Definitive Interconnection System Impact Study for Generation Interconnection Requests

(DISIS-2015-002-2)

Group 1 Restudy

(Cost Allocation for All Groups included)

November 2016

Generator Interconnection

SPP Southwest Power Pool

Revision History

Date	Author	Change Description
2/5/2016	SPP	Draft issued to Transmission Owners for review
2/12/2016	SPP	Report Issued (DISIS-2015-002). Some stability analysis still pending. Group 2, 6, 7, 15 and 16 Interconnection Request Results not included in this issue.
2/22/2016	SPP	Draft issued to Transmission Owners for Group 2, 6, and 7 review
2/29/2016	SPP	Report Issued (DISIS-2015-002) to include Group 2, 6, and 7 Results. Some stability analysis still pending. 15 and 16 Interconnection Request Results not included in this issue.
3/17/2016	SPP	Draft issued to Transmission Owners for Group 15, and 16 review
3/29/2016	SPP	Report Issued (DISIS-2015-002) to include Group 15 and 16 Results. Group 16 stability analysis still pending.
4/28/2016	SPP	Report Issued to include Group 16 stability analysis
8/01/2016	SPP	ReStudy to account for withdrawn projects.
8/04/2016	SPP	DISIS-2015-002-1 reposted for AECI Affected System Cost Allocation correction and update to Introduction Section Stand-Alone Language
11/29/2016	SPP	Restudy Power Flow Analysis for Group 1 only. Cost Allocation for all projects. To account for withdrawn Projects, Report Reposted (DISIS-2015-002-2)

Executive Summary

Pursuant to the Generator Interconnection Procedures (GIP) of the Southwest Power Pool (SPP) Open Access Transmission Tariff (OATT), SPP has conducted this Definitive Interconnection System Impact Study (DISIS). The Interconnection Customers' requests have been clustered together for the following DISIS window which closed September 30, 2015. The Interconnection Customers will be referred to in this study as the DISIS-2015-002 Interconnection Customers. This DISIS analyzes the interconnecting of multiple generation interconnection requests associated with new generation totaling approximately 7,158.6 MW of new generation which would be located within the transmission systems of American Electric Power – Western (AEPW), Basin Electric Power Cooperative (BEPC), Nebraska Public Power District (NPPD), Oklahoma Gas and Electric (OKGE), Southwestern Public Service (SPS), Southwestern Power Administration (SWPA), Sunflower Electric Power Corporation\Mid-Kansas Electric Company, LLC (SUNC\MKEC), Western Area Power Administration (WAPA), Westar Energy, Inc. (WERE), and Western Farmers Electric Cooperative (WFEC). The various generation interconnection requests have differing proposed in-service dates[1]. The generation interconnection requests included in this DISIS 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 study represents the "Stand-Alone" analysis for remaining Interconnection Requests in the DISIS-2015-002 analysis.

Power flow analysis has indicated that for the power flow cases studied, 7,158.6 MW of nameplate generation may be interconnected with transmission system reinforcements within the SPP transmission system. For the analyses that has been completed, dynamic stability and power factor analysis has determined the need for reactive compensation in accordance with SPP stability and voltage recovery requirements including FERC Order #661-A for wind farm interconnection requests. Those reactive requirements are listed for each interconnection request within this report. Dynamic stability analysis has determined that the transmission system will remain stable with the assigned Network Upgrades and necessary reactive compensation requirements. A short circuit analysis has been performed with available short circuit values given in the stability study for each group in the appendices of this report. A short circuit analysis has been performed with available short circuit values given in the stability study for each group in the appendices of this report.

In no way does this study guarantee operation for all periods of time. This interconnection study identifies and assigns transmission reinforcements for Energy Resource Interconnection Service (ERIS) interconnection injection constraints (defined as a 20% or greater distribution factor impact

[1] The generation interconnection requests in-service dates may need to be deferred based on the required lead time for the Network Upgrades necessary. The Interconnection Customers that proceed to the Interconnection Facilities Study will be provided a new in-service date based on the Facility Study's time for completion of the Network Upgrades necessary or as otherwise provided for in the GIP.

for outage based constraints and 3% or greater distribution factor impact for system intact constraints) and Network Resource Interconnection Service (NRIS) constraints (defined as 3% or greater distribution factor impact), if requested by the Customer. These constraints are listed in Appendix G-T (Thermal) and Appendix G-V (Voltage). This interconnection study does not assign transmission reinforcements for all potential transmission constraints. It should be noted that although this study analyzed many of the most probable contingencies, it is not an all-inclusive list and cannot account for every operational situation. Because of this, it is likely that the Interconnection Customer(s) may be required to reduce their generation output to 0 MW, also known as curtailment, under certain system conditions to allow system operators to maintain the reliability of the transmission network.

The total minimum cost for interconnecting the DISIS-2015-002 Interconnection Customers is estimated at $640,621,668. The following costs are not included in this total –

- **Costs Not Included** – Costs on Affected Systems for particularly Associated Electric Cooperative Inc. (AECI), Mid-Continent Independent System Operator (MISO), and Minnkota Power Cooperative, Inc (MPC).

These costs determined at this time are shown in Appendix E and F. For Interconnection Requests that result in an interconnection to, or modification to, the transmission facilities of the Western-UGP (WAPA), a National Environmental Policy Act (NEPA) Environmental Review will be required. The Interconnection Customer will be required to execute and Environmental Review Agreement per Section 8.6.1 of the GIP.

Interconnection Service to DISIS-2015-002 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 also do not include the Interconnection Customer Interconnection Facilities as defined by the SPP Open Access Transmission Tariff (OATT) or the additional SPP transmission network constraints identified through this study and shown in Appendix H.

Constraints listed in Appendix H do not require transmission reinforcement for Interconnection Service, but could require Interconnection Customer to reduce generation in operational conditions. These transmission constraints occur when this study's generation is dispatched into the SPP footprint for ERIS or when this study's generation is dispatched into the interconnecting Transmission Owner's (T.O.) area for NRIS.

It should be noted that the additional network constraints identified in Appendix H may also be identified by a Transmission Service Request (TSR) and may need to be verified by associated studies. With a defined source and sink in a TSR, the 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 costs associated with the deliverability of the energy to load or other customers. These costs are determined by separate studies should the Customer decide to submit a Transmission Service Request through SPP's Open Access Same Time Information System (OASIS) as required by Attachment Z1 of the SPP OATT. Furthermore, this DISIS neither guarantees transmission service or deliverability of the requested resource.

When applicable, affected system thermal and voltage constraints are listed in Appendix H-T-AS and Appendix H-V-AS. Affected System constraints could require an affects system impact study review by the affected party or affected system parties. The affected system impact study could result in identifying additional affected transmission system reinforcement network upgrades required for interconnection.

NERC FAC-002-2 Compliance Statement

SPP, as Planning Coordinator has studied the reliability impact of interconnecting new or materially modified generation requesting interconnection to the Transmission System of SPP and any affected systems as requested by those entities. Affected systems include both the systems of SPP Transmission Owners and systems not included in the SPP Tariff footprint. The impact of the generation interconnection on affected systems will be further coordinated with the following systems as part of the coordinated planning procedures as described in Section 6 of this report and summarized below.

- Impacts on Associated Electric Cooperative Inc. (AECI) – For any observed violations of thermal overloads on AECI facilities, AECI has been notified by SPP to evaluate the violations for impacts on its transmission system.
- Impacts on Mid Continent Independent System Operation (MISO) – MISO has been contacted and provided a list of interconnection requests that proceed to move forward into the Interconnection Facilities Study Queue. MISO is evaluating the Interconnection Requests for impacts.
- Impacts on Minnkota Power Cooperative, Inc (MPC) – MPC has been contacted and provided a list of interconnection requests that proceed to move forward into the Interconnection Facilities Study Queue. MP is evaluating the Interconnection Requests for impacts.

This analysis adheres to NERC standards, regional, and Transmission Owner planning criteria, as related to generator interconnections. Facility interconnection requirements will be fully evaluated by the Transmission Owners during the Interconnection Facilities Study.

This analysis evaluates steady-state (Section 8), short-circuit (Section 9), and dynamic studies (Section 9) to evaluate system performance under both normal and contingency conditions. Study assumptions (Section 2) and system performance (Section 3) are documented in this report. Alternatives considered and coordinated recommendations are documented in Section 8 and Section 9.

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1 Introduction

Pursuant to the Southwest Power Pool (SPP) Open Access Transmission Tariff (OATT), SPP has conducted this DISIS for certain generation interconnection requests in the SPP Generation Interconnection Queue. These interconnection requests have been clustered together for the following DISIS window which closed September 30, 2015. The customers will be referred to in this study as the DISIS-2015-002 Interconnection Customers. This DISIS analyzes the interconnecting of multiple generation interconnection requests associated with new generation totaling 7,158.6 MW of new generation which would be located within the transmission systems of American Electric Power – Western (AEPW), Basin Electric Power Cooperative (BEPC), Nebraska Public Power District (NPPD), Oklahoma Gas and Electric (OKGE), Southwestern Public Service (SPS), Southwestern Power Administration (SWPA), Sunflower Electric Power Corporation\Mid-Kansas Electric Company, LLC (SUNC\MKEC), Western Area Power Administration (WAPA), Westar Energy, Inc. (WERE), and Western Farmers Electric Cooperative (WFEC). The various generation interconnection requests have differing proposed in-service dates[2]. The generation interconnection requests included in this DISIS 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 study represents the "Stand-Alone" analysis for remaining Interconnection Requests in the DISIS-2015-002 analysis.

The primary objective of this DISIS is to identify the system constraints, transient instabilities, and over-dutied equipment associated with connecting the generation to the area transmission system. The Impact Study and other subsequent Interconnection Studies are designed to identify required Transmission Owner Interconnection Facilities, Network Upgrades and other Direct Assignment Facilities needed to inject power into the grid at each specific point of interconnection.

[2] The generation interconnection requests in-service dates may need to be deferred based on the required lead time for the Network Upgrades necessary. The Interconnection Customers that proceed to the Facility Study will be provided a new in-service date based on the completion of the Facility Study or as otherwise provided for in the GIP.

2 Model Development (Study Assumptions)

2.1.1 Interconnection Requests Included in the Cluster

SPP included all interconnection requests that submitted a DISIS Agreement no later than September 30, 2015 and were subsequently accepted by Southwest Power Pool under the terms of the Generator Interconnection Procedures (GIP) that were in effect at the time this study commenced on October 1, 2015. The interconnection requests that are included in this study are listed in Appendix A.

2.1.2 Affected System Interconnection Request

Also included in this DISIS is one (1) Affected System Study. The Affected System Interconnection Requests have been given the designations with the "ASGI" prefix. These requests are listed in Appendix A. Affected System Interconnection Requests were only studied in "cluster" scenarios.

2.1.3 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 ERIS with equal distribution across the SPP footprint. Prior queued projects that requested NRIS were also dispatched in separate NRIS scenarios into the balancing authority of the interconnecting transmission owner.

2.2 Development of Base Cases

2.2.1 Power Flow

The 2015 series Integrated Transmission Planning models (used in the 2016 ITPNT) including the 2016 winter peak (16WP) season, the 2017 spring (17G) and 2017 summer peak (17SP) seasons, the 2020 light load (20L), summer (20SP) and winter peak (20WP) seasons, and the 2025 summer peak (25SP) season were the starting seasonal models for this study.

2.2.2 Dynamic Stability

The 2015 series SPP Model Development Working Group (MDWG) Models for 2016 winter peak (16WP) season, 2017 summer peak (17SP) season, and the 2025 summer peak (25SP) season cases were used as starting points for this study.

2.2.3 Short Circuit

The 2017 and 2025 summer peak stability cases are used for this analysis.

2.2.4 Base Case Upgrades

The following facilities are part of the SPP Transmission Expansion Plan, the Balanced Portfolio or recently approved Priority Projects. These facilities have an approved Notification to Construct (NTC) or are in construction stages and were assumed to be in-service at the time of dispatch and added to the base case models. The DISIS-2015-002 Interconnection Customers have not been assigned advancement costs for the below listed projects. The DISIS-2015-002 Interconnection Customers Generation Facilities in service dates may need to be delayed until the completion of the following upgrades. In some cases, the in-service date is beyond the allowable time a customer

can delay. In this case, the Interconnection Customer may move forward with Limited Operation or remain in the DISIS Queue for additional study cycles. 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.

- 2012 Integrated Transmission Plan (2012 ITP10) Projects
  - Woodward-Tatonga-Mathewson-Cimarron 345kV transmission line circuit #2, scheduled for 2018 in-service[3]
  - Chisholm – Gracemont 345kV transmission line, and Chisholm 345/230kV transformer circuit #1, scheduled for 3/1/2018 in-service[4]
- 2015 Integrated Transmission Plan Near Term (2015 ITPNT) Projects
  - Potash Junction – Intrepid – IMC #1 – Livingston Ridge 115kV rebuild
  - National Enrichment Plant – Targa – Cardinal 115kV circuit #1 rebuild
- 2016 Integrated Transmission Plan Near Term (2016 ITPNT) Projects
  - DeGrasse 345/138kV Project[5]
    - DeGrasse 345/138kV Substation and transformer build
    - DeGrasse – Knob Hill 138kV build
- Gentleman – Thedford (Cherry County) – Holt County 345kV circuit #1 scheduled for 2018 in-service[6]
- Hoskins – Neligh East 345/115 kV Project[7]
  - Neligh East 345/115 kV substation and transformer
  - Neligh East Area 115 kV upgrades to support new station
  - Hoskins – Neligh East 345 kV circuit #1
- High Priority Incremental Loads (HPILs) Projects[8]:
  - TUCO Interchange – Yoakum – Hobbs Interchange 345/230 kV Project
    - TUCO Interchange – Yoakum – Hobbs Interchange 345 kV circuit #1 and associated terminal equipment upgrades
    - Hobbs 345/230/13 kV transformer circuit #1
    - Yoakum 345/230/13 kV transformer circuit #1
  - Chaves County – Price – CV Pines – Capitan 115 kV circuit #1
  - China Draw – Yeso Hills 115 kV circuit #1
  - Dollarhide – Toboso Flats 115 kV circuit #1
  - Hobbs Interchange – Kiowa 345 kV circuit #1
  - Kiowa – North Loving – China Draw 345/115 kV Projects
    - Kiowa – North Loving – China Draw circuit #1 and associated terminal equipment upgrades

[3] SPP Notification to Construct (NTC) 200223
[4] SPP Notification to Construct (NTC) 200240 and 200255
[5] SPP Notification to Construct (NTC) 200391
[6] SPP Notification to Construct (NTC) 200220
[7] SPP Regional Reliability 2012 ITP 10 Project Per SPP-NTC-200220
[8] Per Network Upgrades assigned in High Priority Incremental Loads (HPILs) study, Including Direct Assigned Upgrades, Projects in SPP-NTC-200256 and SPP-NTC-200283.

        - China Draw 345/115/13 kV transformer circuit #1
        - North Loving 345/115/13 kV transformer circuit #1
    - Kiowa – Road Runner 345/230/115 kV Projects
        - Kiowa 345/230 kV transformer circuit #1
        - Road Runner 345/115/13 kV transformer circuit #1
    - Livingston Ridge – Sage Brush – Lagarto – Cardinal 115 kV circuit #1
    - North Loving – South Loving 115 kV circuit #1
    - Ponderosa – Ponderosa Tap 115 kV circuit #1
- Nebraska City – Mullin Creek – Sibley 345kV circuit #1 build, scheduled for 12/31/2016 in-service[9]

2.2.5 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-2015-002 study and are assumed to be in service. This list may not be all inclusive. The DISIS-2015-002 Interconnection Customers, at this time, do not have responsibility for these facilities but may later be assigned the cost of these facilities if higher queued customers terminate their Generation Interconnection Agreement or withdraw from the interconnection queue. The DISIS-2015-002 Interconnection Customer Generation Facilities in-service dates may need to be delayed until the completion of the following upgrades.

- Upgrades assigned to DISIS-2010-002 Interconnection Customers:
    - Twin Church – Dixon County 230 kV circuit #1 rerate (320 MVA).
    - Buckner – Spearville 345 kV circuit #1 terminal equipment.
- Upgrades assigned to DISIS-2011-001 Interconnection Customers:
    - Hoskins – Dixon County – Twin Church 230 kV circuit #1 conductor clearance increase.
    - (NRIS only) Woodward District EHV Phase Shifting Transformer.
- Upgrades assigned to DISIS-2012-002 Interconnection Customers:
    - Lake Creek – Lone Wolf 69 kV circuit #1 reset CT, placed in-service
- Upgrades assigned to DISIS-2013-002 Interconnection Customers:
    - Battle Creek – County Line – Neligh East 115kV circuit #1 rebuild.
- Upgrades assigned to DISIS-2014-002 Interconnection Customers:
    - Arnold – Ransom 115kV circuit #1, terminal equipment replacement.
    - Tolk – Plant X 230kV circuit #1 and circuit #2, re-conductor.
    - Tuco 345/230kV transformer replacement.
- Upgrades assigned to DISIS-2015-001 Interconnection Customers:
    - Beach – GEN-2010-048 Tap 115kV circuit #1 replace terminal equipment.
    - Cimarron River Tap – Kismet – Cudahy – Crooked Creek 115kV circuit #1 rebuild.
    - Greenburg – Shooting Star 115kV circuit #1 rebuild.
    - Kress Interchange – Swisher 115kV circuit #1 replace terminal equipment.

[9] SPP Notification to Construct (NTC) 20097 and 20098

- Oklaunion 345kV Reactive Power Support
  - Install two (2) 130Mvar Capacitor Bank(s).
- (NRIS Only) Cox Interchange – Hale County 115kV circuit #1 rebuild.
- (NRIS Only) Potter County Interchange 345/230/13kV Transformer circuit #2, build.
- (NRIS Only) Renfrow – Renfrow 138kV circuit #1 rebuild.
- (NRIS Only) Sundown Interchange 230/115/13.8kV transformer circuit #1 replacement.
- (NRIS Only) Crawfish Draw Substation 345/230kV
  - Build new 345/230kV substation along TUCO – Border 345kV and TUCO – Swisher 230kV. Tie in and Terminate TUCO 345kV, Border 345kV, TUCO 230kV, and Swisher 230kV at Crawfish Draw (TUCO 2).
  - Build 345/230/13kV transformer
- (NRIS Only) Wolfforth – Terry County 115kV circuit #1 replace terminal equipment.
- (NRIS Only) Wolfforth Interchange 230/225/13.2kV circuit #1 replacement.

2.2.6 Potential Upgrades Not in the Base Case

Any potential upgrades that do not have a Notification to Construct (NTC) and are 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.

2.2.7 Regional Groupings

The interconnection requests listed in Appendix A are grouped together into ten (10) active regional groups based on geographical and electrical impacts. These groupings are shown in Appendix C.

To determine interconnection impacts, ten (10) different generation dispatch scenarios of the spring, summer, and winter base case models are developed to accommodate the regional groupings.

2.3 Development of Analysis Cases

2.3.1 Power Flow

For Variable Energy Resources (VER) (solar/wind) in each power flow case, ERIS, is evaluated for the generating plants within a geographical area of the interconnection request(s) for the VERs dispatched at 100% nameplate of maximum generation. The VERs in the remote areas are dispatched at 20% nameplate of maximum generation. These projects are dispatched across the SPP footprint using load factor ratios.

Peaking units are not dispatched in the 2017 spring, 2020 light, or in the “High VER” summer and winter peaks. To study peaking units’ impacts, the 2016 winter peak and 2017 summer peak, 2020 summer and winter peaks, and 2025 summer peak models are developed with peaking units dispatched at 100% of the nameplate rating and VERs dispatched at 20% of the nameplate rating. Each interconnection request is also modeled separately at 100% nameplate for certain analyses.

All generators (VER and peaking) that requested NRIS are dispatched in an additional analysis into the interconnecting Transmission Owner’s (T.O.) area at 100% nameplate with ERIS only requests

at 80% nameplate. This method allows for identification of network constraints that are common between regional groupings to have affecting requests share the mitigating upgrade costs throughout the cluster.

2.3.1.1 Additional Sensitivities Considered – The following sensitivities were run for situations prevalent to the local area for which they were considered

- North Dakota – Canadian border – The phase shifting transformer to Saskatchewan Power (also known as B-10T) and Miles City DC Tie were dispatched at the following levels
  - 2016 Winter Peak –
    - Miles City DC Tie– 200MW East to West transfer
    - B-10T – 65MW South to North transfer
  - 2017 Summer Peak –
    - Miles City DC Tie – 200MW East to West transfer
    - B-10T – 200MW North to South transfer
  - Other Seasons
    - Miles City DC Tie – 140MW East to West transfer (20WP)
    - Miles City DC Ties – 92MW East to West transfer (17G & 20L)
    - B-10T – 0MW

2.3.2 Dynamic Stability

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

2.3.2.1 Additional Sensitivities Considered

- North Dakota – Canadian border – The phase shifting transformer to Saskatchewan Power (also known as B-10T) and Miles City DC Tie were dispatched at the following levels
  - 2016 Winter Peak –
    - Miles City DC Tie– 200MW East to West transfer
    - B-10T – 65MW South to North transfer
  - 2017 Summer Peak –
    - Miles City DC Tie – 200MW East to West transfer
    - B-10T – 200MW North to South transfer

2.3.3 Short Circuit

The dynamic stability models (2017 SP and 2025 SP) are used for this analysis.

3 Identification of Network Constraints (System Performance)

3.1.1 Thermal Overloads

Network constraints are found by using PSS/E AC Contingency Calculation (ACCC) analysis with PSS/E MUST First Contingency Incremental Transfer Capability (FCITC) analysis on the entire cluster grouping dispatched at the various levels previously mentioned.

For ERIS, thermal overloads are determined for system intact (n-0) (greater than 100% of Rate A - normal) and for contingency (n-1) (greater than 100% of Rate B – emergency) conditions.

The overloads are then screened to determine which of generator interconnection requests have at least

- 3% Distribution Factor (DF) for system intact conditions (n-0),
- 20% DF upon outage based conditions (n-1),
- or 3% DF on contingent elements that resulted in a non-converged solution.

Appropriate transmission support is then determined to mitigate the constraints.

Interconnection Requests that requested NRIS are also studied in a separate NRIS analysis to determine if any constraint measured greater than or equal to a 3% DF. If so, these constraints are also considered for transmission reinforcement under NRIS.

3.1.2 Voltage

For non-converged power flow solutions that are determined to be caused by lack of voltage support, appropriate transmission support will be determined to mitigate the constraint.

After all thermal overload and voltage support mitigations are determined; a full ACCC analysis is then performed to determine voltage constraints. The following voltage performance guidelines are used in accordance with the Transmission Owner local planning criteria.

SPP Areas (69kV+):

Transmission Owner	Voltage Criteria (System Intact)	Voltage Criteria (Contingency)
AEPW	0.95 – 1.05 pu	0.92 – 1.05 pu
GRDA	0.95 – 1.05 pu	0.90 – 1.05 pu
SWPA	0.95 – 1.05 pu	0.90 – 1.05 pu
OKGE	0.95 – 1.05 pu	0.90 – 1.05 pu
OMPA	0.95 – 1.05 pu	0.90 – 1.05 pu
WFEC	0.95 – 1.05 pu	0.90 – 1.05 pu
SWPS	0.95 – 1.05 pu	0.90 – 1.05 pu
MIDW	0.95 – 1.05 pu	0.90 – 1.05 pu

SUNC	0.95 – 1.05 pu	0.90 – 1.05 pu
KCPL	0.95 – 1.05 pu	0.90 – 1.05 pu
INDN	0.95 – 1.05 pu	0.90 – 1.05 pu
SPRM	0.95 – 1.05 pu	0.90 – 1.05 pu
NPPD	0.95 – 1.05 pu	0.90 – 1.05 pu
WAPA	0.95 – 1.05 pu	0.90 – 1.05 pu
WERE L-V	0.95 – 1.05 pu	0.93 – 1.05 pu
WERE H-V	0.95 – 1.05 pu	0.95 – 1.05 pu
EMDE L-V	0.95 – 1.05 pu	0.90 – 1.05 pu
EMDE H-V	0.95 – 1.05 pu	0.92 – 1.05 pu
LES	0.95 – 1.05 pu	0.90 – 1.05 pu
OPPD	0.95 – 1.05 pu	0.90 – 1.05 pu

SPP Buses with more stringent voltage criteria:

Bus Name/Number	Voltage Criteria (System Intact)	Voltage Criteria (Contingency)
TUCO 230kV 525830	0.925 – 1.05 pu	0.925 – 1.05 pu
Wolf Creek 230kV 532797	0.985 – 1.03 pu	0.985 – 1.03 pu
FCS 646251	1.001 – 1.047 pu	1.001 – 1.047 pu

Affected System Areas (115kV+):

Transmission Owner	Voltage Criteria (System Intact)	Voltage Criteria (Contingency)
EES-EAI	0.95 – 1.05 pu	0.90 – 1.05 pu
LAGN	0.95 – 1.05 pu	0.90 – 1.05 pu
EES	0.95 – 1.05 pu	0.90 – 1.05 pu
AMMO	0.95 – 1.05 pu	0.90 – 1.05 pu
CLEC	0.95 – 1.05 pu	0.90 – 1.05 pu
LAFA	0.95 – 1.05 pu	0.90 – 1.05 pu
LEPA	0.95 – 1.05 pu	0.90 – 1.05 pu
XEL	0.95 – 1.05 pu	0.90 – 1.05 pu
MP	0.95 – 1.05 pu	0.90 – 1.05 pu
SMMPA	0.95 – 1.05 pu	0.90 – 1.05 pu
GRE	0.95 – 1.05 pu	0.90 – 1.10 pu
OTP	0.95 – 1.05 pu	0.90 – 1.05 pu
OTP-H (115kV+)	0.97 – 1.05 pu	0.92 – 1.10 pu
ALTW	0.95 – 1.05 pu	0.90 – 1.05 pu
MEC	0.95 – 1.05 pu	0.90 – 1.05 pu
MDU	0.95 – 1.05 pu	0.90 – 1.05 pu
SPC	0.95 – 1.05 pu	0.95 – 1.05 pu
DPC	0.95 – 1.05 pu	0.90 – 1.05 pu

ALTE	0.95 – 1.05 pu	0.90 – 1.05 pu

The constraints identified through the voltage scan are then screened for the following for each interconnection request. 1) 3% DF on the contingent element and 2) 2% change in pu voltage. In certain conditions, engineering judgement was used to determine whether or not a generator had impacts to voltage constraints.

3.1.3 Dynamic Stability

Stability issues considered for transmission reinforcement under ERIS. Generators that fail to meet low voltage ride-through requirements (FERC Order #661-A) or SPP's stability criteria for damping or dynamic voltage recovery are assigned upgrades such that these requirements can be met.

3.1.4 Upgrades Assigned

Thermal overloads that require transmission support to mitigate are discussed in Section 8 and listed in Appendix G-T. Voltage constraints that may require transmission support are discussed in Section 8 and listed in Appendix G-V (Cluster Analysis). Constraints that are identified solely through the stability analysis are discussed in Section 8 and the appropriate appendix for the detailed stability study of that Interconnection Request. All of these upgrades are cost assigned in Appendix E and Appendix F.

Other network constraints not requiring transmission reinforcements are shown in Appendix H (Cluster Analysis). With a defined source and sink in a Transmission Service Request, this list of network constraints can be refined and expanded to account for all Network Upgrade requirements for firm transmission service. Additional constraints identified by multi-element contingencies are listed in Appendix I.

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

4 Determination of Cost Allocated Network Upgrades

Cost Allocated Network Upgrades of Variable Energy Resources (VER) (solar/wind) generation interconnection requests are determined using the 2017 spring model. Cost Allocated Network Upgrades of peaking units is determined using the 2020 summer peak model. A PSS/E and MUST sensitivity analysis is performed to determine the Distribution Factors (DF), a distribution factor with no contingency that each generation interconnection request has on each new upgrade. The impact each generation interconnection request has on each upgrade project is weighted by the size of each request. Finally the costs due by each request for a particular project are then

determined by allocating the portion of each request's impact over the impact of all affecting requests.

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

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

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

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

  Request Z Impact Factor on Upgrade Project 1 = PTDF(%)(Z) * MW(Z) = Z1

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

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

- Repeat previous for each responsible GI request for each Project

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

4.1.1 Credits/Compensation for Amounts Advanced for Network Upgrades

Interconnection Customer shall be entitled to either credits or potentially Long Term Congestion Rights (LTCR), otherwise known as compensation, 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.

5 Required Interconnection Facilities

The requirement to interconnect the 7,158.6 MW of generation into the existing and proposed transmission systems in the affected areas of the SPP transmission footprint consist of the necessary cost allocated shared facilities listed in Appendix F by upgrade. The interconnection requirements for the cluster total an estimated $640,621,668 not including the following costs.

- **Costs Not Included** – Costs on Affected Systems for particularly Associated Electric Cooperative Inc. (AECI), Mid-Continent Independent System Operator (MISO), and Minnkota Power Cooperative, Inc (MPC).

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.

For an explanation of how required Network Upgrades and Interconnection Facilities were determined, refer to the section on "Identification of Network Constraints."

5.1.1 Facilities Analysis

The interconnecting Transmission Owner for each Interconnection Request has provided its preliminary analysis of required Transmission Owner Interconnection Facilities and the associated Network Upgrades, shown in Appendix D. This analysis was limited only to the expected facilities to be constructed by the Transmission Owner at the Point of Interconnection. These costs are included within one-line diagrams in Appendix D and also listed in Appendix E and F as combined "Interconnection Costs". If the one-lines and costs in Appendix D have been updated by the Transmission Owner's Interconnection Facilities Study, those costs will be noted in the appendix. These costs will be further refined by the Transmission Owner as part of the Interconnection Facilities Study. Any additional Network Upgrades identified by this DISIS beyond the Point of Interconnection are defined and estimated by either the Transmission Owner or by SPP. These additional Network Upgrade costs will also be refined further by the Transmission Owner within the Interconnection Facilities Study.

5.1.2 Environmental Review

For Interconnection Requests that result in an interconnection to, or modification to, the transmission facilities of the Western-UGP, a National Environmental Policy Act (NEPA) Environmental Review will be required. The Interconnection Customer will be required to execute and Environmental Review Agreement per Section 8.6.1 of the GIP.

6 Affected Systems Coordination

The following procedures are in place to coordinate with Affected Systems.

- Impacts on Associated Electric Cooperative Inc. (AECI) – For any observed violations of thermal overloads on AECI facilities, AECI has been notified by SPP to evaluate the violations for impacts on its transmission system. AECI has instructed SPP to notify the affected Interconnection Customers after posting of this study to contact AECI for an Affected System Study Agreement to further study the impacts on the AECI system.
- Impacts on Mid Continent Independent System Operation (MISO) – Per SPP's agreement with MISO, MISO has been contacted and provided a list of interconnection requests that proceed to move forward into the Interconnection Facilities Study Queue. MISO is evaluating the Interconnection Requests for impacts and will be in contact with affected Interconnection Customers.
    - For potential impacts see Appendix H-T – Affected System and Appendix H-V – Affected System

- Impacts on Minnkota Power Cooperative, Inc (MPC) – MPC has been contacted and provided a list of interconnection requests that proceed to move forward into the Interconnection Facilities Study Queue. MP is evaluating the Interconnection Requests for impacts.
    - For potential impacts see Appendix H-T – Affected System and Appendix H-V – Affected System
- Impacts to other affected systems – For any observed violations of thermal overloads or voltage constraints, SPP will contact the owner of the facility for further information.

7 Power Flow Analysis

7.1.1 Power Flow Analysis Methodology

The ACCC function of PSS/E is 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. Single element and multi-element contingencies are evaluated.

7.1.2 Power Flow Analysis

A power flow analysis is conducted for each Interconnection Customer's facility using modified versions of the 2016 winter peak (16WP) season, the 2017 spring (17G) and 2017 summer peak (17SP) seasons, the 2020 light load (20L), summer (20SP) and winter peak (20WP) seasons, and the 2025 summer peak (25SP) seasonal models. The output of the Interconnection Customer's facility is offset in each model by a reduction in output of existing online SPP generation. This method allows the request to be studied as an ERIS. Certain requests that are also pursuing NRIS have an additional analysis conducted for displacing resources in the interconnecting Transmission Owner's balancing area.

8 Power Flow Results

8.1 Cluster Group 1 (Woodward Area)

In addition to the 4,377.5 MW of previously queued generation in the area, 980.5 MW of new interconnection service was studied. ERIS thermal constraints were observed for system intact and N-1 conditions including Cleo Corner – Cleo Corner Tap 138kV circuit #1, Mooreland – DeGrasse – Rose Valley 138kV circuit #1, Woodward 345/138/13kV transformer circuit #1, and Woodward 345/138/13kV transformer circuit #2. To alleviate the thermal violations, terminal equipment upgrades will be required for Cleo Corner – Cleo Corner Tap 138kV circuit #1, DeGrasse 345/138 Project per SPP-NTC-200391, and build Woodward 345/138/13kV circuit #3 transformer will be required to alleviate the thermal violations.

In additional to the ERIS constraints mitigations, NRIS constraints mitigation include Roman Nose – Southard 138kV. It can be alleviated by the advancement of Woodward – Tatonga – Mathewson – Cimarron 345kV transmission circuit #2, which has been previously cost allocated as a regional upgrade per SPP NTC 200223 from the 2012 SPP Integrated Transmission Plan 10 year (2012 ITP 10) with a current anticipated in-service date of July, 2018.

For Group 1 Cluster Analysis cost allocation, please refer to Appendix E and F.

Cluster ERIS Constraints			
MONITORED ELEMENT	Limiting Rate A/B (MVA)	TC%LOADING (% MVA)	CONTINGENCY
CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	100.6585	System Intact
CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	119.4052	MATHWSN7 345.00 - TATONGA7 345.00 345KV CKT 1

Cluster ERIS Constraints			
MONITORED ELEMENT	**Limiting Rate A/B (MVA)**	**TC%LOADING (% MVA)**	**CONTINGENCY**
	Mitigation		**Replace terminal equipment**
DGRASSE4 138.00 - MOORELAND 138KV CKT 1	143	104.0547	System Intact
DGRASSE4 138.00 - ROSE_VALLEY 138.00 138KV CKT 1	143	104.0587	System Intact
	Mitigation		**DeGrasse 345/138kV Project per SPP NTC 200391**
WOODWARD DISTRICT EHV (WWDEHV) 345/138/13.8KV TRANSFORMER CKT 1	493	100.1201	WOODWARD DISTRICT EHV (WWDEHV-T2) 345/138/13.8KV TRANSFORMER CKT 2
WOODWARD DISTRICT EHV (WWDEHV-T2) 345/138/13.8KV TRANSFORMER CKT 2	493	100.612	WOODWARD DISTRICT EHV (WWDEHV) 345/138/13.8KV TRANSFORMER CKT 1
	Mitigation		**Build Woodward 345/138/13kV transformer circuit #3**

Cluster NRIS Constraints			
MONITORED ELEMENT	**Limiting Rate A/B (MVA)**	**TC%LOADING (% MVA)**	**CONTINGENCY**
ROMAN NOSE - SOUTHARD 138KV CKT 1	153	101.2066	MATHWSN7 345.00 - TATONGA7 345.00 345KV CKT 1
	Mitigation		**Woodward – Tatonga – Mathewson 345kV circuit #2**

8.1.1 Group 1 (Limited Operation)

Limited Operation results are listed below. While these results are based on the criteria listed in GIP 8.4.3, the Interconnection Customer may request additional scenarios for Limited Operation based on higher queued Interconnection Requests not being placed in service. All of these amounts listed are based on the assumption that the Woodward District Phase Shifting Transformer goes into service no later than June 1, 2017.

Limited Operation Analysis		
Interconnection Request	**MW**	**Constraint that most limits LOIS**
GEN-2015-048	133	Cleo Corner – Cleo Corner Tap 138kV
GEN-2015-057	100	None
GEN-2015-060	52	DeGrasse – Rose_Valley 138KV CKT 1
GEN-2015-081	180	None
	138 (NRIS)	Roman Nose – Southard 138KV CKT 1
GEN-2015-093	250	None

8.2 Cluster Group 2 (Hitchland Area)

In addition to the 3,616.20 MW of previously queued generation in the area, 200.0 MW of new interconnection service was studied. This group was not analyzed for this restudy and previously identified results remain valid.

8.3 Cluster Group 3 (Spearville Area)

In addition to the 3,235.83 MW of previously queued generation in the area, 0.0 MW of new interconnection service was studied. No current study DISIS-2015-002 Interconnection Customer(s) are located in this geographical group.

8.4 Cluster Group 4 (Northwest Kansas Area)

In addition to the 1,532.2 MW of previously queued generation in the area, 600.2 MW of new interconnection service was studied. This group was not analyzed for this restudy and previously identified results remain valid.

8.5 Cluster Group 6 (South Texas Panhandle/New Mexico Area)

In addition to the 4,550.77 MW of previously queued generation in the area, 1,011.68 MW of new interconnection service was studied. This group was not analyzed for this restudy and previously identified results remain valid.

8.6 Cluster Group 7 (Southwestern Oklahoma Area)

In addition to the 1,923.90 MW of previously queued generation in the area, 413.70 MW of new interconnection service was studied. This group was not analyzed for this restudy and previously identified results remain valid.

8.7 Cluster Group 8 (North Oklahoma/South Central Kansas Area)

In addition to the 5,226.06 MW of previously queued generation in the area, 2,348.00 MW of new interconnection service was studied. This group was not analyzed for this restudy and previously identified results remain valid.

8.8 Cluster Group 9 (Nebraska Area)

In addition to the 2,927.7 MW of previously queued generation in the area, 574.4 MW of new interconnection service was studied. This group was not analyzed for this restudy and previously identified results remain valid.

8.9 Cluster Group 10 (Southeast Oklahoma/Northeast Texas Area)

There is no current study Interconnection Request(s) in the Group 10 geographical region.

8.10 Cluster Group 12 (Northwest Arkansas Area)

There is no current study Interconnection Request(s) in the Group 12 geographical region.

8.11 Cluster Group 13 (Northeast Kansas/Northwest Missouri Area)

There is no current study Interconnection Request(s) in the Group 13 geographical region.

8.12 Cluster Group 14 (South Central Oklahoma Area)

In addition to the 612.50 MW of previously queued generation in the area, 279.0 MW of new interconnection service was studied. This group was not analyzed for this restudy and previously identified results remain valid.

8.13 Group 15 (Eastern South Dakota)

In addition to approximately 1,915.70 MW of previously queued generation in the area, 100 MW of new interconnection service was studied. This group was not analyzed for this restudy and previously identified results remain valid.

8.14 Group 16 (Western North Dakota)

In addition to approximately 3,247.81 MW of previously queued generation in the area, 651.2 MW of new interconnection service was studied. This group was not analyzed for this restudy and previously identified results remain valid.

8.15 Curtailment and System Reliability

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

9 Stability & Short Circuit Analysis

A stability and short circuit analysis is conducted for each Interconnection Customer using modified versions of the 2015 series SPP Model Development Working Group (MDWG) Models 2016 winter (16WP), 2017 summer (17SP), and 2025 summer peak (25SP) dynamic cases[10]. The stability analysis is conducted with all upgrades in service that are identified in the power flow analysis unless otherwise noted in the individual group stability study. For each group, the interconnection requests are studied at 100% nameplate output while the other groups are dispatched at 20% output for Variable Energy Resource (VER) requests and 100% output for other requests. The output of the Interconnection Customer's facility is offset in each model by a reduction in output of existing online SPP generation. Each Interconnection Request is studied in a Stand Alone scenario in addition to the cluster scenario. A synopsis is included for each group. The entire stability study for each group can be found in the Appendices.

Short-circuit analysis is performed but verification of over-dutied equipment is performed by the Transmission Owner within the Interconnection Facilities Study. Results of that analysis may require additional costs to replace circuit breakers and associated equipment.

9.1 Cluster Group 1 (Woodward Area)

The Group 1 stability analysis was not performed again for this restudy. This group was not analyzed for this restudy and previously identified restudy results remain valid.

9.2 Cluster Group 2 (Hitchland Area)

The Group 2 stability analysis was not performed again for this restudy. This group was not analyzed for this restudy and previously identified restudy results remain valid.

9.3 Cluster Group 3 (Spearville Area)

No current study DISIS-2015-002 Interconnection Customer(s) are located in this geographical group.

9.4 Cluster Group 4 (Northwest Kansas)

The Group 4 stability analysis was not performed again for this restudy. The original analysis in DISIS-2015-002 is still valid.

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

The Group 6 stability analysis was not performed again for this restudy. This group was not analyzed for this restudy and previously identified restudy results remain valid.

[10] Short Circuit analysis performed only on the 2017 and 2025 Summer Peak seasonal model. Group 6 Stability Analysis also includes 2020 Summer and Winter Peak seasons.

9.6 Cluster Group 7 (Southwest Oklahoma)

The Group 7 stability analysis was not performed again for this restudy. The original analysis in DISIS-2015-002 is still valid.

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

The Group 8 stability analysis was not performed again for this restudy. The original analysis in DISIS-2015-002 is still valid. GEN-2015-073 is currently being evaluated for wind turbine change modification impacts. This GEN-2015-073 turbine modification analysis will be posted once completed in another report posting.

9.8 Cluster Group 9 (Nebraska)

The Group 9 stability analysis was not performed again for this restudy. This group was not analyzed for this restudy and previously identified restudy results remain valid.

9.9 Cluster Group 10 (Southeast Oklahoma/Northeast Texas Area)

There is no current study Interconnection Request(s) in the Group 10 geographical region.

9.10 Cluster Group 12 (Northwest Arkansas Area)

There is no current study Interconnection Request(s) in the Group 12 geographical region.

9.11 Cluster Group 13 (Northeast Kansas/Northwest Missouri Area)

There is no current study Interconnection Request(s) in the Group 13 geographical region.

9.12 Cluster Group 14 (South Central Oklahoma)

The Group 14 stability analysis was not performed again for this restudy. The original analysis in DISIS-2015-002 is still valid.

9.13 Cluster Group 15 (Eastern South Dakota)

The Group 15 stability analysis was not performed again for this restudy. The original analysis in DISIS-2015-002 is still valid.

9.14 Cluster Group 16 (Western North Dakota)

The Group 16 stability analysis was not performed again for this restudy. The original analysis in DISIS-2015-002 is still valid. GEN-2015-098 is currently being evaluated for wind turbine change modification impacts. This GEN-2015-098 turbine modification analysis will be posted once completed in another report posting.

10 Conclusion

The minimum cost of interconnecting 7,158.6 MW of new generation interconnection requests included in this DISIS is estimated at $640,621,668 not including the following costs.

- **Costs Not Included** – Costs on Affected Systems for particularly Associated Electric Cooperative Inc. (AECI), Mid-Continent Independent System Operator (MISO), and Minnkota Power Cooperative, Inc (MPC).

Interconnection Requests allocated Network Upgrades and Transmission Owner Interconnection Facilities listed in Appendix E and F. For Interconnection Requests that result in an interconnection to, or modification to, the transmission facilities of the Western-UGP (WAPA), a National Environmental Policy Act (NEPA) Environmental Review will be required. The Interconnection Customer will be required to execute and Environmental Review Agreement per Section 8.6.1 of the GIP.

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 any Network Upgrades that are identified as required through the short circuit analysis. Potential over-duty circuit breakers capability will be identified by the Transmission Owner in the Interconnection Facilities Study.

Further refinement of total estimated interconnection costs will be provided, should the Interconnection Customer meet the requirements for acceptance and choose to move into the Interconnection Facilities Study following the posting of this DISIS. The Interconnection Facilities Study may include additional study analysis, additional facility upgrades not yet identified by this DISIS, such as circuit breaker replacements and affected system facilities, and further refinement of existing cost estimates.

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).

11 Appendices

11.1 A: Generation Interconnection Requests Considered for Impact Study

See next page.

A: Generation Interconnection Requests Considered for 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-2015-006	9.00	ER	SWPA	Tupelo 138kV	Tupelo 138kV		TBD
GEN-2014-037	200.00	ER	SPS	Tap Hitchland - Beaver County Dbl Ckt (Optima) 345kV	Tap Hitchland - Beaver County Dbl Ckt (Optima) 345kV	9/30/2017	TBD
GEN-2015-020	100.00	ER	SPS	Oasis 115kV	Oasis 115kV	12/1/2016	TBD
GEN-2015-031	150.50	ER	SPS	Tap Amarillo South - Swisher 230kV	Tap Amarillo South - Swisher 230kV	9/1/2017	TBD
GEN-2015-034	200.00	ER	OKGE	Ranch Road 345kV	Ranch Road 345kV	10/31/2017	TBD
GEN-2015-045	20.00	ER	AEPW	Tap Lawton - Sunnyside (Terry Road) 345kV	Tap Lawton - Sunnyside (Terry Road) 345kV	12/1/2017	TBD
GEN-2015-046	300.00	ER	WAPA	Tande 345kV	Tande 345kV	12/1/2017	TBD
GEN-2015-047	300.00	ER	OKGE	Sooner 345kV	Sooner 345kV	12/1/2017	TBD
GEN-2015-048	200.00	ER	OKGE	Cleo Corner 138kV	Cleo Corner 138kV	12/1/2017	TBD
GEN-2015-052	300.00	ER	WERE	Tap Open Sky - Rose Hill 345kV	Tap Open Sky - Rose Hill 345kV	12/1/2017	TBD
GEN-2015-053	50.00	ER	NPPD	Antelope 115kV	Antelope 115kV	12/31/2017	TBD
GEN-2015-055	40.00	ER	WFEC	Erick 138kV	Erick 138kV	10/30/2016	TBD
GEN-2015-056	101.20	ER	SPS	Crossroads 345kV	Crossroads 345kV	12/1/2017	TBD
GEN-2015-057	100.00	ER	OKGE	Minco 345kV	Minco 345kV	12/1/2016	TBD
GEN-2015-058	50.00	ER	SPS	Atoka 115kV	Atoka 115kV	10/1/2017	TBD
GEN-2015-060	250.50	ER	OKGE	Woodward EHV 138kV	Woodward EHV 138kV	12/31/2021	TBD
GEN-2015-061	200.00	ER	SUNCMKEC	Mingo 345kV	Mingo 345kV	12/31/2018	TBD
GEN-2015-062	4.50	ER	OKGE	Tap and Tie South 4th - Bunch Creek & Enid Tap - Fairmont (GEN-2012-033T) 138kV	Tap and Tie South 4th - Bunch Creek & Enid Tap - Fairmont (GEN-2012-033T) 138kV	3/1/2016	TBD
GEN-2015-063	300.00	ER	OKGE	Tap Woodring - Mathewson 345kV	Tap Woodring - Mathewson 345kV	12/1/2017	TBD
GEN-2015-064	197.80	ER	SUNCMKEC	Mingo 115kV	Mingo 115kV	11/1/2017	TBD
GEN-2015-065	202.40	ER	SUNCMKEC	Mingo 345kV	Mingo 345kV	11/1/2017	TBD
GEN-2015-066	248.40	ER	OKGE	Tap Cleveland - Sooner 345kV	Tap Cleveland - Sooner 345kV	12/1/2017	TBD
GEN-2015-067	150.00	ER	OKGE	Sooner 138kV	Sooner 138kV	10/1/2017	TBD
GEN-2015-068	300.00	ER	SPS	TUCO Interchange 345kV	TUCO Interchange 345kV	12/1/2017	TBD
GEN-2015-069	300.00	ER	WERE	Union Ridge 230kV	Union Ridge 230kV	12/1/2017	TBD
GEN-2015-071	200.00	ER	AEPW	Chisholm 345kV	Chisholm 345kV	9/30/2017	TBD
GEN-2015-073	200.10	ER/NR	WERE	Emporia Energy Center 345kV	Emporia Energy Center 345kV	12/31/2018	TBD
GEN-2015-075	51.50	ER	SPS	Carlisle 69kV	Carlisle 69kV	12/1/2018	TBD
GEN-2015-076	158.40	ER	NPPD	Belden 115kV	Belden 115kV	7/31/2017	TBD
GEN-2015-079	129.20	ER	SPS	Tap Yoakum - Hobbs Interchange 230kV	Tap Yoakum - Hobbs Interchange 230kV	10/1/2018	TBD
GEN-2015-080	129.20	ER	SPS	Tap Yoakum - Hobbs Interchange 230kV	Tap Yoakum - Hobbs Interchange 230kV	5/1/2019	TBD
GEN-2015-081	180.00	ER/NR	OKGE	Tap Woodward - Tatonga (GEN-2011-051 Tap) 345kV	Tap Woodward - Tatonga (GEN-2011-051 Tap) 345kV	7/1/2018	TBD
GEN-2015-083	125.00	ER	WERE	Belle Plain 138kV	Belle Plain 138kV	12/31/2017	TBD
GEN-2015-084	51.30	ER	AEPW	Hollis 138kV	Hollis 138kV	12/10/2018	TBD
GEN-2015-085	122.40	ER	AEPW	Altus Junction 138kV	Altus Junction 138kV	12/10/2018	TBD
GEN-2015-087	66.00	ER/NR	NPPD	Tap Fairbury - Hebron 115kV	Tap Fairbury - Hebron 115kV	1/1/2019	TBD
GEN-2015-088	300.00	ER/NR	NPPD	Tap Moore - Pauline 345kV	Tap Moore - Pauline 345kV	1/1/2019	TBD
GEN-2015-090	220.00	ER	WERE	Tap Thistle - Wichita 345kV Dbl CKT	Tap Thistle - Wichita 345kV Dbl CKT	12/1/2017	TBD
GEN-2015-091	101.20	ER	WAPA	Daglum 230kV	Daglum 230kV	12/1/2017	TBD

Request	Amount	Service	Area	Requested Point of Interconnection	Proposed Point of Interconnection	Requested In-Service Date	In Service Date Delayed Until no earlier than*
GEN-2015-092	250.00	ER	AEPW	Tap Lawton - Sunnyside (Terry Road) 345kV	Tap Lawton - Sunnyside (Terry Road) 345kV	12/1/2017	TBD
GEN-2015-093	250.00	ER	OKGE	Gracemont 345kV	Gracemont 345kV	12/1/2017	TBD
GEN-2015-096	150.00	ER	WAPA	Tap Belfied - Rhame 230kV	Tap Belfied - Rhame 230kV	12/31/2017	TBD
GEN-2015-097	100.00	ER	WAPA	Groton 115kV	Groton 115kV	12/31/2016	TBD
GEN-2015-098	100.00	ER	WAPA	Mingusville 230kV	Mingusville 230kV	12/15/2017	TBD
Total:	**7,158.60**						

*In-Service Date for each request is to be determined after the Interconnection Facility Study is completed.

11.2 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	Remington 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	27.30	SPS	Lovington 115kV	On-Line
ASGI-2011-002	20.00	SPS	Herring 115kV	On-Line
ASGI-2011-003	10.00	SPS	Hendricks 69kV	On-Line
ASGI-2011-004	20.00	SPS	Pleasant Hill 69kV	Under Study (DISIS-2011-002)
ASGI-2012-002	18.15	SPS	FE-Clovis Interchange 115kV	Under Study (DISIS-2012-002)
ASGI-2012-006	22.50	SUNCMKEC	Tap Hugoton - Rolla 69kV	Under Study (DISIS-2012-001)
ASGI-2013-001	11.50	SPS	PanTex South 115kV	Under Study (DISIS-2013-001)
ASGI-2013-002	18.40	SPS	FE Tucumcari 115kV	Under Study (DISIS-2013-001)
ASGI-2013-003	18.40	SPS	FE Clovis 115kV	Under Study (DISIS-2013-001)
ASGI-2013-004	36.60	SUNCMKEC	Morris 115kV	Under Study (DISIS-2013-002)
ASGI-2013-005	1.65	SPS	FE Clovis 115kV	Under Study (DISIS-2013-002)
ASGI-2013-006	2.00	SPS	SP-Erskine 115kV	
ASGI-2014-001	2.50	SPS	SP-Erskine 115kV	Under Study (DISIS-2014-001)
ASGI-2014-014	56.40	GRDA	Ferguson 69kV	Under Study (DISIS-2014-002)
ASGI-2015-001	6.13	SUNCMKEC	Ninnescah 115kV	Under Study (DISIS-2015-001)
ASGI-2015-002	2.00	SPS	SP-Yuma 69kV	Under Study (DISIS-2015-001)
ASGI-2015-004	56.36	GRDA	Coffeyville City 69kV	Under Study (DISIS-2015-001)
G176	100.00	XEL	Yankee 115kV	
G255	100.00	XEL	Yankee 115kV	MISO Queued Request
G359	150.00	MDU	MDU 230 kV system near Ellendale	MISO Queued Request
G380	150.00	OTP	Rugby 115kV	MISO Queued Request
G408	12.00	XEL	Tap McHenry - Souris 115kV	MISO Queued Request
G502	50.60	MP	Milton Young 230kV	MISO Queued Request
G586	30.00	XEL	Yankee 115kV	
G645	50.00	GRE	Ladish 115kV	MISO Queued Request
G723	10.00	MDU	Haskett 115kV	MISO Queued Request
G736	200.00	OTP	Big Stone South 230kV	
G752	150.00	MDU	Tap Bison - Hettinger 230kV	MISO Queued Request
G788	49.00	GRE	Ladish 115kV	MISO Queued Request
G830	99.00	GRE	GRE McHenry 115kV	MISO Queued Request
GEN-2001-014	96.00	WFEC	Ft Supply 138kV	On-Line
GEN-2001-026	74.30	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	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-2002-008IS	40.50	WAPA	Edgeley 115kV [Pomona 115kV]	Commercial Operation
GEN-2002-009	80.00	SPS	Hansford 115kV	On-Line

Request	Amount	Area	Requested/Proposed Point of Interconnection	Status or In-Service Date
GEN-2002-009IS	40.00	WAPA	Ft Thompson 69kV [Hyde 69kV]	Commercial Operation
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	Weatherford 138kV	On-Line
GEN-2004-014	154.50	SUNCMKEC	Spearville 230kV	On-Line at 100MW
GEN-2004-020	27.00	AEPW	Weatherford 138kV	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-2005-003IS	100.00	WAPA	Nelson 115kV	Commercial Operation
GEN-2005-008	120.00	OKGE	Woodward 138kV	On-Line
GEN-2005-008IS	50.00	WAPA	Hilken 230kV [Ecklund 230kV]	Commercial Operation
GEN-2005-012	250.00	SUNCMKEC	Ironwood 345kV	On-Line at 160MW
GEN-2005-013	201.00	WERE	Caney River 345kV	On-Line
GEN-2006-001IS	10.00	XEL	Marshall 115kV	Commercial Operation
GEN-2006-002	101.00	AEPW	Sweetwater 230kV	On-Line
GEN-2006-002IS	51.00	WAPA	Wessington Springs 230kV	Commercial Operation
GEN-2006-006IS	10.00	XEL	Marshall 115kV	Commercial Operation
GEN-2006-015IS	50.00	WAPA	Hilken 230kV [Ecklund 230kV]	Commercial Operation
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	502.00	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
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-2007-013IS	50.00	WAPA	Wessington Springs 230kV	Commercial Operation
GEN-2007-014IS	100.00	WAPA	Wessington Springs 230kV	Commercial Operation
GEN-2007-015IS	100.00	WAPA	Hilken 230kV [Ecklund 230kV]	Commercial Operation
GEN-2007-017IS	166.00	WAPA	Ft Thompson-Grand Island 345kV	On Schedule
GEN-2007-018IS	234.00	WAPA	Ft Thompson-Grand Island 345kV	On Schedule
GEN-2007-020IS	16.00	WAPA	Nelson 115kV	Commercial Operation
GEN-2007-021	201.00	OKGE	Tatonga 345kV	On-Line
GEN-2007-023IS	50.00	WAPA	Formit-Summit 115kV	On Suspension

Request	Amount	Area	Requested/Proposed Point of Interconnection	Status or In-Service Date
GEN-2007-025	300.00	WERE	Viola 345kV	On-Line
GEN-2007-027IS	99.00	WAPA	Bismarck-Garrison 230kV #1	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	200.00	SPS	Hitchland 115kV	On-Line
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 2016 and 2017
GEN-2008-003	101.00	OKGE	Woodward EHV 138kV	On-Line
GEN-2008-008IS	5.00	WAPA	Nelson 115kV	Commercial Operation
GEN-2008-013	300.00	OKGE	Hunter 345kV	On-Line at 235MW
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	Crossroads 345kV	On-Line
GEN-2008-023	150.00	AEPW	Hobart Junction 138kV	On-Line
GEN-2008-037	101.00	WFEC	Slick Hills 138kV	On-Line
GEN-2008-044	197.80	OKGE	Tatonga 345kV	On-Line
GEN-2008-047	300.00	OKGE	Beaver County 345kV	On-Line
GEN-2008-051	322.00	SPS	Potter County 345kV	On-Line at 161MW
GEN-2008-079	99.20	SUNCMKEC	Crooked Creek 115kV	On-Line
GEN-2008-086N02	201.00	NPPD	Meadow Grove 230kV	On-Line
GEN-2008-092	200.60	MIDW	Post Rock 230kV	On-Line
GEN-2008-098	100.80	WERE	Waverly 345kV	On-Line
GEN-2008-119O	60.00	OPPD	S1399 161kV	On-Line
GEN-2008-123N	89.70	NPPD	Tap Pauline - Hildreth (Rosemont) 115kV	On Schedule for 2016
GEN-2008-124	200.10	SUNCMKEC	Ironwood 345kV	On Schedule for 2016
GEN-2008-129	80.00	KCPL	Pleasant Hill 161kV	On-Line
GEN-2009-001IS	200.00	WAPA	Groton-Watertown 345kV	On Schedule
GEN-2009-006IS	90.00	WAPA	Mission 115kV	On Suspension
GEN-2009-007IS	100.00	WAPA	Mission 115kV	On Suspension
GEN-2009-008	199.50	MIDW	South Hays 230kV	On-Line
GEN-2009-018IS	100.00	WAPA	Groton 115kV	Commercial Operation
GEN-2009-020	48.30	MIDW	Walnut Creek 69kV	On-Line
GEN-2009-020AIS	130.50	WAPA	Tripp Junction 115kV	Commercial Operation
GEN-2009-025	59.80	OKGE	Nardins 69kV	On-Line
GEN-2009-026IS	110.00	WAPA	Dickenson-Heskett 230kV	On Schedule
GEN-2009-040	73.80	WERE	Marshall 115kV	On Schedule for 2016
GEN-2010-001	300.00	OKGE	Beaver County 345kV	On-Line
GEN-2010-001IS	99.00	WAPA	Bismarck-Glenham 230kV	On Schedule
GEN-2010-003	100.80	WERE	Waverly 345kV	On-Line
GEN-2010-003IS	34.00	WAPA	Wessington Springs 230kV	Commercial Operation
GEN-2010-005	299.20	WERE	Viola 345kV	On-Line at 170MW
GEN-2010-006	205.00	SPS	Jones 230kV	On-Line
GEN-2010-007IS	172.50	WAPA	Antelope Valley 345kV	On Suspension
GEN-2010-009	165.60	SUNCMKEC	Buckner 345kV	On-Line
GEN-2010-011	29.70	OKGE	Tatonga 345kV	On-Line
GEN-2010-014	358.80	SPS	Hitchland 345kV	On Schedule for 2018
GEN-2010-036	4.60	WERE	6th Street 115kV	On-Line
GEN-2010-040	300.00	OKGE	Cimarron 345kV	On-Line

Request	Amount	Area	Requested/Proposed Point of Interconnection	Status or In-Service Date
GEN-2010-041	10.50	OPPD	S1399 161kV	On Schedule for 2015
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-2010-048	70.00	MIDW	Tap Beach Station - Redline 115kV	FACILITY STUDY STAGE
GEN-2010-051	200.00	NPPD	Tap Hoskins - Twin Church (Dixon County) 230kV	On Suspension
GEN-2010-055	4.50	AEPW	Wekiwa 138kV	On-Line
GEN-2010-057	201.00	MIDW	Rice County 230kV	On-Line
GEN-2011-008	600.00	SUNCMKEC	Clark County 345kV	On Schedule for 2016
GEN-2011-010	100.80	OKGE	Minco 345kV	On-Line
GEN-2011-011	50.00	KCPL	Iatan 345kV	On-Line
GEN-2011-014	201.00	OKGE	Tap Hitchland - Woodward Dbl Ckt (GEN-2011-014 Tap) 345kV	On Schedule for 2016
GEN-2011-016	200.10	SUNCMKEC	Ironwood 345kV	On Suspension
GEN-2011-018	73.60	NPPD	Steele City 115kV	On-Line
GEN-2011-019	299.00	OKGE	Woodward 345kV	On Schedule for 2017
GEN-2011-020	299.00	OKGE	Woodward 345kV	On Schedule for 2017
GEN-2011-022	299.00	SPS	Hitchland 345kV	On Schedule for 2016 (150MW) and 2017 (149MW)
GEN-2011-025	80.00	SPS	Tap Floyd County - Crosby County 115kV	On Schedule for 2016
GEN-2011-027	120.00	NPPD	Tap Hoskins - Twin Church (Dixon County) 230kV	On Suspension
GEN-2011-037	7.00	WFEC	Blue Canyon 5 138kV	On-Line
GEN-2011-040	111.00	OKGE	Carter County 138kV	On-Line
GEN-2011-045	205.00	SPS	Jones 230kV	On-Line
GEN-2011-046	27.00	SPS	Lopez 115kV	On-Line
GEN-2011-048	175.00	SPS	Mustang 230kV	On-Line
GEN-2011-049	250.70	OKGE	Border 345kV	On Schedule for 2016
GEN-2011-050	109.80	AEPW	Santa Fe Tap 138kV	On Schedule for 2016
GEN-2011-051	104.40	OKGE	Tap Woodward - Tatonga 345kV (GEN-2011-051 Tap)	On Schedule for 2017
GEN-2011-054	300.00	OKGE	Cimarron 345kV	On-Line
GEN-2011-056	3.60	NPPD	Jeffrey 115kV	On-Line
GEN-2011-056A	3.60	NPPD	John 1 115kV	On-Line
GEN-2011-056B	4.50	NPPD	John 2 115kV	On-Line
GEN-2011-057	150.40	WERE	Creswell 138kV	On-Line
GEN-2012-001	61.20	SPS	Cirrus Tap 230kV	On-Line
GEN-2012-004	41.40	OKGE	Carter County 138kV	On-Line
GEN-2012-006IS	125.01	WAPA	Williston-Ch. Creek 230kV	On Schedule
GEN-2012-007	120.00	SUNCMKEC	Rubart 115kV	On-Line
GEN-2012-009IS	99.00	WAPA	Fort Randall 115kV	On Suspension
GEN-2012-012IS	75.00	WAPA	Wolf Point-Circle 115kV	On Suspension
GEN-2012-014IS	99.50	WAPA	Groton 115kV	On Schedule
GEN-2012-020	478.00	SPS	TUCO 230kV	On Schedule for 2016
GEN-2012-021	4.80	LES	Terry Bundy Generating Station 115kV	On-Line
GEN-2012-024	180.00	SUNCMKEC	Clark County 345kV	On Schedule for 2016
GEN-2012-028	74.80	WFEC	Gotebo 69kV	On-Line
GEN-2012-032	300.00	OKGE	Open Sky 345kV	On-Line
GEN-2012-033	98.10	OKGE	Tap and Tie South 4th - Bunch Creek & Enid Tap - Fairmont (GEN-2012-033T) 138kV	On-Line
GEN-2012-034	7.00	SPS	Mustang 230kV	On-Line
GEN-2012-035	7.00	SPS	Mustang 230kV	On-Line
GEN-2012-036	7.00	SPS	Mustang 230kV	On-Line
GEN-2012-037	203.00	SPS	TUCO 345kV	On-Line

Request	Amount	Area	Requested/Proposed Point of Interconnection	Status or In-Service Date
GEN-2012-041	121.50	OKGE	Ranch Road 345kV	On-Line
GEN-2013-001IS	90.00	WAPA	Summit-Watertown 115kV	On Suspension
GEN-2013-002	50.60	LES	Tap Sheldon - Folsom & Pleasant Hill (GEN-2013-002 Tap) 115kV CKT 2	On Schedule for 2016
GEN-2013-007	100.30	OKGE	Tap Prices Falls - Carter 138kV	On-Line
GEN-2013-008	1.20	NPPD	Steele City 115kV	On-Line
GEN-2013-009IS	19.50	WAPA	Redfield NW 115kV	Commercial Operation
GEN-2013-010	99.00	SUNCMKEC	Tap Spearville - Post Rock (North of GEN-2011-017 Tap) 345kV	On Schedule for 2018
GEN-2013-011	30.00	AEPW	Turk 138kV	On-Line
GEN-2013-012	147.00	OKGE	Redbud 345kV	On-Line
GEN-2013-016	203.00	SPS	TUCO 345kV	On Schedule for 2017
GEN-2013-019	73.60	LES	Tap Sheldon - Folsom & Pleasant Hill (GEN-2013-002 Tap) 115kV CKT 2	On Schedule for 2016
GEN-2013-022	25.00	SPS	Norton 115kV	On Schedule for 2016
GEN-2013-027	150.00	SPS	Tap Tolk - Yoakum 230kV	IA Pending
GEN-2013-028	559.50	GRDA	Tap N Tulsa - GRDA 1 345kV	On Schedule for 2017
GEN-2013-029	300.00	OKGE	Renfrow 345kV	On-Line for 151.6MW
GEN-2013-030	300.00	OKGE	Beaver County 345kV	On Schedule for 2016 (200MW) and 2017 (100MW)
GEN-2013-032	204.00	NPPD	Antelope 115kV	On Schedule for 2017
GEN-2013-033	28.00	MIDW	Knoll 115kV	On Schedule for 2016
GEN-2014-001	200.60	WERE	Tap Wichita - Emporia Energy Center (GEN-2014-001 Tap) 345kV	On Suspension
GEN-2014-001IS	103.70	WAPA	Newell-Maurine 115kV	FACILITY STUDY STAGE
GEN-2014-002	10.50	OKGE	Tatonga 345kV (GEN-2007-021 POI)	On Schedule for 2015
GEN-2014-003	15.80	OKGE	Tatonga 345kV (GEN-2007-044 POI)	On Schedule for 2015
GEN-2014-003IS	91.00	WAPA	Culbertson 115kV	On Schedule
GEN-2014-004	4.00	NPPD	Steele City 115kV (GEN-2011-018 POI)	On-Line
GEN-2014-004IS	384.20	WAPA	Charlie Creek 345kV	FACILITY STUDY STAGE
GEN-2014-005	5.70	OKGE	Minco 345kV (GEN-2011-010 POI)	On-Line
GEN-2014-006IS	125.00	WAPA	Williston 115kV	On Schedule
GEN-2014-010IS	150.00	WAPA	Neset 115kV	On Schedule
GEN-2014-012	225.00	SPS	Tap Hobbs Interchange - Andrews 230kV	On Schedule for 2018
GEN-2014-013	73.50	NPPD	Meadow Grove (GEN-2008-086N2 Sub) 230kV	On-Line
GEN-2014-014IS	151.50	WAPA	Belfield-Rhame 230kV	On Schedule
GEN-2014-020	100.00	AEPW	Tuttle 138kV	On Schedule for 2017
GEN-2014-021	300.00	KCPL	Tap Nebraska City - Mullin Creek 345kV	On Schedule for 2016
GEN-2014-025	2.40	MIDW	Walnut Creek 69kV	On-Line
GEN-2014-028	35.00	EMDE	Riverton 161kV	On Schedule for 2016
GEN-2014-031	35.80	NPPD	Meadow Grove 230kV	On-Line
GEN-2014-032	10.20	NPPD	Meadow Grove 230kV	On Schedule for 2016
GEN-2014-033	70.00	SPS	Chaves County 115kV	On Schedule for 2016
GEN-2014-034	70.00	SPS	Chaves County 115kV	On Schedule for 2016
GEN-2014-035	30.00	SPS	Chaves County 115kV	On Schedule for 2018
GEN-2014-039	73.40	NPPD	Friend 115kV	On Schedule for 2017
GEN-2014-040	320.40	SPS	Castro 115kV	On Schedule for 2016
GEN-2014-041	120.80	SUNCMKEC	Arnold 115kV	On Suspension
GEN-2014-047	40.00	SPS	Crossroads 345kV	IA Pending
GEN-2014-056	250.00	OKGE	Minco 345kV	On Schedule for 2016
GEN-2014-057	250.00	AEPW	Tap Lawton - Sunnyside (Terry Road) 345kV	On Schedule for 2016

Request	Amount	Area	Requested/Proposed Point of Interconnection	Status or In-Service Date
GEN-2014-064	248.40	OKGE	Otter 138kV	On Suspension
GEN-2014-074	152.00	SPS	Tap TUCO Interchange - Oklaunion (GEN-2014-074 Tap) 345kV	FACILITY STUDY STAGE
GEN-2015-001	200.00	OKGE	Ranch Road 345kV	On Schedule for 2016
GEN-2015-004	52.90	OKGE	Border 345kV	IA Pending
GEN-2015-005	200.10	KCPL	Tap Nebraska City - Sibley 345kV	FACILITY STUDY STAGE
GEN-2015-007	160.00	NPPD	Hoskins 345kV	FACILITY STUDY STAGE
GEN-2015-013	120.00	WFEC	Synder 138kV	FACILITY STUDY STAGE
GEN-2015-014	150.00	SPS	Tap Cochran - Lehman 115kV	FACILITY STUDY STAGE
GEN-2015-015	154.60	OKGE	Tap Medford Tap - Coyote 138kV	FACILITY STUDY STAGE
GEN-2015-016	200.00	KCPL	Tap Marmaton - Centerville 161kV	FACILITY STUDY STAGE
GEN-2015-021	20.00	SUNCMKEC	Johnson Corner 115kV	FACILITY STUDY STAGE
GEN-2015-022	112.00	SPS	Swisher 115kV	FACILITY STUDY STAGE
GEN-2015-023	300.70	NPPD	Holt County 345kV	FACILITY STUDY STAGE
GEN-2015-024	220.00	WERE	Tap Thistle - Wichita 345kV Dbl CKT	On Schedule for 2016
GEN-2015-025	220.00	WERE	Tap Thistle - Wichita 345kV Dbl CKT	FACILITY STUDY STAGE
GEN-2015-027	4.90	SUNCMKEC	Crooked Creek 115kV	FACILITY STUDY STAGE
GEN-2015-029	161.00	OKGE	Tatonga 345kV	IA Pending
GEN-2015-030	200.10	OKGE	Sooner 345kV	IA Pending
Gray County Wind (Montezuma)	110.00	SUNCMKEC	Gray County Tap 115kV	On-Line
J003	20.00	MDU	Baker 115kV	MISO Queued Request
J249	180.00	MDU	MDU Tatanka 230kV	MISO Queued Request
J262	100.00	OTP	Jamestown 345	MISO Queued Request
J263	100.00	OTP	Jamestown 345	MISO Queued Request
J290	150.00	XEL	Tap Glenboro South - Rugby 230kV	MISO Queued Request
J316	150.00	MDU	MDU 230 kV Tatanka-Ellendale line	MISO Queued Request
J436	150.00	OTP	Big Stone South 345kV	MISO Queued Request
J437	150.00	OTP	Big Stone South 345kV	MISO Queued Request
J442	200.00	OTP	Big Stone 230 kV	MISO Queued Request
Llano Estacado (White Deer)	80.00	SPS	Llano Wind 115kV	On-Line
MPC01200	44.00	OTP	Sidney 230kV	
MPC02100	100.00	OTP	Sidney 230kV	
NPPD Distributed (Broken Bow)	8.30	NPPD	Broken Bow 115kV	On-Line
NPPD Distributed (Buffalo County Solar)	10.00	NPPD	Kearney Northeast	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 (North Platte - Lexington)	54.00	NPPD	Multiple: Jeffrey 115kV, John_1 115kV, John_2 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

Request	Amount	Area	Requested/Proposed Point of Interconnection	Status or In-Service Date
SPS Distributed (Spearman)	10.00	SPS	Spearman 69kV	On-Line
SPS Distributed (TC-Texas County)	20.00	SPS	Texas County 115kV	On-Line
SPS Distributed (Yuma)	2.57	SPS	SP-Yuma 69kV	On-Line
Total:	**34,482.9**			

11.3 C: Study Groupings

See next page

C. Study Groups

GROUP 1: WOODWARD AREA			
Request	**Capacity**	**Area**	**Proposed Point of Interconnection**
GEN-2001-014	96.00	WFEC	Ft Supply 138kV
GEN-2001-037	100.00	OKGE	FPL Moreland Tap 138kV
GEN-2005-008	120.00	OKGE	Woodward 138kV
GEN-2006-024S	19.80	WFEC	Buffalo Bear Tap 69kV
GEN-2006-046	131.00	OKGE	Dewey 138kV
GEN-2007-021	201.00	OKGE	Tatonga 345kV
GEN-2007-043	200.00	OKGE	Minco 345kV
GEN-2007-044	300.00	OKGE	Tatonga 345kV
GEN-2007-050	170.00	OKGE	Woodward EHV 138kV
GEN-2007-062	765.00	OKGE	Woodward EHV 345kV
GEN-2008-003	101.00	OKGE	Woodward EHV 138kV
GEN-2008-044	197.80	OKGE	Tatonga 345kV
GEN-2010-011	29.70	OKGE	Tatonga 345kV
GEN-2010-040	300.00	OKGE	Cimarron 345kV
GEN-2011-010	100.80	OKGE	Minco 345kV
GEN-2011-019	299.00	OKGE	Woodward 345kV
GEN-2011-020	299.00	OKGE	Woodward 345kV
GEN-2011-051	104.40	OKGE	Tap Woodward - Tatonga 345kV (GEN-2011-051 Tap)
GEN-2011-054	300.00	OKGE	Cimarron 345kV
GEN-2014-002	10.50	OKGE	Tatonga 345kV (GEN-2007-021 POI)
GEN-2014-003	15.80	OKGE	Tatonga 345kV (GEN-2007-044 POI)
GEN-2014-005	5.70	OKGE	Minco 345kV (GEN-2011-010 POI)
GEN-2014-020	100.00	AEPW	Tuttle 138kV
GEN-2014-056	250.00	OKGE	Minco 345kV
GEN-2015-029	161.00	OKGE	Tatonga 345kV
PRIOR QUEUED SUBTOTAL	**4,377.50**		
GEN-2015-048	200.00	OKGE	Cleo Corner 138kV
GEN-2015-057	100.00	OKGE	Minco 345kV
GEN-2015-060	250.50	OKGE	Woodward EHV 138kV
GEN-2015-081	180.00	OKGE	Tap Woodward - Tatonga (GEN-2011-051 Tap) 345kV
GEN-2015-093	250.00	OKGE	Gracemont 345kV
CURRENT CLUSTER SUBTOTAL	**980.50**		
AREA TOTAL	**5,358.00**		

GROUP 2: HITCHLAND AREA			
Request	**Capacity**	**Area**	**Proposed Point of Interconnection**
ASGI-2011-002	20.00	SPS	Herring 115kV
ASGI-2013-001	11.50	SPS	PanTex South 115kV
GEN-2002-008	240.00	SPS	Hitchland 345kV
GEN-2002-009	80.00	SPS	Hansford 115kV
GEN-2002-022	240.00	SPS	Bushland 230kV
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	200.00	SPS	Hitchland 115kV
GEN-2008-047	300.00	OKGE	Beaver County 345kV
GEN-2008-051	322.00	SPS	Potter County 345kV
GEN-2010-001	300.00	OKGE	Beaver County 345kV
GEN-2010-014	358.80	SPS	Hitchland 345kV
GEN-2011-014	201.00	OKGE	Tap Hitchland - Woodward Dbl Ckt (GEN-2011-014 Tap) 345kV
GEN-2011-022	299.00	SPS	Hitchland 345kV
GEN-2013-030	300.00	OKGE	Beaver County 345kV
Llano Estacado (White Deer)	80.00	SPS	Llano Wind 115kV
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	**3,616.20**		
GEN-2014-037	200.00	SPS	Tap Hitchland - Beaver County Dbl Ckt (Optima) 345kV
CURRENT CLUSTER SUBTOTAL	**200.00**		
AREA TOTAL	**3,816.20**		

GROUP 3: SPEARVILLE AREA

Request	Capacity	Area	Proposed Point of Interconnection
ASGI-2012-006	22.50	SUNCMKEC	Tap Hugoton - Rolla 69kV
ASGI-2015-001	6.13	SUNCMKEC	Ninnescah 115kV
GEN-2001-039A	105.00	SUNCMKEC	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-2006-021	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	Crooked Creek 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
GEN-2011-008	600.00	SUNCMKEC	Clark County 345kV
GEN-2011-016	200.10	SUNCMKEC	Ironwood 345kV
GEN-2012-007	120.00	SUNCMKEC	Rubart 115kV
GEN-2012-024	180.00	SUNCMKEC	Clark County 345kV
GEN-2013-010	99.00	SUNCMKEC	Tap Spearville - Post Rock (North of GEN-2011-017 Tap) 345kV
GEN-2015-021	20.00	SUNCMKEC	Johnson Corner 115kV
GEN-2015-027	4.90	SUNCMKEC	Crooked Creek 115kV
Gray County Wind (Montezuma)	110.00	SUNCMKEC	Gray County Tap 115kV
PRIOR QUEUED SUBTOTAL	**3,235.83**		
AREA TOTAL	**3,235.83**		

GROUP 4: NORTHWEST KANSAS AREA

Request	Capacity	Area	Proposed Point of Interconnection
ASGI-2013-004	36.60	SUNCMKEC	Morris 115kV
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-2008-092	200.60	MIDW	Post Rock 230kV
GEN-2009-008	199.50	MIDW	South Hays 230kV
GEN-2009-020	48.30	MIDW	Walnut Creek 69kV
GEN-2010-048	70.00	MIDW	Tap Beach Station - Redline 115kV
GEN-2010-057	201.00	MIDW	Rice County 230kV
GEN-2013-033	28.00	MIDW	Knoll 115kV
GEN-2014-025	2.40	MIDW	Walnut Creek 69kV
GEN-2014-041	120.80	SUNCMKEC	Arnold 115kV
PRIOR QUEUED SUBTOTAL	**1,532.20**		
GEN-2015-061	200.00	SUNCMKEC	Mingo 345kV
GEN-2015-064	197.80	SUNCMKEC	Mingo 115kV
GEN-2015-065	202.40	SUNCMKEC	Mingo 345kV
CURRENT CLUSTER SUBTOTAL	**600.20**		
AREA TOTAL	**2,132.40**		

GROUP 6: SOUTH TEXAS PANHANDLE/NEW MEXICO 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	27.30	SPS	Lovington 115kV
ASGI-2011-003	10.00	SPS	Hendricks 69kV
ASGI-2011-004	20.00	SPS	Pleasant Hill 69kV
ASGI-2012-002	18.15	SPS	FE-Clovis Interchange 115kV
ASGI-2013-002	18.40	SPS	FE Tucumcari 115kV
ASGI-2013-003	18.40	SPS	FE Clovis 115kV
ASGI-2013-005	1.65	SPS	FE Clovis 115kV
ASGI-2013-006	2.00	SPS	SP-Erskine 115kV
ASGI-2014-001	2.50	SPS	SP-Erskine 115kV
ASGI-2015-002	2.00	SPS	SP-Yuma 69kV
GEN-2001-033	180.00	SPS	San Juan Tap 230kV
GEN-2001-036	80.00	SPS	Norton 115kV
GEN-2006-018	170.00	SPS	TUCO Interchange 230kV
GEN-2006-026	502.00	SPS	Hobbs 230kV & Hobbs 115kV
GEN-2008-022	300.00	SPS	Crossroads 345kV
GEN-2010-006	205.00	SPS	Jones 230kV
GEN-2010-046	56.00	SPS	TUCO Interchange 230kV
GEN-2011-025	80.00	SPS	Tap Floyd County - Crosby County 115kV
GEN-2011-045	205.00	SPS	Jones 230kV
GEN-2011-046	27.00	SPS	Lopez 115kV
GEN-2011-048	175.00	SPS	Mustang 230kV
GEN-2012-001	61.20	SPS	Cirrus Tap 230kV
GEN-2012-020	478.00	SPS	TUCO 230kV
GEN-2012-034	7.00	SPS	Mustang 230kV
GEN-2012-035	7.00	SPS	Mustang 230kV
GEN-2012-036	7.00	SPS	Mustang 230kV
GEN-2012-037	203.00	SPS	TUCO 345kV
GEN-2013-016	203.00	SPS	TUCO 345kV
GEN-2013-022	25.00	SPS	Norton 115kV
GEN-2013-027	150.00	SPS	Tap Tolk - Yoakum 230kV
GEN-2014-012	225.00	SPS	Tap Hobbs Interchange - Andrews 230kV
GEN-2014-033	70.00	SPS	Chaves County 115kV
GEN-2014-034	70.00	SPS	Chaves County 115kV
GEN-2014-035	30.00	SPS	Chaves County 115kV
GEN-2014-040	320.40	SPS	Castro 115kV
GEN-2014-047	40.00	SPS	Crossroads 345kV
GEN-2014-074	152.00	SPS	Tap TUCO Interchange - Oklaunion (GEN-2014-074 Tap) 345kV
GEN-2015-014	150.00	SPS	Tap Cochran - Lehman 115kV
GEN-2015-022	112.00	SPS	Swisher 115kV
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
SPS Distributed (Yuma)	2.57	SPS	SP-Yuma 69kV
PRIOR QUEUED SUBTOTAL	**4,550.77**		

GEN-2015-020	100.00	SPS	Oasis 115kV
GEN-2015-031	150.50	SPS	Tap Amarillo South - Swisher 230kV
GEN-2015-056	101.20	SPS	Crossroads 345kV
GEN-2015-058	50.00	SPS	Atoka 115kV
GEN-2015-068	300.00	SPS	TUCO Interchange 345kV
GEN-2015-075	51.50	SPS	Carlisle 69kV
GEN-2015-079	129.20	SPS	Tap Yoakum - Hobbs Interchange 230kV
GEN-2015-080	129.20	SPS	Tap Yoakum - Hobbs Interchange 230kV
CURRENT CLUSTER SUBTOTAL	**1,011.60**		
AREA TOTAL	**5,562.37**		

GROUP 7: SOUTHWEST OKLAHOMA AREA

Request	Capacity	Area	Proposed Point of Interconnection
GEN-2001-026	74.30	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	Weatherford 138kV
GEN-2004-020	27.00	AEPW	Weatherford 138kV
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-2007-052	150.00	WFEC	Anadarko 138kV
GEN-2008-023	150.00	AEPW	Hobart Junction 138kV
GEN-2008-037	101.00	WFEC	Slick Hills 138kV
GEN-2011-037	7.00	WFEC	Blue Canyon 5 138kV
GEN-2011-049	250.70	OKGE	Border 345kV
GEN-2012-028	74.80	WFEC	Gotebo 69kV
GEN-2015-004	52.90	OKGE	Border 345kV
GEN-2015-013	120.00	WFEC	Synder 138kV
PRIOR QUEUED SUBTOTAL	**1,923.90**		
GEN-2015-055	40.00	WFEC	Erick 138kV
GEN-2015-071	200.00	AEPW	Chisholm 345kV
GEN-2015-084	51.30	AEPW	Hollis 138kV
GEN-2015-085	122.40	AEPW	Altus Junction 138kV
CURRENT CLUSTER SUBTOTAL	**413.70**		
AREA TOTAL	**2,337.60**		

GROUP 8: NORTH OKLAHOMA/SOUTH CENTRAL KANSAS AREA

Request	Capacity	Area	Proposed Point of Interconnection
ASGI-2010-006	150.00	AECI	Remington 138kV
ASGI-2014-014	56.40	GRDA	Ferguson 69kV
ASGI-2015-004	56.36	GRDA	Coffeyville City 69kV
GEN-2002-004	200.00	WERE	Latham 345kV
GEN-2005-013	201.00	WERE	Caney River 345kV
GEN-2007-025	300.00	WERE	Viola 345kV
GEN-2008-013	300.00	OKGE	Hunter 345kV
GEN-2008-021	42.00	WERE	Wolf Creek 345kV
GEN-2008-098	100.80	WERE	Waverly 345kV
GEN-2009-025	59.80	OKGE	Nardins 69kV
GEN-2010-003	100.80	WERE	Waverly 345kV
GEN-2010-005	299.20	WERE	Viola 345kV
GEN-2010-055	4.50	AEPW	Wekiwa 138kV
GEN-2011-057	150.40	WERE	Creswell 138kV
GEN-2012-032	300.00	OKGE	Open Sky 345kV
GEN-2012-033	98.10	OKGE	Tap and Tie South 4th - Bunch Creek & Enid Tap - Fairmont (GEN-2012-033T) 138kV
GEN-2012-041	121.50	OKGE	Ranch Road 345kV
GEN-2013-012	147.00	OKGE	Redbud 345kV
GEN-2013-028	559.50	GRDA	Tap N Tulsa - GRDA 1 345kV
GEN-2013-029	300.00	OKGE	Renfrow 345kV
GEN-2014-001	200.60	WERE	Tap Wichita - Emporia Energy Center (GEN-2014-001 Tap) 345kV

GEN-2014-028	35.00	EMDE	Riverton 161kV
GEN-2014-064	248.40	OKGE	Otter 138kV
GEN-2015-001	200.00	OKGE	Ranch Road 345kV
GEN-2015-015	154.60	OKGE	Tap Medford Tap - Coyote 138kV
GEN-2015-016	200.00	KCPL	Tap Marmaton - Centerville 161kV
GEN-2015-024	220.00	WERE	Tap Thistle - Wichita 345kV Dbl CKT
GEN-2015-025	220.00	WERE	Tap Thistle - Wichita 345kV Dbl CKT
GEN-2015-030	200.10	OKGE	Sooner 345kV
PRIOR QUEUED SUBTOTAL	**5,226.06**		
GEN-2015-034	200.00	OKGE	Ranch Road 345kV
GEN-2015-047	300.00	OKGE	Sooner 345kV
GEN-2015-052	300.00	WERE	Tap Open Sky - Rose Hill 345kV
GEN-2015-062	4.50	OKGE	Tap and Tie South 4th - Bunch Creek & Enid Tap - Fairmont (GEN-2012-033T) 138kV
GEN-2015-063	300.00	OKGE	Tap Woodring - Mathewson 345kV
GEN-2015-066	248.40	OKGE	Tap Cleveland - Sooner 345kV
GEN-2015-067	150.00	OKGE	Sooner 138kV
GEN-2015-069	300.00	WERE	Union Ridge 230kV
GEN-2015-073	200.10	WERE	Emporia Energy Center 345kV
GEN-2015-083	125.00	WERE	Belle Plain 138kV
GEN-2015-090	220.00	WERE	Tap Thistle - Wichita 345kV Dbl CKT
CURRENT CLUSTER SUBTOTAL	**2,348.00**		
AREA TOTAL	**7,574.06**		

GROUP 9: 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-2007-017IS	166.00	WAPA	Ft Thompson-Grand Island 345kV
GEN-2007-018IS	234.00	WAPA	Ft Thompson-Grand Island 345kV
GEN-2008-086N02	201.00	NPPD	Meadow Grove 230kV
GEN-2008-119O	60.00	OPPD	S1399 161kV
GEN-2008-123N	89.70	NPPD	Tap Pauline - Hildreth (Rosemont) 115kV
GEN-2009-040	73.80	WERE	Marshall 115kV
GEN-2010-041	10.50	OPPD	S1399 161kV
GEN-2010-051	200.00	NPPD	Tap Hoskins - Twin Church (Dixon County) 230kV
GEN-2011-018	73.60	NPPD	Steele City 115kV
GEN-2011-027	120.00	NPPD	Tap Hoskins - Twin Church (Dixon County) 230kV
GEN-2011-056	3.60	NPPD	Jeffrey 115kV
GEN-2011-056A	3.60	NPPD	John 1 115kV
GEN-2011-056B	4.50	NPPD	John 2 115kV
GEN-2012-021	4.80	LES	Terry Bundy Generating Station 115kV
GEN-2013-002	50.60	LES	Tap Sheldon - Folsom & Pleasant Hill (GEN-2013-002 Tap) 115kV CKT 2
GEN-2013-008	1.20	NPPD	Steele City 115kV
GEN-2013-019	73.60	LES	Tap Sheldon - Folsom & Pleasant Hill (GEN-2013-002 Tap) 115kV CKT 2
GEN-2013-032	204.00	NPPD	Antelope 115kV
GEN-2014-004	4.00	NPPD	Steele City 115kV (GEN-2011-018 POI)

GEN-2014-013	73.50	NPPD	Meadow Grove (GEN-2008-086N2 Sub) 230kV
GEN-2014-031	35.80	NPPD	Meadow Grove 230kV
GEN-2014-032	10.20	NPPD	Meadow Grove 230kV
GEN-2014-039	73.40	NPPD	Friend 115kV
GEN-2015-007	160.00	NPPD	Hoskins 345kV
GEN-2015-023	300.70	NPPD	Holt County 345kV
NPPD Distributed (Broken Bow)	8.30	NPPD	Broken Bow 115kV
NPPD Distributed (Buffalo County Solar)	10.00	NPPD	Kearney Northeast
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 (North Platte - Lexington)	54.00	NPPD	Multiple: Jeffrey 115kV, John_1 115kV, John_2 115kV
NPPD Distributed (Ord)	11.90	NPPD	Ord 115kV
NPPD Distributed (Stuart)	2.10	NPPD	Ainsworth 115kV
PRIOR QUEUED SUBTOTAL	**2,927.70**		
GEN-2015-053	50.00	NPPD	Antelope 115kV
GEN-2015-076	158.40	NPPD	Belden 115kV
GEN-2015-087	66.00	NPPD	Tap Fairbury - Hebron 115kV
GEN-2015-088	300.00	NPPD	Tap Moore - Pauline 345kV
CURRENT CLUSTER SUBTOTAL	**574.40**		
AREA TOTAL	**3,502.10**		

GROUP 10: SOUTHEAST OKLAHOMA/NORTHEAST TEXAS AREA

Request	Capacity	Area	Proposed Point of Interconnection
AREA TOTAL	**0.00**		

GROUP 12: NORTHWEST ARKANSAS AREA

Request	Capacity	Area	Proposed Point of Interconnection
GEN-2013-011	30.00	AEPW	Turk 138kV
PRIOR QUEUED SUBTOTAL	**30.00**		
AREA TOTAL	**30.00**		

GROUP 13: NORTHWEST MISSOURI AREA

Request	Capacity	Area	Proposed Point of Interconnection
GEN-2008-129	80.00	KCPL	Pleasant Hill 161kV
GEN-2010-036	4.60	WERE	6th Street 115kV
GEN-2011-011	50.00	KCPL	Iatan 345kV
GEN-2014-021	300.00	KCPL	Tap Nebraska City - Mullin Creek 345kV
GEN-2015-005	200.10	KCPL	Tap Nebraska City - Sibley 345kV
PRIOR QUEUED SUBTOTAL	**634.70**		
AREA TOTAL	**634.70**		

GROUP 14: SOUTH CENTRAL OKLAHOMA AREA

Request	Capacity	Area	Proposed Point of Interconnection
GEN-2011-040	111.00	OKGE	Carter County 138kV
GEN-2011-050	109.80	AEPW	Santa Fe Tap 138kV
GEN-2012-004	41.40	OKGE	Carter County 138kV
GEN-2013-007	100.30	OKGE	Tap Prices Falls - Carter 138kV
GEN-2014-057	250.00	AEPW	Tap Lawton - Sunnyside (Terry Road) 345kV
PRIOR QUEUED SUBTOTAL	**612.50**		
ASGI-2015-006	9.00	SWPA	Tupelo 138kV
GEN-2015-045	20.00	AEPW	Tap Lawton - Sunnyside (Terry Road) 345kV
GEN-2015-092	250.00	AEPW	Tap Lawton - Sunnyside (Terry Road) 345kV
CURRENT CLUSTER SUBTOTAL	**279.00**		
AREA TOTAL	**891.50**		

GROUP 15: E-SOUTH DAKOTA AREA

Request	Capacity	Area	Proposed Point of Interconnection
G176	100.00	XEL	Yankee 115kV
G255	100.00	XEL	Yankee 115kV
G586	30.00	XEL	Yankee 115kV
G736	200.00	OTP	Big Stone South 230kV
GEN-2002-009IS	40.00	WAPA	Ft Thompson 69kV [Hyde 69kV]
GEN-2007-013IS	50.00	WAPA	Wessington Springs 230kV
GEN-2007-014IS	100.00	WAPA	Wessington Springs 230kV
GEN-2007-023IS	50.00	WAPA	Formit-Summit 115kV
GEN-2009-001IS	200.00	WAPA	Groton-Watertown 345kV
GEN-2009-018IS	100.00	WAPA	Groton 115kV
GEN-2010-001IS	99.00	WAPA	Bismarck-Glenham 230kV
GEN-2010-003IS	34.00	WAPA	Wessington Springs 230kV
GEN-2012-014IS	99.50	WAPA	Groton 115kV
GEN-2013-001IS	90.00	WAPA	Summit-Watertown 115kV
GEN-2013-009IS	19.50	WAPA	Redfield NW 115kV
GEN-2014-001IS	103.70	WAPA	Newell-Maurine 115kV
J436	150.00	OTP	Big Stone South 345kV
J437	150.00	OTP	Big Stone South 345kV
J442	200.00	OTP	Big Stone 230 kV
PRIOR QUEUED SUBTOTAL	**1,915.70**		
GEN-2015-097	100.00	WAPA	Groton 115kV
CURRENT CLUSTER SUBTOTAL	**100.00**		
AREA TOTAL	**2,015.70**		

GROUP 16: W-NORTH DAKOTA AREA

Request	Capacity	Area	Proposed Point of Interconnection

G359	150.00	MDU	MDU 230 kV system near Ellendale
G380	150.00	OTP	Rugby 115kV
G408	12.00	XEL	Tap McHenry - Souris 115kV
G502	50.60	MP	Milton Young 230kV
G645	50.00	GRE	Ladish 115kV
G723	10.00	MDU	Haskett 115kV
G752	150.00	MDU	Tap Bison - Hettinger 230kV
G788	49.00	GRE	Ladish 115kV
G830	99.00	GRE	GRE McHenry 115kV
GEN-2005-008IS	50.00	WAPA	Hilken 230kV [Ecklund 230kV]
GEN-2006-015IS	50.00	WAPA	Hilken 230kV [Ecklund 230kV]
GEN-2007-015IS	100.00	WAPA	Hilken 230kV [Ecklund 230kV]
GEN-2007-027IS	99.00	WAPA	Bismarck-Garrison 230kV #1
GEN-2009-026IS	110.00	WAPA	Dickenson-Heskett 230kV
GEN-2010-007IS	172.50	WAPA	Antelope Valley 345kV
GEN-2012-006IS	125.01	WAPA	Williston-Ch. Creek 230kV
GEN-2012-012IS	75.00	WAPA	Wolf Point-Circle 115kV
GEN-2014-003IS	91.00	WAPA	Culbertson 115kV
GEN-2014-004IS	384.20	WAPA	Charlie Creek 345kV
GEN-2014-006IS	125.00	WAPA	Williston 115kV
GEN-2014-010IS	150.00	WAPA	Neset 115kV
GEN-2014-014IS	151.50	WAPA	Belfield-Rhame 230kV
J003	20.00	MDU	Baker 115kV
J249	180.00	MDU	MDU Tatanka 230kV
J262	100.00	OTP	Jamestown 345
J263	100.00	OTP	Jamestown 345
J290	150.00	XEL	Tap Glenboro South - Rugby 230kV
J316	150.00	MDU	MDU 230 kV Tatanka-Ellendale line
MPC01200	44.00	OTP	Sidney 230kV
MPC02100	100.00	OTP	Sidney 230kV
PRIOR QUEUED SUBTOTAL	**3,247.81**		
GEN-2015-046	300.00	WAPA	Tande 345kV
GEN-2015-091	101.20	WAPA	Daglum 230kV
GEN-2015-096	150.00	WAPA	Tap Belfied - Rhame 230kV
GEN-2015-098	100.00	WAPA	Mingusville 230kV
CURRENT CLUSTER SUBTOTAL	**651.20**		
AREA TOTAL	**0.00**		

GROUP 17: W-SOUTH DAKOTA AREA			
Request	**Capacity**	**Area**	**Proposed Point of Interconnection**
GEN-2006-002IS	51.00	WAPA	Wessington Springs 230kV
GEN-2009-006IS	90.00	WAPA	Mission 115kV
GEN-2009-007IS	100.00	WAPA	Mission 115kV
GEN-2009-020AIS	130.50	WAPA	Tripp Junction 115kV
GEN-2012-009IS	99.00	WAPA	Fort Randall 115kV
PRIOR QUEUED SUBTOTAL	**470.50**		
AREA TOTAL	**0.00**		

GROUP 18: E-NORTH DAKOTA AREA			
Request	**Capacity**	**Area**	**Proposed Point of Interconnection**
GEN-2002-008IS	40.50	WAPA	Edgeley 115kV [Pomona 115kV]
GEN-2005-003IS	100.00	WAPA	Nelson 115kV
GEN-2007-020IS	16.00	WAPA	Nelson 115kV
GEN-2008-008IS	5.00	WAPA	Nelson 115kV
PRIOR QUEUED SUBTOTAL	**161.50**		
AREA TOTAL	**0.00**		

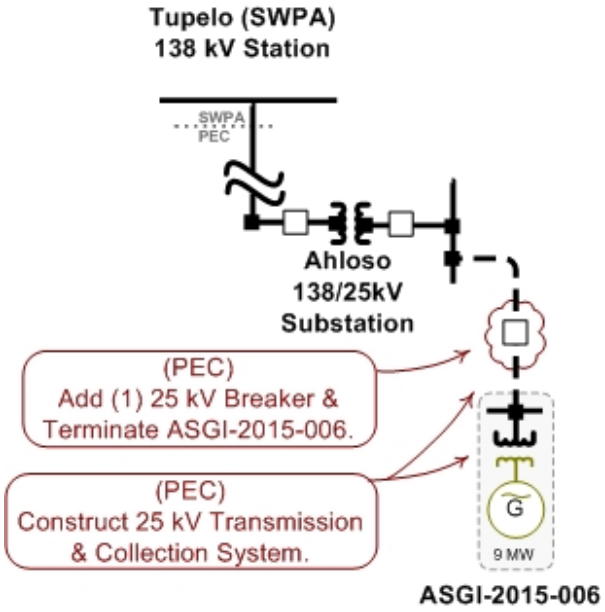
CLUSTER TOTAL (CURRENT STUDY)	**7,158.6**	**MW**
PQ TOTAL (PRIOR QUEUED)	**34,482.9**	**MW**
CLUSTER TOTAL (INCLUDING PRIOR QUEUED)	**41,641.5**	**MW**

11.4 D: Proposed Point of Interconnection One Line Diagrams

See next page

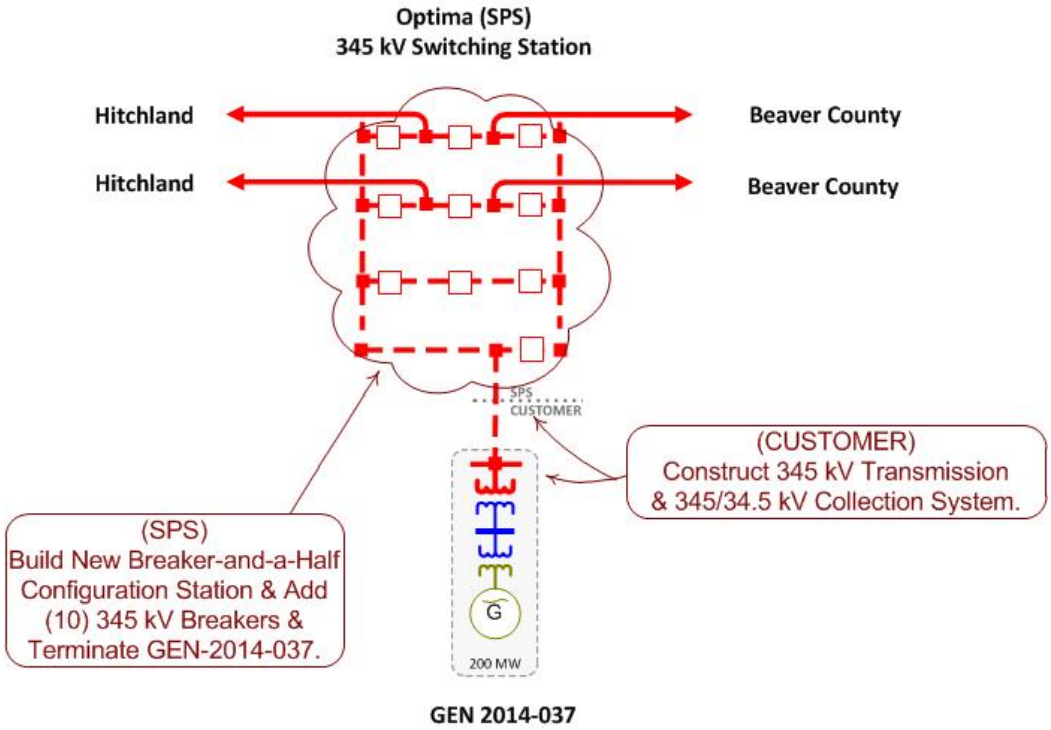
*Note: If not denoted otherwise for Affected System Generator Interconnection Requests (ASGI) interconnection cost estimate could include distribution system or third party system network upgrades and costs estimates.

ASGI-2015-006
Estimated Cluster Analysis Interconnection Cost: $0

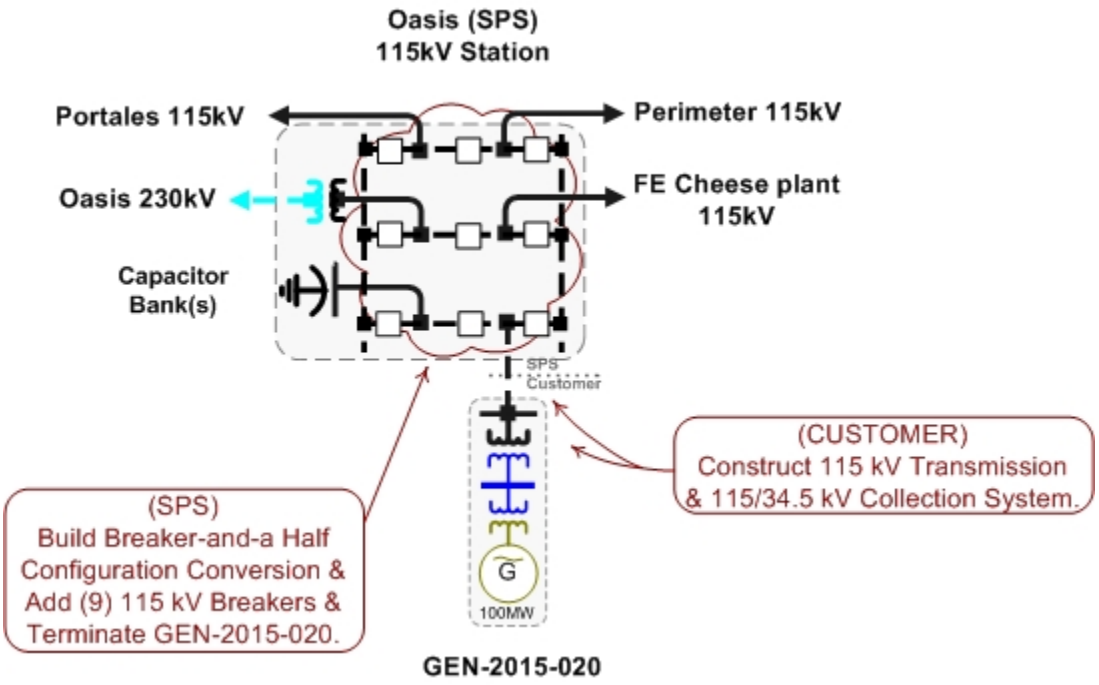


*** Interconnection Cost Estimate(s) only include Affected System Interconnection costs**

GEN-2014-037
Estimated Cluster Analysis Interconnection Cost: $20,334,923

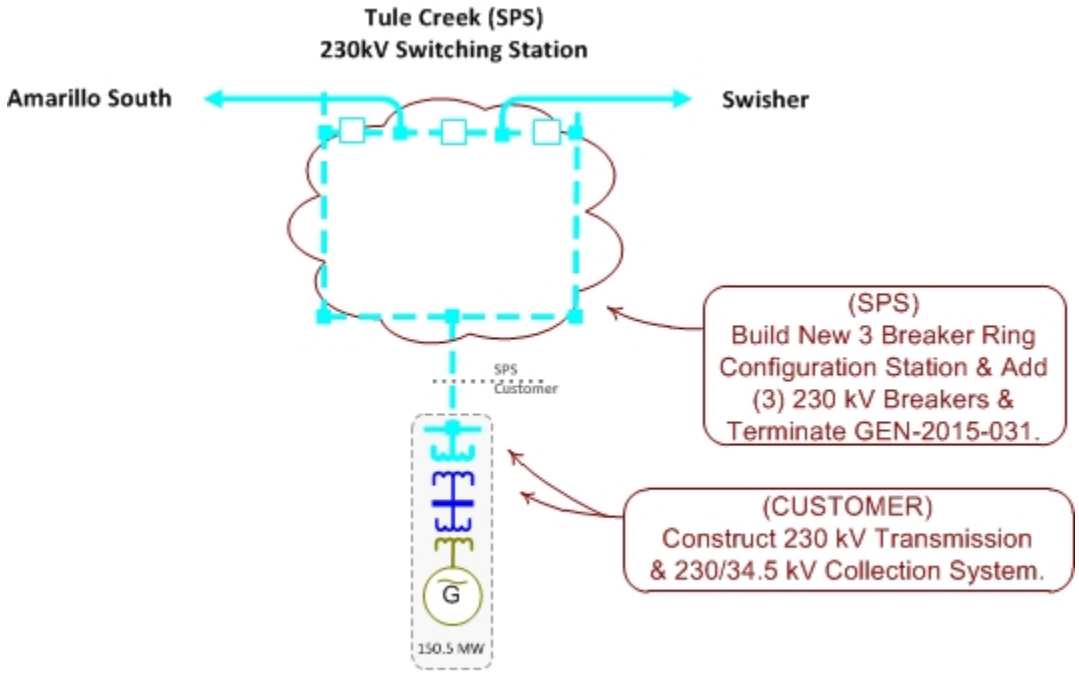


GEN-2015-020
Estimated Cluster Analysis Interconnection Cost: $10,606,653



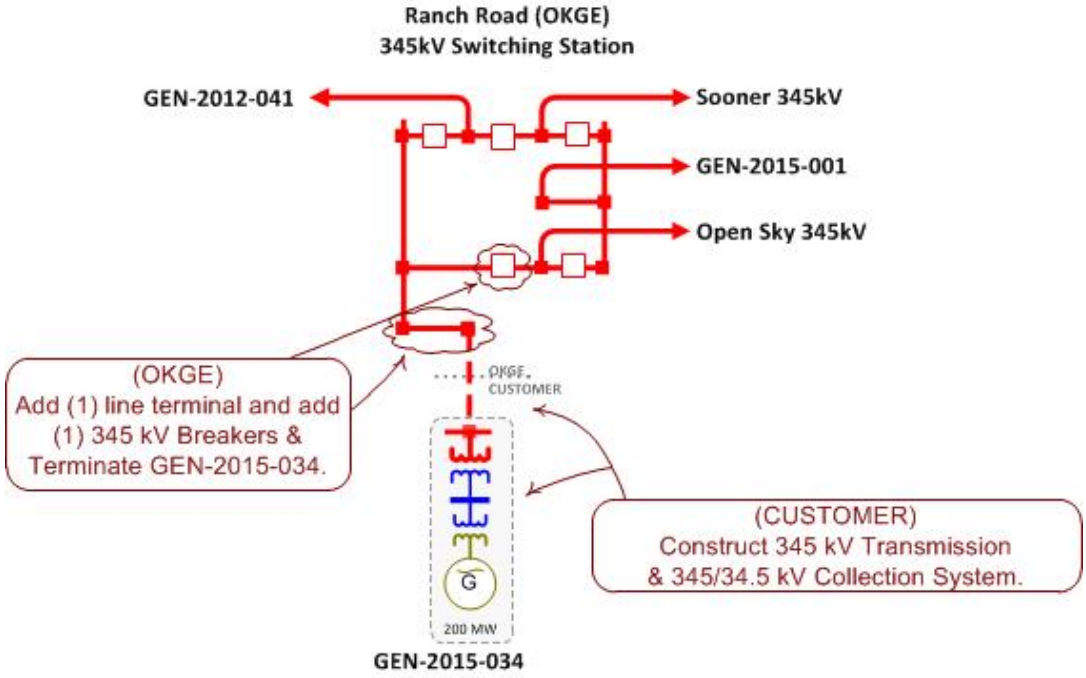
GEN-2015-020

GEN-2015-031
Estimated Cluster Analysis Interconnection Cost: $7,567,148

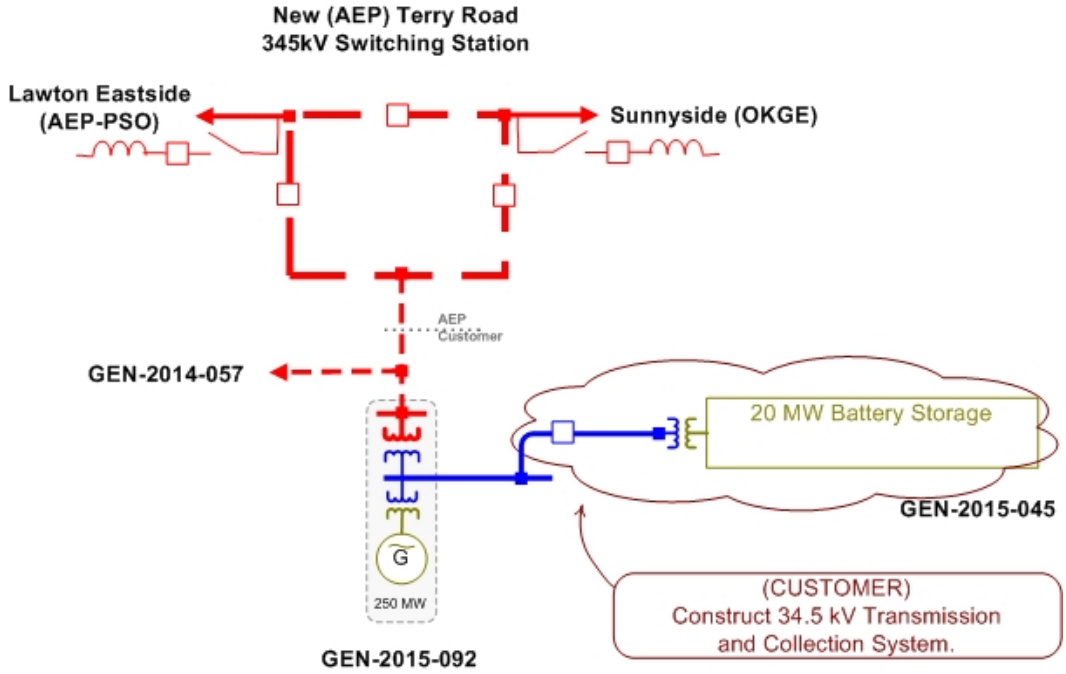


GEN-2015-031

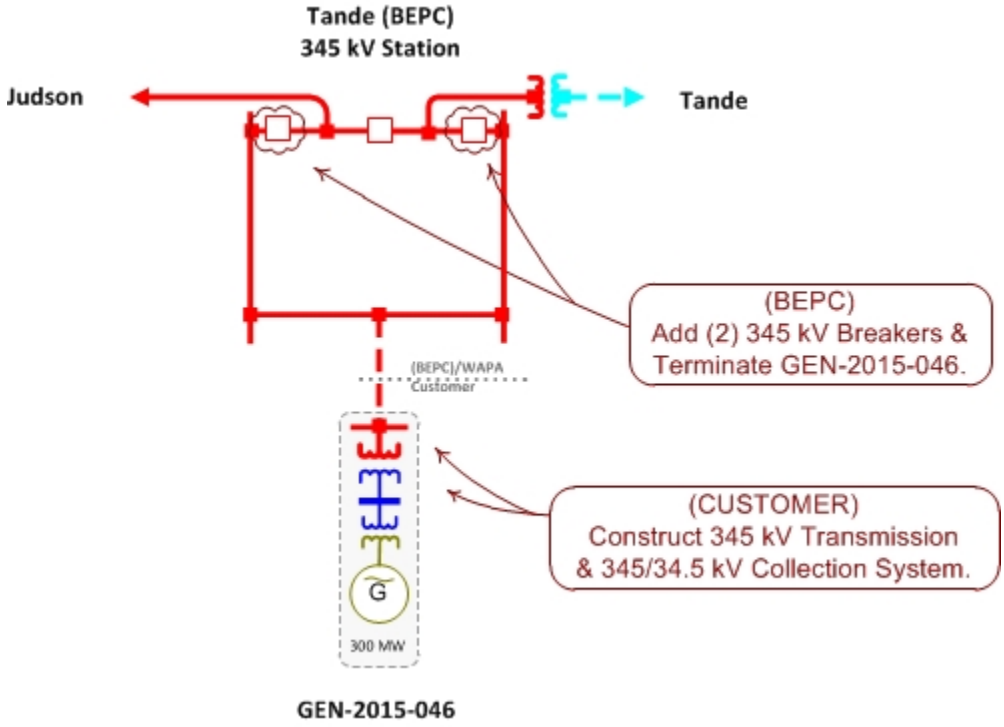
GEN-2015-034
Estimated Cluster Analysis Interconnection Cost: $2,025,000



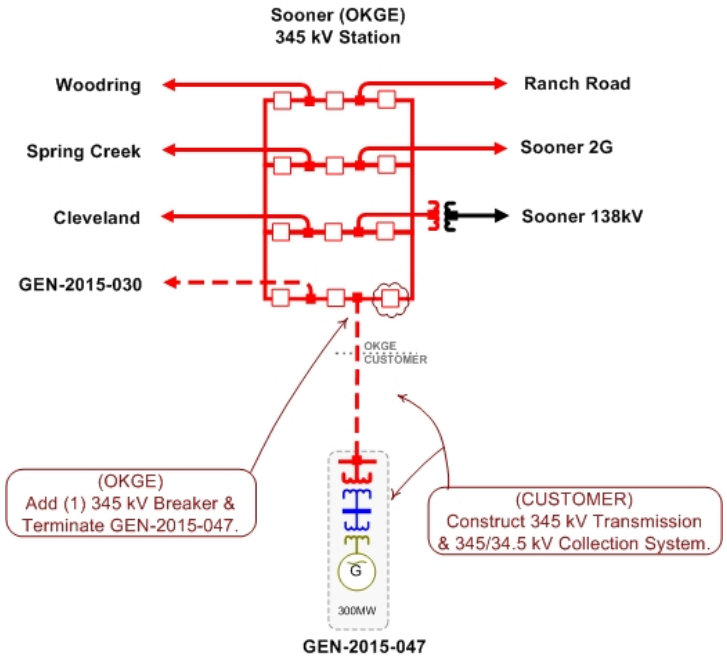
GEN-2015-045
Estimated Cluster Analysis Interconnection Cost: $0



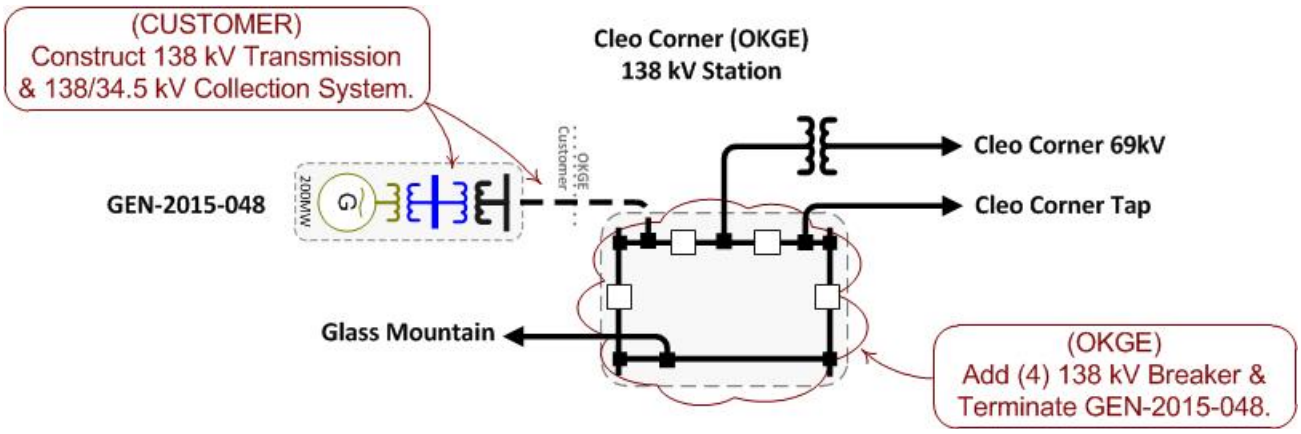
GEN-2015-046
Estimated Cluster Analysis Interconnection Cost: $3,759,097



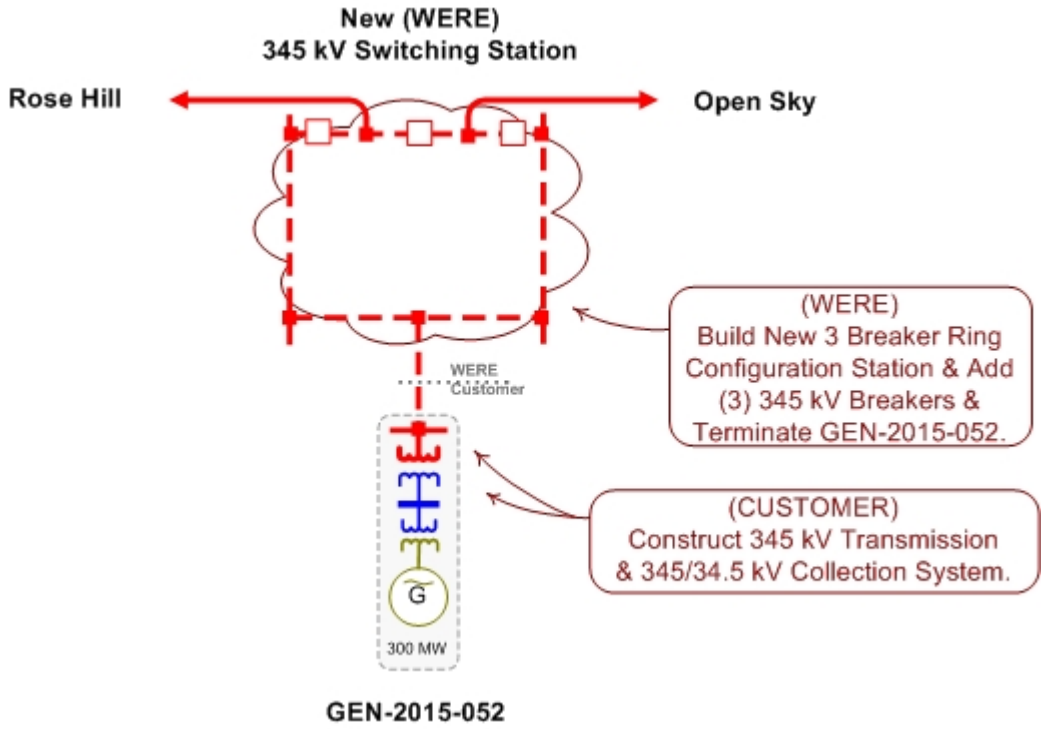
GEN-2015-047
Estimated Cluster Analysis Interconnection Cost: $2,540,000



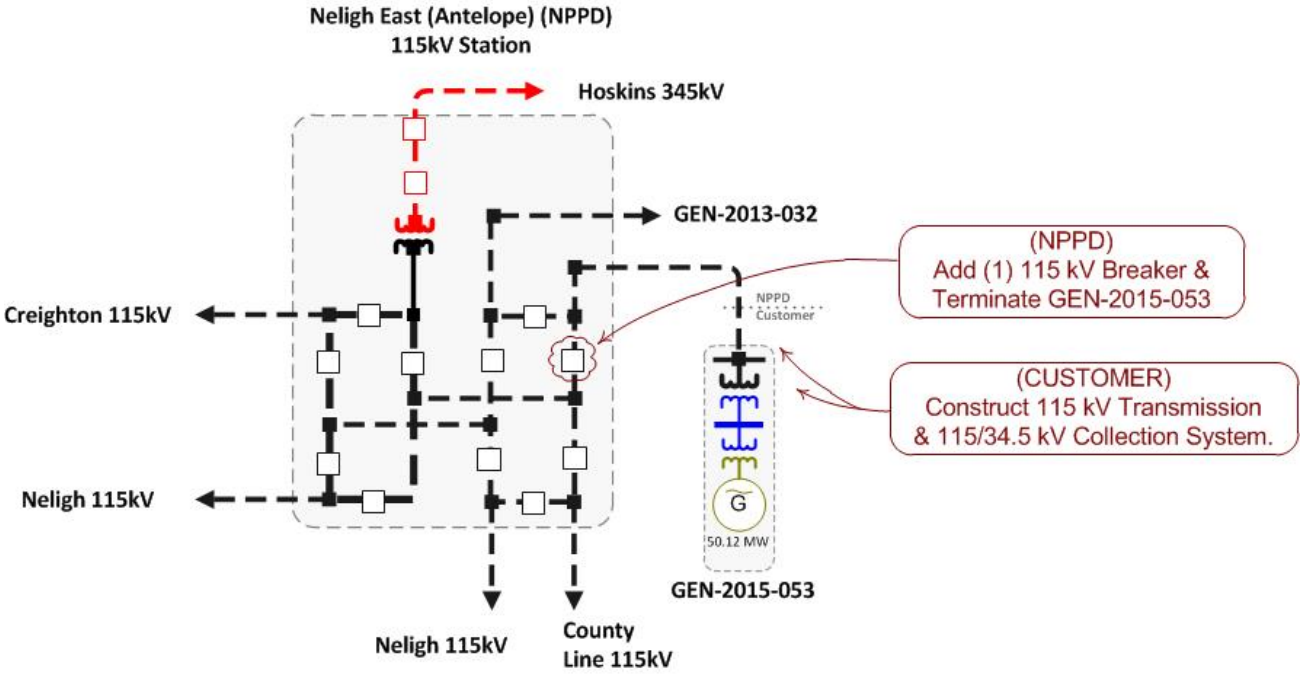
GEN-2015-048
Estimated Cluster Analysis Interconnection Cost: $2,968,000



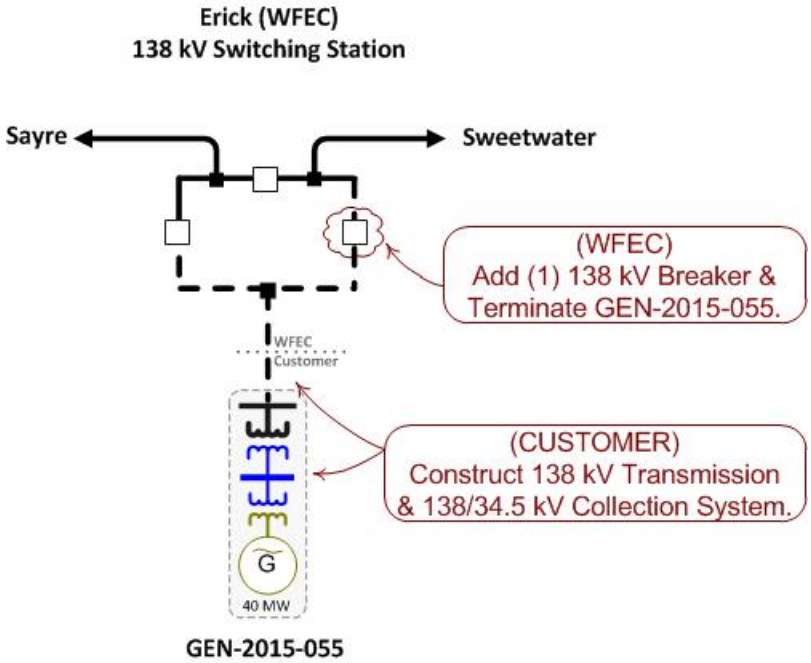
GEN-2015-052
Estimated Cluster Analysis Interconnection Cost: $15,602,434



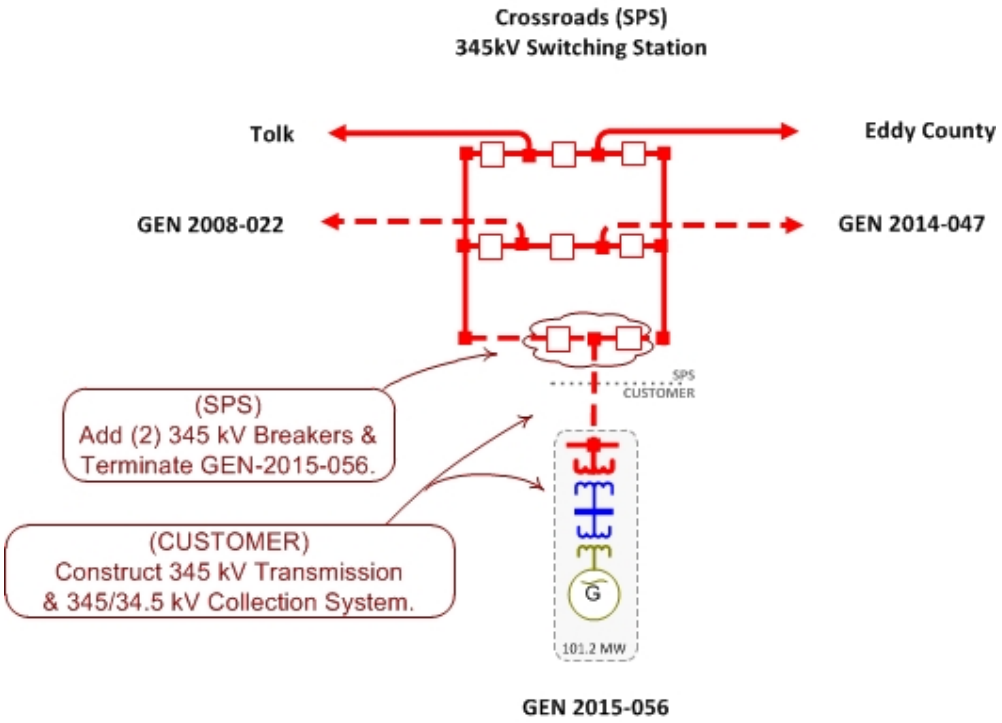
GEN-2015-053
Estimated Cluster Analysis Interconnection Cost: $1,000,000



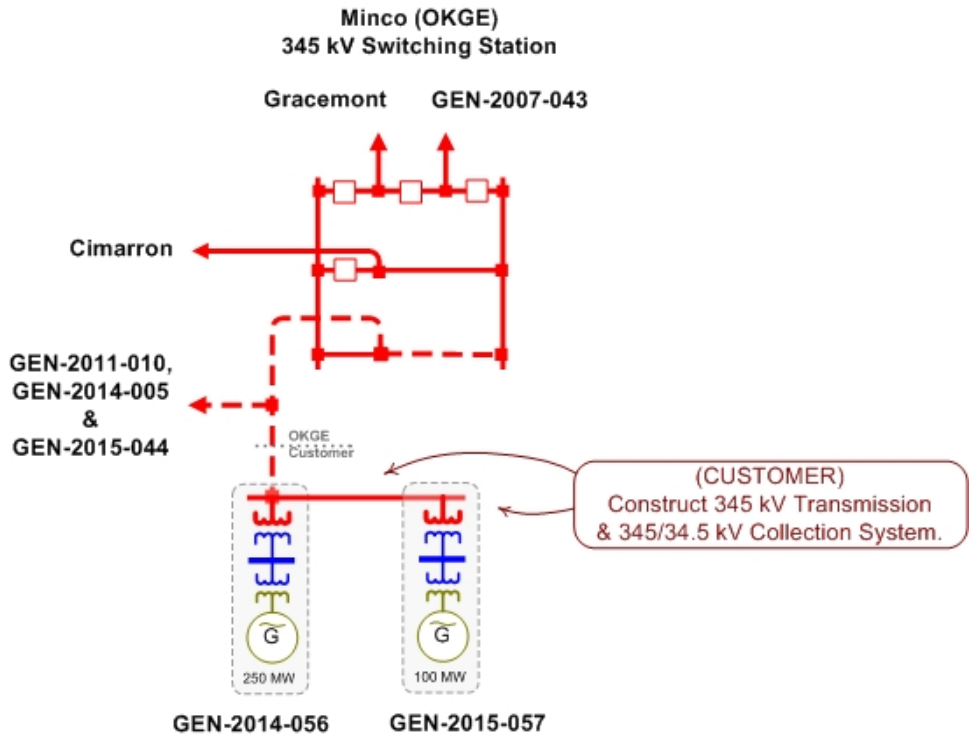
GEN-2015-055
Estimated Cluster Analysis Interconnection Cost: $1,900,000



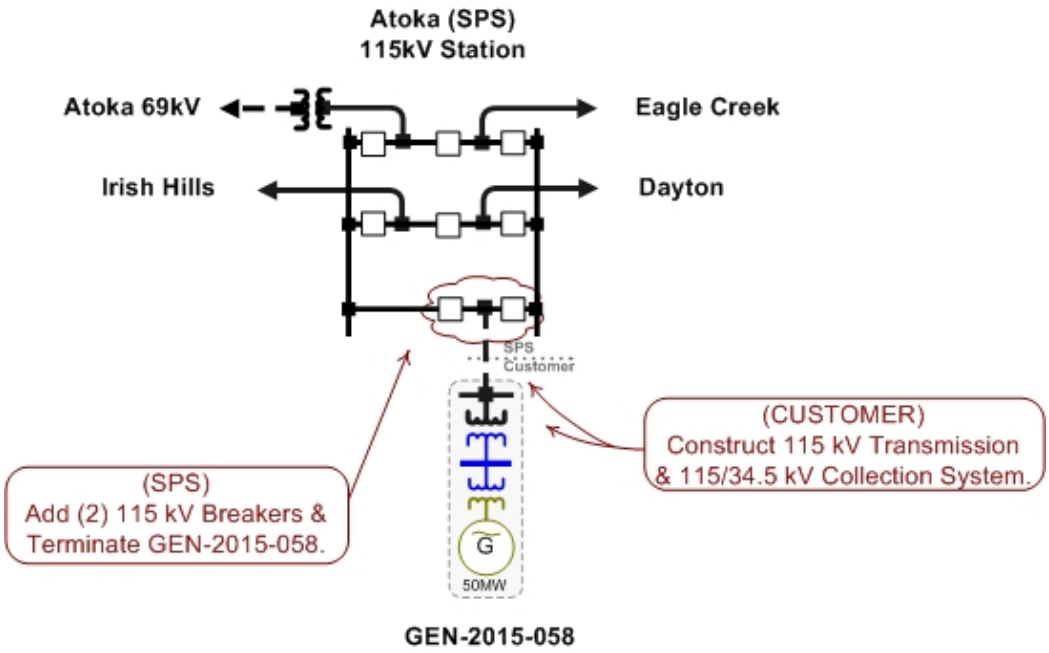
GEN-2015-056
Estimated Cluster Analysis Interconnection Cost: $5,080,273



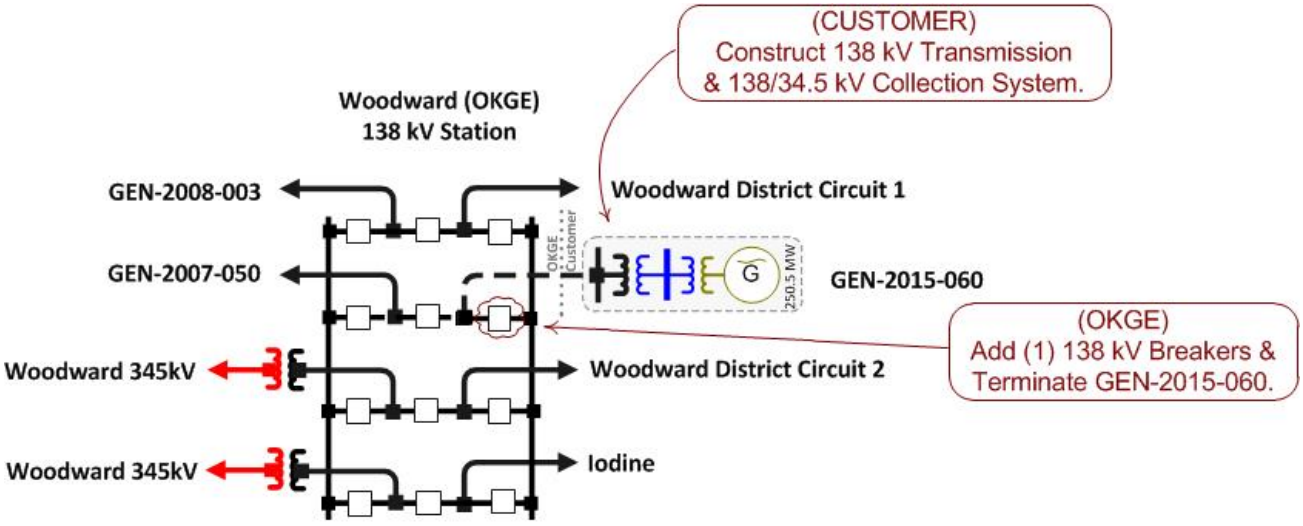
GEN-2015-057
Estimated Cluster Analysis Interconnection Cost: $20,000



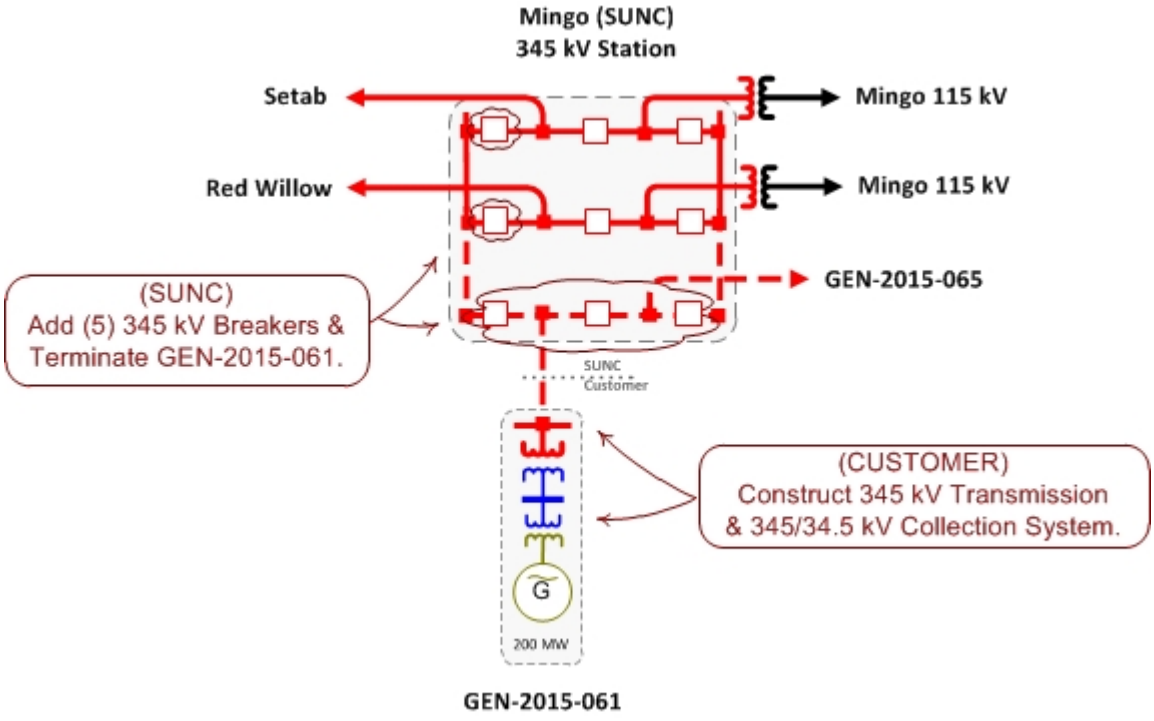
GEN-2015-058
Estimated Cluster Analysis Interconnection Cost: $2,751,641



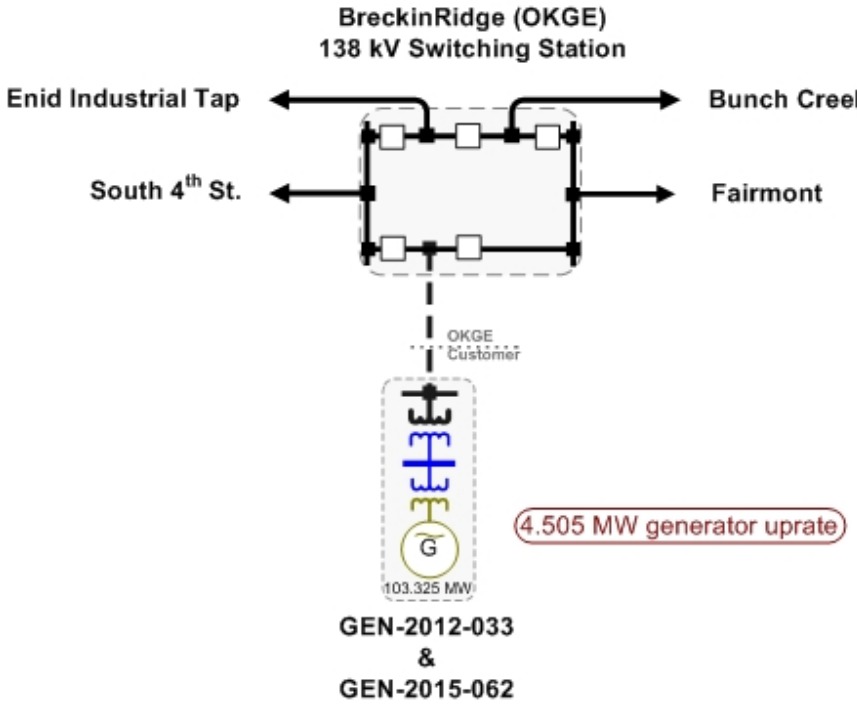
GEN-2015-060
Estimated Cluster Analysis Interconnection Cost: $863,000



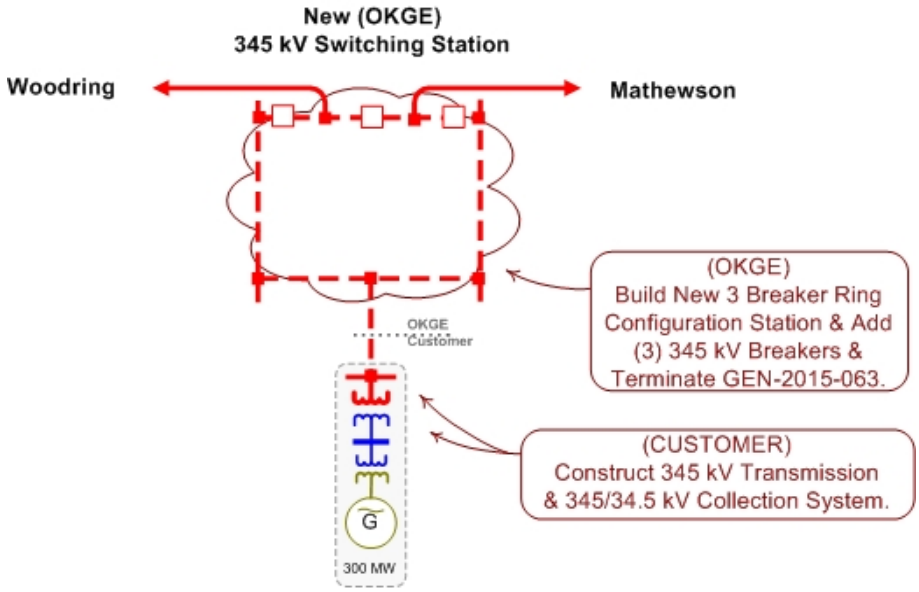
GEN-2015-061
Estimated Cluster Analysis Interconnection Cost: $6,988,986



GEN-2015-062
Estimated Cluster Analysis Interconnection Cost: $0

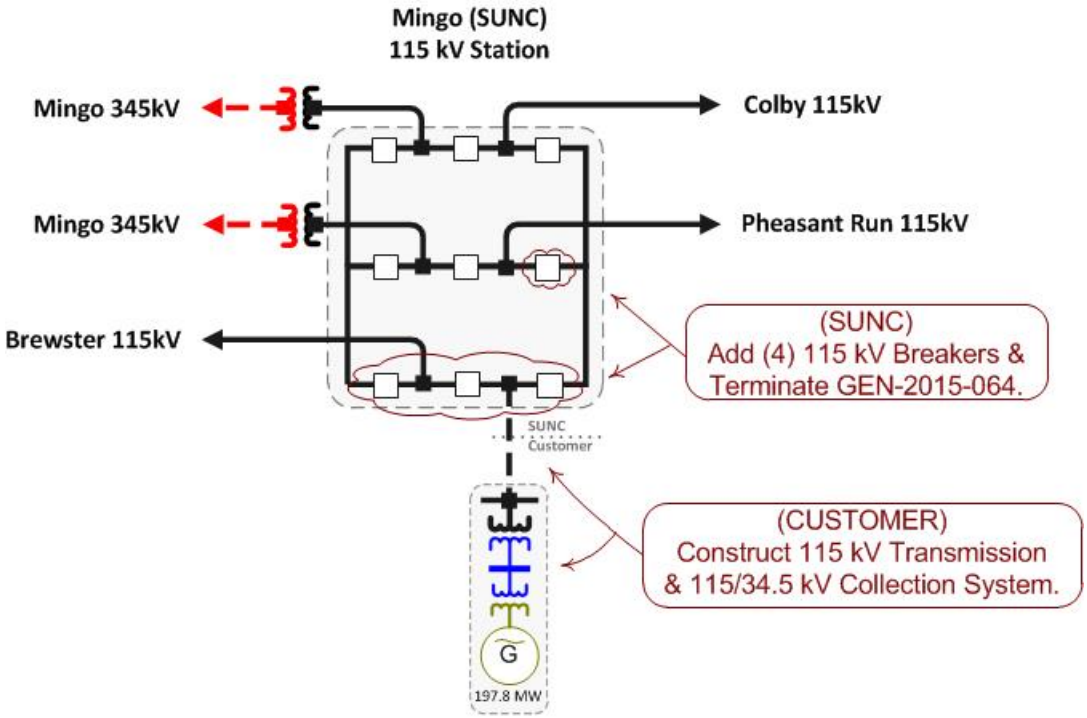


GEN-2015-063
Estimated Cluster Analysis Interconnection Cost: $10,613,000



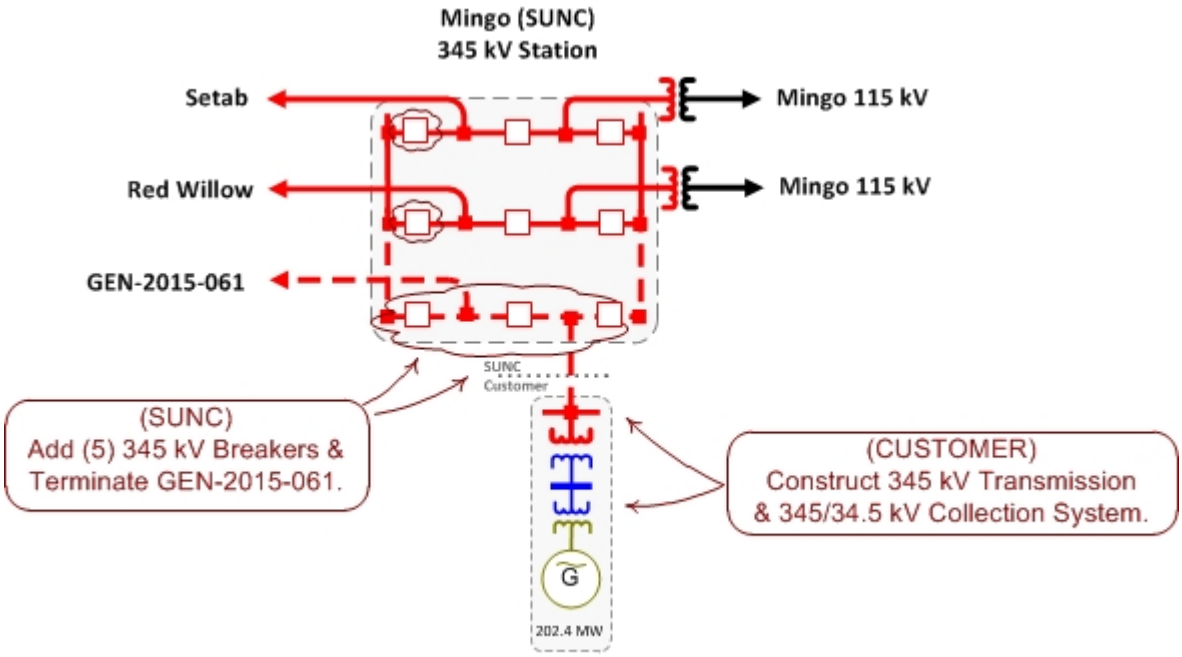
GEN-2015-063

GEN-2015-064
Estimated Cluster Analysis Interconnection Cost: $4,638,823



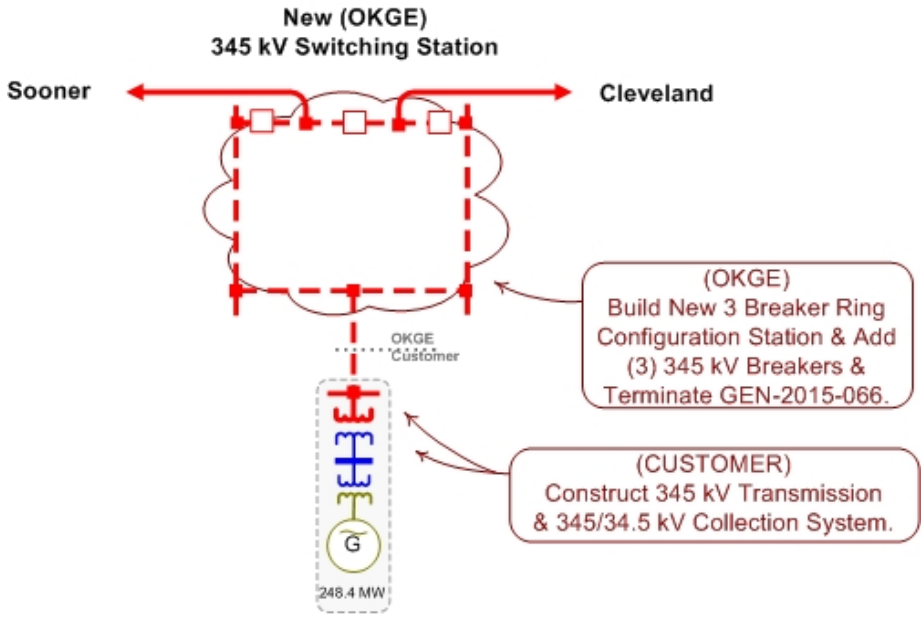
GEN-2015-064

GEN-2015-065
Estimated Cluster Analysis Interconnection Cost: $6,988,986



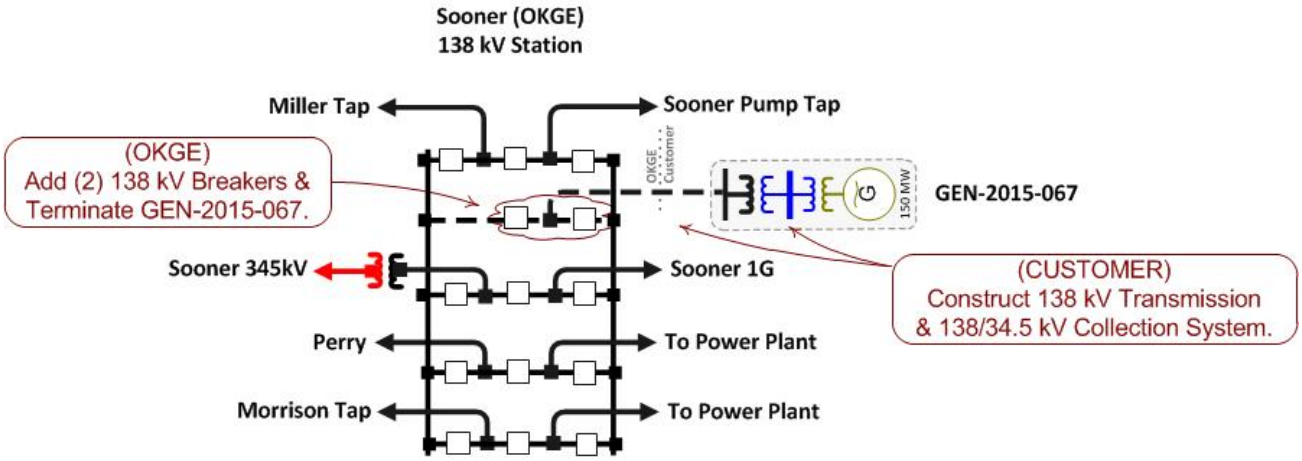
GEN-2015-065

GEN-2015-066
Estimated Cluster Analysis Interconnection Cost: $10,313,000

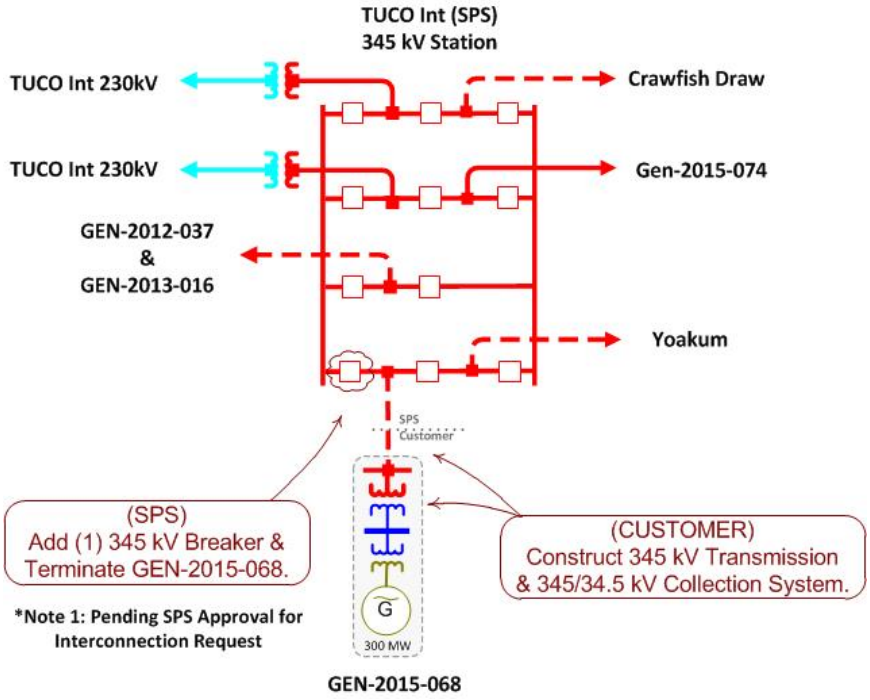


GEN-2015-066

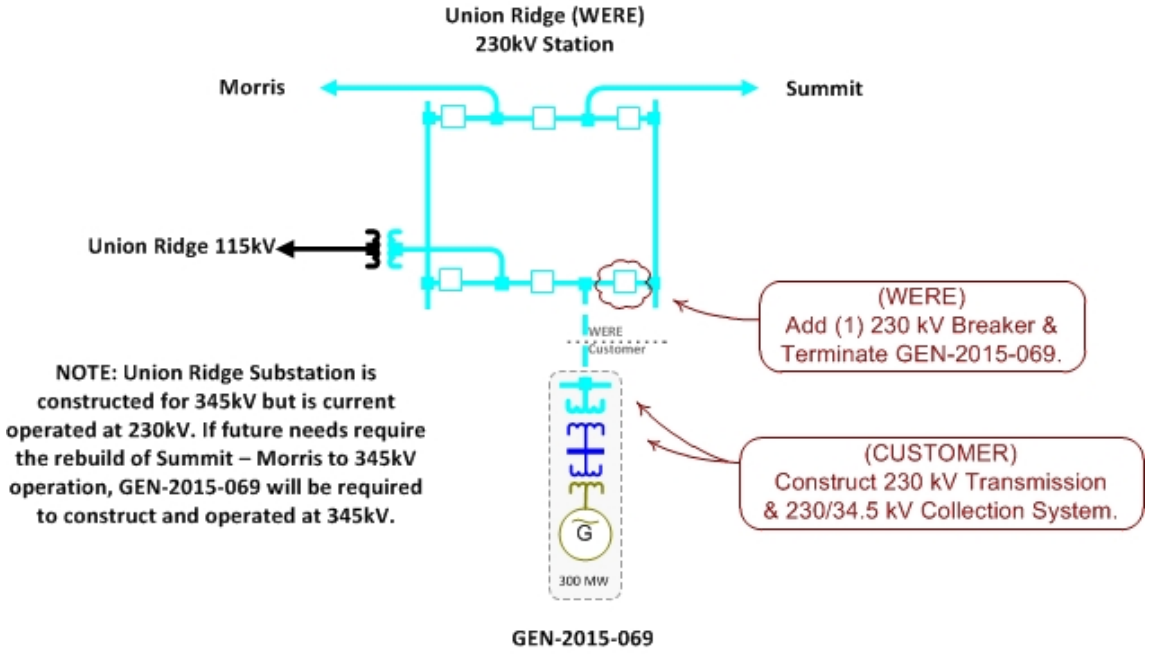
GEN-2015-067
Estimated Cluster Analysis Interconnection Cost: $3,521,000



GEN-2015-068
Estimated Cluster Analysis Interconnection Cost: $4,831,332

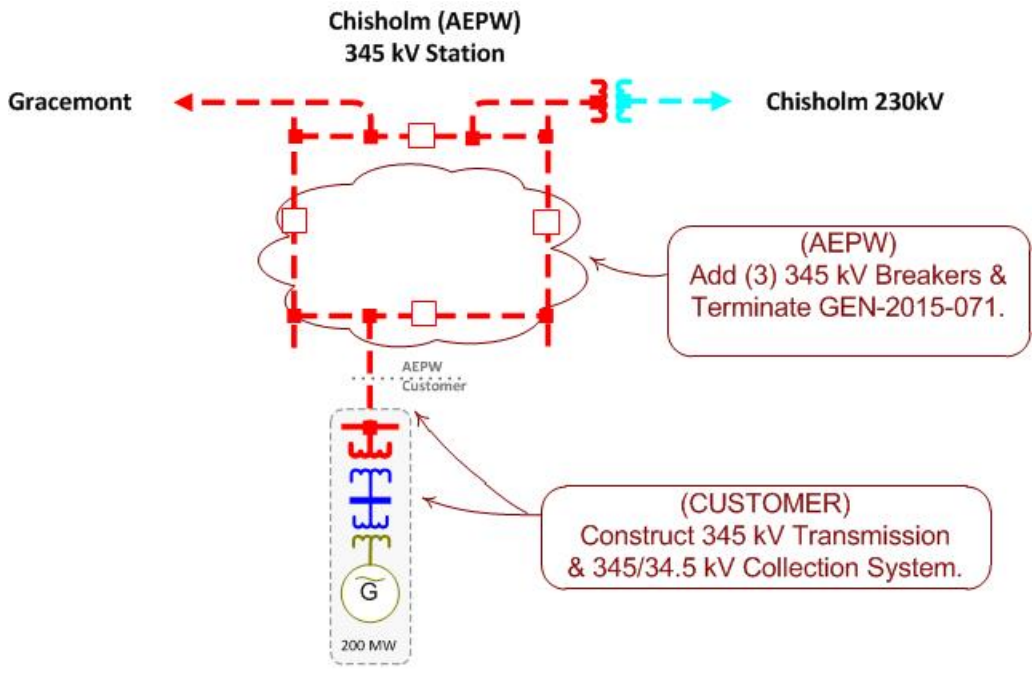


GEN-2015-069
Estimated Cluster Analysis Interconnection Cost: $2,755,752



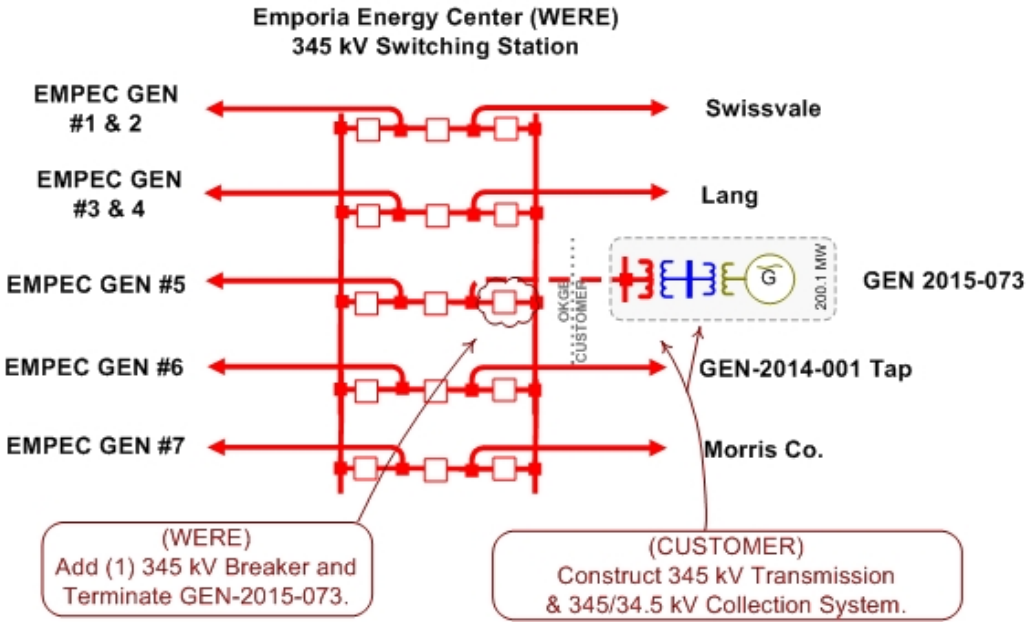
GEN-2015-069

GEN-2015-071
Estimated Cluster Analysis Interconnection Cost: $14,623,541

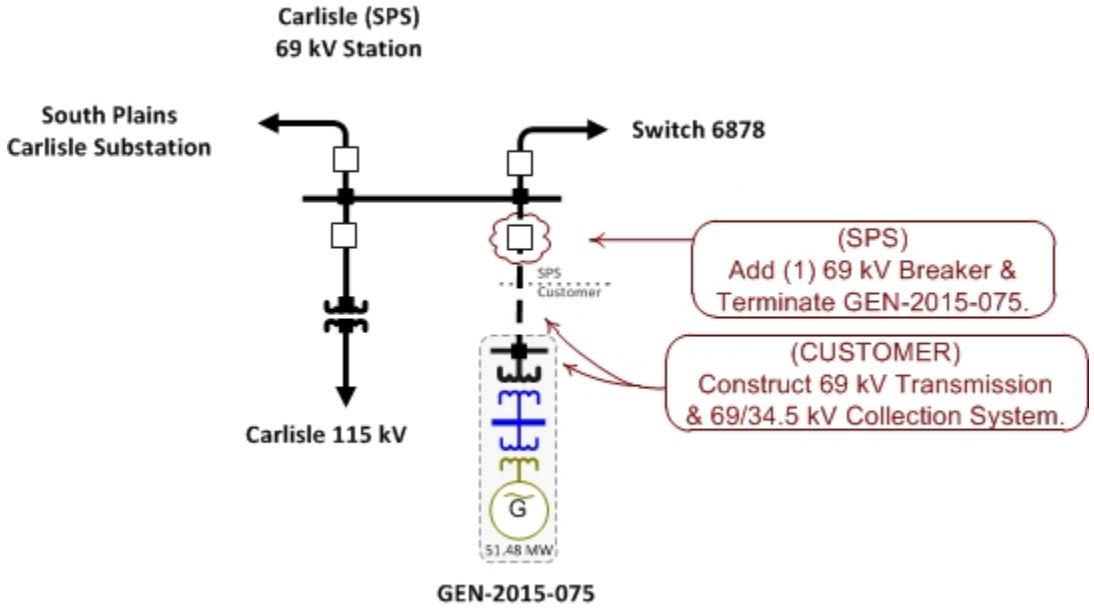


GEN-2015-071

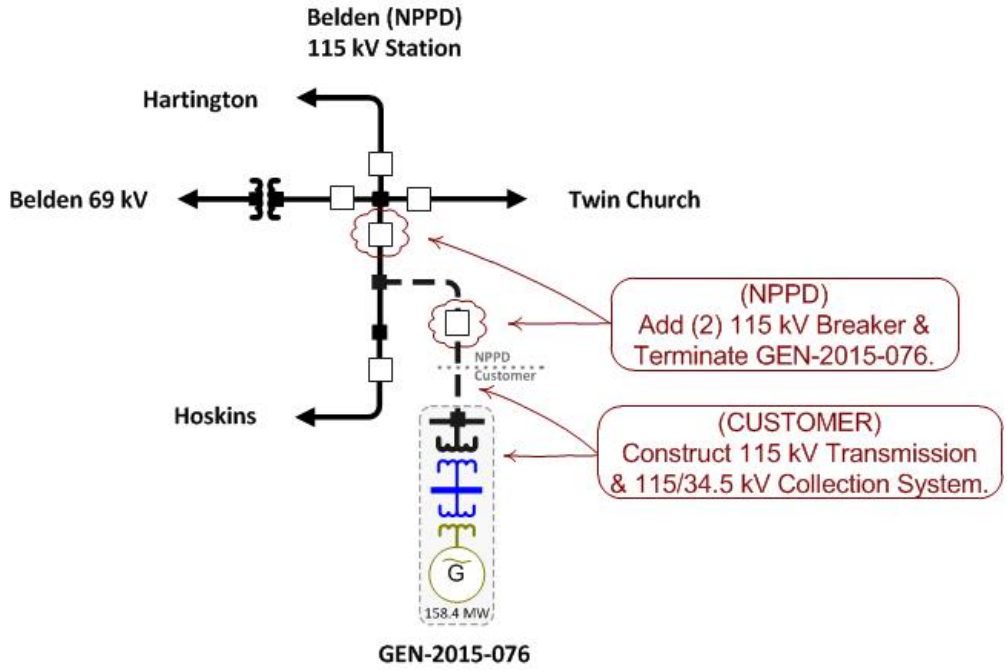
GEN-2015-073
Estimated Cluster Analysis Interconnection Cost: $2,576,628



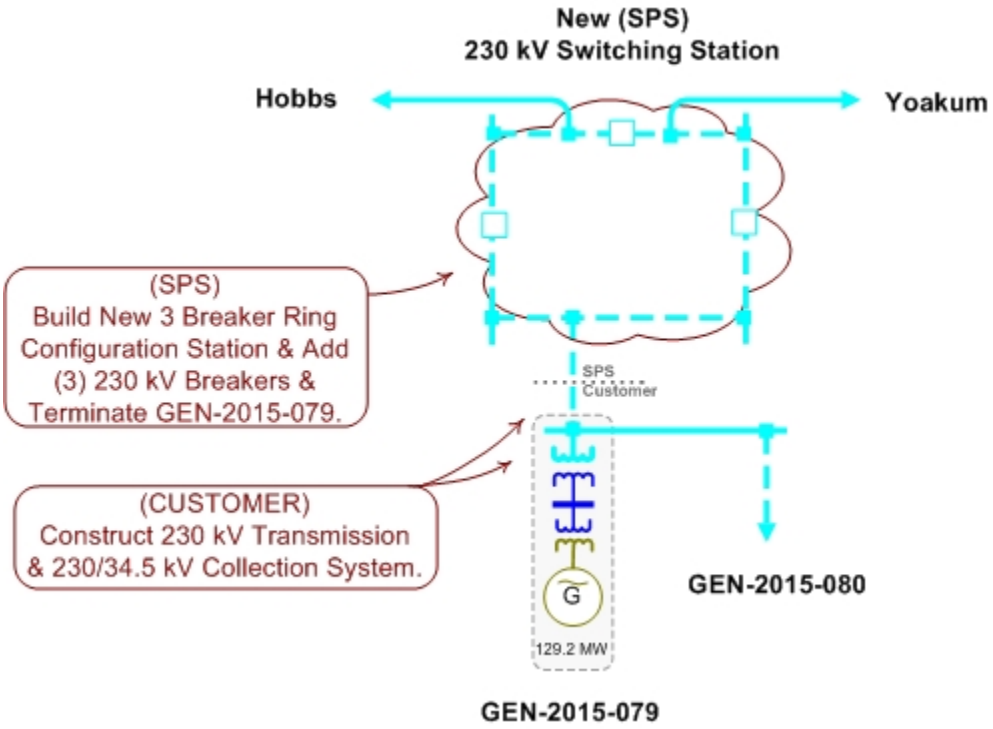
GEN-2015-075
Estimated Cluster Analysis Interconnection Cost: $5,000,000



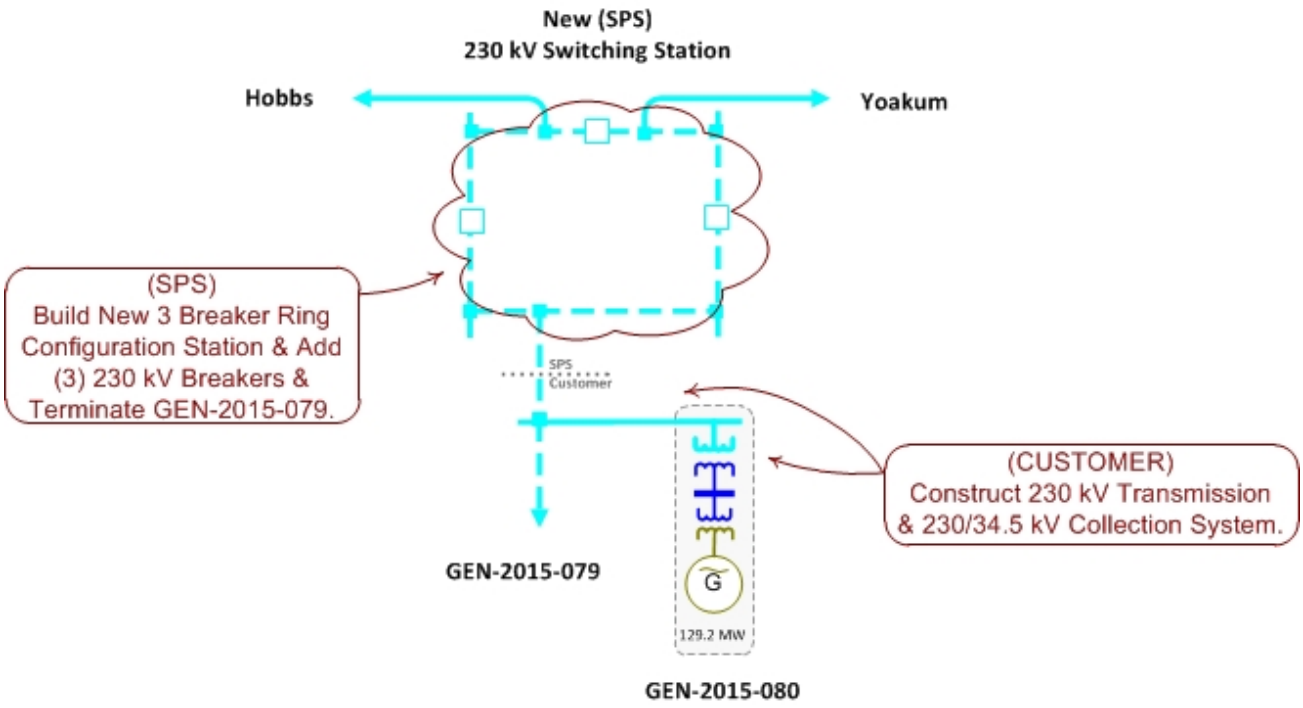
GEN-2015-076
Estimated Cluster Analysis Interconnection Cost: $2,600,000



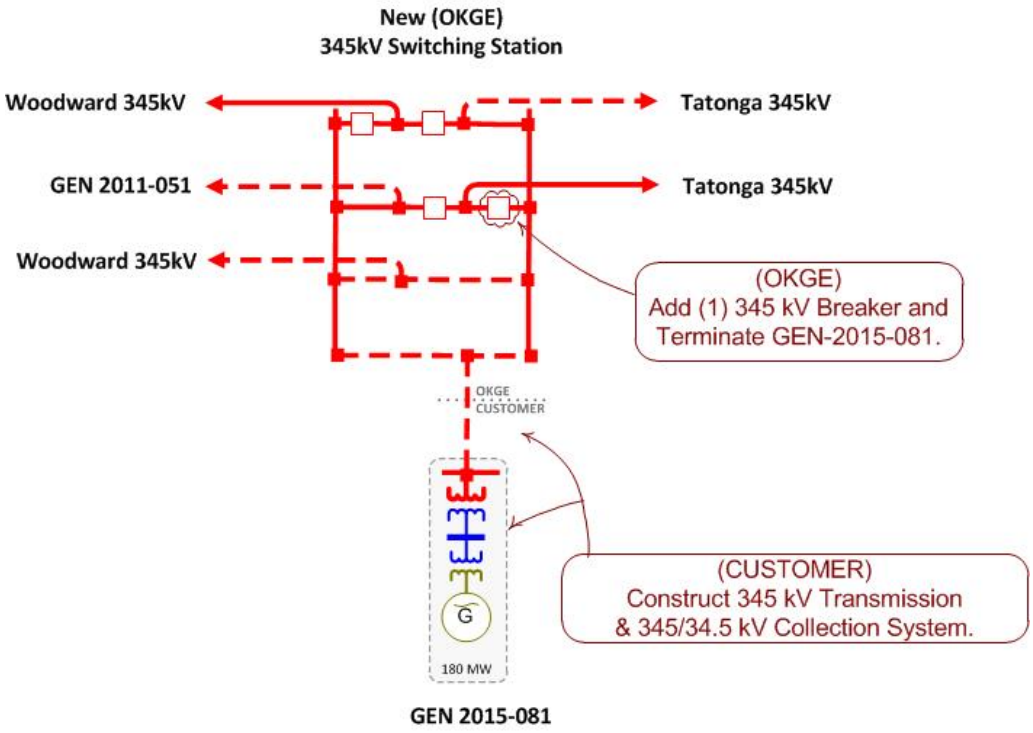
GEN-2015-079
Estimated Cluster Analysis Interconnection Cost: $3,191,360



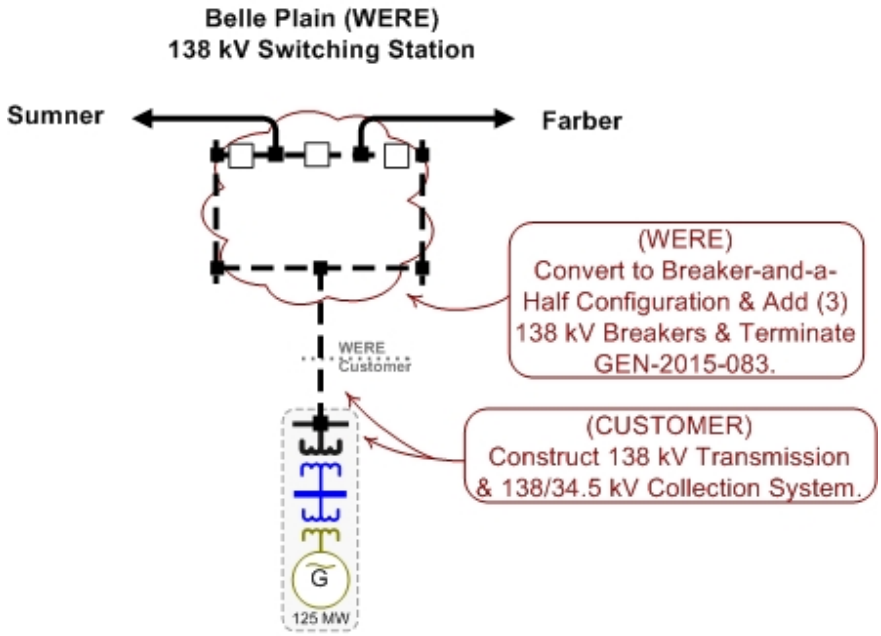
GEN-2015-080
Estimated Cluster Analysis Interconnection Cost: $3,191,360



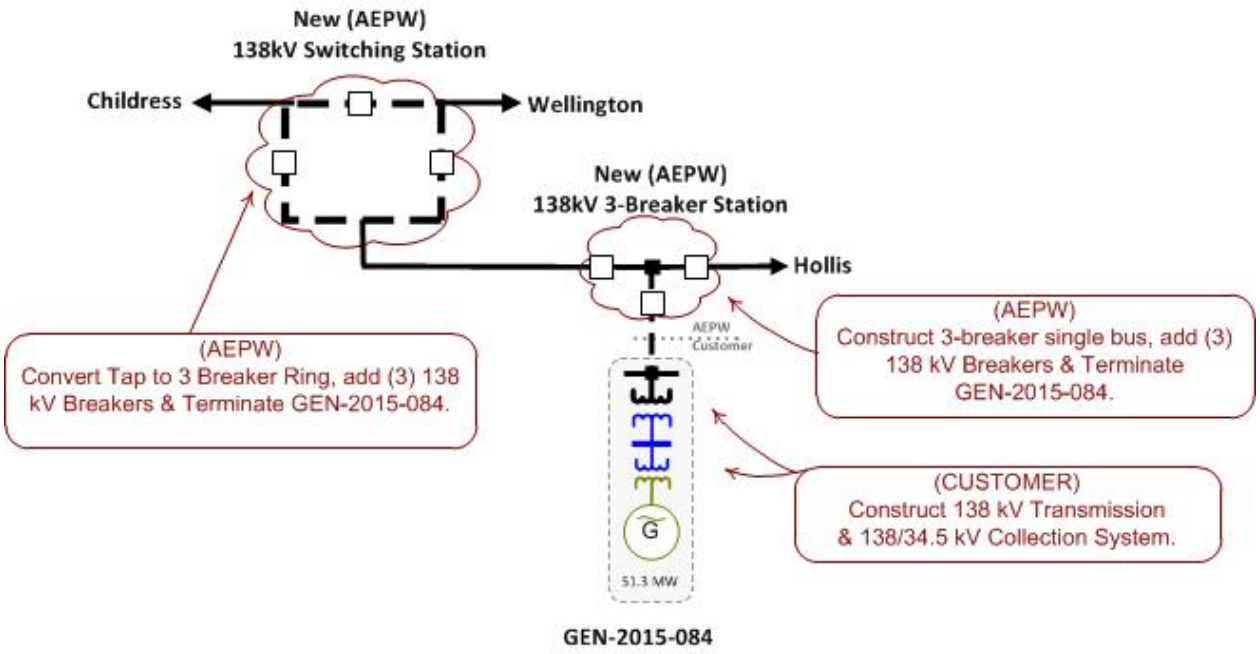
GEN-2015-081
Estimated Cluster Analysis Interconnection Cost: $3,005,000



GEN-2015-083
Estimated Cluster Analysis Interconnection Cost: $6,713,963

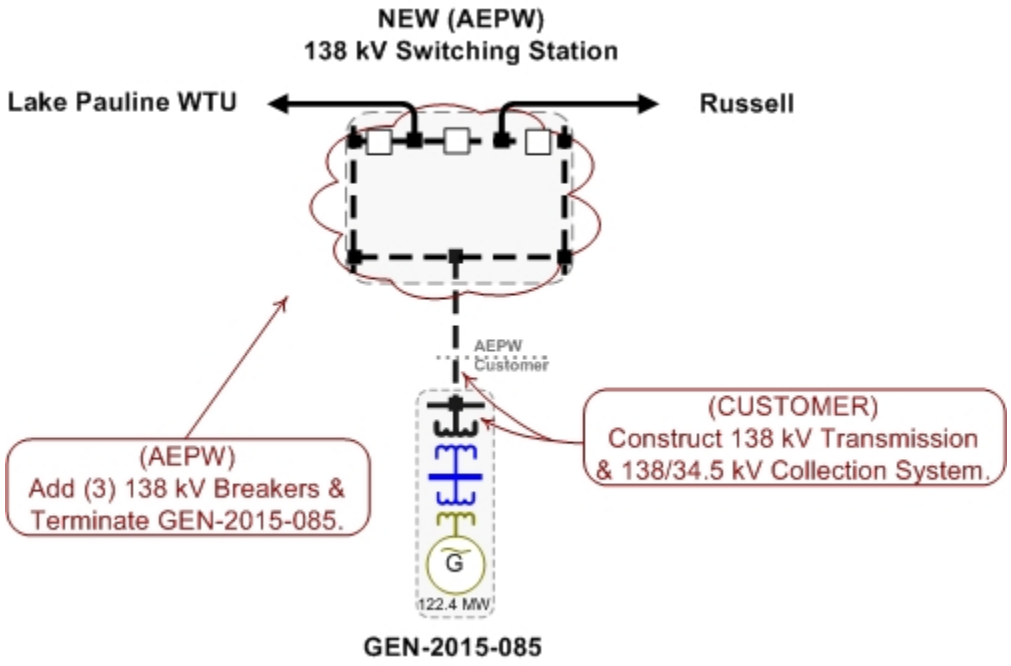


GEN-2015-084
Estimated Cluster Analysis Interconnection Cost: $14,665,056

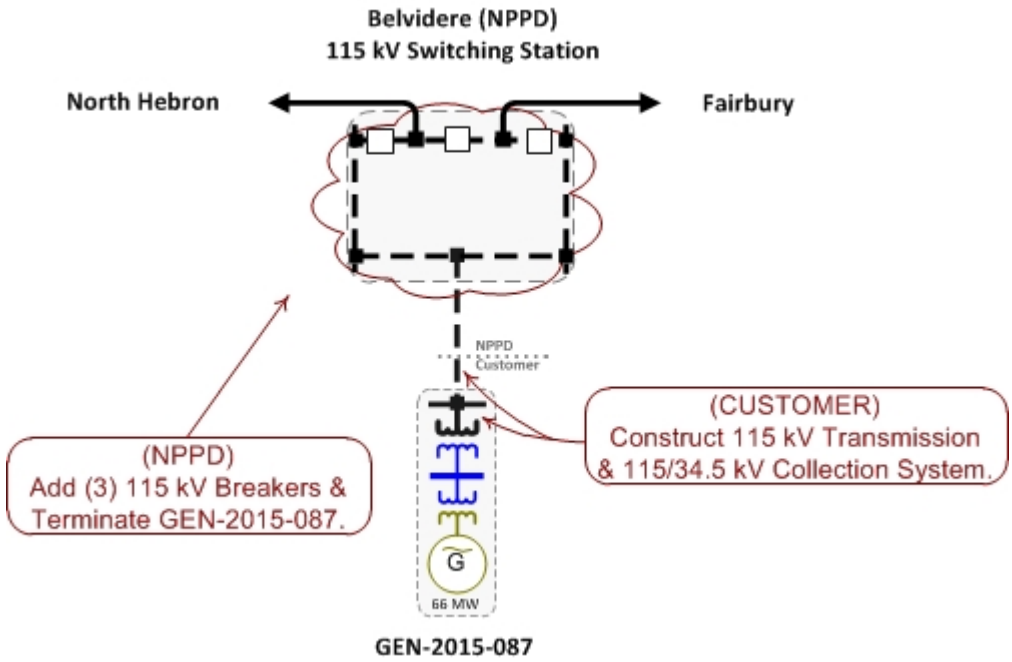


***Remote end work is required at Sharmack and Childress substations for the addition of GEN-2015-084**

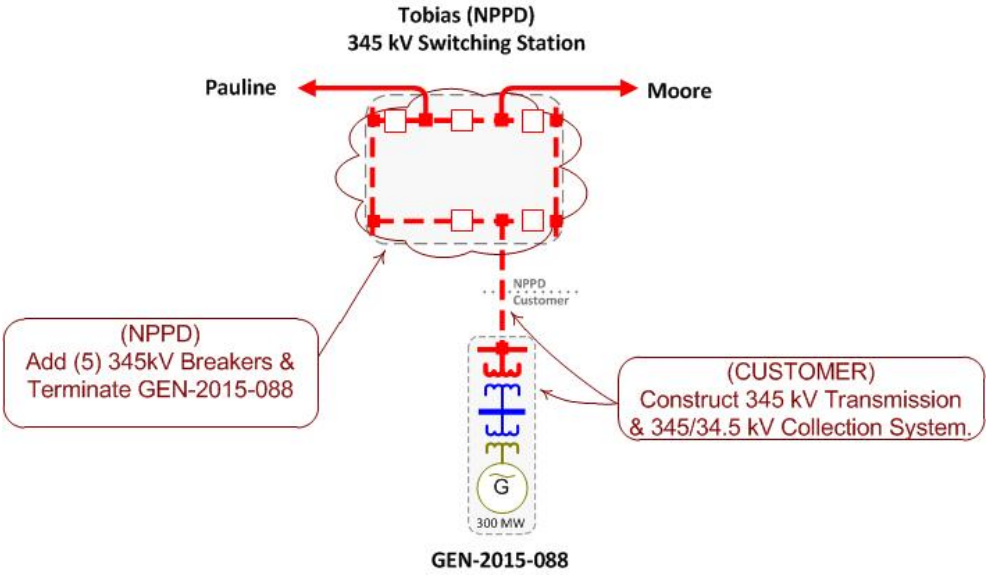
GEN-2015-085
Estimated Cluster Analysis Interconnection Cost: $8,406,414



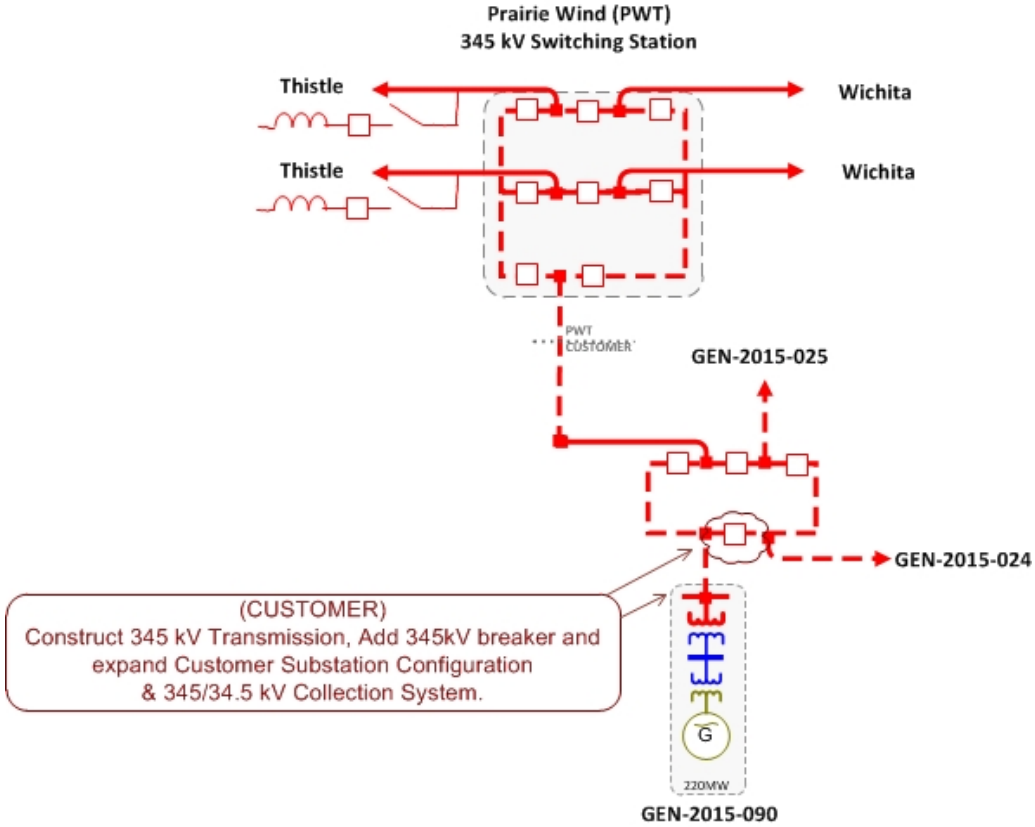
GEN-2015-087
Estimated Cluster Analysis Interconnection Cost: $5,300,000



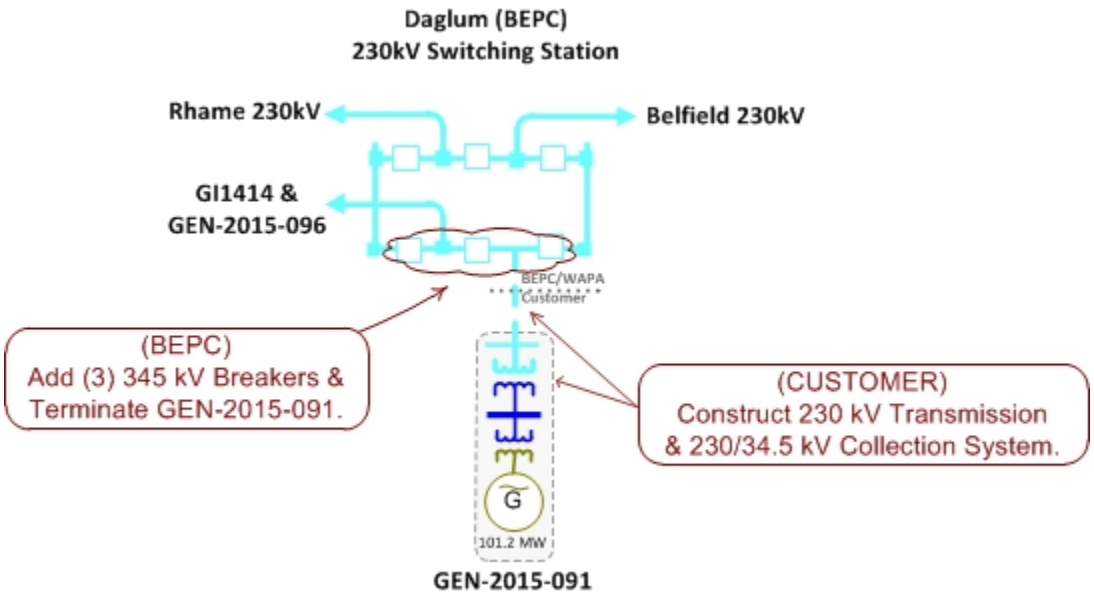
GEN-2015-088
Estimated Cluster Analysis Interconnection Cost: $15,000,000



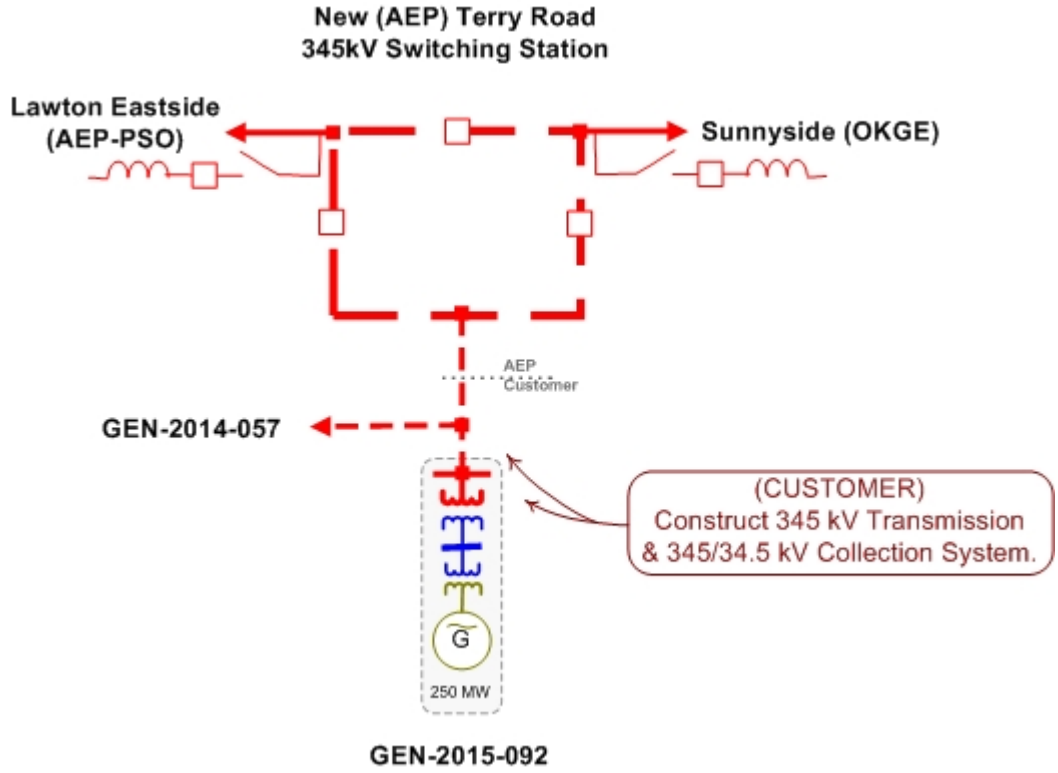
GEN-2015-090
Estimated Cluster Analysis Interconnection Cost: $10,000



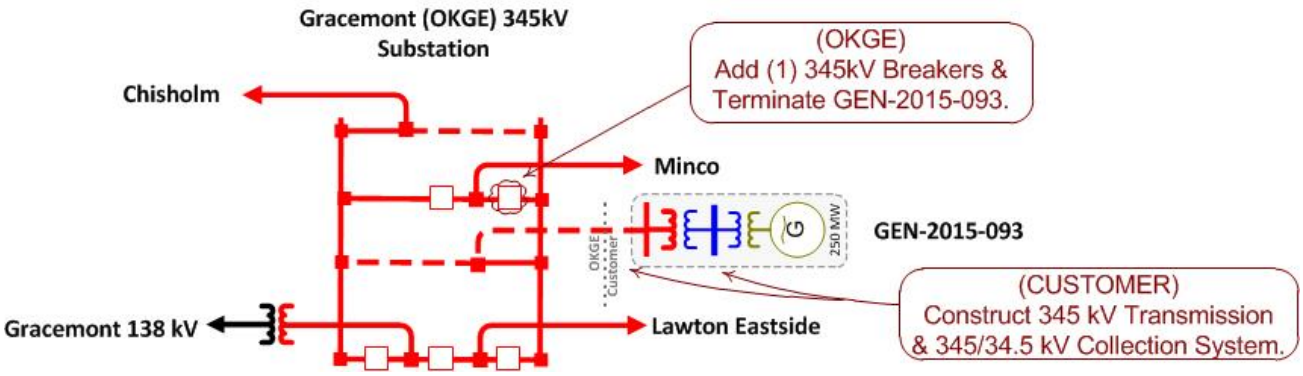
GEN-2015-091
Estimated Cluster Analysis Interconnection Cost: $3,224,682



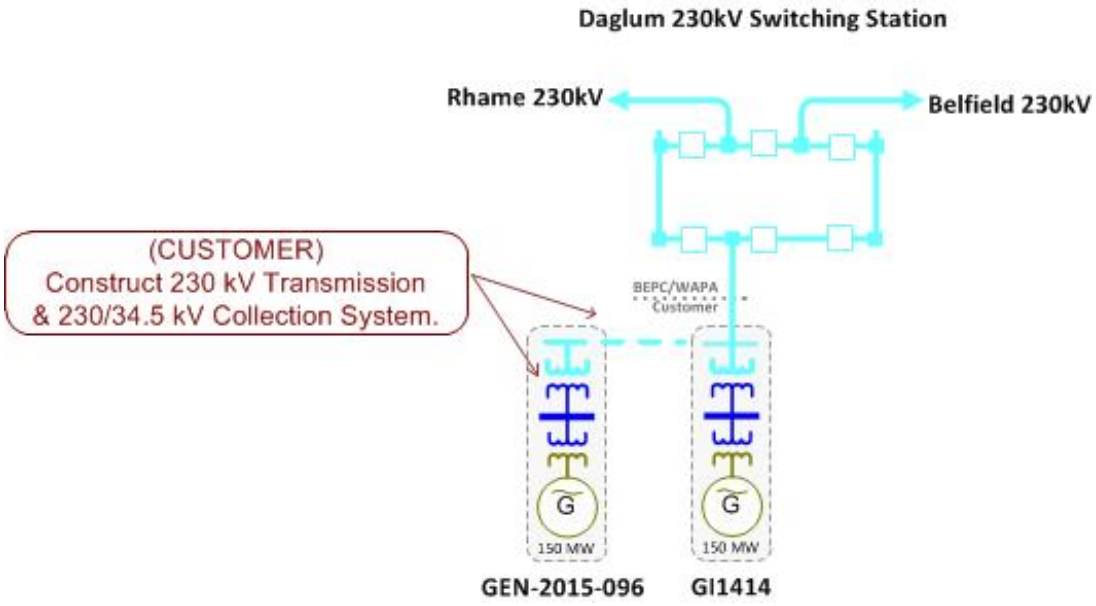
GEN-2015-092
Estimated Cluster Analysis Interconnection Cost: $0



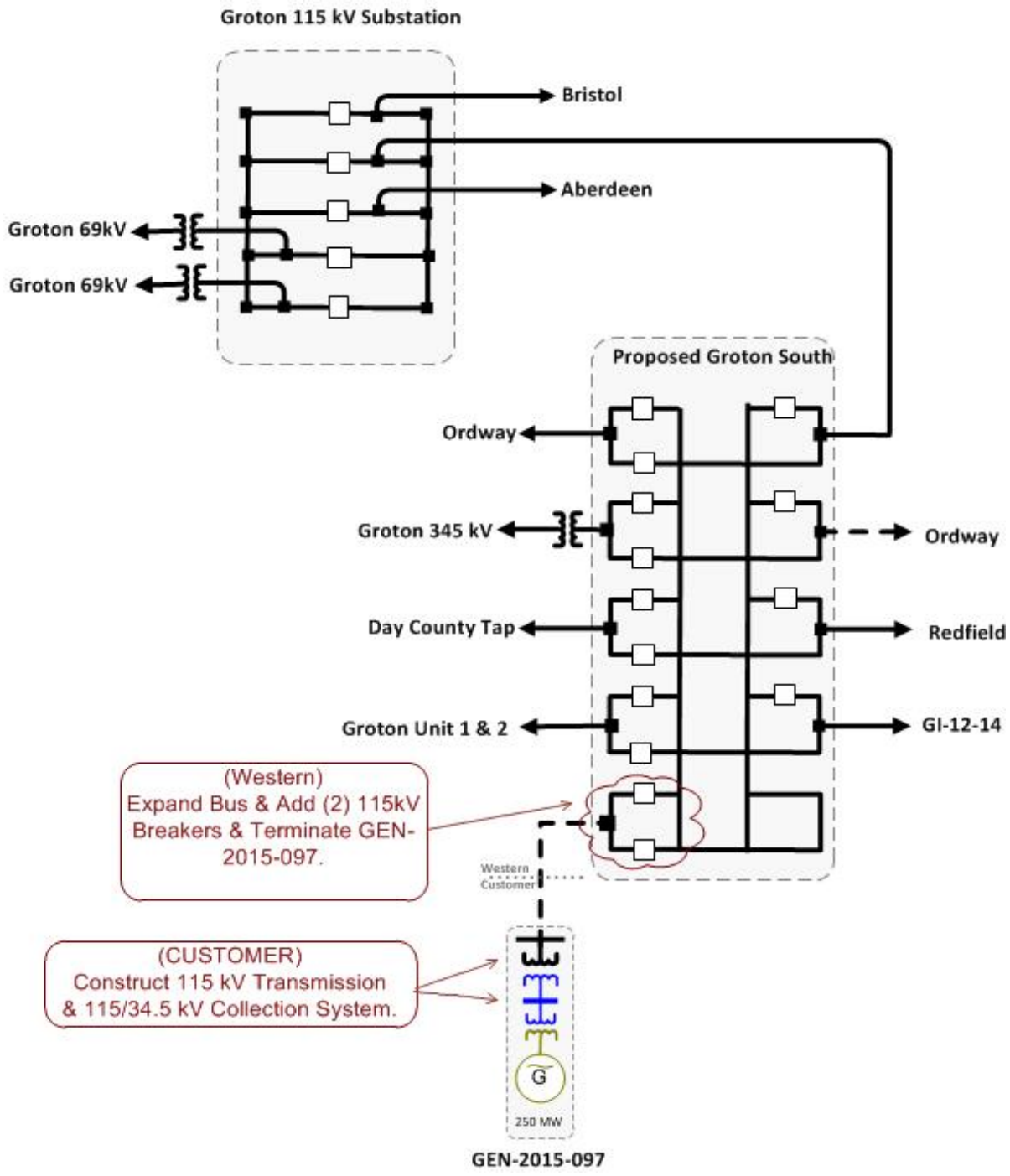
GEN-2015-093
Estimated Cluster Analysis Interconnection Cost: $2,125,000



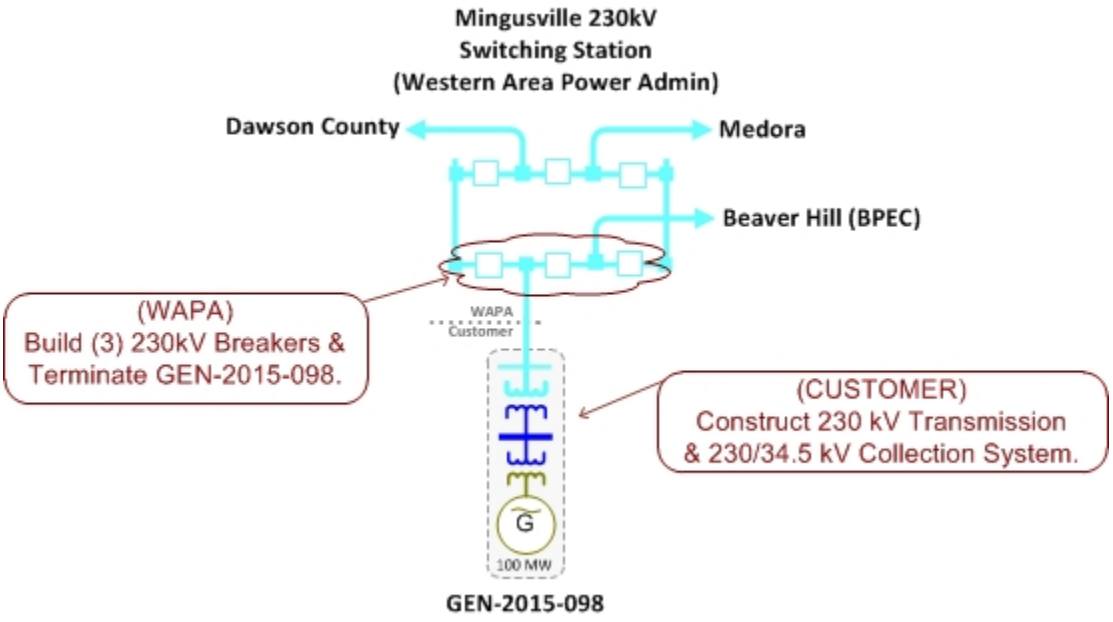
GEN-2015-096
Estimated Cluster Analysis Interconnection Cost: $0



GEN-2015-097
Estimated Cluster Analysis Interconnection Cost: $3,000,000



GEN-2015-098
Estimated Cluster Analysis Interconnection Cost: $3,000,000



11.5 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.

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

Appendix E. Cost Allocation Per Request

(Including Previously Allocated Network Upgrades*)

Interconnection Request and Upgrades	Upgrade Type	Allocated Cost	Upgrade Cost
ASGI-2015-006			
ASGI-2015-006 Interconnection Costs See One-Line Diagram.	Current Study	$0	$0
	Current Study Total	$0	
GEN-2014-037			
Beaver County 345kV Reactive Power Support Install +100Mvar SVC at Beaver County Substation.	Current Study	$26,264,777	$26,264,777
GEN-2014-037 Interconnection Costs See One-Line Diagram.	Current Study	$20,334,923	$20,334,923
Mathewson - Cimarron 345kV CKT 2 Build second 345kV circuit from Matthewson - Cimarron @ 3000 amps per ITP10.	Previously Allocated		$42,903,753
Potter County Interchange 345/230/13kV Transformer CKT 2 Build second 345/230/13kV transformer at Potter County	Previously Allocated		$15,000,000
Tatonga - Mathewson 345kV CKT 2 Build second 345kV circuit from Tatonga - Matthewson @ 3000 amps per ITP10.	Previously Allocated		$104,260,473
Woodward EHV Phase Shifting Transformer CKT 1 Install one phase shifting transformer at Woodward	Previously Allocated		$7,200,000
	Current Study Total	$46,599,700	
GEN-2015-020			
Border - Chisholm 345kV CKT 2 Build approximately 25 miles of second circuit 345kV from Border - Chisholm	Current Study	$2,266,649	$25,000,000
Border 345kV Reactive Power Support Install (6)Steps of 50Mvar Capacitor Bank(s) and +300Mvar SVC at Border Substation	Current Study	$3,069,038	$32,633,384
Chisholm Substation Upgrade 345kV Expand planned Chisholm Substation to tap and terminate Woodward - Border 345kV into the Chisholm Substation	Current Study	$1,088,010	$12,000,000
Crawfish Draw - Border 345kV CKT 2 Build approximately 194 miles of second circuit 345kV from TUCO 2 - Border	Current Study	$17,621,703	$194,000,000
GEN-2014-074 Tap Dynamic Reactive Power Support 34.5kV STATCOM at GEN-2014-074	Current Study	$282,138	$3,000,000

* 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
GEN-2015-020 Interconnection Costs See One-Line Diagram.	Current Study	$10,606,653	$10,606,653
Grapevine - Nichols 230kV CKT 1 Replace terminal equipment	Current Study	$51,213	$400,000
Grapevine - Wheeler 230kV CKT 1 Replace terminal equipment	Current Study	$32,133	$400,000
Oklaunion 345kV Reactive Power Support Incremental Upgrade Install +/-100Mvar SVC at Oklaunion	Current Study	$1,816,670	$20,000,000
Wheeler - Sweetwater 230kV CKT 1 Rebuild AEP's portion of the circuit and replace terminal equipment on SPS portion	Current Study	$460,332	$6,000,000
2016 ITPNT Upgrade(s) 2016 ITPNT Upgrade(s) for migitation of stability constraints near Mustang and Seminole	Previously Allocated		$0
Chisholm - Gracemont 345kV CKT 1 Per SPP-NTC-200255 and 200240 (Total Project E&C Cost Shown)	Previously Allocated		$162,952,357
Crawfish Draw Substation Upgrade 345/230kV Tap Border-TUCO approximately 2 miles from TUCO and build Crawfish Draw 345kV substation and add 345/230/13.2kV transformer and tie on TUCO-Swisher 230kV.	Previously Allocated		$24,764,205
Elk City 230/138/13kV Transformer CKT 1 Replace terminal equipment for Elk City Transformer to achieve transformer limit of 450MVA.	Previously Allocated		$15,000,000
Oklaunion 345kV Reactive Power Install (2)-130Mvar Capacitor Bank(s) at Oklaunion	Previously Allocated		$10,000,000
Potash Junction 230kV Reactive Power Support Build Potash Junction 100Mvar Capacitor bank per 2015 ITPNT.	Previously Allocated		$6,465,875
Tolk - Plant X 230kV CKT 1 & 2 Rebuild circuit 1 and 2 betweek Tolk - Plant X 230kV to 1200 amps each.	Previously Allocated		$9,921,693
TUCO 345/230/13.2kV Transformer CKT 1 Replace existing TUCO 345/230/13.2kV Transformer circuit #1 with 640MVA.	Previously Allocated		$3,347,036
	Current Study Total	$37,294,539	
GEN-2015-031			
Border - Chisholm 345kV CKT 2 Build approximately 25 miles of second circuit 345kV from Border - Chisholm	Current Study	$1,943,934	$25,000,000
Border 345kV Reactive Power Support Install (6)Steps of 50Mvar Capacitor Bank(s) and +300Mvar SVC at Border Substation	Current Study	$2,923,068	$32,633,384

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Interconnection Request and Upgrades	Upgrade Type	Allocated Cost	Upgrade Cost
Chisholm Substation Upgrade 345kV Expand planned Chisholm Substation to tap and terminate Woodward - Border 345kV into the Chisholm Substation	Current Study	$933,104	$12,000,000
Crawfish Draw - Border 345kV CKT 2 Build approximately 194 miles of second circuit 345kV from TUCO 2 - Border	Current Study	$16,076,755	$194,000,000
GEN-2014-074 Tap Dynamic Reactive Power Support 34.5kV STATCOM at GEN-2014-074	Current Study	$268,719	$3,000,000
GEN-2015-031 Interconnection Costs See One-Line Diagram.	Current Study	$7,567,148	$7,567,148
Grapevine - Nichols 230kV CKT 1 Replace terminal equipment	Current Study	$66,836	$400,000
Grapevine - Wheeler 230kV CKT 1 Replace terminal equipment	Current Study	$41,940	$400,000
Oklaunion 345kV Reactive Power Support Incremental Upgrade Install +/-100Mvar SVC at Oklaunion	Current Study	$1,657,397	$20,000,000
Wheeler - Sweetwater 230kV CKT 1 Rebuild AEP's portion of the circuit and replace terminal equipment on SPS portion	Current Study	$600,726	$6,000,000
2016 ITPNT Upgrade(s) 2016 ITPNT Upgrade(s) for migitation of stability constraints near Mustang and Seminole	Previously Allocated		$0
Chisholm - Gracemont 345kV CKT 1 Per SPP-NTC-200255 and 200240 (Total Project E&C Cost Shown)	Previously Allocated		$162,952,357
Crawfish Draw Substation Upgrade 345/230kV Tap Border-TUCO approximately 2 miles from TUCO and build Crawfish Draw 345kV substation and add 345/230/13.2kV transformer and tie on TUCO-Swisher 230kV.	Previously Allocated		$24,764,205
Elk City 230/138/13kV Transformer CKT 1 Replace terminal equipment for Elk City Transformer to achieve transformer limit of 450MVA.	Previously Allocated		$15,000,000
Kress Interchange - Swisher 115kV CKT 1 Replace terminal equipment	Previously Allocated		$500,000
Oklaunion 345kV Reactive Power Install (2)-130Mvar Capacitor Bank(s) at Oklaunion	Previously Allocated		$10,000,000
Potash Junction 230kV Reactive Power Support Build Potash Junction 100Mvar Capacitor bank per 2015 ITPNT.	Previously Allocated		$6,465,875
TUCO 345/230/13.2kV Transformer CKT 1 Replace existing TUCO 345/230/13.2kV Transformer circuit #1 with 640MVA.	Previously Allocated		$3,347,036
	Current Study Total	$32,079,628	

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Interconnection Request and Upgrades	Upgrade Type	Allocated Cost	Upgrade Cost
GEN-2015-034			
Cleveland - Silver City 138kV CKT 1 AECI Affected System Study is required	Current Study	$TBD	$TBD
GEN-2015-034 Interconnection Costs See One-Line Diagram.	Current Study	$2,025,000	$2,025,000
	Current Study Total	$2,025,000	
GEN-2015-045			
GEN-2015-045 Interconnection Costs See One-Line Diagram.	Current Study	$0	$0
	Current Study Total	$0	
GEN-2015-046			
Daglum - Dickinson 230kV CKT 1 Build new 230kV line from Daglum - Dickinson.	Current Study	$2,033,296	$28,000,000
Dickinson 230/115/13.8kV CKT 2 Build new 230/115/13.8kV Transformer circuit #2 at Dickinson.	Current Study	$948,770	$3,500,000
GEN-2015-046 Interconnection Costs See One-Line Diagram.	Current Study	$3,759,097	$3,759,097
MISO Affected System Study See section 4 power flow analysis.	Current Study	$TBD	$TBD
Gentleman - Thedford 345kV CKT 1 Build approximately 76 Miles of 345kV from Gentleman to Thedford per SPP-NTC-200220 (Total Project E&C Cost Shown).	Previously Allocated		$311,717,040
Neset - Tande 230kV CKT 1 Build new 230kV line from Neset - Tande	Previously Allocated		$3,000,000
Neset 230kV Terminal Upgrade(s) Install necessary terminal equInstall necessary terminal upgrades at Neset 230kV to accommodate new 230kV line from new Tande substation	Previously Allocated		$4,000,000
Patent Gate - Kummer Ridge - Roundup Project	Previously Allocated		$0
Tande 345/230 Substation Construct new 345kV Tande Substation & Tande 345/230/13kV transformer Construct new 345kV Tande Substation adjacent to the existing 230kV Neset Substation and	Previously Allocated		$18,000,000
Thedford - Holt County 345kV CKT 1 Build approximately 146 Miles of 345kV from Thedford to Holt County per SPP-NTC-200220 (Total Project E&C Cost Shown).	Previously Allocated		$311,717,040

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Interconnection Request and Upgrades	Upgrade Type	Allocated Cost	Upgrade Cost
Thedford 345/115kV Transformer CKT 1 Install Thedford 345/115kV transformer per SPP-NTC-200277 (Total Project E&C Cost Shown).	Previously Allocated		$311,717,040
	Current Study Total	$6,741,163	
GEN-2015-047			
Cleveland - Silver City 138kV CKT 1 AECI Affected System Study is required	Current Study	$TBD	$TBD
GEN-2015-047 Interconnection Costs See One-Line Diagram.	Current Study	$2,540,000	$2,540,000
GEN-2015-063 Tap - Mathewson 345kV CKT 1 Replace terminal equipment to achieve conductor limit	Current Study	$1,263,186	$7,625,108
	Current Study Total	$3,803,186	
GEN-2015-048			
Cleo Corner - Cleo Plant Tap 138kV CKT 1 Replace terminal equipment to at least 1200 amps	Current Study	$57,865	$61,890
GEN-2015-048 Interconnection Costs See One-Line Diagram.	Current Study	$2,968,000	$2,968,000
Mathewson - Cimarron 345kV CKT 2 Build second 345kV circuit from Matthewson - Cimarron @ 3000 amps per ITP10.	Previously Allocated		$42,903,753
Tatonga - Mathewson 345kV CKT 2 Build second 345kV circuit from Tatonga - Matthewson @ 3000 amps per ITP10.	Previously Allocated		$104,260,473
Woodward - GEN-2011-051 Tap - Tatonga 345kV CKT 2 Build second 345kV circuit from Woodward - Tatonga @ 3000 amps per ITP10.	Previously Allocated		$71,876,622
Woodward EHV Phase Shifting Transformer CKT 1 Install one phase shifting transformer at Woodward	Previously Allocated		$7,200,000
	Current Study Total	$3,025,865	
GEN-2015-052			
GEN-2015-052 Interconnection Costs See One-Line Diagram.	Current Study	$15,602,434	$15,602,434
	Current Study Total	$15,602,434	
GEN-2015-053			
Albion - Petersburg - North Petersburg 115kV CKT 1 Reconductor 115kV lines and replace all terminal equipment for at least a 193MVA rate.	Current Study	$3,500,000	$3,500,000

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Interconnection Request and Upgrades	Upgrade Type	Allocated Cost	Upgrade Cost
GEN-2015-053 Interconnection Costs See One-Line Diagram.	Current Study	$1,000,000	$1,000,000
Battle Creek-County Line 115kV CKT 1 Rebuild approximately 11 miles of 115kV from Battle Creek to County Line.	Previously Allocated		$4,000,000
County Line-Neligh East 115kV CKT 1 Rebuild approximately 12 miles of 115kV from County Line to Neligh East.	Previously Allocated		$8,050,000
Gentleman - Thedford 345kV CKT 1 Build approximately 76 Miles of 345kV from Gentleman to Thedford per SPP-NTC-200220 (Total Project E&C Cost Shown).	Previously Allocated		$311,717,040
Hoskins - Neligh 345/115kV Projects Per SPP 2014 ITP NT and NTC 200253 for 6/1/2016 in-service.	Previously Allocated		$98,697,720
Thedford - Holt County 345kV CKT 1 Build approximately 146 Miles of 345kV from Thedford to Holt County per SPP-NTC-200220 (Total Project E&C Cost Shown).	Previously Allocated		$311,717,040
Thedford 345/115kV Transformer CKT 1 Install Thedford 345/115kV transformer per SPP-NTC-200277 (Total Project E&C Cost Shown).	Previously Allocated		$311,717,040
Twin Church - Dixon County 230kV Increase conductor clearances to accommodate 320MVA facility rating	Previously Allocated		$100,000
	Current Study Total	$4,500,000	
GEN-2015-055			
GEN-2015-055 Interconnection Costs See One-Line Diagram.	Current Study	$1,900,000	$1,900,000
Grapevine - Wheeler 230kV CKT 1 Replace terminal equipment	Current Study	$20,807	$400,000
Wheeler - Sweetwater 230kV CKT 1 Rebuild AEP's portion of the circuit and replace terminal equipment on SPS portion	Current Study	$301,294	$6,000,000
Chisholm - Gracemont 345kV CKT 1 Per SPP-NTC-200255 and 200240 (Total Project E&C Cost Shown)	Previously Allocated		$162,952,357
	Current Study Total	$2,222,101	
GEN-2015-056			
Border - Chisholm 345kV CKT 2 Build approximately 25 miles of second circuit 345kV from Border - Chisholm	Current Study	$2,402,319	$25,000,000
Border 345kV Reactive Power Support Install (6)Steps of 50Mvar Capacitor Bank(s) and +300Mvar SVC at Border Substation	Current Study	$3,203,972	$32,633,384

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Interconnection Request and Upgrades	Upgrade Type	Allocated Cost	Upgrade Cost
Chisholm Substation Upgrade 345kV Expand planned Chisholm Substation to tap and terminate Woodward - Border 345kV into the Chisholm Substation	Current Study	$1,153,133	$12,000,000
Crawfish Draw - Border 345kV CKT 2 Build approximately 194 miles of second circuit 345kV from TUCO 2 - Border	Current Study	$18,627,649	$194,000,000
GEN-2014-074 Tap Dynamic Reactive Power Support 34.5kV STATCOM at GEN-2014-074	Current Study	$294,542	$3,000,000
GEN-2015-056 Interconnection Costs See One-Line Diagram.	Current Study	$5,080,273	$5,080,273
Grapevine - Nichols 230kV CKT 1 Replace terminal equipment	Current Study	$48,587	$400,000
Grapevine - Wheeler 230kV CKT 1 Replace terminal equipment	Current Study	$30,428	$400,000
Oklaunion 345kV Reactive Power Support Incremental Upgrade Install +/-100Mvar SVC at Oklaunion	Current Study	$1,920,376	$20,000,000
Wheeler - Sweetwater 230kV CKT 1 Rebuild AEP's portion of the circuit and replace terminal equipment on SPS portion	Current Study	$435,826	$6,000,000
2016 ITPNT Upgrade(s) 2016 ITPNT Upgrade(s) for migitation of stability constraints near Mustang and Seminole	Previously Allocated		$0
Amoco Wasson - Oxy Tap 230kV CKT 1 Replace line traps at both terminals	Previously Allocated		$200,000
Chisholm - Gracemont 345kV CKT 1 Per SPP-NTC-200255 and 200240 (Total Project E&C Cost Shown)	Previously Allocated		$162,952,357
Crawfish Draw Substation Upgrade 345/230kV Tap Border-TUCO approximately 2 miles from TUCO and build Crawfish Draw 345kV substation and add 345/230/13.2kV transformer and tie on TUCO-Swisher 230kV.	Previously Allocated		$24,764,205
Elk City 230/138/13kV Transformer CKT 1 Replace terminal equipment for Elk City Transformer to achieve transformer limit of 450MVA.	Previously Allocated		$15,000,000
Oklaunion 345kV Reactive Power Install (2)-130Mvar Capacitor Bank(s) at Oklaunion	Previously Allocated		$10,000,000
Potash Junction 230kV Reactive Power Support Build Potash Junction 100Mvar Capacitor bank per 2015 ITPNT.	Previously Allocated		$6,465,875
Tolk - Plant X 230kV CKT 1 & 2 Rebuild circuit 1 and 2 betweek Tolk - Plant X 230kV to 1200 amps each.	Previously Allocated		$9,921,693

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Interconnection Request and Upgrades	Upgrade Type	Allocated Cost	Upgrade Cost
TUCO 345/230/13.2kV Transformer CKT 1 Replace existing TUCO 345/230/13.2kV Transformer circuit #1 with 640MVA.	Previously Allocated		$3,347,036
	Current Study Total	$33,197,107	
GEN-2015-057			
GEN-2015-057 Interconnection Costs See One-Line Diagram.	Current Study	$20,000	$20,000
Bucker - Spearville 345V CKT 1 Replace Terminal equipment	Previously Allocated		$1,480,238
Woodward EHV Phase Shifting Transformer CKT 1 Install one phase shifting transformer at Woodward	Previously Allocated		$7,200,000
	Current Study Total	$20,000	
GEN-2015-058			
Border - Chisholm 345kV CKT 2 Build approximately 25 miles of second circuit 345kV from Border - Chisholm	Current Study	$1,243,832	$25,000,000
Border 345kV Reactive Power Support Install (6)Steps of 50Mvar Capacitor Bank(s) and +300Mvar SVC at Border Substation	Current Study	$1,636,045	$32,633,384
Chisholm Substation Upgrade 345kV Expand planned Chisholm Substation to tap and terminate Woodward - Border 345kV into the Chisholm Substation	Current Study	$597,050	$12,000,000
Crawfish Draw - Border 345kV CKT 2 Build approximately 194 miles of second circuit 345kV from TUCO 2 - Border	Current Study	$9,626,112	$194,000,000
GEN-2014-074 Tap Dynamic Reactive Power Support 34.5kV STATCOM at GEN-2014-074	Current Study	$150,402	$3,000,000
GEN-2015-058 Interconnection Costs See One-Line Diagram.	Current Study	$2,751,641	$2,751,641
Grapevine - Nichols 230kV CKT 1 Replace terminal equipment	Current Study	$22,262	$400,000
Grapevine - Wheeler 230kV CKT 1 Replace terminal equipment	Current Study	$13,921	$400,000
Oklaunion 345kV Reactive Power Support Incremental Upgrade Install +/-100Mvar SVC at Oklaunion	Current Study	$992,383	$20,000,000
Wheeler - Sweetwater 230kV CKT 1 Rebuild AEP's portion of the circuit and replace terminal equipment on SPS portion	Current Study	$199,353	$6,000,000

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Interconnection Request and Upgrades	Upgrade Type	Allocated Cost	Upgrade Cost
2016 ITPNT Upgrade(s) 2016 ITPNT Upgrade(s) for migitation of stability constraints near Mustang and Seminole	Previously Allocated		$0
Amoco Wasson - Oxy Tap 230kV CKT 1 Replace line traps at both terminals	Previously Allocated		$200,000
Chisholm - Gracemont 345kV CKT 1 Per SPP-NTC-200255 and 200240 (Total Project E&C Cost Shown)	Previously Allocated		$162,952,357
Crawfish Draw Substation Upgrade 345/230kV Tap Border-TUCO approximately 2 miles from TUCO and build Crawfish Draw 345kV substation and add 345/230/13.2kV transformer and tie on TUCO-Swisher 230kV.	Previously Allocated		$24,764,205
Elk City 230/138/13kV Transformer CKT 1 Replace terminal equipment for Elk City Transformer to achieve transformer limit of 450MVA.	Previously Allocated		$15,000,000
Oklaunion 345kV Reactive Power Install (2)-130Mvar Capacitor Bank(s) at Oklaunion	Previously Allocated		$10,000,000
Potash Junction 230kV Reactive Power Support Build Potash Junction 100Mvar Capacitor bank per 2015 ITPNT.	Previously Allocated		$6,465,875
Tolk - Plant X 230kV CKT 1 & 2 Rebuild circuit 1 and 2 betweek Tolk - Plant X 230kV to 1200 amps each.	Previously Allocated		$9,921,693
TUCO 345/230/13.2kV Transformer CKT 1 Replace existing TUCO 345/230/13.2kV Transformer circuit #1 with 640MVA.	Previously Allocated		$3,347,036
	Current Study Total	$17,233,001	
GEN-2015-060			
Cleo Corner - Cleo Plant Tap 138kV CKT 1 Replace terminal equipment to at least 1200 amps	Current Study	$4,025	$61,890
GEN-2015-060 Interconnection Costs See One-Line Diagram.	Current Study	$863,000	$863,000
Woodward 345/138/13kV Transformer CKT 3 Add Woodward 345/138/13kV Transformer circuit #3	Current Study	$9,634,457	$9,634,457
Bucker - Spearville 345V CKT 1 Replace Terminal equipment	Previously Allocated		$1,480,238
DeGrasse - Knob Hill 138kV CKT 1 Per 2016 ITPNT: NTC 200391. DeGrasse 345kV Substation and 345/138kV transformer. (Total Project E&C Cost Shown)	Previously Allocated		$30,500,000
Mathewson - Cimarron 345kV CKT 2 Build second 345kV circuit from Matthewson - Cimarron @ 3000 amps per ITP10.	Previously Allocated		$42,903,753

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Interconnection Request and Upgrades	Upgrade Type	Allocated Cost	Upgrade Cost
Tatonga - Mathewson 345kV CKT 2 Build second 345kV circuit from Tatonga - Matthewson @ 3000 amps per ITP10.	Previously Allocated		$104,260,473
Woodward - GEN-2011-051 Tap - Tatonga 345kV CKT 2 Build second 345kV circuit from Woodward - Tatonga @ 3000 amps per ITP10.	Previously Allocated		$71,876,622
Woodward EHV Phase Shifting Transformer CKT 1 Install one phase shifting transformer at Woodward	Previously Allocated		$7,200,000
	Current Study Total	$10,501,482	
GEN-2015-061			
GEN-2015-061 Interconnection Costs See One-Line Diagram.	Current Study	$6,988,986	$6,988,986
	Current Study Total	$6,988,986	
GEN-2015-062			
GEN-2015-062 Interconnection Costs See One-Line Diagram.	Current Study	$0	$0
GEN-2015-063 Tap - Mathewson 345kV CKT 1 Replace terminal equipment to achieve conductor limit	Current Study	$31,587	$7,625,108
	Current Study Total	$31,587	
GEN-2015-063			
GEN-2015-063 Interconnection Costs See One-Line Diagram.	Current Study	$10,613,000	$10,613,000
GEN-2015-063 Tap - Mathewson 345kV CKT 1 Replace terminal equipment to achieve conductor limit	Current Study	$6,330,335	$7,625,108
	Current Study Total	$16,943,335	
GEN-2015-064			
GEN-2015-064 Interconnection Costs See One-Line Diagram.	Current Study	$4,638,823	$4,638,823
	Current Study Total	$4,638,823	
GEN-2015-065			
GEN-2015-065 Interconnection Costs See One-Line Diagram.	Current Study	$6,988,986	$6,988,986
	Current Study Total	$6,988,986	

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Interconnection Request and Upgrades	Upgrade Type	Allocated Cost	Upgrade Cost
GEN-2015-066			
Cleveland - Silver City 138kV CKT 1 AECI Affected System Study is required	Current Study	$TBD	$TBD
GEN-2015-066 Interconnection Costs See One-Line Diagram.	Current Study	$10,313,000	$10,313,000
	Current Study Total	$10,313,000	
GEN-2015-067			
GEN-2015-067 Interconnection Costs See One-Line Diagram.	Current Study	$3,521,000	$3,521,000
	Current Study Total	$3,521,000	
GEN-2015-068			
Border - Chisholm 345kV CKT 2 Build approximately 25 miles of second circuit 345kV from Border - Chisholm	Current Study	$9,020,898	$25,000,000
Border 345kV Reactive Power Support Install (6)Steps of 50Mvar Capacitor Bank(s) and +300Mvar SVC at Border Substation	Current Study	$11,284,661	$32,633,384
Chisholm Substation Upgrade 345kV Expand planned Chisholm Substation to tap and terminate Woodward - Border 345kV into the Chisholm Substation	Current Study	$4,330,105	$12,000,000
Crawfish Draw - Border 345kV CKT 2 Build approximately 194 miles of second circuit 345kV from TUCO 2 - Border	Current Study	$69,318,271	$194,000,000
GEN-2014-074 Tap Dynamic Reactive Power Support 34.5kV STATCOM at GEN-2014-074	Current Study	$1,037,403	$3,000,000
GEN-2015-068 Interconnection Costs See One-Line Diagram.	Current Study	$4,831,332	$4,831,332
Grapevine - Nichols 230kV CKT 1 Replace terminal equipment	Current Study	$85,608	$400,000
Grapevine - Wheeler 230kV CKT 1 Replace terminal equipment	Current Study	$52,883	$400,000
Oklaunion 345kV Reactive Power Support Incremental Upgrade Install +/-100Mvar SVC at Oklaunion	Current Study	$7,146,213	$20,000,000
Wheeler - Sweetwater 230kV CKT 1 Rebuild AEP's portion of the circuit and replace terminal equipment on SPS portion	Current Study	$756,014	$6,000,000

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Interconnection Request and Upgrades	Upgrade Type	Allocated Cost	Upgrade Cost
2016 ITPNT Upgrade(s) 2016 ITPNT Upgrade(s) for migitation of stability constraints near Mustang and Seminole	Previously Allocated		$0
Chisholm - Gracemont 345kV CKT 1 Per SPP-NTC-200255 and 200240 (Total Project E&C Cost Shown)	Previously Allocated		$162,952,357
Elk City 230/138/13kV Transformer CKT 1 Replace terminal equipment for Elk City Transformer to achieve transformer limit of 450MVA.	Previously Allocated		$15,000,000
Kress Interchange - Swisher 115kV CKT 1 Replace terminal equipment	Previously Allocated		$500,000
National Enrichment Plant-Targa 115kV CKT 1 Rebuild approximately 4 miles of 115kV from National Enrichment Plant to Targa per 2015 ITPNT.	Previously Allocated		$2,909,669
Oklaunion 345kV Reactive Power Install (2)-130Mvar Capacitor Bank(s) at Oklaunion	Previously Allocated		$10,000,000
Targa-Cardinal 115kV CKT 1 Rebuild approximately 3 miles of 115kV from Targa to Cardinal per 2015 ITPNT.	Previously Allocated		$2,049,062
Tolk - Plant X 230kV CKT 1 & 2 Rebuild circuit 1 and 2 betweek Tolk - Plant X 230kV to 1200 amps each.	Previously Allocated		$9,921,693
	Current Study Total	$107,863,388	
GEN-2015-069			
GEN-2015-069 Interconnection Costs See One-Line Diagram.	Current Study	$2,755,752	$2,755,752
	Current Study Total	$2,755,752	
GEN-2015-071			
GEN-2015-071 Interconnection Costs See One-Line Diagram.	Current Study	$14,623,541	$14,623,541
Grapevine - Wheeler 230kV CKT 1 Replace terminal equipment	Current Study	$129,592	$400,000
Wheeler - Sweetwater 230kV CKT 1 Rebuild AEP's portion of the circuit and replace terminal equipment on SPS portion	Current Study	$1,884,339	$6,000,000
Chisholm - Gracemont 345kV CKT 1 Per SPP-NTC-200255 and 200240 (Total Project E&C Cost Shown)	Previously Allocated		$162,952,357
	Current Study Total	$16,637,472	

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Interconnection Request and Upgrades	Upgrade Type	Allocated Cost	Upgrade Cost
GEN-2015-073			
GEN-2015-073 Interconnection Costs See One-Line Diagram.	Current Study	$2,576,628	$2,576,628
	Current Study Total	$2,576,628	
GEN-2015-075			
Border - Chisholm 345kV CKT 2 Build approximately 25 miles of second circuit 345kV from Border - Chisholm	Current Study	$1,400,105	$25,000,000
Border 345kV Reactive Power Support Install (6)Steps of 50Mvar Capacitor Bank(s) and +300Mvar SVC at Border Substation	Current Study	$1,788,649	$32,633,384
Carlisle 115/69/13kV Transformer CKT 1 Replace existing Carlisle 115/69/13kV Transformer circuit #1	Current Study	$4,000,000	$4,000,000
Chisholm Substation Upgrade 345kV Expand planned Chisholm Substation to tap and terminate Woodward - Border 345kV into the Chisholm Substation	Current Study	$671,856	$12,000,000
Crawfish Draw - Border 345kV CKT 2 Build approximately 194 miles of second circuit 345kV from TUCO 2 - Border	Current Study	$10,799,709	$194,000,000
GEN-2014-074 Tap Dynamic Reactive Power Support 34.5kV STATCOM at GEN-2014-074	Current Study	$164,431	$3,000,000
GEN-2015-075 Interconnection Costs See One-Line Diagram.	Current Study	$5,000,000	$5,000,000
Grapevine - Nichols 230kV CKT 1 Replace terminal equipment	Current Study	$19,412	$400,000
Grapevine - Wheeler 230kV CKT 1 Replace terminal equipment	Current Study	$12,089	$400,000
Oklaunion 345kV Reactive Power Support Incremental Upgrade Install +/-100Mvar SVC at Oklaunion	Current Study	$1,113,372	$20,000,000
Wheeler - Sweetwater 230kV CKT 1 Rebuild AEP's portion of the circuit and replace terminal equipment on SPS portion	Current Study	$173,024	$6,000,000
2016 ITPNT Upgrade(s) 2016 ITPNT Upgrade(s) for migitation of stability constraints near Mustang and Seminole	Previously Allocated		$0
Amoco Wasson - Oxy Tap 230kV CKT 1 Replace line traps at both terminals	Previously Allocated		$200,000
Chisholm - Gracemont 345kV CKT 1 Per SPP-NTC-200255 and 200240 (Total Project E&C Cost Shown)	Previously Allocated		$162,952,357

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Interconnection Request and Upgrades	Upgrade Type	Allocated Cost	Upgrade Cost
Crawfish Draw Substation Upgrade 345/230kV Tap Border-TUCO approximately 2 miles from TUCO and build Crawfish Draw 345kV substation and add 345/230/13.2kV transformer and tie on TUCO-Swisher 230kV.	Previously Allocated		$24,764,205
Elk City 230/138/13kV Transformer CKT 1 Replace terminal equipment for Elk City Transformer to achieve transformer limit of 450MVA.	Previously Allocated		$15,000,000
National Enrichment Plant-Targa 115kV CKT 1 Rebuild approximately 4 miles of 115kV from National Enrichment Plant to Targa per 2015 ITPNT.	Previously Allocated		$2,909,669
Oklaunion 345kV Reactive Power Install (2)-130Mvar Capacitor Bank(s) at Oklaunion	Previously Allocated		$10,000,000
Targa-Cardinal 115kV CKT 1 Rebuild approximately 3 miles of 115kV from Targa to Cardinal per 2015 ITPNT.	Previously Allocated		$2,049,062
Tolk - Plant X 230kV CKT 1 & 2 Rebuild circuit 1 and 2 betweek Tolk - Plant X 230kV to 1200 amps each.	Previously Allocated		$9,921,693
TUCO 345/230/13.2kV Transformer CKT 1 Replace existing TUCO 345/230/13.2kV Transformer circuit #1 with 640MVA.	Previously Allocated		$3,347,036
	Current Study Total	$25,142,648	
GEN-2015-076			
Gavins Point - Yankton Junction 115kV CKT 1 Rebuild approximately 5 miles of 115kV from Gavins to Yankton	Current Study	$5,000,000	$5,000,000
GEN-2015-076 Interconnection Costs See One-Line Diagram.	Current Study	$2,600,000	$2,600,000
Gentleman - Thedford 345kV CKT 1 Build approximately 76 Miles of 345kV from Gentleman to Thedford per SPP-NTC-200220 (Total Project E&C Cost Shown).	Previously Allocated		$311,717,040
Hoskins - Dixon County - Twin Church 230kV Rerate per NPPD Facility Study	Previously Allocated		$500,000
Hoskins - Neligh 345/115kV Projects Per SPP 2014 ITP NT and NTC 200253 for 6/1/2016 in-service.	Previously Allocated		$98,697,720
Thedford - Holt County 345kV CKT 1 Build approximately 146 Miles of 345kV from Thedford to Holt County per SPP-NTC-200220 (Total Project E&C Cost Shown).	Previously Allocated		$311,717,040
Thedford 345/115kV Transformer CKT 1 Install Thedford 345/115kV transformer per SPP-NTC-200277 (Total Project E&C Cost Shown).	Previously Allocated		$311,717,040
	Current Study Total	$7,600,000	

* 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
GEN-2015-079			
Border - Chisholm 345kV CKT 2 Build approximately 25 miles of second circuit 345kV from Border - Chisholm	Current Study	$3,361,132	$25,000,000
Border 345kV Reactive Power Support Install (6)Steps of 50Mvar Capacitor Bank(s) and +300Mvar SVC at Border Substation	Current Study	$4,363,976	$32,633,384
Chisholm Substation Upgrade 345kV Expand planned Chisholm Substation to tap and terminate Woodward - Border 345kV into the Chisholm Substation	Current Study	$1,613,371	$12,000,000
Crawfish Draw - Border 345kV CKT 2 Build approximately 194 miles of second circuit 345kV from TUCO 2 - Border	Current Study	$25,964,901	$194,000,000
GEN-2014-074 Tap Dynamic Reactive Power Support 34.5kV STATCOM at GEN-2014-074	Current Study	$401,182	$3,000,000
GEN-2015-079 Interconnection Costs See One-Line Diagram.	Current Study	$3,191,360	$3,191,360
Grapevine - Nichols 230kV CKT 1 Replace terminal equipment	Current Study	$53,040	$400,000
Grapevine - Wheeler 230kV CKT 1 Replace terminal equipment	Current Study	$33,103	$400,000
Oklaunion 345kV Reactive Power Support Incremental Upgrade Install +/-100Mvar SVC at Oklaunion	Current Study	$2,676,794	$20,000,000
Wheeler - Sweetwater 230kV CKT 1 Rebuild AEP's portion of the circuit and replace terminal equipment on SPS portion	Current Study	$473,918	$6,000,000
2016 ITPNT Upgrade(s) 2016 ITPNT Upgrade(s) for migitation of stability constraints near Mustang and Seminole	Previously Allocated		$0
Chisholm - Gracemont 345kV CKT 1 Per SPP-NTC-200255 and 200240 (Total Project E&C Cost Shown)	Previously Allocated		$162,952,357
Crawfish Draw Substation Upgrade 345/230kV Tap Border-TUCO approximately 2 miles from TUCO and build Crawfish Draw 345kV substation and add 345/230/13.2kV transformer and tie on TUCO-Swisher 230kV.	Previously Allocated		$24,764,205
Elk City 230/138/13kV Transformer CKT 1 Replace terminal equipment for Elk City Transformer to achieve transformer limit of 450MVA.	Previously Allocated		$15,000,000
National Enrichment Plant-Targa 115kV CKT 1 Rebuild approximately 4 miles of 115kV from National Enrichment Plant to Targa per 2015 ITPNT.	Previously Allocated		$2,909,669
Oklaunion 345kV Reactive Power Install (2)-130Mvar Capacitor Bank(s) at Oklaunion	Previously Allocated		$10,000,000

* 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
Targa-Cardinal 115kV CKT 1 Rebuild approximately 3 miles of 115kV from Targa to Cardinal per 2015 ITPNT.	Previously Allocated		$2,049,062
Tolk - Plant X 230kV CKT 1 & 2 Rebuild circuit 1 and 2 betweek Tolk - Plant X 230kV to 1200 amps each.	Previously Allocated		$9,921,693
TUCO 345/230/13.2kV Transformer CKT 1 Replace existing TUCO 345/230/13.2kV Transformer circuit #1 with 640MVA.	Previously Allocated		$3,347,036
	Current Study Total	$42,132,777	
GEN-2015-080			
Border - Chisholm 345kV CKT 2 Build approximately 25 miles of second circuit 345kV from Border - Chisholm	Current Study	$3,361,132	$25,000,000
Border 345kV Reactive Power Support Install (6)Steps of 50Mvar Capacitor Bank(s) and +300Mvar SVC at Border Substation	Current Study	$4,363,976	$32,633,384
Chisholm Substation Upgrade 345kV Expand planned Chisholm Substation to tap and terminate Woodward - Border 345kV into the Chisholm Substation	Current Study	$1,613,371	$12,000,000
Crawfish Draw - Border 345kV CKT 2 Build approximately 194 miles of second circuit 345kV from TUCO 2 - Border	Current Study	$25,964,901	$194,000,000
GEN-2014-074 Tap Dynamic Reactive Power Support 34.5kV STATCOM at GEN-2014-074	Current Study	$401,182	$3,000,000
GEN-2015-080 Interconnection Costs See One-Line Diagram.	Current Study	$3,191,360	$3,191,360
Grapevine - Nichols 230kV CKT 1 Replace terminal equipment	Current Study	$53,040	$400,000
Grapevine - Wheeler 230kV CKT 1 Replace terminal equipment	Current Study	$33,103	$400,000
Oklaunion 345kV Reactive Power Support Incremental Upgrade Install +/-100Mvar SVC at Oklaunion	Current Study	$2,676,794	$20,000,000
Wheeler - Sweetwater 230kV CKT 1 Rebuild AEP's portion of the circuit and replace terminal equipment on SPS portion	Current Study	$473,918	$6,000,000
2016 ITPNT Upgrade(s) 2016 ITPNT Upgrade(s) for migitation of stability constraints near Mustang and Seminole	Previously Allocated		$0
Chisholm - Gracemont 345kV CKT 1 Per SPP-NTC-200255 and 200240 (Total Project E&C Cost Shown)	Previously Allocated		$162,952,357

* 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
Crawfish Draw Substation Upgrade 345/230kV Tap Border-TUCO approximately 2 miles from TUCO and build Crawfish Draw 345kV substation and add 345/230/13.2kV transformer and tie on TUCO-Swisher 230kV.	Previously Allocated		$24,764,205
Elk City 230/138/13kV Transformer CKT 1 Replace terminal equipment for Elk City Transformer to achieve transformer limit of 450MVA.	Previously Allocated		$15,000,000
National Enrichment Plant-Targa 115kV CKT 1 Rebuild approximately 4 miles of 115kV from National Enrichment Plant to Targa per 2015 ITPNT.	Previously Allocated		$2,909,669
Oklaunion 345kV Reactive Power Install (2)-130Mvar Capacitor Bank(s) at Oklaunion	Previously Allocated		$10,000,000
Targa-Cardinal 115kV CKT 1 Rebuild approximately 3 miles of 115kV from Targa to Cardinal per 2015 ITPNT.	Previously Allocated		$2,049,062
Tolk - Plant X 230kV CKT 1 & 2 Rebuild circuit 1 and 2 betweek Tolk - Plant X 230kV to 1200 amps each.	Previously Allocated		$9,921,693
TUCO 345/230/13.2kV Transformer CKT 1 Replace existing TUCO 345/230/13.2kV Transformer circuit #1 with 640MVA.	Previously Allocated		$3,347,036
	Current Study Total	$42,132,777	
GEN-2015-081			
GEN-2015-081 Interconnection Costs See One-Line Diagram.	Current Study	$3,005,000	$3,005,000
Bucker - Spearville 345V CKT 1 Replace Terminal equipment	Previously Allocated		$1,480,238
Mathewson - Cimarron 345kV CKT 2 Build second 345kV circuit from Matthewson - Cimarron @ 3000 amps per ITP10.	Previously Allocated		$42,903,753
Tatonga - Mathewson 345kV CKT 2 Build second 345kV circuit from Tatonga - Matthewson @ 3000 amps per ITP10.	Previously Allocated		$104,260,473
Woodward - GEN-2011-051 Tap - Tatonga 345kV CKT 2 Build second 345kV circuit from Woodward - Tatonga @ 3000 amps per ITP10.	Previously Allocated		$71,876,622
Woodward EHV Phase Shifting Transformer CKT 1 Install one phase shifting transformer at Woodward	Previously Allocated		$7,200,000
	Current Study Total	$3,005,000	
GEN-2015-083			
GEN-2015-083 Interconnection Costs See One-Line Diagram.	Current Study	$6,713,963	$6,713,963

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Interconnection Request and Upgrades	Upgrade Type	Allocated Cost	Upgrade Cost
	Current Study Total	$6,713,963	
GEN-2015-084			
Cornville Tap - Naples Tap 138kV CKT 1 Rebuild approximately 11 miles of 138kV from Cornville Tap to Naples Tap	Current Study	$1,865,168	$7,700,000
GEN-2015-084 Interconnection Costs See One-Line Diagram.	Current Study	$14,665,056	$14,665,056
Naples Tap - Payne 138kV CKT 1 Rebuild approximately 8 miles of 138kV from Naples Tap to Payne	Current Study	$1,356,486	$5,600,000
Chisholm - Gracemont 345kV CKT 1 Per SPP-NTC-200255 and 200240 (Total Project E&C Cost Shown)	Previously Allocated		$162,952,357
	Current Study Total	$17,886,710	
GEN-2015-085			
Cornville Tap - Naples Tap 138kV CKT 1 Rebuild approximately 11 miles of 138kV from Cornville Tap to Naples Tap	Current Study	$5,834,832	$7,700,000
GEN-2015-085 Interconnection Costs See One-Line Diagram.	Current Study	$8,406,414	$8,406,414
Naples Tap - Payne 138kV CKT 1 Rebuild approximately 8 miles of 138kV from Naples Tap to Payne	Current Study	$4,243,514	$5,600,000
Norge - Southwest Station 138kV CKT 1 Rebuild approximately 23 miles of 138kV from Norge to Southwest Station	Current Study	$23,000,000	$23,000,000
Wheeler - Sweetwater 230kV CKT 1 Rebuild AEP's portion of the circuit and replace terminal equipment on SPS portion	Current Study	$241,254	$6,000,000
Chisholm - Gracemont 345kV CKT 1 Per SPP-NTC-200255 and 200240 (Total Project E&C Cost Shown)	Previously Allocated		$162,952,357
	Current Study Total	$41,726,014	
GEN-2015-087			
GEN-2015-087 Interconnection Costs See One-Line Diagram.	Current Study	$5,300,000	$5,300,000
Gentleman - Thedford 345kV CKT 1 Build approximately 76 Miles of 345kV from Gentleman to Thedford per SPP-NTC-200220 (Total Project E&C Cost Shown).	Previously Allocated		$311,717,040
Gentleman - Thedford 345kV CKT 1 Build approximately 76 Miles of 345kV from Gentleman to Thedford per SPP-NTC-200220 (Total Project E&C Cost Shown).	Previously Allocated		$311,717,040

* 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
Thedford - Holt County 345kV CKT 1 Build approximately 146 Miles of 345kV from Thedford to Holt County per SPP-NTC-200220 (Total Project E&C Cost Shown).	Previously Allocated		$311,717,040
Twin Church - Dixon County 230kV Increase conductor clearances to accommodate 320MVA facility rating	Previously Allocated		$100,000
	Current Study Total	$5,300,000	
GEN-2015-088			
GEN-2015-088 Interconnection Costs See One-Line Diagram.	Current Study	$15,000,000	$15,000,000
Gentleman - Thedford 345kV CKT 1 Build approximately 76 Miles of 345kV from Gentleman to Thedford per SPP-NTC-200220 (Total Project E&C Cost Shown).	Previously Allocated		$311,717,040
Gentleman - Thedford 345kV CKT 1 Build approximately 76 Miles of 345kV from Gentleman to Thedford per SPP-NTC-200220 (Total Project E&C Cost Shown).	Previously Allocated		$311,717,040
Thedford - Holt County 345kV CKT 1 Build approximately 146 Miles of 345kV from Thedford to Holt County per SPP-NTC-200220 (Total Project E&C Cost Shown).	Previously Allocated		$311,717,040
Thedford - Holt County 345kV CKT 1 Build approximately 146 Miles of 345kV from Thedford to Holt County per SPP-NTC-200220 (Total Project E&C Cost Shown).	Previously Allocated		$311,717,040
Twin Church - Dixon County 230kV Increase conductor clearances to accommodate 320MVA facility rating	Previously Allocated		$100,000
	Current Study Total	$15,000,000	
GEN-2015-090			
GEN-2015-090 Interconnection Costs See One-Line Diagram.	Current Study	$10,000	$10,000
	Current Study Total	$10,000	
GEN-2015-091			
Daglum - Dickinson 230kV CKT 1 Build new 230kV line from Daglum - Dickinson.	Current Study	$9,471,433	$28,000,000
Dickinson 230/115/13.8kV CKT 2 Build new 230/115/13.8kV Transformer circuit #2 at Dickinson.	Current Study	$794,317	$3,500,000
GEN-2015-091 Interconnection Costs See One-Line Diagram.	Current Study	$3,224,682	$3,224,682
MISO Affected System Study See section 4 power flow analysis.	Current Study	$TBD	$TBD

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Interconnection Request and Upgrades	Upgrade Type	Allocated Cost	Upgrade Cost
Gentleman - Thedford 345kV CKT 1 Build approximately 76 Miles of 345kV from Gentleman to Thedford per SPP-NTC-200220 (Total Project E&C Cost Shown).	Previously Allocated		$311,717,040
Neset - Tande 230kV CKT 1 Build new 230kV line from Neset - Tande	Previously Allocated		$3,000,000
Neset 230kV Terminal Upgrade(s) Install necessary terminal equInstall necessary terminal upgrades at Neset 230kV to accommodate new 230kV line from new Tande substation	Previously Allocated		$4,000,000
Patent Gate - Kummer Ridge - Roundup Project	Previously Allocated		$0
Tande 345/230 Substation Construct new 345kV Tande Substation & Tande 345/230/13kV transformer Construct new 345kV Tande Substation adjacent to the existing 230kV Neset Substation and	Previously Allocated		$18,000,000
Thedford - Holt County 345kV CKT 1 Build approximately 146 Miles of 345kV from Thedford to Holt County per SPP-NTC-200220 (Total Project E&C Cost Shown).	Previously Allocated		$311,717,040
Thedford 345/115kV Transformer CKT 1 Install Thedford 345/115kV transformer per SPP-NTC-200277 (Total Project E&C Cost Shown).	Previously Allocated		$311,717,040
	Current Study Total	$13,490,432	
GEN-2015-092			
GEN-2015-092 Interconnection Costs See One-Line Diagram.	Current Study	$0	$0
	Current Study Total	$0	
GEN-2015-093			
GEN-2015-093 Interconnection Costs See One-Line Diagram.	Current Study	$2,125,000	$2,125,000
Bucker - Spearville 345V CKT 1 Replace Terminal equipment	Previously Allocated		$1,480,238
Woodward EHV Phase Shifting Transformer CKT 1 Install one phase shifting transformer at Woodward	Previously Allocated		$7,200,000
	Current Study Total	$2,125,000	
GEN-2015-096			
Daglum - Dickinson 230kV CKT 1 Build new 230kV line from Daglum - Dickinson.	Current Study	$14,038,685	$28,000,000
Dickinson 230/115/13.8kV CKT 2 Build new 230/115/13.8kV Transformer circuit #2 at Dickinson.	Current Study	$1,177,348	$3,500,000

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Interconnection Request and Upgrades	Upgrade Type	Allocated Cost	Upgrade Cost
GEN-2015-096 Interconnection Costs See One-Line Diagram.	Current Study	$0	$0
MISO Affected System Study See section 4 power flow analysis.	Current Study	$TBD	$TBD
Gentleman - Thedford 345kV CKT 1 Build approximately 76 Miles of 345kV from Gentleman to Thedford per SPP-NTC-200220 (Total Project E&C Cost Shown).	Previously Allocated		$311,717,040
Neset - Tande 230kV CKT 1 Build new 230kV line from Neset - Tande	Previously Allocated		$3,000,000
Neset 230kV Terminal Upgrade(s) Install necessary terminal equInstall necessary terminal upgrades at Neset 230kV to accommodate new 230kV line from new Tande substation	Previously Allocated		$4,000,000
Patent Gate - Kummer Ridge - Roundup Project	Previously Allocated		$0
Tande 345/230 Substation Construct new 345kV Tande Substation & Tande 345/230/13kV transformer Construct new 345kV Tande Substation adjacent to the existing 230kV Neset Substation and	Previously Allocated		$18,000,000
Thedford - Holt County 345kV CKT 1 Build approximately 146 Miles of 345kV from Thedford to Holt County per SPP-NTC-200220 (Total Project E&C Cost Shown).	Previously Allocated		$311,717,040
Thedford 345/115kV Transformer CKT 1 Install Thedford 345/115kV transformer per SPP-NTC-200277 (Total Project E&C Cost Shown).	Previously Allocated		$311,717,040
	Current Study Total	$15,216,033	
GEN-2015-097			
GEN-2015-097 Interconnection Costs See One-Line Diagram.	Current Study	$3,000,000	$3,000,000
MISO Affected System Study See section 4 power flow analysis.	Current Study	$TBD	$TBD
	Current Study Total	$3,000,000	
GEN-2015-098			
Daglum - Dickinson 230kV CKT 1 Build new 230kV line from Daglum - Dickinson.	Current Study	$2,456,586	$28,000,000
Dickinson 230/115/13.8kV CKT 2 Build new 230/115/13.8kV Transformer circuit #2 at Dickinson.	Current Study	$579,565	$3,500,000
GEN-2015-098 Interconnection Costs See One-Line Diagram.	Current Study	$3,000,000	$3,000,000

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Interconnection Request and Upgrades	Upgrade Type	Allocated Cost	Upgrade Cost
MISO Affected System Study See section 4 power flow analysis.	Current Study	$TBD	$TBD
Gentleman - Thedford 345kV CKT 1 Build approximately 76 Miles of 345kV from Gentleman to Thedford per SPP-NTC-200220 (Total Project E&C Cost Shown).	Previously Allocated		$311,717,040
Neset - Tande 230kV CKT 1 Build new 230kV line from Neset - Tande	Previously Allocated		$3,000,000
Neset 230kV Terminal Upgrade(s) Install necessary terminal equInstall necessary terminal upgrades at Neset 230kV to accommodate new 230kV line from new Tande substation	Previously Allocated		$4,000,000
Patent Gate - Kummer Ridge - Roundup Project	Previously Allocated		$0
Tande 345/230 Substation Construct new 345kV Tande Substation & Tande 345/230/13kV transformer Construct new 345kV Tande Substation adjacent to the existing 230kV Neset Substation and	Previously Allocated		$18,000,000
Thedford - Holt County 345kV CKT 1 Build approximately 146 Miles of 345kV from Thedford to Holt County per SPP-NTC-200220 (Total Project E&C Cost Shown).	Previously Allocated		$311,717,040
Thedford 345/115kV Transformer CKT 1 Install Thedford 345/115kV transformer per SPP-NTC-200277 (Total Project E&C Cost Shown).	Previously Allocated		$311,717,040
	Current Study Total	$6,036,150	
	TOTAL CURRENT STUDY COSTS:	**$640,621,668***	

* Does not include cost to mitigate possible AECI, MISO, and/or MPC Affecte System Upgrade(s) or cost estimate(s)

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

11.6 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-2015-006 Interconnection Costs		**$0**
See One-Line Diagram.		
	ASGI-2015-006	$0
	Total Allocated Costs	**$0**
Beaver County 345kV Reactive Power Support		**$26,264,777**
Install +100Mvar SVC at Beaver County Substation.		
	GEN-2014-037	$26,264,777
	Total Allocated Costs	**$26,264,777**
Border - Chisholm 345kV CKT 2		**$25,000,000**
Build approximately 25 miles of second circuit 345kV from Border - Chisholm		
	GEN-2015-020	$2,266,649
	GEN-2015-031	$1,943,934
	GEN-2015-056	$2,402,319
	GEN-2015-058	$1,243,832
	GEN-2015-068	$9,020,898
	GEN-2015-075	$1,400,105
	GEN-2015-079	$3,361,132
	GEN-2015-080	$3,361,132
	Total Allocated Costs	**$25,000,000**
Border 345kV Reactive Power Support		**$32,633,384**
Install (6)Steps of 50Mvar Capacitor Bank(s) and +300Mvar SVC at Border Substation		
	GEN-2015-020	$3,069,038
	GEN-2015-031	$2,923,068
	GEN-2015-056	$3,203,972
	GEN-2015-058	$1,636,045
	GEN-2015-068	$11,284,661
	GEN-2015-075	$1,788,649
	GEN-2015-079	$4,363,976
	GEN-2015-080	$4,363,976
	Total Allocated Costs	**$32,633,384**

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

Carlisle 115/69/13kV Transformer CKT 1		**$4,000,000**
Replace existing Carlisle 115/69/13kV Transformer circuit #1		
	GEN-2015-075	$4,000,000
	Total Allocated Costs	**$4,000,000**
Chisholm Substation Upgrade 345kV		**$12,000,000**
Expand planned Chisholm Substation to tap and terminate Woodward - Border 345kV into the Chisholm Substation		
	GEN-2015-020	$1,088,010
	GEN-2015-031	$933,104
	GEN-2015-056	$1,153,133
	GEN-2015-058	$597,050
	GEN-2015-068	$4,330,105
	GEN-2015-075	$671,856
	GEN-2015-079	$1,613,371
	GEN-2015-080	$1,613,371
	Total Allocated Costs	**$12,000,000**
Cleo Corner - Cleo Plant Tap 138kV CKT 1		**$61,890**
Replace terminal equipment to at least 1200 amps		
	GEN-2015-048	$57,865
	GEN-2015-060	$4,025
	Total Allocated Costs	**$61,890**
Cleveland - Silver City 138kV CKT 1		**$TBD**
AECI Affected System Study is required		
	GEN-2015-034	$TBD
	GEN-2015-047	$TBD
	GEN-2015-066	$TBD
	Total Allocated Costs	**$TBD**
Cornville Tap - Naples Tap 138kV CKT 1		**$7,700,000**
Rebuild approximately 11 miles of 138kV from Cornville Tap to Naples Tap		
	GEN-2015-084	$1,865,168
	GEN-2015-085	$5,834,832
	Total Allocated Costs	**$7,700,000**

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

Crawfish Draw - Border 345kV CKT 2			**$194,000,000**
Build approximately 194 miles of second circuit 345kV from TUCO 2 - Border			
	GEN-2015-020	$17,621,703	
	GEN-2015-031	$16,076,755	
	GEN-2015-056	$18,627,649	
	GEN-2015-058	$9,626,112	
	GEN-2015-068	$69,318,271	
	GEN-2015-075	$10,799,709	
	GEN-2015-079	$25,964,901	
	GEN-2015-080	$25,964,901	
	Total Allocated Costs	**$194,000,000**	
Daglum - Dickinson 230kV CKT 1			**$28,000,000**
Build new 230kV line from Daglum - Dickinson.			
	GEN-2015-046	$2,033,296	
	GEN-2015-091	$9,471,433	
	GEN-2015-096	$14,038,685	
	GEN-2015-098	$2,456,586	
	Total Allocated Costs	**$28,000,000**	
Dickinson 230/115/13.8kV CKT 2			**$3,500,000**
Build new 230/115/13.8kV Transformer circuit #2 at Dickinson.			
	GEN-2015-046	$948,770	
	GEN-2015-091	$794,317	
	GEN-2015-096	$1,177,348	
	GEN-2015-098	$579,565	
	Total Allocated Costs	**$3,500,000**	
Gavins Point - Yankton Junction 115kV CKT 1			**$5,000,000**
Rebuild approximately 5 miles of 115kV from Gavins to Yankton			
	GEN-2015-076	$5,000,000	
	Total Allocated Costs	**$5,000,000**	
GEN-2014-037 Interconnection Costs			**$20,334,923**
See One-Line Diagram.			
	GEN-2014-037	$20,334,923	
	Total Allocated Costs	**$20,334,923**	

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

GEN-2014-074 Tap Dynamic Reactive Power Support			**$3,000,000**
34.5kV STATCOM at GEN-2014-074			
	GEN-2015-020	$282,138	
	GEN-2015-031	$268,719	
	GEN-2015-056	$294,542	
	GEN-2015-058	$150,402	
	GEN-2015-068	$1,037,403	
	GEN-2015-075	$164,431	
	GEN-2015-079	$401,182	
	GEN-2015-080	$401,182	
	Total Allocated Costs	**$3,000,000**	
GEN-2015-020 Interconnection Costs			**$10,606,653**
See One-Line Diagram.			
	GEN-2015-020	$10,606,653	
	Total Allocated Costs	**$10,606,653**	
GEN-2015-031 Interconnection Costs			**$7,567,148**
See One-Line Diagram.			
	GEN-2015-031	$7,567,148	
	Total Allocated Costs	**$7,567,148**	
GEN-2015-034 Interconnection Costs			**$2,025,000**
See One-Line Diagram.			
	GEN-2015-034	$2,025,000	
	Total Allocated Costs	**$2,025,000**	
GEN-2015-045 Interconnection Costs			**$0**
See One-Line Diagram.			
	GEN-2015-045	$0	
	Total Allocated Costs	**$0**	
GEN-2015-046 Interconnection Costs			**$3,759,097**
See One-Line Diagram.			
	GEN-2015-046	$3,759,097	
	Total Allocated Costs	**$3,759,097**	

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

GEN-2015-047 Interconnection Costs			**$2,540,000**
See One-Line Diagram.			
	GEN-2015-047	$2,540,000	
	Total Allocated Costs	**$2,540,000**	
GEN-2015-048 Interconnection Costs			**$2,968,000**
See One-Line Diagram.			
	GEN-2015-048	$2,968,000	
	Total Allocated Costs	**$2,968,000**	
GEN-2015-052 Interconnection Costs			**$15,602,434**
See One-Line Diagram.			
	GEN-2015-052	$15,602,434	
	Total Allocated Costs	**$15,602,434**	
GEN-2015-053 Interconnection Costs			**$1,000,000**
See One-Line Diagram.			
	GEN-2015-053	$1,000,000	
	Total Allocated Costs	**$1,000,000**	
GEN-2015-055 Interconnection Costs			**$1,900,000**
See One-Line Diagram.			
	GEN-2015-055	$1,900,000	
	Total Allocated Costs	**$1,900,000**	
GEN-2015-056 Interconnection Costs			**$5,080,273**
See One-Line Diagram.			
	GEN-2015-056	$5,080,273	
	Total Allocated Costs	**$5,080,273**	
GEN-2015-057 Interconnection Costs			**$20,000**
See One-Line Diagram.			
	GEN-2015-057	$20,000	
	Total Allocated Costs	**$20,000**	
GEN-2015-058 Interconnection Costs			**$2,751,641**
See One-Line Diagram.			
	GEN-2015-058	$2,751,641	
	Total Allocated Costs	**$2,751,641**	

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

GEN-2015-060 Interconnection Costs			**$863,000**
See One-Line Diagram.			
	GEN-2015-060	$863,000	
	Total Allocated Costs	**$863,000**	
GEN-2015-061 Interconnection Costs			**$6,988,986**
See One-Line Diagram.			
	GEN-2015-061	$6,988,986	
	Total Allocated Costs	**$6,988,986**	
GEN-2015-062 Interconnection Costs			**$0**
See One-Line Diagram.			
	GEN-2015-062	$0	
	Total Allocated Costs	**$0**	
GEN-2015-063 Interconnection Costs			**$10,613,000**
See One-Line Diagram.			
	GEN-2015-063	$10,613,000	
	Total Allocated Costs	**$10,613,000**	
GEN-2015-063 Tap - Mathewson 345kV CKT 1			**$7,625,108**
Replace terminal equipment to achieve conductor limit			
	GEN-2015-047	$1,263,186	
	GEN-2015-062	$31,587	
	GEN-2015-063	$6,330,335	
	Total Allocated Costs	**$7,625,108**	
GEN-2015-064 Interconnection Costs			**$4,638,823**
See One-Line Diagram.			
	GEN-2015-064	$4,638,823	
	Total Allocated Costs	**$4,638,823**	
GEN-2015-065 Interconnection Costs			**$6,988,986**
See One-Line Diagram.			
	GEN-2015-065	$6,988,986	
	Total Allocated Costs	**$6,988,986**	

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

GEN-2015-066 Interconnection Costs			**$10,313,000**
See One-Line Diagram.			
	GEN-2015-066	$10,313,000	
	Total Allocated Costs	**$10,313,000**	
GEN-2015-067 Interconnection Costs			**$3,521,000**
See One-Line Diagram.			
	GEN-2015-067	$3,521,000	
	Total Allocated Costs	**$3,521,000**	
GEN-2015-068 Interconnection Costs			**$4,831,332**
See One-Line Diagram.			
	GEN-2015-068	$4,831,332	
	Total Allocated Costs	**$4,831,332**	
GEN-2015-069 Interconnection Costs			**$2,755,752**
See One-Line Diagram.			
	GEN-2015-069	$2,755,752	
	Total Allocated Costs	**$2,755,752**	
GEN-2015-071 Interconnection Costs			**$14,623,541**
See One-Line Diagram.			
	GEN-2015-071	$14,623,541	
	Total Allocated Costs	**$14,623,541**	
GEN-2015-073 Interconnection Costs			**$2,576,628**
See One-Line Diagram.			
	GEN-2015-073	$2,576,628	
	Total Allocated Costs	**$2,576,628**	
GEN-2015-075 Interconnection Costs			**$5,000,000**
See One-Line Diagram.			
	GEN-2015-075	$5,000,000	
	Total Allocated Costs	**$5,000,000**	
GEN-2015-076 Interconnection Costs			**$2,600,000**
See One-Line Diagram.			
	GEN-2015-076	$2,600,000	
	Total Allocated Costs	**$2,600,000**	

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

GEN-2015-079 Interconnection Costs			**$3,191,360**
See One-Line Diagram.			
	GEN-2015-079	$3,191,360	
	Total Allocated Costs	**$3,191,360**	
GEN-2015-080 Interconnection Costs			**$3,191,360**
See One-Line Diagram.			
	GEN-2015-080	$3,191,360	
	Total Allocated Costs	**$3,191,360**	
GEN-2015-081 Interconnection Costs			**$3,005,000**
See One-Line Diagram.			
	GEN-2015-081	$3,005,000	
	Total Allocated Costs	**$3,005,000**	
GEN-2015-083 Interconnection Costs			**$6,713,963**
See One-Line Diagram.			
	GEN-2015-083	$6,713,963	
	Total Allocated Costs	**$6,713,963**	
GEN-2015-084 Interconnection Costs			**$14,665,056**
See One-Line Diagram.			
	GEN-2015-084	$14,665,056	
	Total Allocated Costs	**$14,665,056**	
GEN-2015-085 Interconnection Costs			**$8,406,414**
See One-Line Diagram.			
	GEN-2015-085	$8,406,414	
	Total Allocated Costs	**$8,406,414**	
GEN-2015-087 Interconnection Costs			**$5,300,000**
See One-Line Diagram.			
	GEN-2015-087	$5,300,000	
	Total Allocated Costs	**$5,300,000**	
GEN-2015-088 Interconnection Costs			**$15,000,000**
See One-Line Diagram.			
	GEN-2015-088	$15,000,000	
	Total Allocated Costs	**$15,000,000**	

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

GEN-2015-090 Interconnection Costs			**$10,000**
See One-Line Diagram.			
	GEN-2015-090	$10,000	
	Total Allocated Costs	**$10,000**	
GEN-2015-091 Interconnection Costs			**$3,224,682**
See One-Line Diagram.			
	GEN-2015-091	$3,224,682	
	Total Allocated Costs	**$3,224,682**	
GEN-2015-092 Interconnection Costs			**$0**
See One-Line Diagram.			
	GEN-2015-092	$0	
	Total Allocated Costs	**$0**	
GEN-2015-093 Interconnection Costs			**$2,125,000**
See One-Line Diagram.			
	GEN-2015-093	$2,125,000	
	Total Allocated Costs	**$2,125,000**	
GEN-2015-096 Interconnection Costs			**$0**
See One-Line Diagram.			
	GEN-2015-096	$0	
	Total Allocated Costs	**$0**	
GEN-2015-097 Interconnection Costs			**$3,000,000**
See One-Line Diagram.			
	GEN-2015-097	$3,000,000	
	Total Allocated Costs	**$3,000,000**	
GEN-2015-098 Interconnection Costs			**$3,000,000**
See One-Line Diagram.			
	GEN-2015-098	$3,000,000	
	Total Allocated Costs	**$3,000,000**	

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

Grapevine - Nichols 230kV CKT 1		**$400,000**
Replace terminal equipment		
	GEN-2015-020	$51,213
	GEN-2015-031	$66,836
	GEN-2015-056	$48,587
	GEN-2015-058	$22,262
	GEN-2015-068	$85,608
	GEN-2015-075	$19,412
	GEN-2015-079	$53,040
	GEN-2015-080	$53,040
	Total Allocated Costs	**$400,000**
Grapevine - Wheeler 230kV CKT 1		**$400,000**
Replace terminal equipment		
	GEN-2015-020	$32,133
	GEN-2015-031	$41,940
	GEN-2015-055	$20,807
	GEN-2015-056	$30,428
	GEN-2015-058	$13,921
	GEN-2015-068	$52,883
	GEN-2015-071	$129,592
	GEN-2015-075	$12,089
	GEN-2015-079	$33,103
	GEN-2015-080	$33,103
	Total Allocated Costs	**$400,000**
MISO Affected System Study		**$TBD**
See section 4 power flow analysis.		
	GEN-2015-046	$TBD
	GEN-2015-091	$TBD
	GEN-2015-096	$TBD
	GEN-2015-097	$TBD
	GEN-2015-098	$TBD
	Total Allocated Costs	**$TBD**

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

Naples Tap - Payne 138kV CKT 1			**$5,600,000**
Rebuild approximately 8 miles of 138kV from Naples Tap to Payne			
	GEN-2015-084	$1,356,486	
	GEN-2015-085	$4,243,514	
	Total Allocated Costs	**$5,600,000**	
Norge - Southwest Station 138kV CKT 1			**$23,000,000**
Rebuild approximately 23 miles of 138kV from Norge to Southwest Station			
	GEN-2015-085	$23,000,000	
	Total Allocated Costs	**$23,000,000**	
Oklaunion 345kV Reactive Power Support Incremental Upgrade			**$20,000,000**
Install +/-100Mvar SVC at Oklaunion			
	GEN-2015-020	$1,816,670	
	GEN-2015-031	$1,657,397	
	GEN-2015-056	$1,920,376	
	GEN-2015-058	$992,383	
	GEN-2015-068	$7,146,213	
	GEN-2015-075	$1,113,372	
	GEN-2015-079	$2,676,794	
	GEN-2015-080	$2,676,794	
	Total Allocated Costs	**$20,000,000**	
Albion - Petersburg - North Petersburg 115kV CKT 1			**$3,500,000**
Reconductor 115kV lines and replace all terminal equipment for at least a 193MVA rate.			
	GEN-2015-053	$3,500,000	
	Total Allocated Costs	**$3,500,000**	

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

Wheeler - Sweetwater 230kV CKT 1		**$6,000,000**
Rebuild AEP's portion of the circuit and replace terminal equipment on SPS portion		
	GEN-2015-020	$460,332
	GEN-2015-031	$600,726
	GEN-2015-055	$301,294
	GEN-2015-056	$435,826
	GEN-2015-058	$199,353
	GEN-2015-068	$756,014
	GEN-2015-071	$1,884,339
	GEN-2015-075	$173,024
	GEN-2015-079	$473,918
	GEN-2015-080	$473,918
	GEN-2015-085	$241,254
	Total Allocated Costs	**$6,000,000**
Woodward 345/138/13kV Transformer CKT 3		**$9,634,457**
Add Woodward 345/138/13kV Transformer circuit #3		
	GEN-2015-060	$9,634,457
	Total Allocated Costs	**$9,634,457**

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

11.7 G-T: Thermal Power Flow Analysis (Constraints Requiring Transmission Reinforcement)

See next page.

SOLUTION	GROUP	SCENARIO	SEASON	SOURCE	DIRECTION	MONITORED ELEMENT	RATEA (MVA)	RATEB(MVA)	TDF	TC%LOADING (% MVA)	CONTINGENCY
FDNS	01ALL	0	16WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57167	119.4052	MATHWSN7 345.00 - TATONGA7 345.00 345KV CKT 1
FDNS	01ALL	0	17SP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57159	118.0422	MATHWSN7 345.00 - TATONGA7 345.00 345KV CKT 1
FDNS	01ALL	0	17SP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.64106	115.2178	CLEO CORNER (CLEOCOR1) 138/69/13.8KV TRANSFORMER CKT 1
FDNS	01ALL	0	17G	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57232	115.1804	MATHWSN7 345.00 - TATONGA7 345.00 345KV CKT 1
FDNS	01ALL	0	16WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.64107	113.9297	CLEO CORNER (CLEOCOR1) 138/69/13.8KV TRANSFORMER CKT 1
FDNS	01ALL	0	20WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.64072	111.3908	CLEO CORNER (CLEOCOR1) 138/69/13.8KV TRANSFORMER CKT 1
FDNS	01ALL	0	17G	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.64152	110.8792	CLEO CORNER (CLEOCOR1) 138/69/13.8KV TRANSFORMER CKT 1
FDNS	01ALL	0	20SP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.64104	110.1386	CLEO CORNER (CLEOCOR1) 138/69/13.8KV TRANSFORMER CKT 1
FDNS	01ALL	0	17SP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.53833	108.1399	WOODRING (WOODRNG2) 345/138/13.8KV TRANSFORMER CKT 1
FDNS	01ALL	0	17SP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57495	107.9802	MOORELAND - PIC4 138.00 138KV CKT 1
FDNS	01ALL	0	17SP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57495	107.9597	P12:138:WFEC:MSL12
FDNS	01ALL	0	17SP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57495	107.8886	CEDARDALE - PIC4 138.00 138KV CKT 1
FDNS	01ALL	0	17SP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57879	107.765	P12:138:WFEC:MSL14
FDNS	01ALL	0	17SP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.5993	107.7392	CLEO CORNER - CLEO JCT 69KV CKT 1
FDNS	01ALL	0	17SP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.5993	107.7368	CLEO JCT - RINGWOOD 69KV CKT 1
FDNS	01ALL	0	17SP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57879	107.7314	BEARCAT 138.00 - MOORELAND 138KV CKT 1
FDNS	01ALL	0	17SP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57495	107.7133	CEDARDALE - OKEENE 138KV CKT 1
FDNS	01ALL	0	16WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57497	107.5453	MOORELAND - PIC4 138.00 138KV CKT 1
FDNS	01ALL	0	16WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57497	107.5198	P12:138:WFEC:MSL12
FDNS	01ALL	0	16WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57497	107.4524	CEDARDALE - PIC4 138.00 138KV CKT 1
FDNS	01ALL	0	17SP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57879	107.2763	BEARCAT 138.00 - NINE MILE 138KV CKT 1
FDNS	01ALL	0	16WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57497	107.2624	CEDARDALE - OKEENE 138KV CKT 1
FDNS	01ALL	0	16WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57877	107.0514	P12:138:WFEC:MSL14
FDNS	01ALL	0	16WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57877	107.0181	BEARCAT 138.00 - MOORELAND 138KV CKT 1
FDNS	01ALL	0	17SP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57417	106.763	DOVER SW - OKEENE 138KV CKT 1
FDNS	01ALL	0	17SP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.5756	106.7353	P12:138:WFEC:MSL15
FDNS	01ALL	0	16WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.59933	106.7104	CLEO CORNER - CLEO JCT 69KV CKT 1
FDNS	01ALL	0	16WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.59933	106.708	CLEO JCT - RINGWOOD 69KV CKT 1
FDNS	01ALL	0	16WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57877	106.5622	BEARCAT 138.00 - NINE MILE 138KV CKT 1
FDNS	01ALL	0	17SP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57879	106.5332	MOREWOOD SW - NINE MILE 138KV CKT 1
FDNS	01ALL	0	16WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57421	106.3018	DOVER SW - OKEENE 138KV CKT 1
FDNS	01ALL	0	16WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57563	106.1066	P12:138:WFEC:MSL15
FDNS	01ALL	0	17SP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.60262	106.057	CLEO CORNER - CLEOTP 2 69.000 69KV CKT 1
FDNS	01ALL	0	16WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57877	105.8171	MOREWOOD SW - NINE MILE 138KV CKT 1
FDNS	01ALL	0	17SP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.60262	105.7107	ALINETP2 69.000 - CLEOTP 2 69.000 69KV CKT 1
FDNS	01ALL	0	17SP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.5756	105.6643	NOEL_SW 138.00 - SALT_PLAINS 138.00 138KV CKT 1
FDNS	01ALL	0	17SP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.5736	105.5887	DEWEY - SOUTHARD 138KV CKT 1
FDNS	01ALL	0	17SP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.60262	105.5577	ALINETP2 69.000 - ALVA 69KV CKT 1
FDNS	01ALL	0	16WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57361	105.2578	DEWEY - SOUTHARD 138KV CKT 1
FDNS	01ALL	0	16WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.60265	105.2548	CLEO CORNER - CLEOTP 2 69.000 69KV CKT 1
FDNS	01ALL	0	16WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57563	105.1674	NOEL_SW 138.00 - SALT_PLAINS 138.00 138KV CKT 1
FDNS	01ALL	0	17SP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.5993	105.0922	NSAH - RINGWOOD 69KV CKT 1
FDNS	01ALL	0	16WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.60265	105.0377	ALINETP2 69.000 - CLEOTP 2 69.000 69KV CKT 1
FDNS	01ALL	0	17SP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.5736	105.0023	ROMAN NOSE - SOUTHARD 138KV CKT 1
FDNS	01ALL	0	16WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.60265	104.9373	ALINETP2 69.000 - ALVA 69KV CKT 1
FDNS	01ALL	0	16WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57361	104.8762	ROMAN NOSE - SOUTHARD 138KV CKT 1
FDNS	01ALL	0	16WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.59933	104.6325	NSAH - RINGWOOD 69KV CKT 1
FDNS	01ALL	0	17SP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57195	104.6291	THISTLE7 345.00 - WOODWARD DISTRICT EHV 345KV CKT 1
FDNS	01ALL	0	17SP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57195	104.6291	THISTLE7 345.00 - WOODWARD DISTRICT EHV 345KV CKT 1
FDNS	01ALL	0	17SP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57195	104.6291	THISTLE7 345.00 - WOODWARD DISTRICT EHV 345KV CKT 2
FDNS	01ALL	0	17SP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57195	104.6291	THISTLE7 345.00 - WOODWARD DISTRICT EHV 345KV CKT 2
FDNS	01ALL	0	17SP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.5712	104.4132	GEN514805 1-SOONER UNIT 1
FDNS	01ALL	0	17SP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57084	104.4053	CIMARRON - MINCO 345KV CKT 1
FDNS	01ALL	0	17SP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57114	104.2884	DGRASSE4 138.00 - MOORELAND 138KV CKT 1
FDNS	01ALL	0	17SP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57114	104.285	DGRASSE4 138.00 - ROSE_VALLEY 138.00 138KV CKT 1
FDNS	01ALL	0	16WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57199	104.267	THISTLE7 345.00 - WOODWARD DISTRICT EHV 345KV CKT 1
FDNS	01ALL	0	16WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57199	104.267	THISTLE7 345.00 - WOODWARD DISTRICT EHV 345KV CKT 1
FDNS	01ALL	0	16WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57199	104.267	THISTLE7 345.00 - WOODWARD DISTRICT EHV 345KV CKT 2
FDNS	01ALL	0	16WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57199	104.267	THISTLE7 345.00 - WOODWARD DISTRICT EHV 345KV CKT 2
FDNS	01ALL	0	17SP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.5756	104.1089	C_CITY_138 138.00 - SALT_PLAINS 138.00 138KV CKT 1
FDNS	01ALL	0	17SP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57114	104.0086	NOEL_SW 138.00 - ROSE_VALLEY 138.00 138KV CKT 1
FDNS	01ALL	0	16WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.53844	103.8784	WOODRING (WOODRNG2) 345/138/13.8KV TRANSFORMER CKT 1
FDNS	01ALL	0	17SP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.568	103.8241	G15063_T 345.00 - WOODRING 345KV CKT 1
FDNS	01ALL	0	16WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57087	103.8111	CIMARRON - MINCO 345KV CKT 1
FDNS	01ALL	0	17G	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57552	103.7373	MOORELAND - PIC4 138.00 138KV CKT 1
FDNS	01ALL	0	17SP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.5756	103.7107	BYRON_138 138.00 - C_CITY_138 138.00 138KV CKT 1
FDNS	01ALL	0	17G	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.5998	103.6602	CLEO CORNER - CLEO JCT 69KV CKT 1
FDNS	01ALL	0	17SP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57384	103.6586	WOODWARD DISTRICT EHV (WWDEHV-T2) 345/138/13.8KV TRANSFORMER CKT 2
FDNS	01ALL	0	17G	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.5998	103.6576	CLEO JCT - RINGWOOD 69KV CKT 1
FDNS	01ALL	0	17G	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57552	103.6437	CEDARDALE - PIC4 138.00 138KV CKT 1
FDNS	01ALL	0	16WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57117	103.5721	DGRASSE4 138.00 - MOORELAND 138KV CKT 1
FDNS	01ALL	0	20WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.5988	103.5715	CLEO CORNER - CLEO JCT 69KV CKT 1
FDNS	01ALL	0	20WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.5988	103.569	CLEO JCT - RINGWOOD 69KV CKT 1
FDNS	01ALL	0	16WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57117	103.5686	DGRASSE4 138.00 - ROSE_VALLEY 138.00 138KV CKT 1

SOLUTION	GROUP	SCENARIO	SEASON	SOURCE	DIRECTION	MONITORED ELEMENT	RATEA (MVA)	RATEB(MVA)	TDF	TC%LOADING (% MVA)	CONTINGENCY
FDNS	01ALL	0	17SP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57371	103.5125	WOODWARD DISTRICT EHV (WWDEHV) 345/138/13.8KV TRANSFORMER CKT 1
FDNS	01ALL	0	16WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57124	103.5096	GEN514805 1-SOONER UNIT 1
FDNS	01ALL	0	17SP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.5749	103.4974	ELK CITY - RED HILLS WIND 138KV CKT 1
FDNS	01ALL	0	17SP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.5749	103.4974	ELK CITY - RED HILLS WIND 138KV CKT 1
FDNS	01ALL	0	17G	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57552	103.4622	CEDARDALE - OKEENE 138KV CKT 1
FDNS	01ALL	0	16WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57563	103.4519	C_CITY_138 138.00 - SALT_PLAINS 138.00 138KV CKT 1
FDNS	01ALL	0	20WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57436	103.2458	MOORELAND - PIC4 138.00 138KV CKT 1
FDNS	01ALL	0	16WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57117	103.218	NOEL_SW 138.00 - ROSE_VALLEY 138.00 138KV CKT 1
FDNS	01ALL	0	20WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57436	103.2172	P12:138:WFEC:MSL12
FDNS	01ALL	0	16WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57563	103.1569	BYRON_138 138.00 - C_CITY_138 138.00 138KV CKT 1
FDNS	01ALL	0	20WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57436	103.1548	CEDARDALE - PIC4 138.00 138KV CKT 1
FDNS	01ALL	0	16WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.59933	103.1298	WAKITAS4 138.00 (WAKITA_XMER) 138/69/13.8KV TRANSFORMER CKT 1
FDNS	01ALL	0	17SP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.568	103.1105	G15063_T 345.00 - MATHWSN7 345.00 345KV CKT 1
FDNS	01ALL	0	16WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.59933	103.1098	NSAH - WAKITA 69KV CKT 1
FDNS	01ALL	0	17SP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.5712	102.989	GEN514806 1-SOONER UNIT 2
FDNS	01ALL	0	20WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57436	102.9537	CEDARDALE - OKEENE 138KV CKT 1
FDNS	01ALL	0	16WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57386	102.9132	WOODWARD DISTRICT EHV (WWDEHV-T2) 345/138/13.8KV TRANSFORMER CKT 2
FDNS	01ALL	0	17SP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.5993	102.8141	NSAH - WAKITA 69KV CKT 1
FDNS	01ALL	0	17SP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.5749	102.7833	ELLIS 4 138.00 - MOREWOOD SW 138KV CKT 1
FDNS	01ALL	0	17G	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57931	102.7739	BEARCAT 138.00 - MOORELAND 138KV CKT 1
FDNS	01ALL	0	16WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57373	102.7704	WOODWARD DISTRICT EHV (WWDEHV) 345/138/13.8KV TRANSFORMER CKT 1
FDNS	01ALL	0	16WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57491	102.7201	ELK CITY - RED HILLS WIND 138KV CKT 1
FDNS	01ALL	0	16WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57491	102.7201	ELK CITY - RED HILLS WIND 138KV CKT 1
FDNS	01ALL	0	17SP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57149	102.6787	G14-057T 345.00 - SUNNYSIDE 345KV CKT 1
FDNS	01ALL	0	17G	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57478	102.6051	DOVER SW - OKEENE 138KV CKT 1
FDNS	01ALL	0	16WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57154	102.5453	G14-057T 345.00 - SUNNYSIDE 345KV CKT 1
FDNS	01ALL	0	20WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57814	102.5302	P12:138:WFEC:MSL14
FDNS	01ALL	0	20WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57814	102.5029	BEARCAT 138.00 - MOORELAND 138KV CKT 1
FDNS	01ALL	0	17G	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57931	102.3174	BEARCAT 138.00 - NINE MILE 138KV CKT 1
FDNS	01ALL	0	16WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.5718	102.2807	FINNEY SWITCHING STATION - HOLCOMB 345KV CKT 1
FDNS	01ALL	0	16WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.5718	102.2807	FINNEY SWITCHING STATION - HOLCOMB 345KV CKT 1
FDNS	01ALL	0	16WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57167	102.2356	G11_051T 345.00 - TATONGA7 345.00 345KV CKT 1
FDNS	01ALL	0	16WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57124	102.2065	GEN514806 1-SOONER UNIT 2
FDNS	01ALL	0	20WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.5751	102.1217	P12:138:WFEC:MSL15
FDNS	01ALL	0	16WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57154	102.0843	G14-057T 345.00 - LAWTON EASTSIDE 345KV CKT 1
FDNS	01ALL	0	20WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57814	102.0564	BEARCAT 138.00 - NINE MILE 138KV CKT 1
FDNS	01ALL	0	16WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.56811	102.0351	G15063_T 345.00 - WOODRING 345KV CKT 1
FDNS	01ALL	0	20SP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.53816	102.0182	WOODRING (WOODRNG2) 345/138/13.8KV TRANSFORMER CKT 1
FDNS	01ALL	0	16WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57491	101.9995	ELLIS 4 138.00 - MOREWOOD SW 138KV CKT 1
FDNS	01ALL	0	17G	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.60312	101.9856	CLEO CORNER - CLEOTP 2 69.000 69KV CKT 1
FDNS	01ALL	0	16WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57137	101.9806	G1524G1525 345.00 - THISTLE7 345.00 345KV CKT 1
FDNS	01ALL	0	16WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57137	101.9806	G1524G1525 345.00 - THISTLE7 345.00 345KV CKT 2
FDNS	01ALL	0	20SP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.59912	101.9635	CLEO CORNER - CLEO JCT 69KV CKT 1
FDNS	01ALL	0	20SP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.59912	101.9609	CLEO JCT - RINGWOOD 69KV CKT 1
FDNS	01ALL	0	16WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.5718	101.924	FINNEY SWITCHING STATION - Hitchland Interchange 345KV CKT 1
FDNS	01ALL	0	20WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.60227	101.8568	CLEO CORNER - CLEOTP 2 69.000 69KV CKT 1
FDNS	01ALL	0	17G	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.60312	101.7796	ALINETP2 69.000 - CLEOTP 2 69.000 69KV CKT 1
FDNS	01ALL	0	20WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57358	101.7463	DOVER SW - OKEENE 138KV CKT 1
FDNS	01ALL	0	17G	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57415	101.744	DEWEY - SOUTHARD 138KV CKT 1
FDNS	01ALL	0	17G	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57613	101.7295	NOEL_SW 138.00 - SALT_PLAINS 138.00 138KV CKT 1
FDNS	01ALL	0	17G	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.60312	101.6817	ALINETP2 69.000 - ALVA 69KV CKT 1
FDNS	01ALL	0	20WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.60227	101.6364	ALINETP2 69.000 - CLEOTP 2 69.000 69KV CKT 1
FDNS	01ALL	0	17G	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.5998	101.5757	NSAH - RINGWOOD 69KV CKT 1
FDNS	01ALL	0	17G	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57931	101.5698	MOREWOOD SW - NINE MILE 138KV CKT 1
FDNS	01ALL	0	20WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.60227	101.5381	ALINETP2 69.000 - ALVA 69KV CKT 1
FDNS	01ALL	0	17G	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57415	101.3388	ROMAN NOSE - SOUTHARD 138KV CKT 1
FDNS	01ALL	0	20WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57814	101.3271	MOREWOOD SW - NINE MILE 138KV CKT 1
FDNS	01ALL	0	20WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.53789	101.2319	WOODRING (WOODRNG2) 345/138/13.8KV TRANSFORMER CKT 1
FDNS	01ALL	0	17G	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57543	101.2091	ELK CITY - RED HILLS WIND 138KV CKT 1
FDNS	01ALL	0	20WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57082	101.1358	MATHWSN7 345.00 - TATONGA7 345.00 345KV CKT 1
FDNS	01ALL	0	20WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57082	101.1358	MATHWSN7 345.00 - TATONGA7 345.00 345KV CKT 2
FDNS	01ALL	0	17G	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57244	101.0573	THISTLE7 345.00 - WOODWARD DISTRICT EHV 345KV CKT 1
FDNS	01ALL	0	17G	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57244	101.0573	THISTLE7 345.00 - WOODWARD DISTRICT EHV 345KV CKT 2
FDNS	01ALL	0	20WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.5751	101.004	NOEL_SW 138.00 - SALT_PLAINS 138.00 138KV CKT 1
FDNS	01ALL	0	17G	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57173	100.8226	GEN514805 1-SOONER UNIT 1
FDNS	01ALL	0	20WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.5988	100.7592	NSAH - RINGWOOD 69KV CKT 1
FDNS	01ALL	0	20SP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57474	100.6817	MOORELAND - PIC4 138.00 138KV CKT 1
FDNS	01ALL	0	17SP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.5712	100.6585	BASE CASE
FDNS	01ALL	0	20SP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57474	100.6535	P12:138:WFEC:MSL12
FDNS	01ALL	0	20WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57293	100.6291	DEWEY - SOUTHARD 138KV CKT 1
FDNS	01ALL	0	25SP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.6413	100.61	CLEO CORNER (CLEOCOR1) 138/69/13.8KV TRANSFORMER CKT 1
FDNS	01ALL	0	20SP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57474	100.591	CEDARDALE - PIC4 138.00 138KV CKT 1
FDNS	01ALL	0	20WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57293	100.4076	ROMAN NOSE - SOUTHARD 138KV CKT 1
FDNS	01ALL	0	20SP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57474	100.3894	CEDARDALE - OKEENE 138KV CKT 1

SOLUTION	GROUP	SCENARIO	SEASON	SOURCE	DIRECTION	MONITORED ELEMENT	RATEA (MVA)	RATEB(MVA)	TDF	TC%LOADING (% MVA)	CONTINGENCY
FDNS	01ALL	0	17G	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57167	100.3375	DGRASSE4 138.00 - MOORELAND 138KV CKT 1
FDNS	01ALL	0	17G	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57167	100.3331	DGRASSE4 138.00 - ROSE_VALLEY 138.00 138KV CKT 1
FDNS	01ALL	0	17G	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.53899	100.2149	WOODRING (WOODRNG2) 345/138/13.8KV TRANSFORMER CKT 1
FDNS	01ALL	0	17G	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57613	100.1958	C_CITY_138 138.00 - SALT_PLAINS 138.00 138KV CKT 1
FDNS	01ALL	0	20SP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.5785	100.1188	P12:138:WFEC:MSL14
FDNS	01ALL	0	20SP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.5785	100.0914	BEARCAT 138.00 - MOORELAND 138KV CKT 1
FDNS	01ALL	0	16WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57124	100	BASE CASE
FDNS	01ALL	0	17G	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57613	100	BYRON_138 138.00 - C_CITY_138 138.00 138KV CKT 1
FDNS	01ALL	0	17G	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57138	100	CIMARRON - MINCO 345KV CKT 1
FDNS	01ALL	0	17G	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57167	99.9	NOEL_SW 138.00 - ROSE_VALLEY 138.00 138KV CKT 1
FDNS	01ALL	0	17G	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57433	99.8	WOODWARD DISTRICT EHV (WWDEHV-T2) 345/138/13.8KV TRANSFORMER CKT 2
FDNS	01ALL	0	20SP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.60258	99.8	CLEO CORNER - CLEOTP 2 69.000 69KV CKT 1
FDNS	01ALL	0	20SP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57544	99.8	P12:138:WFEC:MSL15
FDNS	01ALL	0	20WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.56751	99.7	G15063_T 345.00 - WOODRING 345KV CKT 1
FDNS	01ALL	0	17G	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57421	99.6	WOODWARD DISTRICT EHV (WWDEHV) 345/138/13.8KV TRANSFORMER CKT 1
FDNS	01ALL	0	20SP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.5785	99.6	BEARCAT 138.00 - NINE MILE 138KV CKT 1
FDNS	01ALL	0	17G	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.5998	99.5	NSAH - WAKITA 69KV CKT 1
FDNS	01ALL	0	20WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.5751	99.5	C_CITY_138 138.00 - SALT_PLAINS 138.00 138KV CKT 1
FDNS	01ALL	0	20WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57074	99.5	GEN514805 1-SOONER UNIT 1
FDNS	01ALL	0	20WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57065	99.5	DGRASSE4 138.00 - MOORELAND 138KV CKT 1
FDNS	01ALL	0	20WP	G15_048	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.57065	99.5	DGRASSE4 138.00 - ROSE_VALLEY 138.00 138KV CKT 1
FDNS	01ALL	0	17SP	G15_060	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.03274	100.6585	BASE CASE
FDNS	01ALL	0	16WP	G15_060	FROM->TO	CLEO CORNER - CLEOPLT4 138.00 138KV CKT 1	191	191	0.03282	100	BASE CASE
FDNS	01ALL	0	17SP	G15_060	TO->FROM	DGRASSE4 138.00 - MOORELAND 138KV CKT 1	143	187	0.02966	104.0547	BASE CASE
FDNS	01ALL	0	16WP	G15_060	TO->FROM	DGRASSE4 138.00 - MOORELAND 138KV CKT 1	143	187	0.02961	100.7693	BASE CASE
FDNS	01ALL	0	17SP	G15_060	FROM->TO	DGRASSE4 138.00 - ROSE_VALLEY 138.00 138KV CKT 1	143	187	0.02966	104.0587	BASE CASE
FDNS	01ALL	0	16WP	G15_060	FROM->TO	DGRASSE4 138.00 - ROSE_VALLEY 138.00 138KV CKT 1	143	187	0.02961	100.7693	BASE CASE
FDNS	01ALL	2	25SP	G15_060	FROM->TO	WOODWARD DISTRICT EHV (WWDEHV) 345/138/13.8KV TRANSFORMER CKT 1	493	493	0.73627	100.1201	WOODWARD DISTRICT EHV (WWDEHV-T2) 345/138/13.8KV TRANSFORMER CKT 2
FDNS	01ALL	2	25SP	G15_060	FROM->TO	WOODWARD DISTRICT EHV (WWDEHV) 345/138/13.8KV TRANSFORMER CKT 1	493	493	0.73627	99.7	WOODWARD DISTRICT EHV (WWDEHV-T2) 345/138/13.8KV TRANSFORMER CKT 2
FDNS	01ALL	2	25SP	G15_060	FROM->TO	WOODWARD DISTRICT EHV (WWDEHV-T2) 345/138/13.8KV TRANSFORMER CKT 2	493	493	0.74012	100.612	WOODWARD DISTRICT EHV (WWDEHV) 345/138/13.8KV TRANSFORMER CKT 1
FDNS	01ALL	2	25SP	G15_060	FROM->TO	WOODWARD DISTRICT EHV (WWDEHV-T2) 345/138/13.8KV TRANSFORMER CKT 2	493	493	0.74012	100.1916	WOODWARD DISTRICT EHV (WWDEHV) 345/138/13.8KV TRANSFORMER CKT 1
FDNS	01NR	0	17G	G15_081	TO->FROM	ROMAN NOSE - SOUTHARD 138KV CKT 1	133	153	0.05382	101.2066	MATHWSN7 345.00 - TATONGA7 345.00 345KV CKT 1
FDNS	01NR	2	17G	G15_081	TO->FROM	ROMAN NOSE - SOUTHARD 138KV CKT 1	133	153	0.05565	103.9651	MATHWSN7 345.00 - TATONGA7 345.00 345KV CKT 1

11.8 G-V: Voltage Power Flow Analysis (Constraints Requiring Transmission Reinforcement)

Available upon request. Contact SPP Generation Interconnection Studies for details.

11.9 H-T: Thermal Power Flow Analysis (Other Constraints Not Requiring Transmission Reinforcement)

Available upon request. Contact SPP Generation Interconnection Studies for details.

11.10 H-T-AS: Affected System Thermal Power Flow Analysis (Constraints for Potential Upgrades)

Available upon request. Contact SPP Generation Interconnection Studies for details.

11.11 H-V-AS: Affected System Voltage Power Flow Analysis(Constraints for Potential Upgrades)

Available upon request. Contact SPP Generation Interconnection Studies for details.

11.12 I: Power Flow Analysis (Constraints from Multi-Contingencies)

Available upon request. Contact SPP Generation Interconnection Studies for details.