Revised
Generation Interconnection
Combined Feasibility/System
Impact Study Report

For

PJM Generation Interconnection Request
Queue Position AE1-221

“North Wales 34.5 kV”

14 MW Capacity/ 0 MW Energy

March 2019
Revision 1

Preface

The intent of the Combined Feasibility/System Impact Study is to determine a plan, with approximate cost and construction time estimates, to connect the subject generation interconnection project to the PJM network at a location specified by the Interconnection Customer. As a requirement for interconnection, the Interconnection Customer may be responsible for the cost of constructing: Network Upgrades, which are facility additions, or upgrades to existing facilities, that are needed to maintain the reliability of the PJM system. All facilities required for interconnection of a generation interconnection project must be designed to meet the technical specifications (on PJM web site) for the appropriate transmission owner.

In some instances an Interconnection Customer may not be responsible for 100% of the identified network upgrade cost because other transmission network uses, e.g. another generation interconnection or merchant transmission upgrade, may also contribute to the need for the same network reinforcement. The possibility of sharing the reinforcement costs with other projects may be identified in the Feasibility Study, but the actual allocation, if any, is included in the System Impact Study.

The Study estimates do not include the feasibility, cost, or time required to obtain property rights and permits for construction of the required facilities. The project developer is responsible for the right of way, real estate, and construction permit issues. For properties currently owned by Transmission Owners, the costs associated with them will be addressed when seeking an Interconnection Agreement as outlined below. Developer will also be responsible for providing and installing metering equipment in compliance with applicable PJM and Transmission Owner standards.

Changes from Combined Feasibility/System Impact Study Report Issued on January 26, 2019

Clarification was added to the "General" section below regarding the history of the Capacity Interconnection Rights requested by the Interconnection Customer.

General

Merck Sharp & Dohme Corp., the Interconnection Customer (IC), has proposed a **14 MW Capacity only uprate** to their existing natural gas generating facility located at 770 Sumneytown Pike, West Point, Pennsylvania (Montgomery County). The installed facilities will have a total capability of **38 MW** with **14 MW** of this output being recognized by PJM as capacity. The proposed Commercial Operation Date for this project is on or before **June 1, 2022**.

In 2003, the G22 Interconnection Service Agreement for Merck granted 38 MW of Capacity Interconnection Rights. These CIRs were lost within three years of being granted (by 2006) as the customer did not test to their CIR amount as required by Tariff Section 230. AE1-221 is a Capacity only request to regain some of those rights that were lost.

AE1-221 is a 14 MW Capacity only uprate to the existing G22 project:

	G22 (MW)	AE1-221	Total
MFO	38	+0	**38**
Energy	38	+0	**38**
Capacity	38 original - 38 lost 0	+14	**14**

Point of Interconnection

AE1-221 "North Wales 34.5 kV" will be accomplished by utilizing the existing G22 interconnection at the Merck 34.5 kV Substation. The Merck 34.5 kV yard is sourced from the PECO North Wales 230-34.5 kV substation via three 34.5 kV distribution circuits. The Points of Interconnection (POIs) with PECO occurs on where each of the three 34.5 kV express circuits land on the deadend switch structures at the Merck Substation.

See **Attachment 1** for a one line of the interconnection.

Cost Summary

The AE1-221 "North Wales 34.5 kV" project will be responsible for the following costs:

Description	Total Cost
Attachment Facilities	$ 0
Direct Connection Network Upgrades	$ 0
Non Direct Connection Network Upgrades	$ 0
Total Costs	**$ 0**

In addition, the AE1-221 project may be responsible for a contribution to the following costs:

Description	Total Cost
New System Upgrades	$ 0
Previously Identified Upgrades	$ 0
Total Costs	**$ 0**

The transmission and substation costs given above exclude any applicable state or federal taxes. If at a future date Federal CIAC (contribution in aid of construction) taxes are deemed necessary by the IRS (per IRS Notice 88-129) for this project, PECO shall be reimbursed by the Interconnection Customer for such taxes.

The required Attachment Facilities, Direct Connection, and Non-Direct Connection work for the interconnection of the AE1-221 generation uprate project to the PECO Transmission System is detailed in the following sections. The associated one-line with the generation project is shown in **Attachment 1**.

Attachment Facilities

No Attachment Facility scope of work is required to accommodate the proposed AE1-221 project as it is a Capacity only increase to the existing G22 project.

Direct Connection Cost Estimate

No Direct Connection scope of work is required to accommodate the proposed AE1-221 project as it is a Capacity only increase to the existing G22 project.

Non-Direct Connection Cost Estimate

No Non-Direct Connection scope of work is required to accommodate the proposed AE1-221 project as it is a Capacity only increase to the existing G22 project.

PECO Interconnection Requirements

The Interconnection Customer facilities must be designed in accordance with the "Exelon Utilities Transmission Facility Interconnection Requirements" document dated January 1, 2016. This document is located at the following link:

http://www.pjm.com/~/media/planning/plan-standards/private-ce/exelon-utilities-transmission-facility-interconnection-requirements.ashx

Schedule

No physical construction work is required to accommodate this Capacity only uprate request.

Revenue Metering and SCADA Requirements

PJM Requirements

Existing metering is adequate for this request.

Network Impacts

The Queue Project AE1-221 was evaluated as a 0.0 MW (Capacity 14.0 MW) uprate to the G22 projects which is modeled at the Merck 34.5 kV Substation in the PECO area. Project AE1-221 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AE1-221 was studied with a commercial probability of 100%. Potential network impacts were as follows:

Summer Peak Analysis - 2022

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

None

Multiple Facility Contingency
(Double Circuit Tower Line, Fault with a Stuck 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

Steady-State Voltage Requirements
(Results of the steady-state voltage studies should be inserted here)

None

Short Circuit
(Summary of impacted circuit breakers)

None

Affected System Analysis & Mitigation

None

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.
Only the most severely overloaded conditions are listed. There is no guarantee of full delivery of energy for this project by fixing only the conditions listed in this section. With a Transmission Interconnection Request, a subsequent analysis will be performed, which will study all overload conditions associated with the overloaded element(s) identified.

None

Light Load Analysis - 2022

Light Load Studies to be conducted during later study phases (as required by PJM Manual 14B).

Not required.

System Reinforcements

Short Circuit
(Summary form of Cost allocation for breakers will be inserted here if any)

None

Stability and Reactive Power Requirement
(Results of the dynamic studies should be inserted here)

None

Summer Peak Load Flow Analysis Reinforcements

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

None

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)
(Summary form of Cost allocation for transmission lines and transformers will be inserted here if any)

None

Light Load Load Flow Analysis Reinforcements

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

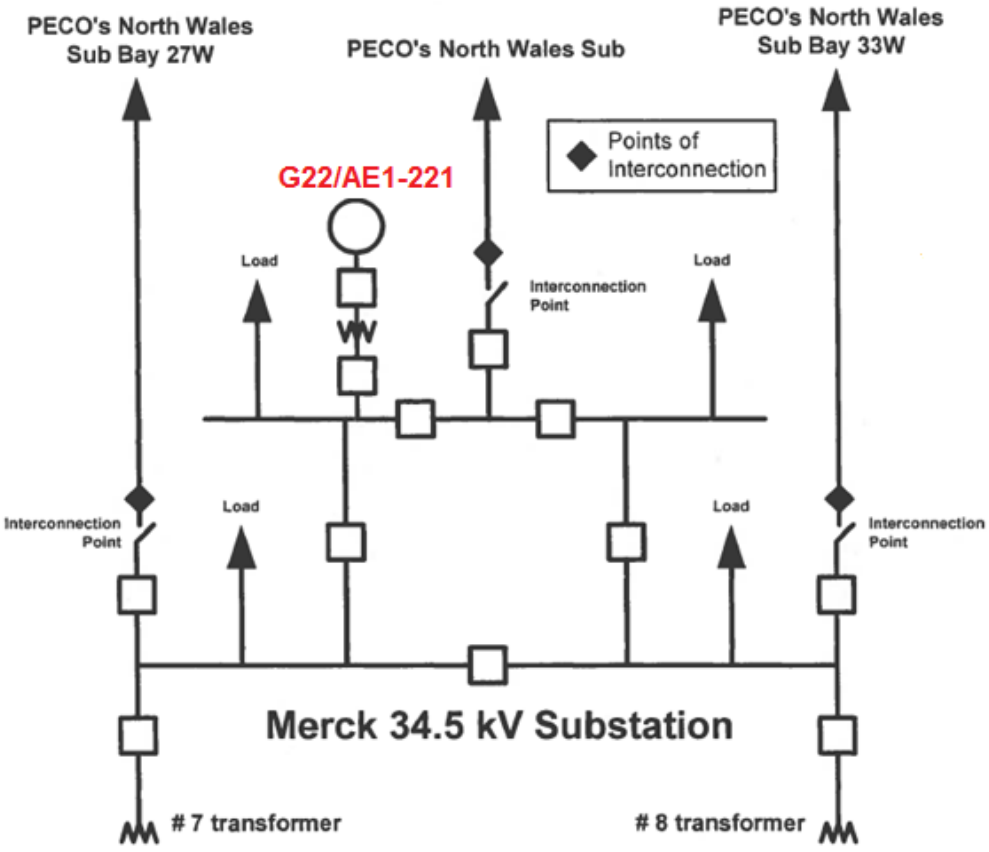
None

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)
(Summary form of Cost allocation for transmission lines and transformers will be inserted here if any)

None

Attachment 1
Interconnection Single Line Diagram

"North Wales 34.5 kV" (AE1-221) Generation Project



Attachment 2
CUSTOMER FACILITY LOCATION/SITE PLAN

770 Sumneytown Pike, West Point, PA 19486