Generation Interconnection Feasibility Study Queue Position #S124

General

The Interconnection Customer (IC) has proposed a 41MW Hydropower generating facility to be installed in Cumberland WV, at the New Cumberland Locks and Dam in the city of New Martinsville WV. The IC will interconnect with Allegheny Power (AP) at the new Rockydale 138kV interconnection Station or at the existing Wylie Ridge 138kV Station. The generating facility will consist of two 25 MVA turbine-generators. The proposed in-service date for the project is September 2010.

Option 1:
The project will be connected to a new Allegheny Power Rockydale 138 kV switching station as depicted in Attachment No. 1.

Option 2:
The project will be connected to the existing Allegheny Power Wylie Ridge 138 kV substation as depicted in Attachment No. 2.

Attachment Facilities Option 1

Point of Interconnection: New AP Rockydale switching station on the Wylie Ridge (AP) – Arroyo (AP) 138kV line section.

Attachment Facilities Option 2

Point of Interconnection: Existing AP Wylie Ridge 138kV substation using existing open location.

Required reinforcements Options 1 & 2

- No reinforcements are required for this project.

Estimated Cost

Attachment Facilities for Option 1

- **Rockydale SS** - Construct a new 138 kV switching station on property to be furnished by the Developer to provide a service point for a proposed generation facility (New Cumberland Hydro) which will be located in the Weirton Service Center territory. This new switching station (Rockydale) will be situated adjacent to the existing Wylie Ridge - Arroyo 138 kV transmission line at a point approximately 6.5 miles from the Wylie Ridge Substation. The station will be arranged in a ring bus configuration. Major equipment in the new station will include three line dead-end structures, three 138kV circuit breakers, seven 138kV air switches and 138kV Metering Equipment. The station will also include a control building, which will house all protective relaying, metering and SCADA RTU communications equipment required to accommodate the electrical facilities. The site and all permits to be furnished by the IC. The developer's station is approximately 0.25 miles from the AP station and interconnection is assumed to be by overhead line. Site and access road grading to be done by AP. Revenue metering will be located on the feed to the generator.

  Estimated Cost: $2,243,000 in 2010 dollars

- **138kV Line** – Acquire ROW as needed and install new line facilities required to loop the Wylie Ridge-Arroyo 138kV transmission line into the proposed new Rockydale 138kV switching station for the proposed interconnection. It is assumed that the developer will provide ROW easement at no cost to AP.

  Estimated Cost: $156,000 in 2010 dollars

Attachment Facilities for Option 2

- Extend the 138kV main bus and complete the 138kV cross bus to provide a terminal for the proposed 138kV line. Major equipment to include a 138kV deadend structure, two 138kV breakers, four 138kV switches, three metering units, two CVT's and two line traps.

Estimated Cost: $1,147,000 in 2010 dollars

COST AND TIMING SUMMARY

The estimates in this report do not include tax gross-up.

Note that the figures above do not include construction of the line required to interconnect the customer's proposed new generating facility with the new Allegheny Power Rockydale switching station or existing Wylie Ridge Substation. Route selection, line design, right-of-way acquisition and construction of such lines will be entirely the responsibility of the Interconnection Customer. It also does not include the cost of the Network Upgrades which have been identified as required by this project

The estimated time to provide for the interconnection of this project is **32 months** after the receipt of a signed Interconnection Service Agreement and Interconnection Construction Service Agreement.

While the information in this transmittal is reasonable for the scope of work defined, it should, however, be noted that the cost figures are conceptual in nature at this stage, as an engineering team has not been assigned to the project. Obviously, any change to the scope of work will require that the estimates be revisited. The costs are a best estimate, but the developer will be charged for actual costs. Any under-runs or over-runs will be reconciled at the conclusion of the project.

Summary of estimated costs for Option 1

1	Attachment Facilities	$ 2,399,000
2	Network Upgrades	$ 0
3	Engineering and field test relay installations	$5,000
4	Area relay coordination study	$5,000
	Total	$ 2,409,000

Summary of estimated costs for Option 2

1	Attachment Facilities	$ 1,147,000
2	Network Upgrades	$ 0
3	Engineering and field test relay installations at customer substation	$5,000
4	Area relay coordination study	$5,000
	Total	1,157,000

Network Impacts Option 1

Queue Position **#S124 option 1 was studied as a total injection of 40 MW** into a loop of AP's Wylie Ridge-Arroyo 138 kV circuit. Project #S124, option 1 was evaluated for compliance with reliability criteria for summer peak conditions in 2012. There were no potential network impacts found in this study.

Generator Deliverability* Option 1

(No contingencies, Single or N-1 contingencies for the full energy output)

No base case overloads were identified.

Single Contingency Conditions

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

No overloads due to single contingency events were identified.

Multiple Contingency Conditions

(Double Circuit Tower Line contingencies only for the full energy output. Stuck breaker and bus fault contingencies will be performed for the Impact Study)

No overloads due to multiple contingency events were identified.

Network Impacts Option 2

The **#S124 option 2 project was studied as a total injection of 40 MW** from AP's Wylie Ridge 138kV substation. Project #S124, option 2 was evaluated for compliance with reliability criteria for summer peak conditions in 2012. Potential network impacts were as follows:

Generator Deliverability* Option 2

(No contingencies, Single or N-1 contingencies for the full energy output)

No base case overloads were identified.

Single Contingency Conditions

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

No overloads due to single contingency events were identified.

Multiple Contingency Conditions

(Double Circuit Tower Line contingencies only for the full energy output. Stuck breaker and bus fault contingencies will be performed for the Impact Study)

No overloads due to multiple contingency events were 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)

None

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

Short Circuit

Option 1 & 2

No breakers were identified as being over their maximum interrupting rating.

Listed below are the positive and zero sequence source equivalent impedance at the proposed Rockydale 138 kV site with the GSU and generators OPEN option 1.

Positive: (0.00384+j0.02482)
Zero: (0.01043+j0.04608)

Listed below are the positive and zero sequence source equivalent impedance at the Wylie Ridge 138 kV site with the GSU and generators OPEN option 2.

Positive: (0.00065+j0.00986)
Zero: (0.00186+j0.01353)

While we can't mandate that our personnel install protective relaying and communications equipment at the generator site, Allegheny Power has responsibility for designing the protection scheme and providing specifications for all relays to be employed on the interconnection breaker terminal at the generation site to assure that the protective relaying equipment will be compatible with that installed on the interconnection breaker terminal at the new switching station. The relaying package will

likely include both primary and backup protection. Allegheny Power is also responsible for testing and calibrating all relays and performing all tests to assure that relaying at the generator site is properly installed and functional. The estimated total cost of this engineering and field test effort is **$5,000 in 2010 dollars**.

Note: Purchase and installation of protective relaying and associated equipment at the generation site is not included in this scope of work. This phase of work is the responsibility of the customer.

The estimated cost for Controls Engineering to complete a coordination review of the area, develop new relay settings, and implement the required changes is approximately **$5,000 in 2010 dollars**.