Impact Study of Limited Operation for Affected System Generator ASGI-2013-004

December 2013
Generator Interconnection

Southwest Power Pool

Executive Summary

<OMITTED TEXT> (Customer; ASGI-2013-004) has requested an Affected System Impact Study to determine impacts to the Southwest Power Pool Transmission System for the interconnection of 27.6 MW (summer peak) and 36.6 MW (winter peak) of generation to the 34.5kV system of the Garden City municipal utility in Finney County, Kansas. The generator is to be studied as an Energy Resource (ERIS). The point of impact to the SPP Transmission System is at the Morris substation on Sunflower Electric Power Corporation (SUNC). ASGI-2013-004 is to be studied for full impacts in the DISIS-2013-002 Impact Study to be completed in January, 2014. The Customer has requested this Limited Operation Interconnection Study (LOIS) to determine the impacts of interconnecting its generation before all required Network Upgrades identified in the DISIS-2013-002 Impact Study can be placed into service.

This LOIS addresses the effects of interconnecting the plant to the rest of the transmission system for the system topology and conditions as expected in March 2014. ASGI-2013-004 is requesting the interconnection of three (3) 14 MVA combustion turbines and associated facilities on the distribution system served from the Morris 115kV substation on the Dobson (SUNC) – Irsik and Doll (SUNC) 115kV transmission line. For the typical LOIS, both a power flow and transient stability analysis are conducted. The LOIS assumes that only the higher queued projects listed within Table 1 of this study might go into service before the completion of all Network Upgrades identified within Table 2 of this report. If additional generation projects, listed within Table 3, with queue priority equal to or higher than the study project request rights to go into commercial operation before all Network Upgrades identified within Table 2 of this report are completed, this LOIS will need to be restudied to ensure that interconnection service remains for the ASGI-2013-004 request.

Power flow analysis from this LOIS has been performed in two scenarios. The first scenario, which assumes GEN-2012-002 Interconnection Customer proceeds to interconnect prior to 2014 summer, has determined that the ASGI-2013-004 request can interconnect 0 MW (summer and winter peak) of generation as an Energy Resource prior to the completion of the required Network Upgrades, listed within Table 2 of this report. The second scenario, which assumes that GEN-2012-002 Interconnection Customer does not proceed to interconnect until after the completion of its Network Upgrades has determined that the ASGI-2013-004 request can interconnect 27.6MW (summer peak) and 36.6MW (winter peak) of generation prior to the completion of the required Network Upgrades listed in Table 6 of this report.

Should any other projects, other than those listed within Table 1 of this report, come into service an additional study may be required to determine if any limited operation service is available. It should be noted that although this LOIS analyzed many of the most probable contingencies, it is not an all-inclusive list that can account for every operational situation. Additionally, the generator may not be able to inject any power onto the Transmission System due to constraints that fall below the threshold of mitigation for a Generator Interconnection request. Because of this, it is likely that the Customer may be required to reduce their generation output to **0 MW** under certain system conditions to allow system operators to maintain the reliability of the transmission network.

Transient stability analysis for this LOIS has determined that the transmission system will remain stable for the fifty-six (56) selected faults for the limited operation interconnection of ASGI-2013-004.

Nothing in this study should be construed as a guarantee of transmission service. If the customer wishes to sell power from the facility, a separate request for transmission service must be requested on Southwest Power Pool's OASIS by the Customer.

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Purpose

<OMITTED TEXT> (Customer; ASGI-2013-004) has requested an Affected System Impact Study to determine impacts to the Southwest Power Pool Transmission System for the interconnection of 27.6 MW (summer peak) and 36.6 MW (winter peak) of generation to the 34.5kV system of the Garden City municipal utility in Finney County, Kansas. The generator is to be studied as an Energy Resource (ERIS). The point of impact to the SPP Transmission System is at the Morris substation on Sunflower Electric Power Corporation (SUNC). ASGI-2013-004 is to be studied for full impacts in the DISIS-2013-002 Impact Study to be completed in January, 2014. The Customer has requested this Limited Operation Interconnection Study (LOIS) to determine the impacts of interconnecting its generation before all required Network Upgrades identified in the DISIS-2013-002 Impact Study can be placed into service.

The purpose of this study is to reevaluate the impacts of interconnecting ASGI-2013-004 request of 27.6 MW (summer peak) and 36.6 MW (winter peak) comprised of three (3) 14 MVA combustion turbines and associated facilities interconnecting into the distribution system that is served from the Morris 115kV substation on the Dobson (SUNC) – Irsik and Doll (SUNC) 115kV transmission line in Finney County, Kansas. The Customer has requested this amount to be studied as an Energy Resource (ER) with Limited Operation Interconnection Service to commence on or around March of 2014.

Both power flow and transient stability analysis were conducted for this Limited Operation Interconnection Service. Limited Operation Studies are conducted under GIA Section 5.9.

The LOIS considers the Base Case as well as all Generating Facilities (and with respect to (b) below, any identified Network Upgrades associated with such higher queued interconnection) that, on the date the LOIS is commenced:

a) are directly interconnected to the Transmission System;
b) are interconnected to Affected Systems and may have an impact on the Interconnection Request;
c) have a pending higher queued Interconnection Request to interconnect to the Transmission System listed in Table 1; or
d) have no Queue Position but have executed an LGIA or requested that an unexecuted LGIA be filed with FERC.

Any changes to these assumptions, for example, one or more of the previously queued requests not included within this study execute an interconnection agreement and commencing commercial operation, may require a re-study of this LOIS at the expense of the Customer.

Nothing within this System Impact Study constitutes a request for transmission service or confers upon the Interconnection Customer any right to receive transmission service rights. Should the Customer require transmission service, those rights should be requested through SPP’s Open Access Same-Time Information System (OASIS).

This LOIS study included prior queued generation interconnection requests. Those listed within Table 1 are the generation interconnection requests that are assumed to have rights to either full or partial interconnection service prior to the requested 3/2014 in-service of ASGI-2013-004 for this LOIS. Also listed in Table 1 are both the amount of MWs of interconnection service expected at the effective time of this study and the total MWs requested of interconnection service, the fuel type, the point of interconnection (POI), and the current status of each particular prior queued request.

Table 1: Generation Requests Included within LOIS

Project	MW	Total MW	Fuel Source	POI	Status
GEN-2001-039A	105.0	105.0	Wind	Tap Greensburg - Ft Dodge (Shooting Star Tap) 115kV	Commercial Operation
GEN-2001-039M	99.0	99.0	Wind	Central Plains Tap 115kV	Commercial Operation
GEN-2002-025A	150.0	150.0	Wind	Spearville 230kV	Commercial Operation
GEN-2003-006A	200.0	200.0	Wind	Elm Creek 230kV	Commercial Operation
GEN-2003-019	250.0	250.0	Wind	Smoky Hills Tap 230kV	Commercial Operation
GEN-2004-014	100.0	154.5	Wind	Spearville 230kV	Commercial Operation
GEN-2005-012	167.0	250.0	Wind	Spearville 345kV	Commercial Operation
GEN-2006-021	101.0	101.0	Wind	Flat Ridge Tap 138kV	Commercial Operation
GEN-2007-040	132.0	200.0	Wind	Buckner 345kV	Commercial Operation
GEN-2008-018	250.0	405.0	Wind	Finney 345kV	IA Executed/On Schedule
GEN-2008-079	98.9	98.9	Wind	Tap Cudahy - Ft Dodge 115kV	Commercial Operation
GEN-2009-008	199.5	199.5	Wind	South Hays 230kV	IA Executed/On Suspension
GEN-2009-020	48.3	48.3	Wind	Tap Nekoma - Bazine 69kV	IA Executed/On Suspension
GEN-2010-009	165.6	165.6	Wind	Buckner 345kV	Commercial Operation
GEN-2012-002	101.2	101.2	Wind	Tap Scott City - Pile 115kV	IA Pending
GEN-2012-007	120.0	120.0	Gas	Rubart 115kV	IA Pending
ASGI-2012-006	22.5	22.5	Steam	Tap Hugoton - Rolla 69kV	IA Pending
ASGI-2013-004	36.6	36.6	Gas	Morris 115kV	Under Study

This LOIS was required because the Customer is requesting interconnection prior to the completion of all interconnection studies and before all upgrades have been identified in the DISIS-2013-002 Definitive Interconnection System Impact Study (DISIS). Table 2 below lists the required upgrade projects for which this request depends upon.

Impact of GEN-2012-002 Interconnection Request

GEN-2012-002 Interconnection Request, a 101.2MW wind farm requesting to interconnect on the Scott City – Pile 115kV line was determined to be a critical prior queued request. GEN-2012-002 has indicated its intent to move forward in a Limited Operation Scenariosimilar to the request of ASGI-2013-004. GEN-2012-002, at the time of this report, has not authorized construction of its Network Upgrades. GEN-2012-002 has a large impact on the constraints identified in the powerflow analysis. As such, a sensitivity was run assuming that GEN-2012-002 does not move forward with its request before its Network Upgrades are complete.

Table 2: Upgrade Projects not included but Required for Full Interconnection Service

Upgrade Project	Type	Description	Status
Holcomb 345/115/13.8kV Transformer (Build second 345/115kV transformer at Holcomb)	Shared Network Upgrade to be designed, constructed, and owned by the Transmission Owner. Required to support full interconnection.	DISIS-2012-001 Customers	Not authorized to begin construction
Beaver County 345kV Expansion	Most recent iteration of DISIS 2011-001. Previous Network Upgrade not responsibility of Customer but required to support full interconnection.	Upgrade	Not authorized to begin construction
Beaver County – Buckner 345kV CKT 1 (Build approx. 90 miles of 345kV)	Most recent iteration of DISIS 2011-001. Previous Network Upgrade not responsibility of Customer but required to support full interconnection.	Upgrade	Not authorized to begin construction
Finney Switching Station – Holcomb 345kV CKT 2	Most recent iteration of ICS 2008-001. Previous Network Upgrade not responsibility of Customer but required to support full interconnection.	Upgrade	Not authorized to begin construction
Fort Dodge – North Fort Dodge 115kV CKT 2 (Build approx. 1 mile of 115kV)	Most recent iteration of DISIS 2009-001. Previous Network Upgrade not responsibility of Customer but required to support full interconnection.	Upgrade	Not authorized to begin construction
Hitchland 345/230kV Autotransformer CKT 2	Most recent iteration of DISIS 2010-001. Previous Network Upgrade not responsibility of Customer but required to support full interconnection.	Build Priority Project	Current Estimated In-Service date of 6/30/2014
Hitchland – Woodward 345kV Dbl CKT	Most recent iteration of DISIS 2011-001. Previous Network Upgrade not responsibility of Customer but required to support full interconnection.	Build Priority Project	Current Estimated In-Service date of 6/30/2014
Matthewson – Cimarron 345kV CKT 2	Most recent iteration of DISIS 2011-001. Previous Network Upgrade not responsibility of Customer but required to support full interconnection.	Upgrade	Not authorized to begin construction
Mullergren – Reno 345kV Dbl CKT (Build approx. 92 miles of 345kV)	Most recent iteration of DISIS 2011-001. Previous Network Upgrade not responsibility of Customer but required to support full interconnection.	Upgrade	Not authorized to begin construction
North Fort Dodge – Spearville 115kV CKT 2	Most recent iteration of DISIS 2009-001. Previous Network Upgrade not responsibility of Customer but required to support full interconnection.	Upgrade	Not authorized to begin construction
Spearville – Clark – Thistle 345kV Dbl CKT	Most recent iteration of DISIS 2010-001. Previous Network Upgrade not responsibility of Customer but required to support full interconnection.	Build Priority Project	Current Estimated In-Service date of 12/31/2014
Spearville – Mullergren 345kV Dbl CKT (Build approx. 85 miles of 345kV)	Most recent iteration of DISIS 2011-001. Previous Network Upgrade not responsibility of Customer but required to support full interconnection.	Upgrade	Not authorized to begin construction

Upgrade Project	Type	Description	Status
Spearville 345/115/13.8kV Transformer CKT 1	Most recent iteration of DISIS 2009-001. Previous Network Upgrade not responsibility of Customer but required to support full interconnection.	Upgrade	Not authorized to begin construction
Tatonga – Matthewson 345kV CKT 2	Most recent iteration of DISIS 2011-001. Previous Network Upgrade not responsibility of Customer but required to support full interconnection.	Upgrade	Not authorized to begin construction
Thistle – Wichita 345kV Dbl CKT	Most recent iteration of DISIS 2010-001. Previous Network Upgrade not responsibility of Customer but required to support full interconnection.	Build Priority Project	Current Estimated In-Service date of 12/31/2014
Woodward 345/138/13.8kV Transformer CKT 2	Most recent iteration of DISIS 2012-001. Previous Network Upgrade not responsibility of Customer but required to support full interconnection.	Build Balanced Portfolio Project	Current Estimated In-Service date of 5/19/2014

Any changes to these assumptions, for example, one or more of the previously queued requests not included within this study execute an interconnection agreement and commencing commercial operation, may require a re-study of this LOIS at the expense of the Customer. The higher or equally queued projects that were not included in this study are listed in Table 3. While this list is not all inclusive it is a list of the most probable and affecting prior queued requests that were not included within this LOIS, either because no request for an LOIS has been made or the request is on suspension, etc.

Table 3: Higher or Equally Queued GI Requests not included within LOIS

Project	Remainder MW	Total MW	Fuel	POI	Status
GEN-2004-014	54.5	154.5	Wind	Spearville 230kV	Commercial Operation
GEN-2005-012	83.0	250.0	Wind	Spearville 345kV	IA Executed/On Schedule for 2015
GEN-2006-006	205.5	205.5	Wind	Spearville 345kV	IA Executed/On Schedule for 2015
GEN-2006-040	108.0	108.0	Wind	Mingo 115kV	IA Executed/On Suspension
GEN-2007-011	135.0	135.0	Wind	Syracuse 115kV	IA Executed/On Suspension
GEN-2007-038	200.0	200.0	Wind	Spearville 345kV	IA Executed/On Schedule for 08/25/2015
GEN-2007-040	68.0	200.0	Wind	Buckner 345kV	IA Executed/On Schedule for 2012
GEN-2008-017	300.0	300.0	Wind	Setab 345kV	IA Executed/On Schedule for 10/2015
GEN-2008-018	155.0	405.0	Wind	Finney 345kV	IA Executed/On Schedule
GEN-2008-092	201.0	201.0	Wind	Knoll 230kV	IA Pending
GEN-2008-124	200.1	200.1	Wind	Spearville 345kV	IA Executed/On Schedule for 01/01/2016
GEN-2010-015	200.1	200.1	Wind	Spearville 345kV	IA Executed/On Schedule for 01/01/2015

Nothing in this System Impact Study constitutes a request for transmission service or grants the Interconnection Customer any rights to transmission service.

Facilities

Generating Facility

ASGI-2013-004 Interconnection Customer's request to interconnect a total of 27.6 MW (summer peak) and 36.6 MW (winter peak) is comprised of three (3) 14 MVA combustion turbines and associated interconnection facilities.

Interconnection Facilities

The POI for ASGI-2013-004 Interconnection Customer is through the existing Morris 115kV substation in Finney County, Kansas. Figure 1 depicts the one-line diagram of the local transmission system including the POI as well as the power flow model representing the request.

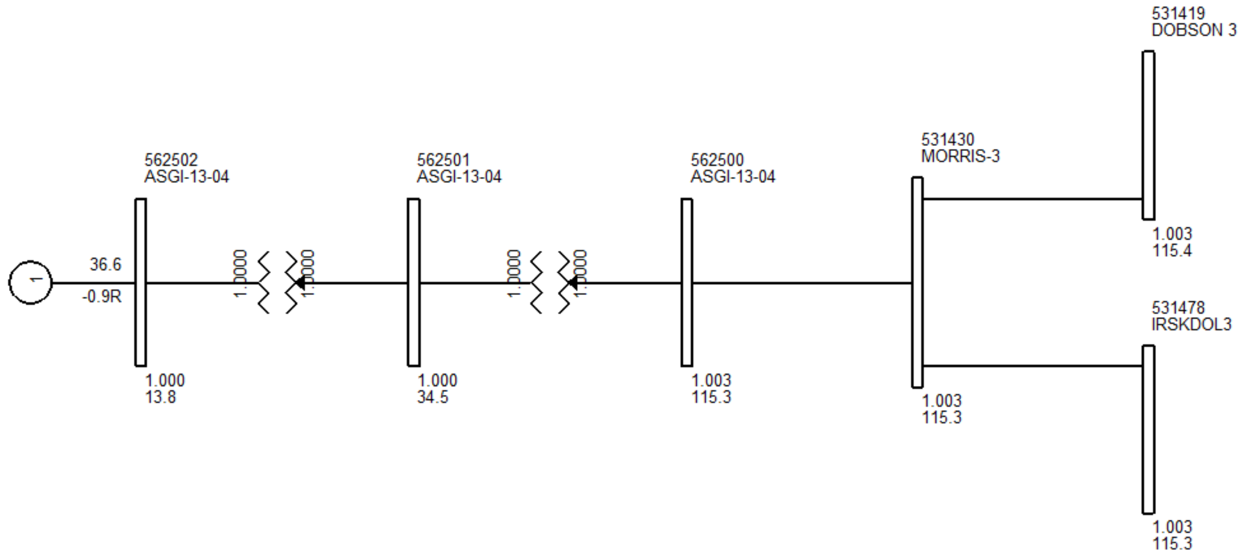

Figure 1: Proposed POI Configuration and Request Power Flow Model

Base Case Network Upgrades

The Network Upgrades included within the cases used for this LOIS study are those facilities that are a part of the SPP Transmission Expansion Plan or the Balanced Portfolio projects that have in-service dates prior to the ASGI-2013-004 LOIS requested in-service date of March 2014. These facilities have an approved Notice to Construct (NTC), or are in construction stages and expected to be in-service at the effective time of this study. No other upgrades were included for this LOIS. If for some reason, construction on these projects is delayed or discontinued, a restudy may be needed to determine the interconnection service availability of the Customer.

Power Flow Analysis

Power flow analysis is used to determine if the transmission system can accommodate the injection from the request without violating thermal or voltage transmission planning criteria.

Model Preparation

Power flow analysis was performed using modified versions of the 2012 series of transmission service request study models including the 2013 (spring, summer, and winter) seasonal models. To incorporate the Interconnection Customer's request, a re-dispatch of existing generation within SPP was performed with respect to the amount of the Customer's injection and the interconnecting Balancing Authority. This method allows the request to be studied as an Energy Resource (ERIS) Interconnection Request. For this LOIS, only the previous queued requests listed in Table 1 were assumed to be in-service.

Study Methodology and Criteria

The ACCC function of PSS/E is used to simulate contingencies, including single and multiple facility (i.e. breaker-to-breaker, etc.) outages, within all of the control areas of SPP and other control areas external to SPP and the resulting data analyzed. This satisfies the "more probable" contingency testing criteria mandated by NERC and the SPP criteria.

The contingency set includes all SPP control area branches and ties 69kV and above, first tier Non-SPP control area branches and ties 115 kV and above, any defined contingencies for these control areas, and generation unit outages for the SPP control areas with SPP reserve share program redispatch.

The monitor elements include all SPP control area branches, ties, and buses 69 kV and above, and all first tier Non-SPP control area branches and ties 69 kV and above. NERC Power Transfer Distribution Flowgates for SPP and first tier Non-SPP control area are monitored. Additional NERC Flowgates are monitored in second tier or greater Non-SPP control areas. Voltage monitoring was performed for SPP control area buses 69 kV and above.

Results

Power flow analysis from this LOIS has been performed in two scenarios.

The first scenario, which assumes GEN-2012-002 Interconnection Customer proceeds to interconnect prior to 2014 summer, has determined that the ASGI-2013-004 request can interconnect 0 MW (summer and winter peak) of generation as an Energy Resource prior to the completion of the required Network Upgrades, listed within Table 2 of this report. The constraint identified is the GEN-2012-002 Substation – Scott City 115kV line for the outage of the Holcomb 345/115kV transformer. An addition of a second Holcomb 345/115kV transformer has been identified in DISIS-2012-001 and has been assigned to three interconnection customers in that

DISIS Impact Study. The Holcomb transformer addition has a construction lead time of approximately 20 months.

Impact of GEN-2012-002

As indicated earlier in this report, GEN-2012-002 was determined to be a critical prior queued generator in this analysis. An additional scenario was run with GEN 2012-002 not in service. These results are in Table 6 below. There were no interconnection constraints identified in this scenario. The second scenario, which assumes that GEN-2012-002 Interconnection Customer does not proceed to interconnect until after the completion of its Network Upgrades has determined that the ASGI-2013-004 request can interconnect 27.6MW (summer peak) and 36.6MW (winter peak) of generation prior to the completion of the required Network Upgrades listed in Table 6 of this report.

ACCC results for the LOIS can be found in Table 4 and Table 5 below. Generator Interconnection Energy Resource analysis doesn’t mitigate for those issues in which the affecting GI request has less than a 20% OTDF, Table 5 is provided for informational purposes only so that the Customer understands there may be operational conditions when they may be required to reduce their output to maintain system reliability.

Curtailment and System Reliability

In no way does this study guarantee limited operation for all periods of time. It should be noted that although this LOIS 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 may be required to reduce their generation output to **0 MW** under certain system conditions to allow system operators to maintain the reliability of the transmission network.

Table 4: Interconnection Constraints for Mitigation of ASGI-2013-004 LOIS @ 36.6MW

Season	Dispatch Group	Flow	Monitored Element	RATEA (MVA)	RATEB (MVA)	TDF	TC% LOADING	Max MW Available	Contingency
13SP	00G13_004	FROM->TO	G12_002T 115.00 - SCOTT CITY 115KV CKT 1	165	198	0.607	119.8	0	HOLCOMB (HOLCOMB) 345/115/13.8KV TRANSFORMER CKT 1
13WP	00G13_004	FROM->TO	G12_002T 115.00 - SCOTT CITY 115KV CKT 1	165	198	0.607	115.0	0	HOLCOMB (HOLCOMB) 345/115/13.8KV TRANSFORMER CKT 1

Table 5: Additional Constraints of ASGI-2013-004 LOIS @ 36.6MW

Season	Dispatch Group	Flow	Monitored Element	RATEA (MVA)	RATEB (MVA)	TDF	TC% LOADING	ATC Available	Contingency
All			None					0	None

Table 6: Interconnection Constraints without GEN-2012-002

Season	Dispatch Group	Flow	Monitored Element	RATEA (MVA)	RATEB (MVA)	TDF	TC% LOADING	ATC Available	Contingency
All			None					0	None

Stability Analysis

Transient stability analysis is used to determine if the transmission system can maintain angular stability and ensure bus voltages stay within planning criteria bandwidth during and after a disturbance while considering the addition of a generator interconnection request.

Model Preparation

Transient stability analysis was performed using modified versions of the 2012 series of Model Development Working Group (MDWG) dynamic study models including the 2014 summer and 2013 winter peak dynamic cases. The cases were adapted to resemble the power flow study cases with regards to prior queued generation requests and topology as expected in June 2014. A sensitivity was also conducted for the topology and additional interconnection requests expected for in-service by end of December 2015. Finally the prior queued and study generation was dispatched into the SPP footprint. Initial simulations are then carried out for a no-disturbance run of twenty (20) seconds to verify the numerical stability of the model.

Disturbances

Fifty-six (56) contingencies were identified for the Limited Operation scenario for use in this study. These faults are listed within Table 7. These contingencies included three-phase faults and single-phase line faults at locations defined by SPP. Single-phase line faults were simulated by applying fault impedance to the positive sequence network at the fault location to represent the effect of the negative and zero sequence networks on the positive sequence network. The fault impedance was computed to give a positive sequence voltage at the specified fault location of approximately 60% of pre-fault voltage. This method is in agreement with SPP current practice.

With exception to transformers, the typical sequence of events for a three-phase and single-phase fault is as follows:

1. apply fault at particular location
2. continue fault for five (5) cycles, clear the fault by tripping the faulted facility
3. after an additional twenty (20) cycles, re-close the previous facility back into the fault
4. continue fault for five (5) additional cycles
5. trip the faulted facility and remove the fault

Transformer faults are typically only performed for three-phase faults, unless otherwise noted. Additionally the sequence of events for a transformer is to 1) apply a three-phase fault for five (5) cycles and 2) clear the fault by tripping the affected transformer facility. Unless otherwise noted there will be no re-closing into a transformer fault.

Table 7: Contingencies Evaluated for Limited Operation

Contingency Number and Name		Description
1	FLT_01_HOLCOMB7_FINNEY7_345kV_3PH	*3-Phase fault on the Finney – Holcomb345kV line near the Holcomb 345kV bus.*
2	FLT_02_HOLCOMB7_FINNEY7_345kV_1PH	*Single-phase fault similar to previous fault.*
3	FLT_03_HOLCOMB7_SETAB7_345kV_3PH	*3-Phase fault on the Holcomb – Setab 345kV line near the Holcomb 345kV bus.*
4	FLT_04_HOLCOMB7_SETAB7_345kV_1PH	*Single-phase fault similar to previous fault.*
5	FLT_05_HOLCOMB7_BUCKNER_345kV_3PH	*3-Phase fault on the Buckner – Holcomb 345kV line near the Holcomb 345kV bus.*
6	FLT_06_HOLCOMB7_BUCKNER_345kV_1PH	*Single-phase fault similar to previous fault.*
7	FLT_07_SETAB7_MINGO7_345kV_3PH	*3-Phase fault on the Mingo – Setab 345kV line near the Setab 345kV bus.*
8	FLT_08_SETAB7_MINGO7_345kV_1PH	*Single-phase fault similar to previous fault.*
9	FLT_09_MINGO7_REDWILLOW_345kV_3PH	*3-Phase fault on the Mingo – Red Willow 345kV line near the Mingo 345kV bus.*
10	FLT_10_MINGO7_REDWILLOW_345kV_1PH	*Single-phase fault similar to previous fault.*
11	FLT_11_FINNEY_HITCHLND7_345kV_3PH	*3-Phase fault on the Finney – Hitchland 345kV line near the Finney 345kV bus.*
12	FLT_12_FINNEY_HITCHLND7_345kV_1PH	*Single-phase fault similar to previous fault.*
13	FLT_13_BUCKNER_SPEARVLL7_345kV_3PH	*3-Phase fault on the Buckner – Spearville 345kV line near the Buckner 345kV bus.*
14	FLT_14_BUCKNER_SPEARVLL7_345kV_1PH	*Single-phase fault similar to previous fault.*
15	FLT_15_SPEARVLL7_POSTRCK7_345kV_3PH	*3-Phase fault on the Spearville – Post Rock 345kV line near the Spearville 345kV bus.*
16	FLT_16_SPEARVLL7_POSTRCK7_345kV_1PH	*Single-phase fault similar to previous fault.*
17	FLT_17_POSTRCK7_AXTELL_345kV_3PH	*3-Phase fault on the Axtell – Post Rock 345kV line near the Post Rock 345kV bus.*
18	FLT_18_POSTRCK7_AXTELL_345kV_1PH	*Single-phase fault similar to previous fault.*
19	FLT_19_MORRIS3_DOBSON3_115kV_3PH	*3-Phase fault on the Dobson – Morris 115kV line near the Morris 115kV bus.*
20	FLT_20_MORRIS3_DOBSON3_115kV_1PH	*Single-phase fault similar to previous fault.*
21	FLT_21_MORRIS3_IRSKDOL3_115kV_3PH	*3-Phase fault on the Irsik and Doll – Morris 115kV line near the Morris 115kV bus.*
22	FLT_22_MORRIS3_IRSKDOL3_115kV_1PH	*Single-phase fault similar to previous fault.*
23	FLT_23_DOBSON_LOWETAP3_115kV_3PH	*3-Phase fault on the Dobson – Lowe Tap 115kV line near the Dobson 115kV bus.*
24	FLT_24_DOBSON_LOWETAP3_115kV_1PH	*Single-phase fault similar to previous fault.*
25	FLT_25_DOBSON_KSAVWTP3_115kV_3PH	*3-Phase fault on the Dobson – Kansas Ave. Water Treatment Plant 115kV line near the Dobson 345kV bus.*
26	FLT_26_DOBSON_KSAVWTP3_115kV_1PH	*Single-phase fault similar to previous fault.*
27	FLT_27_DOBSON_GANO_115kV_3PH	*3-Phase fault on the Dobson – Gano 115kV line near the Dobson 115kV bus.*
28	FLT_28_DOBSON_GANO_115kV_1PH	*Single-phase fault similar to previous fault.*
29	FLT_29_GRDNCTY_HOLCOMB3_115kV_3PH	*3-Phase fault on the Garden City Plant – Holcomb 115kV line near the Garden City Plant 5kV bus.*
30	FLT_30_GRDNCTY_HOLCOMB3_115kV_1PH	*Single-phase fault similar to previous fault.*
31	FLT_31_GRDNCTY_KSAVWTP3_115kV_3PH	*3-Phase fault on the Garden City Plant – Kansas Ave. Water Treatment Plant 115kV line near the Garden City Plant 115kV bus.*
32	FLT_32_GRDNCTY_KSAVWTP3_115kV_1PH	*Single-phase fault similar to previous fault.*
33	FLT_33_HOLCOMB3_JONES3_115kV_3PH	*3-Phase fault on the Holcomb – Jones 115kV line near the Holcomb 115kV bus.*
34	FLT_34_HOLCOMB3_JONES3_115kV_1PH	*Single-phase fault similar to previous fault.*
35	FLT_35_HOLCOMB3_PLYMELL3_115kV_3PH	*3-Phase fault on the Holcomb – Plymell Switch 138kV line near the Holcomb 115kV bus.*
36	FLT_36_HOLCOMB3_PLYMELL3_115kV_1PH	*Single-phase fault similar to previous fault.*
37	FLT_37_HOLCOMB3_FLETCHR3_115kV_3PH	*3-Phase fault on the Holcomb – Fletcher 115kV line near the Holcomb 115kV bus.*

	Contingency Number and Name	Description
38	FLT_38_HOLCOMB3_FLETCHR3_115kV_1PH	*Single-phase fault similar to previous fault.*
39	FLT_39_G1202TAP_PILE_115kV_3PH	*3-Phase fault on the GEN-2012-002 Tap – Pile 115kV line near the GEN-2012-002 Tap 115kV bus.*
40	FLT_40_G1202TAP_PILE_115kV_1PH	*Single-phase fault similar to previous fault.*
41	FLT_41_G1202TAP_SCOTTCITY3_115kV_3PH	*3-Phase fault on the GEN-2012-002 Tap – Scott City 115kV line near the GEN-2012-002 Tap 115kV bus.*
42	FLT_42_G1202TAP_SCOTTCITY3_115kV_1PH	*Single-phase fault similar to previous fault.*
43	FLT_43_SCOTTCITY3_MANNGTAP_115kV_3PH	*3-Phase fault on the Manning Tap – Scott City 115kV line near the Scott City 115kV bus.*
44	FLT_44_SCOTTCITY3_MANNGTAP_115kV_1PH	*Single-phase fault similar to previous fault.*
45	FLT_45_SCOTTCITY3_SETAB_115kV_3PH	*3-Phase fault on the Scott City – Setab 115kV line near the Scott City 115kV bus.*
46	FLT_46_SCOTTCITY3_SETAB_115kV_1PH	*Single-phase fault similar to previous fault.*
47	FLT_47_SETAB3_CTYSERV_115kV_3PH	*3-Phase fault on the City Service – Setab 115kV line near the Setab 115kV bus.*
48	FLT_48_SETAB3_CTYSERV_115kV_1PH	*Single-phase fault similar to previous fault.*
49	FLT_49_RUBART_SATATAP3_115kV_3PH	*3-Phase fault on the Rubart – Satanta Tap 115kV line near the Rubart 115kV bus.*
50	FLT_50_RUBART_SATATAP3_115kV_1PH	*Single-phase fault similar to previous fault.*
51	FLT_51_RUBART_HICKOCK_115kV_3PH	*3-Phase fault on the Hickock – Rubart 115kV line near the Rubart 115kV bus.*
52	FLT_52_RUBART_HICKOCK_115kV_1PH	*Single-phase fault similar to previous fault.*
53	FLT_53_HOLCOMB3_HOLCOMB7_115_345kV_3PH	*3-Phase fault on the Holcomb 345kV/115kV transformer near the Holcomb 115kV bus.*
54	FLT_54_SETAB3_SETAB7_115_345kV_3PH	*3-Phase fault on the Setab 345kV/115kV transformer near the Setab 115kV bus.*
55	FLT_55_SPEARVLL6_SPEARVLL7_230_345kV_3PH	*3-Phase fault on the Spearville 345kV/230kV transformer near the Spearville 230kV bus.*
56	FLT_56_POSTRCK6_POSTRCK7_230_345kV_3PH	*3-Phase fault on the Post Rock 345kV/230kV transformer near the Post Rock 230kV bus.*

Results

Results of the stability analysis are summarized in Table 8. These results are valid for ASGI-2013-004 interconnecting with a generation amount up to 27.6 MW (summer peak) and 36.6 MW (winter peak). The results indicate that the transmission system remains stable for all contingencies studied. The plots will be available upon request.

Table 8: Fault Analysis Results for Limited Operation

	Contingency Number and Name	2014SP	2013WP
1	FLT_01_HOLCOMB7_FINNEY7_345kV_3PH	Stable	Stable
2	FLT_02_HOLCOMB7_FINNEY7_345kV_1PH	Stable	Stable
3	FLT_03_HOLCOMB7_SETAB7_345kV_3PH	Stable	Stable
4	FLT_04_HOLCOMB7_SETAB7_345kV_1PH	Stable	Stable
5	FLT_05_HOLCOMB7_BUCKNER_345kV_3PH	Stable	Stable
6	FLT_06_HOLCOMB7_BUCKNER_345kV_1PH	Stable	Stable
7	FLT_07_SETAB7_MINGO7_345kV_3PH	Stable	Stable
8	FLT_08_SETAB7_MINGO7_345kV_1PH	Stable	Stable
9	FLT_09_MINGO7_REDWILLOW_345kV_3PH	Stable	Stable
10	FLT_10_MINGO7_REDWILLOW_345kV_1PH	Stable	Stable
11	FLT_11_FINNEY_HITCHLND7_345kV_3PH	Stable	Stable
12	FLT_12_FINNEY_HITCHLND7_345kV_1PH	Stable	Stable
13	FLT_13_BUCKNER_SPEARVLL7_345kV_3PH	Stable	Stable

	Contingency Number and Name	2014SP	2013WP
14	FLT_14_BUCKNER_SPEARVLL7_345kV_1PH	Stable	Stable
15	FLT_15_SPEARVLL7_POSTRCK7_345kV_3PH	Stable	Stable
16	FLT_16_SPEARVLL7_POSTRCK7_345kV_1PH	Stable	Stable
17	FLT_17_POSTRCK7_AXTELL_345kV_3PH	Stable	Stable
18	FLT_18_POSTRCK7_AXTELL_345kV_1PH	Stable	Stable
19	FLT_19_MORRIS3_DOBSON3_115kV_3PH	Stable	Stable
20	FLT_20_MORRIS3_DOBSON3_115kV_1PH	Stable	Stable
21	FLT_21_MORRIS3_IRSKDOL3_115kV_3PH	Stable	Stable
22	FLT_22_MORRIS3_IRSKDOL3_115kV_1PH	Stable	Stable
23	FLT_23_DOBSON_LOWETAP3_115kV_3PH	Stable	Stable
24	FLT_24_DOBSON_LOWETAP3_115kV_1PH	Stable	Stable
25	FLT_25_DOBSON_KSAVWTP3_115kV_3PH	Stable	Stable
26	FLT_26_DOBSON_KSAVWTP3_115kV_1PH	Stable	Stable
27	FLT_27_DOBSON_GANO_115kV_3PH	Stable	Stable
28	FLT_28_DOBSON_GANO_115kV_1PH	Stable	Stable
29	FLT_29_GRDNCTY_HOLCOMB3_115kV_3PH	Stable	Stable
30	FLT_30_GRDNCTY_HOLCOMB3_115kV_1PH	Stable	Stable
31	FLT_31_GRDNCTY_KSAVWTP3_115kV_3PH	Stable	Stable
32	FLT_32_GRDNCTY_KSAVWTP3_115kV_1PH	Stable	Stable
33	FLT_33_HOLCOMB3_JONES3_115kV_3PH	Stable	Stable
34	FLT_34_HOLCOMB3_JONES3_115kV_1PH	Stable	Stable
35	FLT_35_HOLCOMB3_PLYMELL3_115kV_3PH	Stable	Stable
36	FLT_36_HOLCOMB3_PLYMELL3_115kV_1PH	Stable	Stable
37	FLT_37_HOLCOMB3_FLETCHR3_115kV_3PH	Stable	Stable
38	FLT_38_HOLCOMB3_FLETCHR3_115kV_1PH	Stable	Stable
39	FLT_39_G1202TAP_PILE_115kV_3PH	Stable	Stable
40	FLT_40_G1202TAP_PILE_115kV_1PH	Stable	Stable
41	FLT_41_G1202TAP_SCOTTCITY3_115kV_3PH	Stable	Stable
42	FLT_42_G1202TAP_SCOTTCITY3_115kV_1PH	Stable	Stable
43	FLT_43_SCOTTCITY3_MANNGTAP_115kV_3PH	Stable	Stable
44	FLT_44_SCOTTCITY3_MANNGTAP_115kV_1PH	Stable	Stable
45	FLT_45_SCOTTCITY3_SETAB_115kV_3PH	Stable	Stable
46	FLT_46_SCOTTCITY3_SETAB_115kV_1PH	Stable	Stable
47	FLT_47_SETAB3_CTYSERV_115kV_3PH	Stable	Stable
48	FLT_48_SETAB3_CTYSERV_115kV_1PH	Stable	Stable
49	FLT_49_RUBART_SATATAP3_115kV_3PH	Stable	Stable
50	FLT_50_RUBART_SATATAP3_115kV_1PH	Stable	Stable
51	FLT_51_RUBART_HICKOCK_115kV_3PH	Stable	Stable
52	FLT_52_RUBART_HICKOCK_115kV_1PH	Stable	Stable
53	FLT_53_HOLCOMB3_HOLCOMB7_115_345kV_3PH	Stable	Stable
54	FLT_54_SETAB3_SETAB7_115_345kV_3PH	Stable	Stable
55	FLT_55_SPEARVLL6_SPEARVLL7_230_345kV_3PH	Stable	Stable
56	FLT_56_POSTRCK6_POSTRCK7_230_345kV_3PH	Stable	Stable

Conclusion

<OMITTED TEXT> (Interconnection Customer, ASGI-2013-004) has requested a Limited Operation System Impact Study for the interconnection of 27.6 MW (summer peak) and 36.6 MW (winter peak) of generation to be interconnected as an Energy Resource (ER) into the distribution system served from a transmission facility of Sunflower Electric Power Corporation (SUNC) in Finney County, Kansas. The transmission system facility is the Morris 115kV substation on the Dobson (SUNC) – Irsik and Doll (SUNC) 115kV transmission line. ASGI-2013-004, has requested this Limited Operation Interconnection Study (LOIS) to determine the impacts of interconnecting to the transmission system before all required Network Upgrades identified in the DISIS-2013-002 Impact Study can be placed into service.

Power flow analysis from this LOIS has been performed in two scenarios. The first scenario, which assumes GEN-2012-002 Interconnection Customer proceeds to interconnect prior to 2014 summer, has determined that the ASGI-2013-004 request can interconnect 0 MW (summer and winter peak) of generation as an Energy Resource prior to the completion of the required Network Upgrades, listed within Table 2 of this report. The second scenario, which assumes that GEN-2012-002 Interconnection Customer does not proceed to interconnect until after the completion of its Network Upgrades has determined that the ASGI-2013-004 request can interconnect 27.6MW (summer peak) and 36.6MW (winter peak) of generation prior to the completion of the required Network Upgrades listed in Table 6 of this report.

Transient stability analysis indicates that with the reactive equipment identified for ASGI-2013-004, the transmission system will remain stable for the contingencies listed within Table 7 with the addition of ASGI-2013-004 generation.

Any changes to these assumptions, for example, one or more of the previously queued requests not included within this study execute an interconnection agreement and commencing commercial operation, will require a re-study of this LOIS at the expense of the Customer.

Nothing in this System Impact Study constitutes a request for transmission service or confers upon the Interconnection Customer any right to receive transmission service.