Southwest Power Pool

Feasibility Study For Generation Interconnection Request GEN-2005-009A

SPP Tariff Studies
(#GEN-2005-009A)

November 18, 2005

Executive Summary

<OMITTED TEXT> (Customer) has requested a Feasibility Study for the purpose of interconnecting 200MW of additional wind generation within the service territory of West Plains Energy (WEPL) (d/b/a Aquila, Inc.) in Cloud County Kansas. The proposed point of interconnection is in the existing East Manhattan – Concordia 230kV line at a new switching station in Cloud County. This 230kV line is owned by WEPL. The proposed in-service date is December 1, 2007. The Vestas turbine is the machine modeled for this study with a total of 400MW at this location including the original 200MW interconnection request.

The existing transmission system in the area of the proposed interconnection has insufficient Available Transfer Capability (ATC) to accommodate this request for interconnection. One option to increase the ATC is to add a 230kV transmission line between the Summit and Concordia Substations. The Customer agreed that this line would be required and that it would bear the cost of adding this line. Therefore, a representation of a new Summit - Concordia 1272MCM 50 mile 230kV transmission line was included in all models used for the analyses. The estimated engineering and construction costs associated with this facility and terminal additions in the substations are not included in any table within this report.

Power flow analysis has indicated that for the powerflow cases studied, it is possible to interconnect the 200MW of additional generation with transmission system reinforcements within the local transmission system. In order to maintain acceptable bus voltages in the local area, the Customer will need to install 124MVAR of reactive compensation in the Customer's substation including one switched 40MVAR 230kV capacitor bank and one 30MVAR bank switched at each of two 34.5kV buses as well as a 24MVAR SVC at the remaining third 34.5 bus. In addition, down-line 34.5kV capacitor banks will be required totaling 21.6MVAR. Dynamic Stability studies performed as part of the impact study will provide additional guidance as to whether the reactive compensation can in part be static or must be dynamic (such as a SVC).

The requirements for interconnection consist of adding a new 230kV 3-breaker ring switching station of which is required for the original 200MW interconnection request of Aquila. This 230kV addition shall be constructed and maintained by WEPL. The Customer did not propose a specific 230kV line extending to serve its 230-34.5kV facilities. It is assumed that obtaining all necessary right-of-way for the substation additions in the East Manhattan – Concordia 230kV line will not be a significant expense.

The total cost for adding a new 230kV switching station, the required interconnection facility, is estimated at $3,500,000 which is based on estimates provided by the WEPL engineering department. Other Network Constraints in the WEPL and Westar Energy (WERE) 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 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 230kV line from the Customer substation into a new WEPL switching station. This cost does not include the Customer's 230-34.5kV substation.

In Table 4, a value of 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. When a facility is overloaded for more than 10 contingencies, then only the results with the 10 lowest values of ATC may be included in this table.

There are several other proposed generation additions in the general area of the Customer's facility. It was assumed in this preliminary analysis that these other projects within the WEPL and WERE service territories 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 200MW of wind generation within the service territory of WEPL in Cloud County Kansas. The existing East Manhattan – Concordia 230kV line is owned by WEPL, and the proposed generation interconnection is within WEPL in Cloud County. The proposed point of interconnection is at a new 230kV switching station in this line. The proposed in-service date is December 1, 2007.

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 requirements for interconnection consist of adding a new 230kV switching station. This 230kV addition shall be constructed and maintained by WEPL. The Customer did not propose a route of its 230kV line to serve its 230-34.5kV facilities. It is assumed that obtaining all necessary right-of-way for the new WEPL 230kV switching station will not be a significant expense.

The total cost for WEPL to add a new 230kV switching station, the interconnection facility, in the East Manhattan – Concordia 230kV line is estimated at $3,500,000 which is based on estimates provided by the WEPL engineering department. Other Network Constraints in the WEPL and WERE 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 230kV line from the Customer substation into the new WEPL switching station. The Customer is responsible for this 230kV line up to the point of interconnection. This cost does not include the Customer's 230-34.5kV substation and the cost estimate should be determined by the Customer.

The costs of interconnecting the facility to the WEPL transmission system are listed in Table 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 (2005 DOLLARS)
Customer – 230-34.5 kV Substation facilities including a 40MVAR 230kV capacitor bank, two 30MVAR 34.5kV capacitor banks, and one 24MVAR 34.5kV SVC. Down-line 34.5kV fixed capacitor banks total 21.6MVAR.	*
Customer – 230kV line between Customer substation and new WEPL 230kV switching station.	*
Customer - Right-of-Way for Customer Substation & Line.	*
Total	*****

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

Table 2: Required Interconnection Network Upgrade Facilities

Facility	ESTIMATED COST (2005 DOLLARS)
WEPL - New 230kV three position ring switching station in existing East Manhattan – Concordia 230kV line.	$3,500,000
WEPL - Right-of-way for new WEPL 230kV switching station.	0
Total	**$3,500,000**

Table 3: Network Constraints

Facility
WERE - 29TH & EVENINGSIDE JUNCTION - 29TH & GAGE 115kV, 57185 - 57186
WERE - 54TH & MERIDEN - HOYT 115kV, 57156 - 57163
WERE - ABILENE ENERGY CENTER - EAST ABILENE 115kV, 57361 - 57365
WERE - AUBURN ROAD - AUBRN77X 115-230kV, 57151 - WND 2, WND 1 - 56851
WERE - AUBURN ROAD - JEFFREY ENERGY CENTER 230kV, 56851 - 56852
WERE - AUBURN ROAD - SWISSVALE 230kV, 56851 - 56856
WEPL - Clifton - Greenleaf 115kV, 58756 - 58765
WEPL - Concordia - 2005-9AT 230kV, 58758 - 99946
WEPL - Concordia 230-115kV, 58757 - 58758
WEPL - East Hall Tap 115kV, 58760
WEPL - EAST MANHATTAN - * 2005-9AT 230kV, 56861 - 99946
WERE - EAST MANHATTAN - * 2005-9AT 230kV, 56861 - 99946
WERE - EAST MANHATTAN - EMANHT3X 115-230kV, 57326 - WND 2, WND 1 - 56861
WEPL – Ellsworth 115kV, 58762
WERE - EXIDE JUNCTION - NORTH AMERICAN PHILIPS 115kV, 57368 - 57372
WERE - EXIDE JUNCTION - SUMMIT 115kV, 57368 - 57381
WERE - GOODYEAR JUNCTION - NORTHLAND 115kV, 57162 - 57169
WERE - HOYT - JEFFERY ENERGY CENTER 345kV, 56765 - 56766
WERE - KNOB HILL - Greenleaf 115kV, 57332 - 58765
WEPL - KNOB HILL - Greenleaf 115kV, 57332 - 58765
WERE - LAWRENCE HILL - LAWHL29X 115-230kV, 57250 - WND 2, WND 1 - 56853
WERE - LAWRENCE HILL - LAWRENCE ENERGY CENTER UNIT 5 230kV, 56853 - 56854
WERE - MOCKINGBIRD HILL SWITCHING STATION - STULL SWITCHING STATION 115kV, 57253 - 57270
WERE - NORTH AMERICAN PHILIPS - NORTH AMERICAN PHILIPS JUNCTION (SOUTH) 115kV, 57372 - 57374
WERE - NORTH AMERICAN PHILIPS JUNCTION (SOUTH) - WEST MCPHERSON 115kV, 57374 - 57438
WERE - NORTHVIEW - SUMMIT 115kV, 57371 - 57381
WEPL – Russell 115kV, 58801

Note: These constraints are based on a new Summit – Concordia 230kV line in service.

Table 3: Network Constraints

Facility
WEPL - Smith Center 115kV, 58793
WERE - TECUMSEH HILL 115-161kV, 57182 - WND 2, WND 1 - 56920
WERE - TECUMSEH HILL - STULL SWITCHING STATION 115kV, 57182 - 57270
WEPL – Waldo 115kV, 58798

Note: These constraints are based on a new Summit – Concordia 230kV line in service.

Table 4: Contingency Analysis Results

Facility	Model & Contingency	Facility Loading (% Rate B) Or Voltage (PU)	ATC (MW)	Date Required (M/D/Y)
(To Be Determined)	10WP, 56765-56766, WERE NEAST , HOYT - JEFFERY ENERGY CENTER 345kV	No Solution		12/1/2007
(To Be Determined)	15SP, 56765-56766, WERE NEAST , HOYT - JEFFERY ENERGY CENTER 345kV	No Solution		12/1/2007
(To Be Determined)	15SP, 56765-56772, WERE NEAST , HOYT - STRANGER CREEK 345kV	No Solution		12/1/2007
(To Be Determined)	15SP, 56873-99950, WERE WEST - , SUMMIT - 2003-19T 230kV	No Solution		12/1/2007
29TH & EVENINGSIDE JUNCTION - 29TH & GAGE 115kV, 57185 - 57186	10SP, 56765-56766, WERE NEAST , HOYT - JEFFERY ENERGY CENTER 345kV	117.2	0	6/1/2008
54TH & MERIDEN - HOYT 115kV, 57156 - 57163	10WP, 56765-56772, WERE NEAST , HOYT - STRANGER CREEK 345kV	110.6	0	12/1/2008
ABILENE ENERGY CENTER - EAST ABILENE 115kV, 57361 - 57365	15SP, 57361-57365, WERE WEST , ABILENE ENERGY CENTER - EAST ABILENE 115kV CKT 2	107.3	79	6/1/2011
AUBURN ROAD - AUBRN77X 115-( )kV, 57151 - WND 2	10SP, 56851-56856, WERE NEAST , AUBURN ROAD - SWISSVALE 230kV	107.5	0	6/1/2008
AUBURN ROAD - AUBRN77X 115-( )kV, 57151 - WND 2	10WP, 56851-56856, WERE NEAST , AUBURN ROAD - SWISSVALE 230kV	100.3	181	
AUBURN ROAD - AUBRN77X 230-( )kV, 56851 - WND 1	10SP, 56851-56856, WERE NEAST , AUBURN ROAD - SWISSVALE 230kV	108.2	0	6/1/2008
AUBURN ROAD - AUBRN77X 230-( )kV, 56851 - WND 1	10WP, 56851-56856, WERE NEAST , AUBURN ROAD - SWISSVALE 230kV	100.8	148	
AUBURN ROAD - JEFFREY ENERGY CENTER 230kV, 56851 - 56852	10SP, 56765-56766, WERE NEAST , HOYT - JEFFERY ENERGY CENTER 345kV	150.3	0	6/1/2008
AUBURN ROAD - SWISSVALE 230kV, 56851 - 56856	10SP, 56765-56766, WERE NEAST , HOYT - JEFFERY ENERGY CENTER 345kV	116.4	19	6/1/2008

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.

Table 4: Contingency Analysis Results

Facility	Model & Contingency	Facility Loading (% Rate B) Or Voltage (PU)	ATC (MW)	Date Required (M/D/Y)
Clifton - Greenleaf 115kV, 58756 - 58765	10SP, 56765-56766, WERE NEAST , HOYT - JEFFERY ENERGY CENTER 345kV	137.9	0	6/1/2008
Clifton - Greenleaf 115kV, 58756 - 58765	15SP, 56873-58758, WERE WEST - WEPL , SUMMIT - Concordia 230kV	112.2	67	
Clifton - Greenleaf 115kV, 58756 - 58765	10SP, 56873-58758, WERE WEST - WEPL , SUMMIT - Concordia 230kV	109.8	131	
Clifton - Greenleaf 115kV, 58756 - 58765	15SP, 57163-57165, WERE NEAST , HOYT - HOYT HTI SWITCHING JUNCTION 115kV	106.0	114	
Clifton - Greenleaf 115kV, 58756 - 58765	15SP, 56861-99946, WERE NCENTRAL - , EAST MANHATTAN - 2005-9AT 230kV	104.6	158	
Clifton - Greenleaf 115kV, 58756 - 58765	15SP, 57152-57165, WERE NEAST , CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115kV	104.6	139	
Clifton - Greenleaf 115kV, 58756 - 58765	15SP, 56765-57163-56804, WERE NEAST , HOYT 345-115kV	103.3	150	
Clifton - Greenleaf 115kV, 58756 - 58765	10SP, 57163-57165, WERE NEAST , HOYT - HOYT HTI SWITCHING JUNCTION 115kV	102.1	172	
Clifton - Greenleaf 115kV, 58756 - 58765	10SP, 56765-56772, WERE NEAST , HOYT - STRANGER CREEK 345kV	102.1	174	
Clifton - Greenleaf 115kV, 58756 - 58765	10SP, 57152-57165, WERE NEAST , CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115kV	101.1	186	

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.

Table 4: Contingency Analysis Results

Facility	Model & Contingency	Facility Loading (% Rate B) Or Voltage (PU)	ATC (MW)	Date Required (M/D/Y)
Concordia - 2005-9AT 230kV, 58758 - 99946	15SP, 56861-99946, WERE NCENTRAL - , EAST MANHATTAN - 2005-9AT 230kV	132.3	109	12/1/2007
Concordia - 2005-9AT 230kV, 58758 - 99946	10SP, 56861-99946, WERE NCENTRAL - , EAST MANHATTAN - 2005-9AT 230kV	130.0	108	
Concordia - 2005-9AT 230kV, 58758 - 99946	10WP, 56861-99946, WERE NCENTRAL - , EAST MANHATTAN - 2005-9AT 230kV	127.2	119	
Concordia - 2005-9AT 230kV, 58758 - 99946	06AP, 56861-99946, WERE NCENTRAL - , EAST MANHATTAN - 2005-9AT 230kV	126.8	116	
Concordia - 2005-9AT 230kV, 58758 - 99946	07WP, 56861-99946, WERE NCENTRAL - , EAST MANHATTAN - 2005-9AT 230kV	126.5	120	
Concordia - 2005-9AT 230kV, 58758 - 99946	07WP, 56861-57326-56888, WERE NCENTRAL, EAST MANHATTAN 230-115kV	117.2	119	
Concordia - 2005-9AT 230kV, 58758 - 99946	10WP, 56861-57326-56888, WERE NCENTRAL, EAST MANHATTAN 230-115kV	116.9	121	
Concordia - 2005-9AT 230kV, 58758 - 99946	10SP, 56765-56766, WERE NEAST , HOYT - JEFFERY ENERGY CENTER 345kV	113.3	144	
Concordia - 2005-9AT 230kV, 58758 - 99946	15SP, 56861-57326-56888, WERE NCENTRAL, EAST MANHATTAN 230-115kV	113.2	139	
Concordia - 2005-9AT 230kV, 58758 - 99946	07WP, 56766-56773, WERE NEAST - WERE WEST , JEFFERY ENERGY CENTER - SUMMIT 345kV	112.8	136	

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.

Table 4: Contingency Analysis Results

Facility	Model & Contingency	Facility Loading (% Rate B) Or Voltage (PU)	ATC (MW)	Date Required (M/D/Y)
Concordia 230-115kV, 58757 - 58758	10SP, 56765-56766, WERE NEAST , HOYT - JEFFERY ENERGY CENTER 345kV	102.0	179	6/1/2009
East Hall Tap 115kV, 58760	10SP, 58760-58778, WEPL , East Hall Tap - Mullergren 115kV	Base case voltage is 0.7973 pu. Test case voltage is 0.7298 pu.	0	6/1/2008
East Hall Tap 115kV, 58760	15SP, 58760-58778, WEPL , East Hall Tap - Mullergren 115kV	Base case voltage is 0.7817 pu. Test case voltage is 0.7323 pu.	0	
EAST MANHATTAN - * 2005-9AT 230kV, 56861 - 99946	15SP, 58758-99946, WEPL - , Concordia - 2005-9AT 230kV	133.6	106	12/1/2007
EAST MANHATTAN - * 2005-9AT 230kV, 56861 - 99946,	10SP, 58758-99946, WEPL - , Concordia - 2005-9AT 230kV	130.7	109	
EAST MANHATTAN - * 2005-9AT 230kV, 56861 - 99946	10WP, 58758-99946, WEPL - , Concordia - 2005-9AT 230kV	121.8	127	
EAST MANHATTAN - *2005-9AT 230kV, 56861 - 99946	06AP, 58758-99946, WEPL - , Concordia - 2005-9AT 230kV	131.7	110	
EAST MANHATTAN - *2005-9AT 230kV, 56861 - 99946	07WP, 58758-99946, WEPL - , Concordia - 2005-9AT 230kV	117.8	136	

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.

Table 4: Contingency Analysis Results

Facility	Model & Contingency	Facility Loading (% Rate B) Or Voltage (PU)	ATC (MW)	Date Required (M/D/Y)
EAST MANHATTAN - EMANHT3X 115-( )kV, 57326 - WND 2	15SP, 58758-99946, WEPL - , Concordia - 2005-9AT 230kV	109.1	69	6/1/2008
EAST MANHATTAN - EMANHT3X 115-( )kV, 57326 - WND 2	10SP, 58758-99946, WEPL - , Concordia - 2005-9AT 230kV	105.6	121	
EAST MANHATTAN - EMANHT3X 115-( )kV, 57326 - WND 2	15SP, 56851-56852, WERE NEAST , AUBURN ROAD - JEFFREY ENERGY CENTER 230kV	103.9	27	
EAST MANHATTAN - EMANHT3X 115-( )kV, 57326 - WND 2	10SP, 56765-56766, WERE NEAST , HOYT - JEFFERY ENERGY CENTER 345kV	101.4	118	
EAST MANHATTAN - EMANHT3X 115-( )kV, 57326 - WND 2	15SP, 56766-56770, WERE NEAST - WERE NCENTRAL, JEFFERY ENERGY CENTER - MORRIS COUNTY 345kV	100.0	200	
EAST MANHATTAN - EMANHT3X 230-( )kV, 56861 - WND 1	15SP, 58758-99946, WEPL - , Concordia - 2005-9AT 230kV	108.5	60	6/1/2008
EAST MANHATTAN - EMANHT3X 230-( )kV, 56861 - WND 1	10SP, 58758-99946, WEPL - , Concordia - 2005-9AT 230kV	105.2	117	
EAST MANHATTAN - EMANHT3X 230-( )kV, 56861 - WND 1	15SP, 56851-56852, WERE NEAST , AUBURN ROAD - JEFFREY ENERGY CENTER 230kV	104.7	0	
EAST MANHATTAN - EMANHT3X 230-( )kV, 56861 - WND 1	10SP, 56765-56766, WERE NEAST , HOYT - JEFFERY ENERGY CENTER 345kV	102.5	61	
EAST MANHATTAN - EMANHT3X 230-( )kV, 56861 - WND 1	15SP, 56766-56770, WERE NEAST - WERE NCENTRAL, JEFFERY ENERGY CENTER - MORRIS COUNTY 345kV	100.9	138	

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.

Table 4: Contingency Analysis Results

Facility	Model & Contingency	Facility Loading (% Rate B) Or Voltage (PU)	ATC (MW)	Date Required (M/D/Y)
Ellsworth 115kV, 58762	10SP, 58760-58778, WEPL , East Hall Tap - Mullergren 115kV	Base case voltage is 0.7874 pu. Test case voltage is 0.7147 pu.	0	6/1/2008
Ellsworth 115kV, 58762	15SP, 58760-58778, WEPL , East Hall Tap - Mullergren 115kV	Base case voltage is 0.7702 pu. Test case voltage is 0.7174 pu.	0	
EXIDE JUNCTION - NORTH AMERICAN PHILIPS 115kV, 57368 - 57372	07WP, 56872-99977, WERE WEST - , EAST MCPHERSON - 2004-16T 230kV	104.3	54	12/1/2007
EXIDE JUNCTION - SUMMIT 115kV, 57368 - 57381	07WP, 56872-99977, WERE WEST - , EAST MCPHERSON - 2004-16T 230kV	100.9	168	12/1/2007
GOODYEAR JUNCTION - NORTHLAND 115kV, 57162 - 57169	10SP, 56765-56772, WERE NEAST , HOYT - STRANGER CREEK 345kV	112.8	0	6/1/2008
GOODYEAR JUNCTION - NORTHLAND 115kV, 57162 - 57169	10WP, 56765-56772, WERE NEAST , HOYT - STRANGER CREEK 345kV	106.8	0	

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.

Table 4: Contingency Analysis Results

Facility	Model & Contingency	Facility Loading (% Rate B) Or Voltage (PU)	ATC (MW)	Date Required (M/D/Y)
HOYT - JEFFERY ENERGY CENTER 345kV, 56765 - 56766	15SP, 56851-56852, WERE NEAST , AUBURN ROAD - JEFFREY ENERGY CENTER 230kV	117.8	0	12/1/2007
HOYT - JEFFERY ENERGY CENTER 345kV, 56765 - 56766	15SP, 56766-56770, WERE NEAST - WERE NCENTRAL, JEFFERY ENERGY CENTER - MORRIS COUNTY 345kV	115.8	0	
HOYT - JEFFERY ENERGY CENTER 345kV, 56765 - 56766	15SP, 56769-56770, WERE NCENTRAL, LANG - MORRIS COUNTY 345kV	111.7	0	
HOYT - JEFFERY ENERGY CENTER 345kV, 56765 - 56766	10SP, 56851-56852, WERE NEAST , AUBURN ROAD - JEFFREY ENERGY CENTER 230kV	110.8	0	
HOYT - JEFFERY ENERGY CENTER 345kV, 56765 - 56766	10SP, 56766-56770, WERE NEAST - WERE NCENTRAL, JEFFERY ENERGY CENTER - MORRIS COUNTY 345kV	110.7	0	
HOYT - JEFFERY ENERGY CENTER 345kV, 56765 - 56766	10WP, 56766-56770, WERE NEAST - WERE NCENTRAL, JEFFERY ENERGY CENTER - MORRIS COUNTY 345kV	106.6	0	
HOYT - JEFFERY ENERGY CENTER 345kV, 56765 - 56766	07WP, 56766-56770, WERE NEAST - WERE NCENTRAL, JEFFERY ENERGY CENTER - MORRIS COUNTY 345kV	106.1	0	
HOYT - JEFFERY ENERGY CENTER 345kV, 56765 - 56766	10SP, 56769-56770, WERE NCENTRAL, LANG - MORRIS COUNTY 345kV	106.1	0	
HOYT - JEFFERY ENERGY CENTER 345kV, 56765 - 56766	10WP, 56851-56852, WERE NEAST , AUBURN ROAD - JEFFREY ENERGY CENTER 230kV	106.1	0	
HOYT - JEFFERY ENERGY CENTER 345kV, 56765 - 56766	07WP, 56851-56852, WERE NEAST , AUBURN ROAD - JEFFREY ENERGY CENTER 230kV	104.9	34	

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.

Table 4: Contingency Analysis Results

Facility	Model & Contingency	Facility Loading (% Rate B) Or Voltage (PU)	ATC (MW)	Date Required (M/D/Y)
KNOB HILL - Greenleaf 115kV, 57332 - 58765	10SP, 56765-56766, WERE NEAST , HOYT - JEFFERY ENERGY CENTER 345kV	120.8	28	6/1/2008
LAWRENCE HILL - LAWHL29X 115-( )kV, 57250 - WND 2	07WP, 56853-56855, WERE NEAST , LAWRENCE HILL - MIDLAND JUNCTION 230kV	107.6	0	12/1/2007
LAWRENCE HILL - LAWHL29X 115-( )kV, 57250 - WND 2	07WP, 56855-57252-56884, WERE NEAST , MIDLAND JUNCTION 230-115kV	107.5	0	
LAWRENCE HILL - LAWHL29X 115-( )kV, 57250 - WND 2	10SP, 56853-56855, WERE NEAST , LAWRENCE HILL - MIDLAND JUNCTION 230kV	106.0	0	
LAWRENCE HILL - LAWHL29X 115-( )kV, 57250 - WND 2	10SP, 56855-57252-56884, WERE NEAST , MIDLAND JUNCTION 230-115kV	105.9	0	
LAWRENCE HILL - LAWHL29X 115-( )kV, 57250 - WND 2	10WP, 56853-56855, WERE NEAST , LAWRENCE HILL - MIDLAND JUNCTION 230kV	104.8	0	
LAWRENCE HILL - LAWHL29X 115-( )kV, 57250 - WND 2	10WP, 56855-57252-56884, WERE NEAST , MIDLAND JUNCTION 230-115kV	104.7	0	

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.

Table 4: Contingency Analysis Results

Facility	Model & Contingency	Facility Loading (% Rate B) Or Voltage (PU)	ATC (MW)	Date Required (M/D/Y)
LAWRENCE HILL - LAWHL29X 230-( )kV, 56853 - WND 1	07WP, 56853-56855, WERE NEAST , LAWRENCE HILL - MIDLAND JUNCTION 230kV	110.2	0	12/1/2007
LAWRENCE HILL - LAWHL29X 230-( )kV, 56853 - WND 1	07WP, 56855-57252-56884, WERE NEAST , MIDLAND JUNCTION 230-115kV	110.1	0	
LAWRENCE HILL - LAWHL29X 230-( )kV, 56853 - WND 1	10SP, 56853-56855, WERE NEAST , LAWRENCE HILL - MIDLAND JUNCTION 230kV	108.2	0	
LAWRENCE HILL - LAWHL29X 230-( )kV, 56853 - WND 1	10SP, 56855-57252-56884, WERE NEAST , MIDLAND JUNCTION 230-115kV	108.1	0	
LAWRENCE HILL - LAWHL29X 230-( )kV, 56853 - WND 1	10WP, 56853-56855, WERE NEAST , LAWRENCE HILL - MIDLAND JUNCTION 230kV	107.5	0	
LAWRENCE HILL - LAWHL29X 230-( )kV, 56853 - WND 1	10WP, 56855-57252-56884, WERE NEAST , MIDLAND JUNCTION 230-115kV	107.4	0	
LAWRENCE HILL - LAWRENCE ENERGY CENTER UNIT 5 230kV, 56853 - 56854	10SP, 56765-56766, WERE NEAST , HOYT - JEFFERY ENERGY CENTER 345kV	109.3	101	6/1/2008
MOCKINGBIRD HILL SWITCHING STATION - STULL SWITCHING STATION 115kV, 57253 - 57270	07WP, 56765-56772, WERE NEAST , HOYT - STRANGER CREEK 345kV	128.7	0	12/1/2007
NORTH AMERICAN PHILIPS - NORTH AMERICAN PHILIPS JUNCTION (SOUTH) 115kV, 57372 - 57374	07WP, 56872-99977, WERE WEST - , EAST MCPHERSON - 2004-16T 230kV	132.0	0	12/1/2007
NORTH AMERICAN PHILIPS - NORTH AMERICAN PHILIPS JUNCTION (SOUTH) 115kV, 57372 - 57374	10WP, 56872-99977, WERE WEST - , EAST MCPHERSON - 2004-16T 230kV	129.2	0	

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.

Table 4: Contingency Analysis Results

Facility	Model & Contingency	Facility Loading (% Rate B) Or Voltage (PU)	ATC (MW)	Date Required (M/D/Y)
NORTH AMERICAN PHILIPS JUNCTION (SOUTH) - WEST MCPHERSON 115kV, 57374 - 57438	10WP, 56872-99977, WERE WEST - , EAST MCPHERSON - 2004-16T 230kV	139.5	0	12/1/2008
NORTH AMERICAN PHILIPS JUNCTION (SOUTH) - WEST MCPHERSON 115kV CKT 2, 57374 - 57438	10WP, 56872-99977, WERE WEST - , EAST MCPHERSON - 2004-16T 230kV	121.7	0	12/1/2008
NORTHVIEW - SUMMIT 115kV, 57371 - 57381	07WP, 57368-57381, WERE WEST , EXIDE JUNCTION - SUMMIT 115kV	101.9	132	12/1/2007
Russell 115kV, 58801	10SP, 58760-58778, WEPL , East Hall Tap - Mullergren 115kV	Base case voltage is 0.8018 pu. Test case voltage is 0.7355 pu.	0	6/1/2008
Russell 115kV, 58801	15SP, 58760-58778, WEPL , East Hall Tap - Mullergren 115kV	Base case voltage is 0.7866 pu. Test case voltage is 0.7381 pu.	0	
Smith Center 115kV, 58793	10SP, 58760-58778, WEPL , East Hall Tap - Mullergren 115kV	Base case voltage is 0.9304 pu. Test case voltage is 0.887 pu.	140	6/1/2008
TECUMSEH HILL - 115-( )kV, 57182 - WND 2	10SP, 56765-56766, WERE NEAST , HOYT - JEFFERY ENERGY CENTER 345kV	105.9	106	6/1/2008
TECUMSEH HILL - 161-( )kV, 56920 - WND 1	10SP, 56765-56766, WERE NEAST , HOYT - JEFFERY ENERGY CENTER 345kV	110.8	58	6/1/2008
TECUMSEH HILL - STULL SWITCHING STATION 115kV, 57182 - 57270	07WP, 56765-56772, WERE NEAST , HOYT - STRANGER CREEK 345kV	132.4	0	12/1/2007
Waldo 115kV, 58798	10SP, 58760-58778, WEPL , East Hall Tap - Mullergren 115kV	Base case voltage is 0.8306 pu. Test case voltage is 0.7695 pu.	0	6/1/2008
Waldo 115kV, 58798	15SP, 58760-58778, WEPL , East Hall Tap - Mullergren 115kV	Base case voltage is 0.8171 pu. Test case voltage is 0.7721 pu.	0	

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.

Powerflow Analysis

A powerflow analysis was conducted for the facility using modified versions of the 2006 April, 2007 Winter Peak, Summer and Winter Peak for 2010, and 2015 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. The proposed in-service date of the generators is December 1, 2007. The available seasonal models used were through the 2015 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 additional 200MW of generation (totaling 400 given 200MW initial) and location, additional criteria violations will occur on the existing WEPL and WERE facilities under steady state conditions in the peak seasons. Given the lack of existing ATC, a representation of a new Summit - Concordia 1272MCM 50 mile 230kV transmission line was included in all models used for the analyses.

There are several other proposed generation additions in the general area of the Customer's facility. 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.

In order to maintain acceptable bus voltages in the local area, the Customer will need to install additional reactive compensation in the WEPL area. 124MVAR switched compensation is required on a contingency basis to prevent excessive voltage decay. This Customer must install approximately 40MVAR switched at 230kV, 30MVAR in each of two capacitor banks switched at 34.5kV in the Customer's 230-34.5kV Substation, plus a 24MVAR SVC at the remaining 34.5kV bus. In addition, capacitor banks must be added in down-line 34.5kV feeders from the three power transformers near the generation center of the fields totaling 21.6MVAR. Dynamic Stability studies performed as part of the impact study will provide additional guidance as to how much of the reactive compensation can be static or a portion must be dynamic (such as a SVC).

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 West Plains, Westar Energy, Kansas City Power & Light, and Midwest Energy were applied and the resulting scenarios analyzed. This satisfies the 'more probable' contingency testing criteria mandated by NERC and the SPP criteria.

Conclusion

The minimum cost of interconnecting the Customer project is estimated at $3,500,000 for WEPL's interconnection Network Upgrade facilities listed in Table 2 excluding upgrades of other transmission facilities by WEPL 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. As stated earlier, local projects that were previously queued are assumed to be in service in this Feasibility Study.

The existing transmission system in the area of the proposed interconnection has insufficient ATC to accommodate this request for interconnection. One option to increase the ATC is to add a 230kV transmission line between the Summit and Concordia Substations. The Customer agreed that this line would be required and that it would bear the cost of adding this line. Therefore, a representation of a new 1272MCM 50 mile 230kV transmission line was included in all load flow models used for this study.

In order to aid in maintaining adequate voltages, the Customer will need to install 124MVAR of reactive compensation in its new substation. A 40MVAR must be switched at the 230kV bus. A switched 30MVAR capacitor bank may be installed at each of two 34.5kV buses. A 24MVAR SVC may be installed at the third 34.5kV bus. Dynamic Stability studies performed as part of the impact study will provide guidance as to how much reactive compensation can be static or must be dynamic (such as a SVC). In addition, down-line 34.5kV capacitor banks will be required totaling 21.6MVAR.

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 10 contingencies, then only the results with the 10 lowest values of ATC may be included in this 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.

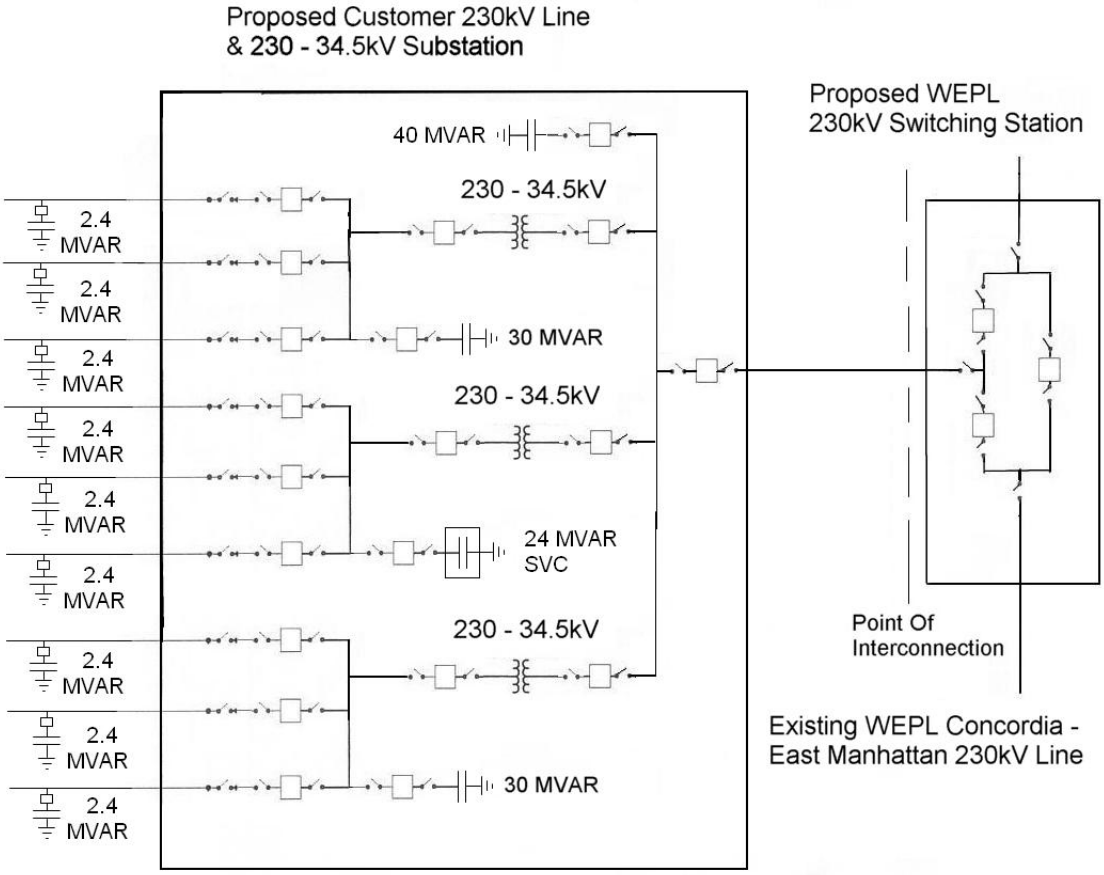

Figure 1: Proposed Interconnection
(Final substation design to be determined)

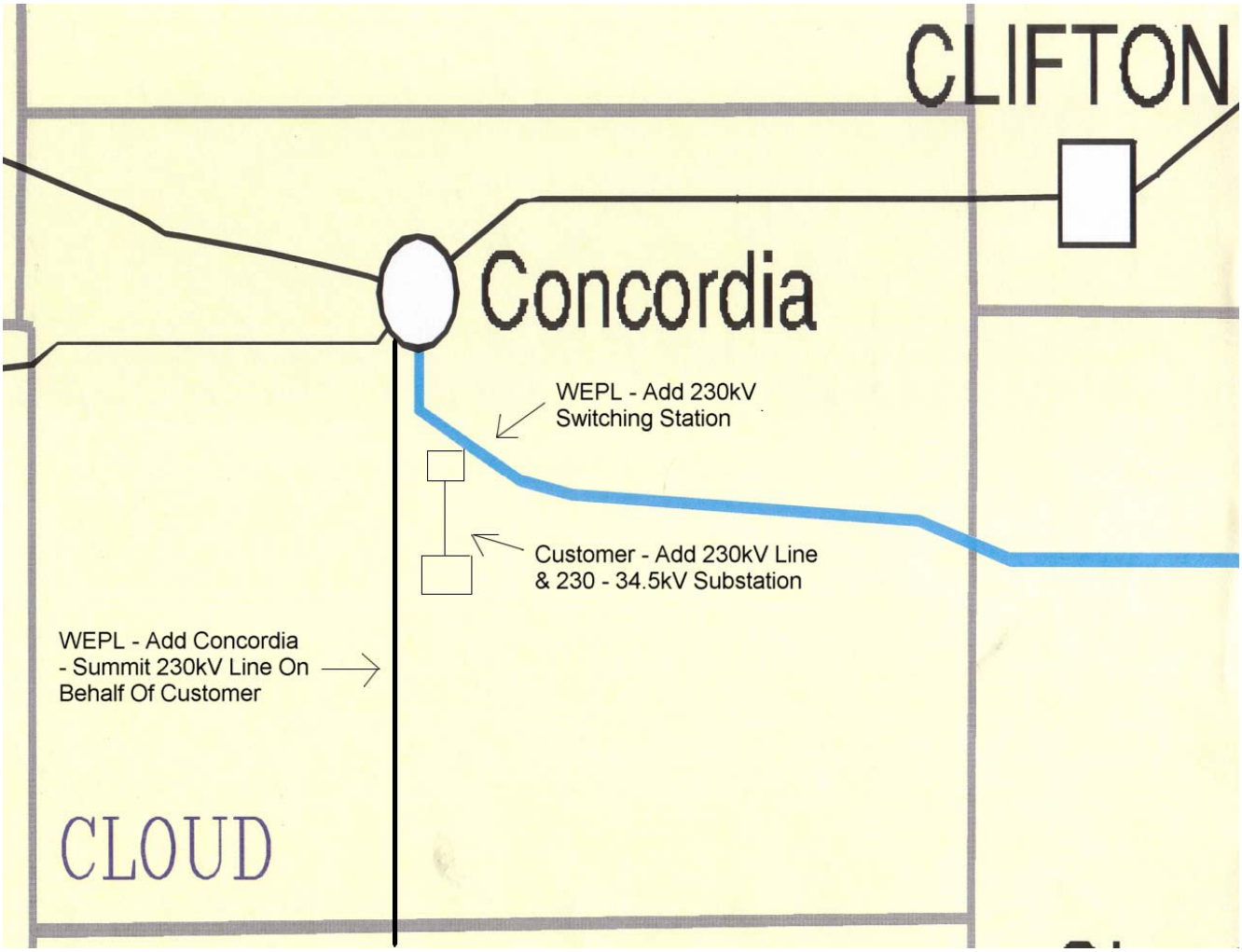

Figure 2: Map Of The Surrounding Area