Generation Interconnection Request
Corder Crossing 138kV

General

The Interconnection Customer (IC) has proposed a 165 MW energy (21.45 MW capacity) wind power generating facility to be located near the boundary of Barbour, Preston, and Tucker counties in West Virginia. The project was evaluated for compliance with reliability criteria for summer peak conditions in 2013. The in-service date is December, 2012.

U4-017 will interconnect with the Allegheny Power (AP) transmission system either as a direct connection into the existing Corder Crossing 138kV substation (Option 1), or as a direct connection into the existing Denver 138kV substation (Option 2).

Option 1

Point of Interconnection

U4-017 Option 1 will interconnect with the AP transmission system at the existing Corder Crossing 138kV substation which is adjacent to the Buckhannon-Pruntytown 138kV circuit. Option 1 was studied as a 165 MW injection into the Corder Crossing 138kV substation.

Direct Connection Requirements

Transmission Owner Scope of Direct Connection Work

The Transmission Owner's (Allegheny Power) scope of work for the direct connection facility includes:

Attachment Facilities

- Corder Crossing 138kV substation: Expand the existing west fence and yard for an additional area of approximately 60' x 130'. Install one (1) 138kV breaker, three (3) 138kV switches, 138kV steel structures, one (1) 138kV dead-end structure, 138kV metering, 138kV line trap and CVT, 138kV transfer trip facilities, control cables, panels, foundations, ground grid, and associated material. The AP station interconnection will be to the developer's 138kV line.

The estimated cost to perform this work is **$1,187,000** in 2009 dollars.

Network Upgrades

- Install facilities for transfer trip at the Pruntytown 138kV substation.

The estimated cost to perform this work is **$168,100** in 2009 dollars.

- Install facilities for transfer trip at the Buckhannon 138kV substation.

The estimated cost to perform this work is **$168,100** in 2009 dollars.

Interconnection Customer Scope of Direct Connection Work

The Interconnection Customer (IC) has assumed full responsibility for the design and construction of all facilities associated with the U4-017 generating facility and the 138kV direct connection line on the IC side of the Point of Interconnection (POI). The IC will interconnect U4-017 with the AP transmission system by constructing a customer-owned 138kV line from the generating facility site to AP's Corder Crossing 138kV substation. Route selection, line design, right-of-way acquisition and construction of such lines will be entirely the responsibility of the IC. Cost estimates do not include construction of that line. It is assumed that the ICs step up transformer will conform to the AP standard of delta on the low side and grounded wye on the high side.

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

The cost estimates in this report do not include tax gross-up, land acquisition, or any network upgrades which may have been identified and required by this project.

The estimated time to provide for the interconnection of this project is **21 months** after the receipt of a signed Interconnection Service Agreement and Construction Service Agreement.

Network Impacts

Potential network impacts are as follows:

Generator Deliverability

*(Single or N-1 contingencies for the **Capacity** output portion 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 breakers were identified as being over their maximum interrupting rating.

Stability and Reactive Power Requirements

Will be performed during the Queue U4-017 System Impact Study.

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

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.

Note: Only the most severely overloaded conditions are listed below. 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 to study all overload conditions associated with the overloaded element(s) identified.

As a result of the aggregate energy resources in the area, the following potential congestion was identified:

These are not required reliability upgrades.

1. The 01BUCKHN-01NATLCN 138/138kV (APS) line (from bus 20307 to bus 20375 ckt 1) loads from 58.5% to 112.7% (DC power flow) of its emergency rating (129 MVA) for the single line contingency outage ('APS-SB-367'). This project contributes approximately 69.9 MW to the thermal congestion.

2. The 01BLACKO-01BLACKO 138/500 kV transformer (from bus 20446 to bus 20103 ckt 3) loads from 165.5% to 167.3% (DC power flow) of its emergency rating (437 MVA) for the single line contingency outage ('01BLACKO 500 - 01HATFLD 500 – 1'). This project contributes approximately 8 MW to the thermal congestion.

3. The 01LKLYNN-01LARDIN 138/138 kV line (from bus 20122 to bus 20207 ckt 1) loads from 99.9% to 105% (DC power flow) of its emergency rating (113 MVA) for the single line contingency outage ('APS-SB-94'). This project contributes approximately 5.8 MW to the thermal congestion.

4. The 01LKLYNN-01LARDIN 138/138 kV line (from bus 20122 to bus 20207 ckt 2) loads from 99.9% to 105% (DC power flow) of its emergency rating (113 MVA) for the single line contingency outage ('APS-SB-93'). This project contributes approximately 5.8 MW to the thermal congestion.

Option 2

Point of Interconnection

U4-017 Option 2 will interconnect with the AP transmission system at the existing Denver 138kV substation which is adjacent to the Pruntytown-Albright 138kV circuit. Option 2 was studied as a 165 MW injection into the Denver 138kV substation.

Direct Connection Requirements

Transmission Owner Scope of Direct Connection Work

The Transmission Owner's (Allegheny Power) scope of work for the direct connection facility includes:

Attachment Facilities

- Denver 138kV substation: Expand the existing west fence and yard for an additional area of approximately 40' x 150'. Install one (1) 138kV breaker, three (3) 138kV switches, 138kV steel structures, one (1) 138kV dead-end structure, 138kV metering, 138kV line trap and CVT, 138kV transfer trip facilities, control cables, panels, foundations, ground grid, and associated material. The AP station interconnection will be to the developer's 138kV line.

The estimated cost to perform this work is **$1,245,000** in 2009 dollars.

Network Upgrades

- Install facilities for transfer trip at the Pruntytown 138kV substation.

  The estimated cost to perform this work is **$168,100** in 2009 dollars.

- Install facilities for transfer trip at the Albright 138kV substation.

  The estimated cost to perform this work is **$168,100** in 2009 dollars.

Interconnection Customer Scope of Direct Connection Work

The Interconnection Customer (IC) has assumed full responsibility for the design and construction of all facilities associated with the U4-017 generating facility and the 138kV direct connection line on the IC side of the POI. The IC will interconnect U4-017 with the AP system by constructing a customer-owned 138kV line from the generating facility site to AP's Denver 138kV substation. Route selection, line design, right-of-way acquisition and construction of such lines will be entirely the responsibility of the IC. Cost estimates do not include construction of that line. It is assumed that the ICs step up transformer will conform to the AP standard of delta on the low side and grounded wye on the high side. It is further assumed that a fiber optic interface will be used for the protection channel between the AP and developer's 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 Allegheny Power Applicable Standards.

Cost and Timing Summary

The cost estimates in this report do not include tax gross-up, land acquisition, or any network upgrades which may have been identified and required by this project.

The estimated time to provide for the interconnection of this project is **21 months** after the receipt of a signed Interconnection Service Agreement and Construction Service Agreement.

Network Impacts

Potential network impacts are as follows:

Generator Deliverability

*(Single or N-1 contingencies for the **Capacity** output portion 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 breakers were identified as being over their maximum interrupting rating.

Stability and Reactive Power Requirements

Will be performed during the Queue U4-017 System Impact Study.

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.

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.

Note: Only the most severely overloaded conditions are listed below. 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 to study all overload conditions associated with the overloaded element(s) identified.

As a result of the aggregate energy resources in the area, the following potential congestion was identified:

These are not required reliability upgrades.

1. The GARRETT-01GARRETT 115/115 kV line (from bus 472 to bus 20470 ckt1) loads from 104.8% to 111.6% (DC power flow) of its emergency rating (125 MVA) for the single line contingency outage ('AP128_OP'). This project contributes approximately 8.5 MW to the thermal congestion.

2. The 01BLACKO-01BLACKO 138/500 kV transformer (from bus 20446 to bus 20103 ckt 3) loads from 165.5% to 170.2% (DC power flow) of its emergency rating (437 MVA) for the single line contingency outage ('01BLACKO 500 - 01HATFLD 500 – 1'). This project contributes approximately 20.2 MW to the thermal congestion.

3. The 01ALBRIG-01KINGWD 138/138 kV line (from bus 20120 to bus 20356 ckt1) loads from 97.1% to 107.8% (DC power flow) of its emergency rating (176 MVA) for the single line contingency outage ('AP128_OP'). This project contributes approximately 19 MW to the thermal congestion.

4. The 01ALBRIG-01RUTHBL 138/138 kV line (from bus 20120 to bus 20398 ckt1) loads from 106.8% to 116.5% (DC power flow) of its emergency rating (176 MVA) for the single line contingency outage ('AP128_OP'). This project contributes approximately 17 MW to the thermal congestion.

5. The 01LKLYNN-01LARDIN 138/138 kV line (from bus 20122 to bus 20207 ckt 1) loads from 99.9% to 109.8% (DC power flow) of its emergency rating (113MVA) for the single line contingency outage ('APS-SB-94'). This project contributes approximately 10MW to the thermal congestion.

6. The 01LKLYNN-01LARDIN 138/138 kV line (from bus 20122 to bus 20207 ckt 2) loads from 99.9% to 109.8% (DC power flow) of its emergency rating (113 MVA) for the single line contingency outage ('APS-SB-93'). This project contributes approximately 10 MW to the thermal congestion.

7. The 01RUTHBL-01CHEATL 138/138 kV line (from bus 20398 to bus 20802 ckt 1) loads from 104.3% to 114% (DC power flow) of its emergency rating (176 MVA) for the single line contingency outage ('APS-SB-16'). This project contributes approximately 17 MW to the thermal congestion.

8. The 01WESTVA - 01BLACKO 138/138 kV line (from bus 20518 to bus 20446 ckt 1) loads from 123.6% to 128% (DC power flow) of its emergency rating (201 MVA) for the single line contingency outage ('01BLACKO 500 - 01HATFLD 500 – 1'). This project contributes approximately 8.7 MW to the thermal congestion.

9. The N47C -01WESTVA 138/138 kV line (from bus 93380 to bus 20518 ckt 1) loads from 121.7% to 126% (DC power flow) of its emergency rating (201 MVA) for the single line contingency outage ('01BLACKO 500 - 01HATFLD 500 – 1'). This project contributes approximately 8.7 MW to the thermal congestion.