

**PJM Generator Interconnection Request  
Feasibility Study Report**

**Queue Position #U1-070  
Dashields Lock & Dam Project  
14 MW  
July, 2008**

**DOCS # 494679v1  
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 14 MW (14 MW Capacity) hydro-electric generating facility to be constructed at the Dashiels Lock and Dam located along the Ohio River on the border of Emsworth and Edgeworth Boroughs, Allegheny County, Pennsylvania. The proposed point of interconnection is the Sewickley 138kV Substation owned by the Duquesne Light Company (DLCO). The planned in-service date is sometime during 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 #U1-70 was studied as a 14MW energy and capacity injection at the Sewickley 138 kV substation in the DLCO area. Project #U1-70 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)

None

#### **Multiple Facility Contingency**

(Double Circuit Tower Line, Line with Failed Breaker and Bus Fault contingencies for the full energy output)

None

#### **Short Circuit**

(Summary form of Cost allocation for breakers will be inserted here if any)

Not Required

#### **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

#### **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)

(Summary form of Cost allocation for transmission lines and transformers will be inserted here if any)

None

## **Transmission Owner Analysis:**

### **Direct Connection**

The proposed generation project will be looped through the future Crescent-Sewickley (22862) 23 kV subtransmission circuit. See Figure #1 for a diagram of the proposed interconnection. The proposed interconnection will require the construction a double circuit, approximately 0.1 miles in length, to connect the generation site to the future 22862 line.

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

- DLCO will construct two sections of new line, each approximately 0.1 miles in length.
- 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 outdoor 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**

Future Crescent-Sewickley (22862) between Sewickley and U1-070 for loss of future Crescent-Sewickley (22862) between Leetsdale and U1-070 resulted in the following single contingency overload:

Sewickley-U1-070 prior to U1-070 installation:	0%* of its emergency rating
Sewickley-U1-070 after U1-070 installation:	109% of its emergency rating

\*This contingency did not exist before the looped interconnection of the U1-070 generator. Prior to U1-070 installation, a single contingency would outage the entire section of the Crescent-Sewickley subtransmission line that the U1-070 has been looped through.

Additionally, future Crescent-Sewickley (22862) between Leetsdale and U1-070 as well as, future Crescent-Sewickley (22862) between Bethlehem Steel tap and Leetsdale for loss of future Legionville-Sewickley (22852) between Sewickley Valley Hospital (SVH) and Sewickley resulted in the following two single contingency overloads:

Leetsdale-U1-070 prior to U1-070 installation:	93% of its emergency rating
Bethlehem-Leetsdale after U1-070 installation:	121% of its emergency rating

SVH-Sewickley prior to U1-070 installation:	92% of its emergency rating
SVH-Sewickley after U1-070 installation:	114% of its emergency rating

Approximately 2.35 miles of conductors must be replaced to accommodate the new generator and mitigate this overload condition. DLCO will reconductor the lines or line sections.

No breaker replacements were identified during the short circuit analysis.

The preliminary cost estimate is **\$1,409,000** in 2008 dollars, which includes the New System Reinforcement costs and tax gross-up.

## **Preliminary Cost Estimate**

The preliminary total cost estimate is **\$4,600,000** 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.