T186 England
Generation Interconnection

General

The Interconnection Customer has proposed a 20 MW (4 MW of which is capacity) wind power generating facility to be located approximately 3 miles offshore in the Atlantic Ocean between Atlantic City and Ocean City, New Jersey. T186 will connect with the Atlantic City Electric's (ACE) BL England 138kV substation. The generating facility will consist of an array of eight (8) 2.5 MW Clipper Liberty C89 wind turbine generators. The project was evaluated for compliance with reliability criteria for summer peak conditions in 2012. The proposed in-service date for the project is the second quarter of 2011.

Queue Project #T186 is in response to a proposal to Develop Off-Shore Wind Renewable Energy Facilities Supplying Electricity to the Distribution System Serving New Jersey, New Jersey Board of Public Utilities, dated October 5, 2005.

Point of Interconnection: T186 will interconnect to the ACE system at the BL England 138kV substation.

Direct Connection Requirements

Transmission Owner Scope of Direct Connection Work

The scope of work and estimated costs for the direct connection facilities is as follows:
BL England Substation

Create one (1) 138 kV terminal position to an estimated location outside of the BL England substation for the connection of the Interconnection Customer's 138kV line to the T186 site. The assumption is made that the terminal position has not been utilized by a previous queue project.

> The estimated cost to perform this work is **$2,600,000**. This work can be completed **in 24 to 36 months**.

Interconnection Customer Scope of Direct Connection Work

The Interconnection Customer's off-shore facility is comprised of an array of 8 wind turbine generators and a 30 kV collection substation. The collection substation will be connected to the ACE's BL England 138kV substation via a submarine/underground or overhead cable. Prior to connecting to the BL England substation, the voltage will be stepped up to 138kV. The developer assumes full responsibility for design and construction of all facilities associated with the T186 generating station and the 138 kV direct connection line on the Interconnection Customer side of the Point of Interconnection (POI). Site preparation including grading and an access road is assumed to

be by the developer. The above estimates do not include any of those costs. Route selection, line design, right-of-way acquisition and construction of lines will be entirely the responsibility of the Interconnection Customer.

The Interconnection Customer 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 Atlantic City Electric Applicable Standards.

Cost and Timing Summary

While the information in this transmittal is reasonable for the scope of work defined, it should however be noted that the cost figures are conceptual in nature at this stage, as an engineering team has not been assigned to the project. Obviously, any change to the scope of work will require that the estimates be revisited. The costs are a best estimate, but the developer will be charged for actual costs. Any under-runs or over-runs will be reconciled at the conclusion of the project.

Note: costs do not include the Contribution in Aid of Construction (CIAC) tax.

Network Impacts

Generator Deliverability

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

None

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 System Impact Study)

1. The CHICHST1-FOULK8 230kV (PECO) line loads from 99.96% to 100.03% (DC power flow) of its emergency rating (1335MVA) for the tower line outage of the Mickleton – Monroe circuits 1 and 2 (4AE_A19). This project contributes approximately 0.9MW to cause this thermal violation.

Short Circuit

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)

2. The BLE-MDLE TP 138kV (AE) line loads from 103.08% to 105.59% (DC power flow) of its emergency rating (219MVA) for the tower line outage of the Cardiff – Cedar 230kV line and the Cardiff – Lewis 138kV line (14AE). This project contributes approximately 5.5MW to the thermal violation.

Stability and Reactive Power Requirements

Will be performed during the Queue T186 System Impact Study.

New System Reinforcements

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

1. The Chichester to Foulk line is limited by the circuit breaker at Foulk. To mitigate the overload (assuming the line cannot be re-rated) would require replacement of the circuit breaker at a cost of **$250,000.**

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 System Impact Study)

2. To mitigate the BLE-MDLE TP 138kV (AE) overload would require a reconductor of the BLE-Middle Tap 138 kV line with an ACSS conductor. The estimated cost to perform this work is **$3,000,000** and will take **30 months** to complete from the time "Notice to Proceed" is given after the ISA and CSA are executed.

Delivery of Energy Portion of Interconnection Request

PJM also studied the delivery of the energy portion of this interconnection request. Any 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 Merchant Transmission Interconnection request. As a result of the aggregate energy resources in the area, the following violations were identified:

1. The #2 Mill-Scull 138 kV line section will be loaded to 250.6.% of emergency rating (268 MVA) for the outage of the #1 BL England-Mill-Lewis 138 kV line. This project contributes 9.3 MW to the contingency facility loading. To mitigate the #2 Mill-Scull 138 kV line section overload will require a rebuild and reconductor of the line with a larger conductor. The estimated cost to perform this work is **$4,800,000** and will take **30 months** to complete from the time "Notice to Proceed" is given after the ISA and CSA are executed.

2. The #2 BLE-Scull 138 kV line section will be loaded to 239.5% of emergency rating (307 MVA) for the outage of the #1 BL England-Mill-Lewis 138 kV line. This project contributes 9.6 MW to the contingency facility loading. To mitigate the #2 BLE-Scull 138 kV line section overload will require

a rebuild and reconductor of the line with a larger conductor. The estimated cost to perform this work is **$2,000,000** and will take **30 months** to complete from the time "Notice to Proceed" is given after the ISA and CSA are executed.

3. The #2 Mill-Lewis 138 kV line section will be loaded to 207.7% of emergency rating (225 MVA) for the outage of the #1 BL England-Mill-Lewis 138 kV line. This project contributes 6.6 MW to the contingency facility loading. To mitigate the #2 Mill – Lewis line section overload will require a rebuild and reconductor of the line with a larger conductor. The estimated cost to perform this work is **$4,700,000** and will **30** months to complete from the time "Notice to Proceed" is given after the ISA and CSA are executed.

4. The #1 BLE-Scull 138 kV line section will be loaded to 221.9% of emergency rating (307 MVA) for the outage of the #2 BL England-Mill-Lewis 138 kV line. This project contributes 9.0 MW to the contingency facility loading. To mitigate the #1 BLE-Scull 138 kV line section overload will require a rebuild and reconductor of the line with a larger conductor. The estimated cost to perform this work is **$2,000,000** and will take **30 months** to complete from the time "Notice to Proceed" is given after the ISA and CSA are executed.

5. The #1 Mill-Scull 138 kV line section will be loaded to 230.8% of emergency rating (268 MVA) for the outage of the #2 BL England-Mill-Lewis 138 kV line. This project contributes 8.7 MW to the contingency facility loading. To mitigate the the #1 Mill - Scull 138kV line section overload will require a rebuild and reconductor of the line with a larger conductor. The estimated cost to perform this work is **$4,800,000** and will take **30** months to complete from the time "Notice to Proceed" is given after the ISA and CSA are executed.

6. The #1 Lewis-Mill 138 kV line section will be loaded to 226.2% of emergency rating (268 MVA) for the outage of the #2 BL England-Mill-Lewis 138 kV line. This project contributes 8.2 MW to the contingency facility loading. To mitigate the #1 Lewis- Mill 138kV line section overload will require a rebuild and reconductor of the line with a larger conductor. The estimated cost to perform this work is **$4,700,000** and will take **30** months to complete from the time "Notice to Proceed" is given after the ISA and CSA are executed.