

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

For

***PJM Generation Interconnection Request
Queue Position V3-019***

Edinboro 13.8kV

January 2010

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.

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, is included in the System Impact Study.

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 project developer is responsible for the right of way, real estate, and construction permit issues. For properties currently owned by Transmission Owners, the costs associated with them will be addressed when seeking an Interconnection Agreement as outlined below. Developer will also be responsible for providing and installing metering equipment in compliance with applicable PJM and Transmission Owner standards.

General

The developer has proposed a 2.0 MW (2.0 MW capacity) natural gas fueled generating facility, consisting of Cummins Model QSK60, 16 cylinder turbocharged reciprocating engine-generator. The proposed generating unit site is approximately 2.0 miles west of Edinboro, PA, off US Rte 6N. The project is proposed to be in service by the 1st quarter of 2011.

Attachment facilities and local upgrades (if required) along with terms and conditions to interconnect V3-019 will be specified in a separate two party Interconnection Agreement (IA) between the Transmission Owner and the Interconnection Customer as this project is considered FERC non-jurisdictional per the PJM Open Access Transmission Tariff (OATT). *From the transmission system perspective, no network impacts were identified as detailed below.*

The developer is responsible for constructing all of the facilities on its side of the point of interconnection, on the line to the generating plant. The developer will also be responsible for remote relay and control work required by First Energy at Edinboro South 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 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 developer provided equipment & communications channel is required from Edinboro South substation to provide protection against unintentional generation islanding. Developer to be responsible for all DTT terminal equipment, rights of way for suitable location, all auxiliary power, environmental control and housing needs for the DTT terminal).

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 Edinboro South Substation for trip initiation interconnection to developer provided DTT system.	\$137,900
2.	DTT communication for the project.	N/A Developer cost
3.	RTU programming for connection to the First Energy SCADA	\$10,000

Conceptual Estimate: \$147,900
 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 developer, 3) generation SCADA to be provided by the developer, and 4) engineering and field activities for design review and commissioning of the developer’s facilities.

The attached Figure 2 provides a conceptual one-line of the direct connection facilities needed.

Point of Interconnection

V3-019 will interconnect with the Penelec distribution system as a tap of the existing 34.5 kV X distribution circuit from the Edinboro South substation. The proposed generation is to be installed within the existing Edinboro delivery point pole # X-531-5CE.

Network Impacts

The queue V3-019 project was studied as a 2.0MW capacity injection into Penelec's system at the Edinboro South#2 34.5kV substation. The project was studied on a combined feasibility-impact basis which utilizes an AC analysis, and incorporates all contingency types. Project V3-019 was evaluated for compliance with reliability criteria for summer peak conditions in 2014.

Potential network impacts were as follows:

Generator Deliverability

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

No problems identified.

Multiple Facility Contingency

*(Double Circuit Tower Line, Line with Failed Breaker and, Bus Fault contingencies for the **Full** energy output.*

No problems 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)

No problems identified.

Short Circuit

Not required.

New System Reinforcements

(Upgrades required to mitigate reliability criteria violations, i.e. "Network Impacts," initially caused by the addition of this project's generation)

None

Contribution to Previously Identified System Reinforcements

(Overloads initially caused by prior Queue positions with additional contribution to overloading by this project.

None

Stability Analysis

Not required.

Cost Allocation

The #V3-019 project will be responsible for 100% of the direct connection costs estimated at \$0.148 million. Total costs are estimated to be \$0.148 million to accommodate interconnection of the project.

Summary

Conceptual estimates are provided for the assumption that the point of interconnection would be at the 34.5 kV tie point at pole # X-531-5CE and that the customer interconnection substation would be at a site approximately 2.0 miles west of Edinboro, PA, off US Rte 6N.

Direct Transfer Trip (DTT) using developer provided equipment & communications channel is required from Edinboro South substation to provide protection against unintentional generation islanding.

Figure #1
Penelec Area 34.5 kV Transmission Facilities - Existing Configuration

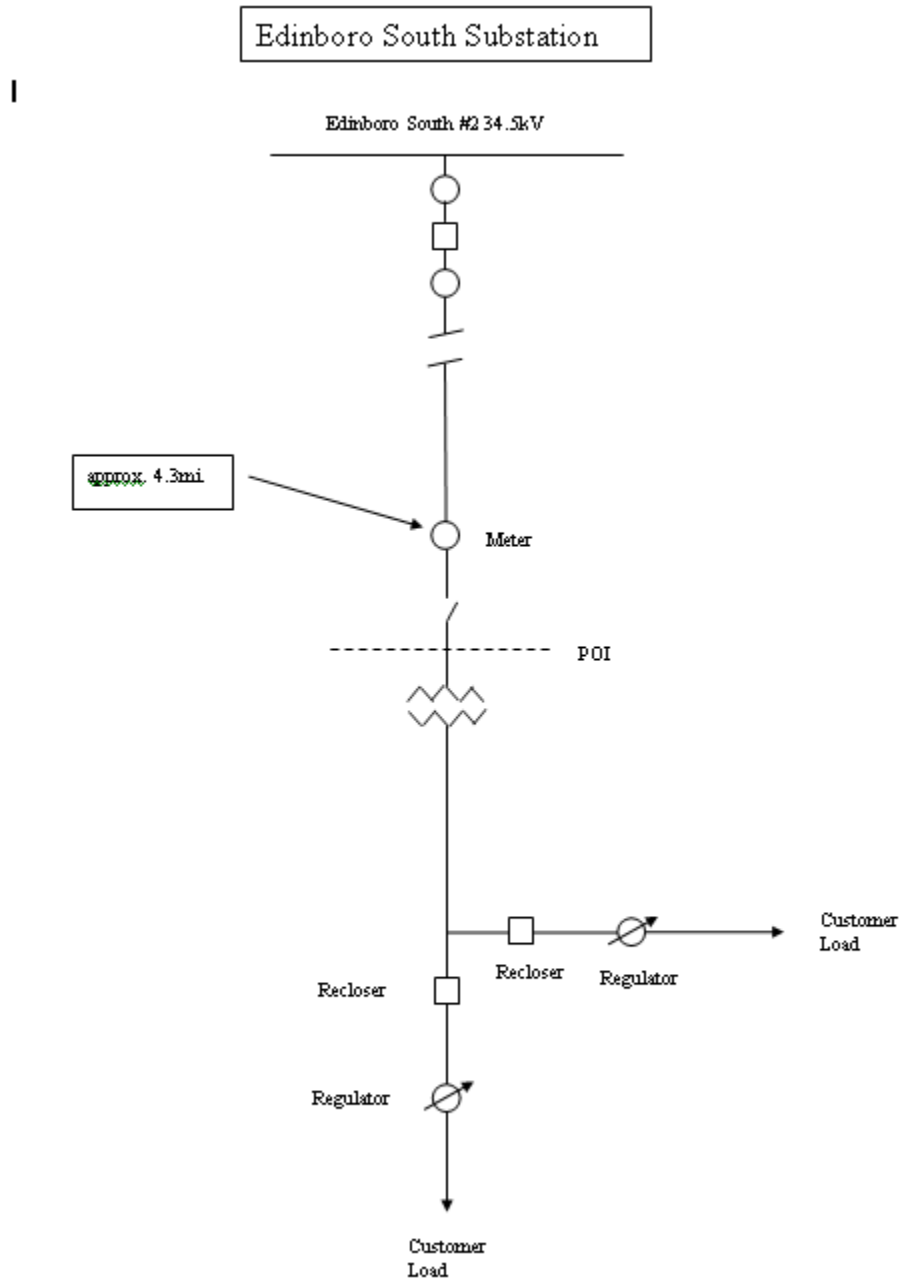


Figure #2
Proposed Interconnection

