Generation Interconnection Feasibility Study Report

For

PJM Generation Interconnection Request Queue Position AC2-092

Susquehanna-Lackawanna 500kV 65 MW Capacity / 55 MW Energy

July 2017

Preface

The intent of the Feasibility 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, will be deferred until the System Impact Study is performed.

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 Interconnection Customer may be 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), has proposed an uprate to its natural gas generating facility located in the Luzerne County of Pennsylvania. Under the queue position Z2-046, the IC proposed a project with capability of 1050 MW with 900 MW being recognized by PJM as Capacity. Subsequently, under queue position AA1-066, the IC proposed a 0 MW increase in capability and an 80 MW increase in the megawatts being recognized by PJM as capacity. The total combined capability of queue positions AC2-092, AA1-066 and Z2-046 will be 1105 MW, with 1045 MW being recognized by PJM as capacity. The proposed in-service date for the AC2-092 project is June 2021. **This study does not imply a PPL EU commitment to this in-service date.**

Point of Interconnection (POI)

The IC requested a transmission level interconnection. As a result, the queue position AC2-092 will interconnect with the PPL EU transmission network via the Susquehanna-Shickshinny and Shickshinny-Lackawanna 500kV lines (formerly the Susquehanna-Lackawanna 500kV line) through the Shickshinny 500kV switchyard. The queue position AC2-092 POI is identical to the queue position Z2-046 POI. The single line is shown in Attachment 1.

Cost Summary

The AC2-092 project will be responsible for the following costs:

Description	Total Cost
Attachment Facilities	$ 0
Direct Connection Network Upgrades	$ 0
Non Direct Connection Network Upgrades	$ 20,000
Total Costs	**$ 20,000**

Attachment Facilities

There are no additional Attachment Facilities for the Transmission Owner required to support this uprate.

Direct Connection Cost Estimate

There are no additional Direct Connection Facilities for the Transmission Owner required to support this uprate.

Non-Direct Connection Cost Estimate

Remote Terminal Work:

- Perform PPL EU protective relay analysis and revise settings where necessary.
- Review IC protective relay settings.

The estimated cost for this work is **$20,000** and it is estimated to take **3 – 4 months** to complete.

Interconnection Customer Requirements

Requirements for the customer facility can be found the in Z2-046 and AA1-066 study reports

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.

PPL Requirements

Requirements for the customer facility can be found the in Z2-046 and AA1-066 study reports.

Network Impacts

The Queue Project AC2-092 was evaluated as a 65.0 MW (Capacity 65.0 MW) injection tapping the Susquehanna – Lackawanna 500 kV line in the PPL area. Project AC2-092 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AC2-092 was studied with a commercial probability of 53%. Potential network impacts were as follows:

Summer Peak Analysis - 2020

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

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

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 System Impact Study)

None

Steady-State Voltage Requirements

To be performed during later study phases.

Short Circuit

No issues identified.

Stability and Reactive Power Requirement

To be performed during later study phases.

Light Load Analysis – 2020

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

Potential Congestion due to Local Energy Deliverability

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.

Attachment 1 – Single Line Diagram