Generation Interconnection
Feasibility Study Report
Queue Position W1-007

The Interconnection Customer (IC) has proposed a 20 MWE (7.6 MWC) solar powered generating facility consisting of ground mounted fixed panel solar arrays to be located in New Church, Accomack County, Virginia. PJM studied W1-007 as a 20 MW injection into the Delmarva Power and Light's (DPL) system at the Oak Hall 138kV substation. The project was evaluated for compliance with reliability criteria for summer peak conditions in 2014.

Point of Interconnection

W1-007 will interconnect with the DPL transmission system at the Oak Hall 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:

Oak Hall Substation

Create one (1) 138 kV bus position and cabling to a disconnect switch within the fence line before the Point of Interconnection (POI) for the Interconnection Customer's 138 kV line to the W1-007 site. The scope of the work may require the expansion of the 138 kV yard and fence area.

The estimated cost to perform this work is **$3,500,000** and will take an estimated **24 – 36 months** to complete after receipt of a fully executed Interconnection Service Agreement (ISA) and Interconnection Construction Service Agreement (CSA).

Note: the above cost estimates do not include the Contribution in Aid of Construction (CIAC) tax or Certificate of Public Convenience and Necessity (CPCN) requirements.

Interconnection Customer Scope of Direct Connection Work

The Interconnection Customer (IC) assumes full responsibility for design and construction of all facilities associated with the W1-007 generating station and the 138kV direct connection line on the IC's side of the Point of Interconnection. Site preparation including grading and an access road, as necessary, is assumed to be by the IC. Route selection, line design, right-of-way acquisition and construction of lines will be entirely the responsibility of the IC.

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)*

None

Multiple Facility Contingency

(Double Circuit Tower Line Contingencies only with 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)

None

Short Circuit

No problems identifed.

Stability Analysis

Not required due to project size.

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.

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 overloads.

1. The N_CHURCH-PINEY138 138 kV line (from bus 232131 to bus 232128 ckt 1) loads from 89.09% to 94.1% (DC power flow) of its normal rating (172 MVA) for non-contingency condition. This project contributes approximately 8.63 MW to cause the thermal violation.

2. The OAK HALL-POCOMOKE 138 kV line (from bus 232132 to bus 232130 ckt 1) loads from 95.39% to 101.15% (DC power flow) of its emergency rating (289 MVA) for the single line contingency ('CKT 13764'). This project contributes approximately 16.63 MW to cause the thermal violation.

3. The PINEY_69-M HERMON 69 kV line (from bus 232274 to bus 232272 ckt 1) loads from 101.13% to 105.22% (DC power flow) of its emergency rating (143 MVA) for the single line contingency ('CKT 23002'). This project contributes approximately 5.85 MW to cause the thermal violation.

4. The POCOMOKE-T-144 TAP 138 kV line (from bus 232130 to bus 292497 ckt 1) loads from 104.65% to 111.38% (DC power flow) of its emergency rating (247 MVA) for the single line contingency ('CKT 13764'). This project contributes approximately 16.63 MW to cause the thermal violation.

5. The T-144 TAP-COSTEN 138 kV line (from bus 292497 to bus 232807 ckt 1) loads from 108.59% to 115.33% (DC power flow) of its emergency rating (247 MVA) for the single line contingency ('CKT 13764'). This project contributes approximately 16.63 MW to cause the thermal violation.

6. The N_CHURCH-PINEY138 138 kV line (from bus 232131 to bus 232128 ckt 1) loads from 124.31% to 131.77% (DC power flow) of its emergency rating (226 MVA) for the single line contingency ('CKT 13787'). This project contributes approximately 16.86 MW to cause the thermal violation.