T157 New Creek Mountain 500kV
Generation Interconnection

General

The Interconnection Customer has proposed a 160 MW wind generating facility to be located near the town of New Creek, Mineral County, West Virginia. The generating facility will consist of 64 Clipper C-93 wind turbines. T157 was studied as a 160 MW injection into the Allegheny Power (AP) transmission system. The project was evaluated for compliance with reliability criteria for summer peak conditions in 2012. The planned commercial in service date is November 30, 2010.

Point of Interconnection: T157 will interconnect to the new AP Bismark 500kV switching station on the Mt. Storm (VAP) – Doubs (AP) 500kV line section. The existing Mt. Storm – Doubs 500 kV circuit will be looped into the new Bismark switching station.

Direct Connection Requirements

Transmission Owner Scope of Direct Connection Work

The scope of work and estimated costs for the direct connection facilities is as follows:

1. Bismark Switching Station - Construct a new 500kV switching station, to be called Bismark, on property to be furnished by the developer to provide a service point for the proposed generation facility which will be located in the AP Cumberland Service Center. The new switching station will be situated on the existing Mt. Storm-Doubs 500kV line at a point approximately 10 miles from the Mt. Storm switching station and 90 miles from the Doubs switching station.

   Major equipment in the new Bismark switching station will include three (3) 500kV breakers configured as a ring bus and interconnection metering. A redundant channel transfer trip scheme requiring the installation of CVTs and traps is included. The station will also include a control building which will house all protective relaying, metering and SCADA RTU communications equipment required to accommodate the electric facilities. Revenue metering will be located on the feed to the generator.

   The estimated cost to perform this work is **$12,000,000** in 2010 dollars.

2. Loop the existing Mt. Storm – Doubs 500 kV circuit into the Bismark switching station.

   The estimated cost to perform this work is $**1,500,000** in 2010 dollars.

3. Mt. Storm – Install redundant channel transfer trip on the Bismark 500kV terminal.

   The estimated cost to perform this work is **$273,000** in 2010 dollars.

4. Doubs – Install redundant channel transfer trip on the Bismark 500kV terminal.

The estimated cost to perform this work is **$273,000** in 2010 dollars.

Interconnection Customer Scope of Direct Connection Work

The Interconnection Customer will interconnect with the AP system by constructing a customer-owned 500 kV circuit from their site to the new AP station. The above cost estimates do not include construction of that line. Route selection, line design, right-of-way acquisition and construction of such lines will be entirely the responsibility of the Interconnection Customer. It is assumed that the Interconnection Customer's substation will be adjacent to the new Bismark switching station and the customer will provide a graded site including an access road. It is further assumed that the Interconnection Customer's step up transformer will conform to the AP standard with delta on the low side and grounded wye on the high side.

While we can't mandate that our personnel install protective relaying and communications equipment at the generator site, Allegheny Power has responsibility for designing the protection scheme and providing specifications for all relays to be employed on the interconnection breaker terminal at the generation site to assure that the protective relaying equipment will be compatible with that installed on the interconnection breaker terminal at the new switching station. The relaying package will likely include both primary and backup protection. Allegheny Power is also responsible for testing and calibrating all relays and performing all tests to assure that relaying at the generator site is properly installed and functional.

The estimated total cost of this engineering and field test effort is **$5,000 in 2010 dollars**.

Note: Purchase and installation of protective relaying and associated equipment at the generation site is not included in this scope of work. This phase of work is the responsibility of the customer.

The estimated cost for Allegheny Power Controls Engineering to complete a coordination review of the area, develop new relay settings, and implement the required changes is approximately **$5,000 in 2010 dollars**.

It is assumed that a fiber optic interface will be used for the protection channel between the AP and developer's stations. The Interconnection Customer will be required to install metering and telemetry equipment to provide revenue metering and real-time telemetry data to PJM. The requirements for this equipment are listed in Appendix 2, Section 8 of Attachment O to the PJM Tariff, as well as PJM Manuals 01 and 14D. Protective relaying and metering design and installation must comply with the Allegheny Power Applicable Standards.

Cost and Timing Summary

The estimated time to provide for the interconnection of this project is **30 months** after the receipt of a signed Interconnection Service Agreement and Construction Service Agreement.

While the information in this transmittal is reasonable for the scope of work defined, it should, however, be noted that the cost figures are conceptual in nature at this stage, as an engineering team

has not been assigned to the project. Obviously, any change to the scope of work will require that the estimates be revisited. The costs are a best estimate, but the developer will be charged for actual costs. Any under-runs or over-runs will be reconciled at the conclusion of the project.

The estimates in this report do not include tax gross-up.

Network Impacts

Generator Deliverability

(Single or N-1 contingencies for the Capacity portion only of the interconnection)

None

Multiple Facility Contingency

(Double Circuit Tower Line contingencies only for the full energy output. Stuck breaker and bus fault contingencies will be performed for the System Impact Study)

None

Short Circuit

No breakers were identified as being over their maximum interrupting rating.

Listed below are the positive and zero sequence source equivalent impedance at the proposed Bismark site with the GSU and generators OPEN.

Positive: (0.00025+j0.00384)
Zero: (0.00010+j0.00541)

Contribution to Previously Identified Overloads

(This project contributes to the following contingency overloads, i.e. "Network Impacts", identified for earlier generation or transmission interconnection projects in the PJM Queue)

None

Steady-State Voltage Requirements

No problems identified.

Stability and Reactive Power Requirements

Will be performed during the Queue T157 System Impact Study.

New System Reinforcements

(Upgrades required to mitigate reliability criteria violations, i.e. "Network Impacts", initially caused by the addition of this project generation)

None

Contribution to Previously Identified System Reinforcements

(Overloads initially caused by prior Queue positions with additional contribution to overloading by this project. This project may have a % allocation cost responsibility which will be calculated and reported for the System Impact Study)

None

Delivery of Energy Portion of Interconnection Request

(PJM also studied the delivery of the energy portion of this interconnection request. Any problems identified below are likely to result in operational restrictions to the project under study. The developer can proceed with Network Upgrades to eliminate the operational restriction at their discretion by submitting a Transmission Interconnection Request).

As a result of the aggregate energy resources in the area, the following violations were identified:

None