Facilities Study Report

For

Physical Interconnection of

PJM Generation Interconnection Request Project ID AH1-254

“Greenland Gap 500 kV II”

Introduction

This Facilities Study has been prepared in accordance with the PJM Open Access Transmission Tariff, as well as the Application and Studies Agreement between the Project Developer and PJM Interconnection, LLC (PJM or Transmission Provider (TP)). The Transmission Owner (TO) is Monongahela Power Company (MP), a FirstEnergy company.

This Facilities Study was performed to satisfy the Phase 2 Facilities Study requirement of the PJM Tariff. The Facilities 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 agreement's 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 wind powered Generating Facility located in Barbour County, West Virginia with a designated PJM Project ID of AH1-254. The installed facilities will have a total Maximum Facility Output (MFO) of 171.4 MW with 36.538 MW of this output being recognized by PJM as Capacity.

2. POINT OF INTERCONNECTION (POI)

The Generating Facility will interconnect with the MP transmission system as a direct connect to the existing Greenland Gap 500 kV Substation.

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 will be located at the first dead-end structure, owned by the Project Developer, outside the existing Greenland Gap 500 kV Substation fence line.

4. SCOPE OF PROJECT DEVELOPER INTERCONNECTION FACILITIES

Project Developer will design, build, own, operate and maintain the Project Developer Interconnection Facilities on 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 GSU and the Point of Change in Ownership.
- Existing Generator lead line from the Generating Facility to the Point of Change in Ownership.

- Relay and protective equipment, and Supervisory Control and Data Acquisition (SCADA) and telecommunications equipment 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 AH1-254 project to MP transmission system. These facilities shall be designed according to FirstEnergy Applicable Technical Requirements and Standards. Once built, MP will own, operate, and maintain these Facilities.

1. TRANSMISSION OWNER INTERCONNECTION FACILITIES (TOIF):

1.1 Greenland Gap 500kV Substation Interconnection Line

Update protection for interconnection line at Greenland Gap Substation.

- Relay and Control
    - Reuse existing SEL-411L relay for primary protection
    - Replace (1) existing SEL-311L relay with (1) SEL-411L relay for backup line protection over fiber
    - Install (1) SEL-451 relay for GL-2 breaker position
    - Additional Equipment to be removed
        - (1) SEL-501 Relay
- Siting & Licensing
    - none
- Scope of Work Assumptions:
    - There is room in existing panels for new relays
    - Reusing existing control cables from equipment in yard including some cabling and terminal blocks if needed between panels inside control house
    - Reusing existing control pane fuses, terminal blocks, test switches and LOR and Aux relays
- Ancillary Scope of Work
    - Project Management
        - Provide project management, coordination, administration, scheduling, material management and project development if required.
    - Information Technology
        - SCADA work at Greenland Gap to support the (1) new relay
    - IT Scope Assumptions

        - Existing SCADA transport at Greenland Gap is sufficient for additional SCADA telemetry
        - Any potential changes to revenue metering would not affect IT
    - Testing and Commissioning
        - Testing and commissioning services as required.

1.2 AH1-254 Generator Substation

Energize and integrate generator Interconnection Facilities to the transmission system.

- Relay and Controls Scope of Work
    - Integrate Interconnection Facilities protection and controls to the transmission system.
- Ancillary Scope of Work
    - Project Management
        - Provide project management, coordination, administration, scheduling, material management and project development if required.
    - Testing and Commissioning
        - Testing and commissioning services as required.

2. STAND ALONE NETWORK UPGRADES

- None.

3. NETWORK UPGRADES

3.1 Meadow Brook Substation

- Relay and Controls Scope of Work
    - Revise Relay settings.
- Assumptions
    - Using existing relays
- Ancillary Scope of Work
    - Project Management
        - Provide project management, coordination, administration, scheduling, material management and project development as required
    - Testing and Commissioning
        - Testing and commissioning services as required for revised relay settings.

3.2 Mount Storm Substation (Virginia Electric and Power Company d/b/a Dominion Energy Virginia (Dominion))

- Update relay settings.

4. OTHER SCOPE OF WORK

4.1 Revenue Metering

- Revenue metering support for Project Developer installed metering.

5. MILESTONE SCHEDULE FOR COMPLETION OF MP WORK

Facilities outlined in this report are estimated to take 15 months to construct, from the time the Generation Interconnection Agreement is fully executed. This schedule may be 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	End Month
Preliminary Engineering	**1**	**2**
Siting, Permits & Real Estate	**5**	**9**
Detailed Engineering	**3**	**9**
Equipment Delivery	**11**	**11**
Construction	**12**	**14**
Testing & Commissioning	**15**	**15**

6. ASSUMPTIONS IN DEVELOPING SCOPE/COST/SCHEDULE

6.1 Scope Assumptions:

- All new generator only and new generator plus load facilities must be isolated from the MP Transmission System by a Power Transformer with a winding configuration meeting the

requirements in FirstEnergy's "Requirements for Transmission Connected Facilities" document.

- Revenue metering equipment. The revenue metering will be installed on the Project Developer side of the Point of Change in Ownership will be installed, owned and maintained by Transmission Owner.

6.2 Cost Estimate Assumptions:

- The cost estimates provided in this report were developed as of March 5, 2026, based upon current market conditions. Hence, they are subject to significant changes in the event that project implementation is delayed. Notwithstanding the cost estimates from this report being used in the Generator Interconnection Agreement for the related project, MP reserves the right to re-evaluate and provide a more accurate cost estimate during the implementation phase of the project. In accordance with section 217 of the Open Access Transmission Tariff, the Project Developer will be responsible for 100 percent of the actual costs of the facilities required to accommodate its Interconnection Request.
- MP reserves the right to charge the Project Developer operation and maintenance expenses to maintain the Transmission Owner Interconnection Facilities, including metering facilities, owned by MP. These costs will be specified in the Generator Interconnection Agreement.

6.3 Schedule Assumptions:

- This schedule assumes that all issues covered by the "Environmental, Real Estate and Permitting Issues" section of this document are resolved. Construction cannot begin until after all applicable permits and/or easements have been obtained.
- MP's ability to support this schedule also depends on the feasibility of taking the required outages to support construction. Outages that are determined to negatively impact system reliability or cause congestion may be delayed or denied, at any time, even if they are submitted on time based on the Outage Submittal Rules in section 4.2.1 of PJM Manual 03. This includes, but is not limited to, outages requested between the months of June and September, as well as January and March, which typically get denied due to summer and winter peak conditions. Therefore, the construction schedule will be adjusted as needed to accommodate any outage restrictions that have been identified by MP or the Transmission Provider.

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 AH1-254 GIA, and in PJM Manuals M01 and M14D. The details of applicable revenue metering requirements are given in the 'Requirements for Transmission Connected Facilities' posted on PJM website.

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

The revenue metering system (particularly the revenue metering current transformers) shall be designed to accurately meter the light loads that will occur when the facility is not generating power

and only back-feeding station service from the Transmission Owner. This may require the use of high accuracy extended range current transformers.

Transmission Owner will obtain real-time, site-specific, generation data from PJM, via the required communication link from Project Developer to PJM. Transmission Owner will work with PJM and Project Developer to ensure the generation data provided to PJM meets Transmission Owner's requirements.

These requirements are in addition to any metering required by PJM.

8. LAND REQUIREMENTS FOR INTERCONNECTION SUBSTATION

- Not applicable.

9. APPLICABLE TECHNICAL REQUIREMENTS AND STANDARDS

- The Requirements for Transmission Connected Facilities, Revision 7, dated January 27, 2026, shall apply.
- The TPP-REF-003 Transmission Planning Criteria, Revision 10, dated December 19, 2023, shall apply.
- These facilities shall be designed according to all Dominion Applicable Technical Requirements and Standards in effect March 20th, 2026. Dominion Energy Virginia – Electric Transmission Facility Interconnection Requirements, Procedure Version 25.0, dated October 1, 2025, shall apply.

10. ENVIRONMENTAL AND PERMITTING

The following are possible environmental, real estate and permitting issues:

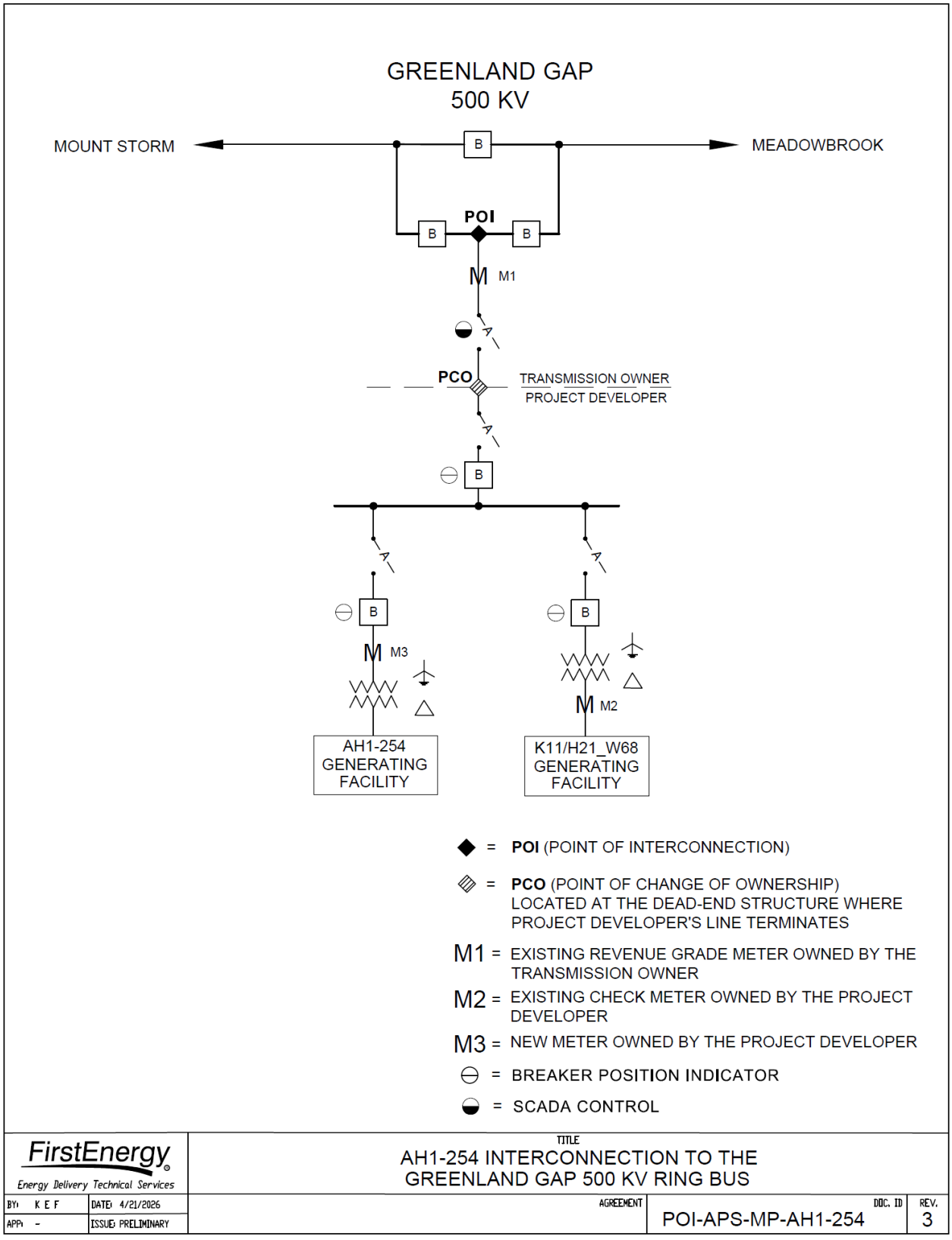
- Environmental permitting, Real Estate acquisition, and notifications to the state's Public Service Commission vary, some up to twelve (12) months after preliminary engineering is completed to secure the required approvals.
- Assumed Project Developer is to provide all access rights, easements, ROW and permits necessary to complete the Project to the satisfaction of Transmission Owner. Environmental permitting shall encompass all federal, state, and local requirements, consultations, and agency coordination. Confirmation of meeting all permitting requirements shall be provided to Transmission Owner, prior to start of construction. Following construction and energization, confirmation of permit closeout shall be provided to the satisfaction of Transmission Owner, prior to transfer of ownership. If any of these elements are not included in the final agreement between Transmission Owner and Project Developer, twelve (12)-to-eighteen (18) months should be added to the Project Schedule to secure necessary permits, and additional costs would apply.
- Project Developer will provide copies of all the relative environmental permits and other necessary approvals to Transmission Owner before Transmission Owner accepts the Interconnection Facilities.

- Project Developer is responsible for all property acquisition (including easements/rights-of-way (ROW)) for transmission, distribution and communication facilities needed for the generator interconnection.
- All property rights must be surveyed and metes and bounds descriptions prepared for incorporation into Transmission Owner's document forms, for transfer of title.
- All work occurs within an existing transmission line right-of-way or on Project Developer's property with access to all existing structures possible via that property and the right-of- way following established access routes that do not cross wetlands or streams.
- Project Developer will develop, and secure regulatory approval for, all necessary Erosion and Sediment Control (E&SC) plans and National Pollutant Discharge Elimination System (NPDES) permits.
- Project Developer will obtain all necessary permits.
- Project Developer will conduct all necessary wetlands and waterways studies and permits.
- Project Developer will conduct all necessary historical and archaeological studies.
- If the Project Developer plans to cross the transmission line right of way with facilities or access roads, please refer to the Transmission Rights-of-Way Restrictions information located at:

  https://www.firstenergycorp.com/help/safety/real-estate-power-lines/transmission-right-of-way.html#ROWform

C. APPENDICES

ATTACHMENT #1: SINGLE LINE DIAGRAM FOR THE PHYSICAL INTERCONNECTION



ATTACHMENT #2: SUBSTATION GENERAL ARRANGEMENT

Not applicable. No changes to substation arrangement.

ATTACHMENT #3: MATERIAL LIST AND EQUIPMENT RATINGS

Material/Equipment	Quantity
Relay - Individual (ea)	2
Control Cable (ft)	300

ATTACHMENT #4: PROTECTION SCOPE

AH1-254 Protection Requirements

- The generation delivery points must comply with the technical requirements detailed in the FirstEnergy "Requirements for Transmission Connected Facilities" document.
- The Generator Step-Up (GSU) transformer(s) connecting to the FE system shall have a grounded-wye winding configuration on the high side and a delta configuration on the low side. This establishes an effective ground on the transmission system and mitigates overvoltage conditions during ground faults. A delta connected winding on the low side provides isolation of zero-sequence currents such that the FE system will not be exposed to ground faults on the generator system.
- Single fully rated circuit breaker is required at the point of interconnection (POI).
- (2) SEL-411L's for primary and backup current differential protection are required for the transmission line connecting the FE interconnection substation to the POI. Project Developer shall install and maintain direct fiber that is routed to the FE interconnection substation for use by these relays for protection communications. Relay part number and firmware shall be sent to FE for approval to confirm communications compatibility. The 87L channel shall be used to communicate anti-islanding DTT to Project Developer. The 87L channel shall also be used for breaker failure DTT communications.
- Redundant high-speed protection schemes are required to protect the Project Developer owned equipment at POI voltage. Each zone of protection covering the POI voltage portion of the Project Developer's system, the GSU Transformer(s), and the POI voltage interconnection breaker, shall be protected by two independent relay schemes meeting the following redundancy requirements. Primary and backup relaying shall use independent CTs, and independent PTs or independent windings from the same PTs. Primary and backup relaying shall not have any common wiring, isolating switches, or auxiliary tripping relays. Redundancy of a protection system can be achieved by ensuring that there is no single point of failure between two locally independent primary and backup protection schemes for a given element. Relays from the same manufacturer are acceptable for both the primary and backup schemes.
- A protection scheme containing generator Intertie functions is required and must be able to provide tripping for the following functions: overfrequency, underfrequency, phase and zero-sequence overvoltage, phase undervoltage, directional overcurrent, and directional power. The current source and voltage source are to be at the Transmission POI voltage. The current source for the intertie relaying is preferred to be from CTs on the POI voltage interconnection breaker. The voltage source for the intertie relaying is preferred to be located between the high side of the GSU Transformer and the POI voltage interconnection breaker
- C800 CTs must be used on the POI voltage portion of the Project Developer's system, and the CTs should not saturate for the maximum expected through-fault current at the tap ratio in use.
- The relaying system and interrupting device control circuits shall have a reliable source of power independent from the AC system or immune to AC system disturbance or loss (for example - DC battery and charger) to assure proper operation of the protection scheme.

- If there are multiple existing utility feeds, they shall not be paralleled. Either a mechanical or electrical interlock shall be in place to prevent paralleling of service points.

The Project Developer is solely responsible for protecting its own equipment in such a manner that electrical faults or other disturbances on the FE transmission system do not damage its equipment.

FE Protection Requirements

Greenland Gap Substation:

- Project Developer 500kV line – Replace existing SEL-311L backup line relay with (1) SEL-411L for line protection and transfer trip over dedicated fiber.
- Install one (1) SEL-451 relay for 500kV breaker failure to trip protection for breaker GL-2.
- Review and Revise relay settings

Meadow Brook Substation:

- Review and revise relay settings

Dominion Energy Mount Storm Substation:

- Review and revise relay settings

Short Circuit Data

The short circuit levels at the Greenland Gap 500 kV bus are the following:

Short Circuit values at 500 kV

Three phase faults = 29.3 kA

Single line to ground fault = 26.3 kA

Transmission System Impedances at 500 kV, 100 MVA base

Positive sequence Z1 = (0.0002 + j0.0040) (per unit)

Zero sequence Z0 = (0.0006 + j0.0053) (per unit)

The fault current and system impedance values are for the proposed interconnect location on the existing 500 kV bus, for the normal system configuration connecting to Greenland Gap substation. The fault currents provided are bolted, symmetrical values for present, normal transmission system conditions. Future increases in fault currents are possible and it is the Project Developer's responsibility to upgrade their equipment and/or protective equipment coordination when necessary.

ATTACHMENT #5: PRELIMINARY GEOTECHNICAL SUMMARY

Not applicable.