



**Feasibility Study
For
Generation Interconnection
Request
GEN-2007-047**

SPP Tariff Studies
(#GEN-2007-047)

June, 2008

Executive Summary

<OMITTED TEXT> (Customer) has requested a Feasibility Study for the purpose of interconnecting 204 MW of wind generation within the control area of Sunflower Electric Power Corporation (SUNC) located in Thomas County, Kansas. The proposed interconnection point is at the existing Mingo 115 kV substation, owned by SUNC. The proposed in-service date is July, 2009.

Power flow analysis has indicated that for the powerflow cases studied, it is possible to interconnect the 204 MW of generation with transmission system reinforcements within the local transmission system. A preliminary reactive compensation analysis has indicated the wind farm will be required to provide +/- 95% power factor at the point of interconnection. This need will be verified in the Impact Study based on the wind turbine manufacturer and type requested by the Customer. 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) or whether additional interconnection facilities will be required as a result of this reactive power deficiency at the point of interconnection.

The requirement to interconnect the 204 MW of wind generation at the existing Mingo 115kV substation consists of adding a new 115 kV circuit-breaker and a line terminal at the existing Mingo substation. The new terminal 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 204 MW of generation is \$1,550,000. These costs are shown in Tables 1 and 2. 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 possible need for reactive compensation. Network constraints in the Sunflower Electric Power Corporation (SUNC) 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.

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 SPP 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.

Contents

Introduction	5
Interconnection Facilities	5
Interconnection Estimated Costs	7
Powerflow Analysis	8
Powerflow Analysis Methodology	10
Powerflow Results.....	11
Conclusion	16
Appendix A: Point of Interconnection Area Map.....	17

Tables

Table 1: Direct Assignment Facilities	7
Table 2: Required Interconnection Network Upgrade Facilities.....	7
Table 3: Network Constraints.....	11
Table 5: Contingency Analysis	12

Figures

Figure 1: Proposed Method of Interconnection	6
Figure 2: Point of Interconnection Area Map	17

Introduction

<OMITTED TEXT> (Customer) has requested a Feasibility Study for the purpose of interconnecting 204 MW of wind generation within the control area of Sunflower Electric Power Corporation (SUNC) located in Thomas County, Kansas. The proposed interconnection point is at the existing Mingo 115 kV substation, owned by SUNC. The proposed in-service date is July, 2009.

Interconnection Facilities

The primary objective of this study is to identify the system problems associated with connecting the generation 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 requirement to interconnect the 204 MW of wind generation on the existing Mingo 115 kV substation consists of adding a new 115 kV circuit-breaker and line terminal at Mingo. The line terminal 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.

Other Network Constraints in the Sunflower Electric Power Corporation transmission systems that were identified are shown in Table 3. With a defined source and sink in a Transmission Service Request (TSR), this list of Network Constraints will be refined and expanded to account for all Network Upgrade requirements.

A preliminary one-line drawing of the interconnection and direct assigned facilities are shown in Figure 1.

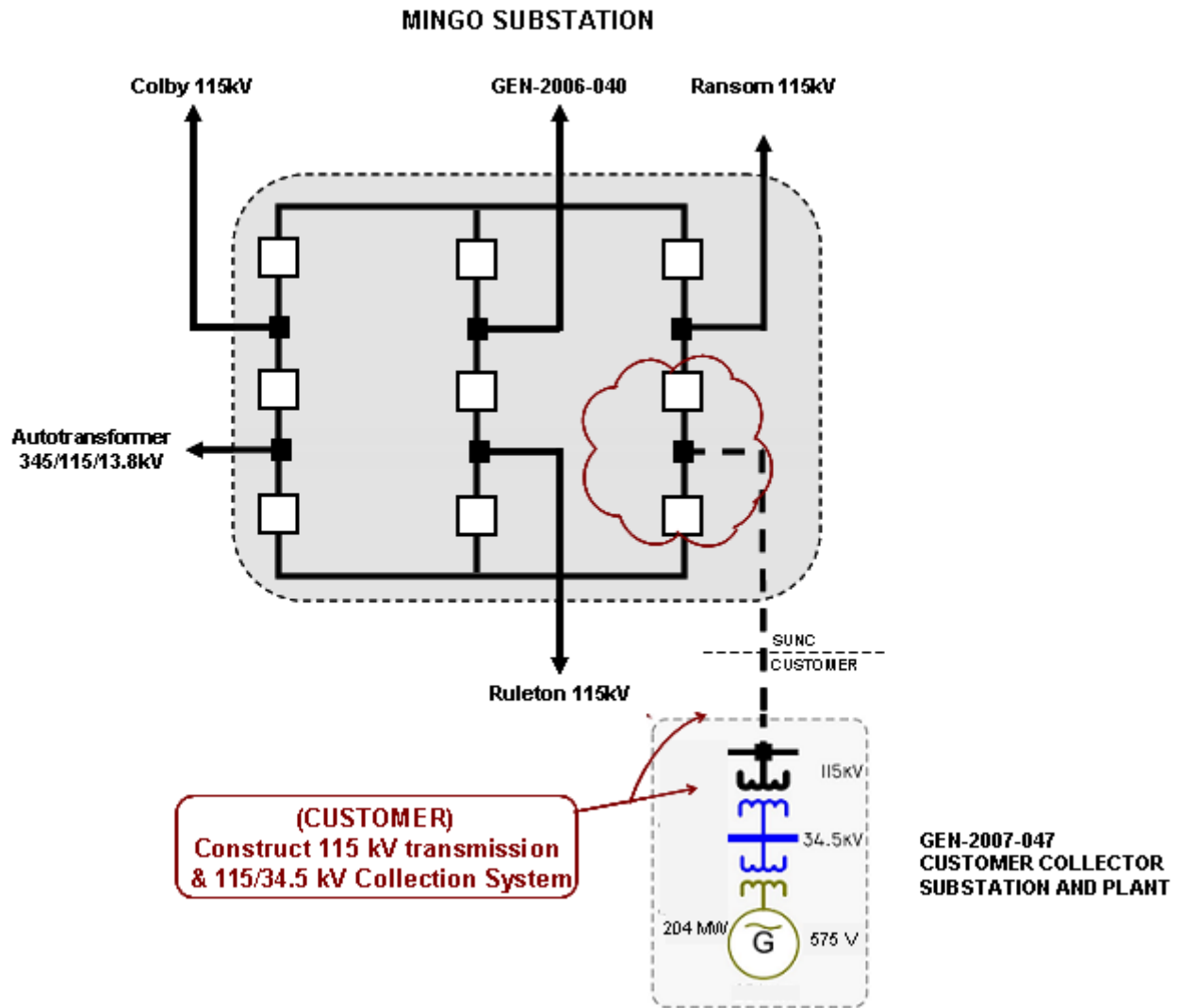


Figure 1: Proposed Method of Interconnection
(Final design to be determined)

Interconnection Estimated Costs

The minimum cost for adding a new 115 kV circuit-breaker and line terminal serving GEN-2007-047 facilities is estimated at \$1,550,000. 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 possible need for reactive compensation, 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.

The costs of interconnecting the facility to the SUNC transmission system are listed in Table 1 & 2. **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 (2008 DOLLARS)
CUSTOMER – 115/34.5 kV substation facilities.	*
CUSTOMER – 115 kV line between Customer substation and Mingo (SUNC) 115 kV substation.	*
CUSTOMER – Reactive compensation for +/-95% power factor at the point of interconnection to be determined during impact study.	*
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 (2008 DOLLARS)
SUNC – 115 kV line terminal to be built for generation request #GEN-2007-047 on the Mingo 115 kV substation. Work to include associated switches, control relaying, high speed communications, metering and related equipment and all related structures.	\$1,550,000
TOTAL	\$1,550,000

* Estimates of cost to be determined.

Powerflow Analysis

A powerflow analysis was conducted for the facility using modified versions of the 2009 summer and winter peak model, 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 July, 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 204 MW and location, additional criteria violations will occur on the existing SUNC 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.

The need for reactive compensation will be determined during the Impact Study. The need for reactive compensation will be based on the Customer's choice of wind turbine make and manufacturer. 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.

A preliminary reactive compensation analysis was conducted for the outage of the Mingo 345/115kV autotransformer for the 2012 summer peak. The results show that the wind farm would need to be able to supply 91% power factor at the point of interconnection as well as a new 50 Mvar reactive source at the Colby power station.

Season	Outage	Wind Farm MW	Wind Farm MVar	Wind Farm Power Factor	Reactive Source at Colby
2012 Summer	Mingo 345/115kV autotransformer	198 MW	82 Mvar	91.7% Lag	50 MVar

The Impact Study will determine what power factor the wind farm must provide. It may be determined that a new autotransformer at Mingo is required or that an alternate point of interconnection on the 345kV bus is needed.

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 - NEKOMA 115KV CKT 1
MIDW	ALEXANDER - NESS CITY 115KV CKT 1
MIDW	ATWOOD - COLBY 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/SUNC	COLBY - MINGO 115KV CKT 1
MIDW/SUNC	NESS CITY - NESS CITY 115KV CKT 1
MIDW/WEPL	ST JOHN - ST-JOHN 115KV CKT 1
SPS	HARRINGTON STATION - NICHOLS STATION 230KV CKT 1
SPS	HARRNG_MID6 - NICHOLS STATION 230KV CKT 2
SPS	POTTER COUNTY INTERCHANGE (POTTR CO) 345/230/13.2KV TRANSFORMER CKT 1
SUNC	BEELER - DIGHTON TAP 115KV CKT 1
SUNC	BEELER - NESS CITY 115KV CKT 1
SUNC	CITIES SERVICE TAP - 2001-039M 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	LEOTI - 2001-039M 115KV CKT 1
SUNC	LEOTI - SELKIRK 115KV CKT 1
SUNC	MINGO - 2006-040 115KV CKT 1
SUNC	MINGO (MINGO) 345/115/13.8KV TRANSFORMER CKT 1
SUNC	PIONEER TAP - CTU SUBLETTE 115KV CKT 1
SUNC	PIONEER TAP - PLYMELL 115KV CKT 1
SUNC	SCOTT CITY - SETAB 115KV CKT 1
SUNC	SETAB (SETAB) 345/115/13.8KV TRANSFORMER CKT 1
SUNC	SHARON SPRINGS - 2006-034 115KV CKT 1
SUNC	SYRACUSE - WILLIAMSON 115KV CKT 1
SUNC/WEPL	SPEARVILLE (SPEARVL) 345/230/13.8KV TRANSFORMER CKT 1
WEPL	CIMARRON RIVER PLANT - CIMARRON RIVER TAP 115KV CKT 1
WEPL	CIMARRON RIVER PLANT - NORTH LIBERAL TAP 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	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/MIDW	MULLERGREN - S HAYS6 230.00 230KV CKT 1
WEPL/SUNC	CIMARRON RIVER PLANT - NORTH CIMARRON 115KV CKT 1
WERE	CIRCLE - RENO COUNTY 115KV CKT 1
WERE	CIRCLE - RENO COUNTY 115KV CKT 2
WERE	EXIDE JUNCTION - NORTH AMERICAN PHILIPS 115KV CKT 1
MIDW	Midwest Energy
SPS	Southwestern Public Service Company
SUNC	Sunflower Electric Power Corporation
WEPL	West Plains
WERE	Westar Energy

Table 4: Contingency Analysis

SEASON	OVERLOADED ELEMENT	RATING (MVA)	LOADING (%)	ATC (MW)	CONTINGENCY
09SP	SYRACUSE - WILLIAMSON 115KV CKT 1	98	238	0	2001-039M - CITIES SERVICE TAP 115KV CKT 1
09SP	CIRCLE - RENO COUNTY 115KV CKT 2	92	208	0	CIRCLE - RENO COUNTY 115KV CKT 1
09SP	CITIES SERVICE TAP - 2001-039M 115KV CKT 1	143	199	0	SYRACUSE - WILLIAMSON 115KV CKT 1
09SP	CITIES SERVICE TAP - SETAB 115KV CKT 1	143	195	0	SYRACUSE - WILLIAMSON 115KV CKT 1
09SP	SEWARD - ST JOHN 115KV CKT 1	80	167	0	CIRCLE - MULLERGREN 230KV CKT 1
09SP	FLETCHER - WILLIAMSON 115KV CKT 1	98	160	0	HOLCOMB -SETAB 345KV CKT 1
09SP	MEDICINE LODGE - SUN CITY 115KV CKT 1	80	157	0	MULLERGREN - SPEARVILLE 230KV CKT 1
09SP	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	140	0	FINNEY SWITCHING STATION - HOLCOMB 345KV CKT 1
09SP	ALEXANDER - NESS CITY 115KV CKT 1	101	138	0	MULLERGREN - SPEARVILLE 230KV CKT 1
09SP	HOLCOMB (HOLCOMB) 345/115/13.8KV TRANSFORMER CKT 1	336	134	0	HOLCOMB -SETAB 345KV CKT 1
09SP	LEOTI - SELKIRK 115KV CKT 1	143	132	0	SYRACUSE - WILLIAMSON 115KV CKT 1
09SP	GREAT BEND TAP - SEWARD 115KV CKT 1	90	131	0	CIRCLE - MULLERGREN 230KV CKT 1
09SP	ALEXANDER - NEKOMA 115KV CKT 1	101	131	0	MULLERGREN - SPEARVILLE 230KV CKT 1
09SP	HARPER - MEDICINE LODGE 138KV CKT 1	72	127	0	FINNEY SWITCHING STATION - HOLCOMB 345KV CKT 1
09SP	HOLCOMB - PLYMELL 115KV CKT 1	143	126	0	HOLCOMB (HOLCOMB) 345/115/13.8KV TRANSFORMER CKT 1
09SP	LEOTI - 2001-039M 115KV CKT 1	143	125	0	SYRACUSE - WILLIAMSON 115KV CKT 1
09SP	MULLERGREN - S HAYS6 230KV CKT 1	147	125	0	KNOLL - SMOKYHILLS 230KV CKT 1
09SP	SPEARVILLE (SPEARVL) 345/230/13.8KV TRANSFORMER CKT 1	336	124	0	FINNEY SWITCHING STATION - HOLCOMB 345KV CKT 1
09SP	PIONEER TAP - PLYMELL 115KV CKT 1	143	122	0	HOLCOMB (HOLCOMB) 345/115/13.8KV TRANSFORMER CKT 1
09SP	CIMARRON RIVER PLANT - NORTH CIMARRON 115KV CKT 1	143	122	0	HOLCOMB (HOLCOMB) 345/115/13.8KV TRANSFORMER CKT 1
09SP	CIMARRON RIVER PLANT - CIMARRON RIVER TAP 115KV CKT 1	90	120	0	CIMARRON RIVER PLANT - NORTH LIBERAL TAP 115KV CKT 1
09SP	DIGHTON TAP - MANNING TAP 115KV CKT 1	98	117	0	MULLERGREN - SPEARVILLE 230KV CKT 1
09SP	POTTER COUNTY INTERCHANGE (POTTR CO) 345/230/13.2KV TRANSFORMER CKT 1	560	117	0	HOLCOMB -SPEARVILLE 345KV CKT 1
09SP	HARRINGTON STATION - NICHOLS STATION 230KV CKT 1	635	115	0	HARRNG_MID6 - NICHOLS STATION 230KV CKT 2
09SP	HARRNG_MID6 - NICHOLS STATION 230KV CKT 2	635	115	0	HARRINGTON STATION - NICHOLS STATION 230KV CKT 1
09SP	MINGO - 2006-040 115KV CKT 1	100	109	0	MULLERGREN - SPEARVILLE 230KV CKT 1
09SP	SETAB (SETAB) 345/115/13.8KV TRANSFORMER CKT 1	280	108	0	HOLCOMB (HOLCOMB) 345/115/13.8KV TRANSFORMER CKT 1
09SP	EXIDE JUNCTION - NORTH AMERICAN PHILIPS 115KV CKT 1	196	106	0	NORTHVIEW - SUMMIT 115KV CKT 1
09SP	SCOTT CITY - SETAB 115KV CKT 1	198	122	12	HOLCOMB -SETAB 345KV CKT 1
09SP	ST JOHN - ST-JOHN 115KV CKT 1	88	113	15	CIRCLE - MULLERGREN 230KV CKT 1
09SP	COLBY - HOXIE 115KV CKT 1	101	216	21	MINGO (MINGO) 345/115/13.8KV TRANSFORMER CKT 1
09SP	BEACH STATION - HOXIE 115KV CKT 1	101	207	36	MINGO (MINGO) 345/115/13.8KV TRANSFORMER CKT 1
09SP	BEELER - DIGHTON TAP 115KV CKT 1	98	109	74	MULLERGREN - SPEARVILLE 230KV CKT 1
09SP	GREENSBURG - JUDSON LARGE 115KV CKT 1	130	109	81	MULLERGREN - SPEARVILLE 230KV CKT 1
09SP	MULLERGREN - SPEARVILLE 230KV CKT 1	355	110	107	FINNEY SWITCHING STATION - HOLCOMB 345KV CKT 1
09SP	COLBY - MINGO 115KV CKT 1	143	123	132	MINGO (MINGO) 345/115/13.8KV TRANSFORMER CKT 1
09SP	BEELER - NESS CITY 115KV CKT 1	98	105	135	MULLERGREN - SPEARVILLE 230KV CKT 1
09SP	CIRCLE - RENO COUNTY 115KV CKT 1	194	101	164	CIRCLE - RENO COUNTY 115KV CKT 2
09SP	NESS CITY - NESS CITY 115KV CKT 1	143	102	184	MULLERGREN - SPEARVILLE 230KV CKT 1
09SP	GREENSBURG - SUN CITY 115KV CKT 1	130	101	195	MULLERGREN - SPEARVILLE 230KV CKT 1
09SP	ATWOOD - COLBY 115KV CKT 1	75	102	198	MINGO (MINGO) 345/115/13.8KV TRANSFORMER CKT 1

TABLE 5: Contingency Analysis (continued)

SEASON	OVERLOADED ELEMENT	RATING (MVA)	LOADING (%)	ATC (MW)	CONTINGENCY
09WP	SYRACUSE - WILLIAMSON 115KV CKT 1	98	248	0	2001-039M - CITIES SERVICE TAP 115KV CKT 1
09WP	CITIES SERVICE TAP - 2001-039M 115KV CKT 1	143	209	0	SYRACUSE - WILLIAMSON 115KV CKT 1
09WP	CITIES SERVICE TAP - SETAB 115KV CKT 1	143	205	0	SYRACUSE - WILLIAMSON 115KV CKT 1
09WP	FLETCHER - WILLIAMSON 115KV CKT 1	98	192	0	HOLCOMB - SETAB 345KV CKT 1
09WP	CIRCLE - RENO COUNTY 115KV CKT 2	92	184	0	CIRCLE - RENO COUNTY 115KV CKT 1
09WP	SEWARD - ST JOHN 115KV CKT 1	80	160	0	CIRCLE - MULLERGREN 230KV CKT 1
09WP	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	153	0	FINNEY SWITCHING STATION - HOLCOMB 345KV CKT 1
09WP	SCOTT CITY - SETAB 115KV CKT 1	198	153	0	HOLCOMB - SETAB 345KV CKT 1
09WP	LEOTI - SELKIRK 115KV CKT 1	143	140	0	SYRACUSE - WILLIAMSON 115KV CKT 1
09WP	MULLERGREN - S HAYS6 230KV CKT 1	147	139	0	KNOLL 230 - SMOKYHILLS 230KV CKT 1
09WP	HARPER - MEDICINE LODGE 138KV CKT 1	72	139	0	FINNEY SWITCHING STATION - HOLCOMB 345KV CKT 1
09WP	MEDICINE LODGE - SUN CITY 115KV CKT 1	80	137	0	FINNEY SWITCHING STATION - HOLCOMB 345KV CKT 1
09WP	SPEARVILLE (SPEARVL) 345/230/115KV TRANSFORMER CKT 1	336	137	0	FINNEY SWITCHING STATION - HOLCOMB 345KV CKT 1
09WP	NORTH CIMARRON - CIMARRON RIVER PLANT 115KV CKT 1	143	135	0	HOLCOMB (HOLCOMB) 345/115/13.8KV TRANSFORMER CKT 1
09WP	LEOTI - 2001-039M 115KV CKT 1	143	134	0	SYRACUSE - WILLIAMSON 115KV CKT 1
09WP	ALEXANDER - NESS CITY 115KV CKT 1	101	127	0	HOLCOMB - SETAB 345KV CKT 1
09WP	HOLCOMB - PLYMELL 115KV CKT 1	143	125	0	HOLCOMB (HOLCOMB) 345/115/13.8KV TRANSFORMER CKT 1
09WP	PIONEER TAP - PLYMELL 115KV CKT 1	143	123	0	HOLCOMB (HOLCOMB) 345/115/13.8KV TRANSFORMER CKT 1
09WP	SETAB (SETAB) 345/115/13.8KV TRANSFORMER CKT 1	280	118	0	HOLCOMB (HOLCOMB) 345/115/13.8KV TRANSFORMER CKT 1
09WP	HOLCOMB (HOLCOMB) 345/115/13.8KV TRANSFORMER CKT 1	336	110	0	CIMARRON RIVER PLANT - NORTH CIMARRON 115KV CKT 1
09WP	MINGO - 2006-040 115KV CKT 1	100	110	0	HOLCOMB (HOLCOMB) 345/115/13.8KV TRANSFORMER CKT 1
09WP	ALEXANDER - NEKOMA 115KV CKT 1	101	121	24	HOLCOMB - SETAB 345KV CKT 1
09WP	CIMARRON RIVER PLANT - NORTH CIMARRON 115KV CKT 1	143	111	26	SPEARVILLE (SPEARVL) 345/230/13.8KV TRANSFORMER CKT 1
09WP	COLBY - HOXIE 115KV CKT 1	101	198	35	MINGO (MINGO) 345/115/13.8KV TRANSFORMER CKT 1
09WP	BEACH STATION - HOXIE 115KV CKT 1	101	193	45	MINGO (MINGO) 345/115/13.8KV TRANSFORMER CKT 1
09WP	ST JOHN - ST_JOHN 115KV CKT 1	88	108	93	CIRCLE - MULLERGREN 230KV CKT 1
09WP	NEKOMA 115/69KV TRANSFORMER CKT 1	44	108	119	LACROSSE TAP - NEKOMA 115KV CKT 1
09WP	COLBY - MINGO 115KV CKT 1	143	124	126	MINGO (MINGO) 345/115/13.8KV TRANSFORMER CKT 1
09WP	PIONEER TAP - CTU SUBLETTE 115KV CKT 1	143	103	142	HOLCOMB (HOLCOMB) 345/115/13.8KV TRANSFORMER CKT 1
09WP	SHARON SPRINGS - 2006-034 115KV CKT 1	98	102	192	MINGO - SETAB 345KV CKT 1
09WP	HARRINGTON STATION - NICHOLS STATION 230KV CKT 1	706	100	196	HARRNG_MID6 - NICHOLS STATION 230KV CKT 2
12SP	SYRACUSE - WILLIAMSON 115KV CKT 1	98	236	0	2001-039M - CITIES SERVICE TAP 115KV CKT 1
12SP	CITIES SERVICE TAP - 2001-039M 115KV CKT 1	143	197	0	SYRACUSE - WILLIAMSON 115KV CKT 1
12SP	CITIES SERVICE TAP - SETAB 115KV CKT 1	143	193	0	SYRACUSE - WILLIAMSON 115KV CKT 1
12SP	FLETCHER - WILLIAMSON 115KV CKT 1	98	153	0	HOLCOMB - SETAB 345KV CKT 1
12SP	SEWARD - ST JOHN 115KV CKT 1	80	151	0	CIRCLE - MULLERGREN 230KV CKT 1
12SP	MEDICINE LODGE - SUN CITY 115KV CKT 1	80	140	0	MULLERGREN - SPEARVILLE 230KV CKT 1
12SP	HOLCOMB - PLYMELL 115KV CKT 1	143	132	0	PIONEER – PK_GOAB3 115KV CKT 1; PK_GOAB3 – PUCKET 115KV CKT 1; PK_GOAB3 – FLETCHER 115KV CKT 1
12SP	HOLCOMB - PLYMELL 115KV CKT 1	143	132	0	HOLCOMB (HOLCOMB) 345/115/13.8KV TRANSFORMER CKT 1
12SP	LEOTI - SELKIRK 115KV CKT 1	143	131	0	SYRACUSE - WILLIAMSON 115KV CKT 1
12SP	PIONEER TAP - PLYMELL 115KV CKT 1	143	128	0	HOLCOMB (HOLCOMB) 345/115/13.8KV TRANSFORMER CKT 1
12SP	ALEXANDER - NESS CITY 115KV CKT 1	101	126	0	MULLERGREN - SPEARVILLE 230KV CKT 1

TABLE 5: Contingency Analysis (continued)

SEASON	OVERLOADED ELEMENT	RATING (MVA)	LOADING (%)	ATC (MW)	CONTINGENCY
12SP	LEOTI - 2001-039M 115KV CKT 1	143	124	0	SYRACUSE - WILLIAMSON 115KV CKT 1
12SP	GREAT BEND TAP - SEWARD 115KV CKT 1	90	122	0	CIRCLE - MULLERGREN 230KV CKT 1
12SP	MULLERGREN - S HAYS6 230KV CKT 1	147	122	0	SMOKYHILLS - SUMMIT 230KV CKT 1
12SP	CIMARRON RIVER PLANT - NORTH CIMARRON 115KV CKT 1	143	119	0	HOLCOMB (HOLCOMB) 345/115/13.8KV TRANSFORMER CKT 1
12SP	HARRINGTON STATION - NICHOLS STATION 230KV CKT 1	635	118	0	HARRNG_MID6 - NICHOLS STATION 230KV CKT 2
12SP	HARRNG_MID6 - NICHOLS STATION 230KV CKT 2	635	118	0	HARRINGTON STATION - NICHOLS STATION 230KV CKT 1
12SP	CIMARRON RIVER PLANT - CIMARRON RIVER TAP 115KV CKT 1	90	113	0	CIMARRON RIVER PLANT - NORTH LIBERAL TAP 115KV CKT 1
12SP	SPEARVILLE (SPEARVL) 345/230/13.8KV TRANSFORMER CKT 1	336	117	4	FINNEY SWITCHING STATION - HOLCOMB 345KV CKT 1
12SP	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	119	20	FINNEY SWITCHING STATION - HOLCOMB 345KV CKT 1
12SP	COLBY - HOXIE 115KV CKT 1	101	209	26	MINGO (MINGO) 345/115/13.8KV TRANSFORMER CKT 1
12SP	POTTER COUNTY INTERCHANGE (POTTR CO) 345/230/13.2KV TRANSFORMER CKT 1	560	111	39	HOLCOMB - SPEARVILLE 345KV CKT 1
12SP	BEACH STATION - HOXIE 115KV CKT 1	101	199	41	MINGO (MINGO) 345/115/13.8KV TRANSFORMER CKT 1
12SP	ALEXANDER - NEKOMA 115KV CKT 1	101	119	44	MULLERGREN - SPEARVILLE 230KV CKT 1
12SP	DIGHTON TAP - MANNING TAP 115KV CKT 1	98	109	50	MULLERGREN - SPEARVILLE 230KV CKT 1
12SP	SCOTT CITY - SETAB 115KV CKT 1	198	111	102	HOLCOMB - SETAB 345KV CKT 1
12SP	HARPER - MEDICINE LODGE 138KV CKT 1	72	108	118	FINNEY SWITCHING STATION - HOLCOMB 345KV CKT 1
12SP	COLBY - MINGO 115KV CKT 1	143	123	131	MINGO (MINGO) 345/115/13.8KV TRANSFORMER CKT 1
12SP	HOLCOMB (HOLCOMB) 345/115/13.8KV TRANSFORMER CKT 1	336	107	166	CIMARRON RIVER PLANT - NORTH CIMARRON 115KV CKT 1
12SP	ST JOHN - ST_JOHN 115KV CKT 1	88	103	174	CIRCLE - MULLERGREN 230KV CKT 1
12SP	BEELER - DIGHTON TAP 115KV CKT 1	98	101	185	MULLERGREN - SPEARVILLE 230KV CKT 1
12WP	SYRACUSE - WILLIAMSON 115KV CKT 1	98	247	0	2001-039M - CITIES SERVICE TAP 115KV CKT 1
12WP	CITIES SERVICE TAP - 2001-039M 115KV CKT 1	143	207	0	SYRACUSE - WILLIAMSON 115KV CKT 1
12WP	CITIES SERVICE TAP - SETAB 115KV CKT 1	143	203	0	SYRACUSE - WILLIAMSON 115KV CKT 1
12WP	FLETCHER - WILLIAMSON 115KV CKT 1	98	151	0	MINGO (MINGO) 345/115/13.8KV TRANSFORMER CKT 1
12WP	SEWARD - ST JOHN 115KV CKT 1	80	143	0	CIRCLE - MULLERGREN 230KV CKT 1
12WP	LEOTI - SELKIRK 115KV CKT 1	143	139	0	SYRACUSE - WILLIAMSON 115KV CKT 1
12WP	SCOTT CITY - SETAB 115KV CKT 1	198	135	0	HOLCOMB - SETAB 345KV CKT 1
12WP	LEOTI - 2001-039M 115KV CKT 1	143	133	0	SYRACUSE - WILLIAMSON 115KV CKT 1
12WP	MULLERGREN - S HAYS6 230KV CKT 1	147	130	0	SMOKYHILLS - SUMMIT 230KV CKT 1
12WP	PLYMELL -HOLCOMB 115KV CKT 1	143	125	0	HOLCOMB (HOLCOMB) 345/115/13.8KV TRANSFORMER CKT 1
12WP	CIMARRON RIVER PLANT - NORTH CIMARRON 115KV CKT 1	143	124	0	HOLCOMB (HOLCOMB) 345/115/13.8KV TRANSFORMER CKT 1
12WP	PIONEER TAP - PLYMELL 115KV CKT 1	143	122	0	HOLCOMB (HOLCOMB) 345/115/13.8KV TRANSFORMER CKT 1
12WP	HOLCOMB (HOLCOMB) 345/115/13.8KV TRANSFORMER CKT 1	336	111	0	CIMARRON RIVER PLANT - NORTH CIMARRON 115KV CKT 1
12WP	COLBY - HOXIE 115KV CKT 1	101	201	32	MINGO (MINGO) 345/115/13.8KV TRANSFORMER CKT 1
12WP	BEACH STATION - HOXIE 115KV CKT 1	101	194	44	MINGO (MINGO) 345/115/13.8KV TRANSFORMER CKT 1
12WP	ALEXANDER - NESS CITY 115KV CKT 1	101	119	65	SPEARVILLE (SPEARVL) 345/230/13.8KV TRANSFORMER CKT 1
12WP	HARRINGTON STATION - NICHOLS STATION 230KV CKT 1	706	101	107	HARRNG_MID6 - NICHOLS STATION 230KV CKT 2
12WP	HARRNG_MID6 - NICHOLS STATION 230KV CKT 2	706	101	123	HARRINGTON STATION - NICHOLS STATION 230KV CKT 1
12WP	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	107	123	CIRCLE - MULLERGREN 230KV CKT 1
12WP	COLBY - MINGO 115KV CKT 1	143	124	127	MINGO (MINGO) 345/115/13.8KV TRANSFORMER CKT 1
12WP	NEKOMA 115/69KV TRANSFORMER CKT 1	44	105	142	LACROSSE TAP - NEKOMA 115KV CKT 1

TABLE 5: Contingency Analysis (continued)

SEASON	OVERLOADED ELEMENT	RATING (MVA)	LOADING (%)	ATC (MW)	CONTINGENCY
12WP	MEDICINE LODGE - SUN CITY 115KV CKT 1	80	127	180	MULLERGREN - SPEARVILLE 230KV CKT 1
12WP	HEIZER 115/69KV TRANSFORMER CKT 2	24	102	192	BASE CASE
12WP	ALEXANDER - NEKOMA 115KV CKT 1	101	113	242	SPEARVILLE (SPEARVL) 345/230/13.8KV TRANSFORMER CKT 1
17SP	SYRACUSE - WILLIAMSON 115KV CKT 1	98	230	0	2001-039M - CITIES SERVICE TAP 115KV CKT 1
17SP	CITIES SERVICE TAP - 2001-039M 115KV CKT 1	143	192	0	SYRACUSE - WILLIAMSON 115KV CKT 1
17SP	CITIES SERVICE TAP - SETAB 115KV CKT 1	143	188	0	SYRACUSE - WILLIAMSON 115KV CKT 1
17SP	HEIZER 115/69KV TRANSFORMER CKT 2	24	176	0	BASE CASE
17SP	FLETCHER - WILLIAMSON 115KV CKT 1	98	138	0	MINGO (MINGO) 345/115/13.8KV TRANSFORMER CKT 1
17SP	HOLCOMB - PLYMELL 115KV CKT 1	143	133	0	HOLCOMB (HOLCOMB) 345/115/13.8KV TRANSFORMER CKT 1
17SP	PIONEER TAP - PLYMELL 115KV CKT 1	143	129	0	HOLCOMB (HOLCOMB) 345/115/13.8KV TRANSFORMER CKT 1
17SP	LEOTI - SELKIRK 115KV CKT 1	143	127	0	SYRACUSE - WILLIAMSON 115KV CKT 1
17SP	LEOTI - 2001-039M 115KV CKT 1	143	119	0	SYRACUSE - WILLIAMSON 115KV CKT 1
17SP	CIMARRON RIVER PLANT - NORTH CIMARRON 115KV CKT 1	143	116	0	HOLCOMB (HOLCOMB) 345/115/13.8KV TRANSFORMER CKT 1
17SP	MULLERGREN - S HAYS6 230KV CKT 1	147	115	0	KNOLL - SMOKYHILLS 230.00 230KV CKT 1
17SP	HOLCOMB (HOLCOMB) 345/115/13.8KV TRANSFORMER CKT 1	336	115	0	HOLCOMB - SETAB 345KV CKT 1
17SP	SETAB (SETAB) 345/115/13.8KV TRANSFORMER CKT 1	280	109	0	HOLCOMB (HOLCOMB) 345/115/13.8KV TRANSFORMER CKT 1
17SP	CIMARRON RIVER PLANT - CIMARRON RIVER TAP 115KV CKT 1	90	109	21	CIMARRON RIVER PLANT - NORTH LIBERAL TAP 115KV CKT 1
17SP	COLBY - HOXIE 115KV CKT 1	101	191	40	MINGO (MINGO) 345/115/13.8KV TRANSFORMER CKT 1
17SP	SEWARD - ST JOHN 115KV CKT 1	80	108	41	LAMAR – FINNEY 345KV CKT 1; FINNEY – POTTER COUNTY INTERCHANGE 345KV CKT 1
17SP	BEACH STATION - HOXIE 115KV CKT 1	101	181	58	MINGO (MINGO) 345/115/13.8KV TRANSFORMER CKT 1
17SP	MEDICINE LODGE - SUN CITY 115KV CKT 1	80	111	83	MULLERGREN - SPEARVILLE 230KV CKT 1
17SP	COLBY - MINGO 115KV CKT 1	143	122	135	MINGO (MINGO) 345/115/13.8KV TRANSFORMER CKT 1
17SP	ALEXANDER - NESS CITY 115KV CKT 1	101	104	166	HOLCOMB - SPEARVILLE 345KV CKT 1
17SP	CIMARRON RIVER PLANT - NORTH LIBERAL TAP 115KV CKT 1	115	100	198	LAMAR – FINNEY 345KV CKT 1; FINNEY – POTTER COUNTY INTERCHANGE 345KV CKT 1
17SP	MINGO (MINGO) 345/115/13.8KV TRANSFORMER CKT 1	280	102	198	2001-039M - 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 \$1,550,000 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 may be responsible for installing reactive compensation 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

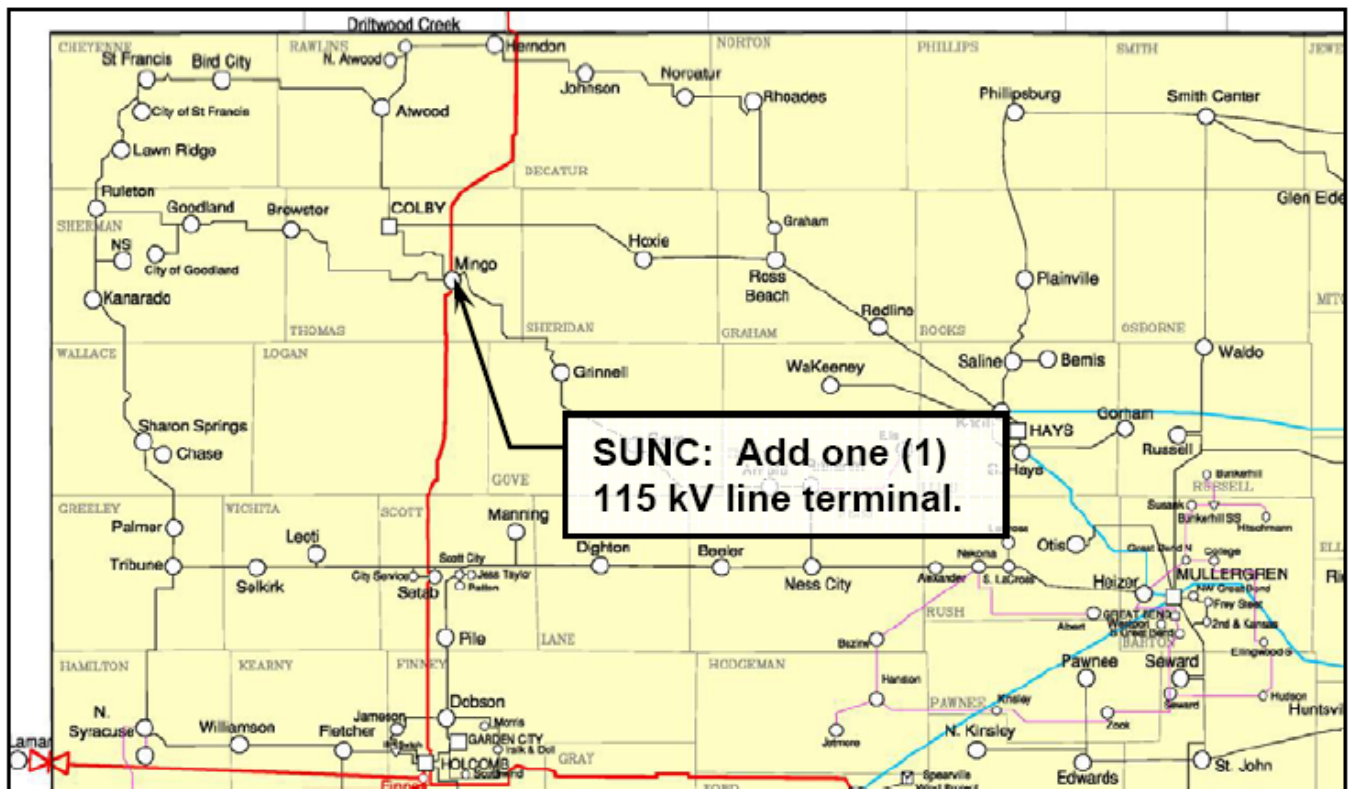


Figure 2: Point of Interconnection Area Map