Generation Interconnection Feasibility Study Report-Web Version

For

PJM Generation Interconnection Request Queue Position W3-040

Martinsburg Project

February, 2011

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Overview

General

The Interconnection Customer (IC) has proposed the installation of three (3) - 1.6 MW methane gas fired generators totaling 4.8 MW gross with a 1 MW host load leaving a 3.8 MW net injection available. The IC is requesting this be studied for 3.8 MW energy and 3.8 MW Capacity. The project is proposed to be in service by the first quarter of 2012. The analysis was performed using a 2014 base year. .

PJM Report on the Transmission System

This portion of the report addresses the impacts on and the required reinforcements to the transmission system under PJM jurisdiction.

Network Impacts

Queue project W3-040 was studied as a 3.8 MW (3.8 MW of which was Capacity) injection into the Pennelec system at the Curryville 23.0 kV substation. Project W3-040 was evaluated for compliance with reliability criteria for summer peak conditions in 2014.

Potential transmission network impacts are 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 contingencies only with full energy output. Stuck Breaker and Bus Fault contingencies will be applied during the Impact Study)

No violations 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 violations identified.

New System Reinforcements

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

None required.

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Contribution to Previously Identified System Reinforcements
(Overloads initially caused by prior Queue positions with additional contribution to overloading by this project. This project may have a % allocation cost responsibility which will be calculated and reported for the Impact Study.)

None required.

Short Circuit
(Report over-dutied breakers.)

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.*

No violations identified.

FirstEnergy Feasibility Analysis Report

This portion of this Feasibility Study Report has been prepared for PJM by Penelec (FirstEnergy). It addresses the impacts on and required reinforcements, if needed, including the attachment and direct connection facilities. It also presents the FirstEnergy standards-based requirements for interconnection.

Direct Connection

It was proposed that the project be studied as an interconnection into the Curryville Substation #1 23kV bus via the 23kV RSM line. The proposed generation is to be interconnected to the FirstEnergy distribution system at pole # 2RCR3-139.

IC is responsible for constructing all of the facilities on its side of the point of interconnection, on the line to the generating plant. IC will also be responsible for remote relay and control work required by FirstEnergy at Curryville substation that is required due to connecting the facility.

The proposed interconnection facilities must be designed in accordance with Attachment 2, FirstEnergy's "Technical Requirements for the Interconnection of Parallel-Operated Generation to the FirstEnergy Distribution System" and must also meet IEEE 1547.

The 23kV interconnection point will require the installation of an Interconnection Customer installed/owned main line breaker (which will act as the disconnect point between FirstEnergy

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and the generator interconnection) and a radio controlled switch on the utility side of the interconnection.

Interconnection metering is also required for this generation connection per Attachment 1, "FirstEnergy Revenue Metering Requirements for Generation Facilities Connected 46 kV and Lower". The Interconnection Customer shall provide Penelec with dial-up communication to the revenue meter.

The Interconnection Customer will be responsible for designing, furnishing and installing a SCADA RTU in their generation substation and obtaining the telecommunication circuits from the RTU to the Penelec Data Center. The connection to the Penelec Data Center will be to provide MW, MVAR and 23kV voltage at IC generation substation.

Direct Transfer Trip (DTT) using developer provided equipment & communications channel is required from Curryville substation to provide protection against unintentional generation islanding. The type of communications channel (telephone line or fiber optic cable) shall be specified by the developer. The FirstEnergy standard communication channel is fiber optic cable. Developer is responsible for all DTT terminal equipment, rights of way for suitable location, all auxiliary power, environmental control and housing needs for the DTT terminal. Direct Transfer Trip (DTT) is required from any substation that may feed the generator. Currently, the generator would be fed from the Curryville substation. If the generator agrees to be disconnected from the 23kV system while IC 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 Curryville substation, and Claysburg substation.)

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 Curryville Substation for trip initiation interconnection to developer provided DTT system.	$98,500
2	RTU programming for connection to the First Energy SCADA.	$10,000
3	23kV tap, and radio controlled switch.	$43,700

Conceptual Estimate: $152,200
Estimated Lead Time: 6 months from signed ISA/CSA

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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, 4 DTT to be provided by the developer and 5) 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.

Network Impacts

The W3-040 project was studied as total injection of 3.8 MW (3.8 MW of capacity) into the Curryville #1 23 kV bus. Project W3-040 was evaluated for compliance with reliability criteria for summer peak conditions in 2014. Potential network impacts were as follows:

Generator Deliverability
None

Multiple Facility Contingency
None

Contribution to Previously Identified Overloads
None

New System Reinforcements
None

Contribution to Previously Identified System Reinforcements
None

Short Circuit
No identified problems

Cost Allocation
IC will be responsible for 100% of the direct connection costs estimated to accommodate interconnection of the project. The total estimate is $152,200.

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Summary

Conceptual estimates are provided for the assumption that the point of interconnection would be at the 23kV tie point. and that the customer interconnection substation would be at the IC's site.

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

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