

Definitive Interconnection System Impact Study for Generation Interconnection Requests

Southwest Power Pool
Engineering Department
Tariff Studies – Generation Interconnection

(DISIS-2010-001-7 Study)
[Group 4/11 Only]
June 2013



SPP RESTRICTED

Date	Rev.	Comment
July 30, 2010	0	Issued Report
January 31, 2011	1	Account for Withdrawn Projects
May 13, 2011	2	Account for Withdrawn Projects
November 2, 2011	3	Account for Withdrawn Projects
December 2, 2011	4	Account for Withdrawn Projects
March 15, 2012	5	Account for Withdrawn Projects
March 6, 2013	6	Account for Withdrawn Projects
June 25, 2013	7	Restudy of Group 4/11 only to account for the withdrawal of GEN-2006-032

Executive Summary

Pursuant to the Southwest Power Pool (SPP) Open Access Transmission Tariff (OATT), SPP has conducted this Definitive Interconnection System Impact Study (DISIS) for certain generation interconnection requests in the SPP Generation Interconnection Queue. These interconnection requests have been clustered together for the following Impact Study. This Impact Re-Study is being performed on the Group 4/11 Projects to account for the withdrawal of higher and equally queued customers, specifically GEN-2006-032. The customers will be referred to in this study as the DISIS-2010-001 Interconnection Customers. This Impact Study analyzes the interconnecting of multiple generation interconnection requests associated with new generation totaling 248.1 MW of new generation which would be located within the transmission system of Midwest Energy Inc. (MIDW). The various generation interconnection requests have differing proposed in-service dates¹. The generation interconnection requests included in this DISIS are listed in Appendix A by their queue number, amount, area, requested interconnection point, proposed interconnection point, and the requested in-service date.

Power flow analysis has indicated that for the power flow cases studied, 248.1 MW of nameplate generation may be interconnected with transmission system reinforcements within the SPP transmission system. Dynamic Stability and power factor analysis has determined the need for reactive compensation in accordance with Order No. 661-A for wind farm interconnection requests and those requirements are listed for each interconnection request within the contents of this report.

In no way does this study guarantee operation for all periods of time. This interconnection study identifies and assigns transmission reinforcements for interconnection constraints (defined as 20% distribution factor impact) and does not assign transmission reinforcements for all potential transmission constraints. It should be noted that although this study analyzed many of the most probable contingencies, it is not an all-inclusive list and cannot account for every operational situation. Because of this, it is likely that the Customer[s] may be required to reduce their generation output to 0 MW under certain system conditions to allow system operators to maintain the reliability of the transmission network.

Dynamic Stability Analysis has determined that the transmission system will remain stable with the assigned Network Upgrades and necessary reactive compensation requirements.

The total estimated minimum cost for interconnecting the affected Group 4/11 DISIS-2010-001 interconnection customers is \$18,023,959. These costs are shown in Appendices E and F. Interconnection Service to DISIS-2010-001 interconnection customers is also contingent upon higher queued customers paying for certain required network upgrades. The in service date for the DISIS customers will be deferred until the construction of these network upgrades can be completed. Additionally, it was determined that shared Network Upgrades previously assigned to certain Group 3 projects are no longer required.

¹ The generation interconnection requests in-service dates will need to be deferred based on the required lead time for the Network Upgrades necessary. The Interconnection Customer's that proceed to the Facility Study will be provided a new in-service date based on the Facility Study's time for completion of the Network Upgrades necessary time for the Network Upgrades necessary. The Interconnection Customer's that proceed to the Facility Study will be provided a new in-service date based on the completion of the Facility Study.

These costs do not include the Interconnection Customer Interconnection Facilities as defined by the SPP Open Access Transmission Tariff (OATT). This cost does not include additional network constraints in the SPP transmission system are identified as shown in Appendix H (if provided).

Network Constraints listed in Appendix H (if provided) are in the local area of the new generation when this generation is injected throughout the SPP footprint for the Energy Resource (ER) Interconnection Request. Additional Network constraints will have to be verified with a Transmission Service Request (TSR) and associated studies. With a defined source and sink in a TSR, this list of Network Constraints will be refined and expanded to account for all Network Upgrade requirements.

The required interconnection costs listed in Appendices E and F do not include all costs associated with the deliverability of the energy to final customers. These costs are determined by separate studies if the Customer submits a Transmission Service Request through SPP's Open Access Same Time Information System (OASIS) as required by Attachment Z1 of the SPP OATT.

Table of Contents

Introduction	5
Model Development.....	5
Identification of Network Constraints	8
Determination of Cost Allocated Network Upgrades	8
Interconnection Facilities	9
Power flow.....	9
Stability and Power Factor Analysis.....	10
Conclusion	11
A. Generation Interconnection Requests Considered for Impact Study	A-0
B. Prior Queued Interconnection Requests	B-0
C. Study Groupings.....	C-0
D. Proposed Point of Interconnection One line Diagrams	D-0
E. Cost Allocation per Interconnection Request (Including Prior Queued Upgrades).....	E-0
F. Cost Allocation per Proposed Study Network Upgrade	F-0
G. Power Flow ACCC Analysis (Constraints Used for Mitigation)	G-0
H. Power Flow ACCC Analysis (Other Constraints Not Requiring Mitigation)	H-0
I. Power Flow ACCC Analysis (Category "C")	I-0

Introduction

Pursuant to the Southwest Power Pool (SPP) Open Access Transmission Tariff (OATT), SPP has conducted this Definitive Interconnection System Impact Study (DISIS) for certain generation interconnection requests in the SPP Generation Interconnection Queue. These interconnection requests have been clustered together for the following Impact Study. The customers will be referred to in this study as the DISIS-2010-001 Interconnection Customers. This Impact Study analyzes the interconnecting of multiple generation interconnection requests associated with new generation totaling 248.1 MW of new generation which would be located within the transmission systems of Midwest Energy Inc. (MIDW). The various generation interconnection requests have differing proposed in-service dates². The generation interconnection requests included in this Impact Cluster Study are listed in Appendix A by their queue number, amount, area, requested interconnection point, proposed interconnection point, and the requested in-service date.

The primary objective of this Definitive Interconnection System Impact Study is to identify the system constraints associated with connecting the generation to the area transmission system. The Impact and other subsequent Interconnection Studies are designed to identify attachment facilities, Network Upgrades and other Direct Assignment Facilities needed to accept power into the grid at each specific interconnection receipt point.

Model Development

Interconnection Requests Included in the DISIS-2010-001 Study

SPP included all interconnection requests that submitted a Definitive Interconnection System Impact Study request no later than March 31, 2010 and were subsequently accepted by Southwest Power Pool under the terms of the Generation Interconnection Procedures (GIP) that became effective March 31, 2010.

The interconnection requests that are included in this study are listed in Appendix A.

Previous Queued Projects

The previous queued projects included in this study are listed in Appendix B. In addition to the Base Case Upgrades, the previous queued projects and associated upgrades are assumed to be in-service and added to the Base Case models. These projects are then dispatched as Energy Resources with equal distribution across the SPP footprint.

Development of Base Cases

Power flow - The 2012 series Transmission Service Request (TSR) Seasonal Models including the 2013 spring, 2013 summer and winter peak, and 2018 summer and winter peak, and 2023 summer peak scenario 0 cases are used for this study. After the cases are developed, each of the control

² The generation interconnection requests in-service dates will need to be deferred based on the required lead time for the Network Upgrades necessary. The Interconnection Customer's that proceed to the Facility Study will be provided a new in-service date based on the completion of the Facility Study.

areas' resources are then re-dispatched using current dispatch orders to account for the generation interconnection requests under study.

Stability – The 2012 series SPP Model Development Working Group (MDWG) Models 2014 winter and 2014 summer are used for this study.

Base Case Upgrades

The following facilities are part of the SPP Transmission Expansion Plan or the Balanced Portfolio or recently approved Priority Projects. These facilities have been approved or are in construction stages and were assumed to be in-service at the time of dispatch and added to the base case models. The DISIS-2010-001 Customers have not been assigned cost for the below listed projects. This list may not be all inclusive. The DISIS-2010-001 Customers Generation Facilities in service dates may need to be delayed until the completion of the following upgrades. If for some reason, construction on these projects is discontinued, additional restudies will be needed to determine the interconnection needs of the DISIS customers.

- Hitchland 230/115kV area projects³:
 - Hitchland – Moore County 230kV, (placed in-service in 2012)
 - Hitchland – Ochiltree 230kV Project, (placed in-service in 2013)
- Valliant – Hugo – Sunnyside 345kV, (placed in-service in 2012)⁴
- Rose Hill – Sooner 345kV, (placed in-service in 2012)⁵
- Balanced Portfolio Projects⁶:
 - Woodward – Border – TUCO 345kV project, scheduled for 5/19/2014 in-service
 - Woodward 2nd 345/138kV autotransformer
 - TUCO 2nd 345/230kV autotransformer
 - Reactors at Woodward and Border
 - Iatan– Nashua 345kV, scheduled for 6/1/2015 in-service
 - Nashua 345/161kV autotransformer
 - Muskogee– Seminole 345kV, scheduled for 12/31/2013 in-service
 - Spearville – Post Rock 345kV, (placed in-service in 2012)
 - Post Rock 345/230kV autotransformer, (placed in-service in 2012)
 - Post Rock – Axtell 345kV, (placed in-service in 2012)
 - Cleveland – Sooner 345kV, (placed in-service in 2013)
 - Tap Stillwell – Swissvale 345kV line at West Gardner, (placed in-service in 2013)
- Priority Projects⁷:
 - Hitchland – Woodward double circuit 345kV, scheduled for 6/30/2014 in-service
 - Hitchland 345/230kV autotransformer
 - Woodward – Thistle double circuit 345kV, scheduled for 12/31/2014 in-service
 - Spearville – Clark double circuit 345kV, scheduled for 12/31/2014 in-service
 - Clark – Thistle double circuit 345kV, scheduled for 12/31/2014 in-service
 - Thistle – Wichita double circuit 345kV, scheduled for 12/31/2014 in-service
 - Thistle 345/138kV autotransformer, scheduled for 12/31/2014 in-service

³ SPP Regional Reliability Projects identified in 2007 STEP. As of the writing of this report, SPP Project Tracking TAGIT shows some of these project's in-service dates have been delayed from the original 2010/2011 in-service dates.

⁶ Notice to Construct (NTC) issued June 2009.

⁷ Notice to Construct (NTC) issued June 2010.

- Thistle – Flat Ridge 138kV, scheduled for 12/31/2014 in-service
- Various Mid-Kansas Electric Transmission System Upgrades⁸
 - Harper – Flat Ridge 138kV rebuild, scheduled for 12/31/2013 in-service
 - Flat Ridge – Medicine 138kV rebuild, scheduled for 12/31/2013 in-service
 - Pratt – Medicine Lodge 115kV rebuild, scheduled for 6/1/2013 in-service
 - Medicine Lodge 138/115kV autotransformer replacement, scheduled for 6/1/2013 in-service

Contingent Upgrades

The following facilities do not yet have approval. These facilities have been assigned to higher queued interconnection customers. These facilities have been included in the models for the DISIS-2010-001 study and are assumed to be in service. This list may not be all inclusive. The DISIS-2010-001 Customers at this time do not have responsibility for these facilities but may later be assigned the cost of these facilities if higher queued customers terminate their GIA or withdraw from the interconnection queue. The DISIS-2010-001 Customer Generation Facilities in service dates may need to be delayed until the completion of the following upgrades.

- Upgrades assigned to ICS-2008-001 Customers
 - Finney – Holcomb 345kV 2nd circuit
 - Amarillo – Swisher 230kV line traps
- Upgrades assigned to DISIS-2009-001 Interconnection Customers:
 - Fort Dodge – North Fort Dodge – Spearville 115kV circuit #2
 - Albion – Petersburg – Neligh 115kV rerate, (placed in-service 2011)
 - Fort Randall – Madison County – Kelly 230kV rerate
 - Spearville 345/115kV autotransformer

Potential Upgrades Not in the Base Case

Any potential upgrades that do not have a Notification to Construct (NTC) have not been included in the base case. These upgrades include any identified in the SPP Extra-High Voltage (EHV) overlay plan or any other SPP planning study other than the upgrades listed above in the previous sections.

Regional Groupings

The interconnection requests listed in Appendix A are grouped together in fourteen different regional groups based on geographical and electrical impacts. These groupings are shown in Appendix C.

To determine interconnection impacts, fourteen different dispatch variations of the spring base case models are developed to accommodate the regional groupings.

Power flow - For each group, the various wind generating plants are dispatched at 100% nameplate of maximum generation. The other wind generating plants within the same area are dispatched at 80% nameplate and wind in the other areas is dispatched at 20% nameplate of maximum generation. These projects are dispatched as Energy Resources with equal distribution across the SPP footprint. This method allowed for the identification of network constraints that are common to the regional groupings that could then in turn have the mitigating upgrade cost allocated throughout the entire cluster. Each interconnection request is also modeled separately at 100% nameplate for certain analyses.

⁸ SPP Transmission Service Projects identified in SPP-2007-AG3-AFS-9.

Peaking units are not dispatched in the 2013 spring model. To study peaking units' impacts, the 2013 summer and winter peak, and 2018 summer and winter peak, and 2023 summer peak model is chosen and peaking units are modeled at 100% of the nameplate rating and wind generating facilities are modeled at 10% of the nameplate rating. Each interconnection request is also modeled separately at 100% nameplate for certain analyses.

Stability - For each group, all interconnection requests (wind and non-wind) are modeled at 100% nameplate of maximum generation in both winter and summer seasonal models. The wind interconnection requests in the other areas are modeled at 20% nameplate of maximum generation while fossil units are modeled at 100% in the other areas. This process created twelve different scenarios with each group being studied at 100% nameplate rating. These projects are dispatched as Energy Resources with equal distribution across the SPP footprint.

Identification of Network Constraints

The initial set of network constraints are found by using PTI MUST First Contingency Incremental Transfer Capability (FCITC) analysis on the entire cluster grouping dispatched at the various levels mentioned above. These constraints are then screened to determine if any of the generation interconnection requests had at least a 20% Distribution Factor (DF) upon the constraint. Constraints that measured at least a 20% DF from at least one interconnection request are considered for mitigation.

Determination of Cost Allocated Network Upgrades

Cost Allocated Network Upgrades of wind generation interconnection requests are determined using the 2013 spring model. Cost Allocated Network Upgrades of peaking units is determined using the 2017 summer peak model. Once a determination of the required Network Upgrades is made, a powerflow model of the 2013 spring case is developed with all cost allocated Network Upgrades in-service. A MUST FCITC analysis is performed to determine the Power Transfer Distribution Factors (PTDF), defined as a distribution factor with system impact conditions that each generation interconnection request has on each new upgrade. The impact each generation interconnection request has on each upgrade project is weighted by the size of each request. Finally the costs due by each request for a particular project are then determined by allocating the portion of each request's impact over the impact of all the required upgrades.

For example, assume that there are three Generation Interconnection requests, X, Y, and Z that are responsible for the costs of Upgrade Project '1'. Given that their respective PTDF for the project have been determined, the cost allocation for Generation Interconnection request 'X' for Upgrade Project 1 is found by the following set of steps and formulas:

- Determine an Impact Factor on a given project for all responsible GI requests:

$$\text{Request X Impact Factor on Upgrade Project 1} = \text{PTDF}(\%)(X) * \text{MW}(X) = X1$$

$$\text{Request Y Impact Factor on Upgrade Project 1} = \text{PTDF}(\%)(Y) * \text{MW}(Y) = Y1$$

$$\text{Request Z Impact Factor on Upgrade Project 1} = \text{PTDF}(\%)(Z) * \text{MW}(Z) = Z1$$

- Determine each request’s Allocation of Cost for that particular project:

$$\text{Request X’s Project 1 Cost Allocation (\$)} = \frac{\text{Network Upgrade Project 1 Cost(\$)} * X1}{X1 + Y1 + Z1}$$

- Repeat previous for each responsible GI request for each Project

The cost allocation of each needed Network Upgrade is determined by the size of each request and its impact on the given project. This allows for the most efficient and reasonable mechanism for sharing the costs of upgrades.

Credits for Amounts Advanced for Network Upgrades

Interconnection Customer shall be entitled to credits in accordance with Attachment Z1 of the SPP Tariff for any Network Upgrades including any tax gross-up or any other tax-related payments associated with the Network Upgrades, and not refunded to the Interconnection Customer.

Interconnection Facilities

The requirement to interconnect the 248.1MW of generation into the existing and proposed transmission systems in the affected areas of the SPP transmission footprint consist of the necessary cost allocated shared facilities listed in Appendix F by upgrade. The interconnection requirements for the affected Group 4/11 estimated cost total of \$18,023,959. Interconnection Facilities, including prior allocated facilities, specific to each generation interconnection request are listed in Appendix E.

A list of constraints with greater than or equal to a 20% OTDF that are identified and used for mitigation is listed in Appendix G. Other Network Constraints in the MIDW, OKGE, SUNC, and WERE transmission systems that are identified are shown in Appendix H (if provided). With a defined source and sink in a TSR, this list of Network Constraints will be refined and expanded to account for all Network Upgrade requirements. A preliminary one-line drawing for each generation interconnection request is listed in Appendix D, unless a Facility Study has already been performed.

Power flow

Power flow Analysis Methodology

The ACCC function of PSS/E was used to simulate single element and special (i.e., breaker-to-breaker, multi-element, etc) contingencies in portions or all of the modeled control areas of SPP, as well as, other control areas external to SPP and the resulting scenarios analyzed. NERC Category “B” and “C” contingencies were evaluated.

Power flow Analysis

A power flow analysis is conducted for each Interconnection Customer's facility using modified versions of the 2013 spring peak, 2013 summer and winter peak, and the 2018 summer and winter peak, and 2023 summer peak models. The output of the Interconnection Customer's facility is offset in each model by a reduction in output of existing online SPP generation. This method allows the request to be studied as an Energy Resource (ER) Interconnection Request.

This analysis is conducted assuming that previous queued requests in the immediate area of these interconnect requests are in-service. The analysis of each Customer's project indicates that additional criteria violations will occur on the AEPW, MIDW, OKGE, SPS, SUNC, SWPA, MKEC, WERE, and WFEC transmission systems under steady state and contingency conditions in the peak seasons.

Cluster Group 4 (NW Kansas Group)

The NW Kansas area contains 248.1 MW in addition to the 1,469 MW of prior queued generation in the area. No new interconnection constraints for mitigation were found in this area.

Note on Group 3 Projects

The previously assigned Post Rock 345/230kV transformer #2 shared network upgrade is no longer required for DISIS-2010-001. No Group 3 projects are assigned this upgrade.

Curtailement and System Reliability

In no way does this study guarantee operation for all periods of time. It should be noted that although this study analyzed many of the most probable contingencies, it is not an all-inclusive list and cannot account for every operational situation. Because of this, it is likely that the Customer(s) may be required to reduce their generation output to 0 MW under certain system conditions to allow system operators to maintain the reliability of the transmission network.

Stability Analysis

The Stability Analysis was not repeated as no major transmission configuration was necessary as a result of this restudy. Previous Impact Studies for DISIS-2010-001 should be consulted for power factor requirements.

Conclusion

The minimum cost of interconnecting the affected interconnection requests included in this Impact Cluster Study for only the affected Group 4/11 requests is estimated at \$18,023,959 for the Allocated Network Upgrades and Transmission Owner Interconnection Facilities listed in Appendix E, F, and G. These costs do not include the cost of upgrades of other transmission facilities listed in Appendix H (if provided) which are Network Constraints. Additionally, it was determined that shared Network Upgrades previously assigned to certain Group 3 projects are no longer required.

These interconnection costs do not include any cost of Network Upgrades determined to be required by short circuit analysis. These studies are being performed as part of the Interconnection System Facility Study that each customer has already executed.

The required interconnection costs listed in Appendices E, and F, and G and other upgrades associated with Network Constraints do not include all costs associated with the deliverability of the energy to final customers. These costs are determined by separate studies if the Customer submits a Transmission Service Request (TSR) through SPP's Open Access Same Time Information System (OASIS) as required by Attachment Z1 of the SPP Open Access Transmission Tariff (OATT).

In no way does this study guarantee operation for all periods of time. This interconnection study identifies and assigns transmission reinforcements for interconnection constraints (defined as 20% distribution factor impact) and does not assign transmission reinforcements for all potential transmission constraints. It should be noted that although this study analyzed many of the most probable contingencies, it is not an all-inclusive list and cannot account for every operational situation. Because of this, it is likely that the Customer[s] may be required to reduce their generation output to 0 MW under certain system conditions to allow system operators to maintain the reliability of the transmission network.

A. Generation Interconnection Requests Considered for Impact Study

See next page.

A: Generation Interconnection Requests Considered for Impact Study

Request	Amount	Service	Area	Requested Point of Interconnection	Proposed Point of Interconnection	Requested In-Service Date
GEN-2009-008	199.5	ER	MIDW	South Hays 230kV	South Hays 230kV	9/1/2011
GEN-2009-020	48.6	ER	MIDW	Tap Nekoma - Bazine 69kV	Tap Nekoma - Bazine 69kV	12/31/2011
TOTAL	248.1					

*request dependent upon Priority Projects or Balanced Portfolio may be delayed until 12/31/2014.
Other projects in service date to be determined after Facility Study.

B. Prior Queued Interconnection Requests

See next page.

B: Prior Queued Interconnection Requests

Request	Amount	Area	Requested/Proposed Point of Interconnection	Status or In-Service Date
GEN-2001-039M	99.00	SUNCMKEC	Central Plains Tap 115kV	On-Line
GEN-2003-006A	200.00	SUNCMKEC	Elm Creek 230kV	On-Line
GEN-2003-019	250.00	MIDW	Smoky Hills Tap 230kV	On-Line
GEN-2006-031	75.00	MIDW	Knoll 115kV	On-Line
GEN-2006-040	108.00	SUNCMKEC	Mingo 115kV	On Suspension
GEN-2007-011	135.00	SUNCMKEC	Syracuse 115kV	On Suspension
GEN-2008-017	300.00	SUNCMKEC	Setab 345kV	On Schedule for 2014
GEN-2008-025	101.00	SUNCMKEC	Ruleton 115kV	On Schedule for 2015
GEN-2008-092	201.00	MIDW	Knoll 230kV	IA Pending
Total:				1,469.0

C. Study Groupings

Not included for this restudy of Group 4/11.

D. Proposed Point of Interconnection One line Diagrams

Refer to the separately posted Facility Study for each request for the most up to date one-line.

E. Cost Allocation per Interconnection Request (Including Prior Queued Upgrades)

Important Note:

****WITHDRAWAL OF HIGHER QUEUED PROJECTS WILL CAUSE A RESTUDY
AND MAY RESULT IN HIGHER INTERCONNECTION COSTS****

This section shows each Generation Interconnection Request Customer, their current study impacted Network Upgrades, and the previously allocated upgrades upon which they rely to accommodate their interconnection to the transmission system.

The costs associated with the current study Network Upgrades are allocated to the Customers shown in this report.

In addition should a higher queued request, defined as one this study includes as a prior queued request, withdraw, the Network Upgrades assigned to the withdrawn request may be reallocated to the remaining requests that have an impact on the Network Upgrade under a restudy. Also, should a Interconnection Request choose to go into service prior to the operation date of any necessary Network Upgrades, the costs associated with those upgrades may be reallocated to the impacted Interconnection Request. The actual costs allocated to each Generation Interconnection Request Customer will be determined at the time of a restudy.

The required interconnection costs listed do not include all costs associated with the deliverability of the energy to final customers. These costs are determined by separate studies if the Customer submits a Transmission Service Request through SPP's Open Access Same Time Information System (OASIS) as required by Attachment Z1 of the SPP OATT. In addition, costs associated with a short circuit analysis will be allocated should the Interconnection Request Customer choose to execute a Facility Study Agreement.

Appendix E. Cost Allocation Per Request

(Including Previously Allocated Network Upgrades*)

Interconnection Request and Upgrades	Upgrade Type	Allocated Cost	Upgrade Cost
GEN-2009-008			
GEN-2009-008 Interconnection Costs See Online Diagram.	Current Study	\$4,302,877.00	\$4,302,877.00
Clark - Thistle 345KV Dbl CKT Priority Project: Spearville - Clark - Thistle Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		\$291,088,130.00
Finney Switching Station - Holcomb 345KV CKT 2 Assigned to ICS-2008-001 Customers	Previously Allocated		\$10,507,445.00
Hitchland 345/230kV Autotransformer CKT 2 Priority Project: Hitchland 345/230kV Autotransformer CKT 2 (Total Project E&C Cost Shown.)	Previously Allocated		\$8,883,760.00
Spearville -Clark 345KV Dbl CKT Priority Project: Spearville - Clark - Thistle Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		\$291,088,131.00
Thistle - Wichita 345KV Dbl CKT Priority Project: Thistle - Wichita Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		\$166,598,000.00
	Current Study Total	\$4,302,877.00	
GEN-2009-020			
GEN-2009-020 Interconnection Costs See Online Diagram.	Current Study	\$3,691,270.00	\$3,691,270.00
Beaver - Woodward 345kV Dbl CKT Priority Project: Hitchland - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$226,040,727.00
Clark - Thistle 345KV Dbl CKT Priority Project: Spearville - Clark - Thistle Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		\$291,088,130.00
Finney Switching Station - Holcomb 345KV CKT 2 Assigned to ICS-2008-001 Customers	Previously Allocated		\$10,507,445.00
Hitchland - Beaver 345kV Dbl CKT Priority Project: Hitchland - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$226,040,727.00
Hitchland 345/230kV Autotransformer CKT 2 Priority Project: Hitchland 345/230kV Autotransformer CKT 2 (Total Project E&C Cost Shown.)	Previously Allocated		\$8,883,760.00
Iatan - Nashua 345KV CKT 1 Balanced Portfolio: Iatan - Nashua 345kV CKT 1 (Total Project E&C Cost Shown).	Previously Allocated		\$60,569,180.00

* Withdrawal of higher queued projects will cause a restudy and may result in higher costs

Interconnection Request and Upgrades	Upgrade Type	Allocated Cost	Upgrade Cost
Spearville -Clark 345KV Dbl CKT Priority Project: Spearville - Clark - Thistle Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		\$291,088,131.00
Thistle - Wichita 345KV Dbl CKT Priority Project: Thistle - Wichita Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		\$166,598,000.00
	Current Study Total	\$3,691,270.00	

GEN-2010-009

GEN-2010-009 Interconnection Costs See Online Diagram.	Current Study	\$5,014,906.00	\$5,014,906.00
Border - Tuco Interchange 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV CKT 1 (Total Project E&C Cost Shown)	Previously Allocated		\$249,247,072.00
Border - Woodward 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV CKT 1 (Total Project E&C Cost Shown)	Previously Allocated		\$249,247,072.00
Clark - Thistle 345KV Dbl CKT Priority Project: Spearville - Clark - Thistle Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		\$291,088,130.00
Finney Switching Station - Holcomb 345KV CKT 2 Assigned to ICS-2008-001 Customers	Previously Allocated		\$10,507,445.00
Hitchland 345/230kV Autotransformer CKT 2 Priority Project: Hitchland 345/230kV Autotransformer CKT 2 (Total Project E&C Cost Shown).	Previously Allocated		\$8,883,760.00
Spearville -Clark 345KV Dbl CKT Priority Project: Spearville - Clark - Thistle Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		\$291,088,131.00
Thistle - Wichita 345KV Dbl CKT Priority Project: Thistle - Wichita Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		\$166,598,000.00
Thistle - Woodward 345KV Dbl CKT Priority Project: Thistle - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$207,782,000.00
Woodward XFMR 345/138/13.8kV CKT 2 Balanced Portfolio: Woodward 345/138kV Transformer CKT 2 & 50 MVAR Reactor (Total Project E&C Cost Shown).	Previously Allocated		\$15,000,000.00
	Current Study Total	\$5,014,906.00	

GEN-2010-015

GEN-2010-015 Interconnection Costs See Online Diagram.	Current Study	\$5,014,906.00	\$5,014,906.00
Border - Tuco Interchange 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV CKT 1 (Total Project E&C Cost Shown)	Previously Allocated		\$249,247,072.00

* Withdrawal of higher queued projects will cause a restudy and may result in higher costs

Interconnection Request and Upgrades	Upgrade Type	Allocated Cost	Upgrade Cost
Border - Woodward 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV CKT 1 (Total Project E&C Cost Shown)	Previously Allocated		\$249,247,072.00
Clark - Thistle 345KV Dbl CKT Priority Project: Spearville - Clark - Thistle Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		\$291,088,130.00
Finney Switching Station - Holcomb 345KV CKT 2 Assigned to ICS-2008-001 Customers	Previously Allocated		\$10,507,445.00
Hitchland 345/230kV Autotransformer CKT 2 Priority Project: Hitchland 345/230kV Autotransformer CKT 2 (Total Project E&C Cost Shown).	Previously Allocated		\$8,883,760.00
Spearville -Clark 345KV Dbl CKT Priority Project: Spearville - Clark - Thistle Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		\$291,088,131.00
Thistle - Wichita 345KV Dbl CKT Priority Project: Thistle - Wichita Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		\$166,598,000.00
Thistle - Woodward 345KV Dbl CKT Priority Project: Thistle - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$207,782,000.00
Woodward XFMR 345/138/13.8kV CKT 2 Balanced Portfolio: Woodward 345/138kV Transformer CKT 2 & 50 MVAR Reactor (Total Project E&C Cost Shown).	Previously Allocated		\$15,000,000.00
	Current Study Total		\$5,014,906.00
TOTAL CURRENT STUDY COSTS:			\$18,023,959.00

* Withdrawal of higher queued projects will cause a restudy and may result in higher costs

F. Cost Allocation per Proposed Study Network Upgrade

Important Note:

****WITHDRAWAL OF HIGHER QUEUED PROJECTS WILL CAUSE A RESTUDY
AND MAY RESULT IN HIGHER INTERCONNECTION COSTS****

This section shows each Direct Assigned Facility and Network Upgrade and the Generation Interconnection Request Customer(s) which have an impact in this study assuming all higher queued projects remain in the queue and achieve commercial operation.

The required interconnection costs listed do not include all costs associated with the deliverability of the energy to final customers. These costs are determined by separate studies if the Customer submits a Transmission Service Request through SPP's Open Access Same Time Information System (OASIS) as required by Attachment Z1 of the SPP OATT. In addition, costs associated with a short circuit analysis will be allocated should the Interconnection Request Customer choose to execute a Facility Study Agreement.

There may be additional costs allocated to each Customer. See Appendix E for more details.

Appendix F. Cost Allocation by Upgrade

GEN-2009-008 Interconnection Costs **\$4,302,877.00**

See Online Diagram.

GEN-2009-008 \$4,302,877.00

Total Allocated Costs **\$4,302,877.00**

GEN-2009-020 Interconnection Costs **\$3,691,270.00**

See Online Diagram.

GEN-2009-020 \$3,691,270.00

Total Allocated Costs **\$3,691,270.00**

GEN-2010-009 Interconnection Costs **\$5,014,906.00**

See Online Diagram.

GEN-2010-009 \$5,014,906.00

Total Allocated Costs **\$5,014,906.00**

GEN-2010-015 Interconnection Costs **\$5,014,906.00**

See Online Diagram.

GEN-2010-015 \$5,014,906.00

Total Allocated Costs **\$5,014,906.00**

* Withdrawal of higher queued projects will cause a restudy and may result in higher costs

G. Power Flow ACCC Analysis (Constraints Used for Mitigation)

See next page.

SOLUTION	GROUP	SCENARIO	SEASON	SOURCE	DIRECTION	MONITORED ELEMENT	RATEB (MVA)	TDF	TC%LOADING (% MVA)	CONTINGENCY
						Currently No Constraints for Mitigation				

H. Power Flow ACCC Analysis (Other Constraints Not Requiring Mitigation)

See next page

SOLUTION	GROUP	SCENARIO	SEASON	SOURCE	DIRECTION	MONITORED ELEMENT	RATEB		TC%LOADING		CONTINGENCY
							(MVA)	TDF	(% MVA)		
FNSL-Blown up	03ALL		0 13G	G09_008		Nonconverged Contingency	-	0.25206	-		DBL-SPRVL-CL
FNSL-Blown up	03ALL		0 13G	G09_008		Nonconverged Contingency	-	0.25206	-		DBL-THIS-CLR
FDNS	03ALL		0 13G	G09_008	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	319	0.14076	104.766		DBL-WICH-THI
FDNS	3		0 13G	G09_008	TO->FROM	FLATRDG3 - MEDICINE LODGE 138KV CKT 1	95.6	0.0479	150.0568		DBL-SPRVL-CL
FDNS	3		0 13G	G09_008	TO->FROM	FLATRDG3 - MEDICINE LODGE 138KV CKT 1	95.6	0.0479	146.3201		DBL-THIS-CLR
FDNS	00G09_008		0 23SP	G09_008	TO->FROM	HAYS PLANT - SOUTH HAYS 115KV CKT 1	99	0.06836	123.1886		KNOLL 230 (KNOLL T1) 230/115/11.49KV TRANSFORMER CKT 1
FDNS	0		0 23SP	G09_008	TO->FROM	HAYS PLANT - SOUTH HAYS 115KV CKT 1	99	0.06836	113.7712		KNOLL 230 (KNOLL T1) 230/115/11.49KV TRANSFORMER CKT 1
FDNS	00G09_008		0 18SP	G09_008	TO->FROM	HAYS PLANT - SOUTH HAYS 115KV CKT 1	99	0.06825	107.9219		KNOLL 230 (KNOLL T1) 230/115/11.49KV TRANSFORMER CKT 1
FDNS	03ALL		0 13G	G09_008	TO->FROM	HAYS PLANT - SOUTH HAYS 115KV CKT 1	99	0.13986	106.2418		KNOLL 230 - POSTROCK6 230.00 230KV CKT 1
FDNS	03ALL		0 13G	G09_008	FROM->TO	HUNTSVILLE - HUTCHINSON ENERGY CENTER 115KV CKT 1	68	0.03342	125.5963		CIRCLE - MULLERGREN 230KV CKT 1
FDNS	03ALL		0 13G	G09_008	TO->FROM	HUNTSVILLE - ST JOHN 115KV CKT 1	88	0.03342	101.6937		CIRCLE - MULLERGREN 230KV CKT 1
FDNS	3		0 13G	G09_008	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.0479	220.3192		DBL-SPRVL-CL
FDNS	3		0 13G	G09_008	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.0479	212.5527		DBL-THIS-CLR
FDNS	3		0 13G	G09_008	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.0479	210.2012		DBL-SPRVL-CL
FDNS	3		0 13G	G09_008	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.0479	204.1398		DBL-THIS-CLR
FDNS	03ALL		0 13G	G09_008	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.03404	128.1172		POST ROCK (POSTROCK T1) 345/230/13.8KV TRANSFORMER CKT 1
FDNS	03ALL		0 13G	G09_008	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.03404	125.7569		POST ROCK (POSTROCK T1) 345/230/13.8KV TRANSFORMER CKT 1
FDNS	04ALL		0 13G	G09_008	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	319	0.17931	109.8226		DBL-THIS-CLR
FDNS	04ALL		0 13G	G09_008	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	319	0.17931	109.7498		DBL-SPRVL-CL
FDNS	04ALL		0 13G	G09_008	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	319	0.15951	103.4579		DBL-WICH-THI
FDNS	04ALL		0 13G	G09_008	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	319	0.09445	102.8875		KNOLL 230 - POSTROCK6 230.00 230KV CKT 1
FDNS	03ALL		0 13G	G09_008	FROM->TO	ST JOHN - ST JOHN 115KV CKT 1	86	0.03342	137.6212		CIRCLE - MULLERGREN 230KV CKT 1
FDNS	3		0 13G	G09_008	FROM->TO	ST JOHN - ST JOHN 115KV CKT 1	86	0.0335	111.6727		CIRCLE - MULLERGREN 230KV CKT 1
FNSL-Blown up	03ALL		0 13G	G09_020		Nonconverged Contingency	-	0.21656	-		DBL-SPRVL-CL
FNSL-Blown up	03ALL		0 13G	G09_020		Nonconverged Contingency	-	0.21656	-		DBL-THIS-CLR
FDNS	03ALL		0 13G	G09_020	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	319	0.19441	104.766		DBL-WICH-THI
FDNS	03ALL		0 13G	G09_020	TO->FROM	CLEARWATER - MILAN TAP 138KV CKT 1	110	0.03508	106.6486		FLATRDG3 - THISTLE4 138.00 138KV CKT 1
FDNS	03ALL		0 13G	G09_020	TO->FROM	CLEARWATER - MILAN TAP 138KV CKT 1	110	0.03508	106.6347		THISTLE7 345.00 (THISTLE T1) 345/138/13.8KV TRANSFORMER CKT 1
FDNS	03ALL		0 13G	G09_020	FROM->TO	FLATRDG3 - HARPER 138KV CKT 1	95.6	0.03508	150.9182		FLATRDG3 - THISTLE4 138.00 138KV CKT 1
FDNS	03ALL		0 13G	G09_020	FROM->TO	FLATRDG3 - HARPER 138KV CKT 1	95.6	0.03508	150.9044		THISTLE7 345.00 (THISTLE T1) 345/138/13.8KV TRANSFORMER CKT 1
FDNS	3		0 13G	G09_020	FROM->TO	FLATRDG3 - HARPER 138KV CKT 1	95.6	0.03515	119.0937		FLATRDG3 - THISTLE4 138.00 138KV CKT 1
FDNS	3		0 13G	G09_020	FROM->TO	FLATRDG3 - HARPER 138KV CKT 1	95.6	0.03515	119.0819		THISTLE7 345.00 (THISTLE T1) 345/138/13.8KV TRANSFORMER CKT 1
FDNS	3		0 13G	G09_020	TO->FROM	FLATRDG3 - MEDICINE LODGE 138KV CKT 1	95.6	0.0786	150.0568		DBL-SPRVL-CL
FDNS	3		0 13G	G09_020	TO->FROM	FLATRDG3 - MEDICINE LODGE 138KV CKT 1	95.6	0.0786	146.3201		DBL-THIS-CLR
FDNS	03ALL		0 13G	G09_020	TO->FROM	FLATRDG3 - MEDICINE LODGE 138KV CKT 1	95.6	0.07681	118.5177		ST JOHN - ST JOHN 115KV CKT 1
FDNS	03ALL		0 13G	G09_020	TO->FROM	FLATRDG3 - MEDICINE LODGE 138KV CKT 1	95.6	0.06246	113.2357		CLARKCOUNTY7345.00 - THISTLE7 345.00 345KV CKT 1
FDNS	03ALL		0 13G	G09_020	TO->FROM	FLATRDG3 - MEDICINE LODGE 138KV CKT 1	95.6	0.06246	113.2357		CLARKCOUNTY7345.00 - THISTLE7 345.00 345KV CKT 2
FDNS	03ALL		0 13G	G09_020	TO->FROM	FLATRDG3 - MEDICINE LODGE 138KV CKT 1	95.6	0.07681	110.6679		MIDW-CATB05
FDNS	03ALL		0 13G	G09_020	TO->FROM	FLATRDG3 - MEDICINE LODGE 138KV CKT 1	95.6	0.07681	110.6431		HUNTSVILLE - ST JOHN 115KV CKT 1
FDNS	03ALL		0 13G	G09_020	TO->FROM	FLATRDG3 - MEDICINE LODGE 138KV CKT 1	95.6	0.07681	109.4557		HUNTSVILLE - HUTCHINSON ENERGY CENTER 115KV CKT 1
FDNS	03ALL		0 13G	G09_020	TO->FROM	FLATRDG3 - MEDICINE LODGE 138KV CKT 1	95.6	0.06355	109.407		SPP-SWPS-05
FDNS	03ALL		0 13G	G09_020	TO->FROM	FLATRDG3 - MEDICINE LODGE 138KV CKT 1	95.6	0.06355	109.3005		FINNEY SWITCHING STATION - Hitchland Interchange 345KV CKT 1
FDNS	03ALL		0 13G	G09_020	TO->FROM	FLATRDG3 - MEDICINE LODGE 138KV CKT 1	95.6	0.06305	103.0838		NORTH JUDSON LARGE SUB - SSTARTP3 115.00 115KV CKT 1
FDNS	03ALL		0 13G	G09_020	TO->FROM	FLATRDG3 - MEDICINE LODGE 138KV CKT 1	95.6	0.06035	102.5677		CLARKCOUNTY7345.00 - SPEARVILLE 345KV CKT 1
FDNS	03ALL		0 13G	G09_020	TO->FROM	FLATRDG3 - MEDICINE LODGE 138KV CKT 1	95.6	0.06035	102.5677		CLARKCOUNTY7345.00 - SPEARVILLE 345KV CKT 2
FDNS	03ALL		0 13G	G09_020	TO->FROM	FLATRDG3 - MEDICINE LODGE 138KV CKT 1	95.6	0.0601	101.4135		SPEARVILLE (SPEARVLX) 345/115/13.8KV TRANSFORMER CKT 3
FDNS	03ALL		0 13G	G09_020	TO->FROM	FLATRDG3 - MEDICINE LODGE 138KV CKT 1	95.6	0.06471	100.8871		CIRCLE - MULLERGREN 230KV CKT 1
FDNS	03ALL		0 13G	G09_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.03194	155.6578		NORTHWEST - TATONGA7 345.00 345KV CKT 1
FDNS	03ALL		0 13G	G09_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.031	155.3085		DBL-WICH-THI
FDNS	3		0 13G	G09_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.03203	139.3396		NORTHWEST - TATONGA7 345.00 345KV CKT 1
FDNS	03ALL		0 13G	G09_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.03194	139.1579		TATONGA7 345.00 - WOODWARD DISTRICT EHV 345KV CKT 1
FDNS	3		0 13G	G09_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.03114	135.7196		DBL-WICH-THI
FDNS	3		0 13G	G09_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.03203	122.6654		TATONGA7 345.00 - WOODWARD DISTRICT EHV 345KV CKT 1
FDNS	04ALL		0 13G	G09_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.03226	121.3306		NORTHWEST - TATONGA7 345.00 345KV CKT 1
FDNS	04G09_020		0 13G	G09_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.03228	114.6708		NORTHWEST - TATONGA7 345.00 345KV CKT 1
FDNS	4		0 13G	G09_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.03228	114.5069		NORTHWEST - TATONGA7 345.00 345KV CKT 1
FDNS	04ALL		0 13G	G09_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.03141	109.3726		DBL-WICH-THI
FDNS	04ALL		0 13G	G09_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.03226	104.6143		TATONGA7 345.00 - WOODWARD DISTRICT EHV 345KV CKT 1
FDNS	04G09_020		0 13G	G09_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.03145	102.4478		DBL-WICH-THI
FDNS	4		0 13G	G09_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.03145	102.2476		DBL-WICH-THI
FDNS	03ALL		0 13G	G09_020	FROM->TO	HARPER - MILAN TAP 138KV CKT 1	95.6	0.03508	129.3853		FLATRDG3 - THISTLE4 138.00 138KV CKT 1
FDNS	03ALL		0 13G	G09_020	FROM->TO	HARPER - MILAN TAP 138KV CKT 1	95.6	0.03508	129.3754		THISTLE7 345.00 (THISTLE T1) 345/138/13.8KV TRANSFORMER CKT 1
FDNS	3		0 13G	G09_020	FROM->TO	HARPER - MILAN TAP 138KV CKT 1	95.6	0.03515	108.3725		FLATRDG3 - THISTLE4 138.00 138KV CKT 1
FDNS	3		0 13G	G09_020	FROM->TO	HARPER - MILAN TAP 138KV CKT 1	95.6	0.03515	108.3585		THISTLE7 345.00 (THISTLE T1) 345/138/13.8KV TRANSFORMER CKT 1
FDNS	03ALL		0 13G	G09_020	TO->FROM	HAYS PLANT - SOUTH HAYS 115KV CKT 1	99	0.03292	106.2418		KNOLL 230 - POSTROCK6 230.00 230KV CKT 1
FDNS	03ALL		0 13G	G09_020	FROM->TO	HUNTSVILLE - HUTCHINSON ENERGY CENTER 115KV CKT 1	68	0.07491	143.3658		DBL-WICH-THI
FDNS	03ALL		0 13G	G09_020	FROM->TO	HUNTSVILLE - HUTCHINSON ENERGY CENTER 115KV CKT 1	68	0.09098	125.5963		CIRCLE - MULLERGREN 230KV CKT 1
FDNS	03ALL		0 13G	G09_020	FROM->TO	HUNTSVILLE - HUTCHINSON ENERGY CENTER 115KV CKT 1	68	0.08262	117.028		SPP-MKEC-08
FDNS	03ALL		0 13G	G09_020	FROM->TO	HUNTSVILLE - HUTCHINSON ENERGY CENTER 115KV CKT 1	68	0.08256	115.9272		FLATRDG3 - MEDICINE LODGE 138KV CKT 1

SOLUTION	GROUP	SCENARIO	SEASON	SOURCE	DIRECTION	MONITORED ELEMENT	RATEB		TC%LOADING		CONTINGENCY
							(MVA)	TDF	(% MVA)		
FDNS	03ALL		0 13G	G09_020	FROM->TO	HUNTSVILLE - HUTCHINSON ENERGY CENTER 115KV CKT 1	68	0.08256	115.9272	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	
FDNS	03ALL		0 13G	G09_020	FROM->TO	HUNTSVILLE - HUTCHINSON ENERGY CENTER 115KV CKT 1	68	0.09456	112.8085	NINNESEC3 115.00 - PRATT 115KV CKT 1	
FDNS	3		0 13G	G09_020	FROM->TO	HUNTSVILLE - HUTCHINSON ENERGY CENTER 115KV CKT 1	68	0.075	109.1547	DBL-WICH-THI	
FDNS	03ALL		0 13G	G09_020	FROM->TO	HUNTSVILLE - HUTCHINSON ENERGY CENTER 115KV CKT 1	68	0.07479	102.5869	FLATRDG3 - THISTLE4 138.00 138KV CKT 1	
FDNS	03ALL		0 13G	G09_020	FROM->TO	HUNTSVILLE - HUTCHINSON ENERGY CENTER 115KV CKT 1	68	0.07479	102.5814	THISTLE7 345.00 (THISTLE T1) 345/138/13.8KV TRANSFORMER CKT 1	
FDNS	03ALL		0 13G	G09_020	FROM->TO	HUNTSVILLE - HUTCHINSON ENERGY CENTER 115KV CKT 1	68	0.05901	102.2746	CIRCLE - HUTCHINSON ENERGY CENTER 115KV CKT 1	
FDNS	03ALL		0 13G	G09_020	FROM->TO	HUNTSVILLE - HUTCHINSON ENERGY CENTER 115KV CKT 1	68	0.07114	101.9643	THISTLE7 345.00 - WICHITA 345KV CKT 1	
FDNS	03ALL		0 13G	G09_020	FROM->TO	HUNTSVILLE - HUTCHINSON ENERGY CENTER 115KV CKT 1	68	0.07114	101.9643	THISTLE7 345.00 - WICHITA 345KV CKT 2	
FDNS	03ALL		0 13G	G09_020	FROM->TO	HUNTSVILLE - HUTCHINSON ENERGY CENTER 115KV CKT 1	68	0.07219	101.864	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	
FDNS	03ALL		0 13G	G09_020	TO->FROM	HUNTSVILLE - ST_JOHN 115KV CKT 1	88	0.07491	115.4693	DBL-WICH-THI	
FDNS	03ALL		0 13G	G09_020	TO->FROM	HUNTSVILLE - ST_JOHN 115KV CKT 1	88	0.09098	101.6937	CIRCLE - MULLERGREEN 230KV CKT 1	
FDNS	3		0 13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.0786	220.3192	DBL-SPRVL-CL	
FDNS	3		0 13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.0786	212.5527	DBL-THIS-CLR	
FDNS	3		0 13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.0786	210.2012	DBL-SPRVL-CL	
FDNS	3		0 13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.0786	204.1398	DBL-THIS-CLR	
FDNS	03ALL		0 13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.07681	171.1255	ST JOHN - ST_JOHN 115KV CKT 1	
FDNS	03ALL		0 13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.07681	167.0126	ST JOHN - ST_JOHN 115KV CKT 1	
FDNS	03ALL		0 13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.06246	162.6464	CLARKCOUNTY7345.00 - THISTLE7 345.00 345KV CKT 1	
FDNS	03ALL		0 13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.06246	162.6464	CLARKCOUNTY7345.00 - THISTLE7 345.00 345KV CKT 2	
FDNS	03ALL		0 13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.07681	160.2223	MIDW-CATB05	
FDNS	03ALL		0 13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.07681	160.1878	HUNTSVILLE - ST_JOHN 115KV CKT 1	
FDNS	03ALL		0 13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.06246	158.6111	CLARKCOUNTY7345.00 - THISTLE7 345.00 345KV CKT 1	
FDNS	03ALL		0 13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.06246	158.6111	CLARKCOUNTY7345.00 - THISTLE7 345.00 345KV CKT 2	
FDNS	03ALL		0 13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.07681	158.5057	HUNTSVILLE - HUTCHINSON ENERGY CENTER 115KV CKT 1	
FDNS	03ALL		0 13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.07681	156.7097	MIDW-CATB05	
FDNS	03ALL		0 13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.07681	156.6763	HUNTSVILLE - ST_JOHN 115KV CKT 1	
FDNS	03ALL		0 13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.0584	155.8972	BASE CASE	
FDNS	03ALL		0 13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.06355	155.6276	SPP-SWPS-05	
FDNS	03ALL		0 13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.06355	155.5688	FINNEY SWITCHING STATION - Hitchland Interchange 345KV CKT 1	
FDNS	03ALL		0 13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.07681	155.0622	HUNTSVILLE - HUTCHINSON ENERGY CENTER 115KV CKT 1	
FDNS	03ALL		0 13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.0584	152.9278	BASE CASE	
FDNS	03ALL		0 13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.06355	152.205	SPP-SWPS-05	
FDNS	03ALL		0 13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.06355	152.1499	FINNEY SWITCHING STATION - Hitchland Interchange 345KV CKT 1	
FDNS	03ALL		0 13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.06035	148.4927	CLARKCOUNTY7345.00 - SPEARVILLE 345KV CKT 1	
FDNS	03ALL		0 13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.06035	148.4927	CLARKCOUNTY7345.00 - SPEARVILLE 345KV CKT 2	
FDNS	03ALL		0 13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.06305	147.7815	NORTH JUDSON LARGE SUB - SSTARTP3 115.00 115KV CKT 1	
FDNS	03ALL		0 13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.0601	146.7506	SPEARVILLE (SPEARVLX) 345/115/13.8KV TRANSFORMER CKT 3	
FDNS	03ALL		0 13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.06471	145.6412	CIRCLE - MULLERGREEN 230KV CKT 1	
FDNS	03ALL		0 13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.0584	145.4107	GEN539945 1-FLATRDWDWG1 0.6900	
FDNS	03ALL		0 13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.06035	145.1789	CLARKCOUNTY7345.00 - SPEARVILLE 345KV CKT 1	
FDNS	03ALL		0 13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.06035	145.1789	CLARKCOUNTY7345.00 - SPEARVILLE 345KV CKT 2	
FDNS	03ALL		0 13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.05834	144.2319	NORTH JUDSON LARGE SUB - SPEARVILLE 115KV CKT 1	
FDNS	03ALL		0 13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.05834	144.2319	NORTH JUDSON LARGE SUB - SPEARVILLE 115KV CKT 2	
FDNS	03ALL		0 13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.06305	143.4648	NORTH JUDSON LARGE SUB - SSTARTP3 115.00 115KV CKT 1	
FDNS	03ALL		0 13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.0601	143.4478	SPEARVILLE (SPEARVLX) 345/115/13.8KV TRANSFORMER CKT 3	
FDNS	03ALL		0 13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.06471	142.6473	CIRCLE - MULLERGREEN 230KV CKT 1	
FDNS	03ALL		0 13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.0584	142.2557	GEN539945 1-FLATRDWDWG1 0.6900	
FDNS	03ALL		0 13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.05834	141.1309	NORTH JUDSON LARGE SUB - SPEARVILLE 115KV CKT 1	
FDNS	03ALL		0 13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.05834	141.1309	NORTH JUDSON LARGE SUB - SPEARVILLE 115KV CKT 2	
FDNS	03ALL		0 13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.05828	141.0768	CUDAHY - G08-79T 115.00 115KV CKT 1	
FDNS	03ALL		0 13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.06031	140.8153	AXTELL - POST ROCK 345KV CKT 1	
FDNS	03ALL		0 13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.05828	140.6961	CUDAHY - KISMET 3 115.00 115KV CKT 1	
FDNS	03ALL		0 13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.05828	140.5743	CIMARRON RIVER TAP - KISMET 3 115.00 115KV CKT 1	
FDNS	03ALL		0 13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.05828	138.0841	CUDAHY - G08-79T 115.00 115KV CKT 1	
FDNS	03ALL		0 13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.06031	138.0332	AXTELL - POST ROCK 345KV CKT 1	
FDNS	03ALL		0 13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.05828	137.7266	CUDAHY - KISMET 3 115.00 115KV CKT 1	
FDNS	03ALL		0 13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.05828	137.6161	CIMARRON RIVER TAP - KISMET 3 115.00 115KV CKT 1	
FDNS	03ALL		0 13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.0584	129.3432	GEN560522 1-G05-12 0.6900	
FDNS	03ALL		0 13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.05861	129.0157	POST ROCK - SPEARVILLE 345KV CKT 1	
FDNS	3		0 13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.0769	128.3713	ST JOHN - ST_JOHN 115KV CKT 1	
FDNS	03ALL		0 13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.06131	128.1172	POST ROCK (POSTROCK T1) 345/230/13.8KV TRANSFORMER CKT 1	
FDNS	03ALL		0 13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.0584	128.0996	GEN560279 1-G08-18 0.6900	
FDNS	03ALL		0 13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.05784	127.3924	NORTHWEST - TATONGA7 345.00 345KV CKT 1	
FDNS	03ALL		0 13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.0584	127.1576	GEN531447 1-HOLCOMB GENERATOR	
FDNS	03ALL		0 13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.0584	126.9242	GEN560522 1-G05-12 0.6900	
FDNS	03ALL		0 13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.05861	126.6379	POST ROCK - SPEARVILLE 345KV CKT 1	
FDNS	03ALL		0 13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.05756	126.5627	CLEARWATER - GILL ENERGY CENTER WEST 138KV CKT 1	
FDNS	03ALL		0 13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.0584	126.0543	GEN560232 1-G08-79 0.5750	
FDNS	3		0 13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.0769	126.0308	ST JOHN - ST_JOHN 115KV CKT 1	

SOLUTION	GROUP	SCENARIO	SEASON	SOURCE	DIRECTION	MONITORED ELEMENT	RATEB		TC%LOADING		CONTINGENCY
							(MVA)	TDF	(% MVA)		
FDNS	03ALL	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.06131	125.7569	POST ROCK (POSTROCK T1) 345/230/13.8KV TRANSFORMER CKT 1	
FDNS	03ALL	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.0584	125.7137	GEN560279 1-G08-18 0.6900	
FDNS	03ALL	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.05756	125.692	CLEARWATER - MILAN TAP 138KV CKT 1	
FDNS	03ALL	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.05756	125.629	SPP-WEPL-03A	
FDNS	03ALL	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.05784	125.1374	NORTHWEST - TATONGA7 345.00 345KV CKT 1	
FDNS	03ALL	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.0584	124.8395	GEN531447 1-HOLCOMB GENERATOR	
FDNS	03ALL	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.05756	124.4043	CLEARWATER - GILL ENERGY CENTER WEST 138KV CKT 1	
FDNS	03ALL	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.05756	124.3444	HARPER - MILAN TAP 138KV CKT 1	
FDNS	03ALL	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.0584	124.2639	GEN539767 1-GRAY COUNTY WIND FARM	
FDNS	03ALL	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.05756	124.2167	SPP-MKEC-05	
FDNS	03ALL	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.05756	124.1538	SPP-WEPL-03	
FDNS	03ALL	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.0584	123.8681	GEN560232 1-G08-79 0.5750	
FDNS	03ALL	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.05756	123.5633	CLEARWATER - MILAN TAP 138KV CKT 1	
FDNS	03ALL	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.05756	123.5024	SPP-WEPL-03A	
FDNS	03ALL	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.05756	123.1386	FLATRDG3 - HARPER 138KV CKT 1	
FDNS	03ALL	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.05756	122.3386	HARPER - MILAN TAP 138KV CKT 1	
FDNS	03ALL	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.0584	122.2513	GEN539767 1-GRAY COUNTY WIND FARM	
FDNS	03ALL	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.05756	122.2142	SPP-MKEC-05	
FDNS	03ALL	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.05756	122.1535	SPP-WEPL-03	
FDNS	03ALL	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.05756	121.1568	FLATRDG3 - HARPER 138KV CKT 1	
FDNS	03ALL	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.0584	120.8469	GEN539670 4-JUDSON LARGE GENERATOR	
FDNS	3	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.06255	120.8078	CLARKCOUNTY7345.00 - THISTLE7 345.00 345KV CKT 1	
FDNS	3	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.06255	120.8078	CLARKCOUNTY7345.00 - THISTLE7 345.00 345KV CKT 2	
FDNS	03ALL	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.06445	120.755	MULLERGREN - SPEARVILLE 230KV CKT 1	
FDNS	03ALL	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.05714	119.2336	THISTLE7 345.00 - WICHITA 345KV CKT 1	
FDNS	03ALL	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.05714	119.2336	THISTLE7 345.00 - WICHITA 345KV CKT 2	
FDNS	3	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.06255	118.646	CLARKCOUNTY7345.00 - THISTLE7 345.00 345KV CKT 1	
FDNS	3	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.06255	118.646	CLARKCOUNTY7345.00 - THISTLE7 345.00 345KV CKT 2	
FDNS	03ALL	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.0584	118.6383	GEN539670 4-JUDSON LARGE GENERATOR	
FDNS	03ALL	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.06445	118.5978	MULLERGREN - SPEARVILLE 230KV CKT 1	
FDNS	3	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.0769	117.3217	MIDW-CATB05	
FDNS	3	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.0769	117.2717	HUNTSVILLE - ST_JOHN 115KV CKT 1	
FDNS	03ALL	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.05714	117.2635	THISTLE7 345.00 - WICHITA 345KV CKT 1	
FDNS	03ALL	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.05714	117.2635	THISTLE7 345.00 - WICHITA 345KV CKT 2	
FDNS	3	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.0769	115.5494	HUNTSVILLE - HUTCHINSON ENERGY CENTER 115KV CKT 1	
FDNS	3	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.0769	115.3969	MIDW-CATB05	
FDNS	3	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.0769	115.3454	HUNTSVILLE - ST_JOHN 115KV CKT 1	
FDNS	3	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.06363	114.9047	SPP-SWPS-05	
FDNS	3	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.06363	114.8311	FINNEY SWITCHING STATION - Hitchland Interchange 345KV CKT 1	
FDNS	3	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.0769	113.6726	HUNTSVILLE - HUTCHINSON ENERGY CENTER 115KV CKT 1	
FDNS	3	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.05848	113.3434	BASE CASE	
FDNS	3	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.06363	113.0306	SPP-SWPS-05	
FDNS	3	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.06363	112.9566	FINNEY SWITCHING STATION - Hitchland Interchange 345KV CKT 1	
FDNS	3	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.05848	111.7361	BASE CASE	
FDNS	3	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.06044	109.2955	CLARKCOUNTY7345.00 - SPEARVILLE 345KV CKT 1	
FDNS	3	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.06044	109.2955	CLARKCOUNTY7345.00 - SPEARVILLE 345KV CKT 2	
FDNS	3	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.06022	107.6906	SPEARVILLE (SPEARVLX) 345/115/13.8KV TRANSFORMER CKT 3	
FDNS	3	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.06044	107.4838	CLARKCOUNTY7345.00 - SPEARVILLE 345KV CKT 1	
FDNS	3	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.06044	107.4838	CLARKCOUNTY7345.00 - SPEARVILLE 345KV CKT 2	
FDNS	3	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.06479	106.8488	CIRCLE - MULLERGREN 230KV CKT 1	
FDNS	3	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.05848	106.8237	GEN539945 1-FLATRWDDWG1 0.6900	
FDNS	3	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.05846	105.9463	NORTH JUDSON LARGE SUB - SPEARVILLE 115KV CKT 1	
FDNS	3	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.05846	105.9463	NORTH JUDSON LARGE SUB - SPEARVILLE 115KV CKT 2	
FDNS	3	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.06022	105.9114	SPEARVILLE (SPEARVLX) 345/115/13.8KV TRANSFORMER CKT 3	
FDNS	3	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.06479	105.2195	CIRCLE - MULLERGREN 230KV CKT 1	
FDNS	3	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.05848	105.0569	GEN539945 1-FLATRWDDWG1 0.6900	
FDNS	3	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.05846	104.2649	NORTH JUDSON LARGE SUB - SPEARVILLE 115KV CKT 1	
FDNS	3	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.05846	104.2649	NORTH JUDSON LARGE SUB - SPEARVILLE 115KV CKT 2	
FDNS	3	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.05836	104.0247	CUDAHY - G08-79T 115.00 115KV CKT 1	
FDNS	3	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.05836	103.6365	CUDAHY - KISMET 3 115.00 115KV CKT 1	
FDNS	3	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.05836	103.5065	CIMARRON RIVER TAP - KISMET 3 115.00 115KV CKT 1	
FDNS	3	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.0604	102.715	AXTELL - POST ROCK 345KV CKT 1	
FDNS	3	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.05836	102.3845	CUDAHY - G08-79T 115.00 115KV CKT 1	
FDNS	3	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.05836	102.0116	CUDAHY - KISMET 3 115.00 115KV CKT 1	
FDNS	3	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.05836	101.8885	CIMARRON RIVER TAP - KISMET 3 115.00 115KV CKT 1	
FDNS	3	0	13G	G09_020	FROM->TO	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	0.0604	101.2093	AXTELL - POST ROCK 345KV CKT 1	
FDNS	04ALL	0	13G	G09_020	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	319	0.08253	109.8226	DBL-THIS-CLR	
FDNS	04ALL	0	13G	G09_020	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	319	0.08253	109.7498	DBL-SPRVL-CL	
FDNS	04ALL	0	13G	G09_020	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	319	0.06752	103.4579	DBL-WICH-THI	

SOLUTION	GROUP	SCENARIO	SEASON	SOURCE	DIRECTION	MONITORED ELEMENT	RATEB		TC%LOADING		CONTINGENCY
							(MVA)	TDF	(% MVA)		
FDNS	04ALL	0	13G	G09_020	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	319	0.04152	102.8875	KNOLL 230 - POSTROCK6 230.00 230KV CKT 1	
FDNS	04ALL	0	13G	G09_020	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	319	0.10558	102.4746	POST ROCK (POSTROCK T1) 345/230/13.8KV TRANSFORMER CKT 1	
FDNS	03ALL	0	13G	G09_020	FROM->TO	ST JOHN - ST_JOHN 115KV CKT 1	86	0.07491	151.8407	DBL-WICH-THI	
FDNS	03ALL	0	13G	G09_020	FROM->TO	ST JOHN - ST_JOHN 115KV CKT 1	86	0.09098	137.6212	CIRCLE - MULLERGREN 230KV CKT 1	
FDNS	03ALL	0	13G	G09_020	FROM->TO	ST JOHN - ST_JOHN 115KV CKT 1	86	0.08262	131.103	SPP-MKEC-08	
FDNS	03ALL	0	13G	G09_020	FROM->TO	ST JOHN - ST_JOHN 115KV CKT 1	86	0.08256	130.213	FLATRDG3 - MEDICINE LODGE 138KV CKT 1	
FDNS	03ALL	0	13G	G09_020	FROM->TO	ST JOHN - ST_JOHN 115KV CKT 1	86	0.08256	130.213	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	
FDNS	03ALL	0	13G	G09_020	FROM->TO	ST JOHN - ST_JOHN 115KV CKT 1	86	0.09456	127.4901	NINNES3 115.00 - PRATT 115KV CKT 1	
FDNS	3	0	13G	G09_020	FROM->TO	ST JOHN - ST_JOHN 115KV CKT 1	86	0.075	124.1235	DBL-WICH-THI	
FDNS	03ALL	0	13G	G09_020	FROM->TO	ST JOHN - ST_JOHN 115KV CKT 1	86	0.07479	119.5793	FLATRDG3 - THISTLE4 138.00 138KV CKT 1	
FDNS	03ALL	0	13G	G09_020	FROM->TO	ST JOHN - ST_JOHN 115KV CKT 1	86	0.07479	119.5752	THISTLE7 345.00 (THISTLE T1) 345/138/13.8KV TRANSFORMER CKT 1	
FDNS	03ALL	0	13G	G09_020	FROM->TO	ST JOHN - ST_JOHN 115KV CKT 1	86	0.07114	119.076	THISTLE7 345.00 - WICHITA 345KV CKT 1	
FDNS	03ALL	0	13G	G09_020	FROM->TO	ST JOHN - ST_JOHN 115KV CKT 1	86	0.07114	119.076	THISTLE7 345.00 - WICHITA 345KV CKT 2	
FDNS	03ALL	0	13G	G09_020	FROM->TO	ST JOHN - ST_JOHN 115KV CKT 1	86	0.07219	118.9624	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	
FDNS	03ALL	0	13G	G09_020	FROM->TO	ST JOHN - ST_JOHN 115KV CKT 1	86	0.05901	118.9531	CIRCLE - HUTCHINSON ENERGY CENTER 115KV CKT 1	
FDNS	03ALL	0	13G	G09_020	FROM->TO	ST JOHN - ST_JOHN 115KV CKT 1	86	0.0721	117.4446	SPP-SWPS-05	
FDNS	03ALL	0	13G	G09_020	FROM->TO	ST JOHN - ST_JOHN 115KV CKT 1	86	0.0721	117.3639	FINNEY SWITCHING STATION - Hitchland Interchange 345KV CKT 1	
FDNS	03ALL	0	13G	G09_020	FROM->TO	ST JOHN - ST_JOHN 115KV CKT 1	86	0.07717	116.9113	CIRCLE (CIRCLE1X) 230/115/13.8KV TRANSFORMER CKT 1	
FDNS	03ALL	0	13G	G09_020	FROM->TO	ST JOHN - ST_JOHN 115KV CKT 1	86	0.09456	116.2162	ALEXANDER - PRATT 115KV CKT 1	
FDNS	03ALL	0	13G	G09_020	FROM->TO	ST JOHN - ST_JOHN 115KV CKT 1	86	0.07219	115.6285	KNOLL 230 - SMOKYHL6 230.00 230KV CKT 1	
FDNS	03ALL	0	13G	G09_020	FROM->TO	ST JOHN - ST_JOHN 115KV CKT 1	86	0.09456	115.4751	ALEXANDER - SAWYER 3 115.00 115KV CKT 1	
FDNS	03ALL	0	13G	G09_020	FROM->TO	ST JOHN - ST_JOHN 115KV CKT 1	86	0.07066	115.0203	NORTHWEST - TATONGA7 345.00 345KV CKT 1	
FDNS	03ALL	0	13G	G09_020	FROM->TO	ST JOHN - ST_JOHN 115KV CKT 1	86	0.07092	114.934	CLARKCOUNTY7345.00 - THISTLE7 345.00 345KV CKT 1	
FDNS	03ALL	0	13G	G09_020	FROM->TO	ST JOHN - ST_JOHN 115KV CKT 1	86	0.07092	114.934	CLARKCOUNTY7345.00 - THISTLE7 345.00 345KV CKT 2	
FDNS	03ALL	0	13G	G09_020	FROM->TO	ST JOHN - ST_JOHN 115KV CKT 1	86	0.09456	114.8778	MEDICINE LODGE - SAWYER 3 115.00 115KV CKT 1	
FDNS	03ALL	0	13G	G09_020	FROM->TO	ST JOHN - ST_JOHN 115KV CKT 1	86	0.07173	114.4862	AXTELL - POST ROCK 345KV CKT 1	
FDNS	03ALL	0	13G	G09_020	FROM->TO	ST JOHN - ST_JOHN 115KV CKT 1	86	0.07001	113.3875	GEN530685 L1-LARNED3 115.00	
FDNS	03ALL	0	13G	G09_020	FROM->TO	ST JOHN - ST_JOHN 115KV CKT 1	86	0.07284	113.1045	SPP-MKEC-02	
FDNS	03ALL	0	13G	G09_020	FROM->TO	ST JOHN - ST_JOHN 115KV CKT 1	86	0.07284	112.9928	ELLSWTP3 115.00 - MULLERGREN 115KV CKT 1	
FDNS	3	0	13G	G09_020	FROM->TO	ST JOHN - ST_JOHN 115KV CKT 1	86	0.09106	111.6727	CIRCLE - MULLERGREN 230KV CKT 1	
FDNS	3	0	13G	G09_020	FROM->TO	ST JOHN - ST_JOHN 115KV CKT 1	95.6	0.0746	109.8614	DBL-SPRVL-CL	
FDNS	3	0	13G	G09_020	FROM->TO	ST JOHN - ST_JOHN 115KV CKT 1	86	0.0746	109.5926	DBL-THIS-CLR	
FDNS	03ALL	0	13G	G09_020	FROM->TO	ST JOHN - ST_JOHN 115KV CKT 1	86	0.07001	109.3668	BASE CASE	
FDNS	3	0	13G	G09_020	FROM->TO	ST JOHN - ST_JOHN 115KV CKT 1	86	0.0827	105.0336	SPP-MKEC-08	
FDNS	03ALL	0	13G	G09_020	FROM->TO	ST JOHN - ST_JOHN 115KV CKT 1	86	0.07001	104.945	GEN560522 1-G05-12 0.6900	
FDNS	03ALL	0	13G	G09_020	FROM->TO	ST JOHN - ST_JOHN 115KV CKT 1	86	0.06972	104.7689	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	
FDNS	03ALL	0	13G	G09_020	FROM->TO	ST JOHN - ST_JOHN 115KV CKT 1	86	0.0697	104.567	WRTOD400	
FDNS	3	0	13G	G09_020	FROM->TO	ST JOHN - ST_JOHN 115KV CKT 1	86	0.08263	104.279	FLATRDG3 - MEDICINE LODGE 138KV CKT 1	
FDNS	3	0	13G	G09_020	FROM->TO	ST JOHN - ST_JOHN 115KV CKT 1	86	0.08263	104.2648	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	
FDNS	03ALL	0	13G	G09_020	FROM->TO	ST JOHN - ST_JOHN 115KV CKT 1	86	0.07001	103.7509	GEN539762 1-SSWIND 1 34.500	
FDNS	03ALL	0	13G	G09_020	FROM->TO	ST JOHN - ST_JOHN 115KV CKT 1	86	0.07001	103.4621	GEN531447 1-HOLCOMB GENERATOR	
FDNS	3	0	13G	G09_020	FROM->TO	ST JOHN - ST_JOHN 115KV CKT 1	86	0.09459	103.1626	NINNES3 115.00 - PRATT 115KV CKT 1	
FDNS	03ALL	0	13G	G09_020	FROM->TO	ST JOHN - ST_JOHN 115KV CKT 1	86	0.07001	103.1459	GEN560279 1-G08-18 0.6900	
FDNS	3	0	13G	G09_020	FROM->TO	ST JOHN - ST_JOHN 115KV CKT 1	86	0.05906	101.7319	CIRCLE - HUTCHINSON ENERGY CENTER 115KV CKT 1	
FDNS	03ALL	0	13G	G09_020	FROM->TO	ST JOHN - ST_JOHN 115KV CKT 1	86	0.07067	100.5257	MEDICINE LODGE - SUN CITY 115KV CKT 1	
FDNS	03ALL	0	13G	G09_020	FROM->TO	ST JOHN - ST_JOHN 115KV CKT 1	86	0.07067	100.1511	GREENSBURG - SUN CITY 115KV CKT 1	

Appendix I:



I. Power Flow Analysis (Category “C”)

See next page

SOLUTION	GROUP	SCENARIO	SEASON	SOURCE	DIRECTION	MONITORED ELEMENT	RATEB		TC%LOADING		CONTINGENCY
							(MVA)	TDF	(% MVA)		
FDNS	04ALL	0	13G	G09_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.03226	117.7163		NORTHWEST - TATONGA7 345.00 345KV CKT 1 & CRSRDSW7 345.00 - TATONGA7 345.00 345KV CKT 1
FDNS	04ALL	0	13G	G09_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.03226	116.4897		NORTHWEST - TATONGA7 345.00 345KV CKT 1 & G08-19 345.00 - TATONGA7 345.00 345KV CKT 1
FDNS	04G09_020	0	13G	G09_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.03259	116.4899		NORTHWEST - SPRING CREEK 345KV CKT 1 & NORTHWEST - TATONGA7 345.00 345KV CKT 1
FDNS	4	0	13G	G09_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.03259	116.3262		NORTHWEST - SPRING CREEK 345KV CKT 1 & NORTHWEST - TATONGA7 345.00 345KV CKT 1
FDNS	04G09_020	0	13G	G09_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.03219	115.0649		ARCADIA - NORTHWEST 345KV CKT 1 & NORTHWEST - TATONGA7 345.00 345KV CKT 1
FDNS	04G09_020	0	13G	G09_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.03224	114.9509		CIMARRON - NORTHWEST 345KV CKT 1 & NORTHWEST - TATONGA7 345.00 345KV CKT 1
FDNS	4	0	13G	G09_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.03219	114.9043		ARCADIA - NORTHWEST 345KV CKT 1 & NORTHWEST - TATONGA7 345.00 345KV CKT 1
FDNS	4	0	13G	G09_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.03224	114.7899		CIMARRON - NORTHWEST 345KV CKT 1 & NORTHWEST - TATONGA7 345.00 345KV CKT 1
FDNS	04ALL	0	13G	G09_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.03775	113.2079		TATONGA7 345.00 - WOODWARD DISTRICT EHV 345KV CKT 1 & BORDER 7345.00 - WOODWARD DISTRICT EHV 345KV CKT 1
FDNS	04G09_020	0	13G	G09_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.03228	111.3433		NORTHWEST - TATONGA7 345.00 345KV CKT 1 & G07-21 345.00 - TATONGA7 345.00 345KV CKT 1
FDNS	4	0	13G	G09_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.03228	111.1793		NORTHWEST - TATONGA7 345.00 345KV CKT 1 & G07-21 345.00 - TATONGA7 345.00 345KV CKT 1
FDNS	04G09_020	0	13G	G09_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.03228	110.9304		NORTHWEST - TATONGA7 345.00 345KV CKT 1 & CRSRDSW7 345.00 - TATONGA7 345.00 345KV CKT 1
FDNS	4	0	13G	G09_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.03228	110.7662		NORTHWEST - TATONGA7 345.00 345KV CKT 1 & CRSRDSW7 345.00 - TATONGA7 345.00 345KV CKT 1
FDNS	04G09_020	0	13G	G09_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.03228	109.79		NORTHWEST - TATONGA7 345.00 345KV CKT 1 & G08-19 345.00 - TATONGA7 345.00 345KV CKT 1
FDNS	4	0	13G	G09_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.03228	109.626		NORTHWEST - TATONGA7 345.00 345KV CKT 1 & G08-19 345.00 - TATONGA7 345.00 345KV CKT 1
FDNS	04ALL	0	13G	G09_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.03141	109.3726		THISTLE7 345.00 - WICHITA 345KV CKT 1 & THISTLE7 345.00 - WICHITA 345KV CKT 2
FDNS	04G09_020	0	13G	G09_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.03776	105.5683		TATONGA7 345.00 - WOODWARD DISTRICT EHV 345KV CKT 1 & BORDER 7345.00 - WOODWARD DISTRICT EHV 345KV CKT 1
FDNS	4	0	13G	G09_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.03776	105.3659		TATONGA7 345.00 - WOODWARD DISTRICT EHV 345KV CKT 1 & BORDER 7345.00 - WOODWARD DISTRICT EHV 345KV CKT 1
FDNS	04ALL	0	13G	G09_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.03226	104.9255		NORTHWEST - TATONGA7 345.00 345KV CKT 1 & TATONGA7 345.00 - WOODWARD DISTRICT EHV 345KV CKT 1
FDNS	04ALL	0	13G	G09_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.03226	104.7033		TATONGA7 345.00 - WOODWARD DISTRICT EHV 345KV CKT 1 & G08-19 345.00 - TATONGA7 345.00 345KV CKT 1
FDNS	04ALL	0	13G	G09_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.03226	104.6778		TATONGA7 345.00 - WOODWARD DISTRICT EHV 345KV CKT 1 & CRSRDSW7 345.00 - TATONGA7 345.00 345KV CKT 1
FDNS	04ALL	0	13G	G09_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.03226	104.6749		TATONGA7 345.00 - WOODWARD DISTRICT EHV 345KV CKT 1 & G07-21 345.00 - TATONGA7 345.00 345KV CKT 1
FDNS	04G09_020	0	13G	G09_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.03145	102.4478		THISTLE7 345.00 - WICHITA 345KV CKT 1 & THISTLE7 345.00 - WICHITA 345KV CKT 2
FDNS	4	0	13G	G09_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.03145	102.2476		THISTLE7 345.00 - WICHITA 345KV CKT 1 & THISTLE7 345.00 - WICHITA 345KV CKT 2
FDNS	04ALL	0	13G	G09_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.03196	101.6793		TATONGA7 345.00 - WOODWARD DISTRICT EHV 345KV CKT 1 & Hitchland Interchange - WOODWARD DISTRICT EHV 345KV CKT 2
FDNS	04ALL	0	13G	G09_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.03196	101.0099		TATONGA7 345.00 - WOODWARD DISTRICT EHV 345KV CKT 1 & BEAVER CO 345.00 - WOODWARD DISTRICT EHV 345KV CKT 1
FDNS	4	0	13G	G09_020	FROM->TO	HOLCOMB (HOLCOMB) 345/115/13.8KV TRANSFORMER CKT 1	336	0.10877	101.8075		HOLCOMB - SETAB 345KV CKT 1 & MINGO - SETAB 345KV CKT 1
FDNS	04G09_020	0	13G	G09_020	FROM->TO	HOLCOMB (HOLCOMB) 345/115/13.8KV TRANSFORMER CKT 1	336	0.10877	101.8025		HOLCOMB - SETAB 345KV CKT 1 & MINGO - SETAB 345KV CKT 1
FDNS	04G09_020	0	13G	G09_020	FROM->TO	HOLCOMB (HOLCOMB) 345/115/13.8KV TRANSFORMER CKT 1	336	0.10877	101.2842		HOLCOMB - SETAB 345KV CKT 1 & MINGO - SETAB 345KV CKT 1
FDNS	4	0	13G	G09_020	FROM->TO	HOLCOMB (HOLCOMB) 345/115/13.8KV TRANSFORMER CKT 1	336	0.10877	101.2826		HOLCOMB - SETAB 345KV CKT 1 & MINGO - SETAB 345KV CKT 1
FDNS	04ALL	0	13G	G09_020	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	319	0.08253	109.8226		CLARKCOUNTY7345.00 - THISTLE7 345.00 345KV CKT 1 & CLARKCOUNTY7345.00 - THISTLE7 345.00 345KV CKT 2
FDNS	04ALL	0	13G	G09_020	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	319	0.08253	109.7498		CLARKCOUNTY7345.00 - SPEARVILLE 345KV CKT 1 & CLARKCOUNTY7345.00 - SPEARVILLE 345KV CKT 2
FDNS	04ALL	0	13G	G09_020	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	319	0.06833	107.6836		KNOLL 230 - POSTROCK6 230.00 230KV CKT 1 & POSTROCK6 230.00 - SOUTH HAYS 230KV CKT 1
FDNS	04ALL	0	13G	G09_020	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	319	0.06833	107.6836		MIDW-CATD05
FDNS	04ALL	0	13G	G09_020	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	319	0.10736	103.6151		POST ROCK - SPEARVILLE 345KV CKT 1 & AXTELL - POST ROCK 345KV CKT 1
FDNS	04ALL	0	13G	G09_020	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	319	0.06752	103.4579		THISTLE7 345.00 - WICHITA 345KV CKT 1 & THISTLE7 345.00 - WICHITA 345KV CKT 2
FDNS	04ALL	0	13G	G09_020	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	319	0.04752	101.9911		MULLERGREN - SOUTH HAYS 230KV CKT 1 & CIRCLE - MULLERGREN 230KV CKT 1