Definitive Interconnection System Impact Study for Generation Interconnection Requests

(DISIS-2012-001-2)

January 2014

Generation Interconnection

SPP Southwest Power Pool

Revision History

Date	Author	Change Description
07/26/2012	SPP	Report Issued (DISIS-2012-001)
02/08/2013	SPP	Account for Withdrawn Projects, Report Re-Posted (DISIS-2012-001-1)
01/21/2014	SPP	Account for Withdrawn Projects, Report Re-Posted (DISIS-2012-001-2)

Executive Summary

Generation Interconnection customers have requested a Definitive Interconnection System Impact Study (DISIS) under the Generation Interconnection Procedures (GIP) in the Southwest Power Pool Open Access Transmission Tariff (OATT). The Interconnection Customers' requests have been clustered together for the following System Impact Cluster Study window which closed March 31, 2012. The customers will be referred to in this study as the DISIS-2012-001 Interconnection Customers. This System Impact Study analyzes the interconnecting of multiple generation interconnection requests associated with new generation totaling approximately 475.1MW of new generation which would be located within the transmission systems of Oklahoma Gas and Electric (OKGE), Sunflower Electric Power Corporation/Mid-Kansas Electric Power LLC (SUNC)/(MKEC), and Southwestern Public Service (SPS). The various generation interconnection requests have differing proposed in-service dates[1]. The generation interconnection requests included in this System Impact Cluster Study are listed in Appendix A by their queue number, amount, requested interconnection service, 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, 475.1MW of nameplate generation may be interconnected with transmission system reinforcements within the SPP transmission system. Previously performed dynamic stability analysis and additional power flow analysis for power factor requirements has determined the need for reactive. Previously performed dynamic stability analysis has determined that the transmission system will remain stable with the assigned Network Upgrades and Interconnection Facilities to the DISIS.

The total estimated minimum cost for interconnecting the DISIS-2012-001 interconnection customers is $30,111,834.27. These costs are shown in Appendix E and F. Interconnection Service to DISIS-2012-001 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.**

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 identified and shown in Appendix H.

Network Constraints listed in Appendix H are in the local area of the new generation when this generation is injected throughout the SPP footprint for the Energy Resource (ERIS) Interconnection Request. Certain Interconnection Requests were also studied for Network Resource Interconnection Service (NRIS). Those constraints are also listed in Appendix H. Additional Network

[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.

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 Appendix 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.

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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 System Impact Study window which closed March 31, 2012. The customers will be referred to in this study as the DISIS-2012-001 Interconnection Customers. This System Impact Study analyzes the interconnecting of multiple generation interconnection requests associated with new generation totaling 475.1 MW of new generation which would be located within the transmission systems of Oklahoma Gas and Electric (OKGE), Sunflower Electric Power Corporation/Mid-Kansas Electric Power LLC (SUNC/MKEC), and Southwestern Public Service (SPS). The various generation interconnection requests have differing proposed in-service dates[2]. The generation interconnection requests included in this System Impact Study are listed in Appendix A by their queue number, amount, requested interconnection service, 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.

[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 competition of the Facility Study.

Model Development

Interconnection Requests Included in the Cluster

SPP has included all interconnection requests that submitted a Definitive Interconnection System Impact Study Agreement no later than March 31, 2012 and were subsequently accepted by Southwest Power Pool under the terms of the Generator Interconnection Procedures (GIP). The interconnection requests that are included in this study are listed in Appendix A.

Affected System Interconnection Request

Also included in this Definitive Impact Study is a single Affected System Study, located on the Pioneer Electric Cooperative, Inc. system, which shares connections to the Sunflower Electric Power Corporation (SUNC) system. The Affected System Study Requests has been given the designation: ASGI-2012-006. ASGI-2012-006 capacity nameplate is 22.5 MW (and associated 17MW internal load) with Point of Interconnection (POI) at a tap on Hugoton – Rolla 69kV line.

Previously Queued Interconnection Requests

The previous queued requests included in this study are listed in Appendix B. In addition to the Base Case Upgrades, the previous queued requests and associated upgrades were assumed to be in-service and added to the Base Case models. These projects were dispatched as Energy Resources with equal distribution across the SPP footprint. Prior queued projects that requested Network Resource Interconnection Service (NRIS) were dispatched in an additional analysis into the balancing authority of the interconnecting transmission owner.

Development of Base Cases

Power Flow

The 2013 series Transmission Service Request (TSR) Models 2014 spring, 2014 summer and winter peak, 2019 summer and winter peak, and the 2024 summer peak scenario 0 cases were used for this study. After the cases were developed, each of the control areas' resources were then re-dispatched to account for the new generation requests using current dispatch orders.

Dynamic Stability

The stability analysis was not re-performed for this restudy.

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 an approved Notice to Construct (NTC), 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-2012-001 Customers have not been assigned acceleration costs for the below listed projects. The DISIS-2012-001 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 projects[3]:
  - Hitchland – Ochiltree 230kV Project (placed In-Service in 2013)
- Balanced Portfolio Projects[4]:
  - Woodward – Border – TUCO 345kV project, scheduled for 5/19/2014 in-service
    - Woodward 345/138kV circuit #2 autotransformer
    - TUCO 345/138kV circuit #2 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
  - Cleveland – Sooner 345kV (placed In-Service in 2012)
  - Tap Stillwell – Swissvale 345kV line at West Gardner (placed In-Service in 2013)
- Priority Projects[5]:
  - Hitchland – Woodward double circuit 345kV, scheduled for 6/30/2014 in-service
    - Hitchland 345/230kV circuit #2 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
  - Thistle – Flat Ridge 138kV, scheduled for 12/31/2014 in-service
- Various MKEC Transmission System Upgrades[6]
  - Harper – Flat Ridge 138kV rebuild (placed In-Service in 2013)
  - Flat Ridge – Medicine Lodge 138kV rebuild, scheduled for 12/31/2013 in-service
  - Pratt – Medicine Lodge 115kV rebuild, scheduled for 6/15/2014 in-service
  - Medicine Lodge 138/115kV autotransformer replacement, (placed In-Service in 2013)

[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.
[4] Notice to Construct (NTC) issued June 2009.
[5] Notice to Construct (NTC) issued June 2010.
[6] SPP Transmission Service Projects identified in SPP-2007-AG3-AFS-9.

- Northwest 345/138/13.8kV circuit #3 autotransformer, scheduled for 6/1/2017 in-service[7]
- Woodward (OKGE) – Woodward (WFEC) 69kV rebuild, scheduled for 6/1/2015 in-service[8]
- Sheldon – SW7th and Pleasant Hill 115kV circuit #2 rebuild (placed In-Service in 2013)[9]

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-2012-001 study and are assumed to be in service. This list may not be all inclusive. The DISIS-2012-001 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-2012-001 Customer Generation Facilities in service dates may need to be delayed until the completion of the following upgrades.

- Upgrades assigned to ICS-2008-001 Interconnection Customers
  - Line Traps at Amarillo South – Swisher 230kV
- Upgrades assigned to DISIS-2009-001 Interconnection Customers:
  - Fort Dodge – North Fort Dodge – Spearville 115kV circuit #2
  - Albion – Petersburg – Neligh 115kV circuit #1 rerate (placed In-Service in 2011)
  - Fort Randall – Madison County – Kelly 230kV circuit #1 rerate (320MVA)
  - Spearville 345/115kV autotransformer circuit #1
- Upgrades assigned to DISIS-2010-001 Interconnection Customers:
  - Beaver County 345kV Expansion (Tap & Tie Hitchland – Woodward circuit #2 into Beaver County 345kV)
  - Switch 2749 – Wildorado 69kV circuit # 1 rebuild
  - Washita – Gracemont 138kV circuit #2 (placed In-Service in 2012)
- Upgrades assigned to DISIS-2010-002 Interconnection Customers:
  - Twin Church – Dixon County 230kV circuit #1 rerate (320MVA)
- Upgrades assigned to DISIS-2011-001 Interconnection Customers:
  - Beaver County – Buckner 345kV circuit #1 buildTatonga – Matthewson - Cimarron 345kV circuit #2 build
    - Tatonga terminal equipment upgrade (1792 MVA)
  - Rice County – Circle 230kV conversion (placed In-Service in 2012)
  - Rice County – Lyons 115kV rebuild (placed In-Service in 2013)
  - Rice County 230/115kV autotransformer (placed In-Service in 2012)
  - Lyons – Wheatland 115kV rerate (placed In-Service in 2012)
  - Hoskins – Dixon County – Twin Church 230kV circuit #1 rerate
  - (NRIS only) Spearville – Mullergren 230kV circuit #1 rebuild
  - (NRIS only) FPL Switch – Woodward - Mooreland 138kV circuit #1 rebuild
  - (NRIS only) Hitchland 230/115kV transformer circuit #2, build

[7] SPP Transmission Service Project identified in SPP-2009-AG2-AFS6. Per SPP-NTC-20137.
[8] SPP Regional Reliability Project. Per SPP-NTC-20003.
[9] SPP Regional Reliability 2012 ITPNT Project. Per SPP-NTC-200171.

- Upgrades assigned to DISIS-2011-002 interconnection Customers:
  - Power System Stabilizers - Install Power System Stabilizers @ Tolk(Units: 1,2) and Jones (Units: 1,2,3,4)
  - GEN-2011-017 Tap – Mullergren 345kV circuit #1 build
    - Build Mullergren 345/230kV Substation
    - Build Mullergren 345/230/13kV Transformer
  - SUB 967 - SUB 968 69kV circuit #1 replace terminal equipment
  - (NRIS only) Hydro Carbon Tap - Sub974 69kV circuit #1 rewire CT
  - (NRIS only) Lubbock South 230/115kV Autotransformer build circuit #2
  - (NRIS only) Mullergren – Reno 345kV circuit #1 build
  - (NRIS only) Nebraska City U Syracuse – SUB 970 circuit #1 replace terminal equipment
  - (NRIS only) Yoakum 230/115kV transformer circuit #1 and circuit #2 replacement

Potential Upgrades Not in the Base Case

Any potential upgrades that do not have a Notification to Construct (NTC) and not explicitly listed within this report 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 section.

Regional Groupings

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

To determine interconnection impacts, fifteen different generation dispatch scenarios of the spring base case models were developed to accommodate the regional groupings.

Power Flow

For each group, the various wind generating plants were modeled at 100% nameplate of maximum generation. The other wind generating plants in each area were modeled at 80% nameplate while the wind generating plants in the other areas were modeled at 20% nameplate of maximum generation. These projects were dispatched as Energy Resources with equal distribution across the SPP footprint. Certain projects that requested Network Resource Interconnection Service were dispatched in an additional analysis into the balancing authority of the interconnecting transmission owner. This method allowed for the identification of network constraints that were common to the regional groupings that could then in turn have the mitigating upgrade cost allocated throughout the entire cluster. Other sensitivity analyses are also performed with all interconnection requests in each group being dispatched at 100% nameplate.

Peaking units were not dispatched in the 2014 spring model. To study peaking units' impacts, the 2014 summer and winter and 2019 summer and winter, and 2024 summer seasonal models were chosen and peaking units were modeled at 100% of the nameplate rating and wind generating facilities were modeled at 10% of the nameplate rating. Each interconnection request was also modeled separately at 100% nameplate for certain analyses.

Dynamic Stability

The stability analysis was not re-performed for this restudy.

Identification of Network Constraints

The initial set of network constraints were 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 were 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 were considered for mitigation. Interconnection Requests that have requested Network Resource Interconnection Service (NRIS) were also studied in the NRIS analysis to determine if any constraint had at least a 3% DF. If so, these constraints were considered for mitigation.

Determination of Cost Allocated Network Upgrades

Cost Allocated Network Upgrades of wind generation interconnection requests were determined using the 2014 spring model. Cost Allocated Network Upgrades of peaking units was determined using the 2019 summer peak model. A MUST sensitivity analysis was performed to determine the Distribution Factors (DF), a distribution factor with no contingency that each generation interconnection request had on each new upgrade. The impact each generation interconnection request had on each upgrade project was weighted by the size of each request. Finally the costs due by each request for a particular project were then determined by allocating the portion of each request's impact over the impact of all affecting requests.

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:

  Request X Impact Factor on Upgrade Project 1 = PTDF(%)(X) * MW(X) = X1

  Request Y Impact Factor on Upgrade Project 1 = PTDF(%)(Y) * MW(Y) = Y1

  Request Z Impact Factor on Upgrade Project 1 = PTDF(%)(Z) * 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 Z2 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.

Required Interconnection Facilities

The requirement to interconnect the 475.1 MW 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 cluster total $30,111,834.27. Interconnection Facilities specific to each generation interconnection request are listed in Appendix E. A preliminary one-line drawing for each generation interconnection request are listed in Appendix D.

A list of constraints that were identified and used for mitigation are listed in Appendix G. Listed within Appendix G are the ERIS constraints with greater than or equal to a 20% DF, as well as, the NRIS constraints that have a DF of 3% or greater. Other Network Constraints which are not requiring mitigation are shown in Appendix H. 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.

Power Flow Analysis

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 was conducted for each Interconnection Customer's facility using modified versions of the 2014 spring peak, 2014 summer and winter peak, the 2019 summer and winter peak models, and the 2024 summer peak models. The output of the Interconnection Customer's facility was 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. Certain requests that requested Network Resource Interconnection Service (NRIS) had an additional analysis conducted for displacing resources in the interconnecting Transmission Owner's balancing authority.

This analysis was conducted assuming that previous queued requests in the immediate area of these interconnect requests were in-service. The analysis of each Customer's project indicates that criteria violations will occur on the SPS and SUNC transmission systems under system intact and contingency conditions in the peak seasons.

Cluster Group 1 (Woodward Area)

In addition to the 4,635.1 MW of previously queued generation in the area, 0 MW of new interconnection service was studied. No new constraints were found in this area.

Cluster Group 2 (Hitchland Area)

In addition to the 2,961.2 MW of previously queued generation in the area, 0 MW of new interconnection service was studied. No new constraints were found in this area.

Cluster Group 3 (Spearville Area)

In addition to the 3,867.9 MW of previously queued generation in the area, 342.5 MW of new interconnection service was studied. ERIS upgrade second Holcomb 345/230/13kV autotransformer circuit #2 that was previously identified is no longer needed since Holcomb 345/230/13kV circuit #1 does not have overload violations. However without the second Holcomb autotransformer, Garden City – Kansas Ave Water Treatment Plant 115kV and Dobson – Gano 115kV circuits do overload during contingency and will require terminal equipment upgrades. NRIS overloads were also mitigated by the ERIS upgrade placing terminal equipment on Dobson – Gano 115kV.

Group 3: ERIS Constraints			
MONITORED ELEMENT	RATE B (MVA)	TC%LOADING (% MVA)	CONTINGENCY
GARDEN CITY - KANSAS AVENUE WATER TREATMENT PLANT 115KV CKT 1	119.5	121.9964	HOLCOMB (HOLCOMB) 345/115/13.8KV TRANSFORMER CKT 1
DOBSON - GANO 3 115.00 115KV CKT 1	148.2	101.3103	HOLCOMB (HOLCOMB) 345/115/13.8KV TRANSFORMER CKT 1

Group 3: NRIS Constraints			
MONITORED ELEMENT	RATE B (MVA)	TC%LOADING (% MVA)	CONTINGENCY
DOBSON - GANO 3 115.00 115KV CKT 1	119.5	118.0312	HOLCOMB (HOLCOMB) 345/115/13.8KV TRANSFORMER CKT 1

Cluster Group 4/11 (Mingo/NW Kansas Group)

In addition to the 1,888.10 MW of previously queued generation in the area, 0.0 MW of new interconnection service was studied. The withdrawal of the GEN-2012-002 request alleviated any thermal violations on the Holcomb 345/115kV autotransformer circuit #1 for this study. The previously identified Holcomb 345/115/13kV autotransformer circuit #2 is no longer required.

Cluster Group 5 (Amarillo Area)

In addition to the 1,332.6 MW of previously queued generation in the area, 0.0 MW of new interconnection service was studied. No new constraints were found in this area.

Cluster Group 6 (South Texas Panhandle/New Mexico)

In addition to the 2,380.3 MW of previously queued generation in the area, 91.2 MW of new interconnection service was studied. Outlet constraints of the Mustang 115kV bus were previously identified for generators at Mustang in the last restudy, but due to higher or equally queued request withdrawal, the overloads are alleviated. Previously assigned DISIS-2011-002 upgrade for Mustang – Yoakum 230kV terminal equipment is now assigned to this study. From previous performed stability analysis, potential stability issues were identified for GEN-2012-001 for loss of the Grassland 230kV line from the wind farm.

Group 6: ERIS Constraints			
MONITORED ELEMENT	RATE B (MVA)	TC%LOADING (% MVA)	CONTINGENCY
MUSTANG STATION - YOAKUM COUNTY INTERCHANGE 230KV CKT 1	351	103.0690	AMOCO WASSON SWITCHING STATION - MUSTANG STATION 230KV CKT 1

Cluster Group 7 (Southwestern Oklahoma)

In addition to the 1,825.2 MW of previously queued generation in the area, 0.0 MW of new interconnection service was studied. No new constraints were found in this area.

Cluster Group 8 (South Central Kansas/North Oklahoma)

In addition to the 1,909.5 MW of previously queued generation in the area, 0.0 MW of new interconnection service was studied. No new constraints were found in this area.

Cluster Group 9/10 (Nebraska)

In addition to the 1,587.9 MW of previously queued generation in the area, 0.0 MW of new interconnection service was studied. No new constraints were found in this area.

Cluster Group 11 (North Central Kansas)

Group 11 has been merged with Group 4.

Cluster Group 12 (Northwest Arkansas)

In addition to the 0 MW of previously queued generation in the area, 0.0 MW of new interconnection service was studied. No new constraints were found in this area.

Cluster Group 13 (Northwest Missouri)

In addition to the 285.8 MW of previously queued generation in the area, 0 MW of new interconnection service was studied. No new constraints were found in this area.

Cluster Group 14 (South Central Oklahoma)

In addition to the 220.8 MW of previously queued generation in the area, 41.4 MW of new interconnection service was studied. No new ERIS constraints were found in this area.

Cluster Group 15 (reserved)

This group has been retired and all prior Group 15 requests have been re-designated as Group 9/10 requests.

Stability Analysis

The stability analysis was not re-performed for this restudy.

Conclusion

The minimum cost of interconnecting 475.1 MW of new interconnection requests included in this Definitive Interconnection System Impact Study is estimated at $30,111,834.27 for the Allocated Network Upgrades and Transmission Owner Interconnection Facilities are listed in Appendix E and F. These costs do not include the cost of upgrades of other transmission facilities listed in Appendix H which are Network Constraints.

These interconnection costs do not include any cost of Network Upgrades determined to be required by short circuit analysis. These studies will be performed if the Interconnection Customer executes the appropriate Interconnection Facilities Study Agreement and provides the required data along with demonstration of Site Control and the appropriate deposit. At the time of the Interconnection Facilities Study, a better determination of the interconnection facilities may be available.

The required interconnection costs listed in Appendices E, and F, 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).

Appendix

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	In Service Date Delayed Until no earlier than*
ASGI-2012-006	22.50	ER	SUNCMKEC	Tap Hugoton - Rolla 69kV	Tap Hugoton - Rolla 69kV		
GEN-2012-001	61.20	ER	SPS	Tap Grassland - Borden County 230kV	Tap Grassland - Borden County 230kV	11/30/2012	
GEN-2012-004	41.40	ER/NR	OKGE	Pooleville 138kV	Tap Ratliff - Pooleville (Carter County) 138kV	12/31/2013	
GEN-2012-007	120.00	ER/NR	SUNCMKEC	Rubart 115kV	Rubart 115kV	4/1/2014	TBD
GEN-2012-009	15.00	ER	SPS	Mustang 230kV	Mustang 230kV	4/1/2015	
GEN-2012-010	15.00	ER	SPS	Mustang 230kV	Mustang 230kV	4/1/2015	
GEN-2012-011	200.00	ER	SUNCMKEC	Tap Spearville - Post Rock 345kV (GEN-2011-017 Tap)	Tap Spearville - Post Rock 345kV (North of GEN-2011-017 Tap)	11/1/2013	TBD
Total:	**475.10**						

*Requests that dependent upon Priority Projects or Balanced Portfolio may be delayed until 12/31/2014. Other requests 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
ASGI-2010-006	150.00	AECI	Tap Fairfax (AECI) - Shilder (AEPW) 138kV	AECI queue Affected Study
ASGI-2010-010	42.20	SPS	Lovington 115kV	Lea County Affected Study
ASGI-2010-020	30.00	SPS	Tap LE-Tatum - LE-Crossroads 69kV	Lea County Affected Study
ASGI-2010-021	15.00	SPS	Tap LE-Saunders Tap - LE-Anderson 69kV	Lea County Affected Study
ASGI-2011-001	28.80	SPS	Lovington 115kV	On-Line
ASGI-2011-002	20.00	SPS	Herring 115kV	On-Line
ASGI-2011-003	10.00	SPS	Hendricks 115kV	On-Line
ASGI-2011-004	20.00	SPS	Pleasant Hill 69kV	Under Study (DISIS-2011-002)
GEN-2001-014	96.00	WFEC	Ft Supply 138kV	On-Line
GEN-2001-026	74.00	WFEC	Washita 138kV	On-Line
GEN-2001-033	180.00	SPS	San Juan Tap 230kV	On-Line at 120MW
GEN-2001-036	80.00	SPS	Norton 115kV	On-Line
GEN-2001-037	100.00	OKGE	FPL Moreland Tap 138kV	On-Line
GEN-2001-039A	105.00	SUNCMKEC	Tap Greensburg - Ft Dodge (Shooting Star Tap) 115kV	On-Line
GEN-2001-039M	100.00	SUNCMKEC	Central Plains Tap 115kV	On-Line
GEN-2002-004	200.00	WERE	Latham 345kV	On-Line at 150MW
GEN-2002-005	120.00	WFEC	Red Hills Tap 138kV	On-Line
GEN-2002-008	240.00	SPS	Hitchland 345kV	On-Line at 120MW
GEN-2002-009	80.00	SPS	Hansford 115kV	On-Line
GEN-2002-022	240.00	SPS	Bushland 230kV	On-Line
GEN-2002-023N	0.80	NPPD	Harmony 115kV	On-Line
GEN-2002-025A	150.00	SUNCMKEC	Spearville 230kV	On-Line
GEN-2003-004	100.00	WFEC	Washita 138kV	On-Line
GEN-2003-005	100.00	WFEC	Anadarko - Paradise (Blue Canyon) 138kV	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-2003-020	160.00	SPS	Martin 115kV	On-Line
GEN-2003-021N	75.00	NPPD	Ainsworth Wind Tap 115kV	On-Line
GEN-2003-022	120.00	AEPW	Washita 138kV	On-Line
GEN-2004-005N	30.00	NPPD	St Francis 115kV	On Suspension
GEN-2004-014	154.50	SUNCMKEC	Spearville 230kV	On-Line at 100MW
GEN-2004-020	27.00	AEPW	Washita 34.5kV	On-Line
GEN-2004-023	20.60	WFEC	Washita 138kV	On-Line
GEN-2004-023N	75.00	NPPD	Columbus Co 115kV	On-Line
GEN-2005-003	30.60	WFEC	Washita 138kV	On-Line
GEN-2005-008	120.00	OKGE	Woodward 138kV	On-Line
GEN-2005-012	250.00	SUNCMKEC	Ironwood 345kV	On-Line at 160MW
GEN-2005-013	201.00	WERE	Tap Latham - Neosho (Caney River) 345kV	On-Line
GEN-2006-002	101.00	AEPW	Sweetwater 230kV	On-Line
GEN-2006-006	205.50	SUNCMKEC	Spearville 345kV	On Schedule for 2015
GEN-2006-018	170.00	SPS	TUCO Interchange 230kV	On-Line
GEN-2006-020N	42.00	NPPD	Bloomfield 115kV	On-Line
GEN-2006-020S	18.90	SPS	DWS Frisco 115kV	On-Line
GEN-2006-021	101.00	SUNCMKEC	Flat Ridge Tap 138kV	On-Line
GEN-2006-024S	19.80	WFEC	Buffalo Bear Tap 69kV	On-Line
GEN-2006-026	604.00	SPS	Hobbs 230kV & Hobbs 115kV	On-Line
GEN-2006-031	75.00	MIDW	Knoll 115kV	On-Line

Request	Amount	Area	Requested/Proposed Point of Interconnection	Status or In-Service Date
GEN-2006-035	225.00	AEPW	Sweetwater 230kV	On-Line at 132MW
GEN-2006-037N1	75.00	NPPD	Broken Bow 115kV	On Schedule for 2014
GEN-2006-038N005	80.00	NPPD	Broken Bow 115kV	On-Line
GEN-2006-038N019	80.00	NPPD	Petersburg North 115kV	On-Line
GEN-2006-040	108.00	SUNCMKEC	Mingo 115kV	On Suspension
GEN-2006-043	99.00	AEPW	Sweetwater 230kV	On-Line
GEN-2006-044	370.00	SPS	Hitchland 345kV	On-Line at 80MW
GEN-2006-044N	40.50	NPPD	North Petersburg 115kV	On-Line
GEN-2006-046	131.00	OKGE	Dewey 138kV	On-Line
GEN-2006-047	240.00	SPS	Tap Bushland - Deaf Smith (Buffalo) 230kV	On Suspension
GEN-2007-011	135.00	SUNCMKEC	Syracuse 115kV	On Suspension
GEN-2007-011N08	81.00	NPPD	Bloomfield 115kV	On-Line
GEN-2007-021	201.00	OKGE	Tatonga 345kV	On Schedule for 2014
GEN-2007-025	300.00	WERE	Viola 345kV	On-Line
GEN-2007-032	150.00	WFEC	Tap Clinton Junction - Clinton 138kV	On Suspension
GEN-2007-038	200.00	SUNCMKEC	Spearville 345kV	On Schedule for 2015
GEN-2007-040	200.00	SUNCMKEC	Buckner 345kV	On-Line at 132MW
GEN-2007-043	200.00	OKGE	Minco 345kV	On-Line
GEN-2007-044	300.00	OKGE	Tatonga 345kV	On Schedule for 2014
GEN-2007-046	199.50	SPS	Hitchland 115kV	On Schedule for 2014
GEN-2007-048	400.00	SPS	Tap Amarillo S - Swisher 230kV	On Schedule for 2014
GEN-2007-050	170.00	OKGE	Woodward EHV 138kV	On-Line at 150MW
GEN-2007-052	150.00	WFEC	Anadarko 138kV	On-Line
GEN-2007-062	765.00	OKGE	Woodward EHV 345kV	On Schedule for 2014
GEN-2008-003	101.00	OKGE	Woodward EHV 138kV	On-Line
GEN-2008-008	60.00	SPS	Graham 69kV	On Suspension
GEN-2008-013	300.00	OKGE	Tap Wichita - Woodring (Hunter) 345kV	On-Line at 235MW
GEN-2008-017	300.00	SUNCMKEC	Setab 345kV	On Schedule for 2015
GEN-2008-018	250.00	SPS	Finney 345kV	On Schedule for 2014
GEN-2008-019	300.00	OKGE	Tatonga 345kV	On Schedule for 2015
GEN-2008-021	42.00	WERE	Wolf Creek 345kV	On-Line
GEN-2008-022	300.00	SPS	Tap Eddy Co - Tolk (Chaves County) 345kV	On Schedule for 2015
GEN-2008-023	150.00	AEPW	Hobart Junction 138kV	On-Line
GEN-2008-029	250.50	OKGE	Woodward EHV 138kV	On Schedule for 2014
GEN-2008-037	101.00	WFEC	Tap Washita - Blue Canyon Wind 138kV	On-Line
GEN-2008-044	197.80	OKGE	Tatonga 345kV	On-Line
GEN-2008-047	300.00	OKGE	Tap Hitchland - Woodward Dbl Ckt (Beaver County) 345kV	IA Pending
GEN-2008-051	322.00	SPS	Potter County 345kV	On-Line at 161MW
GEN-2008-079	99.20	SUNCMKEC	Tap Cudahy - Ft Dodge 115kV	On-Line
GEN-2008-086N02	200.00	NPPD	Tap Ft Randle - Columbus (Madison County) 230kV	On Schedule for 2014
GEN-2008-088	50.60	SPS	Vega 69kV	On Schedule for 2014
GEN-2008-092	201.00	MIDW	Post Rock 230kV	IA Pending
GEN-2008-098	100.80	WERE	Tap Lacygne - Wolf Creek (Anderson County) 345kV	On Schedule for 2015
GEN-2008-119O	60.00	OPPD	S1399 161kV	On-Line
GEN-2008-123N	89.70	NPPD	Tap Guide Rock - Pauline (Rosemont) 115kV	On Schedule for 2014
GEN-2008-124	200.10	SUNCMKEC	Ironwood 345kV	On Schedule for 2016
GEN-2008-129	80.00	MIPU	Pleasant Hill 161kV	On-Line
GEN-2009-008	199.50	MIDW	South Hays 230kV	On Schedule for 2015
GEN-2009-020	48.60	MIDW	Tap Nekoma - Bazine (Walnut Creek) 69kV	On Schedule for 2015

Request	Amount	Area	Requested/Proposed Point of Interconnection	Status or In-Service Date
GEN-2009-025	60.00	OKGE	Nardins 69kV	On-Line
GEN-2009-040	108.00	WERE	Marshall 115kV	On Schedule for 2015
GEN-2010-001	300.00	OKGE	Tap Hitchland - Woodward Dbl Ckt (Beaver County) 345kV	On Schedule for 2014 (204 MW) and 2015 (96 MW)
GEN-2010-003	100.80	WERE	Tap Lacygne - Wolf Creek (Anderson County) 345kV	On Schedule for 2015
GEN-2010-005	300.00	WERE	Viola 345kV	On-Line at 170MW
GEN-2010-006	205.00	SPS	Jones 230kV	On-Line
GEN-2010-009	165.60	SUNCMKEC	Buckner 345kV	On-Line
GEN-2010-011	29.70	OKGE	Tatonga 345kV	On Line
GEN-2010-014	358.80	SPS	Hitchland 345kV	On Schedule for 2016
GEN-2010-015	200.10	SUNCMKEC	Spearville 345kV	On Schedule for 2015
GEN-2010-020	20.00	SPS	Roswell 69kV	On Suspension
GEN-2010-036	4.60	WERE	6th Street 115kV	On-Line
GEN-2010-040	300.00	OKGE	Cimarron 345kV	On-Line
GEN-2010-041	10.50	OPPD	S 1399 161kV	IA Pending
GEN-2010-045	197.80	SUNCMKEC	Buckner 345kV	IA Pending
GEN-2010-046	56.00	SPS	TUCO Interchange 230kV	On Schedule for 2016
GEN-2010-048	70.00	MIDW	Tap Beach Station - Redline 115kV	IA Pending
GEN-2010-051	200.00	NPPD	Tap Twin Church - Hoskins 230kV	On Schedule for 2014
GEN-2010-055	4.50	AEPW	Wekiwa 138kV	On-Line
GEN-2010-056	151.20	MIPU	Tap Saint Joseph - Cooper 345kV	On Suspension
GEN-2010-057	201.00	MIDW	Rice County 230kV	On-Line
GEN-2010-058	20.00	SPS	Chaves County 115kV	On Suspension
GEN-2010-061	180.00	SUNCMKEC	Tap Post Rock - Spearville (GEN-2011-017T) 345kV	Facility Study
GEN-2011-007	250.10	OKGE	Tap Cimarron - Woodring (Mathewson) 345kV	On Schedule for 2014
GEN-2011-008	600.00	SUNCMKEC	Clark County 345kV	IA Pending
GEN-2011-010	100.80	OKGE	Minco 345kV	On-Line
GEN-2011-011	50.00	KACP	Iatan 345kV	On-Line
GEN-2011-014	201.00	OKGE	Tap Hitchland - Woodward Dbl Ckt (Beaver County) 345kV	IA Pending
GEN-2011-016	200.10	SUNCMKEC	Spearville 345kV	IA Pending
GEN-2011-017	299.00	SUNCMKEC	Tap Spearville - PostRock (GEN-2011-017T) 345kV	IA Pending
GEN-2011-018	73.60	NPPD	Steele City 115kV	On Schedule for 2013
GEN-2011-019	299.00	OKGE	Woodward 345kV	IA Pending
GEN-2011-020	299.00	OKGE	Woodward 345kV	IA Pending
GEN-2011-021	299.00	OKGE	Tap Hitchland - Woodward Dbl Ckt (Beaver County) 345kV	IA Pending
GEN-2011-022	299.00	SPS	Hitchland 345kV	IA Pending
GEN-2011-025	82.30	SPS	Tap Floyd County - Crosby County 115kV	On Suspension
GEN-2011-027	120.00	NPPD	Tap Twin Church - Hoskins 230kV (GEN-2010-51 Tap)	IA Pending
GEN-2011-037	7.00	WFEC	Blue Canyon 5 138kV	On-Line
GEN-2011-040	111.00	OKGE	Tap Ratliff - Pooleville 138kV	On Schedule for 2014
GEN-2011-045	205.00	SPS	Jones 230kV	On-Line
GEN-2011-046	27.00	SPS	Lopez 115kV	On Schedule for 2013
GEN-2011-048	175.00	SPS	Mustang 230kV	On Schedule for 2014
GEN-2011-049	250.00	OKGE	Border 345kV	IA Pending
GEN-2011-050	109.80	AEPW	Rush Springs Natural Gas Tap 138kV	On Suspension
GEN-2011-051	104.40	OKGE	Tap Woodward - Tatonga 345kV	IA Pending
GEN-2011-054	300.00	OKGE	Cimarron 345kV	On Schedule for 2013 (200 MW) and 2014 (99 MW)
GEN-2011-055	52.80	OPPD	South Sterling 69kV	Facility Study

Request	Amount	Area	Requested/Proposed Point of Interconnection	Status or In-Service Date
GEN-2011-056	3.60	NPPD	Jeffrey 115kV	On-Line
GEN-2011-056A	3.60	NPPD	John 1 115kV	On-Line
GEN-2011-056B	4.50	NPPD	John 2 115kV	On-Line
GEN-2011-057	150.40	WERE	Creswell 138kV	On Schedule for 2014
Gray County Wind (Montezuma)	110.00	SUNCMKEC	Gray County Tap 115kV	On-Line
Llano Estacado (White Deer)	80.00	SPS	Llano Wind 115kV	On-Line
NPPD Distributed (Broken Bow)	8.30	NPPD	Broken Bow 115kV	On-Line
NPPD Distributed (Burt County Wind)	12.00	NPPD	Tekamah & Oakland 115kV	On-Line
NPPD Distributed (Burwell)	3.00	NPPD	Ord 115kV	On-Line
NPPD Distributed (Columbus Hydro)	45.00	NPPD	Columbus 115kV	On-Line
NPPD Distributed (Ord)	11.90	NPPD	Ord 115kV	On-Line
NPPD Distributed (Stuart)	2.10	NPPD	Ainsworth 115kV	On-Line
SPS Distributed (Dumas 19th St)	20.00	SPS	Dumas 19th Street 115kV	On-Line
SPS Distributed (Etter)	20.00	SPS	Etter 115kV	On-Line
SPS Distributed (Hopi)	10.00	SPS	Hopi 115kV	On-Line
SPS Distributed (Jal)	10.00	SPS	S Jal 115kV	On-Line
SPS Distributed (Lea Road)	10.00	SPS	Lea Road 115kV	On-Line
SPS Distributed (Monument)	10.00	SPS	Monument 115kV	On-Line
SPS Distributed (Moore E)	25.00	SPS	Moore East 115kV	On-Line
SPS Distributed (Ocotillo)	10.00	SPS	S_Jal 115kV	On-Line
SPS Distributed (Sherman)	20.00	SPS	Sherman 115kV	On-Line
SPS Distributed (Spearman)	10.00	SPS	Spearman 69kV	On-Line
SPS Distributed (TC-Texas County)	20.00	SPS	Texas County 115kV	On-Line
Total:	**22,894.4**			

C: Study Groupings

See next page

C. Study Groups

GROUP 1: WOODWARD AREA			
Request	**Capacity**	**Area**	**Proposed Point of Interconnection**
GEN-2001-014	96.00	WFEC	Ft Supply 138kV
GEN-2001-037	100.00	OKGE	FPL Moreland Tap 138kV
GEN-2005-008	120.00	OKGE	Woodward 138kV
GEN-2006-024S	19.80	WFEC	Buffalo Bear Tap 69kV
GEN-2006-046	131.00	OKGE	Dewey 138kV
GEN-2007-021	201.00	OKGE	Tatonga 345kV
GEN-2007-043	200.00	OKGE	Minco 345kV
GEN-2007-044	300.00	OKGE	Tatonga 345kV
GEN-2007-050	170.00	OKGE	Woodward EHV 138kV
GEN-2007-062	765.00	OKGE	Woodward EHV 345kV
GEN-2008-003	101.00	OKGE	Woodward EHV 138kV
GEN-2008-019	300.00	OKGE	Tatonga 345kV
GEN-2008-029	250.50	OKGE	Woodward EHV 138kV
GEN-2008-044	197.80	OKGE	Tatonga 345kV
GEN-2010-011	29.70	OKGE	Tatonga 345kV
GEN-2010-040	300.00	OKGE	Cimarron 345kV
GEN-2011-007	250.10	OKGE	Tap Cimarron - Woodring (Mathewson) 345kV
GEN-2011-010	100.80	OKGE	Minco 345kV
GEN-2011-019	299.00	OKGE	Woodward 345kV
GEN-2011-020	299.00	OKGE	Woodward 345kV
GEN-2011-051	104.40	OKGE	Tap Woodward - Tatonga 345kV
GEN-2011-054	300.00	OKGE	Cimarron 345kV
PRIOR QUEUED SUBTOTAL	**4,635.10**		
AREA TOTAL	**4,635.10**		

GROUP 2: HITCHLAND AREA			
Request	**Capacity**	**Area**	**Proposed Point of Interconnection**
ASGI-2011-002	20.00	SPS	Herring 115kV
GEN-2002-008	240.00	SPS	Hitchland 345kV
GEN-2002-009	80.00	SPS	Hansford 115kV
GEN-2003-020	160.00	SPS	Martin 115kV
GEN-2006-020S	18.90	SPS	DWS Frisco 115kV
GEN-2006-044	370.00	SPS	Hitchland 345kV
GEN-2007-046	199.50	SPS	Hitchland 115kV
GEN-2008-047	300.00	OKGE	Tap Hitchland - Woodward Dbl Ckt (Beaver County) 345kV
GEN-2010-001	300.00	OKGE	Tap Hitchland - Woodward Dbl Ckt (Beaver County) 345kV
GEN-2010-014	358.80	SPS	Hitchland 345kV
GEN-2011-014	201.00	OKGE	Tap Hitchland - Woodward Dbl Ckt (Beaver County) 345kV
GEN-2011-021	299.00	OKGE	Tap Hitchland - Woodward Dbl Ckt (Beaver County) 345kV
GEN-2011-022	299.00	SPS	Hitchland 345kV
SPS Distributed (Dumas 19th St)	20.00	SPS	Dumas 19th Street 115kV
SPS Distributed (Etter)	20.00	SPS	Etter 115kV
SPS Distributed (Moore E)	25.00	SPS	Moore East 115kV
SPS Distributed (Sherman)	20.00	SPS	Sherman 115kV
SPS Distributed (Spearman)	10.00	SPS	Spearman 69kV
SPS Distributed (TC-Texas County)	20.00	SPS	Texas County 115kV
PRIOR QUEUED SUBTOTAL	**2,961.20**		
AREA TOTAL	**2,961.20**		

GROUP 3: SPEARVILLE AREA			
Request	**Capacity**	**Area**	**Proposed Point of Interconnection**
GEN-2001-039A	105.00	SUNCMKEC	Tap Greensburg - Ft Dodge (Shooting Star Tap) 115kV
GEN-2002-025A	150.00	SUNCMKEC	Spearville 230kV
GEN-2004-014	154.50	SUNCMKEC	Spearville 230kV
GEN-2005-012	250.00	SUNCMKEC	Ironwood 345kV
GEN-2006-006	205.50	SUNCMKEC	Spearville 345kV
GEN-2006-021	101.00	SUNCMKEC	Flat Ridge Tap 138kV
GEN-2007-038	200.00	SUNCMKEC	Spearville 345kV
GEN-2007-040	200.00	SUNCMKEC	Buckner 345kV
GEN-2008-018	250.00	SPS	Finney 345kV
GEN-2008-079	99.20	SUNCMKEC	Tap Cudahy - Ft Dodge 115kV
GEN-2008-124	200.10	SUNCMKEC	Ironwood 345kV
GEN-2010-009	165.60	SUNCMKEC	Buckner 345kV
GEN-2010-015	200.10	SUNCMKEC	Spearville 345kV
GEN-2010-045	197.80	SUNCMKEC	Buckner 345kV
GEN-2010-061	180.00	SUNCMKEC	Tap Post Rock - Spearville (GEN-2011-017T) 345kV
GEN-2011-008	600.00	SUNCMKEC	Clark County 345kV
GEN-2011-016	200.10	SUNCMKEC	Spearville 345kV
GEN-2011-017	299.00	SUNCMKEC	Tap Spearville - PostRock (GEN-2011-017T) 345kV
Gray County Wind (Montezuma)	110.00	SUNCMKEC	Gray County Tap 115kV
PRIOR QUEUED SUBTOTAL	**3,867.90**		
ASGI-2012-006	22.50	SUNCMKEC	Tap Hugoton - Rolla 69kV
GEN-2012-007	120.00	SUNCMKEC	Rubart 115kV
GEN-2012-011	200.00	SUNCMKEC	Tap Spearville - Post Rock 345kV (North of GEN-2011-017 Tap)
CURRENT CLUSTER SUBTOTAL	**342.50**		
AREA TOTAL	**4,210.40**		

GROUP 4/11: NW KANSAS AREA

Request	Capacity	Area	Proposed Point of Interconnection
GEN-2001-039M	100.00	SUNCMKEC	Central Plains Tap 115kV
GEN-2003-006A	200.00	SUNCMKEC	Elm Creek 230kV
GEN-2003-019	250.00	MIDW	Smoky Hills Tap 230kV
GEN-2006-031	75.00	MIDW	Knoll 115kV
GEN-2006-040	108.00	SUNCMKEC	Mingo 115kV
GEN-2007-011	135.00	SUNCMKEC	Syracuse 115kV
GEN-2008-017	300.00	SUNCMKEC	Setab 345kV
GEN-2008-092	201.00	MIDW	Post Rock 230kV
GEN-2009-008	199.50	MIDW	South Hays 230kV
GEN-2009-020	48.60	MIDW	Tap Nekoma - Bazine (Walnut Creek) 69kV
GEN-2010-048	70.00	MIDW	Tap Beach Station - Redline 115kV
GEN-2010-057	201.00	MIDW	Rice County 230kV
PRIOR QUEUED SUBTOTAL	**1,888.10**		
AREA TOTAL	**1,888.10**		

GROUP 5: AMARILLO AREA

Request	Capacity	Area	Proposed Point of Interconnection
GEN-2002-022	240.00	SPS	Bushland 230kV
GEN-2006-047	240.00	SPS	Tap Bushland - Deaf Smith (Buffalo) 230kV
GEN-2007-048	400.00	SPS	Tap Amarillo S - Swisher 230kV
GEN-2008-051	322.00	SPS	Potter County 345kV
GEN-2008-088	50.60	SPS	Vega 69kV
Llano Estacado (White Deer)	80.00	SPS	Llano Wind 115kV
PRIOR QUEUED SUBTOTAL	**1,332.60**		
AREA TOTAL	**1,332.60**		

GROUP 6: S-TX PANHANDLE/W-TX AREA			
Request	**Capacity**	**Area**	**Proposed Point of Interconnection**
ASGI-2010-010	42.20	SPS	Lovington 115kV
ASGI-2010-020	30.00	SPS	Tap LE-Tatum - LE-Crossroads 69kV
ASGI-2010-021	15.00	SPS	Tap LE-Saunders Tap - LE-Anderson 69kV
ASGI-2011-001	28.80	SPS	Lovington 115kV
ASGI-2011-003	10.00	SPS	Hendricks 115kV
ASGI-2011-004	20.00	SPS	Pleasant Hill 69kV
GEN-2001-033	180.00	SPS	San Juan Tap 230kV
GEN-2001-036	80.00	SPS	Norton 115kV
GEN-2006-018	170.00	SPS	TUCO Interchange 230kV
GEN-2006-026	604.00	SPS	Hobbs 230kV & Hobbs 115kV
GEN-2008-008	60.00	SPS	Graham 69kV
GEN-2008-022	300.00	SPS	Tap Eddy Co - Tolk (Chaves County) 345kV
GEN-2010-006	205.00	SPS	Jones 230kV
GEN-2010-020	20.00	SPS	Roswell 69kV
GEN-2010-046	56.00	SPS	TUCO Interchange 230kV
GEN-2010-058	20.00	SPS	Chaves County 115kV
GEN-2011-025	82.30	SPS	Tap Floyd County - Crosby County 115kV
GEN-2011-045	205.00	SPS	Jones 230kV
GEN-2011-046	27.00	SPS	Lopez 115kV
GEN-2011-048	175.00	SPS	Mustang 230kV
SPS Distributed (Hopi)	10.00	SPS	Hopi 115kV
SPS Distributed (Jal)	10.00	SPS	S Jal 115kV
SPS Distributed (Lea Road)	10.00	SPS	Lea Road 115kV
SPS Distributed (Monument)	10.00	SPS	Monument 115kV
SPS Distributed (Ocotillo)	10.00	SPS	S_Jal 115kV
PRIOR QUEUED SUBTOTAL	**2,380.30**		
GEN-2012-001	61.20	SPS	Tap Grassland - Borden County 230kV
GEN-2012-009	15.00	SPS	Mustang 230kV
GEN-2012-010	15.00	SPS	Mustang 230kV
CURRENT CLUSTER SUBTOTAL	**91.20**		
AREA TOTAL	**2,471.50**		

GROUP 7: SW-OKLAHOMA AREA			
Request	**Capacity**	**Area**	**Proposed Point of Interconnection**
GEN-2001-026	74.00	WFEC	Washita 138kV
GEN-2002-005	120.00	WFEC	Red Hills Tap 138kV
GEN-2003-004	100.00	WFEC	Washita 138kV
GEN-2003-005	100.00	WFEC	Anadarko - Paradise (Blue Canyon) 138kV
GEN-2003-022	120.00	AEPW	Washita 138kV
GEN-2004-020	27.00	AEPW	Washita 34.5kV
GEN-2004-023	20.60	WFEC	Washita 138kV
GEN-2005-003	30.60	WFEC	Washita 138kV
GEN-2006-002	101.00	AEPW	Sweetwater 230kV
GEN-2006-035	225.00	AEPW	Sweetwater 230kV
GEN-2006-043	99.00	AEPW	Sweetwater 230kV
GEN-2007-032	150.00	WFEC	Tap Clinton Junction - Clinton 138kV
GEN-2007-052	150.00	WFEC	Anadarko 138kV
GEN-2008-023	150.00	AEPW	Hobart Junction 138kV
GEN-2008-037	101.00	WFEC	Tap Washita - Blue Canyon Wind 138kV
GEN-2011-037	7.00	WFEC	Blue Canyon 5 138kV
GEN-2011-049	250.00	OKGE	Border 345kV
PRIOR QUEUED SUBTOTAL	**1,825.20**		
AREA TOTAL	**1,825.20**		

GROUP 8: N-OK/S-KS AREA			
Request	**Capacity**	**Area**	**Proposed Point of Interconnection**
ASGI-2010-006	150.00	AECI	Tap Fairfax (AECI) - Shilder (AEPW) 138kV
GEN-2002-004	200.00	WERE	Latham 345kV
GEN-2005-013	201.00	WERE	Tap Latham - Neosho (Caney River) 345kV
GEN-2007-025	300.00	WERE	Viola 345kV
GEN-2008-013	300.00	OKGE	Tap Wichita - Woodring (Hunter) 345kV
GEN-2008-021	42.00	WERE	Wolf Creek 345kV
GEN-2008-098	100.80	WERE	Tap Lacygne - Wolf Creek (Anderson County) 345kV
GEN-2009-025	60.00	OKGE	Nardins 69kV
GEN-2010-003	100.80	WERE	Tap Lacygne - Wolf Creek (Anderson County) 345kV
GEN-2010-005	300.00	WERE	Viola 345kV
GEN-2010-055	4.50	AEPW	Wekiwa 138kV
GEN-2011-057	150.40	WERE	Creswell 138kV
PRIOR QUEUED SUBTOTAL	**1,909.50**		
AREA TOTAL	**1,909.50**		

GROUP 9/10: NEBRASKA AREA			
Request	**Capacity**	**Area**	**Proposed Point of Interconnection**
GEN-2002-023N	0.80	NPPD	Harmony 115kV
GEN-2003-021N	75.00	NPPD	Ainsworth Wind Tap 115kV
GEN-2004-005N	30.00	NPPD	St Francis 115kV
GEN-2004-023N	75.00	NPPD	Columbus Co 115kV
GEN-2006-020N	42.00	NPPD	Bloomfield 115kV
GEN-2006-037N1	75.00	NPPD	Broken Bow 115kV
GEN-2006-038N005	80.00	NPPD	Broken Bow 115kV
GEN-2006-038N019	80.00	NPPD	Petersburg North 115kV
GEN-2006-044N	40.50	NPPD	North Petersburg 115kV
GEN-2007-011N08	81.00	NPPD	Bloomfield 115kV
GEN-2008-086N02	200.00	NPPD	Tap Ft Randle - Columbus (Madison County) 230kV
GEN-2008-119O	60.00	OPPD	S1399 161kV
GEN-2008-123N	89.70	NPPD	Tap Guide Rock - Pauline (Rosemont) 115kV
GEN-2009-040	108.00	WERE	Marshall 115kV
GEN-2010-041	10.50	OPPD	S 1399 161kV
GEN-2010-051	200.00	NPPD	Tap Twin Church - Hoskins 230kV
GEN-2011-018	73.60	NPPD	Steele City 115kV
GEN-2011-027	120.00	NPPD	Tap Twin Church - Hoskins 230kV (GEN-2010-51 Tap)
GEN-2011-055	52.80	OPPD	South Sterling 69kV
GEN-2011-056	3.60	NPPD	Jeffrey 115kV
GEN-2011-056A	3.60	NPPD	John 1 115kV
GEN-2011-056B	4.50	NPPD	John 2 115kV
NPPD Distributed (Broken Bow)	8.30	NPPD	Broken Bow 115kV
NPPD Distributed (Burt County Wind)	12.00	NPPD	Tekamah & Oakland 115kV
NPPD Distributed (Burwell)	3.00	NPPD	Ord 115kV
NPPD Distributed (Columbus Hydro)	45.00	NPPD	Columbus 115kV
NPPD Distributed (Ord)	11.90	NPPD	Ord 115kV
NPPD Distributed (Stuart)	2.10	NPPD	Ainsworth 115kV
PRIOR QUEUED SUBTOTAL	**1,587.90**		
AREA TOTAL	**1,587.90**		

GROUP 12: NW-AR AREA			
Request	**Capacity**	**Area**	**Proposed Point of Interconnection**
AREA TOTAL	**0.00**		

GROUP 13: NW MISSOURI AREA			
Request	**Capacity**	**Area**	**Proposed Point of Interconnection**
GEN-2008-129	80.00	MIPU	Pleasant Hill 161kV
GEN-2010-036	4.60	WERE	6th Street 115kV
GEN-2010-056	151.20	MIPU	Tap Saint Joseph - Cooper 345kV
GEN-2011-011	50.00	KACP	Iatan 345kV
PRIOR QUEUED SUBTOTAL	**285.80**		
AREA TOTAL	**285.80**		

GROUP 14: S-OKLAHOMA AREA			
Request	**Capacity**	**Area**	**Proposed Point of Interconnection**
GEN-2011-040	111.00	OKGE	Tap Ratliff - Pooleville 138kV
GEN-2011-050	109.80	AEPW	Rush Springs Natural Gas Tap 138kV
PRIOR QUEUED SUBTOTAL	**220.80**		
GEN-2012-004	41.40	OKGE	Tap Ratliff - Pooleville (Carter County) 138kV
CURRENT CLUSTER SUBTOTAL	**41.40**		
AREA TOTAL	**262.20**		

CLUSTER TOTAL (CURRENT STUDY)	**475.1**	**MW**
PQ TOTAL (PRIOR QUEUED)	**22,894.4**	**MW**
CLUSTER TOTAL (INCLUDING PRIOR QUEUED)	**23,369.5**	**MW**

D: Proposed Point of Interconnection One line Diagrams

ASGI-2012-006

*****Facility Study one-line by Interconnecting Transmission Owner****

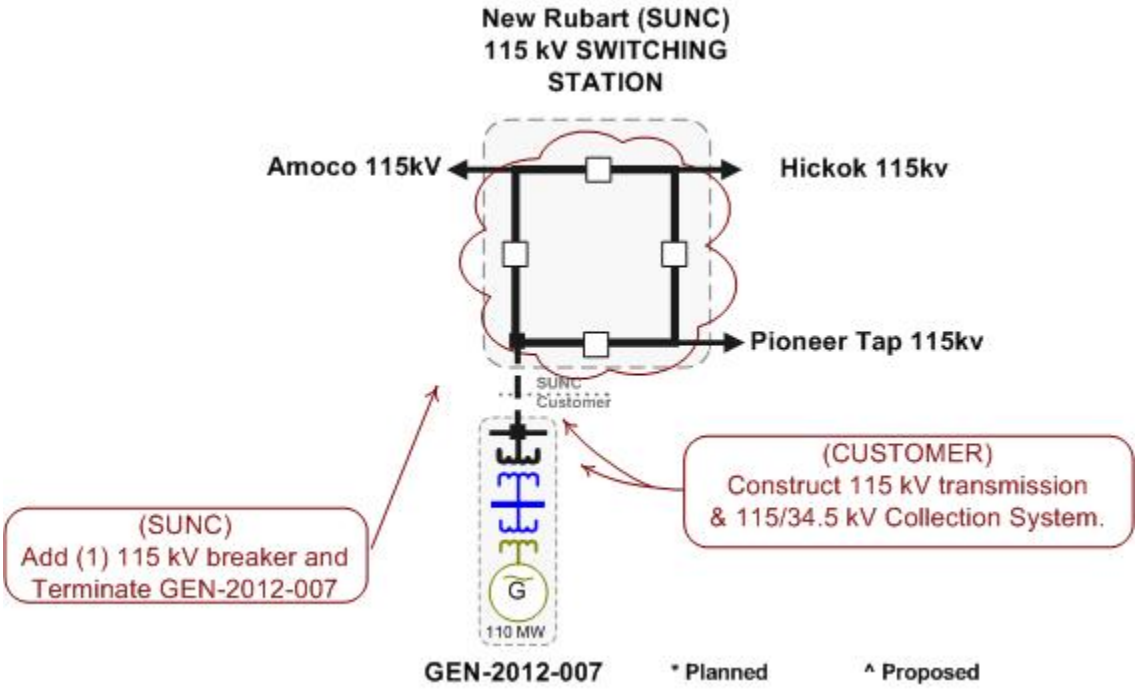
GEN-2012-001

*****Please refer to the Facility Study for an updated one-line*****

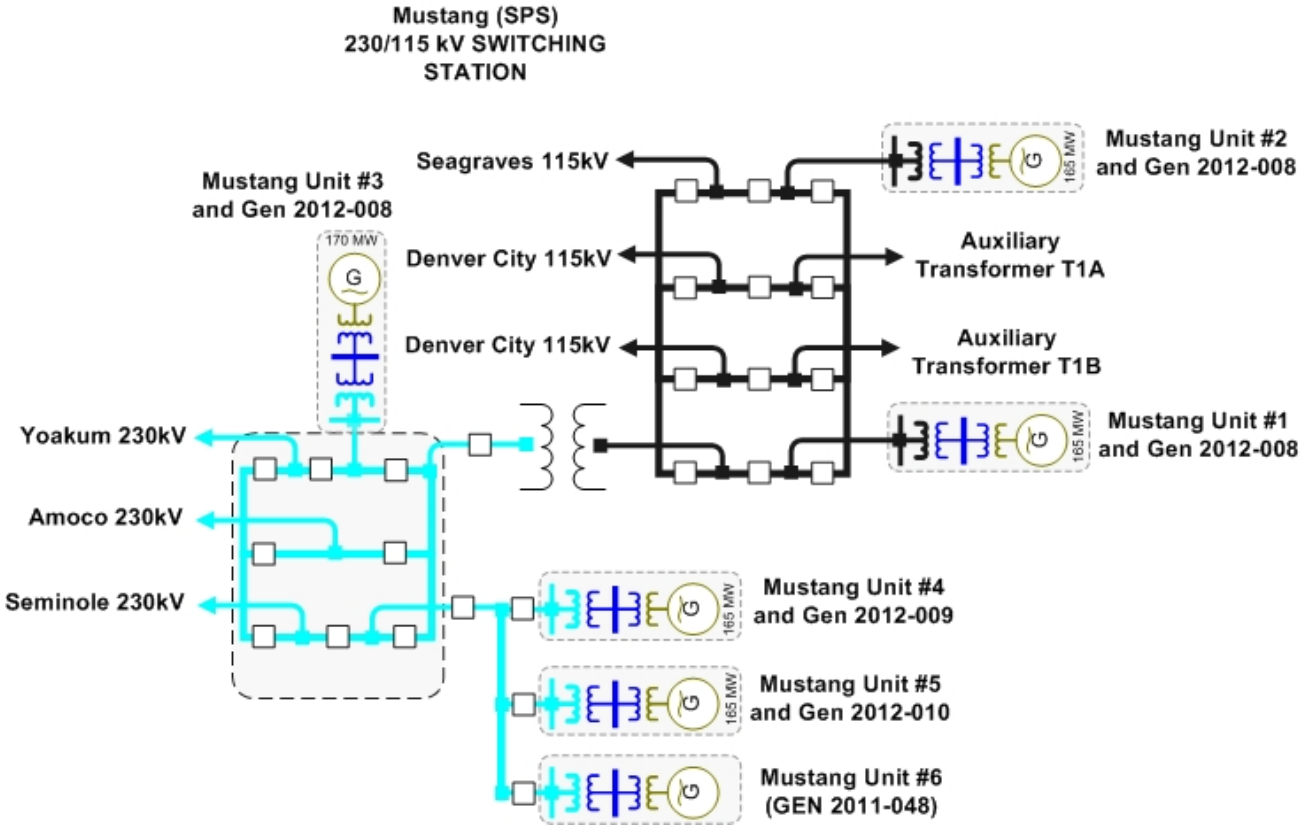
GEN-2012-004

*****Please refer to the Facility Study for an updated one-line*****

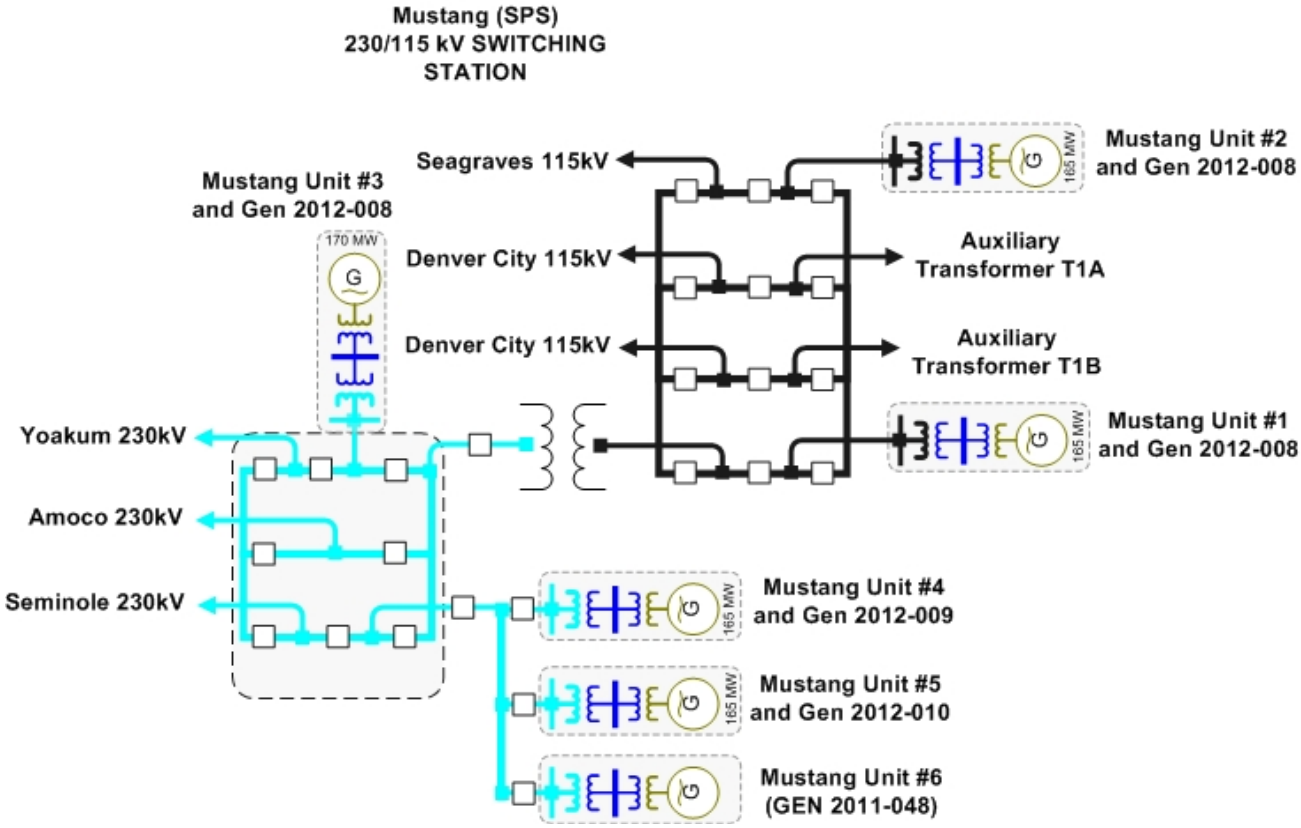
GEN-2012-007



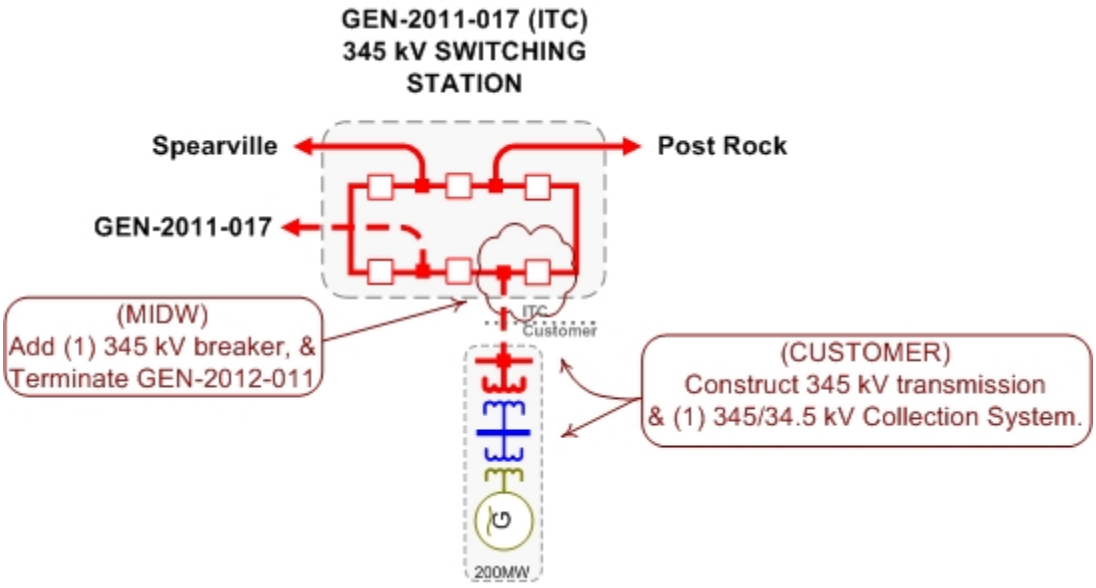
GEN-2012-009



GEN-2012-010



GEN-2012-011


GEN-2011-017 (ITC)
345 kV SWITCHING
STATION
Spearville
Post Rock
GEN-2011-017
(MIDW)
Add (1) 345 kV breaker, &
Terminate GEN-2012-011
ITC
Customer
(CUSTOMER)
Construct 345 kV transmission
& (1) 345/34.5 kV Collection System.
200MW

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
ASGI-2012-006			
ASGI 2012-006 Interconnection Costs See Oneline Diagram	Current Study	$100,000.00	$100,000.00
Dobson - Gano 115kV CKT 1 Replace terminal equipment	Current Study	$3,658.57	$82,481.09
Garden City - Kansas Ave Water Treatment Plant 115kV CKT1 Replace terminal equipment	Current Study	$4,972.34	$112,722.18
Beaver County - Buckner 345kV Build approximately 90 miles of 345kV from Beaver County - Gray County @ 3000 amps	Previously Allocated		$170,209,050.00
Beaver County - Woodward 345kV Dbl CKT Priority Project: Hitchland - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		$226,040,727.00
Beaver County 345kV Expansion Beaver County Expansion: Tap & Tie in Hitchland - Woodward 345kV CKT 2	Previously Allocated		$3,500,000.00
Clark - Thistle 345KV Dbl CKT Priority Project: Spearville - Clark - Thistle Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		$426,504,292.00
Fort Dodge - North Fort Dodge 115kV CKT 2 Construct approximately 1 mile of new 115kV for 2nd circuit	Previously Allocated		$6,113,000.00
GEN-2011-017 Tap - Mullergren 345kV CKT 1 Build approximately 55 miles of new 345kV and add new terminal at GEN-2011-017 Tap 345kV	Previously Allocated		$67,000,000.00
Hitchland - Beaver County 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
Matthewson - Cimarron 345kV CKT 2 Build second 345kV circuit from Matthewson - Cimarron @ 3000 amps	Previously Allocated		$42,903,753.00
Mullergren 345/230/13kV Transformer CKT 1 Build new 345/230/13kV transformer at Mullergren	Previously Allocated		$8,000,000.00
Mullergren 345/230kV Substation Build new 345/230kV substation for terminating GEN-2011-017 Tap - Mullergren 345kV line, Mullergren 345/230/13kV transformer, and Mullergren - Great Bend 230kV	Previously Allocated		$25,000,000.00

* 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		$426,504,292.00
Tatonga - Matthewson 345kV CKT 2 Build second 345kV circuit from Tatonga - Matthewson @ 3000 amps	Previously Allocated		$104,260,473.00
Thistle - Wichita 345KV Dbl CKT Priority Project: Thistle - Wichita Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		$426,504,292.00
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		$249,247,072.00
	Current Study Total	$108,630.91	

GEN-2012-001

GEN-2012-001 Interconnection Costs See Oneline Diagram.	Current Study	$7,316,677.00	$7,316,677.00
Beaver County - Woodward 345kV Dbl CKT Priority Project: Hitchland - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		$226,040,727.00
Beaver County 345kV Expansion Beaver County Expansion: Tap & Tie in Hitchland - Woodward 345kV CKT 2	Previously Allocated		$3,500,000.00
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
Hitchland - Beaver County 345kV Dbl CKT Priority Project: Hitchland - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		$226,040,727.00
Power System Stabilizers (PSS) Install Power System Stabilizers @ Tolk(Units: 1,2) and Jones (Units: 1,2,3,4)	Previously Allocated		$300,000.00
Thistle - Flat Ridge 138kV CKT 1 Priority Project: Thistle - Flat Ridge 138kV CKT 1 (Total Project E&C Cost Shown.)	Previously Allocated		$5,776,280.00
Thistle - Wichita 345KV Dbl CKT Priority Project: Thistle - Wichita Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		$426,504,292.00
Thistle - Woodward 345KV Dbl CKT Priority Project: Thistle - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		$207,782,000.00
Thistle 345/138KV Transformer CKT 1 Priority Project: Thistle 345/138kV Transformer CKT 1 (Total Project E&C Cost Shown.)	Previously Allocated		$6,585,986.00

* 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
TUCO Interchange 345/230/13.2KV Autotransformer CKT 2 Balanced Portfolio: TUCO 345/230 kV Transformer CKT 2 (Total Project E&C Cost Shown)	Previously Allocated		$14,900,907.00
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		$249,247,072.00
	Current Study Total	$7,316,677.00	
GEN-2012-004			
GEN-2012-004 Interconnection Costs See Oneline Diagram.	Current Study	$0.00	$0.00
	Current Study Total	$0.00	
GEN-2012-007			
Dobson - Gano 115kV CKT 1 Replace terminal equipment	Current Study	$78,822.52	$82,481.09
Garden City - Kansas Ave Water Treatment Plant 115kV CKT1 Replace terminal equipment	Current Study	$107,749.84	$112,722.18
GEN-2012-007 Interconnection Costs See Oneline Diagram.	Current Study	$12,299,954.00	$12,299,954.00
Beaver County - Buckner 345kV Build approximately 90 miles of 345kV from Beaver County - Gray County @ 3000 amps	Previously Allocated		$170,209,050.00
Beaver County - Woodward 345kV Dbl CKT Priority Project: Hitchland - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		$226,040,727.00
Beaver County 345kV Expansion Beaver County Expansion: Tap & Tie in Hitchland - Woodward 345kV CKT 2	Previously Allocated		$3,500,000.00
Clark - Thistle 345KV Dbl CKT Priority Project: Spearville - Clark - Thistle Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		$426,504,292.00
Cleveland - Sooner 345KV CKT 1 Balanced Portfolio: Cleveland - Sooner 345kV CKT 1 (Total Project E&C Cost Shown).	Previously Allocated		$58,692,000.00
Fort Dodge - North Fort Dodge 115kV CKT 2 Construct approximately 1 mile of new 115kV for 2nd circuit	Previously Allocated		$6,113,000.00
GEN-2011-017 Tap - Mullergren 345kV CKT 1 Build approximately 55 miles of new 345kV and add new terminal at GEN-2011-017 Tap 345kV	Previously Allocated		$67,000,000.00
Hitchland - Beaver County 345kV Dbl CKT Priority Project: Hitchland - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		$226,040,727.00

* 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
Hitchland - Woodward 345kV CKT 2 Priority Project: Hitchland - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		$215,877,433.00
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
Matthewson - Cimarron 345kV CKT 2 Build second 345kV circuit from Matthewson - Cimarron @ 3000 amps	Previously Allocated		$42,903,753.00
Mullergren 345/230/13kV Transformer CKT 1 Build new 345/230/13kV transformer at Mullergren	Previously Allocated		$8,000,000.00
Mullergren 345/230kV Substation Build new 345/230kV substation for terminating GEN-2011-017 Tap - Mullergren 345kV line, Mullergren 345/230/13kV transformer, and Mullergren - Great Bend 230kV	Previously Allocated		$25,000,000.00
North Fort Dodge - Spearville 115kV DIS-2009-001-1 upgrade.	Previously Allocated		$9,660,000.00
Spearville - Clark 345KV Dbl CKT Priority Project: Spearville - Clark - Thistle Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		$426,504,292.00
Tatonga - Matthewson 345kV CKT 2 Build second 345kV circuit from Tatonga - Matthewson @ 3000 amps	Previously Allocated		$104,260,473.00
Thistle - Wichita 345KV Dbl CKT Priority Project: Thistle - Wichita Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		$426,504,292.00
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		$249,247,072.00
	Current Study Total	$12,486,526.36	

GEN-2012-009

GEN-2012-009 Interconnection Costs See Oneline Diagram.	Current Study	$0.00	$0.00
Mustang - Yoakum 230kV CKT 1 Replace line traps at both terminals	Current Study	$100,000.00	$200,000.00
Beaver County - Woodward 345kV Dbl CKT Priority Project: Hitchland - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		$226,040,727.00
Beaver County 345kV Expansion Beaver County Expansion: Tap & Tie in Hitchland - Woodward 345kV CKT 2	Previously Allocated		$3,500,000.00
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
Hitchland - Beaver County 345kV Dbl CKT Priority Project: Hitchland - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		$226,040,727.00
Nichols - Harrington Mid 230kV CKT 1 Per GEN-2008-051 LOIS: Rebuild approximately 1 mile of 230kV @ 1825 amps	Previously Allocated		$869,251.00
Nichols - Harrington West 230kV CKT 1 Per GEN-2008-051 LOIS: Rebuild approximately 1 mile of 230kV @ 1825 amps	Previously Allocated		$869,251.00
Power System Stabilizers (PSS) Install Power System Stabilizers @ Tolk(Units: 1,2) and Jones (Units: 1,2,3,4)	Previously Allocated		$300,000.00
Thistle - Flat Ridge 138kV CKT 1 Priority Project: Thistle - Flat Ridge 138kV CKT 1 (Total Project E&C Cost Shown.)	Previously Allocated		$5,776,280.00
Thistle - Wichita 345KV Dbl CKT Priority Project: Thistle - Wichita Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		$426,504,292.00
Thistle - Woodward 345KV Dbl CKT Priority Project: Thistle - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		$207,782,000.00
Thistle 345/138KV Transformer CKT 1 Priority Project: Thistle 345/138kV Transformer CKT 1 (Total Project E&C Cost Shown.)	Previously Allocated		$6,585,986.00
TUCO Interchange 345/230/13.2KV Autotransformer CKT 2 Balanced Portfolio: TUCO 345/230 kV Transformer CKT 2 (Total Project E&C Cost Shown)	Previously Allocated		$14,900,907.00
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		$249,247,072.00
	Current Study Total	$100,000.00	
GEN-2012-010			
GEN-2012-010 Interconnection Costs See Oneline Diagram.	Current Study	$0.00	$0.00
Mustang - Yoakum 230kV CKT 1 Replace line traps at both terminals	Current Study	$100,000.00	$200,000.00
Beaver County - Woodward 345kV Dbl CKT Priority Project: Hitchland - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		$226,040,727.00
Beaver County 345kV Expansion Beaver County Expansion: Tap & Tie in Hitchland - Woodward 345kV CKT 2	Previously Allocated		$3,500,000.00

* 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 - 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
Hitchland - Beaver County 345kV Dbl CKT Priority Project: Hitchland - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		$226,040,727.00
Nichols - Harrington Mid 230kV CKT 1 Per GEN-2008-051 LOIS: Rebuild approximately 1 mile of 230kV @ 1825 amps	Previously Allocated		$869,251.00
Nichols - Harrington West 230kV CKT 1 Per GEN-2008-051 LOIS: Rebuild approximately 1 mile of 230kV @ 1825 amps	Previously Allocated		$869,251.00
Power System Stabilizers (PSS) Install Power System Stabilizers @ Tolk(Units: 1,2) and Jones (Units: 1,2,3,4)	Previously Allocated		$300,000.00
Thistle - Flat Ridge 138kV CKT 1 Priority Project: Thistle - Flat Ridge 138kV CKT 1 (Total Project E&C Cost Shown.)	Previously Allocated		$5,776,280.00
Thistle - Wichita 345KV Dbl CKT Priority Project: Thistle - Wichita Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		$426,504,292.00
Thistle - Woodward 345KV Dbl CKT Priority Project: Thistle - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		$207,782,000.00
Thistle 345/138KV Transformer CKT 1 Priority Project: Thistle 345/138kV Transformer CKT 1 (Total Project E&C Cost Shown.)	Previously Allocated		$6,585,986.00
TUCO Interchange 345/230/13.2KV Autotransformer CKT 2 Balanced Portfolio: TUCO 345/230 kV Transformer CKT 2 (Total Project E&C Cost Shown)	Previously Allocated		$14,900,907.00
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		$249,247,072.00
	Current Study Total	$100,000.00	

GEN-2012-011

GEN-2012-011 Interconnection Costs See Oneline Diagram.	Current Study	$10,000,000.00	$10,000,000.00
Beaver County - Buckner 345kV Build approximately 90 miles of 345kV from Beaver County - Gray County @ 3000 amps	Previously Allocated		$170,209,050.00
Beaver County - Woodward 345kV Dbl CKT Priority Project: Hitchland - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		$226,040,727.00

* 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
Beaver County 345kV Expansion Beaver County Expansion: Tap & Tie in Hitchland - Woodward 345kV CKT 2	Previously Allocated		$3,500,000.00
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		$426,504,292.00
GEN-2011-017 Tap - Mullergren 345kV CKT 1 Build approximately 55 miles of new 345kV and add new terminal at GEN-2011-017 Tap 345kV	Previously Allocated		$67,000,000.00
Hitchland - Beaver County 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
Matthewson - Cimarron 345kV CKT 2 Build second 345kV circuit from Matthewson - Cimarron @ 3000 amps	Previously Allocated		$42,903,753.00
Mullergren 345/230/13kV Transformer CKT 1 Build new 345/230/13kV transformer at Mullergren	Previously Allocated		$8,000,000.00
Mullergren 345/230kV Substation Build new 345/230kV substation for terminating GEN-2011-017 Tap - Mullergren 345kV line, Mullergren 345/230/13kV transformer, and Mullergren - Great Bend 230kV	Previously Allocated		$25,000,000.00
Spearville - Clark 345KV Dbl CKT Priority Project: Spearville - Clark - Thistle Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		$426,504,292.00
Tatonga - Matthewson 345kV CKT 2 Build second 345kV circuit from Tatonga - Matthewson @ 3000 amps	Previously Allocated		$104,260,473.00
Thistle - Wichita 345KV Dbl CKT Priority Project: Thistle - Wichita Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		$426,504,292.00
Thistle - Woodward 345KV Dbl CKT Priority Project: Thistle - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		$207,782,000.00
TUCO Interchange 345/230/13.2KV Autotransformer CKT 2 Balanced Portfolio: TUCO 345/230 kV Transformer CKT 2 (Total Project E&C Cost Shown)	Previously Allocated		$14,900,907.00
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		$249,247,072.00
	Current Study Total	$10,000,000.00	

* 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
TOTAL CURRENT STUDY COSTS:		**$30,111,834.27**	

* 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

ASGI 2012-006 Interconnection Costs			**$100,000.00**
See Oneline Diagram			
	ASGI-2012-006	$100,000.00	
	Total Allocated Costs	**$100,000.00**	
Dobson - Gano 115kV CKT 1			**$82,481.09**
Replace terminal equipment			
	ASGI-2012-006	$3,658.57	
	GEN-2012-007	$78,822.52	
	Total Allocated Costs	**$82,481.09**	
Garden City - Kansas Ave Water Treatment Plant 115kV CKT1			**$112,722.18**
Replace terminal equipment			
	ASGI-2012-006	$4,972.34	
	GEN-2012-007	$107,749.84	
	Total Allocated Costs	**$112,722.18**	
GEN-2012-001 Interconnection Costs			**$7,316,677.00**
See Oneline Diagram.			
	GEN-2012-001	$7,316,677.00	
	Total Allocated Costs	**$7,316,677.00**	
GEN-2012-004 Interconnection Costs			**$0.00**
See Oneline Diagram.			
	GEN-2012-004	$0.00	
	Total Allocated Costs	**$0.00**	
GEN-2012-007 Interconnection Costs			**$12,299,954.00**
See Oneline Diagram.			
	GEN-2012-007	$12,299,954.00	
	Total Allocated Costs	**$12,299,954.00**	
GEN-2012-009 Interconnection Costs			**$0.00**
See Oneline Diagram.			
	GEN-2012-009	$0.00	
	Total Allocated Costs	**$0.00**	

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

GEN-2012-010 Interconnection Costs			**$0.00**
See Oneline Diagram.			
	GEN-2012-010	$0.00	
	Total Allocated Costs	**$0.00**	
GEN-2012-011 Interconnection Costs			**$10,000,000.00**
See Oneline Diagram.			
	GEN-2012-011	$10,000,000.00	
	Total Allocated Costs	**$10,000,000.00**	
Mustang - Yoakum 230kV CKT 1			**$200,000.00**
Replace line traps at both terminals			
	GEN-2012-009	$100,000.00	
	GEN-2012-010	$100,000.00	
	Total Allocated Costs	**$200,000.00**	

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

G: Power Flow Analysis (Constraints For Mitigation)

See next page.

SOLUTION	GROUP	SCENARIO	SEASON	SOURCE	DIRECTION	MONITORED ELEMENT	RATEB (MVA)	TDF	TC%LOADING (% MVA)	CONTINGENCY
FDNS	0	0	19SP	ASGI_12_006	FROM->TO	DOBSON - GANO 3 115.00 115KV CKT 1	148.2	0.36915	101.3103	HOLCOMB (HOLCOMB) 345/115/13.8KV TRANSFORMER CKT 1
FDNS	0	0	19SP	G12_007	FROM->TO	DOBSON - GANO 3 115.00 115KV CKT 1	148.2	0.42032	101.3103	HOLCOMB (HOLCOMB) 345/115/13.8KV TRANSFORMER CKT 1
FDNS	0	0	24SP	G12_007	FROM->TO	GARDEN CITY - KANSAS AVENUE WATER TREATMENT PLANT 115KV CKT 1	119.5	0.21662	116.6179	HOLCOMB (HOLCOMB) 345/115/13.8KV TRANSFORMER CKT 1
FDNS	0	0	19SP	G12_007	FROM->TO	GARDEN CITY - KANSAS AVENUE WATER TREATMENT PLANT 115KV CKT 1	119.5	0.21636	121.9964	HOLCOMB (HOLCOMB) 345/115/13.8KV TRANSFORMER CKT 1
FDNS	03NR	0	14G	G12_007	FROM->TO	DOBSON - GANO 3 115.00 115KV CKT 1	148.2	0.11589	118.0312	HOLCOMB (HOLCOMB) 345/115/13.8KV TRANSFORMER CKT 1
FDNS	00NR	0	19SP	G12_007	FROM->TO	DOBSON - GANO 3 115.00 115KV CKT 1	148.2	0.05552	101.7045	HOLCOMB (HOLCOMB) 345/115/13.8KV TRANSFORMER CKT 1
FDNS	03NR	0	14G	G12_007	FROM->TO	GARDEN CITY - KANSAS AVENUE WATER TREATMENT PLANT 115KV CKT 1	119.5	0.03234	107.5977	HOLCOMB (HOLCOMB) 345/115/13.8KV TRANSFORMER CKT 1
FDNS	00G12_009	0	14SP	G12_009	FROM->TO	MUSTANG STATION - YOAKUM COUNTY INTERCHANGE 230KV CKT 1	351	0.67723	99.8	AMOCO WASSON SWITCHING STATION - MUSTANG STATION 230KV CKT 1
FDNS	00G12_009	0	19SP	G12_009	FROM->TO	MUSTANG STATION - YOAKUM COUNTY INTERCHANGE 230KV CKT 1	351	0.67641	103.0699	AMOCO WASSON SWITCHING STATION - MUSTANG STATION 230KV CKT 1
FDNS	00G12_010	0	14SP	G12_010	FROM->TO	MUSTANG STATION - YOAKUM COUNTY INTERCHANGE 230KV CKT 1	351	0.67723	99.8	AMOCO WASSON SWITCHING STATION - MUSTANG STATION 230KV CKT 1
FDNS	00G12_010	0	19SP	G12_010	FROM->TO	MUSTANG STATION - YOAKUM COUNTY INTERCHANGE 230KV CKT 1	351	0.67641	103.0699	AMOCO WASSON SWITCHING STATION - MUSTANG STATION 230KV CKT 1

H: Power Flow Analysis (Other Constraints Not Requiring Mitigation)

See next page.

SOLUTION	GROUP	SCENARIO	SEASON	SOURCE	DIRECTION	MONITORED ELEMENT	RATEB (MVA)	TDF	TC%LOADING (% MVA)	CONTINGENCY
FDNS	0	0	19SP	ASGI_12_006	FROM->TO	GARDEN CITY - KANSAS AVENUE WATER TREATMENT PLANT 115KV CKT 1	119.5	0.18987	121.9964	HOLCOMB (HOLCOMB) 345/115/13.8KV TRANSFORMER CKT 1
FDNS	0	0	24SP	ASGI_12_006	FROM->TO	GARDEN CITY - KANSAS AVENUE WATER TREATMENT PLANT 115KV CKT 1	119.5	0.19013	116.6179	HOLCOMB (HOLCOMB) 345/115/13.8KV TRANSFORMER CKT 1
FNSL-Blown up	03ALL	0	14G	G12_001		Non-converged Contingency	0	0.14657	-	DBL-WICH-THI
FNSL-Blown up	03ALL	0	14G	G12_001		Non-converged Contingency	0	0.13121	-	DBL-TGA-MATT
FNSL-Blown up	03ALL	0	14G	G12_001		Non-converged Contingency	0	0.09644	-	DBL-BVR-WWRD
FNSL-Blown up	06ALL	0	14G	G12_001		Non-converged Contingency	0	0.1326	-	DBL-TGA-MATT
FDNS	00G12_001	0	24SP	G12_001	TO->FROM	ALLEN SUB - LUBBOCK SOUTH INTERCHANGE 115KV CKT 1	160	0.14975	100.1786	LUBBOCK SOUTH INTERCHANGE - WOLFFORTH INTERCHANGE 230KV
FDNS	00G12_001	0	14SP	G12_001	TO->FROM	BAILEY COUNTY REC-EARTH INTERCHANGE - PLANT X STATION 115KV CKT 1	160	0.04388	105.1945	DEAF SMITH COUNTY INTERCHANGE - PLANT X STATION 230KV CKT 1
FDNS	0	0	14SP	G12_001	TO->FROM	BAILEY COUNTY REC-EARTH INTERCHANGE - PLANT X STATION 115KV CKT 1	160	0.04389	103.4154	DEAF SMITH COUNTY INTERCHANGE - PLANT X STATION 230KV CKT 1
FDNS	3	0	14G	G12_001	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.03643	139.8191	DBL-WICH-THI
FDNS	3	0	14G	G12_001	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.04298	165.2322	DBL-TGA-MATT
FDNS	3	0	14G	G12_001	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.04298	146.8398	G11_051T 345.00 - TATONGA7 345.00 345KV CKT 1
FDNS	3	0	14G	G12_001	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.04298	145.1847	G11_051T 345.00 - WOODWARD DISTRICT EHV 345KV CKT 1
FDNS	3	0	14G	G12_001	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.03553	140.6024	DBL-WICH-THI
FDNS	03ALL	0	14G	G12_001	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.03007	118.8703	GRAPEVINE INTERCHANGE - NICHOLS STATION 230KV CKT 1
FDNS	03ALL	0	14G	G12_001	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.04089	115.0528	SPP-AEPW-32
FDNS	03ALL	0	14G	G12_001	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.03467	113.6509	STATELINE INTERCHANGE - STLN-DEMARC6 230KV CKT 1
FDNS	03ALL	0	14G	G12_001	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.03467	113.6405	SPP-SWPS-02
FDNS	03ALL	0	14G	G12_001	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.03467	113.6347	STLN-DEMARC6 - SWEETWATER 230KV CKT 1
FDNS	03ALL	0	14G	G12_001	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.04022	113.1517	SPP-SWPS-01
FDNS	03ALL	0	14G	G12_001	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.04089	112.9543	OKLAUNION - TUCO INTERCHANGE 345KV CKT 1
FDNS	06G12_001	0	14G	G12_001	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.04307	102.117	DBL-TGA-MATT
FDNS	6	0	14G	G12_001	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.04308	101.687	DBL-TGA-MATT
FDNS	3	0	14G	G12_001	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.04114	100.1731	LAWTON EASTSIDE - OKLAUNION 345KV CKT 1
FDNS	3	0	14G	G12_001	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.03492	100	ELK CITY 230KV - SWEETWATER 230KV CKT 1
FDNS	3	0	14G	G12_001	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.03492	99.9	ELK CITY 230KV (ELKCTY-6) 230/138/13.8KV TRANSFORMER CKT 1
FDNS	00G12_001	0	14SP	G12_001	FROM->TO	GRASSLAND INTERCHANGE (PENN 0105951) 230/115/13.2KV TRANSFORMER CKT	100	0.10894	104.6185	LUBBOCK SOUTH INTERCHANGE (ABB LLM60043) 230/115/13.2KV
FDNS	00G12_001	0	14SP	G12_001	FROM->TO	GRASSLAND INTERCHANGE (PENN 0105951) 230/115/13.2KV TRANSFORMER CKT	100	0.10894	101.8737	LUBBOCK SOUTH INTERCHANGE (ABB LLM60043) 230/115/13.2KV
FDNS	00G12_001	0	14SP	G12_001	FROM->TO	LUBBOCK SOUTH INTERCHANGE (ABB LLM60043) 230/115/13.2KV	252	0.07301	113.3658	JONES STATION - LUBBOCK EAST INTERCHANGE 230KV CKT 1
FDNS	0	0	14SP	G12_001	FROM->TO	LUBBOCK SOUTH INTERCHANGE (ABB LLM60043) 230/115/13.2KV	252	0.07302	111.8404	JONES STATION - LUBBOCK EAST INTERCHANGE 230KV CKT 1
FDNS	00G12_001	0	14SP	G12_001	FROM->TO	LUBBOCK SOUTH INTERCHANGE (ABB LLM60043) 230/115/13.2KV	252	0.07301	107.8371	JONES STATION - LUBBOCK EAST INTERCHANGE 230KV CKT 1
FDNS	0	0	14SP	G12_001	FROM->TO	LUBBOCK SOUTH INTERCHANGE (ABB LLM60043) 230/115/13.2KV	252	0.07302	106.3827	JONES STATION - LUBBOCK EAST INTERCHANGE 230KV CKT 1
FDNS	00G12_001	0	14SP	G12_001	FROM->TO	LUBBOCK SOUTH INTERCHANGE (ABB LLM60043) 230/115/13.2KV	252	0.07796	103.3027	LUBBOCK EAST INTERCHANGE (ENRCO 136162) 230/115/13.2KV
FDNS	0	0	14SP	G12_001	FROM->TO	LUBBOCK SOUTH INTERCHANGE (ABB LLM60043) 230/115/13.2KV	252	0.07797	101.6543	LUBBOCK EAST INTERCHANGE (ENRCO 136162) 230/115/13.2KV
FDNS	03ALL	0	14G	G12_001	FROM->TO	MULGREN7 345.00 (MULLERGRENT1) 345/230/13.8KV TRANSFORMER CKT 1	600	0.03642	100.9988	G12-011T 345.00 - POST ROCK 345KV CKT 1
FDNS	03ALL	0	14G	G12_001	FROM->TO	MULGREN7 345.00 (MULLERGRENT1) 345/230/13.8KV TRANSFORMER CKT 1	600	0.03642	100.7008	G12-011T 345.00 - POST ROCK 345KV CKT 1
FDNS	03ALL	0	14G	G12_001	TO->FROM	MULLERGREN - SPEARVILLE 230KV CKT 1	318.7	0.03457	113.3455	G11-17T 345.00 - SPEARVILLE 345KV CKT 1
FDNS	06ALL	0	14G	G12_004	FROM->TO	LAWEASOKLUNI	425	0.08365	106.4	BASE CASE
FDNS	03NR	0	14G	G12_007	TO->FROM	5 HICKOCK - RUBART 3 115.00 115KV CKT 1	119.5	1	98.6	RUBART 3 115.00 - SANT T 3 115KV CKT 1
FDNS	03NR	0	14G	G12_007	FROM->TO	RUBART 3 115.00 - SANT T 3 115KV CKT 1	119.5	1	98.7	5 HICKOCK - RUBART 3 115.00 115KV CKT 1
FDNS	0	0	14SP	G12_009	TO->FROM	BAILEY COUNTY REC-EARTH INTERCHANGE - PLANT X STATION 115KV CKT 1	160	0.05715	103.4154	DEAF SMITH COUNTY INTERCHANGE - PLANT X STATION 230KV CKT 1
FDNS	00G12_009	0	14SP	G12_009	TO->FROM	BAILEY COUNTY REC-EARTH INTERCHANGE - PLANT X STATION 115KV CKT 1	160	0.05718	103.3283	DEAF SMITH COUNTY INTERCHANGE - PLANT X STATION 230KV CKT 1
FDNS	0	0	14SP	G12_009	FROM->TO	LUBBOCK SOUTH INTERCHANGE (ABB LLM60043) 230/115/13.2KV	252	0.03084	101.6543	LUBBOCK EAST INTERCHANGE (ENRCO 136162) 230/115/13.2KV
FDNS	00G12_009	0	14SP	G12_009	FROM->TO	LUBBOCK SOUTH INTERCHANGE (ABB LLM60043) 230/115/13.2KV	252	0.03088	101.35	LUBBOCK EAST INTERCHANGE (ENRCO 136162) 230/115/13.2KV
FDNS	00G12_009	0	24SP	G12_009	TO->FROM	PCA INTERCHANGE - REDDY 3115.00 115KV CKT 1	160	0.03921	101.2464	CUNNINGHAM STATION - POTASH JUNCTION INTERCHANGE 230KV
FDNS	0	0	24SP	G12_009	TO->FROM	PCA INTERCHANGE - REDDY 3115.00 115KV CKT 1	160	0.03922	100.2039	CUNNINGHAM STATION - POTASH JUNCTION INTERCHANGE 230KV
FDNS	0	0	24SP	G12_009	FROM->TO	YOAKUM COUNTY INTERCHANGE (PENN C010585) 230/115/13.2KV	150	0.0593	102.8553	YOAKUM COUNTY INTERCHANGE (GE M100899) 230/115/13.2KV
FDNS	00G12_009	0	24SP	G12_009	FROM->TO	YOAKUM COUNTY INTERCHANGE (PENN C010585) 230/115/13.2KV	150	0.0593	102.4358	YOAKUM COUNTY INTERCHANGE (GE M100899) 230/115/13.2KV
FDNS	0	0	24SP	G12_009	FROM->TO	YOAKUM COUNTY INTERCHANGE (PENN C010585) 230/115/13.2KV	150	0.0593	100	YOAKUM COUNTY INTERCHANGE (GE M100899) 230/115/13.2KV
FDNS	00G12_009	0	24SP	G12_009	FROM->TO	YOAKUM COUNTY INTERCHANGE (PENN C010585) 230/115/13.2KV	150	0.0593	99.6	YOAKUM COUNTY INTERCHANGE (GE M100899) 230/115/13.2KV
FDNS	0	0	14SP	G12_010	TO->FROM	BAILEY COUNTY REC-EARTH INTERCHANGE - PLANT X STATION 115KV CKT 1	160	0.05715	103.4154	DEAF SMITH COUNTY INTERCHANGE - PLANT X STATION 230KV CKT 1
FDNS	00G12_010	0	14SP	G12_010	TO->FROM	BAILEY COUNTY REC-EARTH INTERCHANGE - PLANT X STATION 115KV CKT 1	160	0.05718	103.3283	DEAF SMITH COUNTY INTERCHANGE - PLANT X STATION 230KV CKT 1
FDNS	0	0	14SP	G12_010	FROM->TO	LUBBOCK SOUTH INTERCHANGE (ABB LLM60043) 230/115/13.2KV	252	0.03084	101.6543	LUBBOCK EAST INTERCHANGE (ENRCO 136162) 230/115/13.2KV
FDNS	00G12_010	0	14SP	G12_010	FROM->TO	LUBBOCK SOUTH INTERCHANGE (ABB LLM60043) 230/115/13.2KV	252	0.03088	101.35	LUBBOCK EAST INTERCHANGE (ENRCO 136162) 230/115/13.2KV
FDNS	00G12_010	0	24SP	G12_010	TO->FROM	PCA INTERCHANGE - REDDY 3115.00 115KV CKT 1	160	0.03921	101.2464	CUNNINGHAM STATION - POTASH JUNCTION INTERCHANGE 230KV
FDNS	0	0	24SP	G12_010	TO->FROM	PCA INTERCHANGE - REDDY 3115.00 115KV CKT 1	160	0.03922	100.2039	CUNNINGHAM STATION - POTASH JUNCTION INTERCHANGE 230KV
FDNS	0	0	24SP	G12_010	FROM->TO	YOAKUM COUNTY INTERCHANGE (PENN C010585) 230/115/13.2KV	150	0.0593	102.8553	YOAKUM COUNTY INTERCHANGE (GE M100899) 230/115/13.2KV
FDNS	00G12_010	0	24SP	G12_010	FROM->TO	YOAKUM COUNTY INTERCHANGE (PENN C010585) 230/115/13.2KV	150	0.0593	102.4358	YOAKUM COUNTY INTERCHANGE (GE M100899) 230/115/13.2KV
FDNS	0	0	24SP	G12_010	FROM->TO	YOAKUM COUNTY INTERCHANGE (PENN C010585) 230/115/13.2KV	150	0.0593	100	YOAKUM COUNTY INTERCHANGE (GE M100899) 230/115/13.2KV
FDNS	00G12_010	0	24SP	G12_010	FROM->TO	YOAKUM COUNTY INTERCHANGE (PENN C010585) 230/115/13.2KV	150	0.0593	99.6	YOAKUM COUNTY INTERCHANGE (GE M100899) 230/115/13.2KV
FNSL-Blown up	03ALL	0	14G	G12_011		Non-converged Contingency	0	0.27141	-	DBL-IRON-CLR
FNSL-Blown up	03ALL	0	14G	G12_011		Non-converged Contingency	0	0.27141	-	DBL-THIS-CLR
FNSL-Blown up	03ALL	0	14G	G12_011		Non-converged Contingency	0	0.16112	-	DBL-WICH-THI
FNSL-Blown up	03ALL	0	14G	G12_011		Non-converged Contingency	0	0.11251	-	DBL-TGA-MATT

SOLUTION	GROUP	SCENARIO	SEASON	SOURCE	DIRECTION	MONITORED ELEMENT	RATEB (MVA)	TDF	TC%LOADING (% MVA)	CONTINGENCY
FNSL-Blown up	03ALL	0	14G	G12_011		Non-converged Contingency	0	0.07881	-	DBL-BVR-WWRD
FNSL-Blown up	03G12_011	0	14G	G12_011		Non-converged Contingency	0	0.11357	-	DBL-TGA-MATT
FNSL-Blown up	06ALL	0	14G	G12_011		Non-converged Contingency	0	0.1139	-	DBL-TGA-MATT
FDNS	03G12_011	0	14G	G12_011	TO->FROM	BUCKNER7 345.00 - SPEARVILLE 345KV CKT 1	611.9	0.34059	137.0911	DBL-THIS-CLR
FDNS	3	0	14G	G12_011	TO->FROM	BUCKNER7 345.00 - SPEARVILLE 345KV CKT 1	611.9	0.3404	124.1216	DBL-THIS-CLR
FDNS	03ALL	0	14G	G12_011	TO->FROM	CHISHOLM - MAIZEE 4 138.00 138KV CKT 1	287	0.04061	104.168	BENTON - WICHITA 345KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.12173	164.3538	DBL-THIS-CLR
FDNS	3	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.12184	155.2916	DBL-THIS-CLR
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.10243	146.0007	DBL-WICH-THI
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.10661	145.9406	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.12093	143.4115	DBL-SPRVL-CL
FDNS	3	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.10254	139.8191	DBL-WICH-THI
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.09142	139.4051	CLARKCOUNTY7345.00 - THISTLE7 345.00 345KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.09142	139.4051	CLARKCOUNTY7345.00 - THISTLE7 345.00 345KV CKT 2
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.10546	138.3315	AXTELL - POST ROCK 345KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.10661	138.2114	KNOLL 230 - SMOKYHL6 230.00 230KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.12173	138.1379	DBL-IRON-CLR
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08737	134.8328	THISTLE7 345.00 - WICHITA 345KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08737	134.8328	THISTLE7 345.00 - WICHITA 345KV CKT 2
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08877	132.2772	BEAVER CO 345.00 - BUCKNER7 345.00 345KV CKT 1
FDNS	3	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.12184	131.5455	DBL-IRON-CLR
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.10027	131.0346	G12-011T 345.00 - POST ROCK 345KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08642	130.5163	ST JOHN - ST_JOHN 115KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.09617	130.4795	KNOLL 230 - POSTROCK6 230.00 230KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08864	129.693	SPP-MKEC-06
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08863	129.6557	SEWARD - ST JOHN 115KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.06099	128.2415	G11-17T 345.00 - G12-011T 345.00 345KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08339	127.8449	MINGO - RED WILLOW 345KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08642	127.7232	HUNTSVILLE - ST_JOHN 115KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	127.6079	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08642	127.4932	MIDW-CATB05
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08642	127.2078	HUNTSVILLE - HUTCHINSON ENERGY CENTER 115KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	127.0157	GEN532652 1-JEFFREY ENERGY CENTER UNIT 2
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	127.0151	GEN532653 1-JEFFREY ENERGY CENTER UNIT 3
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08536	126.9995	SPP-SWPS-05
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08536	126.8712	FINNEY SWITCHING STATION - Hitchland Interchange 345KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.09687	126.8092	BUCKNER7 345.00 - SPEARVILLE 345KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	126.7493	GEN532651 1-JEFFREY ENERGY CENTER UNIT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08699	126.6966	CLARKCOUNTY7345.00 - IRONWOOD7 345.00 345KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.0846	126.5685	GRAND ISLAND - SWEETWATER 345KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08628	126.5537	AXTELL - PAULINE 345KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08699	126.5217	CLARKCOUNTY7345.00 - SPEARVILLE 345KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08561	126.4339	GREAT BEND TAP - SEWARD 115KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08561	126.4222	GREAT BEND TAP - MULLERGREN 115KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08568	125.7538	MOORE - PAULINE 345KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08383	125.6056	SPP-MKEC-02
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08328	125.4618	SPEARVILLE (SPEARVL) 345/230/13.8KV TRANSFORMER CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08383	125.4303	ELLSWTP3 115.00 - MULLERGREN 115KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08375	125.3035	BEAVER CO 345.00 - WOODWARD DISTRICT EHV 345KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08375	125.3035	BEAVER CO 345.00 - WOODWARD DISTRICT EHV 345KV CKT 2
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08268	125.1305	MINGO - SETAB 345KV CKT 1
FNSL	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08433	125.1211	SPP-MKEC-08
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.06874	124.7488	MULLERGREN - SOUTH HAYS 230KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08383	124.7049	ELLSWTP3 115.00 - RUSSELL 115KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08327	124.4794	SPP-MKEC-09B
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08327	124.346	GREENSBURG - SSTARTP3 115.00 115KV CKT 1
FNSL	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08465	124.3348	ELM CREEK - NORTHWEST MANHATTAN 230KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	124.3192	GEN542962 2-IATAN UNIT #2
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	124.2702	GEN530690 1-PRWINDG1 0.6900
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08327	124.1364	GREENSBURG - SUN CITY 115KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	124.109	GEN542955 1-LACYGNE UNIT #1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	124.1052	GEN542956 2-LACYGNE UNIT #2
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08341	124.06	MATHWSN7 345.00 - TATONGA7 345.00 345KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08341	124.06	MATHWSN7 345.00 - TATONGA7 345.00 345KV CKT 2

SOLUTION	GROUP	SCENARIO	SEASON	SOURCE	DIRECTION	MONITORED ELEMENT	RATEB (MVA)	TDF	TC%LOADING (% MVA)	CONTINGENCY
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08327	124.0306	MEDICINE LODGE - SUN CITY 115KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08298	124.0272	STEGALL TY 345/230KV TRANSFORMER CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08475	124.0247	BUCKNER7 345.00 - HOLCOMB 345KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08298	124.0234	STEGALL - STEGALL TY 345KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08298	124.0206	STEGALL - STEGALL TRANSFORMER 230KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08298	124.0176	TRF-STEGALL
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08339	123.9839	HARPER - MILAN TAP 138KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08377	123.9767	POTTER COUNTY INTERCHANGE (WAUK 90343-A) 345/230/13.2KV
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	123.9239	GEN542957 1-IATAN UNIT #1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08366	123.8962	GRAND ISLAND - MCCOOL 345KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08339	123.8872	SPP-MKEC-03A
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08339	123.8844	SPP-MKEC-05
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08383	123.8687	RUSSELL - WALDO 115KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08339	123.8132	SPP-MKEC-03B
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08339	123.8112	CLEARWATER - MILAN TAP 138KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08327	123.7937	BARBER 3 115.00 - MEDICINE LODGE 115KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	123.702	GEN532663 1-LAWRENCE ENERGY CENTER UNIT 5
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	123.6623	GEN532722 1-EVANS ENERGY CENTER UNIT 2
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08377	123.6432	Hitchland Interchange - POTTER COUNTY INTERCHANGE 345KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08339	123.6148	CLEARWATER - GILL ENERGY CENTER WEST 138KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08536	123.591	FINNEY SWITCHING STATION - HOLCOMB 345KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.07391	123.575	POSTROCK6 230.00 - SOUTH HAYS 230KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08383	123.5561	COVERT 3 115.00 - WALDO 115KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08377	123.5397	SPP-SWPS-04
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08383	123.5386	COVERT 3 115.00 - SMITH CENTER 115KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	123.5329	GEN542951 5-HAWTHORN UNIT #5
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08378	123.5295	MULLERGREN (MULGREN6) 230/115/13.8KV TRANSFORMER CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08377	123.5132	HEIZER 6 230.00 - MULLERGREN 230KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08301	123.5093	GERALD GENTLEMAN STATION - RED WILLOW 345KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08377	123.4877	HEIZER 6 230.00 (HEIZER T1) 230/115/12.5KV TRANSFORMER CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08365	123.4802	MCCOOL - MOORE 345KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08299	123.2906	NUNDRWD - WAYSIDE 230KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08344	123.2904	G10-056T 345.00 - ST JOE 345KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.10726	122.7136	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	122.119	BASE CASE
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	121.2119	GEN645012 2-NEBRASKA CITY 2
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08328	121.1356	MANNING TAP - SCOTT CITY 115KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	121.0048	GEN560235 1-G08-92 0.6900
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08187	120.9582	WR-DOUBLE17
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08339	120.9473	CIRCLE - HUTCHINSON ENERGY CENTER 115KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	120.9131	GEN526331 1-JONES GEN #1 22 KV
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08098	120.9124	VIOLA 7 345.00 - WICHITA 345KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	120.8816	GEN527902 1-HOBBS PLANT #2 (CT)
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	120.8773	GEN527161 1-MUSTANG GEN #1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	120.8773	GEN527162 1-MUSTANG GEN #2
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	120.8719	GEN527901 1-HOBBS PLANT #1 (CT)
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08095	120.8403	CIRCLE - RENO COUNTY 115KV CKT 2
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.07913	120.82	EAST MCPHERSON - SUMMIT 230KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	120.7992	GEN526334 1-JONES_4 116.500
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.07768	120.7954	POST ROCK (POSTROCK T1) 345/230/13.8KV TRANSFORMER CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08237	120.7948	LYONS - RICE_CO 115KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.07161	120.774	RENO COUNTY - WICHITA 345KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	120.7713	GEN526332 1-JONES GEN #2 21 KV
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	120.7667	GEN560140 1-G09-08 0.7000
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.12173	120.7349	DBL-SPRVL-CL
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08237	120.7321	CIRCLE - RICE 6 230.00 230KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	120.7298	GEN659111 2-LELAND OLDS UNIT2
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08151	120.7099	HUNTERS7 345.00 - WOODRING 345KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	120.6876	GEN527163 1-MUSTANG GEN #3 22 KV
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08177	120.655	BENTON - WICHITA 345KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	120.6409	GEN659103 1-ANTELOPE VALLEY UNIT1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	120.6409	GEN659107 2-ANTELOPE VALLEY UNIT2
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08037	120.6263	MORRIS COUNTY - UNIONRG6 230.00 230KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08154	120.5456	MOUNDRIDGE (MOUND10X) 138/115/13.8KV TRANSFORMER CKT 1

SOLUTION	GROUP	SCENARIO	SEASON	SOURCE	DIRECTION	MONITORED ELEMENT	RATEB (MVA)	TDF	TC%LOADING (% MVA)	CONTINGENCY
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08154	120.5379	WR-B3-9
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08263	120.5215	SPP-WR-335A
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	120.3885	EASTDC - WELSH 345KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	120.2835	GEN527903 1-HOBBS PLANT #3 (ST)
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	120.2589	GEN531459 2-S2 GENERATOR
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08037	120.1688	SUMMIT - UNIONRG6 230.00 230KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08241	120.1274	EAST MCPHERSON (EMCPHR1X) 230/115/13.8KV TRANSFORMER CKT
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	119.9741	GEN539762 1-SSWIND 1 34.500
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	119.967	GEN560522 1-G05-12-2 0.6900
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08237	119.9582	RICE 6 230.00 (RICE T1) 230/115/12.47KV TRANSFORMER CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08098	119.9192	RENFROW7 345.00 - VIOLA 7 345.00 345KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08187	119.8617	SWISSVALE - WEST GARDNER 345KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	119.8284	GEN539785 1-ENSNGW 1 0.5750
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	119.8266	GEN560696 1-G11-008-4 0.6900
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	119.7249	GEN523971 1-HARRINGTON GEN #1 24 KV
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	119.7247	GEN523972 1-HARRINGTON GEN #2 24 KV
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	119.7179	GEN523973 1-HARRINGTON GEN #3 24 KV
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08097	119.531	WR-B3-8
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08237	119.5191	MIDW-CATB06
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08097	119.4969	MOUNDRIDGE - RENO COUNTY 115KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	119.4942	GEN560267 1-G10-15-1 0.6900
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	119.4342	GEN560268 1-G10-15-2 0.6900
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	119.3259	GEN539767 1-GRAY COUNTY WIND FARM
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	119.188	GEN560695 1-G11-008-3 0.6900
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	119.022	GEN560694 1-G11-008-2 0.6900
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	118.8609	GEN525561 1-TOLK GEN #1 24 KV
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	118.7728	GEN525562 1-TOLK GEN #2 24 KV
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	118.6948	GEN640011 2-GERALD GENTLEMAN STATION UNIT 2
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	118.6429	GEN560238 1-G10-09 0.6900
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	118.6187	GEN640010 1-GERALD GENTLEMAN STATION UNIT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	118.6063	GEN539670 4-JUDSON LARGE GENERATOR
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	117.9639	GEN560693 1-G11-008-1 0.6900
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	117.9287	GEN560329 1-G10-45 0.6900
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	117.9143	GEN531503 1-CIMRRN 1 34.500
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	117.6545	GEN539807 1-G05-12 0.6900
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	117.5814	GEN539677 3-A. M. MULLERGREN GENERATOR
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	117.5745	GEN542902 1-GPW_G1 0.6900
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08196	117.4637	HOYT - STRANGER CREEK 345KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	117.388	GEN560514 1-G04_014 0.6900
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	117.3419	GEN523117 1-BUFF_DUNES210.6900
FDNS	3	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.10735	116.9225	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	116.89	GEN560659 1-G07-38 0.6900
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	116.8682	GEN560432 1-G08-124 0.6900
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	116.8461	GEN562035 1-G11_016_3 0.6900
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	116.6946	GEN560549 1-G06-06 0.6900
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	116.4526	GEN562123 1-G12_011_3 0.6900
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	116.3808	GEN560714 1-G10_061_3 0.6900
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	116.0735	GEN659118 1-LARAMIE RIVER UNIT1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.10611	115.6553	AXTELL - POST ROCK 345KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.09203	115.5377	CLARKCOUNTY7345.00 - THISTLE7 345.00 345KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.09203	115.5377	CLARKCOUNTY7345.00 - THISTLE7 345.00 345KV CKT 2
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	115.2153	GEN531447 1-HOLCOMB GENERATOR
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08196	115.104	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.10726	115.1026	KNOLL 230 - SMOKYHL6 230.00 230KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08189	114.6974	WRTOD400
FDNS	3	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.12184	113.699	DBL-SPRVL-CL
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08758	113.3162	DBL-BVR-WWRD
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08277	112.6185	GEN562032 1-G11_017_3 0.6900
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08799	112.5762	THISTLE7 345.00 - WICHITA 345KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08799	112.5762	THISTLE7 345.00 - WICHITA 345KV CKT 2
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08562	112.4119	MULLERGREN - SPEARVILLE 230KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.07687	111.1084	CIRCLE - EAST MCPHERSON 230KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08718	110.18	G11_051T 345.00 - TATONGA7 345.00 345KV CKT 1
FDNS	3	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.09211	110.0535	CLARKCOUNTY7345.00 - THISTLE7 345.00 345KV CKT 1

SOLUTION	GROUP	SCENARIO	SEASON	SOURCE	DIRECTION	MONITORED ELEMENT	RATEB (MVA)	TDF	TC%LOADING (% MVA)	CONTINGENCY
FDNS	3	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.09211	110.0535	CLARKCOUNTY7345.00 - THISTLE7 345.00 345KV CKT 2
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08718	109.966	G11_051T 345.00 - WOODWARD DISTRICT EHV 345KV CKT 1
FDNS	3	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.10619	109.8971	AXTELL - POST ROCK 345KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.09677	109.3226	KNOLL 230 - POSTROCK6 230.00 230KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.10087	109.3134	G12-011T 345.00 - POST ROCK 345KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08936	109.2898	BEAVER CO 345.00 - BUCKNER7 345.00 345KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08702	109.2846	ST JOHN - ST_JOHN 115KV CKT 1
FDNS	3	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.10735	109.2777	KNOLL 230 - SMOKYHL6 230.00 230KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08922	108.7202	SPP-MKEC-06
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08921	108.6926	SEWARD - ST JOHN 115KV CKT 1
FDNS	3	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08767	107.9972	DBL-BVR-WWRD
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08333	107.696	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1
FDNS	3	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08726	107.4144	DBL-TGA-MATT
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08333	107.4136	GEN532652 1-JEFFREY ENERGY CENTER UNIT 2
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08333	107.413	GEN532653 1-JEFFREY ENERGY CENTER UNIT 3
FDNS	3	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08808	107.3042	THISTLE7 345.00 - WICHITA 345KV CKT 1
FDNS	3	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08808	107.3042	THISTLE7 345.00 - WICHITA 345KV CKT 2
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08333	107.1352	GEN532651 1-JEFFREY ENERGY CENTER UNIT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.06159	106.8856	G11-17T 345.00 - G12-011T 345.00 345KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08702	106.5776	HUNTSVILLE - ST_JOHN 115KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.14494	106.4379	G11-17T 345.00 - SPEARVILLE 345KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08702	106.3501	MIDW-CATB05
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08758	106.0919	CLARKCOUNTY7345.00 - IRONWOOD7 345.00 345KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08702	106.0778	HUNTSVILLE - HUTCHINSON ENERGY CENTER 115KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08517	106.0192	GRAND ISLAND - SWEETWATER 345KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08618	105.9927	GREAT BEND TAP - SEWARD 115KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08686	105.9779	AXTELL - PAULINE 345KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08618	105.9699	GREAT BEND TAP - MULLERGREN 115KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08758	105.9541	CLARKCOUNTY7345.00 - SPEARVILLE 345KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08402	105.9039	MINGO - RED WILLOW 345KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08596	105.6198	SPP-SWPS-05
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08596	105.5365	FINNEY SWITCHING STATION - Hitchland Interchange 345KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.09731	105.4649	BUCKNER7 345.00 - SPEARVILLE 345KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08625	105.2661	MOORE - PAULINE 345KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08441	105.2371	SPP-MKEC-02
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08339	105.1286	LAWTON EASTSIDE - OKLAUNION 345KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08441	105.0597	ELLSWTP3 115.00 - MULLERGREN 115KV CKT 1
FDNS	3	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08726	105.0029	G11_051T 345.00 - TATONGA7 345.00 345KV CKT 1
FDNS	3	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08726	104.792	G11_051T 345.00 - WOODWARD DISTRICT EHV 345KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08433	104.7733	BEAVER CO 345.00 - WOODWARD DISTRICT EHV 345KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08433	104.7733	BEAVER CO 345.00 - WOODWARD DISTRICT EHV 345KV CKT 2
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08388	104.6617	SPEARVILLE (SPEARVL) 345/230/13.8KV TRANSFORMER CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08491	104.542	SPP-MKEC-08
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08333	104.5362	GEN530690 1-PRWINDG1 0.6900
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08333	104.5194	GEN542962 2-IATAN UNIT #2
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08441	104.3596	ELLSWTP3 115.00 - RUSSELL 115KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08333	104.306	GEN542955 1-LACYGNE UNIT #1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08333	104.277	GEN542956 2-LACYGNE UNIT #2
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08327	104.2335	MINGO - SETAB 345KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.0852	104.1925	ELM CREEK - NORTHWEST MANHATTAN 230KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08385	104.1878	SPP-MKEC-09B
FDNS	3	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.0871	104.158	ST JOHN - ST_JOHN 115KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08395	104.1203	FLATRDG3 - HARPER 138KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08333	104.1059	GEN542957 1-IATAN UNIT #1
FDNS	3	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.09684	104.0576	KNOLL 230 - POSTROCK6 230.00 230KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.06934	104.0318	MULLERGREN - SOUTH HAYS 230KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08385	104.0254	GREENSBURG - SSTARTP3 115.00 115KV CKT 1
FDNS	3	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.10095	103.9772	G12-011T 345.00 - POST ROCK 345KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08397	103.9338	MATHWSN7 345.00 - TATONGA7 345.00 345KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08397	103.9338	MATHWSN7 345.00 - TATONGA7 345.00 345KV CKT 2
FDNS	3	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08944	103.9227	BEAVER CO 345.00 - BUCKNER7 345.00 345KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.0794	103.9127	JEFFREY ENERGY CENTER - SUMMIT 345KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08333	103.8945	GEN532722 1-EVANS ENERGY CENTER UNIT 2
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08333	103.8487	GEN532663 1-LAWRENCE ENERGY CENTER UNIT 5

SOLUTION	GROUP	SCENARIO	SEASON	SOURCE	DIRECTION	MONITORED ELEMENT	RATEB (MVA)	TDF	TC%LOADING (% MVA)	CONTINGENCY
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08385	103.8363	GREENSBURG - SUN CITY 115KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08395	103.8291	HARPER - MILAN TAP 138KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08395	103.7402	SPP-MKEC-03A
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08395	103.7366	SPP-MKEC-05
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08385	103.728	MEDICINE LODGE - SUN CITY 115KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08422	103.7048	GRAND ISLAND - MCCOOL 345KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08333	103.7018	GEN542951 5-HAWTHORN UNIT #5
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08433	103.6932	POTTER COUNTY INTERCHANGE (WAUK 90343-A) 345/230/13.2KV
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08525	103.6838	BUCKNER7 345.00 - HOLCOMB 345KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08395	103.6576	SPP-MKEC-03B
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08395	103.6544	CLEARWATER - MILAN TAP 138KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08441	103.5708	RUSSELL - WALDO 115KV CKT 1
FDNS	3	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.0893	103.5417	SPP-MKEC-06
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08385	103.5138	BARBER 3 115.00 - MEDICINE LODGE 115KV CKT 1
FDNS	3	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08929	103.5123	SEWARD - ST JOHN 115KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08395	103.5011	CLEARWATER - GILL ENERGY CENTER WEST 138KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08433	103.4168	MULLERGREN (MULGREN6) 230/115/13.8KV TRANSFORMER CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08432	103.411	HEIZER 6 230.00 - MULLERGREN 230KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08432	103.388	HEIZER 6 230.00 (HEIZER T1) 230/115/12.5KV TRANSFORMER CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.084	103.3646	G10-056T 345.00 - ST JOE 345KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08333	103.3638	GEN541151 3-SIBLEY GENERATING UNIT #3
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08433	103.3587	Hitchland Interchange - POTTER COUNTY INTERCHANGE 345KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08422	103.3107	MCCOOL - MOORE 345KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.07449	103.2368	POSTROCK6 230.00 - SOUTH HAYS 230KV CKT 1
FDNS	3	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08341	102.7836	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1
FDNS	3	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08341	102.5489	GEN532652 1-JEFFREY ENERGY CENTER UNIT 2
FDNS	3	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08341	102.5483	GEN532653 1-JEFFREY ENERGY CENTER UNIT 3
FDNS	3	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08341	102.2694	GEN532651 1-JEFFREY ENERGY CENTER UNIT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08333	102.2346	BASE CASE
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08333	102.2346	NC1_GEN-NEBRASKA CITY 1
FDNS	3	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.06167	102.0286	G11-17T 345.00 - G12-011T 345.00 345KV CKT 1
FDNS	3	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.0871	101.4743	HUNTSVILLE - ST_JOHN 115KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08154	101.309	VIOLA 7 345.00 - WICHITA 345KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08333	101.2697	GEN645012 2-NEBRASKA CITY 2
FDNS	3	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.0871	101.2468	MIDW-CATB05
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08241	101.2311	WR-DOUBLE17
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08091	101.2096	MORRIS COUNTY - UNIONRG6 230.00 230KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08316	101.1837	EMPORIA ENERGY CENTER - MORRIS COUNTY 345KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.0815	101.1699	CIRCLE - RENO COUNTY 115KV CKT 2
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08363	101.1675	EASTOWN7 345.00 - IATAN 345KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08333	101.1522	GEN560173 1-G08-17 0.5750
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08333	101.1487	GEN560235 1-G08-92 0.6900
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08333	101.0922	GEN527882 1-CUNNINGHAM GEN #2 20 KV
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08333	101.0692	GEN539653 1-CIMARRON RIVER PLANT GENERATOR
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08292	101.0657	CIRCLE - RICE 6 230.00 230KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.07824	101.0465	POST ROCK (POSTROCK T1) 345/230/13.8KV TRANSFORMER CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08333	101.043	GEN527902 1-HOBBS PLANT #2 (CT)
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08333	101.0385	GEN527161 1-MUSTANG GEN #1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08333	101.0385	GEN527162 1-MUSTANG GEN #2
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08333	101.0346	GEN527901 1-HOBBS PLANT #1 (CT)
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08333	101.0322	GEN526331 1-JONES GEN #1 22 KV
FDNS	3	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08525	101.0315	GRAND ISLAND - SWEETWATER 345KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08207	101.0195	HUNTERS7 345.00 - WOODRING 345KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08232	101.012	BENTON - WICHITA 345KV CKT 1
FDNS	3	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.0871	100.974	HUNTSVILLE - HUTCHINSON ENERGY CENTER 115KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08333	100.9628	GEN526334 1-JONES_4 116.500
FDNS	3	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08626	100.9597	GREAT BEND TAP - SEWARD 115KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08292	100.95	LYONS - RICE_CO 115KV CKT 1
FDNS	3	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08766	100.9485	CLARKCOUNTY7345.00 - IRONWOOD7 345.00 345KV CKT 1
FDNS	3	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08626	100.9415	GREAT BEND TAP - MULLERGREN 115KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08333	100.9227	GEN560140 1-G09-08 0.7000
FDNS	3	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08694	100.9184	AXTELL - PAULINE 345KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08333	100.8904	GEN526332 1-JONES GEN #2 21 KV
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.06513	100.876	CIRCLE (CIRCLE1X) 230/115/13.8KV TRANSFORMER CKT 1

SOLUTION	GROUP	SCENARIO	SEASON	SOURCE	DIRECTION	MONITORED ELEMENT	RATEB (MVA)	TDF	TC%LOADING (% MVA)	CONTINGENCY
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08333	100.8606	GEN659111 2-LELAND OLDS UNIT2
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08333	100.8463	GEN527163 1-MUSTANG GEN #3 22 KV
FDNS	3	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08766	100.8119	CLARKCOUNTY7345.00 - SPEARVILLE 345KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.0821	100.8048	MOUNDRIDGE (MOUND10X) 138/115/13.8KV TRANSFORMER CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.0821	100.7818	WR-B3-9
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08333	100.7729	GEN659103 1-ANTELOPE VALLEY UNIT1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08333	100.7729	GEN659107 2-ANTELOPE VALLEY UNIT2
FDNS	3	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08411	100.7687	MINGO - RED WILLOW 345KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08091	100.7225	SUMMIT - UNIONRG6 230.00 230KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.07222	100.7041	RENO COUNTY - WICHITA 345KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08319	100.6992	SPP-WR-335A
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08333	100.608	GEN539762 1-SSWIND 1 34.500
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08333	100.6028	GEN560522 1-G05-12-2 0.6900
FDNS	3	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08604	100.5148	SPP-SWPS-05
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08333	100.5128	EASTDC - WELSH 345KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08333	100.4812	GEN560696 1-G11-008-4 0.6900
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08333	100.474	GEN539785 1-ENSNGW 1 0.5750
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08333	100.4663	GEN527903 1-HOBBS PLANT #3 (ST)
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08333	100.4626	GEN531459 2-S2 GENERATOR
FDNS	3	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08604	100.4248	FINNEY SWITCHING STATION - Hitchland Interchange 345KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08297	100.3585	EAST MCPHERSON (EMCPHR1X) 230/115/13.8KV TRANSFORMER CKT
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08154	100.3244	RENFROW7 345.00 - VIOLA 7 345.00 345KV CKT 1
FDNS	3	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08449	100.3067	SPP-MKEC-02
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08292	100.2937	RICE 6 230.00 (RICE T1) 230/115/12.47KV TRANSFORMER CKT 1
FDNS	3	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08633	100.2492	MOORE - PAULINE 345KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08333	100.2278	GEN560267 1-G10-15-1 0.6900
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08333	100.2028	GEN560268 1-G10-15-2 0.6900
FDNS	3	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08347	100.1686	LAWTON EASTSIDE - OKLAUNION 345KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08333	100.123	GEN539767 1-GRAY COUNTY WIND FARM
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08242	100.1067	SWISSVALE - WEST GARDNER 345KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08333	100	GEN560695 1-G11-008-3 0.6900
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08333	99.9	GEN523971 1-HARRINGTON GEN #1 24 KV
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08333	99.9	GEN523972 1-HARRINGTON GEN #2 24 KV
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08333	99.9	GEN560694 1-G11-008-2 0.6900
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08152	99.9	MOUNDRIDGE - RENO COUNTY 115KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08152	99.9	WR-B3-8
FDNS	3	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.09737	99.8	BUCKNER7 345.00 - SPEARVILLE 345KV CKT 1
FDNS	3	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08441	99.8	BEAVER CO 345.00 - WOODWARD DISTRICT EHV 345KV CKT 1
FDNS	3	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08441	99.8	BEAVER CO 345.00 - WOODWARD DISTRICT EHV 345KV CKT 2
FDNS	3	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08395	99.8	SPEARVILLE (SPEARVL) 345/230/13.8KV TRANSFORMER CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.07022	99.8	G11-17T 345.00 - MULGREN7 345.00 345KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08333	99.8	GEN523973 1-HARRINGTON GEN #3 24 KV
FDNS	03ALL	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.07022	99.7	MULGREN7 345.00 (MULLERGRENT1) 345/230/13.8KV
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08292	99.7	MIDW-CATB06
FDNS	3	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08341	99.6	GEN530690 1-PRWINDG1 0.6900
FDNS	3	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08341	99.6	GEN542962 2-IATAN UNIT #2
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08333	99.6	GEN560238 1-G10-09 0.6900
FDNS	3	0	14G	G12_011	TO->FROM	CIRCLE - MULLERGREN 230KV CKT 1	318.7	0.08499	99.5	SPP-MKEC-08
FDNS	03G12_011	0	14G	G12_011	FROM->TO	CLEARWATER - GILL ENERGY CENTER WEST 138KV CKT 1	191	0.03269	116.6579	DBL-WICH-THI
FDNS	3	0	14G	G12_011	FROM->TO	CLEARWATER - GILL ENERGY CENTER WEST 138KV CKT 1	191	0.03274	112.8814	DBL-WICH-THI
FDNS	03G12_011	0	14G	G12_011	TO->FROM	CLEARWATER - MILAN TAP 138KV CKT 1	110	0.03269	214.7735	DBL-WICH-THI
FDNS	3	0	14G	G12_011	TO->FROM	CLEARWATER - MILAN TAP 138KV CKT 1	110	0.03274	208.1722	DBL-WICH-THI
FDNS	06ALL	0	14G	G12_011	TO->FROM	CLEARWATER - MILAN TAP 138KV CKT 1	110	0.03304	119.7729	DBL-WICH-THI
FDNS	6	0	14G	G12_011	TO->FROM	CLEARWATER - MILAN TAP 138KV CKT 1	110	0.03314	113.3721	DBL-WICH-THI
FDNS	03G12_011	0	14G	G12_011	TO->FROM	FLATRDG3 - MEDICINE LODGE 138KV CKT 1	136.7	0.04411	116.5217	DBL-THIS-CLR
FDNS	3	0	14G	G12_011	TO->FROM	FLATRDG3 - MEDICINE LODGE 138KV CKT 1	136.7	0.04416	107.9487	DBL-THIS-CLR
FDNS	3	0	14G	G12_011	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.04175	165.2322	DBL-TGA-MATT
FDNS	03G12_011	0	14G	G12_011	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.04169	151.8831	G11_051T 345.00 - TATONGA7 345.00 345KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.04169	150.2287	G11_051T 345.00 - WOODWARD DISTRICT EHV 345KV CKT 1
FDNS	3	0	14G	G12_011	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.04175	146.8398	G11_051T 345.00 - TATONGA7 345.00 345KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.03778	146.2155	DBL-WICH-THI
FDNS	3	0	14G	G12_011	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.04175	145.1847	G11_051T 345.00 - WOODWARD DISTRICT EHV 345KV CKT 1
FDNS	3	0	14G	G12_011	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.03783	140.6024	DBL-WICH-THI
FDNS	03ALL	0	14G	G12_011	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.03069	134.4856	IODINE - WOODWARD EHV 138KV CKT 1

SOLUTION	GROUP	SCENARIO	SEASON	SOURCE	DIRECTION	MONITORED ELEMENT	RATEB (MVA)	TDF	TC%LOADING (% MVA)	CONTINGENCY
FDNS	03ALL	0	14G	G12_011	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.03069	132.7703	DEWEY - IODINE 138KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.03107	119.3729	RENFROW7 345.00 - VIOLA 7 345.00 345KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.03235	115.7981	G12-011T 345.00 - POST ROCK 345KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.03107	115.1276	VIOLA 7 345.00 - WICHITA 345KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.03089	114.1281	IODINE - WOODWARD EHV 138KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.03089	112.4162	DEWEY - IODINE 138KV CKT 1
FDNS	3	0	14G	G12_011	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.03093	110.5149	IODINE - WOODWARD EHV 138KV CKT 1
FDNS	3	0	14G	G12_011	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.03093	108.8498	DEWEY - IODINE 138KV CKT 1
FDNS	6	0	14G	G12_011	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.04186	101.687	DBL-TGA-MATT
FDNS	03G12_011	0	14G	G12_011	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.03124	100.6461	RENFROW7 345.00 - VIOLA 7 345.00 345KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	GREAT BEND TAP - MULLERGREN 115KV CKT 1	79.7	0.03053	165.8295	DBL-THIS-CLR
FDNS	3	0	14G	G12_011	TO->FROM	GREAT BEND TAP - MULLERGREN 115KV CKT 1	79.7	0.03055	157.6305	DBL-THIS-CLR
FDNS	03G12_011	0	14G	G12_011	TO->FROM	GREAT BEND TAP - MULLERGREN 115KV CKT 1	79.7	0.03053	136.2894	DBL-IRON-CLR
FDNS	03ALL	0	14G	G12_011	TO->FROM	GREAT BEND TAP - MULLERGREN 115KV CKT 1	79.7	0.0304	129.694	DBL-SPRVL-CL
FDNS	3	0	14G	G12_011	TO->FROM	GREAT BEND TAP - MULLERGREN 115KV CKT 1	79.7	0.03055	128.9195	DBL-IRON-CLR
FDNS	03G12_011	0	14G	G12_011	TO->FROM	GREAT BEND TAP - MULLERGREN 115KV CKT 1	79.7	0.03053	115.8349	DBL-SPRVL-CL
FDNS	3	0	14G	G12_011	TO->FROM	GREAT BEND TAP - MULLERGREN 115KV CKT 1	79.7	0.03055	109.1276	DBL-SPRVL-CL
FDNS	03G12_011	0	14G	G12_011	FROM->TO	GREAT BEND TAP - SEWARD 115KV CKT 1	80.3	0.03053	164.5754	DBL-THIS-CLR
FDNS	3	0	14G	G12_011	FROM->TO	GREAT BEND TAP - SEWARD 115KV CKT 1	80.3	0.03055	156.4303	DBL-THIS-CLR
FDNS	03G12_011	0	14G	G12_011	FROM->TO	GREAT BEND TAP - SEWARD 115KV CKT 1	80.3	0.03053	135.2317	DBL-IRON-CLR
FDNS	03ALL	0	14G	G12_011	FROM->TO	GREAT BEND TAP - SEWARD 115KV CKT 1	80.3	0.0304	128.6924	DBL-SPRVL-CL
FDNS	3	0	14G	G12_011	FROM->TO	GREAT BEND TAP - SEWARD 115KV CKT 1	80.3	0.03055	127.8955	DBL-IRON-CLR
FDNS	03G12_011	0	14G	G12_011	FROM->TO	GREAT BEND TAP - SEWARD 115KV CKT 1	80.3	0.03053	114.9144	DBL-SPRVL-CL
FDNS	3	0	14G	G12_011	FROM->TO	GREAT BEND TAP - SEWARD 115KV CKT 1	80.3	0.03055	108.2461	DBL-SPRVL-CL
FDNS	03G12_011	0	14G	G12_011	FROM->TO	HARPER - MILAN TAP 138KV CKT 1	110	0.03269	225.2153	DBL-WICH-THI
FDNS	3	0	14G	G12_011	FROM->TO	HARPER - MILAN TAP 138KV CKT 1	110	0.03274	218.684	DBL-WICH-THI
FDNS	06ALL	0	14G	G12_011	FROM->TO	HARPER - MILAN TAP 138KV CKT 1	110	0.03304	130.3028	DBL-WICH-THI
FDNS	6	0	14G	G12_011	FROM->TO	HARPER - MILAN TAP 138KV CKT 1	110	0.03314	123.9095	DBL-WICH-THI
FDNS	14ALL	0	14G	G12_011	FROM->TO	HARPER - MILAN TAP 138KV CKT 1	110	0.03332	109.1508	DBL-WICH-THI
FDNS	14	0	14G	G12_011	FROM->TO	HARPER - MILAN TAP 138KV CKT 1	110	0.03333	108.4529	DBL-WICH-THI
FDNS	03ALL	0	14G	G12_011	TO->FROM	HAYS PLANT - SOUTH HAYS 115KV CKT 1	99	0.06607	158.7036	KNOLL 230 - POSTROCK6 230.00 230KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	HAYS PLANT - SOUTH HAYS 115KV CKT 1	99	0.06626	140.8065	KNOLL 230 - POSTROCK6 230.00 230KV CKT 1
FDNS	3	0	14G	G12_011	TO->FROM	HAYS PLANT - SOUTH HAYS 115KV CKT 1	99	0.06626	135.9975	KNOLL 230 - POSTROCK6 230.00 230KV CKT 1
FDNS	00G12_011	0	14SP	G12_011	TO->FROM	HAYS PLANT - SOUTH HAYS 115KV CKT 1	99	0.06644	101.894	KNOLL 230 - POSTROCK6 230.00 230KV CKT 1
FDNS	03ALL	0	14G	G12_011	FROM->TO	HAYS PLANT - VINE STREET 115KV CKT 1	88	0.06607	155.4805	KNOLL 230 - POSTROCK6 230.00 230KV CKT 1
FDNS	03G12_011	0	14G	G12_011	FROM->TO	HAYS PLANT - VINE STREET 115KV CKT 1	88	0.06626	135.3013	KNOLL 230 - POSTROCK6 230.00 230KV CKT 1
FDNS	3	0	14G	G12_011	FROM->TO	HAYS PLANT - VINE STREET 115KV CKT 1	88	0.06626	129.8858	KNOLL 230 - POSTROCK6 230.00 230KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	KNOLL - N HAYS3 115.00 115KV CKT 1	88	0.06607	141.9581	KNOLL 230 - POSTROCK6 230.00 230KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	KNOLL - N HAYS3 115.00 115KV CKT 1	88	0.06626	121.6283	KNOLL 230 - POSTROCK6 230.00 230KV CKT 1
FDNS	3	0	14G	G12_011	TO->FROM	KNOLL - N HAYS3 115.00 115KV CKT 1	88	0.06626	116.2287	KNOLL 230 - POSTROCK6 230.00 230KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	KNOLL 230 - POSTROCK6 230.00 230KV CKT 1	398	0.19214	101.268	AXTELL - POST ROCK 345KV CKT 1
FDNS	03ALL	0	14G	G12_011	FROM->TO	MULLERGREN - SOUTH HAYS 230KV CKT 1	297	0.10797	117.3779	G12-011T 345.00 - POST ROCK 345KV CKT 1
FDNS	03ALL	0	14G	G12_011	TO->FROM	N HAYS3 115.00 - VINE STREET 115KV CKT 1	99	0.06607	130.9184	KNOLL 230 - POSTROCK6 230.00 230KV CKT 1
FDNS	03G12_011	0	14G	G12_011	TO->FROM	N HAYS3 115.00 - VINE STREET 115KV CKT 1	99	0.06626	112.9	KNOLL 230 - POSTROCK6 230.00 230KV CKT 1
FDNS	3	0	14G	G12_011	TO->FROM	N HAYS3 115.00 - VINE STREET 115KV CKT 1	99	0.06626	108.0917	KNOLL 230 - POSTROCK6 230.00 230KV CKT 1
FDNS	03G12_011	0	14G	G12_011	FROM->TO	SEWARD - ST JOHN 115KV CKT 1	87.6	0.03778	177.1283	DBL-THIS-CLR
FDNS	3	0	14G	G12_011	FROM->TO	SEWARD - ST JOHN 115KV CKT 1	87.6	0.03782	167.3411	DBL-THIS-CLR
FDNS	03ALL	0	14G	G12_011	FROM->TO	SEWARD - ST JOHN 115KV CKT 1	87.6	0.03209	152.2573	CIRCLE - MULLERGREN 230KV CKT 1
FDNS	03G12_011	0	14G	G12_011	FROM->TO	SEWARD - ST JOHN 115KV CKT 1	87.6	0.03778	142.2152	DBL-IRON-CLR
FDNS	03ALL	0	14G	G12_011	FROM->TO	SEWARD - ST JOHN 115KV CKT 1	87.6	0.03761	134.8313	DBL-SPRVL-CL
FDNS	3	0	14G	G12_011	FROM->TO	SEWARD - ST JOHN 115KV CKT 1	87.6	0.03782	134.0634	DBL-IRON-CLR
FDNS	03G12_011	0	14G	G12_011	FROM->TO	SEWARD - ST JOHN 115KV CKT 1	87.6	0.03224	131.5707	CIRCLE - MULLERGREN 230KV CKT 1
FDNS	3	0	14G	G12_011	FROM->TO	SEWARD - ST JOHN 115KV CKT 1	87.6	0.03227	125.2979	CIRCLE - MULLERGREN 230KV CKT 1
FDNS	03G12_011	0	14G	G12_011	FROM->TO	SEWARD - ST JOHN 115KV CKT 1	87.6	0.03778	118.5854	DBL-SPRVL-CL
FDNS	3	0	14G	G12_011	FROM->TO	SEWARD - ST JOHN 115KV CKT 1	87.6	0.03782	111.0867	DBL-SPRVL-CL
FDNS	03G12_011	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.1317	128.5642	DBL-THIS-CLR
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.14301	126.5695	AXTELL - POST ROCK 345KV CKT 1
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.12059	121.9674	CIRCLE - MULLERGREN 230KV CKT 1
FDNS	3	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.13177	121.2359	DBL-THIS-CLR
FDNS	03G12_011	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.11861	116.1379	DBL-WICH-THI
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.13114	114.7746	DBL-SPRVL-CL
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.11127	112.1753	CLARKCOUNTY7345.00 - THISTLE7 345.00 345KV CKT 1
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.11127	112.1753	CLARKCOUNTY7345.00 - THISTLE7 345.00 345KV CKT 2
FDNS	03G12_011	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.1317	111.0269	DBL-IRON-CLR

SOLUTION	GROUP	SCENARIO	SEASON	SOURCE	DIRECTION	MONITORED ELEMENT	RATEB (MVA)	TDF	TC%LOADING (% MVA)	CONTINGENCY
FDNS	3	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.11868	110.9301	DBL-WICH-THI
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.10852	108.9427	THISTLE7 345.00 - WICHITA 345KV CKT 1
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.10852	108.9427	THISTLE7 345.00 - WICHITA 345KV CKT 2
FDNS	03G12_011	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.14356	108.8517	AXTELL - POST ROCK 345KV CKT 1
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.10957	107.4035	BEAVER CO 345.00 - BUCKNER7 345.00 345KV CKT 1
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.11042	106.3622	AXTELL - PAULINE 345KV CKT 1
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.10545	106.062	GEN532652 1-JEFFREY ENERGY CENTER UNIT 2
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.10545	106.0613	GEN532653 1-JEFFREY ENERGY CENTER UNIT 3
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.10545	105.8076	GEN532651 1-JEFFREY ENERGY CENTER UNIT 1
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.10771	105.553	GRAND ISLAND - SWEETWATER 345KV CKT 1
FDNS	3	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.13177	105.1165	DBL-IRON-CLR
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.10944	105.0777	MOORE - PAULINE 345KV CKT 1
FDNS	03G12_011	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.12109	105.0227	CIRCLE - MULLERGREN 230KV CKT 1
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.10545	104.9588	GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.1081	104.5401	CIRCLE - EAST MCPHERSON 230KV CKT 1
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.10743	103.8692	SPP-SWPS-05
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.10743	103.7873	FINNEY SWITCHING STATION - Hitchland Interchange 345KV CKT 1
FDNS	3	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.14363	103.4675	AXTELL - POST ROCK 345KV CKT 1
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.1083	103.2437	CLARKCOUNTY7345.00 - IRONWOOD7 345.00 345KV CKT 1
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.1083	103.1247	CLARKCOUNTY7345.00 - SPEARVILLE 345KV CKT 1
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.11367	103.0451	BUCKNER7 345.00 - SPEARVILLE 345KV CKT 1
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.10663	102.6785	ST JOHN - ST_JOHN 115KV CKT 1
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.10545	102.498	GEN542962 2-IATAN UNIT #2
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.10615	102.4464	BEAVER CO 345.00 - WOODWARD DISTRICT EHV 345KV CKT 1
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.10615	102.4464	BEAVER CO 345.00 - WOODWARD DISTRICT EHV 345KV CKT 2
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.10729	102.4382	SPP-MKEC-06
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.10729	102.4217	SEWARD - ST JOHN 115KV CKT 1
FNSL	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.10736	102.4022	ELM CREEK - NORTHWEST MANHATTAN 230KV CKT 1
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.1056	102.2973	MINGO - RED WILLOW 345KV CKT 1
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.10653	102.2598	GRAND ISLAND - MCCOOL 345KV CKT 1
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.10786	102.2013	PHILLIPSBURG - SMITH CENTER 115KV CKT 1
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.10734	102.1823	KNOLL - SALINE RIVER 115KV CKT 1
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.10545	102.1554	GEN542955 1-LACYGNE UNIT #1
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.10545	102.1507	GEN542956 2-LACYGNE UNIT #2
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.10567	102.1011	STEGALL TY 345/230KV TRANSFORMER CKT 1
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.10567	102.0985	STEGALL - STEGALL TY 345KV CKT 1
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.10567	102.0944	STEGALL - STEGALL TRANSFORMER 230KV CKT 1
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.10567	102.0919	TRF-STEGALL
FNSL	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.1063	102.0716	SPP-MKEC-08
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.10545	102.0515	GEN542957 1-IATAN UNIT #1
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.10545	101.9989	GEN532663 1-LAWRENCE ENERGY CENTER UNIT 5
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.10734	101.9693	PLAINVILLE - SALINE RIVER 115KV CKT 1
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.10663	101.7581	HUNTSVILLE - ST_JOHN 115KV CKT 1
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.1058	101.7517	SPP-MKEC-09B
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.10653	101.7398	MCCOOL - MOORE 345KV CKT 1
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.10663	101.724	MIDW-CATB05
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.1058	101.6664	GREENSBURG - SSTARTP3 115.00 115KV CKT 1
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.10545	101.6092	GEN542951 5-HAWTHORN UNIT #5
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.10663	101.5852	HUNTSVILLE - HUTCHINSON ENERGY CENTER 115KV CKT 1
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.10629	101.5813	G10-056T 345.00 - ST JOE 345KV CKT 1
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.1059	101.52	MATHWSN7 345.00 - TATONGA7 345.00 345KV CKT 1
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.1059	101.52	MATHWSN7 345.00 - TATONGA7 345.00 345KV CKT 2
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.10633	101.5186	GREAT BEND TAP - SEWARD 115KV CKT 1
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.1058	101.5162	GREENSBURG - SUN CITY 115KV CKT 1
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.10734	101.5144	PHILLIPSBURG - PLAINVILLE 115KV CKT 1
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.10633	101.5094	GREAT BEND TAP - MULLERGREN 115KV CKT 1
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.10617	101.4753	POTTER COUNTY INTERCHANGE (WAUK 90343-A) 345/230/13.2KV
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.1058	101.427	MEDICINE LODGE - SUN CITY 115KV CKT 1
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.10585	101.3844	HARPER - MILAN TAP 138KV CKT 1
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.10601	101.3734	EMPORIA ENERGY CENTER - WICHITA 345KV CKT 1
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.10629	101.3707	COOPER - G10-056T 345.00 345KV CKT 1
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.10585	101.3521	SPP-MKEC-03A
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.10585	101.324	SPP-MKEC-05
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.10568	101.3194	NUNDRWD - WAYSIDE 230KV CKT 1

SOLUTION	GROUP	SCENARIO	SEASON	SOURCE	DIRECTION	MONITORED ELEMENT	RATEB (MVA)	TDF	TC%LOADING (% MVA)	CONTINGENCY
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.10545	101.2669	GEN541151 3-SIBLEY GENERATING UNIT #3
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.1058	101.2549	BARBER 3 115.00 - MEDICINE LODGE 115KV CKT 1
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.10731	101.202	BEACH STATION - G10-48T 115.00 115KV CKT 1
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.10746	101.0019	KNOLL 230 (KNOLL T1) 230/115/11.49KV TRANSFORMER CKT 1
FDNS	3	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.12116	100.2088	CIRCLE - MULLERGREN 230KV CKT 1
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.10545	100.0976	BASE CASE
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.10545	100.0976	NC1_GEN-NEBRASKA CITY 1
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.09336	99.9	SUMMIT (SUMMIT1X) 345/230/14.4KV TRANSFORMER CKT 1
FDNS	03ALL	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.10551	99.5	MINGO - SETAB 345KV CKT 1
FDNS	03G12_011	0	14G	G12_011	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	330	0.1317	99.5	DBL-SPRVL-CL
FDNS	03ALL	0	14G	G12_011	FROM->TO	SOUTH HAYS (S HAYS T1) 230/115/12.47KV TRANSFORMER CKT 1	166.7	0.06607	100.7895	KNOLL 230 - POSTROCK6 230.00 230KV CKT 1

I: Power Flow Analysis (Category C Contingencies)

See next page.