Generation Interconnection
Feasibility Study Report
Queue Position W1-062

The Interconnection Customer (IC) has proposed a 67 MWE (67 MWC) natural gas and distillate fueled combustion turbine addition to its existing generating facility in Smyrna, Delaware. PJM studied W1-062 as a 67 MW injection into the Delmarva Power and Light's (DPL) system at the Clayton 138kV substation. The project was evaluated for compliance with reliability criteria for summer peak conditions in 2014.

Point of Interconnection

W1-062 will interconnect with the DPL transmission system at the Clayton 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:

No additional direct connection work is required, beyond what already exists, to accommodate the interconnection of the W1-062 project on the DPL side of the Point of Interconnection (POI).

Interconnection Customer Scope of Direct Connection Work

The Interconnection Customer (IC) assumes full responsibility for design and construction of all facilities associated with the W1-062 generating station on the IC's 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 DPL's Applicable Standards.

Network Impacts

Potential transmission network impacts are as follows:

Generator Deliverability

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

1. The NOTTNGHM-NOTTREAC 230 kV line (from bus 213844 to bus 213846 ckt 1) loads from 99.57% to 99.74% (DC power flow) of its emergency rating (627 MVA) for the single line

contingency ('PJM17'). This project contributes approximately 7.02 MW to cause the thermal violation.

Multiple Facility Contingency

*(Double Circuit Tower Line contingencies only at **Full** energy output. Stuck Breaker and Bus Fault contingencies will be applied during the Impact Study.*

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)

1. The GLASGOW-CECIL138 138 kV line (from bus 231124 to bus 231130 ckt 1) loads from 110.48% to 110.85% (DC power flow) of its emergency rating (234 MVA) for the single line contingency ('CHIC125'). This project contributes approximately 5.32 MW to cause the thermal violation.

2. The LINWOOD-CHICHST2 230 kV line (from bus 213750 to bus 213490 ckt 1) loads from 114.51% to 114.73% (DC power flow) of its emergency rating (904 MVA) for the single line contingency ('220-39'). This project contributes approximately 11.91 MW to cause the thermal violation.

3. The LINWOOD-CHICHST2 230 kV line (from bus 213750 to bus 213490 ckt 2) loads from 114.92% to 115.13% (DC power flow) of its emergency rating (904 MVA) for the single line contingency ('220-43'). This project contributes approximately 11.95 MW to cause the thermal violation.

4. The COOPER-V4-002TAP1 230 kV line (from bus 214089 to bus 900010 ckt 1) loads from 125.62% to 125.84% (DC power flow) of its emergency rating (485 MVA) for the single line contingency ('PJM17'). This project contributes approximately 7.02 MW to cause the thermal violation.

5. The PEACHBTM-CNASTONE 500 kV line (from bus 200013 to bus 200004 ckt 1) loads from 125.85% to 126.9% (DC power flow) of its normal rating (2490 MVA) for non-contingency condition. This project contributes approximately 26.96 MW to cause the thermal violation.

6. The PCHBTMTP-COOPER 230 kV line (from bus 213869 to bus 214089 ckt 1) loads from 128.74% to 128.95% (DC power flow) of its emergency rating (485 MVA) for the single line contingency ('PJM17'). This project contributes approximately 7.02 MW to cause the thermal violation.

7. The V4-002TAP1-GRACETON 230 kV line (from bus 900010 to bus 220964 ckt 1) loads from 229.54% to 229.76% (DC power flow) of its emergency rating (485 MVA) for the single line

contingency ('PJM17'). This project contributes approximately 7.02 MW to cause the thermal violation.

Short Circuit

No problems identified.

Stability Analysis

To be performed during the System Impact Study for W1-062.

New System Reinforcements

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

1. To mitigate the NOTTNGHM-NOTTREAC 230 kV line (from bus 213844 to bus 213846 ckt 1) overload will require the replacement of the Nottingham 230kV inductor. The estimated cost to perform this work is **$1,200,000** and will take **12 months** to complete after receipt of a fully executed Interconnection Services Agreement (ISA) and Interconnection Construction Services Agreement (CSA).

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)

1. To mitigate the GLASGOW-CECIL138 138 kV line overload will require a rebuild of the 138kV circuit from Glasgow to Cecil. The estimated cost to perform this work is **$4,200,000** and will take **24 to 36 months** to complete after receipt of a fully executed Interconnection Services Agreement (ISA) and Interconnection Construction Services Agreement (CSA).

2/3. To mitigate the LINWOOD-CHICHST2 230 kV line (from bus 213750 to bus 213490 ckts 1&2) overload will require the construction of a third Linwood to Chichester 230kV circuit. The estimated cost to perform this work is **$21,900,000** and will take **4 years** to complete after receipt of a fully executed Interconnection Services Agreement (ISA) and Interconnection Construction Services Agreement (CSA).

4. To mitigate the COOPER-V4-002TAP1 230 kV line (from bus 214089 to bus 900010 ckt 1) overload will require the reconductor of the Cooper to V4-002 Tap1 230 kV circuit. The estimated cost to perform this work is **$500,000** and will take **12 months** to complete after receipt of a fully executed Interconnection Services Agreement (ISA) and Interconnection Construction Services Agreement (CSA).

5. To mitigate the PEACHBTM-CNASTONE 500 kV line (from bus 200013 to bus 200004 ckt 1) overload will require:

PECO portion – Construct a second Peach Bottom to Conastone 500kV circuit. The estimated cost to perform this work is **$21,800,000** and will take **5 years** to complete after receipt of a fully executed Interconnection Services Agreement (ISA) and Interconnection Construction Services Agreement (CSA).

BGE portion - Rebuild or upgrade Conastone breakers (3). The estimated cost to perform this work is **$2,100,000** and will take **6-12 months** to complete after receipt of a fully executed Interconnection Services Agreement (ISA) and Interconnection Construction Services Agreement (CSA). A Facility Study will determine whether it is possible to increase the capacity in the bay or build a new bay. (PJM Upgrade# n0890)

6. To mitigate the PCHBTMTP-COOPER 230 kV line (from bus 213869 to bus 214089 ckt 1) overload will require the reconductor of the Peach Bottom Tap to Cooper 230kV circuit. The estimated cost to perform this work is **$1,000,000** and will take **24 months** to complete after receipt of a fully executed Interconnection Services Agreement (ISA) and Interconnection Construction Services Agreement (CSA).

7. To mitigate the V4-002TAP1-GRACETON 230 kV line (from bus 900010 to bus 220964 ckt 1) overload will require:

PECO portion – rebuild the V4-002TAP1to Graceton 230kV line. The estimated cost to perform this work is **$8,000,000** and will take **4 years** to complete after receipt of a fully executed Interconnection Services Agreement (ISA) and Interconnection Construction Services Agreement (CSA).

BGE portion – 1) construct a double circuit line with 1033.5kcmil ACSR. Create one circuit by connecting the two lines into one at the terminal ends to achieve a 968/1227MVA SN/SE rating 2) Replace two breakers, 4 breaker disconnects, and line connections at Graceton.

The estimated cost to perform this work is **$3,000,000** ($1,000,000 for breakers, disconnects and line connections) and will take **30 months** (12 months for CPCN and 18 months to construct) to complete after receipt of a fully executed Interconnection Services Agreement (ISA) and Interconnection Construction Services Agreement (CSA).