Generation Interconnection Feasibility Study Report (Web Version)

For

PJM Generation Interconnection Request Queue Position W3-168

Germantown 13.2kV Project

January 2011

Scope

Generation Interconnection Feasibility Study W3-168 for the Interconnection Customer (IC), examines the capability of Metropolitan Edison Co.'s (Met-ED) electric distribution system to accept the output of the proposed 15.0 MW solar panel generation. The project has a scheduled in service date of June 2012

Transmission Network Impacts

Queue project W3-168 was studied as a 15.0 MW (5.7 MW of which was Capacity) injection into ME's system. Project W3-168 was evaluated for compliance with reliability criteria for summer peak conditions in 2014.

Potential transmission network impacts are as follows:

Option 1: Germantown 13.2 kV substation

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.

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.

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.

Option 2: Germantown 115 kV substation

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.

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.

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 (MetEd)Distribution System Impacts

Local Distribution Circuit Information

This area is presently served by Distribution Circuit 00756-4, a three phase 13.2 kV grounded wye distribution circuit originating from Met-Ed's Germantown Substation. The inter-connection will be considered at the 13.2 kV bus as per customer request.

A Load Flow analysis was conducted to determine the impact of the generation project on the Germantown substation 13.2 kV Bus. The study was completed using both a projected 2011 summer peak and a spring load level case. The findings and recommendations from this study are based on identifying abnormal conditions that violate either the FE Planning Criteria or the FE Interconnection Policy and are associated with this project.

FE cannot accommodate 15 MW of generation on one circuit due to thermal overload of standard breaker and conductor ratings. Also, there is a FirstEnergy limit of 4 MVA solar and wind generation per circuit.

Furthermore, the 15 MW of solar generation creates unacceptable voltage swings due to varying output levels from the array. This is due to varying sunlight intensities, (i.e. cloudiness). The voltage swings would cause excessive operation of the distribution transformer's load tap changer.

A short circuit analysis was conducted to determine the fault duty contribution by the generator. The study found that no Met-Ed interrupting device will exceed its interrupting capacity due to the fault duty contribution from the generator. Therefore no reinforcements will be required due to increased duty.

Primary Point of Interconnection: Germantown substation 13.2 kV Bus

It was concluded based on the foregoing that interconnection at this POI is not feasible. Therefore no cost estimates were provided.

Secondary Point of Interconnection: 115 kV line between Germantown and Straban substations

Interconnection Customer LLC has chosen a Secondary POI of connecting directly to the 115 kV 998 line between the Germantown substation and the Straban substation, as shown on Attachment 3. While it has been determined that this connection is feasible, because it is the Secondary POI, a cost estimate for this option is not provided in this Feasibility Study Report. However, in compliance with the FE Requirements for Transmission Connected Facilities document, if the Secondary POI is chosen, Interconnection Customer must build a three breaker ring bus must be built to split the 998 line and to accept the proposed generation. Interconnection Customer will also be responsible for constructing a radial attachment line to the 115 kV substation.