



**Feasibility Study
For
Generation Interconnection
Request
GEN-2007-024**

SPP Tariff Studies
(#GEN-2007-024)

January, 2008

Executive Summary

<OMITTED TEXT> (Customer) has requested a Feasibility Study for the purpose of interconnecting 120 MW of wind generation within the control area of Southwestern Public Service Company (SPS) in Sherman County, Texas. The proposed method of interconnection is to build a new three breaker 115kV ring bus substation on the Moore – Texas County 115kV transmission line, owned by SPS. The proposed in-service date of this request is December 31, 2009

Power flow analysis has indicated that for the power flow cases studied, it is possible to interconnect the 120 MW of generation with transmission system reinforcements within the local transmission systems. In order to maintain acceptable reactive power compensation, the Customer will need to install 20 Mvar of 34.5 kV capacitor banks in the Customer's collector substation on the 34.5 kV bus. Dynamic Stability studies performed as part of the 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 120 MW of wind generation on the Moore – Texas County 115kV line consist of building a new three breaker 115kV ring bus substation on this line. 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 120 MW of generation is approximately \$2,500,000. These costs are shown in Table 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 does not include the Customer's 115/34.5 kV substation or the 20 Mvar of 34.5 kV capacitor banks.

Other Network Constraints in the American Electric Power West (AEPW), Kansas City Power & Light (KACP), Midwest Energy (MIDW), Missouri Public Service (MIPU), Sunflower Electric Power Corporation (SUNC), West Plains (WEPL), Westar Energy (WERE), Western Farmers Electric Cooperative (WFEC) and SPS transmission systems that may be verified with a transmission service request and associated studies are listed in Table 3. These 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 (TSR), 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 American Electric Power West (AEPW), Kansas City Power & Light (KACP), Midwest Energy (MIDW), Missouri Public Service (MIPU), Sunflower Electric Power Corporation (SUNC), West Plains (WEPL), Westar Energy (WERE), Western Farmers Electric Cooperative (WFEC) and SPS 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 120 MW of wind generation within the control area of Southwestern Public Service Company (SPS) in Sherman County, Texas. The proposed point of interconnection is on the Moore – Texas County 115kV transmission line, owned by SPS. 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 into 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 Customer requested interconnection to a point on the existing Moore – Texas County 115kV transmission line in Sherman County, Texas. Request GEN-2006-020S is a small generation interconnection request with an executed Interconnection Agreement that is in very close proximity to the request.

The requirements to interconnect the 120 MW of wind generation on the Moore – Texas County 115 kV transmission line consists of constructing a new three breaker 115kV ring bus substation by SPS. During the course of a Facility Study, it may be determined that GEN-2006-020S wind farm may also need to be interconnected into this substation. This will be determined during the Facility Study. The Customer has not proposed a route of its 115 kV line to serve its 115/34.5 kV facilities. It is assumed that obtaining all necessary right-of-way for the substation construction will not be a significant expense.

Other Network Constraints in the American Electric Power West (AEPW), Kansas City Power & Light (KACP), Midwest Energy (MIDW), Missouri Public Service (MIPU), Sunflower Electric Power Corporation (SUNC), West Plains (WEPL), Westar Energy (WERE), Western Farmers Electric Cooperative (WFEC) and SPS transmission systems that were identified are listed 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.

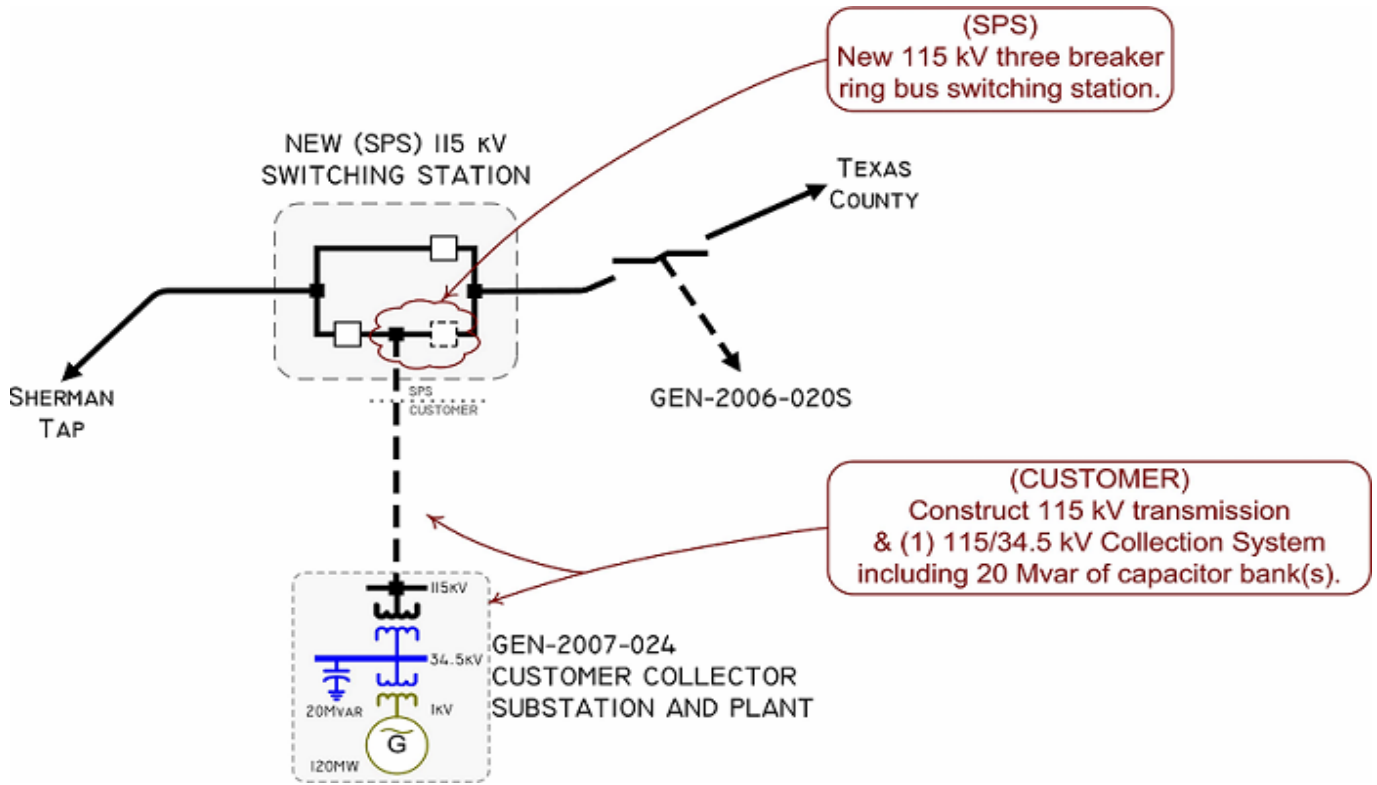


Figure 1: Proposed Method of Interconnection

(Final design to be determined)

Interconnection Estimated Costs

The total cost for building the required facilities for this 120 MW of generation is estimated at \$2,500,000. These estimates will be refined during the development of the impact study based on the final designs. 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 115/34.5 kV facilities up to the point of interconnection.

The costs of interconnecting the facility to the SPS 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 (2007 DOLLARS)
Customer – 115/34.5 kV Substation facilities.	*
Customer – 115 kV transmission line facilities between Customer facilities and SPS 115 kV switching station.	*
Customer - Right-of-Way for Customer facilities.	*
Customer – 34.5 kV, 20 MVAR capacitor bank(s) in Customer substation.	*
Total	*

* Estimates of cost to be determined.

Table 2: Required Interconnection Network Upgrade Facilities

FACILITY	ESTIMATED COST (2007 DOLLARS)
SPS – Build 115 kV three-breaker ring bus switching station. Station to include switches, control relaying, high speed communications, all structures, and metering and other related equipment.	\$2,500,000
Total	\$2,500,000

* Estimates of cost to be determined.

Powerflow Analysis

A powerflow analysis was conducted for the facility using modified versions of the 2009 winter peak, 2012 summer and winter peak, and 2017 summer peak models. 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.

The analysis of the Customer's project indicates that, given the requested generation level of 120 MW and location, additional criteria violations will occur on the existing AEPW, KACP, MIDW, MIPU, WFEC, SUNC, WEPL, WERE and SPS 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.

Certain SPP Expansion Plan projects planned for the local area of this request were included in this analysis. If for any reason these projects are not constructed as planned this analysis may need to be reevaluated.

In order to maintain a zero reactive power flow exchange at the point of interconnection, additional reactive compensation is required at the point of interconnection. The Customer will be required to install 20 Mvar of capacitor banks in their substation on the 34.5 kV buses in the Customer substation. Dynamic Stability studies performed as part of the 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. These local projects that were previously queued were assumed to be in service in this Feasibility Study. Those 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 (KACP), 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
AEPW	CLINTON JUNCTION - ELK CITY 138KV CKT 1
AEPW	ELK CITY 230KV (ELKCTY-6) 230/138/13.8KV TRANSFORMER CKT 1
AEPW	LONE STAR SOUTH - WILKES 138KV CKT 1
AEPW	SHAMROCK (SHAMRCK1) 115/69/14.4KV TRANSFORMER CKT 1
AEPW/SPS	ELK CITY 230KV - GRAPEVINE INTERCHANGE 230KV CKT 1
AEPW/WFEC	ALTUS JCT TAP - RUSSELL 138KV CKT 1
AEPW/WFEC	LAKE PAULINE - RUSSELL 138KV CKT 1
MIDW	ALEXANDER - NEKOMA 115KV CKT 1
MIDW	ALEXANDER - NESS CITY 115KV CKT 1
MIPU	LAKE ROAD - ALABAMA 161KV CKT 1
MIPU/KACP	ALABAMA - NASHUA 161KV CKT 1
MIPU/KACP	ST JOE - IATAN 345KV CKT 1
SPS	ARROWHEAD SUB - OSAGE SWITCHING STATION 115KV CKT 1
SPS	CANYON EAST SUB - OSAGE SWITCHING STATION 115KV CKT 1
SPS	CHERRY SUB - NICHOLS STATION 115KV CKT 1
SPS	EAST PLANT INTERCHANGE - MANHATTAN SUB 115KV CKT 1
SPS	EAST PLANT INTERCHANGE - PIERCE STREET TAP 115KV CKT 1
SPS	EAST PLANT INTERCHANGE - WHITAKER SUB 115KV CKT 1
SPS	GRAPEVINE INTERCHANGE - KIRBY SWITCHING STATION 115KV CKT 1
SPS	GRAPEVINE INTERCHANGE 230/115KV TRANSFORMER CKT 1
SPS	HAPPY INTERCHANGE - PALO DURO SUB 115KV CKT 1
SPS	HAPPY INTERCHANGE - TULIA TAP 115KV CKT 1
SPS	KIRBY SWITCHING STATION - MCCLELLAN SUB 115KV CKT 1
SPS	KRESS INTERCHANGE - TULIA TAP 115KV CKT 1
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	MANHATTAN SUB - MANHATTAN TAP 115KV CKT 1
SPS	MANHATTAN TAP - OSAGE SWITCHING STATION 115KV CKT 1
SPS	MCCLELLAN SUB - MCLEAN RURAL SUB 115KV CKT 1
SPS	MCCULLOUGH SUB - KINGSMILL INTERCHANGE 69KV CKT 1
SPS	NICHOLS STATION - WHITAKER SUB 115KV CKT 1
SPS	OSAGE SWITCHING STATION - PIERCE STREET TAP 115KV CKT 1
SPS	PALO DURO SUB - RANDALL COUNTY INTERCHANGE 115KV CKT 1
SPS	TEXAS COUNTY INTERCHANGE - TEXAS COUNTY INTERCHANGE PHASE SHIFT TFMR 115KV CKT 1
SPS	TUCO INTERCHANGE (TUCO XX4) 345/230/13.2KV TRANSFORMER CKT 1
SPS/AEPW	MCLEAN RURAL SUB - SHAMROCK 115KV CKT 1
SUNC	BEELER - DIGHTON TAP 115KV CKT 1
SUNC	DIGHTON TAP - MANNING TAP 115KV CKT 1
SUNC	HOLCOMB - PLYMELL 115KV CKT 1
SUNC	PIONEER TAP - PLYMELL 115KV CKT 1
SUNC	SPEARVILLE (SPEARVL) 345/230/13.8KV TRANSFORMER 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/MIDW	MULLERGREN - S HAYS6 230.00 230KV CKT 1
WEPL/SPS	EAST LIBERAL - TEXAS COUNTY INTERCHANGE PHASE SHIFT TFMR 115KV CKT 1
WERE	ANZIO - FORT JUNCTION SWITCHING STATION 115KV CKT 1
WERE	EAST MANHATTAN (EMANHT3X) 230/115/18.0KV TRANSFORMER CKT 1
WERE	EXIDE JUNCTION - NORTH AMERICAN PHILIPS 115KV CKT 1
WERE	EXIDE JUNCTION - SUMMIT 115KV CKT 1
WERE	FORT JUNCTION SWITCHING STATION - MCDOWELL CREEK SWITCHING STATION 115KV CKT 1
WERE	NORTHVIEW - SUMMIT 115KV CKT 1
AEPW	American Electric Power West
KACP	Kansas City Power & Light
MIDW	Midwest Energy
MIPU	Missouri Public Service

SPS	Southwestern Public Service Company
SUNC	Sunflower Electric Power Corporation
WFEC	Western Farmers Electric Cooperative
WEPL	West Plains
WERE	Westar Energy

Table 3: Contingency Analysis

SEASON	OVERLOADED ELEMENT	RATING (MVA)	LOADING (%)	ATC (MW)	CONTINGENCY
09WP	GRAPEVINE INTERCHANGE 230/115KV TRANSFORMER CKT 1	140	200	0	CONWAY SUB - YARNELL SUB 115KV CKT 1
09WP	ELK CITY 230KV (ELKCTY-6) 230/138/13.8KV TRANSFORMER CKT 1	287	168	0	TUCO INTERCHANGE (TUCO XX4) 345/230/13.2KV TRANSFORMER CKT 1
09WP	ELK CITY 230KV - GRAPEVINE INTERCHANGE 230KV CKT 1	351	165	0	TUCO INTERCHANGE (TUCO XX4) 345/230/13.2KV TRANSFORMER CKT 1
09WP	LAKE PAULINE - RUSSELL 138KV CKT 1	72	145	0	SPP-SWPS-03
09WP	CLINTON JUNCTION - ELK CITY 138KV CKT 1	143	143	0	TUCO INTERCHANGE (TUCO XX4) 345/230/13.2KV TRANSFORMER CKT 1
09WP	KIRBY SWITCHING STATION - MCCLELLAN SUB 115KV CKT 1	107	138	0	SPP-SWPS-03
09WP	MCCLELLAN SUB - MCLEAN RURAL SUB 115KV CKT 1	107	137	0	SPP-SWPS-03
09WP	MEDICINE LODGE - SUN CITY 115KV CKT 1	80	131	0	MULLERGREN - SPEARVILLE 230KV CKT 1
09WP	MCLEAN RURAL SUB - SHAMROCK 115KV CKT 1	107	125	0	SPP-SWPS-02
09WP	TUCO INTERCHANGE (TUCO XX4) 345/230/13.2KV TRANSFORMER CKT 1	560	123	0	FINNEY SWITCHING STATION - HITCHLAND 345.00 345KV CKT 1
09WP	ALTUS JCT TAP - RUSSELL 138KV CKT 1	72	119	0	SPP-SWPS-03
09WP	ALEXANDER - NESS CITY 115KV CKT 1	101	110	0	SPEARVILLE (SPEARVL) 345/230/13.8KV TRANSFORMER CKT 1
09WP	SPEARVILLE (SPEARVL) 345/230/13.8KV TRANSFORMER CKT 1	336	107	0	GEN532751 1
09WP	EAST LIBERAL - TEXAS COUNTY INTERCHANGE PHASE SHIFT TFMR 115KV CKT 1	119	127	15	FINNEY SWITCHING STATION - HITCHLAND 345.00 345KV CKT 1
09WP	ALEXANDER - NEKOMA 115KV CKT 1	101	104	39	SPEARVILLE (SPEARVL) 345/230/13.8KV TRANSFORMER CKT 1
09WP	DIGHTON TAP - MANNING TAP 115KV CKT 1	98	103	59	HOLCOMB - SPEARVILLE 345KV CKT 1
09WP	MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1	65	103	91	TUCO INTERCHANGE (TUCO XX4) 345/230/13.2KV TRANSFORMER CKT 1
09WP	TEXAS COUNTY INTERCHANGE - TEXAS COUNTY INTERCHANGE PHASE SHIFT TFMR 115KV CKT 1	146	104	101	FINNEY SWITCHING STATION - HITCHLAND 345.00 345KV CKT 1
12SP	GRAPEVINE INTERCHANGE 230/115KV TRANSFORMER CKT 1	129	192	0	NICHOLS STATION - YARNELL SUB 115KV CKT 1
12SP	KIRBY SWITCHING STATION - MCCLELLAN SUB 115KV CKT 1	90	157	0	SPP-SWPS-03
12SP	MCCLELLAN SUB - MCLEAN RURAL SUB 115KV CKT 1	90	155	0	SPP-SWPS-03
12SP	ELK CITY 230KV (ELKCTY-6) 230/138/13.8KV TRANSFORMER CKT 1	287	154	0	FINNEY SWITCHING STATION - HOLCOMB 345KV CKT 1
12SP	ELK CITY 230KV - GRAPEVINE INTERCHANGE 230KV CKT 1	351	151	0	FINNEY SWITCHING STATION - HOLCOMB 345KV CKT 1
12SP	MCLEAN RURAL SUB - SHAMROCK 115KV CKT 1	90	138	0	ELK CITY 230KV - GRAPEVINE INTERCHANGE 230KV CKT 1
12SP	MEDICINE LODGE - SUN CITY 115KV CKT 1	80	135	0	MULLERGREN - SPEARVILLE 230KV CKT 1
12SP	NORTHVIEW - SUMMIT 115KV CKT 1	181	134	0	EXIDE JUNCTION - SUMMIT 115KV CKT 1
12SP	SHAMROCK (SHAMRCK1) 115/69/14.4KV TRANSFORMER CKT 1	69	132	0	IATAN - STRANGER CREEK 345KV CKT 1
12SP	CLINTON JUNCTION - ELK CITY 138KV CKT 1	143	127	0	FINNEY SWITCHING STATION - HOLCOMB 345KV CKT 1
12SP	SPEARVILLE (SPEARVL) 345/230/13.8KV TRANSFORMER CKT 1	336	124	0	HOLCOMB - SETAB 345KV CKT 1
12SP	EXIDE JUNCTION - SUMMIT 115KV CKT 1	196	123	0	NORTHVIEW - SUMMIT 115KV CKT 1
12SP	HOLCOMB - PLYMELL 115KV CKT 1	143	123	0	FLETCHER - HOLCOMB 115KV CKT 1
12SP	ANZIO - FORT JUNCTION SWITCHING STATION 115KV CKT 1	92	121	0	WEST JUNCTION CITY - WEST JUNCTION CITY JUNCTION (EAST) 115KV CKT 1
12SP	LAKE PAULINE - RUSSELL 138KV CKT 1	72	119	0	SPP-SWPS-03
SEASON	OVERLOADED ELEMENT	RATING	LOADING	ATC	CONTINGENCY

TABLE 5: Contingency Analysis (continued)

		(MVA)	(%)	(MW)	
12SP	PIONEER TAP - PLYMELL 115KV CKT 1	143	119	0	FLETCHER - HOLCOMB 115KV CKT 1
12SP	PALO DURO SUB - RANDALL COUNTY INTERCHANGE 115KV CKT 1	99	119	0	AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY INTERCHANGE 230KV CKT 1
12SP	HAPPY INTERCHANGE - PALO DURO SUB 115KV CKT 1	99	118	0	AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY INTERCHANGE 230KV CKT 1
12SP	EXIDE JUNCTION - NORTH AMERICAN PHILIPS 115KV CKT 1	196	117	0	NORTHVIEW - SUMMIT 115KV CKT 1
12SP	EAST PLANT INTERCHANGE - PIERCE STREET TAP 115KV CKT 1	161	115	0	EAST PLANT INTERCHANGE - MANHATTAN SUB 115KV CKT 1
12SP	EAST PLANT INTERCHANGE - MANHATTAN SUB 115KV CKT 1	161	115	0	EAST PLANT INTERCHANGE - PIERCE STREET TAP 115KV CKT 1
12SP	DIGHTON TAP - MANNING TAP 115KV CKT 1	98	112	0	MULLERGREN - SPEARVILLE 230KV CKT 1
12SP	NICHOLS STATION - WHITAKER SUB 115KV CKT 1	249	110	0	CHERRY SUB - NICHOLS STATION 115KV CKT 1
12SP	MULLERGREN - SPEARVILLE 230KV CKT 1	355	110	0	HOLCOMB - SETAB 345KV CKT 1
12SP	ALEXANDER - NESS CITY 115KV CKT 1	101	108	0	SPEARVILLE (SPEARVL) 345/230/13.8KV TRANSFORMER CKT 1
12SP	FORT JUNCTION SWITCHING STATION - MCDOWELL CREEK SWITCHING STATION 115KV CKT 1	68	108	0	FORT JUNCTION SWITCHING STATION - MCDOWELL CREEK SWITCHING STATION 115KV CKT 3
12SP	CHERRY SUB - NICHOLS STATION 115KV CKT 1	161	108	0	NICHOLS STATION - WHITAKER SUB 115KV CKT 1
12SP	MANHATTAN TAP - OSAGE SWITCHING STATION 115KV CKT 1	161	107	0	EAST PLANT INTERCHANGE - PIERCE STREET TAP 115KV CKT 1
12SP	LAKE ROAD - ALABAMA 161KV CKT 1	153	154	7	IATAN - STRANGER CREEK 345KV CKT 1
12SP	OSAGE SWITCHING STATION - PIERCE STREET TAP 115KV CKT 1	161	103	20	EAST PLANT INTERCHANGE - MANHATTAN SUB 115KV CKT 1
12SP	BEELER - DIGHTON TAP 115KV CKT 1	98	104	28	MULLERGREN - SPEARVILLE 230KV CKT 1
12SP	ST JOE - IATAN 345KV CKT 1	1073	139	34	IATAN - STRANGER CREEK 345KV CKT 1
12SP	EAST LIBERAL - TEXAS COUNTY INTERCHANGE PHASE SHIFT TFMR 115KV CKT 1	119	119	34	FINNEY SWITCHING STATION - HOLCOMB 345KV CKT 1
12SP	ALTUS JCT TAP - RUSSELL 138KV CKT 1	72	106	52	SPP-SWPS-03
12SP	ALABAMA - NASHUA 161KV CKT 1	153	143	59	IATAN - STRANGER CREEK 345KV CKT 1
12SP	EAST PLANT INTERCHANGE - WHITAKER SUB 115KV CKT 1	249	102	69	CHERRY SUB - NICHOLS STATION 115KV CKT 1
12SP	ALEXANDER - NEKOMA 115KV CKT 1	101	102	79	MULLERGREN - SPEARVILLE 230KV CKT 1
12SP	EAST MANHATTAN (EMANHT3X) 230/115/18.0KV TRANSFORMER CKT 1	308	100	100	MCDOWELL CREEK - MORRIS COUNTY 230KV CKT 1
12SP	MULLERGREN - S HAYS6 230.00 230KV CKT 1	147	101	102	CIRCLE - MULLERGREN 230KV CKT 1
12SP	HAPPY INTERCHANGE - TULIA TAP 115KV CKT 1	99	101	105	AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY INTERCHANGE 230KV CKT 1
12WP	GRAPEVINE INTERCHANGE 230/115KV TRANSFORMER CKT 1	112	150	0	BASE CASE
12WP	CLINTON JUNCTION - ELK CITY 138KV CKT 1	143	150	0	FINNEY SWITCHING STATION - HITCHLAND 345.00 345KV CKT 1
12WP	LAKE PAULINE - RUSSELL 138KV CKT 1	72	149	0	SPP-SWPS-03
12WP	EAST LIBERAL - TEXAS COUNTY INTERCHANGE PHASE SHIFT TFMR 115KV CKT 1	119	144	0	FINNEY SWITCHING STATION - HITCHLAND 345.00 345KV CKT 1
12WP	KIRBY SWITCHING STATION - MCCLELLAN SUB 115KV CKT 1	107	142	0	SPP-SWPS-03
12WP	MCCLELLAN SUB - MCLEAN RURAL SUB 115KV CKT 1	107	141	0	SPP-SWPS-03
12WP	ELK CITY 230KV (ELKCTY-6) 230/138/13.8KV TRANSFORMER CKT 1	287	135	0	CHILDRESS - LAKE PAULINE 138KV CKT 1
12WP	MCLEAN RURAL SUB - SHAMROCK 115KV CKT 1	107	134	0	SPP-SWPS-03
12WP	MEDICINE LODGE - SUN CITY 115KV CKT 1	80	129	0	MULLERGREN - SPEARVILLE 230KV CKT 1
12WP	ALTUS JCT TAP - RUSSELL 138KV CKT 1	72	124	0	SPP-SWPS-03
SEASON	OVERLOADED ELEMENT	RATING (MVA)	LOADING (%)	ATC (MW)	CONTINGENCY

TABLE 5: Contingency Analysis (continued)

12WP	ELK CITY 230KV - GRAPEVINE INTERCHANGE 230KV CKT 1	351	119	0	CHILDRESS - LAKE PAULINE 138KV CKT 1
12WP	SPEARVILLE (SPEARVL) 345/230/13.8KV TRANSFORMER CKT 1	336	115	0	SPP-SWPS-01
12WP	ALEXANDER - NESS CITY 115KV CKT 1	101	108	0	SPEARVILLE (SPEARVL) 345/230/13.8KV TRANSFORMER CKT 1
12WP	GRAPEVINE INTERCHANGE - KIRBY SWITCHING STATION 115KV CKT 1	195	103	0	CONWAY SUB - YARNELL SUB 115KV CKT 1
12WP	TUCO INTERCHANGE (TUCO XX4) 345/230/13.2KV TRANSFORMER CKT 1	560	119	17	FINNEY SWITCHING STATION - HITCHLAND 345.00 345KV CKT 1
12WP	TEXAS COUNTY INTERCHANGE - TEXAS COUNTY INTERCHANGE PHASE SHIFT TFMR 115KV CKT 1	146	114	54	FINNEY SWITCHING STATION - HITCHLAND 345.00 345KV CKT 1
12WP	DIGHTON TAP - MANNING TAP 115KV CKT 1	98	103	62	SPEARVILLE (SPEARVL) 345/230/13.8KV TRANSFORMER CKT 1
12WP	ALEXANDER - NEKOMA 115KV CKT 1	101	102	79	SPEARVILLE (SPEARVL) 345/230/13.8KV TRANSFORMER CKT 1
17SP	GRAPEVINE INTERCHANGE 230/115KV TRANSFORMER CKT 1	129	184	0	CONWAY SUB - YARNELL SUB 115KV CKT 1
17SP	KIRBY SWITCHING STATION - MCCLELLAN SUB 115KV CKT 1	90	157	0	SPP-SWPS-03
17SP	ELK CITY 230KV (ELKCTY-6) 230/138/13.8KV TRANSFORMER CKT 1	287	156	0	FINNEY SWITCHING STATION - HOLCOMB 345KV CKT 1
17SP	MCCLELLAN SUB - MCLEAN RURAL SUB 115KV CKT 1	90	155	0	SPP-SWPS-03
17SP	ELK CITY 230KV - GRAPEVINE INTERCHANGE 230KV CKT 1	351	155	0	FINNEY SWITCHING STATION - HOLCOMB 345KV CKT 1
17SP	MCLEAN RURAL SUB - SHAMROCK 115KV CKT 1	90	138	0	SPP-SWPS-02
17SP	SHAMROCK (SHAMRCK1) 115/69/14.4KV TRANSFORMER CKT 1	69	136	0	BOWERS INTERCHANGE 115/69KV TRANSFORMER CKT 1
17SP	EAST LIBERAL - TEXAS COUNTY INTERCHANGE PHASE SHIFT TFMR 115KV CKT 1	119	131	0	FINNEY SWITCHING STATION - HOLCOMB 345KV CKT 1
17SP	PALO DURO SUB - RANDALL COUNTY INTERCHANGE 115KV CKT 1	99	131	0	AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY INTERCHANGE 230KV CKT 1
17SP	EAST PLANT INTERCHANGE - PIERCE STREET TAP 115KV CKT 1	161	130	0	EAST PLANT INTERCHANGE - MANHATTAN SUB 115KV CKT 1
17SP	HAPPY INTERCHANGE - PALO DURO SUB 115KV CKT 1	99	130	0	AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY INTERCHANGE 230KV CKT 1
17SP	CLINTON JUNCTION - ELK CITY 138KV CKT 1	143	129	0	FINNEY SWITCHING STATION - HOLCOMB 345KV CKT 1
17SP	EAST PLANT INTERCHANGE - MANHATTAN SUB 115KV CKT 1	161	129	0	EAST PLANT INTERCHANGE - PIERCE STREET TAP 115KV CKT 1
17SP	HOLCOMB - PLYMELL 115KV CKT 1	143	126	0	FLETCHER - HOLCOMB 115KV CKT 1
17SP	NICHOLS STATION - WHITAKER SUB 115KV CKT 1	249	125	0	CHERRY SUB - NICHOLS STATION 115KV CKT 1
17SP	LUBBOCK POWER & LIGHT-SOUTHEAST 230/69KV TRANSFORMER CKT 1	100	122	0	JONES STATION - LUBBOCK POWER & LIGHT-HOLLY PLANT 230KV CKT 1
17SP	PIONEER TAP - PLYMELL 115KV CKT 1	143	122	0	FLETCHER - HOLCOMB 115KV CKT 1
17SP	SPEARVILLE (SPEARVL) 345/230/13.8KV TRANSFORMER CKT 1	336	121	0	MINGO - SETAB 345KV CKT 1
17SP	LUBBOCK POWER & LIGHT-HOLLY PLANT 230/69KV TRANSFORMER CKT 1	100	120	0	LUBBOCK POWER & LIGHT-SOUTHEAST 230/69KV TRANSFORMER CKT 1
17SP	EAST PLANT INTERCHANGE - WHITAKER SUB 115KV CKT 1	249	117	0	CHERRY SUB - NICHOLS STATION 115KV CKT 1
17SP	OSAGE SWITCHING STATION - PIERCE STREET TAP 115KV CKT 1	161	116	0	EAST PLANT INTERCHANGE - MANHATTAN SUB 115KV CKT 1
17SP	LAKE PAULINE - RUSSELL 138KV CKT 1	72	114	0	SPP-SWPS-03
17SP	HAPPY INTERCHANGE - TULIA TAP 115KV CKT 1	99	112	0	AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY INTERCHANGE 230KV CKT 1
17SP	CANYON EAST SUB - OSAGE SWITCHING STATION 115KV CKT 1	99	112	0	BUSHLAND INTERCHANGE - DEAF SMITH COUNTY INTERCHANGE 230KV CKT 1
SEASON	OVERLOADED ELEMENT	RATING (MVA)	LOADING (%)	ATC (MW)	CONTINGENCY
17SP	MANHATTAN SUB - MANHATTAN TAP 115KV CKT 1	161	112	0	EAST PLANT INTERCHANGE - PIERCE STREET TAP 115KV CKT 1

TABLE 5: Contingency Analysis (continued)

17SP	MCCULLOUGH SUB - KINGSMILL INTERCHANGE 69KV CKT 1	97	111	0	BOWERS INTERCHANGE 115/69KV TRANSFORMER CKT 1
17SP	LUBBOCK POWER & LIGHT-WADSWORTH 230/69KV TRANSFORMER CKT 1	100	111	0	LUBBOCK POWER & LIGHT-SOUTHEAST 230/69KV TRANSFORMER CKT 1
17SP	NICHOLS STATION - WHITAKER SUB 115KV CKT 1	226	106	0	BASE CASE
17SP	LONE STAR SOUTH - WILKES 138KV CKT 1	394	105	0	WELSH REC - WILKES 138KV CKT 1
17SP	KRESS INTERCHANGE - TULIA TAP 115KV CKT 1	99	107	4	AMARILLO SOUTH INTERCHANGE - SWISHER COUNTY INTERCHANGE 230KV CKT 1
17SP	MEDICINE LODGE - SUN CITY 115KV CKT 1	80	108	17	MULLERGREN - SPEARVILLE 230KV CKT 1
17SP	ARROWHEAD SUB - OSAGE SWITCHING STATION 115KV CKT 1	161	102	17	AMARILLO SOUTH INTERCHANGE - NICHOLS STATION 230KV CKT 1
17SP	MULLERGREN - SPEARVILLE 230KV CKT 1	355	105	57	MINGO - SETAB 345KV CKT 1
17SP	MULLERGREN - S HAYS6 230.00 230KV CKT 1	147	105	68	MINGO - SETAB 345KV CKT 1
17SP	DIGHTON TAP - MANNING TAP 115KV CKT 1	98	103	73	MINGO - SETAB 345KV CKT 1
17SP	ALTUS JCT TAP - RUSSELL 138KV CKT 1	72	103	83	SPP-SWPS-03
17SP	TEXAS COUNTY INTERCHANGE - TEXAS COUNTY INTERCHANGE PHASE SHIFT TMR 115KV CKT 1	146	106	87	FINNEY SWITCHING STATION - HOLCOMB 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 \$2,500,000 for SPS's interconnection Network Upgrade facilities listed in Table 2. At this time, the cost estimates for other Direct Assignment facilities including those in Table 1 have not been defined by the Customer. In addition to the Customer's proposed interconnection facilities, the Customer will be responsible for installing 20 Mvar of 34.5 kV capacitors in the Customer substation for reactive support. Dynamic Stability studies performed as part of the 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). These costs exclude upgrades of other transmission facilities by AEPW, KACP, MIPU, MIDW, WFEC, SUNC, WEPL, WERE and SPS listed in Table 4 of which are Network Constraints. As stated earlier, the local projects that were previously queued are assumed to be in service in this Feasibility Study.

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.

The required interconnection costs listed in Tables 1 and 2 and other upgrades associated with Network Constraints listed in Table 3 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 requests transmission service through Southwest Power Pool's OASIS.

Appendix A: Point of Interconnection Area Map

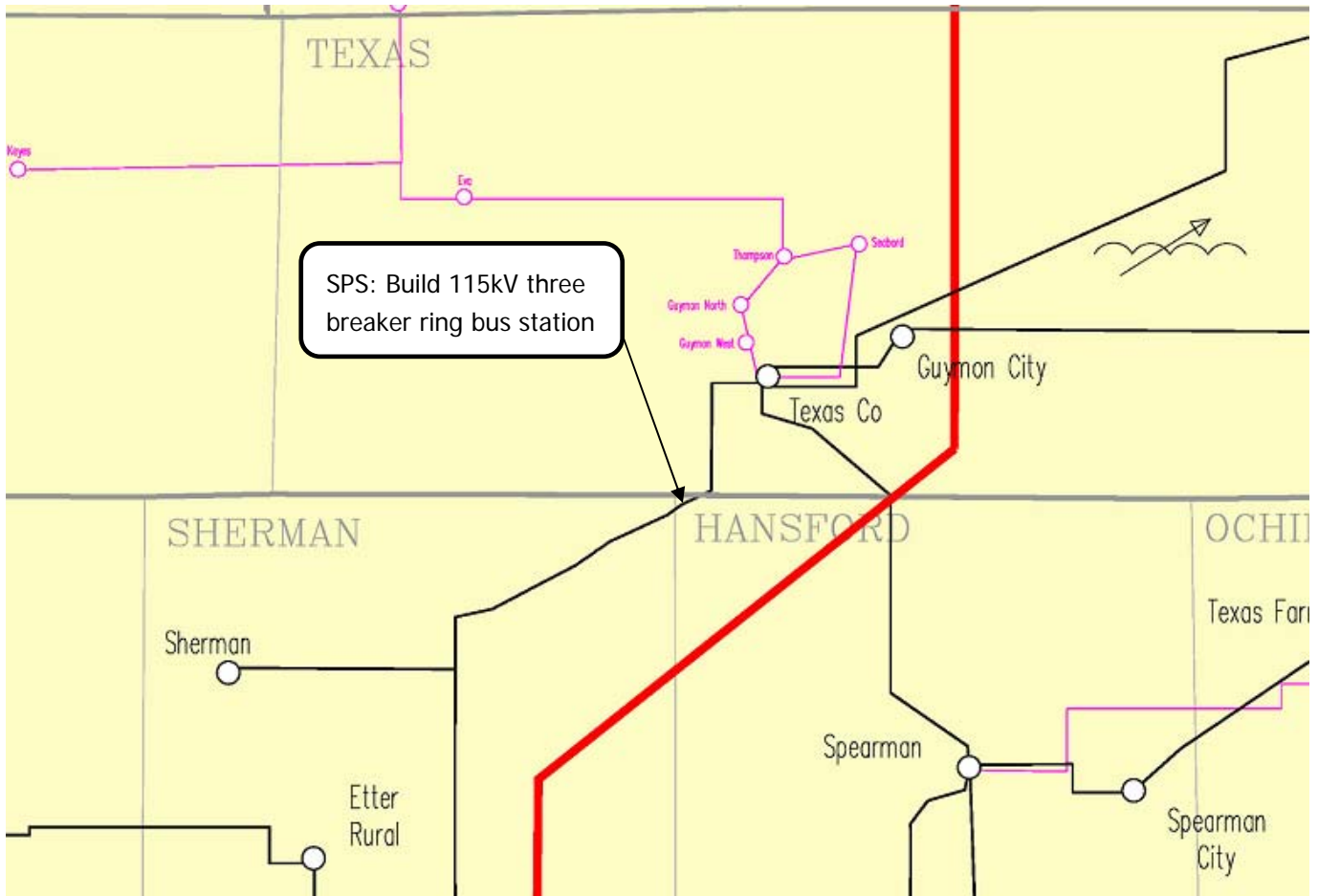


Figure 2: Point of Interconnection Area Map