

Interconnection Feasibility Study Report

Request # GI-2007-12

Supplemental Information

250 MW Wind Farm, Near Calhan, Colorado
PSCo Transmission Planning
August 15, 2008

Executive Summary

On November 5, 2007, Public Service Company of Colorado (PSCo) Transmission Planning received a generation interconnection request to determine the feasibility of injecting power from a 250 MW wind turbine generation farm into the bulk transmission system at the Jackson Fuller Substation near Colorado Springs. The proposed commercial operation date is December 31, 2010. The proposed back feed date is May 31, 2010.

On July 18, 2008, PSCo and the Customer held the GI-2007-12 Feasibility Study Review Meeting. The customer asked about the Network Upgrades for Delivery. The study identified three facilities on the Colorado Springs Utilities (CSU) system that could experience contingency overloads with the addition of the proposed 250 MW wind farm (and assuming the Monument-Palmer Lake 115kV line is placed in service permanently). These include the following facilities:

- Cottonwood N-Kettle Creek 115kV line (132 MVA)
- Kettle Creek-Flying Horse 115kV line (132 MVA)
- Fuller 230-115kV Transformer (100 MVA)

PSCo agreed to provide high level planning cost estimates (with no implied accuracy) by assuming that these facilities were PSCo-owned facilities. PSCo indicated that better estimates (+/- 30% scoping level cost estimates) would be provided in the System Impact Study.

The total estimated cost for network upgrades is approximately \$24.31 million. This estimate is an indicative planning cost estimate with no implied accuracy. CSU indicated that they are planning to uprate the Cottonwood N-Kettle Creek 115kV line using new rating assumptions and any associated cost for this uprate was not included in the indicative transmission planning cost estimate. The indicative transmission planning costs estimate includes the cost for five miles of 115kV transmission between the Kettle Creek Substation and the Flying Horse Substation that is expected to require underground construction and the installation of a second 100 MVA Fuller 230-115kV transformer.



Indicative Transmission Planning Cost Estimates (no implied accuracy)

The cost estimates provided in Table 1 below are based on transmission planning estimating guides and have no implied accuracy. They are provided to the customer as a courtesy.

Table 1 Network Upgrades for Delivery (Indicative Planning Cost Estimates)

Facility	Additions/Modification Required	Approximate Cost (2008 dollars)
Uprate the Cottonwood N-Kettle Creek 115kV Line	The rating of the CottonwoodN-Kettle Creek 115kV line needs to be increased to at least 155MVA (117% of its 132 MVA rating). CSU is considering a different set of rating assumptions for their line ratings with an ambient temperature of 95 F and a wind speed of 4 fps.	\$ 0.00 million
Add a second Kettle Creek-Flying Horse 115kV line	New lines in the area are required to be placed underground. The approximate cost/mile for underground 115kV construction is \$3.5 million per mile. The Kettle Creek-Flying Horse 115kV line #2 would be approximately five miles in length.	\$ 17.50 million
Kettle Creek Substation	Add one 115kV line bay to create a main-and-transfer bus arrangement along with 115kV transfer breaker, engineering and survey, permitting and environmental, administration and general, AFUDC, land acquisition	\$ 1.88 million
Flying Horse Substation	Add one 115kV line bay in a single bus arrangement, engineering and survey, permitting and environmental, administration and general, AFUDC, land acquisition	\$ 0.97 million
Jackson Fuller Substation	Add a 230kV breaker to a breaker-and-a-half bus configuration, add a 115kV breaker to a single bus arrangement, add a second 100 MVA 230-115kV autotransformer ¹ , engineering and survey, permitting and environmental, administration and general, AFUDC, land acquisition	\$ 3.96 million
TOTAL		\$ 24.31 million

¹ The Fuller 100 MVA 230-115kV transformer is owned by Tri-State and any upgrades would need to be coordinated with them.

Figure 1 Proposed Jackson Fuller One-Line Diagram (Upgrades Marked in Blue)

