

Generation Interconnection Feasibility Study Report Queue Position V3-056

General

The Interconnection Customer (IC), has proposed a 50 MW energy (50 MW capacity) biomass fueled generating facility to be located in Metropolitan Court, Frederick, Maryland. The project will consist of a single steam driven turbine and generator. V3-056 was studied as a 50 MW injection into the Allegheny Power System and evaluated for compliance with reliability criteria for summer peak conditions in 2014. The current in-service date for the project is October, 2013.

Point of Interconnection (POI)

V3-056 will interconnect with the Allegheny Power (AP) system as either a tap of the Thomas Bakery – Ballenger Sewage 34.5 circuit (primary option) or as a direct connection into the existing Lime Kiln 230kV substation (secondary option).

Primary POI Option

V3-056 will interconnect with the AP system at the future Waste Disposal Authority 34.5 switching station to be constructed adjacent to the Thomas Bakery – Ballenger Sewage 34.5 circuit.

Direct Connection Requirements

Transmission Owner Scope of Direct Connection Work

The Transmission Owner's (AP) scope of work includes:

Attachment Facilities

Waste Disposal Authority 34.5kV switching station

- Construct a new 34.5kV switching station on property provided by the Interconnection Customer (IC) at no cost to Allegheny Power (AP). Note: all rights-of-way and easements must be conveyed to AP by the IC in the form of either direct ownership or a perpetual lease. The interconnection switching station (Waste Disposal Authority) will be situated adjacent to the existing AL 34.5kV subtransmission line at a point approximately 0.3 miles from Thomas Bakery Tap and 0.36 miles from Ballenger Sewage substation.
- Grade and install access roads, ground grid, structures, foundations, and yard stone for a fenced area of approximately 80' x 100'. Install 3-34.5kV breakers, 18-34.5kV hookstick disconnect switches, 1-34.5kV vertical break switch, 9-34.5kV VTs, 34.5kV station service, 34.5kV metering, arresters, CVTs, and line traps. Install a 16' x 28' metal control building, battery, SCADA, telephone service, control cables, panels, transfer trip, and associated

equipment. Install 34.5kV transfer trip facilities with communication to breakers at Lime Kiln, Ballenger Sewage, Frederick A, Waste Disposal Authority, and V3-056.

- Loop the Thomas Bakery-Ballenger Sewage 34.5kV circuit into the new station. Assume connection to the IC via overhead 34.5kV line and that switching station property and 34.5kV tap line rights-of-way will be acquired by the IC at no cost to AP.

The estimated cost to perform this work is **\$1,928,638** in 2014 dollars.

Network Upgrades

- Install 34.5kV Power Line Carrier transfer trip facilities at Ballenger Creek substation.

The estimated cost to perform this work is **\$106,651** in 2014 dollars.

- Install 34.5kV Power Line Carrier transfer trip facilities at Frederick A substation.

The estimated cost to perform this work is **\$106,651** in 2014 dollars.

- Install 34.5kV Power Line Carrier transfer trip facilities at Lime Kiln substation.

The estimated cost to perform this work is **\$106,651** in 2014 dollars.

Allegheny Power reserves the right to review the electrical protection design and relay settings for the Interconnecting Customer facilities to ensure that the protective relaying equipment will be compatible with that installed at the new switching station. The relaying package will likely include both primary and backup protection. Allegheny Power personnel must be present at the time of commissioning to witness proper function of the protection scheme and related coordination. The estimated cost to perform this engineering review and field test effort is **\$5,000 in 2014 dollars**.

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

Interconnection Customer Scope of Direct Connection Work

The IC is responsible for all construction on their side of the Point of Interconnection. IC will interconnect V3-056 with the APS system by constructing a customer owned 34.5kV circuit from their facility to the future Waste Disposal Authority 34.5 switching station. The above cost estimates do not include construction of that line or bus work. Route selection, line design, right-of-way acquisition and construction of such lines will be entirely the responsibility of the Interconnection Customer. It's assumed that the Interconnection Customer's step up transformer will conform to the AP standard with delta on the low side and grounded wye on the high side as illustrated in the AP Facility Connection Manual.

It is assumed that a fiber optic interface will be used for the protection channel between the AP and IC's station. 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 Allegheny Power Applicable Standards.

Cost and Timing Summary

While the information in this transmittal is reasonable for the scope of work defined, it should be noted however, that the cost figures are conceptual in nature at this stage, and that an engineering team has not yet 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. The cost estimates in this report **do not** include tax gross-up.

The estimated time to provide for the interconnection of this project is **18 months** after the receipt of a fully executed Interconnection Service Agreement and Interconnection Construction Service Agreement.

Network Impacts

Potential network impacts are as follows:

Generator Deliverability

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

1. The LIMEKILN-S.FREDER 34.5 kV line (from bus 92110 to bus 92173 ckt 1) loads to 102.2% (DC power flow) of its emergency rating (25.8 MVA) for the single 34.5 kV line contingency outage V3-056 TAP-BALLEN B.
2. The ROSEMONT-W.FREDER 34.5 kV line (from bus 92168 to bus 92206 ckt 1) loads to 107.8% (DC power flow) of its emergency rating (36.8 MVA) for the single 230/34.5 kV transformer contingency outage MCCAIN-01MCCAIN.
3. The KEY MALL-DETENT T 34.5 kV line (from bus 92102 to bus 92420 ckt 1) loads to 109.3% (DC power flow) of its emergency rating (36.8 MVA) for the single 34.5 kV line contingency outage V3-056 TAP-THOMAS B.
4. The V3-056 TAP-BALLEN B 34.5 kV line (from bus 92300 to bus 92416 ckt 1) loads to 154.8% (DC power flow) of its emergency rating (32.3 MVA) for the single 34.5 kV line contingency outage V3-056 TAP-THOMAS B.
5. The BALLEN A-DETENT T 34.5 kV line (from bus 92417 to bus 92420 ckt 1) loads to 130.0% (DC power flow) of its emergency rating (32.3 MVA) for the single 34.5 kV line contingency outage V3-056 TAP-THOMAS B.

Multiple Facility Contingency

*(Double Circuit Tower Line, Line with Failed Breaker and, Bus Fault contingencies for the **Full** energy output.*

None

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

Short Circuit

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’s generation)

1. To mitigate the LIMEKILN-S.FREDER 34.5 kV line overload will require the reconductor of 0.53 miles of the LIMEKILN-S.FREDER 34.5 kV line with 795 AAC and upgrade the associated terminal equipment and disconnect switches. The estimated cost to perform this work is **\$190,587** in 2014 dollars and will take **18 months** to complete following the receipt of an executed Interconnection Service Agreement and Construction Service Agreement.
2. To mitigate the ROSEMONT-W.FREDER 34.5 kV line overload will require the reconductor of 0.81 miles of the ROSEMONT-W.FREDER 34.5 kV line with 954 AAC and upgrade the associated terminal equipment and disconnect switches. The estimated cost to perform this work is **\$289,615** in 2014 dollars and will take **18 months** to complete following the receipt of an executed Interconnection Service Agreement and Construction Service Agreement.
3. To mitigate the KEY MALL-DETENT T 34.5 kV line overload will require the reconductor of 1.42 miles of the KEY MALL-DETENT T 34.5 kV line with 954 AAC and upgrade the associated terminal equipment and disconnect switches. The estimated cost to perform this work is **\$522,155** in 2014 dollars and will take **18 months** to complete following the receipt of an executed Interconnection Service Agreement and Construction Service Agreement.

4. To mitigate the V3-056 TAP-BALLEN B 34.5 kV line overload will require the installation of a second set of parallel 750 UG 0.04 miles into the 34.5 kV Ballenger bus on the V3-056 TAP-BALLEN B 34.5 kV line and upgrade the associated terminal equipment and disconnect switches. The estimated cost to perform this work is **\$63,356** in 2014 dollars and will take **18 months** to complete following the receipt of an executed Interconnection Service Agreement and Construction Service Agreement.
5. To mitigate the BALLEN A-DETENT T 34.5 kV line overload will require the installation of a second set of parallel 750 UG and reconductor 0.04 miles of the V3-056 TAP-BALLEN B 34.5 kV line with 954 AAC and upgrade the associated terminal equipment and disconnect switches. The estimated cost to perform this work is **\$66,135** in 2014 dollars and will take **18 months** to complete following the receipt of an executed Interconnection Service Agreement and Construction Service Agreement.

Contribution to Previously Identified System Reinforcements

(Overloads initially caused by prior Queue positions with additional contribution to overloading by this project.

None

Stability Analysis

Will be completed during the V3-056 System Impact Study.

Other Supporting Facility Charge

The Other Supporting Facilities Charge may include non-transmission facilities directly assigned and/or a general (rolled-in) facilities charge. The guidelines apply to all wholesale customers and to 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 V3-056 generator interconnection project has been estimated to be **\$34,500/month** in 2010 dollars. The estimate is based on an average (or rolled-in) rate for Potomac Edison Company's sub-transmission system at a total generating capability of 50 MW.

Secondary POI Option

V3-056 will interconnect with the AP transmission system as a direct connection into the existing Lime Kiln 230kV substation.

Network Impacts

Potential network impacts are as follows:

Generator Deliverability

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

None

Multiple Facility Contingency

*(Double Circuit Tower Line, Line with Failed Breaker and, Bus Fault contingencies for the **Full** energy output.*

None

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

Short Circuit

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’s generation)

None

Contribution to Previously Identified System Reinforcements

(Overloads initially caused by prior Queue positions with additional contribution to overloading by this project.

None

Stability Analysis

Will be completed during the V3-056 System Impact Study.