FINAL

FACILITIES STUDY

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Queue 2006-G2

[Revised 3 Apr 08, for public posting]

Facilities Study for 2006-G2 Wind

1. DESCRIPTION

1.1. Background of Request

2006-G2, per a Letter agreement No. 07-RMR-1696 Interconnection facilities Study Agreement dated 4 Apr 07, requested a facilities study for an interconnection to Western Area Power Administration's (Western) transmission system on the 230-kV transmission line between Archer and Hayden Substations located in Southern Wyoming. The requested interconnection is between structures nos. 33-4 and 33-6.

Western performed a System Impact Study (SIS) to determine the impacts, if any to Western's transmission system of the proposed interconnection. The SIS results found that the proposed 100.5 MW generation would not significantly impact Western's 230-kV transmission line between Archer and Hayden Substation.

The completed SIS does not address the Fraser 138/115-kV transformer owned and operated by Tri-State Generation and Transmission (TSG&T) south of the proposed interconnect.

- The Fraser Transformer had the possibility of overloading. This transformer is not Western owned, further consultation with the owner, Tri-State Generation and Transmission, will be required to mitigate the situation.
- The 138/115-kV transformer was found to have a Remedial Action Scheme, so no further improvements are necessary.

This Facilities Study provides for a general description and cost estimates for the proposed interconnection to Western's Archer – Hayden 230-kV transmission line.

1.2. Description of Connection Facility

The requirement for the interconnection facility to Western's Archer – Hayden 230 – kV line is a sectionalizing switchyard. Western requires the installation of a 230-kV three breaker ring bus configuration to meet the sectionalizing requirements. It is assumed that the customer's 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 the 230-kV transmission line from the Archer substation to the Hayden Substation. The line is approximately 157.5 miles long and has a thermal rating of 320MVA. This line was constructed in 1963 with 1272 ASCR.

2. SUMMARY OF EXISTING STUDIES

2.1. Feasibility Study

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

2.2. SIS Requirements

A System Impact Study (SIS) was performed and the SIS report was forwarded to 2006-G2. The SIS performed was an interconnection and transmission study.

2.3. Environmental Studies

2006-G2 as executed a separate agreement dated 17 May 07 and provided funding to Western for performance of environmental reviews and studies for the interconnection facility and the associated applicant facilities.

3. STUDY REQUIREMENTS

3.1. Contracts

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 estimate for all western labor, overheads, equipment additions, modifications, etc.

3.2. Interconnection Facilities

By definition provided in the LGIP Manual, Interconnection Facilities shall mean the Transmission Provider'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.

3.3. 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.

3.4. 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.

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

3.6. 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 100 MW interconnection requested by the Customer.

4.1. Contracts
Upon acceptance and agreement of this facility study Western will draft a LGIA agreement.

4.2. Description of Interconnection Facility (see Attachment A)
4.2.1. Transmission Provider's Interconnection Facility

- Metering equipment and associated metering class instrument transformers
- One -230-kV manual gang operated disconnecting switch

4.2.2. Interconnect Customer's Interconnection Facilities
It is expected that the customer will install a 34.5-kV line from generation facility to a location within a new Western Substation.

- One – 230/34.5-kV 100MVA transformer (assumed located within the substation) (Note: This equipment is not included in cost estimate)
- One – 34.5-kV, 1600 amp power circuit breaker or equivalent interrupter for transformer protection (Note: This equipment is not included in cost estimate)
- Metering equipment may be located on low side of transformer

4.3. Network Improvements (see Attachment B) A new substation would be constructed directly adjacent to Western's Hayden – Archer transmission line, at approximately Structure 33-4/34-6.

4.3.1. The SIS found that Tri-State Generation and Transmission's Fraser 138/115-kV transformer had the possibility of overloading. The Fraser 138/115-kV transformer was found to have a Remedial Action Scheme, so no further improvements are necessary.

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 – 230-kV, 1600 amp, SF6 power circuit breakers
- Six – 230-kV manual gang-operated disconnecting switches
- Two – 230-kV manual gang operated disconnecting switches with ground blades
- Instrument transformer 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.
  One - 900MHz radio
  One - Communications tower (if needed)

- Control Building (approximately 1200 sq. ft.)
- Two – 230-kV transmission line tap structures.
- Approximately 8.6 acres (375,000 ft^2) of land for the new substation.

4.4. 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 for maintenance and emergency situations. Coordination of the proposed work at all affected facilities could affect the generation output capability until all work is completed.

4.5. Schedule

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

2006-G2 had requested an in-service date of 1 Jul 08, however due to various factors an In-Service date of 1 Jun 09 is feasible.

PROPOSED PROJECT SCHEDULE

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

4.6. 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. 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 in 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 and 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

2006-G2 Wind
Design and Construction Budgetary Cost Estimates

Description	Cost
Construction Costs	$ 2,600,000
Communication Equipment	$ 145,000
Land	$ 60,000
Western Labor Costs	
Planning/Field Data	$ 25,000
Environment	$ 50,000
Design	$ 330,000
Construction Management	$ 300,000
Commissioning	$ 200,000
Project Management	$ 50,000
Procurement/Contract Administration	$ 10,000
TOTAL	$3,770,000

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. The estimate does not include the cost of the 230/34.5 –kV 100 MVA transformer proposed for the substation.

ATTACHMENT B

PROPOSED SWITCHING DIAGRAM