSA SOUTHEAST 138KV CKT 1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	115.0	7.84%	LACYGNE - WEST GARDNER 345KV CKT 1	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
5	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	115.0	7.84%	LACYGNE - WEST GARDNER 345KV CKT 1	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps
5	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	115.0	7.84%	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	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	115.0	7.84%	LACYGNE - WEST GARDNER 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	115.0	7.84%	LACYGNE - WEST GARDNER 345KV CKT 1	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	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	114.5	7.83%	MCCREDIE - THOMAS HILL 345KV CKT 1	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
5	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	114.5	7.83%	MCCREDIE - THOMAS HILL 345KV CKT 1	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps
5	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	114.5	7.83%	MCCREDIE - THOMAS HILL 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	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	114.5	7.83%	MCCREDIE - THOMAS HILL 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	114.5	7.83%	MCCREDIE - THOMAS HILL 345KV CKT 1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	113.9	7.82%	BASE CASE	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
5	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	113.9	7.82%	BASE CASE	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps
5	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	113.9	7.82%	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	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	113.9	7.82%	BASE CASE	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	113.9	7.82%	BASE CASE	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	113.2	7.85%	ROSE HILL - WOLF CREEK 345KV CKT 1	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
5	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	113.2	7.85%	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	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	113.2	7.85%	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	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	113.2	7.85%	ROSE HILL - WOLF CREEK 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	113.2	7.85%	ROSE HILL - WOLF CREEK 345KV CKT 1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	112.1	7.61%	DOLET HILLS - SOUTHWEST SHREVEPORT 345KV CKT 1	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
5	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	112.1	7.61%	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	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	112.1	7.61%	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	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	112.1	7.61%	DOLET HILLS - SOUTHWEST SHREVEPORT 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	112.1	7.61%	DOLET HILLS - SOUTHWEST SHREVEPORT 345KV CKT 1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	111.7	7.90%	LACYGNE - NEOSHO 345KV CKT 1	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
5	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	111.7	7.90%	LACYGNE - NEOSHO 345KV CKT 1	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps
5	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	111.7	7.90%	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	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	111.7	7.90%	LACYGNE - NEOSHO 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	111.7	7.90%	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	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	111.7	7.90%	LACYGNE - NEOSHO 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	23WP	OKGE	OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	111.7	7.90%	LACYGNE - NEOSHO 345KV CKT 1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5	14WP	OKGE	OKGE	FT SMITH (FTSMITH1) 500/345/13.8KV TRANSFORMER CKT 1	103.1	8.88%	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
5	18SP	OKGE	OKGE	FT SMITH (FTSMITH1) 500/345/13.8KV TRANSFORMER CKT 1	102.3	10.30%	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
5	18WP	OKGE	OKGE	FT SMITH (FTSMITH1) 500/345/13.8KV TRANSFORMER CKT 1	103.4	9.49%	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
5	23WP	OKGE	OKGE	FT SMITH (FTSMITH1) 500/345/13.8KV TRANSFORMER CKT 1	108.6	7.70%	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
5	14WP	OKGE	OKGE	FT SMITH (FTSMITH5) 345/161/13.8KV TRANSFORMER CKT 5	117.1	6.24%	FT SMITH (FTSMITH1) 500/345/13.8KV TRANSFORMER CKT 1	FT SMITH (FTSMITH1) 500/345/13.8KV TRANSFORMER CKT 1	Install 2nd 500/345 kV bus tie in Ft. Smith Sub
5	18SP	OKGE	OKGE	FT SMITH (FTSMITH5) 345/161/13.8KV TRANSFORMER CKT 5	122.2	7.58%	FT SMITH (FTSMITH1) 500/345/13.8KV TRANSFORMER CKT 1	FT SMITH (FTSMITH1) 500/345/13.8KV TRANSFORMER CKT 1	Install 2nd 500/345 kV bus tie in Ft. Smith Sub
5	18WP	OKGE	OKGE	FT SMITH (FTSMITH5) 345/161/13.8KV TRANSFORMER CKT 5	119.8	6.98%	FT SMITH (FTSMITH1) 500/345/13.8KV TRANSFORMER CKT 1	FT SMITH (FTSMITH1) 500/345/13.8KV TRANSFORMER CKT 1	Install 2nd 500/345 kV bus tie in Ft. Smith Sub
5	23WP	OKGE	OKGE	FT SMITH (FTSMITH5) 345/161/13.8KV TRANSFORMER CKT 5	126.2	5.64%	FT SMITH (FTSMITH1) 500/345/13.8KV TRANSFORMER CKT 1	FT SMITH (FTSMITH1) 500/345/13.8KV TRANSFORMER CKT 1	Install 2nd 500/345 kV bus tie in Ft. Smith Sub
5	14WP	SWPA	SWPA	GORE - MUSKOGEE TAP 161KV CKT 1	109.1	3.48%	FT SMITH - MUSKOGEE 345KV CKT 1	ADABELL - VBI 161KV CKT 1	Replace existing 800 amp wave trap with 1200 amp in VBI sub
5	14WP	SWPA	SWPA	GORE - MUSKOGEE TAP 161KV CKT 1	109.1	3.48%	FT SMITH - MUSKOGEE 345KV CKT 1	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa
5	14WP	SWPA	SWPA	GORE - MUSKOGEE TAP 161KV CKT 1	109.1	3.48%	FT SMITH - MUSKOGEE 345KV CKT 1	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
5	14WP	SWPA	SWPA	GORE - MUSKOGEE TAP 161KV CKT 1	109.1	3.48%	FT SMITH - MUSKOGEE 345KV CKT 1	Lacygne - Mariosa 345KV AMRN	Indeterminate
5	14WP	SWPA	SWPA	GORE - MUSKOGEE TAP 161KV CKT 1	109.1	3.48%	FT SMITH - MUSKOGEE 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	SWPA	SWPA	GORE - MUSKOGEE TAP 161KV CKT 1	109.1	3.48%	FT SMITH - MUSKOGEE 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	14WP	SWPA	SWPA	GORE - MUSKOGEE TAP 161KV CKT 1	109.1	3.48%	FT SMITH - MUSKOGEE 345KV CKT 1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5	18SP	SWPA	SWPA	GORE - MUSKOGEE TAP 161KV CKT 1	123.6	3.81%	FT SMITH - MUSKOGEE 345KV CKT 1	ADABELL - VBI 161KV CKT 1	Replace existing 800 amp wave trap with 1200 amp in VBI sub
5	18SP	SWPA	SWPA	GORE - MUSKOGEE TAP 161KV CKT 1	123.6	3.81%	FT SMITH - MUSKOGEE 345KV CKT 1	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa
5	18SP	SWPA	SWPA	GORE - MUSKOGEE TAP 161KV CKT 1	123.6	3.81%	FT SMITH - MUSKOGEE 345KV CKT 1	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
5	18SP	SWPA	SWPA	GORE - MUSKOGEE TAP 161KV CKT 1	123.6	3.81%	FT SMITH - MUSKOGEE 345KV CKT 1	Lacygne - Mariosa 345KV AMRN	Indeterminate
5	18SP	SWPA	SWPA	GORE - MUSKOGEE TAP 161KV CKT 1	123.6	3.81%	FT SMITH - MUSKOGEE 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	SWPA	SWPA	GORE - MUSKOGEE TAP 161KV CKT 1	123.6	3.81%	FT SMITH - MUSKOGEE 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	18SP	SWPA	SWPA	GORE - MUSKOGEE TAP 161KV CKT 1	123.6	3.81%	FT SMITH - MUSKOGEE 345KV CKT 1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5	18WP	SWPA	SWPA	GORE - MUSKOGEE TAP 161KV CKT 1	105.3	3.63%	FT SMITH - MUSKOGEE 345KV CKT 1	ADABELL - VBI 161KV CKT 1	Replace existing 800 amp wave trap with 1200 amp in VBI sub

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	SWPA	SWPA	GORE - MUSKOGEE TAP 161KV CKT 1	105.3	3.63%	FT SMITH - MUSKOGEE 345KV CKT 1	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa
5	18WP	SWPA	SWPA	GORE - MUSKOGEE TAP 161KV CKT 1	105.3	3.63%	FT SMITH - MUSKOGEE 345KV CKT 1	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
5	18WP	SWPA	SWPA	GORE - MUSKOGEE TAP 161KV CKT 1	105.3	3.63%	FT SMITH - MUSKOGEE 345KV CKT 1	Lacygne - Mariosa 345KV AMRN	Indeterminate
5	18WP	SWPA	SWPA	GORE - MUSKOGEE TAP 161KV CKT 1	105.3	3.63%	FT SMITH - MUSKOGEE 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	SWPA	SWPA	GORE - MUSKOGEE TAP 161KV CKT 1	105.3	3.63%	FT SMITH - MUSKOGEE 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	18WP	SWPA	SWPA	GORE - MUSKOGEE TAP 161KV CKT 1	105.3	3.63%	FT SMITH - MUSKOGEE 345KV CKT 1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5	23WP	SWPA	SWPA	GORE - MUSKOGEE TAP 161KV CKT 1	113.1	3.26%	FT SMITH - MUSKOGEE 345KV CKT 1	ADABELL - VBI 161KV CKT 1	Replace existing 800 amp wave trap with 1200 amp in VBI sub
5	23WP	SWPA	SWPA	GORE - MUSKOGEE TAP 161KV CKT 1	113.1	3.26%	FT SMITH - MUSKOGEE 345KV CKT 1	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa
5	23WP	SWPA	SWPA	GORE - MUSKOGEE TAP 161KV CKT 1	113.1	3.26%	FT SMITH - MUSKOGEE 345KV CKT 1	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
5	23WP	SWPA	SWPA	GORE - MUSKOGEE TAP 161KV CKT 1	113.1	3.26%	FT SMITH - MUSKOGEE 345KV CKT 1	Lacygne - Mariosa 345KV AMRN	Indeterminate
5	23WP	SWPA	SWPA	GORE - MUSKOGEE TAP 161KV CKT 1	113.1	3.26%	FT SMITH - MUSKOGEE 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	23WP	SWPA	SWPA	GORE - MUSKOGEE TAP 161KV CKT 1	113.1	3.26%	FT SMITH - MUSKOGEE 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	23WP	SWPA	SWPA	GORE - MUSKOGEE TAP 161KV CKT 1	113.1	3.26%	FT SMITH - MUSKOGEE 345KV CKT 1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5	18WP	OKGE	AEPW	GRACEMONT - LAWTON EASTSIDE 345KV CKT 1	102.2	7.34%	G12-038 TAP 345.00 - TUCO INTERCHANGE 345KV CKT 1	GRACEMONT - LAWTON EASTSIDE 345KV CKT 1	Replace Terminal Equipment
5	23WP	OKGE	AEPW	GRACEMONT - LAWTON EASTSIDE 345KV CKT 1	110.5	8.19%	G12-038 TAP 345.00 - TUCO INTERCHANGE 345KV CKT 1	GRACEMONT - LAWTON EASTSIDE 345KV CKT 1	Replace Terminal Equipment
5	23WP	OKGE	AEPW	GRACEMONT - LAWTON EASTSIDE 345KV CKT 1	105.9	8.97%	OKLAUNION - TUCO INTERCHANGE 345KV CKT 1	GRACEMONT - LAWTON EASTSIDE 345KV CKT 1	Replace Terminal Equipment
5	23WP	OKGE	AEPW	GRACEMONT - LAWTON EASTSIDE 345KV CKT 1	105.9	8.97%	SPP-SWPS-01	GRACEMONT - LAWTON EASTSIDE 345KV CKT 1	Replace Terminal Equipment
5	23WP	OKGE	AEPW	GRACEMONT - LAWTON EASTSIDE 345KV CKT 1	103.0	7.94%	BASE CASE	GRACEMONT - LAWTON EASTSIDE 345KV CKT 1	Replace Terminal Equipment
5	18SP	GRDA	GRDA	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1	110.8	5.22%	CHAMBER SPRINGS - CLARKSVILLE 345KV CKT 1	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1 #2	Replace Terminal Equipment
5	18SP	GRDA	GRDA	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1	110.8	5.22%	CHAMBER SPRINGS - CLARKSVILLE 345KV CKT 1	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1 #1	Add new pole to increase line clearance
5	18SP	GRDA	GRDA	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1	103.7	6.88%	7JASPER 345.00 - BLACKBERRY 345KV CKT 1	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1 #2	Replace Terminal Equipment
5	18SP	GRDA	GRDA	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1	103.7	6.88%	7JASPER 345.00 - BLACKBERRY 345KV CKT 1	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1 #1	Add new pole to increase line clearance
5	18SP	GRDA	GRDA	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1	100.3	6.65%	7JASPER 345.00 - MORGAN 345KV CKT 1	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1 #2	Replace Terminal Equipment
5	18SP	GRDA	GRDA	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1	100.3	6.65%	7JASPER 345.00 - MORGAN 345KV CKT 1	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1 #1	Add new pole to increase line clearance
5	18WP	GRDA	GRDA	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1	114.5	4.95%	CHAMBER SPRINGS - CLARKSVILLE 345KV CKT 1	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1 #2	Replace Terminal Equipment
5	18WP	GRDA	GRDA	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1	114.5	4.95%	CHAMBER SPRINGS - CLARKSVILLE 345KV CKT 1	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1 #1	Add new pole to increase line clearance
5	18WP	GRDA	GRDA	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1	107.6	6.62%	7JASPER 345.00 - BLACKBERRY 345KV CKT 1	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1 #2	Replace Terminal Equipment
5	18WP	GRDA	GRDA	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1	107.6	6.62%	7JASPER 345.00 - BLACKBERRY 345KV CKT 1	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1 #1	Add new pole to increase line clearance
5	18WP	GRDA	GRDA	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1	104.2	6.40%	7JASPER 345.00 - MORGAN 345KV CKT 1	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1 #2	Replace Terminal Equipment
5	18WP	GRDA	GRDA	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1	104.2	6.40%	7JASPER 345.00 - MORGAN 345KV CKT 1	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1 #1	Add new pole to increase line clearance
5	23WP	GRDA	GRDA	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1	121.0	4.32%	CHAMBER SPRINGS - CLARKSVILLE 345KV CKT 1	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1 #2	Replace Terminal Equipment
5	23WP	GRDA	GRDA	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1	121.0	4.32%	CHAMBER SPRINGS - CLARKSVILLE 345KV CKT 1	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1 #1	Add new pole to increase line clearance
5	23WP	GRDA	GRDA	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1	113.0	6.02%	7JASPER 345.00 - BLACKBERRY 345KV CKT 1	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1 #2	Replace Terminal Equipment
5	23WP	GRDA	GRDA	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1	113.0	6.02%	7JASPER 345.00 - BLACKBERRY 345KV CKT 1	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1 #1	Add new pole to increase line clearance
5	23WP	GRDA	GRDA	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1	109.2	5.83%	7JASPER 345.00 - MORGAN 345KV CKT 1	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1 #2	Replace Terminal Equipment
5	23WP	GRDA	GRDA	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1	109.2	5.83%	7JASPER 345.00 - MORGAN 345KV CKT 1	GRDA1 - SILOAM SPRINGS TAP 345KV CKT 1 #1	Add new pole to increase line clearance
5	14WP	GRDA	OKGE	HIGHWAY 59 - TAHLEQUAH 161KV CKT 1	118.4	3.46%	FT SMITH - MUSKOGEE 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	GRDA	OKGE	HIGHWAY 59 - TAHLEQUAH 161KV CKT 1	118.4	3.46%	FT SMITH - MUSKOGEE 345KV CKT 1	ADABELL - VBI 161KV CKT 1	Replace existing 800 amp wave trap with 1200 amp in VBI sub
5	14WP	GRDA	OKGE	HIGHWAY 59 - TAHLEQUAH 161KV CKT 1	118.4	3.46%	FT SMITH - MUSKOGEE 345KV CKT 1	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
5	14WP	GRDA	OKGE	HIGHWAY 59 - TAHLEQUAH 161KV CKT 1	118.4	3.46%	FT SMITH - MUSKOGEE 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	14WP	GRDA	OKGE	HIGHWAY 59 - TAHLEQUAH 161KV CKT 1	118.4	3.46%	FT SMITH - MUSKOGEE 345KV CKT 1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5	18SP	GRDA	OKGE	HIGHWAY 59 - TAHLEQUAH 161KV CKT 1	112.8	3.90%	FT SMITH - MUSKOGEE 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	GRDA	OKGE	HIGHWAY 59 - TAHLEQUAH 161KV CKT 1	112.8	3.90%	FT SMITH - MUSKOGEE 345KV CKT 1	ADABELL - VBI 161KV CKT 1	Replace existing 800 amp wave trap with 1200 amp in VBI sub
5	18SP	GRDA	OKGE	HIGHWAY 59 - TAHLEQUAH 161KV CKT 1	112.8	3.90%	FT SMITH - MUSKOGEE 345KV CKT 1	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
5	18SP	GRDA	OKGE	HIGHWAY 59 - TAHLEQUAH 161KV CKT 1	112.8	3.90%	FT SMITH - MUSKOGEE 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	18SP	GRDA	OKGE	HIGHWAY 59 - TAHLEQUAH 161KV CKT 1	112.8	3.90%	FT SMITH - MUSKOGEE 345KV CKT 1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5	18WP	GRDA	OKGE	HIGHWAY 59 - TAHLEQUAH 161KV CKT 1	116.8	3.66%	FT SMITH - MUSKOGEE 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	GRDA	OKGE	HIGHWAY 59 - TAHLEQUAH 161KV CKT 1	116.8	3.66%	FT SMITH - MUSKOGEE 345KV CKT 1	ADABELL - VBI 161KV CKT 1	Replace existing 800 amp wave trap with 1200 amp in VBI sub

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	GRDA	OKGE	HIGHWAY 59 - TAHLEQUAH 161KV CKT 1	116.8	3.66%	FT SMITH - MUSKOGEE 345KV CKT 1	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
5	18WP	GRDA	OKGE	HIGHWAY 59 - TAHLEQUAH 161KV CKT 1	116.8	3.66%	FT SMITH - MUSKOGEE 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	18WP	GRDA	OKGE	HIGHWAY 59 - TAHLEQUAH 161KV CKT 1	116.8	3.66%	FT SMITH - MUSKOGEE 345KV CKT 1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5	23WP	GRDA	OKGE	HIGHWAY 59 - TAHLEQUAH 161KV CKT 1	121.3	3.16%	FT SMITH - MUSKOGEE 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	23WP	GRDA	OKGE	HIGHWAY 59 - TAHLEQUAH 161KV CKT 1	121.3	3.16%	FT SMITH - MUSKOGEE 345KV CKT 1	ADABELL - VBI 161KV CKT 1	Replace existing 800 amp wave trap with 1200 amp in VBI sub
5	23WP	GRDA	OKGE	HIGHWAY 59 - TAHLEQUAH 161KV CKT 1	121.3	3.16%	FT SMITH - MUSKOGEE 345KV CKT 1	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
5	23WP	GRDA	OKGE	HIGHWAY 59 - TAHLEQUAH 161KV CKT 1	121.3	3.16%	FT SMITH - MUSKOGEE 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	23WP	GRDA	OKGE	HIGHWAY 59 - TAHLEQUAH 161KV CKT 1	121.3	3.16%	FT SMITH - MUSKOGEE 345KV CKT 1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5	14WP	OKGE	OKGE	HIGHWAY 59 - VBI 161KV CKT 1	126.4	3.46%	FT SMITH - MUSKOGEE 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	HIGHWAY 59 - VBI 161KV CKT 1	126.4	3.46%	FT SMITH - MUSKOGEE 345KV CKT 1	ADABELL - VBI 161KV CKT 1	Replace existing 800 amp wave trap with 1200 amp in VBI sub
5	14WP	OKGE	OKGE	HIGHWAY 59 - VBI 161KV CKT 1	126.4	3.46%	FT SMITH - MUSKOGEE 345KV CKT 1	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
5	14WP	OKGE	OKGE	HIGHWAY 59 - VBI 161KV CKT 1	126.4	3.46%	FT SMITH - MUSKOGEE 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	14WP	OKGE	OKGE	HIGHWAY 59 - VBI 161KV CKT 1	126.4	3.46%	FT SMITH - MUSKOGEE 345KV CKT 1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5	18SP	OKGE	OKGE	HIGHWAY 59 - VBI 161KV CKT 1	118.9	3.90%	FT SMITH - MUSKOGEE 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	HIGHWAY 59 - VBI 161KV CKT 1	118.9	3.90%	FT SMITH - MUSKOGEE 345KV CKT 1	ADABELL - VBI 161KV CKT 1	Replace existing 800 amp wave trap with 1200 amp in VBI sub
5	18SP	OKGE	OKGE	HIGHWAY 59 - VBI 161KV CKT 1	118.9	3.90%	FT SMITH - MUSKOGEE 345KV CKT 1	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
5	18SP	OKGE	OKGE	HIGHWAY 59 - VBI 161KV CKT 1	118.9	3.90%	FT SMITH - MUSKOGEE 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	18SP	OKGE	OKGE	HIGHWAY 59 - VBI 161KV CKT 1	118.9	3.90%	FT SMITH - MUSKOGEE 345KV CKT 1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5	18WP	OKGE	OKGE	HIGHWAY 59 - VBI 161KV CKT 1	124.8	3.66%	FT SMITH - MUSKOGEE 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	HIGHWAY 59 - VBI 161KV CKT 1	124.8	3.66%	FT SMITH - MUSKOGEE 345KV CKT 1	ADABELL - VBI 161KV CKT 1	Replace existing 800 amp wave trap with 1200 amp in VBI sub
5	18WP	OKGE	OKGE	HIGHWAY 59 - VBI 161KV CKT 1	124.8	3.66%	FT SMITH - MUSKOGEE 345KV CKT 1	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
5	18WP	OKGE	OKGE	HIGHWAY 59 - VBI 161KV CKT 1	124.8	3.66%	FT SMITH - MUSKOGEE 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	18WP	OKGE	OKGE	HIGHWAY 59 - VBI 161KV CKT 1	124.8	3.66%	FT SMITH - MUSKOGEE 345KV CKT 1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5	23WP	OKGE	OKGE	HIGHWAY 59 - VBI 161KV CKT 1	129.7	3.16%	FT SMITH - MUSKOGEE 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	23WP	OKGE	OKGE	HIGHWAY 59 - VBI 161KV CKT 1	129.7	3.16%	FT SMITH - MUSKOGEE 345KV CKT 1	ADABELL - VBI 161KV CKT 1	Replace existing 800 amp wave trap with 1200 amp in VBI sub
5	23WP	OKGE	OKGE	HIGHWAY 59 - VBI 161KV CKT 1	129.7	3.16%	FT SMITH - MUSKOGEE 345KV CKT 1	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
5	23WP	OKGE	OKGE	HIGHWAY 59 - VBI 161KV CKT 1	129.7	3.16%	FT SMITH - MUSKOGEE 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	23WP	OKGE	OKGE	HIGHWAY 59 - VBI 161KV CKT 1	129.7	3.16%	FT SMITH - MUSKOGEE 345KV CKT 1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5	18SP	AEPW	AEPW	KNOX LEE - SOUTH TEXAS EASTMAN 138KV CKT 1	106.9	27.60%	EASTON REC - PIRKEY 138KV CKT 1	KNOX LEE - SOUTH TEXAS EASTMAN 138KV CKT 1 Accelerate	Rebuild 5.5 miles with 1533.3 ACSR/TW
5	18SP	AEPW	AEPW	KNOX LEE - SOUTH TEXAS EASTMAN 138KV CKT 1	105.8	27.60%	EASTON REC - KNOX LEE 138KV CKT 1	KNOX LEE - SOUTH TEXAS EASTMAN 138KV CKT 1 Accelerate	Rebuild 5.5 miles with 1533.3 ACSR/TW
5	18SP	AEPW	AEPW	LIEBERMAN - LONGWOOD 138KV CKT 1	110.8	15.34%	LONGWOOD - NORAM 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	18SP	AEPW	AEPW	LIEBERMAN - LONGWOOD 138KV CKT 1	110.2	15.34%	NORAM - RAINES 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	18SP	AEPW	AEPW	LIEBERMAN - LONGWOOD 138KV CKT 1	105.1	15.34%	ARSENAL HILL - RAINES 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	18SP	AEPW	AEPW	LONGWOOD - NORAM 138KV CKT 1	121.6	24.30%	SPP-AEPW-05	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	18SP	AEPW	AEPW	LONGWOOD - NORAM 138KV CKT 1	108.1	22.03%	LIEBERMAN - LONGWOOD 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	18SP	AEPW	AEPW	LONGWOOD - OAK PAN-HARR REC 138KV CKT 1	102.0	7.28%	SPP-AEPW-05	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	18SP	AEPW	AEPW	LONGWOOD (LONGWOOD) 345/138/13.2KV TRANSFORMER CKT 1	103.4	34.23%	SPP-AEPW-05	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	18WP	AEPW	AEPW	LYDIA - VALLIANT 345KV CKT 1	115.0	41.47%	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	115.0	41.47%	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	115.0	41.47%	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	115.0	41.47%	NORTHWEST TEXARKANA - VALLIANT 345KV CKT 1	Lacygne - Mariosa 345KV AMRN	Indeterminate
5	18WP	AEPW	AEPW	LYDIA - VALLIANT 345KV CKT 1	115.0	41.47%	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	115.0	41.47%	NORTHWEST TEXARKANA - VALLIANT 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	18WP	AEPW	AEPW	LYDIA - VALLIANT 345KV CKT 1	115.0	41.47%	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	107.9	42.25%	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	107.9	42.25%	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	107.9	42.25%	NORTHWEST TEXARKANA - VALLIANT 345KV CKT 1	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
5	23WP	AEPW	AEPW	LYDIA - VALLIANT 345KV CKT 1	107.9	42.25%	NORTHWEST TEXARKANA - VALLIANT 345KV CKT 1	Lacygne - Mariosa 345KV AMRN	Indeterminate

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	AEPW	AEPW	LYDIA - VALLIANT 345KV CKT 1	107.9	42.25%	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	23WP	AEPW	AEPW	LYDIA - VALLIANT 345KV CKT 1	107.9	42.25%	NORTHWEST TEXARKANA - VALLIANT 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	23WP	AEPW	AEPW	LYDIA - VALLIANT 345KV CKT 1	107.9	42.25%	NORTHWEST TEXARKANA - VALLIANT 345KV CKT 1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line
5	18SP	AEPW	AEPW	NORAM - RAINES 138KV CKT 1	120.5	24.30%	SPP-AEPW-05	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	18SP	AEPW	AEPW	NORAM - RAINES 138KV CKT 1	107.0	22.03%	LIEBERMAN - LONGWOOD 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	18SP	AEPW	AEPW	NORTH NEW BOSTON - NW TEXARKANA-BANN T 138KV CKT 1	109.6	4.21%	PATTERSON - SOUTH FOREMAN REC 138KV CKT 1	NORTH NEW BOSTON - NW TEXARKANA-BANN T 138KV CKT 1	Rebuild 14.19 miles to 1533.6 ACSR/TW 54/19
5	18SP	AEPW	AEPW	NORTH NEW BOSTON - NW TEXARKANA-BANN T 138KV CKT 1	105.6	3.44%	SPP-AEPW-04	NORTH NEW BOSTON - NW TEXARKANA-BANN T 138KV CKT 1	Rebuild 14.19 miles to 1533.6 ACSR/TW 54/19
5	14WP	AEPW	AEPW	PAWHUSKA TAP - WEST PAWHUSKA 138KV CKT 1	121.1	41.90%	4REMNGTON 138.00 - FAIRFAX 138KV CKT 1	PAWHUSKA TAP - WEST PAWHUSKA 138KV CKT 1	Rebuild 5.98 miles with 1533.3 ACSR/TW
5	14WP	AEPW	AEPW	PAWHUSKA TAP - WEST PAWHUSKA 138KV CKT 1	109.9	41.90%	4REMNGTON 138.00 - SHIDLER 138KV CKT 1	PAWHUSKA TAP - WEST PAWHUSKA 138KV CKT 1	Rebuild 5.98 miles with 1533.3 ACSR/TW
5	14WP	AEPW	AEPW	PAWHUSKA TAP - WEST PAWHUSKA 138KV CKT 1	105.5	36.90%	FAIRFAX - FAXTAP4 138.00 138KV CKT 1	PAWHUSKA TAP - WEST PAWHUSKA 138KV CKT 1	Rebuild 5.98 miles with 1533.3 ACSR/TW
5	18SP	AEPW	AEPW	PAWHUSKA TAP - WEST PAWHUSKA 138KV CKT 1	143.2	40.48%	4REMNGTON 138.00 - FAIRFAX 138KV CKT 1	PAWHUSKA TAP - WEST PAWHUSKA 138KV CKT 1	Rebuild 5.98 miles with 1533.3 ACSR/TW
5	18SP	AEPW	AEPW	PAWHUSKA TAP - WEST PAWHUSKA 138KV CKT 1	129.2	40.48%	4REMNGTON 138.00 - SHIDLER 138KV CKT 1	PAWHUSKA TAP - WEST PAWHUSKA 138KV CKT 1	Rebuild 5.98 miles with 1533.3 ACSR/TW
5	18SP	AEPW	AEPW	PAWHUSKA TAP - WEST PAWHUSKA 138KV CKT 1	123.6	35.54%	FAIRFAX - FAXTAP4 138.00 138KV CKT 1	PAWHUSKA TAP - WEST PAWHUSKA 138KV CKT 1	Rebuild 5.98 miles with 1533.3 ACSR/TW
5	18SP	AEPW	AEPW	PAWHUSKA TAP - WEST PAWHUSKA 138KV CKT 1	109.7	26.09%	LACYGNE - NEOSHO 345KV CKT 1	PAWHUSKA TAP - WEST PAWHUSKA 138KV CKT 1	Rebuild 5.98 miles with 1533.3 ACSR/TW
5	18SP	AEPW	AEPW	PAWHUSKA TAP - WEST PAWHUSKA 138KV CKT 1	108.3	26.13%	SHIDWFC - WEBB CITY TAP 138KV CKT 1	PAWHUSKA TAP - WEST PAWHUSKA 138KV CKT 1	Rebuild 5.98 miles with 1533.3 ACSR/TW
5	18SP	AEPW	AEPW	PAWHUSKA TAP - WEST PAWHUSKA 138KV CKT 1	107.8	26.13%	WRTOD400	PAWHUSKA TAP - WEST PAWHUSKA 138KV CKT 1	Rebuild 5.98 miles with 1533.3 ACSR/TW
5	18SP	AEPW	AEPW	PAWHUSKA TAP - WEST PAWHUSKA 138KV CKT 1	107.7	26.13%	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	PAWHUSKA TAP - WEST PAWHUSKA 138KV CKT 1	Rebuild 5.98 miles with 1533.3 ACSR/TW
5	18SP	AEPW	AEPW	PAWHUSKA TAP - WEST PAWHUSKA 138KV CKT 1	107.7	25.98%	SPP-WERE-18	PAWHUSKA TAP - WEST PAWHUSKA 138KV CKT 1	Rebuild 5.98 miles with 1533.3 ACSR/TW
5	18SP	AEPW	AEPW	PAWHUSKA TAP - WEST PAWHUSKA 138KV CKT 1	107.7	26.13%	SPP-AEPW-32	PAWHUSKA TAP - WEST PAWHUSKA 138KV CKT 1	Rebuild 5.98 miles with 1533.3 ACSR/TW
5	18SP	AEPW	AEPW	PAWHUSKA TAP - WEST PAWHUSKA 138KV CKT 1	104.8	26.13%	BASE CASE	PAWHUSKA TAP - WEST PAWHUSKA 138KV CKT 1	Rebuild 5.98 miles with 1533.3 ACSR/TW
5	18WP	AEPW	AEPW	PAWHUSKA TAP - WEST PAWHUSKA 138KV CKT 1	113.0	42.56%	4REMNGTON 138.00 - FAIRFAX 138KV CKT 1	PAWHUSKA TAP - WEST PAWHUSKA 138KV CKT 1	Rebuild 5.98 miles with 1533.3 ACSR/TW
5	18WP	AEPW	AEPW	PAWHUSKA TAP - WEST PAWHUSKA 138KV CKT 1	101.7	42.56%	4REMNGTON 138.00 - SHIDLER 138KV CKT 1	PAWHUSKA TAP - WEST PAWHUSKA 138KV CKT 1	Rebuild 5.98 miles with 1533.3 ACSR/TW
5	23SP	AEPW	AEPW	PAWHUSKA TAP - WEST PAWHUSKA 138KV CKT 1	135.1	41.83%	4REMNGTON 138.00 - FAIRFAX 138KV CKT 1	PAWHUSKA TAP - WEST PAWHUSKA 138KV CKT 1	Rebuild 5.98 miles with 1533.3 ACSR/TW
5	23SP	AEPW	AEPW	PAWHUSKA TAP - WEST PAWHUSKA 138KV CKT 1	121.1	41.83%	4REMNGTON 138.00 - SHIDLER 138KV CKT 1	PAWHUSKA TAP - WEST PAWHUSKA 138KV CKT 1	Rebuild 5.98 miles with 1533.3 ACSR/TW
5	23SP	AEPW	AEPW	PAWHUSKA TAP - WEST PAWHUSKA 138KV CKT 1	114.5	36.85%	FAIRFAX - FAXTAP4 138.00 138KV CKT 1	PAWHUSKA TAP - WEST PAWHUSKA 138KV CKT 1	Rebuild 5.98 miles with 1533.3 ACSR/TW
5	23WP	AEPW	AEPW	PAWHUSKA TAP - WEST PAWHUSKA 138KV CKT 1	111.5	41.20%	4REMNGTON 138.00 - FAIRFAX 138KV CKT 1	PAWHUSKA TAP - WEST PAWHUSKA 138KV CKT 1	Rebuild 5.98 miles with 1533.3 ACSR/TW
5	23WP	AEPW	AEPW	PAWHUSKA TAP - WEST PAWHUSKA 138KV CKT 1	100.2	41.20%	4REMNGTON 138.00 - SHIDLER 138KV CKT 1	PAWHUSKA TAP - WEST PAWHUSKA 138KV CKT 1	Rebuild 5.98 miles with 1533.3 ACSR/TW
5	14WP	GMO	GMO	PECULIAR - PLEASANT HILL 345KV CKT 1	114.0	3.87%	EASTOWN7 345.00 - IATAN 345KV CKT 1	IATAN - NASHUA 345KV CKT 1	Tap Nashua 345kV bus in Hawthorn - St. Joseph 345 kV line. Build new 345 kV line from Iatan to Nashua,Add Nashua 345/161 kV
5	14WP	GMO	GMO	PECULIAR - PLEASANT HILL 345KV CKT 1	101.2	3.18%	HAWTHORN - ST JOE 345KV CKT 1	IATAN - NASHUA 345KV CKT 1	Tap Nashua 345kV bus in Hawthorn - St. Joseph 345 kV line. Build new 345 kV line from Iatan to Nashua,Add Nashua 345/161 kV
5	18WP	AEPW	AEPW	PITTSBURG - VALLIANT 345KV CKT 1	108.8	35.43%	HUGO - SUNNYSIDE 345KV CKT 1	PITTSBURG - VALLIANT 345KV CKT 1	Replace wavetrap and associated equipment at Pittsburg
5	18WP	AEPW	AEPW	PITTSBURG - VALLIANT 345KV CKT 1	108.7	33.79%	HUGO - VALLIANT 345KV CKT 1	PITTSBURG - VALLIANT 345KV CKT 1	Replace wavetrap and associated equipment at Pittsburg
5	23WP	AEPW	AEPW	PITTSBURG - VALLIANT 345KV CKT 1	101.9	37.65%	HUGO - VALLIANT 345KV CKT 1	PITTSBURG - VALLIANT 345KV CKT 1	Replace wavetrap and associated equipment at Pittsburg
5	23WP	AEPW	AEPW	PITTSBURG - VALLIANT 345KV CKT 1	101.4	39.90%	HUGO - SUNNYSIDE 345KV CKT 1	PITTSBURG - VALLIANT 345KV CKT 1	Replace wavetrap and associated equipment at Pittsburg
5	14WP	AEPW	AEPW	SHIDLER - WEST PAWHUSKA 138KV CKT 1	121.9	41.90%	4REMNGTON 138.00 - FAIRFAX 138KV CKT 1	SHIDLER - WEST PAWHUSKA 138KV CKT 1	Rebuild 16.11
5	14WP	AEPW	AEPW	SHIDLER - WEST PAWHUSKA 138KV CKT 1	110.7	41.90%	4REMNGTON 138.00 - SHIDLER 138KV CKT 1	SHIDLER - WEST PAWHUSKA 138KV CKT 1	Rebuild 16.11
5	14WP	AEPW	AEPW	SHIDLER - WEST PAWHUSKA 138KV CKT 1	106.3	36.90%	FAIRFAX - FAXTAP4 138.00 138KV CKT 1	SHIDLER - WEST PAWHUSKA 138KV CKT 1	Rebuild 16.11
5	18SP	AEPW	AEPW	SHIDLER - WEST PAWHUSKA 138KV CKT 1	144.4	40.48%	4REMNGTON 138.00 - FAIRFAX 138KV CKT 1	SHIDLER - WEST PAWHUSKA 138KV CKT 1	Rebuild 16.11
5	18SP	AEPW	AEPW	SHIDLER - WEST PAWHUSKA 138KV CKT 1	130.5	40.48%	4REMNGTON 138.00 - SHIDLER 138KV CKT 1	SHIDLER - WEST PAWHUSKA 138KV CKT 1	Rebuild 16.11
5	18SP	AEPW	AEPW	SHIDLER - WEST PAWHUSKA 138KV CKT 1	124.9	35.54%	FAIRFAX - FAXTAP4 138.00 138KV CKT 1	SHIDLER - WEST PAWHUSKA 138KV CKT 1	Rebuild 16.11
5	18SP	AEPW	AEPW	SHIDLER - WEST PAWHUSKA 138KV CKT 1	118.5	26.13%	BASE CASE	SHIDLER - WEST PAWHUSKA 138KV CKT 1	Rebuild 16.11
5	18SP	AEPW	AEPW	SHIDLER - WEST PAWHUSKA 138KV CKT 1	111.0	26.09%	LACYGNE - NEOSHO 345KV CKT 1	SHIDLER - WEST PAWHUSKA 138KV CKT 1	Rebuild 16.11
5	18SP	AEPW	AEPW	SHIDLER - WEST PAWHUSKA 138KV CKT 1	109.5	26.13%	SHIDWFC - WEBB CITY TAP 138KV CKT 1	SHIDLER - WEST PAWHUSKA 138KV CKT 1	Rebuild 16.11
5	18SP	AEPW	AEPW	SHIDLER - WEST PAWHUSKA 138KV CKT 1	109.1	26.13%	WRTOD400	SHIDLER - WEST PAWHUSKA 138KV CKT 1	Rebuild 16.11
5	18SP	AEPW	AEPW	SHIDLER - WEST PAWHUSKA 138KV CKT 1	109.0	26.13%	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	SHIDLER - WEST PAWHUSKA 138KV CKT 1	Rebuild 16.11
5	18SP	AEPW	AEPW	SHIDLER - WEST PAWHUSKA 138KV CKT 1	108.9	26.13%	SPP-AEPW-32	SHIDLER - WEST PAWHUSKA 138KV CKT 1	Rebuild 16.11
5	18SP	AEPW	AEPW	SHIDLER - WEST PAWHUSKA 138KV CKT 1	108.9	25.98%	SPP-WERE-18	SHIDLER - WEST PAWHUSKA 138KV CKT 1	Rebuild 16.11
5	18SP	AEPW	AEPW	SHIDLER - WEST PAWHUSKA 138KV CKT 1	108.2	26.13%	HOYT - STRANGER CREEK 345KV CKT 1	SHIDLER - WEST PAWHUSKA 138KV CKT 1	Rebuild 16.11
5	18WP	AEPW	AEPW	SHIDLER - WEST PAWHUSKA 138KV CKT 1	113.8	42.56%	4REMNGTON 138.00 - FAIRFAX 138KV CKT 1	SHIDLER - WEST PAWHUSKA 138KV CKT 1	Rebuild 16.11

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	SHIDLER - WEST PAWHUSKA 138KV CKT 1	102.6	42.56%	4REMNGTON 138.00 - SHIDLER 138KV CKT 1	SHIDLER - WEST PAWHUSKA 138KV CKT 1	Rebuild 16.11
5	23SP	AEPW	AEPW	SHIDLER - WEST PAWHUSKA 138KV CKT 1	136.4	41.83%	4REMNGTON 138.00 - FAIRFAX 138KV CKT 1	SHIDLER - WEST PAWHUSKA 138KV CKT 1	Rebuild 16.11
5	23SP	AEPW	AEPW	SHIDLER - WEST PAWHUSKA 138KV CKT 1	122.5	41.83%	4REMNGTON 138.00 - SHIDLER 138KV CKT 1	SHIDLER - WEST PAWHUSKA 138KV CKT 1	Rebuild 16.11
5	23SP	AEPW	AEPW	SHIDLER - WEST PAWHUSKA 138KV CKT 1	115.8	36.85%	FAIRFAX - FAXTAP4 138.00 138KV CKT 1	SHIDLER - WEST PAWHUSKA 138KV CKT 1	Rebuild 16.11
5	23SP	AEPW	AEPW	SHIDLER - WEST PAWHUSKA 138KV CKT 1	106.3	27.49%	BASE CASE	SHIDLER - WEST PAWHUSKA 138KV CKT 1	Rebuild 16.11
5	23WP	AEPW	AEPW	SHIDLER - WEST PAWHUSKA 138KV CKT 1	112.4	41.20%	4REMNGTON 138.00 - FAIRFAX 138KV CKT 1	SHIDLER - WEST PAWHUSKA 138KV CKT 1	Rebuild 16.11
5	23WP	AEPW	AEPW	SHIDLER - WEST PAWHUSKA 138KV CKT 1	101.1	41.20%	4REMNGTON 138.00 - SHIDLER 138KV CKT 1	SHIDLER - WEST PAWHUSKA 138KV CKT 1	Rebuild 16.11
5	18SP	AEPW	AEPW	SOUTHWEST SHREVEPORT - WESTERN ELECTRIC T 138KV CKT 1	101.0	13.99%	NEW PROSPEST - ROCK HILL 138KV CKT 1	SOUTHWEST SHREVEPORT - WESTERN ELECTRIC T 138KV CKT 1	Rebuild 2.9 miles
5	23SP	WFEC	AEPW	SOUTHWESTERN STATION - WASHITA 138KV CKT 1	131.9	13.81%	GRACEMONT - LAWTON EASTSIDE 345KV CKT 1	SOUTHWESTERN STATION - WASHITA 138KV CKT 2	Add Second 138 kV line
5	23SP	WFEC	AEPW	SOUTHWESTERN STATION - WASHITA 138KV CKT 1	114.8	13.44%	BASE CASE	SOUTHWESTERN STATION - WASHITA 138KV CKT 2	Add Second 138 kV line
5	23SP	WFEC	AEPW	SOUTHWESTERN STATION - WASHITA 138KV CKT 1	112.4	14.00%	ANADARKO - GRACMNT4 138.00 138KV CKT 1	SOUTHWESTERN STATION - WASHITA 138KV CKT 2	Add Second 138 kV line
5	23SP	AEPW	AEPW	TERRA NITROGEN TAP - VERDIGRIS 138KV CKT 1	106.4	4.07%	SPP-AEPW-41	TERRA NITROGEN TAP - VERDIGRIS 138KV CKT 1	Rebuild 4.31 miles
5	23SP	AEPW	AEPW	TERRA NITROGEN TAP - VERDIGRIS 138KV CKT 1	101.0	3.83%	SPP-AEPW-31	TERRA NITROGEN TAP - VERDIGRIS 138KV CKT 1	Rebuild 4.31 miles
5	23SP	AEPW	AEPW	TERRA NITROGEN TAP - VERDIGRIS 138KV CKT 1	100.4	3.83%	NORTHEAST STATION - OWASSO SOUTH 138KV CKT 1	TERRA NITROGEN TAP - VERDIGRIS 138KV CKT 1	Rebuild 4.31 miles
5	23WP	SWPA	OKGE	VAN BUREN - VBI 161KV CKT 1	102.2	3.20%	FT SMITH - MUSKOGEE 345KV CKT 1	ADABELL - VBI 161KV CKT 1	Replace existing 800 amp wave trap with 1200 amp in VBI sub
5	23WP	SWPA	OKGE	VAN BUREN - VBI 161KV CKT 1	102.2	3.20%	FT SMITH - MUSKOGEE 345KV CKT 1	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa
5	23WP	SWPA	OKGE	VAN BUREN - VBI 161KV CKT 1	102.2	3.20%	FT SMITH - MUSKOGEE 345KV CKT 1	Arkansas Nuclear One 500/345 Transformer	Build 500/345 kV Transformer at ANO
5	23WP	SWPA	OKGE	VAN BUREN - VBI 161KV CKT 1	102.2	3.20%	FT SMITH - MUSKOGEE 345KV CKT 1	Lacygne - Mariosa 345KV AMRN	Indeterminate
5	23WP	SWPA	OKGE	VAN BUREN - VBI 161KV CKT 1	102.2	3.20%	FT SMITH - MUSKOGEE 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	23WP	SWPA	OKGE	VAN BUREN - VBI 161KV CKT 1	102.2	3.20%	FT SMITH - MUSKOGEE 345KV CKT 1	VBI - Arkansas Nuclear One 345kV EES	Indeterminate
5	23WP	SWPA	OKGE	VAN BUREN - VBI 161KV CKT 1	102.2	3.20%	FT SMITH - MUSKOGEE 345KV CKT 1	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line

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

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	10/1/2015	10/1/2018	$ 11,630,000
AEPW	DOMES - MOUND ROAD 138KV CKT 1	Rebuild 13.59 miles	10/1/2014	10/1/2017	$ 13,600,000
AEPW	DOMES - PAWHUSKA TAP 138KV CKT 1	Rebuild 5.74 miles	10/1/2014	10/1/2017	$ 5,800,000
AEPW	SOUTHWEST SHREVEPORT - WESTERN ELECTRIC T 138KV CKT 1	Rebuild 2.9 miles	6/1/2015	6/1/2018	$ 2,900,000
AEPW	TERRA NITROGEN TAP - VERDIGRIS 138KV CKT 1	Rebuild 4.31 miles	6/1/2019	6/1/2019	$ 4,320,000

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

Transmission Owner	Upgrade	Solution	Earliest Date Upgrade Required (DUN)	Estimated Date of Upgrade Completion (EOC)	Estimated Engineering & Construction Cost
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 miles with 1533.3 ACSR/TW	6/1/2015	6/1/2018	$ 6,000,000
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	Lacygne - Mariosa 345KV KACP	Build approximately 181 miles of 345kV from KCPL Lacygne - AMRN Mariosa	10/1/2014	6/1/2019	$ 275,120,000
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	FT SMITH (FTSMITH1) 500/345/13.8KV TRANSFORMER CKT 1	Install 2nd 500/345 kV bus tie in Ft. Smith Sub	10/1/2014	6/1/2018	$ 14,500,000
OKGE	FT SMITH - MUSKOGEE 345KV CKT 1	Upgrade Ft. Smith 345 kV breakers and switches to 2000 amps	10/1/2014	6/1/2015	$ 1,800,000
OKGE	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	6/1/2014	6/1/2019	$ 129,000,000
OKGE	VBI - Arkansas Nuclear One 345kV OKGE	Build 73 miles of 345kV line	6/1/2014	6/1/2019	$ 119,355,000
WFEC	FRANKLIN SW - MIDWEST TAP 138KV CKT 1	Replace Terminal Equipment	6/1/2019	6/1/2019	$ 225,000
WFEC	SOUTHWESTERN STATION - WASHITA 138KV CKT 2	Add Second 138 kV line	10/1/2014	6/1/2017	$ 2,260,000

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

Transmission Owner	Upgrade	Solution	Earliest Date Upgrade Required (DUN)	Estimated Date of Upgrade Completion (EOC)
AEPW	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	10/1/2014	12/31/2015
KACP	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

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)
	No Reliability Projects			