PJM Generator Interconnection Request
Queue #V4-059
Pine Creek-Logan Springs 138kV
Feasibility Study Report

April 2010
#591358

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,

V4-059 Pine Creek-Logan Springs 138kV Feasibility Study

General

The interconnection customer (IC) has proposed installing a 20 MW wood (biomass) fuel project at the Redevelopment Authority, Wood Products Industyrial Park in Holder, Mingo County, West Virginia. The project has the capability to be ecxpanded to 60MW. The project will be connected to an expanded Pine Creek 138kV station. The in-service date for the project is December 31, 2011. Backfeed will be required by June 30, 2011.

Direct Connection

Attachment Facilities will consist of expanding AEP's Pine Creek Station to include a two string breaker and a half arrangement (utilizing only 4 breakers) to accommodate the customer's generation facilities, approximately 1 mile away. AEP's new station upgrades include building a new four breaker 138kV bus, installing four new 138kV breakers, 138kV metering, and a new 1.8 mile 138kV line between Pine Creek Station the Logan – Sprigg #2 line. See Exhibits 1, 2, 3 and 4. AEP will retain ownership of the proposed station facilities. The IC will be responsible for all costs associated with this construction, as well as facilities upgrades associated with connecting the 20 MW of generation to the AEP system.

In addition, right-of-way and property purchase costs for this project have been included in the estimates below. Note that the customer owned station facilities are not included in the cost estimate; these are the responsibility of the IC.

The AEP construction scope for the attachment facilities:

- Expansion of Pine Creek Station (connected to the 138kV Pine Creek Tap), which includes 4 – 138kV circuit breakers and associated bus work, 138kV line relaying at Pine Creek Station, 138kV remote end relaying at Logan Station, 138kV remote end relaying at Sprigg Station, 138kV metering, communication equipment, a control house, and associated equipment.
  Estimated Cost (2009 Dollars)*: **$6,265,300***

- Transmission costs associated with building a new 1.8 mile 138kV line from Pine Creek Station to the Pine Creek Tap (Logan – Sprigg #2) line include:
  Estimated Cost (2009 Dollars)*: **$2,518,000***

*Estimates are intended to be preliminary in nature, as they were determined without the benefit of detailed engineering studies. Final estimates will require an on-site review and coordination to determine final construction requirements. The Pine Creek Station work outlined above can be completed by 12/31/2011 provided we obtain the necessary

agreements in a timely fashion. The 138kV line work may take longer to complete but the customers generation facility can still operate during this time.

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 double 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 a 20 MW net energy injection consistent with the interconnection application. The interconnection project was studied at full capacity. The results are summarized below.

Normal System (2012 Winter Conditions)

- No problems identified.

Single Contingency (2012 Winter Conditions)

- No problems identified.

Double Contingency (2012 Winter Conditions)

- No problems identified.

Short Circuit Analysis

- No problems identified.

Local/Network Upgrades

- No Local or Network Upgrades are needed.

Reactive Requirements

- None.

Network Impacts

The queue V4-059 project was studied as a 20 MW capacity injection into AEP's system tapping Pine Creek – Logan 138kV line. The project was studied on a combined feasibility-impact basis which utilizes an AC analysis, and incorporates all contingency types. Project V4-059 was evaluated for compliance with reliability criteria for summer peak conditions in 2014. Potential network impacts were as follows:

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

Stability

Not required because the project is less than 30 MW.

System Reinforcements

None.

Potential Congestion due to Local Energy Deliverability

(PJM also studied the delivery of the energy portion of the surrounding generation. Any potential 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 Transmission Interconnection Request. Note: Only the most severely overloaded conditions are listed below. There is no guarantee of full deliverability for this project by fixing only the conditions listed in this section. With a Transmission Interconnection Request, a subsequent analysis will be performed which analyzes all overload conditions associated with the identified overloaded element(s). As a result of the aggregate energy resources in the area, the following violations were identified:

None

Exhibit 1: Area map of the proposed facilities

Exhibit 2: Approximate interconnection location of the proposed facilities

Exhibit 3: Simplified diagram of the existing facilities

Exhibit 4: Proposed modifications to existing facilities

Additional Assumptions

- IC will build and maintain the 138kV line from their generation facility to AEP's Pine Creek Station.
- The IC can operate their generator on a single 138kV line until the new 138kV line from Pine Creek Tap to Pine Creek Station can be built.
- This estimate assumes the total fault current seen at Pine Creek Station will not exceed 20kA; if the customer expects the additional future generators to exceed this amount, AEP will have to modify the protection scheme (slightly higher cost).
- This estimate was based on site soil conditions being relatively free of rock and shale. Station site development costs would increase significantly if rock and shale were found to be present.
- The land owner for the line and station has verbally agreed to a cost of $10,000/acre.