DISIS-2015-001-4

Definitive Interconnection System Impact Study Report

Group 6 Restudy

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By Generator Interconnections Dept.

REVISION HISTORY

DATE OR VERSION NUMBER	AUTHOR	CHANGE DESCRIPTION
07/30/2015	SPP	Report Issued (DISIS-2015-001). Group 2, 5, 6, and 7 Interconnection Request Results not included in this issue.
08/28/2015	SPP	Report Reissued (DISIS-2015-001) to include Group 2, 5, 6, and 7 Interconnection Requests Results
12/23/2015	SPP	Re-Study to account for withdrawn projects
01/06/2016	SPP	Re-posted 12/23/15 issue with cost allocation correction for GEN-2014-074
03/09/2016	SPP	Re-Study to account for withdrawn projects
09/01/2017	SPP	Group 6 and GEN-2015-004 Re-Study to account for withdrawn projects
12/20/2018	SPP	Group 6 restudy to account for withdrawn projects.

CONTENTS

SECTION 1: INTRODUCTION

Pursuant to the Southwest Power Pool (SPP) Open Access Transmission Tariff (OATT), SPP has conducted this Definitive Interconnection System Impact Study (DISIS) for generation interconnection requests received during the DISIS Queue Cluster Window which closed on March 31, 2015. The customers will be referred to in this study as the DISIS Interconnection Customers. This DISIS analyzes the impact of interconnecting new generation totaling 152 MW to the SPP Transmission System. The interconnecting SPP Transmission Owners include:

- American Electric Power West (AEPW)
- Basin Electric Power Cooperative (BPEC)
- Grand River Dam Authority (GRDA)
- Kansas City Power and Light\KCP&L Greater Missouri Operations (KCPL)
- Midwest Energy (MIDW)
- Nebraska Public Power District (NPPD)
- Oklahoma Gas and Electric (OKGE)
- Omaha Public Power District (OPPD)
- Southwestern Public Service (SPS)
- Southwestern Power Administration (SWPA)*
- Western Area Power Administration (WAPA)
- Westar Energy, Inc. (WERE)
- Western Farmers Electric Cooperative (WFEC)

*SWPA is a SPP Contract Participant

The generation interconnection requests included in this System Impact Study are listed in 11.1 by queue number, amount, requested interconnection service type, area, requested interconnection point, proposed interconnection point, and the requested in-service date[1].

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.

[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 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.

SECTION 2: MODEL DEVELOPMENT (STUDY ASSUMPTIONS)

SUBSECTION A: INTERCONNECTION REQUESTS INCLUDED IN THE CLUSTER

This DISIS includes all interconnection requests that were submitted during the DISIS Queue Cluster Window that met all of the requirements of the Generator Interconnection Procedures (GIP) that were in effect at the time this study commenced. Appendix A lists the interconnection requests that are included in this study.

SUBSECTION B: AFFECTED SYSTEM INTERCONNECTION REQUEST

Affected System Interconnection Requests included in this study are listed in Appendix A with the "ASGI" prefix. Affected System Interconnection Requests were only studied in "cluster" scenarios.

SUBSECTION C: 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 requests were dispatched as Energy Resource Interconnection Service (ERIS) resources with equal distribution across the SPP footprint. Prior-queued requests that requested Network Resource Interconnection Service (NRIS) were also dispatched in separate NRIS scenarios sinking into the area of the interconnecting transmission owner.

SUBSECTION D: DEVELOPMENT OF BASE CASES

POWER FLOW

The power flow models used for this study are based on the 2016-series Integrated Transmission Planning models used for the 2017 ITP-Near Term analysis. These models include:

- Year 1 2017 winter peak (17WP)
- Year 2 2018 spring (18G)
- Year 2 2018 summer peak (18SP)
- Year 5 2021 light (21L)
- Year 5 2021 summer (21SP)
- Year 5 2021 winter peak (21WP)
- Year 10 2026 summer peak (26SP)

DYNAMIC STABILITY

The dynamic stability models used for this study are based on the 2016-series SPP Model Development Working Group (MDWG) Models. These models include:

- Year 1 2017 winter peak (17WP)
- Year 2 2018 summer peak (18SP)
- Year 10 2026 summer peak (26SP)

SHORT CIRCUIT

The Year 2 and Year 10 dynamic stability summer peak models were used for short-circuit analysis.

BASE CASE UPGRADES

The facilities listed in the table below are part of the current 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 Interconnection Customers have not been assigned advancement costs for the projects listed below.

The DISIS 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.

SPP Notification to Construct (NTC) ID	UID	Project Owner	Upgrade Name	Estimated Date of Upgrade Completion (EOC)
200223		OGE	Tatonga - Woodward District EHV 345 kV Ckt 2	3/1/2018
200223		OGE	Matthewson - Tatonga 345 kV Ckt 2	3/1/2018
200240		OGE	Chisholm - Gracemont 345 kV Ckt 1 (OGE)	3/1/2018
200255		AEP	Chisholm - Gracemont 345kV Ckt 1 (AEP)	3/1/2018
200255		AEP	Chisholm 345/230 kV Substation	3/1/2018
200255		AEP	Chisholm 230 kV	3/1/2018
200360		SPS	IMC #1 Tap - Livingston Ridge 115 kV Ckt 1 Rebuild	11/16/2018
200360		SPS	Intrepid West - Potash Junction 115 kV Ckt 1 Rebuild	11/16/2018
200360		SPS	IMC #1 Tap - Intrepid West 115 kV Ckt 1 Rebuild	11/16/2018
200360		SPS	Cardinal - Targa 115 kV Ckt 1 Rebuild	5/31/2018
200360	51250	SPS	National Enrichment Plant - Targa 115 kV Ckt 1	12/15/2018
200391	51528	OGE	DeGrasse 345 kV Substation	6/1/2019
200391	51529	OGE	DeGrasse 345/138 kV Transformer	6/1/2019
200391	51530	OGE	DeGrasse - Knob Hill 138 kV New Line	6/1/2019
200391	51569	OGE	DeGrasse 138 kV Substation (OGE)	6/1/2019
200220		NPPD	Cherry Co. (Thedford) - Gentleman 345 kV Ckt 1	10/1/2019
200220		NPPD	Cherry Co. (Thedford) Substation 345 kV	10/1/2019
200220		NPPD	Cherry Co. (Thedford) - Holt Co. 345 kV Ckt 1	10/1/2019
200220		NPPD	Holt Co. Substation 345 kV	10/1/2019
200253	50441	NPPD	Neligh 345/115 kV Substation	4/1/2018
200309		SPS	Hobbs 345/230 kV Ckt 1 Transformer	6/1/2018
200309		SPS	Hobbs - Yoakum 345 kV Ckt 1	6/1/2020
200395		SPS	Tuco - Yoakum 345 kV Ckt 1	6/1/2020
200395		SPS	Yoakum 345/230 kV Ckt 1 Transformer	6/1/2020
200256	50722	SPS	Chaves - Price 115 kV Ckt 1 Rebuild	1/30/2018

SPP Notification to Construct (NTC) ID	UID	Project Owner	Upgrade Name	Estimated Date of Upgrade Completion (EOC)
200256	50723	SPS	CV Pines - Price 115 kV Ckt 1 Rebuild	1/30/2018
200256	50724	SPS	Capitan - CV Pines 115 kV Ckt 1 Rebuild	1/30/2018
200282		SPS	China Draw - Yeso Hills 115 kV Ckt 1	6/1/2018
200282		SPS	Dollarhide - Toboso Flats 115 kV Ckt 1	6/1/2018
200309		SPS	Hobbs - Kiowa 345 kV Ckt 1	6/1/2018
200309		SPS	Kiowa 345 kV Substation	6/1/2018
200309		SPS	Kiowa - North Loving 345 kV Ckt 1	6/1/2018
200309		SPS	North Loving 345 kV Terminal Upgrades	6/1/2018
200309		SPS	China Draw - North Loving 345 kV Ckt 1	6/1/2018
200309		SPS	China Draw 345 kV Ckt 1 Terminal Upgrades	6/1/2018
200309		SPS	China Draw 345/115 kV Ckt 1 Transformer	6/1/2018
200309		SPS	North Loving 345/115 kV Ckt 1 Transformer	6/1/2018
200309		SPS	Kiowa 345/115 kV Ckt 1 Transformer	6/1/2018
200395	50924	SPS	Livingston Ridge 115 kV Substation Conversion	11/30/2017
200411		SPS	Livingston Ridge - Sage Brush 115 kV Ckt 1	6/1/2018
200309	50925	SPS	Sage Brush 115 kV Substation	12/16/2016
200309	50928	SPS	Largarto - Sage Brush 115 kV Ckt 1	12/15/2016
200309	50927	SPS	Lagarto 115 kV Substation	6/1/2018
200309	50951	SPS	Cardinal - Lagarto 115 kV Ckt 1	12/15/2016
200309	50967	SPS	Cardinal 115 kV Substation	12/15/2016
200411	50923	SPS	Ponderosa - Ponderosa Tap 115 kV Ckt 1	6/1/2017
200395		SPS	Canyon West – Dawn – Panda – Deaf Smith 115kV Ckt 1	12/15/2018
200369		SPS	Canyon East Sub – Randall County Interchange 115kV Ckt 1	12/31/2020
200359	11509	SPS	Carlisle 230/115kV transformer replacement	3/27/2018
200309		SPS	Hobbs – Yoakum – TUCO 345kV project	6/1/2020
200395		SPS	Terry County – Wolfforth 115kV Ckt 1 terminal equipment replacement	6/1/2018
200391		OGE	DeGrasse 345/138kV project	6/1/2019
200396		WFEC	DeGrasse 345/138kV project	12/31/2019
200395		SPS	Harrington East – Potter 230kV Ckt 1 terminal equipment replacement	6/1/2019
200228		WERE	Viola 345/138kV project	6/1/2018
200228		MKEC	Viola 345/138kV project	6/1/2018
200395		SPS	Seminole 230/115kV transformer Ckt 1 & 2 replacement	5/15/2018
200262		SPS	Yoakum County Interchange 230/115kV transformer Ckt 1 & 2 replacement	6/1/2019

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

All previously allocated projects have been completed.

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.

REGIONAL GROUPINGS

The interconnection requests listed in Appendix A are grouped into sixteen (16) active regional groups based on geographical and electrical impacts. These groupings are shown in Appendix C. This restudy is a study of regional grouping 6 (South Texas Panhandle/New Mexico Area) only.

SUBSECTION E: DEVELOPMENT OF ANALYSIS CASES

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 in the models. These projects are dispatched across the SPP footprint using load factor ratios.

Peaking units are not dispatched in the spring case, or in the "High VER" summer and winter peak cases. To study peaking units' impacts, the Year 1 winter peak and Year 2 summer peak, Year 5 summer and winter peaks, and Year 10 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.

Each interconnection request is included in the power flow analysis models as an equivalent generator(s) dispatched at the applicable percentage of the requested service amount with 0.95 power factor capability. The facility modeling includes explicit representation of equivalent Generator Step-Up (GSU) and main project transformer(s) with impedance data provided in the interconnection request. Equivalent collector system(s) as well as transmission lead line(s) shorter than 20 miles are added to the power flow analysis models with zero impedance branches.

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.

- Each study group includes system adjustments of dispatching, to maximum output, generation interconnected at the same or adjacent substations to a current study request within that group.
- Study Group 9 included an additional dispatch scenario to evaluate the Gerald Gentleman Station registered NERC flowgate #6006.
- Study Group 16 included system adjustments for the Miles City DC Tie, North Dakota – Canadian border – The phase shifting transformer to Saskatchewan Power (also known as B-10T), and reduction of WAPA (area 652) load and generation:
    - 2017 Winter Peak –
        - Miles City DC Tie– 200MW East to West transfer
        - B-10T – 65MW South to North transfer
    - 2018 Summer Peak –
        - Miles City DC Tie – 200MW East to West transfer
        - B-10T – 200MW North to South transfer
        - 1,100 MW reduction to load and generation (proxy for summer shoulder)
    - 2026 Summer Peak –
        - Miles City DC Tie – 200MW East to West transfer

Each interconnection request is included in the dynamic stability analysis models as an equivalent generator(s) dispatched at the applicable percentage of the aggregate generator nameplate capabilities provided in the interconnection request. The facility modeling includes explicit representation of equivalent Generator Step-up (GSU) transformer(s), equivalent collector system(s), main project transformer(s), and transmission lead line(s) with impedance data provided in the interconnection request.

SHORT CIRCUIT

The Year 2 and Year 10 dynamic stability Summer Peak models were used for this analysis.

SECTION 3: IDENTIFICATION OF NETWORK CONSTRAINTS (SYSTEM PERFORMANCE)

SUBSECTION A: 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 described.

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

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

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

Appropriate transmission reinforcements are identified 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 assigned transmission reinforcements to mitigate the impacts.

SUBSECTION B: VOLTAGE

For non-converged power flow solutions that are determined to be caused by lack of voltage support, appropriate transmission support will be identified 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 voltage criteria is applicable to all SPP facilities 69 kV and greater in the absence of more stringent criteria:

System Intact	Contingency
0.95 – 1.05 per unit	0.90 – 1.05 per unit

Areas and specific buses having more-stringent voltage criteria:

Areas/Facilities	System Intact	Contingency
AEPW – all buses EMDE High Voltage	0.95 – 1.05 per unit	0.92 – 1.05 per unit
WERE Low Voltage	0.95 – 1.05 per unit	0.93 – 1.05 per unit
WERE High Voltage	0.95 – 1.05 per unit	0.95 – 1.05 per unit
TUCO 230 kV Bus #525830	0.925 – 1.05 per unit	0.925 – 1.05 per unit
Wolf Creek 345 kV Bus #532797	0.985 – 1.03 per unit	0.985 – 1.03 per unit
FCS Bus #646251	1.001 – 1.047 per unit	1.001 – 1.047 per unit

First-Tier External Areas facilities 115 kV and greater.

Area	System Intact	Contingency
EES-EAI LAGN EES AMMO CLEC LAFA LEPA XEL MP SMMPA GRE OTP ALTW MEC MDU DPC ALTE	0.95 – 1.05 per unit	0.90 – 1.05 per unit
OTP-H (115kV+)	0.97 – 1.05 per unit	0.92 – 1.10 per unit
SPC	0.95 – 1.05 per unit	0.95 – 1.05 per unit

The constraints identified through the voltage scan are 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.

SUBSECTION C: DYNAMIC STABILITY

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

SUBSECTION D: UPGRADES ASSIGNED

Thermal overloads that require transmission support to mitigate are discussed in Section 8 and listed in Appendix G-T (Cluster Analysis). 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 9 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-T (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-T (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.

SECTION 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 Year 2 spring model. Cost Allocated Network Upgrades of peaking units are determined using the Year 5 summer peak model. A PSS/E and MUST sensitivity analysis is performed to determine the DF 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 for a given project for all responsible GI requests:

$$Request\ X\ Impact\ Factor\ on\ Upgrade\ Project\ 1 = PTDF(\%)(X) \times MW(X) = X1$$

$$Request\ Y\ Impact\ Factor\ on\ Upgrade\ Project\ 1 = PTDF(\%)(Y) \times MW(Y) = Y1$$

$$Request\ Z\ Impact\ Factor\ on\ Upgrade\ Project\ 1 = PTDF(\%)(Z) \times MW(Z) = Z1$$

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

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

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.

SUBSECTION A: CREDITS/COMPENSATION FOR AMOUNTS ADVANCED FOR NETWORK UPGRADES

Interconnection Customer shall be entitled to either credits or potentially incremental Long Term Congestion Rights (iLTCR), 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.

SECTION 5: REQUIRED INTERCONNECTION FACILITIES

The requirement to interconnect the requested 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.

Interconnection Facilities specific to each interconnection request are listed in Appendix E. A preliminary one-line diagram for each request is 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."

SUBSECTION A: 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 in the 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.

SUBSECTION B: 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 an Environmental Review Agreement per Section 8.6.1 of the GIP.

SECTION 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.
- Impacts on Midcontinent Independent System Operator (MISO) – Per SPP's agreement with MISO, MISO will be contacted and provided a list of interconnection requests that proceed to move forward into the Interconnection Facilities Study Queue. MISO will then evaluate 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 will be contacted and provided a list of interconnection requests that proceed to move forward into the Interconnection Facilities Study Queue. MPC will then evaluate 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.

SECTION 7: POWER FLOW ANALYSIS

SUBSECTION A: 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 control areas external to SPP.

SUBSECTION B: POWER FLOW ANALYSIS

A power flow analysis is conducted for each Interconnection Customer's facility using modified versions of the year 1 winter peak season, the year 2 spring, year 2 summer peak season, year 5 summer and winter peak seasons, year 5 light load season, and year 10 summer peak 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 request. Requests that are pursuing NRIS have an additional analysis conducted for displacing resources in the interconnecting Transmission Owner's balancing area.

SECTION 8: POWER FLOW RESULTS

SUBSECTION A: CLUSTER SCENARIO

The Cluster Scenario considers the Base Case as well as all Interconnection Requests in the DISIS Study Queue and all generating facilities (and with respect to (3) below, any identified Network Upgrades associated with such higher-queued interconnection) that, on the date the DISIS is commenced:

1. are directly connected to the Transmission System;
2. are interconnection to Affected Systems and may have an impact on the Interconnection Request;
3. have a pending higher-queued Interconnection Request to interconnect to the Transmission System; and
4. have no Interconnection Queue Position but have executed a GIA or requested that an unexecuted GIA be filed with FERC.

Constraints and associated mitigations for each Interconnection Request are summarized below. Details are contained in Appendix G-T and Appendix G-V. Cost allocation for the Cluster Scenario is found in Appendix E.

CLUSTER GROUP 6 (SOUTH TEXAS PANHANDLE/NEW MEXICO AREA)

Requests for this study group as well as prior-queued requests are listed in Appendix C

No thermal or voltage constraints were observed.

SUBSECTION B: 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. Requests not being placed in service. Please refer to section 8 for power flow constraint mitigation.

Table 8-1: Limited Operation Results

Group Number	Request	Available MW Before Mitigation	Most-Limiting Constraint
Group 6	ASGI-2015-002	ERIS – 2	N/A
	GEN-2015-014	ERIS – 150	N/A

SUBSECTION C: 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.

SECTION 9: STABILITY & SHORT CIRCUIT ANALYSIS

A stability and short-circuit analysis was not conducted. The previous analyses remain valid.

SECTION 10: CONCLUSION

Allocated costs for Network Upgrades and Transmission Owner Interconnection Facilities are listed in Appendix E and F. For Interconnection Requests that result in an interconnection to, or modification of, 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 an 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.

The Interconnection Facilities Study will be revised, if needed, 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).

APPENDICES

A: GENERATION INTERCONNECTION REQUESTS CONSIDERED FOR IMPACT STUDY

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-2015-001	6.132	ER	SUNCMKEC	Ninnescah 115kV	Ninnescah 115kV		TBD
ASGI-2015-002	2	ER	SPS	SP-Yuma 69kV	SP-Yuma 69kV		TBD
ASGI-2015-004	56.364	ER	GRDA	Coffeyville City 69kV	Coffeyville City 69kV		TBD
GEN-2015-001	200	ER	OKGE	Ranch Road 345kV	Ranch Road 345kV	12/31/2016	TBD
GEN-2015-004	52.9	ER	OKGE	Border 345kV	Border 345kV	05/15/2017	TBD
GEN-2015-005	200.1	ER	KCPL	Tap Nebraska City - Sibley (Ketchem) 345kV	Tap Nebraska City - Sibley (Ketchem) 345kV	12/31/2017	TBD
GEN-2015-007	160	ER	NPPD	Hoskins 345kV	Hoskins 345kV	12/31/2016	TBD
GEN-2015-013	120	ER/NR	WFEC	Synder 138kV	Synder 138kV	12/01/2016	TBD
GEN-2015-014	150	ER	SPS	Tap Cochran - Lehman 115kV	Tap Cochran - Lehman 115kV	12/01/2016	TBD
GEN-2015-015	154.56	ER/NR	OKGE	Road Runner 138kV	Road Runner 138kV	07/31/2016	TBD
GEN-2015-016	200	ER/NR	KCPL	Tap Marmaton - Centerville 161kV	Tap Marmaton - Centerville 161kV	12/31/2017	TBD
GEN-2015-021	20	ER/NR	SUNCMKEC	Johnson Corner 115kV	Johnson Corner 115kV	12/31/2016	TBD
GEN-2015-023	300.7	ER/NR	NPPD	Holt County 345kV	Holt County 345kV	12/31/2019	TBD
GEN-2015-024	217.7	ER	WERE	Tap Thistle - Wichita 345kV Dbl CKT	Tap Thistle - Wichita 345kV Dbl CKT	12/31/2016	TBD
GEN-2015-025	215.9	ER	WERE	Tap Thistle - Wichita 345kV Dbl CKT	Tap Thistle - Wichita 345kV Dbl CKT	12/31/2016	TBD
Total:	**2,056.35**						

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

B: PRIOR-QUEUED INTERCONNECTION REQUESTS

B: Prior Queued Interconnection Requests

Request	Amount	Area	Requested/Proposed Point of Interconnection	Status or In-Service Date
ASGI-2010-006	150	AECI	Remington 138kV	
ASGI-2010-010	42.2	SPS	Lovington 115kV	
ASGI-2010-010	42.2	SPS	Lovington 115kV	
ASGI-2010-010	42.2	SPS	Lovington 115kV	
ASGI-2010-010	42.2	SPS	Lovington 115kV	
ASGI-2010-010	42.2	SPS	Lovington 115kV	
ASGI-2010-020	30	SPS	Tap LE-Tatum - LE-Crossroads 69kV	
ASGI-2010-021	15	SPS	Tap LE-Saunders Tap - LE-Anderson 69kV	
ASGI-2011-001	27.3	SPS	Lovington 115kV	
ASGI-2011-002	20	SPS	Herring 115kV	12/1/2010
ASGI-2011-002	20	SPS	Herring 115kV	12/1/2010
ASGI-2011-003	10	SPS	Hendricks 69kV	
ASGI-2011-004	20	SPS	Pleasant Hill 69kV	
ASGI-2012-002	18.15	SPS	FE-Clovis Interchange 115kV	
ASGI-2012-006	22.5	SUNCMKEC	Tap Hugoton - Rolla 69kV	
ASGI-2013-001	11.5	SPS	PanTex South 115kV	
ASGI-2013-002	18.4	SPS	FE Tucumcari 115kV	
ASGI-2013-003	18.4	SPS	FE Clovis 115kV	
ASGI-2013-004	36.6	SUNCMKEC	Morris 115kV	
ASGI-2013-004	36.6	SUNCMKEC	Morris 115kV	
ASGI-2013-004	36.6	SUNCMKEC	Morris 115kV	
ASGI-2013-005	1.65	SPS	FE Clovis 115kV	
ASGI-2014-014	56.4	GRDA	Ferguson 69kV	
ASGI-2014-014	56.4	GRDA	Ferguson 69kV	
ASGI-2014-014	56.4	GRDA	Ferguson 69kV	
GEN-2001-014	94.5	WFEC	Ft Supply 138kV	06/30/2007
GEN-2001-026	74.25	WFEC	Washita 138kV	10/01/2003
GEN-2001-033	180	SPS	San Juan Tap 230kV	10/01/2002
GEN-2001-033	180	SPS	San Juan Tap 230kV	10/01/2002
GEN-2001-033	180	SPS	San Juan Tap 230kV	10/01/2002
GEN-2001-033	180	SPS	San Juan Tap 230kV	10/01/2002
GEN-2001-033	180	SPS	San Juan Tap 230kV	10/01/2002
GEN-2001-033	180	SPS	San Juan Tap 230kV	10/01/2002
GEN-2001-033	180	SPS	San Juan Tap 230kV	10/01/2002
GEN-2001-033	180	SPS	San Juan Tap 230kV	10/01/2002
GEN-2001-036	80	SPS	Norton 115kV	10/01/2002
GEN-2001-037	102	OKGE	FPL Moreland Tap 138kV	10/01/2002
GEN-2001-039A	104	SUNCMKEC	Shooting Star Tap 115kV	unknown
GEN-2001-039M	100	SUNCMKEC	Central Plains Tap 115kV	12/01/2008
GEN-2002-004	200	WERE	Latham 345kV	09/30/2003
GEN-2002-004	200	WERE	Latham 345kV	09/30/2003
GEN-2002-005	123	WFEC	Red Hills Tap 138kV	12/31/2006
GEN-2002-008	240	SPS	Hitchland 345kV	11/01/2007
GEN-2002-008	240	SPS	Hitchland 345kV	11/01/2007
GEN-2002-008	240	SPS	Hitchland 345kV	11/01/2007
GEN-2002-009	79.8	SPS	Hansford 115kV	09/30/2006

Request	Amount	Area	Requested/Proposed Point of Interconnection	Status or In-Service Date
GEN-2002-022	239.2	SPS	Bushland 230kV	12/15/2006
GEN-2002-022	239.2	SPS	Bushland 230kV	12/15/2006
GEN-2002-023N	0.8	NPPD	Harmony 115kV	On-Line
GEN-2002-025A	150	SUNCMKEC	Spearville 230kV	06/01/2006
GEN-2003-004	100	WFEC	Washita 138kV	12/01/2005
GEN-2003-005	100	WFEC	Anadarko - Paradise (Blue Canyon) 138kV	12/01/2006
GEN-2003-005	100	WFEC	Anadarko - Paradise (Blue Canyon) 138kV	12/01/2006
GEN-2003-006A	201.6	SUNCMKEC	Elm Creek 230kV	unknown
GEN-2003-006A	201.6	SUNCMKEC	Elm Creek 230kV	unknown
GEN-2003-019	250	MIDW	Smoky Hills Tap 230kV	11/01/2006
GEN-2003-019	250	MIDW	Smoky Hills Tap 230kV	11/01/2006
GEN-2003-020	159.1	SPS	Martin 115kV	06/01/2007
GEN-2003-020	159.1	SPS	Martin 115kV	06/01/2007
GEN-2003-021N	75	NPPD	Ainsworth Wind Tap 115kV	10/01/2005
GEN-2003-021N	75	NPPD	Ainsworth Wind Tap 115kV	10/01/2005
GEN-2003-022	120	AEPW	Weatherford 138kV	12/31/2004
GEN-2004-014	154.5	SUNCMKEC	Spearville 230kV	11/15/2005
GEN-2004-020	27	AEPW	Weatherford 138kV	12/31/2005
GEN-2004-023	20.6	WFEC	Washita 138kV	12/01/2005
GEN-2004-023N	75	NPPD	Columbus Co 115kV	01/01/2009
GEN-2005-003	30.6	WFEC	Washita 138kV	12/01/2005
GEN-2005-008	120	OKGE	Woodward 138kV	07/31/2007
GEN-2005-012	248.4	SUNCMKEC	Ironwood 345kV	12/31/2015
GEN-2005-012	248.4	SUNCMKEC	Ironwood 345kV	12/31/2015
GEN-2005-013	199.8	WERE	Caney River 345kV	11/01/2007
GEN-2006-002	100.8	AEPW	Sweetwater 230kV	12/31/2006
GEN-2006-002	100.8	AEPW	Sweetwater 230kV	12/31/2006
GEN-2006-018	168.1	SPS	TUCO Interchange 230kV	06/01/2007
GEN-2006-018	168.1	SPS	TUCO Interchange 230kV	06/01/2007
GEN-2006-018	168.1	SPS	TUCO Interchange 230kV	06/01/2007
GEN-2006-018	168.1	SPS	TUCO Interchange 230kV	06/01/2007
GEN-2006-018	168.1	SPS	TUCO Interchange 230kV	06/01/2007
GEN-2006-018	168.1	SPS	TUCO Interchange 230kV	06/01/2007
GEN-2006-018	168.1	SPS	TUCO Interchange 230kV	06/01/2007
GEN-2006-018	168.1	SPS	TUCO Interchange 230kV	06/01/2007
GEN-2006-018	168.1	SPS	TUCO Interchange 230kV	06/01/2007
GEN-2006-018	168.1	SPS	TUCO Interchange 230kV	06/01/2007
GEN-2006-018	168.1	SPS	TUCO Interchange 230kV	06/01/2007
GEN-2006-018	168.1	SPS	TUCO Interchange 230kV	06/01/2007
GEN-2006-018	168.1	SPS	TUCO Interchange 230kV	06/01/2007
GEN-2006-018	168.1	SPS	TUCO Interchange 230kV	06/01/2007
GEN-2006-018	168.1	SPS	TUCO Interchange 230kV	06/01/2007
GEN-2006-018	168.1	SPS	TUCO Interchange 230kV	06/01/2007
GEN-2006-018	168.1	SPS	TUCO Interchange 230kV	06/01/2007
GEN-2006-018	168.1	SPS	TUCO Interchange 230kV	06/01/2007
GEN-2006-020N	42	NPPD	Bloomfield 115kV	01/01/2009
GEN-2006-020S	20	SPS	DWS Frisco 115kV	09/01/2007
GEN-2006-021	94	SUNCMKEC	Flat Ridge Tap 138kV	05/31/2008
GEN-2006-024S	18.9	WFEC	Buffalo Bear Tap 69kV	12/31/2007
GEN-2006-026	604	SPS	Hobbs 230kV & Hobbs 115kV	06/01/2008

Request	Amount	Area	Requested/Proposed Point of Interconnection	Status or In-Service Date
GEN-2006-026	604	SPS	Hobbs 230kV & Hobbs 115kV	06/01/2008
GEN-2006-026	604	SPS	Hobbs 230kV & Hobbs 115kV	06/01/2008
GEN-2006-031	75	MIDW	Knoll 115kV	On-Line
GEN-2006-035	224	AEPW	Sweetwater 230kV	12/01/2008
GEN-2006-035	224	AEPW	Sweetwater 230kV	12/01/2008
GEN-2006-037N1	73.1	NPPD	Broken Bow 115kV	01/01/2010
GEN-2006-038N005	79.9	NPPD	Broken Bow 115kV	12/01/2010
GEN-2006-038N019	79.9	NPPD	Petersburg North 115kV	05/01/2011
GEN-2006-043	98.9	AEPW	Sweetwater 230kV	08/01/2008
GEN-2006-044	370	SPS	Hitchland 345kV	10/01/2010
GEN-2006-044	370	SPS	Hitchland 345kV	10/01/2010
GEN-2006-044	370	SPS	Hitchland 345kV	10/01/2010
GEN-2006-044	370	SPS	Hitchland 345kV	10/01/2010
GEN-2006-044N	40.5	NPPD	North Petersburg 115kV	01/01/2010
GEN-2006-046	129.6	OKGE	Dewey 138kV	12/31/2009
GEN-2007-011N08	81	NPPD	Bloomfield 115kV	01/01/2009
GEN-2007-017IS	166	WAPA	Ft Thompson-Grand Island 345kV	
GEN-2007-018IS	234	WAPA	Ft Thompson-Grand Island 345kV	
GEN-2007-021	201	OKGE	Tatonga 345kV	08/01/2009
GEN-2007-021	201	OKGE	Tatonga 345kV	08/01/2009
GEN-2007-025	299.2	WERE	Viola 345kV	12/31/2009
GEN-2007-025	299.2	WERE	Viola 345kV	12/31/2009
GEN-2007-040	200.1	SUNCMKEC	Buckner 345kV	12/15/2010
GEN-2007-043	200	OKGE	Minco 345kV	12/01/2009
GEN-2007-044	300	OKGE	Tatonga 345kV	12/01/2009
GEN-2007-044	300	OKGE	Tatonga 345kV	12/01/2009
GEN-2007-044	300	OKGE	Tatonga 345kV	12/01/2009
GEN-2007-046	200	SPS	Hitchland 115kV	12/31/2011
GEN-2007-046	200	SPS	Hitchland 115kV	12/31/2011
GEN-2007-050	170.2	OKGE	Woodward EHV 138kV	10/01/2009
GEN-2007-050	170.2	OKGE	Woodward EHV 138kV	10/01/2009
GEN-2007-052	135	WFEC	Anadarko 138kV	05/01/2009
GEN-2007-052	135	WFEC	Anadarko 138kV	05/01/2009
GEN-2007-052	135	WFEC	Anadarko 138kV	05/01/2009
GEN-2007-062	423.6	OKGE	Woodward EHV 345kV	12/31/2011
GEN-2007-062	423.6	OKGE	Woodward EHV 345kV	12/31/2011
GEN-2008-003	101.2	OKGE	Woodward EHV 138kV	08/31/2009
GEN-2008-013	300	OKGE	Hunter 345kV	10/01/2010
GEN-2008-013	300	OKGE	Hunter 345kV	10/01/2010
GEN-2008-018	249.75	SPS	Finney 345kV	12/31/2012
GEN-2008-018	249.75	SPS	Finney 345kV	12/31/2012
GEN-2008-021	42	WERE	Wolf Creek 345kV	On-Line
GEN-2008-022	299.7	SPS	Crossroads 345kV	09/01/2011
GEN-2008-022	299.7	SPS	Crossroads 345kV	09/01/2011
GEN-2008-022	299.7	SPS	Crossroads 345kV	09/01/2011
GEN-2008-023	148.8	AEPW	Hobart Junction 138kV	12/01/2010
GEN-2008-023	148.8	AEPW	Hobart Junction 138kV	12/01/2010
GEN-2008-037	99	WFEC	Slick Hills 138kV	11/30/2011
GEN-2008-044	197.8	OKGE	Tatonga 345kV	12/01/2011
GEN-2008-044	197.8	OKGE	Tatonga 345kV	12/01/2011

Request	Amount	Area	Requested/Proposed Point of Interconnection	Status or In-Service Date
GEN-2008-047	298.9	OKGE	Beaver County 345kV	12/31/2012
GEN-2008-047	298.9	OKGE	Beaver County 345kV	12/31/2012
GEN-2008-051	322	SPS	Potter County 345kV	12/31/2010
GEN-2008-079	98.9	SUNCMKEC	Crooked Creek 115kV	12/01/2010
GEN-2008-086N02	201	NPPD	Meadow Grove 230kV	unknown
GEN-2008-086N02	201	NPPD	Meadow Grove 230kV	unknown
GEN-2008-092	200.5	MIDW	Post Rock 230kV	12/01/2011
GEN-2008-092	200.5	MIDW	Post Rock 230kV	12/01/2011
GEN-2008-098	100.8	WERE	Waverly 345kV	12/31/2011
GEN-2008-119O	60	OPPD	S1399 161kV	12/31/2009
GEN-2008-123N	89.66	NPPD	Tap Pauline - Guide Rock (Rosemont) 115kV	12/31/2016
GEN-2008-124	200.1	SUNCMKEC	Ironwood 345kV	01/01/2016
GEN-2008-129	80	KCPL	Pleasant Hill 161kV	05/01/2009
GEN-2008-129	80	KCPL	Pleasant Hill 161kV	05/01/2009
GEN-2009-008	198.69	MIDW	South Hays 230kV	09/01/2011
GEN-2009-020	48.3	MIDW	Walnut Creek 69kV	12/31/2011
GEN-2009-025	59.8	OKGE	Nardins 69kV	12/31/2011
GEN-2009-040	72	WERE	Marshall 115kV	12/31/2012
GEN-2010-001	299.7	OKGE	Beaver County 345kV	01/01/2012
GEN-2010-001	299.7	OKGE	Beaver County 345kV	01/01/2012
GEN-2010-003	100.8	WERE	Waverly 345kV	12/31/2011
GEN-2010-005	299.2	WERE	Viola 345kV	12/01/2012
GEN-2010-005	299.2	WERE	Viola 345kV	12/01/2012
GEN-2010-006	205	SPS	Jones 230kV	06/01/2012
GEN-2010-009	165.6	SUNCMKEC	Buckner 345kV	12/01/2011
GEN-2010-011	29.7	OKGE	Tatonga 345kV	12/31/2011
GEN-2010-014	358.8	SPS	Hitchland 345kV	12/31/2013
GEN-2010-014	358.8	SPS	Hitchland 345kV	12/31/2013
GEN-2010-036	4.6	WERE	6th Street 115kV	08/01/2012
GEN-2010-036	4.6	WERE	6th Street 115kV	08/01/2012
GEN-2010-036	4.6	WERE	6th Street 115kV	08/01/2012
GEN-2010-036	4.6	WERE	6th Street 115kV	08/01/2012
GEN-2010-036	4.6	WERE	6th Street 115kV	08/01/2012
GEN-2010-036	4.6	WERE	6th Street 115kV	08/01/2012
GEN-2010-036	4.6	WERE	6th Street 115kV	08/01/2012
GEN-2010-036	4.6	WERE	6th Street 115kV	08/01/2012
GEN-2010-036	4.6	WERE	6th Street 115kV	08/01/2012
GEN-2010-036	4.6	WERE	6th Street 115kV	08/01/2012
GEN-2010-036	4.6	WERE	6th Street 115kV	08/01/2012
GEN-2010-040	298.45	OKGE	Cimarron 345kV	11/30/2011
GEN-2010-040	298.45	OKGE	Cimarron 345kV	11/30/2011
GEN-2010-041	10.29	OPPD	S1399 161kV	12/31/2011
GEN-2010-046	56	SPS	TUCO Interchange 230kV	05/01/2013
GEN-2010-051	200	NPPD	Tap Hoskins - Twin Church (Dixon County) 230kV	12/15/2012
GEN-2010-055	4.5	AEPW	Wekiwa 138kV	12/31/2011
GEN-2010-057	201	MIDW	Rice County 230kV	08/01/2012
GEN-2011-008	600	SUNCMKEC	Clark County 345kV	12/01/2015
GEN-2011-008	600	SUNCMKEC	Clark County 345kV	12/01/2015
GEN-2011-008	600	SUNCMKEC	Clark County 345kV	12/01/2015
GEN-2011-010	100.8	OKGE	Minco 345kV	12/01/2012

Request	Amount	Area	Requested/Proposed Point of Interconnection	Status or In-Service Date
GEN-2011-011	50	KCPL	Iatan 345kV	12/31/2010
GEN-2011-014	198	OKGE	Tap Hitchland - Woodward Dbl Ckt (GEN-2011-014 Tap) 345kV	12/31/2013
GEN-2011-016	200.1	SUNCMKEC	Ironwood 345kV	12/01/2013
GEN-2011-018	73.6	NPPD	Steele City 115kV	12/01/2013
GEN-2011-019	175	OKGE	Woodward 345kV	12/31/2012
GEN-2011-020	165.6	OKGE	Woodward 345kV	12/31/2012
GEN-2011-022	299	SPS	Hitchland 345kV	12/31/2012
GEN-2011-022	299	SPS	Hitchland 345kV	12/31/2012
GEN-2011-025	78.76	SPS	Tap Floyd County - Crosby County 115kV	06/30/2012
GEN-2011-027	120	NPPD	Tap Hoskins - Twin Church (Dixon County) 230kV	12/31/2012
GEN-2011-037	7	WFEC	Blue Canyon 5 138kV	01/01/2012
GEN-2011-040	111	OKGE	Carter County 138kV	12/31/2012
GEN-2011-040	111	OKGE	Carter County 138kV	12/31/2012
GEN-2011-045	205	SPS	Jones 230kV	06/01/2013
GEN-2011-046	27	SPS	Lopez 115kV	06/01/2013
GEN-2011-048	175	SPS	Mustang 230kV	03/01/2013
GEN-2011-049	250.7	OKGE	Border 345kV	12/31/2013
GEN-2011-050	108	AEPW	Santa Fe Tap 138kV	12/31/2013
GEN-2011-054	300	OKGE	Cimarron 345kV	11/30/2013
GEN-2011-054	300	OKGE	Cimarron 345kV	11/30/2013
GEN-2011-056	3.6	NPPD	Jeffrey 115kV	06/30/2012
GEN-2011-056A	3.6	NPPD	John 1 115kV	06/30/2012
GEN-2011-056B	4.5	NPPD	John 2 115kV	06/30/2012
GEN-2011-057	150	WERE	Creswell 138kV	12/31/2013
GEN-2012-001	61.2	SPS	Cirrus Tap 230kV	11/30/2012
GEN-2012-004	41.4	OKGE	Carter County 138kV	12/31/2013
GEN-2012-004	41.4	OKGE	Carter County 138kV	12/31/2013
GEN-2012-007	120	SUNCMKEC	Rubart 115kV	04/01/2014
GEN-2012-007	120	SUNCMKEC	Rubart 115kV	04/01/2014
GEN-2012-007	120	SUNCMKEC	Rubart 115kV	04/01/2014
GEN-2012-007	120	SUNCMKEC	Rubart 115kV	04/01/2014
GEN-2012-007	120	SUNCMKEC	Rubart 115kV	04/01/2014
GEN-2012-007	120	SUNCMKEC	Rubart 115kV	04/01/2014
GEN-2012-007	120	SUNCMKEC	Rubart 115kV	04/01/2014
GEN-2012-007	120	SUNCMKEC	Rubart 115kV	04/01/2014
GEN-2012-007	120	SUNCMKEC	Rubart 115kV	04/01/2014
GEN-2012-007	120	SUNCMKEC	Rubart 115kV	04/01/2014
GEN-2012-007	120	SUNCMKEC	Rubart 115kV	04/01/2014
GEN-2012-007	120	SUNCMKEC	Rubart 115kV	04/01/2014
GEN-2012-020	478	SPS	TUCO 230kV	09/30/2015
GEN-2012-020	478	SPS	TUCO 230kV	09/30/2015
GEN-2012-021	4.8	LES	Terry Bundy Generating Station 115kV	08/01/2013
GEN-2012-024	178.2	SUNCMKEC	Clark County 345kV	12/31/2015
GEN-2012-028	74	WFEC	Gotebo 69kV	12/01/2014
GEN-2012-032	299	OKGE	Open Sky 345kV	11/30/2014
GEN-2012-032	299	OKGE	Open Sky 345kV	11/30/2014
GEN-2012-033	98.06	OKGE	Tap and Tie South 4th - Bunch Creek & Enid Tap - Fairmont (GEN-2012-033T) 138kV	12/01/2014
GEN-2012-034	7	SPS	Mustang 230kV	06/01/2013

Request	Amount	Area	Requested/Proposed Point of Interconnection	Status or In-Service Date
GEN-2012-035	7	SPS	Mustang 230kV	06/01/2013
GEN-2012-036	7	SPS	Mustang 230kV	06/01/2013
GEN-2012-037	203	SPS	TUCO 345kV	03/01/2015
GEN-2012-041	121.5	OKGE	Ranch Road 345kV	04/15/2015
GEN-2013-002	50.6	LES	Tap Sheldon - Folsom & Pleasant Hill (GEN-2013-002 Tap) 115kV CKT 2	12/31/2013
GEN-2013-007	100	OKGE	Tap Prices Falls - Carter 138kV	12/31/2014
GEN-2013-008	1.2	NPPD	Steele City 115kV	12/31/2013
GEN-2013-011	30	AEPW	Turk 138kV	unknown
GEN-2013-012	147	OKGE	Redbud 345kV	11/30/2014
GEN-2013-012	147	OKGE	Redbud 345kV	11/30/2014
GEN-2013-012	147	OKGE	Redbud 345kV	11/30/2014
GEN-2013-012	147	OKGE	Redbud 345kV	11/30/2014
GEN-2013-016	203	SPS	TUCO 345kV	12/01/2016
GEN-2013-019	73.6	LES	Tap Sheldon - Folsom & Pleasant Hill (GEN-2013-002 Tap) 115kV CKT 2	06/30/2014
GEN-2013-022	25	SPS	Norton 115kV	05/01/2015
GEN-2013-027	148.4	SPS	Tap Tolk - Yoakum 230kV	03/31/2016
GEN-2013-028	559.5	GRDA	Tap N Tulsa - GRDA 1 345kV	04/16/2016
GEN-2013-028	559.5	GRDA	Tap N Tulsa - GRDA 1 345kV	04/16/2016
GEN-2013-029	299	OKGE	Renfrow 345kV	12/15/2015
GEN-2013-029	299	OKGE	Renfrow 345kV	12/15/2015
GEN-2013-030	300	OKGE	Beaver County 345kV	12/15/2015
GEN-2013-032	202.5	NPPD	Antelope 115kV	12/31/2016
GEN-2013-033	28	MIDW	Knoll 115kV	12/31/2015
GEN-2013-033	28	MIDW	Knoll 115kV	12/31/2015
GEN-2013-033	28	MIDW	Knoll 115kV	12/31/2015
GEN-2014-001	200.6	WERE	Tap Wichita - Emporia Energy Center (GEN-2014-001 Tap) 345kV	07/15/2014
GEN-2014-002	10.5	OKGE	Tatonga 345kV (GEN-2007-021 POI)	12/31/2014
GEN-2014-003	15.8	OKGE	Tatonga 345kV (GEN-2007-044 POI)	12/31/2014
GEN-2014-004	4	NPPD	Steele City 115kV (GEN-2011-018 POI)	unknown
GEN-2014-005	5.7	OKGE	Minco 345kV (GEN-2011-010 POI)	unknown
GEN-2014-013	73.4	NPPD	Meadow Grove (GEN-2008-086N2 Sub) 230kV	12/31/2014
GEN-2014-020	99.1	AEPW	Tuttle 138kV	12/31/2014
GEN-2014-021	300	KCPL	Tap Nebraska City - Mullin Creek (Holt) 345kV	12/01/2016
GEN-2014-021	300	KCPL	Tap Nebraska City - Mullin Creek (Holt) 345kV	12/01/2016
GEN-2014-025	2.4	MIDW	Walnut Creek 69kV	10/15/2015
GEN-2014-028	35	EMDE	Riverton 161kV	01/01/2016
GEN-2014-031	35.8	NPPD	Meadow Grove 230kV	10/01/2015
GEN-2014-032	10.2	NPPD	Meadow Grove 230kV	10/01/2015
GEN-2014-032	10.2	NPPD	Meadow Grove 230kV	10/01/2015
GEN-2014-033	70	SPS	Chaves County 115kV	12/31/2016
GEN-2014-034	70	SPS	Chaves County 115kV	12/31/2016
GEN-2014-035	30	SPS	Chaves County 115kV	12/31/2016
GEN-2014-039	73.4	NPPD	Friend 115kV	12/01/2016
GEN-2014-040	319.7	SPS	Castro 115kV	09/01/2016
GEN-2014-056	250	OKGE	Minco 345kV	12/31/2016
GEN-2014-057	249.9	AEPW	Tap Lawton - Sunnyside (Terry Road) 345kV	12/31/2016
GEN-2014-064	248.4	OKGE	Otter 138kV	12/01/2016
Gray County Wind (Montezuma)	110	SUNCMKEC	Gray County Tap 115kV	

Request	Amount	Area	Requested/Proposed Point of Interconnection	Status or In-Service Date
Llano Estacado (White Deer)	80	SPS	Llano Wind 115kV	
NPPD Distributed (Broken Bow)	8.3	NPPD	Broken Bow 115kV	
NPPD Distributed (Buffalo County Solar)	10	NPPD	Kearney Northeast	
NPPD Distributed (Burt County Wind)	12	NPPD	Tekamah & Oakland 115kV	
NPPD Distributed (Burt County Wind)	12	NPPD	Tekamah & Oakland 115kV	
NPPD Distributed (Burwell)	3	NPPD	Ord 115kV	
NPPD Distributed (Columbus Hydro)	45	NPPD	Columbus 115kV	
NPPD Distributed (Columbus Hydro)	45	NPPD	Columbus 115kV	
NPPD Distributed (Columbus Hydro)	45	NPPD	Columbus 115kV	
NPPD Distributed (North Platte - Lexington)	54	NPPD	Multiple: Jeffrey 115kV, John_1 115kV, John_2 115kV	
NPPD Distributed (North Platte - Lexington)	54	NPPD	Multiple: Jeffrey 115kV, John_1 115kV, John_2 115kV	
NPPD Distributed (North Platte - Lexington)	54	NPPD	Multiple: Jeffrey 115kV, John_1 115kV, John_2 115kV	
NPPD Distributed (Ord)	11.9	NPPD	Ord 115kV	
NPPD Distributed (Stuart)	2.1	NPPD	Ainsworth 115kV	
SPS Distributed (Carson)	10	SPS	Martin 115kV	
SPS Distributed (Dumas 19th St)	20	SPS	Dumas 19th Street 115kV	
SPS Distributed (Dumas 19th St)	20	SPS	Dumas 19th Street 115kV	
SPS Distributed (Etter)	20	SPS	Etter 115kV	
SPS Distributed (Etter)	20	SPS	Etter 115kV	
SPS Distributed (Hopi)	10	SPS	Hopi 115kV	
SPS Distributed (Jal)	10	SPS	S Jal 115kV	
SPS Distributed (Lea Road)	10	SPS	Lea Road 115kV	
SPS Distributed (Monument)	10	SPS	Monument 115kV	
SPS Distributed (Moore E)	25	SPS	Moore East 115kV	
SPS Distributed (Moore E)	25	SPS	Moore East 115kV	
SPS Distributed (Ocotillo)	10	SPS	S_Jal 115kV	
SPS Distributed (Sherman)	20	SPS	Sherman 115kV	
SPS Distributed (Sherman)	20	SPS	Sherman 115kV	
Sunray	49.5	SPS	Valero 115kV	
Total:	**45,427.5**			

C: STUDY GROUPINGS

C. Study Groups

GROUP 1: WOODWARD AREA			
Request	**Capacity**	**Area**	**Proposed Point of Interconnection**
GEN-2001-014	94.5	WFEC	Ft Supply 138kV
GEN-2001-037	102	OKGE	FPL Moreland Tap 138kV
GEN-2005-008	120	OKGE	Woodward 138kV
GEN-2006-024S	18.9	WFEC	Buffalo Bear Tap 69kV
GEN-2006-046	129.6	OKGE	Dewey 138kV
GEN-2007-021	201	OKGE	Tatonga 345kV
GEN-2007-043	200	OKGE	Minco 345kV
GEN-2007-044	300	OKGE	Tatonga 345kV
GEN-2007-050	170.2	OKGE	Woodward EHV 138kV
GEN-2007-062	423.6	OKGE	Woodward EHV 345kV
GEN-2008-003	101.2	OKGE	Woodward EHV 138kV
GEN-2008-044	197.8	OKGE	Tatonga 345kV
GEN-2010-011	29.7	OKGE	Tatonga 345kV
GEN-2010-040	298.45	OKGE	Cimarron 345kV
GEN-2011-010	100.8	OKGE	Minco 345kV
GEN-2011-019	175	OKGE	Woodward 345kV
GEN-2011-020	165.6	OKGE	Woodward 345kV
GEN-2011-054	300	OKGE	Cimarron 345kV
GEN-2014-002	10.5	OKGE	Tatonga 345kV (GEN-2007-021 POI)
GEN-2014-003	15.8	OKGE	Tatonga 345kV (GEN-2007-044 POI)
GEN-2014-005	5.7	OKGE	Minco 345kV (GEN-2011-010 POI)
GEN-2014-020	99.1	AEPW	Tuttle 138kV
GEN-2014-056	250	OKGE	Minco 345kV
PRIOR QUEUED SUBTOTAL	**3,509.45**		
AREA TOTAL	**3,509.45**		

GROUP 2: HITCHLAND AREA

Request	Capacity	Area	Proposed Point of Interconnection
ASGI-2011-002	20	SPS	Herring 115kV
ASGI-2013-001	11.5	SPS	PanTex South 115kV
GEN-2002-008	240	SPS	Hitchland 345kV
GEN-2002-009	79.8	SPS	Hansford 115kV
GEN-2002-022	239.2	SPS	Bushland 230kV
GEN-2003-020	159.1	SPS	Martin 115kV
GEN-2006-020S	20	SPS	DWS Frisco 115kV
GEN-2006-044	370	SPS	Hitchland 345kV
GEN-2007-046	200	SPS	Hitchland 115kV
GEN-2008-047	298.9	OKGE	Beaver County 345kV
GEN-2008-051	322	SPS	Potter County 345kV
GEN-2010-001	299.7	OKGE	Beaver County 345kV
GEN-2010-014	358.8	SPS	Hitchland 345kV
GEN-2011-014	198	OKGE	Tap Hitchland - Woodward Dbl Ckt (GEN-2011-014 Tap) 345kV
GEN-2011-022	299	SPS	Hitchland 345kV
GEN-2013-030	300	OKGE	Beaver County 345kV
Llano Estacado (White Deer)	80	SPS	Llano Wind 115kV
SPS Distributed (Carson)	10	SPS	Martin 115kV
SPS Distributed (Dumas 19th St)	20	SPS	Dumas 19th Street 115kV
SPS Distributed (Etter)	20	SPS	Etter 115kV
SPS Distributed (Moore E)	25	SPS	Moore East 115kV
SPS Distributed (Sherman)	20	SPS	Sherman 115kV
PRIOR QUEUED SUBTOTAL	**3,591.00**		
AREA TOTAL	**3,591.00**		

GROUP 3: SPEARVILLE AREA

Request	Capacity	Area	Proposed Point of Interconnection
ASGI-2012-006	22.5	SUNCMKEC	Tap Hugoton - Rolla 69kV
GEN-2001-039A	104	SUNCMKEC	Shooting Star Tap 115kV
GEN-2002-025A	150	SUNCMKEC	Spearville 230kV
GEN-2004-014	154.5	SUNCMKEC	Spearville 230kV
GEN-2005-012	248.4	SUNCMKEC	Ironwood 345kV
GEN-2006-021	94	SUNCMKEC	Flat Ridge Tap 138kV
GEN-2007-040	200.1	SUNCMKEC	Buckner 345kV
GEN-2008-018	249.75	SPS	Finney 345kV
GEN-2008-079	98.9	SUNCMKEC	Crooked Creek 115kV
GEN-2008-124	200.1	SUNCMKEC	Ironwood 345kV
GEN-2010-009	165.6	SUNCMKEC	Buckner 345kV
GEN-2011-008	600	SUNCMKEC	Clark County 345kV
GEN-2011-016	200.1	SUNCMKEC	Ironwood 345kV
GEN-2012-007	120	SUNCMKEC	Rubart 115kV
GEN-2012-024	178.2	SUNCMKEC	Clark County 345kV
Gray County Wind (Montezuma)	110	SUNCMKEC	Gray County Tap 115kV
PRIOR QUEUED SUBTOTAL	**2,896.15**		
ASGI-2015-001	6.132	SUNCMKEC	Ninnescah 115kV
GEN-2015-021	20	SUNCMKEC	Johnson Corner 115kV
CURRENT CLUSTER SUBTOTAL	**26.13**		
AREA TOTAL	**2,922.28**		

GROUP 4: NORTHWEST KANSAS AREA			
Request	**Capacity**	**Area**	**Proposed Point of Interconnection**
ASGI-2013-004	36.6	SUNCMKEC	Morris 115kV
GEN-2001-039M	100	SUNCMKEC	Central Plains Tap 115kV
GEN-2003-006A	201.6	SUNCMKEC	Elm Creek 230kV
GEN-2003-019	250	MIDW	Smoky Hills Tap 230kV
GEN-2006-031	75	MIDW	Knoll 115kV
GEN-2008-092	200.5	MIDW	Post Rock 230kV
GEN-2009-008	198.69	MIDW	South Hays 230kV
GEN-2009-020	48.3	MIDW	Walnut Creek 69kV
GEN-2010-057	201	MIDW	Rice County 230kV
GEN-2013-033	28	MIDW	Knoll 115kV
GEN-2014-025	2.4	MIDW	Walnut Creek 69kV
PRIOR QUEUED SUBTOTAL	**1,342.09**		
AREA TOTAL	**1,342.09**		

GROUP 6: SOUTH TEXAS PANHANDLE/NEW MEXICO AREA			
Request	**Capacity**	**Area**	**Proposed Point of Interconnection**
ASGI-2010-010	42.2	SPS	Lovington 115kV
ASGI-2010-020	30	SPS	Tap LE-Tatum - LE-Crossroads 69kV
ASGI-2010-021	15	SPS	Tap LE-Saunders Tap - LE-Anderson 69kV
ASGI-2011-001	27.3	SPS	Lovington 115kV
ASGI-2011-003	10	SPS	Hendricks 69kV
ASGI-2011-004	20	SPS	Pleasant Hill 69kV
ASGI-2012-002	18.15	SPS	FE-Clovis Interchange 115kV
ASGI-2013-002	18.4	SPS	FE Tucumcari 115kV
ASGI-2013-003	18.4	SPS	FE Clovis 115kV
ASGI-2013-005	1.65	SPS	FE Clovis 115kV
GEN-2001-033	180	SPS	San Juan Tap 230kV
GEN-2001-036	80	SPS	Norton 115kV
GEN-2006-018	168.1	SPS	TUCO Interchange 230kV
GEN-2006-026	604	SPS	Hobbs 230kV & Hobbs 115kV
GEN-2008-022	299.7	SPS	Crossroads 345kV
GEN-2010-006	205	SPS	Jones 230kV
GEN-2010-046	56	SPS	TUCO Interchange 230kV
GEN-2011-025	78.76	SPS	Tap Floyd County - Crosby County 115kV
GEN-2011-045	205	SPS	Jones 230kV
GEN-2011-046	27	SPS	Lopez 115kV
GEN-2011-048	175	SPS	Mustang 230kV
GEN-2012-001	61.2	SPS	Cirrus Tap 230kV
GEN-2012-020	478	SPS	TUCO 230kV
GEN-2012-034	7	SPS	Mustang 230kV
GEN-2012-035	7	SPS	Mustang 230kV
GEN-2012-036	7	SPS	Mustang 230kV
GEN-2012-037	203	SPS	TUCO 345kV
GEN-2013-016	203	SPS	TUCO 345kV
GEN-2013-022	25	SPS	Norton 115kV
GEN-2013-027	148.4	SPS	Tap Tolk - Yoakum 230kV
GEN-2014-033	70	SPS	Chaves County 115kV
GEN-2014-034	70	SPS	Chaves County 115kV
GEN-2014-035	30	SPS	Chaves County 115kV
GEN-2014-040	319.7	SPS	Castro 115kV
SPS Distributed (Hopi)	10	SPS	Hopi 115kV
SPS Distributed (Jal)	10	SPS	S Jal 115kV
SPS Distributed (Lea Road)	10	SPS	Lea Road 115kV
SPS Distributed (Monument)	10	SPS	Monument 115kV
SPS Distributed (Ocotillo)	10	SPS	S_Jal 115kV
Sunray	49.5	SPS	Valero 115kV
PRIOR QUEUED SUBTOTAL	**4,008.46**		
ASGI-2015-002	2	SPS	SP-Yuma 69kV
GEN-2015-014	150	SPS	Tap Cochran - Lehman 115kV
CURRENT CLUSTER SUBTOTAL	**152.00**		
AREA TOTAL	**4,160.46**		

GROUP 7: SOUTHWEST OKLAHOMA AREA			
Request	**Capacity**	**Area**	**Proposed Point of Interconnection**
GEN-2001-026	74.25	WFEC	Washita 138kV
GEN-2002-005	123	WFEC	Red Hills Tap 138kV
GEN-2003-004	100	WFEC	Washita 138kV
GEN-2003-005	100	WFEC	Anadarko - Paradise (Blue Canyon) 138kV
GEN-2003-022	120	AEPW	Weatherford 138kV
GEN-2004-020	27	AEPW	Weatherford 138kV
GEN-2004-023	20.6	WFEC	Washita 138kV
GEN-2005-003	30.6	WFEC	Washita 138kV
GEN-2006-002	100.8	AEPW	Sweetwater 230kV
GEN-2006-035	224	AEPW	Sweetwater 230kV
GEN-2006-043	98.9	AEPW	Sweetwater 230kV
GEN-2007-052	135	WFEC	Anadarko 138kV
GEN-2008-023	148.8	AEPW	Hobart Junction 138kV
GEN-2008-037	99	WFEC	Slick Hills 138kV
GEN-2011-037	7	WFEC	Blue Canyon 5 138kV
GEN-2011-049	250.7	OKGE	Border 345kV
GEN-2012-028	74	WFEC	Gotebo 69kV
PRIOR QUEUED SUBTOTAL	**1,733.65**		
GEN-2015-004	52.9	OKGE	Border 345kV
GEN-2015-013	120	WFEC	Synder 138kV
CURRENT CLUSTER SUBTOTAL	**172.90**		
AREA TOTAL	**1,906.55**		

GROUP 8: NORTH OKLAHOMA/SOUTH CENTRAL KANSAS AREA			
Request	**Capacity**	**Area**	**Proposed Point of Interconnection**
ASGI-2010-006	150	AECI	Remington 138kV
ASGI-2014-014	56.4	GRDA	Ferguson 69kV
GEN-2002-004	200	WERE	Latham 345kV
GEN-2005-013	199.8	WERE	Caney River 345kV
GEN-2007-025	299.2	WERE	Viola 345kV
GEN-2008-013	300	OKGE	Hunter 345kV
GEN-2008-021	42	WERE	Wolf Creek 345kV
GEN-2008-098	100.8	WERE	Waverly 345kV
GEN-2009-025	59.8	OKGE	Nardins 69kV
GEN-2010-003	100.8	WERE	Waverly 345kV
GEN-2010-005	299.2	WERE	Viola 345kV
GEN-2010-055	4.5	AEPW	Wekiwa 138kV
GEN-2011-057	150	WERE	Creswell 138kV
GEN-2012-032	299	OKGE	Open Sky 345kV
GEN-2012-033	98.06	OKGE	Tap and Tie South 4th - Bunch Creek & Enid Tap - Fairmont (GEN-2012-033T) 138kV
GEN-2012-041	121.5	OKGE	Ranch Road 345kV
GEN-2013-012	147	OKGE	Redbud 345kV
GEN-2013-028	559.5	GRDA	Tap N Tulsa - GRDA 1 345kV
GEN-2013-029	299	OKGE	Renfrow 345kV
GEN-2014-001	200.6	WERE	Tap Wichita - Emporia Energy Center (GEN-2014-001 Tap) 345kV
GEN-2014-028	35	EMDE	Riverton 161kV
GEN-2014-064	248.4	OKGE	Otter 138kV
PRIOR QUEUED SUBTOTAL	**3,970.56**		

ASGI-2015-004	56.364	GRDA	Coffeyville City 69kV
GEN-2015-001	200	OKGE	Ranch Road 345kV
GEN-2015-015	154.56	OKGE	Road Runner 138kV
GEN-2015-016	200	KCPL	Tap Marmaton - Centerville 161kV
GEN-2015-024	217.7	WERE	Tap Thistle - Wichita 345kV Dbl CKT
GEN-2015-025	215.9	WERE	Tap Thistle - Wichita 345kV Dbl CKT
CURRENT CLUSTER SUBTOTAL	**1,044.52**		
AREA TOTAL	**5,015.08**		

GROUP 9: NEBRASKA AREA

Request	Capacity	Area	Proposed Point of Interconnection
GEN-2002-023N	0.8	NPPD	Harmony 115kV
GEN-2003-021N	75	NPPD	Ainsworth Wind Tap 115kV
GEN-2004-023N	75	NPPD	Columbus Co 115kV
GEN-2006-020N	42	NPPD	Bloomfield 115kV
GEN-2006-037N1	73.1	NPPD	Broken Bow 115kV
GEN-2006-038N005	79.9	NPPD	Broken Bow 115kV
GEN-2006-038N019	79.9	NPPD	Petersburg North 115kV
GEN-2006-044N	40.5	NPPD	North Petersburg 115kV
GEN-2007-011N08	81	NPPD	Bloomfield 115kV
GEN-2007-017IS	166	WAPA	Ft Thompson-Grand Island 345kV
GEN-2007-018IS	234	WAPA	Ft Thompson-Grand Island 345kV
GEN-2008-086N02	201	NPPD	Meadow Grove 230kV
GEN-2008-119O	60	OPPD	S1399 161kV
GEN-2008-123N	89.66	NPPD	Tap Pauline - Guide Rock (Rosemont) 115kV
GEN-2009-040	72	WERE	Marshall 115kV
GEN-2010-041	10.29	OPPD	S1399 161kV
GEN-2010-051	200	NPPD	Tap Hoskins - Twin Church (Dixon County) 230kV
GEN-2011-018	73.6	NPPD	Steele City 115kV
GEN-2011-027	120	NPPD	Tap Hoskins - Twin Church (Dixon County) 230kV
GEN-2011-056	3.6	NPPD	Jeffrey 115kV
GEN-2011-056A	3.6	NPPD	John 1 115kV
GEN-2011-056B	4.5	NPPD	John 2 115kV
GEN-2012-021	4.8	LES	Terry Bundy Generating Station 115kV
GEN-2013-002	50.6	LES	Tap Sheldon - Folsom & Pleasant Hill (GEN-2013-002 Tap) 115kV CKT 2
GEN-2013-008	1.2	NPPD	Steele City 115kV
GEN-2013-019	73.6	LES	Tap Sheldon - Folsom & Pleasant Hill (GEN-2013-002 Tap) 115kV CKT 2
GEN-2013-032	202.5	NPPD	Antelope 115kV
GEN-2014-004	4	NPPD	Steele City 115kV (GEN-2011-018 POI)
GEN-2014-013	73.4	NPPD	Meadow Grove (GEN-2008-086N2 Sub) 230kV
GEN-2014-031	35.8	NPPD	Meadow Grove 230kV
GEN-2014-032	10.2	NPPD	Meadow Grove 230kV
GEN-2014-039	73.4	NPPD	Friend 115kV
NPPD Distributed (Broken Bow)	8.3	NPPD	Broken Bow 115kV
NPPD Distributed (Buffalo County Solar)	10	NPPD	Kearney Northeast
NPPD Distributed (Burt County Wind)	12	NPPD	Tekamah & Oakland 115kV
NPPD Distributed (Burwell)	3	NPPD	Ord 115kV
NPPD Distributed (Columbus Hydro)	45	NPPD	Columbus 115kV
NPPD Distributed (North Platte - Lexington)	54	NPPD	Multiple: Jeffrey 115kV, John_1 115kV, John_2 115kV
NPPD Distributed (Ord)	11.9	NPPD	Ord 115kV
NPPD Distributed (Stuart)	2.1	NPPD	Ainsworth 115kV

PRIOR QUEUED SUBTOTAL	**2,461.25**		
GEN-2015-007	160	NPPD	Hoskins 345kV
GEN-2015-023	300.7	NPPD	Holt County 345kV
CURRENT CLUSTER SUBTOTAL	**460.70**		
AREA TOTAL	**2,921.95**		

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	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	KCPL	Pleasant Hill 161kV
GEN-2010-036	4.6	WERE	6th Street 115kV
GEN-2011-011	50	KCPL	Iatan 345kV
GEN-2014-021	300	KCPL	Tap Nebraska City - Mullin Creek (Holt) 345kV
PRIOR QUEUED SUBTOTAL	**434.60**		
GEN-2015-005	200.1	KCPL	Tap Nebraska City - Sibley (Ketchem) 345kV
CURRENT CLUSTER SUBTOTAL	**200.10**		
AREA TOTAL	**634.70**		

GROUP 14: SOUTH CENTRAL OKLAHOMA AREA

Request	Capacity	Area	Proposed Point of Interconnection
GEN-2011-040	111	OKGE	Carter County 138kV
GEN-2011-050	108	AEPW	Santa Fe Tap 138kV
GEN-2012-004	41.4	OKGE	Carter County 138kV
GEN-2013-007	100	OKGE	Tap Prices Falls - Carter 138kV
GEN-2014-057	249.9	AEPW	Tap Lawton - Sunnyside (Terry Road) 345kV
PRIOR QUEUED SUBTOTAL	**610.30**		
AREA TOTAL	**610.30**		

GROUP 15: E-SOUTH DAKOTA AREA			
Request	Capacity	Area	Proposed Point of Interconnection
AREA TOTAL	0.00		

GROUP 16: W-NORTH DAKOTA AREA			
Request	Capacity	Area	Proposed Point of Interconnection
AREA TOTAL	0.00		

GROUP 17: W-SOUTH DAKOTA AREA			
Request	Capacity	Area	Proposed Point of Interconnection
AREA TOTAL	0.00		

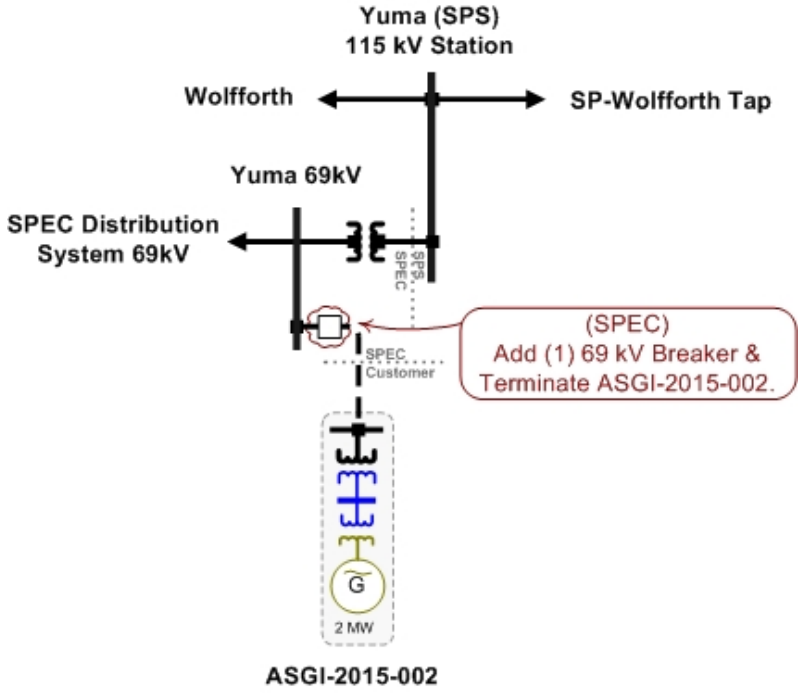
GROUP 18: E-NORTH DAKOTA AREA			
Request	Capacity	Area	Proposed Point of Interconnection
AREA TOTAL	0.00		

CLUSTER TOTAL (CURRENT STUDY)	2,056.4	MW
PQ TOTAL (PRIOR QUEUED)	24,587.5	MW
CLUSTER TOTAL (INCLUDING PRIOR QUEUED)	26,643.9	MW

D: PROPOSED POINT OF INTERCONNECTION ONE-LINE DIAGRAMS

ASGI-2015-002

Estimated Cluster Analysis Interconnection Cost: $0*



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

GEN-2015-014

See Posted Interconnection Facilties Study for GEN-2015-014

E: COST ALLOCATION PER REQUEST

Appendix E. Cost Allocation Per Request

(Including Previously Allocated Network Upgrades*)

Interconnection Request and Upgrades	Upgrade Type	Allocated Cost	Upgrade Cost
ASGI-2015-002			
ASGI-2015-002 Interconnection Costs See One-Line Diagram.	Current Study	$0	$0
	Current Study Total	$0	
GEN-2015-014			
GEN-2015-014 Interconnection Costs See One-Line Diagram.	Current Study	$6,121,184	$6,121,184
	Current Study Total	$6121,184	
	TOTAL CURRENT STUDY COSTS:	**$6,121,184**	

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

F: COST ALLOCATION PER PROPOSED STUDY NETWORK UPGRADE

Appendix F. Cost Allocation by Upgrade

ASGI-2015-002 Interconnection Costs			**$0**
See One-Line Diagram.			
	ASGI-2015-002	$0	
	Total Allocated Costs	**$0**	
GEN-2015-014 Interconnection Costs			**$6,121,184**
See One-Line Diagram.			
	GEN-2015-014	$6,121,184	
	Total Allocated Costs	**$6,121,184**	

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

G-T: THERMAL POWER FLOW ANALYSIS (CONSTRAINTS REQUIRING TRANSMISSION REINFORCEMENT)

Posted as a separate file

Legend:

Column	Definition
Solution	Solution Method
Group	Model Case Identification: • ##ALL: ERIS-HVER • 00: ERIS-LVER • ##NR or 00NR: NRIS
Scenario	Upgrade Scenario Identification
Season	Model Year and Season
Source	Gen ID producing the TDF above the limit for the constraint
Monitored Element	Monitored Bus Identification
Rate A	Planning Term Normal Rating
Rate B	Planning Term Emergency Rating
TDF	Transfer Distribution Factor for the Source
TC%LOADING	Post-transfer, loading percent for system intact or contingency
Contingency	Contingency Description

SOLUTION	GROUP	SCENARIO	SEASON	SOURCE	DIRECTION	MONITORED ELEMENT	RATEA (MVA)	RATEB(MVA)	TDF	TC%LOADING (% MVA)	CONTINGENCY
						Currently no thermal constraints for DISIS-2015-001-4 Group 06					

G-V: VOLTAGE POWER FLOW ANALYSIS (CONSTRAINTS REQUIRING TRANSMISSION REINFORCEMENT)

Available upon request

Legend:

Column	Definition
Solution	Solution Method
Group	Model Case Identification: • ##ALL: ERIS-HVER • 00: ERIS-LVER • ##NR or 00NR: NRIS
Scenario	Upgrade Scenario Identification
Season	Model Year and Season
Source	Gen ID producing the TDF above the limit for the constraint
Monitored Element	Monitored Bus Identification
BC Voltage (pu)	Pre-transfer, post-contingency voltage
TC Voltage (pu)	Post-transfer, post-contingency voltage
Voltage Differ (pu)	TC Voltage - BC Voltage
VINIT (pu)	Post-transfer, pre-contingency (system intact) voltage
VMIN (pu)	Lower Voltage Limit
VMAX (pu)	Upper Voltage Limit
TDF	Transfer Distribution Factor for the Source
Contingency	Contingency Description

SOLUTION	GROUP	SCENARIO	SEASON	SOURCE	DIRECTION	MONITORED ELEMENT	RATEA (MVA)	RATEB(MVA)	TDF	TC%LOADING (% MVA)	CONTINGENCY
						Currently no thermal constraints for DISIS-2015-001-4 Group 06					

H-T: THERMAL POWER FLOW ANALYSIS (OTHER CONSTRAINTS NOT REQUIRING TRANSMISSION REINFORCEMENT)

Available upon request

H-T-AS: AFFECTED SYSTEM THERMAL POWER FLOW ANALYSIS (CONSTRAINTS FOR POTENTIAL UPGRADES)

Available upon request

H-V-AS: AFFECTED SYSTEM VOLTAGE POWER FLOW ANALYSIS (CONSTRAINTS FOR POTENTIAL UPGRADES)

Available upon request