

# Generation Interconnection Request Combined Feasibility/System Impact Study Report

Queue Position #T85  
Roxbury-Blain 23kV  
(Carlisle Pike)  
6.4 MW  
(6.0 MW Capacity)

March 2008

## General

PJM Interconnection, LLC has proposed the installation of 4 methane fired generators totaling 6.4 MW at Cumberland County Landfill's facilities on 135 Vaughn Road, Shippensburg, Pennsylvania (shown in Figure 2 of the Appendix). This generation has a proposed in-service date of October 1, 2008. The Queue Position #T85 project was studied as an injection of 6.0 MW over a new 5-mile express 23kV feeder to Penelec's Carlisle Pike Substation. Queue Position #T85 was evaluated for compliance with reliability criteria for summer peak conditions in 2012.

## Direct Connection

It is proposed that the project be connected off a new 23kV circuit breaker that Penelec will construct off the No. 1 bus at its Carlisle Pike Substation (shown in Figure 1 of the Appendix).

Cumberland County Landfill is responsible for constructing all of the facilities on its side of the Point of Interconnection, which will be between the manhole and the generating plant substation. It will be the developer's responsibility to obtain any needed right-of-way between the plant site and FirstEnergy's facilities. The developer will furnish and install the manhole (8'x10'x8') and concrete encased duct with three (3) 500kcmil Cu 25kV Jkt Conc. Neutral cables from the manhole to the 23kV line that will also be furnished and installed by the developer, as shown in Figure No. 3. The developer will be responsible for all costs related to the installation of the new 23kV circuit breaker, including relay and control work, and the conduit and cable from the new 23kV circuit breaker to the customer owned manhole at Carlisle Pike Substation that are required to connect the generation facility.

The installation of the new 23kV circuit breaker will require an outage on the 23kV No. 1 bus at Carlisle Pike Substation. This outage is required to terminate the new bus structure for the 23kV circuit breaker to the existing No. 1 bus. Due to loading on this bus and the overall Shippensburg area, an outage is not possible during peak conditions, by switching load to other sources. Therefore, an estimate was included to install a Mobile Substation. At the start of construction, Penelec will examine possible outage dates to determine the availability of Mobile Substations and the possibility of other alternatives to accomplish the required outage of the 23kV No. 1 bus at Carlisle Pike Substation. The duration and actual timeframe of the needed outage may affect the need for extensive work at Carlisle Pike substation, such as the connection of a Mobile Substation. The cost responsibility related to providing this outage has yet to be determined and is presently under review.

The proposed interconnection facilities must be designed in accordance with the FirstEnergy "Requirements for Transmission Connected Facilities" document, located at the "FirstEnergy" link on the web page located at:

<http://www.pjm.com/planning/trans-standard.html>

The Interconnection Customer must request access to the document listed above from PJM in order to receive the necessary password for access to the document.

Operational metering is also required for this generation connection. These requirements are also outlined in FirstEnergy "Requirements for Transmission Connected Facilities" document. For this project, the revenue metering will be located inside First Energy's Carlisle Pike Substation. The metering also requires a new telephone line that will require protective

equipment for ground-potential-rise (GPR). The developer will be responsible for the revenue metering and the telephone equipment costs, as shown below.

Below are conceptual estimates for the engineering/construction associated with Direct Connection requirements.

Item	Description	Conceptual Cost Estimate
1	New 23kV bus extension and power circuit breaker installation, including all associated equipment, relays, SCADA, control wiring, steel structures, and underground exit to customer owned manhole.	\$ 350,000
2	Revenue Metering	\$ 20,000
3	New Telephone line for Revenue Metering and required protective equipment for GPR at Carlisle Pike Substation.	\$ 30,000
4	Installation of Mobile Substation to accommodate outage of 23kV No. 1 bus at Carlisle Pike Substation.	\$ 100,000 (Cost Responsibility TBD)

Conceptual Estimate:

\$500,000

Estimated Lead Time:

26 weeks from signed IA\*

\*The inability to obtain an outage of the Carlisle Pike No. 1 23 kV bus may provide a longer lead time for this project. Penelec will examine possible outage dates to determine the availability of Mobile Substations and the possibility of other alternatives to accomplish the required outage of the 23kV No. 1 bus at Carlisle Pike Substation. The cost responsibility related to providing this outage has yet to be determined and is presently under review.

Notes:

- Detailed Engineering & Construction Estimates to be provided during detailed engineering associated with work to be performed during construction of the project under the Interconnection Construction Service Agreement.
- The above estimates do not include 1) tax gross-up, 2) property costs and site development up to rough grade which is to be provided by the developer, 3) interconnection metering and generation SCADA to be provided by the developer, 4) engineering and field activities for design review and commissioning of the developer's facilities, and 5) real estate costs that may be required for right-of-way easements to extend the single circuit 23 kV line.
- Presently, 26 weeks is the most critical lead time. However, FE is still waiting on an estimated lead time for engineering and constructing the new 23 kV line exit at Carlisle Pike substation.

Figure 1 in the Appendix provides a conceptual one-line of the direct connection facilities needed.

## **Network Impacts**

The Queue Position #T85 project was studied as total injection of 6.0 MW into the 23kV No. 1 bus at First Energy's Carlisle Pike Substation. Queue Position T85 was evaluated for compliance with reliability criteria for summer peak conditions in 2008 and 2009. Potential network impacts were as follows:

### **Generator Deliverability**

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

No identified problems.

### **Multiple Facility Contingency – Tower line Outages (MAAC Criteria IIC)**

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

No identified problems.

### **Single Contingency**

No identified problems.

### **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)*

### **Stability and Reactive Power Requirement**

Not required due to size of project.

### **Short Circuit**

No identified problems.

### **New System Reinforcements**

None required.

### **Contribution to Previously Identified System Reinforcements**

*(Overloads initially caused by prior Queue positions with additional contribution to overloading by this project.)*

None.

### **Cost Allocation**

Queue Position #T85 project will be responsible for 100% of the direct connection costs estimated at \$400,000. Additionally, as mentioned above, the cost responsibility for the mobile substation has yet to be determined, which may add \$100,000 to the direct connection costs. There were not any system reinforcements identified for this project to accommodate interconnection of the project.

### **Summary**

Conceptual estimates are provided under the assumption that the Point of Interconnection would be the new 23 kV circuit breaker at First Energy's Carlisle Pike Substation and that the customer interconnection would be via the customer's 5-mile 23kV circuit to their substation. The generating unit site is located near 135 Vaughn Road, Shippensburg, Pennsylvania.



Figure 2  
Geographic Depiction of Cumberland County Landfill Location



Figure 3  
Geographic Depiction of Carlisle Pike Substation

