AEP Portion of
Facilities Study Report
For
Physical Interconnection of
PJM Generation Interconnection Request
Project ID AH1-535

"Nagel - Cane River 230 kV"

Introduction

This Facilities Study has been prepared in accordance with the PJM Open Access Transmission Tariff Part VII, and, if applicable, the Application and Studies Agreement between the Project Developer and PJM Interconnection, LLC (PJM or Transmission Provider (TP)). The Transmission Owner (TO) is Appalachian Power Company to be abbreviated in the remainder of this report as APCO.

This Facility Study was performed to satisfy the Phase 2 Facility Study requirement of the PJM Tariff. The Facility Study is intended to provide scope, cost and schedule estimates for the project as currently defined and approved for Phase 2 study. In the event project changes are made during DP2 that impact this report, updates will be provided as part of the Phase 3 report. Following execution of the project's final agreement, this report will not be updated to account for other changes made as part of the agreements modification clause and instead the scope change process will be followed.

A. Transmission Owner Facilities Study Summary

1. PROJECT DESCRIPTION

The Project Developer (PD) has proposed a Hybrid Generating Facility located in Hawkins County, TN with the designated PJM Project ID AH1-535. The installed facilities for AH1-535 will have a total Maximum Facility Output (MFO) of 100 MW with 40MW of this output being recognized by PJM as Capacity.

2. POINT OF INTERCONNECTION (POI)

The Generating Facility will interconnect with the American Electric Power (AEP) transmission system via a newly constructed, APCO owned, 230 kV breaker and a half substation (initially populated with 3 breakers and operated as a ring bus) (name TBD), tapping the CANE RIVER - NAGEL 230 kV line, approximately 51.36 miles from CANE RIVER and 4.84 miles from NAGEL.

The construction of the new interconnection substation will result in the splitting of the existing CANE RIVER – NAGEL 230 kV into two lines on the transmission system.

The proposed generation interconnection is shown on the single line diagram in Attachment #1.

3. POINT OF CHANGE IN OWNERSHIP

The Point of Change in Ownership (PCO) will be located at the first dead-end structure in the generation lead circuit outside of the proposed AH1-535 230 kV Station fence. APCO will own the span from the proposed AH1-535 230 kV Station to the APCO constructed and owned dead-end PCO structure, including the jumpers. The Project Developer will own the other span connecting to the PCO structure, along with the remainder of the 230 kV generation lead circuit transmission line and associated structures back to the AH1-535 generation collector station.

4. SCOPE OF PROJECT DEVELOPER INTERCONNECTION FACILITIES

The Project Developer will design, build, own, operate, and maintain the Project Developer Interconnection Facilities on the Project Developer's side of the Point of Change in Ownership (PCO). This includes, but is not limited to:

- Circuit breakers and associated equipment located between the high side of the MPT(s) or GSU(s) and the Point of Change in Ownership
- Generator lead line from the Generating Facility to the Point of Change in Ownership
- Relay and protective equipment, telecommunications equipment, and Supervisory Control and Data Acquisition (SCADA) to comply with the TO's Applicable Technical Requirements and Standards

B. Transmission Owner Facilities Study Results

The following is a description of the planned Transmission Owner facilities for the physical interconnection of the proposed AH1-535 project to APCO transmission system. These facilities shall be designed according to APCO Applicable Technical Requirements and Standards. Once built, APCO will own, operate, and maintain these Facilities.

1. TRANSMISSION OWNER INTERCONNECTION FACILITIES

A 230 kV dead-end structure and foundation outside the fence of the Interconnection Substation, to terminate the Project Developer's generator lead line.

Line conductor from the dead-end structure to the bus position in the switchyard of the interconnection substation.

The APCO Interconnection Facilities will include but are not limited to the following:

- Installation of one (1) new steel, 120', single circuit, single pole dead end structure on a concrete pier foundation with an anchor bolt cage and one span of double bundle ACSR 954 (Cardinal) transmission line conductor with 7#8 Alumoweld shield wire for the generation lead circuit extending from the AH1-535 New Station 345 kV Station.

2. STAND ALONE NETWORK UPGRADES

A new breaker and a half station (initially populated with 3 breakers and operated as a ring bus), AH1-535 New Station (name TBD) 230 kV, will be constructed along the CANE RIVER - NAGEL 230 kV transmission line to interconnect the project with the APCO transmission system.

Installation of (3) 345KV RCVTs with (3) single-phase 345KV CCVT structures, foundations, and adapter steel. Installation of two 2 wavetraps. Appalachian Power Company will construct a new 345 kV breaker and a half station, to be operated as a three (3) circuit breaker ring bus, initially expandable to six (6) circuit breakers. This typical arrangement is planned to be designed to accommodate 5000A of continuous current. Major Equipment Installation of three (3) single phase CCVTs on the line exit to the generation lead circuit. Removal of four 4 existing coupling capacitor voltage transformer at the NAGEL 230 kV Station. 2 mile of gravel access road. Installation of two (2) Carrier Protection panels at the AH1-535 New Station 345 kV Station. Appalachian Power Company will transition existing OPGW fiber-optic shield wire from the cut-in dead ends into the AH1-535 New Station 230 kV Station. Appalachian Power Company will install 1 mile of 144 count all dielectric self supporting (ADSS) fiber-optic cable. Appalachian Power Company will install 1 mile of 144 count all dielectric loose tube (ADLT) underground fiber-optic cable. Appalachian Power Company will install one (1) new 8340 router at the AH1-535 New Station 230 kV Station.

3. NETWORK UPGRADES

CANE RIVER – NAGEL 230 kV line will be cut and looped into the new interconnection substation.

3.1. NAGEL 230kV

Installation of one 1 breaker control at the NAGEL 230 kV Station. Installation of DCB Line Protection at the NAGEL 230 kV Station. Appalachian Power Company will review and revise (as needed) the protective relay settings at the NAGEL 230 kV Station.

4. OTHER SCOPE OF WORK

- Installation of three (3) standard revenue metering packages, including three (3) single phase current transformers (CT), three (3) single phase coupling capacitor voltage transformers (CCVT), associated structures and foundations, one (1) ethernet switch, and one (1) DICM-installed metering panel, for the generation lead circuit at the AH1-535 New Station 345 kV Station.

5. MILESTONE SCHEDULES FOR COMPLETION OF AEP WORK

5.1. STANDARD OPTION

Facilities outlined in this report are estimated to take approximately 42 months to be functionally complete. This timeline begins at the PJM construction project kickoff meeting, after execution of the Generation Interconnection Agreement. This schedule is impacted by the timeline for procurement and installation of long lead items, the ability to obtain outages to construct and test the proposed facilities.

Activity	Start Month	Finish Month
Agreement Period*	1	2
Engineering	3	15
Procurement	4	40
Construction	19	42

***Day 1 will be determined at the PJM construction project kick off meeting.**

Note - Scheduled Outages are contingent upon outage availability. Longer duration outages are not available during peak load periods.

The above schedule is based on typical AEP construction timelines, long lead material availability, and common outage constraints which are subject to change during the tariff defined Final Agreement Negotiation Phase.

5.2. OPTION TO BUILD

Facilities outlined in this report are estimated to take approximately 42 months to be functionally complete. This timeline begins at the PJM construction project kickoff meeting, after execution of the Generation Interconnection Agreement. This schedule is impacted by the timeline for procurement and installation of long lead items, the ability to obtain outages to construct and test the proposed facilities.

Activity	Start Month	Finish Month

Agreement Period*	1	2
Engineering	3	15
Procurement	4	40
Construction	19	42

***Day 1 will be determined at the PJM construction project kick off meeting.**

Note - Scheduled Outages are contingent upon outage availability. Longer duration outages are not available during peak load periods.

The above schedule is based on typical AEP construction timelines, long lead material availability, and common outage constraints which are subject to change during the tariff defined Final Agreement Negotiation Phase.

6. ASSUMPTIONS IN DEVELOPING SCOPE/COST/SCHEDULE

Note - Any materials purchased, or design decisions made by the Project Developer (relative to any facilities to be owned by AEP) prior to coordination with and approval by the executing AEP team (pursuant to an Engineering and Procurement or Generation Interconnection Agreement) are at the developer's risk and may not meet the specifications required for interconnection with the AEP transmission system.

6.1. SCOPE ASSUMPTIONS

- Equipment specifications (Breaker ratings, conductor size, etc.) are a result of the desktop functional scoping process observed while conducting this facilities study. These specifications are subject to change based on the results of the detailed scoping efforts that will take place post-interconnection or engineering and procurement agreements.
- Protection and Control (P&C) coordination with the Project Developer will be needed throughout the project. The Project Developer will be required to install an AEP-compatible line relaying protection panel at the collector substation using AEP standards to ensure relay coordination and adequate line protection. The AEP design team will ensure that the firmware at the collector station terminal matches the approved firmware at the AEP terminal. Failure to accept the cost of a matching line relay protection panel may change scoping.
- Scopes provided are based on a table-top process without the benefit of the results of site-specific engineering studies (e.g., soil borings, environmental survey, ground grid, etc.), unless otherwise provided by the Project Developer.
- The Project Developer will obtain, at its cost, all necessary provisions for the AEP direct connection facilities.
- The Project Developer will provide a site acceptable to AEP (for transfer in Fee Simple) and any required easements for the proposed AH1-535 230 kV station and associated line work to enable access to all facilities and structures.
- The proposed AH1-535 230 kV station interconnecting AH1-535 will be located in close proximity to the existing Nagel - Cane River 230 kV Transmission Line Right of Way.
- The Project Developer will have their construction and required checkout completed prior to the start of the interconnection to the proposed AH1-535 230 kV station and any required testing outages.

6.2. SCHEDULE ASSUMPTIONS

All transmission outages are subject to PJM and AEP Operations outage scheduling requirements.

Significant scope of work changes will impact the schedule.

The above schedule reflects only the work required to interconnect the AH1-535 project. The schedules regarding network upgrades associated with this project, if any, are detailed in the documentation related to the specific network upgrade.

Slippage by the Project Developer in executing the Generation Interconnection Agreement (GIA) does not equate to a "day for day" slippage in the scheduled back feed and in service dates. Depending on the time of year, planned outages, neighboring projects and maintenance of the grid, outage availability has the potential to shift by weeks or months depending on conditions at the time of the fully executed agreement.

6.3. ESTIMATE ASSUMPTIONS

Estimates provided are based on a table-top process without the benefit of the results of site-specific engineering studies (e.g., soil borings, environmental survey, ground grid, etc.), unless otherwise provided by the Project Developer.

6.4. OPTION TO BUILD ASSUMPTIONS

The Project Developer will use firms from the AEP approved list that have experience in the transmission region where the POI is located.

The Project Developer follows the requirements specified in "Independent Power Producers Option to Build Guidelines", available at:

https://www.aep.com/requiredpostings/AEPTransmissionStudies

7. REVENUE METERING REQUIREMENTS

All revenue metering needed for this interconnection project must meet the metering requirements stated in Appendix 2, section 8 of the AH1-535 GIA, and in PJM Manuals M01 and M14D. The details of applicable revenue metering requirements are provided in the "Connection Requirements for the AEP Transmission System" document, found at:

https://www.aep.com/requiredpostings/AEPTransmissionStudies

The primary and backup metering will be installed on the Transmission Owner side of the Point of Change in Ownership and will be owned and maintained by the Transmission Owner.

Any additional generation proposed behind an originating project's PCO that differs in either fuel type or corporate entity from the originating project will require the installation of additional submetering for both the originating project and the uprate for the purpose of settlement. Submetering will require additional space within the originating project's facilities. The meters, routers, Ethernet to fiber converters, and telecom switch will be procured and owned by AEP. The revenue quality instrument transformers, fiber-optic cable connecting the submeters, and any other additional hardware for the required submetering will be procured, installed, owned, and maintained by the Project Developer.

8. LAND REQUIREMENTS FOR INTERCONNECTION SUBSTATION

Land requirements for the Interconnection Substation needed for this interconnection project must meet the requirements in the https://www.aep.com/requiredpostings/AEPTransmissionStudies posted on AEP website.

9. APPLICABLE TECHNICAL REQUIREMENTS AND STANDARDS

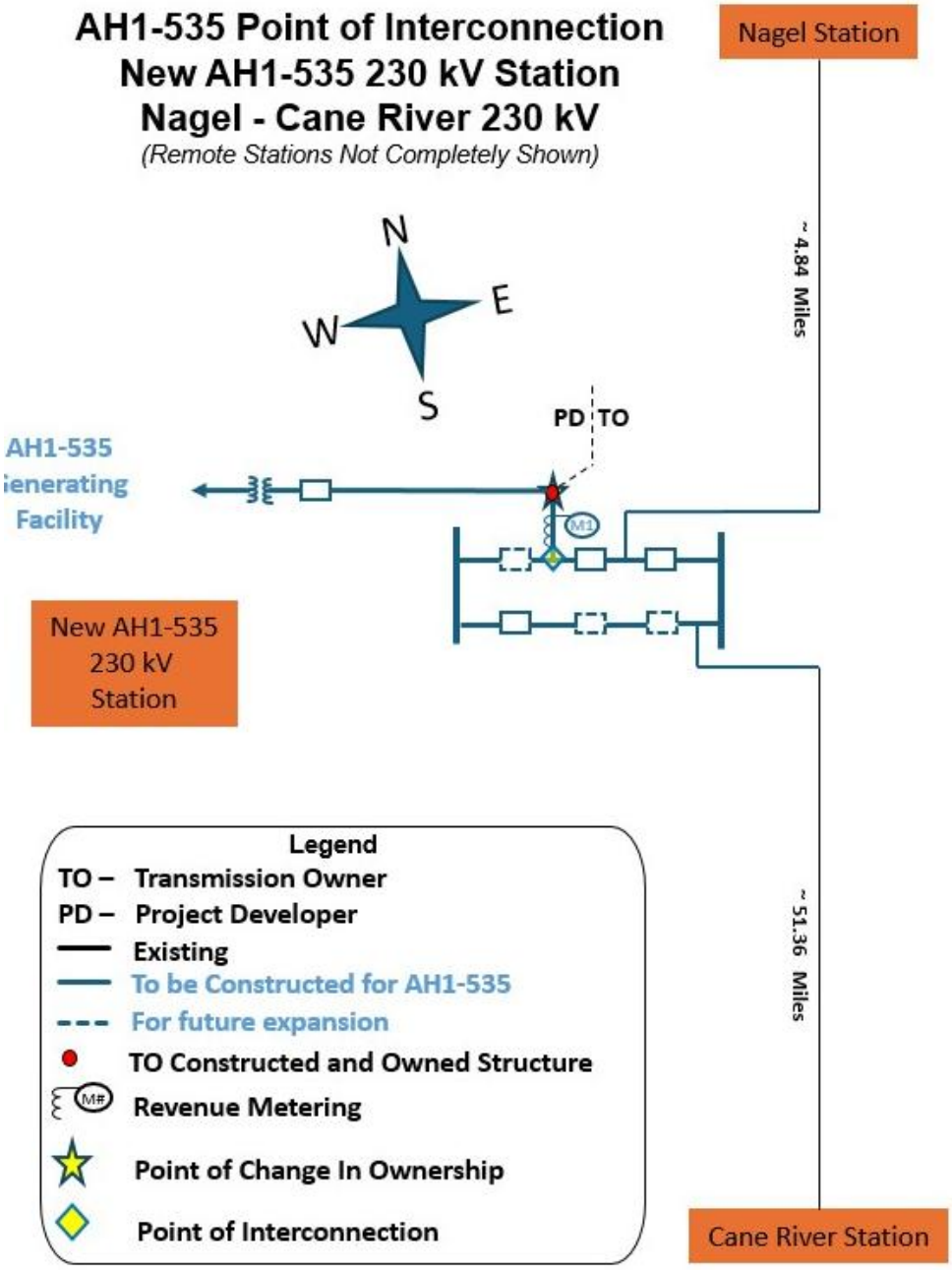
Applicable Technical Requirements and Standard: The Connection Requirements for the AEP Transmission System Rev 7 dated 12/31/2025 shall apply.

10. ENVIRONMENTAL AND PERMITTING

The Project Developer is expected to obtain, at its cost, all necessary permits and provisions for the facilities to be constructed for this interconnection. AEP requires that the standards provided in the "Standards and Expectations for Siting, Real Estate, Right-Of-Way, and Environmental Permitting for Transmission Interconnection Projects", found at: https://www.aep.com/requiredpostings/AEPTransmissionStudies be adhered to for all facilities interconnecting with the AEP transmission system.

C APPENDICES

Attachment #1: Single Line Diagram for the Physical Interconnection



Attachment #2: Substation General Arrangement

