



***Feasibility Study
For
Generation Interconnection
Request
GEN-2004-016***

***SPP Tariff Studies
(#GEN-2004-016)***

April 13, 2005

Executive Summary

<OMITTED TEXT> (Customer) has requested a Feasibility Study for the purpose of interconnecting 150MW of wind generation within the service territory of Westar Energy (WERE) in McPherson County Kansas. The proposed point of interconnection is in the existing Summit – E. McPherson 230kV line at a new switching station to be located southwest of Salina, OK. This 230kV line is owned by WERE. The proposed in-service date is December 31, 2005. This proposed in-service date seems very optimistic.

Power flow analysis has indicated that for the powerflow cases studied, it is possible to interconnect the 150MW of generation with transmission system reinforcements within the local transmission system. The requirements for interconnection consist of adding a new 230kV switching station with 3 breakers. This 230kV addition shall be constructed and maintained by WERE. 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 necessary substation additions in the Summit – E. McPherson 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. Other Network Constraints in the WERE system 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. 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 WERE switching station. This cost does not include the Customer's 230-34.5kV substation.

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 these other projects within the Midwest Energy 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 150MW of wind generation within the service territory of WERE in McPherson County Kansas. The existing Summit – E. McPherson 230kV line is owned by WERE, and the proposed generation interconnect is within WERE. The proposed point of interconnection is at a new 230kV switching station in this line. The proposed in-service date is December 31, 2005.

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 WERE. 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 WERE 230kV switching station will not be a significant expense.

The total cost for WERE to add a new 230kV switching station, the interconnection facility, in the Summit – E. McPherson 230kV line is estimated at \$3,500,000. Other Network Constraints in the WERE system 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 WERE 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 WERE 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.	*
Customer – 230kV line between Customer substation and new WERE 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)
WERE - Add 3-breaker ring 230kV switching station in Summit – E. McPherson 230kV line.	\$3,500,000
Total	\$3,500,000

Table 3: Network Constraints

Facility
WERE - 54TH & MERIDEN - HOYT 115kV
WERE - AUBURN ROAD - JEFFREY ENERGY CENTER 230kV
WERE - AUBURN ROAD 230-115kV
WERE - CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115kV
WERE - CIRCLEVILLE - KING HILL N.M. COOP (NEMAHA MARSHALL R.E.C. 115kV
WERE - EXIDE JUNCTION - NORTH AMERICAN PHILIPS 115kV
WERE - EXIDE JUNCTION - SUMMIT 115kV
WERE - GATZ - GOLDEN PLAINS JUNCTION 69kV
WERE - GILL ENERGY CENTER WEST - GEC3 GSU 69-()kV
WERE - GOLDEN PLAINS JUNCTION - HESSTON 69kV
WERE - GOODYEAR JUNCTION - NORTHLAND 115kV
WERE - KELLY - KING HILL N.M. COOP (NEMAHA MARSHALL R.E.C. 115kV
WERE - LAWRENCE HILL - LAWHL29X 115-()kV
WERE - MIDLAND JUNCTION - MIDJ126X 115-()kV
WERE - MOUNDRIDGE - MOUND10X 115-()kV
WERE - NORTH AMERICAN PHILIPS - NORTH AMERICAN PHILIPS JUNCTION (SOUTH) 115kV
WERE - NORTH AMERICAN PHILIPS JUNCTION (SOUTH) - WEST MCPHERSON 115kV
WERE - NORTH AMERICAN PHILIPS JUNCTION (SOUTH) - WEST MCPHERSON 115kV CKT 2
WERE - NORTHVIEW - SUMMIT 115kV
WERE - TECUMSEH ENERGY CENTER - TECUMSEH HILL 115kV
WERE - TECUMSEH HILL - 115-()kV
WERE - TECUMSEH HILL - STULL SWITCHING STATION 115kV

Table 4: Contingency Analysis Results

Facility	Model & Contingency	Facility Loading (% Rate B) Or Voltage (PU)	ATC (MW)	Date Required (M/D/Y)
54TH & MERIDEN - HOYT 115kV	07SP, 56765-56772, WERE NEAST, HOYT - STRANGER CREEK 345kV	101.8	81	6/1/2006
54TH & MERIDEN - HOYT 115kV	10SP, 56765-56772, WERE NEAST, HOYT - STRANGER CREEK 345kV	100.1	146	
AUBURN ROAD - JEFFREY ENERGY CENTER 230kV	07SP, 56765-56766, WERE NEAST, HOYT - JEFFREY ENERGY CENTER 345kV	120.7	0	12/31/2005
AUBURN ROAD - JEFFREY ENERGY CENTER 230kV	10SP, 56765-56766, WERE NEAST, HOYT - JEFFREY ENERGY CENTER 345kV	118.8	0	
AUBURN ROAD - JEFFREY ENERGY CENTER 230kV	05WP, 56765-56766, WERE NEAST, HOYT - JEFFREY ENERGY CENTER 345kV	113.7	0	
AUBURN ROAD - JEFFREY ENERGY CENTER 230kV	07WP, 56765-56766, WERE NEAST, HOYT - JEFFREY ENERGY CENTER 345kV	112.4	0	
AUBURN ROAD - JEFFREY ENERGY CENTER 230kV	10WP, 56765-56766, WERE NEAST, HOYT - JEFFREY ENERGY CENTER 345kV	104.9	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)
AUBURN ROAD 230-115kV	07SP, 56765-56766, WERE NEAST, HOYT - JEFFREY ENERGY CENTER 345kV	115.9	0	12/31/2005
AUBURN ROAD 230-115kV	07WP, 56765-56766, WERE NEAST, HOYT - JEFFREY ENERGY CENTER 345kV	102.8	0	
AUBURN ROAD 230-115kV	05WP, 56765-56766, WERE NEAST, HOYT - JEFFREY ENERGY CENTER 345kV	101.1	53	
CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115kV	10WP, 56765-56772, WERE NEAST, HOYT - STRANGER CREEK 345kV	117.9	0	12/31/2005
CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115kV	05WP, 56765-56772, WERE NEAST, HOYT - STRANGER CREEK 345kV	113.7	0	
CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115kV	07WP, 56765-56772, WERE NEAST, HOYT - STRANGER CREEK 345kV	110.9	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)
CIRCLEVILLE - KING HILL N.M. COOP (NEMAHA MARSHALL R.E.C. 115kV	05WP, 56765-56772, WERE NEAST, HOYT - STRANGER CREEK 345kV	109.7	0	
EXIDE JUNCTION - NORTH AMERICAN PHILIPS 115kV	10WP, 56872-99977, WERE WEST - , EAST MCPHERSON - 2004-16T 230kV	116.3	0	12/31/2005
EXIDE JUNCTION - NORTH AMERICAN PHILIPS 115kV	07WP, 56872-99977, WERE WEST - , EAST MCPHERSON - 2004-16T 230kV	109.8	0	
EXIDE JUNCTION - NORTH AMERICAN PHILIPS 115kV	05WP, 56872-99977, WERE WEST - , EAST MCPHERSON - 2004-16T 230kV	102.1	113	
EXIDE JUNCTION - SUMMIT 115kV	10WP, 56872-99977, WERE WEST - , EAST MCPHERSON - 2004-16T 230kV	110.7	0	12/1/2006
EXIDE JUNCTION - SUMMIT 115kV	07WP, 56872-99977, WERE WEST - , EAST MCPHERSON - 2004-16T 230kV	104.4	73	
GATZ - GOLDEN PLAINS JUNCTION 69kV	05AP, 57011-57013, WERE SCENTRAL, HALSTEAD NORTH - MOUNDRIDGE 138kV	106.1	108	4/1/2006
GILL ENERGY CENTER WEST - GEC3 GSU 69-()kV	07SP, 57046-57795-57106, WERE SCENTRAL, GILL ENERGY CENTER SOUTH - GILL ENERGY CENTER EAST 138-69kV	122.7	0	6/1/2006

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)
GOLDEN PLAINS JUNCTION - HESSTON 69kV	05AP, 57011-57013, WERE SCENTRAL, HALSTEAD NORTH - MOUNDRIDGE 138kV	105.8	108	4/1/2006
GOODYEAR JUNCTION - NORTHLAND 115kV	07SP, 56765-56772, WERE NEAST, HOYT - STRANGER CREEK 345kV	101.4	86	6/1/2006
GOODYEAR JUNCTION - NORTHLAND 115kV	10SP, 56765-56772, WERE NEAST, HOYT - STRANGER CREEK 345kV	101.0	100	
KELLY - KING HILL N.M. COOP (NEMAHA MARSHALL R.E.C. 115kV	05WP, 56765-56772, WERE NEAST, HOYT - STRANGER CREEK 345kV	107.7	0	12/31/2005
LAWRENCE HILL - LAWHL29X 115-()kV	07SP, 56853-56855, WERE NEAST, LAWRENCE HILL - MIDLAND JUNCTION 230kV	112.3	0	6/1/2006
LAWRENCE HILL - LAWHL29X 115-()kV	07SP, 56855-57252-56884, WERE NEAST, MIDLAND JUNCTION 230-115kV	112.3	0	
LAWRENCE HILL - LAWHL29X 115-()kV	10SP, 56853-56855, WERE NEAST, LAWRENCE HILL - MIDLAND JUNCTION 230kV	106.8	0	
LAWRENCE HILL - LAWHL29X 115-()kV	10SP, 56855-57252-56884, WERE NEAST, MIDLAND JUNCTION 230-115kV	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)
LAWRENCE HILL - LAWHL29X 115-()kV	07WP, 56853-56855, WERE NEAST, LAWRENCE HILL - MIDLAND JUNCTION 230kV	103.0	70	
LAWRENCE HILL - LAWHL29X 115-()kV	07WP, 56855-57252-56884, WERE NEAST, MIDLAND JUNCTION 230-115kV	103.0	72	
LAWRENCE HILL - LAWHL29X 230-()kV	07SP, 56853-56855, WERE NEAST, LAWRENCE HILL - MIDLAND JUNCTION 230kV	114.4	0	
LAWRENCE HILL - LAWHL29X 230-()kV	07SP, 56855-57252-56884, WERE NEAST, MIDLAND JUNCTION 230-115kV	114.4	0	
LAWRENCE HILL - LAWHL29X 230-()kV	10SP, 56853-56855, WERE NEAST, LAWRENCE HILL - MIDLAND JUNCTION 230kV	109.0	0	
LAWRENCE HILL - LAWHL29X 230-()kV	10SP, 56855-57252-56884, WERE NEAST, MIDLAND JUNCTION 230-115kV	108.9	0	
LAWRENCE HILL - LAWHL29X 230-()kV	07WP, 56853-56855, WERE NEAST, LAWRENCE HILL - MIDLAND JUNCTION 230kV	105.3	18	
LAWRENCE HILL - LAWHL29X 230-()kV	07WP, 56855-57252-56884, WERE NEAST, MIDLAND JUNCTION 230-115kV	105.3	20	

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)
MIDLAND JUNCTION - MIDJ126X 115-()kV	07SP, 56853-57250-56882, WERE NEAST, LAWRENCE HILL 230-115kV	101.7	8	6/1/2006
MIDLAND JUNCTION - MIDJ126X 230-()kV	07SP, 56853-57250-56882, WERE NEAST, LAWRENCE HILL 230-115kV	102.8	0	
MOUNDRIDGE - MOUND10X 115-()kV	05AP, 56769-56796, WERE NCENTRAL - WERE SCENTRAL, LANG - WICHITA 345kV	109.2	68	4/1/2006
MOUNDRIDGE - MOUND10X 138-()kV	05AP, 56769-56796, WERE NCENTRAL - WERE SCENTRAL, LANG - WICHITA 345kV	110.2	61	
NORTH AMERICAN PHILIPS - NORTH AMERICAN PHILIPS JUNCTION (SOUTH) 115kV	10WP, 56872-99977, WERE WEST - , EAST MCPHERSON - 2004-16T 230kV	151.0	0	12/31/2005
NORTH AMERICAN PHILIPS - NORTH AMERICAN PHILIPS JUNCTION (SOUTH) 115kV	07WP, 56872-99977, WERE WEST - , EAST MCPHERSON - 2004-16T 230kV	138.4	0	
NORTH AMERICAN PHILIPS - NORTH AMERICAN PHILIPS JUNCTION (SOUTH) 115kV	05WP, 56872-99977, WERE WEST - , EAST MCPHERSON - 2004-16T 230kV	134.9	0	
NORTH AMERICAN PHILIPS JUNCTION (SOUTH) - WEST MCPHERSON 115kV	10WP, 56872-99977, WERE WEST - , EAST MCPHERSON - 2004-16T 230kV	163.0	0	12/31/2005

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	07WP, 56872-99977, WERE WEST - , EAST MCPHERSON - 2004-16T 230kV	149.4	0	
NORTH AMERICAN PHILIPS JUNCTION (SOUTH) - WEST MCPHERSON 115kV	05WP, 56872-99977, WERE WEST - , EAST MCPHERSON - 2004-16T 230kV	145.6	0	
NORTH AMERICAN PHILIPS JUNCTION (SOUTH) - WEST MCPHERSON 115kV CKT 2	10WP, 56872-99977, WERE WEST - , EAST MCPHERSON - 2004-16T 230kV	142.2	0	12/31/2005
NORTH AMERICAN PHILIPS JUNCTION (SOUTH) - WEST MCPHERSON 115kV CKT 2	07WP, 56872-99977, WERE WEST - , EAST MCPHERSON - 2004-16T 230kV	130.4	0	
NORTH AMERICAN PHILIPS JUNCTION (SOUTH) - WEST MCPHERSON 115kV CKT 2	05WP, 56872-99977, WERE WEST - , EAST MCPHERSON - 2004-16T 230kV	127.0	0	
NORTHVIEW - SUMMIT 115kV	10WP, 57368-57381, WERE WEST, EXIDE JUNCTION - SUMMIT 115kV	102.3	66	12/1/2008
TECUMSEH ENERGY CENTER - TECUMSEH HILL 115kV	10SP, 56765-56772, WERE NEAST, HOYT - STRANGER CREEK 345kV	105.9	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)
TECUMSEH HILL - 115-()kV	07SP, 56765-56772, WERE NEAST, HOYT - STRANGER CREEK 345kV	114.2	0	6/1/2006
TECUMSEH HILL - 115-()kV	07SP, 56769-56796, WERE NCENTRAL - WERE SCENTRAL, LANG - WICHITA 345kV	109.4	0	
TECUMSEH HILL - 115-()kV	10SP, 56765-56772, WERE NEAST, HOYT - STRANGER CREEK 345kV	103.9	63	
TECUMSEH HILL - 161-()kV	07SP, 56765-56772, WERE NEAST, HOYT - STRANGER CREEK 345kV	114.9	0	
TECUMSEH HILL - 161-()kV	07SP, 56769-56796, WERE NCENTRAL - WERE SCENTRAL, LANG - WICHITA 345kV	109.8	0	
TECUMSEH HILL - 161-()kV	10SP, 56765-56772, WERE NEAST, HOYT - STRANGER CREEK 345kV	104.5	51	
TECUMSEH HILL - STULL SWITCHING STATION 115kV	10SP, 56765-56772, WERE NEAST, HOYT - STRANGER CREEK 345kV	103.1	73	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.

Powerflow Analysis

A powerflow analysis was conducted for the facility using modified versions of the 2005 April, 2005 Winter Peak, 2007 and 2010 Summer and Winter 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 generator is December 31, 2005. The available seasonal models used were the 2005 April, 2005 Winter, and 2007 through 2010 peak models. This is the end of the current SPP planning horizon.

The analysis of the Customer's project indicates that, given the requested generation level of 150MW and location, additional criteria violations will occur on the existing WERE facilities under steady state conditions in the peak seasons.

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.

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

Conclusion

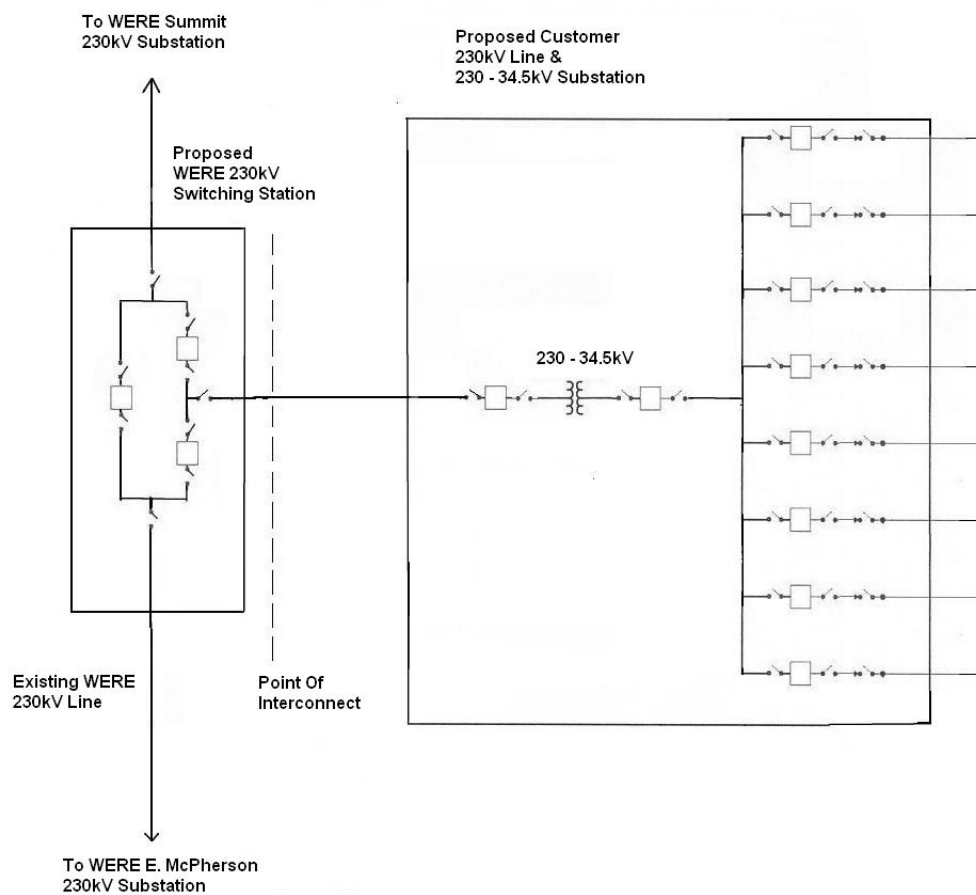
The minimum cost of interconnecting the Customer project is estimated at \$3,500,000 for WERE's interconnection Network Upgrade facilities listed in Table 2 excluding upgrades of other transmission facilities by WERE listed in Table 3 of which are Network Constraints. At this time, the cost estimates 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.

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.

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)**

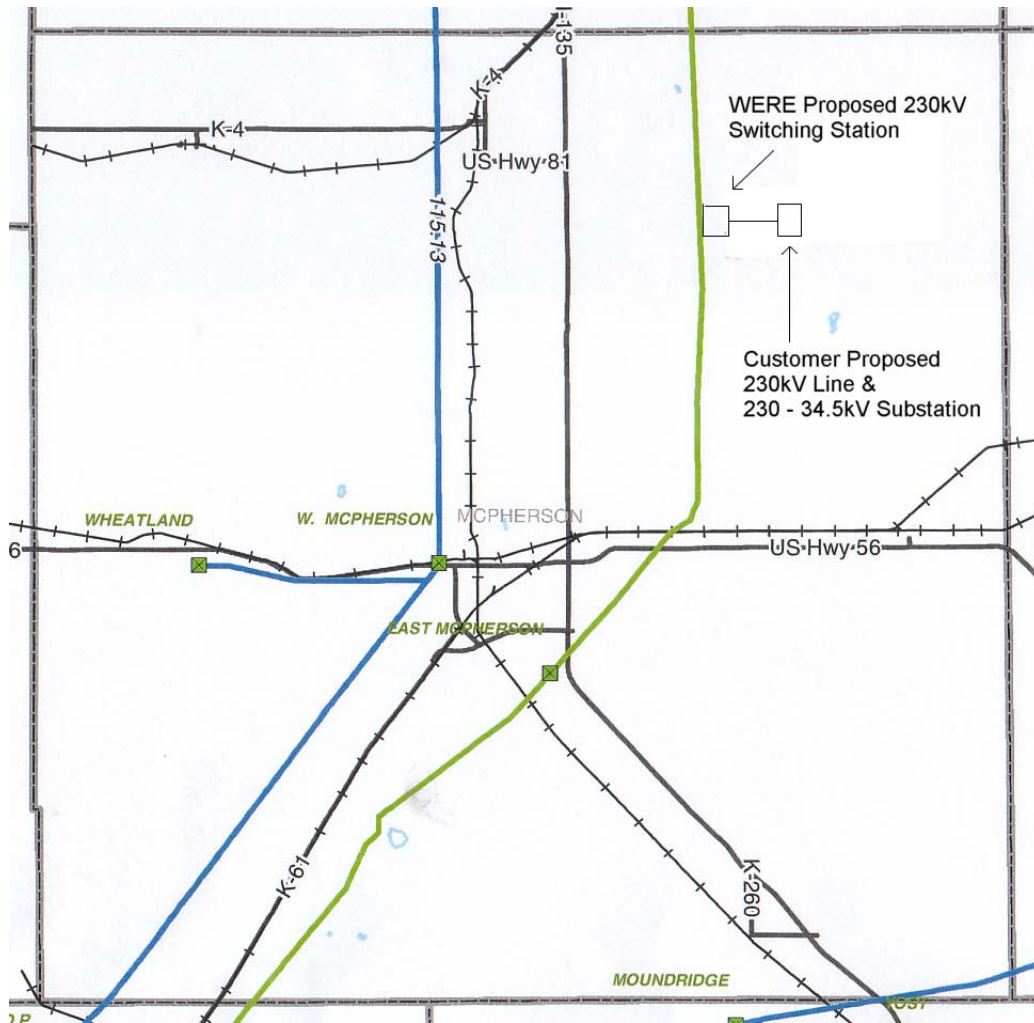


Figure 2: Map Of The Surrounding Area