Generation Interconnection Feasibility Study Report

For

PJM Generation Interconnection Request Queue Position AD2-189

Kammer-Vassell 765kV

July 2018

Preface

The intent of the feasibility study is to determine a plan, with ballpark cost and construction time estimates, to connect the subject generation to the PJM network at a location specified by the Interconnection Customer. The Interconnection Customer may request the interconnection of generation as a capacity resource or as an energy-only resource. As a requirement for interconnection, the Interconnection Customer may be responsible for the cost of constructing: (1) Direct Connections, which are new facilities and/or facilities upgrades needed to connect the generator to the PJM network, and (2) Network Upgrades, which are facility additions, or upgrades to existing facilities, that are needed to maintain the reliability of the PJM system.

In some instances a generator interconnection may not be responsible for 100% of the identified network upgrade cost because other transmission network uses, e.g. another generation interconnection, 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 will be deferred until the impact study is performed.

The Feasibility 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 may be included in the study.

General

The Interconnection Customer (IC) proposes to increase the generation of its previous PJM Projects #AB2-067 and AC1-044, a combined 1650 MW natural gas generating facility in Guernsey County, Ohio by 186 MW (see Figure 2). The point of interconnection is to the proposed Guernsey 765kV substation connecting to AEP's Kammer – Vassell 765kV circuit (see Figure 1). The AD2-189 uprate request is due to additional machine capability and does not reflect any electrical or mechanical changes to the plant. The output of the generating plant is summarized below:

	AB2-067	**AC1-044**	**AD2-189**
Plant Configuration	2 - 1 x 1 CC	1 x 1 CC	increased capability of previous queue positions
Maximum Facility Output (MW)	1,100	550	225
Capacity (MW)	1,100	550	186
Planned Backfeed	September 1, 2019	N/A	N/A
Planned In-Service	September 1, 2020	September 1, 2020	June 1, 2021

Table 1

Attachment Facilities

Point of Interconnection (Guernsey 765kV)

To be constructed by PJM Project #AB2-067.

Note: It is assume that the 765 kV revenue metering and gen lead to be constructed for #AB2-067 will be adequate for the additional generation.

Interconnection Customer Requirements

The Generation Interconnection Agreement does not in or by itself establish a requirement for American Electric Power to provide power for consumption at the developer's facilities. A separate agreement may be reached with the local utility that provides service in the area to ensure that infrastructure is in place to meet this demand and proper metering equipment is installed. It is the responsibility of the developer to contact the local service provider to determine if a local service agreement is required.

Requirement from the PJM Open Access Transmission Tariff:

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.

2. The Interconnection Customer may be required to install and/or pay for metering as necessary to properly track real time output of the facility as well as installing metering which shall be used for billing purposes. See Section 8 of Appendix 2 to the Interconnection Service Agreement as well as Section 4 of PJM Manual 14D for additional information.

Revenue Metering and SCADA Requirements

PJM Requirements

The Interconnection Customer will be required to install equipment necessary to provide Revenue Metering (KWH, KVARH) and real time data (KW, KVAR) for IC's generating Resource. See PJM Manuals M-01 and M-14D, and PJM Tariff Sections 24.1 and 24.2.

AEP Requirements

The Interconnection Customer will be required to comply with all AEP Revenue Metering Requirements for Generation Interconnection Customers. The Revenue Metering Requirements may be found within the "Requirements for Connection of New Facilities or Changes to Existing Facilities Connected to the AEP Transmission System" document located at the following link:

http://www.pjm.com/~/media/planning/plan-standards/private-aep/aep-interconnection-requirements.ashx

Network Impacts

The queue project AD2-189 was evaluated as a 186 MW (Capacity 186 MW) Summer Peak incremental injection at the proposed Guernsey 765 kV station in the AEP area, and was also was evaluated as a 225 MW (Capacity 186 MW) Winter Peak incremental injection at the proposed Guernsey 765 kV station in the AEP area. Project AD2-189 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AD2-189 was studied with a commercial probability of 53%. Potential network impacts were as follows:

Base Case Used

Summer Peak Analysis – 2021 Case

Contingency Descriptions

The following contingencies resulted in overloads:

None

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

None

Short Circuit

(Summary of impacted circuit breakers)

New circuit breakers found to be over-duty:

None

Affected System Analysis & Mitigation

LGEE Impacts:

LGEE Impacts to be determined during later study phases (as applicable).

MISO Impacts:

MISO Impacts to be determined during later study phases (as applicable).

Duke, Progress & TVA Impacts:

Duke Carolina, Progress, & TVA Impacts to be determined during later study phases (as applicable).

OVEC Impacts:

OVEC Impacts to be determined during later study phases (as applicable).

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

New System Reinforcements

None

Schedule

It is anticipated that the time between receipt of executed agreements and Commercial Operation may range from 12 to 18 months if no line work is required. If line work is required, construction time would be between 24 to 36 months after signing an interconnection agreement.

Note: The time provided between anticipated normal completion of System Impact, Facilities Studies, subsequent execution of ISA and ICSA documents, and the proposed In-Service Date is shorter than usual and may be difficult to achieve.

Conclusion

Based upon the results of this Feasibility Study, the increase of 186 MW Summer Peak and 225.0 MW Winter Peak for PJM Project #AD2-189 natural gas generation to the IC's previous requests (PJM Project #AB2-067 and AC1-044) will not require additional interconnection charges.

Cost Breakdown for Point of Interconnection (Kammer-Vassell 765 kV)		
Attachment Cost	PJM Project AB2-067 will pay for the necessary direct connection work required. Project AC1-044 and AD2-189 will share the same Generator lead to the new 765 kV interconnection switching station being constructed for Project AB2-067.	**PJM Project #AB2-067 to pay for Attachment Facilities**

Table 2

Figure 1: Point of Interconnection (Proposed Guernsey 765 kV Switching Station)

Single-Line Diagram

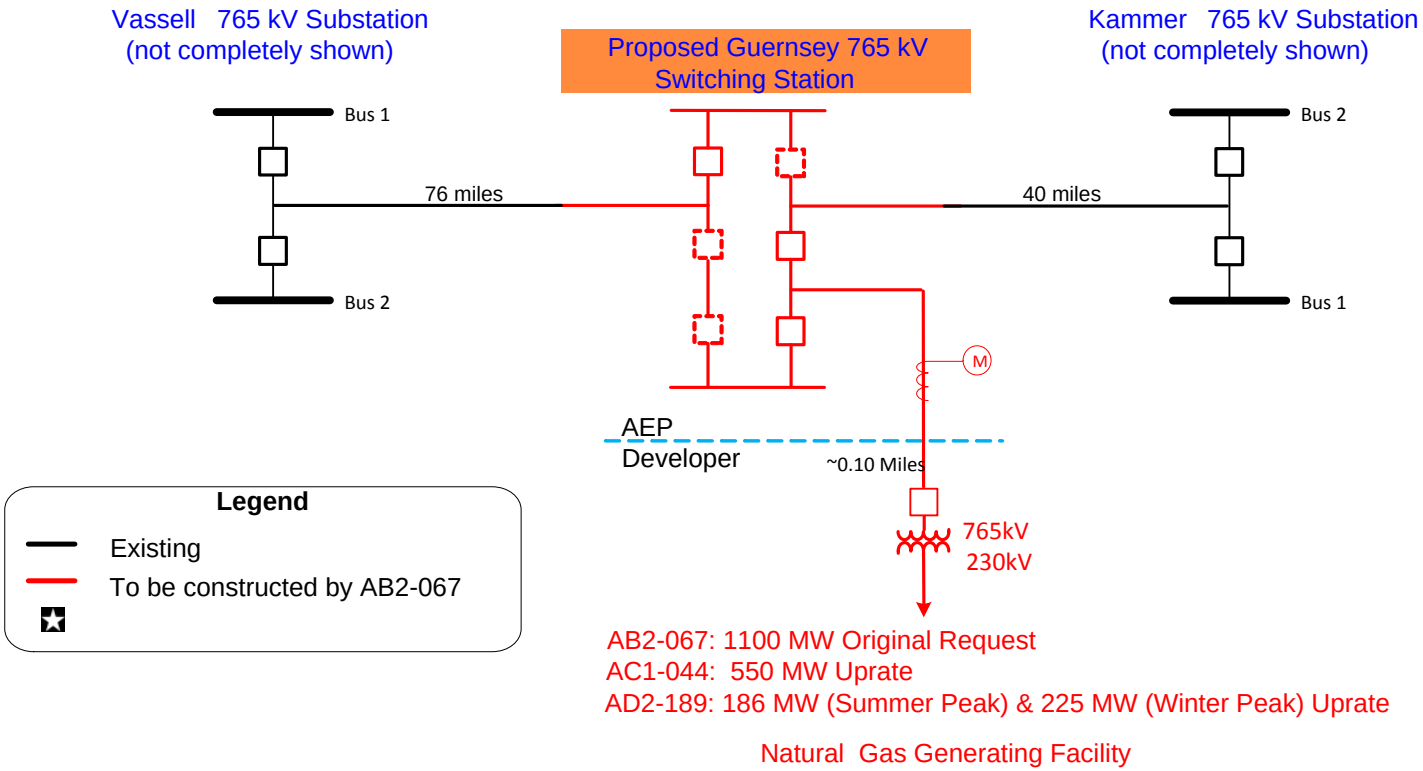

Figure 2: Point of Interconnection (Proposed Guernsey 765 kV Switching Station)