Generation Interconnection Feasibility Study Report

Queue Position AB2-041

Interconnection Customer (or "IC"), has proposed a wind generating facility located in Somerset County, PA. The installed facilities will have a capability of 20 MW with 3.7 MW of this output being recognized by PJM as capacity. Note that this project is an increase to the Interconnection Customer's AB1-038 project, which will share the same property and connection point. The AB1-038 project will have a capability of 200 MW with 37.2 MW being recognized as capacity. The total capability of the combined 200 and 20 projects will be 220 MW with 40.9 MW being recognized by PJM as capacity. The proposed in-service date for the AB2-041 project is December 15, 2017. **This study does not imply a Potomac Edison commitment to this in-service date.**

Point of Interconnection

AB2-041 will interconnect with the Potomac Edison transmission system through an existing POI from previous projects U2-073/Z2-013 and AB2-038. This POI is a direct injection into Frostburg Substation 138 kV bus. Refer to Appendix 2 for one-line diagram.

Network Impacts

The Queue Project AB2-041 was evaluated as a 20.0 MW (Capacity 3.7 MW) uprate to the U2-073/Z2-013 and AB2-038 projects at the Big Savage 34.5kV substation in the APS area. Project AB2-041 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AB2-041 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)

None

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)

None

Steady-State Voltage Requirements

To be determined at later study stages.

Short Circuit

None

Affected System Analysis & Mitigation

NYISO Impacts:

NYISO Impacts to be determined during later study phases (as applicable).

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.

1. (AP - AP) The 01HAZELT-01 106 J 138 kV line (from bus 235297 to bus 235305 ckt 1) loads from **104.68% to 111.11%** (DC power flow) of its emergency rating (**311 MVA**) for the single line contingency outage of 'B2-PE-138-044'. This project contributes approximately **20.0 MW** to the thermal violation.

```
CONTINGENCY
'B2-PE-138-044' /* FROSTBURG - RIDGELEY HAR3 138KV
  DISCONNECT BRANCH FROM BUS 235468 TO BUS 235504 CKT 1 /* 01FROSTB 138 01RIDGLY 138
  END
```

2. (AP - AP) The 01BLACKO 500/138 kV transformer (from bus 235446 to bus 235103 ckt 3) loads from **106.24% to 107.5%** (DC power flow) of its emergency rating (**549 MVA**) for the single line contingency outage of 'B2-WP-500-006'. This project contributes approximately **6.92 MW** to the thermal violation.

```
CONTINGENCY
'B2-WP-500-006' /* BLACK OAK - HATFIELD 500KV LINE WITHOUT SPS
  DISCONNECT BRANCH FROM BUS 235108 TO BUS 235103 CKT 1 /* 01HATFLD 500 01BLACKO 500
  END
```

3. (AP - AP) The 01FROSTB-01RIDGLY 138 kV line (from bus 235468 to bus 235504 ckt 1) loads from **107.53% to 114.07%** (DC power flow) of its emergency rating (**306 MVA**) for the single line contingency outage of 'B2-WP-138-071'. This project contributes approximately **20.0 MW** to the thermal violation.

```
CONTINGENCY
'B2-WP-138-071' /* ALBRIGHT - HAZELTON - LAKE LYNN 138KV (BRANDONVILLE JUNCTION)
  DISCONNECT BRANCH FROM BUS 235122 TO BUS 235305 CKT 1 /* 01LKLYNN 138 01 106 J 138
  DISCONNECT BRANCH FROM BUS 235305 TO BUS 235297 CKT 1 /* 01 106 J 138 01HAZELT 138
  DISCONNECT BRANCH FROM BUS 235305 TO BUS 235120 CKT 1 /* 01 106 J 138 01ALBRIG 138
  DISCONNECT BUS 235297                                 /* 01HAZELT 138
  DISCONNECT BUS 235305                                 /* 01 106 J 138
  END
```

4. (AP - AP) The 01GARRET-01ALBRIG 138 kV line (from bus 235469 to bus 235120 ckt 1) loads from **147.73% to 149.42%** (DC power flow) of its emergency rating (**191 MVA**) for the single line contingency outage of 'B2-PN-115-068'. This project contributes approximately **3.23 MW** to the thermal violation.

```
CONTINGENCY
'B2-PN-115-068' /* ROCKWOOD - SOMERSET 115KV
  DISCONNECT BRANCH FROM BUS 200744 TO BUS 200746 CKT 1 /* 26SOMERST 115 26ROCKWOOD 115
  DISCONNECT BRANCH FROM BUS 200746 TO BUS 200773 CKT 1 /* 26ROCKWOOD 115 26ROCKWOOD 23
  END
```

5. (AP - AP) The AA1-047 TAP-01HAZELT 138 kV line (from bus 921081 to bus 235297 ckt 1) loads from **105.8% to 112.23%** (DC power flow) of its emergency rating (**311 MVA**) for the single line contingency outage of 'B2-PE-138-044'. This project contributes approximately **20.0 MW** to the thermal violation.

```
CONTINGENCY
'B2-PE-138-044' /* FROSTBURG - RIDGELEY HAR3 138KV
  DISCONNECT BRANCH FROM BUS 235468 TO BUS 235504 CKT 1 /* 01FROSTB 138 01RIDGLY 138
  END
```

Light Load Analysis - 2020

Light Load Studies to be conducted during later study phases (as required by PJM Manual 14B).

System Reinforcements

Short Circuit

None

Stability and Reactive Power Requirement

To be determined at later study stages.

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)

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

Light Load 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)

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