Generation Interconnection Facilities Study Report

For

PJM Generation Interconnection Request Queue Position AB2-102

"Cumberland 230 kV"

October 2021

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A. Transmission Owner Facilities Study Summary

1. Description of Project

Calpine Mid-Atlantic Development, LLC, the Interconnection Customer (IC), has proposed a 230 MW Maximum Facility Output (MFO), 225 MW Capacity (MWC) simple cycle combustion turbine generating facility to be located in Millville, New Jersey. Currently, there is an existing 230 kV bus position utilized for an existing IC POI, PJM queue position P06. The IC requested to utilize the same POI as their prior PJM queue position P06 for this interconnection. The IC will install their new generator and associated circuit breaker behind the existing POI. To accommodate this additional generator and circuit breaker, the 230 kV bus differential relays for the P06/AB2-102 ring bus position at Cumberland Substation will need to be replaced. The trip and close schemes for 230 kV CB's U and R will also need to be modified.

PJM studied AB2-102 as a 68 MW injection into the Atlantic City Electric Company (ACE) system at the Cumberland 230 kV Substation and evaluated it for compliance with reliability criteria for summer peak conditions in 2020. The planned in-service date is December 1, 2023. At the Interconnection Customer's request, 157 MWs of Capacity Interconnection Rights (CIRs) from the deactivated Cedar 2, Missouri Ave CT: B, C, & D and the Middle Energy Center: 1, 2 & 3 units were transferred to this AB2-102 project.

2. Amendments to the System Impact Study or System Impact Study Results

The scope of the project as stated in the System Impact Study, submitted in May 2017, has not changed.

3. Interconnection Customer's Milestone Schedule

The planned in-service date is December 1, 2023.

Atlantic City Electric's (ACE's) portion of the project is projected to be completed approximately 18-24 months following an executed Interconnection Service Agreement (ISA) and Construction Service Agreement (CSA). This is assuming a standard land use and environmental permitting and approval process.

4. Customer's Scope of Work

The Interconnection Customer (IC) is responsible for all design and construction related to activities on their side of the Point of Interconnection (POI). Site preparation, including clearing, grading and an access road, as necessary, is assumed to be by the IC. Route selection, line design, and right-of-way acquisition for the IC's facilities are not included in this report and are the responsibility of the IC. Protective relaying and metering design and installation must comply with ACE'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.

ACE Interconnection Customer Scope of Direct Connection Work Requirements:

- ACE requires an IC interface circuit breaker to facilitate the relay protection scheme between ACE and the IC at the Point of Interconnection (POI).

Special Operating Requirements

1. ACE will require the capability to remotely disconnect the generator from the grid by communication from its System Operations facility. Such disconnection may be facilitated by a generator breaker or other method depending upon the specific circumstances and the evaluation by ACE.
2. ACE reserves the right to charge the Interconnection Customer operation and maintenance expenses to maintain the Interconnection Customer attachment facilities, including but not limited to metering and telecommunications facilities, owned by ACE.

Additional Interconnection Customer Responsibilities:

1. An Interconnection Customer entering the New Services Queue on or after October 1, 2012 with a proposed new Customer Facility that has a Maximum Facility Output equal to or greater than 100 MW shall install and maintain, at its expense, phasor measurement units (PMUs). See Section 8.5.3 of Appendix 2 to the Interconnection Service Agreement as well as section 4.3 of PJM Manual 14D for additional information.

5. Description of Facilities Included in the Facilities Study (ACE's Scope of Work)

Substation Interconnection Estimate

Scope: Replace the primary and backup bus differential relays on Cumberland 230 kV Bus Section #4 to accommodate the IC's additional circuit breaker for this interconnection. Install a new below grade PVC conduit between the Cumberland control house and the IC's control house for required cables between the IC's equipment and ACE's equipment.

Estimate: $155,834.76

Construction Time: 18-24 months

Major Equipment Included in Estimate:

- Relay Panel, 230 kV Bus Differential, Primary & Backup (24") Qty. 1

Substation Estimate Assumptions:

- The new generator will be located in the same yard as the existing generator, which is adjacent to the east side of Cumberland Substation. Control cables required for this interconnection will be run between the Cumberland control house and the existing control house for the generation facility.
- Any permitting for this project will be by the IC.
- The soil is not contaminated and does not require special handling and disposal.

Required Relaying:

The breaker for the IC's additional generation being added for AB2-102 must be added to the Cumberland 230 kV Bus #4 primary and backup schemes owned by ACE. ACE will replace the existing relays for this

bus section as described throughout this document to accommodate this additional breaker's current transformer connections.

ACE reserves the right to review the electrical protection design and relay settings for interconnecting customer facilities to ensure that the protective relaying equipment will be compatible with that installed at the remote substations. All interface settings and protection equipment shall be reviewed and approved by ACE. ACE personnel must be present at the time of commissioning to witness proper function of the protection schemes and related coordination.

6. Total Cost of Transmission Owner Facilities Included in the Facilities Study

Item	*Total Cost*
Substation Attachment Facilities	$155,834.76
Total Cost	**$155,834.76**

7. Summary of the Schedule for Completion of Work for the Facilities Study

Attachment Facility	*Timeframe*
Engineering, Procurement, and Construction	18-24 months

B. Transmission Owner Facilities Study Results

This section describes facilities identified to be installed (attachment facilities), replaced, and/or upgraded (upgrade facilities) by ACE to accommodate the project. During detailed design and analysis other components may be identified for installation or replacement due to this interconnection.

1. Transmission Lines –New

None

2. Transmission Lines – Upgrade

None

3. New Substation/Switchyard Facilities

None

4. Substation/Switchyard Facility Upgrades

At ACE's Cumberland Substation, the following items of work must be completed:

- Install one (1) new below grade PVC conduit between the ACE Cumberland control house and the IC's control house and install required current and control cables between the two control houses.
- Remove existing primary and backup relays for 230 kV Bus Section #4
- Install one (1) new relay panel for the new primary and backup relays for 230 kV Bus Section #4
- Modify existing control and protection schemes as required to accommodate the new bus differential relaying.
- Test and commission all new or modified relay and control systems.

Telecommunications Facilities – Upgrades

- The new relays will be connected to the existing Ethernet switch and GPS clock in the ACE control house.

6. Metering & Communications

A new revenue metering point is not required as this interconnection will use the same POI and revenue meter set as Queue #P06 which is already equipped with the necessary metering equipment.

It is the IC's responsibility to send the data that PJM and ACE require for this new generation directly to PJM. The IC will grant permission for PJM to send ACE the following telemetry that the IC sends to PJM: real time MW, MVAR, volts, amperes, generator status, and interval MWH and MVARH for the new generator.

7. Environmental, Real Estate and Permitting

All work to accommodate the interconnection of AB2-102 is dependent upon the IC obtaining all necessary permits. Moreover, the IC shall be responsible for acquiring all necessary real property rights and acquisitions, including but not limited to: rights of way, easements, and fee simple, in a form approved by ACE. Any setbacks in obtaining the necessary real property rights, acquisitions and permits required for this interconnection may delay the construction schedule.

8. Summary of Results of Study

Description	Total Cost (Forecast)
JOB	$155,834.76
Indirects	$35,961.87
Project Coordination & Oversight	$3,745.56
Complete Project Plan	$9,089.92
Project Design	$6,938.76
Project Construction Coordination & Oversight	$24,297.60
Construction Prep	$888.66
Field Construction	$70,435.04
Perform Administrative Close	$394.96
Perform Construction Close	$4,082.40
	$155,834.76

Generation projects meeting IRS "Safe Harbor" provisions generally do not incur "CIAC" (Contribution in Aid to Construction), a tax collected by the utility for the state or federal government. ACE does not expect to collect CIAC for this project. If for any reason, "CIAC" would be required for this project, it would be the responsibility of the party owning the generator to pay this cost.

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

9. Schedules and Assumptions

The overall estimated timeline for ACE to place its direct connect facilities in service for this project is approximately 18 – 24 months after receipt of a fully executed Interconnection Service Agreement (ISA) and Construction Service Agreement (CSA).

Storm damage and restoration, time of year limitations, permitting issues, outage scheduling, system emergencies, and contractor and equipment availability could also impact the schedule. It is important to note that this project will be incorporated into the existing project work load at ACE at the time of contract execution. If the work load of existing projects is extensive, resource constraints may cause this project to be delayed beyond the projected in-service date.

Attachment #1

Cumberland 230 kV
AB2-102