Generation Interconnection Feasibility Study Report-Web Version

For

PJM Generation Interconnection Request Queue Position Z1-056

South Bend Generation Project

March 2014

Feasibility Study Report

South Bend Generation Project

Introduction

This Feasibility Study report provides the documentation of a system assessment performed by PJM Interconnection LLC (PJM) and FirstEnergy (FE) in response to a request made by Interconnection Customer for a 8 MW overall increase in energy and capacity output for the existing South Bend Generating Units. The existing four natural gas fired gen sets currently represent maximum capacity output of 623.4 MW. The location of the existing plant is in Armstrong County, Pennsylvania in South Bend Township at FirstEnergy's South Bend Substation. The proposed increase will occur through the implementation of the GE OpFlex Air Product, which includes minor software and mechanical changes.

Connection Facilities

In compliance with the Regional Transmission Expansion Planning (RTEP) protocol, Interconnection Customer has submitted a "Form of Generation Interconnection Feasibility Study Agreement" to PJM (see Attachment 4) that identifies its plan to implement the South Bend Generation Project upgrade to the existing South Bend Generation plant located just off of Route 56, Shelocta, Armstrong County PA, 15774 (see Attachment 1). The project upgrade will increase the total capability by 8 MW. The proposed effective date for this South Bend Generation Project is June 1, 2016.

The primary point of connection (POI) for Z1-056 Generation Project is existing and will remain unchanged. Attachment 2 is a one-line diagram showing the existing point of interconnection of the South Bend substation.

PJM Interconnection Study Results

The following are the results of the analysis performed by PJM engineers with respect to the transmission system impacts.

Network Impacts

The Queue Project #Z1-056 was studied as a 8.0 MW (Capacity 8.0 MW) injection at South Bend 500 kV substation in the APS area. Project #Z1-056 was evaluated for compliance with reliability criteria for summer peak conditions in 2017. Potential network impacts were as follows:

Generator Deliverability

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

None

Light Load Analysis

Light Load Studies to be conducted during later study phases (applicable to wind, coal, nuclear, and pumped storage projects).

Multiple Facility Contingency

(Double Circuit Tower Line, Failed Breaker and Bus Fault contingencies for the full energy output)

None

Short Circuit

(Summary form of Cost allocation for breakers will be inserted here if any)

Not required

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

Steady-State Voltage Requirements

(Results of the steady-state voltage studies should be inserted here)

None

Stability and Reactive Power Requirement

(Results of the dynamic studies should be inserted here)

Not required

New System Reinforcements

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

None

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)

(Summary form of Cost allocation for transmission lines and transformers will be inserted here if any)

None

Delivery of Energy Portion of Interconnection Request

PJM also studied the delivery of the energy portion of this interconnection request. Any 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 Merchant Transmission Interconnection request.

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 will study all overload conditions associated with the overloaded element(s) identified.

Not Applicable

Interconnected Transmission Owner's Analysis Results

The following was generated by FirstEnergy the Interconnected Transmission Owner, based upon its analysis, as well as that of PJM, for mitigation of the project's impacts on the transmission and lower voltage system as applicable. It includes the costs and schedules for any FirstEnergy system upgrades only.
Costs for affected Transmission owners other than FirstEnergy, if applicable, are included and reported in the "New System Reinforcements" and "Contribution to Previously Identified System Reinforcements" sections of the "PJM Interconnection Study Results" above.

Power Flow Analysis

A Power Flow study was conducted to determine the reliability impact of the proposed South Bend Project on the FE Transmission System. This study was completed using a 2015 summer peak load power flow that contains a detailed representation of the transmission networks in the area of the proposed South Bend Project. The findings and the recommendations from this analysis are based on a contingency review that was performed to identify the facility loadings and/or voltage conditions that violate the ReliabilityFirst, PJM or FE Planning Criteria and are attributable to this project. Note that in accordance with PJM RTEP study procedures, this South Bend queue project under study and earlier active queue projects are considered to be in service. All active queue projects after (Z1-056) are considered not in service.

The South Bend Project request for an incremental increase of 8 MW (8 MW capacity) to the existing South Bend generating units was studied. The results of the FE analysis show that there are no network upgrades required for the deliverability of the South Bend Project generation to the FE transmission system. The results from the study Power Flow Analysis showing a comparison of the FE and PJM contingency study results is detailed on Attachment 3. As shown, there also are no reinforcements defined for previous projects for which this project will have an impact, and there are no new upgrades required for the South Bend Project.

Short Circuit and Dynamics Analysis

A short circuit analysis was not necessary because no electrical characteristics were being modified as part of the South Bend Project.

System Protection Analysis

Since the South Bend Project only consisted of an existing unit upgrade no system protection analysis was required.

Metering

Interconnection Customer will be required to comply with all FE Revenue Metering Requirements for Generation Interconnection Customers. The FirstEnergy Revenue Metering Requirements may be found in the FirstEnergy Requirements for Transmission Connected Facilities document located at the following link:

www.firstenergycorp.com/feconnect
http://www.pjm.com/planning/design-engineering/to-tech-standards.aspx

Based on a review of the information provided by Interconnection Customer, no metering changes/ upgrades will be required.

Compliance Issues

Interconnection Customer will be responsible for meeting all FE criteria as defined in the FE Requirements for Transmission Connected Facilities document referenced above. This includes the provision of a reactive power capability sufficient to maintain a composite power delivery for the facility at the interconnection point at a power factor from .95 leading (absorbing MVARs) to .90 lagging (producing MVARs).

Interconnection Customer will also be required to meet all PJM, ReliabilityFirst and NERC reliability criteria and operating procedures for standards compliance. This includes the need to properly locate and report the over and under-voltage and over and under-frequency system protection elements for its units as well as the submission of the generator model and protection data required to satisfy the PJM and ReliabilityFirst audits. Failure to comply with these requirements may result in a disconnection of service if the violation is found to compromise the reliability of the FE system.

FE Facility Upgrades and Costs

The results of the FE analysis shows that no planning criteria violations are attributable to the addition of the South Bend Project for the conditions studied. Therefore the conclusion is that no Transmission or Subtransmission system reinforcements will be required to provide the requested service.

Interconnection Customer Requirements

In addition to the FE facilities, Interconnection Customer will be responsible for meeting all criteria as specified in the applicable sections of the "FE Requirements for Transmission Connected Facilities" document.

Summary

The connection of the South Bend Project to the FE transmission system will require no network upgrades. Since the point of interconnection will remain unchanged Interconnection Customer will not incur any Direct Connection costs for the South Bend Project.

The estimated cost to complete all work required for oversight, commissioning, and Transmission Owner power system data updates is $10,000, which does not include taxes if applicable.

Note that the FE findings were made from a conceptual review of this project. A more detailed review of this project upgrade will be identified in the System Impact Study.

Attachment 1
South Bend (Z1-056) Project
Project Location

Attachment 2
South Bend (Z1-056) Project
500 kV Point of Interconnection

Attachment 3
South Bend (Z1-056) Project
FE Contingency Analysis Results

Transmission Network Upgrades

Identified New Project Upgrades

ID #	Contingency	Outage description	Overloaded Element	N/4-Hr Rating	FE Results MVA Flow	PJM Results MVA Flow
No Constraints Identified						

Contribution to Previously Identified Overloads

ID #	Contingency	Outage description	Overloaded Element	N/4-Hr Rating	FE Results MVA Flow	PJM Results MVA Flow
No Constraints Identified						