SPP Southwest Power Pool

Feasibility Study For Generation Interconnection Request GEN-2006-022

SPP Tariff Studies
(#GEN-2006-022)

December, 2006

Executive Summary

<OMITTED TEXT> (Customer) has requested a Feasibility Study for the purpose of interconnecting 150MW of generation within the control area of West Plains Energy (d/b/a Aquila Networks – West Plains) (WEPL) in Pratt County, Kansas. The proposed point of interconnection is a new switching station in the existing Pratt - St. John 115kV transmission line, which is owned by WEPL. The proposed in-service date is May 31, 2008.

Power flow analysis has indicated that for the powerflow cases studied, it is possible to interconnect the 150MW of generation with transmission system reinforcements within the local transmission system. In order to maintain acceptable reactive power compensation, the customer will need to install 30Mvars of 34.5kV capacitor banks in the Customer's collector substation on the 34.5kV 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). For the Customer to be able to deliver as much as the requested 150MW, the addition of an SVC or STATCOM device or the construction of new transmission reinforcements will be required.

The requirements to interconnect the 150MW of generation on the Pratt – St. John 115kV line consist of building a new 115kV three breaker ring bus switching station. The Customer did not propose a specific 115kV line extending to serve its 115-34.5kV facilities. It is assumed that obtaining all necessary right-of-way for the new switching station will not be a significant expense.

The total minimum cost for building the required facilities for this 150MW of generation is $4,272,581. These costs are shown in Table 2. Other Network Constraints in the WEPL, Southwestern Public Service (SPS), Westar (WERE), and Midwest Electric Cooperative (MIDW) 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. This cost does not include the upgrade of the 115kV line from Medicine Lodge – St. John, which is a critical constraint to this interconnection request. This cost does not include building 115kV line from the Customer substation into the new 115kV ring bus. This cost does not include the Customer's 115-34.5kV substation or the 34.5kV, 30Mvar 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 WEPL, and Sunflower Electric Cooperative 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.

Introduction

<OMITTED TEXT> (Customer) has requested a feasibility study for the purpose of interconnecting 150MW of generation within the control area of West Plains Energy (d/b/a Aquila Networks – West Plains) (WEPL) in Pratt County, Kansas. The proposed method of interconnection is to build a new 115kV ring bus switching station in the existing Pratt – St. John 115kV transmission line, which is owned by WEPL. The proposed in-service date is May 31, 2008.

Interconnection Facilities

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

The Customer originally requested to interconnect into a 115kV transmission line that traversed property the Customer had options to lease. It was learned this transmission line was owned by Ninnescah Electric Cooperative and did not have adequate capacity to accommodate the wind farm. After exploring options of having the Customer build a new 115kV line into either the WEPL Pratt substation or the Ninnescah substation, it was decided that either of these substations would have to be demolished so that a new substation would have to be built. Therefore, for purposes of this Feasibility study, it was determined the requirements for interconnection of the 150MW consist of building a new 115kV three breaker ring bus substation along or near the right-of-way of the existing Pratt – St. John 115kV transmission line owned by WEPL. This 115kV substation shall be constructed and maintained by WEPL. It is assumed that obtaining all necessary right-of-way for the substation construction will not be a significant expense.

The total cost for building a new 115kV 3-breaker ring switching station, the required interconnection facility, is estimated at $4,272,581. These costs include Contribution in Aid of Construction (CIAC) to the Transmission Owner. Other Network Constraints in the WEPL, Southwestern Public Service (SPS), Westar (WERE), and Midwest Electric Cooperative (MIDW) transmission systems that were identified are listed in Table 3. These estimates will be refined during the development of the impact study based on the final designs. This cost does not include building the 115kV facilities from the Customer substation into the new WEPL 115kV switching station. The Customer is responsible for these 115kV facilities up to the point of interconnection. This cost also does not include the Customer's 115-34.5kV substation, which should be determined by the Customer.

The costs of interconnecting the facility to the WEPL 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.

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

Table 1: Direct Assignment Facilities

Facility	ESTIMATED COST (2006 DOLLARS)
Customer – 115-34.5 kV Substation facilities.	*
Customer – 115kV transmission line facilities between Customer facilities and WEPL 115kV switching station	*
Customer - Right-of-Way for Customer facilities.	*
Customer – 34.5kV, 30MVAR capacitor bank(s) in Customer substation	*
Total	*****

Note: *Estimates of cost to be determined by Customer.

Table 2: Required Interconnection Network Upgrade Facilities

Facility	ESTIMATED COST (2006 DOLLARS)
WEPL – Build 115kV, 3-breaker ring bus switching station. Station to include breakers, switches, control relaying, high speed communications, all structures and metering and other related equipment	$3,560,484
Contribution in Aid of Construction (CIAC)	$712,097
Total	**$4,272,581**

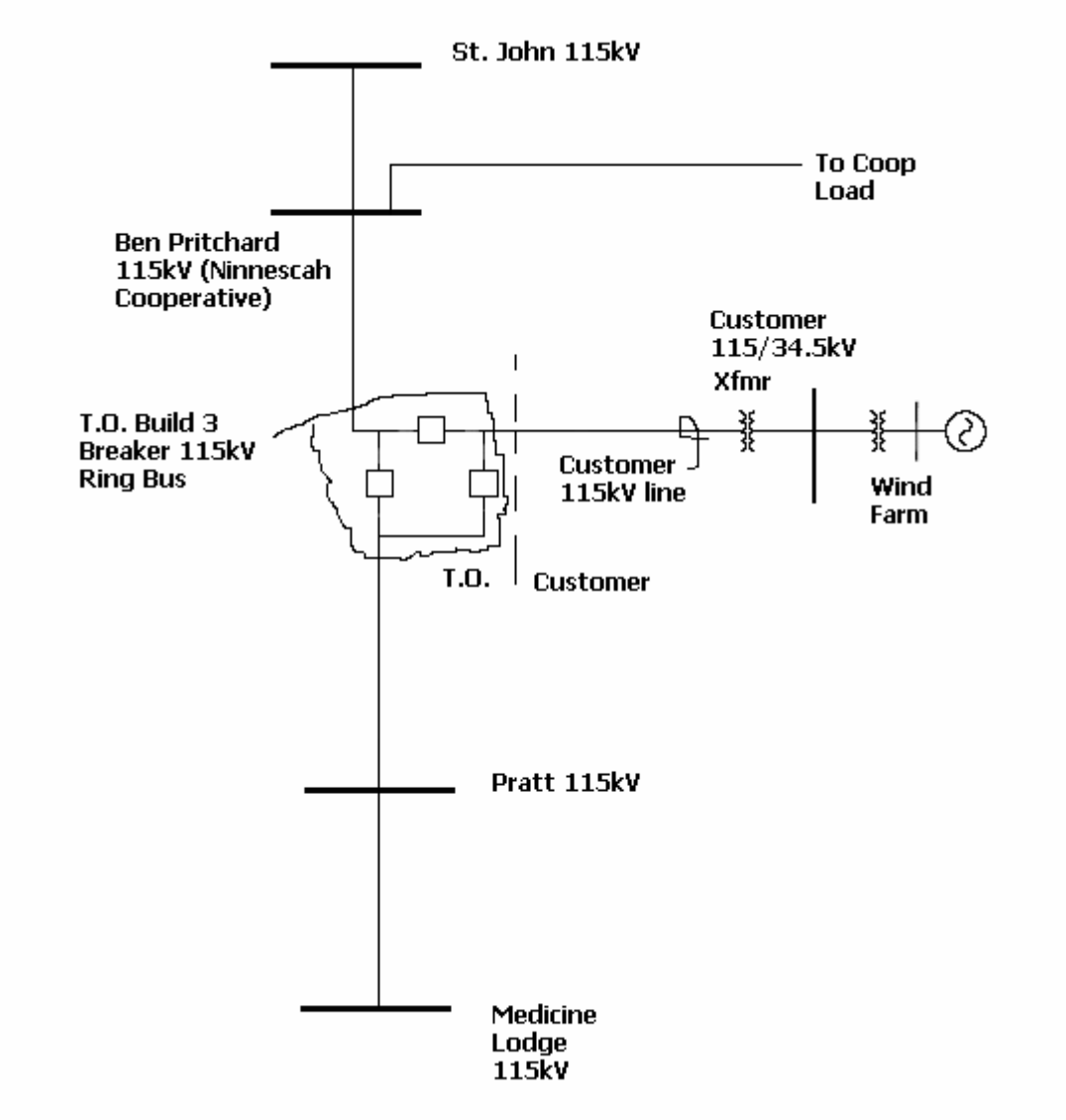

Figure 1: Proposed Interconnection
(Final substation design to be determined

Powerflow Analysis

A powerflow analysis was conducted for the facility using modified versions of the 2008 & 2011 summer and winter peak, and 2016 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 May 31, 2008. The available seasonal models used were through the 2016 Summer Peak of which is the end of the current SPP planning horizon.

Critical issues concerning the feasibility of this request pertain to the 115kV line that the new substation will interconnect into. The Pratt – St. John 115kV transmission line has an emergency rating of 80 MVA. At Medicine Lodge, the transmission path is constrained by the autotransformer which is rated at 56MVA.

The analysis of the Customer's project indicates that, given the requested generation level of 150MW and location, additional criteria violations will occur on the existing WEPL, Southwestern Public Service (SPS), Westar (WERE), and Midwest Electric Cooperative (MIDW) transmission systems under steady state and contingency conditions in the peak seasons.

Contingency analysis revealed that for an outage of either side of the 115kV line to either Medicine Lodge or St. John that a powerflow solution may not be able to be obtained without the installation of a STATCOM or SVC device or the construction of a new 115kV line from Pratt to another substation. This issue is related to the undersized conductor of the Pratt – St. John 115kV line. Mitigation of this constraint and the other constraints shown in Table 3 will be addressed when the Customer applies for transmission service under the SPP OATT.

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.

In order to maintain a zero reactive power flow exchanged at the point of interconnection, additional reactive compensation is required at the point of interconnection. The Customer will be required to install 30MVAR of capacitor banks in their substation on the 34.5kV 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. Some of the 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 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 WEPL, WERE, American Electric Power (AEP), SPS, Oklahoma Gas & Electric (OKGE), Sunflower Electric Cooperative (SUNC), Western Farmers Electric Cooperative (WFEC), and MIDW control areas were applied and the resulting scenarios analyzed. This satisfies the ‘more probable’ contingency testing criteria mandated by NERC and the SPP criteria.

Table 3: Network Constraints

NETWORK CONSTRAINTS
WEPL -"2001-39A 115 - JUDSON LARGE 115KV CKT 1'
WEPL - "2006-21T 138 - HARPER 138KV CKT 1'
WEPL - "2006-21T 138 - MEDICINE LODGE 138KV CKT 1'
WEPL - 'CIMARRON RIVER PLANT - NORTH LIBERAL TAP 115KV CKT 1'
WEPL - 'CIMARRON RIVER TAP - CUDAHY 115KV CKT 1'
WERE - 'CLEARWT - GILL ENERGY CENTER WEST 138KV CKT 1'
WERE - 'CLEARWT - MILAN TAP 138KV CKT 1'
WEPL - 'CUDAHY - JUDSON LARGE 115KV CKT 1'
WEPL - SPS 'EAST LIBERAL - TEXAS COUNTY INTERCHANGE PHSF 115KV CKT 1'
WERE - 'GILL ENERGY CENTER EAST (GEC3 GSU) 138/69/14.4KV TRANSFORMER CKT 1'
WEPL - 'GREAT BEND TAP - SEWARD 115KV CKT 1'
WEPL - 'HARPER - MILAN TAP 138KV CKT 1'
MIDW - WERE - 'HUNTSVILLE - HUTCHINSON ENERGY CENTER 115KV CKT 1'
MIDW - 'HUNTSVILLE - ST JOHN 115KV CKT 1'
MIDW - 'KINSLEY - PAWNEE EDWARDS JUNCTION 115KV CKT 1'
WERE - 'LAWRENCE ENERGY CENTER UNIT 5 - LAWRENCE HILL 230KV CKT 1'
WEPL - 'MEDICINE LODGE - PRATT 115KV CKT 1'
WEPL - 'MEDICINE LODGE - SUN CITY 115KV CKT 1'
WEPL - 'MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1'
WEPL - 'NORTH JUDSON LARGE - SPEARVILLE 115KV CKT 1'
SPS - 'POTTER COUNTY INTERCHANGE (POTTR CO) 345/230/13.2KV TRANSFORMER CKT 1'
WEPL 'PRATT - ST JOHN 115KV CKT 1'
WEPL - 'SEWARD - ST JOHN 115KV CKT 1'
WEPL - MIDW'SEWARD 115/69KV TRANSFORMER CKT 1'
WEPL - 'SPEARVILLE (SPEARVL6) 230/115/13.8KV TRANSFORMER CKT 1'
WEPL - MIDW - 'ST JOHN - ST JOHN 115KV CKT 1'
WERE - 'STULL SWITCHING STATION - TECUMSEH HILL 115KV CKT 1'
SPS - 'TUCO INTERCHANGE (TUCO XX4) 345/230/13.2KV TRANSFORMER CKT 1'

Table 4: Contingency Analysis

ELEMENT	SEASON	RATE (MVA)	LOADING (%)	ATC (MW)	CONTINGENCY
2008 SUMMER PEAK					
'2006-21T 138 - HARPER 138KV CKT 1'	08sp	71.7	472.9	0	'PRATT - ST JOHN 115KV CKT 1'
'2006-21T 138 - MEDICINE LODGE 138KV CKT 1'	08sp	71.7	360.3	0	G06-21 - HARPER 138KV CKT 1'
'PRATT - ST JOHN 115KV CKT 1'	08sp	79.7	346.5	0	'HARPER - MILAN TAP 138KV CKT 1'
'HARPER - MILAN TAP 138KV CKT 1'	08sp	95.6	335.0	0	'PRATT - ST JOHN 115KV CKT 1'
'CLEARWT - MILAN TAP 138KV CKT 1'	08sp	110	277.3	0	'PRATT - ST JOHN 115KV CKT 1'
'CLEARWT - GILL ENERGY CENTER WEST 138KV CKT 1'	08sp	110	262.7	0	'PRATT - ST JOHN 115KV CKT 1'
'2001-39A 115 - JUDSON LARGE 115KV CKT 1'	08sp	79.7	199.3	0	G06-21 - HARPER 138KV CKT 1'
'SEWARD - ST JOHN 115KV CKT 1'	08sp	79.7	196.2	0	'2004-14T 230 - MULLERGREN 230KV CKT 1'
'MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1'	08sp	65	180.3	0	'GEN:99933 1'
'GILL ENERGY CENTER EAST (GEC3 GSU) 138/69/14.4KV TRANSFORMER CKT 1'	08sp	137	134.8	0	'GILL ENERGY CENTER SOUTH - GILL ENERGY CENTER WEST 138KV CKT 1'
'KINSLEY - PAWNEE EDWARDS JUNCTION 115KV CKT 1'	08sp	92	110.2	0	'PRATT - ST JOHN 115KV CKT 1'
'CUDAHY - JUDSON LARGE 115KV CKT 1'	08sp	129.5	107.2	11	'NORTH JUDSON LARGE - SPEARVILLE 115KV CKT 1'
'HUNTSVILLE - ST JOHN 115KV CKT 1'	08sp	88	134.0	40	'HARPER - MILAN TAP 138KV CKT 1'
'ST JOHN - ST JOHN 115KV CKT 1'	08sp	88	159.3	60	'HARPER - MILAN TAP 138KV CKT 1'
'GREAT BEND TAP - SEWARD 115KV CKT 1'	08sp	89.6	120.9	66	'2004-14T 230 - MULLERGREN 230KV CKT 1'
'HUNTSVILLE - HUTCHINSON ENERGY CENTER 115KV CKT 1'	08sp	92	124.3	68	'HARPER - MILAN TAP 138KV CKT 1'
'SEWARD 115/69KV TRANSFORMER CKT 1'	08sp	44	118.7	74	'GREAT BEND TAP - SEWARD 115KV CKT 1'
'MEDICINE LODGE - PRATT 115KV CKT 1'	08sp	79.7	157.7	80	'PRATT - ST JOHN 115KV CKT 1'
'CIMARRON RIVER TAP - CUDAHY 115KV CKT 1'	08sp	129.5	103.0	92	'NORTH JUDSON LARGE - SPEARVILLE 115KV CKT 1'
'NORTH JUDSON LARGE - SPEARVILLE 115KV CKT 1'	08sp	177.7	112.1	100	'PRATT - ST JOHN 115KV CKT 1'

Table 4: Contingency Analysis

ELEMENT	SEASON	RATE (MVA)	LOADING (%)	ATC (MW)	CONTINGENCY
'G06-22 115 115/34.5KV TRANSFORMER CKT 1'	08sp	150	115.4	120	'HARPER - MILAN TAP 138KV CKT 1'
2008 WINTER PEAK					
'2006-21T 138 - HARPER 138KV CKT 1'	08wp	71.7	474.2	0	'PRATT - ST JOHN 115KV CKT 1'
'2006-21T 138 - MEDICINE LODGE 138KV CKT 1'	08wp	71.7	357.6	0	G06-21 - HARPER 138KV CKT 1'
'PRATT - ST JOHN 115KV CKT 1'	08wp	79.7	357.1	0	'HARPER - MILAN TAP 138KV CKT 1'
'HARPER - MILAN TAP 138KV CKT 1'	08wp	95.6	342.1	0	'PRATT - ST JOHN 115KV CKT 1'
'CLEARWT - MILAN TAP 138KV CKT 1'	08wp	110	286.0	0	'PRATT - ST JOHN 115KV CKT 1'
'CLEARWT - GILL ENERGY CENTER WEST 138KV CKT 1'	08wp	110	272.9	0	'PRATT - ST JOHN 115KV CKT 1'
'2001-39A 115 - JUDSON LARGE 115KV CKT 1'	08wp	79.7	225.8	0	'SPP-WERE-34A'
'SEWARD - ST JOHN 115KV CKT 1'	08wp	79.7	185.8	0	'HARPER - MILAN TAP 138KV CKT 1'
'HUNTSVILLE - ST JOHN 115KV CKT 1'	08wp	88	140.8	0	'HARPER - MILAN TAP 138KV CKT 1'
'SPEARVILLE (SPEARVL6) 230/115/13.8KV TRANSFORMER CKT 1'	08wp	205	124.1	0	'PRATT - ST JOHN 115KV CKT 1'
'HUNTSVILLE - HUTCHINSON ENERGY CENTER 115KV CKT 1'	08wp	92	131.9	23	'HARPER - MILAN TAP 138KV CKT 1'
'ST JOHN - ST JOHN 115KV CKT 1'	08wp	88	154.7	46	'HARPER - MILAN TAP 138KV CKT 1'
'MEDICINE LODGE - PRATT 115KV CKT 1'	08wp	79.7	169.1	80	'PRATT - ST JOHN 115KV CKT 1'
'SEWARD 115/69KV TRANSFORMER CKT 1'	08wp	44	108.1	125	'GREAT BEND TAP - SEWARD 115KV CKT 1'
'G06-22 115 115/34.5KV TRANSFORMER CKT 1'	08wp	150	113.5	125	'HARPER - MILAN TAP 138KV CKT 1'
'HUNTSVILLE - ST JOHN 115KV CKT 1'	08wp	80	102.6	138	'BASE CASE'
'KINSLEY - PAWNEE EDWARDS JUNCTION 115KV CKT 1'	08wp	92	100.2	145	'PRATT - ST JOHN 115KV CKT 1'
2011 SUMMER PEAK					
'2006-21T 138 - HARPER 138KV CKT 1'	11sp	71.7	442.9	0	'PRATT - ST JOHN 115KV CKT 1'
'2006-21T 138 - MEDICINE LODGE 138KV CKT 1'	11sp	71.7	358.6	0	G06-21 - HARPER 138KV CKT 1'

Table 4: Contingency Analysis

ELEMENT	SEASON	RATE (MVA)	LOADING (%)	ATC (MW)	CONTINGENCY
'PRATT - ST JOHN 115KV CKT 1'	11sp	79.7	327.4	0	'HARPER - MILAN TAP 138KV CKT 1'
'HARPER - MILAN TAP 138KV CKT 1'	11sp	95.6	307.0	0	'PRATT - ST JOHN 115KV CKT 1'
'CLEARWT - MILAN TAP 138KV CKT 1'	11sp	110	252.3	0	'PRATT - ST JOHN 115KV CKT 1'
'CLEARWT - GILL ENERGY CENTER WEST 138KV CKT 1'	11sp	110	237.3	0	'PRATT - ST JOHN 115KV CKT 1'
'2001-39A 115 - JUDSON LARGE 115KV CKT 1'	11sp	79.7	210.1	0	'SPP-WERE-34A'
'SEWARD - ST JOHN 115KV CKT 1'	11sp	79.7	176.8	0	'2004-14T 230 - MULLERGREN 230KV CKT 1'
'MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1'	11sp	65	167.3	0	'GEN:99933 1'
'GILL ENERGY CENTER EAST (GEC3 GSU) 138/69/14.4KV TRANSFORMER CKT 1'	11sp	137	133.6	0	'GILL ENERGY CENTER SOUTH - GILL ENERGY CENTER WEST 138KV CKT 1'
'CUDAHY - JUDSON LARGE 115KV CKT 1'	11sp	129.5	123.2	0	'SPEARVILLE (SPEARVL6) 230/115/13.8KV TRANSFORMER CKT 1'
'CIMARRON RIVER TAP - CUDAHY 115KV CKT 1'	11sp	129.5	118.9	0	'SPEARVILLE (SPEARVL6) 230/115/13.8KV TRANSFORMER CKT 1'
'WEBRERICHARD'	11sp	1250	111.7	0	'BASE CASE'
'POTTER COUNTY INTERCHANGE (POTTR CO) 345/230/13.2KV TRANSFORMER CKT 1'	11sp	560	106.3	0	'GEN:51442 1'
'SEWARD 115/69KV TRANSFORMER CKT 1'	11sp	44	125.6	28	'GREAT BEND TAP - SEWARD 115KV CKT 1'
'ST JOHN - ST JOHN 115KV CKT 1'	11sp	88	142.8	65	'HARPER - MILAN TAP 138KV CKT 1'
'LAWRENCE ENERGY CENTER UNIT 5 - LAWRENCE HILL 230KV CKT 1'	11sp	478	100.7	72	'GILL ENERGY CENTER EAST (GEC3 GSU) 138/69/14.4KV TRANSFORMER CKT 1'
'MEDICINE LODGE - PRATT 115KV CKT 1'	11sp	79.7	156.8	81	'PRATT - ST JOHN 115KV CKT 1'
'GREAT BEND TAP - SEWARD 115KV CKT 1'	11sp	89.6	105.8	126	'2004-14T 230 - MULLERGREN 230KV CKT 1'
'G06-22 115 115/34.5KV TRANSFORMER CKT 1'	11sp	150	109.1	133	'HARPER - MILAN TAP 138KV CKT 1'
'MEDICINE LODGE - SUN CITY 115KV CKT 1'	11sp	79.7	101.2	146	'SPP-WERE-34A'

Table 4: Contingency Analysis

ELEMENT	SEASON	RATE (MVA)	LOADING (%)	ATC (MW)	CONTINGENCY
2011 WINTER PEAK					
'2006-21T 138 - HARPER 138KV CKT 1'	11wp	71.7	467.6	0	'PRATT - ST JOHN 115KV CKT 1'
'2006-21T 138 - MEDICINE LODGE 138KV CKT 1'	11wp	71.7	357.2	0	G06-21 - HARPER 138KV CKT 1'
'PRATT - ST JOHN 115KV CKT 1'	11wp	79.7	353.2	0	'HARPER - MILAN TAP 138KV CKT 1'
'HARPER - MILAN TAP 138KV CKT 1'	11wp	95.6	331.7	0	'PRATT - ST JOHN 115KV CKT 1'
'CLEARWT - MILAN TAP 138KV CKT 1'	11wp	110	276.7	0	'PRATT - ST JOHN 115KV CKT 1'
'CLEARWT - GILL ENERGY CENTER WEST 138KV CKT 1'	11wp	110	263.6	0	'PRATT - ST JOHN 115KV CKT 1'
'2001-39A 115 - JUDSON LARGE 115KV CKT 1'	11wp	79.7	212.8	0	'SPP-WERE-34A'
'SEWARD - ST JOHN 115KV CKT 1'	11wp	79.7	179.8	0	'2004-14T 230 - MULLERGREN 230KV CKT 1'
'SPEARVILLE (SPEARVL6) 230/115/13.8KV TRANSFORMER CKT 1'	11wp	205	121.6	0	'PRATT - ST JOHN 115KV CKT 1'
'HUNTSVILLE - ST JOHN 115KV CKT 1'	11wp	88	130.2	26	'HARPER - MILAN TAP 138KV CKT 1'
'ST JOHN - ST JOHN 115KV CKT 1'	11wp	88	162.2	45	'HARPER - MILAN TAP 138KV CKT 1'
'HUNTSVILLE - HUTCHINSON ENERGY CENTER 115KV CKT 1'	11wp	92	121.7	57	'HARPER - MILAN TAP 138KV CKT 1'
'MEDICINE LODGE - PRATT 115KV CKT 1'	11wp	79.7	168.6	80	'PRATT - ST JOHN 115KV CKT 1'
'SEWARD 115/69KV TRANSFORMER CKT 1'	11wp	44	112.7	110	'GREAT BEND TAP - SEWARD 115KV CKT 1'
'G06-22 115 115/34.5KV TRANSFORMER CKT 1'	11wp	150	108.5	134	'HARPER - MILAN TAP 138KV CKT 1'
2016 SUMMER PEAK					
'2006-21T 138 - HARPER 138KV CKT 1'	16sp	71.7	424.0	0	'PRATT - ST JOHN 115KV CKT 1'
'2006-21T 138 - MEDICINE LODGE 138KV CKT 1'	16sp	71.7	369.2	0	G06-21 - HARPER 138KV CKT 1'
'PRATT - ST JOHN 115KV CKT 1'	16sp	79.7	317.4	0	'HARPER - MILAN TAP 138KV CKT 1'
'HARPER - MILAN TAP 138KV CKT 1'	16sp	95.6	292.0	0	'PRATT - ST JOHN 115KV CKT 1'
'CLEARWT - MILAN TAP 138KV CKT 1'	16sp	110	239.1	0	PRATT - ST JOHN 115KV CKT 1'
'CLEARWT - GILL ENERGY CENTER WEST 138KV CKT 1'	16sp	110	223.6	0	'PRATT - ST JOHN 115KV CKT 1'

Table 4: Contingency Analysis

'2001-39A 115-JUDSON LARGE 115KV CKT 1'	16sp	79.7	216.4	0	'HARPER - MILAN TAP 138KV CKT 1'
ELEMENT	SEASON	RATE (MVA)	LOADING (%)	ATC (MW)	CONTINGENCY
'SEWARD - ST JOHN 115KV CKT 1'	16sp	79.7	177.4	0	'HARPER - MILAN TAP 138KV CKT 1'
'GILL ENERGY CENTER EAST (GEC3 GSU) 138/69/14.4KV TRANSFORMER CKT 1'	16sp	137	134.6	0	'GILL ENERGY CENTER SOUTH - GILL ENERGY CENTER WEST 138KV CKT 1'
'CUDAHY - JUDSON LARGE 115KV CKT 1'	16sp	129.5	122.3	0	'SPEARVILLE (SPEARVL6) 230/115/13.8KV TRANSFORMER CKT 1'
'CIMARRON RIVER TAP - CUDAHY 115KV CKT 1'	16sp	129.5	117.8	0	'SPEARVILLE (SPEARVL6) 230/115/13.8KV TRANSFORMER CKT 1'
'TUCO INTERCHANGE (TUCO XX4) 345/230/13.2KV TRANSFORMER CKT 1'	16sp	560	115.5	0	'FINNEY STATION - HOLCOMB 345KV CKT 1'
'SPSNORTH_STH'	16sp	800	107.0	0	'BASE CASE'
'SEWARD 115/69KV TRANSFORMER CKT 1'	16sp	44	131.5	8	'GREAT BEND TAP - SEWARD 115KV CKT 1'
'MEDICINE LODGE (MED-LDG4) 138/115/2.72KV TRANSFORMER CKT 1'	16sp	65	148.6	20	'GEN:99933 1'
'EAST LIBERAL - TEXAS COUNTY INTERCHANGE PHSF 115KV CKT 1'	16sp	119	105.1	59	'FINNEY STATION - HOLCOMB 345KV CKT 1'
'MEDICINE LODGE - PRATT 115KV CKT 1'	16sp	79.7	155.0	81	'PRATT - ST JOHN 115KV CKT 1'
'ST JOHN - ST JOHN 115KV CKT 1'	16sp	88	134.4	81	'HARPER - MILAN TAP 138KV CKT 1'
CIMARRON RIVER PLANT - NORTH LIBERAL TAP 115KV CKT 1'	16sp	115.3	100.7	126	'CIMARRON RIVER TAP - EAST LIBERAL 115KV CKT 1'
'MEDICINE LODGE - SUN CITY 115KV CKT 1'	16sp	79.7	108.1	126	'SPP-WERE-34A'
'G06-22 115 115/34.5KV TRANSFORMER CKT 1'	16sp	150	108.6	134	'HARPER - MILAN TAP 138KV CKT 1'
'GREAT BEND TAP - SEWARD 115KV CKT 1'	16sp	89.6	101.4	145	'HARPER - MILAN TAP 138KV CKT 1'
'POTTER COUNTY INTERCHANGE (POTTR CO) 345/230/13.2KV TRANSFORMER CKT 1'	16sp	560	107.0	149	'GEN:52212 1'
'STULL SWITCHING STATION - TECUMSEH HILL 115KV CKT 1'	16sp	92	106.3	149	'GEN:56663 1'

Table 4: Contingency Analysis

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 $4,272,581 for WEPL's interconnection Network Upgrade facilities listed in Table 2. These costs exclude upgrades of other transmission facilities by WEPL, MIDW, SPS, and WERE listed in Table 3 of which are Network Constraints. 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 30Mvar of 34.5kV capacitors in the Customer substation for reactive support. For the Customer to be able to deliver as much as the requested 150MW, the addition of an SVC or STATCOM device or the construction of new transmission reinforcements will be required. 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.

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 Table 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.

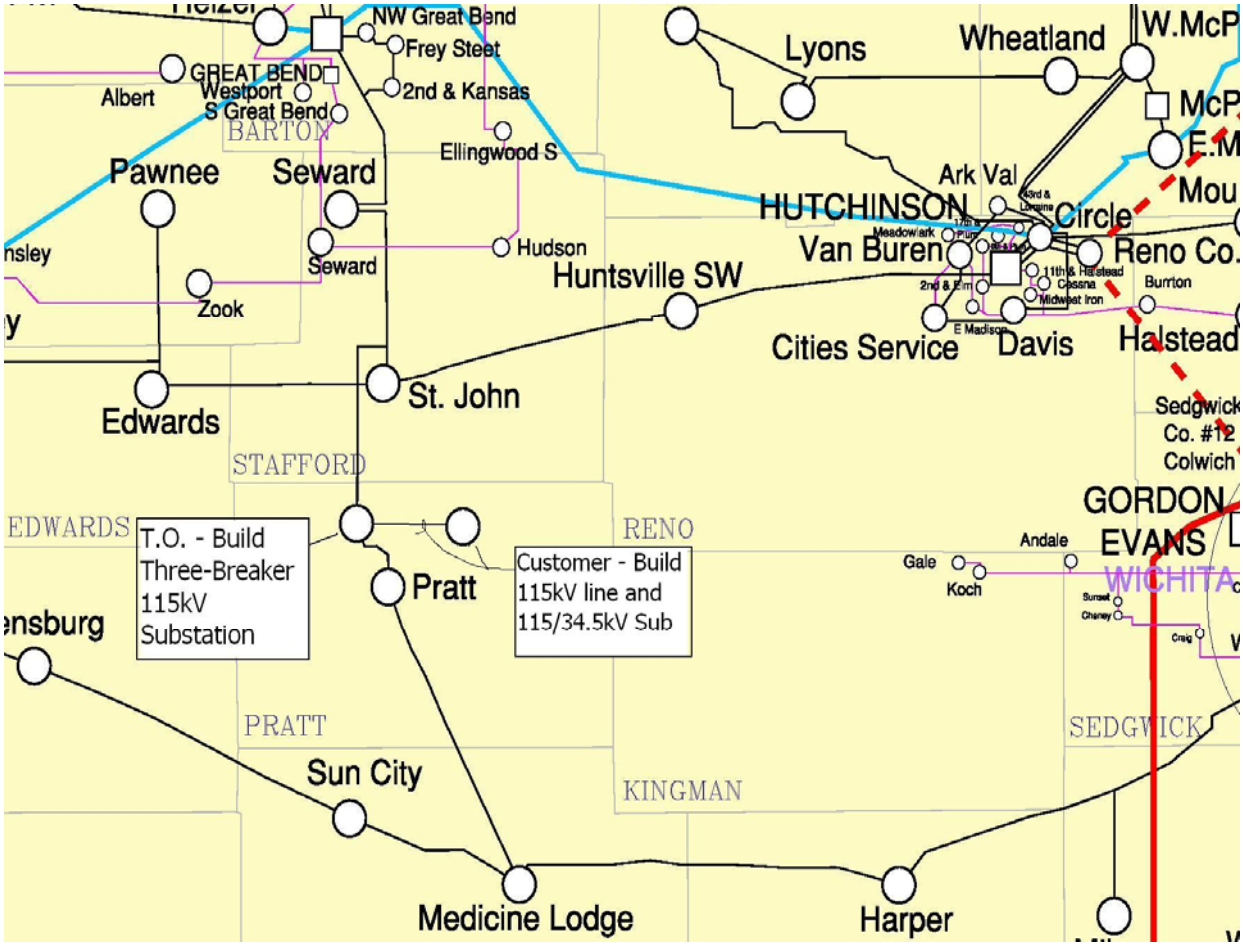

FIGURE 2. MAP OF THE LOCAL AREA