Feasibility Study
For
Generation Interconnection Request
GEN-2007-021

SPP Tariff Studies
(#GEN-2007-028)

January, 2008

Executive Summary

<OMITTED TEXT> (Customer) has requested a Feasibility Study for the purpose of interconnecting 201 MW of wind generation within the control area of Oklahoma Gas and Electric (OKGE) located in Dewey County, Oklahoma. The proposed method of interconnection is a new 138 kV breaker and line terminal Dewey four-breaker ring-bus switching station to be located on the existing Dewey (OKGE) 138 kV substation, owned by OKGE. The proposed in-service date is August 1, 2009.

Power flow analysis has indicated that for the powerflow cases studied, it is possible to interconnect the 201 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 30 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 201 MW of wind generation on the existing Dewey (OKGE) 138 kV substation consists of adding a new 138 kV circuit breaker and line terminal at Dewey. Currently, OKGE plans to rebuild Dewey substation into a three breaker ring bus. This project is denoted in the SPP Expansion Plan. The feasibility Study for GEN-2006-046 proposed to add a fourth terminal at Dewey. GEN 2007-021 will add a fifth terminal to the Dewey substation. The new terminal will be constructed and maintained by OKGE. 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 201 MW of generation is $642,075. These costs are shown in Tables 1 and 2. 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 30 Mvar of 34.5 kV capacitor bank(s). Other Network constraints in the American Electric Power West (AEPW), Kansas City Power & Light (KACP), Western Farmers Electric Cooperative (WFEC) and OKGE 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 American Electric

Power West (AEPW), Kansas City Power & Light (KACP), Western Farmers Electric Cooperative (WFEC), and OKGE 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 201 MW of wind generation within the control area of Oklahoma Gas and Electric (OKGE) located in Dewey County, Oklahoma. The proposed method of interconnection is a new 138 kV breaker and line terminal at Dewey four-breaker ring-bus switching station to be located on the existing Dewey (OKGE) 138 kV substation, owned by OKGE. The proposed in-service date is August 1, 2009.

Interconnection Facilities

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

The requirement to interconnect the 201 MW of wind generation on the existing Dewey (OKGE) 138 kV substation consists of adding a new 138 kV circuit breaker and line terminal at Dewey. Currently, OKGE plans to rebuild Dewey substation into a three breaker ring bus. This project is denoted in the SPP Expansion Plan. The feasibility Study for GEN-2006-046 proposed to add a fourth terminal at Dewey. GEN 2007-021 will add a fifth terminal to the Dewey substation. The new terminal will be constructed and maintained by OKGE. 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.

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.

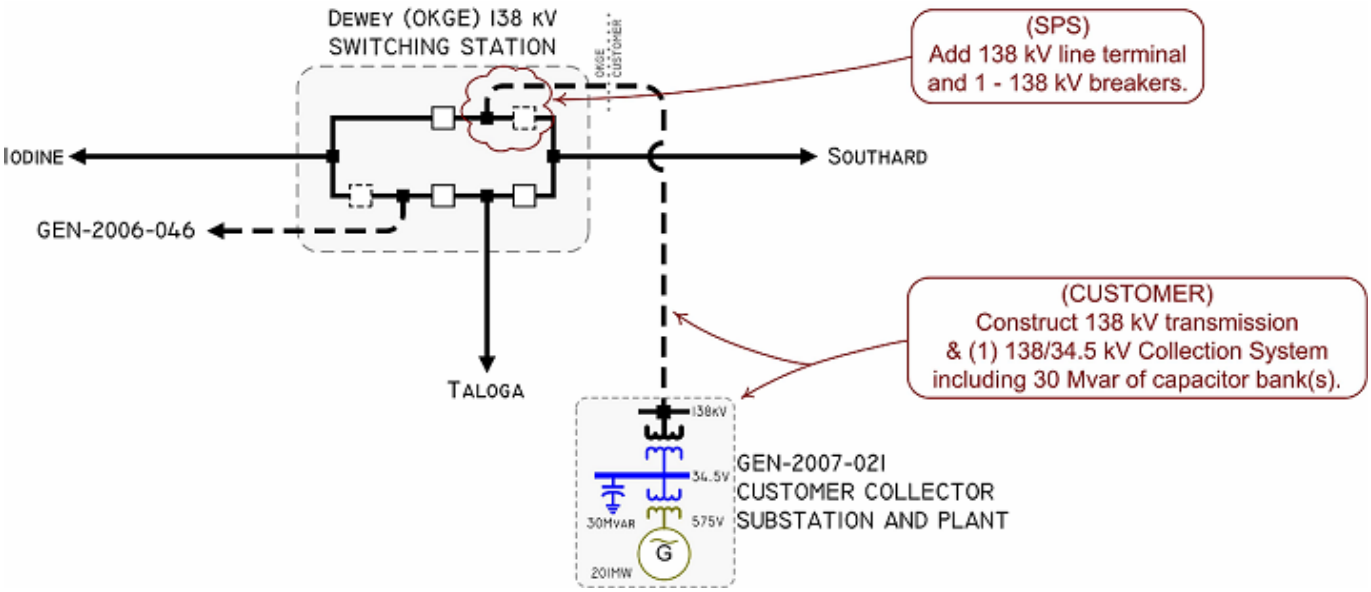

Figure 1: Proposed Method of Interconnection

(Final design to be determined)

Interconnection Estimated Costs

The minimum cost for adding a new breaker and terminating the transmission line serving GEN-2007-021 facilities is estimated at $642,075. 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 30 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.

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 – (1) 138 kV transmission line from Customer collector substation to the four-breaker ring-bus station located on the Dewey (OKGE) 138 kV substation.	
OKGE – Termination and interconnection of CUSTOMER 138 kV transmission line into the 138 kV four-breaker ring bus. Cost of 138 kV revenue metering.	$290,000
CUSTOMER – (1) 138/34.5 kV Customer collector substation facilities.	
CUSTOMER – 34.5 kV, 30 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	**$290,000**

* *Estimates of cost to be determined.*

Table 2: Required Interconnection Network Upgrade Facilities

FACILITY	ESTIMATED COST (2007 DOLLARS)
WERE – (1) 138 kV breaker and line terminal into a previously proposed 138 kV four-breaker ring-bus switching station to be previously proposed for generation request #GEN-2006-046 on the Dewey (OKGE) 138 kV substation. Work to include associated switches, control relaying, high speed communications, metering and related equipment and all related structures.	$352,075
TOTAL	**$352,075**

* *Estimates of cost to be determined.*

Powerflow Analysis

A powerflow analysis was conducted for the facility using modified versions of the 2009 & 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 August 1, 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 201 MW and location, additional criteria violations will occur on the existing AEPW, KACP, WFEC and OKGE 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.

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 30 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	FLETCHER TAP - LAWTON EASTSIDE 138KV CKT 1
AEPW	HOBART JUNCTION - TAMARAC TAP 138KV CKT 1
AEPW	LONE STAR SOUTH - WILKES 138KV CKT 1
AEPW/WFEC	ELK CITY - 2002-05T 138KV CKT 1
KACP	WEST GARDNER (WGARD 11) 345/161/13.8KV TRANSFORMER CKT 11
OKGE	ALVA - KNOBHILL 69KV CKT 1
OKGE	CIMARRON - HAYMAKER 138KV CKT 1
OKGE	CIMARRON - JENSEN TAP 138KV CKT 1
OKGE	CLEO CORNER - GLASS MOUNTAIN 138KV CKT 1
OKGE	DEWEY - SOUTHARD 138KV CKT 1
OKGE	DEWEY - TALOGA 138KV CKT 1
OKGE	DIVISION AVE - HAYMAKER 138KV CKT 1
OKGE	EL RENO - JENSEN TAP 138KV CKT 1
OKGE	EL RENO - ROMAN NOSE 138KV CKT 1
OKGE	EL RENO - SERVICE PL EL RENO 69KV CKT 1
OKGE	FPL SWITCH - MOORELAND 138KV CKT 1
OKGE	ROMAN NOSE - SOUTHARD 138KV CKT 1
OKGE	SOUTH 4TH ST - IMO TAP 138KV CKT1
OKGE	WOODWARD - FPL SWITCH 138KV CKT1
OKGE	WOODWARD (WOODWRD2) 138/69/13.2KV TRANSFORMER CKT 1
OKGE/WFEC	GLASS MOUNTAIN - MOORELAND 138KV CKT 1
OKGE/WFEC	KNOBHILL - MOORELAND 138KV CKT 1
OKGE/WFEC	WODWARD - WOODWARD 69KV CKT 1
SPS	CUNNINGHAM STATION 230/115KV TRANSFORMER CKT 1
SPS	LEA COUNTY INTERCHANGE 230/115KV TRANSFORMER CKT 1
WFEC	BRANTLEY - MORWOOD 69KV CKT 1
WFEC	CANTON - OKEENE 69KV CKT 1
WFEC	CANTON - TALOGA 69KV CKT 1
WFEC	CARTER JCT - ERICK 69KV CKT 1
WFEC	CEDARDALE - MOORELAND 138KV CKT 1
WFEC	CEDARDALE - OKEENE 138KV CKT 1
WFEC	DOVER SW - OKEENE 138KV CKT 1
WFEC	EL RENO SW - EL RENO 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 - TALOGA 138KV CKT 1
WFEC	MOORELAND - WOODWARD 69KV CKT 1
WFEC	MOREWOOD SW - 2002-05T 138KV CKT 1
WFEC	OKEENE - WATONGA SW 69KV CKT 1
WFEC	OKEENE 138/69KV TRANSFORMER CKT 1
WFEC	PUTNAM - TALOGA 69KV CKT 1
WFEC	TALOGA 138/69KV TRANSFORMER CKT 1
AEPW	American Electric Power West
KACP	Kansas City Power & Light
OKGE	Oklahoma Gas and Electric
SPS	Southwestern Public Service Company
WFEC	Western Farmers Electric Cooperative

Table 4: Contingency Analysis

SEASON	OVERLOADED ELEMENT	RATING (MVA)	LOADING (%)	ATC (MW)	CONTINGENCY
09SP	EL RENO - ROMAN NOSE 138KV CKT 1	153	282	0	2002-05T - ELK CITY 138KV CKT1
09SP	ELK CITY - 2002-05T 138KV CKT 1	158	236	0	EL RENO - ROMAN NOSE 138KV CKT1
09SP	TALOGA 138/69KV TRANSFORMER CKT 1	56	235	0	DEWEY - SOUTHARD 138KV CKT 1
09SP	DEWEY - TALOGA 138KV CKT 1	143	233	0	EL RENO - ROMAN NOSE 138KV CKT1
09SP	GLASS MOUNTAIN - MOORELAND 138KV CKT 1	124	207	0	2002-05T - ELK CITY 138KV CKT1
09SP	CARTER JCT - ERICK 69KV CKT1	26	178	0	2002-05T - ELK CITY 138KV CKT1
09SP	DOVER SW - OKEENE 138KV CKT 1	122	176	0	EL RENO - ROMAN NOSE 138KV CKT1
09SP	CLEO CORNER - GLASS MOUNTAIN 138KV CKT 1	153	165	0	2002-05T - ELK CITY 138KV CKT1
09SP	EL RENO SW - EL RENO 69KV CKT 1	26	162	0	EL RENO - ROMAN NOSE 138KV CKT1
09SP	CANTON - TALOGA 69KV CKT 1	61	160	0	CEDARDALE - MOORELAND 138KV CKT 1
09SP	MOREWOOD SW - 2002-05T 138KV CKT 1	158	155	0	EL RENO - ROMAN NOSE 138KV CKT1
09SP	CANTON - OKEENE 69KV CKT 1	61	154	0	CEDARDALE - MOORELAND 138KV CKT 1
09SP	BRANTLEY - MORWOOD 69KV CKT 1	38	152	0	2002-05T - ELK CITY 138KV CKT1
09SP	ALVA - KNOBHILL 69KV CKT 1	48	143	0	GLASS MOUNTAIN - MOORELAND 138KV CKT 1
09SP	KNOBHILL - MOORELAND 138KV CKT 1	96	140	0	GLASS MOUNTAIN - MOORELAND 138KV CKT 1
09SP	OKEENE - WATONGA SW 69KV CKT 1	61	133	0	OKGEMTL-9
09SP	MOORELAND - MOREWOOD SW 138KV CKT1	170	131	0	EL RENO - ROMAN NOSE 138KV CKT1
09SP	CEDARDALE - MOORELAND 138KV CKT 1	170	126	0	2002-05T - ELK CITY 138KV CKT1
09SP	WOODWARD (WOODWRD2) 138/69/13.2KV TRANSFORMER CKT 1	134	120	0	FPL SWITCH - MOORELAND 138KV CKT 1
09SP	FLETCHER TAP - LAWTON EASTSIDE 138KV CKT 1	143	115	0	ELGIN JUNCTION - SOUTHWESTERN STATION 138KV CKT 1
09SP	CEDARDALE - OKEENE 138KV CKT 1	170	124	11	2002-05T - ELK CITY 138KV CKT1
09SP	HOBART JUNCTION - TAMARAC TAP 138KV CKT 1	105	107	17	SPP-SWPS-03
09SP	FPL SWITCH - MOORELAND 138KV CKT 1	212	121	39	EL RENO - ROMAN NOSE 138KV CKT1
09SP	ROMAN NOSE - SOUTHARD 138KV CKT 1	153	139	68	2002-05T - ELK CITY 138KV CKT1
09SP	PUTNAM - TALOGA 69KV CKT 1	61	119	92	MOORELAND - MOREWOOD SW 138KV CKT 1
09SP	CIMARRON - JENSEN TAP 138KV CKT 1	222	115	102	CIMARRON - EL RENO 138KV CKT 1
09SP	HAMON BUTLER - PUTNAM 69KV CKT 1	61	116	107	MOORELAND - MOREWOOD SW 138KV CKT 1
09SP	HAMON BUTLER - MOREWOOD 69KV CKT 1	61	116	108	MOORELAND - MOREWOOD SW 138KV CKT 1
09SP	SOUTH 4TH ST - IMO TAP 138KV CKT1	158	115	125	2002-05T - ELK CITY 138KV CKT1
09SP	MOORELAND - TALOGA 138KV CKT 1	154	117	142	EL RENO - ROMAN NOSE 138KV CKT1
09SP	CIMARRON - HAYMAKER 138KV CKT 1	308	101	167	CIMARRON - CZECH HALL 138KV CKT 1
09SP	WOODWARD - FPL SWITCH 138KV CKT 1	153	106	168	EL RENO - ROMAN NOSE 138KV CKT1
09SP	OKEENE 138/69KV TRANSFORMER CKT 1	70	102	170	OKGEMTL-9
09SP	DEWEY - SOUTHARD 138KV CKT 1	222	104	181	2002-05T - ELK CITY 138KV CKT1
09WP	WODWARD - WOODWARD 69KV CKT 1	38	310	0	FPL SWITCH - MOORELAND 138KV CKT 1
09WP	DEWEY - TALOGA 138KV CKT 1	143	229	0	EL RENO - ROMAN NOSE 138KV CKT1
09WP	EL RENO - ROMAN NOSE 138KV CKT 1	185	224	0	2002-05T 138.00 - ELK CITY 138KV CKT 1
09WP	ELK CITY - 2002-05T 138KV CKT 1	158	216	0	EL RENO - ROMAN NOSE 138KV CKT1
09WP	TALOGA 138/69KV TRANSFORMER CKT 1	56	203	0	DEWEY - SOUTHARD 138KV CKT 1
09WP	GLASS MOUNTAIN - MOORELAND 138KV CKT 1	124	187	0	EL RENO - ROMAN NOSE 138KV CKT1
09WP	DOVER SW - OKEENE 138KV CKT 1	122	164	0	EL RENO - ROMAN NOSE 138KV CKT1
09WP	CARTER JCT - ERICK 69KV CKT 1	26	162	0	2002-05T 138.00 - ELK CITY 138KV CKT 1

TABLE 4: Contingency Analysis (continued)

SEASON	OVERLOADED ELEMENT	RATING (MVA)	LOADING (%)	ATC (MW)	CONTINGENCY
09WP	CANTON - TALOGA 69KV CKT 1	61	152	0	EL RENO - ROMAN NOSE 138KV CKT1
09WP	CANTON - OKEENE 69KV CKT 1	61	148	0	EL RENO - ROMAN NOSE 138KV CKT1
09WP	BRANTLEY - MORWOOD 69KV CKT 1	38	142	0	2002-05T 138.00 - ELK CITY 138KV CKT 1
09WP	MOREWOOD SW - 2002-05T 138KV CKT 1	158	140	0	EL RENO - ROMAN NOSE 138KV CKT1
09WP	OKEENE - WATONGA SW 69KV CKT 1	61	135	0	OKGEMTL-9
09WP	EL RENO SW - EL RENO 69KV CKT 1	26	132	0	EL RENO - ROMAN NOSE 138KV CKT1
09WP	FPL SWITCH - MOORELAND 138KV CKT 1	212	128	0	EL RENO - ROMAN NOSE 138KV CKT1
09WP	CLEO CORNER - GLASS MOUNTAIN 138KV CKT 1	185	124	0	EL RENO - ROMAN NOSE 138KV CKT1
09WP	KNOBHILL - MOORELAND 138KV CKT 1	96	121	0	GLASS MOUNTAIN - MOORELAND 138KV CKT 1
09WP	ALVA - KNOBHILL 69KV CKT 1	48	120	0	GLASS MOUNTAIN - MOORELAND 138KV CKT 1
09WP	DIVISION AVE - HAYMAKER 138KV CKT 1	308	106	0	CIMARRON - CZECH HALL 138KV CKT 1
09WP	WOODWARD (WOODWRD2) 138/69/13.2KV TRANSFORMER CKT 1	134	117	18	FPL SWITCH - MOORELAND 138KV CKT 1
09WP	CEDARDALE - MOORELAND 138KV CKT 1	170	114	43	EL RENO - ROMAN NOSE 138KV CKT1
09WP	MOORELAND - MOREWOOD 138KV CKT 1	170	117	47	EL RENO - ROMAN NOSE 138KV CKT1
09WP	CEDARDALE - OKEENE 138KV CKT 1	170	113	58	EL RENO - ROMAN NOSE 138KV CKT1
09WP	EL RENO - SERVICE PL EL RENO 69KV CKT 1	48	108	91	CIMARRON - EL RENO 138KV CKT 1
09WP	MOORELAND - TALOGA 138KV CKT 1	154	118	130	EL RENO - ROMAN NOSE 138KV CKT1
09WP	SOUTH 4TH ST - IMO TAP 138KV CKT 1	158	106	150	EL RENO - ROMAN NOSE 138KV CKT1
09WP	PUTNAM - TALOGA 69KV CKT 1	61	105	168	MOORELAND - MOREWOOD SW 138KV CKT 1
09WP	ROMAN NOSE - SOUTHARD 138KV CKT 1	185	104	177	GEN560117 1
09WP	HAMON BUTLER - PUTNAM 69KV CKT 1	61	102	185	MOORELAND - MOREWOOD SW 138KV CKT 1
09WP	HAMON BUTLER - MOREWOOD 69KV CKT 1	61	102	186	MOORELAND - MOREWOOD SW 138KV CKT 1
12SP	WODWARD - WOODWARD 69KV CKT 1	38	282	0	FPL SWITCH - MOORELAND 138KV CKT 1
12SP	EL RENO - ROMAN NOSE 138KV CKT 1	153	279	0	2002-05T 138.00 - ELK CITY 138KV CKT 1
12SP	TALOGA 138/69KV TRANSFORMER CKT 1	56	232	0	DEWEY - SOUTHARD 138KV CKT 1
12SP	DEWEY - TALOGA 138KV CKT 1	143	232	0	EL RENO - ROMAN NOSE 138KV CKT1
12SP	ELK CITY - 2002-05T 138KV CKT 1	158	224	0	EL RENO - ROMAN NOSE 138KV CKT1
12SP	GLASS MOUNTAIN - MOORELAND 138KV CKT 1	124	177	0	DEWEY - SOUTHARD 138KV CKT 1
12SP	CARTER JCT - ERICK 69KV CKT 1	26	174	0	2002-05T 138.00 - ELK CITY 138KV CKT 1
12SP	DOVER SW - OKEENE 138KV CKT 1	122	167	0	2002-05T 138.00 - ELK CITY 138KV CKT 1
12SP	MOREWOOD SW - 2002-05T 138KV CKT 1	158	158	0	EL RENO - ROMAN NOSE 138KV CKT1
12SP	CLEO CORNER - GLASS MOUNTAIN 138KV CKT 1	153	157	0	EL RENO - ROMAN NOSE 138KV CKT1
12SP	CANTON - TALOGA 69KV CKT 1	61	157	0	CEDARDALE - MOORELAND 138KV CKT 1
12SP	BRANTLEY - MORWOOD 69KV CKT 1	38	154	0	2002-05T 138.00 - ELK CITY 138KV CKT 1
12SP	CANTON - OKEENE 69KV CKT 1	61	150	0	CEDARDALE - MOORELAND 138KV CKT 1
12SP	ALVA - KNOBHILL 69KV CKT 1	48	145	0	GLASS MOUNTAIN - MOORELAND 138KV CKT 1
12SP	EL RENO SW - EL RENO 69KV CKT 1	26	143	0	EL RENO - ROMAN NOSE 138KV CKT1
12SP	KNOBHILL - MOORELAND 138KV CKT 1	96	137	0	GLASS MOUNTAIN - MOORELAND 138KV CKT 1
12SP	OKEENE - WATONGA SW 69KV CKT 1	61	135	0	OKGEMTL-9
12SP	MOORELAND - MOREWOOD SW 138KV CKT1	170	134	0	EL RENO - ROMAN NOSE 138KV CKT1
12SP	WOODWARD (WOODWRD2) 138/69/13.2KV TRANSFORMER CKT 1	134	121	0	FPL SWITCH - MOORELAND 138KV CKT 1
12SP	CEDARDALE - MOORELAND 138KV CKT 1	170	124	20	2002-05T 138.00 - ELK CITY 138KV CKT 1
12SP	CEDARDALE - OKEENE 138KV CKT 1	170	122	35	2002-05T 138.00 - ELK CITY 138KV CKT 1
12SP	FPL SWITCH - MOORELAND 138KV CKT 1	212	119	49	EL RENO - ROMAN NOSE 138KV CKT1

TABLE 4: Contingency Analysis (continued)

SEASON	OVERLOADED ELEMENT	RATING (MVA)	LOADING (%)	ATC (MW)	CONTINGENCY
12SP	PUTNAM - TALOGA 69KV CKT 1	61	125	59	MOORELAND - MOREWOOD SW 138KV CKT 1
12SP	HAMON BUTLER - PUTNAM 69KV CKT 1	61	121	77	MOORELAND - MOREWOOD SW 138KV CKT 1
12SP	HAMON BUTLER - MOREWOOD 69KV CKT 1	61	121	77	MOORELAND - MOREWOOD SW 138KV CKT 1
12SP	ROMAN NOSE - SOUTHARD 138KV CKT 1	153	127	81	2002-05T 138.00 - ELK CITY 138KV CKT 1
12SP	WEST GARDNER (WGARD 11) 345/161/13.8KV TRANSFORMER CKT 11	440	101	91	CRAIG - WEST GARDNER 345KV CKT 1
12SP	CIMARRON - HAYMAKER 138KV CKT 1	308	102	133	CIMARRON - CZECH HALL 138KV CKT 1
12SP	OKEENE 138/69KV TRANSFORMER CKT 1	70	103	140	OKGEMTL-9
12SP	MOORELAND - TALOGA 138KV CKT 1	154	116	146	EL RENO - ROMAN NOSE 138KV CKT1
12SP	EL RENO - JENSEN TAP 138KV CKT 1	222	107	157	CIMARRON - EL RENO 138KV CKT 1
12SP	IMO TAP - SOUTH 4TH ST 138KV CKT 1	158	108	160	2002-05T 138.00 - ELK CITY 138KV CKT 1
12SP	WOODWARD - FPL SWITCH 138KV CKT 1	153	104	178	EL RENO - ROMAN NOSE 138KV CKT1
12SP	CIMARRON - JENSEN TAP 138KV CKT 1	222	103	181	CIMARRON - EL RENO 138KV CKT 1
12WP	WODWARD - WOODWARD 69KV CKT 1	38	322	0	FPL SWITCH - MOORELAND 138KV CKT 1
12WP	DEWEY - TALOGA 138KV CKT 1	143	236	0	EL RENO - ROMAN NOSE 138KV CKT1
12WP	EL RENO - ROMAN NOSE 138KV CKT 1	185	218	0	2002-05T 138.00 - ELK CITY 138KV CKT 1
12WP	ELK CITY - 2002-05T 138KV CKT 1	158	212	0	EL RENO - ROMAN NOSE 138KV CKT1
12WP	TALOGA 138/69KV TRANSFORMER CKT 1	56	194	0	MOORELAND - MOREWOOD SW 138KV CKT 1
12WP	GLASS MOUNTAIN - MOORELAND 138KV CKT 1	124	176	0	EL RENO - ROMAN NOSE 138KV CKT1
12WP	CARTER JCT - ERICK 69KV CKT 1	26	159	0	2002-05T 138.00 - ELK CITY 138KV CKT 1
12WP	DOVER SW - OKEENE 138KV CKT 1	122	154	0	EL RENO - ROMAN NOSE 138KV CKT1
12WP	CANTON - TALOGA 69KV CKT 1	61	150	0	EL RENO - ROMAN NOSE 138KV CKT1
12WP	CANTON - OKEENE 69KV CKT 1	61	146	0	EL RENO - ROMAN NOSE 138KV CKT1
12WP	BRANTLEY - MORWOOD 69KV CKT 1	38	141	0	2002-05T 138.00 - ELK CITY 138KV CKT 1
12WP	MOREWOOD SW - 2002-05T 138KV CKT 1	158	137	0	EL RENO - ROMAN NOSE 138KV CKT1
12WP	OKEENE - WATONGA SW 69KV CKT 1	61	134	0	OKGEMTL-9
12WP	WOODWARD (WOODWRD2) 138/69/13.2KV TRANSFORMER CKT 1	134	120	0	FPL SWITCH - MOORELAND 138KV CKT 1
12WP	DIVISION AVE - HAYMAKER 138KV CKT 1	308	107	0	CIMARRON - CZECH HALL 138KV CKT 1
12WP	CUNNINGHAM STATION 230/115KV TRANSFORMER CKT 1	168	106	0	LEA COUNTY INTERCHANGE 230/115KV TRANSFORMER CKT 1
12WP	FPL SWITCH - MOORELAND 138KV CKT 1	212	131	37	DEWEY - TALOGA 138KV CKT 1
12WP	EL RENO SW -EL RENO 69KV CKT 1	26	125	38	EL RENO - ROMAN NOSE 138KV CKT1
12WP	ALVA - KNOBHILL 69KV CKT 1	48	115	41	GLASS MOUNTAIN - MOORELAND 138KV CKT 1
12WP	CLEO CORNER - GLASS MOUNTAIN 138KV CKT 1	185	116	80	2002-05T 138.00 - ELK CITY 138KV CKT 1
12WP	MOORELAND - MOREWOOD SW 138KV CKT 1	170	114	80	EL RENO - ROMAN NOSE 138KV CKT1
12WP	KNOBHILL - MOORELAND 138KV CKT 1	96	113	82	GLASS MOUNTAIN - MOORELAND 138KV CKT 1
12WP	EL RENO - SERVICE PL EL RENO 69KV CKT 1	48	107	104	CIMARRON - EL RENO 138KV CKT 1
12WP	MOORELAND - TALOGA 138KV CKT 1	154	124	116	EL RENO - ROMAN NOSE 138KV CKT1
12WP	CEDARDALE - MOORELAND 138KV CKT 1	170	108	123	2002-05T 138.00 - ELK CITY 138KV CKT 1
12WP	CEDARDALE - OKEENE 138KV CKT 1	170	107	136	2002-05T 138.00 - ELK CITY 138KV CKT 1
12WP	PUTNAM - TALOGA 69KV CKT 1	61	106	166	MOORELAND - MOREWOOD SW 138KV CKT 1
12WP	HAMON BUTLER - PUTNAM 69KV CKT 1	61	103	182	MOORELAND - MOREWOOD SW 138KV CKT 1
12WP	HAMON BUTLER - MOREWOOD 69KV CKT 1	61	103	183	MOORELAND - MOREWOOD SW 138KV CKT 1
12WP	LEA COUNTY INTERCHANGE 230/115KV TRANSFORMER CKT 1	168	101	185	CUNNINGHAM STATION 230/115KV TRANSFORMER CKT 1
12WP	ROMAN NOSE - SOUTHARD 138KV CKT 1	185	102	189	GEN560117 1
12WP	MOORELAND - WOODWARD 69KV CKT 1	61	100	198	FPL SWITCH - MOORELAND 138KV CKT 1

TABLE 4: Contingency Analysis (continued)

SEASON	OVERLOADED ELEMENT	RATING (MVA)	LOADING (%)	ATC (MW)	CONTINGENCY
17SP	EL RENO - ROMAN NOSE 138KV CKT 1	153	278	0	2005-05T - ELK CITY 138KV CKT1
17SP	WODWARD - WOODWARD 69KV CKT 1	38	277	0	FPL SWITCH - MOORELAND 138KV CKT 1
17SP	ELK CITY - 2002-05T 138KV CKT 1	158	245	0	EL RENO - ROMAN NOSE 138KV CKT1
17SP	TALOGA 138/69KV TRANSFORMER CKT 1	56	238	0	DEWEY - SOUTHARD 138KV CKT 1
17SP	DEWEY - TALOGA 138KV CKT 1	143	230	0	EL RENO - ROMAN NOSE 138KV CKT1
17SP	GLASS MOUNTAIN - MOORELAND 138KV CKT 1	124	196	0	2005-05T - ELK CITY 138KV CKT1
17SP	CARTER JCT - ERICK 69KV CKT 1	26	182	0	2005-05T - ELK CITY 138KV CKT1
17SP	MOREWOOD SW - 2002-05T 138KV CKT 1	158	163	0	EL RENO - ROMAN NOSE 138KV CKT1
17SP	DOVER SW - OKEENE 138KV CKT 1	122	162	0	EL RENO - ROMAN NOSE 138KV CKT1
17SP	BRANTLEY - MORWOOD 69KV CKT 1	38	160	0	2005-05T - ELK CITY 138KV CKT1
17SP	CLEO CORNER - GLASS MOUNTAIN 138KV CKT 1	153	155	0	2005-05T - ELK CITY 138KV CKT1
17SP	CANTON - TALOGA 69KV CKT 1	61	155	0	EL RENO - ROMAN NOSE 138KV CKT1
17SP	CANTON - OKEENE 69KV CKT 1	61	148	0	EL RENO - ROMAN NOSE 138KV CKT1
17SP	OKEENE - WATONGA SW 69KV CKT 1	61	140	0	OKGEMTL-9
17SP	EL RENO SW - EL RENO 69KV CKT 1	26	140	0	EL RENO - ROMAN NOSE 138KV CKT1
17SP	MOORELAND - MOREWOOD SW 138 KV CKT 1	170	139	0	EL RENO - ROMAN NOSE 138KV CKT1
17SP	KNOBHILL - MOORELAND 138KV CKT 1	96	134	0	GLASS MOUNTAIN - MOORELAND 138KV CKT 1
17SP	WOODWARD (WOODWRD2) 138/69/13.2KV TRANSFORMER CKT 1	134	120	0	FPL SWITCH - MOORELAND 138KV CKT 1
17SP	ALVA - KNOBHILL 69KV CKT 1	48	120	0	2005-05T - ELK CITY 138KV CKT1
17SP	CIMARRON - HAYMAKER 138KV CKT 1	308	118	0	CIMARRON - CZECH HALL 138KV CKT 1
17SP	DIVISION AVE - HAYMAKER 138KV CKT 1	308	113	0	CIMARRON - CZECH HALL 138KV CKT 1
17SP	LONE STAR SOUTH - WILKES 138KV CKT 1	394	102	0	WELSH REC - WILKES 138KV CKT 1
17SP	CEDARDALE - MOORELAND 138KV CKT 1	170	122	18	2005-05T - ELK CITY 138KV CKT1
17SP	PUTNAM - TALOGA 69KV CKT 1	61	130	26	MOORELAND - MOREWOOD SW 138KV CKT 1
17SP	CEDARDALE - OKEENE 138KV CKT 1	170	120	35	2005-05T - ELK CITY 138KV CKT1
17SP	HAMON BUTLER - PUTNAM 69KV CKT 1	61	127	44	MOORELAND - MOREWOOD SW 138KV CKT 1
17SP	HAMON BUTLER - MOREWOOD 69KV CKT 1	61	127	45	MOORELAND - MOREWOOD SW 138KV CKT 1
17SP	FPL SWITCH - MOORELAND 138KV CKT 1	212	118	57	EL RENO - ROMAN NOSE 138KV CKT1
17SP	ROMAN NOSE - SOUTHARD 138KV CKT 1	153	136	70	2005-05T - ELK CITY 138KV CKT1
17SP	OKEENE 138/69KV TRANSFORMER CKT 1	70	105	104	OKGEMTL-9
17SP	MOORELAND - TALOGA 138KV CKT 1	154	115	150	EL RENO - ROMAN NOSE 138KV CKT1
17SP	EL RENO - JENSEN TAP 138KV CKT 1	222	107	160	CIMARRON - EL RENO 138KV CKT 1
17SP	DEWEY - SOUTHARD 138KV CKT 1	222	104	180	2005-05T - ELK CITY 138KV CKT1
17SP	WOODWARD - FPL SWITCH 138KV CKT 1	153	103	185	EL RENO - ROMAN NOSE 138KV CKT1
17SP	SOUTH 4TH ST - IMO TAP 138KV CKT 1	158	102	192	2005-05T - ELK CITY 138KV CKT1

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 $642,075 or 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 30 Mvar of capacitor bank(s) in the Customer's 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, WFEC and OKGE listed in Table 3 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. 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 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 submits a Transmission Service Request through Southwest Power Pool's OASIS.

Appendix A: Point of Interconnection Area Map

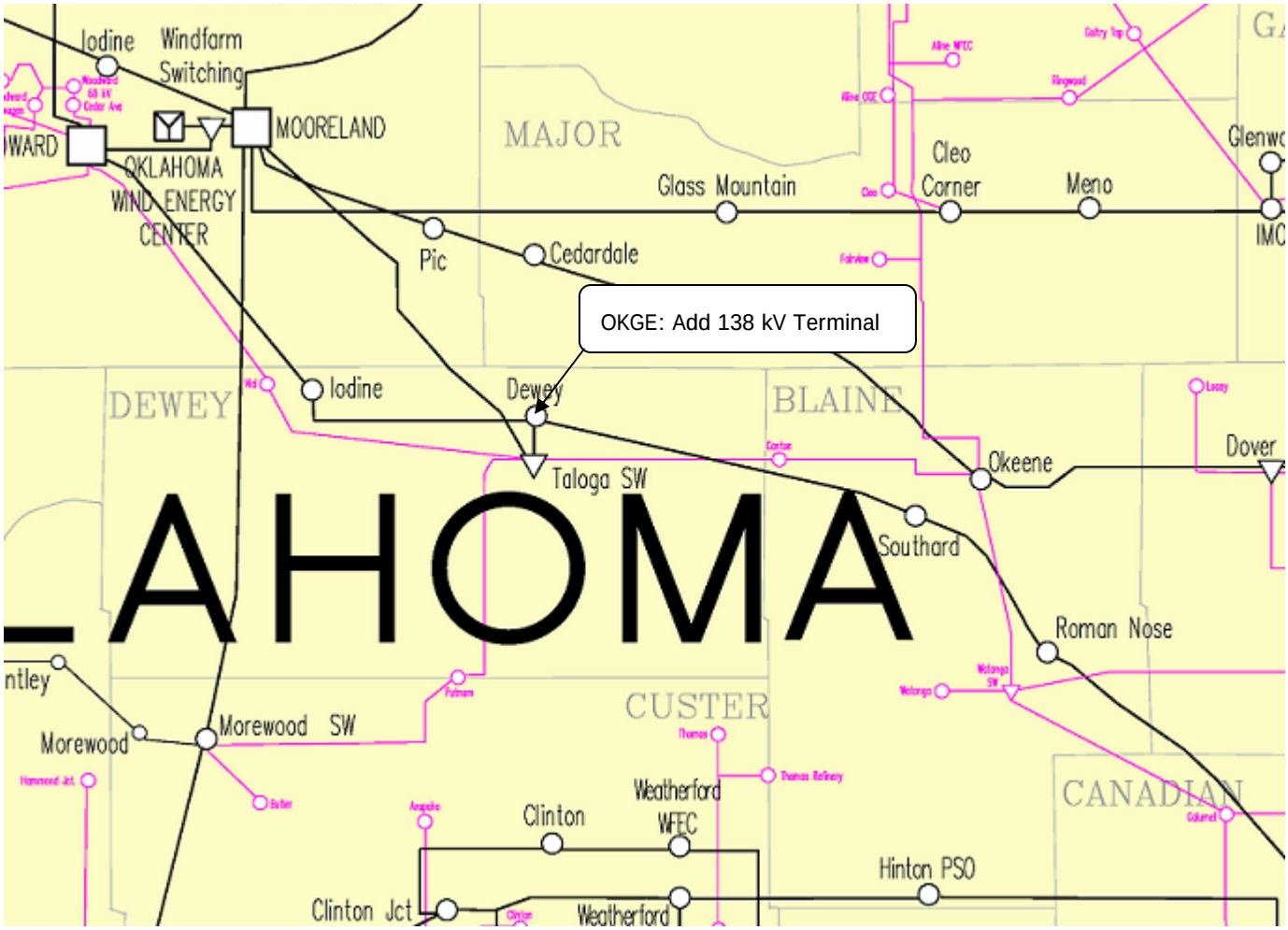

Figure 2: Point of Interconnection Area Map