

**PJM Generator Interconnection Request
Feasibility Study Report**

**Queue Position #U1-080
Montgomery Lock & Dam Project
35 MW
July, 2008**

**DOCS # 494685v1
July 28, 2008**

Preface

The intent of the feasibility study is to determine a plan, with high level cost and construction time estimates, to connect the subject generation interconnection project to the PJM network at a location specified by the Interconnection Customer. As a requirement for interconnection, the Interconnection Customer may be responsible for the cost of constructing Network Upgrades, which are facility additions, or upgrades to existing facilities, that are needed to maintain the reliability of the PJM system. All facilities required for interconnection of a generation interconnection project must be designed to meet the technical specifications (on PJM web site) for the appropriate transmission owner.

In some instances an interconnection customer may not be responsible for 100% of the identified network upgrade cost because other transmission network uses, e.g. another generation interconnection or merchant transmission upgrade, may also contribute to the need for the same network reinforcement. The possibility of sharing the reinforcement costs with other projects may be identified in the feasibility study, but the actual allocation will be deferred until the impact study is performed.

The Feasibility Study estimates do not include the feasibility, cost, or time required to obtain property rights and permits for construction of the required facilities. The project developer is responsible for the right of way, real estate, and construction permit issues. For properties currently owned by Transmission Owners, the costs may be included in the study.

General

The Interconnection Customer has proposed construction of a 35 MW (35 MW Capacity) hydro-electric generating facility at the Montgomery Lock and Dam located along the Ohio River in Industry Borough, Beaver County, Pennsylvania. The proposed point of interconnection is via the 23 kV bus in the Midland Substation, owned by the Duquesne Light Company (DLCO), with modifications outlined in the “Direct Connection” section later in this document. The planned in-service date is the first quarter of 2015.

This Generation Interconnection Feasibility Study provides analysis results to aid the Interconnection Customer in assessing the practicality and cost of incorporating the facility into the PJM system. This study was limited to load flow analyses for all single and tower contingencies. Using information provided by the transmission owners, this report includes facility cost and schedule estimates where appropriate. If the interconnection customer elects to pursue a System Impact Study, a more comprehensive analysis will be performed.

PJM Analysis:

Network Impacts

The queue project U1-080 was studied as a 35MW (capacity) injection into the Duquesne system. The project was modeled as a direct connection to the Raccoon 138kV substation. U1-080 was evaluated for compliance with reliability criteria for summer peak conditions in 2012. Potential network impacts were as follows:

Generator Deliverability

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

No problems identified.

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 Impact Study)

No problems identified.

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)

No problems identified.

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 Impact Study)

None.

Transmission Owner Analysis:

Direct Connection

The proposed generation project will be connected to a 23 kV bus in the Midland Substation utilizing a section of the present 22857 (reconductored) along with new 23 kV subtransmission construction at the Midland and customer ends. See Figure #1 for a

diagram of the proposed interconnection. The proposed interconnection will require the construction of approximately 0.7 miles of new 23kV line to connect the generation site to the present 22857 circuit. A 3 mile section of the 22857 line must be reconducted to accommodate the generator. Additionally, a 1.1 mile section of new line must be built between the 22857 line and a new breaker position at Midland Substation.

The following assumptions were used in the preparation of this high-level cost estimate:

- DLCO will engineer, purchase and construct approximately 1.8 miles of new 23kV line.
- DLCO will reconductor approximately 3 miles of the existing 22857 line.
- DLCO will engineer, purchase, and construct all new equipment required at Midland Substation.
- DLCO will be responsible for the engineering, purchase, and construction of the high voltage equipment from the 23kV line entrance to the metering point within the customer substation.
- DLCO will be responsible for the engineering of the foundations, structural steel, UG conduit and grounding associated with the DLCO high voltage equipment.
- The customer will be responsible for providing land for the interconnection substation including space for DLCO protection and supervisory control within a secure and environmentally controlled building in or adjacent to the customer substation.
- The customer will be responsible for the engineering, purchasing, and construction of the customer substation, except as noted above.
- The customer must meet all National, State, Local, and DLCO requirements and must share control of the customer-purchased circuit breaker.
- DLCO will install and maintain relay protection and communications equipment associated with line protection for the DLCO equipment at the customer substation.
- The line metering, protection, and supervisory control for the DLCO system will be located inside a customer provided secure and environmentally controlled structure within or adjacent to the customer substation.
- The customer is responsible for providing, installing, and maintaining the steel, foundations, conduit, grounding, fencing, and control house per DLCO specifications.
- The customer is responsible for providing station service for DLCO use per DLCO specifications.
- All customer substation equipment beyond the DLCO metering point must be coordinated and meet DLCO specification.

New System Reinforcements

Valley-Midland (22857) between Fairview and Midland for loss of Raccoon-Monaca (22831) between the Spectrum tap and BASF Chemical resulted in the following single contingency overload:

Valley-Midland prior to U1-080 installation: 90% of its emergency rating

Valley-Midland after U1-080 installation: 130% of its emergency rating

Approximately 4.8 miles of 23kV subtransmission circuits must be reconducted to accommodate the proposed generator and mitigate this overload condition. DLCO will reductor the lines or line sections.

No breaker replacements were identified during the short circuit analysis.

The preliminary cost estimate is **\$2,040,000** in 2008 dollars, which includes the New System Reinforcement costs and tax gross-up.

If the customer requires an additional supply for use in the event of a contingency on this newly-formed 23 kV line, further upgrades would be required to support the full capacity of the generator. The cost for these upgrades has not been included in the preliminary cost estimate.

Preliminary Cost Estimate

The preliminary total cost estimate is **\$7,000,000** in 2008 dollars, which includes the Direct Connection costs, New System Reinforcement costs, and tax gross-up. The price will be adjusted for labor rate and material cost changes based on the actual project schedule.

Construction Lead Time

This project will require 3-5 years to complete from the date of receipt of a signed Interconnection Service Agreement (ISA). This estimate is a conservative high-level estimate for the lead-time of the proposed interconnection. If Developer elects to pursue the System Impact Study, a more comprehensive analysis will be performed. Delays could be based on weather, equipment lead-time, procurement of right of ways, site preparation, and availability of outages to perform the work.