Feasibility Study
For
Generation Interconnection Request
GEN-2007-011

SPP Tariff Studies
(#GEN-2007-011)

September, 2007

Executive Summary

<OMITTED TEXT> (Customer) has requested a Feasibility Study for the purpose of interconnecting 135 MW of wind generation within the control area of Sunflower Electric Power Corporation (SUNC) located in Hamilton County, Kansas. The proposed method of interconnection is to add a new 115 kV breaker and line terminal at the existing Syracuse switching station, owned by SUNC. The proposed in-service date is November 1, 2008.

Power flow analysis has indicated that for the powerflow cases studied, it is possible to interconnect the 135 MW of generation with transmission system reinforcements within the local transmission system. In order to maintain acceptable reactive power compensation, the customer will be required to pay for the installation of a combined total of at least 20 Mvar of 34.5 kV capacitor bank(s) to be installed in the Customer's collector substation. Dynamic Stability studies performed as part of the System Impact Study will provide additional guidance as to whether the required reactive compensation can be static or a portion must be dynamic (such as a SVC).

The requirement to interconnect the 135 MW of wind generation into the existing Syracuse Switching Station, owned by SUNC, consists of adding a new 115 kV breaker and line terminal. The Customer did not propose a specific route for the 115 kV line extending to serve its 115/34.5 kV facilities. It is assumed that obtaining all necessary right-of-way for the new transmission line to serve its facilities will not be a significant expense.

The total minimum cost for building the required facilities for this 135 MW of generation is $625,000. These costs are shown in Table 1. Network constraints in the Midwest Energy (MIDW), Southwestern Public Service Company (SPS), SUNC, West Plains (WEPL), and Westar Energy (WERE) transmission systems that were identified are shown in Table 3. These Network constraints will have to be verified with a Transmission Service Request (TSR) and associated studies. Network Constraints are in the local area of the new generation when this generation is sunk throughout the SPP footprint for the Energy Resource (ER) Interconnection request. With a defined source and sink in a Transmission Service Request, this list of Network Constraints will be refined and expanded to account for all Network Upgrade requirements. This cost does not include building the 115 kV line from the Customer 115/34.5 kV collector substation into the point of interconnection. This cost also does not include the Customer's 115/34.5 kV collector substation or the 34.5 kV, 20 Mvar capacitor bank(s).

In Table 4, a value of Available Transfer Capability (ATC) associated with each overloaded facility is included. These values may be used by the Customer for future analyses including the determination of lower generation capacity levels that may be installed. When transmission service associated with this interconnection is evaluated, the loading of the facilities listed in this table may be greater due to higher priority reservations. If the loading of a facility is higher, the level of ATC will be lower.

There are several other proposed generation additions in the general area of the Customer's facility. It was assumed in this preliminary analysis that not all of these other projects within the SPS and SUNC control areas will be in service. Those previously queued projects that have advanced to nearly complete phases were included in this Feasibility Study. In the event that another request for a generation

interconnection with a higher priority withdraws, then this request may have to be re-evaluated to determine the local Network Constraints.

The required interconnection costs listed in Tables 1 and 2 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 through Southwest Power Pool's OASIS.

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Introduction

<OMITTED TEXT> (Customer) has requested a Feasibility Study for the purpose of interconnecting 135 MW of wind generation within the control area of Sunflower Electric Power Corporation (SUNC) located in Hamilton County, Kansas. The proposed method of interconnection is to add a new 115 kV breaker and line terminal at the existing Syracuse switching station, owned by SUNC. The proposed in-service date is November 1, 2008.

Interconnection Facilities

The primary objective of this study is to identify the system problems associated with connecting the plant to the area transmission system. The Feasibility and other subsequent Interconnection Studies are designed to identify attachment facilities, Network Upgrades and other Direct Assignment Facilities needed to accept power into the grid at the interconnection receipt point.

The requirements for interconnection of the 135 MW consist of adding a new 115 kV breaker and line terminal at the existing Syracuse Switching Station, owned by SUNC. A preliminary one-line drawing of the interconnection facilities are shown in Figure 1. The Customer did not propose a specific route of its 115 kV line to serve its 115/34.5 kV collection system facilities. It is assumed that obtaining all necessary right-of-way for construction of the Customer 115 kV transmission line and the 115/34.5 kV collector substation will not be a significant expense.

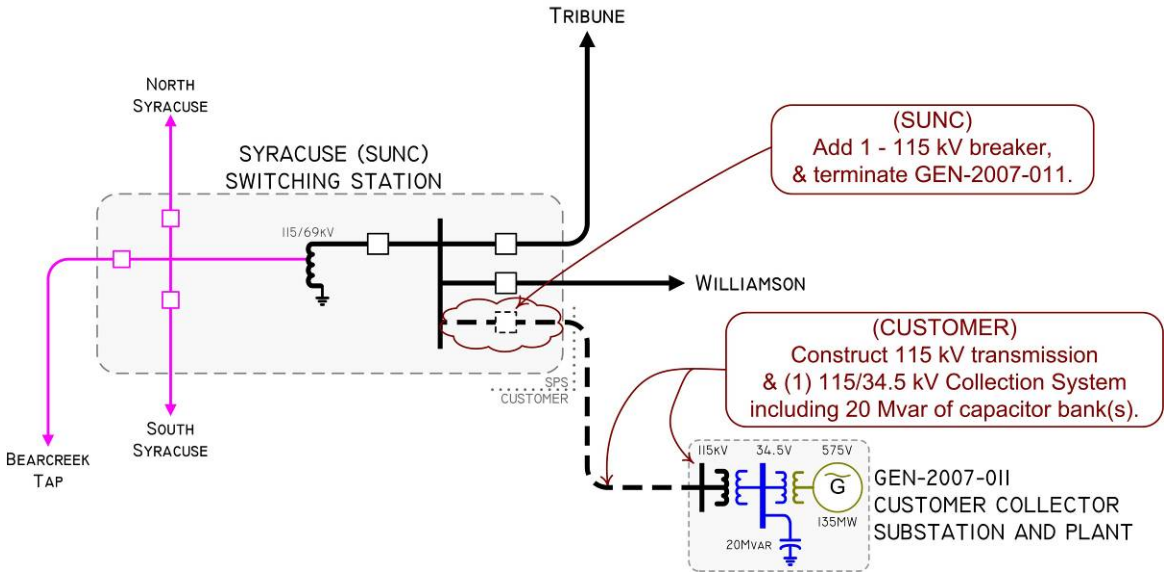

Figure 1: Proposed Method of Interconnection

(Final design to be determined)

Interconnection Estimated Costs

The minimum cost for adding a new breaker and terminating the transmission line serving GEN-2007-011 facilities is estimated at $622,939. These costs are listed in Tables 1 and 2. These estimates will be refined during the development of the System Impact Study based on the final designs. This cost does not include building the Customer's 115 kV transmission line extending from the point of interconnection to serve its 115/34.5 kV collection facilities. This cost also does not include the Customer's 115/34.5 kV collector substation or the 20 Mvar of capacitor bank(s), all of which should be determined by the Customer. The Customer is responsible for these 115 kV – 34.5 kV facilities up to the point of interconnection. Other Network Constraints in the Midwest Energy (MIDW), Southwestern Public Service Company (SPS), SUNC, West Plains (WEPL), and Westar Energy (WERE) transmission systems that were identified are shown in Table 3.

These costs do not include any cost that might be associated with short circuit study results or dynamic stability study results. These costs will be determined when and if a System Impact Study is conducted.

Table 1: Direct Assignment Facilities

FACILITY	ESTIMATED COST (2007 DOLLARS)
CUSTOMER – (1) 115/34.5 kV Customer collector substation facilities.	*
CUSTOMER – (1) 115 kV transmission line from Customer collector substation to the Syracuse switching station.	*
CUSTOMER – 34.5 kV, 20 Mvar capacitor bank(s) to be installed in the Customer 115/34.5 kV collector substation.	*
CUSTOMER – Right-of-Way for all Customer facilities.	*
SUNC – (1) 115 kV breaker and terminal for GEN-2007-011 at Syracuse Switching Station.	$625,000
TOTAL	*****

* *Estimates of cost to be determined.*

Table 2: Required Interconnection Network Upgrade Facilities

FACILITY	ESTIMATED COST (2007 DOLLARS)
None identified at this time.	*
TOTAL	*****

* *Estimates of cost to be determined.*

Powerflow Analysis

A powerflow analysis was conducted for the facility using modified versions of the 2008 winter peak model, the 2009 and 2012 summer and winter peak models, and the 2017 summer peak model. The output of the Customer's facility was offset in each model by a reduction in output of existing online SPP generation. This method allows the request to be studied as an Energy Resource (ER) Interconnection request. The proposed in-service date of the generation is November 1, 2008. The available seasonal models used were through the 2017 Summer Peak of which is the end of the current SPP planning horizon.

Following current practice, this analysis was conducted assuming that previous queued requests in the immediate area of this interconnect request were in service. The analysis of the Customer's project indicates that, given the requested generation level of 135 MW and location, additional criteria violations will occur on the existing MIDW, SPS, SUNC, WEPL, and WERE transmission systems under steady state and contingency conditions in the peak seasons. Table 3 lists these overloaded facilities.

In Table 4, a value of Available Transfer Capability (ATC) associated with each overloaded facility is included. These values may be used by the Customer to determine lower generation capacity levels that may be installed. When transmission service associated with this interconnection is evaluated, the loading of the facilities listed in this table may be greater due to higher priority reservations. When a facility is overloaded for more than one contingency, only the highest loading on the facility for each season is included in the table.

Voltage violations for load serving buses within the SPP footprint were also observed for some of the contingencies listed in Table 3. These voltage violations have not been listed in this report.

In order to maintain a zero reactive power flow exchanged at the point of interconnection, additional reactive compensation is required. The Customer will be required to install a combined total of 20 Mvar of capacitor bank(s) in the Customer's 115/34.5 kV collector substation on the 34.5 kV bus. Dynamic Stability studies performed as part of the System Impact Study will provide additional guidance as to whether the reactive compensation can be static or a portion must be dynamic (such as a SVC or STATCOM). It is possible that an SVC or STATCOM device will be required at the Customer facility because of FERC Order 661A Low Voltage Ride-Through Provisions (LVRT) which went into effect January 1, 2006. FERC Order 661A orders that wind farms stay on-line for 3-phase faults at the point of interconnection even if that requires the installation of a SVC or STATCOM device.

There are several other proposed generation additions in the general area of the Customer's facility. Some of the local projects that were previously queued were assumed to be in service in this Feasibility Study. Not all local projects that were previously queued and have advanced to nearly complete phases were included in this Feasibility Study.

Powerflow Analysis Methodology

The Southwest Power Pool (SPP) criteria states that: “The transmission system of the SPP region shall be planned and constructed so that the contingencies as set forth in the Criteria will meet the applicable NERC Planning Standards for System Adequacy and Security – Transmission System Table I hereafter referred to as NERC Table I) and its applicable standards and measurements”.

Using the created models and the ACCC function of PSS\E, single contingencies in portions or all of the modeled control areas of Sunflower Electric Power Corporation (SUNC), Missouri Public Service (MIPU), Westar Energy (WERE), Kansas City Power & Light (KCPL), West Plains (WEPL), Midwest Energy (MIDW), Oklahoma Gas and Electric OKGE, American Electric Power West (AEPW), Grand River Dam Authority (GRDA), Southwestern Public Service Company (SPS), Western Farmers Electric Cooperative (WFEC) and other control areas were applied and the resulting scenarios analyzed. This satisfies the ‘more probable’ contingency testing criteria mandated by NERC and the SPP criteria.

Powerflow Results

Table 3: Network Constraints

AREA	OVERLOADED ELEMENT
MIDW	ALEXANDER - NESS CITY 115KV CKT 1
MIDW	HEIZER 115/69KV TRANSFORMER CKT 2
MIDW/WEPL	ST JOHN - ST_JOHN 115KV CKT 1
SPS	HARRINGTON STATION - NICHOLS STATION 230KV CKT 1
SPS	HARRNG_MID6 230.00 - NICHOLS STATION 230KV CKT 2
SPS	LUBBOCK POWER & LIGHT-HOLLY PLANT 230/69KV TRANSFORMER CKT 1
SPS	LUBBOCK POWER & LIGHT-SOUTHEAST 230/69KV TRANSFORMER CKT 1
SPS	LUBBOCK POWER & LIGHT-WADSWORTH 230/69KV TRANSFORMER CKT 1
SPS	POTTER COUNTY INTERCHANGE (POTTR CO) 345/230/13.2KV TRANSFORMER CKT 1
SPS/WEPL	EAST LIBERAL - TEXAS COUNTY INTERCHANGE PHASE SHIFT TFMR 115KV CKT 1
SUNC	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1
SUNC	2006-34 115.00 - KANARADO 115KV CKT 1
SUNC	CITIES SERVICE TAP - SETAB 115KV CKT 1
SUNC	FLETCHER - WILLIAMSON 115KV CKT 1
SUNC	HOLCOMB - PLYMELL 115KV CKT 1
SUNC	JOHNCR 3 115.00 (JOHNXFMR) 115/69/13.8KV TRANSFORMER CKT 1
SUNC	JOHNSON - ULU PLT2 69KV CKT 1
SUNC	KANARADO - NATIONAL SUNFLOWER INDUSTRY TAP 115KV CKT 1
SUNC	NATIONAL SUNFLOWER INDUSTRY TAP - RULETON 115KV CKT 1
SUNC	PIONEER TAP - PLYMELL 115KV CKT 1
SUNC	SYRACUSE - WILLIAMSON 115KV CKT 1
WEPL	CIMARRON RIVER PLANT - NORTH LIBERAL TAP 115KV CKT 1
WEPL	GREAT BEND TAP - SEWARD 115KV CKT 1
WEPL	HARPER - MEDICINE LODGE 138KV CKT 1
WEPL	MEDICINE LODGE - SUN CITY 115KV CKT 1
WEPL	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1
WEPL	MULLERGREN - SPEARVILLE 230KV CKT 1
WEPL	SEWARD - ST JOHN 115KV CKT 1
WEPL/WERE	CIRCLE - MULLERGREN 230KV CKT 1
WERE	AUBURN - JEFFERY ENERGY CENTER 230KV CKT 1
WERE	CIRCLE - RENO COUNTY 115KV CKT 1
WERE	CIRCLE - RENO COUNTY 115KV CKT 2
WERE	NEOSHO - NORTHEAST PARSONS 138KV CKT 1
MIDW	Midwest Energy
SPS	Southwestern Public Service
SUNC	Sunflower Electric Power Corporation
WEPL	West Plains
WERE	Westar

Table 4: Contingency Analysis

SEASON	OVERLOADED ELEMENT	RATING (MVA)	LOADING (%)	ATC (MW)	CONTINGENCY
08WP	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	151	0	2003-13 345.00 - POTTER COUNTY INTERCHANGE 345KV CKT 1
08WP	HARPER - MEDICINE LODGE 138KV CKT 1	72	143	0	2003-13 345.00 - POTTER COUNTY INTERCHANGE 345KV CKT 1
08WP	SEWARD - ST JOHN 115KV CKT 1	80	127	0	CIRCLE - MULLERGREN 230KV CKT 1
08WP	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	56	126	0	BASE CASE
08WP	MEDICINE LODGE - SUN CITY 115KV CKT 1	80	115	0	2003-13 345.00 - POTTER COUNTY INTERCHANGE 345KV CKT 1
08WP	AUBURN - JEFFERY ENERGY CENTER 230KV CKT 1	565	108	0	HOYT - JEFFERY ENERGY CENTER 345KV CKT 1
08WP	JOHNCR 3 115.00 (JOHNXFMR) 115/69/13.8KV TRANSFORMER CKT 1	41	132	64	SYRACUSE - WILLIAMSON 115KV CKT 1
08WP	SYRACUSE - WILLIAMSON 115KV CKT 1	98	131	83	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1
08WP	FLETCHER - WILLIAMSON 115KV CKT 1	98	130	85	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1
08WP	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1	143	108	103	SYRACUSE - WILLIAMSON 115KV CKT 1
08WP	JOHNSON - ULU PLT2 69KV CKT 1	38	120	104	SYRACUSE - WILLIAMSON 115KV CKT 1
08WP	CITIES SERVICE TAP - SETAB 115KV CKT 1	143	104	120	SYRACUSE - WILLIAMSON 115KV CKT 1
08WP	POTTER COUNTY INTERCHANGE (POTTR CO) 345/230/13.2KV TRANSFORMER CKT 1	560	101	121	TOLK UNIT (GEN525562 1)
08WP	2006-34 115.00 - KANARADO 115KV CKT 1	98	100	134	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1
09SP	SEWARD - ST JOHN 115KV CKT 1	80	152	0	CIRCLE - MULLERGREN 230KV CKT 1
09SP	HEIZER 115/69KV TRANSFORMER CKT 2	24	143	0	BASE CASE
09SP	MEDICINE LODGE - SUN CITY 115KV CKT 1	80	140	0	2003-13 345.00 - POTTER COUNTY INTERCHANGE 345KV CKT 1
09SP	LUBBOCK POWER & LIGHT-HOLLY PLANT 230/69KV TRANSFORMER CKT 1	100	129	0	LUBBOCK POWER & LIGHT-SOUTHEAST - LUBBOCK SOUTH INTERCHANGE 230KV CKT 1
09SP	LUBBOCK POWER & LIGHT-SOUTHEAST 230/69KV TRANSFORMER CKT 1	100	127	0	JONES STATION - LUBBOCK POWER & LIGHT-HOLLY PLANT 230KV CKT 1
09SP	MULLERGREN - SPEARVILLE 230KV CKT 1	355	125	0	2003-13 345.00 - POTTER COUNTY INTERCHANGE 345KV CKT 1
09SP	POTTER COUNTY INTERCHANGE (POTTR CO) 345/230/13.2KV TRANSFORMER CKT 1	560	122	0	TOLK UNIT (GEN525562 1)
09SP	GREAT BEND TAP - SEWARD 115KV CKT 1	90	121	0	CIRCLE - MULLERGREN 230KV CKT 1
09SP	HARRINGTON STATION - NICHOLS STATION 230KV CKT 1	635	119	0	HARRNG_MID6 230.00 - NICHOLS STATION 230KV CKT 2
09SP	HARRNG_MID6 230.00 - NICHOLS STATION 230KV CKT 2	635	118	0	HARRINGTON STATION - NICHOLS STATION 230KV CKT 1
09SP	HARPER - MEDICINE LODGE 138KV CKT 1	72	116	0	2003-13 345.00 - POTTER COUNTY INTERCHANGE 345KV CKT 1
09SP	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	116	0	2003-13 345.00 - POTTER COUNTY INTERCHANGE 345KV CKT 1
09SP	LUBBOCK POWER & LIGHT-WADSWORTH 230/69KV TRANSFORMER CKT 1	100	114	0	LUBBOCK POWER & LIGHT-SOUTHEAST - LUBBOCK SOUTH INTERCHANGE 230KV CKT 1
09SP	CIMARRON RIVER PLANT - NORTH LIBERAL TAP 115KV CKT 1	115	111	0	2003-13 345.00 - POTTER COUNTY INTERCHANGE 345KV CKT 1
09SP	ST JOHN - ST_JOHN 115KV CKT 1	88	108	18	CIRCLE - MULLERGREN 230KV CKT 1
09SP	EAST LIBERAL - TEXAS COUNTY INTERCHANGE PHASE SHIFT TFMR 115KV CKT 1	119	113	31	2003-13 345.00 - POTTER COUNTY INTERCHANGE 345KV CKT 1
09SP	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1	143	126	65	SYRACUSE - WILLIAMSON 115KV CKT 1
09SP	SYRACUSE - WILLIAMSON 115KV CKT 1	98	149	65	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1

TABLE 4: Contingency Analysis (continued)

SEASON	OVERLOADED ELEMENT	RATING (MVA)	LOADING (%)	ATC (MW)	CONTINGENCY
09SP	FLETCHER - WILLIAMSON 115KV CKT 1	98	148	67	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1
09SP	CITIES SERVICE TAP - SETAB 115KV CKT 1	143	122	76	SYRACUSE - WILLIAMSON 115KV CKT 1
09SP	2006-34 115.00 - KANARADO 115KV CKT 1	98	112	82	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1
09SP	KANARADO - NATIONAL SUNFLOWER INDUSTRY TAP 115KV CKT 1	98	110	91	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1
09SP	NATIONAL SUNFLOWER INDUSTRY TAP - RULETON 115KV CKT 1	98	108	101	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1
09SP	CIRCLE - MULLERGREN 230KV CKT 1	319	102	107	2003-13 345.00 - POTTER COUNTY INTERCHANGE 345KV CKT 1
09SP	ALEXANDER - NESS CITY 115KV CKT 1	101	102	114	MULLERGREN - SPEARVILLE 230KV CKT 1
09WP	SEWARD - ST JOHN 115KV CKT 1	80	144	0	CIRCLE - MULLERGREN 230KV CKT 1
09WP	CIRCLE - RENO COUNTY 115KV CKT 2	92	123	0	CIRCLE - RENO COUNTY 115KV CKT 1
09WP	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	120	0	2003-13 345.00 - POTTER COUNTY INTERCHANGE 345KV CKT 1
09WP	MEDICINE LODGE - SUN CITY 115KV CKT 1	80	119	0	MULLERGREN - SPEARVILLE 230KV CKT 1
09WP	HOLCOMB - PLYMELL 115KV CKT 1	143	113	0	(SPP-SUNC-05): PIONEER - PK-GOAB 115KV CKT 1, PK-GOAB - FLETCHER 115KV CKT 1, AND PK-GOAB - PUCKETT 115KV CKT 1
09WP	PIONEER TAP - PLYMELL 115KV CKT 1	143	110	0	(SPP-SUNC-05): PIONEER - PK-GOAB 115KV CKT 1, PK-GOAB - FLETCHER 115KV CKT 1, AND PK-GOAB - PUCKETT 115KV CKT 1
09WP	HARPER - MEDICINE LODGE 138KV CKT 1	72	114	0	2003-13 345.00 - POTTER COUNTY INTERCHANGE 345KV CKT 1
09WP	SYRACUSE - WILLIAMSON 115KV CKT 1	98	162	46	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1
09WP	FLETCHER - WILLIAMSON 115KV CKT 1	98	161	48	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1
09WP	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1	143	137	53	SYRACUSE - WILLIAMSON 115KV CKT 1
09WP	CITIES SERVICE TAP - SETAB 115KV CKT 1	143	133	62	SYRACUSE - WILLIAMSON 115KV CKT 1
09WP	2006-34 115.00 - KANARADO 115KV CKT 1	98	107	104	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1
09WP	KANARADO - NATIONAL SUNFLOWER INDUSTRY TAP 115KV CKT 1	98	106	108	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1
09WP	NATIONAL SUNFLOWER INDUSTRY TAP - RULETON 115KV CKT 1	98	105	115	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1
09WP	POTTER COUNTY INTERCHANGE (POTTR CO) 345/230/13.2KV TRANSFORMER CKT 1	560	101	123	TOLK UNIT (GEN525562 1)
09WP	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1	120	102	124	BASE CASE
09WP	SYRACUSE - WILLIAMSON 115KV CKT 1	83	107	124	BASE CASE
09WP	FLETCHER - WILLIAMSON 115KV CKT 1	83	106	126	BASE CASE
12SP	SEWARD - ST JOHN 115KV CKT 1	80	135	0	CIRCLE - MULLERGREN 230KV CKT 1
12SP	MEDICINE LODGE - SUN CITY 115KV CKT 1	80	126	0	2003-13 345.00 - POTTER COUNTY INTERCHANGE 345KV CKT 1
12SP	HARRINGTON STATION - NICHOLS STATION 230KV CKT 1	635	119	0	HARRNG_MID6 230.00 - NICHOLS STATION 230KV CKT 2
12SP	HARRNG_MID6 230.00 - NICHOLS STATION 230KV CKT 2	635	118	0	HARRINGTON STATION - NICHOLS STATION 230KV CKT 1
12SP	MULLERGREN - SPEARVILLE 230KV CKT 1	355	117	0	2003-13 345.00 - POTTER COUNTY INTERCHANGE 345KV CKT 1
12SP	POTTER COUNTY INTERCHANGE (POTTR CO) 345/230/13.2KV TRANSFORMER CKT 1	560	116	0	TOLK UNIT (GEN525562 1)
12SP	GREAT BEND TAP - SEWARD 115KV CKT 1	90	111	0	CIRCLE - MULLERGREN 230KV CKT 1

TABLE 4: Contingency Analysis (continued)

SEASON	OVERLOADED ELEMENT	RATING (MVA)	LOADING (%)	ATC (MW)	CONTINGENCY
12SP	HOLCOMB - PLYMELL 115KV CKT 1	143	108	0	(SPP-SUNC-05): PIONEER - PK-GOAB 115KV CKT 1, PK-GOAB - FLETCHER 115KV CKT 1, AND PK-GOAB - PUCKETT 115KV CKT 1
12SP	PIONEER TAP - PLYMELL 115KV CKT 1	143	104	2	(SPP-SUNC-05): PIONEER - PK-GOAB 115KV CKT 1, PK-GOAB - FLETCHER 115KV CKT 1, AND PK-GOAB - PUCKETT 115KV CKT 1
12SP	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1	143	125	67	SYRACUSE - WILLIAMSON 115KV CKT 1
12SP	CIMARRON RIVER PLANT - NORTH LIBERAL TAP 115KV CKT 1	115	105	68	2003-13 345.00 - POTTER COUNTY INTERCHANGE 345KV CKT 1
12SP	SYRACUSE - WILLIAMSON 115KV CKT 1	98	145	70	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1
12SP	FLETCHER - WILLIAMSON 115KV CKT 1	98	144	72	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1
12SP	CITIES SERVICE TAP - SETAB 115KV CKT 1	143	121	78	SYRACUSE - WILLIAMSON 115KV CKT 1
12SP	2006-34 115.00 - KANARADO 115KV CKT 1	98	112	83	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1
12SP	KANARADO - NATIONAL SUNFLOWER INDUSTRY TAP 115KV CKT 1	98	110	92	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1
12SP	NATIONAL SUNFLOWER INDUSTRY TAP - RULETON 115KV CKT 1	98	108	102	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1
12SP	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	102	114	2003-13 345.00 - POTTER COUNTY INTERCHANGE 345KV CKT 1
12SP	EAST LIBERAL - TEXAS COUNTY INTERCHANGE PHASE SHIFT TFMR 115KV CKT 1	119	101	127	2003-13 345.00 - POTTER COUNTY INTERCHANGE 345KV CKT 1
12WP	SEWARD - ST JOHN 115KV CKT 1	80	129	0	CIRCLE - MULLERGREN 230KV CKT 1
12WP	MEDICINE LODGE - SUN CITY 115KV CKT 1	80	117	0	MULLERGREN - SPEARVILLE 230KV CKT 1
12WP	HOLCOMB - PLYMELL 115KV CKT 1	143	114	0	(SPP-SUNC-05): PIONEER - PK-GOAB 115KV CKT 1, PK-GOAB - FLETCHER 115KV CKT 1, AND PK-GOAB - PUCKETT 115KV CKT 1
12WP	PIONEER TAP - PLYMELL 115KV CKT 1	143	111	0	(SPP-SUNC-05): PIONEER - PK-GOAB 115KV CKT 1, PK-GOAB - FLETCHER 115KV CKT 1, AND PK-GOAB - PUCKETT 115KV CKT 1
12WP	HARRINGTON STATION - NICHOLS STATION 230KV CKT 1	706	104	0	HARRNG_MID6 230.00 - NICHOLS STATION 230KV CKT 2
12WP	HARRNG_MID6 230.00 - NICHOLS STATION 230KV CKT 2	706	103	0	HARRINGTON STATION - NICHOLS STATION 230KV CKT 1
12WP	SYRACUSE - WILLIAMSON 115KV CKT 1	98	159	50	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1
12WP	FLETCHER - WILLIAMSON 115KV CKT 1	98	158	52	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1
12WP	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1	143	135	55	SYRACUSE - WILLIAMSON 115KV CKT 1
12WP	CITIES SERVICE TAP - SETAB 115KV CKT 1	143	131	64	SYRACUSE - WILLIAMSON 115KV CKT 1
12WP	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	105	77	2003-13 345.00 - POTTER COUNTY INTERCHANGE 345KV CKT 1
12WP	2006-34 115.00 - KANARADO 115KV CKT 1	98	109	97	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1
12WP	KANARADO - NATIONAL SUNFLOWER INDUSTRY TAP 115KV CKT 1	98	107	103	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1
12WP	NATIONAL SUNFLOWER INDUSTRY TAP - RULETON 115KV CKT 1	98	106	110	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1
12WP	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1	120	102	127	BASE CASE
12WP	SYRACUSE - WILLIAMSON 115KV CKT 1	83	105	128	BASE CASE
12WP	FLETCHER - WILLIAMSON 115KV CKT 1	83	103	130	BASE CASE

TABLE 4: Contingency Analysis (continued)

SEASON	OVERLOADED ELEMENT	RATING (MVA)	LOADING (%)	ATC (MW)	CONTINGENCY
17SP	LUBBOCK POWER & LIGHT-SOUTHEAST 230/69KV TRANSFORMER CKT 1	100	128	0	JONES STATION - LUBBOCK POWER & LIGHT-HOLLY PLANT 230KV CKT 1
17SP	LUBBOCK POWER & LIGHT-HOLLY PLANT 230/69KV TRANSFORMER CKT 1	100	126	0	LUBBOCK POWER & LIGHT-SOUTHEAST - LUBBOCK SOUTH INTERCHANGE 230KV CKT 1
17SP	LUBBOCK POWER & LIGHT-WADSWORTH 230/69KV TRANSFORMER CKT 1	100	116	0	JONES STATION - LUBBOCK POWER & LIGHT-HOLLY PLANT 230KV CKT 1
17SP	HOLCOMB - PLYMELL 115KV CKT 1	143	112	0	(SPP-SUNC-05): PIONEER - PK-GOAB 115KV CKT 1, PK-GOAB - FLETCHER 115KV CKT 1, AND PK-GOAB - PUCKETT 115KV CKT 1
17SP	POTTER COUNTY INTERCHANGE (POTTR CO) 345/230/13.2KV TRANSFORMER CKT 1	560	109	0	TOLK UNIT (GEN525562 1)
17SP	PIONEER TAP - PLYMELL 115KV CKT 1	143	108	0	(SPP-SUNC-05): PIONEER - PK-GOAB 115KV CKT 1, PK-GOAB - FLETCHER 115KV CKT 1, AND PK-GOAB - PUCKETT 115KV CKT 1
17SP	2006-34 115.00 - KANARADO 115KV CKT 1	98	115	70	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1
17SP	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1	143	122	72	SYRACUSE - WILLIAMSON 115KV CKT 1
17SP	SYRACUSE - WILLIAMSON 115KV CKT 1	98	142	75	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1
17SP	FLETCHER - WILLIAMSON 115KV CKT 1	98	141	77	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1
17SP	CIRCLE - RENO COUNTY 115KV CKT 1	194	103	79	CIRCLE - RENO COUNTY 115KV CKT 2
17SP	KANARADO - NATIONAL SUNFLOWER INDUSTRY TAP 115KV CKT 1	98	113	79	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1
17SP	NEOSHO - NORTHEAST PARSONS 138KV CKT 1	159	101	83	SPP-WERE-17
17SP	CITIES SERVICE TAP - SETAB 115KV CKT 1	143	118	84	SYRACUSE - WILLIAMSON 115KV CKT 1
17SP	MEDICINE LODGE - SUN CITY 115KV CKT 1	80	105	89	2003-13 345.00 - POTTER COUNTY INTERCHANGE 345KV CKT 1
17SP	NATIONAL SUNFLOWER INDUSTRY TAP - RULETON 115KV CKT 1	98	110	90	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1

Note: When transmission service associated with this interconnection is evaluated, the loading of the facilities listed in this table may be greater due to higher priority reservations. If the loading of a facility is higher, the level of ATC will be lower.

Conclusion

The minimum cost of interconnecting the Customer's interconnection request is estimated at $625,000 for Direct Assignment Facilities and Network Upgrades. At this time, the cost estimates for other Direct Assignment facilities including those in Tables 1 and 2 have not been defined by the Customer. In addition to the Customer's proposed interconnection facilities, the Customer will be responsible for installing a total of 20 Mvar of capacitor bank(s) in the Customer's substation for reactive support. As stated earlier, some but not all of the local projects that were previously queued are assumed to be in service in this Feasibility Study. These costs exclude upgrades of other transmission facilities that were listed in Table 3 of which are Network Constraints.

In Table 4, a value of Available Transfer Capability (ATC) associated with each overloaded facility is included. These values may be used by the Customer to determine lower generation capacity levels that may be installed. When transmission service associated with this interconnection is evaluated, the loading of the facilities listed in this table may be greater due to higher priority reservations. When a facility is overloaded for more than one contingency, only the highest loading on the facility for each season is included in the table.

These interconnection costs do not include any cost that may be associated with short circuit or transient stability analysis. These studies will be performed if the Customer signs a System Impact Study Agreement. At the time of the System Impact Study, a better determination of the interconnection facilities may be available.

The required interconnection costs listed in Tables 1 and 2 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 through Southwest Power Pool's OASIS.

Appendix A: Point of Interconnection Area Map

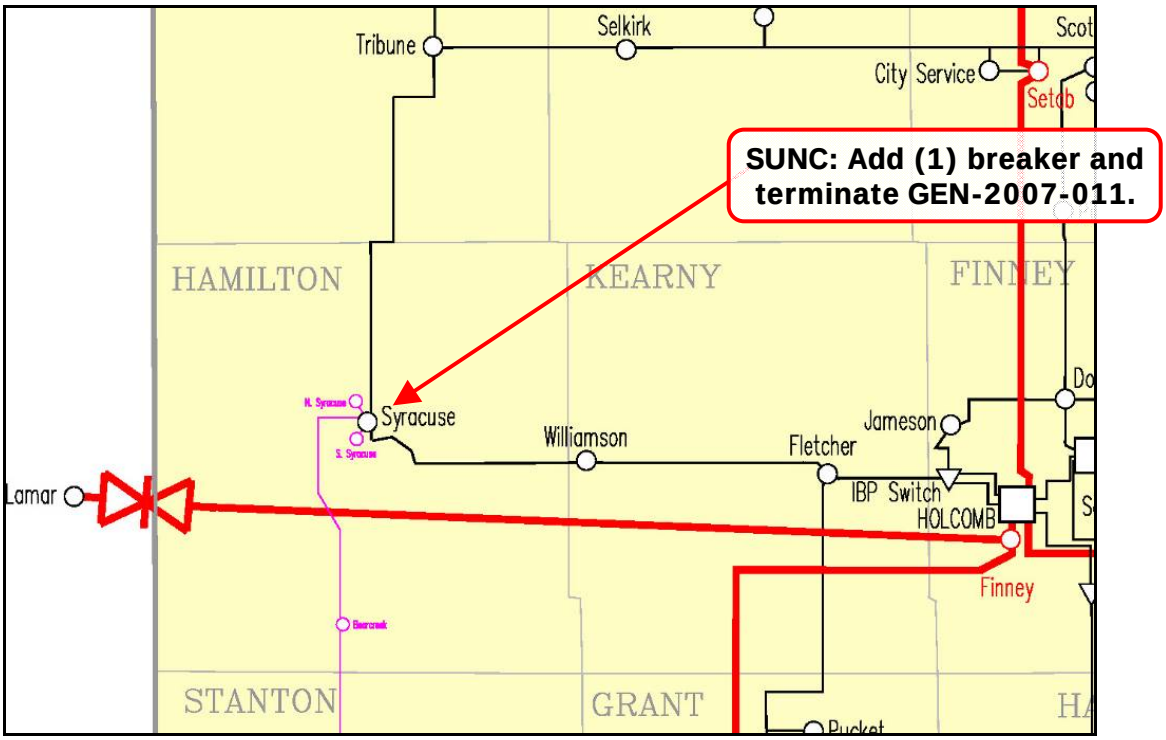

Figure 2: Point of Interconnection Area Map