FINAL

FACILITIES STUDY

2004-G4

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Facilities Study for 2004-G4

1. DESCRIPTION

1.1. Background of Request

The customer "2004-G4" per a Letter Agreement No. 05-RMR-1544 Facilities Study Agreement dated June 20, 2005, requested a facilities study for an interconnection to Western Area Power Administration's (Western) transmission system on the 115-kV Beaver Creek – Big Sandy transmission line located in northeast Colorado. The requested interconnection is in the vicinity of Western structures 61-3 & 61-4 located approximately 5 miles north of Tri-State Generation and Transmission's Big Sandy Substation.

2004-G4 initially requested that the proposed in-service date be December, 2006.

Western performed a System Impact Study to determine the impacts, if any, to Western's transmission system of the proposed interconnection.

This Facilities Study provides for general description and cost estimates for the Network upgrades required for the interconnection to Western's Beaver Creek – Big Sandy 115-kV transmission line. This includes all major 115-kV equipment, switchyard land, control building, relay and control system, communication, metering requirements and modifications to the transmission line.

The System Impact Study identified that a preferred option for the interconnection customer may be investigation of the possibility of building a short transmission line into the Big Sandy Substation which is owned by Tri-State Generation & Transmission Association, Inc. This solution may be more cost effective in that only a single breaker would be required instead of building a new substation with three breakers. However, this facilities study does not address this option. An interconnection request would need to be made with Tri-State and follow Tri-State's interconnection process/procedure if this option is pursued.

This Interconnection Facilities Study shall specify and estimate the cost of the equipment, engineering, procurement and construction work needed to implement the conclusions of the Interconnection System Impact Study in accordance with Good Utility Practice to physically and electrically connect the Interconnection Facility to the Transmission system. The Interconnection Facility Study shall also identify the electrical switching configuration of the connection equipment, including, without limitation: the transformer, switchgear, meters, and other station equipment; the nature and estimated cost of any Transmission Provider's Interconnection Facilities and Network Upgrades necessary to accomplish the interconnection; and an estimate of the time required to complete the construction and installation of such facilities.

1.2. Description of Connection Facility

The requirement for the interconnection facility to Western's Beaver Creek – Big Sandy 115-kV line is a sectionalizing switchyard. Western requires the installation of a 115-kV three breaker ring bus configuration to meet the sectionalizing requirements. It is assumed that the customer's 115/34.5-kV transformer and associated equipment will be located within the new substation.

1.3. Description of Existing Western Facilities Related to Interconnection Request

Western owns, operates, and maintains a 115-kV transmission line from the Beaver Creek substation to the Big Sandy substation. The line is approximately 66.25 miles long and has a thermal rating of 109 MVA. This line was constructed in approximately 1951, with 397.5 ACSR conductor size, wood H-frame structures.

2. SUMMARY OF EXISTING STUDIES

2.1. SIS Requirements

There was not a Feasibility Study performed associated with this interconnection request.

A System Impact Study (SIS) was performed and the SIS Report was forwarded to 2004-G4. The SIS performed was an "**interconnection only**" study for the transmission interconnection. The SIS concluded that the Transmission Interconnection could be accommodated for 100 MW of generation with no transmission upgrades.

To date, there is no associated transmission service request related to the transmission interconnection.

2.2. Environmental Studies

Currently there is not a contract between Western and 2004-G4 for environmental studies to be performed associated with this facility. It is the customer's responsibility to sign a separate agreement and provide funding to Western for performance of environmental reviews and studies for the interconnection facility and the associated applicant facilities.

3. STUDY REQUIREMENTS

Western performed this Facilities Study to specify and estimate the cost of the equipment, engineering, procurement and construction work needed to implement the conclusions of the Interconnection System Impact Study.

Western will perform/develop a substation layout, perform a preliminary bus design, determine all electrical equipment requirements, and determine a suitable site location to accommodate the Request and future transmission

needs. Develop/compile cost estimates for all Western labor, overheads, equipment additions, modifications, etc.

3.1. Interconnection Facilities

By definition provided in the LGIP Manual, Interconnection Facilities shall mean the Transmission Provider's Interconnection Facilities and the Interconnection Customer's Interconnection Facilities. Collectively, Interconnection Facilities include all facilities and equipment between the Generating Facility and the Point of Interconnection, including any modification, additions or upgrades that are necessary to physically and electrically interconnect the Generating Facility to the Transmission Provider's Transmission System.

3.2. Network Modifications/Upgrades and Additions

By definition provided in the LGIP Manual, Network Upgrades shall mean the additions, modifications, and upgrades to the Transmission Provider's Transmission System required at or beyond the point at which the Interconnection Facilities connect to the Transmission Provider's Transmission System to accommodate the interconnection of the Large Generating Facility to the Transmission Provider's Transmission system.

Western will review and document any other interconnection/control area requirements, document these additional requirements (such as indication/metering, monitoring, control, relaying, network upgrades and transmission line upgrades) and include these in the cost estimate.

3.3. Schedule

Develop an overall time schedule for completion of the necessary addition/modifications to meet (if reasonably possible) the requested in-service date.

3.4. Environmental Requirements

Develop a scope, schedule and cost estimate for all Environmental Work associated with this Request.

4. STUDY RESULTS

This estimate was prepared for the 100 MW interconnection requested by the Customer.

4.1. Description of Interconnection Facility (see Attachment A)

a) Transmission Provider's Interconnection Facility
- Metering equipment and associated metering class instrument transformers
- One – 115-kV manual gang-operated disconnecting switch

b) Interconnection Customer's Interconnection Facilities
It is expected that customer will install 34.5-kV line from generation facility to a location within a new Western substation.

- One – 115/34.5-kV transformer (assumed located within the substation) (NOTE: This equipment is not included in cost estimate)
- One -115-kV, 1200 amp power circuit breaker or equivalent interrupter for transformer protection
- Metering equipment may be located on low side of transformer

4.2. Network Improvements (see Attachment B)

A new substation would be constructed directly adjacent to Western's Beaver Creek – Big Sandy transmission line, at approximately Structure 61-3/61-4. It is recommended that the substation be off-set from the transmission line to allow the substation to be constructed without building a T-Line shoo-fly. This will also save acquiring additional T-Line right of way for the shoo-fly.
The substation would be configured as a three breaker ring bus arrangement and would consist of the following equipment:

- Three - 115-kV, 1200 amp, SF6 power circuit breakers
- Six - 115-kV manual gang-operated disconnecting switches
- Two - 115-kV manual gang-operated disconnecting switches with ground blades
- Instrument transformers for control and relaying
- Station service equipment, including transformers, distribution switchgear, 125-kV batteries and chargers.
- Relay and control equipment
- Communication equipment - Communication is required from Western's operation center located in Loveland, Colorado to the substation to provide for remote control of equipment, obtain alarm, status, and metering data from the substation, relay communications requirements and provide a voice link to the substation. Western will design, procure, and install all communication equipment necessary for communication from the substation to Western's operation center.

- Control Building (approximately 1200 sq. ft.)
- Two - 115-kV transmission line tap structures

The estimated cost for Western's labor, overheads, equipment additions, modifications, land, and other miscellaneous costs are outlined in Attachment B.

4.3. Operations Requirements

An Interconnection Agreement is required prior to energization. An Operating Guide will be developed by Western to outline the necessary operating restrictions on the wind farm. Coordination of the proposed work at all affected facilities could affect the generation output capability until all work is completed.

4.4. Schedule

Western is prepared to meet the proposed schedule in this document, if the design work begins as shown. If the project is delayed, Western will reevaluate equipment lead times, workload, and construction seasons to determine a reasonable schedule.

PROPOSED PROJECT SCHEDULE

Activity	Start	Completion
Draft Large Generator Interconnection Agreement	July 2007	August 2007
Planning	August 2007	September 2007
Field Data	September 2007	November 2007
Environmental	December 2007	October 2008
Environmental Record of Decision		November 2008
LGIA Final *	November 2008	December 2008
Land Acquisition	December 2007	May 2008
Design	December 2007	July 2008
Order Breakers	May 2008	December 2008
Construction Contract Procurement	August 2008	September 2008
Award of Construction Contract		October 2008
Construction Contract Performance Period	November 2008	July 2009
Commissioning	June 2009	August 2009
In-service Date		September 1, 2009

* LGIA Final cannot be signed until Environmental Review is completed

4.5. Environmental Requirements

Western requires an Environmental Assessment ("EA") to comply with the National Environmental Policy Act (NEPA) requirements. In addition, Western must demonstrate compliance with several other environmental regulations including, but not limited to the Endangered Species Act, The Migratory Bird Treaty Act, The National Historic Preservation Act, The Clean Water Act, and the Clean Air Act. The following assumptions were taken into account in preparing the estimate:

1. The Applicant procures and manages the contractors for preparing the EA and other required documentation to Western's specifications.
2. The Applicant procures and manages the contractors for cultural and biological surveys to Western's specifications and the requirements of the regulatory agencies
3. The Applicant or their contractor publishes the Pre-approval Draft EA and Final EA and distributes it to Westerns; requirements
4. The applicant undertakes the majority of coordination with the US Fish and Wildlife Service, State Wildlife Agencies, other Regulatory agencies for the purposes of clarifying each agency's requirements, providing information each agency may need to fulfill their respective obligations and reviews.
5. Western shall review all documentation to ensure it complies with Western's requirements and is sufficient to support Western's decisions or other actions under the regulations. The Applicant shall ensure that Western's review comments are incorporated into the reports and other documentation.
6. The project is not controversial and extensive public involvement is not required.
7. The Applicant assumes responsibility for the majority of project meetings with local and state agencies (e.g. Wildlife agencies, County commissioners and planners and cities).
8. Western coordinates with regulatory agencies to the extent required by the regulations and sends letters, signs agreements, or undertakes other required government-to-government communications.
9. The Applicant at no time will commit Western to a course of action or speak on behalf of Western in matters concerning policy, commitment of Federal resources or other matters related to Western's legal responsibilities under the various regulations.
10. That the EA is sufficient to support the preparation of a Finding of No Significant Impact, otherwise an Environmental Impact Statement (EIS) may be required.

Generally, $40,000-50,000 is estimated for Western's costs for environmental reviews and approvals if no other lead agencies were involved.

It is the customer's responsibility to sign a separate agreement and provide funding to Western for performance of the Environmental Review.

ATTACHMENT A

COST ESTIMATE FOR INTERCONNECTION FACILITIES

Substation near Structure 61/3 – 2004-G4
Energy
Design and Construction Budgetary Cost Estimates
February 2, 2007

Description	Cost
Furnish & Install 115-kV, 1200A Switch and breaker bay	$ 357,000
Planning/Field Data	$ 5,000
Design	$ 50,000
Construction Management	$ 50,000
Commissioning	$ 50,000
Project Management	$ 10,000
Procurement/Contract Administration	$ 5,000
TOTAL	$ 527,000

Notes:

1) The above is a budgetary level estimate intended to be accurate to +/-20%
2) Does not include Transmission Provider's Network Upgrades.

ATTACHMENT B

COST ESTIMATE for NETWORK UPGRADES for 100 MW

Substation near Structure 61/3 – 2004-G4
Design and Construction Budgetary Cost Estimates
February 2, 2007

Description	Cost
Construction Costs	$ 1,805,000
Communication Equipment	$ 85,000
Land	$ 100,000
Western Labor Costs	
Planning/Field Data	$ 25,000
Environment	$ 41,000
Design	$ 415,000
Construction Management	$ 300,000
Commissioning	$ 200,000
Project Management	$ 50,000
Procurement/Contract Administration	$ 10,000
IF (From Attachment A)	$ 527,000
SUB-TOTAL	$ 3,558,000

Notes:
1) The above is a budgetary level estimate intended to be accurate to +/-20%
2) The estimate does not include the design and construction cost of a new access road to the substation, if it is required.
3) This estimate does not include the design and construction of the customer's transformer and low side equipment.

ATTACHMENT C

PROPOSED SWITCHING DIAGRAM