

Definitive Interconnection  
System Impact Study for  
Generation Interconnection  
Requests  
(DISIS-2010-002-3)

March 2012

Generation Interconnection

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## Revision History

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Date or Version Number	Author	Change Description
01/31/2011	SPP	Report Issued (DISIS-2010-002)
07/26/2011	SPP	Account for Withdrawn Projects, Report Re-Posted (DISIS-2010-002-1)
11/08/2011	SPP	Account for Withdrawn Projects, Report Re-Posted (DISIS-2010-002-2)
03/25/2012	SPP	Account for Withdrawn Projects, Report Re-Posted (DISIS-2010-002-3)

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## Executive Summary

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Generation Interconnection customers have requested a Definitive Interconnection System Impact Study (DISIS) under the Generation Interconnection Procedures (GIP) in the Southwest Power Pool Open Access Transmission Tariff (OATT). The Interconnection Customers' requests have been clustered together for the following System Impact Cluster Study window which closed September 30, 2010. The customers will be referred to in this study as the DISIS-2010-002 Interconnection Customers. This System Impact Study analyzes the interconnecting of multiple generation interconnection requests associated with new generation totaling approximately 1,477.5 MW of new generation which would be located within the transmission systems of Midwest Energy Inc. (MIDW), Mid-Kansas Electric Power LLC (MKEC), Nebraska Public Power District (NPPD), Oklahoma Gas and Electric (OKGE), Omaha Public Power District (OPPD), Sunflower Electric Power Corporation (SUNC), Southwestern Public Service (SPS), Westar Energy (WERE) and Western Farmers Electric Cooperative (WFEC). The various generation interconnection requests have differing proposed in-service dates<sup>1</sup>. The generation interconnection requests included in this System Impact Cluster Study are listed in Appendix A by their queue number, amount, requested interconnection service, area, requested interconnection point, proposed interconnection point, and the requested in-service date. This restudy was performed to account for withdrawals within the DISIS-2010-002 study and/or higher queued projects withdrawing.

Power flow analysis has indicated that for the power flow cases studied, 1,477.5 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. 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-2010-002 interconnection customers is \$100,762,557. These costs are shown in Appendix E and F. Interconnection Service to DISIS-2010-002 interconnection customers is also contingent upon higher queued customers paying for certain required network upgrades. **The in service date for the DISIS customers will be deferred until the construction of these network upgrades can be completed.**

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

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

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

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

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## Introduction

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Pursuant to the Southwest Power Pool (SPP) Open Access Transmission Tariff (OATT), SPP has conducted this Definitive Interconnection System Impact Study (DISIS) for certain generation interconnection requests in the SPP Generation Interconnection Queue. These interconnection requests have been clustered together for the following System Impact Study window which closed September 30, 2010. The customers will be referred to in this study as the DISIS-2010-002 Interconnection Customers. This System Impact Study analyzes the interconnecting of multiple generation interconnection requests associated with new generation totaling 1,477.5 MW of new generation which would be located within the transmission systems of Midwest Energy Inc. (MIDW), Mid-Kansas Electric Power LLC (MKEC), Nebraska Public Power District (NPPD), Oklahoma Gas and Electric (OKGE), Omaha Public Power District (OPPD), Sunflower Electric Power Corporation (SUNC), Southwestern Public Service (SPS), Westar Energy (WERE) and Western Farmers Electric Cooperative (WFEC). The various generation interconnection requests have differing proposed in-service dates<sup>2</sup>. The generation interconnection requests included in this System Impact Study are listed in Appendix A by their queue number, amount, requested interconnection service, area, requested interconnection point, proposed interconnection point, and the requested in-service date. This restudy was performed to account for withdrawals within the DISIS-2010-001 study and/or higher queued projects withdrawing.

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.

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## Model Development

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### Interconnection Requests Included in the Cluster

SPP has included all interconnection requests that submitted a Definitive Interconnection System Impact Study Agreement no later than September 30, 2010 and were subsequently accepted by Southwest Power Pool under the terms of the Generator Interconnection Procedures (GIP) that became effective March 30, 2010. The interconnection requests that are included in this study are listed in Appendix A.

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

### **Affected System Interconnection Requests**

Also included in this Definitive Impact Study are three Affected System Studies, all located on the Lea County Electric Cooperative (LCEC) system, which is located in Lea County, New Mexico, and shares connections to the SPS system. The Affected System Study Requests has been given the designations: ASGI-2010-020 (30 MW, POI is a tap on LCEC-Tatum – LCEC-Crossroads 69kV), ASGI-2010-021 (15 MW, POI is a tap on LCEC-Saunders – LCEC-Anderson 69kV), and ASGI-2011-001 (28.8 MW, POI is at LCEC-Lovington 115kV).

### **Previously Queued Interconnection Requests**

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

## **Development of Base Cases**

### **Power Flow**

The 2011 series Transmission Service Request (TSR) Models 2012 spring, 2012 summer and winter peak, and the 2017 summer and winter peak scenario 0 cases were used for this study. After the cases were developed, each of the control areas' resources were then re-dispatched to account for the new generation requests using current dispatch orders.

### **Dynamic Stability**

The 2011 series SPP Model Development Working Group (MDWG) Models 2012 winter and 2012 summer were used as starting points 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 an approved Notice to Construct (NTC), or are in construction stages and were assumed to be in-service at the time of dispatch and added to the base case models. The DISIS-2010-002 Customers have not been assigned acceleration costs for the below listed projects. The DISIS-2010-002 Customers Generation Facilities in service dates may need to be delayed until the completion of the following upgrades. If for some reason, construction on these projects is discontinued, additional restudies will be needed to determine the interconnection needs of the DISIS customers.

- Hitchland 230/115kV area projects<sup>3</sup>:
  - Hitchland – Moore County 230kV, scheduled for 6/1/2012 in-service
  - Hitchland – Ochiltree 230kV Project, scheduled for 12/31/2012 in-service
- Valliant – Hugo – Sunnyside 345kV, scheduled for 4/1/2012 in-service<sup>4</sup>

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

<sup>4</sup> SPP Transmission Service Projects identified in SPP-2006-AG3-AFS-11.

- Rose Hill – Sooner 345kV, scheduled for 6/15/2012 in-service<sup>5</sup>
- Balanced Portfolio Projects<sup>6</sup>:
  - Woodward – Border – TUCO 345kV project, scheduled for 5/19/2014 in-service
    - Woodward 345/138kV circuit #2 autotransformer
    - TUCO 345/138kV circuit #2 autotransformer
    - Reactors at Woodward and Border
  - Iatan– Nashua 345kV, scheduled for 6/1/2015 in-service
    - Nashua 345/161kV autotransformer
  - Muskogee– Seminole 345kV, scheduled for 12/31/2012 in-service
  - Spearville – Post Rock 345kV, scheduled for 6/1/2012 in-service
    - Post Rock 345/230kV autotransformer
  - Post Rock – Axtell 345kV, scheduled for 6/1/2013 in-service
  - Cleveland – Sooner 345kV, scheduled for 12/31/2012 in-service
  - Tap Stillwell – Swissvale 345kV line at West Gardner, scheduled for 6/1/2012 in-service
- Priority Projects<sup>7</sup>:
  - Hitchland – Woodward double circuit 345kV, scheduled for 6/30/2014 in-service
    - Hitchland 345/230kV autotransformer
  - Woodward – Thistle double circuit 345kV, scheduled for 12/31/2014 in-service
  - Spearville – Clark double circuit 345kV, scheduled for 12/31/2014 in-service
  - Clark – Thistle double circuit 345kV, scheduled for 12/31/2014 in-service
  - Thistle – Wichita double circuit 345kV, scheduled for 12/31/2014 in-service
  - Thistle 345/138kV autotransformer, scheduled for 12/31/2014 in-service
  - Thistle – Flat Ridge 138kV, scheduled for 12/31/2014 in-service
- Various MKEC Transmission System Upgrades<sup>8</sup>
  - Harper – Flat Ridge 138kV rebuild, scheduled for 12/31/2013 in-service
  - Flat Ridge – Medicine Lodge 138kV rebuild, scheduled for 12/31/2013 in-service
  - Pratt – Medicine Lodge 115kV rebuild, scheduled for 6/1/2013 in-service
  - Medicine Lodge 138/115kV autotransformer replacement, scheduled for 6/1/2013 in-service

## Contingent Upgrades

The following facilities do not yet have approval. These facilities have been assigned to higher queued interconnection customers. These facilities have been included in the models for the DISIS-2010-002 study and are assumed to be in service. This list may not be all inclusive. The DISIS-2010-002 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

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<sup>5</sup> SPP Regional Reliability Project. Approved based on an order of the Kansas Corporation Commission issued in Docket no. 07-WSEE-715-MIS.

<sup>6</sup> Notice to Construct (NTC) issued June 2009.

<sup>7</sup> Notice to Construct (NTC) issued June 2010.

<sup>8</sup> SPP Transmission Service Projects identified in SPP-2007-AG3-AFS-9.



interconnection queue. The DISIS-2010-002 Customer Generation Facilities in service dates may need to be delayed until the completion of the following upgrades.

- Finney – Holcomb 345kV circuit #2, assigned to GEN-2006-049 interconnection customer<sup>9</sup>
- Central Plains – Setab 115kV transmission line, assigned to GEN-2007-013 interconnection customer
- Upgrades assigned to 1<sup>st</sup> Cluster (ICS-2008-001) Interconnection Customers:
  - Grassland – Wolfforth 230kV
- Upgrades assigned to DISIS-2009-001 Interconnection Customers:
  - Fort Dodge – North Fort Dodge – Spearville 115kV circuit #2
  - Albion – Petersburg – Neligh 115kV rerate
  - Fort Randall – Madison County – Kelly 230kV rerate (320MVA)
  - Spearville 345/115kV autotransformer
- Upgrades assigned to DISIS-2010-001 Interconnection Customers:
  - Post Rock 345/230kV circuit #2 autotransformer
  - South Hays – Hays Plant – Vine Street 115kV rebuild
  - Switch 2749 – Wildorado 69kV rebuild
  - Madison County – Kelly 230kV rerate (478MVA)
  - Washita – Gracemont 138kV circuit #2

### **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 section.

### **Regional Groupings**

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

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

### **Power Flow**

For each group, the various wind generating plants were modeled at 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 studied at 80% nameplate rating. These projects were dispatched as Energy Resources with equal distribution across the SPP footprint. Certain projects that requested Network Resource Interconnection Service were dispatched in an additional analysis into the balancing authority of the interconnecting transmission owner. This method allowed for the identification of network

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<sup>9</sup> Facility Study posted November 2008.

constraints that were common to the regional groupings that could then in turn have the mitigating upgrade cost allocated throughout the entire cluster. Other sensitivity analyses are also performed with each interconnection request modeled at 100% nameplate.

Peaking units were not dispatched in the 2012 spring model. To study peaking units' impacts, the 2012 summer and winter, 2013 summer and winter, and 2017 summer and winter seasonal models were chosen and peaking units were modeled at 100% of the nameplate rating and wind generating facilities were modeled at 10% of the nameplate rating. Each interconnection request was also modeled separately at 100% nameplate for certain analyses.

### **Dynamic Stability**

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

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## **Identification of Network Constraints**

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The initial set of network constraints were found by using PTI MUST First Contingency Incremental Transfer Capability (FCITC) analysis on the entire cluster grouping dispatched at the various levels mentioned above. These constraints were then screened to determine if any of the generation interconnection requests had at least a 20% Distribution Factor (DF) upon the constraint. Constraints that measured at least a 20% DF from at least one interconnection request were considered for mitigation. Interconnection Requests that were being studied for Network Resource Interconnection Service were studied in the additional NRIS analysis to determine if any constraint had at least a 3% DF. If so, these constraints were considered for mitigation.

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## **Determination of Cost Allocated Network Upgrades**

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Cost Allocated Network Upgrades of wind generation interconnection requests were determined using the 2012 spring model. Cost Allocated Network Upgrades of peaking units was determined using the 2017 summer peak model. A MUST sensitivity analysis was performed to determine the Distribution Factors (DF), a distribution factor with no contingency that each generation interconnection request had on each new upgrade. The impact each generation interconnection request had on each upgrade project was weighted by the size of each request. Finally the costs due by each request for a particular project were then determined by allocating the portion of each request's impact over the impact of all affecting requests.

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

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

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

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

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

- 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.

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## **Interconnection Facilities**

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The requirement to interconnect the 1,477.5 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 \$100,762,557. Interconnection Facilities specific to each generation interconnection request are listed in Appendix E. A preliminary one-line drawing for each generation interconnection request are listed in Appendix D.

A list of constraints with greater than or equal to a 20% DF that were identified and used for mitigation are listed in Appendix G. Other Network Constraints, those between 3% and 20% DF, which were not used are shown in Appendix H. With a defined source and sink in a TSR, this list of Network Constraints will be refined and expanded to account for all Network Upgrade requirements.

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## Power Flow Analysis

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### Power Flow 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 element and special (i.e., breaker-to-breaker, multi-element, etc) contingencies in portions or all of the modeled control areas of SPP, as well as, other control areas external to SPP and the resulting scenarios analyzed. This satisfies the “more probable” contingency testing criteria mandated by NERC and the SPP criteria.

### Power Flow Analysis

A power flow analysis was conducted for each Interconnection Customer’s facility using modified versions of the 2012 spring peak, 2012 summer and winter peak, and the 2017 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. Certain requests that requested Network Resource Interconnection Service (NRIS) had an additional analysis conducted for displacing resources in the interconnecting Transmission Owner’s balancing authority.

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

### Cluster Group 1 (Woodward Area)

In addition to the 3,359.6 MW of previously queued generation in the area, 300.0 MW of new interconnection service was studied. With the withdrawal of higher queued and DISIS-2010-002 requests, no new upgrades are necessary for interconnection of the remaining request in this group. No new constraints were found in this area. For interconnection customers that requested NRIS, a number of additional upgrades may have been identified and listed in Appendices E and F.

### Cluster Group 2 (Hitchland Area)

In addition to the 2,399.7 MW of previously queued generation in the area, 300.0 MW of new interconnection service was studied. With the withdrawal of higher queued and DISIS-2010-002 requests, the only upgrade necessary for interconnection of the remaining request in this group is the expansion of the Beaver County 345kV substation. The expansion of Beaver County Substation is necessary to interconnect both Hitchland-Woodward 345kV lines into the Beaver County Substation.

**Cluster Group 3 (Spearville Area)**

In addition to the 2,697.2 MW of previously queued generation in the area, 397.6 MW of new interconnection service was studied. With the withdrawal of higher queued and DISIS-2010-002 requests, the only upgrade necessary for interconnection of the remaining requests in this group was the expansion of the Beaver County 345kV substation. For interconnection customers that requested NRIS, a number of additional upgrades may have been identified and listed in Appendices E and F.

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

In addition to the 924.0 MW of previously queued generation in the area, 0.0 MW of new interconnection service was studied. No new constraints were found in this area.

**Cluster Group 5 (Amarillo Area)**

In addition to the 1,972.6 MW of previously queued generation in the area, 0.0 MW of new interconnection service was studied. No new constraints were found in this area.

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

In addition to the 2,017.0 MW of previously queued generation in the area, 129.8 MW of new interconnection service was studied. As previously indicated, limited outlet capacity for the ASGI-2010-020 request will require the rebuild of the entire 69kV transmission line from the ASGI-2010-020 Tap – LCEC-Tatum – LCEC-McDonald – LCEC-Reed – LCEC-Lovington.

**Cluster Group 7 (Southwestern Oklahoma)**

In addition to the 1,669.0 MW of previously queued generation in the area, 65.0 MW of new interconnection service was studied. With the withdrawal of higher queued and DISIS-2010-002 requests, no new upgrades are necessary for interconnection of the remaining request in this group. No new constraints were found in this area.

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

In addition to the 2,031.4 MW of previously queued generation in the area, 0.0 MW of new interconnection service was studied. No new constraints were found in this area.

**Cluster Group 9/10 (Nebraska)**

In addition to the 1,307.5 MW of previously queued generation in the area, 210.5 MW of new interconnection service was studied. Through further investigation by the transmission owner, additional work will be required on the GEN-2010-051 Tap – Twin Church – Dixon County 230kV to accommodate the interconnection of GEN-2010-051.

**Cluster Group 11 (North Central Kansas)**

In addition to the 1,224.1 MW of previously queued generation in the area, 70.0 MW of new interconnection service was studied. No new constraints were found in this area.

**Cluster Group 12 (Northwest Arkansas)**

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

### **Cluster Group 13 (Northwest Missouri)**

In addition to the 1,590.5 MW of previously queued generation in the area, 4.6 MW of new interconnection service was studied. No new constraints were found in this area.

### **Cluster Group 14 (South Central Oklahoma)**

In addition to the 200.0 MW of previously queued generation in the area, 0.0 MW of new interconnection service was studied. No new constraints were found in this area.

### **Cluster Group 15 (reserved)**

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

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## Stability Analysis

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A stability analysis was conducted for each Interconnection Customer's facility using modified versions of the 2012 summer and 2012 winter peak models. The stability analysis was conducted with all upgrades in service that were identified in the power flow analysis. For each group, the interconnection requests were studied at 100% nameplate output while the other groups were dispatched at 20% output for wind requests and 100% output for fossil requests. The output of the Interconnection Customer's facility was offset in each model by a reduction in output of existing online SPP generation. The following synopsis is included for each group. The entire stability study for each group can be found in the Appendices.

### **Cluster Group 1 (Woodward Area)**

The Group 1 stability study was not performed again for this restudy.

### **Cluster Group 2 (Hitchland Area)**

The Group 2 stability study for this restudy was performed by SPP Staff. The Group 2 request was found to stay on line and the transmission system remained stable for studied contingencies for the addition of this generation. The power factor analysis results did not change for this restudy.

### **Cluster Group 3 (Spearville Area)**

The Group 3 stability study for this restudy was performed by SPP Staff. The Group 3 requests was found to stay on line and the transmission system remained stable for studied contingencies for the addition of this generation. The power factor analysis results did not change for this restudy.

### **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)**

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

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

The Group 6 stability study was not performed again for this restudy.

### **Cluster Group 7 (Southwest Oklahoma Area)**

The Group 7 stability study was not performed again for this restudy.

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

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

### **Cluster Group 9/10 (Nebraska)**

The Group 9/10 stability study was not performed again for this restudy.

### **Cluster Group 11 (North Central Kansas Area)**

The Group 11 stability study was not performed again for this restudy.

**Cluster Group 12 (Northwest Arkansas Area)**

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

**Cluster Group 13 (Northwest Missouri Area)**

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

**Cluster Group 14 (South Central Oklahoma)**

The Group 14 stability analysis was not performed again for this restudy.

**Cluster Group 15 (reserved)**

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



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## Conclusion

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The minimum cost of interconnecting 1,477.5 MW of new interconnection requests included in this Definitive Interconnection System Impact Study is estimated at \$100,762,557 for the Allocated Network Upgrades and Transmission Owner Interconnection Facilities are listed in Appendix E and F. These costs do not include the cost of upgrades of other transmission facilities listed in Appendix H which are Network Constraints.

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

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

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# Appendix

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**A: Generation Interconnection Requests Considered for Impact Study**

See next page.

## **A: Generation Interconnection Requests Considered for Impact Study**

Request	Amount	Service	Area	Requested Point of Interconnection	Proposed Point of Interconnection	Requested In-Service Date	In Service Date Delayed Until no earlier than*
ASGI-2010-020	30.0	ER	SPS	Tap LE-Tatum - LE-Crossroads 69kV	Tap LE-Tatum - LE-Crossroads 69kV		
ASGI-2010-021	15.0	ER	SPS	Tap LE-Saunders Tap - LE-Anderson 69kV	Tap LE-Saunders Tap - LE-Anderson 69kV		
ASGI-2011-001	28.8	ER	SPS	LE-Lovington 115kV	LE-Lovington 115kV		
GEN-2010-001	300.0	ER	SPS	Tap Hitchland - Woodward Ckt 1 (Beaver County) 345kV	Tap Hitchland - Woodward Ckt 1 (Beaver County) 345kV	1/1/2012	12/31/2014
GEN-2010-012	65.0	ER	WFEC	Brantley 138kV	Brantley 138kV	3/31/2012	12/31/2014
GEN-2010-036	4.6	ER	WERE	6th Street 115kV	6th Street 115kV	8/1/2012	N/A
GEN-2010-040	300.0	ER/NR	OKGE	Cimarron 345kV	Cimarron 345kV	11/30/2011	N/A
GEN-2010-041	10.5	ER	OPPD	S 1399 161kV	S 1399 161kV	12/31/2011	N/A
GEN-2010-045	197.8	ER/NR	SUNCMKEC	Tap Holcomb - Spearville (Gray County) 345kV	Tap Holcomb - Spearville (Gray County) 345kV	12/31/2012	12/31/2014
GEN-2010-046	56.0	ER	SPS	Tuco 230kV	Tuco 230kV	5/1/2013	12/31/2014
GEN-2010-048	70.0	ER/NR	MIDW	Tap Beach Station - Redline 115kV	Tap Beach Station - Redline 115kV	12/31/2011	12/31/2014
GEN-2010-051	200.0	ER	NPPD	Tap Twin Church - Hoskins 230kV	Tap Twin Church - Hoskins 230kV	12/15/2012	N/A
GEN-2010-053	199.8	ER/NR	SUNCMKEC	Clark County 345kV	Clark County 345kV	12/31/2014	12/31/2014
<b>TOTAL 1,477.5</b>							

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

## **B: Prior Queued Interconnection Requests**

See next page.

## **B: Prior Queued Interconnection Requests**

Request	Amount	Area	Requested/Proposed Point of Interconnection	Status or In-Service Date
ASGI-2010-001	400	AECI	Tap Cooper - Fairport (AECI) 345kV	AECI queue Affected Study
ASGI-2010-005	99	AECI	Lathrop (AECI) 161kV	AECI queue Affected Study
ASGI-2010-006	150	AECI	Tap Fairfax Tap - Fairfax (AECI) 138kV	AECI queue Affected Study
ASGI-2010-009	201	AECI	Osborn (AECI) 161kV	AECI queue Affected Study
ASGI-2010-010	42	SPS	Lovington 115kV	Affected Study
ASGI-2010-011	48	SPS	TC-Texas County 69kV	Affected Study
GEN-2001-014	96	WFEC	Ft Supply 138kV	On-Line
GEN-2001-026	74	WFEC	Washita 138kV	On-Line
GEN-2001-033	180	SPS	San Juan Tap 230kV	On-Line
GEN-2001-036	80	SPS	Norton 115kV	On-Line
GEN-2001-037	100	OKGE	FPL Moreland Tap 138kV	On-Line
GEN-2001-039A	105	SUNCMKEC	Tap Greensburg - Ft Dodge 115kV	On Schedule for 2012
GEN-2001-039M	100	SUNCMKEC	Central Plains Tap 115kV	On-Line
GEN-2002-004	200	WERE	Latham 345kV	On-Line at 150MW
GEN-2002-005	120	WFEC	Red Hills Tap 138kV	On-Line
GEN-2002-008	240	SPS	Hitchland 345kV	On-Line at 120MW
GEN-2002-009	80	SPS	Hansford 115kV	On-Line
GEN-2002-022	240	SPS	Bushland 230kV	On-Line
GEN-2002-023N	0.8	NPPD	Harmony 115kV	On-Line
GEN-2002-025A	150	SUNCMKEC	Spearville 230kV	On-Line
GEN-2003-004 GEN-2004-023 GEN-2005-003	151.2	WFEC	Washita 138kV	On-Line
GEN-2003-005	100	WFEC	Anadarko - Paradise (Blue Canyon) 138kV	On-Line
GEN-2003-006A	200	SUNCMKEC	Elm Creek 230kV	On-Line
GEN-2003-019	250	MIDW	Smoky Hills Tap 230kV	On-Line
GEN-2003-020	160	SPS	Martin 115kV	On-Line at 80MW
GEN-2003-021N	75	NPPD	Ainsworth Wind Tap 115kV	On-Line
GEN-2003-022	120	AEPW	Washita 34.5kV	On-Line
GEN-2004-005N	30	NPPD	St Francis 115kV	IA Pending
GEN-2004-014	154.5	SUNCMKEC	Spearville 230kV	On Schedule for 2012
GEN-2004-020	27	AEPW	Washita 34.5kV	On-Line
GEN-2004-023N	75	NPPD	Columbus County 115kV	On Schedule
GEN-2005-005	18	OKGE	FPL Moreland Tap 138kV	IA Pending
GEN-2005-008	120	OKGE	Woodward 138kV	On-Line
GEN-2005-012	250	SUNCMKEC	Spearville 345kV	On Schedule for 2012
GEN-2005-013	201	WERE	Tap Latham - Neosho (Caney River) 345kV	On-Line
GEN-2006-002	101	AEPW	Sweetwater 230kV	On-Line
GEN-2006-006	205.5	SUNCMKEC	Spearville 345kV	IA Pending
GEN-2006-014	300	MIPU	Tap Maryville - Midway 161kV	On Suspension
GEN-2006-017	300	MIPU	Tap Maryville - Midway 161kV (GEN-2006-014 TAP)	On Suspension
GEN-2006-018	170	SPS	Antelope 230kV	On-Line
GEN-2006-020N	42	NPPD	Bloomfield 115kV	On-Line
GEN-2006-020S	18.9	SPS	DWS Frisco 115kV	On Schedule for 3/2012
GEN-2006-021	101	SUNCMKEC	Flat Ridge Tap 138kV	On-Line

Request	Amount	Area	Requested/Proposed Point of Interconnection	Status or In-Service Date
GEN-2006-022	150	SUNCMKEC	Pratt 115kV	On Suspension
GEN-2006-024S	19.8	WFEC	Buffalo Bear Tap 69kV	On-Line
GEN-2006-026	502	SPS	Hobbs 230kV	On-Line
GEN-2006-031	75	MIDW	Knoll 115kV	On-Line
GEN-2006-032	200	MIDW	South Hays 230kV	On Suspension
GEN-2006-034	81	SUNCMKEC	Kanarado 115kV	On Suspension
GEN-2006-035	225	AEPW	Sweetwater 230kV	On Schedule for 2011
GEN-2006-037N1	75	NPPD	Broken Bow 115kV	On Suspension
GEN-2006-038N005	80	NPPD	Broken Bow 115kV	On Schedule for 2012
GEN-2006-038N019	80	NPPD	Petersburg 115kV	On-Line
GEN-2006-039	400	SPS	Tap and Tie both Potter - Plant X 230kV and Bushland - Deaf Smith (South Randle County) 230kV	On Suspension
GEN-2006-040	108	SUNCMKEC	Mingo 115kV	On Schedule for 2012
GEN-2006-043	99	AEPW	Sweetwater 230kV	On-Line
GEN-2006-044	370	SPS	Hitchland 345kV	On Schedule for 2012
GEN-2006-044N	40.5	NPPD	Petersburg 115kV	On-Line
GEN-2006-044N02	100.5	NPPD	Tap Ft Randle - Columbus (Madison County) 230kV	IA Pending
GEN-2006-045	240	SPS	Tap and Tie both Potter - Plant X 230kV and Bushland - Deaf Smith (South Randle County) 230kV	On Schedule for 2012
GEN-2006-046	131	OKGE	Dewey 138kV	On-Line
GEN-2006-047	240	SPS	Tap and Tie both Potter - Plant X 230kV and Bushland - Deaf Smith (South Randle County) 230kV	On Suspension
GEN-2006-049	400	SPS	Tap Finney - Hitchland (Stevens County) 345kV	On Schedule for 2014
GEN-2007-006	160	OKGE	Roman Nose 138kV	On Suspension
GEN-2007-011	135	SUNCMKEC	Syracuse 115kV	On Schedule
GEN-2007-011N08	81	NPPD	Bloomfield 115kV	On-Line
GEN-2007-013	99	SUNCMKEC	Selkirk 115kV	On Suspension
GEN-2007-015	135	WERE	Tap Kelly(WERE) - S1399(OPPD) 161kV	On Suspension
GEN-2007-017	100.5	MIPU	Tap Maryville - Midway (GEN-2006-014 TAP) 161kV	On Suspension
GEN-2007-021	201	OKGE	Tatonga 345kV	On Schedule for 2014
GEN-2007-025	300	WERE	Tap Wichita - Woodring (Sumner County) 345kV	On Schedule for 2012
GEN-2007-032	150	WFEC	Tap Clinton Junction - Clinton 138kV	On Schedule for 2012
GEN-2007-038	200	SUNCMKEC	Spearville 345kV	On Schedule for 2015
GEN-2007-040	200	SUNCMKEC	Tap Holcomb - Spearville (Gray County) 345kV	On Schedule for 2012
GEN-2007-043	200	OKGE	Minco 345kV	On-Line
GEN-2007-044	300	OKGE	Tatonga 345kV	On Schedule for 2014
GEN-2007-046	199.5	SPS	Hitchland 115kV	On Schedule for 2014
GEN-2007-048	400	SPS	Tap Amarillo S - Swisher 230kV	On Schedule for 2014
GEN-2007-050	170	OKGE	Woodward EHV 138kV	On-Line at 150MW
GEN-2007-051	200	WFEC	Mooreland 138kV	On Schedule for 2014
GEN-2007-052	150	WFEC	Anadarko 138kV	On-Line
GEN-2007-053	110	MIPU	Tap Maryville - Midway (GEN-2006-014 TAP) 161kV	On Schedule for 2013
GEN-2007-057	34.5	SPS	Moore County East 115kV	On Schedule for 2014
GEN-2007-062	765	OKGE	Woodward EHV 345kV	On Schedule for 2014
GEN-2008-003	101	OKGE	Woodward EHV 138kV	On-Line
GEN-2008-008	60	SPS	Graham 69kV	On Suspension
GEN-2008-009	60	SPS	San Juan Tap 230kV	On Schedule for 2014
GEN-2008-013	300	OKGE	Tap Wichita - Woodring (South of GEN-2007-025) 345kV	On Schedule for 2012

Request	Amount	Area	Requested/Proposed Point of Interconnection	Status or In-Service Date
GEN-2008-014	150	SPS	Tap Tuco- Oklaunion 345kV	On Schedule for 2014
GEN-2008-016	248	SPS	Grassland 230kV	IA Pending
GEN-2008-017	300	SUNCMKEC	Setab 345kV	On Schedule for 2014
GEN-2008-018	405	SPS	Finney 345kV	On Schedule for 2012
GEN-2008-019	300	OKGE	Tatonga 345kV	On Schedule for 2015
GEN-2008-021	42.0	WERE	Wolf Creek 345kV	On-Line
GEN-2008-022	300	SPS	Tap Eddy Co - Tolk (Chaves County) 345kV	On Schedule for 2015
GEN-2008-023	150	AEPW	Hobart Junction 138kV	On Schedule for 2012
GEN-2008-025	101	SUNCMKEC	Ruleton 115kV	On Schedul for 2015
GEN-2008-029	250	OKGE	Woodward EHV 138kV	On Schedule for 2014
GEN-2008-037	101	WFEC	Tap Washita - Blue Canyon Wind 138kV	On-Line
GEN-2008-044	197.8	OKGE	Tatonga 345kV	On-Line
GEN-2008-046	200	OKGE	Sunnyside 345kV	On Suspension
GEN-2008-047	300	SPS	Tap Hitchland - Woodward Ckt 1 (Beaver County) 345kV	IA Pending
GEN-2008-051	322	SPS	Potter County 345kV	On Schedule for 2012
GEN-2008-071	76.8	OKGE	Newkirk 138kV	On Schedule for 2013
GEN-2008-079	100.5	SUNCMKEC	Tap Cudahy - Ft Dodge 115kV	On Schedule for 2012
GEN-2008-086N02	200	NPPD	Tap Ft Randle - Columbus (Madison County) 230kV	On Schedule for 2014
GEN-2008-088	50.6	SPS	Vega 69kV	IA Pending
GEN-2008-092	201	MIDW	Postrock 230kV	IA Pending
GEN-2008-098	100.8	WERE	Tap Lacygne - Wolf Creek (Anderson County) 345kV	IA Pending
GEN-2008-1190	60	OPPD	S1399 161kV	On-Line
GEN-2008-123N	89.7	NPPD	Tap Guide Rock - Pauline 115kV	On Suspension
GEN-2008-124	200	SUNCMKEC	Spearville 345kV	On Schedule for 2014
GEN-2008-127	200	WERE	Tap Rosehill - Sooner 345kV	On Suspension
GEN-2008-129	80	MIPU	Pleasant Hill 161kV	On-Line
GEN-2009-008	199.5	MIDW	South Hays 230kV	On Suspension
GEN-2009-011	50	SUNCMKEC	Tap Plainsville - Phillipsburg 115kV	On Schedule for 2014
GEN-2009-016	100.8	AEPW	Falcon Road 138kV	On Suspension
GEN-2009-020	48.6	MIDW	Tap Nekoma - Bazine 69kV	On Suspension
GEN-2009-025	60	OKGE	Tap Deer Creek - Sinclair Blackwell 69kV	On Schedule for 2012
GEN-2009-040	73.8	WERE	Tap Smittyville - Knob Hill 115kV	On Suspension
GEN-2009-067S	20	SPS	Seven Rivers 69kV	IA Pending
GEN-2010-003	100.8	WERE	Tap Lacygne - Wolf Creek (Anderson County) 345kV	IA Pending
GEN-2010-005	300	WERE	Tap Wichita - Woodring (Sumner County) 345kV	On Schedule for 2012
GEN-2010-006	205	SPS	Jones 230kV	On-Line
GEN-2010-007	73.8	SPS	Tap Pringle - Riverview 115kV	IA Pending
GEN-2010-009	165.6	SUNCMKEC	Tap Holcomb - Spearville (Gray County) 345kV	On Schedule for 2012
GEN-2010-011	30	OKGE	Tatonga 345kV	On Line
GEN-2010-014	360	SPS	Hitchland 345kV	IA Pending
GEN-2010-015	200.1	SUNCMKEC	Spearville 345kV	On Schedule for 2015
Gray County Wind (Montezuma)	110	SUNCMKEC	Haggard 115kV	On-Line
Llano Estacado (White Deer)	80	SPS	Llano Wind 115kV	On-Line
NPPD Distributed (Broken Bow)	8.3	NPPD	Broken Bow 115kV	On-Line
NPPD Distributed (Burwell)	3	NPPD	Ord 115kV	On-Line
NPPD Distributed (Columbus Hydro)	45	NPPD	Columbus 115kV	On-Line
NPPD Distributed (Jeffrey)	18.0	NPPD	Jeffrey 115kV	On-Line



Request	Amount	Area	Requested/Proposed Point of Interconnection	Status or In-Service Date
NPPD Distributed (John Lake 1)	19.0	NPPD	John Lake 1 115kV	On-Line
NPPD Distributed (John Lake 2)	19.0	NPPD	John Lake 2 115kV	On-Line
NPPD Distributed (Ord)	10.8	NPPD	Ord 115kV	On-Line
NPPD Distributed (Stuart)	2.1	NPPD	Ainsworth 115kV	On-Line
SPS Distributed (Dumas 19th St)	20	SPS	Dumas 19th Street 115kV	On-Line
SPS Distributed (Etter)	20	SPS	Etter 115kV	On-Line
SPS Distributed (Moore E)	25	SPS	Moore East 115kV	On-Line
SPS Distributed (Sherman)	20	SPS	Sherman 115kV	On-Line
SPS Distributed (Spearman)	10	SPS	Spearman 69kV	On-Line
SPS Distributed (TC-Texas County)	20	SPS	Texas County 115kV	On-Line
<b>TOTAL 21,448.6</b>				

## **C: Study Groupings**

See next page

## C. Study Groups

<b>GROUP 1: WOODWARD AREA</b>			
<b>Request</b>	<b>Capacity</b>	<b>Area</b>	<b>Proposed Point of Interconnection</b>
GEN-2001-014	96.0	WFEC	Ft Supply 138kV
GEN-2001-037	100.0	OKGE	FPL Moreland Tap 138kV
GEN-2005-005	18.0	OKGE	FPL Moreland Tap 138kV
GEN-2005-008	120.0	OKGE	Woodward 138kV
GEN-2006-024S	19.8	WFEC	Buffalo Bear Tap 69kV
GEN-2006-046	131.0	OKGE	Dewey 138kV
GEN-2007-006	160.0	OKGE	Roman Nose 138kV
GEN-2007-021	201.0	OKGE	Tatonga 345kV
GEN-2007-043	200.0	OKGE	Minco 345kV
GEN-2007-044	300.0	OKGE	Tatonga 345kV
GEN-2007-050	170.0	OKGE	Woodward EHV 138kV
GEN-2007-051	200.0	WFEC	Mooreland 138kV
GEN-2007-062	765.0	OKGE	Woodward EHV 345kV
GEN-2008-003	101.0	OKGE	Woodward EHV 138kV
GEN-2008-019	300.0	OKGE	Tatonga 345kV
GEN-2008-029	250.0	OKGE	Woodward EHV 138kV
GEN-2008-044	197.8	OKGE	Tatonga 345kV
GEN-2010-011	30.0	OKGE	Tatonga 345kV
<b>PRIOR QUEUED SUBTOTAL</b>	<b>3,359.6</b>		
GEN-2010-040	300.0	OKGE	Cimarron 345kV
<b>CURRENT CLUSTER SUBTOTAL</b>	<b>300.0</b>		
<b>AREA TOTAL</b>	<b>3,659.6</b>		

<b>GROUP 2: HITCHLAND AREA</b>			
Request	Capacity	Area	Proposed Point of Interconnection
ASGI-2010-011	48.0	SPS	TC-Texas County 69kV
GEN-2002-008	240.0	SPS	Hitchland 345kV
GEN-2002-009	80.0	SPS	Hansford 115kV
GEN-2003-020	160.0	SPS	Martin 115kV
GEN-2006-020S	18.9	SPS	DWS Frisco 115kV
GEN-2006-044	370.0	SPS	Hitchland 345kV
GEN-2006-049	400.0	SPS	Tap Finney - Hitchland (Stevens County) 345kV
GEN-2007-046	199.5	SPS	Hitchland 115kV
GEN-2007-057	34.5	SPS	Moore County East 115kV
GEN-2008-047	300.0	SPS	Tap Hitchland - Woodward Ckt 1 (Beaver County) 345kV
GEN-2010-007	73.8	SPS	Tap Pringle - Riverview 115kV
GEN-2010-014	360.0	SPS	Hitchland 345kV
SPS Distributed (Dumas 19th St)	20.0	SPS	Dumas 19th Street 115kV
SPS Distributed (Etter)	20.0	SPS	Etter 115kV
SPS Distributed (Moore E)	25.0	SPS	Moore East 115kV
SPS Distributed (Sherman)	20.0	SPS	Sherman 115kV
SPS Distributed (Spearman)	10.0	SPS	Spearman 69kV
SPS Distributed (TC-Texas County)	20.0	SPS	Texas County 115kV
<b>PRIOR QUEUED SUBTOTAL</b>	<b>2,399.7</b>		
GEN-2010-001	300.0	SPS	Tap Hitchland - Woodward Ckt 1 (Beaver County) 345kV
<b>CURRENT CLUSTER SUBTOTAL</b>	<b>300.0</b>		
<b>AREA TOTAL</b>	<b>2,699.7</b>		

<b>GROUP 3: SPEARVILLE AREA</b>			
Request	Capacity	Area	Proposed Point of Interconnection
GEN-2001-039A	105.0	SUNCMKEC	Tap Greensburg - Ft Dodge 115kV
GEN-2002-025A	150.0	SUNCMKEC	Spearville 230kV
GEN-2004-014	154.5	SUNCMKEC	Spearville 230kV
GEN-2005-012	250.0	SUNCMKEC	Spearville 345kV
GEN-2006-006	205.5	SUNCMKEC	Spearville 345kV
GEN-2006-021	101.0	SUNCMKEC	Flat Ridge Tap 138kV
GEN-2006-022	150.0	SUNCMKEC	Pratt 115kV
GEN-2007-038	200.0	SUNCMKEC	Spearville 345kV
GEN-2007-040	200.0	SUNCMKEC	Tap Holcomb - Spearville (Gray County) 345kV
GEN-2008-018	405.0	SPS	Finney 345kV
GEN-2008-079	100.5	SUNCMKEC	Tap Cudahy - Ft Dodge 115kV
GEN-2008-124	200.0	SUNCMKEC	Spearville 345kV
GEN-2010-009	165.6	SUNCMKEC	Tap Holcomb - Spearville (Gray County) 345kV
GEN-2010-015	200.1	SUNCMKEC	Spearville 345kV
Gray County Wind (Montezuma)	110.0	SUNCMKEC	Haggard 115kV
<b>PRIOR QUEUED SUBTOTAL</b>	<b>2,697.2</b>		
GEN-2010-045	197.8	SUNCMKEC	Tap Holcomb - Spearville (Gray County) 345kV
GEN-2010-053	199.8	SUNCMKEC	Clark County 345kV
<b>CURRENT CLUSTER SUBTOTAL</b>	<b>397.6</b>		
<b>AREA TOTAL</b>	<b>3,094.8</b>		

**GROUP 4: MINGO/NW KANSAS AREA**

Request	Capacity	Area	Proposed Point of Interconnection
GEN-2001-039M	100.0	SUNCMKEC	Central Plains Tap 115kV
GEN-2006-034	81.0	SUNCMKEC	Kanarado 115kV
GEN-2006-040	108.0	SUNCMKEC	Mingo 115kV
GEN-2007-011	135.0	SUNCMKEC	Syracuse 115kV
GEN-2007-013	99.0	SUNCMKEC	Selkirk 115kV
GEN-2008-017	300.0	SUNCMKEC	Setab 345kV
GEN-2008-025	101.0	SUNCMKEC	Ruleton 115kV
<b>PRIOR QUEUED SUBTOTAL</b>	<b>924.0</b>		
<b>AREA TOTAL</b>	<b>924.0</b>		

**GROUP 5: AMARILLO AREA**

Request	Capacity	Area	Proposed Point of Interconnection
GEN-2002-022	240.0	SPS	Bushland 230kV
GEN-2006-039	400.0	SPS	Tap and Tie both Potter - Plant X 230kV and Bushland - Deaf Smith (South Randle County) 230kV
GEN-2006-045	240.0	SPS	Tap and Tie both Potter - Plant X 230kV and Bushland - Deaf Smith (South Randle County) 230kV
GEN-2006-047	240.0	SPS	Tap and Tie both Potter - Plant X 230kV and Bushland - Deaf Smith (South Randle County) 230kV
GEN-2007-048	400.0	SPS	Tap Amarillo S - Swisher 230kV
GEN-2008-051	322.0	SPS	Potter County 345kV
GEN-2008-088	50.6	SPS	Vega 69kV
Llano Estacado (White Deer)	80.0	SPS	Llano Wind 115kV
<b>PRIOR QUEUED SUBTOTAL</b>	<b>1,972.6</b>		
<b>AREA TOTAL</b>	<b>1,972.6</b>		

**GROUP 6: S-TX PANHANDLE/NW AREA**

Request	Capacity	Area	Proposed Point of Interconnection
ASGI-2010-010	42.0	SPS	Lovington 115kV
GEN-2001-033	180.0	SPS	San Juan Tap 230kV
GEN-2001-036	80.0	SPS	Norton 115kV
GEN-2006-018	170.0	SPS	Antelope 230kV
GEN-2006-026	502.0	SPS	Hobbs 230kV
GEN-2008-008	60.0	SPS	Graham 69kV
GEN-2008-009	60.0	SPS	San Juan Tap 230kV
GEN-2008-014	150.0	SPS	Tap Tuco- Oklaunion 345kV
GEN-2008-016	248.0	SPS	Grassland 230kV
GEN-2008-022	300.0	SPS	Tap Eddy Co - Tolk (Chaves County) 345kV
GEN-2009-067S	20.0	SPS	Seven Rivers 69kV
GEN-2010-006	205.0	SPS	Jones 230kV
<b>PRIOR QUEUED SUBTOTAL</b>	<b>2,017.0</b>		
ASGI-2010-020	30.0	SPS	Tap LE-Tatum - LE-Crossroads 69kV
ASGI-2010-021	15.0	SPS	Tap LE-Saunders Tap - LE-Anderson 69kV
ASGI-2011-001	28.8	SPS	LE-Lovington 115kV
GEN-2010-046	56.0	SPS	Tuco 230kV
<b>CURRENT CLUSTER SUBTOTAL</b>	<b>129.8</b>		
<b>AREA TOTAL</b>	<b>2,146.8</b>		

**GROUP 7: SW OKLAHOMA AREA**

Request	Capacity	Area	Proposed Point of Interconnection
GEN-2001-026	74.0	WFEC	Washita 138kV
GEN-2002-005	120.0	WFEC	Red Hills Tap 138kV
GEN-2003-004 GEN-2004-023 GEN-2005-003	151.2	WFEC	Washita 138kV
GEN-2003-005	100.0	WFEC	Anadarko - Paradise (Blue Canyon) 138kV
GEN-2003-022	120.0	AEPW	Washita 34.5kV
GEN-2004-020	27.0	AEPW	Washita 34.5kV
GEN-2006-002	101.0	AEPW	Sweetwater 230kV
GEN-2006-035	225.0	AEPW	Sweetwater 230kV
GEN-2006-043	99.0	AEPW	Sweetwater 230kV
GEN-2007-032	150.0	WFEC	Tap Clinton Junction - Clinton 138kV
GEN-2007-052	150.0	WFEC	Anadarko 138kV
GEN-2008-023	150.0	AEPW	Hobart Junction 138kV
GEN-2008-037	101.0	WFEC	Tap Washita - Blue Canyon Wind 138kV
GEN-2009-016	100.8	AEPW	Falcon Road 138kV
<b>PRIOR QUEUED SUBTOTAL</b>	<b>1,669.0</b>		
GEN-2010-012	65.0	WFEC	Brantley 138kV
<b>CURRENT CLUSTER SUBTOTAL</b>	<b>65.0</b>		
<b>AREA TOTAL</b>	<b>1,734.0</b>		

**GROUP 8: N-OK/S-KS AREA**

Request	Capacity	Area	Proposed Point of Interconnection
ASGI-2010-006	150.0	AECI	Tap Fairfax Tap - Fairfax (AECI) 138kV
GEN-2002-004	200.0	WERE	Latham 345kV
GEN-2005-013	201.0	WERE	Tap Latham - Neosho (Caney River) 345kV
GEN-2007-025	300.0	WERE	Tap Wichita - Woodring (Sumner County) 345kV
GEN-2008-013	300.0	OKGE	Tap Wichita - Woodring (South of GEN-2007-025) 345kV
GEN-2008-021	42.0	WERE	Wolf Creek 345kV
GEN-2008-071	76.8	OKGE	Newkirk 138kV
GEN-2008-098	100.8	WERE	Tap Lacygne - Wolf Creek (Anderson County) 345kV
GEN-2008-127	200.0	WERE	Tap Rosehill - Sooner 345kV
GEN-2009-025	60.0	OKGE	Tap Deer Creek - Sinclair Blackwell 69kV
GEN-2010-003	100.8	WERE	Tap Lacygne - Wolf Creek (Anderson County) 345kV
GEN-2010-005	300.0	WERE	Tap Wichita - Woodring (Sumner County) 345kV
<b>PRIOR QUEUED SUBTOTAL</b>	<b>2,031.4</b>		
<b>AREA TOTAL</b>	<b>2,031.4</b>		

<b>GROUP 9/10: NEBRASKA AREA</b>			
<b>Request</b>	<b>Capacity</b>	<b>Area</b>	<b>Proposed Point of Interconnection</b>
GEN-2002-023N	0.8	NPPD	Harmony 115kV
GEN-2003-021N	75.0	NPPD	Ainsworth Wind Tap 115kV
GEN-2004-005N	30.0	NPPD	St Francis 115kV
GEN-2004-023N	75.0	NPPD	Columbus County 115kV
GEN-2006-020N	42.0	NPPD	Bloomfield 115kV
GEN-2006-037N1	75.0	NPPD	Broken Bow 115kV
GEN-2006-038N005	80.0	NPPD	Broken Bow 115kV
GEN-2006-038N019	80.0	NPPD	Petersburg 115kV
GEN-2006-044N	40.5	NPPD	Petersburg 115kV
GEN-2006-044N02	100.5	NPPD	Tap Ft Randle - Columbus (Madison County) 230kV
GEN-2007-011N08	81.0	NPPD	Bloomfield 115kV
GEN-2007-015	135.0	WERE	Tap Kelly(WERE) - S1399(OPPD) 161kV
GEN-2008-086N02	200.0	NPPD	Tap Ft Randle - Columbus (Madison County) 230kV
GEN-2008-119O	60.0	OPPD	S1399 161kV
GEN-2008-123N	89.7	NPPD	Tap Guide Rock - Pauline 115kV
GEN-2009-040	73.8	WERE	Tap Smittyville - Knob Hill 115kV
NPPD Distributed (Broken Bow)	8.3	NPPD	Broken Bow 115kV
NPPD Distributed (Burwell)	3.0	NPPD	Ord 115kV
NPPD Distributed (Columbus Hydro)	45.0	NPPD	Columbus 115kV
NPPD Distributed (Ord)	10.8	NPPD	Ord 115kV
NPPD Distributed (Stuart)	2.1	NPPD	Ainsworth 115kV
<b>PRIOR QUEUED SUBTOTAL</b>	<b>1,307.5</b>		
GEN-2010-041	10.5	OPPD	S 1399 161kV
GEN-2010-051	200.0	NPPD	Tap Twin Church - Hoskins 230kV
<b>CURRENT CLUSTER SUBTOTAL</b>	<b>210.5</b>		
<b>AREA TOTAL</b>	<b>1,518.0</b>		

<b>GROUP 11: N KANSAS AREA</b>			
Request	Capacity	Area	Proposed Point of Interconnection
GEN-2003-006A	200.0	SUNCMKEC	Elm Creek 230kV
GEN-2003-019	250.0	MIDW	Smoky Hills Tap 230kV
GEN-2006-031	75.0	MIDW	Knoll 115kV
GEN-2006-032	200.0	MIDW	South Hays 230kV
GEN-2008-092	201.0	MIDW	Postrock 230kV
GEN-2009-008	199.5	MIDW	South Hays 230kV
GEN-2009-011	50.0	SUNCMKEC	Tap Plainsville - Phillipsburg 115kV
GEN-2009-020	48.6	MIDW	Tap Nekoma - Bazine 69kV
<b>PRIOR QUEUED SUBTOTAL</b>	<b>1,224.1</b>		
GEN-2010-048	70.0	MIDW	Tap Beach Station - Redline 115kV
<b>CURRENT CLUSTER SUBTOTAL</b>	<b>70.0</b>		
<b>AREA TOTAL</b>	<b>1,294.1</b>		

<b>GROUP 12: NW AR AREA</b>			
Request	Capacity	Area	Proposed Point of Interconnection
<b>AREA TOTAL</b>	<b>0.0</b>		

<b>GROUP 13: NW MISSOURI AREA</b>			
Request	Capacity	Area	Proposed Point of Interconnection
ASGI-2010-001	400.0	AECI	Tap Cooper - Fairport (AECI) 345kV
ASGI-2010-005	99.0	AECI	Lathrop (AECI) 161kV
ASGI-2010-009	201.0	AECI	Osborn (AECI) 161kV
GEN-2006-014	300.0	MIPU	Tap Maryville - Midway 161kV
GEN-2006-017	300.0	MIPU	Tap Maryville - Midway 161kV (GEN-2006-014 TAP)
GEN-2007-017	100.5	MIPU	Tap Maryville - Midway (GEN-2006-014 TAP) 161kV
GEN-2007-053	110.0	MIPU	Tap Maryville - Midway (GEN-2006-014 TAP) 161kV
GEN-2008-129	80.0	MIPU	Pleasant Hill 161kV
<b>PRIOR QUEUED SUBTOTAL</b>	<b>1,590.5</b>		
GEN-2010-036	4.6	WERE	6th Street 115kV
<b>CURRENT CLUSTER SUBTOTAL</b>	<b>4.6</b>		
<b>AREA TOTAL</b>	<b>1,590.5</b>		



**GROUP 14: S OKLAHOMA AREA**

Request	Capacity	Area	Proposed Point of Interconnection
GEN-2008-046	200.0	OKGE	Sunnyside 345kV
<b>PRIOR QUEUED SUBTOTAL</b>	<b>200.0</b>		
<b>AREA TOTAL</b>	<b>200.0</b>		

**GROUP 15: RESERVED**

Request	Capacity	Area	Proposed Point of Interconnection
<b>AREA TOTAL</b>	<b>0.0</b>		

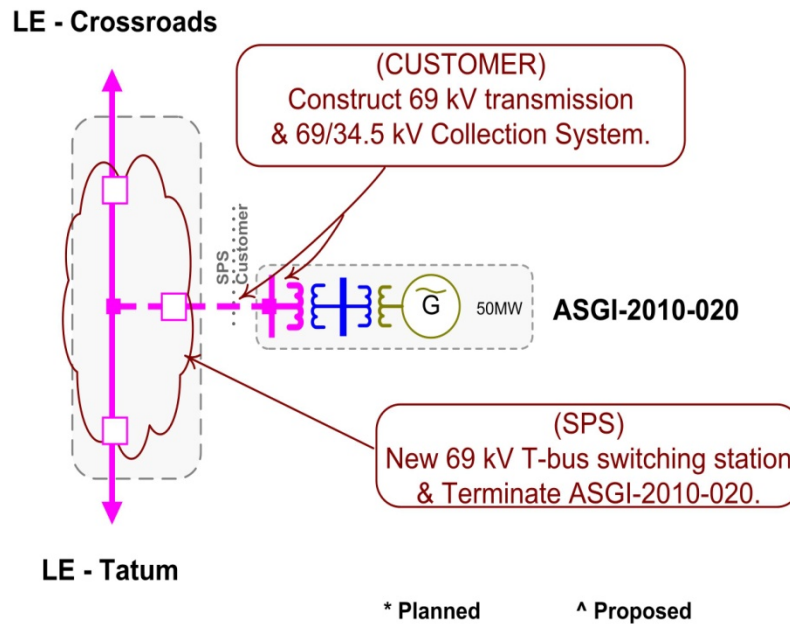
<b>CLUSTER TOTAL (CURRENT STUDY)</b>	<b>1,477.5</b>	<b>MW</b>
<b>PQ TOTAL (PRIOR QUEUED)</b>	<b>21,392.6</b>	<b>MW</b>
<b>CLUSTER TOTAL (INCLUDING PRIOR QUEUED)</b>	<b>22,870.1</b>	<b>MW</b>

### D: Proposed Point of Interconnection One line Diagrams

\*\*Refer to most recent Facility study for each request for an updated one-line.\*\*

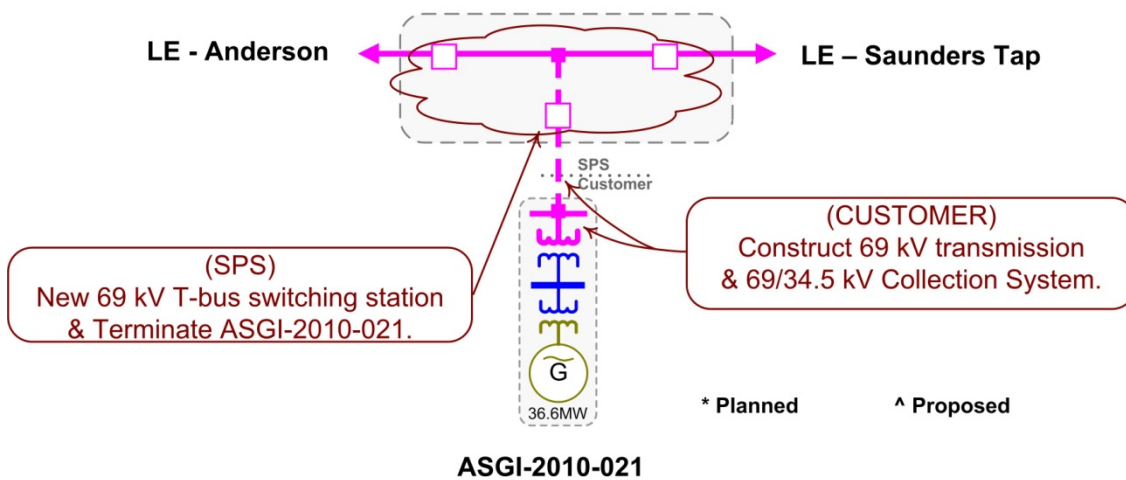
**ASGI-2010-020**

**New (SPS)  
69 kV SWITCHING STATION**

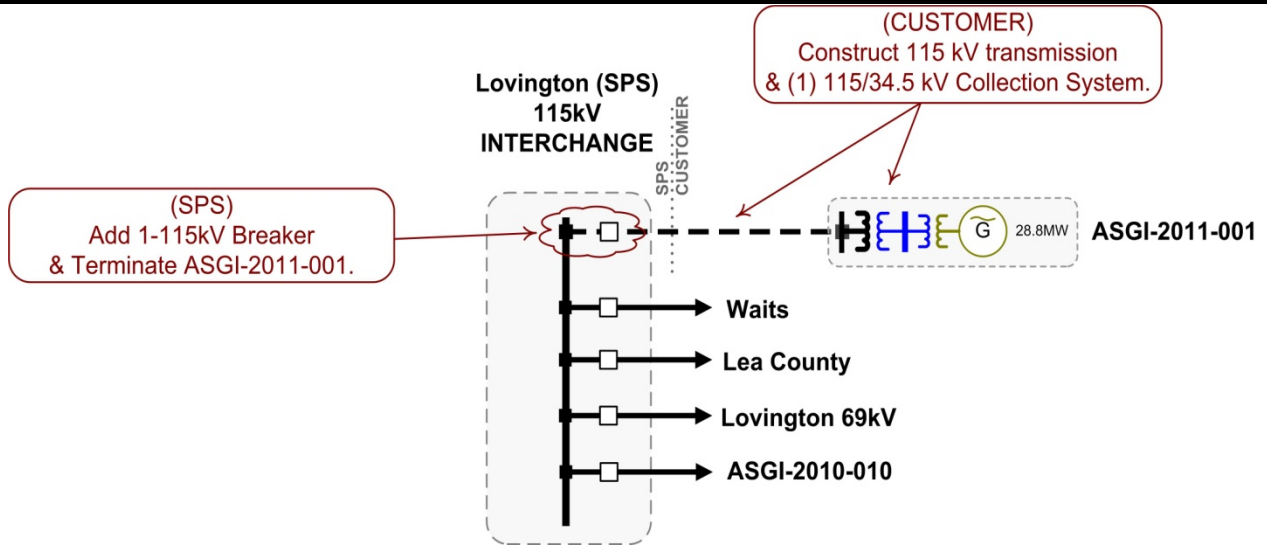


**ASGI-2010-021**

**New (SPS)  
69 kV SWITCHING STATION**



**ASGI-2011-001**



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

Important Note:

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

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

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

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

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

# Appendix E. Cost Allocation Per Request

(Including Previously Allocated Network Upgrades\*)

Interconnection Request and Upgrades	Upgrade Type	Allocated Cost	Upgrade Cost
<b>ASGI-2010-020</b>			
ASGI 2010 - Tatum 69kV LCEC Costs	Current Study	\$0.00	\$0.00
ASGI 2010-020 Interconnection Costs See Online Diagram.	Current Study	\$0.00	\$0.00
McDonald - Reed 69kV LCEC Costs	Current Study	\$0.00	\$0.00
Reed - Lovington 69kV LCEC Costs	Current Study	\$0.00	\$0.00
Tatum -McDonald 69kV LCEC Costs	Current Study	\$0.00	\$0.00
Beaver - Woodward 345kV Dbl CKT Priority Project: Hitchland - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$226,790,727.00
Border - Tuco Interchange 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV CKT 1 (Total Project E&C Cost Shown)	Previously Allocated		\$143,377,063.00
Border - Woodward 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV CKT 1 (Total Project E&C Cost Shown)	Previously Allocated		\$143,377,063.00
Hitchland - Beaver 345kV Dbl CKT Priority Project: Hitchland - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$226,790,727.00
Hitchland 345/230kV Autotransformer CKT 2 Priority Project: Hitchland 345/230kV Autotransformer CKT 2 (Total Project E&C Cost Shown).	Previously Allocated		\$8,883,760.00
Thistle - Wichita 345KV Dbl CKT Priority Project: Thistle - Wichita Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		\$168,750,000.00
Thistle - Woodward 345KV Dbl CKT Priority Project: Thistle - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$212,090,000.00
Thistle 345/138KV Transformer CKT 1 Priority Project: Thistle 345/138kV Transformer CKT 1 & Thistle - Flat Ridge 138kV CKT 1 (Total Project E&C Cost Shown.)	Previously Allocated		\$9,106,306.00
Woodward XFMR 345/138/13.8kV CKT 2 Balanced Portfolio: Woodward 345/138kV Transformer CKT 2 & 50 MVAR Reactor (Total Project E&C Cost Shown).	Previously Allocated		\$15,000,000.00
	<b>Current Study Total</b>	<b>\$0.00</b>	

\* 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****ASGI-2010-021**

ASGI 2010-021 Interconnection Costs See Oneline Diagram.	Current Study	\$0.00	\$0.00
Beaver - Woodward 345kV Dbl CKT Priority Project: Hitchland - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$226,790,727.00
Border - Tuco Interchange 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV CKT 1 (Total Project E&C Cost Shown)	Previously Allocated		\$143,377,063.00
Border - Woodward 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV CKT 1 (Total Project E&C Cost Shown)	Previously Allocated		\$143,377,063.00
Hitchland - Beaver 345kV Dbl CKT Priority Project: Hitchland - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$226,790,727.00
Hitchland 345/230kV Autotransformer CKT 2 Priority Project: Hitchland 345/230kV Autotransformer CKT 2 (Total Project E&C Cost Shown).	Previously Allocated		\$8,883,760.00
Thistle - Wichita 345KV Dbl CKT Priority Project: Thistle - Wichita Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		\$168,750,000.00
Thistle - Woodward 345KV Dbl CKT Priority Project: Thistle - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$212,090,000.00
Thistle 345/138KV Transformer CKT 1 Priority Project: Thistle 345/138kV Transformer CKT 1 & Thistle - Flat Ridge 138kV CKT 1 (Total Project E&C Cost Shown.)	Previously Allocated		\$9,106,306.00
Woodward XFMR 345/138/13.8kV CKT 2 Balanced Portfolio: Woodward 345/138kV Transformer CKT 2 & 50 MVAR Reactor (Total Project E&C Cost Shown).	Previously Allocated		\$15,000,000.00
	<b>Current Study Total</b>	\$0.00	

**ASGI-2011-001**

ASGI 2011-001 Interconnection Costs See Oneline Diagram.	Current Study	\$0.00	\$0.00
Beaver - Woodward 345kV Dbl CKT Priority Project: Hitchland - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$226,790,727.00
Border - Tuco Interchange 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV CKT 1 (Total Project E&C Cost Shown)	Previously Allocated		\$143,377,063.00
Border - Woodward 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV CKT 1 (Total Project E&C Cost Shown)	Previously Allocated		\$143,377,063.00
Hitchland - Beaver 345kV Dbl CKT Priority Project: Hitchland - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$226,790,727.00

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

Interconnection Request and Upgrades	Upgrade Type	Allocated Cost	Upgrade Cost
Hitchland 345/230kV Autotransformer CKT 2 Priority Project: Hitchland 345/230kV Autotransformer CKT 2 (Total Project E&C Cost Shown).	Previously Allocated		\$8,883,760.00
Thistle - Wichita 345KV Dbl CKT Priority Project: Thistle - Wichita Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		\$168,750,000.00
Thistle - Woodward 345KV Dbl CKT Priority Project: Thistle - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$212,090,000.00
Thistle 345/138KV Transformer CKT 1 Priority Project: Thistle 345/138kV Transformer CKT 1 & Thistle - Flat Ridge 138kV CKT 1 (Total Project E&C Cost Shown.)	Previously Allocated		\$9,106,306.00
Woodward XFMR 345/138/13.8kV CKT 2 Balanced Portfolio: Woodward 345/138kV Transformer CKT 2 & 50 MVAR Reactor (Total Project E&C Cost Shown).	Previously Allocated		\$15,000,000.00
	<b>Current Study Total</b>	\$0.00	

### GEN-2010-001

Beaver County 345kV Expansion Beaver County Expansion: Tap & Tie in Hitchland - Woodward 345kV CKT 2	Current Study	\$3,188,455.10	\$3,500,000.00
GEN 2010-001 Interconnection Costs See Online Diagram.	Current Study	\$3,566,677.00	\$3,566,677.00
Beaver - Woodward 345kV Dbl CKT Priority Project: Hitchland - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$226,790,727.00
Border - Tuco Interchange 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV CKT 1 (Total Project E&C Cost Shown)	Previously Allocated		\$143,377,063.00
Border - Woodward 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV CKT 1 (Total Project E&C Cost Shown)	Previously Allocated		\$143,377,063.00
Finney Switching Station - Holcomb 345KV CKT 2 Per GEN-2006-049 Facility Study	Previously Allocated		\$10,507,445.00
Thistle - Wichita 345KV Dbl CKT Priority Project: Thistle - Wichita Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		\$168,750,000.00
Thistle - Woodward 345KV Dbl CKT Priority Project: Thistle - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$212,090,000.00
Thistle 345/138KV Transformer CKT 1 Priority Project: Thistle 345/138kV Transformer CKT 1 & Thistle - Flat Ridge 138kV CKT 1 (Total Project E&C Cost Shown.)	Previously Allocated		\$9,106,306.00
Woodward XFMR 345/138/13.8kV CKT 2 Balanced Portfolio: Woodward 345/138kV Transformer CKT 2 & 50 MVAR Reactor (Total Project E&C Cost Shown).	Previously Allocated		\$15,000,000.00

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

<b>Interconnection Request and Upgrades</b>	<b>Upgrade Type</b>	<b>Allocated Cost</b>	<b>Upgrade Cost</b>
		<b>Current Study Total</b>	\$6,755,132.10
<b>GEN-2010-012</b>			
GEN 2010-012 Interconnection Costs See Online Diagram.	Current Study	\$3,500,000.00	\$3,500,000.00
Washita - Gracemont 138kV CKT 2 Build approximately 11 miles of 138kV.	Previously Allocated		\$5,621,986.00
		<b>Current Study Total</b>	\$3,500,000.00
<b>GEN-2010-036</b>			
GEN 2010-036 Interconnection Costs See Online Diagram.	Current Study	\$204,600.00	\$204,600.00
Iatan - Nashua 345KV CKT 1 Balanced Portfolio: Iatan - Nashua 345kV CKT 1 (Total Project E&C Cost Shown).	Previously Allocated		\$49,824,000.00
		<b>Current Study Total</b>	\$204,600.00
<b>GEN-2010-040</b>			
GEN 2010-040 Interconnection Costs See Online Diagram.	Current Study	\$8,046,756.00	\$8,046,756.00
Border - Tuco Interchange 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV CKT 1 (Total Project E&C Cost Shown)	Previously Allocated		\$143,377,063.00
Border - Woodward 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV CKT 1 (Total Project E&C Cost Shown)	Previously Allocated		\$143,377,063.00
Thistle - Woodward 345KV Dbl CKT Priority Project: Thistle - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$212,090,000.00
TUCO Interchange 345/230/13.2KV Autotransformer CKT 2 Balanced Portfolio: TUCO 345/230 kV Transformer CKT 2 (Total Project E&C Cost Shown)	Previously Allocated		\$14,900,907.00
Woodward XFMR 345/138/13.8kV CKT 2 Balanced Portfolio: Woodward 345/138kV Transformer CKT 2 & 50 MVAR Reactor (Total Project E&C Cost Shown).	Previously Allocated		\$15,000,000.00
		<b>Current Study Total</b>	\$8,046,756.00
<b>GEN-2010-041</b>			
GEN 2010-041 Interconnection Costs See Online Diagram.	Current Study	\$0.00	\$0.00
		<b>Current Study Total</b>	\$0.00
<b>GEN-2010-045</b>			

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



<b>Interconnection Request and Upgrades</b>	<b>Upgrade Type</b>	<b>Allocated Cost</b>	<b>Upgrade Cost</b>
Beaver County 345kV Expansion Beaver County Expansion: Tap & Tie in Hitchland - Woodward 345kV CKT 2	Current Study	\$311,544.90	\$3,500,000.00
GEN 2010-045 Interconnection Costs See Online Diagram.	Current Study	\$5,000,000.00	\$5,000,000.00
Mullergren - Spearville 230kV CKT 1 NRIS only upgrade: Rebuild approximately 62 miles of 230kV line	Current Study	\$30,065,011.04	\$61,500,000.00
Axtell - PostRock 345KV CKT 1 Balanced Portfolio: PostRock - Axtell 345kV CKT 1 (Total Project E&C Cost Shown)	Previously Allocated		\$93,302,649.00
Border - Tuco Interchange 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV CKT 1 (Total Project E&C Cost Shown)	Previously Allocated		\$143,377,063.00
Border - Woodward 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV CKT 1 (Total Project E&C Cost Shown)	Previously Allocated		\$143,377,063.00
Clark - Thistle 345KV Dbl CKT Priority Project: Spearville - Clark - Thistle Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		\$291,088,131.00
Hitchland 345/230kV Autotransformer CKT 2 Priority Project: Hitchland 345/230kV Autotransformer CKT 2 (Total Project E&C Cost Shown).	Previously Allocated		\$8,883,760.00
Post Rock 345/230/13.8KV Autotransformer CKT 1 Balanced Portfolio: PostRock Autotransformer 345/230/13.8kV CKT 1 (Total Project E&C Cost Shown)	Previously Allocated		\$3,994,000.00
Post Rock 345/230/13.8kV Autotransformer CKT 2 DISIS-2010-001 Restudy	Previously Allocated		\$13,749,527.00
Spearville - Postrock 345kV CKT 1 Balanced Portfolio: Spearville - PostRock 345kV CKT 1 (Total Project E&C Cost Shown)	Previously Allocated		\$77,703,351.00
Spearville -Clark 345KV Dbl CKT Priority Project: Spearville - Clark - Thistle Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		\$291,088,131.00
Thistle - Wichita 345KV Dbl CKT Priority Project: Thistle - Wichita Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		\$168,750,000.00
Thistle - Woodward 345KV Dbl CKT Priority Project: Thistle - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$212,090,000.00
TUCO Interchange 345/230/13.2KV Autotransformer CKT 2 Balanced Portfolio: TUCO 345/230 kV Transformer CKT 2 (Total Project E&C Cost Shown)	Previously Allocated		\$14,900,907.00
Woodward XFMR 345/138/13.8kV CKT 2 Balanced Portfolio: Woodward 345/138kV Transformer CKT 2 & 50 MVAR Reactor (Total Project E&C Cost Shown).	Previously Allocated		\$15,000,000.00
	<b>Current Study Total</b>	<b>\$35,376,555.94</b>	

\* 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-2010-046**

GEN 2010-046 Interconnection Costs See Online Diagram.	Current Study	\$0.00	\$0.00
Beaver - Woodward 345kV Dbl CKT Priority Project: Hitchland - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$226,790,727.00
Thistle - Wichita 345KV Dbl CKT Priority Project: Thistle - Wichita Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		\$168,750,000.00
Thistle - Woodward 345KV Dbl CKT Priority Project: Thistle - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$212,090,000.00
Thistle 345/138KV Transformer CKT 1 Priority Project: Thistle 345/138kV Transformer CKT 1 & Thistle - Flat Ridge 138kV CKT 1 (Total Project E&C Cost Shown.)	Previously Allocated		\$9,106,306.00
Woodward XFMR 345/138/13.8kV CKT 2 Balanced Portfolio: Woodward 345/138kV Transformer CKT 2 & 50 MVAR Reactor (Total Project E&C Cost Shown).	Previously Allocated		\$15,000,000.00
	<b>Current Study Total</b>	\$0.00	

**GEN-2010-048**

GEN 2010-048 Interconnection Costs See Online Diagram.	Current Study	\$2,144,524.00	\$2,144,524.00
Axtell - PostRock 345KV CKT 1 Balanced Portfolio: PostRock - Axtell 345kV CKT 1 (Total Project E&C Cost Shown)	Previously Allocated		\$93,302,649.00
Beaver - Woodward 345kV Dbl CKT Priority Project: Hitchland - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$226,790,727.00
Clark - Thistle 345KV Dbl CKT Priority Project: Spearville - Clark - Thistle Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		\$291,088,131.00
Hitchland - Beaver 345kV Dbl CKT Priority Project: Hitchland - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$226,790,727.00
Hitchland 345/230kV Autotransformer CKT 2 Priority Project: Hitchland 345/230kV Autotransformer CKT 2 (Total Project E&C Cost Shown).	Previously Allocated		\$8,883,760.00
Spearville - Postrock 345kV CKT 1 Balanced Portfolio: Spearville - PostRock 345kV CKT 1 (Total Project E&C Cost Shown)	Previously Allocated		\$77,703,351.00
Spearville -Clark 345KV Dbl CKT Priority Project: Spearville - Clark - Thistle Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		\$291,088,131.00
Thistle - Wichita 345KV Dbl CKT Priority Project: Thistle - Wichita Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		\$168,750,000.00

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

<b>Interconnection Request and Upgrades</b>	<b>Upgrade Type</b>	<b>Allocated Cost</b>	<b>Upgrade Cost</b>
	<b>Current Study Total</b>	<b>\$2,144,524.00</b>	
<b>GEN-2010-051</b>			
GEN 2010-051 Interconnection Costs See Online Diagram.	Current Study	\$6,500,000.00	\$6,500,000.00
Twin Church - Dixon County 230kV Increase conductor clearances to accommodate 320MVA facility rating	Current Study	\$100,000.00	\$100,000.00
Albion - Petersbug 115kV CKT 1	Previously Allocated		\$900,000.00
	<b>Current Study Total</b>	<b>\$6,600,000.00</b>	
<b>GEN-2010-053</b>			
GEN 2010-053 Interconnection Costs See Online Diagram.	Current Study	\$6,700,000.00	\$6,700,000.00
Mullergren - Spearville 230kV CKT 1 NRIS only upgrade: Rebuild approximately 62 miles of 230kV line	Current Study	\$31,434,988.96	\$61,500,000.00
Axtell - PostRock 345KV CKT 1 Balanced Portfolio: PostRock - Axtell 345kV CKT 1 (Total Project E&C Cost Shown)	Previously Allocated		\$93,302,649.00
Border - Tuco Interchange 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV CKT 1 (Total Project E&C Cost Shown)	Previously Allocated		\$143,377,063.00
Border - Woodward 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV CKT 1 (Total Project E&C Cost Shown)	Previously Allocated		\$143,377,063.00
Clark - Thistle 345KV Dbl CKT Priority Project: Spearville - Clark - Thistle Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		\$291,088,131.00
Fort Dodge - North Fort Dodge 115kV CKT 2 Construct approximately 1 mile of new 115kV for 2nd circuit	Previously Allocated		\$6,113,000.00
Hitchland 345/230kV Autotransformer CKT 2 Priority Project: Hitchland 345/230kV Autotransformer CKT 2 (Total Project E&C Cost Shown).	Previously Allocated		\$8,883,760.00
Post Rock 345/230/13.8KV Autotransformer CKT 1 Balanced Portfolio: PostRock Autotransformer 345/230/13.8kV CKT 1 (Total Project E&C Cost Shown)	Previously Allocated		\$3,994,000.00
Post Rock 345/230/13.8kV Autotransformer CKT 2 DISIS-2010-001 Restudy	Previously Allocated		\$13,749,527.00
Spearville - Postrock 345kV CKT 1 Balanced Portfolio: Spearville - PostRock 345kV CKT 1 (Total Project E&C Cost Shown)	Previously Allocated		\$77,703,351.00

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

<b>Interconnection Request and Upgrades</b>	<b>Upgrade Type</b>	<b>Allocated Cost</b>	<b>Upgrade Cost</b>
Thistle - Wichita 345KV Dbl CKT Priority Project: Thistle - Wichita Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		\$168,750,000.00
Thistle - Woodward 345KV Dbl CKT Priority Project: Thistle - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$212,090,000.00
TUCO Interchange 345/230/13.2KV Autotransformer CKT 2 Balanced Portfolio: TUCO 345/230 kV Transformer CKT 2 (Total Project E&C Cost Shown)	Previously Allocated		\$14,900,907.00
Woodward XFMR 345/138/13.8kV CKT 2 Balanced Portfolio: Woodward 345/138kV Transformer CKT 2 & 50 MVAR Reactor (Total Project E&C Cost Shown).	Previously Allocated		\$15,000,000.00
	<b>Current Study Total</b>		\$38,134,988.96
<b>TOTAL CURRENT STUDY COSTS:</b>			<b>\$100,762,557.00</b>

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

## **F: Cost Allocation per Proposed Study Network Upgrade**

Important Note:

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

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

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

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

# Appendix F. Cost Allocation by Upgrade

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## ASGI 2010-020 Interconnection Costs \$0.00

See Online Diagram.

	ASGI-2010-020	\$0.00
	<b>Total Allocated Costs</b>	<b>\$0.00</b>

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## ASGI 2010-021 Interconnection Costs \$0.00

See Online Diagram.

	ASGI-2010-021	\$0.00
	<b>Total Allocated Costs</b>	<b>\$0.00</b>

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## ASGI 2010 - Tatum 69kV \$0.00

LCEC Costs

	ASGI-2010-020	\$0.00
	<b>Total Allocated Costs</b>	<b>\$0.00</b>

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## ASGI 2011-001 Interconnection Costs \$0.00

See Online Diagram.

	ASGI-2011-001	\$0.00
	<b>Total Allocated Costs</b>	<b>\$0.00</b>

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## Beaver County 345kV Expansion \$3,500,000.00

Beaver County Expansion: Tap & Tie in Hitchland - Woodward 345kV CKT 2

	GEN-2010-001	\$3,188,455.10
	GEN-2010-045	\$311,544.90
	<b>Total Allocated Costs</b>	<b>\$3,500,000.00</b>

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## Twin Church - Dixon County 230kV \$100,000.00

Increase conductor clearances to accommodate 320MVA facility rating

	GEN-2010-051	\$100,000.00
	<b>Total Allocated Costs</b>	<b>\$100,000.00</b>

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## GEN 2010-001 Interconnection Costs \$3,566,677.00

See Online Diagram.

	GEN-2010-001	\$3,566,677.00
	<b>Total Allocated Costs</b>	<b>\$3,566,677.00</b>

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## GEN 2010-012 Interconnection Costs \$3,500,000.00

See Online Diagram.

	GEN-2010-012	\$3,500,000.00
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\* Withdrawal of higher queued projects will cause a restudy and may result in higher costs

	<b>Total Allocated Costs</b>	<b>\$3,500,000.00</b>
<b>GEN 2010-036 Interconnection Costs</b>		<b>\$204,600.00</b>
See Oonline Diagram.		
	GEN-2010-036	\$204,600.00
	<b>Total Allocated Costs</b>	<b>\$204,600.00</b>
<b>GEN 2010-040 Interconnection Costs</b>		<b>\$8,046,756.00</b>
See Oonline Diagram.		
	GEN-2010-040	\$8,046,756.00
	<b>Total Allocated Costs</b>	<b>\$8,046,756.00</b>
<b>GEN 2010-041 Interconnection Costs</b>		<b>\$0.00</b>
See Oonline Diagram.		
	GEN-2010-041	\$0.00
	<b>Total Allocated Costs</b>	<b>\$0.00</b>
<b>GEN 2010-045 Interconnection Costs</b>		<b>\$5,000,000.00</b>
See Oonline Diagram.		
	GEN-2010-045	\$5,000,000.00
	<b>Total Allocated Costs</b>	<b>\$5,000,000.00</b>
<b>GEN 2010-046 Interconnection Costs</b>		<b>\$0.00</b>
See Oonline Diagram.		
	GEN-2010-046	\$0.00
	<b>Total Allocated Costs</b>	<b>\$0.00</b>
<b>GEN 2010-048 Interconnection Costs</b>		<b>\$2,144,524.00</b>
See Oonline Diagram.		
	GEN-2010-048	\$2,144,524.00
	<b>Total Allocated Costs</b>	<b>\$2,144,524.00</b>
<b>GEN 2010-051 Interconnection Costs</b>		<b>\$6,500,000.00</b>
See Oonline Diagram.		
	GEN-2010-051	\$6,500,000.00
	<b>Total Allocated Costs</b>	<b>\$6,500,000.00</b>
<b>GEN 2010-053 Interconnection Costs</b>		<b>\$6,700,000.00</b>
See Oonline Diagram.		
	GEN-2010-053	\$6,700,000.00

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

<b>Total Allocated Costs</b>		<b>\$6,700,000.00</b>
<hr/>		
<b>McDonald - Reed 69kV</b>		<b>\$0.00</b>
LCEC Costs		
	ASGI-2010-020	\$0.00
<b>Total Allocated Costs</b>		<b>\$0.00</b>
<hr/>		
<b>Mullergren - Spearville 230kV CKT 1</b>		<b>\$61,500,000.00</b>
NRIS only upgrade: Rebuild approximately 62 miles of 230kV line		
	GEN-2010-045	\$30,065,011.04
	GEN-2010-053	\$31,434,988.96
<b>Total Allocated Costs</b>		<b>\$61,500,000.00</b>
<hr/>		
<b>Reed - Lovington 69kV</b>		<b>\$0.00</b>
LCEC Costs		
	ASGI-2010-020	\$0.00
<b>Total Allocated Costs</b>		<b>\$0.00</b>
<hr/>		
<b>Tatum -McDonald 69kV</b>		<b>\$0.00</b>
LCEC Costs		
	ASGI-2010-020	\$0.00
<b>Total Allocated Costs</b>		<b>\$0.00</b>
<hr/>		

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



**G: Power Flow Analysis (Constraints For Mitigation)**

See next page.

SOLUTION	GROUP	SCENARIO	SEASON	SOURCE	DIRECTION	MONITORED ELEMENT	RATEB (MVA)	TDF	TC%LOADING (% MVA)	CONTINGENCY
FNSL-Blown up	02ALL	0	12G	ASGI_10_020		Non-Converge Contingency	1792	0.08307	-	BEAVER CO 345.00 - WOODWARD DISTRICT EHV 345KV CKT 1
FNSL-Blown up	02ALL	0	12G	ASGI_10_020		Non-Converge Contingency	0	0.16614	-	DBL-WWRD-BVR
FDNS	00ASGI_10_020	0	12WP	ASGI_10_020	TO->FROM	LEA COUNTY REC-MCDONALD - LEA COUNTY REC-TATUM 69KV CKT 1	41	1	137.1921	BASE CASE
FDNS	00ASGI_10_020	0	17WP	ASGI_10_020	TO->FROM	LEA COUNTY REC-MCDONALD - LEA COUNTY REC-TATUM 69KV CKT 1	41	1	133.787	BASE CASE
FDNS	00ASGI_10_020	0	12WP	ASGI_10_020	FROM->TO	LEA COUNTY REC-MCDONALD - LEA COUNTY REC-REED 69KV CKT 1	41	1	132.4727	BASE CASE
FDNS	06ASGI_10_020	0	12G	ASGI_10_020	TO->FROM	LEA COUNTY REC-MCDONALD - LEA COUNTY REC-TATUM 69KV CKT 1	41	1	132.3924	BASE CASE
FDNS	06ALL	0	12G	ASGI_10_020	TO->FROM	LEA COUNTY REC-MCDONALD - LEA COUNTY REC-TATUM 69KV CKT 1	41	1	132.1827	BASE CASE
FDNS	00ASGI_10_020	0	12SP	ASGI_10_020	TO->FROM	LEA COUNTY REC-MCDONALD - LEA COUNTY REC-TATUM 69KV CKT 1	41	1	131.0956	BASE CASE
FDNS	00ASGI_10_020	0	17WP	ASGI_10_020	FROM->TO	LEA COUNTY REC-MCDONALD - LEA COUNTY REC-REED 69KV CKT 1	41	1	128.4639	BASE CASE
FDNS	00ASGI_10_020	0	17SP	ASGI_10_020	TO->FROM	LEA COUNTY REC-MCDONALD - LEA COUNTY REC-TATUM 69KV CKT 1	41	1	126.8854	BASE CASE
FDNS	06ASGI_10_020	0	12G	ASGI_10_020	FROM->TO	LEA COUNTY REC-MCDONALD - LEA COUNTY REC-REED 69KV CKT 1	41	1	125.7181	BASE CASE
FDNS	06ALL	0	12G	ASGI_10_020	FROM->TO	LEA COUNTY REC-MCDONALD - LEA COUNTY REC-REED 69KV CKT 1	41	1	125.458	BASE CASE
FDNS	00ASGI_10_020	0	12SP	ASGI_10_020	FROM->TO	LEA COUNTY REC-MCDONALD - LEA COUNTY REC-REED 69KV CKT 1	41	1	123.908	BASE CASE
FDNS	06ALL	0	12G	ASGI_10_020	FROM->TO	TUCO INTERCHANGE (GE M1022338) 345/230/13.2KV TRANSFORMER CKT 1	560	0.41693	120.6282	TUCO INTERCHANGE (UPDATE DATA) 345/230/13.2KV TRANSFORMER CKT 2
FDNS	00ASGI_10_020	0	12WP	ASGI_10_020	FROM->TO	ASGI-10-20T 69.000 - LEA COUNTY REC-TATUM 69KV CKT 1	54	1	120.1593	BASE CASE
FDNS	06ASGI_10_020	0	12G	ASGI_10_020	FROM->TO	ASGI-10-20T 69.000 - LEA COUNTY REC-TATUM 69KV CKT 1	54	1	119.9225	BASE CASE
FDNS	06ALL	0	12G	ASGI_10_020	FROM->TO	ASGI-10-20T 69.000 - LEA COUNTY REC-TATUM 69KV CKT 1	54	1	119.8532	BASE CASE
FDNS	00ASGI_10_020	0	12SP	ASGI_10_020	FROM->TO	ASGI-10-20T 69.000 - LEA COUNTY REC-TATUM 69KV CKT 1	54	1	119.589	BASE CASE
FDNS	00ASGI_10_020	0	17WP	ASGI_10_020	FROM->TO	ASGI-10-20T 69.000 - LEA COUNTY REC-TATUM 69KV CKT 1	54	1	119.487	BASE CASE
FDNS	06ALL	0	12G	ASGI_10_020	FROM->TO	TUCO INTERCHANGE (GE M1022338) 345/230/13.2KV TRANSFORMER CKT 1	560	0.41693	119.2404	TUCO INTERCHANGE (UPDATE DATA) 345/230/13.2KV TRANSFORMER CKT 2
FDNS	00ASGI_10_020	0	17SP	ASGI_10_020	FROM->TO	ASGI-10-20T 69.000 - LEA COUNTY REC-TATUM 69KV CKT 1	54	1	118.9464	BASE CASE
FDNS	00ASGI_10_020	0	17SP	ASGI_10_020	FROM->TO	LEA COUNTY REC-MCDONALD - LEA COUNTY REC-REED 69KV CKT 1	41	1	118.9115	BASE CASE
FDNS	06ALL	0	12G	ASGI_10_020	FROM->TO	TUCO INTERCHANGE (UPDATE DATA) 345/230/13.2KV TRANSFORMER CKT 2	560	0.40751	117.7099	TUCO INTERCHANGE (GE M1022338) 345/230/13.2KV TRANSFORMER CKT 1
FDNS	06ALL	0	12G	ASGI_10_020	FROM->TO	TUCO INTERCHANGE (UPDATE DATA) 345/230/13.2KV TRANSFORMER CKT 1	560	0.40751	116.9504	TUCO INTERCHANGE (GE M1022338) 345/230/13.2KV TRANSFORMER CKT 2
FDNS	06ALL	0	12G	ASGI_10_020	FROM->TO	JONES STATION - TUCO INTERCHANGE 230KV CKT 1	351	0.21914	106.4187	TOLK STATION EAST - TUCO INTERCHANGE 230KV CKT 1
FDNS	01ALL	0	12G	ASGI_10_020	TO->FROM	NORTHWEST - TATONGA7 345.00 345KV CKT 1	1195	0.2025	103.6433	LAWTON EASTSIDE - OKLAUNION 345KV CKT 1
FDNS	00ASGI_10_020	0	12WP	ASGI_10_020	TO->FROM	LEA COUNTY REC-LOVINGTON INTERCHANGE - LEA COUNTY REC-REED 69KV CKT 1	41	1	103.4243	LEA COUNTY REC-DENTON SUB - LEA COUNTY REC-REED 69KV CKT 1
FDNS	00ASGI_10_020	0	12WP	ASGI_10_020	TO->FROM	LEA COUNTY REC-MCDONALD - LEA COUNTY REC-TATUM 69KV CKT 1	41	1	102.6825	LEA COUNTY REC-LOVINGTON INTERCHANGE 115/69KV TRANSFORMER CKT 1
FDNS	6	0	12G	ASGI_10_020	TO->FROM	LEA COUNTY REC-MCDONALD - LEA COUNTY REC-TATUM 69KV CKT 1	41	1	102.1711	BASE CASE
FDNS	06ALL	0	12G	ASGI_10_020	TO->FROM	POTTER COUNTY INTERCHANGE - S-RANDLCO 230.00 230KV CKT 1	351	0.20344	101.4028	LAWTON EASTSIDE - OKLAUNION 345KV CKT 1
FDNS	00ASGI_10_020	0	17WP	ASGI_10_020	TO->FROM	LEA COUNTY REC-LOVINGTON INTERCHANGE - LEA COUNTY REC-REED 69KV CKT 1	41	1	100.3524	LEA COUNTY REC-DENTON SUB - LEA COUNTY REC-REED 69KV CKT 1
FNSL-Blown up	02ALL	0	12G	ASGI_10_021		Non-Converge Contingency	1792	0.08316	-	BEAVER CO 345.00 - WOODWARD DISTRICT EHV 345KV CKT 1
FNSL-Blown up	02ALL	0	12G	ASGI_10_021		Non-Converge Contingency	0	0.16633	-	DBL-WWRD-BVR
FDNS	06ALL	0	12G	ASGI_10_021	FROM->TO	TUCO INTERCHANGE (GE M1022338) 345/230/13.2KV TRANSFORMER CKT 1	560	0.41663	120.6282	TUCO INTERCHANGE (UPDATE DATA) 345/230/13.2KV TRANSFORMER CKT 2
FDNS	06ALL	0	12G	ASGI_10_021	FROM->TO	TUCO INTERCHANGE (GE M1022338) 345/230/13.2KV TRANSFORMER CKT 1	560	0.41663	119.2404	TUCO INTERCHANGE (UPDATE DATA) 345/230/13.2KV TRANSFORMER CKT 2
FDNS	06ALL	0	12G	ASGI_10_021	FROM->TO	TUCO INTERCHANGE (UPDATE DATA) 345/230/13.2KV TRANSFORMER CKT 2	560	0.40722	117.7099	TUCO INTERCHANGE (GE M1022338) 345/230/13.2KV TRANSFORMER CKT 1

SOLUTION	GROUP	SCENARIO	SEASON	SOURCE	DIRECTION	MONITORED ELEMENT	RATEB (MVA)	TDF	TC%LOADING (% MVA)	CONTINGENCY
FDNS	06ALL	0	12G	ASGI_10_021	FROM->TO	TUCO INTERCHANGE (UPDATE DATA) 345/230/13.2KV TRANSFORMER CKT 2	560	0.40722	116.9504	TUCO INTERCHANGE (GE M1022338) 345/230/13.2KV TRANSFORMER CKT 1
FDNS	06ALL	0	12G	ASGI_10_021	FROM->TO	JONES STATION - TUCO INTERCHANGE 230KV CKT 1	351	0.21884	106.4187	TOLK STATION EAST - TUCO INTERCHANGE 230KV CKT 1
FDNS	01ALL	0	12G	ASGI_10_021	TO->FROM	NORTHWEST - TATONGA7 345.00 345KV CKT 1	1195	0.20248	103.6433	LAWTON EASTSIDE - OKLAUNION 345KV CKT 1
FDNS	06ALL	0	12G	ASGI_10_021	TO->FROM	POTTER COUNTY INTERCHANGE - S-RANDLCO 230.00 230KV CKT 1	351	0.20368	101.4028	LAWTON EASTSIDE - OKLAUNION 345KV CKT 1
FNSL-Blown up	02ALL	0	12G	ASGI_11_001		Non-Converge Contingency	1792	0.08297	-	BEAVER CO 345.00 - WOODWARD DISTRICT EHV 345KV CKT 1
FNSL-Blown up	02ALL	0	12G	ASGI_11_001		Non-Converge Contingency	0	0.16594	-	DBL-WWRD-BVR
FDNS	06ALL	0	12G	ASGI_11_001	FROM->TO	TUCO INTERCHANGE (GE M1022338) 345/230/13.2KV TRANSFORMER CKT 1	560	0.41725	120.6282	TUCO INTERCHANGE (UPDATE DATA) 345/230/13.2KV TRANSFORMER CKT 2
FDNS	06ALL	0	12G	ASGI_11_001	FROM->TO	TUCO INTERCHANGE (GE M1022338) 345/230/13.2KV TRANSFORMER CKT 1	560	0.41725	119.2404	TUCO INTERCHANGE (UPDATE DATA) 345/230/13.2KV TRANSFORMER CKT 2
FDNS	06ALL	0	12G	ASGI_11_001	FROM->TO	TUCO INTERCHANGE (UPDATE DATA) 345/230/13.2KV TRANSFORMER CKT 2	560	0.40782	117.7099	TUCO INTERCHANGE (GE M1022338) 345/230/13.2KV TRANSFORMER CKT 1
FDNS	06ALL	0	12G	ASGI_11_001	FROM->TO	TUCO INTERCHANGE (UPDATE DATA) 345/230/13.2KV TRANSFORMER CKT 2	560	0.40782	116.9504	TUCO INTERCHANGE (GE M1022338) 345/230/13.2KV TRANSFORMER CKT 1
FDNS	06ALL	0	12G	ASGI_11_001	FROM->TO	JONES STATION - TUCO INTERCHANGE 230KV CKT 1	351	0.21945	106.4187	TOLK STATION EAST - TUCO INTERCHANGE 230KV CKT 1
FDNS	01ALL	0	12G	ASGI_11_001	TO->FROM	NORTHWEST - TATONGA7 345.00 345KV CKT 1	1195	0.20252	103.6433	LAWTON EASTSIDE - OKLAUNION 345KV CKT 1
FDNS	06ALL	0	12G	ASGI_11_001	TO->FROM	POTTER COUNTY INTERCHANGE - S-RANDLCO 230.00 230KV CKT 1	351	0.20318	101.4028	LAWTON EASTSIDE - OKLAUNION 345KV CKT 1
FNSL-Blown up	02ALL	0	12G	G10_001		Non-Converge Contingency	1792	0.57172	-	BEAVER CO 345.00 - WOODWARD DISTRICT EHV 345KV CKT 1
FNSL-Blown up	02ALL	0	12G	G10_001		Non-Converge Contingency	0	0.64344	-	DBL-WWRD-BVR
FDNS	01ALL	0	12G	G10_001	TO->FROM	NORTHWEST - TATONGA7 345.00 345KV CKT 1	1195	0.3167	125.645	DBL-THIS-WVWR
FDNS	01ALL	0	12G	G10_001	TO->FROM	NORTHWEST - TATONGA7 345.00 345KV CKT 1	1195	0.27624	116.428	DBL-WICH-THI
FDNS	01ALL	0	12G	G10_001	TO->FROM	NORTHWEST - TATONGA7 345.00 345KV CKT 1	1195	0.23283	103.6433	LAWTON EASTSIDE - OKLAUNION 345KV CKT 1
FDNS	01ALL	0	12G	G10_001	TO->FROM	NORTHWEST - TATONGA7 345.00 345KV CKT 1	1195	0.2431	102.483	THISTLE 7 345.00 - WOODWARD DISTRICT EHV 345KV CKT 1
FDNS	01ALL	0	12G	G10_001	TO->FROM	NORTHWEST - TATONGA7 345.00 345KV CKT 1	1195	0.2431	102.483	THISTLE 7 345.00 - WOODWARD DISTRICT EHV 345KV CKT 2
FDNS	02ALL	0	12G	G10_012	TO->FROM	CLINTON JUNCTION - ELK CITY 138KV CKT 1	158	0.26373	111.6773	CLINTON AIR FORCE BASE TAP - ELK CITY 138KV CKT 1
FDNS	02ALL	0	12G	G10_012	TO->FROM	CLINTON JUNCTION - ELK CITY 138KV CKT 1	158	0.26373	110.853	CLINTON AIR FORCE BASE TAP - HOBART JUNCTION 138KV CKT 1
FDNS	07ALL	0	12G	G10_012	FROM->TO	MOREWOOD SW - NINE MILE 138KV CKT 1	179	0.41981	107.2513	SPP-SWPS-02
FDNS	07ALL	0	12G	G10_012	FROM->TO	MOREWOOD SW - NINE MILE 138KV CKT 1	179	0.41981	107.2498	STLN-DEMARC6 - SWEETWATER 230KV CKT 1
FDNS	07ALL	0	12G	G10_012	FROM->TO	MOREWOOD SW - NINE MILE 138KV CKT 1	179	0.41981	107.2082	STATELINE INTERCHANGE - STLN-DEMARC6 230KV CKT 1
FDNS	07ALL	0	12G	G10_012	TO->FROM	MOORELAND - NINE MILE 138KV CKT 1	179	0.41981	107.0969	SPP-SWPS-02
FDNS	07ALL	0	12G	G10_012	TO->FROM	MOORELAND - NINE MILE 138KV CKT 1	179	0.41981	107.0954	STLN-DEMARC6 - SWEETWATER 230KV CKT 1
FDNS	07ALL	0	12G	G10_012	TO->FROM	MOORELAND - NINE MILE 138KV CKT 1	179	0.41981	107.0541	STATELINE INTERCHANGE - STLN-DEMARC6 230KV CKT 1
FDNS	07ALL	0	12G	G10_012	TO->FROM	CLINTON AIR FORCE BASE TAP - ELK CITY 138KV CKT 1	192	0.25459	106.7191	SPP-SWPS-02
FDNS	07ALL	0	12G	G10_012	TO->FROM	CLINTON AIR FORCE BASE TAP - ELK CITY 138KV CKT 1	192	0.25459	106.7188	STLN-DEMARC6 - SWEETWATER 230KV CKT 1
FDNS	07ALL	0	12G	G10_012	TO->FROM	CLINTON AIR FORCE BASE TAP - ELK CITY 138KV CKT 1	192	0.25459	106.658	STATELINE INTERCHANGE - STLN-DEMARC6 230KV CKT 1
FDNS	07ALL	0	12G	G10_012	FROM->TO	CLINTON AIR FORCE BASE TAP - HOBART JUNCTION 138KV CKT 1	189	0.25459	106.5747	SPP-SWPS-02
FDNS	07ALL	0	12G	G10_012	FROM->TO	CLINTON AIR FORCE BASE TAP - HOBART JUNCTION 138KV CKT 1	189	0.25459	106.5745	STLN-DEMARC6 - SWEETWATER 230KV CKT 1
FDNS	07ALL	0	12G	G10_012	FROM->TO	CLINTON AIR FORCE BASE TAP - HOBART JUNCTION 138KV CKT 1	189	0.25459	106.5127	STATELINE INTERCHANGE - STLN-DEMARC6 230KV CKT 1
FDNS	07ALL	0	12G	G10_012	FROM->TO	MOREWOOD SW - NINE MILE 138KV CKT 1	179	0.41981	102.1674	GRAPEVINE INTERCHANGE - STATELINE INTERCHANGE 230KV CKT 1
FDNS	07ALL	0	12G	G10_012	TO->FROM	MOORELAND - NINE MILE 138KV CKT 1	179	0.41981	102.0128	GRAPEVINE INTERCHANGE - STATELINE INTERCHANGE 230KV CKT 1
FDNS	07ALL	0	12G	G10_012	FROM->TO	MOREWOOD SW - NINE MILE 138KV CKT 1	179	0.41999	101.5176	SPP-SWPS-03
FDNS	07ALL	0	12G	G10_012	TO->FROM	CLINTON AIR FORCE BASE TAP - ELK CITY 138KV CKT 1	192	0.25435	101.3951	SPP-SWPS-03
FDNS	07ALL	0	12G	G10_012	TO->FROM	MOORELAND - NINE MILE 138KV CKT 1	179	0.41999	101.3634	SPP-SWPS-03
FDNS	07ALL	0	12G	G10_012	FROM->TO	CLINTON AIR FORCE BASE TAP - HOBART JUNCTION 138KV CKT 1	189	0.25435	101.1721	SPP-SWPS-03
FDNS	07ALL	0	12G	G10_012	TO->FROM	CLINTON AIR FORCE BASE TAP - ELK CITY 138KV CKT 1	192	0.25459	100.7858	GRAPEVINE INTERCHANGE - STATELINE INTERCHANGE 230KV CKT 1
FDNS	07ALL	0	12G	G10_012	FROM->TO	CLINTON AIR FORCE BASE TAP - HOBART JUNCTION 138KV CKT 1	189	0.25459	100.5519	GRAPEVINE INTERCHANGE - STATELINE INTERCHANGE 230KV CKT 1
FNSL-Blown up	03ALL	0	12G	G10_041		Non-Converge Contingency	0	0.04129	-	DBL-THIS-CLR
FNSL-Blown up	03ALL	0	12G	G10_041		Non-Converge Contingency	0	0.04129	-	DBL-SPRVL-CL
FNSL-Blown up	02ALL	0	12G	G10_045		Non-Converge Contingency	1792	0.04644	-	BEAVER CO 345.00 - WOODWARD DISTRICT EHV 345KV CKT 1
FNSL-Blown up	02ALL	0	12G	G10_045		Non-Converge Contingency	0	0.09287	-	DBL-WWRD-BVR

SOLUTION	GROUP	SCENARIO	SEASON	SOURCE	DIRECTION	MONITORED ELEMENT	RATEB (MVA)	TDF	TC%LOADING (% MVA)	CONTINGENCY
FDNS	03NR	0	12G	G10_045	TO->FROM	MULLERGREN - SPEARVILLE 230KV CKT 1	355.3	0.06402	100.192	POST ROCK - SPEARVILLE 345KV CKT 1
FNSL-Blown up	03ALL	0	12G	G10_045		Non-Converge Contingency	0	0.36084	-	DBL-THIS-CLR
FNSL-Blown up	03ALL	0	12G	G10_045		Non-Converge Contingency	0	0.36084	-	DBL-SPRVL-CL
FNSL-Blown up	02ALL	0	12G	G10_048		Non-Converge Contingency	0	0.03201	-	DBL-WWRD-BVR
FNSL-Blown up	00G10_048	0	12SP	G10_048		Non-Converge Contingency	0	0.04588	-	TRF-STEGALL
FNSL-Blown up	0	0	12SP	G10_048		Non-Converge Contingency	0	0.03059	-	NEB01WAPAB3
FDNS	11NR	0	12G	G10_048	FROM->TO	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1	319	0.068	100.9916	DBL-THIS-CLR
FNSL-Blown up	03ALL	0	12G	G10_048		Non-Converge Contingency	0	0.23345	-	DBL-THIS-CLR
FNSL-Blown up	03ALL	0	12G	G10_048		Non-Converge Contingency	0	0.23345	-	DBL-SPRVL-CL
FNSL-Blown up	03ALL	0	12G	G10_051		Non-Converge Contingency	0	0.0665	-	DBL-THIS-CLR
FNSL-Blown up	03ALL	0	12G	G10_051		Non-Converge Contingency	0	0.0665	-	DBL-SPRVL-CL
FDNS	03NR	0	12G	G10_053	TO->FROM	MULLERGREN - SPEARVILLE 230KV CKT 1	355.3	0.06977	100.192	POST ROCK - SPEARVILLE 345KV CKT 1
FNSL-Blown up	03ALL	0	12G	G10_053		Non-Converge Contingency	0	0.55122	-	DBL-THIS-CLR

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

**\*\*The results will be available by request\*\***