

DRAFT FACILITY STUDY REPORT

Network Transmission Request 2005-T2

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Draft Facility Study – (2005-T2)

A. DESCRIPTION

1. Background of Request

On January 25, 2006, 2005-T2 submitted a request No. 2005-T2 for modifications to a Network Integration Transmission Service. The following modifications were requested to be effective on January 1, 2008:

- Increase the delivery capability through Dave Johnston or Miracle Mile to 170 MW
- Maintain the delivery capability at Ault and Stegall West
- Designate the Wyodak bus as a network resource

Western completed a System Impact Study (SIS) in August 2006 to determine the impacts, if any, to Western's transmission system of the proposed interconnection. The SIS determined that to serve the Cheyenne area load via additional generation in the Wyodak area, a new 230-kV transmission line is required to be constructed from the Wyodak generation plant to Pumpkin Butte (addressed as Hartzog in the SIS) to PacifiCorp's Dave Johnston or Casper Substations for interconnection at Western's Miracle Mile Substation. The study also indicates that both termination at either Dave Johnston or Casper Substation provide adequate system reliability, but a termination at the Casper Substation results in slightly more favorable system reliability.

Letter Agreement No. 06-RMR-1649 was executed on October 24, 2006, and provides for the completion of a Facility Study and corresponding final report that summarizes the required system modifications, additions, costs and schedule for the project.

The Facility Study provides for general description and cost estimates for the Network upgrades required for the interconnection to Western's Miracle Mile Substation. This includes all major 230-kV equipment, relay and control system, communication, metering requirements and modifications to the substation.

2. Description of Existing Western Facilities Related to Interconnection Request

Western owns, operates, and maintains the Miracle Mile Substation where seven of Western's 115-kV lines and one customer-owned 24.9-kV line are currently terminated. The substation has provisions for future 115-kV and 230-kV facilities. See Attachment A for the general arrangement plan.

Western owns, operates, and maintains the 146-mile Cheyenne-Miracle Mile 115-kV and the 145-mile Cheyenne-Happy Jack-Miracle Mile 115-kV transmission lines. Western is currently rebuilding the Cheyenne-Miracle Mile 115-kV Line for 230-kV operation by September 2009, as part of the 230-kV transmission path from Ault Substation to Miracle Mile Substation. The line will be constructed with 1272 ACSR

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conductor and an associated thermal rating of 442 MVA. Under the same construction contract, Western will slightly modify the configuration of a small portion of the Cheyenne-Happy Jack-Miracle Mile 115-kV line, in the Laramie, Wyoming, area.

The completed construction work will result in a 147-mile Cheyenne-Snowy Range-Miracle Mile 115-kV Line, suitable for future 230-kV energization, and a 151-mile Cheyenne-Happy Jack-Snowy Range-Miracle Mile 115-kV line.

Western is nearing completion of a new substation (Snowy Range) to provide sectionalizing capability for the existing Cheyenne-Miracle Mile and Cheyenne-Happy Jack-Miracle Mile 115-kV transmission lines. The existing 115-kV lines will be terminated at Snowy Range Substation by June 2007.

By September 2009, Western will energize a 230-kV transmission path from Miracle Mile Substation to Ault Substation. In preparation for the upgrade, a 230/115-kV, 200 MVA transformer, and three-breaker ring bus arrangement are also planned to be installed at Miracle Mile Substation by September 2009. Two breakers will be dedicated to Western's 230/115-kV transformer and the Miracle Mile-Snowy Range 230-kV line section termination. The configuration allows for a future third 230-kV breaker to be installed by Western or other entity.

3. Description of Connection Facility

To connect to Western's transmission system at Miracle Substation, one 230-kV breaker and associated 230-kV disconnect switches, buswork and foundations would be installed within a three-breaker ring bus arrangement. As mentioned in Section 2, Western plans to use two of the breakers in this bus arrangement for termination of a 230/115-kV transformer and the Miracle Mile-Snowy Range 230-kV line section.

In addition, controls and communication equipment and cabling must be installed within the substation.

A 230-kV line must be installed from Miracle Mile to either Casper or Dave Johnston substations, both owned by PacifiCorp. The line would be designed with wood H-frame structures, 1272 ACSR conductor and one overhead optical groundwire.

B. SUMMARY OF EXISTING STUDIES

1. SIS Requirements

A Feasibility Study was not performed for this interconnection request.

The SIS was performed in August 2006, and the corresponding SIS Report was forwarded 2005-T2. The SIS concluded that the increased 170 MW delivery

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capability through Dave Johnston or Miracle Mile Substation could be achieved if a new 230-kV transmission line was constructed from Wyodak to Hartzog/Pumpkin Butte to Dave Johnston to Miracle Mile or Wyodak to Casper to Miracle Mile. A termination at Casper would provide slightly more beneficial system reliability.

2. Environmental Studies

2005-T2 will make a separate request for Western to perform environmental work.

C. STUDY REQUIREMENTS

Western performed this Facilities Study to determine upgrades or modifications needed at the point of the interconnection and includes estimates of the cost of facilities design and construction as well as the time required to complete design and construction.

1. Contracts

Letter Agreement No. 06-RMR-1649, between Western and 2005-T2, was executed on October 24, 2006. The letter agreement provides for the completion of a Facility Study and associated final report and stipulates that 2005-T2 will make a separate request for Western to perform environmental work.

2. Interconnection Facilities

Design and construction of a 230-kV interconnection facility at Miracle Mile Substation and a 230-kV transmission line from Miracle Mile to either Dave Johnston or Casper substations would be required to interconnect to Western's transmission system.

3. Network Modifications/Upgrades and Additions

There are no network modifications/upgrades or additions required to Western's transmission system, at or beyond the point at which the interconnection facilities will connect to Western's system.

4. Schedule

2005-T2 requested that the network modifications be effective January 1, 2008. This timeframe cannot be reasonably accommodated by Western. Western will not have 230-kV transmission facilities in place between Miracle Mile and Cheyenne substations until September 2009.

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D. STUDY RESULTS

This Facility Study Report defines the requirements needed to accommodate 2005-T2' requested network modifications needed to provide 170 MW service to load in the Cheyenne area.

1. Description of Interconnection Facility

a. The following Interconnection Facilities would be required:

- 1) Miracle Mile Substation - One 230-kV, 2000 Amp, SF-6 power circuit breaker and two 230-kV, manual gang-operated disconnect switches, to be installed within a three-breaker ring bus arrangement (of which two breakers are dedicated to a Western 230/115-kV transformer and Western's Miracle Mile-Snowy Range 230-kV Transmission line section; instrument transformers for control and relaying; metering, relay, control and communication equipment; and an optical splice enclosure.

Attachment B illustrates the planned line bay location within Miracle Mile Substation. Attachment C contains the proposed switching diagram. Table 1 identifies the associated cost estimate for the substation addition.

Table 1 – Miracle Mile Substation, Line Breaker Bay Cost Estimate

TASK DESCRIPTION	COST*
Project Management	\$ 6,000
Planning/Field Data	\$ 5,000
Design	\$ 40,000
Procurement	\$ 2,000
Construction Management	\$ 135,000
Construction Contract	\$ 813,000
Commissioning	\$ 130,000
TOTAL:	\$1,131,000

* The budgetary level estimate is intended to be accurate to +/- 20%.

- 2) A 230-kV transmission line from Miracle Mile Substation to either Dave Johnston or Casper Substation, which includes:
 - 230-kV Wood H-frame Design
 - 1272 ACSR Conductor
 - One 0.456-inch, 24-fiber overhead optical ground wire and optical splice enclosures
 - One ½-inch, high strength, 7-strand steel overhead ground wire

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Attachment B also illustrates the planned line termination for a 230-kV line from either the Dave Johnston or the Casper substation. Table 2 identifies the estimated cost associated with the transmission line.

Table 2 – 230-kV Transmission line from Miracle Mile to Dave Johnston Substation or Casper Substation

TASK DESCRIPTION	COST* Dave Johnston (86 miles)	COST* Casper (54 miles)
Project Management	\$25,000	\$25,000
Planning/Field Data	\$2,150,000	\$1,350,000
Lands**	\$1,290,000	\$810,000
Design	\$95,000	\$60,000
Procurement	\$5,000	\$5,000
Construction Management	\$576,000	\$362,000
Construction Contract	<u>\$ 21,328,000</u>	<u>\$ 13,392,000</u>
TOTAL:	\$ 25,469,000	\$ 16,004,000

* The budgetary level estimate is intended to be accurate to +/- 20%

** Land acquisitions costs cannot be accurately determined without performing an appraisal and corresponding surveys. Based on a recent Wyoming transmission line project, \$15,000 per mile was assumed.

b. Interconnection Customer's Interconnection Facilities

A 230-kV line must be constructed from either Dave Johnston or Casper substations to Pumpkin Butte and Wyodak substations and two 230-kV line terminals must be secured at PacifiCorp's Dave Johnston or Casper substations.

2. Network Improvements

There are no additional network improvements required to achieve 2005-T2' request to serve 170 MW of load at Cheyenne, once the 230-kV interconnection facilities at Miracle Mile Substation and the Miracle Mile to Dave Johnston or Casper transmission line are constructed.

3. Operations Requirements

An Interconnection Agreement, between Western and 2005-T2, must be executed prior to energization of the interconnection facility, to define design and construction requirements, and responsibilities of ownership, operation, maintenance and replacement. This Agreement or other agreement will set forth funding required of 2005-T2, as the interconnecting entity, for long-term operations and maintenance costs associated with the interconnection facility. The Interconnecting entity will write Standard Operating Procedures in accordance with Western requirements for the interconnected facility.

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4. Schedule

Western is unable to meet the January 1, 2008, effective date requested by 2005-T2. Western will not energize 230-kV transmission facilities between Miracle Mile and Cheyenne substations until September 2009. After evaluation of Western's work load, required equipment lead times and construction time frames, Western has determined the interconnection facilities can be planned, designed and constructed as shown in Table 3. This schedule does not include the environmental requirements for the project that are to be separately addressed by 2005-T2. This may result in a later in-service date than is projected in this report.

Table 3 – Proposed Project Schedule

ACTIVITY	START	COMPLETION
Interconnection Agreement Execution Receipt of Funding (if Western designs/constructs)	May 2007	August 2007 September 2007
230-kV Substation Additions:		
Planning/Field Data	October 2007	January 2008
Design	February 2008	September 2008
Equipment Purchase	October 2008	October 2009
Construction Contract Solicitation	March 2009	April 2009
Award of Construction Contract		May 2009
Construction Contract Performance	June 2009	February 2010
Commissioning	November 2009	February 2010
In-service date		March 2010
230-kV Transmission Line:		
Planning	October 2007	January 2008
Field Data	February 2008	July 2008
Lands	February 2008	December 2008
Design	August 2008	January 2009
Construction Contract Solicitation	February 2009	March 2009
Award of Construction Contract		April 2009
Construction Contract Performance	May 2009	February 2010
In-service Date		March 2010

**The substation construction activities are coordinated with the anticipated 230-kV transmission line completion, to avoid premature installation of equipment that cannot be energized until the transmission line is energized.*

3. Environmental Requirements

It is 2005-T2 responsibility to sign a separate agreement and provide funding so Western can perform the Environmental Review.

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ATTACHMENT A

Existing Generation Arrangement Plan For Miracle Mile Substation

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ATTACHMENT B

Generation Arrangement Plan For Interconnection Facility at Miracle Mile Substation

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ATTACHMENT C

Proposed Switching Diagram for Interconnection Facility