

***Combined Feasibility/System Impact Study  
Report***

***PJM Generation Interconnection Request  
Queue Position #U4-048  
Saegertown 34.5kV  
(Saegertown Delivery Point)  
2MW***

April 2009

## **Preface**

The intent of the Generation Interconnection Feasibility Study and the System Impact Study is to determine a plan, with cost and construction time estimates, to connect the subject Generation Interconnection Request 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 Request must be designed to meet the technical specifications (located on the PJM web site: Located at: <http://www.pjm.com/planning/design-engineering/to-tech-standards.aspx>) 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 study estimates do not include the feasibility, cost, or time required to obtain property rights and permits for construction of the required facilities unless noted in the report. The project Interconnection Customer is responsible for acquiring any necessary right of way and real estate, as well as applying for and obtaining construction permits unless prior agreement by interested parties allows for other arrangements. For properties currently owned by Transmission Owners, some costs may be included in the study.

## **Cost and Timing Estimates**

The estimates in this report do not include tax gross-up.

While the information in this transmittal is reasonable for the scope of work defined, it should, however, be noted that the cost figures and time estimates are conceptual in nature at this stage, as an engineering team has not been assigned to the project. Any change to the scope of work will require that the estimates be revisited. The costs are a best estimate, but the Interconnection Customer will be charged for actual costs. Any under-runs or over-runs will be reconciled at the conclusion of the project.

## **General**

Allegheny Electric Cooperative, Inc. (Saegertown Project) has proposed the installation of a 2.0 MW oil/gas fired generator and 2.0 MW (capacity). The proposed generating unit site is approximately 9.1 miles southwest of Cambridge Springs, PA, off Short Drive. This is in the PJM queue at U4-048. The project is proposed to be in service by the 1<sup>st</sup> quarter of 2011.

The proposed upgrade must be designed in accordance with the FirstEnergy “Requirements for Transmission Connected Facilities” document.

Located at: <http://www.pjm.com/planning/design-engineering/to-tech-standards.aspx>

The generation owner is responsible for specifying appropriate equipment and facilities such that the parallel generation is compatible with the FirstEnergy Transmission System. The generation owner is also responsible for meeting any applicable federal, state, and local codes. It is also the Interconnection Customer’s responsibility to obtain any needed right-of-way between the plant site and FirstEnergy’s facilities.

FirstEnergy may complete detailed relay coordination studies to identify off-site relay setting changes required due to this generation interconnection during subsequent studies of this project. This may result in additional individual relay replacements being required. These relay replacements will be done at the cost of the Interconnection Customer.

## **Metering**

The Interconnection Customer will be required to maintain metering and telemetry equipment to provide revenue metering and real-time telemetry data to PJM and the Transmission Owner. The PJM requirements for this equipment are listed in Appendix 2, section 8 of Attachment O to the PJM Tariff, as well as PJM Manuals 01 and 14D.

## **Direct Connection Facilities**

It was proposed that the project be studied as an interconnection into the Cambridge Springs Substation and Turner Street Substation 34.5kV buses via the 34.5kV CV line at an existing delivery point at pole # TS-121-7.

Allegheny Electric Cooperative, Inc. is responsible for constructing all of the facilities on its side of the point of interconnection, on the line to the generating plant. Allegheny Electric Cooperative, Inc. will also be responsible for remote relay and control work required by First Energy at Cambridge Springs Substation and Turner Street Substation that is required due to connecting the facility.

The proposed interconnection facilities must be designed in accordance with the FirstEnergy “Requirements for Transmission Connected Facilities” document and must meet IEEE 1547.

The 34.5 kV interconnection point will require the installation of an Interconnection Customer installed/owned main line recloser below the delivery point (which will act as the disconnect point between First Energy and the generator interconnection).

Operational metering is also required for this generation connection. These requirements are outlined in FirstEnergy “Requirements for Transmission Connected Facilities” document.

Direct Transfer Trip (DTT) using a Interconnection Customer provided equipment & communications channel is required from Cambridge Springs Substation & Turner Street Substation to provide protection against unintentional generation islanding. Interconnection Customer to be responsible for all DTT terminal equipment, rights of way for suitable locations, all auxiliary power, environmental control and housing needs for the DTT terminals).

If, in the future, upstream protection is added by First Energy, the Interconnection Customer will be responsible for the cost to add Direct Transfer Trip on any new devices.

Below are conceptual estimates for the engineering/construction associated with Direct Connection requirements.

Item	Description	Conceptual Cost Estimate
1	Relay and control work at Cambridge Springs substation and Turner Street Substation for DTT provision for the project for trip initiation interconnection to Interconnection Customer provided DTT system.	\$251,600
2	DTT communication for the project.	N/A Interconnection Customer cost.
3	RTU programming for connection to the First Energy SCADA	\$5,000

Conceptual Estimate:

\$256,600

Estimated Lead Time:

1.0 year from signed IA

Notes:

- Detailed Engineering & Construction Estimates TBD via Facility Study
- The above estimates do not include 1) tax gross-up, 2) property costs and site development up to rough grade which is to be provided by the Interconnection Customer, 3) generation SCADA to be provided by the Interconnection Customer, and 4) engineering and field activities for design review and commissioning of the Interconnection Customer’s facilities.

The attached Figure 1 provides a conceptual one-line of the direct connection facilities needed.

## **Network Impacts**

The #U4-048 project was studied as total injection of 2.0 MW (2.0 MW of capacity) into the Cambridge Springs 34.5 kV bus and Turner Street West 34.5kV bus. Project #U4-048 was evaluated for compliance with reliability criteria for summer peak conditions in 2013. Potential network impacts were as follows:

### **Generator Deliverability**

None identified

### **Multiple Facility Contingency**

None identified

### **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 identified

### **Short Circuit**

No problems identified

### **Cost Allocation**

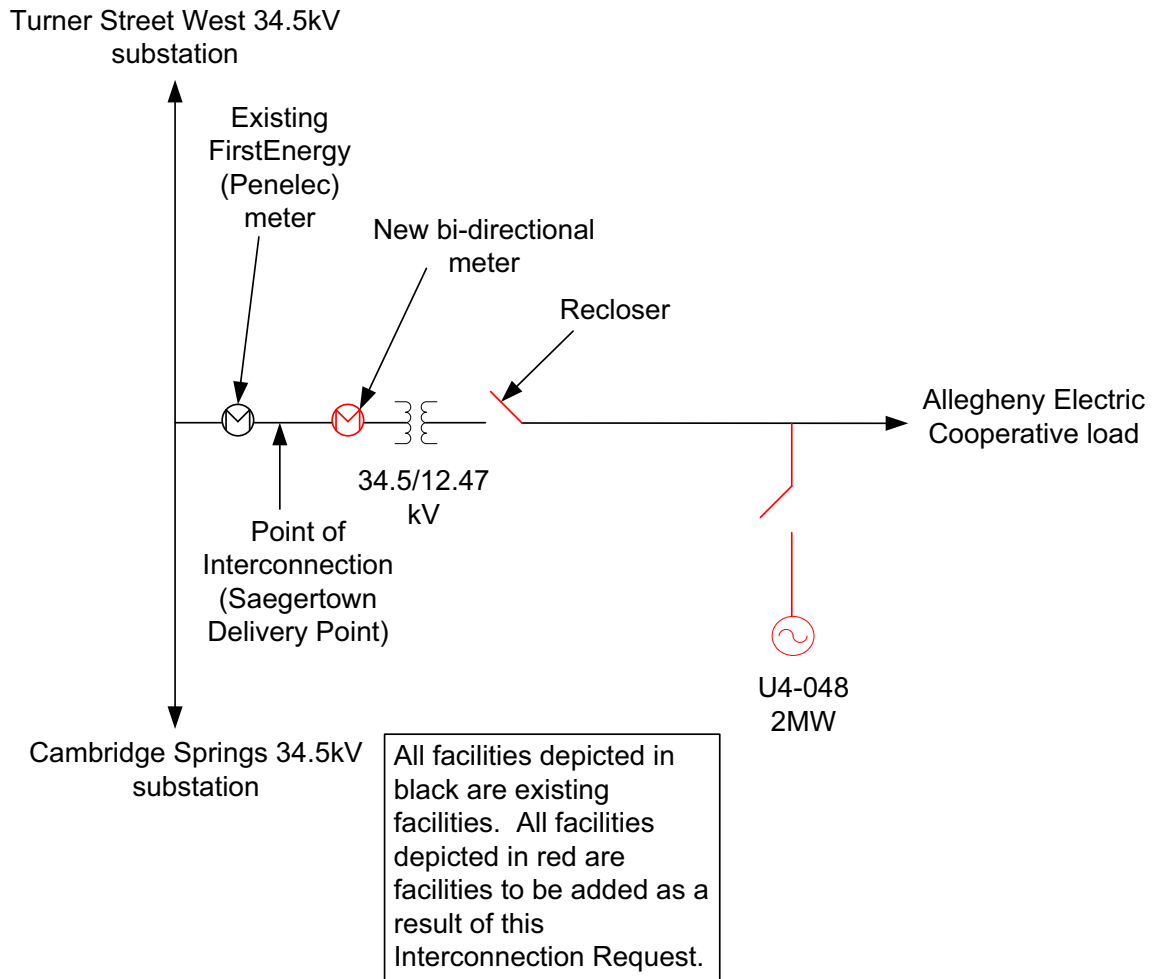
The #U4-048 project will be responsible for 100% of the direct connection costs estimated at \$256,600.

### **Summary**

Conceptual estimates are provided for the assumption that the point of interconnection would be at the 34.5 kV tie point at pole # TS-121-7 and that the customer interconnection substation would be at a site approximately 9.1 miles southwest of Cambridge Springs, PA.

Direct Transfer Trip (DTT) using a developer provided equipment & communications channel is required from Cambridge Springs Substation & Turner Street Substation to provide protection against unintentional generation islanding.

Figure #1



## Attachment A

### FirstEnergy Revenue Metering Requirements for Interconnection Customers

The Interconnection Customer shall install, own, operate, test and maintain the necessary revenue quality Metering Equipment. This includes current transformers, voltage transformers, mounting structures, wiring, meters, communication circuits, and associated devices. The Metering Equipment must meet the specifications listed in the FirstEnergy connection documents listed below:

<http://www.pjm.com/planning/design-engineering/to-tech-standards.aspx>

The Metering Equipment shall be located at the generation facility on the high voltage side of the generator step-up transformers or facility main step-up transformer and/or station service power transformers. Power flows to and from the facility shall be compensated to the Point of Interconnection.

Penelec will provide revenue quality Metering Equipment for a station service power supply at a generation facility if the supply is from the local Penelec distribution system.

The revenue quality Metering Equipment shall be capable of collecting and storing bidirectional billing data. The billing data shall be stored in intervals specified by Penelec, typically fifteen minutes or thirty minutes. The Interconnection Customer must provide Penelec with remote access to the billing data in the Metering Equipment via a dedicated voice-grade analog telephone circuit. The Interconnection Customer shall provide Penelec with contact information for the person or persons responsible for meter programming and Metering Equipment maintenance.

The Interconnection Customer shall consult with Penelec regarding the revenue quality metering system design and provide the following information:

- Facility one line and revenue metering installation drawings (schematics, wiring diagrams, etc.)
- Estimated power flows to and from the facility at all revenue metering points
- Current transformer and voltage transformer specifications, including manufacturer, type, nameplate drawings, and certified accuracy test reports
- Revenue meter specifications including manufacturer, type, model number, and accuracy
- Revenue meter program information including but not limited to billing data recorder channel assignments, recorder pulse weights (Ke), and read-only password for access to interval data by the Penelec billing data collection system (MV-90)
- Revenue meter telephone number
- Revenue meter loss compensation data (if applicable)

The Interconnection Customer shall provide Penelec with prior notification of any modifications at the facility that will affect the revenue meter measurements, including substation reconfigurations and meter program changes.

The revenue metering system at each location shall be tested for accuracy by the Interconnection Customer once every two years. The Interconnection Customer shall give reasonable notice to Penelec of the time when the testing is scheduled so that Penelec may have representatives present. Penelec shall have the right to audit the revenue metering equipment and/or related documents at any time. The Interconnection Customer shall be given a reasonable period of time to comply with any requests associated with an audit.