



***FCS-2008-001 Shared Facility Study
for
Transmission Facilities***

***Spearville – Comanche 345kV Transmission Line
Comanche – Woodward 345 kV Transmission Line
Comanche – Medicine Lodge 345kV Transmission Line
Medicine Lodge – Wichita 345kV Transmission Line***

SPP Tariff Studies

(#FCS-2008-001)

March 2010

Summary

Several transmissions owners performed Facility Studies at the request of the Southwest Power Pool (SPP) for certain Generation Interconnection requests included in FCS-2008-001. The requests for interconnection were placed with SPP in accordance SPP's Open Access Transmission Tariff, which covers new generation interconnections on SPP's transmission system. The transmissions owners were Oklahoma Gas and Electric (OGE), Westar Energy Company (Westar) and Sunflower Electric Power Company (SUNC or Sunflower)

Pursuant to the tariff, the Transmissions Owners were asked to perform a detailed Facility Study of the generation interconnection requests to satisfy the Facility Study Agreement executed by the requesting customers and SPP. The Facility Studies are attached as follows:

- Appendix A - OG&E Woodward – Oklahoma/Kansas Stateline 345kV
- Appendix B - Westar Medicine Lodge – Wichita 345kV and Comanche – Kansas/Oklahoma State line 345kV
- Appendix C - Sunflower Spearville – Comanche – Medicine Lodge 345kV and the Comanche 345kV substation

Shared Interconnection Upgrade Facilities Costs

The FCS-2008-001 Interconnection Customers are included in the 1st Cluster Study approved in FERC Docket #ER09-262. The four sections that follow show the upgrades and the estimated cost for each upgrade. Each section also shows the allocated cost of the upgrade to the Interconnection Customer.

Woodward – Comanche 345kV Transmission

The cost to construct the Woodward – Comanche 345kV transmission line is approximately \$104,224,853 and is broken down by the following transmission owners:

Westar:	\$15,200,000
Sunflower:	\$3,500,000
OG&E:	\$85,524,853

The Interconnection Customers' total shared upgrade costs are broken down as follows for each project:

GEN-2006-006:	\$6,726,918
GEN-2007-005:	\$2,411,958
GEN-2007-008:	\$4,989,479
GEN-2007-021:	\$5,214,809
GEN-2007-038:	\$6,695,272
GEN-2007-044:	\$7,783,297
GEN-2007-045:	\$2,984,465
GEN-2007-046:	\$2,233,463

GEN-2007-048:	\$5,485,030
GEN-2007-050:	\$5,359,273
GEN-2007-051:	\$4,592,839
GEN-2007-057:	\$430,200
GEN-2007-062:	\$26,742,250
GEN-2008-003:	\$3,184,039
GEN-2008-017:	\$4,991,610
GEN-2008-018:	\$6,616,655
GEN-2008-019:	\$7,783,297

Note that one-third (\$3,500,000) the cost of the Comanche County Substation (\$10,500,000) has been allocated to the projects above. See Appendix C for the cost of the Comanche County Substation.

Spearville – Comanche 345kV Transmission

The cost to construct the Spearville – Comanche 345kV transmission line is approximately \$58,500,000 and is broken down by the following transmission owner:

Sunflower: \$58,500,000

The Interconnection Customers’ total shared upgrade costs are broken down as follows for each project:

GEN-2006-006:	\$13,260,854
GEN-2007-005:	\$1,055,296
GEN-2007-038:	\$13,390,286
GEN-2007-046:	\$1,432,095
GEN-2007-048:	\$582,679
GEN-2007-057:	\$166,776
GEN-2008-017:	\$11,722,044
GEN-2008-018:	\$16,889,969

Note that one-third (\$3,500,000) the cost of the Comanche County Substation (\$10,500,000) has been allocated to the projects above. See Appendix C for the cost of the Comanche County Substation.

Comanche – Medicine Lodge 345kV Transmission

The cost to construct the Comanche – Medicine Lodge 345kV transmission line is approximately \$62,900,000 and is broken down by the following transmission owner:

Sunflower: \$62,900,000

The Interconnection Customers’ total shared upgrade costs are broken down as follows for each project:

GEN-2006-006:	\$2,969,502
---------------	-------------

GEN-2007-005:	\$2,016,546
GEN-2007-008:	\$2,539,653
GEN-2007-021:	\$3,149,850
GEN-2007-038:	\$3,057,438
GEN-2007-044:	\$4,701,268
GEN-2007-045:	\$1,435,419
GEN-2007-046:	\$2,108,566
GEN-2007-048:	\$3,622,092
GEN-2007-050:	\$3,237,109
GEN-2007-051:	\$2,774,167
GEN-2007-057:	\$348,329
GEN-2007-062:	\$16,152,858
GEN-2008-003:	\$1,923,224
GEN-2008-017:	\$3,201,735
GEN-2008-018:	\$4,960,976
GEN-2008-019:	\$4,701,268

Note that one-third (\$3,500,000) the cost of the Comanche County Substation (\$10,500,000) has been allocated to the projects above. See Appendix C for the cost of the Comanche County Substation.

Medicine Lodge - Wichita 345kV Transmission

The cost to construct the Medicine Lodge - Wichita 345kV transmission line is approximately \$90,000,000 and is broken down by the following transmission owner:

Westar: \$90,000,000

The Interconnection Customers' total shared upgrade costs are broken down as follows for each project:

GEN-2006-006:	\$4,248,890
GEN-2007-005:	\$2,885,360
GEN-2007-008:	\$3,633,844
GEN-2007-021:	\$4,506,939
GEN-2007-038:	\$4,374,713
GEN-2007-044:	\$6,726,775
GEN-2007-045:	\$2,053,859
GEN-2007-046:	\$3,017,026
GEN-2007-048:	\$5,182,643
GEN-2007-050:	\$4,631,794
GEN-2007-051:	\$3,969,397
GEN-2007-057:	\$498,404
GEN-2007-062:	\$23,112,198
GEN-2008-003:	\$2,751,830
GEN-2008-017:	\$4,581,178
GEN-2008-018:	\$7,098,376

GEN-2008-019: \$6,726,775

Changes to Cost Allocation

This cost allocation is subject to change for restudies conducted by the Transmission Provider in response to the higher queued customers or other customers in the 1st Cluster that withdraw their interconnection request or suspend, terminate, or request unexecuted filings of their LGIAs.

APPENDIX A



FACILITY STUDY

for

Facility Request FCS-2008-001

345kV Single Circuit Transmission Line
From Woodward District EHV Substation
Near
Woodward, Oklahoma
To
Kansas/Oklahoma State Line
(Comanche County, Kansas)

February 26, 2010

Steve M. Hardebeck, PE
Lead Engineer
Transmission Planning
OG&E Electric Services

Summary

Pursuant to the tariff and at the request of the Southwest Power Pool (SPP), Oklahoma Gas and Electric (OG&E) performed the following Facility Study to satisfy the Facility Study Agreement executed by the requesting customer for SPP Facility request FCS-2008-001. The request for interconnection was placed with SPP in accordance SPP's Open Access Transmission Tariff, which covers new interconnections on SPP's transmission system. The requirements for interconnection consist of adding one new 345kV breaker and a terminal in the Woodward District EHV Substation and constructing 56 miles of 345kV H frame transmission line with 3000A capacity. The total cost for OKGE to add one new 345kV breaker and a terminal in the Woodward District EHV Substation, the interconnection facility, and construct 56 miles of single-circuit 345kV H-frame transmission line is estimated at \$85,524,853.

The additional mileage over the 50 miles requested by SPP is due to line routing. A preliminary line routing investigation reveals that there are extremely sensitive environmental issues involved in a direct northern route from Woodward EHV substation. These environmental issues could delay the project indefinitely if the direct route was chosen. A route extending east northeast from Woodward EHV then north by northeast from there approximately to the southeast corner of Comanche County in Kansas would be a more desirable route and would add only a few miles to the total length of the project.

The proposed time line for construction would be approximately forty-two months after an NTC is received by OG&E to allow for right of way procurement, engineering, construction and completion.

Table of Contents

Table of Contents	3
Introduction	4
Interconnection Facilities	5
Interconnection Costs	6
Overview of Gracemont Substation	7
One-Line diagram of Interconnection	8

Introduction

The Southwest Power Pool has requested a Facility Study for the purpose of interconnecting a new 345kV transmission line within the service territory of OG&E Electric Services (OKGE) in Woodward County Oklahoma. The proposed 345kV point of interconnection is at the Woodward District EHV Substation in Woodward County. This substation is owned by OKGE.

Power flow analysis has indicated that for the power flow cases studied, it is possible to interconnect the transmission line with transmission system reinforcements within the local transmission system. Given the Point of Interconnection at an existing substation, there are additional requirements for interconnection including bus, breaker, switches, relaying, metering, etc.

The cost for adding a new 345kV terminal to the Woodward District EHV Substation, the required interconnection facility, is estimated at \$1,099,958. Other Network Constraints in surrounding systems may be verified with a transmission service request and associated studies.

Interconnection Facilities

The primary objective of this study is to identify attachment facilities. The requirements for interconnection consist of adding a new 345kV terminal in the Woodward District EHV Substation. This 345kV addition shall be constructed and maintained by OKGE. No route was proposed for the 345kV line. OG&E will determine a preferred route once the project has been approved.

The total cost for OKGE to add a new 345kV terminal in the Woodward District EHV Substation, the interconnection facility, is estimated at \$1,099,958. This cost does not include building 345kV line to the Woodward District EHV Substation.

This Facility Study does not guarantee the availability of transmission service necessary to deliver the additional generation to any specific point inside or outside the Southwest Power Pool (SPP) transmission system. The transmission network facilities may not be adequate to deliver additional generation output to the transmission system. If the customer requests firm transmission service under the SPP Open Access Transmission Tariff at a future date, Network Upgrades or other new construction may be required to provide the service requested under the SPP OATT.

The costs of interconnecting the facility to the OKGE transmission system are listed in Table 1.

Short Circuit Fault Duty Evaluation

It is standard practice for OG&E to recommend replacing a circuit breaker when the current through the breaker for a fault exceeds 100% of its interrupting rating with recloser de-rating applied, as determined by the ANSI/IEEE C37.5-1979, C37.010-1979 & C37.04-1979 breaker rating methods.

For this interconnection, no breakers were found to exceed their interrupting capability after the addition of the related facilities. OG&E found no breakers that exceeded their interrupting capabilities on their system. Therefore, there is no short circuit upgrade costs associated with the FCS-2008-001 interconnection.

Table 1: Required Interconnection Network Upgrade Facilities

Facility	ESTIMATED COST (2010 DOLLARS)
OKGE – Interconnection Facilities - Add a single 345kV line terminal to the Woodward District EHV Substation. Dead end structure, line switch, line relaying, interconnect metering including CTs and PTs	\$1,099,958
OKGE – Network Upgrades at Woodward District EHV sub, 1-345kV breaker, line relaying, disconnect switches, and associated equipment	\$2,707,042
OKGE – Transmission line H frame, bundled 1590ACSR, 3000A, steel shield wire, 56 miles	\$75,044,414
OKGE - Right-of-Way (150ft) for 345kV transmission line, 56 miles	\$6,673,439
Total	\$85,524,853

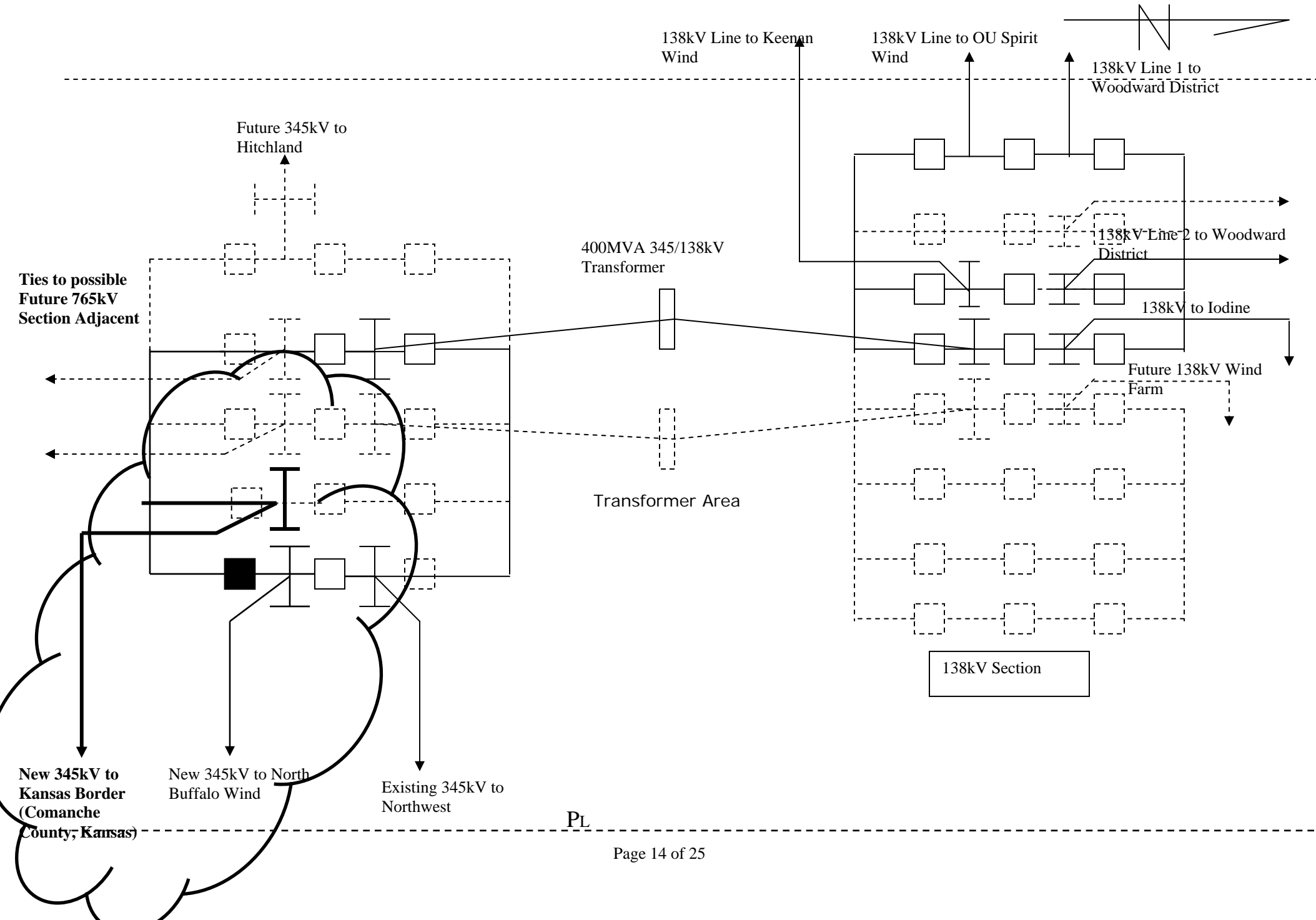
Prepared by Steve M. Hardebeck, PE
Lead Engineer, Transmission Planning
OG&E Electric Services

February 26, 2010

Reviewed by:

Philip L. Crissup 3/1/2010
Director, Regional Transmission Affairs

Woodward District EHV Substation



Transmission Line Route From Woodward District EHV substation to Kansas Oklahoma border



APPENDIX B

FACILITY STUDY

for

Facility Request FCS-2008-001

**345kV Transmission Line from Medicine Lodge to Wichita
345kV Transmission Line from Comanche to Woodward
(Westar)**

Introduction

The Southwest Power Pool has determined the need for a Facility Study for new 345kV transmission lines for the purpose of interconnecting Generation Interconnection Cluster Study Customers. The 345kV transmission lines will be located within the service territory of Westar Energy in Comanche, Barber, Kingman, and Sedgwick Counties, Kansas

Power flow analysis has indicated that for the power flow cases studied, it is possible to interconnect the transmission line with transmission system reinforcements within the local transmission system.

Network Upgrades

The primary objective of this study is to identify certain Network Upgrades. The requirements for interconnection consist of adding a 345kV line terminal at Wichita substation, building 70 miles of 345kV transmission line from the Wichita substation to the Medicine Lodge substation, and building 12 miles of 345 kV transmission line from the Comanche substation (owned by Sunflower Electric Power Company) to the Kansas/Oklahoma border to connect with the Oklahoma Gas and Electric 345 kV transmission line from the Woodward substation. The 345kV addition shall be constructed and maintained by Westar (unless specified different at a later time). A preferred route will be determined once the project has been approved.

The costs of interconnecting the facility to the Westar transmission system are listed in Table 1 and Table 2.

Short Circuit Fault Duty Evaluation

It is standard practice to recommend replacing a circuit breaker when the current through the breaker for a fault exceeds 100% of its interrupting rating with recloser de-rating applied, as determined by the ANSI/IEEE C37.5-1979, C37.010-1979 & C37.04-1979 breaker rating methods.

For this interconnection, no breakers in the Westar area were found to exceed their interrupting capability after the addition of the related facilities.

**Table 1: Required Interconnection Network Upgrade Facilities
Medicine Lodge to Wichita 345 kV Transmission Line**

Facility	ESTIMATED COST (2010 DOLLARS)
Westar – Add 345kV line terminal at Wichita	\$2,000,000
Westar – Construct 70 miles of 345 kV transmission line, utilizing H-frame construction and 2x1590 kcmil ACSR conductors	\$77,000,000
Westar – Right of Way for above lines	\$11,000,000
Total	\$90,000,000

**Table 2: Required Interconnection Network Upgrade Facilities
Comanche to Woodward 345 kV Transmission Line**

Facility	ESTIMATED COST (2010 DOLLARS)
Westar – Construct 12 miles of 345 kV transmission line, utilizing H-frame construction and 2x1590 kcmil ACSR conductors	\$13,200,000
Westar – Right of Way for above lines	2,000,000
Total	\$15,200,000

APPENDIX C

FACILITY STUDY

for

Facility Request FCS-2008-001

**345kV Transmission Line
From Spearville to Comanche to Medicine Lodge
(SUNC)**

Introduction

The Southwest Power Pool has determined the need for a Facility Study for new 345kV transmission lines for the purpose of interconnecting a Generation Interconnection Cluster Study Customers. The 345kV transmission line will be located within the service territory of Sunflower Electric and Mid Kansas Electric Company in Ford, Clark, Comanche, and Barber Counties in Kansas. The proposed 345kV point of interconnection is at the Spearville 345kV substation in Ford County. This substation is owned by Sunflower. There will be other points of interconnection at Comanche 345kV substation (new) and the Westar transmission system at an interconnection point near Medicine Lodge.

Power flow analysis has indicated that for the power flow cases studied, it is possible to interconnect the transmission line with transmission system reinforcements within the local transmission system. Given the Point of Interconnection at an existing substation, there are additional requirements for interconnection including bus, breaker, switches, relaying, metering, etc.

Network Upgrades

The primary objective of this study is to identify certain Network Upgrade. The requirements for interconnection consist of adding a new 345kV terminal in the Spearville substation, building a new Comanche 345kV substation, building the 345kV transmission line from Spearville to Comanche to the interconnect point with Westar near Medicine Lodge. This 345kV addition shall be constructed and maintained by Sunflower (unless specified different at a later time). A preferred route will be determined once the project has been approved.

The total cost for Sunflower to add a new 345kV terminal in the Spearville substation, the interconnection facility, is estimated at \$5,500,000 including the potential addition of a line reactor. The cost of building a new 345kV station at Comanche County is estimated at \$10,500,000, including the potential addition of a bus or line reactor. This cost does not include building 345kV line.

The costs of interconnecting the facility to the Sunflower transmission system are listed in Table 1.

Short Circuit Fault Duty Evaluation

It is standard practice to recommend replacing a circuit breaker when the current through the breaker for a fault exceeds 100% of its interrupting rating with recloser de-rating applied, as determined by the ANSI/IEEE C37.5-1979, C37.010-1979 & C37.04-1979 breaker rating methods.

For this interconnection, no breakers in the Sunflower were found to exceed their interrupting capability after the addition of the related facilities.

Table 1: Required Interconnection Network Upgrade Facilities

Facility	ESTIMATED COST (2010 DOLLARS)
SUNC – Spearville - Add a single 345kV line terminal to the Spearville Substation. Dead end structure, circuit breakers, line switch, line relaying, interconnect metering including CTs and PTs and line reactor	\$5,500,000
SUNC – Comanche County – Build a 345kV 3 breaker ring bus at Comanche County including a line or bus reactor	\$10,500,000
SUNC – Transmission line, bundled 1590ACSR, 3000A, ACSR shield wire. 50 miles from Spearville to Comanche County, including ROW.	\$49,500,000
SUNC – Transmission line, bundled 1590 ACSR, 3000A, ACSR shield wire. 60 miles from Comanche County to Westar interconnect near Medicine Lodge, including ROW. Does not include potential environmental mitigation.	\$59,400,000
Total	\$124,900,000