

***Generation Interconnection Feasibility
Study Report***

***PJM Generation Interconnection Request
Queue Position #U1-078
Tionesta Dam
8 MW***

September 2008

Preface

The intent of the Generation Interconnection Feasibility Study is to determine a plan, with ballpark 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.

The proposed interconnection facilities must be designed in accordance with the FirstEnergy “Requirements for Transmission Connected Facilities” document. Procedures for gaining access to these standards can be found at the link below.

<http://www.pjm.com/planning/trans-standard.html>

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 Generation Interconnection Feasibility Study, but the actual allocation will be deferred until the System Impact Study is performed.

The Generation Interconnection Feasibility 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 developer is responsible for acquiring any necessary right of way and real estate, as well as applying for and obtaining any and all permits unless prior agreement by interested parties allows for other arrangements. For properties currently owned by Transmission Owners, some permitting and real estate 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 developer will be charged for actual costs. Any under-runs or over-runs will be reconciled at the conclusion of the project.

General

The Interconnection Customer has proposed the installation of 1 hydro generator totaling 8.0MW at the US Army Corp of Eng. (Tionesta Dam) facilities at Rt. 36, Tionesta, Pa. The proposed generating unit site is approximately 1.8 miles south east of Tionesta, PA, off Rt. 36. This is in the PJM queue at U1-078. The project is proposed to be in service by the 1st quarter of 2015.

Metering

The Interconnection Customer will be required to install and 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. The PJM and Transmission Owner requirements for Metering Equipment will be discussed in more detail in subsequent studies.

Design Requirements

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 developer's responsibility to obtain any needed right-of-way between the plant site and FirstEnergy's facilities.

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

Reactive Power

Cost and Timing Estimates

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 developer will be charged for actual costs. Any under-runs or over-runs will be reconciled at the conclusion of the project.

Direct Connection Facilities

It is proposed that the project be connected via a tap to the 34.5kV facilities near the Tionesta substation.

The Interconnection Customer is responsible for constructing all of the facilities on its side of the point of interconnection, on the line to the generating plant. The Interconnection Customer will also be responsible for remote relay and control work at Tionesta Junction substation that is required due to connecting the facility.

The 34.5kV interconnection point will require the installation of a breaker on the generator side of the interconnection and a radio controlled recloser on the utility side of the interconnection.

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

Direct Transfer Trip (DTT) using a developer provided communications channel is required from any substation that may feed the generator. Currently, the generator would be fed from the Tionesta Junction Substation and the estimates provided assume that DTT will be from Tionesta Junction Substation. If the generator agrees to be disconnected from the 34.5kV system while The Interconnection Customer is fed from an alternate source, then DTT is not required from the other alternate sources. (Alternate sources to feed this area are another circuit at Warren substation or Corry East substation.)

The proposed Interconnection Facilities must be designed in accordance with the FirstEnergy “Requirements for Transmission Connected Facilities” document. Procedures for gaining access to these standards can be found at the link below.

<http://www.pjm.com/planning/trans-standard.html>

Below are conceptual estimates for the engineering/construction associated with Direct Connection requirements based upon similar projects that have been designed and/or constructed.

Item	Description	Conceptual Cost Estimate
1	New 34.5 kV radio controlled recloser at the connection termination point tapped off 34.5 kV line. Customer would be responsible for the 34.5 kV breaker at the generation plant substation (This cost is not included in the conceptual cost estimate).	\$50,000

2	Relay and control work at Tionesta Junction Substation and the 34.5 kV metering point to include DTT provision for the project.	\$ 880,000
---	---	------------

Conceptual Estimate: \$930,000
Estimated Lead Time: 1.0 year from signed CSA

Notes:

- The Queue Position #U1-078 project is responsible for 100% of the costs associated with the items listed in this section of the report
- Detailed Engineering & Construction Estimates TBD via Facility Study
- The above estimates do not include the 34.5 kV line from the Developer’s site to the point of interconnection and the 34.5 kV breaker at the customer site.
- 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) interconnection metering and generation SCADA to be provided by the developer, 4) engineering and field activities for design review and commissioning of the developer’s facilities, and 5) real estate costs that may be required for right-of-way easements to extend the single circuit 34.5 kV line.

Figure 1 provides a conceptual one line diagram of the Direct Connection Network Upgrades required to accommodate this project.

Network Impacts

The Queue Position#U1-078 project was studied as total injection of 8.0 MW of capacity into the Garland Junction 34.5 kV circuit. Project #U1-078 was evaluated for compliance with reliability criteria for summer peak conditions in 2012.

Potential network impacts were as follows:

Generator Deliverability

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

No problems were identified.

Multiple Facility Contingency

(Double Circuit Tower Line for the full energy output. Stuck breaker and bus fault contingencies will be performed for the System Impact Study)

No problems were 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 were identified.

Short Circuit

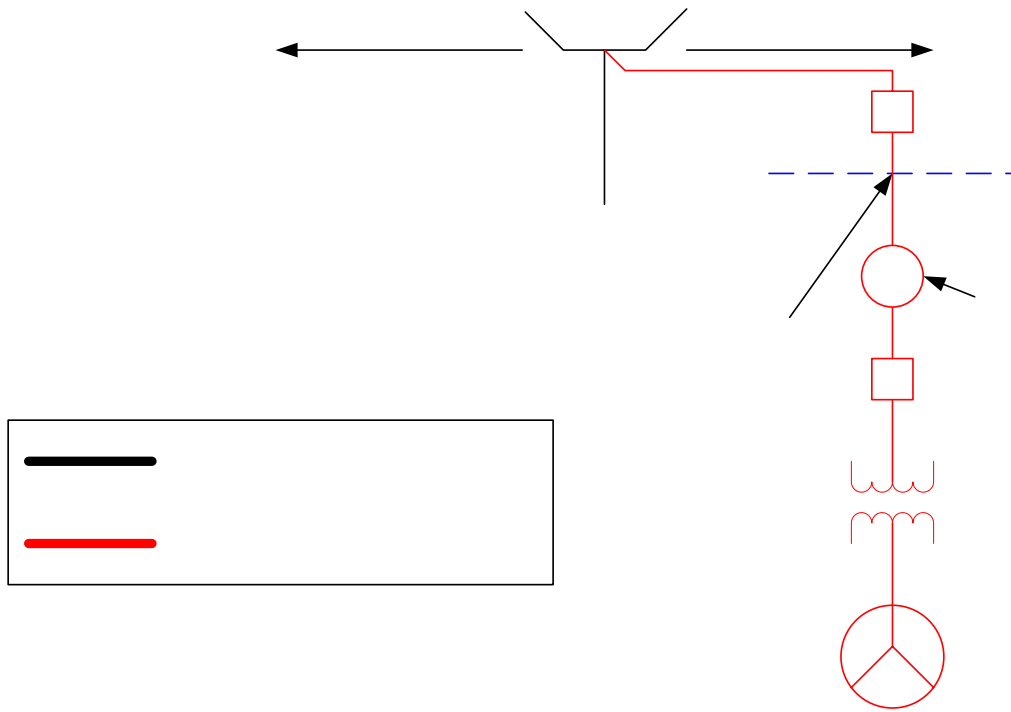
PJM did not perform short circuit studies due to the megawatt size of this project. Additional short circuit analysis may occur during the System Impact Study phase of this project.

Summary

Conceptual estimates are provided for the assumption that the Point of Interconnection would be at a 34.5 kV tap near the Tionesta substation and that the customer interconnection substation would be adjacent to the US Army Corp of Eng. (Tionesta Dam) facilities. The generating unit site is approximately 1.8 miles south east of Tionesta, PA.

Direct Transfer Trip (DTT) using a Interconnection Customer provided communications channel is required from any substation that may feed the generator. Currently, the generator would be fed from the Tionesta Junction Substation and the estimates provided assume that DTT will be from Tionesta Junction Substation. If the generator agrees to be disconnected from the 34.5kV system while The Interconnection Customer's facility is fed from an alternate source, then DTT is not required from the other alternate sources. (Alternate sources to feed this area are another circuit at Warren substation or Corry East substation.)

Figure #1



34.

Figure #2

