Generation Interconnection Feasibility Study Report AD1-085 North Shenandoah – Stanley 34.5 kV

General

The Interconnection Customer has proposed a new solar generation facility located on Dam Acres Road in Stanley, Page County, Virginia. The requested Maximum Facility Output is 20 MWs with 12.3 MW being recognized by PJM as Capacity Interconnection Rights (CIR). The proposed in-service date for this project is December 31, 2020. **This study does not imply a Potomac Edison ("Transmission Owner") commitment to this in-service date.**

Point of Interconnection ("POI")

This project will interconnect with the Potomac Edison distribution system by either one of the following interconnection options:

Option #1 POI or Primary Point of Interconnection: ***North Shenandoah 138 kV Substation via North Shenandoah – Stanley 34.5 kV Line***

AD1-085 will tap the North Shenandoah – Stanley 34.5 distribution feeder by utilizing a single recloser tap connection at a point located approximately 3.82 miles from North Shenandoah substation and 3.65 miles from Stanley substation. North Shenandoah and Stanley substations are owned by Shenandoah Valley Electric Cooperative ("SVEC") and FirstEnergy owns the 138 kV high side of North Shenandoah substation. Therefore, AD1-085 Point of Interconnection (POI) will be located at the 138 kV high side of North Shenandoah substation. Please refer to Appendix 2 for one-line diagram of system configuration. The cost associated with the primary POI interconnection is detailed in the costs summary section of this report.

Option #2 POI or Secondary Point of Interconnection: New substation on North Shenandoah – Page 138 kV System

AD1-085 will tap the North Shenandoah – Page 138 kV transmission line at a point located approximately 4.6 miles from North Shenandoah substation and 18.4 miles from Page substation. A new three breaker ring bus station will be built adjacent to the transmission line (within one span) at Interconnection Customer's premises and the Point of Interconnection will be located at this substation's exist side to solar plant. Please refer to Appendix 4 for one-line diagram of system configuration. The cost associated with the secondary POI interconnection is not shown in this report.

Network Impacts

Option 1 POI or Primary Point of Interconnection:

The Queue Project AD1-085 was evaluated as a 20.0 MW (Capacity 12.3 MW) injection at the North Shenandoah 138kV substation in the APS area. Project AD1-085 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AD1-085 was studied with a commercial probability of 53%. Potential network impacts were as follows:

Summer Peak Analysis - 2021

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 during system impact study phase

Short Circuit

No short circuit impacts

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.

None

Light Load Analysis - 2021

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 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)

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

Option 2 POI or Secondary Point of Interconnection:

The Queue Project AD1-085 was evaluated as a 20.0 MW (Capacity 12.3 MW) injection tapping North Shenandoah to Page 138kV line in the APS area. Project AD1-085 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AD1-085 was studied with a commercial probability of 53%. Potential network impacts were as follows:

Summer Peak Analysis - 2021

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 during system impact study phase

Short Circuit

No short circuit impacts

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.
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None

Light Load Analysis - 2021

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 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)

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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)

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