

***Generation Interconnection
Feasibility Study Report
Web Version***

For

***PJM Generation Interconnection Request
Queue Position W2-069***

Fishburn/Tanney 46kV Project

Overview

Interconnection Customer (IC) has submitted an Attachment N to propose the interconnection of 10 MW energy and 3.8 MW of Capacity into the PJM market via the Allegheny Power network. The Commercial Operation date for this project was requested to be September 1, 2011. The analysis was performed using a 2014 base year. This project is interconnecting to a line that is not under FERC jurisdiction and the developer is not seeking QF status, therefore the developer will interconnect via Interconnection Agreement with APS and will transact energy sales in PJM under a Wholesale Market Participation Agreement.

PJM Report on the Transmission System

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

Network Impacts

Queue project W2-069 was studied as a(n) 10.0MW (3.8MW of which was Capacity) injection into APS's system at a tap point along the Fishburn – Tanney 46kV substation. Project W2-069 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 Contingencies only with full energy output. Stuck Breaker and Bus Fault contingencies will be applied during the Impact Study)

No problems identified.

Contribution to Previously Identified Overloads

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

No problems 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.

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.

Short Circuit

(Report Overdutied breakers here)

Not 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 problems identified.

APS Feasibility Analysis Report

This portion of this Feasibility Study Report has been prepared for PJM queue project W1-069 by Allegheny Power. It addresses the impacts on and required reinforcements to that position of the network at the distribution level, including the attachment and direct connection facilities.

Injection into the Milesburg to Stone Junction 46kV line

Attachment Facilities and Related Network Upgrades

- Construct a new 46kV switching station (Tanney Solar). Grade and install access road for a fenced area of approximately 100' x 75'. Install ground grid, structures, foundations, and yard stone. Install 1-46kV initial bay, 1-46kV breaker, 6-46kV hookstick disconnect switches, 1-46kV vertical break switch, 46kV metering, 46kV VT's and fuses, 46kV arresters, line traps, and CVTs. Install 46kV station service and fuses. Install a 16' x 24' metal control building, battery, SCADA, telephone service, control cables and panels, transfer trip, and associated equipment. Tap the Milesburg-Stone Jct. 46kV line into the station. The IC is to install a fiber optic link between the Tanney Solar switching station and W2-069. Note: All property associated with this station must be obtained by the IC and conveyed to AP, at no cost, in the form of either a perpetual lease or direct ownership. All rights-of-way must be obtained by the IC and transferred, at no cost, to AP.

Estimated Cost: \$1,143,513 in 2011 dollars

- Install 46kV PLC anti-islanding (transfer trip) facilities at Milesburg SS

Estimated Cost: \$125,743 in 2011 dollars

- Install 46kV PLC anti-islanding (transfer trip) facilities at Pleasant Gap SS.

Estimated Cost: \$125,743 in 2011 dollars

- Install 46kV PLC anti-islanding (transfer trip) facilities at Nittany SS.

Estimated Cost: \$125,743 in 2011 dollars

The estimated project duration is **18 months** after the receipt of an executed interconnection Agreement and Construction Agreement. Permitting issues may delay this estimated project duration and any time to complete the impact and facility studies must also be taken into account.

While the information in this transmittal is reasonable for the scope of work defined, it should, however, be noted that the cost figures are conceptual in nature at this stage, as an engineering team has not been assigned to the project. Obviously, any change to the scope of work will require that the estimates be revisited. The costs are a best estimate, but the IC will be charged

for actual costs. Any under-runs or over-runs will be reconciled at the conclusion of the project. The estimates in this report do not include tax gross-up.

The IC will interconnect with the Allegheny Power (AP) system via overhead line from a customer owned substation located approximately 0.7 miles from the new Tanny Solar switching station. The above cost estimates do not include construction of that line. Route selection, line design, rights-of-way acquisition and construction of such lines will be entirely the responsibility of the IC. It is assumed that the IC's main step up transformer will conform to the AP standard with a grounded wye on the high voltage side and a delta on the low voltage side as illustrated in the AP Facility Connection Manual:

http://www.alleghenypower.com/PowerQuality/Attachments/e1936_00.pdf.

No breakers were identified as being over their maximum interrupting rating.

AP reserves the right to review the electrical protection design and relay settings for IC facilities to ensure that the protective relaying equipment will be compatible with that installed on AP facilities. The relaying package will likely include both primary and backup protection. AP personnel must be present at the time of commissioning to inspect and witness proper function of the control scheme and related coordination. The estimated cost to perform this engineering review and field test effort is **\$5,000 in 2010 dollars**.

Note: The purchase and installation of protective relaying and associated equipment at the generation site is the responsibility of the IC and is not included in this scope of work.

It is assumed that a fiber optic interface will be used for the protection channel between the AP and IC stations. The IC will be required to install metering and telemetry equipment to provide revenue metering and real-time telemetry data to PJM. The 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. Protective relaying and metering design and installation must comply with the AP applicable standards.

Overloads and Required Reinforcements

No Generator Deliverability overloads were identified.

Other Supporting Facilities Charge

The Other Supporting Facilities Charge (OSFC) may include non-transmission facilities directly assigned and/or a general (rolled-in) facilities charge. The guidelines apply to all wholesale customers and all generators selling into or through the PJM market, regardless of capacity, not connected directly to the AP Transmission System.

The Other Supporting Facilities Charge for the W2-069 generator interconnection project has been estimated to be **\$5,400/month** in 2010 dollars. The estimate is based on an average (or rolled-in) rate for West Penn's sub-transmission system.