# Definitive Interconnection System Impact Study for Generation Interconnection Requests

# (DISIS-2013-001-3)

# Group 3 and 8 Restudy

**July 2014**

**Generator Interconnection**

SPP Southwest Power Pool

# Revision History

| Date | Author | Change Description |
|---|---|---|
| 07/31/2013 | SPP | Report Issued (DISIS-2013-001) – Group 6 Interconnection Requests not included in this issue. |
| 08/30/2013 | SPP | Group 6 Interconnection Requests results appended and NRIS withdrawals accounted, Report Re-Posted (DISIS-2013-001-1) |
| 01/31/2014 | SPP | Account for Withdrawn Projects, Report Re-Posted (DISIS-2013-001-2) |
| 07/30/2014 | SPP | Account for Withdrawn Projects, Report Re-Posted (DISIS-2013-001-3, Group 3 and 8 Restudy) |

# 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, 2013. The customers will be referred to in this study as the DISIS-2013-001 Interconnection Customers. Only study results for those requests within DISIS-2013-001 Group 3 and Group 8 are included within this restudy. The study results for the previous restudy are still valid for the remaining groups included within this DISIS-2013-001. This System Impact Study analyzes the interconnection of a generation interconnection request associated with new Group 3 and Group 8 generation totaling approximately 346.3 MW of new generation which would be located within the transmission systems of American Electric Cooperative Corporation (AEPW), Oklahoma Gas and Electric (OKGE), Sunflower Electric Power Corporation/Mid-Kansas Electric Power LLC (SUNC)/(MKEC). The generation interconnection request has a differing proposed in-service date[1]. The generation interconnection request included in this System Impact Cluster Study is listed in Appendix A by its 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, 346.3 MW of nameplate generation may be interconnected with transmission system reinforcements within the SPP transmission system. Dynamic stability and power factor analysis has determined the need for reactive compensation in accordance with FERC Order #661A for wind farm interconnection requests and those requirements are listed for each interconnection request within the contents of this report. Dynamic stability analysis has determined that the transmission system will remain stable with the assigned Network Upgrades and necessary reactive compensation requirements.

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

The total estimated minimum cost for interconnecting the DISIS-2013-001 Group 3 and Group 8 Interconnection Customers is estimated at $42,567,553. These costs are shown in Appendix E and F. Interconnection Service to DISIS-2013-001 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 Energy Resource Interconnection Service (ERIS) requests. Certain Interconnection Requests were also studied for Network Resource Interconnection Service (NRIS). Those constraints are also listed in Appendix H. Additional network constraints will have to be verified with a Transmission Service Request (TSR) and associated studies. With a defined source and sink in a TSR, this list of Network Constraints will be refined and expanded to account for all Network Upgrade requirements.

The required interconnection costs listed in 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, 2013. The customers will be referred to in this study as the DISIS-2013-001 Interconnection Customers. Only study results for those requests within DISIS-2013-001 Group 3 and Group 8 are included within this restudy. The study results for the previous restudy are still valid for the remaining groups included within this DISIS-2013-001. This System Impact Study analyzes the interconnection of a generation interconnection request associated with new Group 3 and Group 8 generation totaling approximately 346.3 MW of new generation which would be located within the transmission systems of American Electric Cooperative Corporation (AEPW), Oklahoma Gas and Electric (OKGE), Sunflower Electric Power Corporation/Mid-Kansas Electric Power LLC (SUNC)/(MKEC). The generation interconnection request has a differing proposed in-service date[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 DISIS is to identify the system constraints associated with connecting the generation to the area transmission system. The Impact Study and other subsequent Interconnection Studies are designed to identify required interconnection 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 Customers that proceed to the Facility Study will be provided a new in-service date based on the completion 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, 2013 and were subsequently accepted by Southwest Power Pool under the terms of the Generator Interconnection Procedures (GIP) that became effective March 30, 2010. The interconnection requests that are included in this study are listed in Appendix A.

### Affected System Interconnection Request

Also included in this Definitive Interconnection System Impact Study are three Affected System Studies. The Affected System Study Requests have been given the designations: ASGI-2013-001 (11.5MW, Point of Interconnection is PanTex South 115kV), ASGI-2013-002 (18.4 MW, Point of Interconnection is Farmers Electric Tucumcari 115kV), and ASGI-2013-003 (18.4 MW, Point of Interconnection is Farmers Electric Clovis 115kV). ASGI-2013-001 is located on a Customer distribution voltage bus served by the Southwestern Public Service Transmission System. ASGI-2013-001 was studied in Group 5 (Amarillo Area), ASGI-2013-002 and ASGI-2013-003 was studied in Group 6 (southern Texas Panhandle).

### Previously Queued Interconnection Requests

The previous queued requests included in this study are listed in Appendix C. 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, and the 2019 summer and winter peak, and 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 2013 series SPP Model Development Working Group (MDWG) Models 2014 winter, 2015 summer, and 2024 summer peak cases were used as starting points for this study.

## Base Case Upgrades

The following facilities are part of the SPP Transmission Expansion Plan, the Balanced Portfolio or recently approved Priority Projects. These facilities have an approved Notification 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-2013-001 Interconnection Customers have not been assigned acceleration costs for the below listed projects. The DISIS-2013-001 Interconnection 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 Interconnection Customers.

- Balanced Portfolio Projects[3]:
  - Woodward – Border – TUCO 345kV project, scheduled for 9/30/2014 in-service
    - Woodward 345/138kV circuit #2 autotransformer , placed in-service in 2014
    - TUCO 345/230kV circuit #2 autotransformer, placed in-service in 2014
    - Reactors at Woodward and Border, placed in-service in 2014
  - Iatan – Nashua 345kV, scheduled for 6/1/2015 in-service
    - Nashua 345/161kV autotransformer
  - Muskogee – Seminole 345kV, placed in-service in 2013
- Priority Projects[4]:
  - Hitchland – Woodward double circuit 345kV, placed in-service in 2014
    - Hitchland 345/230kV circuit #2 autotransformer, placed in-service in 2014
  - Woodward – Thistle double circuit 345kV, scheduled for 12/31/2014 in-service
  - Spearville – Clark County double circuit 345kV, scheduled for 12/31/2014 in-service
  - Clark County – Thistle double circuit 345kV, scheduled for 12/31/2014 in-service
  - Thistle – Wichita double circuit 345kV, placed in-service in 2014
  - Thistle 345/138kV autotransformer, placed in-service in 2014
  - Thistle – Flat Ridge 138kV, placed in-service in 2014
- Sheldon – SW 7th and Pleasant Hill 115kV circuit #2 rebuild, placed in-service in 2013[5]
- Arcadia – Redbud 345kV circuit #1 and #2 terminal equipment replacement, placed in-service in 2013[6]

## 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-2013-001 study and are assumed to be in service. This list may not be all inclusive. The DISIS-2013-001 Interconnection 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 Generation Interconnection Agreement or withdraw from the interconnection queue. The DISIS-2013-001 Interconnection Customer Generation Facilities in-service dates may need to be delayed until the completion of the following upgrades.

[3] Notification to Construct (NTC) issued June 2009
[4] Notification to Construct (NTC) issued June 2010
[5] SPP Regional Reliability 2012 ITPNT Project Per SPP-NTC-200171
[6] SPP Regional Reliability 2013 ITPNT Project Per SPP-NTC-200204

- Upgrades assigned to ICS-2008-001 Interconnection Customers
- Upgrades assigned to DISIS-2009-001 Interconnection Customers:
  - Lancer Project
    - Spearville – Lancer 345kV addition
    - Lancer 345/115kV transformer circuit #1 addition
    - Lancer – North Ft. Dodge 115kV addition
    - Ft Dodge – North Ft. Dodge circuit #2 addition
    - Move Fort Dodge terminal of Shooting Star 115kV at North Ft Dodge
  - Fort Randall – Meadow Grove – Kelly 230kV circuit #1 rerate (320MVA)
- 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
- Upgrades assigned to DISIS-2010-002 Interconnection Customers:
  - Buckner – Spearville 345kV terminal equipment
  - Twin Church – Dixon County 230kV circuit #1 rerate (320MVA)
- Upgrades assigned to DISIS-2011-001 Interconnection Customers:
  - Hoskins – Dixon County – Twin Church 230kV circuit #1 conductor clearance increase
  - (NRIS only) Glass Mountain – Mooreland – FPL Switch – Woodward 138kV circuit #1 rebuild
  - (NRIS only) New Deal – TUCO Interchange – Stanton 345kV/115kV Project
    - New Deal – TUCO Interchange 345kV circuit #1 build
    - TUCO Interchange – Stanton 115kV circuit #1 build
    - New Deal 345/115/13kV transformer circuit #1 build
- 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)
  - Jones – Lubbock South 230kV circuit #2 replace line traps, placed in-service in 2014
  - SUB 967 – SUB 968 – SUB 969 – SUB 974 69kV circuit #1 replace terminal equipment
  - (NRIS only) Hydro Carbon Tap – SUB 974 69kV circuit #1 replace terminal equipment
  - (NRIS only) Nebraska City U Syracuse – SUB 970 circuit #1 replace terminal equipment
- Upgrades assigned to DISIS-2012-001 interconnection Customers:
  - GEN-2011-017 Tap 100MVAR Static VAR Compensator (SVC) and 100 MVAR Capacitor Bank(s)
- Upgrades assigned to DISIS-2012-002 interconnection Customers:
  - Amoco Wasson – Oxy Tap 230kV circuit #1 replace line traps
  - Associated Electric Cooperatives Inc. (AECI) Fairfax 138/69kV circuit #1 replace transformer
  - Lake Creek – Lone Wolf 69kV circuit #1 reset CT
  - Remington – Fairfax 138kV circuit #1 conductor clearance increase
  - Thistle 100MVAR Static VAR Compensator (SVC) and 100 MVAR Capacitor Bank(s)

## 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 into twelve active 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 a load factor by area 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

For each group, all interconnection requests were studied at 100% nameplate output while the other groups were dispatched at 20% output for wind requests and 100% output for thermal requests.

## Identification of Network Constraints

The initial set of network constraints were found by using PSS®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 also 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 PSS®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 346.3 MW of Group 3 and Group 8 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 Group 3 and Group 8 total an estimated $42,567,553. Interconnection Facilities specific to each generation interconnection request are listed in Appendix E. A preliminary one-line drawing for the Group 3 and Group 8 generation interconnection request is 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. Additional constraints identified by NERC category "C" contingencies are listed in Appendix I.

# 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 single and multiple 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, and the 2019 summer and winter peak, 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 Interconnection Service request (ERIS). Certain requests that are pursuing 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 Group 3 and Group Interconnection Customer's project indicates that criteria violations will occur on the SUNC/MKEC transmission systems under system intact and contingency conditions in the peak seasons.

## Cluster Group 1 (Woodward Area)

In addition to the 4,284.6 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 2 (Hitchland Area)

In addition to the 2,662.2 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 3 (Spearville Area)

In addition to the 4,010.4 MW of previously queued generation in the area, 99.0 MW of new interconnection service was studied. Due to higher queued requests and SPP GI assigned network upgrade withdrawals, a new ERIS constraint was identified with the addition of Interconnection Customer GEN-2013-010. The outage of Post Rock – GEN-2013-010 Tapping Substation on Spearville – Post Rock 345kV circuit #1 transmission line causes voltage issues in the Thistle area. To mitigate the voltage issues, an additional 100MVAR Static VAR Compensator (SVC) and 75 MVAR of switchable capacitor bank(s) is needed at Thistle 345kV.

| Group 3: ERIS Constraints | | | |
|---|---|---|---|
| MONITORED ELEMENT | RATE B (MVA) | TC%LOADING (% MVA) | CONTINGENCY |
| Non-Converged Contingency | - | - | G12-011T 345.00 - POST ROCK 345KV CKT 1 |

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

In addition to the 1,988.1 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 5 (Amarillo Area)

In addition to the 692.6 MW of previously queued generation in the area, 11.5 MW of new interconnection service was studied. No new constraints were found in this area.

This group was not analyzed for this restudy and previously identified results remain valid.

## Cluster Group 6 (South Texas Panhandle/New Mexico)

In addition to the 3,091.65 MW of previously queued generation in the area, 488.2 MW of new interconnection service was studied.

This group was not analyzed for this restudy and previously identified results remain valid.

## Cluster Group 7 (Southwestern Oklahoma)

In addition to the 1,900.0 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 8 (South Central Kansas/North Oklahoma)

In addition to the 2,757.3 MW of previously queued generation in the area, 247.3 MW of new interconnection service was studied. An additional 1,200 MW of existing generation was studied for Interconnection Requests that share a Point of Interconnection (POI) with the studied

generation. ERIS constraints observed included the Vinita Junction 138/69kV transformer and Vinita – Vinita Junction 69kV circuit #1. Replacement of the Vinita Junction transformer to a larger size along upgradeing ac the Vinita – Vinita Junction and upgrading associated terminal equipment will relieve the ERIS overloads. GEN-2013-009 requested a modification to drop Network Resource Interconnection Service. The request was accepted as no lower queued Interconnection Requests were impacted.

| Group 8: ERIS Constraints | | | |
|---|---|---|---|
| **MONITORED ELEMENT** | **RATE B (MVA)** | **TC%LOADING (% MVA)** | **CONTINGENCY** |
| VINITA JUNCTION (VINITAJC) 138/69/13.8KV TRANSFORMER CKT 1 | 62 | 122.5414 | SUB 404 - HOCKERVILLE (HOCK 138) 161/138/12.5KV TRANSFORMER CKT 1 |
| VINITA - VINITA JUNCTION 69KV CKT 1 | 69 | 117.3672 | SUB 404 - HOCKERVILLE – VINITA JUNCTION 138KV CKT 1 |

| Group 8: NRIS Constraints | | | |
|---|---|---|---|
| **MONITORED ELEMENT** | **RATE B (MVA)** | **TC%LOADING (% MVA)** | **CONTINGENCY** |
| No NRIS Constraints | | | |

## Cluster Group 9/10 (Nebraska)

In addition to the 1,562.7 MW of previously queued generation in the area, 414.2 MW of new interconnection service was studied.

This group was not analyzed for this restudy and previously identified results remain valid.

## Cluster Group 12 (Northwest Arkansas)

In addition to the 0.0 MW of previously queued generation in the area, 30.0 MW of new interconnection service was studied. An additional 620.0 MW of existing generation was studied for Interconnection Requests that share a Point of Interconnection (POI) with the studied generation.

This group was not analyzed for this restudy and previously identified results remain valid.

## Cluster Group 13 (Northwest Missouri)

In addition to the 285.8 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 14 (South Central Oklahoma)

In addition to the 262.2 MW of previously queued generation in the area, 100.3 MW of new interconnection service was studied.

This group was not analyzed for this restudy and previously identified results remain valid.

# Curtailment and System Reliability

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

# Stability Analysis

A stability analysis was conducted for each Interconnection Customer using modified versions of the 2013 series SPP Model Development Working Group (MDWG) Models 2014 winter, 2015 summer, and 2024 summer peak dynamic cases. The stability analysis was conducted with all upgrades in service that were identified in the power flow analysis. For each group, the interconnection requests were studied at 100% nameplate output while the other groups were dispatched at 20% output for wind requests and 100% output for fossil requests. The output of the Interconnection Customer's facility was offset in each model by a reduction in output of existing online SPP generation. The following synopsis is included for each group. The entire stability study for each group can be found in the Appendices section.

## Cluster Group 1 (Woodward Area)

The Group 1 stability analysis was not performed again for this restudy. No requests remain in this Group.

## Cluster Group 2 (Hitchland Area)

There was no stability analysis conducted in the Hitchland area due to no requests in the area.

## Cluster Group 3 (Spearville Area)

The Group 3 stability analysis for this restudy was performed by SPP Staff. The analysis was performed to evaluate the impacts of the removal of the previously assigned Beaver-Buckner 345kV line. Stability analysis has determined that when all previously assigned and currently assigned network upgrades are placed in-service the transmission system will remain stable and low voltage ride through requirements are satisfied for the contingencies studied.

Power Factor analysis was not performed again for this restudy. With the power factor requirements and all network upgrades in service, all interconnection request in Group 3 will meet FERC Order #661A low voltage ride through (LVRT) requirements.

## Cluster Group 4/11 (Northwest Kansas Area)

There was no stability analysis conducted in the northwest Kansas area due to no requests in the area.

## Cluster Group 5 (Amarillo Area)

The Group 5 stability analysis was not performed again for this restudy. The original analysis in DISIS-2013-001 is still valid.

## Cluster Group 6 (South Texas Panhandle/New Mexico)

The Group 6 stability analysis was not performed again for this restudy. The analysis in DISIS-2013-001-2 is still valid.

## Cluster Group 7 (Southwest Oklahoma Area)

There was no stability analysis conducted in the southwest Oklahoma area due to no requests in the area.

## Cluster Group 8 (South Central Kansas/North Oklahoma)

The Group 8 stability analysis was not performed again for this restudy. The original analysis in DISIS-2013-001 is still valid.

## Cluster Group 9/10 (Nebraska)

The Group 9/10 stability analysis was not performed again for this restudy. The original analysis in DISIS-2013-001 is still valid.

## Cluster Group 12 (Northwest Arkansas Area)

The Group 12 stability analysis was not performed again for this restudy. The original analysis in DISIS-2013-001 is still valid.

## Cluster Group 13 (Northwest Missouri Area)

There was no stability analysis conducted in the Northwest Missouri area due to no requests in the area.

## Cluster Group 14 (South Central Oklahoma)

The Group 14 stability analysis was not performed again for this restudy. The original analysis in DISIS-2013-001 is still valid.

# Conclusion

Only study results for those requests within DISIS-2013-001 Group 3 and Group 8 are included within this restudy. The minimum cost of Group 3 and Group 8 interconnecting 346.3 MW of new interconnection requests included in this Definitive Interconnection System Impact Study is estimated at $42,567,553 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).

# Appendices

# A: Generation Interconnection Requests Considered for Impact Study

See next page.

# A: Generation Interconnection Requests Considered for Impact Restudy

| Request | Amount | Service | Area | Requested Point of Interconnection | Proposed Point of Interconnection | Requested In-Service Date | In Service Date Delayed Until no earlier than* |
|---|---|---|---|---|---|---|---|
| GEN-2013-009 | 100.30 | ER | AEPW | Tap Northeastern - Vinita 138kV | Tap Alluwe Tap - Vinita Junction 138kV | 12/31/2015 | TBD |
| GEN-2013-010 | 99.00 | ER | SUNCMKEC | Tap Spearville - Post Rock 345kV | Tap Spearville - Post Rock 345kV (GEN-2012-011 Tap) | 12/31/2015 | TBD |
| GEN-2013-012 | 147.00 | ER | OKGE | Redbud 345kV | Redbud 345kV | 11/30/2014 | TBD |
| **Total:** | **346.30** | | | | | | |

Requests included in Appendix A are those found to be affected and considered for this system impact restudy.

# B: Generation Interconnection Requests in Impact Study

See next page.

# B: Generation Interconnection Requests in 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-2013-001 | 11.50 | ER | SPS | PanTex South 115kV | PanTex South 115kV | | |
| ASGI-2013-002 | 18.40 | ER | SPS | FE Tucumcari 115kV | FE Tucumcari 115kV | | |
| ASGI-2013-003 | 18.40 | ER | SPS | FE Clovis 115kV | FE Clovis 115kV | | |
| GEN-2012-005 | 81.00 | ER/NR | NPPD | Tap Fort Randall - Columbus (North of Meadow Grove) 230kV | Tap Fort Randall - Columbus (North of Meadow Grove) 230kV | 6/1/2015 | TBD |
| GEN-2013-002 | 50.60 | ER/NR | LES | Tap Sheldon - Folsom & Pleasant Hill 115kV CKT 2 | Tap Sheldon - Folsom & Pleasant Hill 115kV CKT 2 | 12/31/2013 | TBD |
| GEN-2013-004 | 6.00 | ER/NR | NPPD | Tap Fort Randall - Columbus (Meadow Grove) 230kV | Tap Fort Randall - Columbus (Meadow Grove) 230kV | 1/1/2014 | TBD |
| GEN-2013-005 | 73.50 | ER/NR | NPPD | Meadow Grove (GEN-2008-086N2 Sub) 230kV | Meadow Grove (GEN-2008-086N2 Sub) 230kV | 12/31/2014 | TBD |
| GEN-2013-006 | 50.60 | ER | NPPD | Tap Fort Randall - Columbus (Meadow Grove) 230kV | Tap Fort Randall - Columbus (Meadow Grove) 230kV | 10/1/2014 | TBD |
| GEN-2013-007 | 100.30 | ER/NR | OKGE | Tap Prices Falls - Carter 138kV | Tap Prices Falls - Carter 138kV | 12/31/2014 | TBD |
| GEN-2013-008 | 1.20 | ER | NPPD | Steele City 115kV | Steele City 115kV | 12/31/2013 | |
| GEN-2013-009 | 100.30 | ER | AEPW | Tap Northeastern - Vinita 138kV | Tap Alluwe Tap - Vinita Junction 138kV | 12/31/2015 | TBD |
| GEN-2013-010 | 99.00 | ER | SUNCMKEC | Tap Spearville - Post Rock 345kV | Tap Spearville - Post Rock 345kV (GEN-2012-011 Tap) | 12/31/2015 | TBD |
| GEN-2013-011 | 30.00 | ER | AEPW | Turk 138kV | Turk 138kV | | TBD |
| GEN-2013-012 | 147.00 | ER | OKGE | Redbud 345kV | Redbud 345kV | 11/30/2014 | TBD |
| GEN-2013-013 | 248.40 | ER/NR | SPS | Tap Eddy County - Tolk 345kV | Tap Eddy County - Tolk (Crossroads) 345kV | 12/1/2014 | TBD |
| GEN-2013-014 | 25.50 | ER/NR | NPPD | Tap Guide Rock - Pauline (GEN-2008-123N Tap) 115kV | Tap Guide Rock - Pauline (GEN-2008-123N Tap) 115kV | 12/31/2014 | TBD |
| GEN-2013-015 | 125.80 | ER/NR | NPPD | Tap Pauline - Hildreth 115kV | Tap Pauline - Hildreth 115kV | 12/31/2015 | TBD |
| GEN-2013-016 | 203.00 | ER | SPS | TUCO 345kV | TUCO 345kV | 12/1/2016 | TBD |
| **Total:** | **1,390.50** | | | | | | |

Appendix B is a complete list of Generation Interconnection Requests in the original system impact study.

# 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-2008-044 | 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 |
| GEN-2012-031 | 200.00 | OKGE | Cimarron 345kV (GEN-2010-040 Sub) |
| **PRIOR QUEUED SUBTOTAL** | **4,284.60** | | |
| **AREA TOTAL** | **4,284.60** | | |

| 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-2011-022 | 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** | **2,662.20** | | |
| **AREA TOTAL** | **2,662.20** | | |

| GROUP 3: SPEARVILLE AREA | | | |
|---|---|---|---|
| **Request** | **Capacity** | **Area** | **Proposed Point of Interconnection** |
| ASGI-2012-006 | 22.50 | SUNCMKEC | Tap Hugoton - Rolla 69kV |
| 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-2007-040 | 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-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 |
| 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) |
| GEN-2012-024 | 180.00 | SUNCMKEC | Clark County 345kV |
| Gray County Wind (Montezuma) | 110.00 | SUNCMKEC | Gray County Tap 115kV |
| **PRIOR QUEUED SUBTOTAL** | **4,010.40** | | |
| GEN-2013-010 | 99.00 | SUNCMKEC | Tap Spearville - Post Rock 345kV (GEN-2012-011 Tap) |
| **CURRENT CLUSTER SUBTOTAL** | **99.00** | | |
| **AREA TOTAL** | **4,109.40** | | |

## 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 |
| GEN-2012-026 | 100.00 | MIDW | Colby 115kV |
| **PRIOR QUEUED SUBTOTAL** | **1,988.10** | | |
| **AREA TOTAL** | **1,988.10** | | |

## GROUP 5: AMARILLO AREA

| Request | Capacity | Area | Proposed Point of Interconnection |
|---|---|---|---|
| GEN-2002-022 | 240.00 | SPS | Bushland 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** | **692.60** | | |
| ASGI-2013-001 | 11.50 | SPS | PanTex South 115kV |
| **CURRENT CLUSTER SUBTOTAL** | **11.50** | | |
| **AREA TOTAL** | **704.10** | | |

| 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 |
| ASGI-2012-002 | 18.15 | SPS | FE-Clovis Interchange 115kV |
| 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-2008-022 | 300.00 | SPS | Tap Eddy County - Tolk (Crossroads) 345kV |
| GEN-2010-006 | 205.00 | SPS | Jones 230kV |
| GEN-2010-046 | 56.00 | SPS | TUCO Interchange 230kV |
| 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 |
| 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 |
| GEN-2012-020 | 478.00 | SPS | TUCO 230kV |
| GEN-2012-034 | 7.00 | SPS | Mustang 230kV |
| GEN-2012-035 | 7.00 | SPS | Mustang 230kV |
| GEN-2012-036 | 7.00 | SPS | Mustang 230kV |
| GEN-2012-037 | 203.00 | SPS | TUCO 345kV |
| 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** | **3,091.65** | | |
| ASGI-2013-002 | 18.40 | SPS | FE Tucumcari 115kV |
| ASGI-2013-003 | 18.40 | SPS | FE Clovis 115kV |
| GEN-2013-013 | 248.40 | SPS | Tap Eddy County - Tolk (Crossroads) 345kV |
| GEN-2013-016 | 203.00 | SPS | TUCO 345kV |
| **CURRENT CLUSTER SUBTOTAL** | **488.20** | | |
| **AREA TOTAL** | **3,579.85** | | |

| 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 |
| GEN-2012-028 | 74.80 | WFEC | Gotebo 69kV |
| **PRIOR QUEUED SUBTOTAL** | **1,900.00** | | |
| **AREA TOTAL** | **1,900.00** | | |

| 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 |
| GEN-2012-023 | 115.00 | WERE | Viola 345kV |
| GEN-2012-027 | 136.00 | AEPW | Shidler 138kV |
| GEN-2012-032 | 300.00 | OKGE | Tap Rose Hill - Sooner (Ranch) 345kV |
| GEN-2012-033 | 98.80 | OKGE | Tap and Tie South 4th - Bunch Creek & Enid Tap - Fairmont (GEN-2012-033T) 138kV |
| GEN-2012-040 | 76.50 | WFEC | Chilocco 138kV |
| GEN-2012-041 | 121.50 | OKGE | Tap Rose Hill - Sooner 345kV |
| **PRIOR QUEUED SUBTOTAL** | **2,757.30** | | |
| GEN-2013-009 | 100.30 | AEPW | Tap Alluwe Tap - Vinita Junction 138kV |
| GEN-2013-012 | 147.00 | OKGE | Redbud 345kV |
| **CURRENT CLUSTER SUBTOTAL** | **247.30** | | |
| **AREA TOTAL** | **3,004.60** | | |

| 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-2004-023N | 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 (Meadow Grove) 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 |
| GEN-2012-021 | 4.80 | LES | Terry Bundy Generating Station 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** | **1,562.70** | | |
| GEN-2012-005 | 81.00 | NPPD | Tap Fort Randall - Columbus (North of Meadow Grove) 230kV |
| GEN-2013-002 | 50.60 | LES | Tap Sheldon - Folsom & Pleasant Hill 115kV CKT 2 |
| GEN-2013-004 | 6.00 | NPPD | Tap Fort Randall - Columbus (Meadow Grove) 230kV |
| GEN-2013-005 | 73.50 | NPPD | Meadow Grove (GEN-2008-086N2 Sub) 230kV |
| GEN-2013-006 | 50.60 | NPPD | Tap Fort Randall - Columbus (Meadow Grove) 230kV |
| GEN-2013-008 | 1.20 | NPPD | Steele City 115kV |
| GEN-2013-014 | 25.50 | NPPD | Tap Guide Rock - Pauline (GEN-2008-123N Tap) 115kV |
| GEN-2013-015 | 125.80 | NPPD | Tap Pauline - Hildreth 115kV |
| **CURRENT CLUSTER SUBTOTAL** | **414.20** | | |
| **AREA TOTAL** | **1,976.90** | | |

| GROUP 12: NW-AR AREA | | | |
|---|---|---|---|
| **Request** | **Capacity** | **Area** | **Proposed Point of Interconnection** |
| GEN-2013-011 | 30.00 | AEPW | Turk 138kV |
| **CURRENT CLUSTER SUBTOTAL** | **30.00** | | |
| **AREA TOTAL** | **30.00** | | |

| 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 (Carter County) 138kV |
| GEN-2011-050 | 109.80 | AEPW | Santa Fe Station 138kV |
| GEN-2012-004 | 41.40 | OKGE | Tap Ratliff - Pooleville (Carter County) 138kV |
| **PRIOR QUEUED SUBTOTAL** | **262.20** | | |
| GEN-2013-007 | 100.30 | OKGE | Tap Prices Falls - Carter 138kV |
| **CURRENT CLUSTER SUBTOTAL** | **100.30** | | |
| **AREA TOTAL** | **362.50** | | |

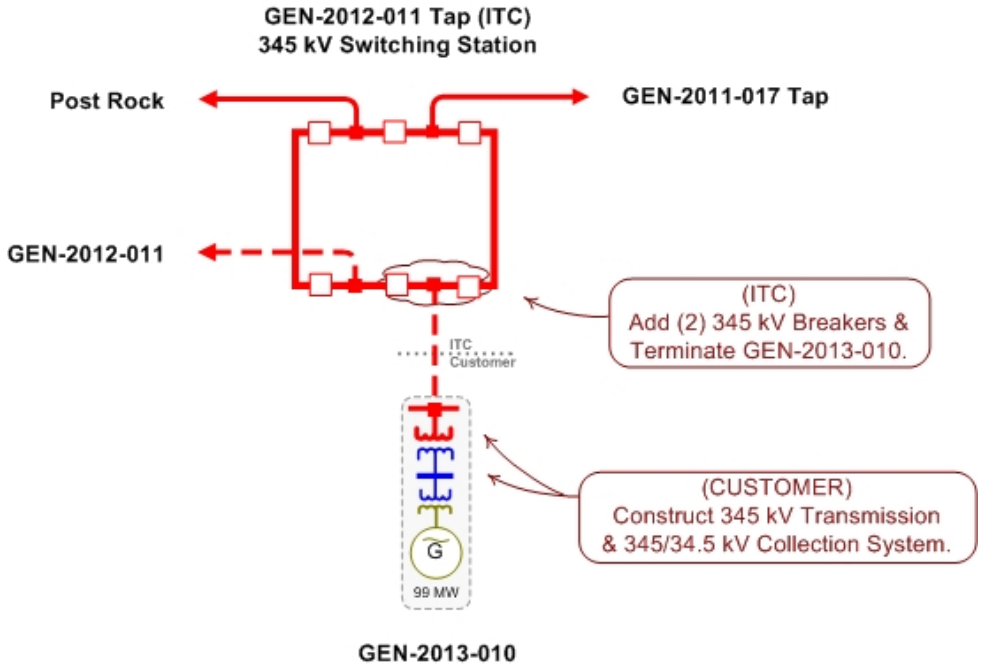
| | | |
|---|---|---|
| **CLUSTER TOTAL (CURRENT STUDY)** | **1,390.5** | **MW** |
| **PQ TOTAL (PRIOR QUEUED)** | **23,497.6** | **MW** |
| **CLUSTER TOTAL (INCLUDING PRIOR QUEUED)** | **24,888.1** | **MW** |

# D: Proposed Point of Interconnection One Line Diagrams

## GEN-2013-009

****Refer to Facility Study for an updated one-line****

## GEN-2013-010




## GEN-2013-012

****Refer to Facility Study for an updated one-line****

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

Important Note:

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

This section shows the Group 3 and Group 8 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 Customer 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 an 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.

There may be additional costs allocated to the Group 3 and Group 8 Customer. See Appendix F for more details.

# Appendix E. Cost Allocation Per Request

**(Including Previously Allocated Network Upgrades*)**

| Interconnection Request and Upgrades | Upgrade Type | Allocated Cost | Upgrade Cost |
|---|---|---|---|
| **GEN-2013-009** | | | |
| GEN-2013-009 Interconnection Costs<br>See Facility Study for One-Line Diagram and Cost Allocation | Current Study | $8,650,000.00 | $8,650,000.00 |
| Vinita - Vinita Junction 69kV CKT 1<br>Replace terminal equipment | Current Study | $1,038,535.00 | $1,038,535.00 |
| Vinita Junction 138/69/13.2kV Transformer CKT 1<br>Replace existing Vinita Junction transformer | Current Study | $3,939,904.00 | $3,939,904.00 |
| Arcadia - Redbud 345kV Dbl CKT 1<br>Per 2014 ITP NT: Upgrade terminal equipment for both circuits | In-Service | | $1,010,523.00 |
| | **Current Study Total** | $13,628,439.00 | |
| **GEN-2013-010** | | | |
| GEN-2013-010 Interconnection Costs<br>See One-Line Diagram. | Current Study | $1,939,114.00 | $1,939,114.00 |
| Thistle 345kV Additional Reactive Power Support<br>Add additional Thistle +100MVAR SVC and 75MVAR Switchable Capacitor Bank(s). | Current Study | $27,000,000.00 | $27,000,000.00 |
| Border - Woodward 345KV CKT 1<br>Balanced Portfolio: Tuco - Woodward 345kV CKT 1 (Total Project E&C Cost Shown) | In-Service | | $249,247,072.00 |
| Hitchland - Woodward 345kV Dbl CKT<br>Priority Project: Hitchland - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown) | In-Service | | $226,040,727.00 |
| Hitchland 345/230kV Autotransformer CKT 2<br>Priority Project: Hitchland 345/230kV Autotransformer CKT 2 (Total Project E&C Cost Shown). | In-Service | | $8,883,760.00 |
| Thistle - Wichita 345KV Dbl CKT<br>Priority Project: Thistle - Wichita Dbl 345kV CKT (Total Project E&C Cost Shown.) | In-Service | | $426,504,292.00 |
| Woodward XFMR 345/138/13.8kV CKT 2<br>Balanced Portfolio: Woodward 345/138kV Transformer CKT 2 & 50 MVAR Reactor (Total Project E&C Cost Shown). | In-Service | | $249,247,072.00 |
| Beaver County 345kV Expansion<br>Beaver County Expansion: Tap & Tie in Hitchland - Woodward 345kV CKT 2 | Previously Allocated | | $3,500,000.00 |
| Bucker - Spearville 345V CKT 1<br>Replace Terminal equipment | Previously Allocated | | $771,000.00 |

* 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 |
|---|---|---|---|
| Clark - Thistle 345KV Dbl CKT<br>Priority Project: Spearville - Clark - Thistle Dbl 345kV CKT (Total Project E&C Cost Shown.) | Previously Allocated | | $426,504,292.00 |
| GEN-2011-017 Tap 345kV Reactive Power Support<br>Build GEN-2011-017 Tap +100MVAR SVC and 100MVAR Switchable Capacitor Bank(s). | Previously Allocated | | $30,000,000.00 |
| Spearville - Clark 345KV Dbl CKT<br>Priority Project: Spearville - Clark - Thistle Dbl 345kV CKT (Total Project E&C Cost Shown.) | Previously Allocated | | $426,504,292.00 |
| Thistle 345kV Reactive Power Support<br>Build Thistle +100MVAR SVC and 100MVAR Switchable Capacitor Bank(s). | Previously Allocated | | $30,000,000.00 |
| | **Current Study Total** | $28,939,114.00 | |
| **GEN-2013-012** | | | |
| GEN-2013-012 Interconnection Costs<br>See Facility Study for One-Line Diagram and Cost Allocation | Current Study | $0.00 | $0.00 |
| Arcadia - Redbud 345kV Dbl CKT 1<br>Per 2014 ITP NT: Upgrade terminal equipment for both circuits | In-Service | | $1,010,523.00 |
| | **Current Study Total** | $0.00 | |
| | **TOTAL CURRENT STUDY COSTS:** | **$42,567,553.00** | |

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

# F: Cost Allocation per Proposed Study Network Upgrade

Important Note:

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

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

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

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

# Appendix F. Cost Allocation by Upgrade

| | | |
|---|---|---|
| **GEN-2013-009 Interconnection Costs** | | **$8,650,000.00** |
| See Facility Study for One-Line Diagram and Cost Allocation | | |
| | GEN-2013-009 | $8,650,000.00 |
| | **Total Allocated Costs** | **$8,650,000.00** |
| **GEN-2013-010 Interconnection Costs** | | **$1,939,114.00** |
| See One-Line Diagram. | | |
| | GEN-2013-010 | $1,939,114.00 |
| | **Total Allocated Costs** | **$1,939,114.00** |
| **GEN-2013-012 Interconnection Costs** | | **$0.00** |
| See Facility Study for One-Line Diagram and Cost Allocation | | |
| | GEN-2013-012 | $0.00 |
| | **Total Allocated Costs** | **$0.00** |
| **Thistle 345kV Additional Reactive Power Support** | | **$27,000,000.00** |
| Add additional Thistle +100MVAR SVC and 75MVAR Switchable Capacitor Bank(s). | | |
| | GEN-2013-010 | $27,000,000.00 |
| | **Total Allocated Costs** | **$27,000,000.00** |
| **Vinita - Vinita Junction 69kV CKT 1** | | **$1,038,535.00** |
| Replace terminal equipment | | |
| | GEN-2013-009 | $1,038,535.00 |
| | **Total Allocated Costs** | **$1,038,535.00** |
| **Vinita Junction 138/69/13.2kV Transformer CKT 1** | | **$3,939,904.00** |
| Replace existing Vinita Junction transformer | | |
| | GEN-2013-009 | $3,939,904.00 |
| | **Total Allocated Costs** | **$3,939,904.00** |

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

# G: Power Flow Analysis (Constraints Used For Mitigation)

See next page.

| SOLUTION | GROUP | SCENARIO | SEASON | SOURCE | DIRECTION | MONITORED ELEMENT | RATEB (MVA) | TDF | TC%LOADING (% MVA) | CONTINGENCY |
|---|---|---|---|---|---|---|---|---|---|---|
| FDNS | 00G13_009 | 0 | 14SP | G13_009 | TO->FROM | VINITA - VINITA JUNCTION 69KV CKT 1 | 69 | 0.25943 | 104.6497 | SUB 404 - HOCKERVILLE - VINITA JUNCTION 138KV CKT 1 |
| FDNS | 00G13_009 | 0 | 14SP | G13_009 | TO->FROM | VINITA - VINITA JUNCTION 69KV CKT 1 | 69 | 0.25943 | 104.482 | SUB 404 - HOCKERVILLE (HOCK 138) 161/138/12.5KV TRANSFORMER CKT 1 |
| FDNS | 00G13_009 | 0 | 19SP | G13_009 | TO->FROM | VINITA - VINITA JUNCTION 69KV CKT 1 | 69 | 0.25934 | 104.2421 | SUB 404 - HOCKERVILLE - VINITA JUNCTION 138KV CKT 1 |
| FDNS | 00G13_009 | 0 | 19SP | G13_009 | TO->FROM | VINITA - VINITA JUNCTION 69KV CKT 1 | 69 | 0.25934 | 104.085 | SUB 404 - HOCKERVILLE (HOCK 138) 161/138/12.5KV TRANSFORMER CKT 1 |
| FDNS | 00G13_009 | 0 | 19WP | G13_009 | FROM->TO | VINITA JUNCTION (VINITAJC) 138/69/13.8KV TRANSFORMER CKT 1 | 62 | 0.25913 | 122.5414 | SUB 404 - HOCKERVILLE (HOCK 138) 161/138/12.5KV TRANSFORMER CKT 1 |
| FDNS | 00G13_009 | 0 | 19WP | G13_009 | FROM->TO | VINITA JUNCTION (VINITAJC) 138/69/13.8KV TRANSFORMER CKT 1 | 62 | 0.25913 | 122.4623 | SUB 404 - HOCKERVILLE - VINITA JUNCTION 138KV CKT 1 |
| FDNS | 00G13_009 | 0 | 19WP | G13_009 | FROM->TO | VINITA JUNCTION (VINITAJC) 138/69/13.8KV TRANSFORMER CKT 1 | 62 | 0.25913 | 121.164 | SUB 404 - HOCKERVILLE (HOCK 138) 161/138/12.5KV TRANSFORMER CKT 1 |
| FDNS | 00G13_009 | 0 | 19WP | G13_009 | FROM->TO | VINITA JUNCTION (VINITAJC) 138/69/13.8KV TRANSFORMER CKT 1 | 62 | 0.25913 | 120.8999 | SUB 404 - HOCKERVILLE - VINITA JUNCTION 138KV CKT 1 |
| FDNS | 00G13_009 | 0 | 14SP | G13_009 | FROM->TO | VINITA JUNCTION (VINITAJC) 138/69/13.8KV TRANSFORMER CKT 1 | 62 | 0.25943 | 117.4397 | SUB 404 - HOCKERVILLE (HOCK 138) 161/138/12.5KV TRANSFORMER CKT 1 |
| FDNS | 00G13_009 | 0 | 14SP | G13_009 | FROM->TO | VINITA JUNCTION (VINITAJC) 138/69/13.8KV TRANSFORMER CKT 1 | 62 | 0.25943 | 117.357 | SUB 404 - HOCKERVILLE - VINITA JUNCTION 138KV CKT 1 |
| FDNS | 00G13_009 | 0 | 19SP | G13_009 | FROM->TO | VINITA JUNCTION (VINITAJC) 138/69/13.8KV TRANSFORMER CKT 1 | 62 | 0.25934 | 116.8132 | SUB 404 - HOCKERVILLE (HOCK 138) 161/138/12.5KV TRANSFORMER CKT 1 |
| FDNS | 00G13_009 | 0 | 19SP | G13_009 | FROM->TO | VINITA JUNCTION (VINITAJC) 138/69/13.8KV TRANSFORMER CKT 1 | 62 | 0.25934 | 116.7193 | SUB 404 - HOCKERVILLE - VINITA JUNCTION 138KV CKT 1 |
| FDNS | 00G13_009 | 0 | 14SP | G13_009 | FROM->TO | VINITA JUNCTION (VINITAJC) 138/69/13.8KV TRANSFORMER CKT 1 | 62 | 0.25943 | 116.4096 | SUB 404 - HOCKERVILLE (HOCK 138) 161/138/12.5KV TRANSFORMER CKT 1 |
| FDNS | 00G13_009 | 0 | 14SP | G13_009 | FROM->TO | VINITA JUNCTION (VINITAJC) 138/69/13.8KV TRANSFORMER CKT 1 | 62 | 0.25943 | 116.1495 | SUB 404 - HOCKERVILLE - VINITA JUNCTION 138KV CKT 1 |
| FDNS | 00G13_009 | 0 | 19SP | G13_009 | FROM->TO | VINITA JUNCTION (VINITAJC) 138/69/13.8KV TRANSFORMER CKT 1 | 62 | 0.25934 | 115.9013 | SUB 404 - HOCKERVILLE (HOCK 138) 161/138/12.5KV TRANSFORMER CKT 1 |
| FDNS | 00G13_009 | 0 | 19SP | G13_009 | FROM->TO | VINITA JUNCTION (VINITAJC) 138/69/13.8KV TRANSFORMER CKT 1 | 62 | 0.25934 | 115.6312 | SUB 404 - HOCKERVILLE - VINITA JUNCTION 138KV CKT 1 |
| FDNS | 00G13_009 | 0 | 14WP | G13_009 | FROM->TO | VINITA JUNCTION (VINITAJC) 138/69/13.8KV TRANSFORMER CKT 1 | 62 | 0.25932 | 113.7364 | SUB 404 - HOCKERVILLE (HOCK 138) 161/138/12.5KV TRANSFORMER CKT 1 |
| FDNS | 00G13_009 | 0 | 14WP | G13_009 | FROM->TO | VINITA JUNCTION (VINITAJC) 138/69/13.8KV TRANSFORMER CKT 1 | 62 | 0.25932 | 113.7051 | SUB 404 - HOCKERVILLE - VINITA JUNCTION 138KV CKT 1 |
| FDNS | 00G13_009 | 0 | 14WP | G13_009 | FROM->TO | VINITA JUNCTION (VINITAJC) 138/69/13.8KV TRANSFORMER CKT 1 | 62 | 0.25932 | 112.3799 | SUB 404 - HOCKERVILLE (HOCK 138) 161/138/12.5KV TRANSFORMER CKT 1 |
| FDNS | 00G13_009 | 0 | 14WP | G13_009 | FROM->TO | VINITA JUNCTION (VINITAJC) 138/69/13.8KV TRANSFORMER CKT 1 | 62 | 0.25932 | 112.176 | SUB 404 - HOCKERVILLE - VINITA JUNCTION 138KV CKT 1 |
| FDNS | 00G13_009 | 0 | 24SP | G13_009 | FROM->TO | VINITA JUNCTION (VINITAJC) 138/69/13.8KV TRANSFORMER CKT 1 | 62 | 0.25944 | 110.4419 | SUB 404 - HOCKERVILLE (HOCK 138) 161/138/12.5KV TRANSFORMER CKT 1 |
| FDNS | 00G13_009 | 0 | 24SP | G13_009 | FROM->TO | VINITA JUNCTION (VINITAJC) 138/69/13.8KV TRANSFORMER CKT 1 | 62 | 0.25944 | 110.4171 | SUB 404 - HOCKERVILLE - VINITA JUNCTION 138KV CKT 1 |
| FDNS | 00G13_009 | 0 | 24SP | G13_009 | FROM->TO | VINITA JUNCTION (VINITAJC) 138/69/13.8KV TRANSFORMER CKT 1 | 62 | 0.25944 | 109.4955 | SUB 404 - HOCKERVILLE (HOCK 138) 161/138/12.5KV TRANSFORMER CKT 1 |
| FDNS | 00G13_009 | 0 | 24SP | G13_009 | FROM->TO | VINITA JUNCTION (VINITAJC) 138/69/13.8KV TRANSFORMER CKT 1 | 62 | 0.25944 | 109.4059 | SUB 404 - HOCKERVILLE - VINITA JUNCTION 138KV CKT 1 |
| FDNS | 8 | 0 | 14G | G13_009 | FROM->TO | VINITA JUNCTION (VINITAJC) 138/69/13.8KV TRANSFORMER CKT 1 | 62 | 0.25925 | 101.4313 | SUB 404 - HOCKERVILLE - VINITA JUNCTION 138KV CKT 1 |
| FDNS | 8 | 0 | 14G | G13_009 | FROM->TO | VINITA JUNCTION (VINITAJC) 138/69/13.8KV TRANSFORMER CKT 1 | 62 | 0.25925 | 101.411 | SUB 404 - HOCKERVILLE (HOCK 138) 161/138/12.5KV TRANSFORMER CKT 1 |
| FDNS | 8 | 0 | 14G | G13_009 | FROM->TO | VINITA JUNCTION (VINITAJC) 138/69/13.8KV TRANSFORMER CKT 1 | 62 | 0.25925 | 100.1776 | SUB 404 - HOCKERVILLE (HOCK 138) 161/138/12.5KV TRANSFORMER CKT 1 |
| FDNS | 8 | 0 | 14G | G13_009 | FROM->TO | VINITA JUNCTION (VINITAJC) 138/69/13.8KV TRANSFORMER CKT 1 | 62 | 0.25925 | 100 | SUB 404 - HOCKERVILLE - VINITA JUNCTION 138KV CKT 1 |
| FDNS | 00G13_009 | 2 | 14SP | G13_009 | TO->FROM | VINITA - VINITA JUNCTION 69KV CKT 1 | 69 | 0.29533 | 117.3672 | SUB 404 - HOCKERVILLE - VINITA JUNCTION 138KV CKT 1 |
| FDNS | 00G13_009 | 2 | 14SP | G13_009 | TO->FROM | VINITA - VINITA JUNCTION 69KV CKT 1 | 69 | 0.29533 | 117.2489 | SUB 404 - HOCKERVILLE (HOCK 138) 161/138/12.5KV TRANSFORMER CKT 1 |
| FDNS | 00G13_009 | 2 | 19SP | G13_009 | TO->FROM | VINITA - VINITA JUNCTION 69KV CKT 1 | 69 | 0.29522 | 116.9824 | SUB 404 - HOCKERVILLE - VINITA JUNCTION 138KV CKT 1 |
| FDNS | 00G13_009 | 2 | 19SP | G13_009 | TO->FROM | VINITA - VINITA JUNCTION 69KV CKT 1 | 69 | 0.29522 | 116.8768 | SUB 404 - HOCKERVILLE (HOCK 138) 161/138/12.5KV TRANSFORMER CKT 1 |
| FDNS | 00G13_009 | 2 | 24SP | G13_009 | TO->FROM | VINITA - VINITA JUNCTION 69KV CKT 1 | 69 | 0.29533 | 110.4821 | SUB 404 - HOCKERVILLE - VINITA JUNCTION 138KV CKT 1 |
| FDNS | 00G13_009 | 2 | 24SP | G13_009 | TO->FROM | VINITA - VINITA JUNCTION 69KV CKT 1 | 69 | 0.29533 | 110.4398 | SUB 404 - HOCKERVILLE (HOCK 138) 161/138/12.5KV TRANSFORMER CKT 1 |
| FDNS | 00G13_009 | 2 | 19WP | G13_009 | TO->FROM | VINITA - VINITA JUNCTION 69KV CKT 1 | 78 | 0.29499 | 107.7664 | SUB 404 - HOCKERVILLE - VINITA JUNCTION 138KV CKT 1 |
| FDNS | 00G13_009 | 2 | 19WP | G13_009 | TO->FROM | VINITA - VINITA JUNCTION 69KV CKT 1 | 78 | 0.29499 | 107.6478 | SUB 404 - HOCKERVILLE (HOCK 138) 161/138/12.5KV TRANSFORMER CKT 1 |
| FDNS | 00G13_009 | 2 | 14WP | G13_009 | TO->FROM | VINITA - VINITA JUNCTION 69KV CKT 1 | 78 | 0.29521 | 99.7 | SUB 404 - HOCKERVILLE - VINITA JUNCTION 138KV CKT 1 |
| FDNS | 00G13_009 | 2 | 14WP | G13_009 | TO->FROM | VINITA - VINITA JUNCTION 69KV CKT 1 | 78 | 0.29521 | 99.6 | SUB 404 - HOCKERVILLE (HOCK 138) 161/138/12.5KV TRANSFORMER CKT 1 |
| FNSL-Blown up | 03ALL | 0 | 14G | G13_010 | | Non-Converged Contingency | 1793 | 0.48033 | - | G12-011T 345.00 - POST ROCK 345KV 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 | 06ALL | 0 | 14G | G13_009 | FROM->TO | TUCXFR345230 | 300 | 0.0447 | 102 | BASE CASE |
| FDNS | 0 | 0 | 14SP | G13_009 | FROM->TO | SILOAM CITY - SILOAM SPRINGS 161KV CKT 1 | 317 | 0.03602 | 105.7726 | FLINT CREEK - SILOAM SPRINGS TAP 345KV CKT 1 |
| FDNS | 00G13_009 | 0 | 14SP | G13_009 | FROM->TO | SILOAM CITY - SILOAM SPRINGS 161KV CKT 1 | 317 | 0.03602 | 106.7705 | FLINT CREEK - SILOAM SPRINGS TAP 345KV CKT 1 |
| FDNS | 0 | 0 | 19SP | G13_009 | FROM->TO | SILOAM CITY - SILOAM SPRINGS 161KV CKT 1 | 317 | 0.03664 | 123.5593 | FLINT CREEK - SILOAM SPRINGS TAP 345KV CKT 1 |
| FDNS | 00G13_009 | 0 | 19SP | G13_009 | FROM->TO | SILOAM CITY - SILOAM SPRINGS 161KV CKT 1 | 317 | 0.03666 | 124.4122 | FLINT CREEK - SILOAM SPRINGS TAP 345KV CKT 1 |
| FDNS | 0 | 0 | 19WP | G13_009 | FROM->TO | SILOAM CITY - SILOAM SPRINGS 161KV CKT 1 | 375 | 0.03966 | 101.3489 | FLINT CREEK - SILOAM SPRINGS TAP 345KV CKT 1 |
| FDNS | 00G13_009 | 0 | 19WP | G13_009 | FROM->TO | SILOAM CITY - SILOAM SPRINGS 161KV CKT 1 | 375 | 0.03968 | 102.1872 | FLINT CREEK - SILOAM SPRINGS TAP 345KV CKT 1 |
| FDNS | 0 | 0 | 24SP | G13_009 | FROM->TO | SILOAM CITY - SILOAM SPRINGS 161KV CKT 1 | 317 | 0.03686 | 131.8105 | FLINT CREEK - SILOAM SPRINGS TAP 345KV CKT 1 |
| FDNS | 00G13_009 | 0 | 24SP | G13_009 | FROM->TO | SILOAM CITY - SILOAM SPRINGS 161KV CKT 1 | 317 | 0.03685 | 132.7012 | FLINT CREEK - SILOAM SPRINGS TAP 345KV CKT 1 |
| FNSL-Blown up | 03ALL | 0 | 14G | G13_010 | | Non-Converged Contingency | 0 | 0.32511 | - | DBL-IRON-CLR |
| FNSL-Blown up | 03ALL | 0 | 14G | G13_010 | | Non-Converged Contingency | 0 | 0.32511 | - | DBL-THIS-CLR |
| FNSL-Blown up | 03ALL | 0 | 14G | G13_010 | | Non-Converged Contingency | 0 | 0.17576 | - | DBL-WICH-THI |
| FNSL-Blown up | 03G13_010 | 0 | 14G | G13_010 | | Non-Converged Contingency | 0 | 0.32696 | - | DBL-THIS-CLR |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SOUTH HAYS (S HAYS T1) 230/115/12.47KV TRANSFORMER CKT 1 | 166.7 | 0.06717 | 102.6188 | KNOLL 230 - POSTROCK6 230.00 230KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SOUTH HAYS (S HAYS T1) 230/115/12.47KV TRANSFORMER CKT 1 | 166.7 | 0.06717 | 101.334 | KNOLL 230 - POSTROCK6 230.00 230KV CKT 1 |
| FDNS | 3 | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.12572 | 119.4455 | DBL-WICH-THI |
| FDNS | 3 | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.15034 | 117.4994 | DBL-IRON-CLR |
| FDNS | 3 | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.15034 | 102.7541 | DBL-SPRVL-CL |
| FNSL | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11212 | 107.502 | KNOLL - SALINE RIVER 115KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.09794 | 105.3271 | SUMMIT (SUMMIT1X) 345/230/14.4KV TRANSFORMER CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.10911 | 99.4 | HOYT - STRANGER CREEK 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11132 | 107.75 | ST JOHN - ST_JOHN 115KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.10999 | 107.5793 | LAWTON EASTSIDE - OKLAUNION 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11061 | 107.0315 | FLATRDG3 - HARPER 138KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11066 | 106.8997 | MEDICINE LODGE - SUN CITY 115KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11061 | 106.7077 | HARPER - MILAN TAP 138KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11061 | 106.5748 | CLEARWATER - MILAN TAP 138KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.14986 | 135.0461 | AXTELL - POST ROCK 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.14958 | 126.5552 | DBL-SPRVL-CL |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.12511 | 125.3562 | CIRCLE - MULLERGREN 230KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11817 | 122.1061 | CLARKCOUNTY7345.00 - THISTLE7 345.00 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11817 | 122.1061 | CLARKCOUNTY7345.00 - THISTLE7 345.00 345KV CKT 2 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11816 | 121.0048 | FINNEY SWITCHING STATION - Hitchland Interchange 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11367 | 115.2605 | THISTLE7 345.00 - WICHITA 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11367 | 115.2605 | THISTLE7 345.00 - WICHITA 345KV CKT 2 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11816 | 113.3974 | FINNEY SWITCHING STATION - HOLCOMB 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11527 | 113.0083 | BUCKNER7 345.00 - HOLCOMB 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11552 | 111.9993 | AXTELL - PAULINE 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.13143 | 111.7527 | MULLERGREN - SOUTH HAYS 230KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11266 | 111.1707 | GRAND ISLAND - SWEETWATER 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 111.1024 | GEN532652 1-JEFFREY ENERGY CENTER UNIT 2 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 111.1018 | GEN532653 1-JEFFREY ENERGY CENTER UNIT 3 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11448 | 110.8739 | MOORE - PAULINE 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 110.8438 | GEN532651 1-JEFFREY ENERGY CENTER UNIT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11168 | 110.7549 | NORTHWEST - TATONGA7 345.00 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 110.075 | GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11168 | 109.4964 | G11_051T 345.00 - TATONGA7 345.00 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.1104 | 109.4831 | DBL-BVR-WWRD |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11168 | 109.3682 | G11_051T 345.00 - WOODWARD DISTRICT EHV 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11245 | 108.8954 | CIRCLE - EAST MCPHERSON 230KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11402 | 108.8716 | CLARKCOUNTY7345.00 - IRONWOOD7 345.00 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.12327 | 108.7974 | POSTROCK6 230.00 - SOUTH HAYS 230KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11402 | 108.7462 | CLARKCOUNTY7345.00 - SPEARVILLE 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11047 | 108.0505 | MINGO - RED WILLOW 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11281 | 107.9436 | PHILLIPSBURG - SMITH CENTER 115KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.1104 | 107.8459 | DBL-HTCH-BVR |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11136 | 107.6777 | GRAND ISLAND - MCCOOL 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11072 | 107.5876 | DBL-THIS-WWR |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 107.4835 | GEN542962 2-IATAN UNIT #2 |

| SOLUTION | GROUP | SCENARIO | SEASON | SOURCE | DIRECTION | MONITORED ELEMENT | RATEB (MVA) | TDF | TC%LOADING (% MVA) | CONTINGENCY |
|---|---|---|---|---|---|---|---|---|---|---|
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11042 | 107.4334 | STEGALL - STEGALL TRANSFORMER 230KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11042 | 107.4283 | STEGALL - STEGALL TY 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11042 | 107.428 | TRF-STEGALL |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11042 | 107.4227 | NEB01WAPAB3 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.1111 | 107.3641 | SPP-MKEC-08 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11212 | 107.2843 | PLAINVILLE - SALINE RIVER 115KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11066 | 107.279 | SPP-MKEC-09B |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 107.2645 | GEN542955 1-LACYGNE UNIT #1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 107.2597 | GEN542956 2-LACYGNE UNIT #2 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11066 | 107.1561 | GREENSBURG - SSTARTP3 115.00 115KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11182 | 107.1405 | SPP-MKEC-06 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11135 | 107.129 | MCCOOL - MOORE 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 107.1209 | GEN532663 1-LAWRENCE ENERGY CENTER UNIT 5 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11182 | 107.1206 | SEWARD - ST JOHN 115KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 107.0795 | GEN542957 1-IATAN UNIT #1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11112 | 107.0575 | G10-056T 345.00 - ST JOE 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11225 | 106.9255 | ELM CREEK - NORTHWEST MANHATTAN 230KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11212 | 106.8442 | PHILLIPSBURG - PLAINVILLE 115KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11112 | 106.8313 | COOPER - G10-056T 345.00 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11132 | 106.7964 | HUNTSVILLE - ST_JOHN 115KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11132 | 106.751 | MIDW-CATB05 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11066 | 106.7129 | BARBER 3 115.00 - MEDICINE LODGE 115KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 106.6893 | GEN542951 5-HAWTHORN UNIT #5 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11061 | 106.6669 | SPP-MKEC-03A |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11061 | 106.6398 | SPP-MKEC-05 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11132 | 106.6199 | HUNTSVILLE - HUTCHINSON ENERGY CENTER 115KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11043 | 106.6124 | NUNDRWD - WAYSIDE 230KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11061 | 106.6026 | SPP-MKEC-03B |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11073 | 106.5548 | EMPORIA ENERGY CENTER - WICHITA 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11094 | 106.3756 | GREAT BEND TAP - SEWARD 115KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11232 | 106.3711 | KNOLL 230 (KNOLL T1) 230/115/11.49KV TRANSFORMER CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11094 | 106.3698 | GREAT BEND TAP - MULLERGREN 115KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 105.2582 | BASE CASE |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 105.2582 | NC1_GEN-NEBRASKA CITY 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.10885 | 104.2873 | WR-DOUBLE18 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11007 | 104.2357 | MULLERGREN - SPEARVILLE 230KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11091 | 104.1721 | COLBY - MINGO 115KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.1106 | 104.1239 | EASTOWN7 345.00 - IATAN 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.10885 | 104.1174 | WR-DOUBLE16 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.10885 | 104.0947 | SPP-WR-305B |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 103.8227 | GEN640009 1-COOPER NUCLEAR STATION |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 103.7805 | GEN523971 1-HARRINGTON GEN #1 24 KV |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 103.7804 | GEN523972 1-HARRINGTON GEN #2 24 KV |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 103.7762 | GEN523973 1-HARRINGTON GEN #3 24 KV |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 103.7491 | GEN641089 2-ENERGY CENTER 2 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.10877 | 103.7062 | RENO COUNTY - SUMMIT 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 103.6985 | GEN645011 1-NEBRASKA CITY 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 103.6798 | GEN531459 2-S2 GENERATOR |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 103.6685 | GEN539762 1-SSWIND 1 34.500 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 103.6627 | GEN645001 1-FORT CALHOUN 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.1091 | 103.6587 | RENFROW7 345.00 - VIOLA 7 345.00 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11527 | 103.6152 | BUCKNER7 345.00 - SPEARVILLE 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.10885 | 103.61 | WR-DOUBLE17 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 103.5834 | GEN539677 3-A. M. MULLERGREN GENERATOR |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.10984 | 103.5829 | EMPORIA ENERGY CENTER - MORRIS COUNTY 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 103.557 | GEN560522 1-G05-12-2 0.6900 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 103.5181 | GEN539785 1-ENSNGW 1 0.5750 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 103.4146 | GEN560696 1-G11-008-4 0.6900 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 103.3501 | GEN645012 2-NEBRASKA CITY 2 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 103.3262 | GEN560140 1-G09-08 0.7000 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 103.2362 | GEN525562 1-TOLK GEN #2 24 KV |

| SOLUTION | GROUP | SCENARIO | SEASON | SOURCE | DIRECTION | MONITORED ELEMENT | RATEB (MVA) | TDF | TC%LOADING (% MVA) | CONTINGENCY |
|---|---|---|---|---|---|---|---|---|---|---|
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 103.2355 | GEN525561 1-TOLK GEN #1 24 KV |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 103.1928 | GEN560267 1-G10-15-1 0.6900 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 103.1786 | GEN539767 1-GRAY COUNTY WIND FARM |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 103.1419 | GEN560268 1-G10-15-2 0.6900 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 102.9807 | GEN560235 1-G08-92 0.6900 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 102.9535 | GEN659111 2-LELAND OLDS UNIT2 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.1057 | 102.9364 | MORRIS COUNTY - UNIONRG6 230.00 230KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 102.9106 | GEN560695 1-G11-008-3 0.6900 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 102.814 | GEN659103 1-ANTELOPE VALLEY UNIT1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 102.814 | GEN659107 2-ANTELOPE VALLEY UNIT2 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 102.7838 | GEN560694 1-G11-008-2 0.6900 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 102.6304 | GEN539670 4-JUDSON LARGE GENERATOR |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.10897 | 102.3097 | SWISSVALE - WEST GARDNER 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 102.2698 | GEN562298 1-G12-024 0.6500 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 102.1919 | GEN560238 1-G10-09 0.6900 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 102.1109 | GEN542902 1-GPW_G1 0.6900 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.1057 | 102.0036 | SUMMIT - UNIONRG6 230.00 230KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 101.963 | GEN560514 1-G04_014 0.6900 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 101.9495 | GEN560693 1-G11-008-1 0.6900 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 101.7618 | GEN539807 1-G05-12 0.6900 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 101.5789 | GEN560329 1-G10-45 0.6900 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 101.5687 | GEN531503 1-CIMRRN 1 34.500 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 101.5478 | GEN560725 1-G13_010_3 0.6900 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 101.1764 | GEN523117 1-BUFF_DUNES210.6900 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 101.1233 | GEN562035 1-G11_016_3 0.6900 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 101.1196 | GEN560432 1-G08-124 0.6900 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 101.0069 | GEN560549 1-G06-06 0.6900 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 100.7287 | GEN640011 2-GERALD GENTLEMAN STATION UNIT 2 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 100.6357 | GEN640010 1-GERALD GENTLEMAN STATION UNIT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 99.8 | GEN530600 02-SMKYP2G1 0.6900 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 99.5 | GEN531447 1-HOLCOMB GENERATOR |
| FDNS | 03G13_010 | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.15024 | 124.3577 | DBL-IRON-CLR |
| FDNS | 03G13_010 | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.12564 | 124.2147 | DBL-WICH-THI |
| FDNS | 03G13_010 | 0 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.15024 | 109.0301 | DBL-SPRVL-CL |
| FDNS | 3 | 0 | 14G | G13_010 | FROM->TO | SEWARD - ST JOHN 115KV CKT 1 | 87.6 | 0.03844 | 117.7216 | DBL-IRON-CLR |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SEWARD - ST JOHN 115KV CKT 1 | 87.6 | 0.03144 | 134.7378 | CIRCLE - MULLERGREN 230KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | SEWARD - ST JOHN 115KV CKT 1 | 87.6 | 0.03824 | 115.0474 | DBL-SPRVL-CL |
| FDNS | 03G13_010 | 0 | 14G | G13_010 | FROM->TO | SEWARD - ST JOHN 115KV CKT 1 | 87.6 | 0.03839 | 126.0191 | DBL-IRON-CLR |
| FDNS | 03G13_010 | 0 | 14G | G13_010 | FROM->TO | SEWARD - ST JOHN 115KV CKT 1 | 87.6 | 0.03839 | 101.555 | DBL-SPRVL-CL |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | N HAYS3 115.00 - VINE STREET 115KV CKT 1 | 99 | 0.06717 | 136.9579 | KNOLL 230 - POSTROCK6 230.00 230KV CKT 1 |
| FDNS | 3 | 0 | 14G | G13_010 | TO->FROM | MULLERGREN - SPEARVILLE 230KV CKT 1 | 398 | 0.06328 | 105.5474 | DBL-IRON-CLR |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | MULLERGREN - SPEARVILLE 230KV CKT 1 | 398 | 0.08395 | 118.1277 | POST ROCK (POSTROCK T1) 345/230/13.8KV TRANSFORMER CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | MULLERGREN - SPEARVILLE 230KV CKT 1 | 398 | 0.0623 | 113.2268 | DBL-SPRVL-CL |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | MULLERGREN - SPEARVILLE 230KV CKT 1 | 398 | 0.05235 | 100.3137 | MULLERGREN - SOUTH HAYS 230KV CKT 1 |
| FDNS | 03G13_010 | 0 | 14G | G13_010 | TO->FROM | MULLERGREN - SPEARVILLE 230KV CKT 1 | 398 | 0.06322 | 110.1012 | DBL-IRON-CLR |
| FDNS | 3 | 0 | 14G | G13_010 | TO->FROM | MEDICINE LODGE - SUN CITY 115KV CKT 1 | 115.1 | 0.03421 | 129.6206 | DBL-IRON-CLR |
| FDNS | 3 | 0 | 14G | G13_010 | TO->FROM | MEDICINE LODGE - SUN CITY 115KV CKT 1 | 115.1 | 0.03421 | 107.2721 | DBL-SPRVL-CL |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | MEDICINE LODGE - SUN CITY 115KV CKT 1 | 115.1 | 0.03373 | 139.9942 | DBL-SPRVL-CL |
| FDNS | 03G13_010 | 0 | 14G | G13_010 | TO->FROM | MEDICINE LODGE - SUN CITY 115KV CKT 1 | 115.1 | 0.03416 | 136.5648 | DBL-IRON-CLR |
| FDNS | 03G13_010 | 0 | 14G | G13_010 | TO->FROM | MEDICINE LODGE - SUN CITY 115KV CKT 1 | 115.1 | 0.03416 | 113.1144 | DBL-SPRVL-CL |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | KNOLL 230 - SMOKYHL6 230.00 230KV CKT 1 | 330 | 0.14986 | 102.709 | AXTELL - POST ROCK 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | KNOLL 230 - POSTROCK6 230.00 230KV CKT 1 | 398 | 0.20194 | 112.3303 | AXTELL - POST ROCK 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | KNOLL - N HAYS3 115.00 115KV CKT 1 | 88 | 0.06717 | 148.9391 | KNOLL 230 - POSTROCK6 230.00 230KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | HAYS PLANT - VINE STREET 115KV CKT 1 | 88 | 0.06717 | 162.0264 | KNOLL 230 - POSTROCK6 230.00 230KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | HAYS PLANT - SOUTH HAYS 115KV CKT 1 | 99 | 0.06717 | 161.9226 | KNOLL 230 - POSTROCK6 230.00 230KV CKT 1 |
| FDNS | 3 | 0 | 14G | G13_010 | FROM->TO | HARPER - MILAN TAP 138KV CKT 1 | 110 | 0.03677 | 233.8508 | DBL-WICH-THI |
| FDNS | 5 | 0 | 14G | G13_010 | FROM->TO | HARPER - MILAN TAP 138KV CKT 1 | 110 | 0.03738 | 128.5016 | DBL-WICH-THI |
| FDNS | 6 | 0 | 14G | G13_010 | FROM->TO | HARPER - MILAN TAP 138KV CKT 1 | 110 | 0.03711 | 144.6528 | DBL-WICH-THI |
| FDNS | 9 | 0 | 14G | G13_010 | FROM->TO | HARPER - MILAN TAP 138KV CKT 1 | 110 | 0.03743 | 117.6357 | DBL-WICH-THI |
| FDNS | 14 | 0 | 14G | G13_010 | FROM->TO | HARPER - MILAN TAP 138KV CKT 1 | 110 | 0.03755 | 113.4113 | DBL-WICH-THI |
| FDNS | 03G13_010 | 0 | 14G | G13_010 | FROM->TO | HARPER - MILAN TAP 138KV CKT 1 | 110 | 0.03672 | 241.6025 | DBL-WICH-THI |

| SOLUTION | GROUP | SCENARIO | SEASON | SOURCE | DIRECTION | MONITORED ELEMENT | RATEB (MVA) | TDF | TC%LOADING (% MVA) | CONTINGENCY |
|---|---|---|---|---|---|---|---|---|---|---|
| FDNS | 05ALL | 0 | 14G | G13_010 | FROM->TO | HARPER - MILAN TAP 138KV CKT 1 | 110 | 0.03724 | 137.8174 | DBL-WICH-THI |
| FDNS | 06ALL | 0 | 14G | G13_010 | FROM->TO | HARPER - MILAN TAP 138KV CKT 1 | 110 | 0.03696 | 159.9267 | DBL-WICH-THI |
| FDNS | 09ALL | 0 | 14G | G13_010 | FROM->TO | HARPER - MILAN TAP 138KV CKT 1 | 110 | 0.0374 | 123.365 | DBL-WICH-THI |
| FDNS | 14ALL | 0 | 14G | G13_010 | FROM->TO | HARPER - MILAN TAP 138KV CKT 1 | 110 | 0.03741 | 119.0514 | DBL-WICH-THI |
| FDNS | 3 | 0 | 14G | G13_010 | FROM->TO | GREENSBURG - SUN CITY 115KV CKT 1 | 115.1 | 0.03421 | 134.6157 | DBL-IRON-CLR |
| FDNS | 3 | 0 | 14G | G13_010 | FROM->TO | GREENSBURG - SUN CITY 115KV CKT 1 | 115.1 | 0.03421 | 112.2721 | DBL-SPRVL-CL |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | GREENSBURG - SUN CITY 115KV CKT 1 | 115.1 | 0.03373 | 145.199 | DBL-SPRVL-CL |
| FDNS | 03G13_010 | 0 | 14G | G13_010 | FROM->TO | GREENSBURG - SUN CITY 115KV CKT 1 | 115.1 | 0.03416 | 141.5802 | DBL-IRON-CLR |
| FDNS | 03G13_010 | 0 | 14G | G13_010 | FROM->TO | GREENSBURG - SUN CITY 115KV CKT 1 | 115.1 | 0.03416 | 118.1059 | DBL-SPRVL-CL |
| FDNS | 3 | 0 | 14G | G13_010 | TO->FROM | GREENSBURG - SSTARTP3 115.00 115KV CKT 1 | 115.1 | 0.03421 | 145.6049 | DBL-IRON-CLR |
| FDNS | 3 | 0 | 14G | G13_010 | TO->FROM | GREENSBURG - SSTARTP3 115.00 115KV CKT 1 | 115.1 | 0.03421 | 123.0563 | DBL-SPRVL-CL |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | GREENSBURG - SSTARTP3 115.00 115KV CKT 1 | 115.1 | 0.03373 | 156.4155 | DBL-SPRVL-CL |
| FDNS | 03G13_010 | 0 | 14G | G13_010 | TO->FROM | GREENSBURG - SSTARTP3 115.00 115KV CKT 1 | 115.1 | 0.03416 | 152.7017 | DBL-IRON-CLR |
| FDNS | 03G13_010 | 0 | 14G | G13_010 | TO->FROM | GREENSBURG - SSTARTP3 115.00 115KV CKT 1 | 115.1 | 0.03416 | 128.9202 | DBL-SPRVL-CL |
| FDNS | 3 | 0 | 14G | G13_010 | FROM->TO | GREAT BEND TAP - SEWARD 115KV CKT 1 | 80.3 | 0.03063 | 111.5826 | DBL-IRON-CLR |
| FDNS | 03ALL | 0 | 14G | G13_010 | FROM->TO | GREAT BEND TAP - SEWARD 115KV CKT 1 | 80.3 | 0.03048 | 108.3114 | DBL-SPRVL-CL |
| FDNS | 03G13_010 | 0 | 14G | G13_010 | FROM->TO | GREAT BEND TAP - SEWARD 115KV CKT 1 | 80.3 | 0.03058 | 118.405 | DBL-IRON-CLR |
| FDNS | 3 | 0 | 14G | G13_010 | TO->FROM | GREAT BEND TAP - MULLERGREN 115KV CKT 1 | 79.7 | 0.03063 | 112.4987 | DBL-IRON-CLR |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | GREAT BEND TAP - MULLERGREN 115KV CKT 1 | 79.7 | 0.03048 | 109.1976 | DBL-SPRVL-CL |
| FDNS | 03G13_010 | 0 | 14G | G13_010 | TO->FROM | GREAT BEND TAP - MULLERGREN 115KV CKT 1 | 79.7 | 0.03058 | 119.3683 | DBL-IRON-CLR |
| FDNS | 3 | 0 | 14G | G13_010 | TO->FROM | FPL SWITCH - WOODWARD 138KV CKT 1 | 153 | 0.04032 | 153.1194 | DBL-WICH-THI |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | FPL SWITCH - WOODWARD 138KV CKT 1 | 153 | 0.03525 | 170.0549 | NORTHWEST - TATONGA7 345.00 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | FPL SWITCH - WOODWARD 138KV CKT 1 | 153 | 0.03525 | 156.3099 | G11_051T 345.00 - TATONGA7 345.00 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | FPL SWITCH - WOODWARD 138KV CKT 1 | 153 | 0.03525 | 154.6158 | G11_051T 345.00 - WOODWARD DISTRICT EHV 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | FPL SWITCH - WOODWARD 138KV CKT 1 | 153 | 0.03124 | 122.055 | RENFROW7 345.00 - VIOLA 7 345.00 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | FPL SWITCH - WOODWARD 138KV CKT 1 | 153 | 0.03124 | 116.3753 | VIOLA 7 345.00 - WICHITA 345KV CKT 1 |
| FDNS | 03G13_010 | 0 | 14G | G13_010 | TO->FROM | FPL SWITCH - WOODWARD 138KV CKT 1 | 153 | 0.04025 | 158.2368 | DBL-WICH-THI |
| FDNS | 05ALL | 0 | 14G | G13_010 | TO->FROM | FPL SWITCH - WOODWARD 138KV CKT 1 | 153 | 0.0342 | 112.9024 | NORTHWEST - TATONGA7 345.00 345KV CKT 1 |
| FDNS | 05ALL | 0 | 14G | G13_010 | TO->FROM | FPL SWITCH - WOODWARD 138KV CKT 1 | 153 | 0.039 | 105.7277 | DBL-WICH-THI |
| FDNS | 05ALL | 0 | 14G | G13_010 | TO->FROM | FPL SWITCH - WOODWARD 138KV CKT 1 | 153 | 0.0342 | 99.7 | G11_051T 345.00 - TATONGA7 345.00 345KV CKT 1 |
| FDNS | 06ALL | 0 | 14G | G13_010 | TO->FROM | FPL SWITCH - WOODWARD 138KV CKT 1 | 153 | 0.03364 | 138.1828 | NORTHWEST - TATONGA7 345.00 345KV CKT 1 |
| FDNS | 06ALL | 0 | 14G | G13_010 | TO->FROM | FPL SWITCH - WOODWARD 138KV CKT 1 | 153 | 0.03841 | 130.7413 | DBL-WICH-THI |
| FDNS | 06ALL | 0 | 14G | G13_010 | TO->FROM | FPL SWITCH - WOODWARD 138KV CKT 1 | 153 | 0.03364 | 124.864 | G11_051T 345.00 - TATONGA7 345.00 345KV CKT 1 |
| FDNS | 06ALL | 0 | 14G | G13_010 | TO->FROM | FPL SWITCH - WOODWARD 138KV CKT 1 | 153 | 0.03364 | 123.1966 | G11_051T 345.00 - WOODWARD DISTRICT EHV 345KV CKT 1 |
| FDNS | 09ALL | 0 | 14G | G13_010 | TO->FROM | FPL SWITCH - WOODWARD 138KV CKT 1 | 153 | 0.03412 | 107.9753 | NORTHWEST - TATONGA7 345.00 345KV CKT 1 |
| FDNS | 09ALL | 0 | 14G | G13_010 | TO->FROM | FPL SWITCH - WOODWARD 138KV CKT 1 | 153 | 0.03887 | 100 | DBL-WICH-THI |
| FDNS | 3 | 0 | 14G | G13_010 | TO->FROM | CLEARWATER - MILAN TAP 138KV CKT 1 | 110 | 0.03677 | 223.345 | DBL-WICH-THI |
| FDNS | 5 | 0 | 14G | G13_010 | TO->FROM | CLEARWATER - MILAN TAP 138KV CKT 1 | 110 | 0.03738 | 117.9811 | DBL-WICH-THI |
| FDNS | 6 | 0 | 14G | G13_010 | TO->FROM | CLEARWATER - MILAN TAP 138KV CKT 1 | 110 | 0.03711 | 134.1188 | DBL-WICH-THI |
| FDNS | 9 | 0 | 14G | G13_010 | TO->FROM | CLEARWATER - MILAN TAP 138KV CKT 1 | 110 | 0.03743 | 107.1424 | DBL-WICH-THI |
| FDNS | 14 | 0 | 14G | G13_010 | TO->FROM | CLEARWATER - MILAN TAP 138KV CKT 1 | 110 | 0.03755 | 102.8853 | DBL-WICH-THI |
| FDNS | 03G13_010 | 0 | 14G | G13_010 | TO->FROM | CLEARWATER - MILAN TAP 138KV CKT 1 | 110 | 0.03672 | 231.0951 | DBL-WICH-THI |
| FDNS | 05ALL | 0 | 14G | G13_010 | TO->FROM | CLEARWATER - MILAN TAP 138KV CKT 1 | 110 | 0.03724 | 127.2284 | DBL-WICH-THI |
| FDNS | 06ALL | 0 | 14G | G13_010 | TO->FROM | CLEARWATER - MILAN TAP 138KV CKT 1 | 110 | 0.03696 | 149.3514 | DBL-WICH-THI |
| FDNS | 09ALL | 0 | 14G | G13_010 | TO->FROM | CLEARWATER - MILAN TAP 138KV CKT 1 | 110 | 0.0374 | 112.8165 | DBL-WICH-THI |
| FDNS | 14ALL | 0 | 14G | G13_010 | TO->FROM | CLEARWATER - MILAN TAP 138KV CKT 1 | 110 | 0.03741 | 108.4856 | DBL-WICH-THI |
| FDNS | 3 | 0 | 14G | G13_010 | FROM->TO | CLEARWATER - GILL ENERGY CENTER WEST 138KV CKT 1 | 191 | 0.03677 | 121.6012 | DBL-WICH-THI |
| FDNS | 03G13_010 | 0 | 14G | G13_010 | FROM->TO | CLEARWATER - GILL ENERGY CENTER WEST 138KV CKT 1 | 191 | 0.03672 | 126.0571 | DBL-WICH-THI |
| FDNS | 3 | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.09483 | 121.5944 | DBL-WICH-THI |
| FDNS | 3 | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.12248 | 116.8642 | DBL-IRON-CLR |
| FDNS | 3 | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.12248 | 99.7 | DBL-SPRVL-CL |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.0745 | 99 | HOYT - STRANGER CREEK 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07582 | 101.5417 | CIRCLE - HUTCHINSON ENERGY CENTER 115KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07905 | 111.4533 | ST JOHN - ST_JOHN 115KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07631 | 106.7837 | ELLSWTP3 115.00 - MULLERGREN 115KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07631 | 105.771 | ELLSWTP3 115.00 - RUSSELL 115KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07498 | 105.4025 | LAWTON EASTSIDE - OKLAUNION 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07581 | 104.9866 | FLATRDG3 - HARPER 138KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07581 | 104.5947 | HARPER - MILAN TAP 138KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07581 | 104.4288 | CLEARWATER - MILAN TAP 138KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07687 | 104.108 | FLATRDG3 - MEDICINE LODGE 138KV CKT 1 |

| SOLUTION | GROUP | SCENARIO | SEASON | SOURCE | DIRECTION | MONITORED ELEMENT | RATEB (MVA) | TDF | TC%LOADING (% MVA) | CONTINGENCY |
|---|---|---|---|---|---|---|---|---|---|---|
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.10018 | 128.0898 | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.12156 | 126.6712 | DBL-SPRVL-CL |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.08461 | 121.5654 | CLARKCOUNTY7345.00 - THISTLE7 345.00 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.08461 | 121.5654 | CLARKCOUNTY7345.00 - THISTLE7 345.00 345KV CKT 2 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.10018 | 120.323 | KNOLL 230 - SMOKYHL6 230.00 230KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.09797 | 120.2296 | AXTELL - POST ROCK 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.08477 | 120.0827 | FINNEY SWITCHING STATION - Hitchland Interchange 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07962 | 114.711 | THISTLE7 345.00 - WICHITA 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07962 | 114.711 | THISTLE7 345.00 - WICHITA 345KV CKT 2 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.08477 | 111.9915 | FINNEY SWITCHING STATION - HOLCOMB 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.08836 | 111.5255 | KNOLL 230 - POSTROCK6 230.00 230KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.08081 | 110.861 | BUCKNER7 345.00 - HOLCOMB 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.08177 | 110.3035 | SPP-MKEC-06 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.08176 | 110.2493 | SEWARD - ST JOHN 115KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07698 | 108.6975 | NORTHWEST - TATONGA7 345.00 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07612 | 108.6385 | MINGO - RED WILLOW 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07905 | 108.4135 | HUNTSVILLE - ST_JOHN 115KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07905 | 108.193 | MIDW-CATB05 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07905 | 107.8521 | HUNTSVILLE - HUTCHINSON ENERGY CENTER 115KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07547 | 107.6599 | DBL-BVR-WWRD |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 107.6185 | GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07698 | 107.4601 | G11_051T 345.00 - TATONGA7 345.00 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.0771 | 107.3283 | GRAND ISLAND - SWEETWATER 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07698 | 107.3235 | G11_051T 345.00 - WOODWARD DISTRICT EHV 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07877 | 107.3078 | AXTELL - PAULINE 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07833 | 107.0012 | GREAT BEND TAP - SEWARD 115KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07833 | 106.9962 | GREAT BEND TAP - MULLERGREN 115KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07631 | 106.9518 | SPP-MKEC-02 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07972 | 106.9291 | CLARKCOUNTY7345.00 - IRONWOOD7 345.00 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07972 | 106.7848 | CLARKCOUNTY7345.00 - SPEARVILLE 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 106.7673 | GEN532652 1-JEFFREY ENERGY CENTER UNIT 2 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 106.7669 | GEN532653 1-JEFFREY ENERGY CENTER UNIT 3 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07817 | 106.6721 | MOORE - PAULINE 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 106.4872 | GEN532651 1-JEFFREY ENERGY CENTER UNIT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07732 | 105.8402 | SPP-MKEC-08 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07547 | 105.8015 | DBL-HTCH-BVR |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07541 | 104.7624 | STEGALL - STEGALL TRANSFORMER 230KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07541 | 104.7576 | STEGALL - STEGALL TY 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07541 | 104.757 | TRF-STEGALL |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07541 | 104.752 | NEB01WAPAB3 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 104.6874 | GEN530690 1-PRWINDG1 0.6900 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07611 | 104.6848 | GRAND ISLAND - MCCOOL 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07568 | 104.6788 | SPP-MKEC-09B |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07631 | 104.6684 | RUSSELL - WALDO 115KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07748 | 104.5929 | ELM CREEK - NORTHWEST MANHATTAN 230KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07581 | 104.4684 | SPP-MKEC-05 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07581 | 104.4654 | SPP-MKEC-03A |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 104.4646 | GEN542955 1-LACYGNE UNIT #1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 104.4614 | GEN542956 2-LACYGNE UNIT #2 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07581 | 104.4268 | SPP-MKEC-03B |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 104.3989 | GEN542962 2-IATAN UNIT #2 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07556 | 104.2879 | GERALD GENTLEMAN STATION - RED WILLOW 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07611 | 104.2721 | MCCOOL - MOORE 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07581 | 104.2617 | CLEARWATER - GILL ENERGY CENTER WEST 138KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07631 | 104.2401 | COVERT 3 115.00 - WALDO 115KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07631 | 104.2184 | COVERT 3 115.00 - SMITH CENTER 115KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.0759 | 104.1463 | G10-056T 345.00 - ST JOE 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07628 | 104.127 | MULLERGREN (MULGREN6) 230/115/13.8KV TRANSFORMER CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 104.1207 | GEN542957 1-IATAN UNIT #1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07687 | 104.1018 | MEDICINE LODGE (BARBER 4) 138/115/2.72KV TRANSFORMER CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 104.0896 | GEN532663 1-LAWRENCE ENERGY CENTER UNIT 5 |

| SOLUTION | GROUP | SCENARIO | SEASON | SOURCE | DIRECTION | MONITORED ELEMENT | RATEB (MVA) | TDF | TC%LOADING (% MVA) | CONTINGENCY |
|---|---|---|---|---|---|---|---|---|---|---|
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07627 | 104.0735 | HEIZER 6 230.00 (HEIZER T1) 230/115/12.5KV TRANSFORMER CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07627 | 104.0692 | HEIZER 6 230.00 - MULLERGREN 230KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.0759 | 103.9784 | COOPER - G10-056T 345.00 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 102.828 | BASE CASE |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 102.828 | NC1_GEN-NEBRASKA CITY 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07486 | 101.7924 | CIRCLE - RICE 6 230.00 230KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 101.7622 | GEN640009 1-COOPER NUCLEAR STATION |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07371 | 101.7204 | VIOLA 7 345.00 - WICHITA 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 101.6871 | GEN645011 1-NEBRASKA CITY 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 101.6618 | GEN645001 1-FORT CALHOUN 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07309 | 101.6267 | MORRIS COUNTY - UNIONRG6 230.00 230KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07414 | 101.5987 | MOUNDRIDGE (MOUND10X) 138/115/13.8KV TRANSFORMER CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07414 | 101.5939 | WR-B3-9 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 101.5925 | GEN560235 1-G08-92 0.6900 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07429 | 101.575 | BENTON - WICHITA 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07418 | 101.5339 | HUNTERS7 345.00 - WOODRING 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07608 | 101.5238 | MINGO (MINGO) 345/115/13.8KV TRANSFORMER CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 101.4295 | GEN645012 2-NEBRASKA CITY 2 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07571 | 101.3341 | BEELER - NESS CITY 115KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 101.2391 | GEN560140 1-G09-08 0.7000 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07571 | 101.2151 | BEELER - DIGHTON TAP 115KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07309 | 101.2115 | SUMMIT - UNIONRG6 230.00 230KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07589 | 101.1953 | SPP-MKEC-12 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07486 | 101.1741 | RICE 6 230.00 (RICE T1) 230/115/12.47KV TRANSFORMER CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07589 | 101.1693 | ALEXANDER - SAWYER 3 115.00 115KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 101.1628 | GEN523971 1-HARRINGTON GEN #1 24 KV |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 101.1627 | GEN523972 1-HARRINGTON GEN #2 24 KV |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 101.158 | GEN523973 1-HARRINGTON GEN #3 24 KV |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07507 | 101.1566 | SPP-WR-335A |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07589 | 101.1401 | BARBER 3 115.00 - SAWYER 3 115.00 115KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 101.1315 | GEN659111 2-LELAND OLDS UNIT2 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07487 | 101.0974 | EAST MCPHERSON (EMCPHR1X) 230/115/13.8KV TRANSFORMER CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.08081 | 101.0914 | BUCKNER7 345.00 - SPEARVILLE 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07633 | 101.0439 | MIDW-CATB04 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 101.0264 | GEN659103 1-ANTELOPE VALLEY UNIT1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 101.0264 | GEN659107 2-ANTELOPE VALLEY UNIT2 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 101 | GEN531459 2-S2 GENERATOR |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07441 | 100.9628 | SWISSVALE - WEST GARDNER 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 100.9417 | GEN560522 1-G05-12-2 0.6900 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07571 | 100.9387 | DIGHTON TAP - MANNING TAP 115KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07632 | 100.8635 | ALEXANDER - NEKOMA 115KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 100.7966 | GEN560696 1-G11-008-4 0.6900 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07371 | 100.7947 | RENFROW7 345.00 - VIOLA 7 345.00 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07632 | 100.7653 | ALEXANDER - NESS CITY 115KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07571 | 100.7639 | MANNING TAP - SCOTT CITY 115KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07364 | 100.7521 | WR-B3-8 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07364 | 100.7289 | MOUNDRIDGE - RENO COUNTY 115KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 100.693 | GEN539785 1-ENSNGW 1 0.5750 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 100.6819 | GEN539762 1-SSWIND 1 34.500 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07486 | 100.5828 | MIDW-CATB06 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 100.5593 | GEN525562 1-TOLK GEN #2 24 KV |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 100.5586 | GEN525561 1-TOLK GEN #1 24 KV |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 100.5445 | GEN560267 1-G10-15-1 0.6900 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 100.508 | GEN560268 1-G10-15-2 0.6900 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07632 | 100.5016 | NESS CITY - NESS CITY 115KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 100.2743 | GEN560695 1-G11-008-3 0.6900 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 100.2444 | GEN539767 1-GRAY COUNTY WIND FARM |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 100.2207 | GEN560725 1-G13_010_3 0.6900 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 100.1361 | GEN560694 1-G11-008-2 0.6900 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.09385 | 99.7 | G11-17T 345.00 - SPEARVILLE 345KV CKT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 99.6 | GEN562298 1-G12-024 0.6500 |

| SOLUTION | GROUP | SCENARIO | SEASON | SOURCE | DIRECTION | MONITORED ELEMENT | RATEB (MVA) | TDF | TC%LOADING (% MVA) | CONTINGENCY |
|---|---|---|---|---|---|---|---|---|---|---|
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 99.5 | GEN539670 4-JUDSON LARGE GENERATOR |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 99.5 | GEN560238 1-G10-09 0.6900 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 99.2 | GEN560693 1-G11-008-1 0.6900 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 99.2 | GEN640010 1-GERALD GENTLEMAN STATION UNIT 1 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 99.2 | GEN640011 2-GERALD GENTLEMAN STATION UNIT 2 |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 99 | GEN539807 1-G05-12 0.6900 |
| FDNS | 03G13_010 | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.0947 | 126.7885 | DBL-WICH-THI |
| FDNS | 03G13_010 | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.12234 | 123.7977 | DBL-IRON-CLR |
| FDNS | 03G13_010 | 0 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.12234 | 105.8 | DBL-SPRVL-CL |
| FDNS | 03ALL | 0 | 14G | G13_010 | TO->FROM | CHISHOLM - MAIZEE 4 138.00 138KV CKT 1 | 287 | 0.04224 | 104.6975 | BENTON - WICHITA 345KV CKT 1 |
| FDNS | 03G13_010 | 0 | 14G | G13_010 | FROM->TO | BUCKNER7 345.00 - HOLCOMB 345KV CKT 1 | 717.1 | 0.28859 | 101.1088 | DBL-IRON-CLR |
| FDNS | 0 | 0 | 14WP | G13_010 | FROM->TO | HARPER - MILAN TAP 138KV CKT 1 | 110 | 0.03674 | 101.9121 | DBL-WICH-THI |
| FNSL | 00G13_010 | 0 | 14WP | G13_010 | FROM->TO | HARPER - MILAN TAP 138KV CKT 1 | 110 | 0.03625 | 138.3989 | DBL-WICH-THI |
| FDNS | 00G13_010 | 0 | 14WP | G13_010 | FROM->TO | HARPER - MILAN TAP 138KV CKT 1 | 110 | 0.03667 | 111.8705 | DBL-WICH-THI |
| FNSL | 00G13_010 | 0 | 14WP | G13_010 | TO->FROM | CLEARWATER - MILAN TAP 138KV CKT 1 | 110 | 0.03625 | 128.1672 | DBL-WICH-THI |
| FDNS | 00G13_010 | 0 | 14WP | G13_010 | TO->FROM | CLEARWATER - MILAN TAP 138KV CKT 1 | 110 | 0.03667 | 101.6097 | DBL-WICH-THI |
| FNSL | 00G13_010 | 0 | 19WP | G13_010 | FROM->TO | HARPER - MILAN TAP 138KV CKT 1 | 110 | 0.03857 | 118.5019 | DBL-WICH-THI |
| FNSL | 00G13_010 | 0 | 19WP | G13_010 | TO->FROM | CLEARWATER - MILAN TAP 138KV CKT 1 | 110 | 0.03857 | 107.1135 | DBL-WICH-THI |
| FDNS | 06ALL | 2 | 14G | G13_009 | FROM->TO | TUCXFR345230 | 300 | 0.04423 | 100.6 | BASE CASE |
| FDNS | 0 | 2 | 14SP | G13_009 | FROM->TO | SILOAM CITY - SILOAM SPRINGS 161KV CKT 1 | 317 | 0.03695 | 105.8565 | FLINT CREEK - SILOAM SPRINGS TAP 345KV CKT 1 |
| FDNS | 0 | 2 | 14SP | G13_009 | FROM->TO | SILOAM CITY - SILOAM SPRINGS 161KV CKT 1 | 317 | 0.03604 | 105.8014 | FLINT CREEK - SILOAM SPRINGS TAP 345KV CKT 1 |
| FDNS | 0 | 2 | 14SP | G13_009 | FROM->TO | SILOAM CITY - SILOAM SPRINGS 161KV CKT 1 | 317 | 0.03604 | 105.7949 | FLINT CREEK - SILOAM SPRINGS TAP 345KV CKT 1 |
| FDNS | 00G13_009 | 2 | 14SP | G13_009 | FROM->TO | SILOAM CITY - SILOAM SPRINGS 161KV CKT 1 | 317 | 0.03695 | 106.8837 | FLINT CREEK - SILOAM SPRINGS TAP 345KV CKT 1 |
| FDNS | 0 | 2 | 19SP | G13_009 | FROM->TO | SILOAM CITY - SILOAM SPRINGS 161KV CKT 1 | 317 | 0.03759 | 123.6502 | FLINT CREEK - SILOAM SPRINGS TAP 345KV CKT 1 |
| FDNS | 0 | 2 | 19SP | G13_009 | FROM->TO | SILOAM CITY - SILOAM SPRINGS 161KV CKT 1 | 317 | 0.03666 | 123.5928 | FLINT CREEK - SILOAM SPRINGS TAP 345KV CKT 1 |
| FDNS | 0 | 2 | 19SP | G13_009 | FROM->TO | SILOAM CITY - SILOAM SPRINGS 161KV CKT 1 | 317 | 0.03666 | 123.5841 | FLINT CREEK - SILOAM SPRINGS TAP 345KV CKT 1 |
| FDNS | 00G13_009 | 2 | 19SP | G13_009 | FROM->TO | SILOAM CITY - SILOAM SPRINGS 161KV CKT 1 | 317 | 0.03761 | 124.5336 | FLINT CREEK - SILOAM SPRINGS TAP 345KV CKT 1 |
| FDNS | 0 | 2 | 19WP | G13_009 | FROM->TO | SILOAM CITY - SILOAM SPRINGS 161KV CKT 1 | 375 | 0.04061 | 101.4147 | FLINT CREEK - SILOAM SPRINGS TAP 345KV CKT 1 |
| FDNS | 0 | 2 | 19WP | G13_009 | FROM->TO | SILOAM CITY - SILOAM SPRINGS 161KV CKT 1 | 375 | 0.03969 | 101.3723 | FLINT CREEK - SILOAM SPRINGS TAP 345KV CKT 1 |
| FDNS | 0 | 2 | 19WP | G13_009 | FROM->TO | SILOAM CITY - SILOAM SPRINGS 161KV CKT 1 | 375 | 0.03969 | 101.3645 | FLINT CREEK - SILOAM SPRINGS TAP 345KV CKT 1 |
| FDNS | 00G13_009 | 2 | 19WP | G13_009 | FROM->TO | SILOAM CITY - SILOAM SPRINGS 161KV CKT 1 | 375 | 0.04063 | 102.2782 | FLINT CREEK - SILOAM SPRINGS TAP 345KV CKT 1 |
| FDNS | 0 | 2 | 24SP | G13_009 | FROM->TO | SILOAM CITY - SILOAM SPRINGS 161KV CKT 1 | 317 | 0.03781 | 131.9832 | FLINT CREEK - SILOAM SPRINGS TAP 345KV CKT 1 |
| FDNS | 0 | 2 | 24SP | G13_009 | FROM->TO | SILOAM CITY - SILOAM SPRINGS 161KV CKT 1 | 317 | 0.03688 | 131.9439 | FLINT CREEK - SILOAM SPRINGS TAP 345KV CKT 1 |
| FDNS | 0 | 2 | 24SP | G13_009 | FROM->TO | SILOAM CITY - SILOAM SPRINGS 161KV CKT 1 | 317 | 0.03688 | 131.9352 | FLINT CREEK - SILOAM SPRINGS TAP 345KV CKT 1 |
| FDNS | 00G13_009 | 2 | 24SP | G13_009 | FROM->TO | SILOAM CITY - SILOAM SPRINGS 161KV CKT 1 | 317 | 0.0378 | 132.9302 | FLINT CREEK - SILOAM SPRINGS TAP 345KV CKT 1 |
| FNSL-Blown up | 3 | 2 | 14G | G13_010 | | Non-Converged Contingency | 0 | 0.3273 | - | DBL-THIS-CLR |
| FNSL-Blown up | 03ALL | 2 | 14G | G13_010 | | Non-Converged Contingency | 0 | 0.32511 | - | DBL-IRON-CLR |
| FNSL-Blown up | 03ALL | 2 | 14G | G13_010 | | Non-Converged Contingency | 0 | 0.32511 | - | DBL-THIS-CLR |
| FNSL-Blown up | 03ALL | 2 | 14G | G13_010 | | Non-Converged Contingency | 0 | 0.17576 | - | DBL-WICH-THI |
| FNSL-Blown up | 03G13_010 | 2 | 14G | G13_010 | | Non-Converged Contingency | 0 | 0.32697 | - | DBL-THIS-CLR |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SOUTH HAYS (S HAYS T1) 230/115/12.47KV TRANSFORMER CKT 1 | 166.7 | 0.06717 | 100.9551 | KNOLL 230 - POSTROCK6 230.00 230KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SOUTH HAYS (S HAYS T1) 230/115/12.47KV TRANSFORMER CKT 1 | 166.7 | 0.06717 | 99.8 | KNOLL 230 - POSTROCK6 230.00 230KV CKT 1 |
| FDNS | 3 | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.12572 | 118.7822 | DBL-WICH-THI |
| FDNS | 3 | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.15034 | 117.5783 | DBL-IRON-CLR |
| FDNS | 3 | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.15034 | 102.6854 | DBL-SPRVL-CL |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.09793 | 104.1109 | SUMMIT (SUMMIT1X) 345/230/14.4KV TRANSFORMER CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11132 | 106.3811 | ST JOHN - ST_JOHN 115KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.10999 | 106.1081 | LAWTON EASTSIDE - OKLAUNION 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11061 | 105.6103 | FLATRDG3 - HARPER 138KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11066 | 105.6069 | GREENSBURG - SUN CITY 115KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11066 | 105.5298 | MEDICINE LODGE - SUN CITY 115KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11061 | 105.3382 | HARPER - MILAN TAP 138KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11061 | 105.1736 | CLEARWATER - MILAN TAP 138KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.14986 | 132.3219 | AXTELL - POST ROCK 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.14958 | 127.099 | DBL-SPRVL-CL |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.12511 | 123.5505 | CIRCLE - MULLERGREN 230KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11817 | 120.5942 | CLARKCOUNTY7345.00 - THISTLE7 345.00 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11817 | 120.5942 | CLARKCOUNTY7345.00 - THISTLE7 345.00 345KV CKT 2 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11816 | 118.174 | SPP-SWPS-05 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11816 | 117.9218 | FINNEY SWITCHING STATION - Hitchland Interchange 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11367 | 113.3916 | THISTLE7 345.00 - WICHITA 345KV CKT 1 |

| SOLUTION | GROUP | SCENARIO | SEASON | SOURCE | DIRECTION | MONITORED ELEMENT | RATEB (MVA) | TDF | TC%LOADING (% MVA) | CONTINGENCY |
|---|---|---|---|---|---|---|---|---|---|---|
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11367 | 113.3916 | THISTLE7 345.00 - WICHITA 345KV CKT 2 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11816 | 111.5691 | FINNEY SWITCHING STATION - HOLCOMB 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11527 | 110.6777 | BUCKNER7 345.00 - HOLCOMB 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11552 | 110.4636 | AXTELL - PAULINE 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.13143 | 110.2025 | MULLERGREN - SOUTH HAYS 230KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 109.7194 | GEN532652 1-JEFFREY ENERGY CENTER UNIT 2 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 109.7187 | GEN532653 1-JEFFREY ENERGY CENTER UNIT 3 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11266 | 109.679 | GRAND ISLAND - SWEETWATER 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 109.4656 | GEN532651 1-JEFFREY ENERGY CENTER UNIT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11448 | 109.3611 | MOORE - PAULINE 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11168 | 109.0636 | NORTHWEST - TATONGA7 345.00 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 108.6125 | GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.1104 | 107.9659 | DBL-BVR-WWRD |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11168 | 107.919 | G11_051T 345.00 - TATONGA7 345.00 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11168 | 107.7849 | G11_051T 345.00 - WOODWARD DISTRICT EHV 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11402 | 107.677 | CLARKCOUNTY7345.00 - IRONWOOD7 345.00 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11402 | 107.5522 | CLARKCOUNTY7345.00 - SPEARVILLE 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11244 | 107.528 | CIRCLE - EAST MCPHERSON 230KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.12327 | 107.3788 | POSTROCK6 230.00 - SOUTH HAYS 230KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11047 | 106.566 | MINGO - RED WILLOW 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11281 | 106.5639 | PHILLIPSBURG - SMITH CENTER 115KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.1104 | 106.4084 | DBL-HTCH-BVR |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11135 | 106.2606 | GRAND ISLAND - MCCOOL 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11212 | 106.1446 | KNOLL - SALINE RIVER 115KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 106.1411 | GEN542962 2-IATAN UNIT #2 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11041 | 106.0597 | STEGALL - STEGALL TRANSFORMER 230KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11041 | 106.0579 | NEB01WAPAB3 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11041 | 106.0517 | STEGALL TY 345/230KV TRANSFORMER CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11041 | 106.0458 | TRF-STEGALL |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11041 | 106.0328 | STEGALL - STEGALL TY 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.1111 | 105.9927 | SPP-MKEC-08 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11212 | 105.951 | PLAINVILLE - SALINE RIVER 115KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 105.9121 | GEN542955 1-LACYGNE UNIT #1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 105.9075 | GEN542956 2-LACYGNE UNIT #2 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11066 | 105.8796 | SPP-MKEC-09B |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11066 | 105.76 | GREENSBURG - SSTARTP3 115.00 115KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 105.7594 | GEN532663 1-LAWRENCE ENERGY CENTER UNIT 5 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11182 | 105.7483 | SPP-MKEC-06 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 105.7445 | THISTLE7 345.00 345/13.0KV TRANSFORMER CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 105.7433 | GEN542957 1-IATAN UNIT #1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11135 | 105.735 | MCCOOL - MOORE 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11182 | 105.7252 | SEWARD - ST JOHN 115KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11112 | 105.6665 | G10-056T 345.00 - ST JOE 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11225 | 105.5917 | ELM CREEK - NORTHWEST MANHATTAN 230KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11212 | 105.4876 | PHILLIPSBURG - PLAINVILLE 115KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11112 | 105.4473 | COOPER - G10-056T 345.00 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11132 | 105.4466 | HUNTSVILLE - ST_JOHN 115KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11132 | 105.403 | MIDW-CATB05 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 105.3509 | GEN542951 5-HAWTHORN UNIT #5 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11066 | 105.3366 | BARBER 3 115.00 - MEDICINE LODGE 115KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11132 | 105.2746 | HUNTSVILLE - HUTCHINSON ENERGY CENTER 115KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11061 | 105.2683 | SPP-MKEC-05 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11061 | 105.2657 | SPP-MKEC-03A |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11072 | 105.2629 | EMPORIA ENERGY CENTER - WICHITA 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11043 | 105.2308 | NUNDRWD - WAYSIDE 230KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11061 | 105.1999 | SPP-MKEC-03B |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11232 | 105.0302 | KNOLL 230 (KNOLL T1) 230/115/11.49KV TRANSFORMER CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 103.9542 | BASE CASE |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 103.9542 | NC1_GEN-NEBRASKA CITY 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.10989 | 103.152 | NORTHVIEW - SUMMIT 115KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.10885 | 102.9739 | WR-DOUBLE18 |

| SOLUTION | GROUP | SCENARIO | SEASON | SOURCE | DIRECTION | MONITORED ELEMENT | RATEB (MVA) | TDF | TC%LOADING (% MVA) | CONTINGENCY |
|---|---|---|---|---|---|---|---|---|---|---|
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11007 | 102.8775 | MULLERGREN - SPEARVILLE 230KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11091 | 102.8364 | COLBY - MINGO 115KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.10885 | 102.8111 | WR-DOUBLE16 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.1106 | 102.8087 | EASTOWN7 345.00 - IATAN 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.10885 | 102.7746 | SPP-WR-305B |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 102.5512 | GEN640009 1-COOPER NUCLEAR STATION |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 102.5238 | GEN523971 1-HARRINGTON GEN #1 24 KV |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 102.5237 | GEN523972 1-HARRINGTON GEN #2 24 KV |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 102.5197 | GEN523973 1-HARRINGTON GEN #3 24 KV |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 102.4846 | GEN641089 2-ENERGY CENTER 2 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 102.4417 | GEN531459 2-S2 GENERATOR |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.10876 | 102.4392 | RENO COUNTY - SUMMIT 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 102.4191 | GEN539762 1-SSWIND 1 34.500 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 102.4127 | GEN645011 1-NEBRASKA CITY 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.1091 | 102.4079 | RENFROW7 345.00 - VIOLA 7 345.00 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 102.3873 | GEN645001 1-FORT CALHOUN 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 102.3137 | GEN560522 1-G05-12-2 0.6900 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 102.2878 | GEN539677 3-A. M. MULLERGREN GENERATOR |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.10885 | 102.2847 | WR-DOUBLE17 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.10984 | 102.2841 | EMPORIA ENERGY CENTER - MORRIS COUNTY 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11527 | 102.282 | BUCKNER7 345.00 - SPEARVILLE 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 102.2807 | GEN539785 1-ENSNGW 1 0.5750 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 102.1898 | GEN560696 1-G11-008-4 0.6900 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 102.075 | GEN645012 2-NEBRASKA CITY 2 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 102.0199 | GEN560140 1-G09-08 0.7000 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 102.0115 | GEN525561 1-TOLK GEN #1 24 KV |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 102.0078 | GEN525562 1-TOLK GEN #2 24 KV |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 101.963 | GEN560267 1-G10-15-1 0.6900 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 101.9545 | GEN539767 1-GRAY COUNTY WIND FARM |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 101.9172 | GEN560268 1-G10-15-2 0.6900 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 101.7076 | GEN560695 1-G11-008-3 0.6900 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 101.6828 | GEN659111 2-LELAND OLDS UNIT2 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 101.6806 | GEN560235 1-G08-92 0.6900 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.1057 | 101.6452 | MORRIS COUNTY - UNIONRG6 230.00 230KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 101.5849 | GEN560694 1-G11-008-2 0.6900 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 101.5466 | GEN659103 1-ANTELOPE VALLEY UNIT1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 101.5466 | GEN659107 2-ANTELOPE VALLEY UNIT2 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 101.4168 | GEN539670 4-JUDSON LARGE GENERATOR |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 101.1125 | GEN562298 1-G12-024 0.6500 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.10897 | 101.0403 | SWISSVALE - WEST GARDNER 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 100.9971 | GEN560238 1-G10-09 0.6900 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 100.9332 | GEN542902 1-GPW_G1 0.6900 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 100.8414 | GEN560693 1-G11-008-1 0.6900 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 100.7976 | GEN560514 1-G04_014 0.6900 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.1057 | 100.7223 | SUMMIT - UNIONRG6 230.00 230KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 100.6155 | GEN539807 1-G05-12 0.6900 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 100.4336 | GEN560329 1-G10-45 0.6900 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 100.4334 | GEN531503 1-CIMRRN 1 34.500 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 100.3244 | GEN560725 1-G13_010_3 0.6900 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 100 | GEN523117 1-BUFF_DUNES210.6900 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 100 | GEN560432 1-G08-124 0.6900 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 100 | GEN562035 1-G11_016_3 0.6900 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 99.9 | GEN560549 1-G06-06 0.6900 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 99.6 | GEN640011 2-GERALD GENTLEMAN STATION UNIT 2 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.11017 | 99.5 | GEN640010 1-GERALD GENTLEMAN STATION UNIT 1 |
| FDNS | 03G13_010 | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.12564 | 124.4076 | DBL-WICH-THI |
| FDNS | 03G13_010 | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.15024 | 123.9805 | DBL-IRON-CLR |
| FDNS | 03G13_010 | 2 | 14G | G13_010 | FROM->TO | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 | 330 | 0.15024 | 108.8452 | DBL-SPRVL-CL |
| FDNS | 3 | 2 | 14G | G13_010 | FROM->TO | SEWARD - ST JOHN 115KV CKT 1 | 87.6 | 0.03844 | 118.983 | DBL-IRON-CLR |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SEWARD - ST JOHN 115KV CKT 1 | 87.6 | 0.03144 | 133.6445 | CIRCLE - MULLERGREN 230KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | SEWARD - ST JOHN 115KV CKT 1 | 87.6 | 0.03824 | 116.7849 | DBL-SPRVL-CL |

| SOLUTION | GROUP | SCENARIO | SEASON | SOURCE | DIRECTION | MONITORED ELEMENT | RATEB (MVA) | TDF | TC%LOADING (% MVA) | CONTINGENCY |
|---|---|---|---|---|---|---|---|---|---|---|
| FDNS | 03G13_010 | 2 | 14G | G13_010 | FROM->TO | SEWARD - ST JOHN 115KV CKT 1 | 87.6 | 0.03839 | 125.1864 | DBL-IRON-CLR |
| FDNS | 03G13_010 | 2 | 14G | G13_010 | FROM->TO | SEWARD - ST JOHN 115KV CKT 1 | 87.6 | 0.03839 | 101.1203 | DBL-SPRVL-CL |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | N HAYS3 115.00 - VINE STREET 115KV CKT 1 | 99 | 0.06717 | 133.8663 | KNOLL 230 - POSTROCK6 230.00 230KV CKT 1 |
| FDNS | 3 | 2 | 14G | G13_010 | TO->FROM | MULLERGREN - SPEARVILLE 230KV CKT 1 | 398 | 0.06328 | 106.1446 | DBL-IRON-CLR |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | MULLERGREN - SPEARVILLE 230KV CKT 1 | 398 | 0.1354 | 153.1241 | G12-011T 345.00 - POST ROCK 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | MULLERGREN - SPEARVILLE 230KV CKT 1 | 398 | 0.08395 | 116.3242 | POST ROCK (POSTROCK T1) 345/230/13.8KV TRANSFORMER CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | MULLERGREN - SPEARVILLE 230KV CKT 1 | 398 | 0.0623 | 114.3569 | DBL-SPRVL-CL |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | MULLERGREN - SPEARVILLE 230KV CKT 1 | 398 | 0.05235 | 99.3 | MULLERGREN - SOUTH HAYS 230KV CKT 1 |
| FDNS | 03G13_010 | 2 | 14G | G13_010 | TO->FROM | MULLERGREN - SPEARVILLE 230KV CKT 1 | 398 | 0.06322 | 109.2356 | DBL-IRON-CLR |
| FDNS | 3 | 2 | 14G | G13_010 | TO->FROM | MEDICINE LODGE - SUN CITY 115KV CKT 1 | 115.1 | 0.03421 | 130.965 | DBL-IRON-CLR |
| FDNS | 3 | 2 | 14G | G13_010 | TO->FROM | MEDICINE LODGE - SUN CITY 115KV CKT 1 | 115.1 | 0.03421 | 108.1982 | DBL-SPRVL-CL |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | MEDICINE LODGE - SUN CITY 115KV CKT 1 | 115.1 | 0.03373 | 141.9288 | DBL-SPRVL-CL |
| FDNS | 03G13_010 | 2 | 14G | G13_010 | TO->FROM | MEDICINE LODGE - SUN CITY 115KV CKT 1 | 115.1 | 0.03416 | 135.7332 | DBL-IRON-CLR |
| FDNS | 03G13_010 | 2 | 14G | G13_010 | TO->FROM | MEDICINE LODGE - SUN CITY 115KV CKT 1 | 115.1 | 0.03416 | 112.562 | DBL-SPRVL-CL |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | KNOLL 230 - SMOKYHL6 230.00 230KV CKT 1 | 330 | 0.14986 | 100.6639 | AXTELL - POST ROCK 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | KNOLL 230 - POSTROCK6 230.00 230KV CKT 1 | 398 | 0.20194 | 110.0147 | AXTELL - POST ROCK 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | KNOLL - N HAYS3 115.00 115KV CKT 1 | 88 | 0.06717 | 145.4039 | KNOLL 230 - POSTROCK6 230.00 230KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | HAYS PLANT - VINE STREET 115KV CKT 1 | 88 | 0.06717 | 158.6227 | KNOLL 230 - POSTROCK6 230.00 230KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | HAYS PLANT - SOUTH HAYS 115KV CKT 1 | 99 | 0.06717 | 159.0275 | KNOLL 230 - POSTROCK6 230.00 230KV CKT 1 |
| FDNS | 3 | 2 | 14G | G13_010 | FROM->TO | HARPER - MILAN TAP 138KV CKT 1 | 110 | 0.03677 | 235.4645 | DBL-WICH-THI |
| FDNS | 6 | 2 | 14G | G13_010 | FROM->TO | HARPER - MILAN TAP 138KV CKT 1 | 110 | 0.03629 | 144.9311 | DBL-WICH-THI |
| FDNS | 9 | 2 | 14G | G13_010 | FROM->TO | HARPER - MILAN TAP 138KV CKT 1 | 110 | 0.03661 | 116.7103 | DBL-WICH-THI |
| FDNS | 03G13_010 | 2 | 14G | G13_010 | FROM->TO | HARPER - MILAN TAP 138KV CKT 1 | 110 | 0.03672 | 240.0525 | DBL-WICH-THI |
| FDNS | 06ALL | 2 | 14G | G13_010 | FROM->TO | HARPER - MILAN TAP 138KV CKT 1 | 110 | 0.03614 | 160.3855 | DBL-WICH-THI |
| FDNS | 09ALL | 2 | 14G | G13_010 | FROM->TO | HARPER - MILAN TAP 138KV CKT 1 | 110 | 0.03659 | 122.3388 | DBL-WICH-THI |
| FDNS | 3 | 2 | 14G | G13_010 | FROM->TO | GREENSBURG - SUN CITY 115KV CKT 1 | 115.1 | 0.03421 | 135.892 | DBL-IRON-CLR |
| FDNS | 3 | 2 | 14G | G13_010 | FROM->TO | GREENSBURG - SUN CITY 115KV CKT 1 | 115.1 | 0.03421 | 113.116 | DBL-SPRVL-CL |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | GREENSBURG - SUN CITY 115KV CKT 1 | 115.1 | 0.03373 | 147.0852 | DBL-SPRVL-CL |
| FDNS | 03G13_010 | 2 | 14G | G13_010 | FROM->TO | GREENSBURG - SUN CITY 115KV CKT 1 | 115.1 | 0.03416 | 140.7336 | DBL-IRON-CLR |
| FDNS | 03G13_010 | 2 | 14G | G13_010 | FROM->TO | GREENSBURG - SUN CITY 115KV CKT 1 | 115.1 | 0.03416 | 117.5535 | DBL-SPRVL-CL |
| FDNS | 3 | 2 | 14G | G13_010 | TO->FROM | GREENSBURG - SSTARTP3 115.00 115KV CKT 1 | 115.1 | 0.03421 | 146.8422 | DBL-IRON-CLR |
| FDNS | 3 | 2 | 14G | G13_010 | TO->FROM | GREENSBURG - SSTARTP3 115.00 115KV CKT 1 | 115.1 | 0.03421 | 123.8774 | DBL-SPRVL-CL |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | GREENSBURG - SSTARTP3 115.00 115KV CKT 1 | 115.1 | 0.03373 | 158.2997 | DBL-SPRVL-CL |
| FDNS | 03G13_010 | 2 | 14G | G13_010 | TO->FROM | GREENSBURG - SSTARTP3 115.00 115KV CKT 1 | 115.1 | 0.03416 | 151.8427 | DBL-IRON-CLR |
| FDNS | 03G13_010 | 2 | 14G | G13_010 | TO->FROM | GREENSBURG - SSTARTP3 115.00 115KV CKT 1 | 115.1 | 0.03416 | 128.3728 | DBL-SPRVL-CL |
| FDNS | 3 | 2 | 14G | G13_010 | FROM->TO | GREAT BEND TAP - SEWARD 115KV CKT 1 | 80.3 | 0.03063 | 112.4509 | DBL-IRON-CLR |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | GREAT BEND TAP - SEWARD 115KV CKT 1 | 80.3 | 0.03048 | 109.3888 | DBL-SPRVL-CL |
| FDNS | 03G13_010 | 2 | 14G | G13_010 | FROM->TO | GREAT BEND TAP - SEWARD 115KV CKT 1 | 80.3 | 0.03059 | 117.6906 | DBL-IRON-CLR |
| FDNS | 3 | 2 | 14G | G13_010 | TO->FROM | GREAT BEND TAP - MULLERGREN 115KV CKT 1 | 79.7 | 0.03063 | 113.3822 | DBL-IRON-CLR |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | GREAT BEND TAP - MULLERGREN 115KV CKT 1 | 79.7 | 0.03048 | 110.2972 | DBL-SPRVL-CL |
| FDNS | 03G13_010 | 2 | 14G | G13_010 | TO->FROM | GREAT BEND TAP - MULLERGREN 115KV CKT 1 | 79.7 | 0.03059 | 118.6533 | DBL-IRON-CLR |
| FDNS | 3 | 2 | 14G | G13_010 | TO->FROM | FPL SWITCH - WOODWARD 138KV CKT 1 | 153 | 0.04032 | 152.4032 | DBL-WICH-THI |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | FPL SWITCH - WOODWARD 138KV CKT 1 | 153 | 0.03525 | 166.2628 | NORTHWEST - TATONGA7 345.00 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | FPL SWITCH - WOODWARD 138KV CKT 1 | 153 | 0.03525 | 152.787 | G11_051T 345.00 - TATONGA7 345.00 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | FPL SWITCH - WOODWARD 138KV CKT 1 | 153 | 0.03525 | 151.071 | G11_051T 345.00 - WOODWARD DISTRICT EHV 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | FPL SWITCH - WOODWARD 138KV CKT 1 | 153 | 0.03458 | 120.172 | G12-011T 345.00 - POST ROCK 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | FPL SWITCH - WOODWARD 138KV CKT 1 | 153 | 0.03124 | 120.1519 | RENFROW7 345.00 - VIOLA 7 345.00 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | FPL SWITCH - WOODWARD 138KV CKT 1 | 153 | 0.03124 | 113.8781 | VIOLA 7 345.00 - WICHITA 345KV CKT 1 |
| FDNS | 03G13_010 | 2 | 14G | G13_010 | TO->FROM | FPL SWITCH - WOODWARD 138KV CKT 1 | 153 | 0.04025 | 158.1422 | DBL-WICH-THI |
| FDNS | 06ALL | 2 | 14G | G13_010 | TO->FROM | FPL SWITCH - WOODWARD 138KV CKT 1 | 153 | 0.0382 | 134.3233 | NORTHWEST - TATONGA7 345.00 345KV CKT 1 |
| FDNS | 06ALL | 2 | 14G | G13_010 | TO->FROM | FPL SWITCH - WOODWARD 138KV CKT 1 | 153 | 0.04159 | 129.3494 | DBL-WICH-THI |
| FDNS | 06ALL | 2 | 14G | G13_010 | TO->FROM | FPL SWITCH - WOODWARD 138KV CKT 1 | 153 | 0.0382 | 121.346 | G11_051T 345.00 - TATONGA7 345.00 345KV CKT 1 |
| FDNS | 06ALL | 2 | 14G | G13_010 | TO->FROM | FPL SWITCH - WOODWARD 138KV CKT 1 | 153 | 0.0382 | 119.7128 | G11_051T 345.00 - WOODWARD DISTRICT EHV 345KV CKT 1 |
| FDNS | 06ALL | 2 | 14G | G13_010 | TO->FROM | FPL SWITCH - WOODWARD 138KV CKT 1 | 153 | 0.03016 | 115.4742 | WOODWARD (WOODWRD2) 138/69/13.2KV TRANSFORMER CKT 1 |
| FDNS | 06ALL | 2 | 14G | G13_010 | TO->FROM | FPL SWITCH - WOODWARD 138KV CKT 1 | 153 | 0.03165 | 110.0638 | IODINE - WOODWARD EHV 138KV CKT 1 |
| FDNS | 06ALL | 2 | 14G | G13_010 | TO->FROM | FPL SWITCH - WOODWARD 138KV CKT 1 | 153 | 0.03165 | 108.3249 | DEWEY - IODINE 138KV CKT 1 |
| FDNS | 06ALL | 2 | 14G | G13_010 | TO->FROM | FPL SWITCH - WOODWARD 138KV CKT 1 | 153 | 0.03016 | 102.2247 | WOODWARD - WOODWARD 69KV CKT 1 |
| FDNS | 09ALL | 2 | 14G | G13_010 | TO->FROM | FPL SWITCH - WOODWARD 138KV CKT 1 | 153 | 0.03862 | 109.8767 | NORTHWEST - TATONGA7 345.00 345KV CKT 1 |
| FDNS | 09ALL | 2 | 14G | G13_010 | TO->FROM | FPL SWITCH - WOODWARD 138KV CKT 1 | 153 | 0.04201 | 101.8209 | DBL-WICH-THI |
| FDNS | 09ALL | 2 | 14G | G13_010 | TO->FROM | FPL SWITCH - WOODWARD 138KV CKT 1 | 153 | 0.03042 | 100.0843 | WOODWARD (WOODWRD2) 138/69/13.2KV TRANSFORMER CKT 1 |
| FDNS | 3 | 2 | 14G | G13_010 | TO->FROM | CLEARWATER - MILAN TAP 138KV CKT 1 | 110 | 0.03677 | 224.8323 | DBL-WICH-THI |

| SOLUTION | GROUP | SCENARIO | SEASON | SOURCE | DIRECTION | MONITORED ELEMENT | RATEB (MVA) | TDF | TC%LOADING (% MVA) | CONTINGENCY |
|---|---|---|---|---|---|---|---|---|---|---|
| FDNS | 6 | 2 | 14G | G13_010 | TO->FROM | CLEARWATER - MILAN TAP 138KV CKT 1 | 110 | 0.03629 | 134.3882 | DBL-WICH-THI |
| FDNS | 9 | 2 | 14G | G13_010 | TO->FROM | CLEARWATER - MILAN TAP 138KV CKT 1 | 110 | 0.03661 | 106.1898 | DBL-WICH-THI |
| FDNS | 03G13_010 | 2 | 14G | G13_010 | TO->FROM | CLEARWATER - MILAN TAP 138KV CKT 1 | 110 | 0.03672 | 229.5679 | DBL-WICH-THI |
| FDNS | 06ALL | 2 | 14G | G13_010 | TO->FROM | CLEARWATER - MILAN TAP 138KV CKT 1 | 110 | 0.03614 | 149.802 | DBL-WICH-THI |
| FDNS | 09ALL | 2 | 14G | G13_010 | TO->FROM | CLEARWATER - MILAN TAP 138KV CKT 1 | 110 | 0.03659 | 111.7637 | DBL-WICH-THI |
| FDNS | 3 | 2 | 14G | G13_010 | FROM->TO | CLEARWATER - GILL ENERGY CENTER WEST 138KV CKT 1 | 191 | 0.03677 | 122.5052 | DBL-WICH-THI |
| FDNS | 03G13_010 | 2 | 14G | G13_010 | FROM->TO | CLEARWATER - GILL ENERGY CENTER WEST 138KV CKT 1 | 191 | 0.03672 | 125.1655 | DBL-WICH-THI |
| FDNS | 3 | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.09483 | 121.2719 | DBL-WICH-THI |
| FDNS | 3 | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.12248 | 117.3989 | DBL-IRON-CLR |
| FDNS | 3 | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.12248 | 99.9 | DBL-SPRVL-CL |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07582 | 100.5912 | CIRCLE - HUTCHINSON ENERGY CENTER 115KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07905 | 110.2254 | ST JOHN - ST_JOHN 115KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07631 | 105.7409 | ELLSWTP3 115.00 - MULLERGREN 115KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07631 | 104.7387 | ELLSWTP3 115.00 - RUSSELL 115KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07498 | 104.3213 | LAWTON EASTSIDE - OKLAUNION 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.0758 | 103.9528 | FLATRDG3 - HARPER 138KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.0758 | 103.5864 | HARPER - MILAN TAP 138KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.0758 | 103.4146 | CLEARWATER - MILAN TAP 138KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.12156 | 127.9006 | DBL-SPRVL-CL |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.10018 | 126.5025 | SMOKYHL6 230.00 - SUMMIT 230KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.08461 | 120.6084 | CLARKCOUNTY7345.00 - THISTLE7 345.00 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.08461 | 120.6084 | CLARKCOUNTY7345.00 - THISTLE7 345.00 345KV CKT 2 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.10018 | 118.8197 | KNOLL 230 - SMOKYHL6 230.00 230KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.09797 | 118.393 | AXTELL - POST ROCK 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.08477 | 117.9578 | SPP-SWPS-05 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.08477 | 117.6493 | FINNEY SWITCHING STATION - Hitchland Interchange 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07962 | 113.1038 | THISTLE7 345.00 - WICHITA 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07962 | 113.1038 | THISTLE7 345.00 - WICHITA 345KV CKT 2 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.08477 | 110.5452 | FINNEY SWITCHING STATION - HOLCOMB 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.08836 | 110.358 | KNOLL 230 - POSTROCK6 230.00 230KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.08177 | 109.2097 | SPP-MKEC-06 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.08176 | 109.1713 | SEWARD - ST JOHN 115KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.08081 | 109.1183 | BUCKNER7 345.00 - HOLCOMB 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07698 | 107.5347 | NORTHWEST - TATONGA7 345.00 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07612 | 107.5115 | MINGO - RED WILLOW 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07905 | 107.3431 | HUNTSVILLE - ST_JOHN 115KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07905 | 107.1248 | MIDW-CATB05 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07905 | 106.7899 | HUNTSVILLE - HUTCHINSON ENERGY CENTER 115KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 106.5486 | GEN532751 1-WOLF CREEK GENERATING STATION UNIT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07547 | 106.5211 | DBL-BVR-WWRD |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07698 | 106.2801 | G11_051T 345.00 - TATONGA7 345.00 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07709 | 106.2428 | GRAND ISLAND - SWEETWATER 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07877 | 106.1966 | AXTELL - PAULINE 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07972 | 106.1354 | CLARKCOUNTY7345.00 - IRONWOOD7 345.00 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07698 | 106.1348 | G11_051T 345.00 - WOODWARD DISTRICT EHV 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07972 | 105.9913 | CLARKCOUNTY7345.00 - SPEARVILLE 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07833 | 105.9405 | GREAT BEND TAP - SEWARD 115KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07631 | 105.9154 | SPP-MKEC-02 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07833 | 105.9137 | GREAT BEND TAP - MULLERGREN 115KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 105.7795 | GEN532652 1-JEFFREY ENERGY CENTER UNIT 2 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 105.7791 | GEN532653 1-JEFFREY ENERGY CENTER UNIT 3 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07817 | 105.5722 | MOORE - PAULINE 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 105.5034 | GEN532651 1-JEFFREY ENERGY CENTER UNIT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07732 | 104.8189 | SPP-MKEC-08 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07547 | 104.7413 | DBL-HTCH-BVR |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07541 | 103.74 | STEGALL - STEGALL TRANSFORMER 230KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07541 | 103.7394 | STEGALL - STEGALL TY 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07541 | 103.7372 | NEB01WAPAB3 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07541 | 103.7322 | STEGALL TY 345/230KV TRANSFORMER CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07541 | 103.7259 | TRF-STEGALL |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07631 | 103.693 | RUSSELL - WALDO 115KV CKT 1 |

| SOLUTION | GROUP | SCENARIO | SEASON | SOURCE | DIRECTION | MONITORED ELEMENT | RATEB (MVA) | TDF | TC%LOADING (% MVA) | CONTINGENCY |
|---|---|---|---|---|---|---|---|---|---|---|
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 103.6888 | GEN530690 1-PRWINDG1 0.6900 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07568 | 103.6728 | SPP-MKEC-09B |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07611 | 103.6517 | GRAND ISLAND - MCCOOL 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07748 | 103.6352 | ELM CREEK - NORTHWEST MANHATTAN 230KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 103.4889 | GEN542955 1-LACYGNE UNIT #1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 103.4858 | GEN542956 2-LACYGNE UNIT #2 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.0758 | 103.4564 | SPP-MKEC-03A |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.0758 | 103.4556 | SPP-MKEC-05 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 103.4358 | GEN542962 2-IATAN UNIT #2 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.0758 | 103.4115 | SPP-MKEC-03B |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 103.2878 | GEN532722 1-EVANS ENERGY CENTER UNIT 2 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07631 | 103.2777 | COVERT 3 115.00 - WALDO 115KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07556 | 103.2769 | GERALD GENTLEMAN STATION - RED WILLOW 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07611 | 103.2577 | MCCOOL - MOORE 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07631 | 103.2517 | COVERT 3 115.00 - SMITH CENTER 115KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.0758 | 103.2499 | CLEARWATER - GILL ENERGY CENTER WEST 138KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 103.1603 | GEN542957 1-IATAN UNIT #1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07628 | 103.1451 | MULLERGREN (MULGREN6) 230/115/13.8KV TRANSFORMER CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.0759 | 103.141 | G10-056T 345.00 - ST JOE 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07627 | 103.1258 | HEIZER 6 230.00 - MULLERGREN 230KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 103.1136 | GEN532663 1-LAWRENCE ENERGY CENTER UNIT 5 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07627 | 103.0956 | HEIZER 6 230.00 (HEIZER T1) 230/115/12.5KV TRANSFORMER CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 101.8961 | BASE CASE |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 101.8961 | NC1_GEN-NEBRASKA CITY 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 100.8354 | GEN640009 1-COOPER NUCLEAR STATION |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07486 | 100.8107 | LYONS - RICE_CO 115KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07371 | 100.76 | VIOLA 7 345.00 - WICHITA 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 100.7568 | GEN645011 1-NEBRASKA CITY 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07486 | 100.7418 | CIRCLE - RICE 6 230.00 230KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 100.7286 | GEN645001 1-FORT CALHOUN 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07414 | 100.7002 | MOUNDRIDGE (MOUND10X) 138/115/13.8KV TRANSFORMER CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07309 | 100.7001 | MORRIS COUNTY - UNIONRG6 230.00 230KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07414 | 100.6988 | WR-B3-9 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 100.6741 | GEN560235 1-G08-92 0.6900 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07429 | 100.6359 | BENTON - WICHITA 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07418 | 100.6013 | HUNTERS7 345.00 - WOODRING 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07607 | 100.5708 | MINGO (MINGO) 345/115/13.8KV TRANSFORMER CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 100.5079 | GEN645012 2-NEBRASKA CITY 2 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07571 | 100.3853 | BEELER - NESS CITY 115KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 100.3027 | GEN560140 1-G09-08 0.7000 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07309 | 100.2867 | SUMMIT - UNIONRG6 230.00 230KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 100.2801 | GEN523971 1-HARRINGTON GEN #1 24 KV |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 100.28 | GEN523972 1-HARRINGTON GEN #2 24 KV |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 100.2754 | GEN523973 1-HARRINGTON GEN #3 24 KV |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07571 | 100.2688 | BEELER - DIGHTON TAP 115KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07589 | 100.2378 | SPP-MKEC-12 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07486 | 100.2254 | RICE 6 230.00 (RICE T1) 230/115/12.47KV TRANSFORMER CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07589 | 100.2133 | ALEXANDER - SAWYER 3 115.00 115KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07507 | 100.2063 | SPP-WR-335A |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07589 | 100.1937 | BARBER 3 115.00 - SAWYER 3 115.00 115KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 100.1933 | GEN659111 2-LELAND OLDS UNIT2 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07487 | 100.1536 | EAST MCPHERSON (EMCPHR1X) 230/115/13.8KV TRANSFORMER CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 100.1339 | GEN531459 2-S2 GENERATOR |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.08081 | 100.1168 | BUCKNER7 345.00 - SPEARVILLE 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07633 | 100.0977 | MIDW-CATB04 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 100.0906 | GEN659103 1-ANTELOPE VALLEY UNIT1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 100.0906 | GEN659107 2-ANTELOPE VALLEY UNIT2 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 100.0725 | GEN560522 1-G05-12-2 0.6900 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07571 | 100 | DIGHTON TAP - MANNING TAP 115KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07441 | 100 | SWISSVALE - WEST GARDNER 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07631 | 99.9 | ALEXANDER - NEKOMA 115KV CKT 1 |

| SOLUTION | GROUP | SCENARIO | SEASON | SOURCE | DIRECTION | MONITORED ELEMENT | RATEB (MVA) | TDF | TC%LOADING (% MVA) | CONTINGENCY |
|---|---|---|---|---|---|---|---|---|---|---|
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 99.9 | GEN560696 1-G11-008-4 0.6900 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07371 | 99.9 | RENFROW7 345.00 - VIOLA 7 345.00 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07364 | 99.9 | WR-B3-8 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07631 | 99.8 | ALEXANDER - NESS CITY 115KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 99.8 | GEN539762 1-SSWIND 1 34.500 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 99.8 | GEN539785 1-ENSNGW 1 0.5750 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07571 | 99.8 | MANNING TAP - SCOTT CITY 115KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07364 | 99.8 | MOUNDRIDGE - RENO COUNTY 115KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 99.7 | GEN525561 1-TOLK GEN #1 24 KV |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 99.7 | GEN525562 1-TOLK GEN #2 24 KV |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 99.7 | GEN560267 1-G10-15-1 0.6900 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07486 | 99.7 | MIDW-CATB06 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 99.6 | GEN560268 1-G10-15-2 0.6900 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07631 | 99.6 | NESS CITY - NESS CITY 115KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 99.4 | GEN539767 1-GRAY COUNTY WIND FARM |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 99.4 | GEN560695 1-G11-008-3 0.6900 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 99.4 | GEN560725 1-G13_010_3 0.6900 |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.07519 | 99.3 | GEN560694 1-G11-008-2 0.6900 |
| FDNS | 03G13_010 | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.09471 | 126.6179 | DBL-WICH-THI |
| FDNS | 03G13_010 | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.12234 | 122.999 | DBL-IRON-CLR |
| FDNS | 03G13_010 | 2 | 14G | G13_010 | TO->FROM | CIRCLE - MULLERGREN 230KV CKT 1 | 318.7 | 0.12234 | 105.3462 | DBL-SPRVL-CL |
| FDNS | 03ALL | 2 | 14G | G13_010 | TO->FROM | CHISHOLM - MAIZEE 4 138.00 138KV CKT 1 | 287 | 0.04225 | 104.9727 | BENTON - WICHITA 345KV CKT 1 |
| FDNS | 03ALL | 2 | 14G | G13_010 | FROM->TO | BUCKNER7 345.00 - HOLCOMB 345KV CKT 1 | 717.1 | 0.29008 | 107.1164 | G12-011T 345.00 - POST ROCK 345KV CKT 1 |
| FDNS | 03G13_010 | 2 | 14G | G13_010 | FROM->TO | BUCKNER7 345.00 - HOLCOMB 345KV CKT 1 | 717.1 | 0.2886 | 100 | DBL-IRON-CLR |
| FDNS | 0 | 2 | 14WP | G13_010 | FROM->TO | HARPER - MILAN TAP 138KV CKT 1 | 110 | 0.03593 | 101.8436 | DBL-WICH-THI |
| FDNS | 0 | 2 | 14WP | G13_010 | FROM->TO | HARPER - MILAN TAP 138KV CKT 1 | 110 | 0.03593 | 101.8212 | DBL-WICH-THI |
| FDNS | 0 | 2 | 14WP | G13_010 | FROM->TO | HARPER - MILAN TAP 138KV CKT 1 | 110 | 0.03593 | 101.7381 | DBL-WICH-THI |
| FDNS | 0 | 3 | 14SP | G13_009 | FROM->TO | SILOAM CITY - SILOAM SPRINGS 161KV CKT 1 | 317 | 0.03702 | 105.8624 | FLINT CREEK - SILOAM SPRINGS TAP 345KV CKT 1 |
| FDNS | 0 | 3 | 14SP | G13_009 | FROM->TO | SILOAM CITY - SILOAM SPRINGS 161KV CKT 1 | 317 | 0.03604 | 105.8036 | FLINT CREEK - SILOAM SPRINGS TAP 345KV CKT 1 |
| FDNS | 00G13_009 | 3 | 14SP | G13_009 | FROM->TO | SILOAM CITY - SILOAM SPRINGS 161KV CKT 1 | 317 | 0.03702 | 106.8943 | FLINT CREEK - SILOAM SPRINGS TAP 345KV CKT 1 |
| FDNS | 0 | 3 | 19SP | G13_009 | FROM->TO | SILOAM CITY - SILOAM SPRINGS 161KV CKT 1 | 317 | 0.03767 | 123.6561 | FLINT CREEK - SILOAM SPRINGS TAP 345KV CKT 1 |
| FDNS | 0 | 3 | 19SP | G13_009 | FROM->TO | SILOAM CITY - SILOAM SPRINGS 161KV CKT 1 | 317 | 0.03666 | 123.5891 | FLINT CREEK - SILOAM SPRINGS TAP 345KV CKT 1 |
| FDNS | 00G13_009 | 3 | 19SP | G13_009 | FROM->TO | SILOAM CITY - SILOAM SPRINGS 161KV CKT 1 | 317 | 0.03769 | 124.5442 | FLINT CREEK - SILOAM SPRINGS TAP 345KV CKT 1 |
| FDNS | 0 | 3 | 19WP | G13_009 | FROM->TO | SILOAM CITY - SILOAM SPRINGS 161KV CKT 1 | 375 | 0.04069 | 101.4195 | FLINT CREEK - SILOAM SPRINGS TAP 345KV CKT 1 |
| FDNS | 0 | 3 | 19WP | G13_009 | FROM->TO | SILOAM CITY - SILOAM SPRINGS 161KV CKT 1 | 375 | 0.03969 | 101.366 | FLINT CREEK - SILOAM SPRINGS TAP 345KV CKT 1 |
| FDNS | 00G13_009 | 3 | 19WP | G13_009 | FROM->TO | SILOAM CITY - SILOAM SPRINGS 161KV CKT 1 | 375 | 0.04071 | 102.2868 | FLINT CREEK - SILOAM SPRINGS TAP 345KV CKT 1 |
| FDNS | 0 | 3 | 24SP | G13_009 | FROM->TO | SILOAM CITY - SILOAM SPRINGS 161KV CKT 1 | 317 | 0.03789 | 131.9875 | FLINT CREEK - SILOAM SPRINGS TAP 345KV CKT 1 |
| FDNS | 0 | 3 | 24SP | G13_009 | FROM->TO | SILOAM CITY - SILOAM SPRINGS 161KV CKT 1 | 317 | 0.03688 | 131.9412 | FLINT CREEK - SILOAM SPRINGS TAP 345KV CKT 1 |
| FDNS | 00G13_009 | 3 | 24SP | G13_009 | FROM->TO | SILOAM CITY - SILOAM SPRINGS 161KV CKT 1 | 317 | 0.03787 | 132.9358 | FLINT CREEK - SILOAM SPRINGS TAP 345KV CKT 1 |
| FDNS | 9 | 3 | 14G | G13_010 | FROM->TO | HARPER - MILAN TAP 138KV CKT 1 | 110 | 0.03661 | 116.7009 | DBL-WICH-THI |
| FDNS | 09ALL | 3 | 14G | G13_010 | FROM->TO | HARPER - MILAN TAP 138KV CKT 1 | 110 | 0.03658 | 122.3245 | DBL-WICH-THI |
| FDNS | 09ALL | 3 | 14G | G13_010 | TO->FROM | FPL SWITCH - WOODWARD 138KV CKT 1 | 153 | 0.03861 | 109.8682 | NORTHWEST - TATONGA7 345.00 345KV CKT 1 |
| FDNS | 09ALL | 3 | 14G | G13_010 | TO->FROM | FPL SWITCH - WOODWARD 138KV CKT 1 | 153 | 0.04201 | 101.8102 | DBL-WICH-THI |
| FDNS | 09ALL | 3 | 14G | G13_010 | TO->FROM | FPL SWITCH - WOODWARD 138KV CKT 1 | 153 | 0.03042 | 100.0781 | WOODWARD (WOODWRD2) 138/69/13.2KV TRANSFORMER CKT 1 |
| FDNS | 9 | 3 | 14G | G13_010 | TO->FROM | CLEARWATER - MILAN TAP 138KV CKT 1 | 110 | 0.03661 | 106.1805 | DBL-WICH-THI |
| FDNS | 09ALL | 3 | 14G | G13_010 | TO->FROM | CLEARWATER - MILAN TAP 138KV CKT 1 | 110 | 0.03658 | 111.7494 | DBL-WICH-THI |
| FDNS | 0 | 3 | 14WP | G13_010 | FROM->TO | HARPER - MILAN TAP 138KV CKT 1 | 110 | 0.03593 | 101.8208 | DBL-WICH-THI |
| FDNS | 0 | 3 | 14WP | G13_010 | FROM->TO | HARPER - MILAN TAP 138KV CKT 1 | 110 | 0.03592 | 101.7604 | DBL-WICH-THI |

# I: Power Flow Analysis (Constraints from Category C Contingencies)

Available on Request

# J: Group 3 Dynamic Stability Analysis Report

Available on request.