PJM Generator Interconnection Request #B12 Limerick 500 MW Feasibility Study Report

May 2000

General

Project #B12 is a 500 MW (Summer) combined cycle, gas fueled, generating facility consisting of two combustion turbines and one steam turbine. #B12 is scheduled to be in service May 2002. The generating facility property is located in Lower Pottsgrove, PA., at the intersection of Sanatoga Rd. and Longview Rd. The property is adjacent to a right-of-way that contains two 500 kV transmission lines that connect the Limerick 500 kV substation to the Whitpain 500 kV substation. The site is approximately ¾ of a mile from the Limerick 500 kV substation.

This report presents the results of a feasibility level analysis for Project #B12 which is seeking to be interconnected to the PJM System as a 500 MW capacity resource. Note: Generator data submitted by the interconnection customer (gross 92°F output of 171.5 MW each for the CTs and 236 MW for the Steam turbine) indicates that the actual net summer capacity value may be greater than 500 MW. The Feasibility Study, as well as subsequent studies for the #B12 queue position interconnection request, will only assume a request for a maximum capacity injection of 500 MW.

Direct Connection and system upgrade requirements, relative costs (without tax considerations) for the system upgrades, and estimated construction times for the system upgrades were provided for several alternatives. Cost and time estimates were not provided for the construction of the Project #B12 generating substation because construction of this facility, to PECO Energy and PJM standards, is totally the responsibility of the Interconnection Customer.

Feasibility studies are performed to provide the generation developer with ballpark reinforcement cost and timing information concerning both direct connection facilities and potential transmission network upgrades. The analysis inherently has to include assumptions regarding existing uncertainties; therefore, the results should be used in this context.

Direct Connection

The generating facility can be connected to the transmission system via the Limerick 230 kV bus as shown on the next page. This plan would require the construction of a 230 kV line from the proposed generating facility to the Limerick 230 kV substation. The length of the line would be approximately 1.2 miles, and the right-of-way would need to be acquired. In addition a new bus section and 1 circuit breaker would be needed for attachment of the line to the 230 kV bus at Limerick. This is the least cost connection plan of the three alternatives which were evaluated. As such, it will be considered as the single connection plan to be used as the basis for all subsequent studies for #B12 generator interconnection request.

The cost estimate for this plan is as follows:

take-off towers at new facility site		$ 200,000
230 kV transmission line (1.2 miles)		$ 1,000,000
230 kV bus section at Limerick and 1 new line CB		$ 1,300,000
	total	**$ 2,500,000**

The estimated time needed for construction of the above facilities is 18 months.

It should be noted that the above estimates do not include the cost or time required to obtain the right-of-way property and permit needed for construction of the transmission line.

The generating facility can also be connected to the transmission system via the Limerick 500 kV bus as shown below.

This plan for attachment would require the construction of a 500 kV line from the proposed generating facility to the Limerick 500 kV substation. The right-of-way for this line would need to be acquired. In addition, a new bus section with 2 circuit breakers would be needed for attachment of the line to the 500 kV bus at Limerick. The cost estimate for this plan is as follows:

Take-off towers at new facility site		$ 200,000
500 kV transmission line (¾ mile)		$ 1,000,000
500 kV bus section and 2 breakers at Limerick		$ 4,000,000
	total	**$ 5,200,000**

Although not considered in the cost estimates above, the interconnection customer should be aware that the Project #B12 generating substation for the 500 kV alternatives will cost considerably more than the 230 kV alternative.

The estimated time needed for construction of the above facilities is 18 months.

It should be noted that the above estimates do not include the cost or time required to obtain the right-of-way property and permit needed for construction of the transmission line.

It is also possible to connect the generating facility to one or both of the 500 kV lines that border the site. However, the cost for this attachment would be higher because a new 500 kV substation with a ring bus arrangement would be required at the connection point. See one possible connection on the one-line diagram below.

The cost estimate for this plan is as follows:

3 take-off towers at new 500 kV Sub site		$ 500,000
New 500 kV Substation development		$ 1,600,000
CBs and terminal positions at new 500 kV Sub		$ 5,500,000
	total	**$ 7,600,000**

The estimated time needed for construction of the above facilities is also 18 months.

Network Requirements

Generation Interconnection project #B12 was evaluated for system normal conditions, single contingency outage conditions, and some multiple contingencies. In addition, a limited breaker short circuit duty screening was also performed. Generator deliverability analysis, stability analysis, and the determination of cost allocation for network upgrade requirements are not performed within the scope of the feasibility study. Upgrade requirements, if any, resulting from reliability criteria violations related to deliverability or stability will be evaluated as part of the project Impact Study.

Project #B12, modeled with any of the three alternative direct connections, was evaluated for compliance with reliability criteria. A summary of the results is as follows:

Normal System

- No identified problems.

Single Contingency (MAAC Criteria IIA)

- Potential overload of the Conastone – Peach Bottom 500 kV circuit for the loss of the Conastone – Hunterstown 500 kV circuit.

Multiple Facility Contingency (MAAC Criteria IIC)

- No identified problems.

Short Circuit Analysis

- No identified problems.

  Since some of the circuit breakers in nearby substations are within 20% of their rated fault interrupting capability, it will be necessary to perform a more complete short circuit analysis during the system impact study for Project #B12. These breakers are located at Peach Bottom (500 kV), Whitpain (230 kV), Plymouth (230 kV) & Cromby (69 kV) Substations. In addition, many circuit breakers in the LDV region of the PJM system were identified as being overdutied as a result of earlier projects in PJM Generator Interconnection Queues A and B. This project may have a cost allocation responsibility toward upgrade or replacement of these circuit breakers.