



Modification Impact Study for Generator Interconnection GEN-2011-008

June 2015
Generator Interconnection



Revision History

Date	Author	Change Description
06/26/2015	SPP	Modification Impact Study for Generator Interconnection GEN-2011-008 Report Issued

Executive Summary

<OMITTED TEXT> (“Interconnection Customer” or “GEN-2011-008”) has requested a modification to its Commercial Operation Date (“COD”) documented in the Milestones of its current Generator Interconnection Agreement (“GIA”). The Interconnection Customer has requested an advancement of its COD from 6/1/2019 to 10/1/2016. Modifications to an Interconnection Request are allowed under Section 4.4 of the GIP provided they do not cause a material impact on the cost or timing of an Interconnection Request with a later queue priority. SPP has determined that a study is required to determine if the modification can be allowed without harm to any lower (“later”) queued Interconnection Requests. This Modification System Impact Study (“MSIS”) analyzes 600 MW of wind generation to be interconnected as an Energy Resource (“ER”) into the transmission facilities of ITC-Great Plains (“ITCGP”), located in Clark County, Kansas.

The results of the analysis indicate that Interconnection Customer request to advance its COD does not cause harm to any later queued Interconnection Request.

Transient stability analysis was not performed for this MSIS study. It should be noted that although this MSIS 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 Customers 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.

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 shall be requested on Southwest Power Pool’s OASIS by the Customer.

This study fulfills SPP’s requirements in accordance with GIP 4.4.3 to evaluate the Customer’s modification. In accordance, with GIP 4.4.2, the Customer may choose to withdraw its request for modification.

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Purpose

<OMITTED TEXT> (“Interconnection Customer” or “GEN-2011-008”) has requested a modification to its Commercial Operation Date (“COD”) documented in the Milestones of its current Generator Interconnection Agreement (“GIA”). The Interconnection Customer has requested an advancement of its COD from 6/1/2019 to 10/1/2016. Modifications to an Interconnection Request are allowed under Section 4.4 of the GIP provided they do not cause a material impact on the cost or timing of an Interconnection Request with a later queue priority. SPP has determined that a study is required to determine if the modification can be allowed without harm to any lower queued Interconnection Requests. This Modification System Impact Study (“MSIS”) analyzes 600 MW of wind generation to be interconnected as an Energy Resource (“ER”) into the transmission facilities of ITC-Great Plains (“ITCGP”).

The purpose of this study is to reevaluate the impacts of interconnecting Generation Interconnection Request GEN-2011-008 for 600 MW, comprised of three hundred seventy-five (375) GE 1.6MW XLE wind turbine generators and associated facilities, into the Clark County 345kV substation located in Clark County, Kansas. The Customer has requested this amount to be studied as an Energy Resource (ER) with Interconnection Service to commence on or around October of 2016.

Only power flow analysis was conducted for this study. The MSIS 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 MSIS 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;
- d) have no Queue Position but have executed a GIA or requested that an unexecuted GIA be filed with FERC; or
- e) have a lower queued Interconnection Request that have requested an in-service date prior to the completion of their Network Upgrades.

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

This study included prior and later 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 10/2016 in-service of GEN-2011-008 for this MSIS. 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 MSIS

Project	MW	Total MW	Fuel Source	POI	Status
GEN-2001-039A	105.0	105.0	Wind	Shooting Star Tap 115kV	Commercial Operation
GEN-2002-025A	150.0	150.0	Wind	Spearville 230kV	Commercial Operation
GEN-2004-014	154.5	154.5	Wind	Spearville 230kV	Commercial Operation
GEN-2005-012	248.4	248.4	Wind	Ironwood 345kV	Commercial Operation
GEN-2006-021	100.0	100.0	Wind	Flat Ridge Tap 138kV	Commercial Operation
Gray County Wind (Montezuma)	110.0	110.0	Wind	Gray County Tap 115kV	Commercial Operation
GEN-2006-006	205.5	205.5	Wind	Spearville 345kV	IA Executed/On Suspension
GEN-2007-040	200.0	200.0	Wind	Buckner 345kV	Commercial Operation
GEN-2008-018	250.0	250.0	Wind	Finney 345kV	Commercial Operation
GEN-2008-079	98.9	98.9	Wind	Crooked Creek 115kV	Commercial Operation
GEN-2010-009	165.6	165.6	Wind	Buckner 345kV	Commercial Operation
GEN-2010-045	197.8	197.8	Wind	Buckner 345kV	IA Executed/On Schedule
ASGI-2012-006	22.5	22.5	Steam	Tap Hugoton - Rolla 69kV	
GEN-2012-007	120.0	120.0	Gas	Rubart 115kV	Commercial Operation
GEN-2012-024	180.0	180.0	Wind	Clark County 345kV	Transitioned to IFS QUEUE
GEN-2013-010	99.0	99.0	Wind	Tap Spearville - Post Rock (North of GEN-2011-017 Tap) 345kV	Transitioned to IFS QUEUE
GEN-2014-049	200.0	200.0	Wind	Thistle 345kV	Transitioned to IFS QUEUE
GEN-2011-008	600.0	600.0	Wind	Clark County 345kV	IA Executed/On Schedule

This study was required because the later queued Interconnection Requests are requesting interconnection prior to the completion of all of the assigned upgrades listed within the latest iteration of their Definitive Interconnection System Impact Study (“DISIS”). Table 2 below lists the required upgrade projects for which these requests have cost responsibility.

Table 2: Upgrade Projects not included but Required for Full Interconnection Service for later queued Interconnection Customer (GEN-2013-010)

Upgrade Project	Type	Description	Status
Clark County 100Mvar SVC	Most recent iteration of DISIS 2014-002.	Interconnection upgrade for DISIS 2014-002 Customers	Not authorized to begin construction
Rebuild Knoll – Post Rock 230kV CKT 1	Most recent iteration of DISIS 2014-002.	Interconnection upgrade for DISIS 2014-002 Customers	Not authorized to begin construction
Replace Terminal Equipment for Buckner – Spearville 345kV CKT 1	Most recent iteration of DISIS 2010-002. Previous Network Upgrade not responsibility of Customer but required to support full interconnection.	Interconnection upgrade for DISIS 2010-002 Customers	Current Estimated In-Service date of 12/31/2016
Viola – Sumner County 138kV CKT 1	Assumed to be out of service for the study.	2014 ITPNT (SPP-NTC-200296)	Current Estimated In-Service date of 6/1/2020
Rebuild FPL – Woodward 138kV CKT 1	Most recent iteration of DISIS 2011-001.	Interconnection upgrade for DISIS 2011-001 Customers	Not authorized to begin construction

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. The higher or equally queued projects 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 MSIS, either because no request for an MSIS has been made or the request is on suspension, etc.

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

Project	MW	Total MW	Fuel Source	POI	Status
GEN-2008-124	200.1	200.1	Wind	Ironwood 345kV	IA Executed/On Schedule
GEN-2011-016	200.1	200.1	Wind	Spearville 345kV	Transitioned to IFS QUEUE
GEN-2011-017	299.0	299.0	Wind	Tap Spearville - Post Rock (GEN-2011-017T) 345kV	IA Executed/On Schedule

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

Facilities

Generating Facility

Interconnection Customer GEN-2011-008 has requested interconnection of 600 MW, comprised of three hundred seventy-five (375) GE 1.6MW XLE wind turbine generators and associated facilities.

Interconnection Facilities

The POI for GEN-2011-008 are the ITCGP transmission facilities located at the Clark County 345kV substation in Clark County, Kansas. Figure 1 depicts the one-line diagram of the local transmission system, including the POI and the Generating Facility of GEN-2011-008.

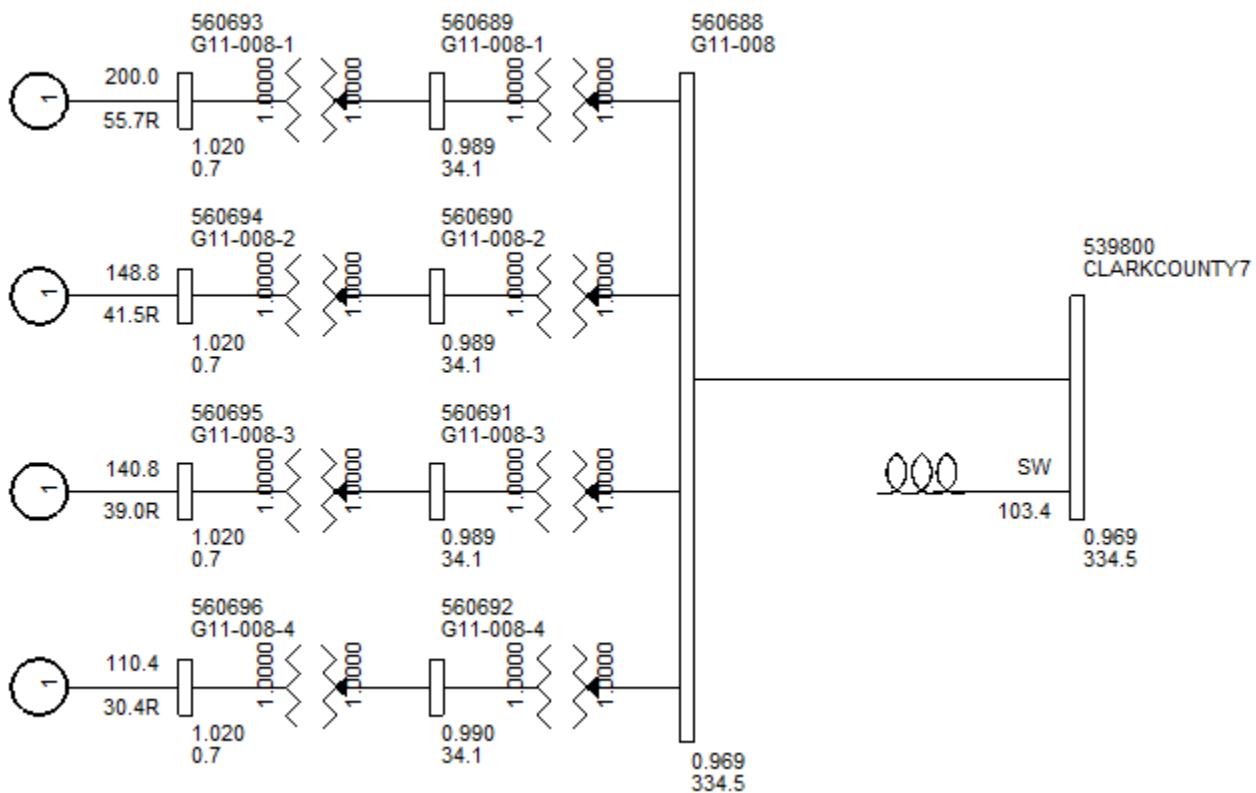


Figure 1: Proposed POI Configuration and Request Power Flow Model

Base Case Network Upgrades

The Network Upgrades included within the cases used for this study are those facilities that are a part of the SPP Integrated Transmission Plan, Transmission Expansion Plan or the Balanced Portfolio projects that have in-service dates prior to the modified COD for GEN-2011-008, December 2016. These facilities have an approved Notification to Construct (NTC), or are in construction stages and expected to be in-service at the effective time for this study. No other upgrades were included for this study. 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 2014 series of transmission service request study models including the 2015 (spring, summer, and winter), 2020 (summer, and winter) and 2025 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 Interconnection Request. For this MSIS, 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

The ACCC analysis indicates that the Interconnection Request can interconnect its generation into the SUNC/MKEC transmission system as requested without impacting later queued generation. ACCC results for the study can be found in Table 4 and Table 5 below. Table 4 lists the impacts to later queued Interconnection Requests due to the modification request. Table 5 reports the overloads that have less than a 20% TDF for which mitigation is not required. 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 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 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.

Southwest Power Pool, Inc. Power Flow Analysis
Power Flow Analysis

Table 4: Additional Interconnection Constraints for Later Queued Interconnection Requests

Interconnection Request	Monitored Element
GEN-2013-010	NONE Additional
GEN-2014-049	NONE Additional

Table 5: Additional Constraints of GEN-2011-008 MSIS @ 600MW

Season	Dispatch Group	Flow	Monitored Element	RATEA (MVA)	RATEB (MVA)	TDF	TC% LOADING	Contingency
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	122.91	BASE CASE
15G	03ALL		DBL-CLRK-THI	0	0	0.5589	9999	BASE CASE
15SP	03ALL		DBL-CLRK-THI	0	0	0.5584	9999	BASE CASE
15WP	03ALL		DBL-CLRK-THI	0	0	0.5569	9999	BASE CASE
15G	03ALL	TO->FROM	CLEARWATER - MILAN TAP 138KV CKT 1	110	110	0.0651	202.1911	DBL-THIS-WIC
15WP	03ALL	TO->FROM	CLEARWATER - MILAN TAP 138KV CKT 1	110	110	0.0648	171.0312	DBL-THIS-WIC
15SP	03ALL	TO->FROM	CLEARWATER - MILAN TAP 138KV CKT 1	110	110	0.0653	169.9472	DBL-THIS-WIC
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0601	164.187	DBL-THIS-WIC
15G	03ALL	FROM->TO	HARPER - MILAN TAP 138KV CKT 1	138.6	143.4	0.0651	163.6935	DBL-THIS-WIC
15SP	03ALL	FROM->TO	HARPER - MILAN TAP 138KV CKT 1	127.2	136.7	0.0653	160.3891	DBL-THIS-WIC
15WP	03ALL	FROM->TO	HARPER - MILAN TAP 138KV CKT 1	143.4	143.4	0.0648	152.5273	DBL-THIS-WIC
15G	03ALL	FROM->TO	CLEARWATER - GILL ENERGY CENTER WEST 138KV CKT 1	143	143	0.0651	147.4091	DBL-THIS-WIC
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0477	145.4277	NORTHWEST - TATONGA7 345.00 345KV CKT 1
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0477	142.181	SPSCONT-05B
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0477	141.565	SPSCONT-04
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0358	134.0692	WOODWARD (WOODWRD2) 138/69/13.2KV TRANSFORMER CKT 1
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0477	132.778	TATONGA7 345.00 - WOODWARD DISTRICT EHV 345KV CKT 1
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0477	129.6426	SPSCONT-05A
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0379	127.5422	IODINE - WOODWARD EHV 138KV CKT 1
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0379	125.9821	DEWEY - IODINE 138KV CKT 1
15SP	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0645	125.5267	DBL-THIS-WIC
15WP	03ALL	FROM->TO	CLEARWATER - GILL ENERGY CENTER WEST 138KV CKT 1	143	143	0.0648	123.6539	DBL-THIS-WIC
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	122.9057	BASE CASE
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	122.9057	BASE CASE
15SP	03ALL	FROM->TO	CLEARWATER - GILL ENERGY CENTER WEST 138KV CKT 1	143	143	0.0653	121.5599	DBL-THIS-WIC

Southwest Power Pool, Inc. Power Flow Analysis
Power Flow Analysis

Season	Dispatch Group	Flow	Monitored Element	RATEA (MVA)	RATEB (MVA)	TDF	TC% LOADING	Contingency
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0358	121.2454	WOODWARD - WOODWARD 69KV CKT 1
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0385	120.3036	THISTLE7 345.00 - WICHITA 345KV CKT 1
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0385	120.3036	THISTLE7 345.00 - WICHITA 345KV CKT 2
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0308	120.0702	RENFROW4 138.00 - SAND RDG_138138.00 138KV CKT 1
15G	03ALL	TO->FROM	CLEARWATER - MILAN TAP 138KV CKT 1	110	110	0.0346	119.2145	THISTLE7 345.00 - WICHITA 345KV CKT 1
15G	03ALL	TO->FROM	CLEARWATER - MILAN TAP 138KV CKT 1	110	110	0.0346	119.2145	THISTLE7 345.00 - WICHITA 345KV CKT 2
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0328	118.8893	RENFROW7 345.00 (BANK 1) 345/138/13.8KV TRANSFORMER CKT 1
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0308	117.4801	SAND RDG_138138.00 - WAKITA_138 138.00 138KV CKT 1
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0380	117.2377	RENFROW7 345.00 - VIOLA 7 345.00 345KV CKT 1
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0331	116.863	ELK CITY 230KV - SWEETWATER 230KV CKT 1
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0331	116.8568	ELK CITY 230KV (ELKCTY-6) 230/138/13.8KV TRANSFORMER CKT 1
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0347	115.7505	BORDER 7345.00 - TUCO INTERCHANGE 345KV CKT 1
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.035	114.8459	G13-010T 345.00 - POST ROCK 345KV CKT 1
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0327	114.4078	DEWEY - TALOGA 138KV CKT 1
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0331	114.3423	SPP-SWPS-03
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0331	114.0328	SPP-SWPS-02A
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0347	113.6573	BORDER 7345.00 - WOODWARD DISTRICT EHV 345KV CKT 1
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0331	113.5683	GRAPEVINE INTERCHANGE - STATELINE INTERCHANGE 230KV CKT 1
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0324	113.4731	GRAPEVINE INTERCHANGE - NICHOLS STATION 230KV CKT 1
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	113.3324	GEN514805 1-SOONER UNIT 1
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.035	113.3083	G13-010T 345.00 - SPEARVILLE 345KV CKT 1
15SP	03ALL	TO->FROM	MULLERGREN - SPEARVILLE 230KV CKT 1	398.4	398.4	0.113	113.0687	G13-010T 345.00 - POST ROCK 345KV CKT 1
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	113.0311	GEN520443 1-REDHIL-WTG1 12.000
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0338	112.8658	POTTER COUNTY INTERCHANGE (WAUK 90343-A) 345/230/13.2KV TRANSFORMER CKT 1
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0380	112.2954	VIOLA 7 345.00 - WICHITA 345KV CKT 1
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0320	111.9249	WOODRING (WOODRNG2) 345/138/13.8KV TRANSFORMER CKT 1
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0308	111.6707	SANDY_CN_138138.00 - WAKITA_138 138.00 138KV CKT 1
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0338	111.4414	SPP-SWPS-04
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0338	111.3569	Hitchland Interchange - POTTER COUNTY INTERCHANGE 345KV CKT 1
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	111.3249	GEN514806 1-SOONER UNIT 2
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	111.2118	GEN515787 1-OKLA WIND ENERGY CENTER
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0332	111.184	MINGO - SETAB 345KV CKT 1
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0338	110.788	SPSCONT-02
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	110.5447	GEN520922 1-SLEEPING BEAR
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0337	110.3258	AXTELL - POST ROCK 345KV CKT 1
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0321	110.0782	CIMARRON - NORTHWEST 345KV CKT 1
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	109.9674	GEN509416 1-TURK GENERATION

Southwest Power Pool, Inc. Power Flow Analysis
Power Flow Analysis

Season	Dispatch Group	Flow	Monitored Element	RATEA (MVA)	RATEB (MVA)	TDF	TC% LOADING	Contingency
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	109.9445	GEN509403 1-PIRKEY GENERATION
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0341	109.9032	BENTON - WICHITA 345KV CKT 1
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	109.846	GEN336821 1-GRAND GULF UNIT
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	109.6969	GEN337911 1-ARKANSAS NUCLEAR ONE UNIT #2
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	109.6568	GEN515226 1-MUSKOGEE 6G
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0326	109.5231	FLATRDG3 - HARPER 138KV CKT 1
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0326	109.4664	FARGO JCT - WOODWARD 69KV CKT 1
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0335	109.433	MINGO - RED WILLOW 345KV CKT 1
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	109.388	GEN336153 1-WATERFORD UNIT#3
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0328	109.3863	HOLCOMB - SETAB 345KV CKT 1
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	109.3853	GEN509406 1-WELSH #3
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	109.3851	GEN509404 1-WELSH #1
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	109.3781	GEN515225 1-MUSKOGEE 5G
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	109.3777	GEN515223 1-MUSKOGEE 4G
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0325	109.3336	SPP-MKEC-08
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0327	109.286	MULLERGREN - SPEARVILLE 230KV CKT 1
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	109.2356	GEN337910 1-ARKANSAS NUCLEAR ONE UNIT #1
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0325	109.2118	SMOKYHL6 230.00 - SUMMIT 230KV CKT 1
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	109.1988	GEN501801 1-DOLET HILLS UNIT1
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0331	109.1604	SPSCONT-01
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0326	109.1525	CIRCLE - MULLERGREN 230KV CKT 1
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	109.132	GEN511839 1-NORTHEASTERN STATION #2
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	109.1317	GEN520947 1-HUGO1
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	109.1273	GEN511840 1-NORTHEASTERN STATION #3
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	109.0972	GEN509394 1-FLINT CREEK
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0322	109.0891	GRAND ISLAND - SWEETWATER 345KV CKT 1
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	109.0797	GEN511841 1-NORTHEASTERN STATION #4
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	109.0673	GEN335831 1-RIVERBEND UNIT#1
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0311	109.0277	SOONER - WOODRING 345KV CKT 1
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0326	108.9794	HARPER - MILAN TAP 138KV CKT 1
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	108.9689	GEN509405 1-WELSH #2
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	108.925	GEN512688 2-GRDA1 GSU2 22
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0316	108.8957	ELK CITY - FALCON ROAD 138KV CKT 1
15G	03ALL	TO->FROM	CLEARWATER - MILAN TAP 138KV CKT 1	110	110	0.0328	107.0161	DBL-THIS-WWR
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	106.8396	NC1_GEN-NEBRASKA CITY 1
15SP	03ALL	TO->FROM	MULLERGREN - SPEARVILLE 230KV CKT 1	398.4	398.4	0.113	105.6318	G13-010T 345.00 - SPEARVILLE 345KV CKT 1
15WP	03ALL	TO->FROM	MULLERGREN - SPEARVILLE 230KV CKT 1	398.4	398.4	0.1132	105.5895	G13-010T 345.00 - POST ROCK 345KV CKT 1
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	104.7992	GEN560121 1-G08-47 0.5750

Southwest Power Pool, Inc. Power Flow Analysis
Power Flow Analysis

Season	Dispatch Group	Flow	Monitored Element	RATEA (MVA)	RATEB (MVA)	TDF	TC% LOADING	Contingency
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	104.7974	GEN562432 1-G13-030 0.6900
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	104.783	GEN527161 1-MUSTANG GEN #1
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	104.783	GEN527162 1-MUSTANG GEN #2
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	104.7373	GEN526332 1-JONES GEN #2 21 KV
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0315	104.7235	KNOBHILL (KNOBHIL4) 138/69/13.2KV TRANSFORMER CKT 1
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0315	104.6928	KNOBHILL - NOEL_SW 138.00 138KV CKT 1
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0311	104.6311	CLINTON AIR FORCE BASE TAP - HOBART JUNCTION 138KV CKT 1
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0308	104.4651	C_CITY_138 138.00 - NOEL_SW 138.00 138KV CKT 1
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	104.4565	GEN527163 1-MUSTANG GEN #3 22 KV
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	104.4499	GEN527882 1-CUNNINGHAM GEN #2 20 KV
15G	03ALL	TO->FROM	MULLERGREN - SPEARVILLE 230KV CKT 1	398.4	398.4	0.1119	104.4452	G13-010T 345.00 - POST ROCK 345KV CKT 1
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0311	104.427	CLINTON AIR FORCE BASE TAP - ELK CITY 138KV CKT 1
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	104.3974	GEN560514 1-G04_014 0.7000
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	104.3825	GEN515365 1-CENT 21 0.7000
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	104.3725	GEN640011 2-GERALD GENTLEMAN STATION UNIT 2
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	104.3321	GEN523116 1-BUFF_DUNES110.6900
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	104.3321	GEN523117 1-BUFF_DUNES210.6900
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	104.3236	GEN640010 1-GERALD GENTLEMAN STATION UNIT 1
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	104.292	GEN515393 1-OGWEND2G
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	104.2771	GEN635214 4-NEAL UNIT 4
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	104.2609	GEN527901 1-HOBBS PLANT #1 (CT)
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	104.2609	GEN527902 1-HOBBS PLANT #2 (CT)
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	104.2329	GEN542902 1-GPW_G1 0.7000
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	104.2055	GEN560695 1-G11-008-3 0.6900
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0310	104.1628	WOODWARD - WOODWARD EHV 138KV CKT 2
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	104.113	GEN635023 3-WALTER SCOTT UNIT 3
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	104.0854	GEN560694 1-G11-008-2 0.6900
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0310	104.0243	CIMARRON - MATHWSN7 345.00 345KV CKT 1
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	103.9613	GEN527166 1-MUSTANG_6 118.000
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0316	103.9508	BVRCNTY7 345.00 - WOODWARD DISTRICT EHV 345KV CKT 1
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0316	103.9508	BVRCNTY7 345.00 - WOODWARD DISTRICT EHV 345KV CKT 2
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0310	103.8994	MATHWSN7 345.00 - WOODRING 345KV CKT 1
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	103.8328	GEN635213 3-NEAL UNIT 3
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	103.805	GEN539807 1-G05-12-1 0.6900
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0374	103.7949	DBL-IRON-CLR
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0311	103.7486	CLINTON JUNCTION - ELK CITY 138KV CKT 1
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	103.728	GEN560238 1-G10-09 0.6900
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	103.5867	GEN526331 1-JONES GEN #1 22 KV

Southwest Power Pool, Inc. Power Flow Analysis
Power Flow Analysis

Season	Dispatch Group	Flow	Monitored Element	RATEA (MVA)	RATEB (MVA)	TDF	TC% LOADING	Contingency
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	103.4986	GEN562298 1-G12-024 0.6500
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0305	103.3068	EL RENO - ROMAN NOSE 138KV CKT 1
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	103.1736	GEN531601 1-SPVLW4-7 0.6900
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	103.1442	GEN531503 1-CIMRRN 1 0.6900
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	103.1438	GEN527903 1-HOBBS PLANT #3 (ST)
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	103.1394	GEN560693 1-G11-008-1 0.6900
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	103.1081	GEN560329 1-G10-45 0.6900
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	103.0568	GEN635024 4-WALTER SCOTT UNIT 4
15WP	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	171	185	0.0658	103.0269	DBL-THIS-WIC
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0305	103.0185	ROMAN NOSE - SOUTHARD 138KV CKT 1
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	102.7859	GEN562565 1-G14_049_3 0.6900
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	102.5944	GEN523971 1-HARRINGTON GEN #1 24 KV
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	102.5943	GEN523973 1-HARRINGTON GEN #3 24 KV
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	102.5941	GEN523972 1-HARRINGTON GEN #2 24 KV
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0305	102.4484	DEWEY - SOUTHARD 138KV CKT 1
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	102.0771	GEN659118 1-LARAMIE RIVER UNIT1
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0309	101.3456	DBL-HTCH-BVR
15SP	03ALL	TO->FROM	MULLERGREN - SPEARVILLE 230KV CKT 1	398.4	398.4	0.1006	100.7094	DBL-THIS-WIC
15G	03ALL	FROM->TO	HARPER - MILAN TAP 138KV CKT 1	138.6	143.4	0.0346	100.1545	THISTLE7 345.00 - WICHITA 345KV CKT 1
15G	03ALL	FROM->TO	HARPER - MILAN TAP 138KV CKT 1	138.6	143.4	0.0346	100.1545	THISTLE7 345.00 - WICHITA 345KV CKT 2
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	99.8	GEN531447 1-HOLCOMB GENERATOR
15G	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0318	99.6	GEN525561 1-TOLK GEN #1 24 KV
15WP	03ALL	TO->FROM	MULLERGREN - SPEARVILLE 230KV CKT 1	398.4	398.4	0.1132	98.3	G13-010T 345.00 - SPEARVILLE 345KV CKT 1
15SP	03ALL	TO->FROM	FPL SWITCH - WOODWARD 138KV CKT 1	133	153	0.0522	97.3	NORTHWEST - TATONGA7 345.00 345KV CKT 1
15G	03ALL	TO->FROM	MULLERGREN - SPEARVILLE 230KV CKT 1	398.4	398.4	0.1119	97.1	G13-010T 345.00 - SPEARVILLE 345KV CKT 1
15SP	03ALL	FROM->TO	HARPER - MILAN TAP 138KV CKT 1	127.2	136.7	0.0350	95.2	THISTLE7 345.00 - WICHITA 345KV CKT 1
15SP	03ALL	FROM->TO	HARPER - MILAN TAP 138KV CKT 1	127.2	136.7	0.0350	95.2	THISTLE7 345.00 - WICHITA 345KV CKT 2

Stability Analysis

Transient stability analysis was not performed for this MSIS study. The results from DISIS 2011-001-6 remain valid.

Conclusion

Interconnection Customer GEN-2011-008 requested a modification to its COD documented in the Milestones of its current GIA. The Interconnection Customer has requested an advancement of its COD from 6/1/2019 to 10/1/2016. Modifications to an Interconnection Request are allowed under Section 4.4 of the GIP provided they do not cause a material impact on the cost or timing of an Interconnection Request with a later queue priority.

Analysis from this study has determined that the advancement of the GEN-2011-008 COD from June 2019 to October 2016 does not cause a material impact on the cost or timing of any later queued Interconnection Request.

Transient stability analysis was not performed for this MSIS. The results from the latest iteration of DISIS-2011-001 remain valid.

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 MSIS at the expense of the Customer.

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