Feasibility Study
For
Generation Interconnection Request
GEN-2007-013

SPP Tariff Studies
(#GEN-2007-013)

October, 2007

Executive Summary

<OMITTED TEXT> (Customer) has requested a Feasibility Study for the purpose of interconnecting 99 MW of wind generation within the control area of Sunflower Electric Power Corporation (SUNC) located in Wichita County, Kansas. The proposed method of interconnection is a new 115 kV ring-bus switching station to be located on the existing Tribune Switching Station – Setab 115 kV transmission line, owned by SUNC. The proposed in-service date is December 31, 2009.

Power flow analysis has indicated that for the powerflow cases studied, it is possible to interconnect the 99 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 14.4 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 99 MW of wind generation on the existing Tribune Switching Station – Setab 115 kV transmission line, owned by SUNC, consists of constructing a new 115 kV three-breaker ring-bus switching station. The new station will be constructed and maintained by SUNC. The Customer did not propose a specific route for the 115 kV line extending to serve its 115/34.5 kV collection 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 99 MW of generation is $2,200,000. These costs are shown in Tables 1 and 2. Network constraints in the Midwest Energy (MIDW), Nebraska Public Power District (NPPD), 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, 14.4 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 99 MW of wind generation within the control area of Sunflower Electric Power Corporation (SUNC) located in Wichita County, Kansas. The proposed method of interconnection is a new 115 kV ring-bus switching station to be located on the existing Tribune Switching Station – Setab 115 kV transmission line, owned by SUNC. The proposed in-service date is December 31, 2009.

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 99 MW consist of constructing a new 115 kV three-breaker ring-bus switching station on the existing Tribune Switching Station – Setab 115 kV transmission line, owned by SUNC. This substation will be constructed and maintained 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.

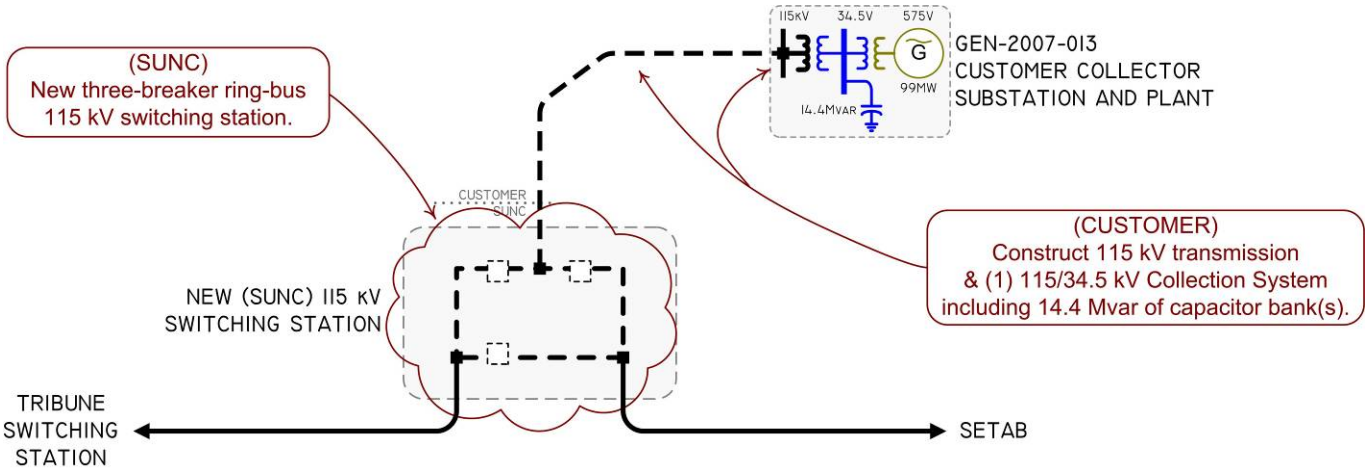

Figure 1: Proposed Method of Interconnection

(Final design to be determined)

Interconnection Estimated Costs

The minimum cost for constructing a new three-breaker ring-bus switching station and terminating the transmission line serving GEN-2007-013 facilities is estimated at $2,200,000. 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 14.4 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), Nebraska Public Power District (NPPD), 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 new three-breaker ring-bus station located on the Tribune Switching Station – Setab 115 kV transmission line.	*
CUSTOMER – 34.5 kV, 14.4 Mvar capacitor bank(s) to be installed in the Customer 115/34.5 kV collector substation.	*
CUSTOMER – Right-of-Way for all Customer facilities.	*
TOTAL	*****

* *Estimates of cost to be determined.*

Table 2: Required Interconnection Network Upgrade Facilities

FACILITY	ESTIMATED COST (2007 DOLLARS)
SUNC – (1) 115 kV three-breaker ring-bus switching station for GEN-2007-013 located on the Tribune Switching Station – Setab 115 kV transmission line. Station to include breakers, switches, control relaying, high speed communications, metering and related equipment and all related structures.	$2,200,000
TOTAL	*****

* *Estimates of cost to be determined.*

Powerflow Analysis

A powerflow analysis was conducted for the facility using modified versions of the 2009 winter peak model, the 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 December 31, 2009. 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 99 MW and location, additional criteria violations will occur on the existing MIDW, NPPD, 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 14.4 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 l hereafter referred to as NERC Table l) 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 - NEKOMA 115KV CKT 1
MIDW	ALEXANDER - NESS CITY 115KV CKT 1
MIDW	BEACH STATION - HOXIE 115KV CKT 1
MIDW	COLBY - HOXIE 115KV CKT 1
MIDW	HEIZER 115/69KV TRANSFORMER CKT 2
MIDW	NEKOMA 115/69KV TRANSFORMER CKT 1
MIDW/WEPL	ST JOHN - ST_JOHN 115KV CKT 1
NPPD	BROKEN BOW (NPPD) - LOUP CITY (NPPD) 115KV CKT 1
NPPD	CROOKED CREEK (NPPD) - N. PLATTE (NPPD) 230KV CKT 1
NPPD	MCCOOK (NPPD) - RED WILLOW (NPPD) 115KV CKT 1
NPPD	MCCOOK (NPPD) - RED WILLOW (NPPD) 115KV CKT 2
SPS	DALHART INTERCHANGE 115/69KV TRANSFORMER CKT 1
SPS	HARRINGTON STATION - NICHOLS STATION 230KV CKT 1
SPS	HARRNG_MID6 230.00 - NICHOLS STATION 230KV CKT 2
SPS	POTTER COUNTY INTERCHANGE (POTTR CO) 345/230/13.2KV TRANSFORMER CKT 1
SPS	RITA BLANCA REC-DALLAM COUNTY 115/69KV TRANSFORMER CKT 1
SPS	RITA BLANCA REC-HOGUE - DALHART INTERCHANGE 115KV CKT 1
SPS	RITA BLANCA REC-HOGUE - MOORE COUNTY INTERCHANGE E. 115KV 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	2001-39M 115.00 - LEOTI 115KV CKT 1
SUNC	2006-34 115.00 - KANARADO 115KV CKT 1
SUNC	BEELER - DIGHTON TAP 115KV CKT 1
SUNC	BEELER - NESS CITY 115KV CKT 1
SUNC	CITIES SERVICE TAP - SETAB 115KV CKT 1
SUNC	DIGHTON TAP - MANNING TAP 115KV CKT 1
SUNC	FLETCHER - WILLIAMSON 115KV CKT 1
SUNC	HOLCOMB - PLYMELL 115KV CKT 1
SUNC	HOLCOMB (HOLCOMB) 345/115/13.8KV TRANSFORMER CKT 1
SUNC	KANARADO - NATIONAL SUNFLOWER INDUSTRY TAP 115KV CKT 1
SUNC	LEOTI - SELKIRK 115KV CKT 1
SUNC	NATIONAL SUNFLOWER INDUSTRY TAP - RULETON 115KV CKT 1
SUNC	PIONEER TAP - PLYMELL 115KV CKT 1
SUNC	SCOTT CITY - SETAB 115KV CKT 1
SUNC	SELKIRK - TRIBUNE SWITCH 115KV CKT 1
SUNC	SPEARVILLE (SPEARVL) 345/230/13.8KV TRANSFORMER CKT 1
SUNC	SYRACUSE - WILLIAMSON 115KV CKT 1
SUNC/WEPL	CIMARRON RIVER PLANT - NORTH CIMARRON 115KV CKT 1
WEPL	CIMARRON RIVER PLANT - CIMARRON RIVER TAP 115KV CKT 1
WEPL	CIMARRON RIVER PLANT - NORTH LIBERAL TAP 115KV CKT 1

TABLE 3: Network Constraints (continued)

AREA	OVERLOADED ELEMENT
WEPL	CIMARRON RIVER TAP - EAST LIBERAL 115KV CKT 1
WEPL	GREAT BEND TAP - SEWARD 115KV CKT 1
WEPL	GREENSBURG - JUDSON LARGE 115KV CKT 1
WEPL	GREENSBURG - SUN CITY 115KV CKT 1
WEPL	HARPER - MEDICINE LODGE 138KV CKT 1
WEPL	HARPER - MILAN TAP 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	CIRCLE - RENO COUNTY 115KV CKT 1
WERE	CIRCLE - RENO COUNTY 115KV CKT 2
WERE	CIRCLE (CIRCLE1X) 230/115/13.8KV TRANSFORMER CKT 1
MIDW	Midwest Energy
NPPD	Nebraska Public Power District
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
09WP	SYRACUSE - WILLIAMSON 115KV CKT 1	98	262	0	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1
09WP	FLETCHER - WILLIAMSON 115KV CKT 1	98	261	0	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1
09WP	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1	143	195	0	SYRACUSE - WILLIAMSON 115KV CKT 1
09WP	CITIES SERVICE TAP - SETAB 115KV CKT 1	143	190	0	SYRACUSE - WILLIAMSON 115KV CKT 1
09WP	2006-34 115.00 - KANARADO 115KV CKT 1	98	177	0	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1
09WP	KANARADO - NATIONAL SUNFLOWER INDUSTRY TAP 115KV CKT 1	98	175	0	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1
09WP	NATIONAL SUNFLOWER INDUSTRY TAP - RULETON 115KV CKT 1	98	174	0	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1
09WP	SEWARD - ST JOHN 115KV CKT 1	80	171	0	CIRCLE - MULLERGREN 230KV CKT 1
09WP	CIRCLE - RENO COUNTY 115KV CKT 2	92	166	0	CIRCLE - RENO COUNTY 115KV CKT 1
09WP	MEDICINE LODGE - SUN CITY 115KV CKT 1	80	155	0	2003-13 345.00 - POTTER COUNTY INTERCHANGE 345KV CKT 1
09WP	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1	120	155	0	BASE CASE
09WP	HARPER - MEDICINE LODGE 138KV CKT 1	72	152	0	2003-13 345.00 - POTTER COUNTY INTERCHANGE 345KV CKT 1
09WP	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	149	0	2003-13 345.00 - POTTER COUNTY INTERCHANGE 345KV CKT 1
09WP	SYRACUSE - WILLIAMSON 115KV CKT 1	83	132	0	BASE CASE
09WP	FLETCHER - WILLIAMSON 115KV CKT 1	83	131	0	BASE CASE
09WP	ALEXANDER - NESS CITY 115KV CKT 1	101	126	0	MULLERGREN - SPEARVILLE 230KV CKT 1
09WP	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	56	124	0	BASE CASE
09WP	HOLCOMB (HOLCOMB) 345/115/13.8KV TRANSFORMER CKT 1	336	124	0	HOLCOMB - SETAB 345KV CKT 1
09WP	ST JOHN - ST_JOHN 115KV CKT 1	88	121	0	CIRCLE - MULLERGREN 230KV CKT 1
09WP	ALEXANDER - NEKOMA 115KV CKT 1	101	120	0	MULLERGREN - SPEARVILLE 230KV CKT 1
09WP	BROKEN BOW (NPPD) - LOUP CITY (NPPD) 115KV CKT 1	92	116	0	GRAND ISLAND (NPPD) - SWEETWATER (NPPD) 345KV CKT 1
09WP	POTTER COUNTY INTERCHANGE (POTTR CO) 345/230/13.2KV TRANSFORMER CKT 1	560	116	0	TOLK (GEN525562 1)
09WP	CIMARRON RIVER PLANT - NORTH CIMARRON 115KV CKT 1	143	113	0	2003-13 345.00 - POTTER COUNTY INTERCHANGE 345KV CKT 1
09WP	CROOKED CREEK (NPPD) - N. PLATTE (NPPD) 230KV CKT 1	402	110	0	GRAND ISLAND (NPPD) - SWEETWATER (NPPD) 345KV CKT 1
09WP	MCCOOK (NPPD) - RED WILLOW (NPPD) 115KV CKT 1	105	105	0	MCCOOK (NPPD) - RED WILLOW (NPPD) 115KV CKT 2
09WP	COLBY - HOXIE 115KV CKT 1	101	109	3	MULLERGREN - SPEARVILLE 230KV CKT 1
09WP	SCOTT CITY - SETAB 115KV CKT 1	198	112	4	HOLCOMB - SETAB 345KV CKT 1
09WP	CITIES SERVICE TAP - SETAB 115KV CKT 1	120	150	4	BASE CASE
09WP	DIGHTON TAP - MANNING TAP 115KV CKT 1	98	108	29	MULLERGREN - SPEARVILLE 230KV CKT 1

TABLE 4: Contingency Analysis (continued)

SEASON	OVERLOADED ELEMENT	RATING (MVA)	LOADING (%)	ATC (MW)	CONTINGENCY
09WP	MCCOOK (NPPD) - RED WILLOW (NPPD) 115KV CKT 2	105	102	33	MCCOOK (NPPD) - RED WILLOW (NPPD) 115KV CKT 1
09WP	CIRCLE (CIRCLE1X) 230/115/13.8KV TRANSFORMER CKT 1	308	103	36	2003-13 345.00 - POTTER COUNTY INTERCHANGE 345KV CKT 1
09WP	SPEARVILLE (SPEARVL) 345/230/13.8KV TRANSFORMER CKT 1	336	105	39	2003-13 345.00 - POTTER COUNTY INTERCHANGE 345KV CKT 1
09WP	LEOTI - SELKIRK 115KV CKT 1	143	128	45	SYRACUSE - WILLIAMSON 115KV CKT 1
09WP	SELKIRK - TRIBUNE SWITCH 115KV CKT 1	143	140	51	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1
09WP	2001-39M 115.00 - LEOTI 115KV CKT 1	143	123	55	SYRACUSE - WILLIAMSON 115KV CKT 1
09WP	BEACH STATION - HOXIE 115KV CKT 1	101	103	70	MULLERGREN - SPEARVILLE 230KV CKT 1
09WP	NEKOMA 115/69KV TRANSFORMER CKT 1	44	102	75	LACROSSE TAP - NEKOMA 115KV CKT 1
09WP	BEELER - DIGHTON TAP 115KV CKT 1	98	102	79	MULLERGREN - SPEARVILLE 230KV CKT 1
09WP	HARPER - MILAN TAP 138KV CKT 1	96	101	85	2003-13 345.00 - POTTER COUNTY INTERCHANGE 345KV CKT 1
09WP	MULLERGREN - SPEARVILLE 230KV CKT 1	471	101	89	2003-13 345.00 - POTTER COUNTY INTERCHANGE 345KV CKT 1
12SP	SYRACUSE - WILLIAMSON 115KV CKT 1	98	240	0	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1
12SP	FLETCHER - WILLIAMSON 115KV CKT 1	98	239	0	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1
12SP	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1	143	182	0	SYRACUSE - WILLIAMSON 115KV CKT 1
12SP	CITIES SERVICE TAP - SETAB 115KV CKT 1	143	178	0	SYRACUSE - WILLIAMSON 115KV CKT 1
12SP	2006-34 115.00 - KANARADO 115KV CKT 1	98	177	0	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1
12SP	KANARADO - NATIONAL SUNFLOWER INDUSTRY TAP 115KV CKT 1	98	174	0	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1
12SP	MEDICINE LODGE - SUN CITY 115KV CKT 1	80	172	0	2003-13 345.00 - POTTER COUNTY INTERCHANGE 345KV CKT 1
12SP	NATIONAL SUNFLOWER INDUSTRY TAP - RULETON 115KV CKT 1	98	172	0	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1
12SP	MULLERGREN - SPEARVILLE 230KV CKT 1	355	161	0	2003-13 345.00 - POTTER COUNTY INTERCHANGE 345KV CKT 1
12SP	SEWARD - ST JOHN 115KV CKT 1	80	160	0	CIRCLE - MULLERGREN 230KV CKT 1
12SP	HARPER - MEDICINE LODGE 138KV CKT 1	72	143	0	2003-13 345.00 - POTTER COUNTY INTERCHANGE 345KV CKT 1
12SP	EAST LIBERAL - TEXAS COUNTY INTERCHANGE PHASE SHIFT TFMR 115KV CKT 1	119	139	0	2003-13 345.00 - POTTER COUNTY INTERCHANGE 345KV CKT 1
12SP	CIMARRON RIVER PLANT - NORTH LIBERAL TAP 115KV CKT 1	115	136	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	132	0	TOLK (GEN525562 1)
12SP	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	130	0	2003-13 345.00 - POTTER COUNTY INTERCHANGE 345KV CKT 1
12SP	GREAT BEND TAP - SEWARD 115KV CKT 1	90	127	0	CIRCLE - MULLERGREN 230KV CKT 1
12SP	ALEXANDER - NESS CITY 115KV CKT 1	101	127	0	MULLERGREN - SPEARVILLE 230KV CKT 1
12SP	HARRINGTON STATION - NICHOLS STATION 230KV CKT 1	635	125	0	HARRNG_MID6 230.00 - NICHOLS STATION 230KV CKT 2
12SP	HARRNG_MID6 230.00 - NICHOLS STATION 230KV CKT 2	635	124	0	HARRINGTON STATION - NICHOLS STATION 230KV CKT 1

TABLE 4: Contingency Analysis (continued)

SEASON	OVERLOADED ELEMENT	RATING (MVA)	LOADING (%)	ATC (MW)	CONTINGENCY
12SP	CIRCLE - MULLERGREN 230KV CKT 1	319	122	0	2003-13 345.00 - POTTER COUNTY INTERCHANGE 345KV CKT 1
12SP	GREENSBURG - JUDSON LARGE 115KV CKT 1	130	121	0	2003-13 345.00 - POTTER COUNTY INTERCHANGE 345KV CKT 1
12SP	SPEARVILLE (SPEARVL) 345/230/13.8KV TRANSFORMER CKT 1	336	121	0	2003-13 345.00 - POTTER COUNTY INTERCHANGE 345KV CKT 1
12SP	ALEXANDER - NEKOMA 115KV CKT 1	101	120	0	MULLERGREN - SPEARVILLE 230KV CKT 1
12SP	DIGHTON TAP - MANNING TAP 115KV CKT 1	98	120	0	MULLERGREN - SPEARVILLE 230KV CKT 1
12SP	ST JOHN - ST_JOHN 115KV CKT 1	88	119	0	CIRCLE - HUTCHINSON ENERGY CENTER 115KV CKT 1
12SP	HOLCOMB - PLYMELL 115KV CKT 1	143	117	0	(SPP-SUNC-05): PIONEER - PK_GOAB3 115 115KV CKT 1, PK_GOAB3 115 - PUCKET 115KV CKT 1, AND PK_GOAB3 115KV - FLETCHER 115KV CKT 1
12SP	COLBY - HOXIE 115KV CKT 1	101	115	0	2003-13 345.00 - POTTER COUNTY INTERCHANGE 345KV CKT 1
12SP	PIONEER TAP - PLYMELL 115KV CKT 1	143	114	0	(SPP-SUNC-05): PIONEER - PK_GOAB3 115 115KV CKT 1, PK_GOAB3 115 - PUCKET 115KV CKT 1, AND PK_GOAB3 115KV - FLETCHER 115KV CKT 1
12SP	CIMARRON RIVER PLANT - CIMARRON RIVER TAP 115KV CKT 1	90	111	0	CIMARRON RIVER PLANT - NORTH LIBERAL TAP 115KV CKT 1
12SP	CIMARRON RIVER PLANT - NORTH CIMARRON 115KV CKT 1	143	110	0	2003-13 345.00 - POTTER COUNTY INTERCHANGE 345KV CKT 1
12SP	MCCOOK (NPPD) - RED WILLOW (NPPD) 115KV CKT 1	105	108	0	MCCOOK (NPPD) - RED WILLOW (NPPD) 115KV CKT 2
12SP	MCCOOK (NPPD) - RED WILLOW (NPPD) 115KV CKT 2	105	106	0	MCCOOK (NPPD) - RED WILLOW (NPPD) 115KV CKT 1
12SP	BEELER - DIGHTON TAP 115KV CKT 1	98	112	3	MULLERGREN - SPEARVILLE 230KV CKT 1
12SP	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1	120	148	7	BASE CASE
12SP	SYRACUSE - WILLIAMSON 115KV CKT 1	83	119	12	BASE CASE
12SP	CITIES SERVICE TAP - SETAB 115KV CKT 1	120	143	17	BASE CASE
12SP	FLETCHER - WILLIAMSON 115KV CKT 1	83	117	19	BASE CASE
12SP	GREENSBURG - SUN CITY 115KV CKT 1	130	111	33	2003-13 345.00 - POTTER COUNTY INTERCHANGE 345KV CKT 1
12SP	BEELER - NESS CITY 115KV CKT 1	98	107	38	MULLERGREN - SPEARVILLE 230KV CKT 1
12SP	SELKIRK - TRIBUNE SWITCH 115KV CKT 1	143	136	54	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1
12SP	NEKOMA 115/69KV TRANSFORMER CKT 1	44	103	66	LACROSSE TAP - NEKOMA 115KV CKT 1
12SP	LEOTI - SELKIRK 115KV CKT 1	143	118	66	SYRACUSE - WILLIAMSON 115KV CKT 1
12SP	BEACH STATION - HOXIE 115KV CKT 1	101	103	72	2003-13 345.00 - POTTER COUNTY INTERCHANGE 345KV CKT 1
12SP	2001-39M 115.00 - LEOTI 115KV CKT 1	143	111	78	SYRACUSE - WILLIAMSON 115KV CKT 1
12SP	CIMARRON RIVER TAP - EAST LIBERAL 115KV CKT 1	120	102	86	2003-13 345.00 - POTTER COUNTY INTERCHANGE 345KV CKT 1
12WP	SYRACUSE - WILLIAMSON 115KV CKT 1	98	256	0	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1
12WP	FLETCHER - WILLIAMSON 115KV CKT 1	98	255	0	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1
12WP	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1	143	192	0	SYRACUSE - WILLIAMSON 115KV CKT 1
12WP	CITIES SERVICE TAP - SETAB 115KV CKT 1	143	188	0	SYRACUSE - WILLIAMSON 115KV CKT 1

TABLE 4: Contingency Analysis (continued)

SEASON	OVERLOADED ELEMENT	RATING (MVA)	LOADING (%)	ATC (MW)	CONTINGENCY
12WP	2006-34 115.00 - KANARADO 115KV CKT 1	98	176	0	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1
12WP	KANARADO - NATIONAL SUNFLOWER INDUSTRY TAP 115KV CKT 1	98	174	0	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1
12WP	NATIONAL SUNFLOWER INDUSTRY TAP - RULETON 115KV CKT 1	98	172	0	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1
12WP	SEWARD - ST JOHN 115KV CKT 1	80	155	0	CIRCLE - MULLERGREN 230KV CKT 1
12WP	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1	120	154	0	BASE CASE
12WP	MEDICINE LODGE - SUN CITY 115KV CKT 1	80	152	0	MULLERGREN - SPEARVILLE 230KV CKT 1
12WP	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	133	0	FINNEY SWITCHING STATION - HOLCOMB 345KV CKT 1
12WP	SYRACUSE - WILLIAMSON 115KV CKT 1	83	130	0	BASE CASE
12WP	FLETCHER - WILLIAMSON 115KV CKT 1	83	128	0	BASE CASE
12WP	ALEXANDER - NESS CITY 115KV CKT 1	101	126	0	MULLERGREN - SPEARVILLE 230KV CKT 1
12WP	HARPER - MEDICINE LODGE 138KV CKT 1	72	120	0	FINNEY SWITCHING STATION - HOLCOMB 345KV CKT 1
12WP	ALEXANDER - NEKOMA 115KV CKT 1	101	120	0	MULLERGREN - SPEARVILLE 230KV CKT 1
12WP	HOLCOMB (HOLCOMB) 345/115/13.8KV TRANSFORMER CKT 1	336	116	0	HOLCOMB - SETAB 345KV CKT 1
12WP	MCCOOK (NPPD) - RED WILLOW (NPPD) 115KV CKT 1	105	112	0	MCCOOK (NPPD) - RED WILLOW (NPPD) 115KV CKT 2
12WP	ST JOHN - ST_JOHN 115KV CKT 1	88	112	0	CIRCLE - MULLERGREN 230KV CKT 1
12WP	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	56	111	0	BASE CASE
12WP	MCCOOK (NPPD) - RED WILLOW (NPPD) 115KV CKT 2	105	110	0	MCCOOK (NPPD) - RED WILLOW (NPPD) 115KV CKT 1
12WP	HARRINGTON STATION - NICHOLS STATION 230KV CKT 1	706	110	0	HARRNG_MID6 230.00 - NICHOLS STATION 230KV CKT 2
12WP	HARRNG_MID6 230.00 - NICHOLS STATION 230KV CKT 2	706	109	0	HARRINGTON STATION - NICHOLS STATION 230KV CKT 1
12WP	POTTER COUNTY INTERCHANGE (POTTR CO) 345/230/13.2KV TRANSFORMER CKT 1	560	106	0	TOLK (GEN525562 1)
12WP	CITIES SERVICE TAP - SETAB 115KV CKT 1	120	149	6	BASE CASE
12WP	COLBY - HOXIE 115KV CKT 1	101	111	14	MULLERGREN - SPEARVILLE 230KV CKT 1
12WP	CIMARRON RIVER PLANT - NORTH CIMARRON 115KV CKT 1	143	110	21	HOLCOMB (HOLCOMB) 345/115/13.8KV TRANSFORMER CKT 1
12WP	DIGHTON TAP - MANNING TAP 115KV CKT 1	98	110	26	MULLERGREN - SPEARVILLE 230KV CKT 1
12WP	CROOKED CREEK (NPPD) - N. PLATTE (NPPD) 230KV CKT 1	402	102	28	GRAND ISLAND (NPPD) - SWEETWATER (NPPD) 345KV CKT 1
12WP	LEOTI - SELKIRK 115KV CKT 1	143	126	50	SYRACUSE - WILLIAMSON 115KV CKT 1
12WP	SELKIRK - TRIBUNE SWITCH 115KV CKT 1	143	139	51	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1
12WP	2001-39M 115.00 - LEOTI 115KV CKT 1	143	121	59	SYRACUSE - WILLIAMSON 115KV CKT 1
12WP	BEACH STATION - HOXIE 115KV CKT 1	101	104	70	MULLERGREN - SPEARVILLE 230KV CKT 1
12WP	BEELER - DIGHTON TAP 115KV CKT 1	98	104	71	MULLERGREN - SPEARVILLE 230KV CKT 1

TABLE 4: Contingency Analysis (continued)

SEASON	OVERLOADED ELEMENT	RATING (MVA)	LOADING (%)	ATC (MW)	CONTINGENCY
12WP	NEKOMA 115/69KV TRANSFORMER CKT 1	44	102	79	LACROSSE TAP - NEKOMA 115KV CKT 1
12WP	SCOTT CITY - SETAB 115KV CKT 1	198	100	96	HOLCOMB - SETAB 345KV CKT 1
12WP	BEELER - NESS CITY 115KV CKT 1	98	100	96	MULLERGREN - SPEARVILLE 230KV CKT 1
17SP	SYRACUSE - WILLIAMSON 115KV CKT 1	98	233	0	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1
17SP	FLETCHER - WILLIAMSON 115KV CKT 1	98	232	0	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1
17SP	RITA BLANCA REC-HOGUE - MOORE COUNTY INTERCHANGE E. 115KV CKT 1	99	196	0	ETTER RURAL SUB - MOORE COUNTY INTERCHANGE E. 115KV CKT 1
17SP	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1	143	178	0	SYRACUSE - WILLIAMSON 115KV CKT 1
17SP	2006-34 115.00 - KANARADO 115KV CKT 1	98	177	0	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1
17SP	RITA BLANCA REC-HOGUE - DALHART INTERCHANGE 115KV CKT 1	99	175	0	ETTER RURAL SUB - MOORE COUNTY INTERCHANGE E. 115KV CKT 1
17SP	KANARADO - NATIONAL SUNFLOWER INDUSTRY TAP 115KV CKT 1	98	175	0	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1
17SP	CITIES SERVICE TAP - SETAB 115KV CKT 1	143	174	0	SYRACUSE - WILLIAMSON 115KV CKT 1
17SP	NATIONAL SUNFLOWER INDUSTRY TAP - RULETON 115KV CKT 1	98	172	0	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1
17SP	MEDICINE LODGE - SUN CITY 115KV CKT 1	80	140	0	2003-13 345.00 - POTTER COUNTY INTERCHANGE 345KV CKT 1
17SP	MULLERGREN - SPEARVILLE 230KV CKT 1	355	128	0	2003-13 345.00 - POTTER COUNTY INTERCHANGE 345KV CKT 1
17SP	POTTER COUNTY INTERCHANGE (POTTR CO) 345/230/13.2KV TRANSFORMER CKT 1	560	124	0	TOLK (GEN525562 1)
17SP	CIMARRON RIVER PLANT - NORTH LIBERAL TAP 115KV CKT 1	115	124	0	2003-13 345.00 - POTTER COUNTY INTERCHANGE 345KV CKT 1
17SP	EAST LIBERAL - TEXAS COUNTY INTERCHANGE PHASE SHIFT TFMR 115KV CKT 1	119	121	0	2003-13 345.00 - POTTER COUNTY INTERCHANGE 345KV CKT 1
17SP	HOLCOMB - PLYMELL 115KV CKT 1	143	120	0	(SPP-SUNC-05): PIONEER - PK_GOAB3 115 115KV CKT 1, PK_GOAB3 115 - PUCKET 115KV CKT 1, AND PK_GOAB3 115KV - FLETCHER 115KV CKT 1
17SP	CIRCLE - RENO COUNTY 115KV CKT 1	194	119	0	CIRCLE - RENO COUNTY 115KV CKT 2
17SP	HARPER - MEDICINE LODGE 138KV CKT 1	72	119	0	2003-13 345.00 - POTTER COUNTY INTERCHANGE 345KV CKT 1
17SP	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	118	0	2003-13 345.00 - POTTER COUNTY INTERCHANGE 345KV CKT 1
17SP	PIONEER TAP - PLYMELL 115KV CKT 1	143	116	0	(SPP-SUNC-05): PIONEER - PK_GOAB3 115 115KV CKT 1, PK_GOAB3 115 - PUCKET 115KV CKT 1, AND PK_GOAB3 115KV - FLETCHER 115KV CKT 1
17SP	COLBY - HOXIE 115KV CKT 1	101	114	0	2007-12T 345.00 - RED WILLOW (NPPD) 345KV CKT 1
17SP	CIMARRON RIVER PLANT - CIMARRON RIVER TAP 115KV CKT 1	90	108	0	CIMARRON RIVER PLANT - NORTH LIBERAL TAP 115KV CKT 1
17SP	MCCOOK (NPPD) - RED WILLOW (NPPD) 115KV CKT 1	105	107	0	MCCOOK (NPPD) - RED WILLOW (NPPD) 115KV CKT 2

TABLE 4: Contingency Analysis (continued)

SEASON	OVERLOADED ELEMENT	RATING (MVA)	LOADING (%)	ATC (MW)	CONTINGENCY
17SP	MCCOOK (NPPD) - RED WILLOW (NPPD) 115KV CKT 2	105	105	0	MCCOOK (NPPD) - RED WILLOW (NPPD) 115KV CKT 1
17SP	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1	120	147	9	BASE CASE
17SP	CITIES SERVICE TAP - SETAB 115KV CKT 1	120	143	18	BASE CASE
17SP	SYRACUSE - WILLIAMSON 115KV CKT 1	83	115	29	BASE CASE
17SP	FLETCHER - WILLIAMSON 115KV CKT 1	83	113	37	BASE CASE
17SP	SPEARVILLE (SPEARVL) 345/230/13.8KV TRANSFORMER CKT 1	336	104	52	2003-13 345.00 - POTTER COUNTY INTERCHANGE 345KV CKT 1
17SP	SELKIRK - TRIBUNE SWITCH 115KV CKT 1	143	135	55	2001-39M 115.00 - CITIES SERVICE TAP 115KV CKT 1
17SP	CIMARRON RIVER PLANT - NORTH CIMARRON 115KV CKT 1	143	102	55	2003-13 345.00 - POTTER COUNTY INTERCHANGE 345KV CKT 1
17SP	RITA BLANCA REC-DALLAM COUNTY 115/69KV TRANSFORMER CKT 1	46	119	58	ETTER RURAL SUB - MOORE COUNTY INTERCHANGE E. 115KV CKT 1
17SP	LEOTI - SELKIRK 115KV CKT 1	143	115	72	SYRACUSE - WILLIAMSON 115KV CKT 1
17SP	ALEXANDER - NESS CITY 115KV CKT 1	101	103	76	2007-12T 345.00 - RED WILLOW (NPPD) 345KV CKT 1
17SP	BEACH STATION - HOXIE 115KV CKT 1	101	102	80	2007-12T 345.00 - RED WILLOW (NPPD) 345KV CKT 1
17SP	DIGHTON TAP - MANNING TAP 115KV CKT 1	98	102	82	MULLERGREN - SPEARVILLE 230KV CKT 1
17SP	2001-39M 115.00 - LEOTI 115KV CKT 1	143	107	85	SYRACUSE - WILLIAMSON 115KV CKT 1
17SP	HEIZER 115/69KV TRANSFORMER CKT 2	40	102	85	FLETCHER - WILLIAMSON 115KV CKT 1
17SP	DALHART INTERCHANGE 115/69KV TRANSFORMER CKT 1	46	104	90	ETTER RURAL SUB - MOORE COUNTY INTERCHANGE E. 115KV CKT 1
17SP	GREENSBURG - JUDSON LARGE 115KV CKT 1	130	100	96	2003-13 345.00 - POTTER COUNTY INTERCHANGE 345KV 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 $2,200,000 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 14.4 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

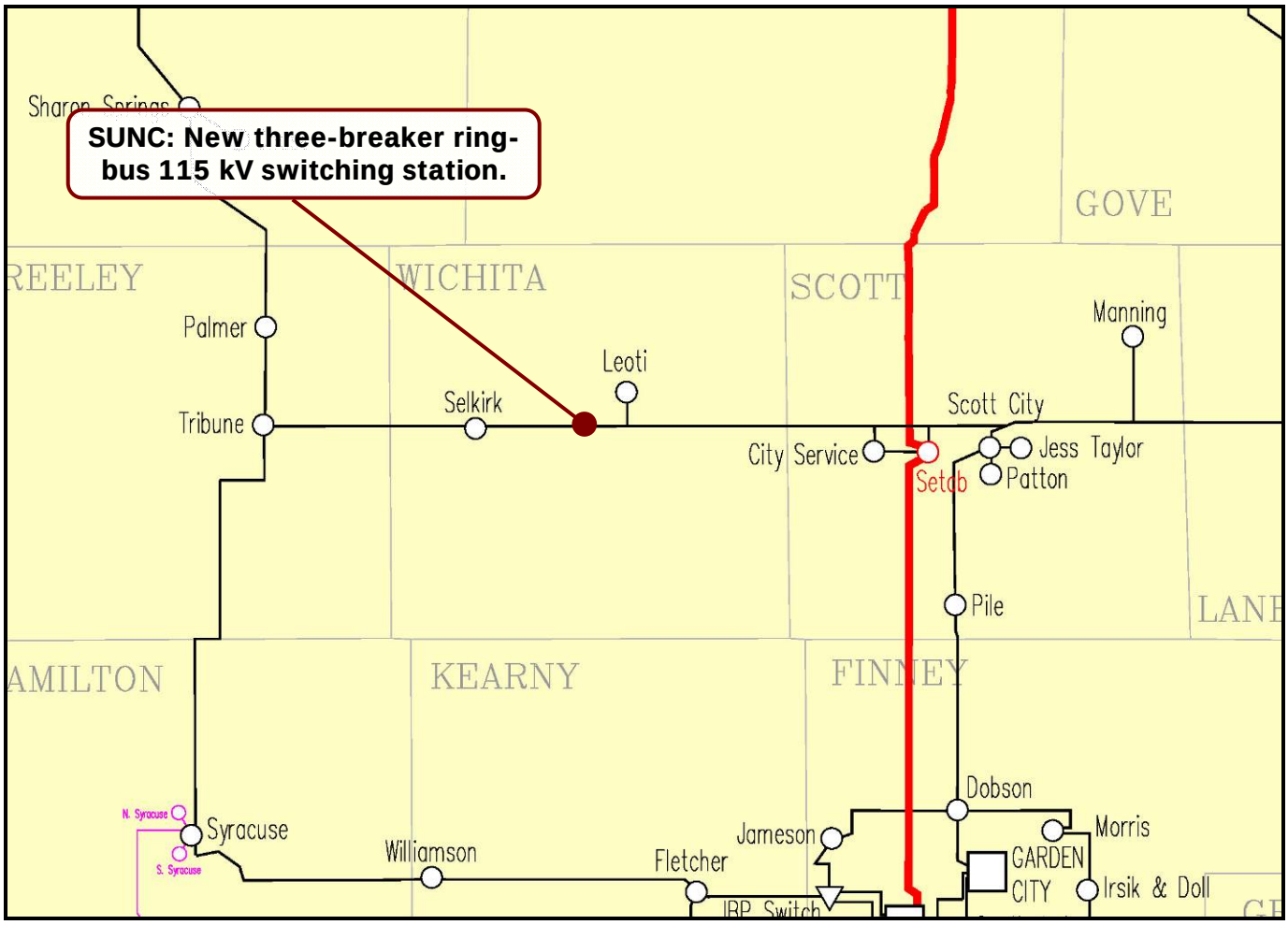

Figure 2: Point of Interconnection Area Map