PJM Generator Interconnection Request
Queue #U2-052
S. Bluefield-Wythe (Wolf Creek) 69kV
Feasibility Study

526786

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Preface

The intent of the feasibility study is to determine a plan, with ballpark cost and construction time estimates, to connect the subject generation to the PJM network at a location specified by the Interconnection Customer. The Interconnection Customer may request the interconnection of generation as a capacity resource or as an energy-only resource. As a requirement for interconnection, the Interconnection Customer may be responsible for the cost of constructing: (1) Direct Connections, which are new facilities and/or facilities upgrades needed to connect the generator to the PJM network, and (2) Network Upgrades, which are facility additions, or upgrades to existing facilities, that are needed to maintain the reliability of the PJM system.

In some instances a generator interconnection may not be responsible for 100% of the identified network upgrade cost because other transmission network uses, e.g. another generation interconnection, may also contribute to the need for the same network reinforcement. The possibility of sharing the reinforcement costs with other projects may be identified in the feasibility study, but the actual allocation will be deferred until the impact study is performed.

The Feasibility Study estimates do not include the feasibility, cost, or time required to obtain property rights and permits for construction of the required facilities. The project developer is responsible for the right of way, real estate, and construction permit issues. For properties currently owned by Transmission Owners,

U2-052 Bluefield-Wythe (Wolf Creek) 69kV Feasibility Study Report

General

The Interconnection Customer (IC) proposes to install PJM Project #U2-052, an 80 MW generating facility comprised of 54 1.5 MW GE wind turbine generators, connecting to the American Electric Power (AEP) Transmission System. 10.4 MW of the facilities output has been requested as a Capacity Resource. The proposed location of the generating facilities and switching station is in Bland County, Virginia (See Exhibit 1). The projected in-service date is scheduled for December 2011.

The connection options included in this report propose connecting the IC facility at the Bland 69 kV station (Option #1) or to the Atkins-Wythe 138 kV line (Option #2). Diagrams of these options can be found near the end of this report.

IC has been informed that AEP has an agreement with the Forest Service concerning South Bluefield-Bland-Wythe 69 kV line which will be removed from its current location on National Forest lands on Rich Mountain. PJM will allow IC to connect to the circuit and include a provision in the agreements that the interconnection customer would be responsible for maintaining their interconnection once AEP takes action to remove the circuits in question.

Attachment Facilities

Option #1 – Bland 69 kV

The proposed generation project is to be directly connected to American Electric Power (AEP) Bland 69 kV Station. For the Feasibility Study analysis the primary interconnection will assume the South Bluefield-Wythe 69kV line will remain in service. However, AEP has prior agreements to remove this line in the relatively near future. Future plans to serve the load at Bland station when the 69 kV line is removed will **not** include the IPP connection. The connection to IC will be removed and a new interconnection will need to be acquired.

The Transmission Provider construction scope includes:
Bland Station:

- Add three 69 kV breakers and one circuit switcher with associated line relaying, controls and customer metering facilities for the IC generating Station (See Option #1).

Estimated Cost* **$ 2,000,000**

South Bluefield Station:

- Replace line relaying on South Bluefield to Bland 69 kV line

Estimated Cost* **$ 300,000**

Wythe Station:

- Replace line relaying on Wythe to Bland 69 kV line

Estimated Cost* $ 300,000

Total Estimated Direct Interconnection Cost* $ 2,600,000

*The estimates are based in 2008 dollars and preliminary in nature, as they were determined without detailed engineering and design studies. Final estimates will require detailed engineering analysis, including on-site review and investigation. It will take a minimum of twelve months after obtaining the authorization to design and construct the facilities as outlined above.

Option #2 – Atkins-Wythe 138 kV line

The proposed generation project is to be directly connected to American Electric Power (AEP) On the Atkins-Wythe 138 kV line.

The Transmission Provider construction scope includes:
New Station:

- Construction of a new switching station connecting to the Atkins – Wythe 138 kV circuit, including three (3) 138 kV circuit breakers, relays, 138 kV metering, SCADA, and associated equipment.
  Estimated Cost (2008 Dollars)*: **$4,500,000**

Atkins Station:

- Replace line relaying on Wythe to Atkins 138 kV line
  Estimated Cost (2008 Dollars)*:**$300,000**

Wythe Station:

- Replace line relaying on Atkins to Wythe 138 kV line
  Estimated Cost (2008 Dollars)*:**$300,000**

Total Estimated Direct Interconnection Cost* $ 5,100,000

* The estimates are based in 2008 dollars and preliminary in nature, as they were determined without detailed engineering and design studies. Final estimates will require detailed engineering analysis, including on-site review and investigation. It will take a minimum of twelve months after obtaining the authorization to design and construct the facilities as outlined above.

Local AEP Impacts

The impact of the proposed generating facility on the AEP System was assessed for adherence with applicable reliability criteria. AEP planning criteria require that the transmission system meet single contingency performance criteria in accordance with the AEP FERC Form 715.

Therefore, this set of criteria was used to assess the impact of the proposed facility on the AEP System. This project was studied as an 80 MW net energy injection consistent with the interconnection application. The results are summarized below.

Option #1 – Bland 69 kV

Limitations for Category A Conditions (2012 Summer Conditions)

- No problems identified.

Limitations for Category B Conditions (2012 Summer Conditions)

- No problems identified.

Short Circuit Analysis

- No problems identified.

Stability Analysis

- Stability studies were not performed as part of this Feasibility Study and are not normally performed as part of a Facility Study effort. The stability assessments are part of the System Impact Study. Based upon the results of this future System Impact Study, the extent of system upgrades could change and the associated costs could be significantly different.

Local/Network Upgrades

- None required

Contributions to Previously Identified Local/Network Overloadss

None.

Contribution to Previously identified Local Network Upgrades

None

Option #2 – Atkins-Wythe 138 kV line

Limitations for Category A Conditions (2012 Summer Conditions)

- No problems identified.

Limitations for Category B Conditions (2012 Summer Conditions)

- No problems identified.

Short Circuit Analysis

- No problems identified.

Stability Analysis

- Stability studies were not performed as part of this Feasibility Study and are not normally performed as part of a Facility Study effort. The stability assessments are part of the System Impact Study. Based upon the results of this future System Impact Study, the extent of system upgrades could change and the associated costs could be significantly different.

Local/Network Upgrades

- None required

Contributions to Previously Identified Local/Network Overloadss

None.

Contribution to Previously identified Local Network Upgrades

None

Reactive Requirements

PJM requires a power factor correction to 95% lead/lag at the point of interconnection for wind generating facilities. It is expected that the IC will adhere to this standard.

Network Impacts

The queue project U2-052 was studied as an 80MW (10.4MW of capacity) injection into the AEP. The project was modeled as two separate options, each with its own point of interconnection. U2-052 was evaluated for compliance with reliability criteria for summer peak conditions in 2012. Potential network impacts were as follows:

Option #1 – Bland 69 kV

Generator Deliverability

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

No problems identified.

Multiple Facility Contingency

(Double Circuit Tower Line, Line with Failed Breaker and Bus Fault contingencies for the full energy output)

No problems identified

Short Circuit

(Summary form of Cost allocation for breakers will be inserted here if any)

No problems identified.

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)

No problems identified except for the local network problems identified above.

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)
(Summary form of Cost allocation for transmission lines and transformers will be inserted here if any)

None

Option #2 – Atkins-Wythe 138 kV line

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

No problems identified.

Multiple Facility Contingency
(Double Circuit Tower Line, Line with Failed Breaker and Bus Fault contingencies for the full energy output)

No problems identified

Short Circuit
(Summary form of Cost allocation for breakers will be inserted here if any)

No problems identified.

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)

No problems identified except for the local network problems identified above.

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)
(Summary form of Cost allocation for transmission lines and transformers will be inserted here if any)

None

MISO Impacts
Any impacts on the MISO transmission system will be identified in the Impact Study.

Alternate #1: Connection to Bland 69kV Station.

Option #1: Connection to Bland 69kV Station.

Alternate #2: Connection to the Adkins – Wythe 138kV Line

Option #2: **Connection to the Adkins – Wythe 138kV Line**