

Generation Interconnection Feasibility Study Report W4-083

The Interconnection Customer (IC) has proposed a 10 MWE (3.8 MWC) solar powered generating facility consisting of ground mounted, fixed panel, solar photovoltaic arrays. The project is to be located in Salem County, New Jersey. PJM studied W4-083 as a 10 MW injection into the Atlantic City Electric (ACE) system at a tap of the Roadstown Tap-W2-035 Tap 69kV circuit. The project was evaluated for compliance with reliability criteria for summer peak conditions in 2014. The proposed in-service date, as stated in Attachment N, is May 1, 2012.

Point of Interconnection

W4-083 will interconnect with the Atlantic City Electric transmission system at a new 69kV three (3)-breaker ring bus substation adjacent to the Roadstown-Laurel 69kV circuit.

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:

Substation Engineering Estimate:

Scope: Construct a 69kV three-breaker ring bus substation cutting into Roadstown – Laurel 69kV line, inclusive of a terminal position for queue project

Estimate: \$3,450,000

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 PHI substation

Estimate: \$125,000

Construction Time: 24 months.

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

Note: Additional costs upon further engineering review may result. Additionally, Contribution in Aid of Construction (CIAC) tax will be included upon further study.

Interconnection Customer Scope of Direct Connection Work

The Interconnection Customer (IC) is responsible for all design and construction related activities on their 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, and right-of-way acquisition of the direct connect facilities is not included in this report, and is the responsibility of the IC. The Interconnection Customer will be responsible for contributing to future O & M costs associated with the direct connect facilities.

Protective relaying and metering design and installation must comply with PHI's applicable standards. The IC is also required to provide revenue metering and real-time telemetering data to PJM in conformance with the requirements contained in PJM Manuals M-01 and M-14 and the PJM Tariff. PHI will require the capability to remotely trip the generator from its System Operations facility. The interconnected customer will grant its permission for PJM to send PHI all telemetry that the Interconnection Customer sends to PJM. The Interconnection Customer will be required to make provisions for a voice quality phone line within approximately 3 feet of each PHI metering position to facilitate remote interrogation and data collection.

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

None

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 reliability upgrades.

1. (AE) The Laurel-Woodstown 69 kV line (from bus 228218 to bus 228360 ckt 1) loads from 108.14% to 111.68% (DC power flow) of its emergency rating (108 MVA) for the operational contingency 'D/W-QUINT'. This project contributes approximately 3.82 MW to the thermal violation.
2. (AE) The Laurel-Laurel 69 kV line (from bus 228259 to bus 228218 ckt 1) loads from 122.27% to 126.27% (DC power flow) of its emergency rating (149 MVA) for the operational contingency 'USLC-SM_V4-036B_WITH_W1-085B'. This project contributes approximately 5.95 MW to the thermal violation.
3. (AE) The W2-035TAP1-Laurel 69 kV line (from bus 902480 to bus 228259 ckt 1) loads from 111.02% to 128.26% (DC power flow) of its emergency rating (58 MVA) for the operational contingency 'D/W-QUINT'. This project contributes approximately 10.00 MW to the thermal violation.
4. (AE) The Fairton-Newport 69 kV line (from bus 228214 to bus 228219 ckt 1) loads from 173.11% to 178.16% (DC power flow) of its emergency rating (48 MVA) for the operational contingency 'CARLL-SHERM'. This project contributes approximately 2.42 MW to the thermal violation.

5. (AE) The Newport-Us Silica Tap 69 kV line (from bus 228219 to bus 228222 ckt 1) loads from 127.61% to 132.01% (DC power flow) of its emergency rating (55 MVA) for the operational contingency 'CARLL-SHERM'. This project contributes approximately 2.42 MW to the thermal violation.
6. (AE) The W4-083 TAP-W2-035TAP1 69 kV line (from bus 905730 to bus 902480 ckt 1) loads from 83.43% to 100.67% (DC power flow) of its emergency rating (58 MVA) for the operational contingency 'D/W-QUINT'. This project contributes approximately 10.00 MW to the thermal violation.
7. (AE) The Sherman-Sherman #1 69 kV line (from bus 228226 to bus 228256 ckt 1) loads from 98.54% to 100.83% (DC power flow) of its emergency rating (108 MVA) for the operational contingency 'USLC-SM_V4-036B_WITH_W1-085B'. This project contributes approximately 2.47 MW to the thermal violation.
8. (AE) The Roadstown Tap-Quinton 69 kV line (from bus 228223 to bus 228329 ckt 1) loads from 126.01% to 133.99% (DC power flow) of its emergency rating (56 MVA) for the operational contingency 'WOOD-LAUR'. This project contributes approximately 4.47 MW to the thermal violation.
9. (AE) The Roadstown Tap-Quinton 69 kV line (from bus 228223 to bus 228329 ckt 1) loads from 101.96% to 110.71% (DC power flow) of its normal rating (44 MVA) for non contingency condition. This project contributes approximately 3.85 MW to the thermal violation.
10. (AE) The Carlls Corner-Sherman 69 kV line (from bus 228252 to bus 228226 ckt 1) loads from 226.91% to 233.1% (DC power flow) of its emergency rating (56 MVA) for the operational contingency 'NEWPORT-SM'. This project contributes approximately 3.47 MW to the thermal violation.
11. (AE) The Carlls Corner-Sherman 69 kV line (from bus 228252 to bus 228226 ckt 1) loads from 173.67% to 179.79% (DC power flow) of its normal rating (44 MVA) for non contingency condition. This project contributes approximately 2.69 MW to the thermal violation.
12. (AE) The Quinton-Deepwater 69 kV line (from bus 228329 to bus 228323 ckt 1) loads from 118.65% to 124.86% (DC power flow) of its emergency rating (72 MVA) for the operational contingency 'WOOD-LAUR'. This project contributes approximately 4.47 MW to the thermal violation.
13. (AE) The Quinton-Deepwater 69 kV line (from bus 228329 to bus 228323 ckt 1) loads from 103.11% to 109.75% (DC power flow) of its normal rating (58 MVA) for non contingency condition. This project contributes approximately 3.85 MW to the thermal violation.

14. (AE) The W4-083 TAP-Roadstown Tap 69 kV line (from bus 905730 to bus 228223 ckt 1) loads from 131.50% to 139.21% (DC power flow) of its emergency rating (58 MVA) for the operational contingency 'WOOD-LAUR'. This project contributes approximately 4.47 MW to the thermal violation.