

Feasibility Study For Generation Interconnection Request GEN-2005-012

SPP Tariff Studies (#GEN-2005-012)

March 17, 2006

Executive Summary

<OMITTED TEXT> (Customer) has requested a Feasibility Study for the purpose of interconnecting 400MW of wind generation within the service territory of West Plains Energy (WEPL) (d/b/a Aquila, Inc.) in Ford County Kansas. The Customer's proposed point of interconnection is in the existing Spearville 345–230-115kV Substation. These facilities are owned by Sunflower Electric Power Corporation (SUNC) and WEPL where the 345kV bus is owned by SUNC. The proposed in-service date is December 1, 2008.

As a result of a scoping meeting held on October 19, 2005 given the then known limitations of transformer capacity in the Spearville Substation, two options existed for evaluation. Subsequently, an interconnection at 345kV was evaluated and the results are documented in this report. Given the lack of ATC in the immediate area with an interconnection at the 345kV bus of which is owned by SUNC, no additional analysis was completed at this time. In the future when additional transmission facilities are defined and represented in load flow models that may accommodate the power transfers, then a comparison analysis may be completed using alternative buses within the Spearville Substation.

In addition, given a modeled contingency with an outage of the Holcomb – Spearville 345kV line in all cases, load flow solutions were nearly obtained with the specified amount of reactive compensation included in the Customer's 345–34.5kV Substation. Additional transmission facilities are required and must be modeled before additional analyses may be completed with reasonable results. The specified reactive compensation is required for voltage regulation at Spearville to minimize the potential for voltage collapse.

Power flow analysis has indicated that for the powerflow cases studied, it is possible to interconnect the 400MW of generation with transmission system reinforcements within the local Midwest Energy (MIDW), Westar Energy (WERE) and WEPL transmission system. The requirements for interconnection consist of adding 345kV bus with applicable breakers. This 345kV addition shall be constructed and maintained by SUNC. The Customer did not propose a specific 345kV line extending to serve its 345-34.5kV facilities. It is assumed that obtaining all necessary right-of-way for the necessary substation additions in the Spearville Substation will not be a significant expense.

In order to maintain acceptable bus voltages in the local area for an outage of the Holcomb – Spearville 345kV line, the Customer while using the Vestas machine will need to install 84MVAR of reactive compensation in the Customer's substation including one 27MVAR bank switched at each of two 34.5kV buses as well as a 30MVAR SVC at a third 34.5kV bus. 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). With this reactive compensation installed, additional transmission facilities are required to increase the ATC above 0MW for this contingency.

The cost for adding the 345kV bus and a breaker in the Spearville Substation, the interconnection facility, is estimated at \$650,000. Including the interconnection metering, the total estimated cost is \$900,000. An alternative point of interconnection is at the WEPL 230kV bus in the Spearville Substation, and adding a line position is estimated to cost \$2,300,000. Other Network Constraints in the Midwest Energy (MIDW), Westar Energy (WERE) and WEPL 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 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 345kV line from the Customer's 345-34.5kV 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. When a facility is overloaded for more than 10 contingencies, then only the results with the 10 highest values of loading may be included in this table.

There are a significant number of overloaded facilities associated with this request. For the outage of the Holcomb – Spearville 345kV line, there is no load flow solution for this contingency in all cases given the lack of existing transmission capacity. While there are low voltage conditions associated with this request, none are included given the lack of transmission facilities that must be addressed for transmission service. Therefore, the reactive compensation requirements in the Customer's substation may be re-evaluated in a subsequent transmission study while using the Vestas machine.

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 MIDW 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 400MW of wind generation within the service territory of West Plains Energy in Ford County Kansas. The existing Spearville 345–230-115kV Substation facilities are owned by both SUNC and WEPL, and the proposed generation interconnection is with WEPL. The evaluated point of interconnection is at an extension of the 345kV bus owned by SUNC. The proposed in-service date is December 1, 2008.

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 345kV bus, breakers, etc. in the Spearville Substation. This 345kV addition shall be constructed and maintained by SUNC. The Customer did not propose a route of its 345kV line to serve its 345-34.5kV facilities. It is assumed that obtaining all necessary right-of-way for the additions in the SUNC 345kV facilities will not be a significant expense.

The cost for SUNC to add 345kV facilities in its Spearville Substation, the interconnection facility, is estimated at \$650,000 for bus and a breaker. Including the interconnection metering, the total estimated cost is \$900,000. Other Network Constraints in the MIDW, WERE and WEPL 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 345kV line from the Customer substation into the SUNC facilities. The Customer is responsible for this 345kV line up to the point of interconnection. This cost does not include the Customer's 345-34.5kV substation and the cost estimate should be determined by the Customer.

The costs of interconnecting the facility to the SUNC 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.

Facility	ESTIMATED COST (2006 DOLLARS)
Customer – 345-34.5 kV Substation facilities	*
including two of 27MVAR 34.5kV capacitor	
banks and a 30MVAR 34.5kV SVC.	
Customer – 345kV line between Customer	*
substation and upgraded SUNC 345kV	
Spearville Substation facilities.	
Customer - Right-of-Way for Customer	*
Substation & Line.	
Customer – Add interconnection metering at	\$250,000
Spearville 345kV bus by SUNC.	
Total	*

Table 1: Direct Assignment Facilities

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

Table 2: Required Interconnection Network Upgrade Facilities

Facility	ESTIMATED COST (2006 DOLLARS)
SUNC - Add 345kV bus, breaker, etc. in the Spearville Substation.	\$650,000
Total	\$650,000

Table 3: Network Constraints

Facility
MIDW - EDWARDS - PAWNEE-EDWARDS_JCT 115kV, 56617 - 56622
MIDW - EDWARDS - ST_JOHN 115kV, 56617 - 56624
WEPL - Greensburg - 2001-39A 115kV, 58764 - 99977
WEPL - Greensburg - Sun City 115kV, 58764 - 58797
WEPL - Harper - Medicine Lodge 138kV, 58768 - 58774
WEPL - Harper - Milan Tap 138kV, 58768 - 58775
MIDW - KINSLEY_115 - PAWNEE-EDWARDS_JCT 115kV, 56619 - 56622
WEPL - Medicine Lodge - Sun City 115kV, 58773 - 58797
WEPL - Medicine Lodge 138-115kV, 58773 - 58774
Customer - Customer Substation Reactive Compensation, Capacitor Banks and SVC.
WERE - AUBURN ROAD - JEFFREY ENERGY CENTER 230kV, 56851 - 56852
WEPL - Cimarron River Tap - Cudahy 115kV, 58752 - 58759
WERE - CIRCLE - SANDHILL JCT 115kV, 57413 - 57434
WERE - CLEARWT - GILL ENERGY CENTER WEST 138kV, 57036 - 57045
WERE - CLEARWT - Milan Tap 138kV, 57036 - 58775
WEPL - CLEARWT - Milan Tap 138kV, 57036 - 58775
WEPL - Cudahy - Judson Large 115kV, 58759 - 58771
WEPL - East Hall Tap - Mullergren 115kV, 58760 - 58778
MIDW - EDWARDS - PAWNEE-EDWARDS_JCT 115kV, 56617 - 56622
MIDW - EDWARDS - ST_JOHN 115kV, 56617 - 56624
WEPL - Greensburg - 2001-39A 115kV, 58764 - 99977
WEPL - Greensburg - Sun City 115kV, 58764 - 58797
WEPL - Haggard - West Dodge 115kV, 58767 - 58799
WEPL - Harper - Medicine Lodge 138kV, 58768 - 58774
WEPL - Harper - Milan Tap 138kV, 58768 - 58775
WERE - HOYT - JEFFERY ENERGY CENTER 345kV, 56765 - 56766
MIDW - HUNTSVILLE - HUTCHINSON ENERGY CENTER 115kV, 56618 - 57419
WERE - HUNTSVILLE - HUTCHINSON ENERGY CENTER 115kV, 56618 - 57419
MIDW - HUNTSVILLE - ST_JOHN 115kV, 56618 - 56624

MIDW - HUNTSVILLE - ST_JOHN 115kV, 56618 - 56624

Table 3: Network Constraints

Facility
WEPL - Judson Large - 2001-39A 115kV, 58771 - 99977
MIDW - KINSLEY_115 - 2004-14 115kV, 56619 - 99973
MIDW - KINSLEY_115 - PAWNEE-EDWARDS_JCT 115kV, 56619 - 56622
WEPL - Medicine Lodge - Sun City 115kV, 58773 - 58797
WEPL - Medicine Lodge 138-115kV, 58773 - 58774
WEPL - Mullergren - 2004-14T 230kV, 58779 - 99976 WERE - NORTH AMERICAN PHILIPS - NORTH AMERICAN PHILIPS JUNCTION (SOUTH) 115kV, 57372 - 57374
WERE - NORTH AMERICAN PHILIPS JUNCTION (SOUTH) - WEST MCPHERSON 115kV, 57374 - 57438
WERE - NORTH AMERICAN PHILIPS JUNCTION (SOUTH) - WEST MCPHERSON 115kV CKT 2, 57374 - 57438
WEPL - Pratt - St John 115kV, 58787 - 58796
WERE - SANDHILL JCT - WEST MCPHERSON 115kV, 57434 - 57438
WERE - SANDHILL JCT - WEST MCPHERSON 115kV CKT 2, 57434 - 57438
WEPL - Seward - St John 115kV, 58792 - 58796
WEPL - Spearville - 2004-14T 230kV, 58795 - 99976
WEPL - Spearville - North Judson Large 115kV, 58794 - 58871
WERE - SPRING CREEK JUNCTION - MOUNDRIDGE 115kV, 57380 - 57429
MIDW - ST_JOHN - St John 115kV, 56624 - 58796
WEPL - ST_JOHN - St John 115kV, 56624 - 58796

Facility	Model &	Facility Loading		Date
	Contingency	Voltage (PU)	(10100)	(M/D/Y)
EDWARDS - PAWNEE-				
EDWARDS_JCT 115kV, 56617 -	15SB Base Case	115.6	106	12/1/2008
FDWARDS - PAWNEE-	TOOP, Dase Case	115.0	190	12/1/2000
EDWARDS JCT 115kV, 56617 –				
56622	10WP, Base Case	114.6	209	
EDWARDS - PAWNEE-				
EDWARDS_JCT 115kV, 56617 –				
56622	07WP, Base Case	114.4	211	
EDWARDS - PAWNEE-				
EDWARDS_JCT 115KV, 50017 - 56622	10SP Base Case	114 1	219	
EDWARDS - ST JOHN 115kV.		117.1	215	
56617 - 56624,	07WP, Base Case	108.3	290	12/1/2008
EDWARDS - ST_JOHN 115kV,				
56617 - 56624	10WP, Base Case	107.7	300	
EDWARDS - ST_JOHN 115kV,	450D Dave Orea	405 5	200	
50617 - 50624	155P, Base Case	105.5	328	
56617 - 56624	10SP Base Case	104 4	342	
Greensburg - 2001-39A 115kV.		101.1	012	
58764 - 99977,	15SP, Base Case	178.0	0	12/1/2008
Greensburg - 2001-39A 115kV,				
58764 - 99977	10SP, Base Case	173.7	0	
Greensburg - 2001-39A 115kV,		172.6	0	
Greensburg - 2001-394 115kV	UTWF, Dase Case	172.0	0	
58764 - 99977	10WP, Base Case	169.9	0	
Greensburg - 2001-39A 115kV,				
58764 - 99977	06AP, Base Case	137.9	0	
Greensburg - Sun City 115kV,	450D David Oraci	101.0	070	0/4/004 4
58764 - 58797,	15SP, Base Case	101.0	376	6/1/2014
58768 - 58774.	15SP. Base Case	161.8	0	12/1/2008
Harper - Medicine Lodge 138kV,	,			
58768 - 58774	07WP, Base Case	161.2	0	
Harper - Medicine Lodge 138kV,			_	
58768 - 58774	10WP, Base Case	157.8	0	
Harper - Medicine Lodge 138kV,	10SP Base Coop	157 0	0	
Harper - Medicine Lodge 138k//	IUSE, DASE GASE	157.0	0	
58768 - 58774	06AP, Base Case	127.2	159	

Facility	Model &	Facility Loading	ATC	Date
	Contingency	(% Rate B) Or	(MW)	Required
		Voltage (PU)		(M/D/Y)
Harper - Milan Tap 138kV, 58768 -		407.0	0.07	40/4/0000
58/75,	07WP, Base Case	107.9	307	12/1/2008
Harper - Milan Tap 138KV, 58768 -	10WP Base Case	105.3	338	
Harper - Milan Tap 138kV. 58768 -		100.0	000	
58775	15SP, Base Case	105.0	344	
Harper - Milan Tap 138kV, 58768 -				
58775	10SP, Base Case	101.4	385	
KINSLEY_115 - PAWNEE-				
EDWARDS_JCT 115KV, 50019 - 56622	15SP Base Case	134.2	0	12/1/2008
KINSLEY 115 - PAWNEE-		104.2	0	12/1/2000
EDWARDS_JCT 115kV, 56619 -				
56622	10SP, Base Case	131.8	0	
KINSLEY_115 - PAWNEE-				
EDWARDS_JCT 115kV, 56619 -		400.0	50	
50622 KINSLEV 115 DAWNEE	1000P, Base Case	126.9	52	
FDWARDS JCT 115kV 56619 -				
56622	07WP, Base Case	125.7	65	
KINSLEY_115 - PAWNEE-				
EDWARDS_JCT 115kV, 56619 -				
56622	06AP, Base Case	105.6	324	
58773 - 58797,	07WP, Base Case	158.8	0	12/1/2008
Medicine Lodge - Sun City 115kV,				
58773 - 58797	15SP, Base Case	157.1	0	
Medicine Lodge - Sun City 115kV,		450.0	0	
58773 - 58797 Modicina Lodgo Sun City 115kV	1000P, Base Case	156.0	0	
58773 - 58797	10SP, Base Case	153.2	0	
Medicine Lodge - Sun City 115kV,		100.0	05	
58/73 - 58/97 Modicing Lodge 128 115k// 58772	UGAP, Base Case	130.6	25	
- 58774,	07WP, Base Case	170.5	0	12/1/2008
Medicine Lodge 138-115kV, 58773	(100 0 0			
- 58//4	15SP, Base Case	168.1	0	
- 58774	10WP, Base Case	166.5	0	
Medicine Lodge 138-115kV, 58773		404.4		
- 20/14 Medicine Lodge 138-11541/ 59772	IUSP, Base Case	104.1	0	
- 58774	06AP. Base Case	140.8	0	

Facility	Model &	Facility Loading	ATC	Date
	Contingency	(% Rate B) Or	(MW)	Required
		Voltage (PU)		(M/D/Y)
	15SP, 58779-99976,			
Customer Substation Reactive	WEPL -,			
Compensation, Capacitor Banks	Mullergren - 2004-141	No solution, and	0	10/1/0000
	230KV .	the ATC = 010100 .	0	12/1/2008
Customer Substation Reactive	00AP, 30449-30409, SUNC SEDC			
Compensation Capacitor Banks	HOLCOMB -	No solution and		
and SVC	SPEARVILLE 345kV	the ATC = $0MW$	0	12/1/2008
	10SP, 56449-56469			12/1/2000
Customer Substation Reactive	SUNC SEPC ,			
Compensation, Capacitor Banks	HOLCOMB -	No solution, and		
and SVC.	SPEARVILLE 345kV.	the ATC = $0MW$.	0	12/1/2008
	07WP, 56449-56469,			
Customer Substation Reactive	SUNC SEPC ,			
Compensation, Capacitor Banks	HOLCOMB -	No solution, and		
and SVC.	SPEARVILLE 345kV.	the ATC = 0MW.	0	12/1/2008
	10WP, 56449-56469,			
Customer Substation Reactive	SUNC SEPC ,	No. and Constant		
Compensation, Capacitor Banks		No solution, and	0	10/1/0000
	SPEARVILLE 345KV .	$\operatorname{trie} A T C = 0 V V V.$	0	12/1/2006
Customer Substation Reactive	SUNC SEPC			
Compensation Capacitor Banks	HOLCOMB -	No solution and		
and SVC.	SPEARVILLE 345kV	the ATC = $0MW$.	0	12/1/2008
				,.,

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.

With reactive compensation installed in the Customer's 345-34.5kV Substation at the 34.5kV buses, additional transmission facilities are required to increase the ATC above 0MW given these contingencies.

Facility	Model & Contingency	Facility Loading	ATC	Date
,		(% Rate B) Or	(MW)	Required
			()	(M/D/Y)
ALIBURN ROAD - IEFEREY	10SP 56765-56766 WERE			
	NEAST HOVE IEEEDV			
56851 - 56852	ENERGY CENTER 3454V	120.3	0	12/1/2008
	10W/D 56765 56766 W/EDE	120.3	0	12/1/2000
	NEAST HOVE RECEDV			
56851 - 56852	ENERGY CENTER 3454V	115 3	0	
30031 - 30032	159D 59704 59971 WEDI	115.5	0	
Cimarron River Tan, Cudaby	Spoonville North Judson			
1151/ 59752 59750	Large 115kV	101 7	2/10	6/1/2012
TISKV, 38732 - 38739,		101.7	340	0/1/2013
	135F, 3007 1-30072, WERE			
115KV 57412 57424		100 6	70	6/1/2011
115KV, 57413 - 57434,		120.0	10	0/1/2011
	SEDC SDS SDS			
CENTED WEST 1294/	AMA HOLCOMP Einnov			
57026 57045	Station 245kV	100.0	224	12/1/2008
CLEADWT CILLENEDCY		122.0	224	12/1/2000
CENTED WEST 1294/				
EZO26 EZO46	Speenville 220 115kV	101.2	200	
	, Spearville 230-115KV	101.2	300	
CENTED WEST 1294/	Speanville North Judson			
EZO26 EZO46	, Spearville - North Judson	100.2	207	
57030 - 57045		100.2	397	
	SEDC SDS SDNC			
CLEADW/T Milan Tan	AMA HOLCOMP Einnov			
138kV/ 57036 - 58775	Station 345kV	10/ 7	205	12/1/2008
136KV, 37030 - 36773,	10W/D 56440 50858 SUNC	124.7	205	12/1/2000
	SEPC _ SPS _ SPS_			
CLEARW/T - Milan Tan				
138kV/ 57036 - 58775	Station 3/5k//	107.0	315	12/1/2008
13687, 37636 - 36773,	10W/P 58794-58871 W/EPI	107.3	515	12/1/2000
CLEARWT - Milan Tan	Spearville - North Judson			
138kV 57036 - 58775	l arge 115kV	107.0	304	
CLEARWT - Milan Tan	10W/P 58794-58795 W/EPI	107.0	- 504	
138k/ 57036 - 58775	Spearville 230-115k\/	105.0	326	
CLEARW/T - Milan Tan	07W/P 58794-58795 W/EPI	100.0	520	
138k\/ 57036 - 58775	Spearville 230-115k\/	104.0	331	
100kV, 07000 00770	07W/P 58794-58871 W/EPI	104.0	001	
CLEARWT - Milan Tan	Spearville - North Judson			
138k/ 57036 - 58775	l arge 115kV	103.2	3/6	
100(1,01000 - 00110	155P 56449-50858 SUNC	105.2	540	
	SEPC - SPS SPS-			
CLEARWT - Milan Tan	AMA HOLCOMB - Finney			
138k\/ 57036 - 58775	Station 345kV	102.1	382	

 CLEARWI - Millin Tap
 AMA, HOLCOMB - Finney

 138kV, 57036 - 58775
 Station 345kV

 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.

Facility	Model & Contingency	Facility Loading (% Rate B) Or Voltage (PU)	ATC (MW)	Date Required (M/D/Y)
	10SP, 58764-99977, WEPL	_ , , , , , , , , , , , , , , , , , ,		
Cudahy - Judson Large	- , Greensburg - 2001-39A			
115kV, 58759 - 58771,	115kV	112.8	279	12/1/2008
	15SP, 58794-58871, WEPL			
Cudahy - Judson Large	, Spearville - North Judson			
115kV, 58759 - 58771	Large 115kV	105.9	220	
	10WP, 58794-58871, WEPL			
Cudahy - Judson Large	, Spearville - North Judson			
115kV, 58759 - 58771	Large 115kV	105.3	251	
Cudahy - Judson Large	10WP, 58794-58795, WEPL			
115kV, 58759 - 58771	, Spearville 230-115kV	101.8	336	
Cudahy - Judson Large	15SP, 58794-58795, WEPL			
115kV, 58759 - 58771	, Spearville 230-115kV	100.4	386	
	15SP, 56551-56561, MIDW			
East Hall Tap - Mullergren	REG E-IL, SALINE RIVER -			
115kV, 58760 - 58778,	KNOLL 115kV	102.5	0	6/1/2011
EDWARDS - PAWNEE-	10WP, 58779-99976, WEPL			
EDWARDS_JCT 115kV,	- , Mullergren - 2004-14T			
56617 - 56622,	230kV	232.6	0	12/1/2008
EDWARDS - PAWNEE-	07WP, 58779-99976, WEPL			
EDWARDS_JCT 115kV,	- , Mullergren - 2004-14T			
56617 - 56622	230kV	231.4	0	
EDWARDS - PAWNEE-	10SP, 58779-99976, WEPL			
EDWARDS_JCT 115kV,	- , Mullergren - 2004-14T			
56617 - 56622	230kV	230.8	0	
EDWARDS - PAWNEE-	06AP, 58779-99976, WEPL			
EDWARDS_JCT 115kV,	- , Mullergren - 2004-141	000 5		
56617 - 56622	230kV	202.5	0	
EDWARDS - PAWNEE-	10SP, 58764-99977, WEPL			
EDWARDS_JCT 115kV,	- , Greensburg - 2001-39A	450.0		
56617 - 56622	115KV	159.2	0	
	07WP, 56449-50858, SUNC			
EDWARDS - PAVVNEE-	SEPC - SPS SPS-			
EDWARDS_JCT 115KV,	AMA, HOLCOMB - Finney	454.0	0	
50017 - 50022		154.3	0	
EDWARDS - PAVVNEE-	155P, 58764-99977, WEPL			
EDWARDS_JCT TT5KV,	- , Greensburg - 2001-39A	150.0	0	
50017 - 50022		150.2	0	
EDWARDS - PAVVINEE-	1000P, 58764-99977, WEPL			
EDWARDS_JCT TISKV,	- , Greensburg - 2001-39A	140.0	0	
50017 - 50022		140.3	0	
EDWARDS - PAVVINEE-	07 WP, 56764-99977, WEPL			
56617 - 56622	- , Greensburg - 2001-39A	1/6 0	0	
	1580 59764 59707 WEDI	140.9	0	
	Greensburg Sup City			
56617 - 56622	115kV	146.2	Ο	
		140.4		

Facility	Model & Contingency	Facility Loading (% Rate B) Or	ATC (MW)	Date Required
		Voltage (PU)	()	(M/D/Y)
	10WP, 58779-99976, WEPL	c ()		
EDWARDS - ST_JOHN	- , Mullergren - 2004-14T	005.4		40/4/0000
115KV, 56617 - 56624,		225.1	0	12/1/2008
EDWARDS - ST JOHN	- Mullergren - 2004-14T			
115kV, 56617 - 56624	230kV	224.4	0	
	10SP, 58779-99976, WEPL			
EDWARDS - ST_JOHN	- , Mullergren - 2004-14T		_	
115kV, 56617 - 56624	230kV	219.0	0	
	06AP, 58779-99976, WEPL			
115kV 56617 - 56624	- , Mullergren - 2004-141	100 1	0	
113(0, 30017 - 30024	10SP 58764-99977 WEPI	100.1		
EDWARDS - ST JOHN	Greensburg - 2001-39A			
115kV, 56617 - 56624	115kV	148.3	15	
	07WP, 56449-50858, SUNC			
	SEPC - SPS SPS-			
EDWARDS - ST_JOHN	AMA , HOLCOMB - Finney	4.40 7		
115kV, 56617 - 56624		146.7	38	
	1000P, 58764-99977, 00EPL			
115kV 56617 - 56624	115kV	141 5	0	
	07WP. 58764-99977. WEPL			
EDWARDS - ST_JOHN	- , Greensburg - 2001-39A			
115kV, 56617 - 56624	115kV	140.7	0	
	15SP, 58764-99977, WEPL			
EDWARDS - ST_JOHN	- , Greensburg - 2001-39A			
115kV, 56617 - 56624	115kV	139.4	0	
	1000P, 58764-58797, WEPL			
115kV 56617 - 56624	115kV	139.2	4	
		10012		

Facility	Model & Contingency	Facility Loading (% Rate B) Or	ATC (MW)	Date Required
		Voltage (PU)		(M/D/Y)
	10WP, 58794-58871, WEPL			
Greensburg - 2001-39A	, Spearville - North Judson			
115kV, 58764 - 99977,	Large 115kV	253.0	0	12/1/2008
Greensburg - 2001-39A	10WP, 58794-58795, WEPL			
115kV, 58764 - 99977	, Spearville 230-115kV	247.3	0	
	15SP, 58795-99976, WEPL			
Greensburg - 2001-39A	- , Spearville - 2004-14T			
115kV, 58764 - 99977	230kV	246.7	0	
	07WP, 58795-99976, WEPL			
Greensburg - 2001-39A	- , Spearville - 2004-14T			
115kV, 58764 - 99977	230kV	241.6	0	
Greensburg - 2001-39A	07WP, 58794-58795, WEPL			
115kV, 58764 - 99977	, Spearville 230-115kV	240.7	0	
	07WP, 58794-58871, WEPL			
Greensburg - 2001-39A	, Spearville - North Judson			
115kV, 58764 - 99977	Large 115kV	237.9	0	
	15SP, 58794-58871, WEPL			
Greensburg - 2001-39A	, Spearville - North Judson			
115kV, 58764 - 99977	Large 115kV	236.2	0	
	10SP, 58795-99976, WEPL			
Greensburg - 2001-39A	- , Spearville - 2004-14T			
115kV, 58764 - 99977	230kV	236.0	0	
	10WP, 58795-99976, WEPL			
Greensburg - 2001-39A	- , Spearville - 2004-14T			
115kV, 58764 - 99977	230kV	234.5	0	
	07WP, 56449-50858, SUNC			
	SEPC - SPS SPS-			
Greensburg - 2001-39A	AMA , HOLCOMB - Finney			
115kV, 58764 - 99977	Station 345kV	231.6	0	

Facility	Model & Contingency	Facility Loading (% Rate B) Or	ATC (MW)	Date Required
	450D 50705 00070 WEDI	vollage (FU)		
Croopoburg Sup City	155P, 58795-99976, WEPL			
	- , Spearville - 2004-141	142.6	20	12/1/2009
115KV, 56764 - 56797,	10SD 58705 00076 WEDI	142.0	20	12/1/2000
Greensburg - Sun City	103F, 50795-99970, WEFL			
115k\/ 58764 - 58797	230kV	136 5	57	
	15SP 58794-58871 WEPI	100.0	07	
Greensburg - Sun City	Spearville - North Judson			
115kV, 58764 - 58797	Large 115kV	136.2	0	
	10SP. 58779-99976. WEPL			
Greensburg - Sun City	- , Mullergren - 2004-14T			
115kV, 58764 - 58797	230kV	132.7	88	
Greensburg - Sun City	15SP, 58794-58795, WEPL			
115kV, 58764 - 58797	, Spearville 230-115kV	132.3	0	
	10SP, 58794-58871, WEPL			
Greensburg - Sun City	, Spearville - North Judson			
115kV, 58764 - 58797	Large 115kV	130.5	0	
Greensburg - Sun City	10SP, 58794-58795, WEPL			
115kV, 58764 - 58797	, Spearville 230-115kV	128.1	0	
	07WP, 56449-50858, SUNC			
	SEPC - SPS SPS-			
Greensburg - Sun City	AMA , HOLCOMB - Finney			
115kV, 58764 - 58797	Station 345kV	124.7	209	
	15SP, 56451-56465, SUNC			
Greensburg - Sun City	SEPC , MINGO - SETAB	447.0	100	
115KV, 58764 - 58797	345KV	117.9	199	
	155P, 56449-50858, SUNC			
Croopoburg Sup City	AMA HOLCOMP Einpor			
$\frac{115}{15}$	Station 345kV	117.0	187	
115KV, 30704 - 30797		117.3	107	

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.

Facility	Model & Contingency	Facility Loading (% Rate B) Or	ATC (MW)	Date Required
		Voltage (PU)	. ,	(M/D/Y)
	10SP, 58764-99977, WEPL			
Haggard - West Dodge	- , Greensburg - 2001-39A			
115kV, 58767 - 58799,	115kV	126.2	0	12/1/2008
	06AP, 56373-56386, SUNC			
	NORTON-D, RHOADES -			
Haggard - West Dodge	GRAHAM SUBSTATION	1110	0	
115KV, 58767 - 58799		114.8	0	
115k\/ 58767 - 58799	Beloit 115-34 5kV	11/1 7	0	
11387, 38787 - 38799	10SP 56558-56873 MIDW	114.7	0	
Haggard - West Dodge	REG F-II - WERE WEST			
115kV. 58767 - 58799	. KNOLL - SUMMIT 230kV	106.6	0	
,	10SP, 56558-56561, MIDW			
Haggard - West Dodge	REG E-IL, KNOLL 230-			
115kV, 58767 - 58799	115kV	106.5	0	
	10SP, 57795-56732, WERE			
	SCENTRAL, GILL ENERGY			
	CENTER EAST - GILL			
Haggard - West Dodge	ENERGY CENTER UNIT 2		_	
115kV, 58767 - 58799	69-12.5kV	106.0	0	
	10SP, 56455-58754, SUNC			
Heagard West Dedge				
115k)/ 58767 - 58700	Cimarron River Plant 115kV	105 /	0	
11387, 38787 - 38799	15SP 56558-56873 MIDW	103.4	0	
Haggard - West Dodge	REG F-II - WERE WEST			
115kV, 58767 - 58799	. KNOLL - SUMMIT 230kV	104.5	0	
	15SP, 56551-56561, MIDW			
Haggard - West Dodge	REG E-IL, SALINE RIVER -			
115kV, 58767 - 58799	KNOLL 115kV	103.4	0	
	15SP, 56451-56465, SUNC			
Haggard - West Dodge	SEPC , MINGO - SETAB			
115kV, 58767 - 58799	345kV	103.3	0	
			<u> </u>	

Facility	Model & Contingency	Facility Loading	ATC	Date
		(% Rate B) Or	(MW)	Required
	07WP, 56449-50858, SUNC			
	SEPC - SPS SPS-			
Harper - Medicine Lodge	AMA, HOLCOMB - Finney	222.5	0	10/1/2009
130KV, 30700 - 30774,	10WP 56449-50858 SUNC	222.5	0	12/1/2000
	SEPC - SPS SPS-			
Harper - Medicine Lodge	AMA , HOLCOMB - Finney			
138kV, 58768 - 58774	Station 345kV	200.5	0	
Harper - Medicine Lodge	10WP, 58/94-588/1, WEPL Speanville - North Judson			
138kV. 58768 - 58774	Large 115kV	198.3	0	
	15SP, 56449-50858, SUNC			
	SEPC - SPS SPS-			
Harper - Medicine Lodge	AMA , HOLCOMB - Finney	405 7		
138kV, 58768 - 58774		195.7	0	
138kV 58768 - 58774	Spearville 230-115kV	195.4	0	
Harper - Medicine Lodge	07WP, 58794-58795, WEPL	100.1		
138kV, 58768 - 58774	, Spearville 230-115kV	193.7	0	
	07WP, 58794-58871, WEPL			
Harper - Medicine Lodge	, Spearville - North Judson	400 7	0	
138KV, 58768 - 58774	Large 115KV	192.7	0	
Harper - Medicine Lodge	Spearville - North Judson			
138kV, 58768 - 58774	Large 115kV	190.6	0	
	15SP, 56451-56465, SUNC			
Harper - Medicine Lodge	SEPC , MINGO - SETAB			
138kV, 58768 - 58774	345kV	189.1	0	
	105P, 56449-50858, SUNC SEPC - SPS SPS-			
Harper - Medicine Lodge	AMA . HOLCOMB - Finney			
138kV, 58768 - 58774	Station 345kV	188.8	0	

Facility	Model & Contingency	Facility Loading	ATC	Date
		(% Rate B) Or	(MW)	Required
		Voltage (PU)	()	(M/D/Y)
	07WP, 56449-50858, SUNC			(, _,)
	SEPC - SPS SPS-			
Harper - Milan Tap 138kV,	AMA , HOLCOMB - Finney			
58768 - 58775,	Station 345kV	156.0	8	12/1/2008
	10WP, 56449-50858, SUNC			
	SEPC - SPS SPS-			
Harper - Milan Tap 138kV,	AMA, HOLCOMB - Finney	407.4	00	
58768 - 58775		137.4	89	
Horpor Milon Top 129k)/	1000P, 58794-58871, WEPL			
58768 - 58775	, Spearville - North Judson	136.3	31	
Harper - Milan Tap 138k\/	10WP 58794-58795 WEPI	130.3	51	
58768 - 58775	Spearville 230-115kV	133.9	32	
Harper - Milan Tap 138kV	07WP 58794-58795 WEPI	100.0	02	
58768 - 58775	. Spearville 230-115kV	132.7	0	
	15SP, 56449-50858, SUNC			
	SEPC - SPS SPS-			
Harper - Milan Tap 138kV,	AMA , HOLCOMB - Finney			
58768 - 58775	Station 345kV	132.0	153	
	07WP, 58794-58871, WEPL			
Harper - Milan Tap 138kV,	, Spearville - North Judson			
58768 - 58775	Large 115kV	131.9	0	
Herner Milen Ten (2014)/	15SP, 58794-58871, WEPL			
	, Spearville - North Judson	128.3	107	
30700 - 30773	15SP 56451-56465 SUNC	120.3	107	
Harper - Milan Tap 138kV	SEPC MINGO - SETAB			
58768 - 58775	345kV	127.0	195	
	10SP, 56449-50858, SUNC			
	SEPC - SPS SPS-			
Harper - Milan Tap 138kV,	AMA , HOLCOMB - Finney			
58768 - 58775	Station 345kV	126.1	175	

Facility	Model & Contingency	Facility Loading	ATC	Date
		(% Rate B) Or	(IMVV)	
	15SP 56766-56770 WERE	vollage (PD)		
	NEAST - WERE			
HOYT - JEFFERY ENERGY	NCENTRAL, JEFFERY			
CENTER 345kV, 56765 -	ENERGY CENTER -			
56766,	MORRIS COUNTY 345kV	104.9	0	6/1/3011
	15SP, 56851-56852, WERE			
HOYT - JEFFERY ENERGY	NEAST , AUBURN ROAD			
CENTER 345kV, 56765 -		4047	0	
56766	LENTER 230KV	104.7	0	
	NEAST I AWRENCE			
CENTER 345kV 56765 -				
56766	230-24k	102 7	0	
	15SP, 56853-56854, WERE	102.1		
	NEAST , LAWRENCE			
HOYT - JEFFERY ENERGY	HILL - LAWRENCE			
CENTER 345kV, 56765 -	ENERGY CENTER UNIT 5			
56766	230kV	102.7	0	
	15SP, 57040-56722, WERE			
	SCENTRAL, EVANS			
HOYT - JEFFERY ENERGY	ENERGY CENTER NORTH			
CENTER 345KV, 56765 -		100.2	201	
	07W/D 56971 59770	100.3	291	
	WERE WEST - WEPI			
CENTER 115kV 56618 -	CIRCLE - Mullergren			
57419.	230kV	117.3	0	12/1/2008
HUNTSVILLE -	10WP, 56871-58779,			
HUTCHINSON ENERGY	WERE WEST - WEPL			
CENTER 115kV, 56618 -	, CIRCLE - Mullergren			
57419,	230kV	114.0	266	12/1/2008
HUNTSVILLE -				
	06AP, 568/1-58//9, WERE			
CENTER 115KV, 56618 -	CIPCIE Mullergreen 220kV	107.4	0	
57419		107.4	0	
	WERE WEST - WEPI			
HUNTSVILLE - ST JOHN	CIRCLE - Mulleraren			
115kV, 56618 - 56624,	230kV	126.8	185	12/1/2008
	10WP, 56871-58779,			
	WERE WEST - WEPL			
HUNTSVILLE - ST_JOHN	, CIRCLE - Mullergren			
115kV, 56618 - 56624	230kV	123.9	182	
	06AP, 56871-58779, WERE			
HUNTSVILLE - ST_JOHN	WEST - WEPL ,			
115KV, 56618 - 56624	OTWD F6440 50050 OUNO	114.9	0	
	SEPC - SPS - SOL			
HUNTSVILLE - ST JOHN	AMA HOLCOMB - Finney			
115kV 56618 - 56624	Station 345kV	103 7	364	

Facility	Model & Contingency	Facility Loading (% Rate B) Or Voltage (PU)	ATC (MW)	Date Required (M/D/Y)
	10SP, 58764-99977, WEPL	3 3 3 3 3 3 3 3 3 3		(
Judson Large - 2001-39A	- , Greensburg - 2001-39A			
115kV, 58771 - 99977,	115kV	152.1	0	12/1/2008
Judson Large - 2001-39A	15SP, 99977-99978, ,			
115kV, 58771 - 99977	2001-39A 115-34.5kV	118.3	181	
Judson Large - 2001-39A	10SP, 99977-99978, ,			
115kV, 58771 - 99977	2001-39A 115-34.5kV	114.8	224	
Judson Large - 2001-39A	07WP, 99977-99978, ,			
115kV, 58771 - 99977	2001-39A 115-34.5kV	114.6	221	
Judson Large - 2001-39A	10WP, 99977-99978, ,			
115kV, 58771 - 99977	2001-39A 115-34.5kV	111.0	271	
	10WP, 58794-58871, WEPL			
Judson Large - 2001-39A	, Spearville - North Judson			
115kV, 58771 - 99977	Large 115kV	108.7	305	
Judson Large - 2001-39A	10WP, 58794-58795, WEPL			
115kV, 58771 - 99977	, Spearville 230-115kV	104.0	350	
	15SP, 58795-99976, WEPL			
Judson Large - 2001-39A	- , Spearville - 2004-14T			
115kV, 58771 - 99977	230kV	102.3	0	
	07WP, 58794-58871, WEPL			
Judson Large - 2001-39A	, Spearville - North Judson			
115kV, 58771 - 99977	Large 115kV	101.1	374	
	07WP, 58795-99976, WEPL			
Judson Large - 2001-39A	- , Spearville - 2004-14T			
115kV, 58771 - 99977	230kV	100.6	0	
	10SP, 58764-99977, WEPL			
KINSLEY_115 - 2004-14	- , Greensburg - 2001-39A			
115kV, 56619 - 99973,	115kV	195.0	73	12/1/2008
	07WP, 56449-50858, SUNC			
	SEPC - SPS SPS-			
KINSLEY_115 - 2004-14	AMA , HOLCOMB - Finney			
115kV, 56619 - 99973	Station 345kV	108.4	284	

Facility	Model & Contingency	Facility Loading (% Rate B) Or	ATC (MW)	Date Required
		Voltage (PU)		(M/D/Y)
KINSLEY_115 - PAWNEE-	10SP, 58779-99976, WEPL			
EDWARDS_JCT 115kV,	- , Mullergren - 2004-14T			
56619 - 56622,	230kV	252.2	0	12/1/2008
KINSLEY_115 - PAWNEE-	10WP, 58779-99976, WEPL			
EDWARDS_JCT 115kV,	- , Mullergren - 2004-14T			
56619 - 56622	230kV	245.8	0	
KINSLEY_115 - PAWNEE-	07WP, 58779-99976, WEPL			
EDWARDS_JCT 115kV,	- , Mullergren - 2004-14T			
56619 - 56622	230kV	244.3	0	
KINSLEY_115 - PAWNEE-	06AP, 58779-99976, WEPL			
EDWARDS_JCT 115kV,	- , Mullergren - 2004-14T			
56619 - 56622	230kV	208.7	0	
KINSLEY_115 - PAWNEE-	10SP, 58764-99977, WEPL			
EDWARDS_JCT 115kV,	- , Greensburg - 2001-39A			
56619 - 56622	115kV	179.5	0	
KINSLEY_115 - PAWNEE-	15SP, 58764-99977, WEPL			
EDWARDS_JCT 115kV,	- , Greensburg - 2001-39A			
56619 - 56622	115kV	170.1	0	
	07WP, 56449-50858, SUNC			
KINSLEY_115 - PAWNEE-	SEPC - SPS SPS-			
EDWARDS_JCT 115kV,	AMA , HOLCOMB - Finney			
56619 - 56622	Station 345kV	168.3	0	
KINSLEY_115 - PAWNEE-	15SP, 58764-58797, WEPL			
EDWARDS_JCT 115kV,	, Greensburg - Sun City			
56619 - 56622	115kV	165.7	0	
KINSLEY_115 - PAWNEE-	15SP, 58773-58797, WEPL			
EDWARDS_JCT 115kV,	, Medicine Lodge - Sun City			
56619 - 56622	115kV	164.1	0	
KINSLEY_115 - PAWNEE-	10SP, 58764-58797, WEPL			
EDWARDS_JCT 115kV,	, Greensburg - Sun City			
56619 - 56622	115kV	161.3	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.

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Facility	Model & Contingency	Facility Loading (% Rate B) Or	ATC (MW)	Date Required
		vollage (PU)		
Madiaina Ladra Sun City	1000P, 58794-58871, WEPL			
	, Spearville - North Judson	220.2	0	40/4/0000
115KV, 56773 - 56797,		230.3	0	12/1/2008
	1000P, 56794-56795, WEPL	222.6	0	
115KV, 56773 - 56797		232.0	0	
Madiaina Ladaa Sun Citu	0/WP, 58/95-999/6, WEPL			
	- , Spearville - 2004-141	227.2	0	
Madiaina Ladra Cur City		221.2	0	
	0/WP, 56/94-56/95, WEPL	226.7	0	
115KV, 58773 - 58797		220.7	0	
Madiaina Ladaa Sun Citu	07WP, 58794-58871, WEPL			
	, Spearville - North Judson	224.0	0	
115KV, 58773 - 58797		224.0	0	
Madiaina Ladra Sun City	155P, 58795-99976, WEPL			
Medicine Lodge - Sun City	- , Spearville - 2004-141	004.0	0	
115KV, 58773 - 58797		224.3	0	
Madiaina Ladara Our Oitu	1000P, 58795-99976, WEPL			
	- , Spearville - 2004-141	220.2	0	
115KV, 58773 - 58797		220.2	0	
	07WP, 56449-50858, SUNC			
Madiaina Ladara Our Oitu	SEPC - SPS SPS-			
Medicine Lodge - Sun City	AMA, HOLCOMB - Finney	040.0	0	
115KV, 58773 - 58797		216.0	0	
Madiaina Ladara Our Oitu	105P, 58795-99976, WEPL			
Medicine Lodge - Sun City	- , Spearville - 2004-141	0445	0	
115KV, 58773 - 58797	230KV	214.5	0	
Madiaina Ladara Our Oitu	15SP, 58/94-588/1, WEPL			
Medicine Lodge - Sun City	, Spearville - North Judson	040.0	0	
115KV, 58773 - 58797	Large TISKV	213.9	0	

Facility	Model & Contingency	Facility Loading	ATC	Date
		(% Rate B) Or	(MW)	Required
		Voltage (PU)	. ,	(M/D/Y)
	10WP, 56449-50858, SUNC	0 ()		· · · · /
	SEPC - SPS SPS-			
Medicine Lodge 138-115kV,	AMA , HOLCOMB - Finney			
58773 - 58774,	Station 345kV	202.9	0	12/1/2008
	10WP, 58794-58871, WEPL			
Medicine Lodge 138-115kV,	, Spearville - North Judson			
58773 - 58774	Large 115kV	193.3	0	
	07WP, 58794-58871, WEPL			
Medicine Lodge 138-115kV,	, Spearville - North Judson			
58773 - 58774	Large 115kV	193.0	0	
Medicine Lodge 138-115kV,	10WP, 58794-58795, WEPL			
58773 - 58774	, Spearville 230-115kV	192.3	0	
	07WP, 56449-50858, SUNC			
	SEPC - SPS SPS-			
Medicine Lodge 138-115kV,	AMA , HOLCOMB - Finney			
58773 - 58774	Station 345kV	190.9	0	
Medicine Lodge 138-115kV,	07WP, 58794-58795, WEPL			
58773 - 58774	, Spearville 230-115kV	190.2	0	
	15SP, 56449-50858, SUNC			
	SEPC - SPS SPS-			
Medicine Lodge 138-115kV,	AMA , HOLCOMB - Finney			
58773 - 58774	Station 345kV	189.7	0	
	10SP, 56449-50858, SUNC			
	SEPC - SPS SPS-			
Medicine Lodge 138-115kV,	AMA , HOLCOMB - Finney			
58773 - 58774	Station 345kV	188.5	0	
	07WP, 56871-58779,			
	WERE WEST - WEPL			
Medicine Lodge 138-115kV,	, CIRCLE - Mullergren			
58773 - 58774	230kV	187.6	0	
	15SP, 57040-56722, WERE			
	SCENTRAL, EVANS			
	ENERGY CENTER NORTH			
Medicine Lodge 138-115kV,	- EVANS ENERGY			
58773 - 58774	CENTER UNIT 2 138-24kV	187.1	0	

Facility	Model & Contingency	Facility Loading (% Rate B) Or Voltage (PU)	ATC (MW)	Date Required (M/D/Y)
Mullergren - 2004-14T 230kV, 58779 - 99976	15SP, 56619-56622, MIDW REG E-IL, KINSLEY_115 - PAWNEE-EDWARDS_JCT 115kV	113.8	269	12/1/2008
Mullergren - 2004-14T 230kV, 58779 - 99976	15SP, 56451-56465, SUNC SEPC , MINGO - SETAB 345kV	113.4	289	
Mullergren - 2004-14T 230kV, 58779 - 99976	10SP, 58764-99977, WEPL - , Greensburg - 2001-39A 115kV	112.0	296	
Mullergren - 2004-14T 230kV, 58779 - 99976	SEPC - SPS SPS- AMA , HOLCOMB - Finney Station 345kV	111.5	294	
Mullergren - 2004-14T 230kV, 58779 - 99976	15SP, 56449-56465, SUNC SEPC , HOLCOMB - SETAB 345kV	111.1	0	
Mullergren - 2004-14T 230kV, 58779 - 99976	REG E-IL, KINSLEY_115 - PAWNEE-EDWARDS_JCT 115kV	110.0	0	
Mullergren - 2004-14T 230kV, 58779 - 99976	15SP, 56617-56622, MIDW REG E-IL, EDWARDS - PAWNEE-EDWARDS_JCT 115kV	109.8	0	
Mullergren - 2004-14T 230kV, 58779 - 99976	10SP, 56451-56465, SUNC SEPC , MINGO - SETAB 345kV	109.6	0	
Mullergren - 2004-14T 230kV, 58779 - 99976	15SP, 56617-56624, MIDW REG E-IL, EDWARDS - ST_JOHN 115kV	107.6	0	
Mullergren - 2004-14T 230kV, 58779 - 99976	SEPC , HOLCOMB - SETAB 345kV	107.6	0	

Facility	Model & Contingency	Facility Loading (% Rate B) Or Voltage (PU)	ATC (MW)	Date Required (M/D/Y)
NORTH AMERICAN PHILIPS - NORTH AMERICAN PHILIPS JUNCTION (SOUTH) 115kV, 57372 -	15SP, 56872-56873, WERE WEST , EAST MCPHERSON - SUMMIT	126.1	0	6/1/2000
NORTH AMERICAN PHILIPS - NORTH AMERICAN PHILIPS JUNCTION (SOUTH) 115kV, 57372 -	10SP, 56872-56873, WERE WEST , EAST MCPHERSON - SUMMIT	130.1	0	0/1/2009
	230kV	114.6	224	
JUNCTION (SOUTH) - WEST MCPHERSON 115kV, 57374 - 57438,	WEST , EAST MCPHERSON - SUMMIT 230kV	147.7	0	6/1/2009
NORTH AMERICAN PHILIPS JUNCTION (SOUTH) - WEST MCPHERSON 115kV, 57374 - 57438	10SP, 56872-56873, WERE WEST , EAST MCPHERSON - SUMMIT 230kV	124 5	125	
NORTH AMERICAN PHILIPS JUNCTION (SOUTH) - WEST MCPHERSON 115kV, 57374 - 57438	15SP, 57374-57438, WERE WEST, NORTH AMERICAN PHILIPS JUNCTION (SOUTH) - WEST MCPHERSON 115kV CKT 2	113.1	149	
NORTH AMERICAN PHILIPS JUNCTION (SOUTH) - WEST MCPHERSON 115kV CKT 2, 57374 - 57438	15SP, 56872-56873, WERE WEST , EAST MCPHERSON - SUMMIT	128.9	13	6/1/2009
NORTH AMERICAN PHILIPS JUNCTION (SOUTH) - WEST MCPHERSON 115kV CKT 2, 57374 - 57438	10SP, 56872-56873, WERE WEST , EAST MCPHERSON - SUMMIT 230kV	108.6	289	0,1/2003

Facility	Model & Contingency	Facility Loading	ATC	Date
		(% Rate B) Or	(MW)	Required
	10SP 58764-99977 WEPI	Vollage (PD)		
Pratt - St John 115kV. 58787 -	Greensburg - 2001-39A			
58796,	115kV	131.5	0	12/1/2008
	15SP, 58764-58797, WEPL			
Pratt - St John 115kV, 58787 -	, Greensburg - Sun City	400.7	0	
58796	115KV 10SD 59764 59707 WEDI	126.7	0	
Pratt - St John 115kV 58787 -	Greensburg - Sun City			
58796	115kV	123.6	45	
	15SP, 58773-58797, WEPL			
Pratt - St John 115kV, 58787 -	, Medicine Lodge - Sun City			
58796	115kV	123.0	49	
Drott St John 11510/ 59797	10SP, 58773-58797, WEPL			
58796		110.0	08	
	07WP. 58764-99977. WEPL	110.0	50	
Pratt - St John 115kV, 58787 -	- , Greensburg - 2001-39A			
58796	115kV	114.8	161	
	07WP, 58764-58797, WEPL			
Pratt - St John 115kV, 58787 -	, Greensburg - Sun City	100.0	054	
58796	10W/D 58764-00077 W/EDI	109.2	251	
Pratt - St John 115kV, 58787 -	Greensburg - 2001-39A			
58796	115kV	108.8	258	
	07WP, 58773-58797, WEPL			
Pratt - St John 115kV, 58787 -	, Medicine Lodge - Sun City			
58796	115kV	106.4	296	
Drott St John 115KV/ 59797	10WP, 58764-58797, WEPL			
58796	115kV	103 1	350	
		100.1	000	

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.

Facility	Model & Contingency	Facility Loading (% Rate B) Or Voltage (PU)	ATC (MW)	Date Required (M/D/Y)
SANDHILL JCT - WEST MCPHERSON 115kV, 57434 - 57438,	15SP, 56871-56872, WERE WEST , CIRCLE - EAST MCPHERSON 230kV	122.3	136	6/1/2011
SANDHILL JCT - WEST MCPHERSON 115kV CKT 2, 57434 - 57438,	15SP, 56871-56872, WERE WEST , CIRCLE - EAST MCPHERSON 230kV	106.7	309	6/1/2011
Seward - St John 115kV, 58792 - 58796,	07WP, 58779-99976, WEPL - , Mullergren - 2004-14T 230kV	149.7	46	12/1/2008
Seward - St John 115kV, 58792 - 58796	06AP, 58779-99976, WEPL - , Mullergren - 2004-14T 230kV	144.8	16	
Seward - St John 115kV, 58792 - 58796	10SP, 58779-99976, WEPL - , Mullergren - 2004-14T 230kV	136.1	119	
Seward - St John 115kV, 58792 - 58796	10WP, 58779-99976, WEPL - , Mullergren - 2004-14T 230kV	133.0	91	

Facility	Model & Contingency	Facility Loading	ATC	Date
, , , , , , , , , , , , , , , , , , ,		(% Rate B) Or	(MW)	Required
		Voltage (PU)	` '	(M/D/Y)
	15SP, 56451-56465, SUNC	 		/
Spearville - 2004-14T 230kV,	SEPC , MINGO - SETAB			
58795 - 99976,	345kV	108.6	339	12/1/2008
	15SP, 56449-50858, SUNC			
	SEPC - SPS SPS-			
Spearville - 2004-141 230KV,	AMA, HOLCOMB - Finney	106.0	247	
38795 - 99976	10SP 58764-00077 W/EDI	100.9	347	
Spearville - 2004-14T 230k\/	- Greensburg - 2001-394			
58795 - 99976	115kV	106.4	348	
	15SP. 56449-56465. SUNC		0.0	
Spearville - 2004-14T 230kV,	SEPC , HOLCOMB -			
58795 - 99976	SETAB 345kV	105.9	0	
	15SP, 58764-99977, WEPL			
Spearville - 2004-14T 230kV,	- , Greensburg - 2001-39A			
58795 - 99976	115kV	104.4	0	
	10SP, 56451-56465, SUNC			
Spearville - 2004-141 230kV,	SEPC , MINGO - SETAB	101.2	0	
58795 - 99976	345KV	104.3	0	
$S_{D} = 2004 - 14T 230kV$	SEPC HOLCOMB -			
58795 - 99976	SETAB 345kV	102.0	0	
	15SP. 58764-58797. WEPL	10210		
Spearville - 2004-14T 230kV,	, Greensburg - Sun City			
58795 - 99976	115kV	101.6	0	
	10SP, 56449-50858, SUNC			
	SEPC - SPS SPS-			
Spearville - 2004-14T 230kV,	AMA , HOLCOMB - Finney	101 5		
58795 - 99976		101.5	0	
$S_{DO2D} = 2004 - 14T 230k//$	Medicine Lodge - Sup City			
58795 - 99976	115k/	100.6	0	
		10010		

Facility	Model & Contingency	Facility Loading (% Rate B) Or Voltage (PU)	ATC (MW)	Date Required (M/D/Y)
Spearville - North Judson Large 115kV, 58794 - 58871,	10SP, 58764-99977, WEPL - , Greensburg - 2001-39A 115kV	124.9	102	6/1/2009
SPRING CREEK JUNCTION - MOUNDRIDGE 115kV, 57380 - 57429,	15SP, 56872-56873, WERE WEST , EAST MCPHERSON - SUMMIT 230kV	108.6	250	6/1/2011
SPRING CREEK JUNCTION - MOUNDRIDGE 115kV, 57380 - 57429	15SP, 56871-56872, WERE WEST , CIRCLE - EAST MCPHERSON 230kV	103.8	329	
ST_JOHN - St John 115kV, 56624 - 58796,	10SP, 58779-99976, WEPL - , Mullergren - 2004-14T 230kV	129.8	69	12/1/2008
ST_JOHN - St John 115kV, 56624 - 58796,	07WP, 58779-99976, WEPL - , Mullergren - 2004-14T 230kV	126.1	156	12/1/2008
ST_JOHN - St John 115kV, 56624 - 58796	06AP, 58779-99976, WEPL - , Mullergren - 2004-14T 230kV	112.9	278	
ST_JOHN - St John 115kV, 56624 - 58796	10WP, 58779-99976, WEPL - , Mullergren - 2004-14T 230kV	111.3	257	

Powerflow Analysis

A powerflow analysis was conducted for the facility using modified versions of the 2006 April, 2007 Winter Peak, 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 generation is December 1, 2008. 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 400MW and location, additional criteria violations will occur on the existing MIDW, WERE and WEPL 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 for an outage of the Holcomb – Spearville 345kV line, the Customer will need to install additional reactive compensation in the WEPL area. 84MVAR switched compensation is required on a contingency basis to prevent excessive voltage decay. This Customer must install approximately 27MVAR in each of two capacitor banks switched at 34.5kV in the Customer's 345-34.5kV Substation, plus a 30MVAR SVC at a third 34.5kV bus. 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 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 Midwest Energy, Sunflower Electric Power Corporation, West Plains 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 \$900,000 for SUNC's interconnection Network Upgrade facilities listed in Tables 1 & 2 excluding upgrades of other transmission facilities by MIDW, 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.

In order to aid in maintaining adequate voltages, the Customer will need to install 84MVAR of reactive compensation in its new substation. A switched 27MVAR capacitor bank may be installed at each of two 34.5kV buses. A 30MVAR SVC may be installed at a 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 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 highest values of loading 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)