



**Feasibility Study
For
Generation Interconnection
Request
GEN-2007-014**

SPP Tariff Studies
(#GEN-2007-014)

October, 2007

Executive Summary

<OMITTED TEXT> (Customer) has requested a Feasibility Study for the purpose of interconnecting 135 MW of wind generation within the control area of Western Farmers Electric Cooperative (WFEC) located in Beckham County, Oklahoma. The proposed method of interconnection is a new 138 kV breaker and terminal at a new WFEC ring-bus switching station scheduled to replace the existing Erick substation in December 2008. The proposed in-service date of the requested generation is December 1, 2008.

Power flow analysis has indicated that for the powerflow cases studied, it is possible to interconnect the 135 MW of generation with transmission system reinforcements within the local transmission system. In order to maintain acceptable reactive power compensation, the customer will be required to pay for the installation of a combined total of at least 31 Mvar of 34.5 kV capacitor bank(s) to be installed in the Customer's collector substation. Dynamic Stability studies performed as part of the System Impact Study will provide additional guidance as to whether the required reactive compensation can be static or a portion must be dynamic (such as a SVC).

The requirement to interconnect the 135 MW of wind generation into the new WFEC 138 kV ring-bus substation at Erick, slated for completion in December 2008, consists of adding a new 138 kV breaker and terminal. Additionally, there are several line replacements and/or upgrades scheduled for completion in December 2008, to serve this new ring-bus switching station. In particular, WFEC is in the process of converting the 69 kV transmission lines from the Morewood Switching Station to Erick to 138 kV operation. American Electric Power (AEP) is also constructing a 138kV line from its Sayre substation to Eric. Should any of these line replacements or upgrades or the new Erick 138 kV ring-bus switching station not meet the scheduled in-service date of December 2008, this study will have to be re-evaluated and studied to determine possible alternatives for interconnection to the transmission system. The Customer did not propose a specific route for the 138 kV line extending to serve its 138/34.5 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 135 MW of generation is \$500,000. These costs are shown in Tables 1 and 2. Network constraints in the American Electric Power West (AEPW), Southwestern Public Service Company (SPS), and WFEC 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 138 kV line from the Customer 138/34.5 kV collector substation into the point of interconnection. This cost also does not include the Customer's 138/34.5 kV collector substation or the 34.5 kV, 31 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 AEPW, SPS and WFEC control areas will be in service. Those previously queued projects that have advanced to nearly complete phases were included in this Feasibility Study. In the event that another request for a generation interconnection with a higher priority withdraws, then this request may have to be re-evaluated to determine the local Network Constraints.

The required interconnection costs listed in Tables 1 and 2 and other upgrades associated with Network Constraints do not include all costs associated with the deliverability of the energy to final customers. These costs are determined by separate studies if the Customer submits a Transmission Service Request through Southwest Power Pool's OASIS.

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Introduction

<OMITTED TEXT> (Customer) has requested a Feasibility Study for the purpose of interconnecting 135 MW of wind generation within the control area of Western Farmers Electric Cooperative (WFEC) located in Beckham County, Oklahoma. The proposed method of interconnection is a new 138 kV breaker and terminal at a new WFEC ring-bus switching station scheduled to replace the existing Erick substation in December 2008. The proposed in-service date of the requested generation is December 1, 2008.

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 135 MW of wind generation into the new WFEC 138 kV ring-bus substation at Erick, slated for completion in December 2008, consists of adding a new 138 kV breaker and terminal. Additionally, there are several line replacements and/or upgrades scheduled for completion in December 2008, to serve this new ring-bus switching station. In particular, WFEC is in the process of converting the 69 kV transmission lines from the Morewood Switching Station to Erick to 138 kV operation. American Electric Power (AEP) is also constructing a 138kV line from its Sayre substation to Eric. Should any of these line replacements or upgrades or the new Erick 138 kV ring-bus switching station not meet the scheduled in-service date of December 2008, this study will have to be re-evaluated and studied to determine possible alternatives for interconnection to the transmission system. A preliminary one-line drawing of the interconnection facilities are shown in Figure 1. The Customer did not propose a specific route for the 138 kV line extending to serve its 138/34.5 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.

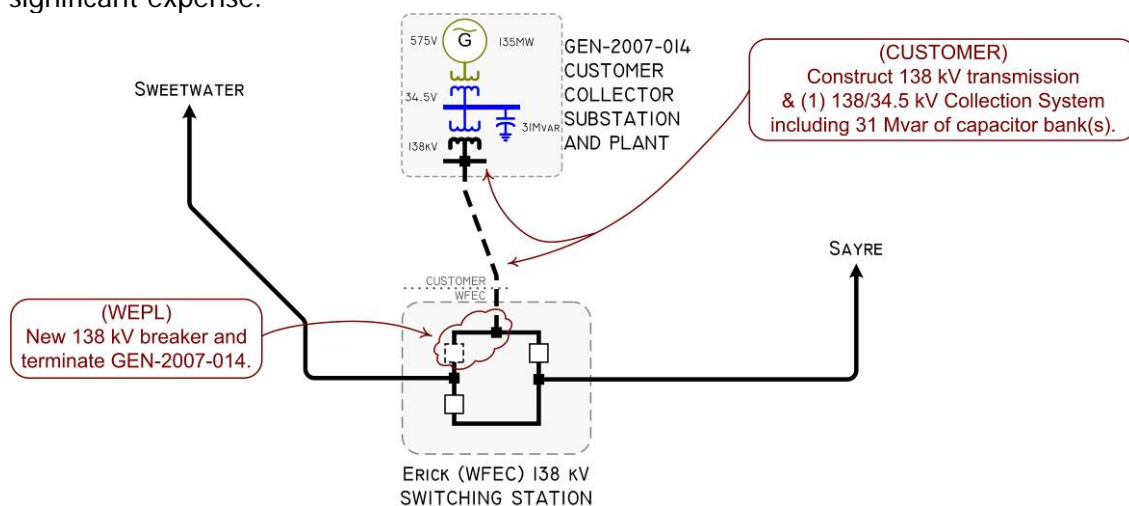


Figure 1: Proposed Method of Interconnection

(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-2007-014 facilities is estimated at \$500,000. 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 138 kV transmission line extending from the point of interconnection to serve its 138/34.5 kV collection facilities. This cost also does not include the Customer's 138/34.5 kV collector substation or the 31 Mvar of capacitor bank(s), all of which should be determined by the Customer. The Customer is responsible for these 138 kV – 34.5 kV facilities up to the point of interconnection. Other Network Constraints in the American Electric Power West (AEPW), Southwestern Public Service Company (SPS), and WFEC 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) 138/34.5 kV Customer collector substation facilities.	*
CUSTOMER – (1) 138 kV transmission line from Customer collector substation to the new four-breaker ring-bus station located at Erick.	*
CUSTOMER – 34.5 kV, 31 Mvar capacitor bank(s) to be installed in the Customer 138/34.5 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)
WFEC – (1) 138 kV breaker and terminate GEN-2007-014 at new Erick 138 kV ring-bus.	\$500,000
TOTAL	\$500,000

* Estimates of cost to be determined.

Powerflow Analysis

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

Following current practice, this analysis was conducted assuming that previous queued requests in the immediate area of this interconnect request were in service. The analysis of the Customer's project indicates that, given the requested generation level of 135 MW and location, additional criteria violations will occur on the existing AEPW, SPS, and WFEC 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 31 Mvar of capacitor bank(s) in the Customer's 138/34.5 kV collector substation on the 34.5 kV bus. Dynamic Stability studies performed as part of the System Impact Study will provide additional guidance as to whether the reactive compensation can be static or a portion must be dynamic (such as a SVC or STATCOM). It is possible that an SVC or STATCOM device will be required at the Customer facility because of FERC Order 661A Low Voltage Ride-Through Provisions (LVRT) which went into effect January 1, 2006. FERC Order 661A orders that wind farms stay on-line for 3-phase faults at the point of interconnection even if that requires the installation of a SVC or STATCOM device.

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

Powerflow Analysis Methodology

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

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

Powerflow Results

Table 3: Network Constraints

AREA	OVERLOADED ELEMENT
AEPW	2006-02T 230.00 - ELK CITY 230KV 230KV CKT 1
AEPW	CLINTON AIR FORCE BASE TAP - ELK CITY 138KV CKT 1
AEPW	CLINTON AIR FORCE BASE TAP - HOBART JUNCTION 138KV CKT 1
AEPW	CLINTON CITY - FOSS TAP 69KV CKT 1
AEPW	CLINTON CITY - THOMAS TAP 69KV CKT 1
AEPW	CLINTON JUNCTION - ELK CITY 138KV CKT 1
AEPW	CLINTON JUNCTION - FOSS TAP 69KV CKT 1
AEPW	ELK CITY (ELKCTY-4) 138/69/13.8KV TRANSFORMER CKT 1
AEPW	HOBART JUNCTION - TAMARAC TAP 138KV CKT 1
AEPW	THOMAS TAP - WEATHERFORD 69KV CKT 1
AEPW	WEATHERFORD SOUTHEAST (WTH_SE) 138/69/13.8KV TRANSFORMER CKT 1
AEPW/WFEC	CLINTON - CLINTON JUNCTION 138KV CKT 1
AEPW/WFEC	ELK CITY - ELK CITY 69KV CKT 1
SPS	BOWERS INTERCHANGE 115/69KV TRANSFORMER CKT 1
SPS	EXELL TAP - FAIN SUB 115KV CKT 1
SPS	FAIN SUB - NICHOLS STATION 115KV CKT 1
SPS	GRAPEVINE INTERCHANGE - KIRBY SWITCHING STATION 115KV CKT 1
SPS	GRAPEVINE INTERCHANGE 230/115KV TRANSFORMER CKT 1
SPS	HERRING TAP - RITA BLANCA REC-SNEED 115KV CKT 1
SPS	HERRING TAP - RIVERVIEW INTERCHANGE 115KV CKT 1
SPS	KINGSMILL INTERCHANGE 115/69KV TRANSFORMER CKT 1
SPS	MOORE COUNTY INTERCHANGE W. - DUMAS SUB 115KV CKT 1
SPS	MOORE COUNTY INTERCHANGE W. - RITA BLANCA REC-SNEED 115KV CKT 1
WFEC	2002-05T 138.00 - MOREWOOD SW 138KV CKT 1
WFEC	CARTER JCT - DILL JCT 69KV CKT 1
WFEC	CARTER JCT - LAKE CREEK 69KV CKT 1
WFEC	DILL JCT - ELK CITY 69KV CKT 1
WFEC	HAMON BUTLER - MOREWOOD 69KV CKT 1
WFEC	HAMON BUTLER - PUTNAM 69KV CKT 1
WFEC	MOORELAND - MOREWOOD SW 138KV CKT 1
WFEC	MOORELAND - MOREWOOD SW 138KV CKT 1
WFEC	PUTNAM - TALOGA 69KV CKT 1
AEPW	American Electric Power West
SPS	Southwestern Public Service
WFEC	Western Farmers Electric Cooperative

Table 4: Contingency Analysis

SEASON	OVERLOADED ELEMENT	RATING (MVA)	LOADING (%)	ATC (MW)	CONTINGENCY
08WP	CLINTON JUNCTION - ELK CITY 138KV CKT 1	143	162	0	CLINTON AIR FORCE BASE TAP - ELK CITY 138KV CKT 1
08WP	HAMON BUTLER - MOREWOOD 69KV CKT 1	61	130	0	MOORELAND - MOREWOOD SW 138KV CKT 1
08WP	HAMON BUTLER - PUTNAM 69KV CKT 1	61	130	0	MOORELAND - MOREWOOD SW 138KV CKT 1
08WP	PUTNAM - TALOGA 69KV CKT 1	61	128	0	MOORELAND - MOREWOOD SW 138KV CKT 1
08WP	2002-05T 138.00 - MOREWOOD SW 138KV CKT 1	158	127	0	ERICK - SWEETWATER 138KV CKT 1
08WP	MOORELAND - MOREWOOD SW 138KV CKT 1	130	120	0	BASE CASE
08WP	THOMAS TAP - WEATHERFORD 69KV CKT 1	53	116	0	WEATHERFORD TAP - WEATHERFORD WIND FARM 138KV CKT 1
08WP	CLINTON CITY - THOMAS TAP 69KV CKT 1	55	116	0	WEATHERFORD TAP - WEATHERFORD WIND FARM 138KV CKT 1
08WP	CLINTON JUNCTION - FOSS TAP 69KV CKT 1	72	112	0	WEATHERFORD TAP - WEATHERFORD WIND FARM 138KV CKT 1
08WP	CLINTON AIR FORCE BASE TAP - ELK CITY 138KV CKT 1	192	124	1	CLINTON JUNCTION - ELK CITY 138KV CKT 1
08WP	ELK CITY (ELKCTY-4) 138/69/13.8KV TRANSFORMER CKT 1	72	114	4	CLINTON AIR FORCE BASE TAP - ELK CITY 138KV CKT 1
08WP	CLINTON AIR FORCE BASE TAP - HOBART JUNCTION 138KV CKT 1	192	123	9	CLINTON JUNCTION - ELK CITY 138KV CKT 1
08WP	MOORELAND - MOREWOOD SW 138KV CKT 1	170	114	35	CLINTON JUNCTION - ELK CITY 138KV CKT 1
08WP	DILL JCT - ELK CITY 69KV CKT 1	61	110	56	CLINTON AIR FORCE BASE TAP - ELK CITY 138KV CKT 1
08WP	CARTER JCT - DILL JCT 69KV CKT 1	61	103	106	CLINTON AIR FORCE BASE TAP - ELK CITY 138KV CKT 1
08WP	CLINTON CITY - FOSS TAP 69KV CKT 1	79	102	114	WEATHERFORD TAP - WEATHERFORD WIND FARM 138KV CKT 1
08WP	ELK CITY - ELK CITY 69KV CKT 1	72	102	117	CLINTON AIR FORCE BASE TAP - ELK CITY 138KV CKT 1
08WP	CARTER JCT - LAKE CREEK 69KV CKT 1	61	100	133	CLINTON AIR FORCE BASE TAP - ELK CITY 138KV CKT 1
09SP	CLINTON JUNCTION - ELK CITY 138KV CKT 1	143	156	0	CLINTON AIR FORCE BASE TAP - ELK CITY 138KV CKT 1
09SP	CLINTON AIR FORCE BASE TAP - ELK CITY 138KV CKT 1	170	135	0	CLINTON JUNCTION - ELK CITY 138KV CKT 1
09SP	CLINTON AIR FORCE BASE TAP - HOBART JUNCTION 138KV CKT 1	170	133	0	CLINTON JUNCTION - ELK CITY 138KV CKT 1
09SP	ELK CITY (ELKCTY-4) 138/69/13.8KV TRANSFORMER CKT 1	72	132	0	CLINTON AIR FORCE BASE TAP - ELK CITY 138KV CKT 1
09SP	CLINTON CITY - THOMAS TAP 69KV CKT 1	48	131	0	WEATHERFORD TAP - WEATHERFORD WIND FARM 138KV CKT 1
09SP	CLINTON JUNCTION - FOSS TAP 69KV CKT 1	72	126	0	WEATHERFORD TAP - WEATHERFORD WIND FARM 138KV CKT 1
09SP	THOMAS TAP - WEATHERFORD 69KV CKT 1	48	125	0	WEATHERFORD TAP - WEATHERFORD WIND FARM 138KV CKT 1
09SP	CLINTON CITY - FOSS TAP 69KV CKT 1	79	114	0	WEATHERFORD TAP - WEATHERFORD WIND FARM 138KV CKT 1
09SP	HOBART JUNCTION - TAMARAC TAP 138KV CKT 1	105	114	0	HOBART JUNCTION (HOB-JCT) 138/69/13.8KV TRANSFORMER CKT 1
09SP	CLINTON AIR FORCE BASE TAP - ELK CITY 138KV CKT 1	147	116	22	BASE CASE
09SP	DILL JCT - ELK CITY 69KV CKT 1	61	112	35	CLINTON AIR FORCE BASE TAP - ELK CITY 138KV CKT 1
09SP	CLINTON AIR FORCE BASE TAP - HOBART JUNCTION 138KV CKT 1	147	113	41	BASE CASE
09SP	ELK CITY - ELK CITY 69KV CKT 1	72	108	59	CLINTON AIR FORCE BASE TAP - ELK CITY 138KV CKT 1
09SP	DILL JCT - ELK CITY 69KV CKT 1	47	104	94	BASE CASE
09SP	CARTER JCT - DILL JCT 69KV CKT 1	61	104	96	CLINTON AIR FORCE BASE TAP - ELK CITY 138KV CKT 1
09SP	CARTER JCT - LAKE CREEK 69KV CKT 1	61	102	120	CLINTON AIR FORCE BASE TAP - ELK CITY 138KV CKT 1

TABLE 4: Contingency Analysis (continued)

SEASON	OVERLOADED ELEMENT	RATING (MVA)	LOADING (%)	ATC (MW)	CONTINGENCY
09SP	HOBART JUNCTION - TAMARAC TAP 138KV CKT 1	96	101	123	BASE CASE
09WP	CLINTON JUNCTION - ELK CITY 138KV CKT 1	143	176	0	CLINTON AIR FORCE BASE TAP - ELK CITY 138KV CKT 1
09WP	CLINTON AIR FORCE BASE TAP - ELK CITY 138KV CKT 1	192	134	0	CLINTON JUNCTION - ELK CITY 138KV CKT 1
09WP	CLINTON AIR FORCE BASE TAP - HOBART JUNCTION 138KV CKT 1	192	133	0	CLINTON JUNCTION - ELK CITY 138KV CKT 1
09WP	ELK CITY (ELKCTY-4) 138/69/13.8KV TRANSFORMER CKT 1	72	129	0	CLINTON AIR FORCE BASE TAP - ELK CITY 138KV CKT 1
09WP	THOMAS TAP - WEATHERFORD 69KV CKT 1	53	121	0	WEATHERFORD TAP - WEATHERFORD WIND FARM 138KV CKT 1
09WP	CLINTON CITY - THOMAS TAP 69KV CKT 1	55	121	0	WEATHERFORD TAP - WEATHERFORD WIND FARM 138KV CKT 1
09WP	DILL JCT - ELK CITY 69KV CKT 1	61	121	0	CLINTON AIR FORCE BASE TAP - ELK CITY 138KV CKT 1
09WP	CARTER JCT - DILL JCT 69KV CKT 1	61	115	0	CLINTON AIR FORCE BASE TAP - ELK CITY 138KV CKT 1
09WP	CLINTON JUNCTION - FOSS TAP 69KV CKT 1	72	115	0	WEATHERFORD TAP - WEATHERFORD WIND FARM 138KV CKT 1
09WP	ELK CITY - ELK CITY 69KV CKT 1	72	115	0	CLINTON AIR FORCE BASE TAP - ELK CITY 138KV CKT 1
09WP	CARTER JCT - LAKE CREEK 69KV CKT 1	61	113	23	CLINTON AIR FORCE BASE TAP - ELK CITY 138KV CKT 1
09WP	DILL JCT - ELK CITY 69KV CKT 1	47	111	28	BASE CASE
09WP	CLINTON AIR FORCE BASE TAP - ELK CITY 138KV CKT 1	172	111	45	BASE CASE
09WP	CLINTON AIR FORCE BASE TAP - HOBART JUNCTION 138KV CKT 1	172	109	58	BASE CASE
09WP	CLINTON - CLINTON JUNCTION 138KV CKT 1	143	107	67	WEATHERFORD JCT. - WEATHERFORD SOUTHEAST 138KV CKT 1
09WP	CLINTON CITY - FOSS TAP 69KV CKT 1	79	105	71	WEATHERFORD TAP - WEATHERFORD WIND FARM 138KV CKT 1
09WP	CARTER JCT - DILL JCT 69KV CKT 1	47	105	90	BASE CASE
09WP	HOBART JUNCTION - TAMARAC TAP 138KV CKT 1	105	103	108	CARNEGIE - HOBART JUNCTION 138KV CKT 1
09WP	WEATHERFORD SOUTHEAST (WTH_SE) 138/69/13.8KV TRANSFORMER CKT 1	55	100	132	WEATHERFORD TAP - WEATHERFORD WIND FARM 138KV CKT 1
09WP	CARTER JCT - LAKE CREEK 69KV CKT 1	47	100	132	BASE CASE
12SP	CLINTON JUNCTION - ELK CITY 138KV CKT 1	143	155	0	CLINTON AIR FORCE BASE TAP - ELK CITY 138KV CKT 1
12SP	ELK CITY (ELKCTY-4) 138/69/13.8KV TRANSFORMER CKT 1	72	138	0	CLINTON AIR FORCE BASE TAP - ELK CITY 138KV CKT 1
12SP	CLINTON AIR FORCE BASE TAP - ELK CITY 138KV CKT 1	170	137	0	CLINTON JUNCTION - ELK CITY 138KV CKT 1
12SP	2006-02T 230.00 - ELK CITY 230KV 230KV CKT 1	351	135	0	2006-02T 230.00 - GRAPEVINE INTERCHANGE 230KV CKT 1
12SP	CLINTON AIR FORCE BASE TAP - HOBART JUNCTION 138KV CKT 1	170	134	0	CLINTON JUNCTION - ELK CITY 138KV CKT 1
12SP	CLINTON CITY - THOMAS TAP 69KV CKT 1	48	121	0	WEATHERFORD TAP - WEATHERFORD WIND FARM 138KV CKT 1
12SP	CLINTON JUNCTION - FOSS TAP 69KV CKT 1	72	121	0	WEATHERFORD TAP - WEATHERFORD WIND FARM 138KV CKT 1
12SP	THOMAS TAP - WEATHERFORD 69KV CKT 1	48	115	0	WEATHERFORD TAP - WEATHERFORD WIND FARM 138KV CKT 1
12SP	HOBART JUNCTION - TAMARAC TAP 138KV CKT 1	105	114	0	HOBART JUNCTION (HOB-JCT) 138/69/13.8KV TRANSFORMER CKT 1
12SP	CLINTON CITY - FOSS TAP 69KV CKT 1	79	110	0	WEATHERFORD TAP - WEATHERFORD WIND FARM 138KV CKT 1
12SP	CLINTON AIR FORCE BASE TAP - ELK CITY 138KV CKT 1	147	118	6	BASE CASE
12SP	DILL JCT - ELK CITY 69KV CKT 1	61	114	9	CLINTON AIR FORCE BASE TAP - ELK CITY 138KV CKT 1
12SP	ELK CITY - ELK CITY 69KV CKT 1	72	112	17	CLINTON AIR FORCE BASE TAP - ELK CITY 138KV CKT 1

TABLE 4: Contingency Analysis (continued)

SEASON	OVERLOADED ELEMENT	RATING (MVA)	LOADING (%)	ATC (MW)	CONTINGENCY
12SP	CLINTON AIR FORCE BASE TAP - HOBART JUNCTION 138KV CKT 1	147	116	25	BASE CASE
12SP	DILL JCT - ELK CITY 69KV CKT 1	47	107	65	BASE CASE
12SP	CARTER JCT - DILL JCT 69KV CKT 1	61	107	74	CLINTON AIR FORCE BASE TAP - ELK CITY 138KV CKT 1
12SP	CARTER JCT - LAKE CREEK 69KV CKT 1	61	104	98	CLINTON AIR FORCE BASE TAP - ELK CITY 138KV CKT 1
12SP	HOBART JUNCTION - TAMARAC TAP 138KV CKT 1	96	101	121	BASE CASE
12WP	CLINTON AIR FORCE BASE TAP - ELK CITY 138KV CKT 1	172	116	0	BASE CASE
12WP	CLINTON JUNCTION - ELK CITY 138KV CKT 1	143	184	0	CLINTON AIR FORCE BASE TAP - ELK CITY 138KV CKT 1
12WP	CLINTON AIR FORCE BASE TAP - ELK CITY 138KV CKT 1	192	141	0	CLINTON JUNCTION - ELK CITY 138KV CKT 1
12WP	CLINTON AIR FORCE BASE TAP - HOBART JUNCTION 138KV CKT 1	192	140	0	CLINTON JUNCTION - ELK CITY 138KV CKT 1
12WP	ELK CITY (ELKCTY-4) 138/69/13.8KV TRANSFORMER CKT 1	72	136	0	CLINTON AIR FORCE BASE TAP - ELK CITY 138KV CKT 1
12WP	DILL JCT - ELK CITY 69KV CKT 1	61	127	0	CLINTON AIR FORCE BASE TAP - ELK CITY 138KV CKT 1
12WP	CARTER JCT - DILL JCT 69KV CKT 1	61	121	0	CLINTON AIR FORCE BASE TAP - ELK CITY 138KV CKT 1
12WP	ELK CITY - ELK CITY 69KV CKT 1	72	120	0	CLINTON AIR FORCE BASE TAP - ELK CITY 138KV CKT 1
12WP	CARTER JCT - LAKE CREEK 69KV CKT 1	61	118	0	CLINTON AIR FORCE BASE TAP - ELK CITY 138KV CKT 1
12WP	THOMAS TAP - WEATHERFORD 69KV CKT 1	53	117	0	WEATHERFORD TAP - WEATHERFORD WIND FARM 138KV CKT 1
12WP	CLINTON CITY - THOMAS TAP 69KV CKT 1	55	117	0	WEATHERFORD TAP - WEATHERFORD WIND FARM 138KV CKT 1
12WP	DILL JCT - ELK CITY 69KV CKT 1	47	116	0	BASE CASE
12WP	CLINTON JUNCTION - FOSS TAP 69KV CKT 1	72	115	0	WEATHERFORD TAP - WEATHERFORD WIND FARM 138KV CKT 1
12WP	CLINTON AIR FORCE BASE TAP - HOBART JUNCTION 138KV CKT 1	172	115	12	BASE CASE
12WP	CLINTON - CLINTON JUNCTION 138KV CKT 1	143	112	25	WEATHERFORD JCT. - WEATHERFORD SOUTHEAST 138KV CKT 1
12WP	CARTER JCT - DILL JCT 69KV CKT 1	47	110	41	BASE CASE
12WP	CLINTON CITY - FOSS TAP 69KV CKT 1	79	104	76	WEATHERFORD TAP - WEATHERFORD WIND FARM 138KV CKT 1
12WP	HOBART JUNCTION - TAMARAC TAP 138KV CKT 1	105	106	79	CARNEGIE - HOBART JUNCTION 138KV CKT 1
12WP	CARTER JCT - LAKE CREEK 69KV CKT 1	47	105	86	BASE CASE
17SP	CLINTON JUNCTION - ELK CITY 138KV CKT 1	143	155	0	CLINTON AIR FORCE BASE TAP - ELK CITY 138KV CKT 1
17SP	ELK CITY (ELKCTY-4) 138/69/13.8KV TRANSFORMER CKT 1	72	144	0	CLINTON AIR FORCE BASE TAP - ELK CITY 138KV CKT 1
17SP	CLINTON AIR FORCE BASE TAP - ELK CITY 138KV CKT 1	170	137	0	CLINTON JUNCTION - ELK CITY 138KV CKT 1
17SP	CLINTON AIR FORCE BASE TAP - HOBART JUNCTION 138KV CKT 1	170	135	0	CLINTON JUNCTION - ELK CITY 138KV CKT 1
17SP	BOWERS INTERCHANGE 115/69KV TRANSFORMER CKT 1	97	133	0	2006-02T 230.00 - GRAPEVINE INTERCHANGE 230KV CKT 1
17SP	CLINTON JUNCTION - FOSS TAP 69KV CKT 1	72	121	0	WEATHERFORD TAP - WEATHERFORD WIND FARM 138KV CKT 1
17SP	KINGSMILL INTERCHANGE 115/69KV TRANSFORMER CKT 1	86	117	0	BOWERS INTERCHANGE 115/69KV TRANSFORMER CKT 1
17SP	HOBART JUNCTION - TAMARAC TAP 138KV CKT 1	105	117	0	ELK CITY (ELKCTY-4) 138/69/13.8KV TRANSFORMER CKT 1
17SP	CLINTON CITY - THOMAS TAP 69KV CKT 1	48	116	0	WEATHERFORD TAP - WEATHERFORD WIND FARM 138KV CKT 1
17SP	GRAPEVINE INTERCHANGE - KIRBY SWITCHING STATION 115KV CKT 1	161	113	0	BOWERS INTERCHANGE 115/69KV TRANSFORMER CKT 1

TABLE 4: Contingency Analysis (continued)

SEASON	OVERLOADED ELEMENT	RATING (MVA)	LOADING (%)	ATC (MW)	CONTINGENCY
17SP	CLINTON CITY - FOSS TAP 69KV CKT 1	79	110	0	WEATHERFORD TAP - WEATHERFORD WIND FARM 138KV CKT 1
17SP	GRAPEVINE INTERCHANGE 230/115KV TRANSFORMER CKT 1	112	109	0	BASE CASE
17SP	CLINTON AIR FORCE BASE TAP - ELK CITY 138KV CKT 1	147	119	2	BASE CASE
17SP	DILL JCT - ELK CITY 69KV CKT 1	61	114	6	CLINTON AIR FORCE BASE TAP - ELK CITY 138KV CKT 1
17SP	ELK CITY - ELK CITY 69KV CKT 1	72	112	13	CLINTON AIR FORCE BASE TAP - ELK CITY 138KV CKT 1
17SP	CLINTON AIR FORCE BASE TAP - HOBART JUNCTION 138KV CKT 1	147	116	19	BASE CASE
17SP	THOMAS TAP - WEATHERFORD 69KV CKT 1	48	110	40	WEATHERFORD TAP - WEATHERFORD WIND FARM 138KV CKT 1
17SP	DILL JCT - ELK CITY 69KV CKT 1	47	107	59	BASE CASE
17SP	HOBART JUNCTION - TAMARAC TAP 138KV CKT 1	96	104	68	BASE CASE
17SP	HERRING TAP - RIVERVIEW INTERCHANGE 115KV CKT 1	180	115	102	2006-02T 230.00 - GRAPEVINE INTERCHANGE 230KV CKT 1
17SP	MOORE COUNTY INTERCHANGE W. - DUMAS SUB 115KV CKT 1	99	118	106	BOWERS INTERCHANGE 115/69KV TRANSFORMER CKT 1
17SP	HERRING TAP - RITA BLANCA REC-SNEED 115KV CKT 1	180	108	117	2006-02T 230.00 - GRAPEVINE INTERCHANGE 230KV CKT 1
17SP	FAIN SUB - NICHOLS STATION 115KV CKT 1	161	107	117	BOWERS INTERCHANGE 115/69KV TRANSFORMER CKT 1
17SP	EXELL TAP - FAIN SUB 115KV CKT 1	161	104	124	BOWERS INTERCHANGE 115/69KV TRANSFORMER CKT 1
17SP	MOORE COUNTY INTERCHANGE W. - RITA BLANCA REC-SNEED 115KV CKT 1	180	101	132	2006-02T 230.00 - GRAPEVINE INTERCHANGE 230KV 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 \$500,000 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 31 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

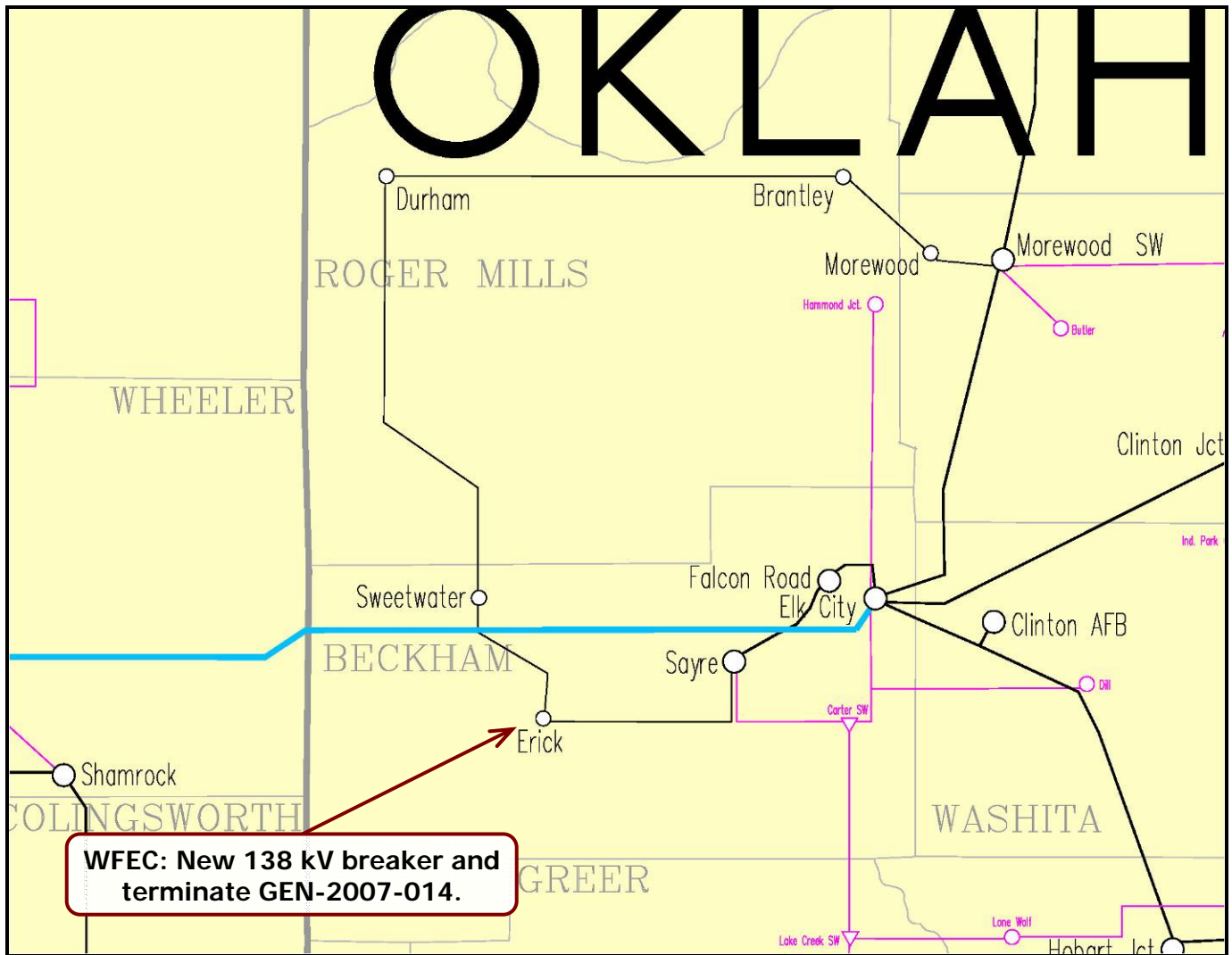


Figure 2: Point of Interconnection Area Map