



***Feasibility Study
For
Generation Interconnection
Request
GEN-2005-007***

***SPP Tariff Studies
(#GEN-2005-007)***

August 22, 2005

Executive Summary

<OMITTED TEXT> (Customer) has requested a Feasibility Study for the purpose of interconnecting 260MW of generation within the service territory of Southwestern Public Service Company (SPS) (d/b/a Xcel Energy, Inc.) in Hutchinson County Texas near Borger. The Customer's proposed point of interconnection is in the existing Hutchinson – Pringle 115kV line at the existing Blackhawk Substation. This 115kV line is owned by SPS. The proposed in-service date is June 1, 2009. Due to the lack of existing available transmission capacity at 115kV adjacent to the Blackhawk Substation, the designated point of interconnection is in the existing Hutchinson 230kV Substation. This will require changes in the Hutchinson Substation and an additional 230kV line extending to the Blackhawk Substation.

Power flow analysis has indicated that for the powerflow cases studied, it is possible to interconnect the 260MW of generation with transmission system reinforcements within the local transmission system. In order to maintain acceptable bus voltages in the local area given this and previous requests for generation interconnection, some Customers will need to install switched capacitor banks. As this Customer is proposing to add a synchronous generator with reactive capacity, this customer may not be required to add a capacitor bank at its location. Dynamic Stability studies performed as part of the impact study will provide additional guidance as to whether any required reactive compensation can be static or a portion must be dynamic (such as a SVC).

The requirements for interconnection consist of adding new 230kV facilities in the existing Hutchinson 230kV Substation. This 230kV addition shall be constructed and maintained by SPS. The Customer did not propose a specific 230kV line extending to serve its Blackhawk 230-18.0kV facilities. It is assumed that obtaining all necessary right-of-way for the additions in the Hutchinson Substation will not be a significant expense.

The total cost for adding 230kV Direct Assignment facilities in the Hutchinson 230kV Substation, the required interconnection facility, is estimated at \$500,000. Other Network Constraints in the American Electric Power West (AEPW), SPS and Western Farmers Electric Cooperative (WFEC) 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 (TSR), 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 the existing SPS Hutchinson Substation. This cost does not include the Customer's 230-18.0kV station.

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. 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. Given the contingency analyses in this area with the Customer exporting generation, steady-state solutions were not obtained for outages of SPS' eastern and northern 345kV lines. These contingency analyses will have to be re-evaluated as part of a TSR with additional transmission facilities between SPS and the remainder of SPP.

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 SPS service territory 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 260MW of generation within the service territory of SPS in Hutchinson County Texas near Borger. The existing Hutchinson - Pringle 115kV line is owned by SPS, and the proposed generation interconnection is within SPS. The Customer's proposed point of interconnection is at the existing Blackhawk 115kV Substation in this line. The proposed in-service date is June 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.

Due to the lack of existing available transmission capacity at 115kV adjacent to this new generation, the designated point of interconnection is in the existing Hutchinson 230kV Substation. This will require changes in the Hutchinson Substation and additional 230kV line extending to the Blackhawk Substation. However, the requirement to rebuild the Blackhawk – Pringle 115kV line should be eliminated.

The requirements for interconnection consist of changing and adding 230kV facilities in the existing Hutchinson 230kV Substation. This 230kV addition shall be constructed and maintained by SPS. The Customer did not propose a route of its 230kV line to serve its 230-18.0kV facilities. It is assumed that obtaining all necessary right-of-way for the additions to SPS' Hutchinson Substation will not be a significant expense.

The total cost for adding 230kV Direct Assignment facilities in the Hutchinson 230kV Substation, the required interconnection facility, is estimated at \$500,000. Other Network Constraints in the AEPW, SPS and WFEC 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 existing SPS Hutchinson Substation. The Customer is responsible for this 230kV line up to the point of interconnection. This cost does not include the Customer's 230-18.0kV substation and the cost estimate should be determined by the Customer.

The costs of interconnecting the facility to the SPS 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 – 230-18.0kV Substation facilities.	*
Customer – 230kV line between Customer substation and SPS Hutchinson Substation.	*
Customer - Right-of-Way for Customer Substation & Line.	*
SPS - Add 230kV breaker terminal in the Hutchinson Substation to accommodate the Customer's new 230kV line.	\$500,000
Total	*

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

Table 2: Required Interconnection Network Upgrade Facilities

Facility	ESTIMATED COST (2005 DOLLARS)
Total	\$0

Table 3: Network Constraints

Facility
AEPW - ALTUS JCT TAP - RUSSELL 138kV
WFEC - ALTUS JCT TAP - RUSSELL 138kV
SPS - Canyon West - Canyon East 115kV
SPS - Canyon West - Dawn 115kV
SPS - CARSNT - Pantex North 115kV
SPS - Cherry - Nichols Station 115kV
SPS - Cherry - Northwest Interchange 115kV
SPS - Dawn - Hereford Interchange 115kV
SPS - East Plant Interchange - Manhattan 115kV
SPS - East Plant Interchange - Pierce Tap 115kV
SPS - East Plant Interchange 230-115kV
AEPW - ELK CITY - CLINTON JUNCTION 138kV
AEPW - ELK CITY 230-138kV
SPS - Grapevine Interchange - ELK CITY 230kV
AEPW - Grapevine Interchange - ELK CITY 230kV
SPS - Grapevine Interchange 230-115kV
SPS - Gray County Interchange 115-69kV
SPS - Hale Co Interchange - Tuco Interchange 115kV
SPS - Happy Interchange - TULIAT 115kV
SPS - HIGHLT - Nichols Station 115kV
SPS - HIGHLT - Pantex South 115kV
AEPW - JERICHO 115-69kV
SPS - Manhattan - MANHTP 115kV
SPS - McCullough - Kingsmill Interchange 69kV
SPS - MCLELLN - Kirby 115kV
SPS - Nichols Station - Whitaker 115kV
SPS - Osage Switching Station - Canyon East 115kV
SPS - Osage Switching Station - MANHTP 115kV
SPS - PALODU - Happy Interchange 115kV

Table 4: Contingency Analysis Results

Facility	Model & Contingency	Facility Loading (% Rate B) Or Voltage (PU)	ATC (MW)	Date Required (M/D/Y)
ALTUS JCT TAP - RUSSELL 138kV	10WP, 50827-54153, SPS SPS-OKLA - AEPW WESTERN , Grapevine Interchange - ELK CITY 230kV	114.5	157	12/1/2009
ALTUS JCT TAP - RUSSELL 138kV	10WP, 54121-54153-54145, AEPW WESTERN , ELK CITY 230-138kV	111.0	174	12/1/2009
Canyon West - Canyon East 115kV	10SP, 50993-51111, SPS SPS-AMA - SPS SPS- CLHF, Bushland Interchange - Deaf Smith Interchange 230kV	140.5	0	6/1/2009
Canyon West - Canyon East 115kV	06AP, 50993-51111, SPS SPS-AMA - SPS SPS- CLHF, Bushland Interchange - Deaf Smith Interchange 230kV	118.1	0	
Canyon West - Canyon East 115kV	15SP, 51435-51441, SPS SPS-CNPL, Tolk Interchange - Tolk 1 230-24kV	111.1	25	
Canyon West - Dawn 115kV	10SP, 50993-51111, SPS SPS-AMA - SPS SPS- CLHF, Bushland Interchange - Deaf Smith Interchange 230kV	117.8	0	6/1/2009
Canyon West - Dawn 115kV	06AP, 50993-51111, SPS SPS-AMA - SPS SPS- CLHF, Bushland Interchange - Deaf Smith Interchange 230kV	105.9	171	
CARSNT - Pantex North 115kV	06AP, 50751-50915, SPS SPS-OKLA - SPS SPS- AMA , Hutchinson Co. Interchange - Nichols Station 230kV	111.1	182	10/1/2009
CARSNT - Pantex North 115kV	15SP, 50751-50915, SPS SPS-OKLA - SPS SPS- AMA , Hutchinson Co. Interchange - Nichols Station 230kV	101.4	250	

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)
Cherry - Nichols Station 115kV	15SP, 50914-50922, SPS SPS-AMA , Nichols Station - Whitaker 115kV	117.3	0	6/1/2011
Cherry - Nichols Station 115kV	15SP, 50922-50956, SPS SPS-AMA , Whitaker - East Plant Interchange 115kV	113.2	0	
Cherry - Northwest Interchange 115kV	15SP, 50914-50922, SPS SPS-AMA , Nichols Station - Whitaker 115kV	107.9	70	6/1/2011
Cherry - Northwest Interchange 115kV	15SP, 50922-50956, SPS SPS-AMA , Whitaker - East Plant Interchange 115kV	103.9	150	
Dawn - Hereford Interchange 115kV	10SP, 50993-51111, SPS SPS-AMA - SPS SPS-CLHF, Bushland Interchange - Deaf Smith Interchange 230kV	113.3	0	6/1/2009
Dawn - Hereford Interchange 115kV	06AP, 50993-51111, SPS SPS-AMA - SPS SPS-CLHF, Bushland Interchange - Deaf Smith Interchange 230kV	103.4	209	

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 Plant Interchange - Manhattan 115kV	15SP, 50956-50964, SPS SPS-AMA , East Plant Interchange - Pierce Tap 115kV	130.2	0	6/1/2009
East Plant Interchange - Manhattan 115kV	15SP, 50964-51014, SPS SPS-AMA , Pierce Tap - Osage Switching Station 115kV	121.1	0	
East Plant Interchange - Manhattan 115kV	10SP, 50956-50964, SPS SPS-AMA , East Plant Interchange - Pierce Tap 115kV	114.5	0	
East Plant Interchange - Manhattan 115kV	15SP, 50907-51021, SPS SPS-AMA , Harrington Station - Randall County Interchange 230kV	108.0	0	
East Plant Interchange - Manhattan 115kV	15SP, 51020-51021, SPS SPS-AMA , Randall County Interchange 230-115kV	107.9	0	
East Plant Interchange - Manhattan 115kV	10SP, 50915-51041, SPS SPS-AMA , Nichols Station - Amarillo S Interchange 230kV	101.8	178	

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 Plant Interchange - Pierce Tap 115kV	15SP, 50956-50978, SPS SPS-AMA , East Plant Interchange - Manhattan 115kV	130.6	0	6/1/2009
East Plant Interchange - Pierce Tap 115kV	15SP, 50978-51018, SPS SPS-AMA , Manhattan - MANHTP 115kV	120.1	0	
East Plant Interchange - Pierce Tap 115kV	10SP, 50956-50978, SPS SPS-AMA , East Plant Interchange - Manhattan 115kV	115.2	0	
East Plant Interchange - Pierce Tap 115kV	15SP, 50907-51021, SPS SPS-AMA , Harrington Station - Randall County Interchange 230kV	108.6	0	
East Plant Interchange - Pierce Tap 115kV	15SP, 51020-51021, SPS SPS-AMA , Randall County Interchange 230-115kV	108.5	0	
East Plant Interchange - Pierce Tap 115kV	10SP, 50915-51041, SPS SPS-AMA , Nichols Station - Amarillo S Interchange 230kV	106.7	0	
East Plant Interchange - Pierce Tap 115kV	10SP, 50978-51018, SPS SPS-AMA , Manhattan - MANHTP 115kV	105.5	0	
East Plant Interchange 230-115kV	15SP, 50914-50922, SPS SPS-AMA , Nichols Station - Whitaker 115kV	100.5	244	6/1/2015

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)
ELK CITY - CLINTON JUNCTION 138kV	10WP, 54109-54121, AEPW WESTERN , CLINTO AIR FORCE BASE TAP - ELK CITY 138kV	110.2	129	6/1/2009
ELK CITY - CLINTON JUNCTION 138kV	10WP, 54109-54126, AEPW WESTERN , CLINTO AIR FORCE BASE TAP - HOBART JUNCTION 138kV	109.2	142	
ELK CITY - CLINTON JUNCTION 138kV	15SP, 54109-54121, AEPW WESTERN , CLINTO AIR FORCE BASE TAP - ELK CITY 138kV	107.9	156	
ELK CITY - CLINTON JUNCTION 138kV	10SP, 54109-54121, AEPW WESTERN , CLINTO AIR FORCE BASE TAP - ELK CITY 138kV	107.6	151	
ELK CITY - CLINTON JUNCTION 138kV	15SP, 54109-54126, AEPW WESTERN , CLINTO AIR FORCE BASE TAP - HOBART JUNCTION 138kV	106.3	177	
ELK CITY - CLINTON JUNCTION 138kV	10WP, 54121-56001, AEPW WESTERN - WFEC AEP-CS , ELK CITY - MOREWOOD SW 138kV	106.2	180	
ELK CITY - CLINTON JUNCTION 138kV	10SP, 54109-54126, AEPW WESTERN , CLINTO AIR FORCE BASE TAP - HOBART JUNCTION 138kV	106.0	174	
ELK CITY - CLINTON JUNCTION 138kV	15SP, 54121-56001, AEPW WESTERN - WFEC AEP-CS , ELK CITY - MOREWOOD SW 138kV	102.3	231	
ELK CITY - CLINTON JUNCTION 138kV	10SP, 56017-56089, WFEC AEP-CS , ONEY - WASHITA 138kV	101.1	235	
ELK CITY - CLINTON JUNCTION 138kV	15SP, 55814-56089, WFEC FLA - WFEC AEP-CS , ANADARKO - WASHITA 138kV	100.8	244	

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)
ELK CITY - ELKCTY-6 138-()kV	10WP, 54290-54296, AEPW WTU , CHILDRESS - LAKE PAULINE 138kV	123.6	0	6/1/2009
ELK CITY - ELKCTY-6 138-()kV	10WP, 50838-50932, SPS SPS-OKLA - SPS SPS- AMA , MCLELLN - Kirby 115kV	121.9	0	
ELK CITY - ELKCTY-6 138-()kV	10WP, 50838-50840, SPS SPS-OKLA, MCLELLN - McLean Rural 115kV	121.8	0	
ELK CITY - ELKCTY-6 138-()kV	10WP, 50840-54295, SPS SPS-OKLA - AEPW WTU , McLean Rural - SHAMROCK 115kV	121.4	0	
ELK CITY - ELKCTY-6 138-()kV	10WP, 54294-54295-54302, AEPW WTU , SHAMROCK 115-69kV	121.1	0	
ELK CITY - ELKCTY-6 138-()kV	10WP, 54292-54293, AEPW WTU , WELLINGTON - SHAMROCK 138kV	120.6	0	
ELK CITY - ELKCTY-6 138-()kV	10WP, 51041-51321, SPS SPS-AMA - SPS SPS- CNPL, Amarillo S Interchange - Swisher County Interchange 230kV	120.4	0	
ELK CITY - ELKCTY-6 138-()kV	10WP, 54293-54294-54301, AEPW WTU , SHAMROCK 138-69kV	120.4	0	
ELK CITY - ELKCTY-6 138-()kV	15SP, 54290-54296, AEPW WTU , CHILDRESS - LAKE PAULINE 138kV	120.4	0	
ELK CITY - ELKCTY-6 138-()kV	10WP, 54291-54292, AEPW WTU , HOLLIS TAP - WELLINGTON 138kV	119.9	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)
ELK CITY - ELKCTY-6 230-()kV	10WP, 54290-54296, AEPW WTU , CHILDRESS - LAKE PAULINE 138kV	117.8	0	6/1/2009
ELK CITY - ELKCTY-6 230-()kV	10WP, 50838-50840, SPS SPS-OKLA, MCLELLN - McLean Rural 115kV	115.8	0	
ELK CITY - ELKCTY-6 230-()kV	10WP, 50838-50932, SPS SPS-OKLA - SPS SPS-AMA , MCLELLN - Kirby 115kV	115.8	0	
ELK CITY - ELKCTY-6 230-()kV	10WP, 50840-54295, SPS SPS-OKLA - AEPW WTU , McLean Rural - SHAMROCK 115kV	115.4	0	
ELK CITY - ELKCTY-6 230-()kV	10WP, 54294-54295-54302, AEPW WTU , SHAMROCK 115-69kV	115.2	0	
ELK CITY - ELKCTY-6 230-()kV	10WP, 54292-54293, AEPW WTU , WELLINGTON - SHAMROCK 138kV	115.0	2	
ELK CITY - ELKCTY-6 230-()kV	10WP, 54293-54294-54301, AEPW WTU , SHAMROCK 138-69kV	114.7	5	
ELK CITY - ELKCTY-6 230-()kV	15SP, 54290-54296, AEPW WTU , CHILDRESS - LAKE PAULINE 138kV	114.7	0	
ELK CITY - ELKCTY-6 230-()kV	10WP, 54291-54292, AEPW WTU , HOLLIS TAP - WELLINGTON 138kV	114.4	15	
ELK CITY - ELKCTY-6 230-()kV	10WP, 54290-54291, AEPW WTU , CHILDRESS - HOLLIS TAP 138kV	114.2	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)
Grapevine Interchange - ELK CITY 230kV	10WP, 51041-51321, SPS SPS-AMA - SPS SPS-CNPL, Amarillo S Interchange - Swisher County Interchange 230kV	115.3	78	6/1/2009
Grapevine Interchange - ELK CITY 230kV	15SP, 50838-50932, SPS SPS-OKLA - SPS SPS-AMA , MCLELLN - Kirby 115kV	115.2	78	6/1/2009
Grapevine Interchange - ELK CITY 230kV	10WP, 50838-50932, SPS SPS-OKLA - SPS SPS-AMA , MCLELLN - Kirby 115kV	115.0	73	
Grapevine Interchange - ELK CITY 230kV	10WP, 54290-54296, AEPW WTU , CHILDRESS - LAKE PAULINE 138kV	115.0	21	
Grapevine Interchange - ELK CITY 230kV	10WP, 50838-50840, SPS SPS-OKLA, MCLELLN - McLean Rural 115kV	114.9	74	
Grapevine Interchange - ELK CITY 230kV	15SP, 50838-50840, SPS SPS-OKLA, MCLELLN - McLean Rural 115kV	114.8	81	
Grapevine Interchange - ELK CITY 230kV	10WP, 50840-54295, SPS SPS-OKLA - AEPW WTU , McLean Rural - SHAMROCK 115kV	114.3	80	
Grapevine Interchange - ELK CITY 230kV	10WP, 54294-54295-54302, AEPW WTU , SHAMROCK 115-69kV	114.2	81	
Grapevine Interchange - ELK CITY 230kV	15SP, 50840-54295, SPS SPS-OKLA - AEPW WTU , McLean Rural - SHAMROCK 115kV	113.9	90	
Grapevine Interchange - ELK CITY 230kV	15SP, 54294-54295-54302, AEPW WTU , SHAMROCK 115-69kV	113.9	90	

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)
Grapevine Interchange 230-115kV	06AP, 50827-50915, SPS SPS-OKLA - SPS SPS-AMA , Grapevine Interchange - Nichols Station 230kV	134.8	0	10/1/2009
Gray County Interchange 115-69kV	15SP, 50807-50808, SPS SPS-OKLA, Kingsmill Interchange 115-69kV	117.6	37	6/1/2011
Gray County Interchange 115-69kV	15SP, 50808-50842, SPS SPS-OKLA, Kingsmill Interchange - Steer Water Wind Gen 115kV	117.5	37	
Hale Co Interchange - Tuco Interchange 115kV	06AP, 51321-51533, SPS SPS-CNPL, Swisher County Interchange - Tuco Interchange 230kV	134.2	0	10/1/2009
Hale Co Interchange - Tuco Interchange 115kV	06AP, 51435-51533, SPS SPS-CNPL, Tolk Interchange - Tuco Interchange 230kV	104.4	196	
Hale Co Interchange - Tuco Interchange 115kV	15SP, 51366-51402, SPS SPS-CNPL, LH-COX - Hale Co Interchange 115kV	102.6	208	
Hale Co Interchange - Tuco Interchange 115kV	15SP, 51360-51366, SPS SPS-CNPL, COX Interchange - LH-COX 115kV	102.4	212	
Happy Interchange - TULIAT 115kV	10SP, 51041-51321, SPS SPS-AMA - SPS SPS-CNPL, Amarillo S Interchange - Swisher County Interchange 230kV	133.6	0	6/1/2009
Happy Interchange - TULIAT 115kV	06AP, 51041-51321, SPS SPS-AMA - SPS SPS-CNPL, Amarillo S Interchange - Swisher County Interchange 230kV	132.7	0	
HIGHLT - Nichols Station 115kV	06AP, 50751-50915, SPS SPS-OKLA - SPS SPS-AMA , Hutchinson Co. Interchange - Nichols Station 230kV	102.4	243	10/1/2009

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)
HIGHT - Pantex South 115kV	06AP, 50751-50915, SPS SPS-OKLA - SPS SPS-AMA , Hutchinson Co. Interchange - Nichols Station 230kV	108.6	200	10/1/2009
JERICO - JERIC2WT 115-()kV	06AP, 50838-50932, SPS SPS-OKLA - SPS SPS-AMA , MCLELLN - Kirby 115kV	112.3	88	10/1/2009
JERICO - JERIC2WT 115-()kV	06AP, 50838-50840, SPS SPS-OKLA, MCLELLN - McLean Rural 115kV	111.7	97	
JERICO - JERIC2WT 115-()kV	06AP, 54294-54295-54302, AEPW WTU , SHAMROCK 115-69kV	111.2	105	
JERICO - JERIC2WT 115-()kV	06AP, 50840-54295, SPS SPS-OKLA - AEPW WTU , McLean Rural - SHAMROCK 115kV	111.0	108	
JERICO - JERIC2WT 115-()kV	06AP, 54292-54293, AEPW WTU , WELLINGTON - SHAMROCK 138kV	110.0	128	
JERICO - JERIC2WT 69-()kV	06AP, 50838-50932, SPS SPS-OKLA - SPS SPS-AMA , MCLELLN - Kirby 115kV	115.0	66	10/1/2009
JERICO - JERIC2WT 69-()kV	06AP, 50838-50840, SPS SPS-OKLA, MCLELLN - McLean Rural 115kV	114.4	74	
JERICO - JERIC2WT 69-()kV	06AP, 54294-54295-54302, AEPW WTU , SHAMROCK 115-69kV	114.1	81	
JERICO - JERIC2WT 69-()kV	06AP, 50840-54295, SPS SPS-OKLA - AEPW WTU , McLean Rural - SHAMROCK 115kV	113.8	83	
JERICO - JERIC2WT 69-()kV	06AP, 54292-54293, AEPW WTU , WELLINGTON - SHAMROCK 138kV	112.7	104	

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)
Manhattan - MANHTP 115kV	15SP, 50956-50964, SPS SPS-AMA , East Plant Interchange - Pierce Tap 115kV	114.9	0	6/1/2011
Manhattan - MANHTP 115kV	15SP, 50964-51014, SPS SPS-AMA , Pierce Tap - Osage Switching Station 115kV	105.9	138	
McCullough - Kingsmill Interchange 69kV	06AP, 50827-50915, SPS SPS-OKLA - SPS SPS-AMA , Grapevine Interchange - Nichols Station 230kV	105.5	193	10/1/2009
MCLELLN - Kirby 115kV	15SP, 54275-54282, AEPW WTU , NW Memphis - MEMPHIS 69kV	117.1	0	6/1/2009
MCLELLN - Kirby 115kV	06AP, 50827-54153, SPS SPS-OKLA - AEPW WESTERN , Grapevine Interchange - ELK CITY 230kV	116.7	0	
MCLELLN - Kirby 115kV	06AP, 54121-54153-54145, AEPW WESTERN , ELK CITY 230-138kV	116.5	0	
MCLELLN - Kirby 115kV	10SP, 54275-54281, AEPW WTU , NW Memphis - NORTH MEMPHIS REA 69kV	114.8	0	
MCLELLN - Kirby 115kV	10SP, 54275-54282, AEPW WTU , NW Memphis - MEMPHIS 69kV	114.0	0	
MCLELLN - Kirby 115kV	15SP, 54282-54283, AEPW WTU , MEMPHIS - RED RIVER ARSENAL 69kV	113.0	47	
MCLELLN - Kirby 115kV	15SP, 54283-54284, AEPW WTU , RED RIVER ARSENAL - ESTELENE 69kV	112.6	53	
MCLELLN - Kirby 115kV	10SP, 54282-54283, AEPW WTU , MEMPHIS - RED RIVER ARSENAL 69kV	110.0	70	
MCLELLN - Kirby 115kV	10SP, 54283-54284, AEPW WTU , RED RIVER ARSENAL - ESTELENE 69kV	109.7	76	
MCLELLN - Kirby 115kV	10SP, 54284-54285, AEPW WTU , ESTELENE - CAREY 69kV	109.4	80	

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)
Nichols Station - Whitaker 115kV	15SP, 50908-50914, SPS SPS-AMA , Cherry - Nichols Station 115kV	125.8	0	6/1/2011
Nichols Station - Whitaker 115kV	15SP, 50907-50957, SPS SPS-AMA , Harrington Station - East Plant Interchange 230kV	122.5	0	
Nichols Station - Whitaker 115kV	15SP, 50956-50957, SPS SPS-AMA , East Plant Interchange 230-115kV	122.4	0	
Nichols Station - Whitaker 115kV	15SP, 50908-50938, SPS SPS-AMA , Cherry - Northwest Interchange 115kV	121.6	0	
Nichols Station - Whitaker 115kV	15SP, 50907-51021, SPS SPS-AMA , Harrington Station - Randall County Interchange 230kV	118.4	0	
Nichols Station - Whitaker 115kV	15SP, 51020-51021, SPS SPS-AMA , Randall County Interchange 230-115kV	118.3	0	
Nichols Station - Whitaker 115kV	15SP, 50751-50915, SPS SPS-OKLA - SPS SPS-AMA , Hutchinson Co. Interchange - Nichols Station 230kV	114.3	133	
Nichols Station - Whitaker 115kV	15SP, 50807-50808, SPS SPS-OKLA, Kingsmill Interchange 115-69kV	104.9	184	
Nichols Station - Whitaker 115kV	15SP, 50808-50842, SPS SPS-OKLA, Kingsmill Interchange - Steer Water Wind Gen 115kV	104.9	184	
Nichols Station - Whitaker 115kV	15SP, 51435-51441, SPS SPS-CNPL, Tolk Interchange - Tolk 1 230-24kV	103.3	165	

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)
Osage Switching Station - Canyon East 115kV	10SP, 50993-51111, SPS SPS-AMA - SPS SPS-CLHF, Bushland Interchange - Deaf Smith Interchange 230kV	154.1	0	6/1/2009
Osage Switching Station - Canyon East 115kV	15SP, 51435-51441, SPS SPS-CNPL, Tolk Interchange - Tolk 1 230-24kV	125.5	0	
Osage Switching Station - Canyon East 115kV	06AP, 50993-51111, SPS SPS-AMA - SPS SPS-CLHF, Bushland Interchange - Deaf Smith Interchange 230kV	125.0	0	
Osage Switching Station - Canyon East 115kV	10SP, 51041-51321, SPS SPS-AMA - SPS SPS-CNPL, Amarillo S Interchange - Swisher County Interchange 230kV	107.2	26	
Osage Switching Station - Canyon East 115kV	10WP, 50993-51111, SPS SPS-AMA - SPS SPS-CLHF, Bushland Interchange - Deaf Smith Interchange 230kV	105.5	173	
Osage Switching Station - Canyon East 115kV	15SP, 50887-50993, SPS SPS-AMA , Potter County Interchange - Bushland Interchange 230kV	103.6	172	
Osage Switching Station - Canyon East 115kV	15SP, 51110-51111, SPS SPS-CLHF, Deaf Smith Interchange 230-115kV	102.2	200	
Osage Switching Station - Canyon East 115kV	15SP, 51110-51111, SPS SPS-CLHF, Deaf Smith Interchange 230-115kV CKT 2	102.2	200	
Osage Switching Station - Canyon East 115kV	15SP, 51020-51082, SPS SPS-AMA - SPS SPS-CLHF, Randall County Interchange - PALODU 115kV	101.3	233	
Osage Switching Station - Canyon East 115kV	15SP, 51250-51418, SPS SPS-CLHF - SPS SPS-CNPL, BC-Earth Interchange - Plant X Interchange 115kV	101.2	232	

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)
Osage Switching Station - MANHTP 115kV	15SP, 50956-50964, SPS SPS-AMA , East Plant Interchange - Pierce Tap 115kV	117.9	0	6/1/2009
Osage Switching Station - MANHTP 115kV	10SP, 50915-51041, SPS SPS-AMA , Nichols Station - Amarillo S Interchange 230kV	109.3	0	
Osage Switching Station - MANHTP 115kV	15SP, 50964-51014, SPS SPS-AMA , Pierce Tap - Osage Switching Station 115kV	108.4	3	
PALODU - Happy Interchange 115kV	10SP, 51041-51321, SPS SPS-AMA - SPS SPS-CNPL, Amarillo S Interchange - Swisher County Interchange 230kV	161.3	0	6/1/2009
PALODU - Happy Interchange 115kV	06AP, 51041-51321, SPS SPS-AMA - SPS SPS-CNPL, Amarillo S Interchange - Swisher County Interchange 230kV	139.5	0	
PALODU - Happy Interchange 115kV	15SP, 51435-51441, SPS SPS-CNPL, Tolk Interchange - Tolk 1 230-24kV	126.1	0	
PALODU - Happy Interchange 115kV	10SP, 50993-51111, SPS SPS-AMA - SPS SPS-CLHF, Bushland Interchange - Deaf Smith Interchange 230kV	125.5	0	
PALODU - Happy Interchange 115kV	15SP, 51396-51418, SPS SPS-CNPL, LC-SOL - Plant X Interchange 115kV	121.0	0	
PALODU - Happy Interchange 115kV	15SP, 51388-51396, SPS SPS-CNPL, Lamton Interchange - LC-SOL 115kV	119.2	0	
PALODU - Happy Interchange 115kV	15SP, 51014-51080, SPS SPS-AMA - SPS SPS-CLHF, Osage Switching Station - Canyon East 115kV	118.1	0	
PALODU - Happy Interchange 115kV	15SP, 51419-51733, SPS SPS-CNPL, Plant X Interchange - Sundown Interchange 230kV	117.6	0	
PALODU - Happy Interchange 115kV	15SP, 51402-51418, SPS SPS-CNPL, Hale Co Interchange - Plant X Interchange 115kV	117.2	0	
PALODU - Happy Interchange 115kV	10SP, 50915-51041, SPS SPS-AMA , Nichols Station - Amarillo S Interchange 230kV	116.8	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)
Pantex North - Pantex South 115kV	06AP, 50751-50915, SPS SPS-OKLA - SPS SPS-AMA , Hutchinson Co. Interchange - Nichols Station 230kV	110.0	190	10/1/2009
Pierce Tap - Osage Switching Station 115kV	15SP, 50956-50978, SPS SPS-AMA , East Plant Interchange - Manhattan 115kV	117.8	0	6/1/2009
Pierce Tap - Osage Switching Station 115kV	15SP, 50978-51018, SPS SPS-AMA , Manhattan - MANHTP 115kV	107.4	109	
Pierce Tap - Osage Switching Station 115kV	10SP, 50956-50978, SPS SPS-AMA , East Plant Interchange - Manhattan 115kV	103.0	101	

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)
Randall County Interchange - PALODU 115kV	06AP, 51041-51321, SPS SPS-AMA - SPS SPS-CNPL, Amarillo S Interchange - Swisher County Interchange 230kV	140.6	0	6/1/2009
Randall County Interchange - PALODU 115kV	15SP, 51316-51320, SPS SPS-CNPL, Kress Interchange - Swisher County Interchange 115kV	137.2	0	
Randall County Interchange - PALODU 115kV	15SP, 51320-51321, SPS SPS-CNPL, Swisher County Interchange 230-115kV	137.2	0	
Randall County Interchange - PALODU 115kV	15SP, 51435-51441, SPS SPS-CNPL, Tolk Interchange - Tolk 1 230-24kV	128.4	0	
Randall County Interchange - PALODU 115kV	10SP, 50993-51111, SPS SPS-AMA - SPS SPS-CLHF, Bushland Interchange - Deaf Smith Interchange 230kV	127.7	0	
Randall County Interchange - PALODU 115kV	15SP, 51396-51418, SPS SPS-CNPL, LC-SOL - Plant X Interchange 115kV	123.5	0	
Randall County Interchange - PALODU 115kV	10SP, 50915-51041, SPS SPS-AMA , Nichols Station - Amarillo S Interchange 230kV	119.0	0	
Randall County Interchange - PALODU 115kV	10SP, 50887-51419, SPS SPS-AMA - SPS SPS-CNPL, Potter County Interchange - Plant X Interchange 230kV	118.7	0	
Randall County Interchange - PALODU 115kV	15SP, 51418-51419, SPS SPS-CNPL, Plant X Interchange 230-115kV	116.3	0	
Randall County Interchange - PALODU 115kV	15SP, 50751-50915, SPS SPS-OKLA - SPS SPS-AMA , Hutchinson Co. Interchange - Nichols Station 230kV	114.8	20	
Randall County Interchange 230-115kV	10SP, 50915-51041, SPS SPS-AMA , Nichols Station - Amarillo S Interchange 230kV	109.2	0	6/1/2009
SHAMROCK - SHAMRCK1 115-()kV	06AP, 54275-54281, AEPW WTU , NW Memphis - NORTH MEMPHIS REA 69kV	104.0	204	10/1/2009
SHAMROCK - SHAMRCK1 69-()kV	06AP, 54275-54281, AEPW WTU , NW Memphis - NORTH MEMPHIS REA 69kV	107.2	170	10/1/2009

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)
SHAMROCK - SHAMRCK2 138-()kV	06AP, 50932-54276, SPS SPS-AMA - AEPW WTU , Kirby - JERICO 115kV	105.4	147	10/1/2009
SHAMROCK - SHAMRCK2 138-()kV	06AP, 54276-54277-54303, AEPW WTU , JERICO 115-69kV	105.4	148	
SHAMROCK - SHAMRCK2 138-()kV	06AP, 54275-54281, AEPW WTU , NW Memphis - NORTH MEMPHIS REA 69kV	102.8	227	
SHAMROCK - SHAMRCK2 69-()kV	06AP, 54276-54277-54303, AEPW WTU , JERICO 115-69kV	102.0	214	10/1/2009
TULIAT - Kress Interchange 115kV	06AP, 51041-51321, SPS SPS-AMA - SPS SPS- CNPL, Amarillo S Interchange - Swisher County Interchange 230kV	129.2	0	6/1/2009
TULIAT - Kress Interchange 115kV	10SP, 51041-51321, SPS SPS-AMA - SPS SPS- CNPL, Amarillo S Interchange - Swisher County Interchange 230kV	126.3	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)
Whitaker - East Plant Interchange 115kV	15SP, 50908-50914, SPS SPS-AMA , Cherry - Nichols Station 115kV	118.6	0	6/1/2011
Whitaker - East Plant Interchange 115kV	15SP, 50907-50957, SPS SPS-AMA , Harrington Station - East Plant Interchange 230kV	114.9	0	
Whitaker - East Plant Interchange 115kV	15SP, 50956-50957, SPS SPS-AMA , East Plant Interchange 230-115kV	114.8	0	
Whitaker - East Plant Interchange 115kV	15SP, 50908-50938, SPS SPS-AMA , Cherry - Northwest Interchange 115kV	114.5	17	
Whitaker - East Plant Interchange 115kV	15SP, 50907-51021, SPS SPS-AMA , Harrington Station - Randall County Interchange 230kV	111.0	50	
Whitaker - East Plant Interchange 115kV	15SP, 51020-51021, SPS SPS-AMA , Randall County Interchange 230-115kV	110.9	50	
Whitaker - East Plant Interchange 115kV	15SP, 50751-50915, SPS SPS-OKLA - SPS SPS-AMA , Hutchinson Co. Interchange - Nichols Station 230kV	106.9	199	

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, 2010 Summer and Winter Peak, 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 generator is June 1, 2009. 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 generation level of 260MW and location, additional criteria violations will occur on the existing AEPW, SPS and WFECC 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.

In order to maintain acceptable bus voltages in the local area given this and previous requests for generation interconnection, some Customers will need to install switched capacitor banks. As this Customer is proposing to add a synchronous generator with reactive capacity, this customer may not be required to add a capacitor bank at its location. Dynamic Stability studies performed as part of the impact study will provide additional guidance as to whether any required reactive compensation can be static or a portion must be dynamic (such as a SVC).

Valid load flow solutions could not be achieved for all contingencies without additional transmission facilities between SPS and the remainder of SPP. When additional transmission facilities are evaluated as part of a future transmission service request, then the need for additional reactive compensation may have to be re-evaluated at that time.

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 American Electric Power West, Southwestern Public Service Company and Western Farmers Electric Cooperative 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 \$0 for SPS' interconnection Network Upgrade facilities listed in Table 2 excluding upgrades of other transmission facilities by AEPW, SPS and WFEC listed in Table 3 of which are Network Constraints. The estimated cost of interconnecting the Customer project is estimated at \$500,000 for SPS' Direct Assignment facilities listed in Table 1. 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. 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. Given the contingency analyses in this area with the Customer exporting generation, steady-state solutions were not obtained for outages of SPS' eastern and northern 345kV lines. These contingency analyses will have to be re-evaluated as part of a TSR with additional transmission facilities between SPS and the remainder of SPP.

These interconnection costs do not include any cost that may be associated with short circuit or transient stability analysis. These studies will be performed if the Customer signs a System Impact Study Agreement.

The required interconnection costs listed in Table 2 and other upgrades associated with Network Constraints listed in Table 3 do not include all costs associated with the deliverability of the energy to final customers. These costs are determined by separate studies if the Customer requests transmission service through Southwest Power Pool's OASIS.

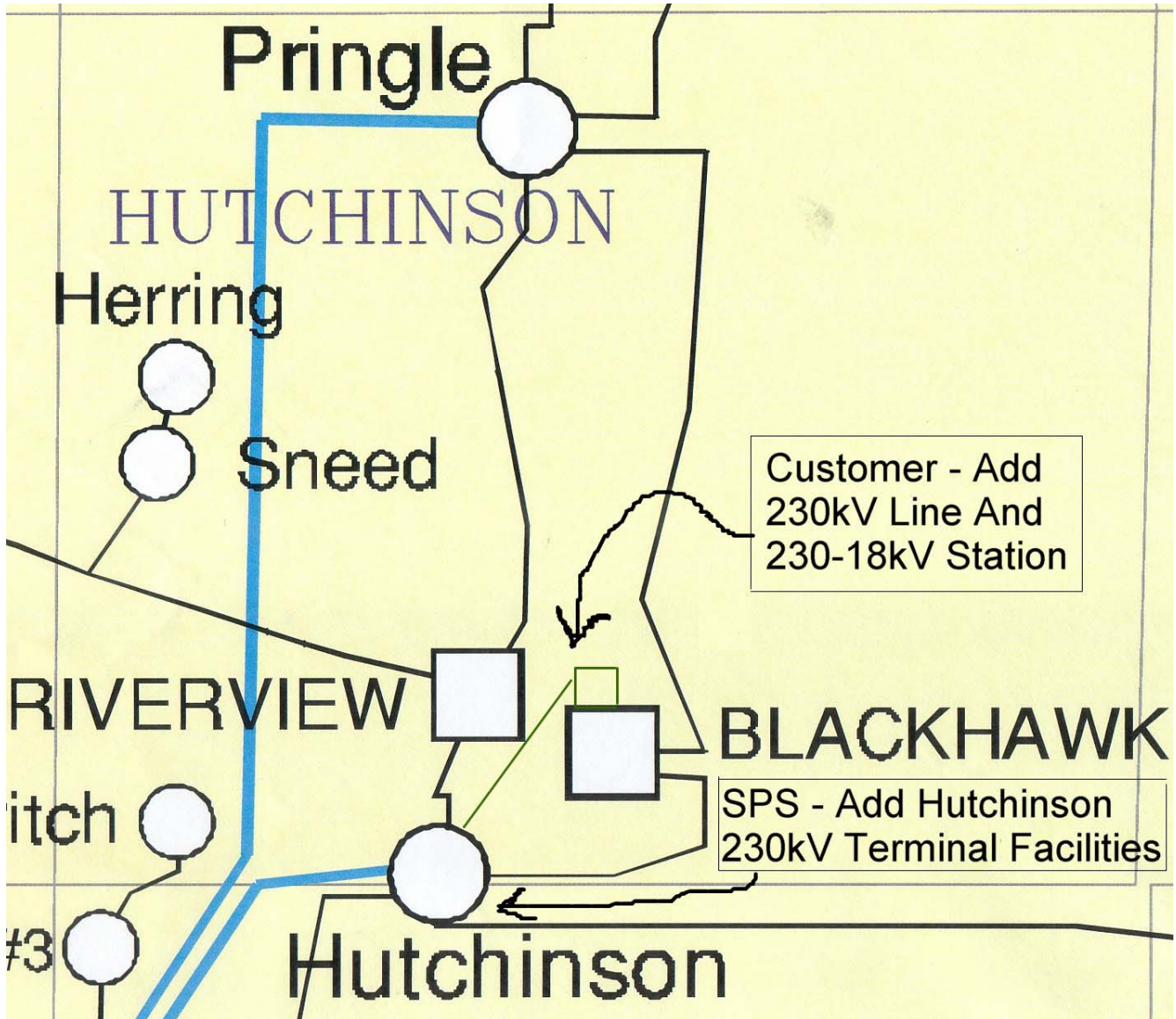


Figure 2: Map Of The Surrounding Area