PJM Generator Interconnection Request
Queue #Q45
N. Lebanon (Greater Lebanon Refuse Authority)
13.2kV
Feasibility/Impact Study Report

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N. Lebanon (GLRA) 13.2kV (Q45) Feasibility/Impact Study

General

PPL Shoreham Energy, LLC has proposed a project consisting of two 1600 kW Caterpillar G3520 generators to be installed at the Greater Lebanon Refuse Authority (GLRA) at 1610 Russell Road in Lebanon, Lebanon County, Pennsylvania that will use landfill gas (methane) as fuel. This project has been assigned position Q45 in the PJM Generation Interconnection Queue. The project is to be evaluated as a capacity resource. The proposed in-service date is June 1, 2007.

The intent of the feasibility / impact study is to determine system reinforcements and associated costs and construction time estimates required to facilitate the addition of the new generating plant to the transmission system. The reinforcements include the direct connection of the generator to the system and any network upgrades necessary to maintain the reliability of the transmission system.

Direct Connection

The generators are to be connected to the Metropolitan Edison 13.2 kV system approximately five miles from Metropolitan Edison's North Lebanon Substation. The generators will interconnect with the 712-2 13.2kV line by a radial attachment that includes a main line recloser (71212 at pole 35844-38558) between the North Lebanon substation and GLRA.

PPL Shoreham Energy, LLC will be responsible for meeting the Met-Ed Direct Connection requirements as they are described as follows:

- The generator site substation will comply with the FirstEnergy “Requirements for Transmission Connected Facilities”, as applicable.
- A fully rated three-phase interrupting device is required to be installed at the interconnection point.
- Revenue Metering will be installed at GLRA substation. The Interconnection Customer is required to provide a phone line and maintain service to the phone line. Metropolitan Edison will own, operate and maintain the revenue metering at the Interconnection Customer’s expense.
- A mini-RTU (Remote Terminal Unit) will be installed at the GLRA substation to monitor the MW, MVAR, Amperes and kilovolts of each generator and provide a status point for the interconnection fault protection (breaker) device. A dedicated phone line and interface with the RTU and Metropolitan Edison’s EMS system in Reading, PA will be required to be installed by GLRA. Metropolitan Edison will own, operate and maintain the RTU at the Interconnection Customer’s expense.
- The generators must be operated to maintain unity power factor to prevent high voltage on the 13.2kV line during off-peak load periods.

- Short circuit duty at the Lebanon landfill pole 34974-37860 is 43MVA three-phase, 1,639 amps phase to phase, and 1,400 amps phase to ground. The short circuit duty available at the North Lebanon substation 13.2kV bus is 138MVA. The 712-2 Line is normally operated as a radial feeder circuit.
- The Interconnection Customerr's transformer must be a wye-wye design and be solidly grounded for this application.
- The protection on the GLRA substation will be specified and/or reviewed by the Metropolitan Edison Regional Engineering personnel in the Detailed Load Study (DLS), which will be conducted as a part of the Interconnection Service Agreement.
- A Direct Transfer Trip (DTT) scheme will be required with the following:
    - The Interconnection customer must provide a radio based DTT system that will trip the generator breaker(s) for any condition which opens the Metropolitan Edison North Lebanon 712-2 line circuit breaker 71262 or the main line recloser 71212.
    - The DTT system must also block reclosing of the Metropolitan Edison source breaker and recloser until the generators are isolated from the 712-2 line.
    - The Interconnection customer must maintain the DTT communication path. The generators must trip and be blocked from interconnection whenever the communication path is interrupted.
    - Metropolitan Edison will provide breaker and recloser contacts to DTT equipment provided by the Interconnection Customer.
    - The DTT system is recommended for the normal configuration of the radial 712-2 distribution line. The generators cannot be operated when the line is reconfigured or tied to adjacent lines when emergency or maintenance switching is performed unless the DTT system is expanded to include every switching scenario.

The estimated cost for the Metropolitan Edison facilities needed for the direct connection of this project are as follows:

Mini RTU at generation site - generation status, MW, MVAR & CB status	$ 50,000
Revenue Metering	$ 18,000
Miscellaneous - System Protection	$ 9,240
Upgrade recloser control	$ 9,900
Substation - DTT design, materials, construction & testing	$ 37,003
Radio Path Testing - Met-Ed bucket truck (two days)	$ 3,300
Total	$127,433

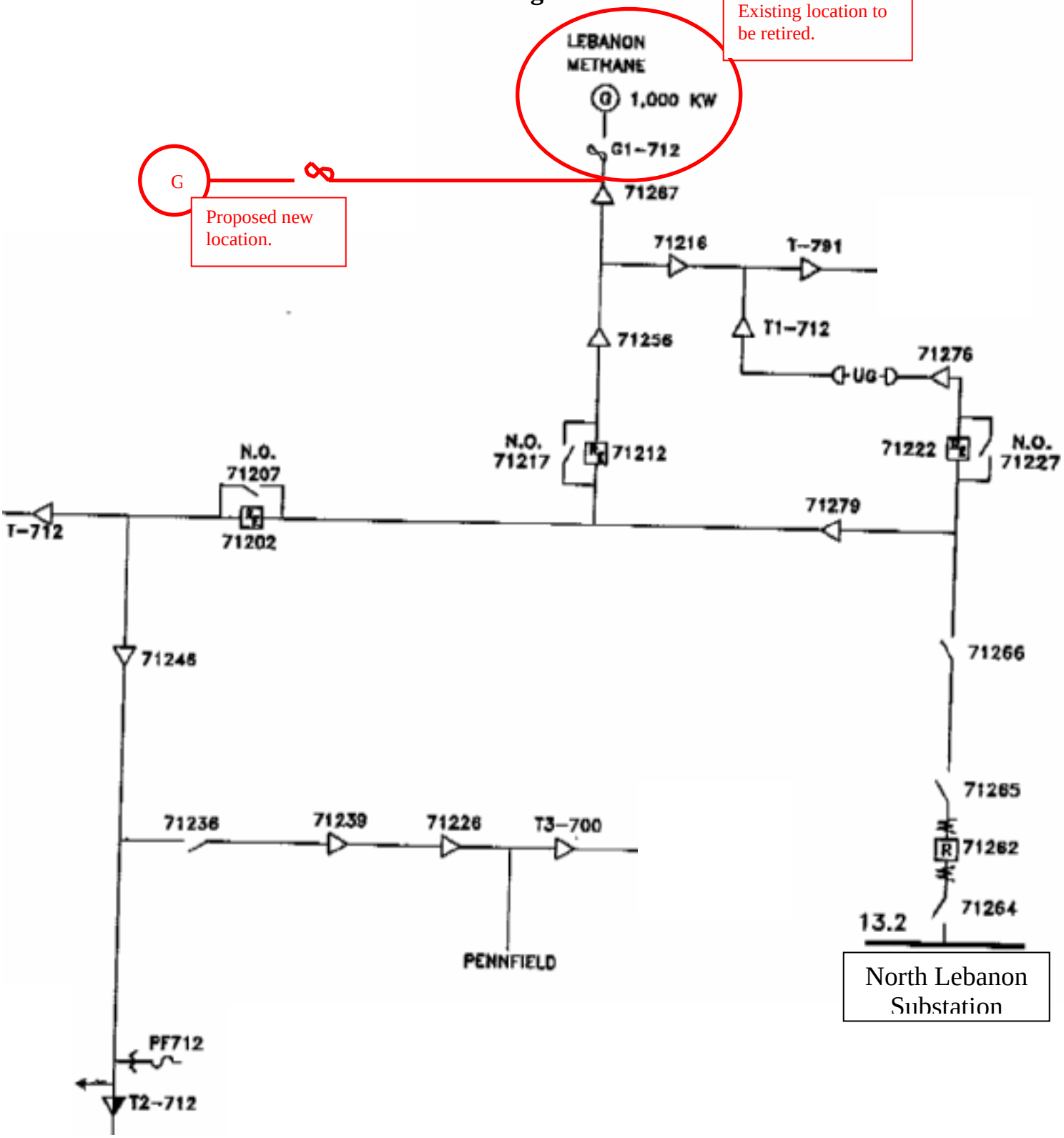
Note: If the Interconnection Customer determines that the radio based Direct Transfer Trip system is not feasible, then the costs of a phone line based system or "wired" system will have to be evaluated.

The required construction is estimated to be complete 8 months after execution of the Interconnection Service Agreement and the Construction Service Agreement as described below.

Schedule -

Start Engineering:	At execution of ISA/CSA
Radio Path Testing	Contractor to call and schedule after ISA/CSA execution
Upgrade Recloser Control	4 months after ISA/CSA execution
Start Const of DTT:	4 months after ISA/CSA execution
Complete Const:	8 months after ISA/CSA execution

Figure #1



Network Impacts

The #Q45 project was studied as an injection of 3.2 MW into the 712-2 13.2kV distribution feeder emanating from the N. Lebanon substation. Project #Q45 was evaluated for compliance with reliability criteria for summer peak conditions in 2011. Potential network impacts were as follows:

Generator Deliverability
No identified problems

Multiple Facility Contingency – Tower Line Outages
No identified problems

Short Circuit
No identified problems

Stability
No analysis required

Contribution to Previously Identified Overloads

None

New System Reinforcements

None

Contribution to Previously Identified System Reinforcements

None

Cost Allocation

The Q45 project is responsible for 100% of the cost of the attachment facilities estimated to be **$112,500**.