FINAL
FACILITY STUDY

Wind Farm Interconnection Request
at
2004-G8

March 2008

[Revised 2 Apr 08, for public posting]

Western
AREA POWER
ADMINISTRATION

Final Facility Study
Wind Farm Interconnection

Background

In November 2004, 2004-G8 requested a 102 MW wind farm interconnection on the Western Area Power Administration (Western) Frenchman Creek-Wauneta 115-kV Line between the Frenchman Creek and Wauneta substations. In January 2007, 2004-G8 requested to interconnect at Wauneta Substation, rather than a tap on the line. 2004-G8 proposes to install a collector station containing two 115/34.5-kV, 60 MVA power transformers, two 115-kV circuit breakers, four 115-kV disconnect switches, and associated materials, communications and controls and all 34.5-kV equipment.

Western completed the original System Impact Study (SIS), for the tap connection in November 2006. Western then prepared a second SIS in May 2007 to address the interconnection request at the Wauneta Substation. The conclusion of this SIS is that the 102 MW wind generation can be connected to the Wauneta Substation, if Western's Archer-Stegall 230-kV Line is rebuilt, Tri-State's Wauneta-Alvin 115-kV Line is rebuilt and a line bay is added at the Wauneta Substation.

Contract No. 07-RMR-1718, between Western and 2004-G8 was signed on August 27, 2007, requesting Western to perform an interconnection Facility Study (FS) to specify and estimate the cost of equipment, engineering, procurement and construction required to physically and electrically connect the wind farm to Western's transmission system.

Project Description

Western will require one 115-kV circuit breaker, two 115-kV disconnect switches and associated materials, communications and controls to be installed at Western's Wauneta Substation. A 115-kV overhead span is required between Western's Wauneta Substation and the collector station. Attachment A illustrates the additions at Western's Wauneta Substation and 2004-G8's collector substation.

Western's 61-mile Archer-Stegall 230-kV Line must be reconductored with 954 ACSS "Canvasback" conductor, to eliminate the overloads identified in the SIS. Attachment B depicts the transmission line switching diagram.

Tri-State's 10-mile Alvin-Wauneta 115-kV Line must be rebuilt with a new line, with wood H-frame structures and 477 ACSR conductor. Attachment C depicts the transmission line switching diagram.

Western's Requirements

Western will require metering on the new 115-kV bus in Western's Wauneta Substation. 2004-G8 will provide control systems within its collector

substation compatible with Western's utility interface. Western will require 2004-G8 to provide transformer test reports to Western prior to energization of the interconnected collector station. Western will install the 115-kV breaker at Wauneta Substation and reconductor the Archer-Stegall 230-kV Line.

Schedule

The 115-kV breaker installation at Wauneta Substation can be completed by December 2008. The reconductor of the Archer-Stegall 230-kV Line can be completed by December 2009. The rebuild of Tri-State's Alvin-Wauneta 115-kV Line is estimated to be completed by December 2009, but is subject to Tri-State's approval, planning, design and construction requirements. The estimates do not include environmental compliance requirements and are anticipated to increase upon inclusion of environmental activities. Table 1 depicts project schedule information.

Table 1 – Project Schedule

Description	Activity	Start	Completion
Installation of one 115-kV circuit breaker, two 115-kV disconnect switches and associated communication and control equipment	• Planning and Designs • Equipment • Construction • Commissioning • Inservice	June 2008 July 2008 October 2008 February 2009	August 2008 November 2008 March 2009 March 2009 April 2009
Reconductor of Archer-Stegall 230-kV Line with 954 ACSS conductor	• Planning and Designs • Construction • Inservice	June 2008 October 2008	August 2008 October 2009 November 2009
Rebuild of Alvin-Wauneta 115-kV Line with 477 ACSR conductor and wood H-frame structures	• Planning and Designs • Construction • Inservice	July 2008 November 2008	September 2008 August 2009 September 2009

Cost

Western's estimate, including design, equipment, construction and commissioning, for the 115-kV breaker addition at Wauneta Substation, the reconductor of the Archer-Stegall 230-kV line and the rebuild of Tri-State's Alvin-Wauneta 115-kV Line is $8,137,000, as shown in Table 2. The estimates do not include environmental activities. Planned work is subject to environmental compliance, so the project cost is anticipated to increase upon inclusion of environmental activities.

Table 2 – Project Cost Estimate Breakdown

Description	Activity	Estimate
Wauneta 115-kV circuit breaker		
	Planning and Designs	$25,000
	Equipment	$75,000
	Construction	$645,000
	Commissioning	$55,000
	Sub Total	$800,000
	Contingency 10%	$80,000
	Subtotal	**$880,000**
Archer-Stegall Reconductor		
	Planning and Designs	$130,000
	Lands	$5,000
	Construction	$4,296,000
	Sub Total	$4,431,000
	Contingency 10%	$443,000
	Subtotal	**$4,874,000**
Alvin-Wauneta 115-kV Line Rebuild		
	Planning and Designs	$51,000
	Lands	$10,000
	Construction	$2,105 ,000
	Sub Total	$2,166,000
	Contingency 10%	$217,000
	Subtotal	**$2,383,000**
	TOTAL	**$8,137,000**

* Budgetary level estimate is intended to be accurate to +/- 25%.

ATTACHMENT A

Wauneta Substation

Switching Diagram

ATTACHMENT B

Archer-Stegall 230-kV Line Reconductor

Switching Diagram

ATTACHMENT C

Alvin-Wauneta 115-kV Line Rebuild

Switching Diagram