Generation Interconnection Feasibility Study Report Queue Position AC1-003

General

Interconnection Customer has proposed an ***uprate*** to prior queue projects AA2-121 and AB2-104 consisting of 2 x 1 combined cycle natural gas generation facility located at approximately 10.4 miles south of Wylie Ridge substation on the Tidd-Wylie Ridge 345 kV line in Brooke County, West Virginia. The increased capability associated with queue position AC1-003 is achieved through improved steam turbine (ST Generator) duct firing application that maximizes the utilization of existing plant equipment. In addition, this project will share the same POI and land (Location site) with prior queue positions AA2-121/AB2-104.

- AC1-003 requested capability increase of 80.0 MW Energy and 80.0 MW Capacity Rights.
- AA2-121/AB2-104 combined will have 750.0 MW Energy and 750.0 MW Capacity Rights.
- All three projects combined, i.e. AA2-121/AB2-104/AC1-003, will have a total capability (MFO) of 830.0 MW with 830.0 MW of this output being recognized by PJM as Capacity Rights.

The proposed in-service date for the AC1-003 project is 6-1-2020. Note that this is the same in-service date for all three queue projects AA2-121/AB2-104 and AC1-003. **This study does not imply a Monongahela Power Company ("Transmission Owner" or "Mon Power) to this in-service date.**

Point of Interconnection

AC1-003 will interconnect with the Mon Power transmission system through the same POI of prior projects AA2-121/AB2-104. Please refer to the single-line diagram in Appendix 2 for system configuration.

Network Impacts

The Queue Project AC1-003 was evaluated as a 80.0 MW (Capacity 80.0 MW) uprate to the AA2-121/AB2-104 projects tapping the Wylie Ridge-Tidd 345kV line in the APS area. Project AC1-003 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AC1-003 was studied with a commercial probability of 53%. Potential network impacts were as follows:

Summer Peak Analysis - 2020

Generator Deliverability

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

1. (AEP - AP) The AA2-121 TAP-01WYLIE R 345 kV line (from bus 922161 to bus 235707 ckt 1) loads from 98.64% to 101.84% (**DC power flow**) of its normal rating (1542 MVA) for the single line contingency outage of 'P12_301'. This project contributes approximately 49.37 MW to the thermal violation.

```
CONTINGENCY 'P12_301'
 OPEN BRANCH FROM BUS 242946 TO BUS 253965 CKT 1
                                / 242946 05TIDD 345 253965 15COLLIE 345 1
 END
```

2. (AEP - AP) The AA2-121 TAP-01WYLIE R 345 kV line (from bus 922161 to bus 235707 ckt 1) loads from 92.29% to 95.44% (**DC power flow**) of its normal rating (1542 MVA) for the single line contingency outage of '8971_B2'. This project contributes approximately 48.6 MW to the thermal violation.

```
CONTINGENCY '8971_B2'
 OPEN BRANCH FROM BUS 242932 TO BUS 247627 CKT 1
              / 242932 05CANTNC 345 247627 Y2-050 TAP 345 1
 END
```

Multiple Facility Contingency

(Double Circuit Tower Line, Fault with a Stuck 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):

1. (AEP - DLCO) The 05TIDD-15COLLIE 345 kV line (from bus 242946 to bus 253965 ckt 1) loads from 100.44% to 102.12% (**DC power flow**) of its normal rating (1229 MVA) for the single line contingency outage of 'B2-TIE-345-521_A'. This project contributes approximately 20.61 MW to the thermal violation.

```
CONTINGENCY 'B2-TIE-345-521_A'        /* WYLIE RIDGE - TIDD 345KV APS-AEP TIE
  DISCONNECT BRANCH FROM BUS 235707 TO BUS 922161 CKT 1
                                          /* 01WYLIE R 345 AA2-121 TAP
  END
```

2. (AEP - AEP) The Y2-050 TAP-05CANTNC 345 kV line (from bus 247627 to bus 242932 ckt 1) loads from 100.12% to 101.63% (**DC power flow**) of its emergency rating (1409 MVA) for the tower line contingency outage of 'C5-MP-138-054_A'. This project contributes approximately 21.26 MW to the thermal violation.

```
CONTINGENCY 'C5-MP-138-054_A'                 /* TIDD-WR-TIDD-COL
  DISCONNECT BRANCH FROM BUS 235707 TO BUS 922161 CKT 1
                                              /* 01WYLIE R 345 AA2-121 TAP 345
  DISCONNECT BRANCH FROM BUS 242946 TO BUS 253965 CKT 1
                                              /* 05TIDD 345 15COLLIE 345
  END
```

Steady-State Voltage Requirements: To be determined during system impact study phase.

Short Circuit: To be determined during system impact study phase.

Affected System Analysis & Mitigation

NYISO Impacts: to be determined during system impact study phase.

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

Light Load Analysis – 2020:

Not required.

System Reinforcements

Short Circuit:

To be determined during system impact study phase.

Stability and Reactive Power Requirement:

To be determined during system impact study phase.

Summer Peak Load Flow Analysis Reinforcements:

New System Reinforcements:

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

System reinforcement(s) associated with the contingencies **'P12_301'** and **'8971_B2'** are:

Reconductor transmission line and replace line risers with 954 45/7 ACSS double circuit for minimum rating 1590 MVA (SN) / 1900 MVA (STE).

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):

System reinforcements associated with 'B2-TIE-345-521_A' and 'C5-MP-138-054_A' contingencies are to be determined during the system impact study phase.

Light Load Load Flow Analysis Reinforcements:

New System Reinforcements:

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

None

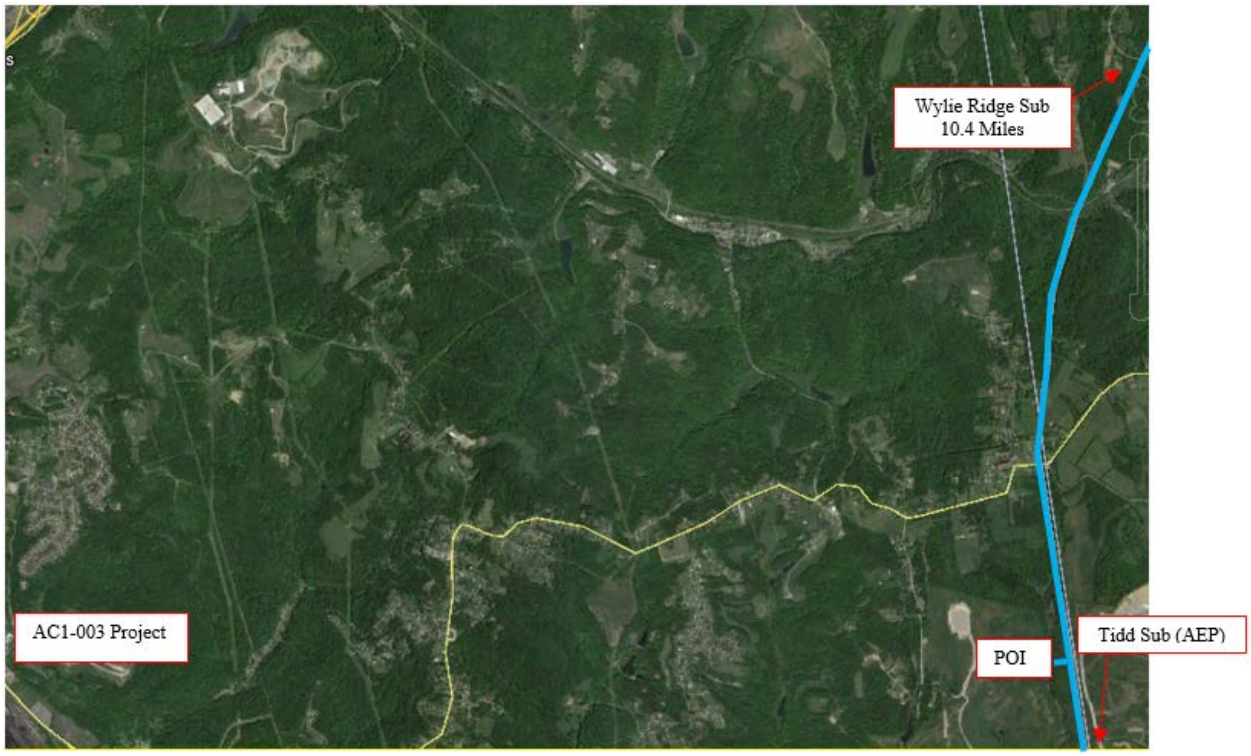
Contribution to Previously Identified System Reinforcements:

(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

Appendix 1

Facility Location
PJM Queue Position: AC1-003



Appendix 2

Interconnection One-Line Diagram
PJM Queue Position: AC1-003