



Definitive Interconnection System Impact Study for Generation Interconnection Requests

(DISIS-2011-001-7)

June 2015

Generation Interconnection



Revision History

Date	Author	Change Description
07/29/2011	SPP	Report Issued (DISIS-2011-001)
12/16/2011	SPP	Account for Withdrawn Projects, Report Re-Posted (DISIS-2011-001-1)
05/04/2012	SPP	Account for Withdrawn Projects, Report Re-Posted (DISIS-2011-001-2)
02/05/2013	SPP	Account for Withdrawn Projects, Report Re-Posted (DISIS-2011-001-3)
12/19/2013	SPP	Account for Withdrawn Projects, Report Re-Posted (DISIS-2011-001-4)
05/19/2014	SPP	Account for Withdrawn Projects, Report Re-Posted (DISIS-2011-001-5)
07/25/2014	SPP	Account for Withdrawn Projects, Report Re-Posted (DISIS-2011-001-6)
06/18/2015	SPP	Account for Withdrawn Projects, Report Re-Posted (DISIS-2011-001-7)

Executive Summary

Generation Interconnection customers have requested a Definitive Interconnection System Impact Study (DISIS) under the Generation Interconnection Procedures (GIP) in the Southwest Power Pool Open Access Transmission Tariff (OATT). The Interconnection Customers' requests have been clustered together for the following System Impact Cluster Study window which closed March 31, 2011. The customers will be referred to in this study as the DISIS-2011-001 Interconnection Customers. This System Impact Study analyzes the interconnecting of multiple generation interconnection requests associated with new generation totaling approximately 2,857.0 MW of new generation which would be located within the transmission systems of American Electric Cooperative Corporation (AEPW), Kansas City Power & Light (KACP), Midwest Energy Inc. (MIDW), Nebraska Public Power District (NPPD), Oklahoma Gas and Electric (OKGE), Sunflower Electric Power Corporation/Mid-Kansas Electric Power LLC (SUNC)/(MKEC), Southwestern Public Service (SPS). The various generation interconnection requests have differing proposed in-service dates¹. 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-2011-001 study and/or higher queued projects withdrawing.

This restudy looked at NRIS powerflow analysis and cost allocation only. The previous iteration of this study did not identify any ERI constraints for the DISIS-2011-001 customers. For full powerflow results, please refer to the previous iteration of this study, DISIS-2011-001-6. For complete stability analysis, please refer to DISIS-2011-001.

Power flow analysis has indicated that for the power flow cases studied, 2,857.0 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.

It should be noted that although this study analyzed many of the most probable contingencies, it is not an all-inclusive list that can account for every operational situation. Additionally, the generator[s] may not be able to inject any power onto the Transmission System due to constraints that fall below the threshold of mitigation for a Generator Interconnection request. Because of this, it is likely that the Customer[s] may be required to reduce their generation output to 0 MW under

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

certain system conditions to allow system operators to maintain the reliability of the transmission network.

The total estimated minimum cost for interconnecting the DISIS-2011-001 interconnection customers is \$69,995,905. These costs are shown in Appendix E and F. Interconnection Service to DISIS-2011-001 interconnection customers is also contingent upon higher queued customers paying for certain required network upgrades. **The in service date for the DISIS customers will be deferred until the construction of these network upgrades can be completed.**

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

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

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

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Introduction

Pursuant to the Southwest Power Pool (SPP) Open Access Transmission Tariff (OATT), SPP has conducted this Definitive Interconnection System Impact Study (DISIS) for certain generation interconnection requests in the SPP Generation Interconnection Queue. These interconnection requests have been clustered together for the following System Impact Study window which closed March 31, 2011. The customers will be referred to in this study as the DISIS-2011-001 Interconnection Customers. This System Impact Study analyzes the interconnecting of multiple generation interconnection requests associated with new generation totaling 2,857.0 MW of new generation which would be located within the transmission systems of American Electric Cooperative Corporation (AEPW), Kansas City Power & Light (KACP), Midwest Energy Inc. (MIDW), Nebraska Public Power District (NPPD), Oklahoma Gas and Electric (OKGE), Sunflower Electric Power Corporation/Mid-Kansas Electric Power LLC (SUNC)/(MKEC), Southwestern Public Service (SPS). The various generation interconnection requests have differing proposed in-service dates². 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-2011-001 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.

This restudy looked at NRIS powerflow analysis and cost allocation only. The previous iteration of this study did not identify any ERS constraints for the DISIS-2011-001 customers. For full powerflow results, please refer to the previous iteration of this study, DISIS-2011-001-6. For complete stability analysis, please refer to DISIS-2011-001.

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

Model Development

Interconnection Requests Included in the Cluster

SPP has included all interconnection requests that submitted a Definitive Interconnection System Impact Study Agreement no later than March 31, 2011 and were subsequently accepted by Southwest Power Pool under the terms of the Generator Interconnection Procedures (GIP) that became effective March 30, 2010. The interconnection requests that are included in this study are listed in Appendix A.

Affected System Interconnection Requests

Also included in this Definitive Impact Re-Study is two Affected System Studies, located on the Southwestern Public Service Company distribution system and share a connection to the SPS transmission system. The Affected System Study Request has been given the designation: ASGI-2011-002 (20 MW, POI is Herring 115kV) and ASGI-2011-003 (10 MW, POI is Hendricks 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. Prior queued projects that requested Network Resource Interconnection Service (NRIS) were dispatched in an additional analysis into the balancing authority of the interconnecting transmission owner.

Development of Base Cases

Power Flow

The 2014 series Transmission Service Request (TSR) Models 2015 spring, 2015 summer and winter peak, 2020 summer and winter peak, and the 2025 summer peak scenario 0 cases were used for this study. After the cases were developed, each of the control areas' resources were then re-dispatched to account for the new generation requests using current dispatch orders.

Dynamic Stability

The 2013 series SPP Model Development Working Group (MDWG) Models 2014 winter, 2015 summer, and 2024 summer 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-2011-001 Customers have not been assigned acceleration costs for the below listed projects. The DISIS-2011-001 Customers Generation Facilities in service dates may need to be delayed until the completion of the following upgrades. If for some reason, construction

on these projects is discontinued, additional restudies will be needed to determine the interconnection needs of the DISIS Interconnection Customers.

- Hitchland 230/115kV area projects³:
 - Hitchland – Ochiltree 230kV Project, (placed in-service 2013)
- Balanced Portfolio Projects⁴:
 - Woodward – Border – TUCO 345kV project, (placed in-service 2014)
 - Woodward 345/138kV circuit #2 autotransformer, (placed in-service 2014)
 - TUCO 345/230kV circuit #2 autotransformer, (placed in-service 2014)
 - Reactors at Woodward and Border, (placed in-service 2014)
 - Iatan– Nashua 345kV, (placed in-service 2015)
 - Nashua 345/161kV autotransformer
 - Muskogee– Seminole 345kV, (placed in-service 2013)
 - Cleveland – Sooner 345kV, (placed in-service 2012)
 - Tap Stillwell – Swissvale 345kV line at West Gardner, (placed in-service 2013)
- Priority Projects⁵:
 - Hitchland – Woodward double circuit 345kV, (placed in-service 2014)
 - Hitchland 345/230kV circuit #2 autotransformer, (placed in-service 2014)
 - Woodward – Thistle double circuit 345kV, (placed in-service 2014)
 - Spearville – Clark – Thistle double circuit 345kV, (placed in-service 2014)
 - Thistle – Wichita double circuit 345kV, (placed in-service 2014)
 - Thistle 345/138kV autotransformer, (placed in-service 2014)
 - Thistle – Flat Ridge 138kV, (placed in-service 2014)
- Various MKEC Transmission System Upgrades⁶
 - Harper – Flat Ridge 138kV rebuild (placed in-service in 2013)
 - Flat Ridge – Medicine Lodge 138kV rebuild, (placed in-service 2014)
 - Pratt – Medicine Lodge 115kV rebuild, (placed in-service 2014)
 - Medicine Lodge 138/115kV autotransformer replacement (placed in-service in 2013)
- Northwest 345/138/13.8kV circuit #3 autotransformer, (placed in-service 2015)⁷
- Sheldon – SW7th and Pleasant Hill 115kV circuit #2 rebuild (placed in-service in 2013)⁸

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-2011-001 study and are assumed to be in service. This list may not be all inclusive. The DISIS-2011-001 Customers at this time do not have responsibility for these facilities but may later be assigned the cost of these facilities if higher queued customers terminate their GIA or withdraw from the

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

⁴ Notice to Construct (NTC) issued June 2009.

⁵ Notice to Construct (NTC) issued June 2010.

⁶ SPP Transmission Service Projects identified in SPP-2007-AG3-AFS-9.

⁷ SPP Transmission Service Project identified in SPP-2009-AG2-AFS6. Per SPP-NTC-20137.

⁸ SPP Regional Reliability 2012 ITPNT Project. Per SPP-NTC-200171.

interconnection queue. The DISIS-2011-001 Customer Generation Facilities in service dates may need to be delayed until the completion of the following upgrades.

- Upgrades assigned to ICS-2008-001 Interconnection Customers
 - Line Traps at Amarillo South – Swisher 230kV
- Upgrades assigned to DISIS-2009-001 Interconnection Customers:
 - Lancer Project
 - Spearville – Lancer 345kV, addition
 - Lancer 345/115kV transformer circuit #1, addition
 - Lancer – North Ft. Dodge 115kV, addition
 - Ft. Dodge – North Ft. Dodge circuit #2, addition
 - Move Ft. Dodge terminal of Shooting Star 115kV
 - Fort Randall – Meadow Grove – Kelly 230kV circuit #1, rerate (320MVA)
- Upgrades assigned to DISIS-2010-001 Interconnection Customers:
 - Beaver County 345kV Expansion (Tap & Tie Hitchland – Woodward circuit #2 into Beaver County 345kV)
 - Switch 2749 – Wildorado 69kV circuit #1, rebuild
- Upgrades assigned to DISIS-2010-002 Interconnection Customers:
 - Buckner –Spearville 345kV circuit #1, replace terminal equipment
 - Twin Church – Dixon County 230kV circuit #1, rerate (320MVA)

Potential Upgrades Not in the Base Case

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

Regional Groupings

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

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

Power Flow

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

Peaking units were not dispatched in the 2015 spring model. To study peaking units' impacts, the 2015 summer and winter, 2020 summer and winter, and 2025 summer peak 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 dispatched at 100% nameplate output while the other groups were dispatched at 20% output for wind requests and 100% output for thermal requests.

Identification of Network Constraints

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

Determination of Cost Allocated Network Upgrades

Cost Allocated Network Upgrades of wind generation interconnection requests were determined using the 2015 spring model. Cost Allocated Network Upgrades of peaking units was determined using the 2020 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 Z2 of the SPP Tariff for any Network Upgrades including any tax gross-up or any other tax-related payments associated with the Network Upgrades, and not refunded to the Interconnection Customer.

Required Interconnection Facilities

The requirement to interconnect the 2,857.0 MW of restudied 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 restudied cluster total \$69,995,905. Interconnection Facilities specific to each generation interconnection request are listed in Appendix E. A preliminary one-line drawing for each generation interconnection request are listed in Appendix D.

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

Power Flow Analysis

Power Flow Analysis Methodology

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

Power Flow Analysis

A power flow analysis was conducted for each Interconnection Customer’s facility using modified versions of the 2015 spring peak, 2015 summer and winter peak, and the 2020 summer and winter peak, and 2025 summer peak models. The output of the Interconnection Customer’s facility was offset in each model by a reduction in output of existing online SPP generation. This method allows the request to be studied as an Energy Resource (ER) Interconnection Request. Certain requests that requested Network Resource Interconnection Service (NRIS) had an additional analysis conducted for displacing resources in the interconnecting Transmission Owner’s balancing authority.

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

Cluster Group 1 (Woodward Area)

In addition to the 2,731.3 MW of previously queued generation in the area, 698.8 MW of new interconnection service was studied. Power Flow Analysis was performed for with withdrawal of GEN-2011-007 and to account for GEN 2011-022 requesting to drop NRIS service. The Mooreland – FPL – Woodward line continues to be a constraint. The result is that GEN-2011-022 continues to share cost responsibility for the FPL – Woodward upgrade. The previously assigned upgrades of Glass Mountain – Mooreland is no longer required for this restudy.

Cluster Group 2 (Hitchland Area)

In addition to the 2,142.2 MW of previously queued generation in the area, 520.0 MW of new interconnection service was studied. Power Flow Analysis was not performed again for this restudy. Please refer to previous Impact Study for results.

Cluster Group 3 (Spearville Area)

In addition to the 2,188.7 MW of previously queued generation in the area, 1,099.1 MW of new interconnection service was studied. Power Flow Analysis was not performed again for this restudy. Please refer to previous Impact Study for results.

Cluster Group 4 (NW Kansas Group)

In addition to the 1,374.1 MW of previously queued generation in the area, 201.0 MW of new interconnection service was studied. Power Flow Analysis was not performed again for this restudy. Please refer to previous Impact Study for results.

Cluster Group 5 (Amarillo Area)

In addition to the 642.0 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 6 (South Texas Panhandle/New Mexico)

In addition to the 1,763.0 MW of previously queued generation in the area, 90.0 MW of new interconnection service was studied. Power Flow Analysis was not performed again for this restudy. Please refer to previous Impact Study for results.

Cluster Group 7 (Southwestern Oklahoma)

In addition to the 1,568.45 MW of previously queued generation in the area, 0.0 MW of new interconnection service was studied. No new constraints were found in this area.

Cluster Group 8 (South Central Kansas/North Oklahoma)

In addition to the 1,754.6 MW of previously queued generation in the area, 4.5 MW of new interconnection service was studied. Power Flow Analysis was not performed again for this restudy. Please refer to previous Impact Study for results.

Cluster Group 9/10 (Nebraska)

In addition to the 1,265.6 MW of previously queued generation in the area, 193.6 MW of new interconnection service was studied. Power Flow Analysis was not performed again for this restudy. Please refer to previous Impact Study for results.

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 84.6 MW of previously queued generation in the area, 50.0 MW of new interconnection service was studied. Power Flow Analysis was not performed again for this restudy. Please refer to previous Impact Study for results.

Cluster Group 14 (South Central Oklahoma)

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.

Curtailment and System Reliability

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

Stability Analysis

A stability analysis was not performed for this study iteration.

Cluster Group 1 (Woodward Area)

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

Cluster Group 2 (Hitchland Area)

The Group 2 stability analysis was not performed again for this restudy.

Cluster Group 3 (Spearville Area)

The Group 3 stability analysis was not performed again 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 analysis was not performed again for this restudy.

Cluster Group 7 (Southwest Oklahoma Area)

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

Cluster Group 8 (South Central Kansas/North Oklahoma)

The Group 8 stability analysis was not performed again for this restudy.

Cluster Group 9/10 (Nebraska)

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

Cluster Group 11 (North Central Kansas Area)

The Group 11 stability analysis 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)

The Group 13 stability analysis was not performed again for this restudy.

Cluster Group 14 (South Central Oklahoma)

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

Conclusion

The minimum cost of interconnecting 2,857.0 MW of new interconnection requests included in this Definitive Interconnection System Impact Re-Study is estimated at \$69,995,905 for the Allocated Network Upgrades and Transmission Owner Interconnection Facilities are listed in Appendix E and F. These costs do not include the cost of upgrades of other transmission facilities listed in Appendix H which are Network Constraints.

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

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

Appendix

A: Generation Interconnection Requests Considered for Impact Study

See next page.

A: Generation Interconnection Requests Considered for Impact Study

Request	Amount	Service	Area	Requested Point of Interconnection	Proposed Point of Interconnection	Requested In-Service Date	In Service Date Delayed Until no earlier than*
ASGI-2011-002	20.00	ER	SPS	Herring 115kV	Herring 115kV		TBD
ASGI-2011-003	10.00	ER	SPS	Hendricks 115kV	Hendricks 115kV		TBD
GEN-2010-055	4.50	ER	AEPW	Wekiwa 138kV	Wekiwa 138kV	12/31/2011	TBD
GEN-2010-057	201.00	ER/NR	MIDW	Rice County 230kV	Rice County 230kV	8/1/2012	TBD
GEN-2011-008	600.00	ER	SUNCMKEC	Clark County 345kV	Clark County 345kV	12/1/2015	12/1/2015
GEN-2011-010	100.80	ER	OKGE	Minco 345kV	Minco 345kV	12/1/2012	TBD
GEN-2011-011	50.00	ER	KACP	Iatan 345kV	Iatan 345kV	12/31/2010	TBD
GEN-2011-014	201.00	ER	OKGE	Tap Hitchland - Woodward Ckt 1 (Beaver County) 345kV	Tap Hitchland - Woodward Dbl Ckt (Beaver County) 345kV	12/31/2013	12/31/2014
GEN-2011-016	200.10	ER	SUNCMKEC	Spearville 345kV	Spearville 345kV	12/1/2013	12/31/2014
GEN-2011-017	299.00	ER	SUNCMKEC	Tap Spearville - PostRock 345kV	Tap Spearville - PostRock (GEN-2011-017T) 345kV	12/1/2013	12/31/2014
GEN-2011-018	73.60	ER/NR	NPPD	Steele City 115kV	Steele City 115kV	12/1/2013	
GEN-2011-019	299.00	ER/NR	OKGE	Woodward 345kV	Woodward 345kV	12/31/2012	12/31/2014
GEN-2011-020	299.00	ER/NR	OKGE	Woodward 345kV	Woodward 345kV	12/31/2012	12/31/2014
GEN-2011-022	299.00	ER	SPS	Hitchland 345kV	Hitchland 345kV	12/31/2012	12/31/2014
GEN-2011-025	80.00	ER	SPS	Tap Floyd County - Crosby County 115kV	Tap Floyd County - Crosby County 115kV	6/30/2012	12/31/2014
GEN-2011-027	120.00	ER/NR	NPPD	Tap Twin Church - Hoskins 230kV (GEN-2010-51 Tap)	Tap Twin Church - Hoskins 230kV (GEN-2010-51 Tap)	12/31/2012	TBD
Total: 2,857.00							

*Requests that are dependent upon Priority Projects or Balanced Portfolio may be delayed until 12/31/2014. Other requests in-service date to be determined after Facility Study.

B: Prior Queued Interconnection Requests

See next page.

B: Prior Queued Interconnection Requests

Request	Amount	Area	Requested/Proposed Point of Interconnection	Status or In-Service Date
ASGI-2010-006	150.00	AECI	Tap Fairfax (AECI) - Shilder (AEPW) 138kV	AECI queue Affected Study
ASGI-2010-010	42.20	SPS	Lovington 115kV	Lea County Affected Study
ASGI-2010-020	30.00	SPS	Tap LE-Tatum - LE-Crossroads 69kV	Lea County Affected Study
ASGI-2010-021	15.00	SPS	Tap LE-Saunders Tap - LE-Anderson 69kV	Lea County Affected Study
ASGI-2011-001	28.80	SPS	Lovington 115kV	On-Line
ASGI-2013-006	2.00	SPS	SP-Erskine 115kV	
GEN-2001-014	96.00	WFEC	Ft Supply 138kV	On-Line
GEN-2001-026	74.25	WFEC	Washita 138kV	On-Line
GEN-2001-033	180.00	SPS	San Juan Tap 230kV	On-Line at 120MW
GEN-2001-036	80.00	SPS	Norton 115kV	On-Line
GEN-2001-037	100.00	OKGE	FPL Moreland Tap 138kV	On-Line
GEN-2001-039A	105.00	SUNCMKEC	Tap Greensburg - Ft Dodge (Shooting Star Tap) 115kV	On-Line
GEN-2001-039M	100.00	SUNCMKEC	Central Plains Tap 115kV	On-Line
GEN-2002-004	200.00	WERE	Latham 345kV	On-Line at 150MW
GEN-2002-005	120.00	WFEC	Red Hills Tap 138kV	On-Line
GEN-2002-008	240.00	SPS	Hitchland 345kV	On-Line at 120MW
GEN-2002-009	80.00	SPS	Hansford 115kV	On-Line
GEN-2002-022	240.00	SPS	Bushland 230kV	On-Line
GEN-2002-023N	0.80	NPPD	Harmony 115kV	On-Line
GEN-2002-025A	150.00	SUNCMKEC	Spearville 230kV	On-Line
GEN-2003-004	100.00	WFEC	Washita 138kV	On-Line
GEN-2003-005	100.00	WFEC	Anadarko - Paradise (Blue Canyon) 138kV	On-Line
GEN-2003-006A	200.00	SUNCMKEC	Elm Creek 230kV	On-Line
GEN-2003-019	250.00	MIDW	Smoky Hills Tap 230kV	On-Line
GEN-2003-020	160.00	SPS	Martin 115kV	On-Line
GEN-2003-021N	75.00	NPPD	Ainsworth Wind Tap 115kV	On-Line
GEN-2003-022	120.00	AEPW	Washita 138kV	On-Line
GEN-2004-014	154.50	SUNCMKEC	Spearville 230kV	On-Line at 100MW
GEN-2004-020	27.00	AEPW	Washita 34.5kV	On-Line
GEN-2004-023	20.60	WFEC	Washita 138kV	On-Line
GEN-2004-023N	75.00	NPPD	Columbus Co 115kV	On-Line
GEN-2005-003	30.60	WFEC	Washita 138kV	On-Line
GEN-2005-008	120.00	OKGE	Woodward 138kV	On-Line
GEN-2005-012	250.00	SUNCMKEC	Ironwood 345kV	On-Line at 160MW
GEN-2005-013	201.00	WERE	Tap Latham - Neosho (Caney River) 345kV	On-Line
GEN-2006-002	101.00	AEPW	Sweetwater 230kV	On-Line
GEN-2006-006	205.50	SUNCMKEC	Spearville 345kV	On Suspension
GEN-2006-018	170.00	SPS	TUCO Interchange 230kV	On-Line
GEN-2006-020N	42.00	NPPD	Bloomfield 115kV	On-Line
GEN-2006-020S	18.90	SPS	DWS Frisco 115kV	On-Line
GEN-2006-021	101.00	SUNCMKEC	Flat Ridge Tap 138kV	On-Line
GEN-2006-024S	19.80	WFEC	Buffalo Bear Tap 69kV	On-Line
GEN-2006-026	604.00	SPS	Hobbs 230kV & Hobbs 115kV	On-Line
GEN-2006-031	75.00	MIDW	Knoll 115kV	On-Line
GEN-2006-035	225.00	AEPW	Sweetwater 230kV	On-Line at 132MW
GEN-2006-037N1	75.00	NPPD	Broken Bow 115kV	On-Line
GEN-2006-038N005	80.00	NPPD	Broken Bow 115kV	On-Line

Request	Amount	Area	Requested/Proposed Point of Interconnection	Status or In-Service Date
GEN-2006-038N019	80.00	NPPD	Petersburg North 115kV	On-Line
GEN-2006-043	99.00	AEPW	Sweetwater 230kV	On-Line
GEN-2006-044	370.00	SPS	Hitchland 345kV	On-Line at 120MW
GEN-2006-044N	40.50	NPPD	North Petersburg 115kV	On-Line
GEN-2006-046	131.00	OKGE	Dewey 138kV	On-Line
GEN-2007-011N08	81.00	NPPD	Bloomfield 115kV	On-Line
GEN-2007-021	201.00	OKGE	Tatonga 345kV	On-Line
GEN-2007-025	300.00	WERE	Viola 345kV	On-Line
GEN-2007-032	150.00	WFEC	Tap Clinton Junction - Clinton 138kV	On Suspension
GEN-2007-040	200.00	SUNCMKEC	Buckner 345kV	On-Line at 132MW
GEN-2007-043	200.00	OKGE	Minco 345kV	On-Line
GEN-2007-044	300.00	OKGE	Tatonga 345kV	On-Line at 199MW
GEN-2007-046	199.50	SPS	Hitchland 115kV	On Schedule for 2015
GEN-2007-050	170.00	OKGE	Woodward EHV 138kV	On-Line at 150MW
GEN-2007-052	150.00	WFEC	Anadarko 138kV	On-Line
GEN-2007-062	765.00	OKGE	Woodward EHV 345kV	On Schedule for 2014
GEN-2008-003	101.00	OKGE	Woodward EHV 138kV	On-Line
GEN-2008-013	300.00	OKGE	Tap Wichita - Woodring (Hunter) 345kV	On-Line at 235MW
GEN-2008-017	300.00	SUNCMKEC	Setab 345kV	On Schedule for 2015
GEN-2008-018	250.00	SPS	Finney 345kV	On-Line
GEN-2008-021	42.00	WERE	Wolf Creek 345kV	On-Line
GEN-2008-022	300.00	SPS	Tap Eddy Co - Tolk (Crossroads) 345kV	On Schedule for 2015
GEN-2008-023	150.00	AEPW	Hobart Junction 138kV	On-Line
GEN-2008-037	101.00	WFEC	Tap Washita - Blue Canyon Wind 138kV	On-Line
GEN-2008-044	197.80	OKGE	Tatonga 345kV	On-Line
GEN-2008-047	300.00	OKGE	Tap Hitchland - Woodward Dbl Ckt (Beaver County) 345kV	On Schedule for 2014
GEN-2008-051	322.00	SPS	Potter County 345kV	On-Line at 161MW
GEN-2008-079	99.20	SUNCMKEC	Tap Cudahy - Ft Dodge 115kV	On-Line
GEN-2008-086N02	200.00	NPPD	Tap Ft Randle - Columbus (Meadow Grove) 230kV	On-Line
GEN-2008-092	201.00	MIDW	Post Rock 230kV	On Schedule for 2014
GEN-2008-098	100.80	WERE	Tap Lacygne - Wolf Creek (Anderson County) 345kV	On Schedule for 2015
GEN-2008-1190	60.00	OPPD	S1399 161kV	On-Line
GEN-2008-123N	89.70	NPPD	Tap Guide Rock - Pauline (Rosemont) 115kV	On Schedule for 2014
GEN-2008-124	200.10	SUNCMKEC	Ironwood 345kV	On Schedule for 2016
GEN-2008-129	80.00	MIPU	Pleasant Hill 161kV	On-Line
GEN-2009-008	199.50	MIDW	South Hays 230kV	On Schedule for 2015
GEN-2009-020	48.60	MIDW	Tap Nekoma - Bazine (Walnut Creek) 69kV	On Schedule for 2015
GEN-2009-025	60.00	OKGE	Nardins 69kV	On-Line
GEN-2009-040	73.80	WERE	Marshall 115kV	On Schedule for 2015
GEN-2010-001	300.00	OKGE	Tap Hitchland - Woodward Dbl Ckt (Beaver County) 345kV	On Schedule for 2014 (204 MW) and 2015 (96 MW)
GEN-2010-003	100.80	WERE	Tap Lacygne - Wolf Creek (Anderson County) 345kV	On Schedule for 2015
GEN-2010-005	300.00	WERE	Viola 345kV	On-Line at 170MW
GEN-2010-006	205.00	SPS	Jones 230kV	On-Line
GEN-2010-009	165.60	SUNCMKEC	Buckner 345kV	On-Line
GEN-2010-011	29.70	OKGE	Tatonga 345kV	On-Line
GEN-2010-014	358.80	SPS	Hitchland 345kV	On Suspension
GEN-2010-036	4.60	WERE	6th Street 115kV	On-Line
GEN-2010-040	300.00	OKGE	Cimarron 345kV	On-Line
GEN-2010-041	10.50	OPPD	S 1399 161kV	On Schedule for 2015

Request	Amount	Area	Requested/Proposed Point of Interconnection	Status or In-Service Date
GEN-2010-045	197.80	SUNCMKEC	Buckner 345kV	On Schedule for 2017
GEN-2010-046	56.00	SPS	TUCO Interchange 230kV	On Schedule for 2016
GEN-2010-051	200.00	NPPD	Tap Twin Church - Hoskins 230kV	On Suspension
Gray County Wind (Montezuma)	110.00	SUNCMKEC	Gray County Tap 115kV	On-Line
Llano Estacado (White Deer)	80.00	SPS	Llano Wind 115kV	On-Line
NPPD Distributed (Broken Bow)	8.30	NPPD	Broken Bow 115kV	On-Line
NPPD Distributed (Burt County Wind)	12.00	NPPD	Tekamah & Oakland 115kV	On-Line
NPPD Distributed (Burwell)	3.00	NPPD	Ord 115kV	On-Line
NPPD Distributed (Columbus Hydro)	45.00	NPPD	Columbus 115kV	On-Line
NPPD Distributed (Ord)	11.90	NPPD	Ord 115kV	On-Line
NPPD Distributed (Stuart)	2.10	NPPD	Ainsworth 115kV	On-Line
SPS Distributed (Dumas 19th St)	20.00	SPS	Dumas 19th Street 115kV	On-Line
SPS Distributed (Etter)	20.00	SPS	Etter 115kV	On-Line
SPS Distributed (Hopi)	10.00	SPS	Hopi 115kV	On-Line
SPS Distributed (Jal)	10.00	SPS	S Jal 115kV	On-Line
SPS Distributed (Lea Road)	10.00	SPS	Lea Road 115kV	On-Line
SPS Distributed (Monument)	10.00	SPS	Monument 115kV	On-Line
SPS Distributed (Moore E)	25.00	SPS	Moore East 115kV	On-Line
SPS Distributed (Ocotillo)	10.00	SPS	S_Jal 115kV	On-Line
SPS Distributed (Sherman)	20.00	SPS	Sherman 115kV	On-Line
SPS Distributed (Spearman)	10.00	SPS	Spearman 69kV	On-Line
SPS Distributed (TC-Texas County)	20.00	SPS	Texas County 115kV	On-Line
Total:		15,514.6		

C: Study Groupings

See next page

C. Study Groups

GROUP 1: WOODWARD AREA			
Request	Capacity	Area	Proposed Point of Interconnection
GEN-2001-014	96.00	WFEC	Ft Supply 138kV
GEN-2001-037	100.00	OKGE	FPL Moreland Tap 138kV
GEN-2005-008	120.00	OKGE	Woodward 138kV
GEN-2006-024S	19.80	WFEC	Buffalo Bear Tap 69kV
GEN-2006-046	131.00	OKGE	Dewey 138kV
GEN-2007-021	201.00	OKGE	Tatonga 345kV
GEN-2007-043	200.00	OKGE	Minco 345kV
GEN-2007-044	300.00	OKGE	Tatonga 345kV
GEN-2007-050	170.00	OKGE	Woodward EHV 138kV
GEN-2007-062	765.00	OKGE	Woodward EHV 345kV
GEN-2008-003	101.00	OKGE	Woodward EHV 138kV
GEN-2008-044	197.80	OKGE	Tatonga 345kV
GEN-2010-011	29.70	OKGE	Tatonga 345kV
GEN-2010-040	300.00	OKGE	Cimarron 345kV
PRIOR QUEUED SUBTOTAL	2,731.30		
GEN-2011-010	100.80	OKGE	Minco 345kV
GEN-2011-019	299.00	OKGE	Woodward 345kV
GEN-2011-020	299.00	OKGE	Woodward 345kV
CURRENT CLUSTER SUBTOTAL	698.80		
AREA TOTAL	3,430.10		

GROUP 2: HITCHLAND AREA			
Request	Capacity	Area	Proposed Point of Interconnection
GEN-2002-008	240.00	SPS	Hitchland 345kV
GEN-2002-009	80.00	SPS	Hansford 115kV
GEN-2003-020	160.00	SPS	Martin 115kV
GEN-2006-020S	18.90	SPS	DWS Frisco 115kV
GEN-2006-044	370.00	SPS	Hitchland 345kV
GEN-2007-046	199.50	SPS	Hitchland 115kV
GEN-2008-047	300.00	OKGE	Tap Hitchland - Woodward Dbl Ckt (Beaver County) 345kV
GEN-2010-001	300.00	OKGE	Tap Hitchland - Woodward Dbl Ckt (Beaver County) 345kV
GEN-2010-014	358.80	SPS	Hitchland 345kV
SPS Distributed (Dumas 19th St)	20.00	SPS	Dumas 19th Street 115kV
SPS Distributed (Etter)	20.00	SPS	Etter 115kV
SPS Distributed (Moore E)	25.00	SPS	Moore East 115kV
SPS Distributed (Sherman)	20.00	SPS	Sherman 115kV
SPS Distributed (Spearman)	10.00	SPS	Spearman 69kV
SPS Distributed (TC-Texas County)	20.00	SPS	Texas County 115kV
PRIOR QUEUED SUBTOTAL	2,142.20		
ASGI-2011-002	20.00	SPS	Herring 115kV
GEN-2011-014	201.00	OKGE	Tap Hitchland - Woodward Dbl Ckt (Beaver County) 345kV
GEN-2011-022	299.00	SPS	Hitchland 345kV
CURRENT CLUSTER SUBTOTAL	520.00		
AREA TOTAL	2,662.20		

GROUP 3: SPEARVILLE AREA			
Request	Capacity	Area	Proposed Point of Interconnection
GEN-2001-039A	105.00	SUNCMKEC	Tap Greensburg - Ft Dodge (Shooting Star Tap) 115kV
GEN-2002-025A	150.00	SUNCMKEC	Spearville 230kV
GEN-2004-014	154.50	SUNCMKEC	Spearville 230kV
GEN-2005-012	250.00	SUNCMKEC	Ironwood 345kV
GEN-2006-006	205.50	SUNCMKEC	Spearville 345kV
GEN-2006-021	101.00	SUNCMKEC	Flat Ridge Tap 138kV
GEN-2007-040	200.00	SUNCMKEC	Buckner 345kV
GEN-2008-018	250.00	SPS	Finney 345kV
GEN-2008-079	99.20	SUNCMKEC	Tap Cudahy - Ft Dodge 115kV
GEN-2008-124	200.10	SUNCMKEC	Ironwood 345kV
GEN-2010-009	165.60	SUNCMKEC	Buckner 345kV
GEN-2010-045	197.80	SUNCMKEC	Buckner 345kV
Gray County Wind (Montezuma)	110.00	SUNCMKEC	Gray County Tap 115kV
PRIOR QUEUED SUBTOTAL	2,188.70		
GEN-2011-008	600.00	SUNCMKEC	Clark County 345kV
GEN-2011-016	200.10	SUNCMKEC	Spearville 345kV
GEN-2011-017	299.00	SUNCMKEC	Tap Spearville - PostRock (GEN-2011-017T) 345kV
CURRENT CLUSTER SUBTOTAL	1,099.10		
AREA TOTAL	3,287.80		

GROUP 4/11: NW KANSAS AREA			
Request	Capacity	Area	Proposed Point of Interconnection
GEN-2001-039M	100.00	SUNCMKEC	Central Plains Tap 115kV
GEN-2003-006A	200.00	SUNCMKEC	Elm Creek 230kV
GEN-2003-019	250.00	MIDW	Smoky Hills Tap 230kV
GEN-2006-031	75.00	MIDW	Knoll 115kV
GEN-2008-017	300.00	SUNCMKEC	Setab 345kV
GEN-2008-092	201.00	MIDW	Post Rock 230kV
GEN-2009-008	199.50	MIDW	South Hays 230kV
GEN-2009-020	48.60	MIDW	Tap Nekoma - Bazine (Walnut Creek) 69kV
PRIOR QUEUED SUBTOTAL	1,374.10		
GEN-2010-057	201.00	MIDW	Rice County 230kV
CURRENT CLUSTER SUBTOTAL	201.00		
AREA TOTAL	1,575.10		

GROUP 5: AMARILLO AREA			
Request	Capacity	Area	Proposed Point of Interconnection
GEN-2002-022	240.00	SPS	Bushland 230kV
GEN-2008-051	322.00	SPS	Potter County 345kV
Llano Estacado (White Deer)	80.00	SPS	Llano Wind 115kV
PRIOR QUEUED SUBTOTAL	642.00		
AREA TOTAL	642.00		

GROUP 6: S-TX PANHANDLE/W-TX AREA			
Request	Capacity	Area	Proposed Point of Interconnection
ASGI-2010-010	42.20	SPS	Lovington 115kV
ASGI-2010-020	30.00	SPS	Tap LE-Tatum - LE-Crossroads 69kV
ASGI-2010-021	15.00	SPS	Tap LE-Saunders Tap - LE-Anderson 69kV
ASGI-2011-001	28.80	SPS	Lovington 115kV
ASGI-2013-006	2.00	SPS	SP-Erskine 115kV
GEN-2001-033	180.00	SPS	San Juan Tap 230kV
GEN-2001-036	80.00	SPS	Norton 115kV
GEN-2006-018	170.00	SPS	TUCO Interchange 230kV
GEN-2006-026	604.00	SPS	Hobbs 230kV & Hobbs 115kV
GEN-2008-022	300.00	SPS	Tap Eddy Co - Tolk (Crossroads) 345kV
GEN-2010-006	205.00	SPS	Jones 230kV
GEN-2010-046	56.00	SPS	TUCO Interchange 230kV
SPS Distributed (Hopi)	10.00	SPS	Hopi 115kV
SPS Distributed (Jal)	10.00	SPS	S Jal 115kV
SPS Distributed (Lea Road)	10.00	SPS	Lea Road 115kV
SPS Distributed (Monument)	10.00	SPS	Monument 115kV
SPS Distributed (Ocotillo)	10.00	SPS	S_Jal 115kV
PRIOR QUEUED SUBTOTAL	1,763.00		
ASGI-2011-003	10.00	SPS	Hendricks 115kV
GEN-2011-025	80.00	SPS	Tap Floyd County - Crosby County 115kV
CURRENT CLUSTER SUBTOTAL	90.00		
AREA TOTAL	1,853.00		

GROUP 7: SW-OKLAHOMA AREA

Request	Capacity	Area	Proposed Point of Interconnection
GEN-2001-026	74.25	WFEC	Washita 138kV
GEN-2002-005	120.00	WFEC	Red Hills Tap 138kV
GEN-2003-004	100.00	WFEC	Washita 138kV
GEN-2003-005	100.00	WFEC	Anadarko - Paradise (Blue Canyon) 138kV
GEN-2003-022	120.00	AEPW	Washita 138kV
GEN-2004-020	27.00	AEPW	Washita 34.5kV
GEN-2004-023	20.60	WFEC	Washita 138kV
GEN-2005-003	30.60	WFEC	Washita 138kV
GEN-2006-002	101.00	AEPW	Sweetwater 230kV
GEN-2006-035	225.00	AEPW	Sweetwater 230kV
GEN-2006-043	99.00	AEPW	Sweetwater 230kV
GEN-2007-032	150.00	WFEC	Tap Clinton Junction - Clinton 138kV
GEN-2007-052	150.00	WFEC	Anadarko 138kV
GEN-2008-023	150.00	AEPW	Hobart Junction 138kV
GEN-2008-037	101.00	WFEC	Tap Washita - Blue Canyon Wind 138kV
PRIOR QUEUED SUBTOTAL	1,568.45		
AREA TOTAL	1,568.45		

GROUP 8: N-OK/S-KS AREA

Request	Capacity	Area	Proposed Point of Interconnection
ASGI-2010-006	150.00	AECI	Tap Fairfax (AECI) - Schilder (AEPW) 138kV
GEN-2002-004	200.00	WERE	Latham 345kV
GEN-2005-013	201.00	WERE	Tap Latham - Neosho (Caney River) 345kV
GEN-2007-025	300.00	WERE	Viola 345kV
GEN-2008-013	300.00	OKGE	Tap Wichita - Woodring (Hunter) 345kV
GEN-2008-021	42.00	WERE	Wolf Creek 345kV
GEN-2008-098	100.80	WERE	Tap Lacygne - Wolf Creek (Anderson County) 345kV
GEN-2009-025	60.00	OKGE	Nardins 69kV
GEN-2010-003	100.80	WERE	Tap Lacygne - Wolf Creek (Anderson County) 345kV
GEN-2010-005	300.00	WERE	Viola 345kV
PRIOR QUEUED SUBTOTAL	1,754.60		
GEN-2010-055	4.50	AEPW	Wekiwa 138kV
CURRENT CLUSTER SUBTOTAL	4.50		
AREA TOTAL	1,759.10		

GROUP 9/10: NEBRASKA AREA			
Request	Capacity	Area	Proposed Point of Interconnection
GEN-2002-023N	0.80	NPPD	Harmony 115kV
GEN-2003-021N	75.00	NPPD	Ainsworth Wind Tap 115kV
GEN-2004-023N	75.00	NPPD	Columbus Co 115kV
GEN-2006-020N	42.00	NPPD	Bloomfield 115kV
GEN-2006-037N1	75.00	NPPD	Broken Bow 115kV
GEN-2006-038N005	80.00	NPPD	Broken Bow 115kV
GEN-2006-038N019	80.00	NPPD	Petersburg North 115kV
GEN-2006-044N	40.50	NPPD	North Petersburg 115kV
GEN-2007-011N08	81.00	NPPD	Bloomfield 115kV
GEN-2008-086N02	200.00	NPPD	Tap Ft Randle - Columbus (Meadow Grove) 230kV
GEN-2008-119O	60.00	OPPD	S1399 161kV
GEN-2008-123N	89.70	NPPD	Tap Guide Rock - Pauline (Rosemont) 115kV
GEN-2009-040	73.80	WERE	Marshall 115kV
GEN-2010-041	10.50	OPPD	S 1399 161kV
GEN-2010-051	200.00	NPPD	Tap Twin Church - Hoskins 230kV
NPPD Distributed (Broken Bow)	8.30	NPPD	Broken Bow 115kV
NPPD Distributed (Burt County Wind)	12.00	NPPD	Tekamah & Oakland 115kV
NPPD Distributed (Burwell)	3.00	NPPD	Ord 115kV
NPPD Distributed (Columbus Hydro)	45.00	NPPD	Columbus 115kV
NPPD Distributed (Ord)	11.90	NPPD	Ord 115kV
NPPD Distributed (Stuart)	2.10	NPPD	Ainsworth 115kV
PRIOR QUEUED SUBTOTAL	1,265.60		
GEN-2011-018	73.60	NPPD	Steele City 115kV
GEN-2011-027	120.00	NPPD	Tap Twin Church - Hoskins 230kV (GEN-2010-51 Tap)
CURRENT CLUSTER SUBTOTAL	193.60		
AREA TOTAL	1,459.20		

GROUP 12: NW-AR AREA

Request	Capacity	Area	Proposed Point of Interconnection
AREA TOTAL	0.00		

GROUP 13: NW MISSOURI AREA

Request	Capacity	Area	Proposed Point of Interconnection
GEN-2008-129	80.00	MIPU	Pleasant Hill 161kV
GEN-2010-036	4.60	WERE	6th Street 115kV
PRIOR QUEUED SUBTOTAL	84.60		
GEN-2011-011	50.00	KACP	Iatan 345kV
CURRENT CLUSTER SUBTOTAL	50.00		
AREA TOTAL	134.60		

GROUP 14: S-OKLAHOMA AREA

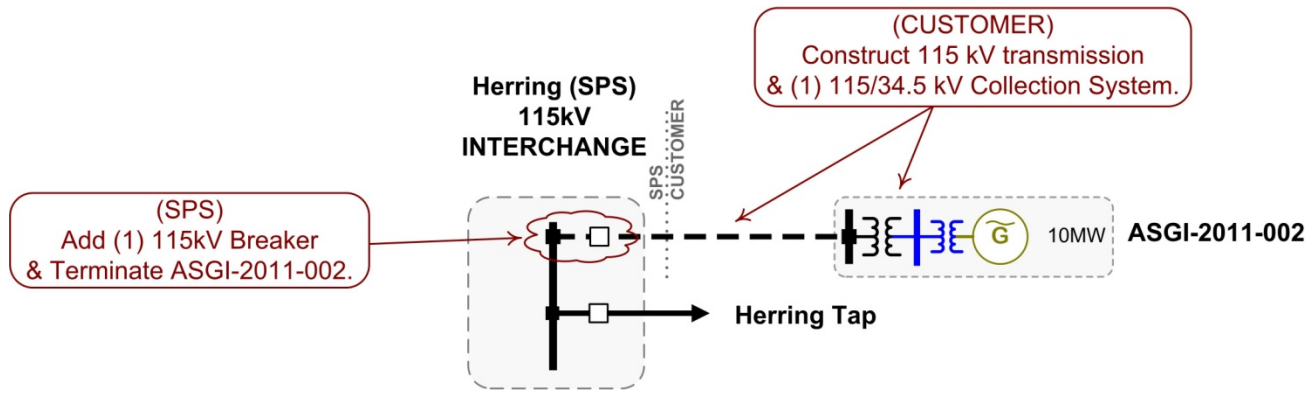
Request	Capacity	Area	Proposed Point of Interconnection
AREA TOTAL	0.00		

CLUSTER TOTAL (CURRENT STUDY)	2,857.0	MW
PQ TOTAL (PRIOR QUEUED)	15,514.6	MW
CLUSTER TOTAL (INCLUDING PRIOR QUEUED)	18,371.6	MW

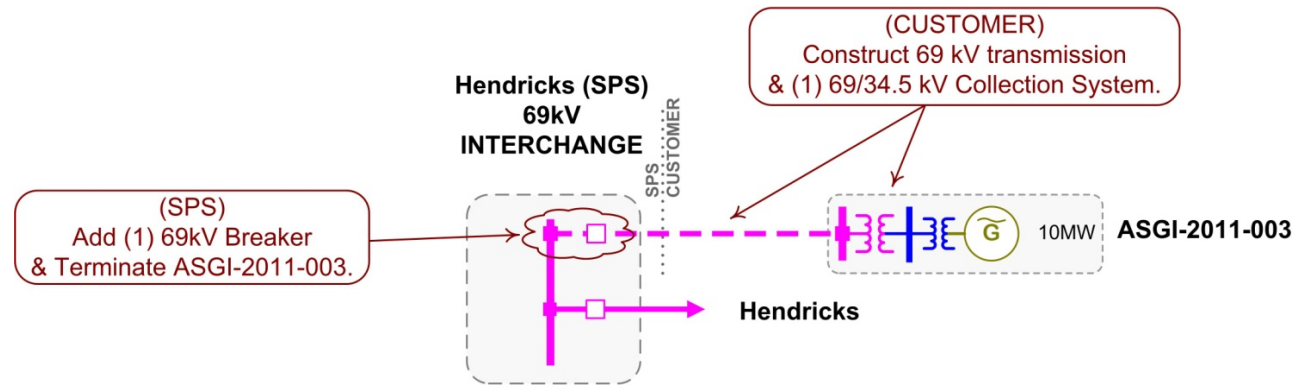
D: Proposed Point of Interconnection One line Diagrams

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

ASGI-2011-002



ASGI-2011-003



GEN-2010-055

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

GEN-2010-057

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

GEN-2011-008

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

GEN-2011-010

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

GEN-2011-011

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

GEN-2011-014

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

GEN-2011-016

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

GEN-2011-017

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

GEN-2011-018

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

GEN-2011-019

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

GEN-2011-020

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

GEN-2011-022

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

GEN-2011-025

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

GEN-2011-027

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

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

Important Note:

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

This section shows 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 an Interconnection Request choose to go into service prior to the operation date of any necessary Network Upgrades, the costs associated with those upgrades may be reallocated to the impacted Interconnection Request. The actual costs allocated to each Generation Interconnection Request Customer will be determined at the time of a restudy.

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

Appendix E. Cost Allocation Per Request

(Including Previously Allocated Network Upgrades*)

Interconnection Request and Upgrades	Upgrade Type	Allocated Cost	Upgrade Cost
ASGI-2011-002			
ASGI-2011-002 Interconnection Costs See Online Diagram.	Current Study	\$0	\$0
Beaver County - Woodward 345kV Dbl CKT Priority Project: Hitchland - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	In-Service		\$226,040,727
Border - Tuco Interchange 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV CKT 1 (Total Project E&C Cost Shown)	In-Service		\$249,247,072
Border - Woodward 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV CKT 1 (Total Project E&C Cost Shown)	In-Service		\$249,247,072
Clark - Thistle 345KV Dbl CKT Priority Project: Spearville - Clark - Thistle Dbl 345kV CKT (Total Project E&C Cost Shown.)	In-Service		\$426,504,292
Hitchland - Beaver County 345kV Dbl CKT Priority Project: Hitchland - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	In-Service		\$226,040,727
Hitchland 345/230kV Autotransformer CKT 2 Priority Project: Hitchland 345/230kV Autotransformer CKT 2 (Total Project E&C Cost Shown).	In-Service		\$8,883,760
Spearville - Clark 345KV Dbl CKT Priority Project: Spearville - Clark - Thistle Dbl 345kV CKT (Total Project E&C Cost Shown.)	In-Service		\$426,504,292
Thistle - Flat Ridge 138kV CKT 1 Priority Project: Thistle - Flat Ridge 138kV CKT 1 (Total Project E&C Cost Shown.)	In-Service		\$5,776,280
Thistle - Wichita 345KV Dbl CKT Priority Project: Thistle - Wichita Dbl 345kV CKT (Total Project E&C Cost Shown.)	In-Service		\$426,504,292
Thistle - Woodward 345KV Dbl CKT Priority Project: Thistle - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	In-Service		\$207,782,000
Thistle 345/138KV Transformer CKT 1 Priority Project: Thistle 345/138kV Transformer CKT 1 (Total Project E&C Cost Shown.)	In-Service		\$6,585,986
TUCO Interchange 345/230/13.2KV Autotransformer CKT 2 Balanced Portfolio: TUCO 345/230 kV Transformer CKT 2 (Total Project E&C Cost Shown)	In-Service		\$14,900,907
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).	In-Service		\$249,247,072
Current Study Total		\$0	

* 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-2011-003**

ASGI-2011-003 Interconnection Costs See Online Diagram.	Current Study	\$0	\$0
Beaver County - Woodward 345kV Dbl CKT Priority Project: Hitchland - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	In-Service		\$226,040,727
Border - Tuco Interchange 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV CKT 1 (Total Project E&C Cost Shown)	In-Service		\$249,247,072
Border - Woodward 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV CKT 1 (Total Project E&C Cost Shown)	In-Service		\$249,247,072
Clark - Thistle 345KV Dbl CKT Priority Project: Spearville - Clark - Thistle Dbl 345kV CKT (Total Project E&C Cost Shown.)	In-Service		\$426,504,292
Hitchland - Beaver County 345kV Dbl CKT Priority Project: Hitchland - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	In-Service		\$226,040,727
Hitchland 345/230kV Autotransformer CKT 2 Priority Project: Hitchland 345/230kV Autotransformer CKT 2 (Total Project E&C Cost Shown).	In-Service		\$8,883,760
Spearville - Clark 345KV Dbl CKT Priority Project: Spearville - Clark - Thistle Dbl 345kV CKT (Total Project E&C Cost Shown.)	In-Service		\$426,504,292
Thistle - Flat Ridge 138kV CKT 1 Priority Project: Thistle - Flat Ridge 138kV CKT 1 (Total Project E&C Cost Shown.)	In-Service		\$5,776,280
Thistle - Wichita 345KV Dbl CKT Priority Project: Thistle - Wichita Dbl 345kV CKT (Total Project E&C Cost Shown.)	In-Service		\$426,504,292
Thistle - Woodward 345KV Dbl CKT Priority Project: Thistle - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	In-Service		\$207,782,000
Thistle 345/138KV Transformer CKT 1 Priority Project: Thistle 345/138kV Transformer CKT 1 (Total Project E&C Cost Shown.)	In-Service		\$6,585,986
TUCO Interchange 345/230/13.2KV Autotransformer CKT 2 Balanced Portfolio: TUCO 345/230 kV Transformer CKT 2 (Total Project E&C Cost Shown)	In-Service		\$14,900,907
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).	In-Service		\$249,247,072
	Current Study Total	\$0	

GEN-2010-055

GEN-2010-055 Interconnection Costs See Online Diagram.	Current Study	\$309,300	\$309,300
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* Withdrawal of higher queued projects will cause a restudy and may result in higher costs

Interconnection Request and Upgrades	Upgrade Type	Allocated Cost	Upgrade Cost
	Current Study Total	\$309,300	
GEN-2010-057			
GEN-2010-057 Interconnection Costs See Online Diagram.	Current Study	\$859,521	\$859,521
Axtell - PostRock 345KV CKT 1 Balanced Portfolio: PostRock - Axtell 345kV CKT 1 (Total Project E&C Cost Shown)	In-Service		\$136,000,000
Clark - Thistle 345KV Dbl CKT Priority Project: Spearville - Clark - Thistle Dbl 345kV CKT (Total Project E&C Cost Shown.)	In-Service		\$426,504,292
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)	In-Service		\$3,994,000
Rice County - Circle 230kV Conversion Convert from 115kV to 230kV operation	In-Service		\$9,889,234
Rice County - Lyons 115kV Rebuild circuit @ 1000 Amps	In-Service		\$6,646,800
Rice County 230/115kV transformer Install 230/115kV transformer at Rice County substation	In-Service		\$7,835,455
Spearville - Clark 345KV Dbl CKT Priority Project: Spearville - Clark - Thistle Dbl 345kV CKT (Total Project E&C Cost Shown.)	In-Service		\$426,504,292
Wheatland - Lyons 115kV Rerate circuit @ 1000 amps	In-Service		\$76,103
Iatan - Nashua 345KV CKT 1 Balanced Portfolio: Iatan - Nashua 345kV CKT 1 (Total Project E&C Cost Shown).	Previously Allocated		\$60,569,180
Nashua 345/161/13.8KV Autotransformer CKT 1 Balanced Portfolio: Nashua/161/13.8 Autotransformer 345kV CKT 1 (Total Project E&C Cost Shown).	Previously Allocated		\$4,230,000
	Current Study Total	\$859,521	

GEN-2011-008

GEN-2011-008 Interconnection Costs See Online Diagram.	Current Study	\$3,236,246	\$3,236,246
Axtell - PostRock 345KV CKT 1 Balanced Portfolio: PostRock - Axtell 345kV CKT 1 (Total Project E&C Cost Shown)	In-Service		\$136,000,000
Beaver County - Woodward 345kV Dbl CKT Priority Project: Hitchland - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	In-Service		\$226,040,727

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

Interconnection Request and Upgrades	Upgrade Type	Allocated Cost	Upgrade Cost
Border - Tuco Interchange 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV CKT 1 (Total Project E&C Cost Shown)	In-Service		\$249,247,072
Border - Woodward 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV CKT 1 (Total Project E&C Cost Shown)	In-Service		\$249,247,072
Clark - Thistle 345KV Dbl CKT Priority Project: Spearville - Clark - Thistle Dbl 345kV CKT (Total Project E&C Cost Shown.)	In-Service		\$426,504,292
GEN-2011-017 Tap - Postrock 345kV CKT 1 Balanced Portfolio: Spearville - PostRock 345kV CKT 1 (Total Project E&C Cost Shown)	In-Service		\$84,006,000
Hitchland - Beaver County 345kV Dbl CKT Priority Project: Hitchland - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	In-Service		\$226,040,727
Hitchland 345/230kV Autotransformer CKT 2 Priority Project: Hitchland 345/230kV Autotransformer CKT 2 (Total Project E&C Cost Shown).	In-Service		\$8,883,760
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)	In-Service		\$3,994,000
Spearville - GEN-2011-017T 345kV CKT 1 Balanced Portfolio: Spearville - PostRock 345kV CKT 1 (Total Project E&C Cost Shown)	In-Service		\$84,006,000
Thistle - Flat Ridge 138kV CKT 1 Priority Project: Thistle - Flat Ridge 138kV CKT 1 (Total Project E&C Cost Shown.)	In-Service		\$5,776,280
Thistle - Wichita 345KV Dbl CKT Priority Project: Thistle - Wichita Dbl 345kV CKT (Total Project E&C Cost Shown.)	In-Service		\$426,504,292
Thistle - Woodward 345KV Dbl CKT Priority Project: Thistle - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	In-Service		\$207,782,000
Thistle 345/138KV Transformer CKT 1 Priority Project: Thistle 345/138kV Transformer CKT 1 (Total Project E&C Cost Shown.)	In-Service		\$6,585,986
TUCO Interchange 345/230/13.2KV Autotransformer CKT 2 Balanced Portfolio: TUCO 345/230 kV Transformer CKT 2 (Total Project E&C Cost Shown)	In-Service		\$14,900,907
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).	In-Service		\$249,247,072
Buckner - Spearville 345V CKT 1 Replace Terminal equipment	Previously Allocated		\$1,480,238
	Current Study Total		\$3,236,246

GEN-2011-010

* 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-2011-010 Interconnection Costs See Online Diagram.	Current Study	\$3,654,353	\$3,654,353
Border - Tuco Interchange 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV CKT 1 (Total Project E&C Cost Shown)	In-Service		\$249,247,072
Border - Woodward 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV CKT 1 (Total Project E&C Cost Shown)	In-Service		\$249,247,072
Thistle - Flat Ridge 138kV CKT 1 Priority Project: Thistle - Flat Ridge 138kV CKT 1 (Total Project E&C Cost Shown.)	In-Service		\$5,776,280
Thistle - Wichita 345KV Dbl CKT Priority Project: Thistle - Wichita Dbl 345kV CKT (Total Project E&C Cost Shown.)	In-Service		\$426,504,292
Thistle - Woodward 345KV Dbl CKT Priority Project: Thistle - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	In-Service		\$207,782,000
Thistle 345/138KV Transformer CKT 1 Priority Project: Thistle 345/138kV Transformer CKT 1 (Total Project E&C Cost Shown.)	In-Service		\$6,585,986
TUCO Interchange 345/230/13.2KV Autotransformer CKT 2 Balanced Portfolio: TUCO 345/230 kV Transformer CKT 2 (Total Project E&C Cost Shown)	In-Service		\$14,900,907
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).	In-Service		\$249,247,072
	Current Study Total	\$3,654,353	

GEN-2011-011

GEN-2011-011 Interconnection Costs See Online Diagram.	Current Study	\$0	\$0
	Current Study Total	\$0	

GEN-2011-014

GEN-2011-014 Interconnection Costs See Online Diagram.	Current Study	\$16,844,894	\$16,844,894
Beaver County - Woodward 345kV Dbl CKT Priority Project: Hitchland - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	In-Service		\$226,040,727
Border - Tuco Interchange 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV CKT 1 (Total Project E&C Cost Shown)	In-Service		\$249,247,072
Border - Woodward 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV CKT 1 (Total Project E&C Cost Shown)	In-Service		\$249,247,072

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

Interconnection Request and Upgrades	Upgrade Type	Allocated Cost	Upgrade Cost
Clark - Thistle 345KV Dbl CKT Priority Project: Spearville - Clark - Thistle Dbl 345kV CKT (Total Project E&C Cost Shown.)	In-Service		\$426,504,292
Hitchland 345/230kV Autotransformer CKT 2 Priority Project: Hitchland 345/230kV Autotransformer CKT 2 (Total Project E&C Cost Shown).	In-Service		\$8,883,760
Spearville - Clark 345KV Dbl CKT Priority Project: Spearville - Clark - Thistle Dbl 345kV CKT (Total Project E&C Cost Shown.)	In-Service		\$426,504,292
Thistle - Flat Ridge 138kV CKT 1 Priority Project: Thistle - Flat Ridge 138kV CKT 1 (Total Project E&C Cost Shown.)	In-Service		\$5,776,280
Thistle - Wichita 345KV Dbl CKT Priority Project: Thistle - Wichita Dbl 345kV CKT (Total Project E&C Cost Shown.)	In-Service		\$426,504,292
Thistle - Woodward 345KV Dbl CKT Priority Project: Thistle - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	In-Service		\$207,782,000
Thistle 345/138KV Transformer CKT 1 Priority Project: Thistle 345/138kV Transformer CKT 1 (Total Project E&C Cost Shown.)	In-Service		\$6,585,986
TUCO Interchange 345/230/13.2KV Autotransformer CKT 2 Balanced Portfolio: TUCO 345/230 kV Transformer CKT 2 (Total Project E&C Cost Shown)	In-Service		\$14,900,907
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).	In-Service		\$249,247,072
	Current Study Total		\$16,844,894

GEN-2011-016

GEN-2011-016 Interconnection Costs See Online Diagram.	Current Study	\$8,000,000	\$8,000,000
Axtell - PostRock 345KV CKT 1 Balanced Portfolio: PostRock - Axtell 345kV CKT 1 (Total Project E&C Cost Shown)	In-Service		\$136,000,000
Beaver County - Woodward 345kV Dbl CKT Priority Project: Hitchland - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	In-Service		\$226,040,727
Border - Tuco Interchange 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV CKT 1 (Total Project E&C Cost Shown)	In-Service		\$249,247,072
Border - Woodward 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV CKT 1 (Total Project E&C Cost Shown)	In-Service		\$249,247,072
Clark - Thistle 345KV Dbl CKT Priority Project: Spearville - Clark - Thistle Dbl 345kV CKT (Total Project E&C Cost Shown.)	In-Service		\$426,504,292

* 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-2011-017 Tap - Postrock 345kV CKT 1 Balanced Portfolio: Spearville - PostRock 345kV CKT 1 (Total Project E&C Cost Shown)	In-Service		\$84,006,000
Hitchland - Beaver County 345kV Dbl CKT Priority Project: Hitchland - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	In-Service		\$226,040,727
Hitchland 345/230kV Autotransformer CKT 2 Priority Project: Hitchland 345/230kV Autotransformer CKT 2 (Total Project E&C Cost Shown).	In-Service		\$8,883,760
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)	In-Service		\$3,994,000
Spearville - Clark 345KV Dbl CKT Priority Project: Spearville - Clark - Thistle Dbl 345kV CKT (Total Project E&C Cost Shown.)	In-Service		\$426,504,292
Spearville - GEN-2011-017T 345kV CKT 1 Balanced Portfolio: Spearville - PostRock 345kV CKT 1 (Total Project E&C Cost Shown)	In-Service		\$84,006,000
Thistle - Flat Ridge 138kV CKT 1 Priority Project: Thistle - Flat Ridge 138kV CKT 1 (Total Project E&C Cost Shown.)	In-Service		\$5,776,280
Thistle - Wichita 345KV Dbl CKT Priority Project: Thistle - Wichita Dbl 345kV CKT (Total Project E&C Cost Shown.)	In-Service		\$426,504,292
Thistle - Woodward 345KV Dbl CKT Priority Project: Thistle - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	In-Service		\$207,782,000
Thistle 345/138KV Transformer CKT 1 Priority Project: Thistle 345/138kV Transformer CKT 1 (Total Project E&C Cost Shown.)	In-Service		\$6,585,986
TUCO Interchange 345/230/13.2KV Autotransformer CKT 2 Balanced Portfolio: TUCO 345/230 kV Transformer CKT 2 (Total Project E&C Cost Shown)	In-Service		\$14,900,907
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).	In-Service		\$249,247,072
Buckner - Spearville 345V CKT 1 Replace Terminal equipment	Previously Allocated		\$1,480,238
	Current Study Total	\$8,000,000	

GEN-2011-017

GEN-2011-017 Interconnection Costs See Online Diagram.	Current Study	\$11,532,284	\$11,532,284
Axtell - PostRock 345KV CKT 1 Balanced Portfolio: PostRock - Axtell 345kV CKT 1 (Total Project E&C Cost Shown)	In-Service		\$136,000,000

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

Interconnection Request and Upgrades	Upgrade Type	Allocated Cost	Upgrade Cost
Beaver County - Woodward 345kV Dbl CKT Priority Project: Hitchland - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	In-Service		\$226,040,727
Border - Tuco Interchange 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV CKT 1 (Total Project E&C Cost Shown)	In-Service		\$249,247,072
Border - Woodward 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV CKT 1 (Total Project E&C Cost Shown)	In-Service		\$249,247,072
Clark - Thistle 345KV Dbl CKT Priority Project: Spearville - Clark - Thistle Dbl 345kV CKT (Total Project E&C Cost Shown.)	In-Service		\$426,504,292
GEN-2011-017 Tap - Postrock 345kV CKT 1 Balanced Portfolio: Spearville - PostRock 345kV CKT 1 (Total Project E&C Cost Shown)	In-Service		\$84,006,000
Hitchland - Beaver County 345kV Dbl CKT Priority Project: Hitchland - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	In-Service		\$226,040,727
Hitchland 345/230kV Autotransformer CKT 2 Priority Project: Hitchland 345/230kV Autotransformer CKT 2 (Total Project E&C Cost Shown).	In-Service		\$8,883,760
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)	In-Service		\$3,994,000
Spearville - Clark 345KV Dbl CKT Priority Project: Spearville - Clark - Thistle Dbl 345kV CKT (Total Project E&C Cost Shown.)	In-Service		\$426,504,292
Spearville - GEN-2011-017T 345kV CKT 1 Balanced Portfolio: Spearville - PostRock 345kV CKT 1 (Total Project E&C Cost Shown)	In-Service		\$84,006,000
Thistle - Flat Ridge 138kV CKT 1 Priority Project: Thistle - Flat Ridge 138kV CKT 1 (Total Project E&C Cost Shown.)	In-Service		\$5,776,280
Thistle - Wichita 345KV Dbl CKT Priority Project: Thistle - Wichita Dbl 345kV CKT (Total Project E&C Cost Shown.)	In-Service		\$426,504,292
Thistle - Woodward 345KV Dbl CKT Priority Project: Thistle - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	In-Service		\$207,782,000
Thistle 345/138KV Transformer CKT 1 Priority Project: Thistle 345/138kV Transformer CKT 1 (Total Project E&C Cost Shown.)	In-Service		\$6,585,986
TUCO Interchange 345/230/13.2KV Autotransformer CKT 2 Balanced Portfolio: TUCO 345/230 kV Transformer CKT 2 (Total Project E&C Cost Shown)	In-Service		\$14,900,907
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).	In-Service		\$249,247,072

* 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
Buckner - Spearville 345V CKT 1 Replace Terminal equipment	Previously Allocated		\$1,480,238
	Current Study Total	\$11,532,284	
GEN-2011-018			
GEN-2011-018 Interconnection Costs See Online Diagram.	Current Study	\$900,000	\$900,000
Twin Church - Dixon County 230kV Increase conductor clearances to accommodate 320MVA facility rating	Previously Allocated		\$100,000
	Current Study Total	\$900,000	
GEN-2011-019			
FPL Switch - Mooreland 138kV CKT 1 Rebuild approximately 0.2 miles of 138kV line	Current Study	\$410,000	\$820,000
FPL Switch - Woodward 138kV CKT 1 Rebuild approximately 12 miles of 138kV line	Current Study	\$3,749,779	\$8,499,000
GEN-2011-019 Interconnection Costs See Online Diagram.	Current Study	\$3,654,353	\$3,654,353
Border - Tuco Interchange 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV CKT 1 (Total Project E&C Cost Shown)	In-Service		\$249,247,072
Border - Woodward 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV CKT 1 (Total Project E&C Cost Shown)	In-Service		\$249,247,072
Thistle - Flat Ridge 138kV CKT 1 Priority Project: Thistle - Flat Ridge 138kV CKT 1 (Total Project E&C Cost Shown.)	In-Service		\$5,776,280
Thistle - Wichita 345KV Dbl CKT Priority Project: Thistle - Wichita Dbl 345kV CKT (Total Project E&C Cost Shown.)	In-Service		\$426,504,292
Thistle - Woodward 345KV Dbl CKT Priority Project: Thistle - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	In-Service		\$207,782,000
Thistle 345/138KV Transformer CKT 1 Priority Project: Thistle 345/138kV Transformer CKT 1 (Total Project E&C Cost Shown.)	In-Service		\$6,585,986
TUCO Interchange 345/230/13.2KV Autotransformer CKT 2 Balanced Portfolio: TUCO 345/230 kV Transformer CKT 2 (Total Project E&C Cost Shown)	In-Service		\$14,900,907
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).	In-Service		\$249,247,072

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

Interconnection Request and Upgrades	Upgrade Type	Allocated Cost	Upgrade Cost
	Current Study Total	\$7,814,132	
GEN-2011-020			
FPL Switch - Mooreland 138kV CKT 1 Rebuild approximately 0.2 miles of 138kV line	Current Study	\$410,000	\$820,000
FPL Switch - Woodward 138kV CKT 1 Rebuild approximately 12 miles of 138kV line	Current Study	\$3,749,779	\$8,499,000
GEN-2011-020 Interconnection Costs See Online Diagram.	Current Study	\$3,654,353	\$3,654,353
Border - Tuco Interchange 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV CKT 1 (Total Project E&C Cost Shown)	In-Service		\$249,247,072
Border - Woodward 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV CKT 1 (Total Project E&C Cost Shown)	In-Service		\$249,247,072
Thistle - Flat Ridge 138kV CKT 1 Priority Project: Thistle - Flat Ridge 138kV CKT 1 (Total Project E&C Cost Shown.)	In-Service		\$5,776,280
Thistle - Wichita 345KV Dbl CKT Priority Project: Thistle - Wichita Dbl 345kV CKT (Total Project E&C Cost Shown.)	In-Service		\$426,504,292
Thistle - Woodward 345KV Dbl CKT Priority Project: Thistle - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	In-Service		\$207,782,000
Thistle 345/138KV Transformer CKT 1 Priority Project: Thistle 345/138kV Transformer CKT 1 (Total Project E&C Cost Shown.)	In-Service		\$6,585,986
TUCO Interchange 345/230/13.2KV Autotransformer CKT 2 Balanced Portfolio: TUCO 345/230 kV Transformer CKT 2 (Total Project E&C Cost Shown)	In-Service		\$14,900,907
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).	In-Service		\$249,247,072
	Current Study Total	\$7,814,132	

GEN-2011-022

FPL Switch - Woodward 138kV CKT 1 Rebuild approximately 12 miles of 138kV line	Current Study	\$999,441	\$8,499,000
GEN-2011-022 Interconnection Costs See Online Diagram.	Current Study	\$3,281,972	\$3,281,972
Beaver County - Woodward 345kV Dbl CKT Priority Project: Hitchland - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	In-Service		\$226,040,727

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

Interconnection Request and Upgrades	Upgrade Type	Allocated Cost	Upgrade Cost
Border - Tuco Interchange 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV CKT 1 (Total Project E&C Cost Shown)	In-Service		\$249,247,072
Border - Woodward 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV CKT 1 (Total Project E&C Cost Shown)	In-Service		\$249,247,072
Clark - Thistle 345KV Dbl CKT Priority Project: Spearville - Clark - Thistle Dbl 345kV CKT (Total Project E&C Cost Shown.)	In-Service		\$426,504,292
Hitchland - Beaver County 345kV Dbl CKT Priority Project: Hitchland - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	In-Service		\$226,040,727
Hitchland 345/230kV Autotransformer CKT 2 Priority Project: Hitchland 345/230kV Autotransformer CKT 2 (Total Project E&C Cost Shown).	In-Service		\$8,883,760
Spearville - Clark 345KV Dbl CKT Priority Project: Spearville - Clark - Thistle Dbl 345kV CKT (Total Project E&C Cost Shown.)	In-Service		\$426,504,292
Thistle - Flat Ridge 138kV CKT 1 Priority Project: Thistle - Flat Ridge 138kV CKT 1 (Total Project E&C Cost Shown.)	In-Service		\$5,776,280
Thistle - Wichita 345KV Dbl CKT Priority Project: Thistle - Wichita Dbl 345kV CKT (Total Project E&C Cost Shown.)	In-Service		\$426,504,292
Thistle - Woodward 345KV Dbl CKT Priority Project: Thistle - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	In-Service		\$207,782,000
Thistle 345/138KV Transformer CKT 1 Priority Project: Thistle 345/138kV Transformer CKT 1 (Total Project E&C Cost Shown.)	In-Service		\$6,585,986
TUCO Interchange 345/230/13.2KV Autotransformer CKT 2 Balanced Portfolio: TUCO 345/230 kV Transformer CKT 2 (Total Project E&C Cost Shown)	In-Service		\$14,900,907
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).	In-Service		\$249,247,072
	Current Study Total	\$4,281,413	

GEN-2011-025

GEN-2011-025 Interconnection Costs See Online Diagram.	Current Study	\$4,249,629	\$4,249,629
Beaver County - Woodward 345kV Dbl CKT Priority Project: Hitchland - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	In-Service		\$226,040,727
Border - Tuco Interchange 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV CKT 1 (Total Project E&C Cost Shown)	In-Service		\$249,247,072

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

Interconnection Request and Upgrades	Upgrade Type	Allocated Cost	Upgrade Cost
Border - Woodward 345KV CKT 1 Balanced Portfolio: Tuco - Woodward 345kV CKT 1 (Total Project E&C Cost Shown)	In-Service		\$249,247,072
Clark - Thistle 345KV Dbl CKT Priority Project: Spearville - Clark - Thistle Dbl 345kV CKT (Total Project E&C Cost Shown.)	In-Service		\$426,504,292
Hitchland - Beaver County 345kV Dbl CKT Priority Project: Hitchland - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	In-Service		\$226,040,727
Spearville - Clark 345KV Dbl CKT Priority Project: Spearville - Clark - Thistle Dbl 345kV CKT (Total Project E&C Cost Shown.)	In-Service		\$426,504,292
Thistle - Flat Ridge 138kV CKT 1 Priority Project: Thistle - Flat Ridge 138kV CKT 1 (Total Project E&C Cost Shown.)	In-Service		\$5,776,280
Thistle - Wichita 345KV Dbl CKT Priority Project: Thistle - Wichita Dbl 345kV CKT (Total Project E&C Cost Shown.)	In-Service		\$426,504,292
Thistle - Woodward 345KV Dbl CKT Priority Project: Thistle - Woodward Dbl 345kV CKT (Total Project E&C Cost Shown)	In-Service		\$207,782,000
Thistle 345/138KV Transformer CKT 1 Priority Project: Thistle 345/138kV Transformer CKT 1 (Total Project E&C Cost Shown.)	In-Service		\$6,585,986
TUCO Interchange 345/230/13.2KV Autotransformer CKT 2 Balanced Portfolio: TUCO 345/230 kV Transformer CKT 2 (Total Project E&C Cost Shown)	In-Service		\$14,900,907
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).	In-Service		\$249,247,072
	Current Study Total		\$4,249,629
GEN-2011-027			
GEN-2011-027 Interconnection Costs See Online Diagram.	Current Study	\$0	\$0
Hoskins - Dixon County - Twin Church 230kV Rerate per NPPD Facility Study	Current Study	\$500,000	\$500,000
Fort Randall - Columbus 230kV CKT 1 Conductor clearance increase	In-Service		\$2,900,000
Twin Church - Dixon County 230kV Increase conductor clearances to accommodate 320MVA facility rating	Previously Allocated		\$100,000
	Current Study Total		\$500,000
TOTAL CURRENT STUDY COSTS:			\$69,995,905

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

F: Cost Allocation per Proposed Study Network Upgrade

Important Note:

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

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

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

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

Appendix F. Cost Allocation by Upgrade

ASGI-2011-002 Interconnection Costs		\$0
See Online Diagram.		
	ASGI-2011-002	\$0
	Total Allocated Costs	\$0
ASGI-2011-003 Interconnection Costs		\$0
See Online Diagram.		
	ASGI-2011-003	\$0
	Total Allocated Costs	\$0
FPL Switch - Mooreland 138kV CKT 1		\$820,000
Rebuild approximately 0.2 miles of 138kV line		
	GEN-2011-019	\$410,000
	GEN-2011-020	\$410,000
	Total Allocated Costs	\$820,000
FPL Switch - Woodward 138kV CKT 1		\$8,499,000
Rebuild approximately 12 miles of 138kV line		
	GEN-2011-019	\$3,749,779
	GEN-2011-020	\$3,749,779
	GEN-2011-022	\$999,441
	Total Allocated Costs	\$8,499,000
GEN-2010-055 Interconnection Costs		\$309,300
See Online Diagram.		
	GEN-2010-055	\$309,300
	Total Allocated Costs	\$309,300
GEN-2010-057 Interconnection Costs		\$859,521
See Online Diagram.		
	GEN-2010-057	\$859,521
	Total Allocated Costs	\$859,521
GEN-2011-008 Interconnection Costs		\$3,236,246
See Online Diagram.		
	GEN-2011-008	\$3,236,246
	Total Allocated Costs	\$3,236,246

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

GEN-2011-010 Interconnection Costs		\$3,654,353
See Online Diagram.		
	GEN-2011-010	\$3,654,353
	Total Allocated Costs	\$3,654,353
GEN-2011-011 Interconnection Costs		\$0
See Online Diagram.		
	GEN-2011-011	\$0
	Total Allocated Costs	\$0
GEN-2011-014 Interconnection Costs		\$16,844,894
See Online Diagram.		
	GEN-2011-014	\$16,844,894
	Total Allocated Costs	\$16,844,894
GEN-2011-016 Interconnection Costs		\$8,000,000
See Online Diagram.		
	GEN-2011-016	\$8,000,000
	Total Allocated Costs	\$8,000,000
GEN-2011-017 Interconnection Costs		\$11,532,284
See Online Diagram.		
	GEN-2011-017	\$11,532,284
	Total Allocated Costs	\$11,532,284
GEN-2011-018 Interconnection Costs		\$900,000
See Online Diagram.		
	GEN-2011-018	\$900,000
	Total Allocated Costs	\$900,000
GEN-2011-019 Interconnection Costs		\$3,654,353
See Online Diagram.		
	GEN-2011-019	\$3,654,353
	Total Allocated Costs	\$3,654,353
GEN-2011-020 Interconnection Costs		\$3,654,353
See Online Diagram.		
	GEN-2011-020	\$3,654,353
	Total Allocated Costs	\$3,654,353

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

GEN-2011-022 Interconnection Costs **\$3,281,972**

See Online Diagram.

GEN-2011-022 \$3,281,972

Total Allocated Costs **\$3,281,972**

GEN-2011-025 Interconnection Costs **\$4,249,629**

See Online Diagram.

GEN-2011-025 \$4,249,629

Total Allocated Costs **\$4,249,629**

GEN-2011-027 Interconnection Costs **\$0**

See Online Diagram.

GEN-2011-027 \$0

Total Allocated Costs **\$0**

Hoskins - Dixon County - Twin Church 230kV **\$500,000**

Rerate per NPPD Facility Study

GEN-2011-027 \$500,000

Total Allocated Costs **\$500,000**

* 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	TC%LOADING		CONTINGENCY
							(MVA)	TDF	(% MVA)	
FDNS	01NR	0	15G	G11_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.08997	107.8306	GEN560222 1-G07-62-2 0.6900
FDNS	01NR	0	15G	G11_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.08997	107.8306	GEN560223 1-G07-62-3 0.6900
FDNS	01NR	0	15G	G11_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.08997	107.8306	GEN560224 1-G07-62-4 0.6900
FDNS	01NR	0	15G	G11_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.08462	107.6585	BYRON_138 138.00 - SANDY_CN_138138.00 138KV CKT 1
FDNS	01NR	0	15G	G11_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.08303	107.5064	DOVER SW - OKEENE 138KV CKT 1
FDNS	01NR	0	15G	G11_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.08462	106.7316	BYRON_138 138.00 - C_CITY_138 138.00 138KV CKT 1
FDNS	01NR	0	15G	G11_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.08026	106.3176	WOODWARD - WOODWARD EHV 138KV CKT 1
FDNS	01NR	0	15G	G11_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.08462	106.1255	C_CITY_138 138.00 - NOEL_SW 138.00 138KV CKT 1
FDNS	01NR	0	15G	G11_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.08997	104.781	GEN515365 1-CENT 21 0.7000
FDNS	01NR	0	15G	G11_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.07983	104.6792	IMO TAP - MEN TAP 138KV CKT 1
FDNS	01NR	0	15G	G11_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.08997	104.6781	GEN515393 1-OGEWND2G
FDNS	01NR	0	15G	G11_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.07983	104.0441	CLEOPLT4 138.00 - MEN TAP 138KV CKT 1
FDNS	01NR	0	15G	G11_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.07983	103.5097	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1
FDNS	01NR	0	15G	G11_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.08997	101.3691	GEN562023 1-G11_020_3 0.6900
FDNS	01NR	0	15G	G11_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.08997	101.3691	GEN562026 1-G11_019_3 0.6900
FDNS	01NR	0	15G	G11_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.08064	100.3278	CEDARDALE - OKEENE 138KV CKT 1

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

See next page

SOLUTION	GROUP	SCENARIO	SEASON	SOURCE	DIRECTION	MONITORED ELEMENT	RATEB	TDF	TC%LOADING	CONTINGENCY
							(MVA)		(% MVA)	
FDNS	01NR		0 15G	G11_019	FROM->TO	CLEARWATER - GILL ENERGY CENTER WEST 138KV CKT 1	143	0.05328	99	DBL-THIS-WIC
FDNS	01NR		0 15G	G11_019	TO->FROM	CLEARWATER - MILAN TAP 138KV CKT 1	110	0.05328	138.1541	DBL-THIS-WIC
FDNS	01NR		0 15G	G11_019	FROM->TO	FPL SWITCH - MOORELAND 138KV CKT 1	287	0.13321	112.0694	DBL-THIS-WWR
FDNS	01NR		0 15G	G11_019	FROM->TO	FPL SWITCH - MOORELAND 138KV CKT 1	287	0.11349	104.4453	DBL-THIS-WIC
FDNS	01NR		0 15G	G11_019	FROM->TO	FPL SWITCH - MOORELAND 138KV CKT 1	287	0.10115	98.1	WOODWARD (WOODWRD2) 138/69/13.2KV TRANSFORMER CKT 1
FDNS	01NR		0 15G	G11_019	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.13321	165.1671	DBL-THIS-WWR
FDNS	01NR		0 15G	G11_019	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.11349	151.608	DBL-THIS-WIC
FDNS	01NR		0 15G	G11_019	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.10142	132.6141	DBL-HTCH-BVR
FDNS	01NR		0 15G	G11_019	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.10142	126.4392	DBL-BVR-G111
FDNS	01NR		0 15G	G11_019	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.10142	123.4211	DBL-G1114-WW
FDNS	01NR		0 15G	G11_019	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.09608	121.4684	LAWTON EASTSIDE - OKLAUNION 345KV CKT 1
FDNS	01NR		0 15G	G11_019	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.07893	98.2	CLEO CORNER - GLASS MOUNTAIN 138KV CKT 1
FDNS	01NR		0 15G	G11_019	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.07893	97.3	GLASS MOUNTAIN - MOORELAND 138KV CKT 1
FDNS	01NR		0 15G	G11_019	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.08632	96.8	ELK CITY - RED HILLS WIND 138KV CKT 1
FDNS	01NR		0 15G	G11_019	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.0822	95	MOREWOOD SW - NINE MILE 138KV CKT 1
FDNS	01NR		0 15G	G11_019	FROM->TO	HARPER - MILAN TAP 138KV CKT 1	143.4	0.05328	115.0236	DBL-THIS-WIC
FDNS	00NR		0 15SP	G11_019	FROM->TO	NORTHWEST (NORTWST2) 345/138/13.8KV TRANSFORMER CKT 1	493	0.0481	95.5	NORTHWEST (NORTWST3) 345/138/13.8KV TRANSFORMER CKT 1
FDNS	00NR		0 25SP	G11_019	FROM->TO	POTTER COUNTY INTERCHANGE (WAUK 90343-A) 345/230/13.2KV TRANSFORMER CKT 1	560	0.04064	98.2	BORDER 7345.00 - TUCO INTERCHANGE 345KV CKT 1
FDNS	00NR		0 25SP	G11_019	FROM->TO	POTTER COUNTY INTERCHANGE (WAUK 90343-A) 345/230/13.2KV TRANSFORMER CKT 1	560	0.04064	98.2	BORDER 7345.00 - WOODWARD DISTRICT EHV 345KV CKT 1
FDNS	00NR		0 25SP	G11_019	FROM->TO	POTTER COUNTY INTERCHANGE (WAUK 90343-A) 345/230/13.2KV TRANSFORMER CKT 1	560	0.04064	96.5	BORDER 7345.00 - TUCO INTERCHANGE 345KV CKT 1
FDNS	00NR		0 25SP	G11_019	FROM->TO	POTTER COUNTY INTERCHANGE (WAUK 90343-A) 345/230/13.2KV TRANSFORMER CKT 1	560	0.04064	96.5	BORDER 7345.00 - WOODWARD DISTRICT EHV 345KV CKT 1
FDNSLock	01NR		0 15G	G11_019	FROM->TO	WOODWARD (WOODWRD2) 138/69/13.2KV TRANSFORMER CKT 1	134	0.04135	97.4	FPL SWITCH - MOORELAND 138KV CKT 1
FDNSLock	01NR		0 15G	G11_019	FROM->TO	WOODWARD (WOODWRD2) 138/69/13.2KV TRANSFORMER CKT 1	134	0.04135	96.2	FPL SWITCH - MOORELAND 138KV CKT 1
FDNS	01NR		0 15G	G11_020	FROM->TO	CLEARWATER - GILL ENERGY CENTER WEST 138KV CKT 1	143	0.05328	99	DBL-THIS-WIC
FDNS	01NR		0 15G	G11_020	TO->FROM	CLEARWATER - MILAN TAP 138KV CKT 1	110	0.05328	138.1541	DBL-THIS-WIC
FDNS	01NR		0 15G	G11_020	FROM->TO	FPL SWITCH - MOORELAND 138KV CKT 1	287	0.13321	112.0694	DBL-THIS-WWR
FDNS	01NR		0 15G	G11_020	FROM->TO	FPL SWITCH - MOORELAND 138KV CKT 1	287	0.11349	104.4453	DBL-THIS-WIC
FDNS	01NR		0 15G	G11_020	FROM->TO	FPL SWITCH - MOORELAND 138KV CKT 1	287	0.10115	98.1	WOODWARD (WOODWRD2) 138/69/13.2KV TRANSFORMER CKT 1
FDNS	01NR		0 15G	G11_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.13321	165.1671	DBL-THIS-WWR
FDNS	01NR		0 15G	G11_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.11349	151.608	DBL-THIS-WIC
FDNS	01NR		0 15G	G11_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.10142	132.6141	DBL-HTCH-BVR
FDNS	01NR		0 15G	G11_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.10142	126.4392	DBL-BVR-G111
FDNS	01NR		0 15G	G11_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.10142	123.4211	DBL-G1114-WW
FDNS	01NR		0 15G	G11_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.09608	121.4684	LAWTON EASTSIDE - OKLAUNION 345KV CKT 1
FDNS	01NR		0 15G	G11_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.07893	98.2	CLEO CORNER - GLASS MOUNTAIN 138KV CKT 1
FDNS	01NR		0 15G	G11_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.07893	97.3	GLASS MOUNTAIN - MOORELAND 138KV CKT 1
FDNS	01NR		0 15G	G11_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.08632	96.8	ELK CITY - RED HILLS WIND 138KV CKT 1
FDNS	01NR		0 15G	G11_020	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	153	0.0822	95	MOREWOOD SW - NINE MILE 138KV CKT 1
FDNS	01NR		0 15G	G11_020	FROM->TO	HARPER - MILAN TAP 138KV CKT 1	143.4	0.05328	115.0236	DBL-THIS-WIC
FDNS	00NR		0 15SP	G11_020	FROM->TO	NORTHWEST (NORTWST2) 345/138/13.8KV TRANSFORMER CKT 1	493	0.0481	95.5	NORTHWEST (NORTWST3) 345/138/13.8KV TRANSFORMER CKT 1
FDNS	00NR		0 25SP	G11_020	FROM->TO	POTTER COUNTY INTERCHANGE (WAUK 90343-A) 345/230/13.2KV TRANSFORMER CKT 1	560	0.04064	98.2	BORDER 7345.00 - TUCO INTERCHANGE 345KV CKT 1
FDNS	00NR		0 25SP	G11_020	FROM->TO	POTTER COUNTY INTERCHANGE (WAUK 90343-A) 345/230/13.2KV TRANSFORMER CKT 1	560	0.04064	98.2	BORDER 7345.00 - WOODWARD DISTRICT EHV 345KV CKT 1
FDNS	00NR		0 25SP	G11_020	FROM->TO	POTTER COUNTY INTERCHANGE (WAUK 90343-A) 345/230/13.2KV TRANSFORMER CKT 1	560	0.04064	96.5	BORDER 7345.00 - TUCO INTERCHANGE 345KV CKT 1
FDNS	00NR		0 25SP	G11_020	FROM->TO	POTTER COUNTY INTERCHANGE (WAUK 90343-A) 345/230/13.2KV TRANSFORMER CKT 1	560	0.04064	96.5	BORDER 7345.00 - WOODWARD DISTRICT EHV 345KV CKT 1
FDNSLock	01NR		0 15G	G11_020	FROM->TO	WOODWARD (WOODWRD2) 138/69/13.2KV TRANSFORMER CKT 1	134	0.04135	97.4	FPL SWITCH - MOORELAND 138KV CKT 1
FDNSLock	01NR		0 15G	G11_020	FROM->TO	WOODWARD (WOODWRD2) 138/69/13.2KV TRANSFORMER CKT 1	134	0.04135	96.2	FPL SWITCH - MOORELAND 138KV CKT 1

I: Power Flow Analysis (Category “C” Contingencies)

Not performed for this study iteration. Please refer to previous iteration.