Generation Interconnection Feasibility/Impact Study Report

For

PJM Generation Interconnection Request Queue Position X4-032

North Wales 34kV

April 2012
Revised November 26, 2012

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.

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 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

Morris Road Investors, L.L.C., the Interconnection Customer (IC), has proposed a 4 MWE (4 MWC) uprate to their existing facility previously submitted as Queue Number V1-028. The project is to be located in Worcester Township, Pennsylvania. The project was evaluated for compliance with reliability criteria for summer peak conditions in 2015. The IC had requested a proposed in-service date, as stated in Attachment N, of May 1, 2012.

The Interconnection customer currently can be connected at either of two Points of Interconnection (POI).

Attachment Facilities for Primary POI

The proposed injection of X4-032 into the existing 34kV line North Wales 372 is shown in Figure 1.

Interconnection Customer Scope of Direct Connection Work

Interconnection Customer is responsible for all work on the X4-032 side of the POI (Point of Interconnection).

Cost of Direct Connection Network Upgrades

Direct Network Upgrades includes the cost of any remote relay and control work that is required at due to the interconnection of the generation facility and communication equipment, along with any system upgrades identified, attributable to this project, to ensure system reliability.

A concern exists with 'islanding' on the North Wales 372 circuit if the North Wales 372 circuit breaker trips and the generation does not. To address this situation, DTT will be required between the North Wales 372 circuit breaker and the customer's generation. This will require the installation of Direct Transfer Trip relays at North Wales on the North Wales 372 circuit and at the customer's site. In addition, the customer must arrange for the lease and schedule the installation of two dedicated phone lines for the RLF DTT relay communications between the customer's site and North Wales. The estimated cost of the PECO work at North Wales Substation is $175,000. All costs associated with this work at both North Wales and at the customer's facility, including the relaying, installation and monthly charges for the phone lines, etc. are the responsibility of the customer.

A Facility Study is required for this project to provide the full scope of required upgrades including cost and time. The Facilities Study will take approximately 6 months after the customer agrees to fund the study. The estimated time to complete the work described above is 18 to 24 months after all agreements are in place.

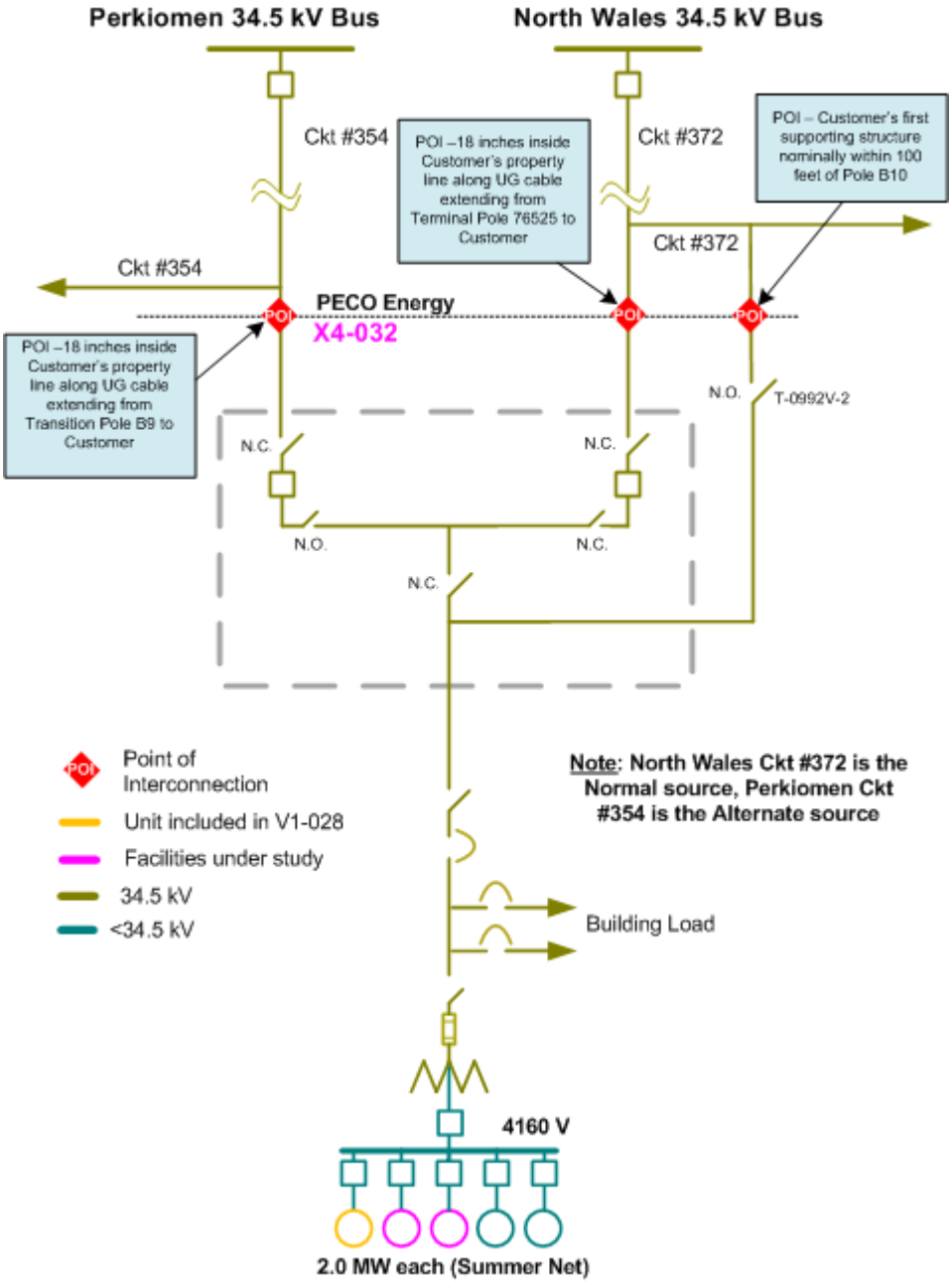

Figure 1

Network Impacts for Primary POI

The Queue Project X4-032 was studied as a 4MW(Capacity 4MW) injection into PECO's system on the 34kV line North Wales 372. Project X4-032 was evaluated for compliance with reliability criteria for summer peak conditions in 2015. Potential network impacts were as follows:

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

No violations identified.

Multiple Facility Contingency
(Double Circuit Tower Line, Line with Failed Breaker and Bus Fault contingencies for the full energy output)

No violations identified.

Short Circuit

Short circuit currents were identified as an issue on the North Wales 372 supply to the customer.

PECO will take steps to address the short current issues on North Wales 372 supply. If possible, these steps will be completed in conjunction with the North Wales Direct Transfer Trip [DTT] discussed below, presuming the customer pursues that alternative.

Steady-State Voltage Requirements

To be determined in the System Impact Study

New System Reinforcements

None required

Contribution to Previously Identified System Reinforcements

None required

Energy Portion of Interconnection Request
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. 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 analyzes all overload conditions associated with the overloaded element(s) identified. As a result of the aggregate energy resources in the area, the following violations were identified*.

None identified.

Attachment Facilities for Alternate POI

The proposed injection of X4-032 into the existing 34kV line Perkiomen 354 is shown in Figure 1.

Interconnection Customer Scope of Direct Connection Work

Interconnection Customer is responsible for all work on the X4-032 side of the POI (Point of Interconnection).

Cost of Direct Connection Network Upgrades

Direct Network Upgrades includes the cost of any remote relay and control work that is required at due to the interconnection of the generation facility and communication equipment, along with any system upgrades identified, attributable to this project, to ensure system reliability.

There are several automatic sectionalizing devices in the Perkiomen 354 circuit between the substation and the point of interconnection of the generation. There is a possibility of these devices opening and the generation operating as an island. The reclosers are equipped with automatic reclosing and will automatically reclose at preset times following overcurrent trippings. If this occurs, the recloser will likely be closing into the 'island', which is no longer synchronized with the system, resulting in potential equipment damage.

To avoid this situation, Direct Transfer Trip [DTT] is required between automatic sectionalzing devices and the circuit breaker connecting the generators to the circuit. Additional engineering work is required to determine the feasibility of implementing DTT on the pole mounted reclosers including extending approximately 9 miles of fiber optic cable from them to customer circuit breaker connecting the generators to the system. The reinforcement for this project is estimated at $1,000,000. In addition, the customer is responsible for all work and cost required within the customer's facility to implement the DTT scheme.

PECO has stated they would allow this project to keep both lines for generation output if the Interconnection Customer funded the upgrades for both. Otherwise, PECO would maintain both supply lines to this the site, however there would have to be a physical and/or operational arrangement (at the cost of the customer) made to limit their generators from operating on one of the 2-lines that does not have the required upgrades to generate power.

A Facility Study is required for this project to provide the full scope of required upgrades including cost and time. The Facilities Study will take approximately 6 months after the customer executes a Facilities Study Agreement. The estimated time to complete the work described above is 18 to 24 months after all agreements are in place.

Network Impacts for Alternate POI

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

No violations identified.

Multiple Facility Contingency
(Double Circuit Tower Line, Line with Failed Breaker and Bus Fault contingencies for the full energy output)

No violations identified.

Short Circuit

There are no fault current issues on the Perkiomen 354 supply.

Steady-State Voltage Requirements

To be determined in the System Impact Study

Stability and Reactive Power Requirement

To be determined in the System Impact Study

New System Reinforcements

None required

Contribution to Previously Identified System Reinforcements

None required

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