

Definitive Interconnection System Impact Study for Generation Interconnection Requests

Southwest Power Pool
Engineering Department
Tariff Studies – Generation Interconnection

(DISIS-2010-001-4 Study)
December 2011



SPP RESTRICTED

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Executive Summary

Pursuant to the Southwest Power Pool (SPP) Open Access Transmission Tariff (OATT), SPP has conducted this Definitive Interconnection System Impact Study (DISIS) for certain generation interconnection requests in the SPP Generation Interconnection Queue. These interconnection requests have been clustered together for the following Impact Study. This Impact Re-Study is being performed to account for the withdrawal of higher and equally queued customers. The customers will be referred to in this study as the DISIS-2010-001 Interconnection Customers. This Impact Study analyzes the interconnecting of multiple generation interconnection requests associated with new generation totaling 3,447.6 MW of new generation which would be located within the transmission systems of Midwest Energy Inc. (MIDW), Nebraska Public Power District (NPPD), Oklahoma Gas and Electric (OKGE), Southwestern Public Service (SPS), Sunflower Electric Power Corporation (SUNC), Westar Energy (WERE), Western Farmers Electric Cooperative (WFEC). The various generation interconnection requests have differing proposed in-service dates¹. The generation interconnection requests included in this DISIS are listed in Appendix A by their queue number, amount, area, requested interconnection point, proposed interconnection point, and the requested in-service date.

Power flow analysis has indicated that for the power flow cases studied, 3,447.6 MW of nameplate generation may be interconnected with transmission system reinforcements within the SPP transmission system. Dynamic Stability and power factor analysis has determined the need for reactive compensation in accordance with Order No. 661-A for wind farm interconnection requests and those requirements are listed for each interconnection request within the contents of this report.

Voltage Stability Analysis including necessary line reactors on 345kV line in the SPS territory has verified the need for the Border-Hitchland 345kV transmission line. Dynamic Stability Analysis has determined that the transmission system will remain stable with the assigned Network Upgrades and necessary reactive compensation requirements.

The total estimated minimum cost for interconnecting the DISIS-2010-001 interconnection customers is \$341,000,000. These costs are shown in Appendices E and F. Interconnection Service to DISIS-2010-001 interconnection customers is also contingent upon higher queued customers paying for certain required network upgrades. The in service date for the DISIS customers will be deferred until the construction of these network upgrades can be completed.

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 that were identified as shown in Appendix H (if provided).

Network Constraints listed in Appendix H (if provided) are in the local area of the new generation when this generation is injected throughout the SPP footprint for the Energy Resource (ER) Interconnection Request. Additional Network constraints will have to be verified with a Transmission

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

Service Request (TSR) and associated studies. With a defined source and sink in a TSR, this list of Network Constraints will be refined and expanded to account for all Network Upgrade requirements.

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

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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 Impact Study. The customers will be referred to in this study as the DISIS-2010-001 Interconnection Customers. This Impact Study analyzes the interconnecting of multiple generation interconnection requests associated with new generation totaling 3,447.6MW of new generation which would be located within the transmission systems of Midwest Energy Inc. (MIDW), Nebraska Public Power District (NPPD), Oklahoma Gas and Electric (OKGE), Southwestern Public Service (SPS), Sunflower Electric Power Corporation (SUNC), Westar Energy (WERE), Western Farmers Electric Cooperative (WFEC). The various generation interconnection requests have differing proposed in-service dates². The generation interconnection requests included in this Impact Cluster Study are listed in Appendix A by their queue number, amount, area, requested interconnection point, proposed interconnection point, and the requested in-service date.

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

Model Development

Interconnection Requests Included in the DISIS-2010-001 Study

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

Affected System Interconnection Requests - Also included in this Definitive Impact Study are four Affected System Studies, one on the Lea County Electric Cooperative system in Lea County, New Mexico (given the designation ASGI-2010-010) and three wind farm requests on the Tri County Electric Cooperative system in Texas County, Oklahoma (given the collective designation ASGI-2010-011).

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

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

Previous Queued Projects

The previous queued projects included in this study are listed in Appendix B. In addition to the Base Case Upgrades, the previous queued projects and associated upgrades 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.

Development of Base Cases

Powerflow - The 2010 series Transmission Service Request (TSR) Models 2011 spring, 2012 summer and winter peak, and 2016 summer and winter peak scenario 0 peak cases were used for this study. After the 2011 spring, 2012 summer and winter peak, and the 2016 summer and winter peak cases were developed, each of the control areas' resources were then re-dispatched using current dispatch orders.

Stability – The 2010 series SPP Model Development Working Group (MDWG) Models 2011 winter and 2011 summer were used for this study.

Base Case Upgrades

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

- Woodward – Northwest 345kV line and associated projects to be built by OKGE placed in service in 2010.
- Hitchland 345/230/115kV upgrades to be built by SPS for 2010/2011 in-service³.
 - Hitchland – Moore County 230kV line
 - Hitchland – Perryton 230kV line
 - Hitchland – Texas County 115kV line
 - Hitchland – Hansford County 115kV line
 - Hitchland – Sherman County Tap 115kV line
- Valliant – Hugo – Sunnyside 345kV – assigned to Aggregate Study AG3-2006 Customers for 2012 in-service.
- Wichita – Reno County – Summit 345kV to be built by WERE for 2010 in-service⁴.
- Rose Hill – Sooner 345kV to be built by WERE/OKGE for 2013 in-service.
- Knob Hill – Steele City 115kV to be built by NPPD/WERE for 2010 in-service.
- Balanced Portfolio Projects⁵:
 - Gracemont 345/138/13.2kV Autotransformer
 - Woodward – Tuco 345kV line
 - Iatan – Nashua 345kV line

³ Approved 230kV upgrades are based on SPP 2007 STEP. Upgrades may need to be re-evaluated in the system impact study.

⁴ Approved based on an order of the Kansas Corporation Commission issued in Docket no. 07-WSEE-715-MIS

⁵ Notice to Construct (NTC) issued June, 2009

- Muskogee – Seminole 345kV line
- Post Rock– Axtell 345kV line
- Spearville – Post Rock 345kV line
- Tap Stillwell – Swissvale 345kV line at West Gardner
- Priority Projects⁶:
 - Hitchland - Woodward double circuit 345kV
 - Woodward – Medicine Lodge double circuit 345kV
 - Spearville – Comanche (Clark) double circuit 345kV
 - Comanche (Clark) – Medicine Lodge double circuit 345kV
 - Medicine Lodge – Wichita double circuit 345kV
 - Medicine Lodge 345/138kV autotransformer

Contingent Upgrades

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

- Finney – Holcomb 345kV Ckt #2 line assigned to GEN-2006-044 interconnection customer⁷.
- Central Plains – Setab 115kV transmission line assigned to GEN-2007-013 interconnection customer. This customer is currently in suspension.
- Grassland 230/115kV autotransformer #2 assigned to 1st Cluster Interconnection Customers (100% to GEN-2008-016)
- Judson Large – North Judson Large – Spearville Ckt #2 assigned to DIS-2009-001-1 Interconnection Customers (100% to GEN-2008-079)

Potential Upgrades Not in the Base Case

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

Regional Groupings

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

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

Powerflow - For each group, the various wind generating plants were modeled at 80% nameplate of maximum generation. The wind generating plants in the other areas were modeled at 20% nameplate of maximum generation. This process created fifteen different scenarios with each group being

⁶ Notice to Construct (NTC) issued June, 2010. NTC for double circuit lines indicated that NTC may be revised at a later time to be built at a higher voltage.

⁷ Based on Facility Study Posting November 2008

studied at 80% nameplate rating. These projects were dispatched as Energy Resources with equal distribution across the SPP footprint. 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. Each interconnection request was also modeled separately at 100% nameplate for certain analyses.

Peaking units were not dispatched in the 2011 spring model. To study peaking units' impacts, the 2012 and 2016 summer and winter peak model was 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.

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

Identification of Network Constraints

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

Determination of Cost Allocated Network Upgrades

Cost Allocated Network Upgrades of wind generation interconnection requests were determined using the 2011 spring model. Cost Allocated Network Upgrades of peaking units was determined using the 2016 summer peak model. Once a determination of the required Network Upgrades was made, a powerflow model of the 2010 spring case was developed with all cost allocated Network Upgrades in-service. A MUST FCITC analysis was performed to determine the Power Transfer Distribution Factors (PTDF), defined as a distribution factor with system impact conditions 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 the required upgrades.

For example, assume that there are three Generation Interconnection requests, X, Y, and Z that are responsible for the costs of Upgrade Project '1'. Given that their respective PTDF for the project have

been determined, the cost allocation for Generation Interconnection request ‘X’ for Upgrade Project 1 is found by the following set of steps and formulas:

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

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

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

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

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

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

- Repeat previous for each responsible GI request for each Project

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

Credits for Amounts Advanced for Network Upgrades

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

Interconnection Facilities

The requirement to interconnect the 3,447.6 MW of generation into the existing and proposed transmission systems in the affected areas of the SPP transmission footprint consist of the necessary cost allocated shared facilities listed in Appendix F by upgrade. The interconnection requirements for the cluster total \$341,000,000. Interconnection Facilities, including prior allocated facilities, specific to each generation interconnection request are listed in Appendix E.

A list of constraints with greater than or equal to a 20% OTDF that were identified and used for mitigation are listed in Appendix G. Other Network Constraints in the MIDW, NPPD, OKGE, SPS, SUNC, WERE, and WFEC transmission systems that were identified are shown in Appendix H (if provided). With a defined source and sink in a TSR, this list of Network Constraints will be refined and expanded to account for all Network Upgrade requirements.

A preliminary one-line drawing for each generation interconnection request are listed in Appendix D. Figure 1 depicts the major transmission line Network Upgrades needed to support the interconnection of the generation amounts requested in this study.

Powerflow

Powerflow Analysis Methodology

The Southwest Power Pool (SPP) Criteria states that:

“The transmission system of the SPP region shall be planned and constructed so that the contingencies as set forth in the Criteria will meet the applicable NERC Reliability Standards for transmission planning. All MDWG power flow models shall be tested to verify compliance with the System Performance Standards from NERC Table 1 – Category A.”

The ACCC function of PSS/E was used to simulate single contingencies in portions or all of the modeled control areas of American Electric Power West (AEPW), Empire District Electric (EMDE), Grand River Dam Authority (GRDA), Kansas City Power & Light (KCPL), Midwest Energy (MIDW), Missouri Public Service (MIPU), Mid-Kansas Electric Company LLC (MKEC), Nebraska Public Power District (NPPD), OG&E Electric Services (OKGE), Omaha Public Power District (OPPD), Southwest Public Service (SPS), Sunflower Electric (SUNC), Westar Energy (WERE), Western Farmers Electric Cooperative (WFEC) and other control areas were applied and the resulting scenarios analyzed. This satisfies the “more probable” contingency testing criteria mandated by NERC and the SPP criteria.

Powerflow Analysis

A power flow analysis was conducted for each Interconnection Customer’s facility using modified versions of the 2011 spring peak, 2012 summer and winter peak, and the 2016 summer and winter peak models. The output of the Interconnection Customer’s facility was offset in each model by a reduction in output of existing online SPP generation. This method allows the request to be studied as an Energy Resource (ER) Interconnection Request. The available seasonal models used were through the 2014 Summer Peak.

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

Cluster Group 1 (Woodward Area)

The Woodward area contained approximately 292 MW of new interconnection requests in addition to the 2,932 MW of prior queued interconnection requests. To mitigate the Fargo Junction – Woodward 69kV constraint the line will need to be rebuilt.

Cluster Group 2 (Hitchland Area)

The Hitchland area contained 782 MW of interconnection request in addition to the 1,933 MW of previous queued generation interconnection requests. An outage of the Finney-Stevens County 345kV line or an outage of the double circuit 345kV line from Hitchland-Woodward was found to cause possible voltage collapse. To mitigate the constraint, a single 345kV circuit from Hitchland – Border is required.

Cluster Group 3 (Spearville Area)

The Spearville area contained 365 MW of interconnection requests and 2,332 MW of previous queued interconnection requests. No new constraints were found in this area.

Cluster Group 4 (Mingo/NW Kansas Group)

The Mingo/NW Kansas group had 0 MW in addition to the 924 MW of previously queued generation in the area. No new constraints were found in this area.

Cluster Group 5 (Amarillo Area)

The Amarillo group had 51 MW of interconnection requests in addition to the 2,082 MW of previously queued interconnection requests in this area. The major constraint for the GEN-2008-088 request was on the Switch 2749 substation – Wildorado 69kV line. To mitigate the constraint, the line will need to be rebuilt. In addition, the GEN-2008-088 request was found to contribute to the possible voltage collapse for the outage of the Hitchland-Woodward 345kV double circuit and Finney-Stevens 345kV outage.

Cluster Group 6 (South Panhandle/New Mexico)

This group had 567 MW of interconnection requests in addition to the 1,450 MW of previously queued interconnection requests. The wind farm projects in Group 6 were also found to contribute to the possible voltage collapse on the Hitchland-Woodward 345kV double circuit.

Cluster Group 7 (Southwestern Oklahoma)

This group had 101 MW of interconnection requests in addition to the 1,770 MW of previous queued generation in the area. Constraints were identified near Washita. To mitigate the constraints in the area, a second Washita – Gracemont 138kV line was added.

Cluster Group 8 (South Central Kansas/North Oklahoma)

This group had 579 MW of interconnection requests in addition to the 1,603 MW of previous queued generation in the area. No new constraints were found in this area.

Cluster Group 9 (Northeast Nebraska)

This group had 101 MW of interconnection requests in addition to the 448 MW of previous queued generation in the area. The addition of this generation caused overloads on the Columbus – Madison County 230kV line. To mitigate the constraint, the rating of the line is increased.

Cluster Group 10 (North Nebraska)

This group had 0 MW of interconnection requests in addition to the 359 MW of previous queued generation in the area.

Cluster Group 11 (North Kansas)

This group had 322 MW of interconnection requests in addition to the 976 MW of previous queued generation in the area. The major constraints for the North Kansas area are the South Hays – Hays Plant – Vine Street 115kV line, and the Smoky Hills – Summit 230kV line. To mitigate the constraints, the following actions were taken: the South Hays – Hays Plant – Vine Street 115kV line was rebuilt. Also, a second Post Rock 345/230kV transformer was added to mitigate the Smoky Hills – Summit 230kV line. Constraints around the interconnection point of GEN-2009-040 were also found but

relieved when the Knob Hill – Steele City 115kV STEP upgrade, slated for a 2010 in-service, was added to the base case.

Cluster Group 12 (Northwest Arkansas)

This group had 0 MW of interconnection requests in addition to the 0 MW of previous queued generation in the area.

Cluster Group 13 (Northwest Missouri)

This group had 0 MW of interconnection requests in addition to the 2,437 MW of previous queued generation in the area. No new constraints were found in this area.

Cluster Group 14 (South Central Oklahoma)

This group had 200 MW of interconnection requests in addition to the 750 MW of previous queued generation in the area. No new constraints were found in this area.

Cluster Group 15 (Southwest Nebraska)

This group had 89.7 MW of interconnection requests in addition to the 0 MW of previous queued generation in the area. No new constraints were found in this area.

Stability and Power Factor Analysis

Cluster Group 1 (Woodward Area)

The analysis for Group 1 showed that a reactive power deficiency was apparent with addition of the interconnection request near Tatonga. The GEN-2008-044 and GEN-2010-011 interconnection requests will need to provide 95% lagging power factor at the point of interconnection (Tatonga). These requests combined will need to be able to provide over 71Mvar at the point of interconnection. This will require additional capacitor banks.

Power Factor Requirements

Request	Size (MW)	Generator Model	Point of Interconnection	Final PF Requirement at POI		Estimated Capacitor Requirement (Mvar)
				Lagging (supplying)	Leading (absorbing)	
GEN-2008-044 GEN-2010-011	197.8 29.7	Siemens SWT 2.3 MW	Tatonga 345kV	0.95	1.00	TBD
GEN-2010-008	64.4	Siemens SWT 2.3 MW	Fargo Jct 69kV	0.993	0.965	TBD

Cluster Group 2 (Hitchland Area)

The analysis for Group 2 showed that a reactive power deficiency was apparent with addition of the interconnection request near Hitchland. The GEN-2008-047 and GEN-2010-014 interconnection requests will need to provide 95% lagging power factor at the point of interconnection. This will require additional capacitor banks.

Power Factor Requirements

Request	Size (MW)	Generator Model	Point of Interconnection	Final PF Requirement at POI		Estimated Capacitor Requirement (Mvar)
				Lagging (supplying)	Leading (absorbing)	
GEN-2008-047	300	G.E. 1.5MW	Tap Hitchland-Woodward 345kV	0.95	1.00	TBD
GEN-2010-014	358.8	Siemens 2.3MW	Hitchland 345kV	0.95	0.98	TBD
GEN-2010-007	73.8	Vestes V100 1.8MW	Riverside – Pringle 115kV	1.00	0.95	TBD

Cluster Group 3 (Spearville Area)

Power Factor Requirements

Request	Size (MW)	Generator Model	Point of Interconnection	Final PF Requirement at POI		Estimated Capacitor Requirement (Mvar)
				Lagging (supplying)	Leading (absorbing)	
GEN-2010-009	165.6	Siemens SWT 2.3MW	Gray County 345kV (531000)(G07-040-POI)	0.95	0.95	TBD
GEN-2010-015	200.1	Siemens SWT 2.3MW	Spearville 345kV (531469)	0.95	1.000	TBD

Cluster Group 4 (Mingo Area)

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

Cluster Group 5 (Amarillo Area)

Power Factor Requirements

Request	Size (MW)	Generator Model	Point of Interconnection	Final PF Requirement at POI		Estimated Capacitor Requirement (Mvar)
				Lagging (supplying)	Leading (absorbing)	
GEN-2008-088	50.6	Siemens SWT 2.3MW	Vega 69kV	1.0	0.957	No

Cluster Group 6 (South Panhandle Area)

Power Factor Requirements

Request	Size (MW)	Generator Model	Point of Interconnection	Final PF Requirement at POI		Estimated Capacitor Requirement (Mvar)
				Lagging (supplying)	Leading (absorbing)	
GEN-2008-022	300	G.E. 1.5MW	Eddy – Tolk 345kV	1.00	0.96	No
GEN-2009-067S	20	Solar	Seven Rivers 69kV	0.95	0.95	
GEN-2010-006	205	GENROU	Jones 230kV	0.95	0.95	0
ASGI-2010-010	48	GENROU	Lovington 115kV	0.95	0.95	0

Cluster Group 7 (Southwest Oklahoma)

Power Factor Requirements

Request	Size (MW)	Generator Model	Point of Interconnection	Final PF Requirement at POI		Estimated Capacitor Requirement (Mvar)
				Lagging (supplying)	Leading (absorbing)	
GEN-2008-037	100.8	Vestas V90 1.8MW	Washita (521089)	0.96	0.93	Yes

Cluster Group 8 (South Central Kansas)

Power Factor Requirements

Request	Size (MW)	Generator Model	Point of Interconnection	Final PF Requirement at POI		Estimated Capacitor Requirement (Mvar)
				Lagging (supplying)	Leading (absorbing)	
GEN-2008-071	76.8	GE 1.6MW	Newkirk 138kV	0.95	0.95	TBD
GEN-2008-098 GEN-2010-003	100.8 100.8	Vestas V90 1.8MW	Wolf Creek – LaCygne 345kV	0.98	0.95	TBD
GEN-2010-005	300	Clipper C95 2.5MW	Wichita – Woodring 345kV	0.99	0.99	TBD

Cluster Group 9 (Northeast Nebraska)

Power Factor Requirements

Request	Size (MW)	Generator Model	Point of Interconnection	Final PF Requirement at POI		Estimated Capacitor Requirement (Mvar)
				Lagging (supplying)	Leading (absorbing)	
GEN-2006-044N02	100.5	GE 1.6MW	Madison County 230kV	1.00	0.97	TBD

Cluster Group 10 (North Nebraska)

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

Cluster Group 11 (North Kansas)

Power Factor Requirements

Request	Size (MW)	Generator Model	Point of Interconnection	Final PF Requirement at POI		Estimated Capacitor Requirement (Mvar)
				Lagging (supplying)	Leading (absorbing)	
GEN-2009-008	199.5	GE 1.5MW	South Hays 230kV	0.99	0.94	TBD
GEN-2009-020	48.6	Vestes V90 1.8MW	Balzine – Nekoma 69kV	1.0	0.98	+/- 15MVar SVC
GEN-2009-040	73.8	Vestes V90 1.8MW	Smittyville-Knob Hill 115kV	1.0	0.95	TBD

Cluster Group 12 (Northwest Arkansas)

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

Cluster Group 13 (Northwest Missouri)

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 South Central Oklahoma stability analysis revealed no stability issues with the study requests.

Power Factor Requirements

Request	Size (MW)	Generator Model	Point of Interconnection	Final PF Requirement at POI		Estimated Capacitor Requirement (Mvar)
				Lagging (supplying)	Leading (absorbing)	
GEN-2008-046	200	Vestes V90 1.8MW	Sunnyside 345kV	0.98	0.955	TBD

Cluster Group 15 (Southwest Nebraska)

Power Factor Requirements

Request	Size (MW)	Generator Model	Point of Interconnection	Final PF Requirement		Estimated Capacitor Requirement (Mvar)
				Lagging (supplying)	Leading (absorbing)	
GEN-2008-123N	89.7	Siemens SWT 2.3 MW	Pauline – Guide Rock 115kV	1.0	0.95	TBD

Conclusion

The minimum cost of interconnecting all of the interconnection requests included in this Impact Cluster Study is estimated at \$341,000,000 for the Allocated Network Upgrades and Transmission Owner Interconnection Facilities are listed in Appendix E, F, and G. These costs do not include the cost of upgrades of other transmission facilities listed in Appendix H (if provided) which are Network Constraints.

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

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

Appendix

A: Generation Interconnection Requests Considered for Impact Study

Request	Amount	Area	Requested Point of Interconnection	Proposed Point of Interconnection	Requested In-Service Date
GEN-2006-044N02	100.5	NPPD	TAP FORT RANDALL-KELLEY 230kV	TAP FORT RANDALL-KELLEY 230kV	
GEN-2008-022	300	SPS	TAP EDDY – GEN-2007-034 345kV	TAP EDDY – TOLK 345kV	09/01/2011
GEN-2008-037	100.8	WFEC	TAP WASHITA - BLUE CANYON 138kV	TAP WASHITA - BLUE CANYON 138kV	1/1/2010
GEN-2008-044	197.8	OKGE	TATONGA 345kV	TATONGA 345kV	12/1/2011
GEN-2008-046	200	OKGE	SUNNYSIDE 345kV	SUNNYSIDE 345kV	12/1/2010
GEN-2008-047	300	SPS	TAP HITCHLAND - WOODWARD 345kV	TAP HITCHLAND - WOODWARD 345kV	12/31/2012
GEN-2008-071	76.8	OKGE	NEWKIRK 138kV	NEWKIRK 138kV	11/1/2010
GEN-2008-088	50.6	SPS	VEGA 69kV	VEGA 69kV	12/1/2011
GEN-2008-098	100.8	WERE	TAP WOLF CREEK - LACYGNE 345kV	TAP WOLF CREEK - LACYGNE 345kV	12/31/2011
GEN-2008-123N	89.7	NPPD	TAP GUIDE - PAULINE 115kV	TAP GUIDE - PAULINE 115kV	
GEN-2009-008	200	SUNC	SOUTH HAYS 230kV	SOUTH HAYS 230kV	9/1/2011
GEN-2009-020	48.6	MIDW	TAP BAZINE - NEKOMA 69kV	TAP BAZINE - NEKOMA 69kV	12/31/2011
GEN-2009-040	73.8	WERE	TAP SMITTYVILLE - KNOB HILL 115kV	TAP SMITTYVILLE - KNOB HILL 115kV	12/31/2012
GEN-2009-067S	20	SPS	7 RIVERS 69kV	7 RIVERS 69kV	12/1/2010
GEN-2010-003	100.8	WERE	GEN-2008-098 345kV	GEN-2008-098 345kV	12/31/2011
GEN-2010-005	300	MKEC	GEN-2007-025 345kV	GEN-2007-025 345kV	12/1/2012
GEN-2010-006	205	SPS	JONES 230kV	JONES 230kV	6/1/2012
GEN-2010-007	73.8	SPS	TAP PRINGLE - RIVERVIEW 115kV	TAP PRINGLE - RIVERVIEW 115kV	12/1/2011
GEN-2010-008	64.4	WFEC	FARGO 69kV	FARGO 69kV	12/22/2011
GEN-2010-009	165.6	SUNC	GRAY COUNTY 345kV	GRAY COUNTY 345kV	12/1/2011
GEN-2010-011	29.7	OKGE	GEN-2008-044 345kV	GEN-2008-044 345kV	12/31/2011
GEN-2010-014	358.8	SPS	HITCHLAND 345kV	HITCHLAND 345kV	12/13/2013
GEN-2010-015	200.1	SUNC	SPEARVILLE 345kV	SPEARVILLE 345kV	1/1/2013
ASGI-2010-010	42	SPS	LOVINGTON 115kV	LOVINGTON 115kV	
ASGI-2010-011	48	SPS	TEXAS COUNTY 69kV	TEXAS COUNTY 69kV	
GROUPED TOTAL	3,447.6				

* Planned Facility

^ Proposed Facility

*** Electrically Remote Interconnection Requests

B: Prior Queued Interconnection Requests

Request	Amount	Area	Requested/Proposed Point of Interconnection	Status or In-Service Date
GEN-2001-014	96.0	WFEC	Fort Supply 138kV	On-Line
GEN-2001-026	74.0	WFEC	Washita 138kV	On-Line
GEN-2001-033	180.0	SPS	San Juan Mesa Tap 230kV	On-Line
GEN-2001-036	80.0	SPS	Caprock Tap 115kV	On-Line
GEN-2001-037	100.0	OKGE	Windfarm Switching 138kV	On-Line
GEN-2001-039A	105.0	MKEC	Tap Greensburg - Judson-Large 115kV	On Schedule for 2011
GEN-2001-039M	100.0	SUNC	Central Plains Tap 115kV	On-Line
GEN-2002-004	200.0	WERE	Latham 345kV	On-Line at 150MW
GEN-2002-005	120.0	WFEC	Red Hills Tap 138kV	On-Line
GEN-2002-008	240.0	SPS	Hitchland 345kV	On-Line at 120MW
GEN-2002-009	80.0	SPS	Hansford County 115kV	On-Line
GEN-2002-022	240.0	SPS	Bushland 230kV	On-Line at 160MW
GEN-2002-025A	150.0	MKEC	Spearville 230kV	On-Line at 100.5MW
GEN-2003-004	100.0	WFEC	Washita 138kV	On-Line
GEN-2003-005	100.0	WFEC	Anadarko - Paradise 138kV	On Line
GEN-2003-006A	200.0	MKEC	Elm Creek 230kV	On-Line
GEN-2003-019	250.0	MIDW	Smoky Hills Tap 230kV	On-Line
GEN-2003-020	160.0	SPS	Martin 115kV	On-Line at 80MW
GEN-2003-022	120.0	AEPW	Washita 138kV	On-Line
GEN-2004-023	20.6	WFEC	Washita 138kV	On-Line
GEN-2004-014	154.5	MKEC	Spearville 230kV	On Schedule for 2011
GEN-2004-020	27.0	AEPW	Washita 138kV	On-Line
GEN-2005-003	30.6	WFEC	Washita 138kV	On-Line
GEN-2005-005	18.0	OKGE	Windfarm Tap 138kV	IA Pending
GEN-2005-008	120.0	OKGE	Woodward 138kV	On-Line
GEN-2005-012	250.0	SUNC	Spearville 345kV	On Schedule for 2012
GEN-2005-013	201.0	WERE	Tap Latham - Neosho	On Schedule for 2012
GEN-2005-017	340.0	SPS	Tap Hitchland - Potter County 345kV	On Suspension
GEN-2006-002	101.0	AEPW	Grapevine - Elk City 230kV	On-Line
GEN-2006-006	205.5	MKEC	Spearville 230kV	IA Pending
GEN-2006-014	300.0	MIPU	Tap Maryville – Clarinda and tie Midway (WFARMS) 161kV	On Suspension
GEN-2006-017	300.0	MIPU	Tap Maryville – Clarinda and tie Midway (WFARMS) 161kV	On Suspension
GEN-2006-018	170.0	SPS	Tuco 230kV	On Schedule for 2011
GEN-2006-020S	18.9	SPS	DWS Frisco Tap	On Schedule for 12/31/2011
GEN-2006-020N	42.0	NPPD	Bloomfield 115kV	On-Line
GEN-2006-021	101.0	MKEC	Flat Ridge Tap 138kV	On-Line
GEN-2006-022	150.0	MKEC	Ninnescah Tap 115kV	On Suspension
GEN-2006-024S	19.8	WFEC	South Buffalo Tap 69kV	On-Line
GEN-2006-026	502.0	SPS	Hobbs 230kV	On-Line
GEN-2006-031	75.0	MIDW	Knoll 115kV	On-Line
GEN-2006-032	200.0	MIDW	South Hays 230kV	On Suspension
GEN-2006-034	81.0	SUNC	Kanarado 115kV	On Suspension
GEN-2006-035	225.0	AEPW	Sweetwater 230kV	On Schedule for 2011
GEN-2006-037N1	75.0	NPPD	Broken Bow 115kV	On Suspension
GEN-2006-038N019	80.0	NPPD	Petersburg 115kV	On-Line
GEN-2006-038	750.0	WFEC	Hugo 345kV	On Suspension
GEN-2006-038N005	80.0	NPPD	Broken Bow 115kV	On-Line
GEN-2006-039	400.0	SPS	Tap and Tie both Potter County - Plant X 230kV and Bushland - Deaf Smith 230kV	On Suspension
GEN-2006-040	108.0	SUNC	Mingo 115kV	On Schedule for 2010
GEN-2006-043	99.0	AEPW	Grapevine - Elk City 230kV	On Line
GEN-2006-044	370.0	SPS	Hitchland 345kV	On Schedule for 2014
GEN-2006-044N	40.5	NPPD	Petersburg 115kV	On Schedule for 12/2011
GEN-2006-045	240.0	SPS	Tap and Tie both Potter County - Plant X 230kV and Bushland - Deaf Smith 230kV	On Suspension

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Appendix B: Prior Queued Interconnection Requests

Request	Amount	Area	Requested/Proposed Point of Interconnection	Status or In-Service Date
GEN-2006-046	131.0	OKGE	Dewey 138kV	On-Line
GEN-2006-047	240.0	SPS	Tap and Tie both Potter County - Plant X 230kV and Bushland - Deaf Smith 230kV	On Schedule for 2013
GEN-2006-049	400.0	SPS	Hitchland - Finney 345kV	On Schedule for 2014
GEN-2007-002	160.0	SPS	Grapevine 115kV	On Suspension
GEN-2007-006	160.0	OKGE	Roman Nose 138kV	On Suspension
GEN-2007-011	135.0	SUNC	Syracuse 115kV	On Schedule
GEN-2007-011N08	81.0	NPPD	Bloomfield 115kV	On-Line
GEN-2007-013	99.0	SUNC	Selkirk 115kV	On Suspension
GEN-2007-015	135.0	WERE	Tap Kelly – S1399 (OPPD) 161kV	On Suspension
GEN-2007-017	100.5	MIPU	Tap Maryville – Clarinda and tie Midway (WFARMS) 161kV	On Suspension
GEN-2007-021	201.0	OKGE	Tatonga 345kV	On Schedule for 2014
GEN-2007-025	300.0	WERE	Tap Woodring – Wichita 345kV	On Suspension
GEN-2007-032	150.0	WFEC	Tap Clinton Junction – Clinton 138kV	On Schedule for 2012
GEN-2007-038	200.0	SUNC	Spearville 345kV	On Schedule for 2015
GEN-2007-040	200.1	SUNC	Tap Holcomb – Spearville 345kV	On Schedule for 2012
GEN-2007-043	200.0	OKGE	Minco 345kV	On-Line (100MW)
GEN-2007-044	300.0	OKGE	Tatonga 345kV	On Schedule for 2014
GEN-2007-046	199.5	SPS	Tap & Tie Texas County – Hitchland & DWS Frisco Tap – Hitchland 115kV	On Schedule for 2014
GEN-2007-048	400.0	SPS	Tap Amarillo South – Swisher 230kV	On Schedule for 2014
GEN-2007-050	170.0	OKGE	Woodward 138kV	On-Line
GEN-2007-051	200.0	WFEC	Mooreland 138kV	On Schedule for 2014
GEN-2007-052	150.0	WFEC	Anadarko 138kV	On-Line
GEN-2007-053	110.0	MIPU	Tap Maryville – Clarinda and tie Midway (WFARMS) 161kV	On Schedule for 2013
GEN-2007-057	34.5	SPS	Moore County East 115kV	On Schedule for 2014
GEN-2007-062	765.0	OKGE	Woodward 345kV	On Schedule for 2014
GEN-2008-003	101.0	OKGE	Woodward EHV 138kV	On-Line
GEN-2008-008	60.0	SPS	Graham 115kV	On Schedule for 2014
GEN-2008-009	60.0	SPS	San Juan Mesa Tap 230kV	On Schedule for 2014
GEN-2008-013	300.0	OKGE	Tap Woodring – Wichita 345kV	On Schedule for 2013
GEN-2008-014	150.0	SPS	Tap Tuco – Oklaunion 345kV	On Schedule for 2014
GEN-2008-016	248.0	SPS	Grassland 230kV	IA Pending
GEN-2008-017	300.0	SUNC	Setab 345kV	On Schedule for 2012
GEN-2008-018	405.0	SPS	Finney 345kV	IA Pending
GEN-2008-019	300.0	OKGE	Tatonga 345kV	On Schedule for 2015
GEN-2008-021	42.0	WERE	Wolf Creek 345kV	IA Pending
GEN-2008-023	150.0	AEPW	Hobart Junction 138kV	On Schedule for 2012
GEN-2008-025	101.2	SUNC	Ruleton 115kV	On Schedule for 2015
GEN-2008-029	250.5	OKGE	Woodward EHV 138kV	On Schedule for 2014
GEN-2008-051	322.0	SPS	Potter 345kV	On Schedule for 2014
GEN-2008-079	100.5	MKEC	Tap Judson Large – Cudahy 115kV	On Schedule for 2012
GEN-2008-086N02	200.0	NPPD	Tap Ft. Randall – Columbus 230kV	On Schedule for 2014
GEN-2008-092	201.0	MIDW	Postrock 230kV	IA Pending
GEN-2008-119O	60.0	OPPD	S1399 161kV	On-Line
GEN-2008-124	200.1	SUNC	Spearville 345kV	On Schedule for 2014
GEN-2008-127	200.1	WERE	Tap Sooner – Rose Hill 345kV	On Schedule for 2012
GEN-2008-129	80.0	MIPU	Pleasant Hill 161kV	On-Line
GEN-2009-011	50.0	MKEC	Tap Plainville – Phillipsburg 115kV	On Schedule for 2014
GEN-2009-016	141.0	AEPW	Falcon Road 138kV	On Schedule for 2012
GEN-2009-017	60.0	SPS	Tap Pembroke – Stiles 138kV	Under Study (DISIS-2009-001)
GEN-2009-025	60.0	OKGE	Tap Deer Creek – Sinclair 69kV	On Suspension
Broken Bow	8.3	NPPD	Genoa 115kV	On-Line
Ord	10.8	NPPD	Bloomfield 115kV	On-Line
Stuart	2.1	NPPD	Petersburg 115kV	On-Line
Ainsworth	75.0	NPPD	Ainsworth Wind Tap 115kV	On-Line
Rosebud	30.0	NPPD	St. Francis 115kV	On-Line
Wolf Creek	1,170.0	WERE	Wolf Creek 345kV	On-Line
Genoa	4.0	NPPD	Genoa 115kV	On-Line

Appendix B: Prior Queued Interconnection Requests

Request	Amount	Area	Requested/Proposed Point of Interconnection	Status or In-Service Date
ASGI-2010-001	400.0	AECI	Tap Cooper – Fairport 345kV	AECI queue Affected Study
ASGI-2010-004	50.0	AECI	Tap Queen City – Lancaster 69kV	AECI queue Affected Study
ASGI-2010-005	99.0	AECI	Lathrop 161kV	AECI queue Affected Study
ASGI-2010-006	150.0	AECI	Tap Fairfax – Fairfax Tap 138kV	AECI queue Affected Study
ASGI-2010-007	150.0	AECI	Tap Fairfax – Fairfax Tap 138kV	AECI queue Affected Study
ASGI-2010-009	201.0	AECI	Osborn 161kV	AECI queue Affected Study
Llano Estacado	80.0	SPS	Llano Wind Farm Tap 115kV	On-Line
SPS DISTRIBUTED	90.0	SPS	Dumas_19ST 115kV	On-Line
			Etter 115kV	On-Line
			Sherman 115kV	On-Line
			Spearman 115kV	On-Line
			Texas County 115kV	On-Line
Montezuma	110.0	MKEC	Haggard 115kV	On-Line
TOTAL	20,584.6			

C: Study Groupings

Cluster	Request	Amount	Area	Proposed Point of Interconnection
Prior Queued	GEN-2001-014	96	WFEC	Fort Supply 138kV
	GEN-2001-037	100	OKGE	Windfarm Switching 138kV
	GEN-2005-005	18	OKGE	Windfarm Tap 138kV
	GEN-2005-008	120	OKGE	Woodward 138kV
	GEN-2006-024S	19.8	WFEC	South Buffalo Tap 69kV
	GEN-2006-046	131	OKGE	Dewey 138kV
	GEN-2007-006	160	OKGE	Roman Nose 138kV
	GEN-2007-021	201	OKGE	*Tatonga 345kV
	GEN-2007-044	300	OKGE	*Tatonga 345kV
	GEN-2007-050	170	OKGE	*Woodward 345kV
	GEN-2007-051	200	WFEC	Mooreland 138kV
	GEN-2007-062	765	OKGE	*Woodward 345kV
	GEN-2008-003	101	OKGE	*Woodward EHV 138kV
	GEN-2008-019	300	OKGE	*Tatonga 345kV
GEN-2008-029	250.5	OKGE	WOODWARD EHV 138kV	
PRIOR QUEUED SUBTOTAL		2,932.3		
Cluster	Request	Amount	Area	Proposed Point of Interconnection
Woodward	GEN-2008-044	197.8	OKGE	Tatonga 345kV
	GEN-2010-008	64.4	WFEC	Fargo 69kV
	GEN-2010-011	29.7	OKGE	Tatonga 345kV
WOODWARD SUBTOTAL		291.9		
AREA SUBTOTAL		3,224.2		

Cluster	Request	Amount	Area	Proposed Point of Interconnection
Prior Queued	SPS Distribution	90	SPS	Various
	GEN-2002-008	240	SPS	*Hitchland 345kV
	GEN-2002-009	80	SPS	Hansford County 115kV
	GEN-2003-020	160	SPS	Martin 115kV
	GEN-2005-017	340	SPS	*Tap Hitchland - Potter County 345kV
	GEN-2006-020S	18.9	SPS	DWS Frisco Tap
	GEN-2006-044	370	SPS	*Hitchland 345kV
	GEN-2006-049	400	SPS	*Tap Hitchland - Finney 345kV
	GEN-2007-046	199.5	SPS	Tap & Tie Texas County – Hitchland & DWS Frisco Tap – Hitchland 115kV
GEN-2007-057	34.5	SPS	Moore County East 115kV	
PRIOR QUEUED SUBTOTAL		1,932.9		
Cluster	Request	Amount	Area	Proposed Point of Interconnection
Hitchland	GEN-2008-047	300	SPS	TAP HITCHLAND - WOODWARD 345kV
	GEN-2010-007	73.8	SPS	Tap Pringle – Riverview 115kV
	GEN-2010-014	358.8	SPS	Hitchland 345kV
	ASGI-2010-011	48	SPS	Texas County 69kV
HITCHLAND SUBTOTAL		780.6		
AREA SUBTOTAL		2,713.5		

Appendix C: Study Groupings

Cluster	Request	Amount	Area	Proposed Point of Interconnection
Prior Queued	Montezuma	110	MKEC	Haggard 115kV
	GEN-2001-039A	105	MKEC	Tap Greensburg - Judson-Large 115kV
	GEN-2002-025A	150	MKEC	Spearville 230kV
	GEN-2004-014	154.5	MIDW	Spearville 230kV
	GEN-2005-012	250	SUNC	Spearville 345kV
	GEN-2006-006	205.5	SUNC	Spearville 230kV
	GEN-2006-021	101	MKEC	Flat Ridge Tap 138kV
	GEN-2006-022	150	MKEC	Ninnescah Tap 115kV
	GEN-2007-038	200	SUNC	Spearville 345kV
	GEN-2007-040	200.1	SUNC	Tap Holcomb – Spearville 345kV
	GEN-2008-018	405	SUNC	Finney 345kV
	GEN-2008-079	100.5	MKEC	Tap Judson Large – Cudahy 115kV
GEN-2008-124	200.1	SUNC	Spearville 230kV	
PRIOR QUEUED SUBTOTAL		2,331.7		
Cluster	Request	Amount	Area	Proposed Point of Interconnection
	GEN-2010-009	165.6	SUNC	Gray County 345kV
	GEN-2010-015	200.1	SUNC	Spearville 345kV
SPEARVILLE SUBTOTAL		365.7		
AREA SUBTOTAL		2,697.4		

Cluster	Request	Amount	Area	Proposed Point of Interconnection
Prior Queued	GEN-2001-039M	100	SUNC	Tap Leoti - City Services 115kV
	GEN-2006-034	81	SUNC	Tap Kanarado - Sharon Springs 115kV
	GEN-2006-040	108	SUNC	Mingo 115kV
	GEN-2007-011	135	SUNC	Syracuse 115kV
	GEN-2007-013	99	SUNC	Selkirk 115kV
	GEN-2008-017	300	SUNC	Setab 345kV
	GEN-2008-025	101.2	SUNC	Ruleton 115kV
PRIOR QUEUED SUBTOTAL		924.2		
MINGO/NW KANSAS SUBTOTAL		924.2		

Appendix C: Study Groupings

Cluster	Request	Amount	Area	Proposed Point of Interconnection
Prior Queued	Llano Estacado	80	SPS	Llano Estacado Tap 115kV
	GEN-2002-022	240	SPS	Bushland 230kV
	GEN-2006-039	400	SPS	Tap and Tie both Potter County - Plant X 230kV and Bushland - Deaf Smith 230kV
	GEN-2006-045	240	SPS	Tap and Tie both Potter County - Plant X 230kV and Bushland - Deaf Smith 230kV
	GEN-2006-047	240	SPS	Tap and Tie both Potter County - Plant X 230kV and Bushland - Deaf Smith 230kV
	GEN-2007-002	160	SPS	Grapevine 115kV
	GEN-2007-048	400	SPS	Tap Amarillo South – Swisher 230kV
	GEN-2008-051	322	SPS	Potter 345kV
PRIOR QUEUED SUBTOTAL		2,082		
Cluster	Request	Amount	Area	Proposed Point of Interconnection
Amarillo	GEN-2008-088	50.6	SPS	Vega 69kV
AMARILLO SUBTOTAL		50.6		
AREA SUBTOTAL		2,132.6		

Cluster	Request	Amount	Area	Proposed Point of Interconnection
Prior Queued	GEN-2001-033	180	SPS	San Juan Mesa Tap 230kV
	GEN-2001-036	80	SPS	Norton 115kV
	GEN-2006-018	170	SPS	Tuco 230kV
	GEN-2006-026	502	SPS	Hobbs 230kV
	GEN-2008-008	60	SPS	Graham 115kV
	GEN-2008-009	60	SPS	San Juan Mesa Tap 230kV
	GEN-2008-014	150	SPS	Tap Tuco – Oklaunion 345kV
	GEN-2008-016	248	SPS	Grassland 230kV
PRIOR QUEUED SUBTOTAL		1,450		
Cluster	Request	Amount	Area	Proposed Point of Interconnection
S Pandle	GEN-2008-022	300	SPS	Tap Eddy – GEN-2007-034 345kV
	GEN-2009-067S	20	SPS	7 Rivers 69kV
	GEN-2010-006	205	SPS	Jones 345kV
	ASGI-2010-010	42	SPS	Lovington 115kV
SOUTH PANHANDLE/NM SUBTOTAL		567		
AREA SUBTOTAL		2,017		

Appendix C: Study Groupings

Cluster	Request	Amount	Area	Proposed Point of Interconnection
Prior Queued	GEN-2001-026	74	WFEC	Washita 138kV
	GEN-2002-005	120	WFEC	Tap Morewood - Elk City 138kV
	GEN-2003-004	101	WFEC	Washita 138kV
	GEN-2003-005	100	WFEC	Anadarko - Paradise 138kV
	GEN-2003-022	120	AEPW	Washita 138kV
	GEN-2004-020	27	AEPW	Washita 138kV
	GEN-2004-023	21	WFEC	Washita 138kV
	GEN-2005-003	31	WFEC	Washita 138kV
	GEN-2006-002	101	AEPW	Grapevine - Elk City 230kV
	GEN-2006-035	225	AEPW	Grapevine - Elk City 230kV
	GEN-2006-043	99	AEPW	Grapevine - Elk City 230kV
	GEN-2007-032	150	WFEC	Tap Clinton Junction – Clinton 138kV
	GEN-2007-043	200	AEPW	Tap Lawton Eastside – Cimarron 345kV
	GEN-2007-052	150	WFEC	Anadarko 138kV
	GEN-2008-023	150	AEPW	Hobart Junction 138kV
GEN-2009-016	100.8	AEPW	Falcon Road 138kV	
PRIOR QUEUED SUBTOTAL		1,769.8		
Cluster	Request	Amount	Area	Proposed Point of Interconnection
SW Oklahoma	GEN-2008-037	100.8	WFEC	Tap Washita – Blue Canyon 138kV
SW OKLAHOMA SUBTOTAL		100.8		
AREA SUBTOTAL		1,870.6		

Cluster	Request	Amount	Area	Proposed Point of Interconnection
Prior Queued	ASGI-2010-006	150	AECI	Tap Fairfax – Fairfax Tap 138kV
	ASGI-2010-007	150	AECI	Tap Fairfax – Fairfax Tap 138kV
	GEN-2002-004	200	WERE	Latham 345kV
	GEN-2005-013	201	WERE	Tap Latham - Neosho
	GEN-2007-025	300	WERE	Tap Woodring – Wichita 345kV
	GEN-2008-013	300	OKGE	Tap Woodring – Wichita 345kV
	GEN-2008-021	42	WERE	Wolf Creek 345kV
	GEN-2008-127	200.1	WERE	Tap Sooner – Rose Hill 345kV
	GEN-2009-025	60	OKGE	Tap Deer Creek – Sinclair 69kV
PRIOR QUEUED SUBTOTAL		1,603.1		
Cluster	Request	Amount	Area	Proposed Point of Interconnection
North Oklahoma	GEN-2008-071	76.8	OKGE	Newkirk 138kV
	GEN-2008-098	100.8	WERE	Tap Wolf Creek – LaCygne 345kV
	GEN-2010-003	100.8	WERE	GEN-2008-098 345kV
	GEN-2010-005	300	MKEC	GEN-2007-025 345kV
NORTH OKLAHOMA SUBTOTAL		578.4		
AREA SUBTOTAL		2,181.5		

Appendix C: Study Groupings

Cluster	Request	Amount	Area	Proposed Point of Interconnection
Prior Queued	Genoa	4	NPPD	Genoa 115kV
	GEN-2006-020N	42	NPPD	Bloomfield 115kV
	GEN-2006-038N019	80	NPPD	Petersburg 115kV
	GEN-2006-044N	40.5	NPPD	Tap Neligh – Petersburg 115kV
	GEN-2007-011N08	81	NPPD	Bloomfield 115kV
	GEN-2008-086N02	200	NPPD	Tap Ft. Randall – Columbus 230kV
PRIOR QUEUED SUBTOTAL		447.5		
Cluster	Request	Amount	Area	Proposed Point of Interconnection
NE Nebraska	GEN-2006-044N02	100.5	NPPD	GEN-2008-086N02 230kV
NE NEBRASKA SUBTOTAL		100.5		
AREA SUBTOTAL		548		

Cluster	Request	Amount	Area	Proposed Point of Interconnection
Prior Queued	Broken Bow	8.3	NPPD	Genoa 115kV
	Ord	13.9	NPPD	Bloomfield 115kV
	Stuart	2.1	NPPD	Petersburg 115kV
	GEN-2003-021N	75	NPPD	Ainsworth Wind Tap 115kV
	GEN-2004-005N	30	NPPD	St. Francis 115kV
	GEN-2004-023N	75	NPPD	Columbus Co 115kV
	GEN-2006-037N1	75	NPPD	Broken Bow 115kV
	GEN-2006-038N005	80	NPPD	Broken Bow 115kV
PRIOR QUEUED SUBTOTAL		359.3		
NORTH NEBRASKA SUBTOTAL		359.3		

Cluster	Request	Amount	Area	Proposed Point of Interconnection
Prior Queued	GEN-2003-006A-E	100	EMDE	Elm Creek 230kV
	GEN-2003-006A-W	100	WERE	Elm Creek 230kV
	GEN-2003-019	250	MIDW	Smoky Hills Tap 230kV
	GEN-2006-031	75	MIDW	Knoll 115kV
	GEN-2006-032	200	MIDW	South Hays 230kV
	GEN-2008-092	201	MIDW	Knoll 115kV
	GEN-2009-011	50	MKEC	Tap Plainville – Phillipsburg 115kV
PRIOR QUEUED SUBTOTAL		976		
Cluster	Request	Amount	Area	Proposed Point of Interconnection
North Kansas	GEN-2009-008	200	SUNC	South Hays 230kV
	GEN-2009-020	48.6	MIDW	Tap Balzine – Nekoma 69kV
	GEN-2009-040	73.8	WERE	Tap Smittyville – Knob Hill 115kV
NORTH KANSAS SUBTOTAL		322.4		
AREA SUBTOTAL		1,298.4		

Appendix C: Study Groupings

Cluster	Request	Amount	Area	Proposed Point of Interconnection
Prior Queued	ASGI-2010-001	400	AECI	Tap Cooper – Fairport 345kV
	ASGI-2010-002	201	AECI	Lathrop 161kV
	ASGI-2010-003	300	AECI	Maryville 161kV
	ASGI-2010-004	50	AECI	Tap Queen City – Lancaster 69kV
	ASGI-2010-005	99	AECI	Lathrop 161kV
	ASGI-2010-008	100	AECI	Maryville 161kV
	ASGI-2010-009	201	AECI	Osborn 161kV
	GEN-2006-014	300	MIPU	Maryville – Clarinda 161kV & Tie to Midway 161kV
	GEN-2006-017	300	MIPU	Maryville – Clarinda 161kV & Tie to Midway 161kV
	GEN-2007-015	135	WERE	Tap Humboldt – Kelly 161kV
	GEN-2007-017	100.5	MIPU	Maryville – Clarinda 161kV & Tie to Midway 161kV
	GEN-2007-053	110	MIPU	Maryville – Clarinda 161kV & Tie to Midway 161kV
	GEN-2008-1190	60	OPPD	Tap Humboldt – Kelly 161kV
	GEN-2008-129	80	MIPU	Pleasant Hill 161kV
PRIOR QUEUED SUBTOTAL		2,436.5		
Cluster	Request	Amount	Area	Proposed Point of Interconnection
NORTHWEST MISSOURI SUBTOTAL				
AREA SUBTOTAL		2,436.5		

Cluster	Request	Amount	Area	Proposed Point of Interconnection
Prior Queued	GEN-2006-038	750	WFEC	Hugo 345kV
PRIOR QUEUED SUBTOTAL		750		
Cluster	Request	Amount	Area	Proposed Point of Interconnection
South Central Oklahoma	GEN-2008-046	200	OKGE	Sunnyside 345kV
SOUTH CENTRAL OKLAHOMA SUBTOTAL		200		
AREA SUBTOTAL		950		

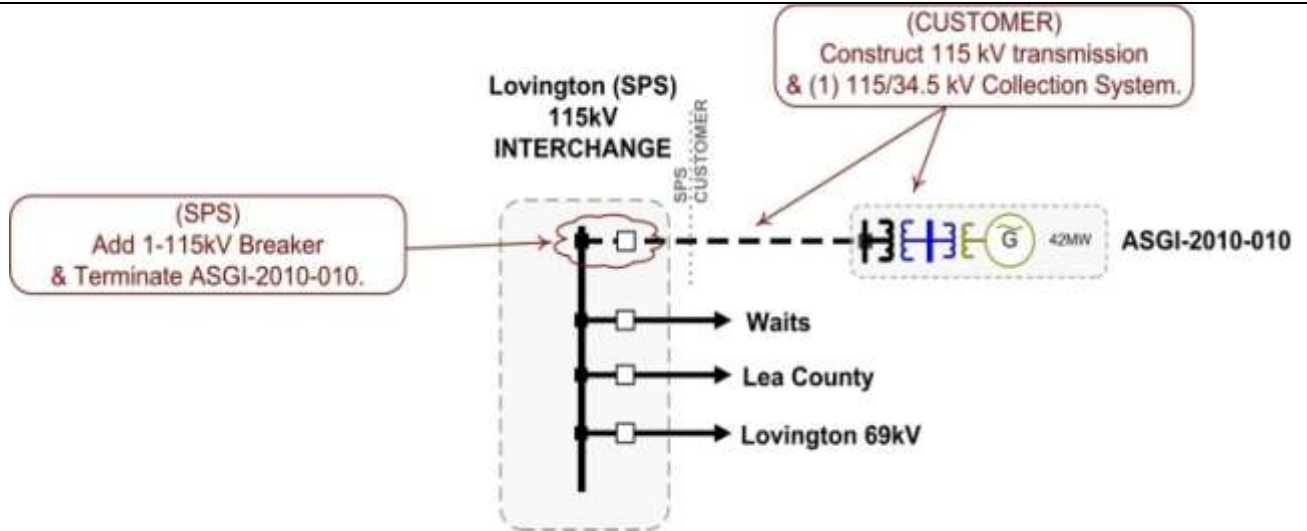
Cluster	Request	Amount	Area	Proposed Point of Interconnection
Southwest Nebraska	GEN-2008-123N	89.7	NPPD	Tap Guide – Pauline 115kV
SOUTHWEST NEBRASKA SUBTOTAL		89.7		
AREA SUBTOTAL		89.7		
***CLUSTERED TOTAL (w/o PRIOR QUEUED)		3,447.6		
***CLUSTERED TOTAL (w/PRIOR QUEUED)		23,442.9		

- * Planned Facility
- ^ Proposed Facility
- ** Alternate requests - counted as one request for study purpose
- *** Electrically Remote Interconnection Requests included in total

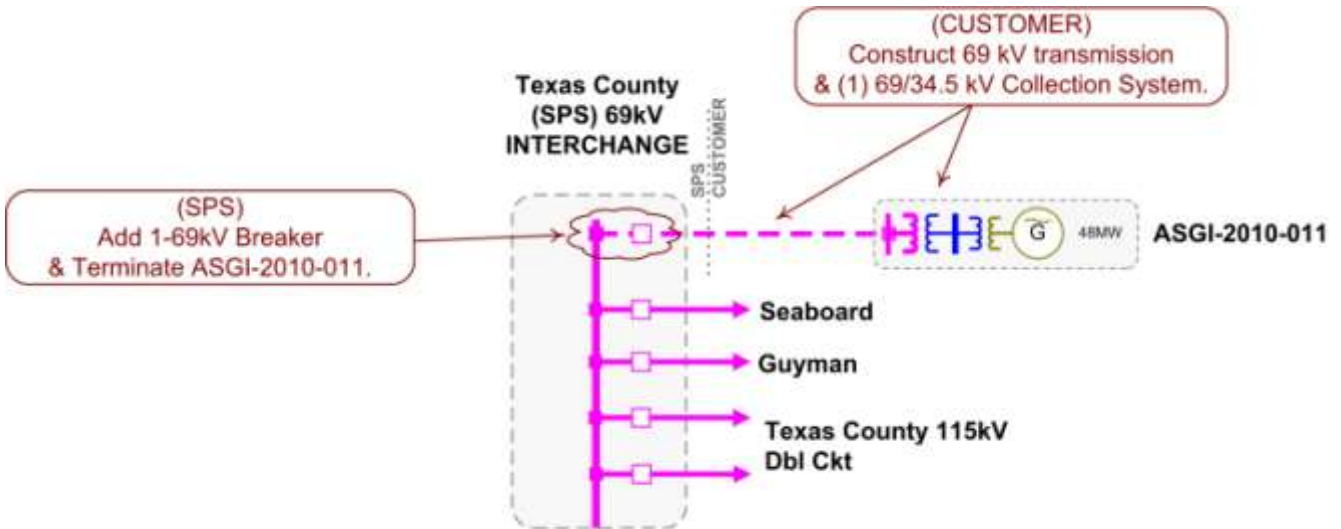
D: Proposed Point of Interconnection One line Diagrams

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

ASGI-2010-010



ASGI-2010-011



E: Cost Allocation per Interconnection Request

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

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

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

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

Appendix E. Cost Allocation Per Request

(Including Previously Allocated Network Upgrades*)

Interconnection Request and Upgrades	Upgrade Type	Allocated Cost	Upgrade Cost
ASGI-2010-010			
ASGI-2010-010 Interconnection Costs See Online Diagram.	Current Study	\$0.00	\$0.00
Border - Tuco Interchange 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV (Total Project E&C Cost Shown)	Previously Allocated		\$148,727,500.00
Border - Woodward 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV (Total Project E&C Cost Shown)	Previously Allocated		\$148,727,500.00
Hitchland - Beaver 345kV Dbl CKT Priority Project: Hitchland - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$247,005,793.00
Medicine Lodge - Wichita 345KV Dbl CKT Priority Project: Spearville - Comanche - Med Lodge - Wichita Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		\$356,300,000.00
Medicine Lodge - Woodward 345KV Dbl CKT Priority Project: Med Lodge - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$194,972,759.00
Medicine Lodge 345/138KV Transformer CKT 1 Priority Project: Spearville - Comanche - Med Lodge - Wichita Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		\$356,300,000.00
	Current Study Total	\$0.00	
ASGI-2010-011			
ASGI-2010-011 Interconnection Costs See Online Diagram.	Current Study	\$0.00	\$0.00
Hitchland - Border 345kV CKT Build approximately 105 miles of 345kV.	Current Study	\$15,678,914.15	\$227,757,964.00
Beaver - Woodward 345kV Dbl CKT Priority Project: Hitchland - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$247,005,793.00
Border - Tuco Interchange 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV (Total Project E&C Cost Shown)	Previously Allocated		\$148,727,500.00
Border - Woodward 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV (Total Project E&C Cost Shown)	Previously Allocated		\$148,727,500.00
Finney Switching Station - Holcomb 345KV CKT 2 Per GEN-2006-044 Facility Study	Previously Allocated		\$6,299,839.00

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

Interconnection Request and Upgrades	Upgrade Type	Allocated Cost	Upgrade Cost
Hitchland - Beaver 345kV Dbl CKT Priority Project: Hitchland - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$247,005,793.00
Medicine Lodge - Wichita 345KV Dbl CKT Priority Project: Spearville - Comanche - Med Lodge - Wichita Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		\$356,300,000.00
Medicine Lodge - Woodward 345KV Dbl CKT Priority Project: Med Lodge - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$194,972,759.00
Medicine Lodge 345/138KV Transformer CKT 1 Priority Project: Spearville - Comanche - Med Lodge - Wichita Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		\$356,300,000.00
	Current Study Total		\$15,678,914.15

GEN-2006-044N02

GEN-2006-044N02 Interconnection Costs See Online Diagram.	Current Study	\$2,100,000.00	\$2,100,000.00
Madison County 230kV Substation See Online Diagram.	Current Study	\$3,600,000.00	\$3,600,000.00
	Current Study Total		\$5,700,000.00

GEN-2008-022

GEN-2008-022 Interconnection Costs See Online Diagram.	Current Study	\$13,042,997.00	\$13,042,997.00
Beaver - Woodward 345kV Dbl CKT Priority Project: Hitchland - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$247,005,793.00
Border - Tuco Interchange 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV (Total Project E&C Cost Shown)	Previously Allocated		\$148,727,500.00
Border - Woodward 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV (Total Project E&C Cost Shown)	Previously Allocated		\$148,727,500.00
Hitchland - Beaver 345kV Dbl CKT Priority Project: Hitchland - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$247,005,793.00
Medicine Lodge - Wichita 345KV Dbl CKT Priority Project: Spearville - Comanche - Med Lodge - Wichita Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		\$356,300,000.00
Medicine Lodge - Woodward 345KV Dbl CKT Priority Project: Med Lodge - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$194,972,759.00
Medicine Lodge 345/138KV Transformer CKT 1 Priority Project: Spearville - Comanche - Med Lodge - Wichita Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		\$356,300,000.00

* 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
	Current Study Total	\$13,042,997.00	
GEN-2008-037			
GEN-2008-037 Interconnection Costs See Online Diagram.	Current Study	\$1,500,000.00	\$1,500,000.00
Washita - Gracemont 138kV CKT 2 Build approximately 11 miles of 138kV.	Current Study	\$5,621,986.00	\$5,621,986.00
Gracemont Transformer 345/138/13.8KV CKT 1 Priority Project: Gracemont Transformer 345/138/13.8KV CKT 1 (Total Project E&C Cost Shown)	Previously Allocated		\$8,000,000.00
Washita - Blue Canyon 138kV CKT 1 Reset CT on 138kV between GEN-2008-037 POI and Washita.	Previously Allocated		\$500,000.00
	Current Study Total	\$7,121,986.00	
GEN-2008-044			
GEN-2008-044 Interconnection Costs See Online Diagram.	Current Study	\$3,403,020.00	\$3,403,020.00
Border - Tuco Interchange 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV (Total Project E&C Cost Shown)	Previously Allocated		\$148,727,500.00
Border - Woodward 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV (Total Project E&C Cost Shown)	Previously Allocated		\$148,727,500.00
Medicine Lodge - Wichita 345KV Dbl CKT Priority Project: Spearville - Comanche - Med Lodge - Wichita Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		\$356,300,000.00
Medicine Lodge - Woodward 345KV Dbl CKT Priority Project: Med Lodge - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$194,972,759.00
Medicine Lodge 345/138KV Transformer CKT 1 Priority Project: Spearville - Comanche - Med Lodge - Wichita Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		\$356,300,000.00
Tuco Interchange 345/230/13.2KV Autotransformer CKT 2 Balanced Portfolio: Tuco 345/230 kV Transformer CKT 2 (Total Project E&C Cost Shown)	Previously Allocated		\$11,250,000.00
	Current Study Total	\$3,403,020.00	
GEN-2008-046			
GEN-2008-046 Interconnection Costs See Online Diagram.	Current Study	\$3,073,333.00	\$3,073,333.00
Tuco Interchange 345/230/13.2KV Autotransformer CKT 2 Balanced Portfolio: Tuco 345/230 kV Transformer CKT 2 (Total Project E&C Cost Shown)	Previously Allocated		\$11,250,000.00

* 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
	Current Study Total	\$3,073,333.00	
GEN-2008-047			
GEN-2008-047 Interconnection Costs See Online Diagram.	Current Study	\$9,276,873.00	\$9,276,873.00
Hitchland - Border 345kV CKT Build approximately 105 miles of 345kV.	Current Study	\$48,522,036.99	\$227,757,964.00
Beaver - Woodward 345kV Dbl CKT Priority Project: Hitchland - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$247,005,793.00
Border - Tuco Interchange 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV (Total Project E&C Cost Shown)	Previously Allocated		\$148,727,500.00
Finney Switching Station - Holcomb 345KV CKT 2 Per GEN-2006-044 Facility Study	Previously Allocated		\$6,299,839.00
Medicine Lodge - Wichita 345KV Dbl CKT Priority Project: Spearville - Comanche - Med Lodge - Wichita Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		\$356,300,000.00
Medicine Lodge - Woodward 345KV Dbl CKT Priority Project: Med Lodge - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$194,972,759.00
Medicine Lodge 345/138KV Transformer CKT 1 Priority Project: Spearville - Comanche - Med Lodge - Wichita Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		\$356,300,000.00
	Current Study Total	\$57,798,909.99	
GEN-2008-071			
GEN-2008-071 Interconnection Costs See Online Diagram.	Current Study	\$2,889,212.00	\$2,889,212.00
Cleveland - Sooner 345KV CKT 1 Balanced Portfolio: Cleveland - Sooner 345kV CKT (Total Project E&C Cost Shown).	Previously Allocated		\$17,000,000.00
	Current Study Total	\$2,889,212.00	
GEN-2008-088			
GEN-2008-088 Interconnection Costs See Online Diagram.	Current Study	\$759,933.00	\$759,933.00
Hitchland - Border 345kV CKT Build approximately 105 miles of 345kV.	Current Study	\$7,284,319.18	\$227,757,964.00
Switch 2749 - Wildorado 69kV CKT 1 Rebuild approximately 4 miles of 69kV.	Current Study	\$2,124,897.00	\$2,124,897.00

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

Interconnection Request and Upgrades	Upgrade Type	Allocated Cost	Upgrade Cost
Beaver - Woodward 345kV Dbl CKT Priority Project: Hitchland - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$247,005,793.00
Border - Tuco Interchange 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV (Total Project E&C Cost Shown)	Previously Allocated		\$148,727,500.00
Border - Woodward 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV (Total Project E&C Cost Shown)	Previously Allocated		\$148,727,500.00
Gracemont Transformer 345/138/13.8KV CKT 1 Priority Project: Gracemont Transformer 345/138/13.8KV CKT 1 (Total Project E&C Cost Shown)	Previously Allocated		\$8,000,000.00
Hitchland - Beaver 345kV Dbl CKT Priority Project: Hitchland - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$247,005,793.00
Medicine Lodge - Wichita 345KV Dbl CKT Priority Project: Spearville - Comanche - Med Lodge - Wichita Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		\$356,300,000.00
Medicine Lodge - Woodward 345KV Dbl CKT Priority Project: Med Lodge - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$194,972,759.00
Medicine Lodge 345/138KV Transformer CKT 1 Priority Project: Spearville - Comanche - Med Lodge - Wichita Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		\$356,300,000.00
	Current Study Total	\$10,169,149.18	

GEN-2008-098

GEN-2008-098 Interconnection Costs See Online Diagram.	Current Study	\$8,259,000.00	\$8,259,000.00
Cleveland - Sooner 345KV CKT 1 Balanced Portfolio: Cleveland - Sooner 345kV CKT (Total Project E&C Cost Shown).	Previously Allocated		\$17,000,000.00
	Current Study Total	\$8,259,000.00	

GEN-2008-123N

GEN-2008-123N Interconnection Costs See Online Diagram. Includes 115kV breakers at Guide Rock.	Current Study	\$6,200,000.00	\$6,200,000.00
Medicine Lodge - Wichita 345KV Dbl CKT Priority Project: Spearville - Comanche - Med Lodge - Wichita Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		\$356,300,000.00
	Current Study Total	\$6,200,000.00	

GEN-2009-008

GEN-2009-008 Interconnection Costs See Online Diagram.	Current Study	\$414,378.00	\$414,378.00
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* 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
Post Rock 345/230/13.8kV Autotransformer CKT 2 DISIS-2010-001 Restudy	Current Study	\$10,584,340.81	\$13,749,527.00
South Hays - Hays Plant - Vine Street 115kV CKT 1 Rebuild approximately 4 miles of 115kV.	Current Study	\$2,827,195.69	\$3,000,000.00
Axtell - PostRock 345KV CKT 1 Balanced Portfolio: Spearville - PostRock - Axtell 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$112,700,000.00
Medicine Lodge - Wichita 345KV Dbl CKT Priority Project: Spearville - Comanche - Med Lodge - Wichita Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		\$356,300,000.00
Post Rock 345/230/13.8KV Autotransformer CKT 1 Balanced Portfolio: Spearville - PostRock - Axtell 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$112,700,000.00
Spearville - PostRock 345KV CKT 1 Balanced Portfolio: Spearville - PostRock - Axtell 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$112,700,000.00
Tuco Interchange 345/230/13.2KV Autotransformer CKT 2 Balanced Portfolio: Tuco 345/230 kV Transformer CKT 2 (Total Project E&C Cost Shown)	Previously Allocated		\$11,250,000.00
	Current Study Total	\$13,825,914.50	

GEN-2009-020

GEN-2009-020 Interconnection Costs See Online Diagram.	Current Study	\$1,664,657.00	\$1,664,657.00
Post Rock 345/230/13.8kV Autotransformer CKT 2 DISIS-2010-001 Restudy	Current Study	\$793,335.49	\$13,749,527.00
South Hays - Hays Plant - Vine Street 115kV CKT 1 Rebuild approximately 4 miles of 115kV.	Current Study	\$172,804.31	\$3,000,000.00
Axtell - PostRock 345KV CKT 1 Balanced Portfolio: Spearville - PostRock - Axtell 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$112,700,000.00
Beaver - Woodward 345kV Dbl CKT Priority Project: Hitchland - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$247,005,793.00
Hitchland - Beaver 345kV Dbl CKT Priority Project: Hitchland - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$247,005,793.00
Medicine Lodge - Wichita 345KV Dbl CKT Priority Project: Spearville - Comanche - Med Lodge - Wichita Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		\$356,300,000.00
Post Rock 345/230/13.8KV Autotransformer CKT 1 Balanced Portfolio: Spearville - PostRock - Axtell 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$112,700,000.00

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

Interconnection Request and Upgrades	Upgrade Type	Allocated Cost	Upgrade Cost
Spearville - PostRock 345KV CKT 1 Balanced Portfolio: Spearville - PostRock - Axtell 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$112,700,000.00
	Current Study Total	\$2,630,796.80	
GEN-2009-040			
GEN-2009-040 Interconnection Costs See Online Diagram.	Current Study	\$5,240,000.00	\$5,240,000.00
	Current Study Total	\$5,240,000.00	
GEN-2009-067S			
GEN-2009-067S Interconnection Costs See Online Diagram.	Current Study	\$1,306,757.00	\$1,306,757.00
Beaver - Woodward 345kV Dbl CKT Priority Project: Hitchland - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$247,005,793.00
Border - Tuco Interchange 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV (Total Project E&C Cost Shown)	Previously Allocated		\$148,727,500.00
Border - Woodward 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV (Total Project E&C Cost Shown)	Previously Allocated		\$148,727,500.00
Hitchland - Beaver 345kV Dbl CKT Priority Project: Hitchland - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$247,005,793.00
Medicine Lodge - Wichita 345KV Dbl CKT Priority Project: Spearville - Comanche - Med Lodge - Wichita Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		\$356,300,000.00
Medicine Lodge - Woodward 345KV Dbl CKT Priority Project: Med Lodge - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$194,972,759.00
Medicine Lodge 345/138KV Transformer CKT 1 Priority Project: Spearville - Comanche - Med Lodge - Wichita Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		\$356,300,000.00
	Current Study Total	\$1,306,757.00	
GEN-2010-003			
GEN-2010-003 Interconnection Costs See Online Diagram.	Current Study	\$26,000.00	\$26,000.00
Cleveland - Sooner 345KV CKT 1 Balanced Portfolio: Cleveland - Sooner 345kV CKT (Total Project E&C Cost Shown).	Previously Allocated		\$17,000,000.00
	Current Study Total	\$26,000.00	
GEN-2010-005			

* 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
GEN-2010-005 Interconnection Costs See Online Diagram.	Current Study	\$26,000.00	\$26,000.00
Cleveland - Sooner 345KV CKT 1 Balanced Portfolio: Cleveland - Sooner 345kV CKT (Total Project E&C Cost Shown).	Previously Allocated		\$17,000,000.00
	Current Study Total	\$26,000.00	
GEN-2010-006			
GEN-2010-006 Interconnection Costs See Online Diagram.	Current Study	\$1,408,514.00	\$1,408,514.00
Beaver - Woodward 345kV Dbl CKT Priority Project: Hitchland - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$247,005,793.00
Border - Tuco Interchange 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV (Total Project E&C Cost Shown)	Previously Allocated		\$148,727,500.00
Border - Woodward 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV (Total Project E&C Cost Shown)	Previously Allocated		\$148,727,500.00
Hitchland - Beaver 345kV Dbl CKT Priority Project: Hitchland - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$247,005,793.00
Medicine Lodge - Wichita 345KV Dbl CKT Priority Project: Spearville - Comanche - Med Lodge - Wichita Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		\$356,300,000.00
Medicine Lodge - Woodward 345KV Dbl CKT Priority Project: Med Lodge - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$194,972,759.00
Medicine Lodge 345/138KV Transformer CKT 1 Priority Project: Spearville - Comanche - Med Lodge - Wichita Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		\$356,300,000.00
	Current Study Total	\$1,408,514.00	
GEN-2010-007			
GEN-2010-007 Interconnection Costs See Online Diagram.	Current Study	\$2,867,363.00	\$2,867,363.00
Hitchland - Border 345kV CKT Build approximately 105 miles of 345kV.	Current Study	\$15,484,159.43	\$227,757,964.00
Beaver - Woodward 345kV Dbl CKT Priority Project: Hitchland - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$247,005,793.00
Border - Tuco Interchange 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV (Total Project E&C Cost Shown)	Previously Allocated		\$148,727,500.00

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

Interconnection Request and Upgrades	Upgrade Type	Allocated Cost	Upgrade Cost
Border - Woodward 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV (Total Project E&C Cost Shown)	Previously Allocated		\$148,727,500.00
Finney Switching Station - Holcomb 345KV CKT 2 Per GEN-2006-044 Facility Study	Previously Allocated		\$6,299,839.00
Gracemont Transformer 345/138/13.8KV CKT 1 Priority Project: Gracemont Transformer 345/138/13.8KV CKT 1 (Total Project E&C Cost Shown)	Previously Allocated		\$8,000,000.00
Hitchland - Beaver 345kV Dbl CKT Priority Project: Hitchland - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$247,005,793.00
Medicine Lodge - Wichita 345KV Dbl CKT Priority Project: Spearville - Comanche - Med Lodge - Wichita Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		\$356,300,000.00
Medicine Lodge - Woodward 345KV Dbl CKT Priority Project: Med Lodge - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$194,972,759.00
Medicine Lodge 345/138KV Transformer CKT 1 Priority Project: Spearville - Comanche - Med Lodge - Wichita Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		\$356,300,000.00
	Current Study Total	\$18,351,522.43	

GEN-2010-008

Fargo Junction - Woodward 69 kV CKT 1 Rebuild approximately 2 miles of 69kV.	Current Study	\$750,000.00	\$750,000.00
GEN-2010-008 Interconnection Costs See Online Diagram.	Current Study	\$1,500,000.00	\$1,500,000.00
Border - Tuco Interchange 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV (Total Project E&C Cost Shown)	Previously Allocated		\$148,727,500.00
Border - Woodward 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV (Total Project E&C Cost Shown)	Previously Allocated		\$148,727,500.00
Gracemont Transformer 345/138/13.8KV CKT 1 Priority Project: Gracemont Transformer 345/138/13.8KV CKT 1 (Total Project E&C Cost Shown)	Previously Allocated		\$8,000,000.00
Medicine Lodge - Wichita 345KV Dbl CKT Priority Project: Spearville - Comanche - Med Lodge - Wichita Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		\$356,300,000.00
Medicine Lodge - Woodward 345KV Dbl CKT Priority Project: Med Lodge - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$194,972,759.00
Medicine Lodge 345/138KV Transformer CKT 1 Priority Project: Spearville - Comanche - Med Lodge - Wichita Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		\$356,300,000.00

* 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
Tuco Interchange 345/230/13.2KV Autotransformer CKT 2 Balanced Portfolio: Tuco 345/230 kV Transformer CKT 2 (Total Project E&C Cost Shown)	Previously Allocated		\$11,250,000.00
	Current Study Total	\$2,250,000.00	
GEN-2010-009			
GEN-2010-009 Interconnection Costs See Online Diagram.	Current Study	\$5,014,906.00	\$5,014,906.00
Post Rock 345/230/13.8kV Autotransformer CKT 2 DISIS-2010-001 Restudy	Current Study	\$934,710.11	\$13,749,527.00
Axtell - PostRock 345KV CKT 1 Balanced Portfolio: Spearville - PostRock - Axtell 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$112,700,000.00
Beaver - Woodward 345KV Dbl CKT Priority Project: Hitchland - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$247,005,793.00
Border - Tuco Interchange 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV (Total Project E&C Cost Shown)	Previously Allocated		\$148,727,500.00
Border - Woodward 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV (Total Project E&C Cost Shown)	Previously Allocated		\$148,727,500.00
Hitchland - Beaver 345KV Dbl CKT Priority Project: Hitchland - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$247,005,793.00
Medicine Lodge - Wichita 345KV Dbl CKT Priority Project: Spearville - Comanche - Med Lodge - Wichita Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		\$356,300,000.00
Medicine Lodge - Woodward 345KV Dbl CKT Priority Project: Med Lodge - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$194,972,759.00
Post Rock 345/230/13.8KV Autotransformer CKT 1 Balanced Portfolio: Spearville - PostRock - Axtell 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$112,700,000.00
Spearville - PostRock 345KV CKT 1 Balanced Portfolio: Spearville - PostRock - Axtell 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$112,700,000.00
Tuco Interchange 345/230/13.2KV Autotransformer CKT 2 Balanced Portfolio: Tuco 345/230 kV Transformer CKT 2 (Total Project E&C Cost Shown)	Previously Allocated		\$11,250,000.00
	Current Study Total	\$5,949,616.11	
GEN-2010-011			
GEN-2010-011 Interconnection Costs See Online Diagram.	Current Study	\$3,403,020.00	\$3,403,020.00

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

Interconnection Request and Upgrades	Upgrade Type	Allocated Cost	Upgrade Cost
Border - Tuco Interchange 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV (Total Project E&C Cost Shown)	Previously Allocated		\$148,727,500.00
Border - Woodward 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV (Total Project E&C Cost Shown)	Previously Allocated		\$148,727,500.00
Medicine Lodge - Wichita 345KV Dbl CKT Priority Project: Spearville - Comanche - Med Lodge - Wichita Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		\$356,300,000.00
Medicine Lodge - Woodward 345KV Dbl CKT Priority Project: Med Lodge - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$194,972,759.00
Medicine Lodge 345/138KV Transformer CKT 1 Priority Project: Spearville - Comanche - Med Lodge - Wichita Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		\$356,300,000.00
Tuco Interchange 345/230/13.2KV Autotransformer CKT 2 Balanced Portfolio: Tuco 345/230 kV Transformer CKT 2 (Total Project E&C Cost Shown)	Previously Allocated		\$11,250,000.00
	Current Study Total	\$3,403,020.00	

GEN-2010-014

GEN-2010-014 Interconnection Costs See Online Diagram.	Current Study	\$3,307,387.00	\$3,307,387.00
Hitchland - Border 345KV CKT Build approximately 105 miles of 345kV.	Current Study	\$140,788,534.26	\$227,757,964.00
Beaver - Woodward 345kV Dbl CKT Priority Project: Hitchland - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$247,005,793.00
Border - Tuco Interchange 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV (Total Project E&C Cost Shown)	Previously Allocated		\$148,727,500.00
Border - Woodward 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV (Total Project E&C Cost Shown)	Previously Allocated		\$148,727,500.00
Finney Switching Station - Holcomb 345KV CKT 2 Per GEN-2006-044 Facility Study	Previously Allocated		\$6,299,839.00
Hitchland - Beaver 345kV Dbl CKT Priority Project: Hitchland - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$247,005,793.00
Medicine Lodge - Wichita 345KV Dbl CKT Priority Project: Spearville - Comanche - Med Lodge - Wichita Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		\$356,300,000.00
Medicine Lodge - Woodward 345KV Dbl CKT Priority Project: Med Lodge - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$194,972,759.00

* 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
Medicine Lodge 345/138KV Transformer CKT 1 Priority Project: Spearville - Comanche - Med Lodge - Wichita Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		\$356,300,000.00
	Current Study Total	\$144,095,921.26	
GEN-2010-015			
GEN-2010-015 Interconnection Costs See Online Diagram.	Current Study	\$5,014,906.00	\$5,014,906.00
Post Rock 345/230/13.8kV Autotransformer CKT 2 DISIS-2010-001 Restudy	Current Study	\$1,437,140.59	\$13,749,527.00
Axtell - PostRock 345KV CKT 1 Balanced Portfolio: Spearville - PostRock - Axtell 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$112,700,000.00
Beaver - Woodward 345kV Dbl CKT Priority Project: Hitchland - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$247,005,793.00
Border - Tuco Interchange 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV (Total Project E&C Cost Shown)	Previously Allocated		\$148,727,500.00
Border - Woodward 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV (Total Project E&C Cost Shown)	Previously Allocated		\$148,727,500.00
Hitchland - Beaver 345kV Dbl CKT Priority Project: Hitchland - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$247,005,793.00
Medicine Lodge - Wichita 345KV Dbl CKT Priority Project: Spearville - Comanche - Med Lodge - Wichita Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		\$356,300,000.00
Medicine Lodge - Woodward 345KV Dbl CKT Priority Project: Med Lodge - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$194,972,759.00
Post Rock 345/230/13.8KV Autotransformer CKT 1 Balanced Portfolio: Spearville - PostRock - Axtell 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$112,700,000.00
Spearville - PostRock 345KV CKT 1 Balanced Portfolio: Spearville - PostRock - Axtell 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$112,700,000.00
Tuco Interchange 345/230/13.2KV Autotransformer CKT 2 Balanced Portfolio: Tuco 345/230 kV Transformer CKT 2 (Total Project E&C Cost Shown)	Previously Allocated		\$11,250,000.00
	Current Study Total	\$6,452,046.59	
TOTAL CURRENT STUDY COSTS:		\$338,302,630.01	

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

F: Cost Allocation per Proposed Study Network Upgrade

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

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

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

Appendix F. Cost Allocation by Upgrade

ASGI-2010-010 Interconnection Costs		\$0.00
See Online Diagram.		
	ASGI-2010-010	\$0.00
	Total Allocated Costs	\$0.00
ASGI-2010-011 Interconnection Costs		\$0.00
See Online Diagram.		
	ASGI-2010-011	\$0.00
	Total Allocated Costs	\$0.00
Fargo Junction - Woodward 69 kV CKT 1		\$750,000.00
Rebuild approximately 2 miles of 69kV.		
	GEN-2010-008	\$750,000.00
	Total Allocated Costs	\$750,000.00
GEN-2006-044N02 Interconnection Costs		\$2,100,000.00
See Online Diagram.		
	GEN-2006-044N02	\$2,100,000.00
	Total Allocated Costs	\$2,100,000.00
GEN-2008-022 Interconnection Costs		\$13,042,997.00
See Online Diagram.		
	GEN-2008-022	\$13,042,997.00
	Total Allocated Costs	\$13,042,997.00
GEN-2008-037 Interconnection Costs		\$1,500,000.00
See Online Diagram.		
	GEN-2008-037	\$1,500,000.00
	Total Allocated Costs	\$1,500,000.00
GEN-2008-044 Interconnection Costs		\$3,403,020.00
See Online Diagram.		
	GEN-2008-044	\$3,403,020.00
	Total Allocated Costs	\$3,403,020.00
GEN-2008-046 Interconnection Costs		\$3,073,333.00
See Online Diagram.		
	GEN-2008-046	\$3,073,333.00

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

	Total Allocated Costs	\$3,073,333.00
GEN-2008-047 Interconnection Costs		\$9,276,873.00
See Oonline Diagram.		
	GEN-2008-047	\$9,276,873.00
	Total Allocated Costs	\$9,276,873.00
GEN-2008-071 Interconnection Costs		\$2,889,212.00
See Oonline Diagram.		
	GEN-2008-071	\$2,889,212.00
	Total Allocated Costs	\$2,889,212.00
GEN-2008-088 Interconnection Costs		\$759,933.00
See Oonline Diagram.		
	GEN-2008-088	\$759,933.00
	Total Allocated Costs	\$759,933.00
GEN-2008-098 Interconnection Costs		\$8,259,000.00
See Oonline Diagram.		
	GEN-2008-098	\$8,259,000.00
	Total Allocated Costs	\$8,259,000.00
GEN-2008-123N Interconnection Costs		\$6,200,000.00
See Oonline Diagram.Includes 115kV breakers at Guide Rock.		
	GEN-2008-123N	\$6,200,000.00
	Total Allocated Costs	\$6,200,000.00
GEN-2009-008 Interconnection Costs		\$414,378.00
See Oonline Diagram.		
	GEN-2009-008	\$414,378.00
	Total Allocated Costs	\$414,378.00
GEN-2009-020 Interconnection Costs		\$1,664,657.00
See Oonline Diagram.		
	GEN-2009-020	\$1,664,657.00
	Total Allocated Costs	\$1,664,657.00
GEN-2009-040 Interconnection Costs		\$5,240,000.00
See Oonline Diagram.		
	GEN-2009-040	\$5,240,000.00

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

	Total Allocated Costs	\$5,240,000.00
GEN-2009-067S Interconnection Costs		\$1,306,757.00
See Oonline Diagram.		
	GEN-2009-067S	\$1,306,757.00
	Total Allocated Costs	\$1,306,757.00
GEN-2010-003 Interconnection Costs		\$26,000.00
See Oonline Diagram.		
	GEN-2010-003	\$26,000.00
	Total Allocated Costs	\$26,000.00
GEN-2010-005 Interconnection Costs		\$26,000.00
See Oonline Diagram.		
	GEN-2010-005	\$26,000.00
	Total Allocated Costs	\$26,000.00
GEN-2010-006 Interconnection Costs		\$1,408,514.00
See Oonline Diagram.		
	GEN-2010-006	\$1,408,514.00
	Total Allocated Costs	\$1,408,514.00
GEN-2010-007 Interconnection Costs		\$2,867,363.00
See Oonline Diagram.		
	GEN-2010-007	\$2,867,363.00
	Total Allocated Costs	\$2,867,363.00
GEN-2010-008 Interconnection Costs		\$1,500,000.00
See Oonline Diagram.		
	GEN-2010-008	\$1,500,000.00
	Total Allocated Costs	\$1,500,000.00
GEN-2010-009 Interconnection Costs		\$5,014,906.00
See Oonline Diagram.		
	GEN-2010-009	\$5,014,906.00
	Total Allocated Costs	\$5,014,906.00
GEN-2010-011 Interconnection Costs		\$3,403,020.00
See Oonline Diagram.		
	GEN-2010-011	\$3,403,020.00

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

	Total Allocated Costs	\$3,403,020.00
<hr/>		
GEN-2010-014 Interconnection Costs		\$3,307,387.00
See Oonline Diagram.		
	GEN-2010-014	\$3,307,387.00
	Total Allocated Costs	\$3,307,387.00
<hr/>		
GEN-2010-015 Interconnection Costs		\$5,014,906.00
See Oonline Diagram.		
	GEN-2010-015	\$5,014,906.00
	Total Allocated Costs	\$5,014,906.00
<hr/>		
Hitchland - Border 345kV CKT		\$227,757,964.00
Build approximately 105 miles of 345kV.		
	ASGI-2010-011	\$15,678,914.15
	GEN-2008-047	\$48,522,036.99
	GEN-2008-088	\$7,284,319.18
	GEN-2010-007	\$15,484,159.43
	GEN-2010-014	\$140,788,534.26
	Total Allocated Costs	\$227,757,964.00
<hr/>		
Madison County 230kV Substation		\$3,600,000.00
See Oonline Diagram.		
	GEN-2006-044N02	\$3,600,000.00
	Total Allocated Costs	\$3,600,000.00
<hr/>		
Post Rock 345/230/13.8kV Autotransformer CKT 2		\$13,749,527.00
DISIS-2010-001 Restudy		
	GEN-2009-008	\$10,584,340.81
	GEN-2009-020	\$793,335.49
	GEN-2010-009	\$934,710.11
	GEN-2010-015	\$1,437,140.59
	Total Allocated Costs	\$13,749,527.00
<hr/>		
South Hays - Hays Plant - Vine Street 115kV CKT 1		\$3,000,000.00
Rebuild approximately 4 miles of 115kV.		
	GEN-2009-008	\$2,827,195.69
	GEN-2009-020	\$172,804.31
	Total Allocated Costs	\$3,000,000.00

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

Switch 2749 - Wildorado 69kV CKT 1**\$2,124,897.00**

Rebuild approximately 4 miles of 69kV.

GEN-2008-088 \$2,124,897.00

Total Allocated Costs \$2,124,897.00

Washita - Gracemont 138kV CKT 2**\$5,621,986.00**

Build approximately 11 miles of 138kV.

GEN-2008-037 \$5,621,986.00

Total Allocated Costs \$5,621,986.00

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

G: Power Flow Analysis with Constraints for Mitigation

SOLUTION	GROUP	SCENARIO	SEASON	SOURCE	DIRECTION	MONITORED ELEMENT COMMON NAME	RATEB	TDF	TC%LOADING	CONTINGENCY NAME
FNSL-Blown up	02ALL	0	11G	ASGI 2010 011		Non Converged Contingency	1052	0.2322	75.91642	FINNEY SWITCHING STATION - STEVENSCO 345.00 345KV CKT 1
FNSL-Blown up	02ALL	0	11G	ASGI 2010 011		Non Converged Contingency	0	0.43541	9999	DBL-HIT-G084
FNSL-Blown up	02ALL	0	11G	ASGI 2010 011		Non Converged Contingency	0	0.43541	9999	DBL-G0847-WO
FDNS	2	0	11G	ASGI 2010 011	TO->FROM	FINNEY SWITCHING STATION - STEVENSCO 345.00 345KV CKT 1	1052	0.47265	117.8725	DBL-G0847-WO
FDNS	2	0	11G	ASGI 2010 011	TO->FROM	FINNEY SWITCHING STATION - STEVENSCO 345.00 345KV CKT 1	1052	0.47265	103.5525	DBL-HIT-G084
FDNS	2	0	11G	ASGI 2010 011	TO->FROM	FINNEY SWITCHING STATION - STEVENSCO 345.00 345KV CKT 1	1052	0.47265	103.5525	DBL-HIT-G084
FDNS	02ASGI 10 011	0	11G	ASGI 2010 011	TO->FROM	FINNEY SWITCHING STATION - STEVENSCO 345.00 345KV CKT 1	1052	0.47258	118.5543	DBL-G0847-WO
FDNS	02ASGI 10 011	0	11G	ASGI 2010 011	TO->FROM	FINNEY SWITCHING STATION - STEVENSCO 345.00 345KV CKT 1	1052	0.47258	104.2014	DBL-HIT-G084
FDNS	02ASGI 10 011	0	11G	ASGI 2010 011	TO->FROM	FINNEY SWITCHING STATION - STEVENSCO 345.00 345KV CKT 1	1052	0.47258	104.2014	DBL-HIT-G084
FDNS	02ALL	2	11G	ASGI 2010 011	TO->FROM	FINNEY SWITCHING STATION - STEVENSCO 345.00 345KV CKT 1	1052	0.32618	112.1327	DBL-G0847-WO
FDNS	1	2	11G	ASGI 2010 011	TO->FROM	NORTHWEST - TATONGA7 345.00 345KV CKT 1	1195	0.2472	106.6923	DBL-WOOD-MED
FDNS	1	2	11G	ASGI 2010 011	TO->FROM	NORTHWEST - TATONGA7 345.00 345KV CKT 1	1195	0.22315	100.6762	DBL-MEDLO-WI
FDNS	00G044N2	0	12SP	G06 044N02	TO->FROM	KELLY - MADISONCO 230.00 230KV CKT 1	320	0.77724	100.4912	ONEILL - SPENCER 115KV CKT 1
FDNS	00G044N2	0	12SP	G06 044N02	TO->FROM	KELLY - MADISONCO 230.00 230KV CKT 1	320	0.76672	100.4632	HOSKINS - RAUN 345KV CKT 1
FDNS	00G044N2	0	12SP	G06 044N02	TO->FROM	KELLY - MADISONCO 230.00 230KV CKT 1	320	0.77724	100.6611	FT RANDAL - SPENCER 115KV CKT 1
FDNS	00G044N2	0	12SP	G06 044N02	TO->FROM	KELLY - MADISONCO 230.00 230KV CKT 1	320	0.77856	103.3702	FT THOMPSON - GRAND ISLAND 345KV CKT 1
FDNS	00G044N2	0	12SP	G06 044N02	TO->FROM	KELLY - MADISONCO 230.00 230KV CKT 1	320	0.7762	100.2	COUNCIL BLUFFS 345/24.0KV TRANSFORMER CKT 1
FDNS	00G044N2	0	12SP	G06 044N02	TO->FROM	KELLY - MADISONCO 230.00 230KV CKT 1	320	0.7762	100.5	COUNCIL BLUFFS 345/26.0KV TRANSFORMER CKT 1
FDNS	00G044N2	0	12SP	G06 044N02	TO->FROM	KELLY - MADISONCO 230.00 230KV CKT 1	320	0.78558	106.7261	FT RANDAL - UTICA JCT 230KV CKT 1
FDNS	00G044N2	0	12SP	G06 044N02	TO->FROM	KELLY - MADISONCO 230.00 230KV CKT 1	320	0.78324	103.3358	FT RANDAL - SIOUX CITY 230KV CKT 1
FDNS	00G044N2	0	12SP	G06 044N02	TO->FROM	KELLY - MADISONCO 230.00 230KV CKT 1	320	0.77724	100.6048	LN-WAPA6
FDNS	00G044N2	0	12SP	G06 044N02	TO->FROM	KELLY - MADISONCO 230.00 230KV CKT 1	320	0.78593	106.7495	DAK02WAPAB2
FDNS	00G044N2	0	12SP	G06 044N02	TO->FROM	KELLY - MADISONCO 230.00 230KV CKT 1	320	0.77724	100.6048	NEB001NPPB2
FDNS	00G044N2	0	16SP	G06 044N02	TO->FROM	KELLY - MADISONCO 230.00 230KV CKT 1	320	0.77474	100.1514	BLOOMFIELD - CREIGHTON 115KV CKT 1
FDNS	00G044N2	0	16SP	G06 044N02	TO->FROM	KELLY - MADISONCO 230.00 230KV CKT 1	320	0.7749	100.1729	CLEARWATER - ONEILL 115KV CKT 1
FDNS	00G044N2	0	16SP	G06 044N02	TO->FROM	KELLY - MADISONCO 230.00 230KV CKT 1	320	0.75899	101.3193	COLUMEAST - NW68TH & HOLDREGE 345KV CKT 1
FDNS	00G044N2	0	16SP	G06 044N02	TO->FROM	KELLY - MADISONCO 230.00 230KV CKT 1	320	0.7734	100.1304	COOPER - MOORE 345KV CKT 1
FDNS	00G044N2	0	16SP	G06 044N02	TO->FROM	KELLY - MADISONCO 230.00 230KV CKT 1	320	0.77596	103.1012	ONEILL - SPENCER 115KV CKT 1
FDNS	00G044N2	0	16SP	G06 044N02	TO->FROM	KELLY - MADISONCO 230.00 230KV CKT 1	320	0.77386	100.3238	103RD & ROKEBY - SUB 3458 NEB CTY 345KV CKT 1
FDNS	00G044N2	0	16SP	G06 044N02	TO->FROM	KELLY - MADISONCO 230.00 230KV CKT 1	320	0.77501	100.5391	GAVINS POINT - HARTINGTON 115KV CKT 1
FDNS	00G044N2	0	16SP	G06 044N02	TO->FROM	KELLY - MADISONCO 230.00 230KV CKT 1	320	0.76545	102.8588	HOSKINS - RAUN 345KV CKT 1
FDNS	00G044N2	0	16SP	G06 044N02	TO->FROM	KELLY - MADISONCO 230.00 230KV CKT 1	320	0.77517	100.1257	KEYSTONE - SIDNEY 345KV CKT 1
FDNS	00G044N2	0	16SP	G06 044N02	TO->FROM	KELLY - MADISONCO 230.00 230KV CKT 1	320	0.77596	103.274	FT RANDAL - SPENCER 115KV CKT 1
FDNS	00G044N2	0	16SP	G06 044N02	TO->FROM	KELLY - MADISONCO 230.00 230KV CKT 1	320	0.77337	100.7258	SIOUX CITY - TWIN CHURCH 230KV CKT 1
FDNS	00G044N2	0	16SP	G06 044N02	TO->FROM	KELLY - MADISONCO 230.00 230KV CKT 1	320	0.77693	105.8846	FT THOMPSON - GRAND ISLAND 345KV CKT 1
FDNS	00G044N2	0	16SP	G06 044N02	TO->FROM	KELLY - MADISONCO 230.00 230KV CKT 1	320	0.77496	102.1	COUNCIL BLUFFS 345/24.0KV TRANSFORMER CKT 1
FDNS	00G044N2	0	16SP	G06 044N02	TO->FROM	KELLY - MADISONCO 230.00 230KV CKT 1	320	0.77496	102.3	COUNCIL BLUFFS 345/26.0KV TRANSFORMER CKT 1
FDNS	00G044N2	0	16SP	G06 044N02	TO->FROM	KELLY - MADISONCO 230.00 230KV CKT 1	320	0.77666	100.3224	UTICA JCT - VFDONES 230KV CKT 1
FDNS	00G044N2	0	16SP	G06 044N02	TO->FROM	KELLY - MADISONCO 230.00 230KV CKT 1	320	0.77564	100.4617	FT RANDAL - WHITE SWAN 115KV CKT 1
FDNS	00G044N2	0	16SP	G06 044N02	TO->FROM	KELLY - MADISONCO 230.00 230KV CKT 1	320	0.77564	100.4425	TYNDALL - WHITE SWAN 115KV CKT 1
FDNS	00G044N2	0	16SP	G06 044N02	TO->FROM	KELLY - MADISONCO 230.00 230KV CKT 1	320	0.77511	100.2688	FT THOMPSON - LETCHER 230KV CKT 1
FDNS	00G044N2	0	16SP	G06 044N02	TO->FROM	KELLY - MADISONCO 230.00 230KV CKT 1	320	0.78424	108.9368	FT RANDAL - UTICA JCT 230KV CKT 1
FDNS	00G044N2	0	16SP	G06 044N02	TO->FROM	KELLY - MADISONCO 230.00 230KV CKT 1	320	0.78178	105.2408	FT RANDAL - SIOUX CITY 230KV CKT 1
FDNS	00G044N2	0	16SP	G06 044N02	TO->FROM	KELLY - MADISONCO 230.00 230KV CKT 1	320	0.77508	100.2288	HANLON - STORLA 230KV CKT 1
FDNS	00G044N2	0	16SP	G06 044N02	TO->FROM	KELLY - MADISONCO 230.00 230KV CKT 1	320	0.7753	100.076	HURON - WATERTOWN 230KV CKT 2
FDNS	00G044N2	0	16SP	G06 044N02	TO->FROM	KELLY - MADISONCO 230.00 230KV CKT 1	320	0.7753	100.1417	CARPENTER - HURON 230KV CKT 1
FDNS	00G044N2	0	16SP	G06 044N02	TO->FROM	KELLY - MADISONCO 230.00 230KV CKT 1	320	0.77506	100.17	PAHOJA - SIOUX FALLS 230KV CKT 1
FDNS	00G044N2	0	16SP	G06 044N02	TO->FROM	KELLY - MADISONCO 230.00 230KV CKT 1	320	0.77511	100.2237	LETCHER - SIOUX FALLS 230KV CKT 1
FDNS	00G044N2	0	16SP	G06 044N02	TO->FROM	KELLY - MADISONCO 230.00 230KV CKT 1	320	0.77726	100.8762	RASMUSN - UTICA JCT 230KV CKT 1
FDNS	00G044N2	0	16SP	G06 044N02	TO->FROM	KELLY - MADISONCO 230.00 230KV CKT 1	320	0.7753	100.0563	CARPENTER - WATERTOWN 230KV CKT 1
FDNS	00G044N2	0	16SP	G06 044N02	TO->FROM	KELLY - MADISONCO 230.00 230KV CKT 1	320	0.77726	100.3362	RASMUSN - SIOUX CITY 230KV CKT 1
FDNS	00G044N2	0	16SP	G06 044N02	TO->FROM	KELLY - MADISONCO 230.00 230KV CKT 1	320	0.77496	100.4112	GEN640009 1-COOPER NUCLEAR STATION
FDNS	00G044N2	0	16SP	G06 044N02	TO->FROM	KELLY - MADISONCO 230.00 230KV CKT 1	320	0.77496	100.4872	GEN640028 1-COLUMCOGENERATION
FDNS	00G044N2	0	16SP	G06 044N02	TO->FROM	KELLY - MADISONCO 230.00 230KV CKT 1	320	0.77496	100.2342	GEN645011 1-NEBRASKA CITY 1
FDNS	00G044N2	0	16SP	G06 044N02	TO->FROM	KELLY - MADISONCO 230.00 230KV CKT 1	320	0.77496	100.2972	GEN645012 2-NEBRASKA CITY 2
FDNS	00G044N2	0	16WP	G06 044N02	TO->FROM	KELLY - MADISONCO 230.00 230KV CKT 1	320	0.7843	100.5308	FT RANDAL - UTICA JCT 230KV CKT 1
FDNS	00G044N2	0	16WP	G06 044N02	TO->FROM	KELLY - MADISONCO 230.00 230KV CKT 1	320	0.78462	100.7211	DAK02WAPAB2
FNSL-Blown up	02ALL	0	11G	G08 022		Non Converged Contingency	1052	0.14405	75.91642	FINNEY SWITCHING STATION - STEVENSCO 345.00 345KV CKT 1
FNSL-Blown up	02ALL	0	11G	G08 022		Non Converged Contingency	0	0.17112	9999	DBL-HIT-G084
FNSL-Blown up	02ALL	0	11G	G08 022		Non Converged Contingency	0	0.17112	9999	DBL-G0847-WO
FDNS	2	0	11G	G08 022	TO->FROM	FINNEY SWITCHING STATION - STEVENSCO 345.00 345KV CKT 1	1052	0.23974	117.8725	DBL-G0847-WO
FDNS	2	0	11G	G08 022	TO->FROM	FINNEY SWITCHING STATION - STEVENSCO 345.00 345KV CKT 1	1052	0.23974	103.5525	DBL-HIT-G084
FDNS	2	0	11G	G08 022	TO->FROM	FINNEY SWITCHING STATION - STEVENSCO 345.00 345KV CKT 1	1052	0.23974	103.5525	DBL-HIT-G084
FDNS	02ALL	2	11G	G08 022	TO->FROM	FINNEY SWITCHING STATION - STEVENSCO 345.00 345KV CKT 1	1052	0.20654	112.1327	DBL-G0847-WO
FDNS	1	2	11G	G08 022	TO->FROM	NORTHWEST - TATONGA7 345.00 345KV CKT 1	1195	0.20139	106.6923	DBL-WOOD-MED
FDNS	07G08 037	0	11G	G08 037	TO->FROM	SOUTHWESTERN STATION - WASHITA 138KV CKT 1	260	0.50238	101.4884	BASE CASE
FDNS	07G08 037	0	11G	G08 037	TO->FROM	GRACMNT4 138.00 - WASHITA 138KV CKT 1	228	0.8014	133.9312	SOUTHWESTERN STATION - WASHITA 138KV CKT 1
FDNS	07G08 037	0	11G	G08 037	TO->FROM	SOUTHWESTERN STATION - WASHITA 138KV CKT 1	260	0.8397	123.7333	GRACMNT4 138.00 - WASHITA 138KV CKT 1
FDNS	7	0	11G	G08 037	TO->FROM	GRACMNT4 138.00 - WASHITA 138KV CKT 1	228	0.8014	125.7223	SOUTHWESTERN STATION - WASHITA 138KV CKT 1
FDNS	7	0	11G	G08 037	TO->FROM	SOUTHWESTERN STATION - WASHITA 138KV CKT 1	260	0.8397	116.3401	GRACMNT4 138.00 - WASHITA 138KV CKT 1
FNSL-Blown up	02ALL	0	11G	G08 044		Non Converged Contingency	1052	0.05296	75.91642	FINNEY SWITCHING STATION - STEVENSCO 345.00 345KV CKT 1
FDNS	01G08 044	0	11G	G08 044	TO->FROM	NORTHWEST - TATONGA7 345.00 345KV CKT 1	1195	0.58452	118.1688	DBL-WOOD-MED
FDNS	1	2	11G	G08 044	TO->FROM	NORTHWEST - TATONGA7 345.00 345KV CKT 1	1195	0.5845	106.6923	DBL-WOOD-MED
FDNS	1	0	11G	G08 044	TO->FROM	NORTHWEST - TATONGA7 345.00 345KV CKT 1	1195	0.58441	106.7257	DBL-WOOD-MED
FDNS	01G08 044	0	11G	G08 044	TO->FROM	NORTHWEST - TATONGA7 345.00 345KV CKT 1	1195	0.53621	110.4201	DBL-MEDLO-WI
FDNS	1	2	11G	G08 044	TO->FROM	NORTHWEST - TATONGA7 345.00 345KV CKT 1	1195	0.53619	100.6762	DBL-MEDLO-WI
FDNS	1	0	11G	G08 044	TO->FROM	NORTHWEST - TATONGA7 345.00 345KV CKT 1	1195	0.53604	100.71	DBL-MEDLO-WI
FNSL-Blown up	02ALL	0	11G	G08 047		Non Converged Contingency	1052	0.16543	75.91642	FINNEY SWITCHING STATION - STEVENSCO 345.00 345KV CKT 1

SOLUTION	GROUP	SCENARIO	SEASON	SOURCE	DIRECTION	MONITORED ELEMENT COMMON NAME	RATEB	TDF	TC%LOADING	CONTINGENCY NAME		
FNSL-Blown up		02ALL	0	11G	G08_047	Non Converged Contingency		0	0.64477	9999	DBL-G0847-WO	
FDNS		2	0	11G	G08_047	TO->FROM FINNEY SWITCHING STATION - STEVENSCO 345.00 345KV CKT 1	1052	0.52055	117.8725		DBL-G0847-WO	
FNSL-Blown up		02ALL	2	11G	G08_047	TO->FROM FINNEY SWITCHING STATION - STEVENSCO 345.00 345KV CKT 1	1052	0.35273	112.1327		DBL-G0847-WO	
FDNS		1	2	11G	G08_047	TO->FROM NORTHWEST - TATONGA7 345.00 345KV CKT 1	1195	0.31815	106.6923		DBL-WOOD-MED	
FNSL-Blown up		02ALL	1	0	11G	G08_047	TO->FROM NORTHWEST - TATONGA7 345.00 345KV CKT 1	1195	0.31806	106.7257		DBL-WOOD-MED
FDNS		1	2	11G	G08_047	TO->FROM NORTHWEST - TATONGA7 345.00 345KV CKT 1	1195	0.27226	100.6762		DBL-MEDLO-WI	
FNSL-Blown up		02ALL	1	0	11G	G08_047	TO->FROM NORTHWEST - TATONGA7 345.00 345KV CKT 1	1195	0.27212	100.71		DBL-MEDLO-WI
FNSL-Blown up		02ALL	0	11G	G08_088	Non Converged Contingency	1052	0.18037	75.91642		FINNEY SWITCHING STATION - STEVENSCO 345.00 345KV CKT 1	
FNSL-Blown up		02ALL	0	11G	G08_088	Non Converged Contingency	0	0.28694	9999		DBL-HIT-G084	
FNSL-Blown up		02ALL	0	11G	G08_088	Non Converged Contingency	0	0.28694	9999		DBL-G0847-WO	
FDNS		05G08_088	0	11G	G08_088	TO->FROM SWITCH 2749 - WILDORADO 69KV CKT 1	35	1	131.4435		BASE CASE	
FDNS		00G08_088	0	12WP	G08_088	TO->FROM SWITCH 2749 - WILDORADO 69KV CKT 1	35	1	129.0237		BASE CASE	
FDNS		00G08_088	0	16WP	G08_088	TO->FROM SWITCH 2749 - WILDORADO 69KV CKT 1	35	1	127.0332		BASE CASE	
FDNS		00G08_088	0	12SP	G08_088	TO->FROM SWITCH 2749 - WILDORADO 69KV CKT 1	35	1	123.3539		BASE CASE	
FDNS		00G08_088	0	16SP	G08_088	TO->FROM SWITCH 2749 - WILDORADO 69KV CKT 1	35	1	120.8236		BASE CASE	
FDNS		5	0	11G	G08_088	TO->FROM SWITCH 2749 - WILDORADO 69KV CKT 1	35	1	104.3694		BASE CASE	
FDNS		2	0	11G	G08_088	TO->FROM FINNEY SWITCHING STATION - STEVENSCO 345.00 345KV CKT 1	1052	0.3395	117.8725		DBL-G0847-WO	
FDNS		2	0	11G	G08_088	TO->FROM FINNEY SWITCHING STATION - STEVENSCO 345.00 345KV CKT 1	1052	0.3395	103.5525		DBL-HIT-G084	
FDNS		2	0	11G	G08_088	TO->FROM FINNEY SWITCHING STATION - STEVENSCO 345.00 345KV CKT 1	1052	0.3395	103.5525		DBL-HIT-G084	
FDNS		02ALL	2	11G	G08_088	TO->FROM FINNEY SWITCHING STATION - STEVENSCO 345.00 345KV CKT 1	1052	0.253	112.1327		DBL-G0847-WO	
FDNS		1	2	11G	G08_088	TO->FROM NORTHWEST - TATONGA7 345.00 345KV CKT 1	1195	0.21211	106.6923		DBL-WOOD-MED	
FNSL-Blown up		00G09_008	0	16SP	G09_008	Non Converged Contingency	0	0.03293	9999		TRF-STEGALL	
FNSL-Blown up		00G09_008	0	16WP	G09_008	Non Converged Contingency	0	0.03263	9999		TRF-STEGALL	
FNSL-Blown up		00G09_008	2	16SP	G09_008	Non Converged Contingency	0	0.03293	9999		TRF-STEGALL	
FNSL-Blown up		00G09_008	2	16WP	G09_008	Non Converged Contingency	0	0.03264	9999		TRF-STEGALL	
FNSL-Blown up		00G09_008	3	16SP	G09_008	Non Converged Contingency	0	0.03376	9999		TRF-STEGALL	
FNSL-Blown up		00G09_008	3	16WP	G09_008	Non Converged Contingency	0	0.03347	9999		TRF-STEGALL	
FDNS		00G09_008	2	12WP	G09_008	TO->FROM N HAYS3 115.00 - VINE STREET 115KV CKT 1	99	0.38488	121.2584		POSTROCK6 230.00 - S HAYS6 230.00 230KV CKT 1	
FDNS		00G09_008	2	12WP	G09_008	TO->FROM KNOLL - N HAYS3 115.00 115KV CKT 1	99	0.38488	115.8085		POSTROCK6 230.00 - S HAYS6 230.00 230KV CKT 1	
FDNS		00G09_008	2	12SP	G09_008	TO->FROM N HAYS3 115.00 - VINE STREET 115KV CKT 1	99	0.38454	112.1858		POSTROCK6 230.00 - S HAYS6 230.00 230KV CKT 1	
FDNS		00G09_008	2	12SP	G09_008	TO->FROM KNOLL - N HAYS3 115.00 115KV CKT 1	99	0.38454	104.357		POSTROCK6 230.00 - S HAYS6 230.00 230KV CKT 1	
FDNS		00G09_008	3	16WP	G09_008	TO->FROM HAYS PLANT - SOUTH HAYS 115KV CKT 1	80	0.37696	176.9749		POSTROCK6 230.00 - S HAYS6 230.00 230KV CKT 1	
FDNS		00G09_008	3	16WP	G09_008	FROM->TO HAYS PLANT - VINE STREET 115KV CKT 1	80	0.37696	158.0099		POSTROCK6 230.00 - S HAYS6 230.00 230KV CKT 1	
FDNS		00G09_008	3	16WP	G09_008	TO->FROM N HAYS3 115.00 - VINE STREET 115KV CKT 1	99	0.37696	122.0164		POSTROCK6 230.00 - S HAYS6 230.00 230KV CKT 1	
FDNS		00G09_008	3	16WP	G09_008	TO->FROM KNOLL - N HAYS3 115.00 115KV CKT 1	99	0.37696	116.7647		POSTROCK6 230.00 - S HAYS6 230.00 230KV CKT 1	
FDNS		00G09_008	3	16SP	G09_008	TO->FROM HAYS PLANT - SOUTH HAYS 115KV CKT 1	80	0.37663	175.3345		POSTROCK6 230.00 - S HAYS6 230.00 230KV CKT 1	
FDNS		00G09_008	3	16SP	G09_008	FROM->TO HAYS PLANT - VINE STREET 115KV CKT 1	80	0.37663	146.172		POSTROCK6 230.00 - S HAYS6 230.00 230KV CKT 1	
FDNS		00G09_008	3	16SP	G09_008	TO->FROM N HAYS3 115.00 - VINE STREET 115KV CKT 1	99	0.37663	109.5541		POSTROCK6 230.00 - S HAYS6 230.00 230KV CKT 1	
FDNS		00G09_008	3	16SP	G09_008	TO->FROM KNOLL - N HAYS3 115.00 115KV CKT 1	99	0.37663	101.7431		POSTROCK6 230.00 - S HAYS6 230.00 230KV CKT 1	
FDNS		00G09_008	3	12WP	G09_008	TO->FROM HAYS PLANT - SOUTH HAYS 115KV CKT 1	80	0.37649	172.8169		POSTROCK6 230.00 - S HAYS6 230.00 230KV CKT 1	
FDNS		00G09_008	3	12WP	G09_008	FROM->TO HAYS PLANT - VINE STREET 115KV CKT 1	80	0.37649	154.6885		POSTROCK6 230.00 - S HAYS6 230.00 230KV CKT 1	
FDNS		00G09_008	3	12WP	G09_008	TO->FROM N HAYS3 115.00 - VINE STREET 115KV CKT 1	99	0.37649	119.7332		POSTROCK6 230.00 - S HAYS6 230.00 230KV CKT 1	
FDNS		00G09_008	3	12WP	G09_008	TO->FROM KNOLL - N HAYS3 115.00 115KV CKT 1	99	0.37649	114.8501		POSTROCK6 230.00 - S HAYS6 230.00 230KV CKT 1	
FDNS		00G09_008	3	12SP	G09_008	TO->FROM HAYS PLANT - SOUTH HAYS 115KV CKT 1	80	0.37614	171.2771		POSTROCK6 230.00 - S HAYS6 230.00 230KV CKT 1	
FDNS		00G09_008	3	12SP	G09_008	FROM->TO HAYS PLANT - VINE STREET 115KV CKT 1	80	0.37614	143.3711		POSTROCK6 230.00 - S HAYS6 230.00 230KV CKT 1	
FDNS		00G09_008	3	12SP	G09_008	TO->FROM N HAYS3 115.00 - VINE STREET 115KV CKT 1	99	0.37614	107.786		POSTROCK6 230.00 - S HAYS6 230.00 230KV CKT 1	
FDNS		00G09_008	3	12SP	G09_008	TO->FROM KNOLL - N HAYS3 115.00 115KV CKT 1	99	0.37614	100.5309		POSTROCK6 230.00 - S HAYS6 230.00 230KV CKT 1	
FDNS		00G09_008	2	16WP	G09_008	TO->FROM N HAYS3 115.00 - VINE STREET 115KV CKT 1	99	0.35962	117.2215		POSTROCK6 230.00 - S HAYS6 230.00 230KV CKT 1	
FDNS		00G09_008	2	16WP	G09_008	TO->FROM KNOLL - N HAYS3 115.00 115KV CKT 1	99	0.35962	111.8808		POSTROCK6 230.00 - S HAYS6 230.00 230KV CKT 1	
FDNS		00G09_008	2	16SP	G09_008	TO->FROM N HAYS3 115.00 - VINE STREET 115KV CKT 1	99	0.35931	103.07		POSTROCK6 230.00 - S HAYS6 230.00 230KV CKT 1	
FDNS		00G09_008	0	16WP	G09_008	TO->FROM HAYS PLANT - SOUTH HAYS 115KV CKT 1	88	0.35736	153.5684		POSTROCK6 230.00 - S HAYS6 230.00 230KV CKT 1	
FDNS		00G09_008	0	16WP	G09_008	FROM->TO HAYS PLANT - VINE STREET 115KV CKT 1	88	0.35736	136.8948		POSTROCK6 230.00 - S HAYS6 230.00 230KV CKT 1	
FDNS		00G09_008	0	16WP	G09_008	TO->FROM N HAYS3 115.00 - VINE STREET 115KV CKT 1	99	0.35736	116.1763		POSTROCK6 230.00 - S HAYS6 230.00 230KV CKT 1	
FDNS		00G09_008	0	16WP	G09_008	TO->FROM KNOLL - N HAYS3 115.00 115KV CKT 1	99	0.35736	110.9757		POSTROCK6 230.00 - S HAYS6 230.00 230KV CKT 1	
FDNS		00G09_008	0	16SP	G09_008	TO->FROM HAYS PLANT - SOUTH HAYS 115KV CKT 1	88	0.35705	152.9566		POSTROCK6 230.00 - S HAYS6 230.00 230KV CKT 1	
FDNS		00G09_008	0	16SP	G09_008	FROM->TO HAYS PLANT - VINE STREET 115KV CKT 1	88	0.35705	127.2254		POSTROCK6 230.00 - S HAYS6 230.00 230KV CKT 1	
FDNS		00G09_008	0	16SP	G09_008	TO->FROM N HAYS3 115.00 - VINE STREET 115KV CKT 1	99	0.35705	104.7707		POSTROCK6 230.00 - S HAYS6 230.00 230KV CKT 1	
FDNS		00G09_008	0	12WP	G09_008	TO->FROM HAYS PLANT - SOUTH HAYS 115KV CKT 1	88	0.3569	147.6544		POSTROCK6 230.00 - S HAYS6 230.00 230KV CKT 1	
FDNS		00G09_008	0	12WP	G09_008	FROM->TO HAYS PLANT - VINE STREET 115KV CKT 1	88	0.3569	131.2296		POSTROCK6 230.00 - S HAYS6 230.00 230KV CKT 1	
FDNS		00G09_008	0	12WP	G09_008	TO->FROM N HAYS3 115.00 - VINE STREET 115KV CKT 1	99	0.3569	111.2015		POSTROCK6 230.00 - S HAYS6 230.00 230KV CKT 1	
FDNS		00G09_008	0	12WP	G09_008	TO->FROM KNOLL - N HAYS3 115.00 115KV CKT 1	99	0.3569	106.0246		POSTROCK6 230.00 - S HAYS6 230.00 230KV CKT 1	
FDNS		11	0	11G	G09_008	TO->FROM HAYS PLANT - SOUTH HAYS 115KV CKT 1	88	0.35661	102.4358		POSTROCK6 230.00 - S HAYS6 230.00 230KV CKT 1	
FDNS		11G09_008	0	11G	G09_008	TO->FROM HAYS PLANT - SOUTH HAYS 115KV CKT 1	88	0.3566	133.8465		POSTROCK6 230.00 - S HAYS6 230.00 230KV CKT 1	
FDNS		11G09_008	0	11G	G09_008	FROM->TO HAYS PLANT - VINE STREET 115KV CKT 1	88	0.3566	115.5914		POSTROCK6 230.00 - S HAYS6 230.00 230KV CKT 1	
FDNS		00G09_008	0	12SP	G09_008	TO->FROM HAYS PLANT - SOUTH HAYS 115KV CKT 1	88	0.35659	147.6038		POSTROCK6 230.00 - S HAYS6 230.00 230KV CKT 1	
FDNS		00G09_008	0	12SP	G09_008	FROM->TO HAYS PLANT - VINE STREET 115KV CKT 1	88	0.35659	121.9669		POSTROCK6 230.00 - S HAYS6 230.00 230KV CKT 1	
FDNS		00G09_008	0	12SP	G09_008	TO->FROM N HAYS3 115.00 - VINE STREET 115KV CKT 1	99	0.35659	100.0497		POSTROCK6 230.00 - S HAYS6 230.00 230KV CKT 1	
FDNS		11G09_008	0	11G	G09_008	FROM->TO SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	319	0.31301	104.6136		POSTROCK7 345.00 (POSTROCK T1) 345/230/13.8KV TRANSFORMER CKT 1	
FDNS		11G09_008	2	11G	G09_008	FROM->TO SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	319	0.31301	104.6104		POSTROCK7 345.00 (POSTROCK T1) 345/230/13.8KV TRANSFORMER CKT 1	
FNSL-Blown up		00G09_020	0	16SP	G09_020	Non Converged Contingency	0	0.03641	9999		TRF-STEGALL	
FNSL-Blown up		00G09_020	2	16SP	G09_020	Non Converged Contingency	0	0.03641	9999		TRF-STEGALL	
FNSL		03ALL	0	11G	G09_020	TO->FROM CIRCLE - MULLERGREN 230KV CKT 1	319	0.2211	134.7121		DBL-SPRVL-CO	
FDNS		3	0	11G	G09_020	TO->FROM CIRCLE - MULLERGREN 230KV CKT 1	319	0.22128	111.1876		DBL-COM-MEDL	
FDNS		3	0	11G	G09_020	TO->FROM CIRCLE - MULLERGREN 230KV CKT 1	319	0.22128	110.7041		DBL-SPRVL-CO	
FDNS		3	0	11G	G09_020	TO->FROM CIRCLE - MULLERGREN 230KV CKT 1	319	0.22128	110.7041		DBL-SPRVL-CO	
FDNS		03ALL	0	11G	G09_020	TO->FROM CIRCLE - MULLERGREN 230KV CKT 1	319	0.2211	134.8296		DBL-COM-MEDL	
FDNS		03ALL	0	11G	G09_020	TO->FROM CIRCLE - MULLERGREN 230KV CKT 1	319	0.20197	116.7054		DBL-MEDLO-WI	
FNSL-Blown up		02ALL	0	11G	G09_0675	Non Converged Contingency	1052	0.14256	75.91642		FINNEY SWITCHING STATION - STEVENSCO 345.00 345KV CKT 1	

SOLUTION	GROUP	SCENARIO	SEASON	SOURCE	DIRECTION	MONITORED ELEMENT COMMON NAME	RATEB	TDF	TC%LOADING	CONTINGENCY NAME
FNSL-Blown up	02ALL	0	11G	G09_0675		Non Converged Contingency	0	0.16647	9999	DBL-HIT-G084
FNSL-Blown up	02ALL	0	11G	G09_0675		Non Converged Contingency	0	0.16647	9999	DBL-G0847-WO
FDNS	2	0	11G	G09_0675	TO->FROM	FINNEY SWITCHING STATION - STEVENSCO 345.00 345KV CKT 1	1052	0.2357	117.8725	DBL-G0847-WO
FDNS	2	0	11G	G09_0675	TO->FROM	FINNEY SWITCHING STATION - STEVENSCO 345.00 345KV CKT 1	1052	0.2357	103.5525	DBL-HIT-G084
FDNS	2	0	11G	G09_0675	TO->FROM	FINNEY SWITCHING STATION - STEVENSCO 345.00 345KV CKT 1	1052	0.2357	103.5525	DBL-HIT-G084
FDNS	02ALL	2	11G	G09_0675	TO->FROM	FINNEY SWITCHING STATION - STEVENSCO 345.00 345KV CKT 1	1052	0.2046	112.1327	DBL-G0847-WO
FDNS	1	2	11G	G09_0675	TO->FROM	NORTHWEST - TATONGA7 345.00 345KV CKT 1	1195	0.20085	106.6923	DBL-WOOD-MED
FNSL-Blown up	02ALL	0	11G	G10_007		Non Converged Contingency	1052	0.19769	75.91642	FINNEY SWITCHING STATION - STEVENSCO 345.00 345KV CKT 1
FNSL-Blown up	02ALL	0	11G	G10_007		Non Converged Contingency	0	0.33743	9999	DBL-HIT-G084
FNSL-Blown up	02ALL	0	11G	G10_007		Non Converged Contingency	0	0.33743	9999	DBL-G0847-WO
FDNS	2	0	11G	G10_007	TO->FROM	FINNEY SWITCHING STATION - STEVENSCO 345.00 345KV CKT 1	1052	0.38448	117.8725	DBL-G0847-WO
FDNS	2	0	11G	G10_007	TO->FROM	FINNEY SWITCHING STATION - STEVENSCO 345.00 345KV CKT 1	1052	0.38448	103.5525	DBL-HIT-G084
FDNS	2	0	11G	G10_007	TO->FROM	FINNEY SWITCHING STATION - STEVENSCO 345.00 345KV CKT 1	1052	0.38448	103.5525	DBL-HIT-G084
FDNS	02G10_007	0	11G	G10_007	TO->FROM	FINNEY SWITCHING STATION - STEVENSCO 345.00 345KV CKT 1	1052	0.38438	118.7016	DBL-G0847-WO
FDNS	02G10_007	0	11G	G10_007	TO->FROM	FINNEY SWITCHING STATION - STEVENSCO 345.00 345KV CKT 1	1052	0.38438	104.3418	DBL-HIT-G084
FDNS	02G10_007	0	11G	G10_007	TO->FROM	FINNEY SWITCHING STATION - STEVENSCO 345.00 345KV CKT 1	1052	0.38438	104.3418	DBL-HIT-G084
FDNS	02ALL	2	11G	G10_007	TO->FROM	FINNEY SWITCHING STATION - STEVENSCO 345.00 345KV CKT 1	1052	0.2771	112.1327	DBL-G0847-WO
FDNS	1	2	11G	G10_007	TO->FROM	NORTHWEST - TATONGA7 345.00 345KV CKT 1	1195	0.22281	106.6923	DBL-WOOD-MED
FNSL-Blown up	02ALL	0	11G	G10_008		Non Converged Contingency	1052	0.06404	75.91642	FINNEY SWITCHING STATION - STEVENSCO 345.00 345KV CKT 1
FDNS	01G10_008	0	11G	G10_008	FROM->TO	FARGO JCT - WOODWARD 69KV CKT 1	65	0.93291	163.9571	FT SUPPLY - IODINE 138KV CKT 1
FDNS	01G10_008	0	11G	G10_008	FROM->TO	FARGO JCT - WOODWARD 69KV CKT 1	65	0.93291	156.2456	IODINE - MOORELAND 138KV CKT 1
FDNS	01G10_008	0	11G	G10_008	FROM->TO	FARGO JCT - WOODWARD 69KV CKT 1	65	0.78268	100.7729	BUFBEAR2 - BUFFALO 69KV CKT 1
FDNS	01G10_008	0	11G	G10_008	FROM->TO	FARGO JCT - WOODWARD 69KV CKT 1	65	0.774	109.9223	BASE CASE
FDNS	1	2	11G	G10_008	TO->FROM	NORTHWEST - TATONGA7 345.00 345KV CKT 1	1195	0.2609	106.6923	DBL-WOOD-MED
FDNS	01G10_008	2	11G	G10_008	TO->FROM	NORTHWEST - TATONGA7 345.00 345KV CKT 1	1195	0.26088	107.038	DBL-WOOD-MED
FDNS	01G10_008	0	11G	G10_008	TO->FROM	NORTHWEST - TATONGA7 345.00 345KV CKT 1	1195	0.26019	107.0687	DBL-WOOD-MED
FDNS	1	2	11G	G10_008	TO->FROM	NORTHWEST - TATONGA7 345.00 345KV CKT 1	1195	0.20746	100.6762	DBL-MEDLO-WI
FDNS	01G10_008	2	11G	G10_008	TO->FROM	NORTHWEST - TATONGA7 345.00 345KV CKT 1	1195	0.20744	100.9532	DBL-MEDLO-WI
FDNS	01G10_008	0	11G	G10_008	TO->FROM	NORTHWEST - TATONGA7 345.00 345KV CKT 1	1195	0.20677	100.9811	DBL-MEDLO-WI
FNSL-Blown up	00G10_009	0	16SP	G10_009		Non Converged Contingency	0	0.04044	9999	TRF-STEGALL
FNSL-Blown up	00G10_009	0	16WP	G10_009		Non Converged Contingency	0	0.04013	9999	TRF-STEGALL
FNSL-Blown up	02ALL	0	11G	G10_009		Non Converged Contingency	0	0.0904	9999	DBL-HIT-G084
FNSL-Blown up	02ALL	0	11G	G10_009		Non Converged Contingency	0	0.0904	9999	DBL-G0847-WO
FNSL-Blown up	02ALL	0	11G	G10_011		Non Converged Contingency	1052	0.05296	75.91642	FINNEY SWITCHING STATION - STEVENSCO 345.00 345KV CKT 1
FDNS	01G10_011	0	11G	G10_011	TO->FROM	NORTHWEST - TATONGA7 345.00 345KV CKT 1	1195	0.58452	118.1688	DBL-WOOD-MED
FDNS	1	2	11G	G10_011	TO->FROM	NORTHWEST - TATONGA7 345.00 345KV CKT 1	1195	0.5845	106.6923	DBL-WOOD-MED
FDNS	1	0	11G	G10_011	TO->FROM	NORTHWEST - TATONGA7 345.00 345KV CKT 1	1195	0.58441	106.7257	DBL-WOOD-MED
FDNS	01G10_011	0	11G	G10_011	TO->FROM	NORTHWEST - TATONGA7 345.00 345KV CKT 1	1195	0.53621	110.4201	DBL-MEDLO-WI
FDNS	1	2	11G	G10_011	TO->FROM	NORTHWEST - TATONGA7 345.00 345KV CKT 1	1195	0.53619	100.6762	DBL-MEDLO-WI
FDNS	1	0	11G	G10_011	TO->FROM	NORTHWEST - TATONGA7 345.00 345KV CKT 1	1195	0.53604	100.71	DBL-MEDLO-WI
FNSL-Blown up	02ALL	0	11G	G10_014		Non Converged Contingency	1052	0.2509	75.91642	FINNEY SWITCHING STATION - STEVENSCO 345.00 345KV CKT 1
FNSL-Blown up	02ALL	0	11G	G10_014		Non Converged Contingency	0	0.48871	9999	DBL-HIT-G084
FNSL-Blown up	02ALL	0	11G	G10_014		Non Converged Contingency	0	0.48871	9999	DBL-G0847-WO
FDNS	2	0	11G	G10_014	TO->FROM	FINNEY SWITCHING STATION - STEVENSCO 345.00 345KV CKT 1	1052	0.52055	117.8725	DBL-G0847-WO
FDNS	2	0	11G	G10_014	TO->FROM	FINNEY SWITCHING STATION - STEVENSCO 345.00 345KV CKT 1	1052	0.52055	103.5525	DBL-HIT-G084
FDNS	2	0	11G	G10_014	TO->FROM	FINNEY SWITCHING STATION - STEVENSCO 345.00 345KV CKT 1	1052	0.52055	103.5525	DBL-HIT-G084
FDNS	02G10_014	0	11G	G10_014	TO->FROM	FINNEY SWITCHING STATION - STEVENSCO 345.00 345KV CKT 1	1052	0.51972	116.7447	DBL-HIT-G084
FDNS	02G10_014	0	11G	G10_014	TO->FROM	FINNEY SWITCHING STATION - STEVENSCO 345.00 345KV CKT 1	1052	0.51972	116.7447	DBL-HIT-G084
FDNS	02ALL	2	11G	G10_014	TO->FROM	FINNEY SWITCHING STATION - STEVENSCO 345.00 345KV CKT 1	1052	0.35273	112.1327	DBL-G0847-WO
FDNS	1	2	11G	G10_014	TO->FROM	NORTHWEST - TATONGA7 345.00 345KV CKT 1	1195	0.26023	106.6923	DBL-WOOD-MED
FDNS	1	2	11G	G10_014	TO->FROM	NORTHWEST - TATONGA7 345.00 345KV CKT 1	1195	0.2374	100.6762	DBL-MEDLO-WI
FNSL-Blown up	00G10_015	0	16SP	G10_015		Non Converged Contingency	0	0.03211	9999	TRF-STEGALL
FNSL-Blown up	00G10_015	0	16WP	G10_015		Non Converged Contingency	0	0.03166	9999	TRF-STEGALL

H: Power Flow Analysis (Constraints with greater than 3% TDF)

For a copy of the entire 313 pages of Appendix H, please contact the SPP GI Studies Department.