Generation Interconnection
Combined Feasibility and System Impact Study Report

For

PJM Generation Interconnection Request
Queue Position Y1-010

Quinton 12kV

July 2012

Preface

The intent of a Combined Feasibility/System Impact Study is to determine a plan, with approximate 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 (cost allocation) with other projects will be identified in the Combined Report.

Study estimates do not include the feasibility, cost, or time required to obtain property rights and permits for construction of the required facilities. The Interconnection Customer may be 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

SC Landfill Energy, LLC, the Interconnection Customer (IC), has proposed a 1.9 MW (1.9 MWC; 1.9 MW MFO) landfill gas fueled reciprocating engine generating facility to be located at the Salem County Landfill in Alloway Township, Salem County, New Jersey. PJM studied the Y1-010 project as a 1.9 MW injection into the Atlantic City Electric (ACE) system at the Quinton 12kV substation and evaluated for compliance with reliability criteria for summer peak conditions in 2015. The planned in-service date, as stated in the Attachment N, is May 17, 2012.

Point of Interconnection

The Interconnection Customer requested at 12kV distribution level Point of Interconnection. After applying the Criteria Limits listed below to that request, ACE determined that the Y1-010 project must interconnect with their system at a new 69/12kV three breaker ring bus substation to be constructed adjacent to the Salem-Woodstown 69kV circuit (see Attachment 1).

Direct Connection Requirements

Criteria Limits for Distributed Energy Resource Connections to the ACE, DPL and Pepco Distribution Systems (less than 69kV)

1. Existing Distribution Circuit Capacity Limits

The aggregate limit of large (250 kW and over) generator injection to a single, existing distribution circuit is 0.5 MWs on the 4kV, **3MWs on the 12 kV**, 6 MWs on the 25 kV, and 10 MWs on the 34 kV.

2. Express Circuit Capacity Limits

Distributed generation installations which exceed the limit for an existing circuit require an express circuit.

The maximum generator size for express circuits shall be:

4 kV	0.5 MW
12 – 13.8 kV	10 MWs
23 – 25 kV	10 MWs
33.26 – 34.5 kV	15 MWs

3. Distribution Power Transformer Limit

The aggregate limit of large (250 kW and over) generator injection to a single distribution transformer of 22.5 MVA nameplate or larger is **10 MWs**. Transformers with nameplate ratings lower than 22.5 MVA will be given lower ratings on an individual basis. If the transformer rating is significantly greater than 40 MVA it may be possible to consider a greater amount of injection.

Adding a new transformer will be considered if there is no availability on any of the existing transformers and space is available in an existing substation. Any proposed transformers would be PHI's standard distribution transformer (37 MVA nameplate rating.)

Quinton Substation T1 transformer cannot accept any additional generation due to an 8 MW PJM project which is currently being studied. The existing 1.9 MW generator already installed at the subject site holds the remaining space on the transformer.

Quinton Substation T2 transformer cannot accept any additional generation due to a 10 MW PJM project which is currently being studied.

Quinton Substation cannot accommodate an additional transformer.

4. Express Circuit Length Limit

If there is no more injection capacity or space for an additional transformer at the closest substation, the next closest substation will be considered. The length of an express circuit is limited to 5 miles, or for the sake of the Feasibility study, 3.8 straight line miles. This simplification is used because the feasibility study phase does not allow for the time and resources to examine routes in detail (including existing pole lines, easements, ROW, and environmental issues etc.)

5. When a New Substation is Required

If a distribution express circuit can't be built from an existing substation for a project, it will be necessary to construct a new distribution substation with a standard ring bus design. It will be supplied by extending existing transmission lines.

All injection limits, given above in MWs, are subject to more detailed study to ensure feasibility.

Transmission Owner Scope of Work

Substation Engineering Estimate:
Scope: Construct a new 69kV three-breaker ring bus substation on the Salem – Woodstown 69kV circuit, inclusive of a terminal position for Y1-010 (PJM Network Upgrade TBD).

Estimated cost: $4,500,000
Construction Time: **24 – 36 months**

Transmission Engineering Estimate:
Scope: Install a self-supporting 69kV steel pole with a concrete foundation, motor operated disconnects and a short span to ACE substation (PJM Network Upgrade TBD).

Estimated cost: $125,000
Construction Time: 24 months

Note: If location of generator is greater than 500 feet from substation, circuit breaker will be necessary

Interconnection Customer Scope of Work

The Interconnection Customer assumes full responsibility for design and construction of all facilities associated with the Y1-010 generating station and the direct connection line on the IC side of the Point of Interconnection.

The IC 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 ACE applicable standards.

The Interconnection Customer will purchase and install all metering instrument transformers as well as construct a metering structure per ACE's specifications. The secondary wiring connections at the instrument transformers will be completed by the interconnection customer's contractors and inspected by ACE, while the secondary wiring work at the metering enclosure will be completed by ACE's meter technicians. The metering control cable and meter cabinets will be supplied by ACE and installed by the interconnection customer's contractors. ACE's meter technicians will program and install two solid state multi function meters (Primary & Backup) for the new metering position. Each meter will be equipped with load profile, telemetry, and form-c pulse outputs. The Interconnection Customer will be required to make provisions for a voice quality phone line within approximately 3 feet of the metering cabinet to facilitate remote interrogation and data collection.

Special Operating Requirements

1. The Company ('Company' referring to ACE, DPL, PEPCO, (PHI)) will require the capability to remotely isolate the generator from the grid from its System Operations facility. Such tripping

may be facilitated by either a generator breaker, inverter (if so equipped), or a line recloser, depending upon the specific circumstances and the evaluation of the Company.

2. It is the Interconnection Customer's responsibility to send the data that PJM and the Company requires directly to PJM. The Interconnection Customer will grant permission for PJM to send the Company the following telemetry that the Interconnection Customer sends to PJM: real time MW, MVAR, volts, amperes, generator/status, and interval MWH and MVARH.

3. The Interconnection Customer will be required to make provisions for a voice quality phone line within approximately 3 feet of each Company metering position to facilitate remote interrogation and data collection.

4. A mutually acceptable means of interrupting and disconnecting the generator with a visible break, able to be tagged and locked out, shall be worked out with Company Engineering.

Transmission Network Impacts

Potential transmission network impacts are 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

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

Short Circuit

No issues identified.

Stability Analysis

Not required due to project size.

Other Charges

ACE reserves the right to charge the Interconnection Customer operation and maintenance expenses to maintain the Interconnection Customer attachment facilities, including metering and telecommunications facilities, owned by ACE.

New System Reinforcements

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

None

Contribution to Previously Identified System Reinforcements

(Overloads initially caused by prior Queue positions with additional contribution to overloading by this project. The costs identified below represent the total to complete the reinforcement, not necessarily this project's cost. Actual cost allocations will be deferred until the System Impact Study is performed.

None

Potential Congestion due to Local Energy Deliverability

(PJM also studied the delivery of the energy portion of the surrounding generation. Any potential 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. Note: Only the most severely overloaded conditions are listed below. There is no guarantee of full deliverability for this project by fixing only the conditions listed in this section. With a Transmission Interconnection Request, a subsequent analysis will be performed which analyzes all overload conditions associated with the identified overloaded element(s). As a result of the aggregate energy resources in the area, the following violations were identified:

These are ***not*** required reliability upgrades.

None

ATTACHMENT 1

Y1-010
Salem – Woodstown 0745
New 69kV Ring Bus