Facilities Study Report

For

Physical Interconnection of

PJM Generation Interconnection Request
Project ID AG2-062

"William 138 kV"

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 Generating Facility located in Tucker and Grant Counties, West Virginia with a designated PJM Project ID of AG2-062. The installed facilities will have a total Maximum Facility Output (MFO) of 147 MW with 21.609 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 at the existing William 138 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 William 138kV 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.
- 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 AG2-062 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 New Interconnection Line Terminal at William 138 kV Substation

Install one disconnect switch and one span of 138 kV conductor from the existing William 138kV substation to the Project Developer-owned dead-end structure at the Point of Change in Ownership (PCO).

- Installations
    - 0.1 miles of conductor 795 kcmil 26/7 ACSR shielded by (1) 7#8 Alumoweld and (1) OPGW
    - (1) set of insulators for existing 138kV dead-end structure.
- Siting & Licensing
    - Letter of Notification (LON) will be required.
- Scope of Work Assumptions:
    - Location of PCO assumed
    - Location of generator substation assumed
    - Assume no ground survey will be required for design and as-built.
    - Assume minimal social and ecological impacts.
    - Assume no local opposition to the project.
- Ancillary Scope of Work
    - Project Management
        - Provide project management, coordination, administration, scheduling, material management and project development if required.

1.2 William 138kV Substation

Interconnect AG2-062 interconnection Generation Facility to existing MP William 138kV Substation at an open bay position within the 138kV box structure (constructed for the withdrawn AA1-062 project). From existing Monopole, bring a conductor drop to the disconnect switch on box structure.

- Below Grade:
    - Control cables from new equipment to control house.
- Above Grade:
    - Replace (1) 138kV existing bus disconnect switch, assume reusing foundation

- Install (1) 138kV new line disconnect switch on box structure
- From existing monopole, bring a conductor drop to the disconnect switch on box structure
- Add (2) sets of slip-on CTs on existing B11 CB
- Add (1) trip coil on existing B11 CB
- Install (1) 138k new 3-phase Surge Arrestor

- Relay and Controls Scope of Work
  - Revise/Update relay settings
  - Install (2) SEL-411L relays with protection communication over dedicated fiber (1 panel)
  - Install (1) SEL-451 relay for breaker failure and dedicated lockout and controls (1 panel)
  - Install (1) lot of SEL-3555 or similar data concentrator RTACs for use as PMU data concentration
  - Install (1) Ametek TR3XXX DFR, exact model to be determined during the detailed design phase (1 panel)
- Additional Equipment to be Removed:
  - Remove existing line relays and associated auxiliaries.
- Scope of work Assumptions
  - 138 kV breaker B11 is sufficient for reuse and can be upgraded with additional trip coil/CTs.
  - SEL RTAC will be installed onto existing HMI panel.
  - There is sufficient room in the control house for new relay panels.
- Ancillary Scope of Work
  - Project Management
    - Provide project management, coordination, administration, scheduling, material management and project development if required.
  - Information Technology
    - SCADA work at William Substation to support relays, RTAC, meters, GOAB, DFR, and disconnect switch installation, as well as the installation of a SAS-DxP- 24 Switch with drawing updates.
    - Install/Test approximately 0.03 miles of 48 fiber (single mode) from the William 138kV control house to the AG2-062 PCO
    - IT Scope of Work Assumptions
      - The existing SCADA transport at William Substation is sufficient for additional SCADA telemetry.
      - Project Developer is responsible for building fiber communications from generator site to PCO.
      - Two separate fiber cables are being run for this build, but no spatial diversity is required.
  - Testing and Commissioning

- Testing and commissioning of all substation equipment.

1.3 AG2-062 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 Loughs Lane Substation

Review and update relay settings.

- Below Grade:
  - None.
- Above Grade Scope of Work
  - None.
- Relay and Controls Scope of Work
  - Review and update relay settings.
- Additional equipment to be removed
  - None.
- Scope of Work Assumptions
  - Reuse existing relays

Ancillary Scope of Work

- Project Management
  - Provide project management, coordination, administration, scheduling, material management and project development as required

- Information Technology
    - None
- Testing and Commissioning
    - Test and commission as required for revised relay settings

3.2 Albright Substation

Review and update relay settings.

- Below Grade:
    - None.
- Above Grade Scope of Work
    - None.
- Relay and Controls Scope of Work
    - Review and update relay settings.
- Additional equipment to be removed
    - None.
- Scope of Work Assumptions
    - Reuse existing relays

Ancillary Scope of Work

- Project Management
    - Provide project management, coordination, administration, scheduling, material management and project development as required
- Information Technology
    - None
- Testing and Commissioning
    - Test and commission as required for revised relay settings

3.3 Seneca Caverns Substation

Review and update relay settings.

- Below Grade:
    - None.
- Above Grade Scope of Work
    - None.
- Relay and Controls Scope of Work
    - Review and update relay settings.

- Additional equipment to be removed
    - None.
- Scope of Work Assumptions
    - Reuse existing relays

Ancillary Scope of Work

- Project Management
    - Provide project management, coordination, administration, scheduling, material management and project development as required
- Information Technology
    - None
- Testing and Commissioning
    - Test and commission as required for revised relay settings

4. OTHER SCOPE OF WORK

4.1 Revenue Metering

Provide revenue metering panel within existing William Control House. Integrate revenue metering to FE William 138 kV substation.

- Below Grade Scope of Work:
    - (1) Lot of excavation, conduit, backfill, grounding, and wiring, between free standing CT/VT combo and revenue metering.
    - (1) Lot of foundations for free-standing 138kV CT/VT Combo Unit.
- Above Grade Scope of Work:
    - (1) set of 3-phase Free Standing 138kV CT/VT Combo Unit.
- Relay & Control Scope of Work
    - (1) New Revenue Metering Panel with test switches.
- Scope of Work Assumptions:
    - It is assumed current and voltage signals will be pulled from new 3-phase free-standing CT/VT Combo Units.
    - Assumes enough room in William 138 kV Control house to support a new revenue metering panel.
    - Assumes enough room in William 138 kV substation to add in free standing CT/VT Combo Units.
    - Assumes the same crew that is doing the expansion will be doing the metering and temp construction facilities are not needed.
- Ancillary Scope of Work

- Project Management
  - Provide project management, coordination, administration, scheduling, material management and project development as required
- Environmental
  - Review drawings and provide support for environmental or permitting requirements for new foundations and excavation within William Substation.
- Revenue Metering
  - Provide high end revenue meter and engineering support for revenue metering at MP Substation William.
- Testing and Commissioning
  - Testing and commissioning services as required

5. MILESTONE SCHEDULE FOR COMPLETION OF MP WORK

Facilities outlined in this report are estimated to take 29 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	Month	Month
Preliminary Engineering	1	2
Siting, Permits & Real Estate	5	18
Detailed Engineering	3	18
Equipment Delivery	21	21
Construction	22	24
Testing & Commissioning	24	29

6. ASSUMPTIONS IN DEVELOPING SCOPE/COST/SCHEDULE

6.1 Scope Assumptions:

- Project Developer will coordinate design and alignment of proposed 138 kV generator lead line with the Transmission Owner for review of any clearance, right-of-way or right-of-way encroachment issues with TO owned facilities.
- Project Developer will coordinate design and construction of proposed 138 kV lead line. For these areas, the Project Developer shall provide TO with proposed drawings prior to construction and as-built drawings, confirmed by as-built survey data post-construction.
- Transmission Owner's preference would be to limit interference and avoid transmission line crossings with new 138 kV terminal positions. As a minimum, Project Developer facilities should not encroach within 100 feet of TO centerline at blowout conditions. If Project Developer's line design does not comply with this requirement TO would need to review this area as a special exception.
- Additional costs will be incurred by the Project Developer, if final alignment of the 138 kV generator lead line causes encroachments, changes, or modifications to any existing or relocated TO facilities.
- Project Developer is responsible for making all arrangements for electric distribution service (if required) for its generation station. No costs or schedule are included herein.
- 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 Transmission Owner 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 February 20, 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 Project Developer 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 AG2-062 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.

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

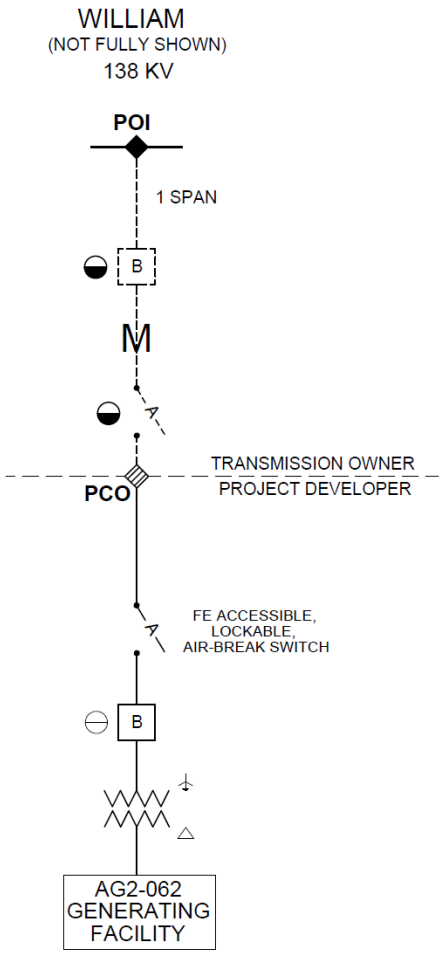
be provided to the satisfaction of Transmission Owner, prior to transfer of ownership. If any of these elements are not included in the final agreement between Transmission Owner and Project Developer, twelve (12)-to-eighteen (18) months should be added to the Project Schedule to secure necessary permits, 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



◆ = **POI** (POINT OF INTERCONNECTION)

▨ = **PCO** (POINT OF CHANGE OF OWNERSHIP) LOCATED AT THE DEAD-END STRUCTURE WHERE PROJECT DEVELOPER'S LINE TERMINATES

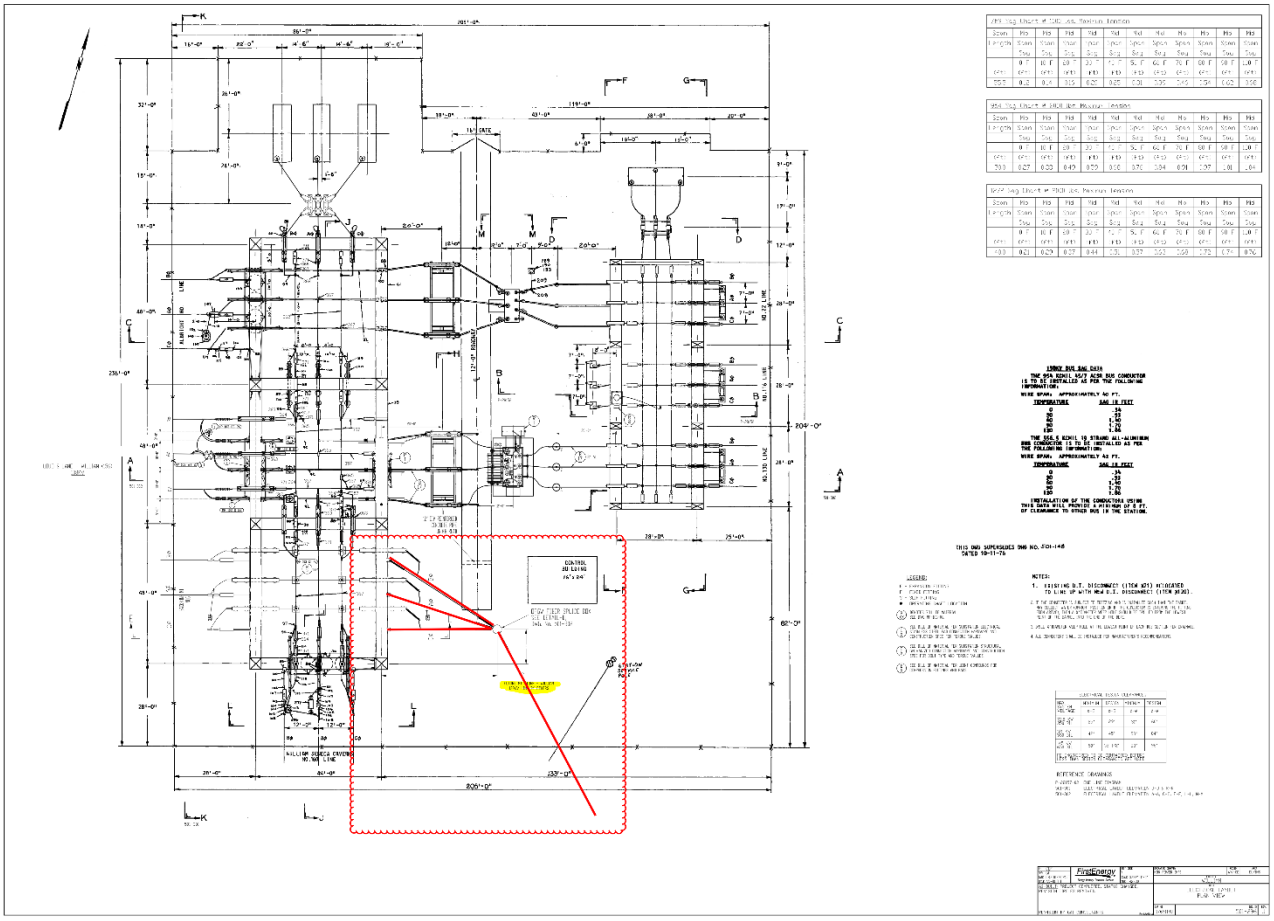
M = REVENUE METERING FOR THE PROJECT DEVELOPER IS OWNED, OPERATED, AND MAINTAINED BY THE PROJECT DEVELOPER

◒ = SCADA CONTROL

⊖ = SCADA INDICATION

FirstEnergy Energy Delivery Technical Services	TITLE AG2-062 INTERCONNECTION TO THE 138 KV WILLIAM SUBSTATION			
BY: K E F	DATE: 4/20/2026	AGREEMENT	DOC. ID POI-APS-MP-AG2-062	REV. 1
APP: -	ISSUE: PRELIMINARY			

ATTACHMENT #2: SUBSTATION GENERAL ARRANGEMENT



ATTACHMENT #3: MATERIAL LIST AND EQUIPMENT RATINGS

Material/Equipment	Quantity
Digital Fault Recorder (DFR) (ea)	1
Remote Terminal Unit (RTU) (ea)	1
Insulator - Line - Polymer (ea)	3
Insulator - Line - Porcelain/Glass (ea)	72
Steel Support Structure (ea)	6
Relay - Individual (ea)	3
Relay Panel (ea)	6
Anchor Bolt - Substation (ea)	24
Insulator - Substation - 138 kV (ea)	6
Surge Arrester - 138 kV (ea)	3
Current Transformer - Freestanding (CT) - 138 kV (ea)	3
Current Transformer - Slip Over (CT) - 138 kV (ea)	6
Potential Transformer (PT) - 138 kV (ea)	3
Disconnect Switch - Substation - 138 kV (ea)	2
Cable - Control/Communication (lf)	6830
Conductor - AAC (ft)	240
Conductor - ACSR (ft)	1877.4
Conduit - Rigid (lf)	270
Wire - Fiber - ADSS (ft)	670.54
Wire - Fiber - Underground (ft)	815.75
Wire - Shield - OPGW (lf)	615.8

ATTACHMENT #4: PROTECTION SCOPE

Project Developer 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.
- At least (1) and up to (2) fully rated circuit breaker(s) are required at the point of interconnection (POI). Project Developer is to design their protective system to clear any faults within their zones of protection with one or more of their local breakers. A dedicated breaker failure to trip relay is required for each of the POI breaker(s) to initiate direct transfer trip to FE substation(s) to effect remote clearing.
- (2) SEL-411L's for primary and backup current differential protection are required for the transmission line connecting the FE interconnection substation to the generating facility substation. Current inputs shall be taken directly from the POI breaker(s') current transformers (CTs) directly into each AC input on the tie line relays without additional transformation through auxiliary CTs or paralleling of CTs. Project Developer shall install and maintain direct fiber that is routed to the FE interconnection substation for use by primary and backup relays for protection communication. Upon failure of the communications channel, these relays shall resort to a backup non-pilot based scheme and thus shall also be wired to voltage transformers (VTs) at the POI. See following bullet for redundancy requirements. Part number and firmware shall be sent to FE for approval to confirm communications compatibility. 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.
- 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

To coordinate with proposed generator substation, the relay settings at the following stations will need adjusted (note that in some cases due to limitations of the existing relays, relays may need to be replaced):

- Albright: Review and revise settings
- Loughs Lane: Review and revise settings
- Seneca Caverns: Review and revise settings
- William:
    - For existing transmission protection schemes - Modify existing 138kV transmission protection schemes to incorporate the new line terminal including CT connections, trips, and BFI.
    - To utilize the existing spare line terminal for the new 138kV generator Line Terminal – (2) SEL-411L relays for primary and backup line current differential protection. (1) SEL-451 relay for breaker failure and controls. Associated auxiliary equipment and lockouts as needed. Add to the existing 138kV circuit breaker, (1) CT per bushing and (1) additional trip coil. Connections to a new or existing fiber patch panel at William to enable protection communications to/from generator facility.
    - For general protection support - Install an SEL-3555 RTAC for synchrophasors data concentration. Install an Ametek DFR for disturbance monitoring.

This generator is connecting to a transmission or sub-transmission circuit that is part of an existing automatic Underfrequency Load Shedding (UFLS) scheme to meet NERC standards and will be financially responsible for relocating that UFLS scheme to another part of the power system. This may include but is not limited to:

- A formal study by transmission planning to determine the full scope of upgrades needed to relocate the scheme.
- Design and Construction upgrades at Loughs Lane, William, Seneca Caverns, Snowy Creek, and possibly additional sites where UFLS relays may need to be installed or revised.

Further study and analysis of William and remote FE transmission substations may be needed if further modifications are made to this application or mitigations addressing this interconnection.

The interconnection of the new generator to the Bulk Electric System (BES) transmission network will initiate a review of existing protection schemes and may introduce new requirements to ensure compliance with the Protection and Control (PRC) standards established by the North American Electric Reliability Corporation (NERC). Additional protection system upgrades at the interconnecting station, and potentially at other affected stations, will be determined by FirstEnergy and the Regional Reliability Coordinator during subsequent stages of the project, prior to detailed design.

Short Circuit Data

The short circuit levels at the William 138 kV bus are the following:

Short Circuit values at 138 kV

Three phase faults = 7.0918 kA

Single line to ground fault = 6.3416 kA

Transmission System Impedances at 138 kV, 100 MVA base

Positive sequence Z1 = (0.0126 + j0.0585) (per unit)

Zero sequence Z0 = (0.0187 + j0.0904) (per unit)

The fault currents provided are bolted, symmetrical values for present, normal transmission system conditions with no proposed generation facilities in-service. 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. No generation assets were modeled.

ATTACHMENT #5: PRELIMINARY GEOTECHNICAL SUMMARY

Observation & Concern Table:

Category	Source	Risk	Comment
Surficial Soil Survey	USDA Soil Survey	Low	Anticipate fill materials
Geologic Formation/Group	WV/USGS Geologic Survey	Low	Possible shallow bedrock if any of the substation was in cut area
Karst	USGS	Low	Conemaugh formation contains minor Limestone. No karst features observed in area
Landslide Susceptibility	GIS/Google Earth/FEMA Risk Map	Low, Medium-High	Low risk inside of substation. Moderate to high risk outside of substation
Coal Mining and Oil and Gas Wells	WV Geologic Survey, TAMI 2	Moderate	Coal mining present within the area, but not recorded below station
Environmental Hazard	US Wetland Maps/FEMA	Low to Moderate	Low risk of flooding
Prior Development	TAMI/GIS MAP/Historic Aerials	NA	Substation previously developed.

Site Background/ Geologic Hazards Potential:

FE conducted this review to determine potential geologic hazards and risks at the existing generator developer (William 138kV Substation) location (AG2-062). The existing William Substation is located in Thomas, Tucker County, West Virginia, and is operated by Mon Power. The proposed work includes the installation of one new breaker with SCADA control which would be installed within the existing substation limits. The geotechnical report for the existing station was not available as part of this review. This location was reviewed for surficial soils survey, geologic formation/group, karst, landslide susceptibility, coal mining and oil and gas well resource mapping, environmental hazards, and prior development. The review was performed to identify any geologic risks that could affect the project's budget, constructability, and/or schedule.

Surficial Soil Survey

The United States Department of Agriculture Web Soil Survey indicates that the site is currently mapped as Dekalb channery loam (DaB, DaC, or DaD). The Dekalb channery loam generally consists of gravelly fine-grained soils with. The formation is mapped as Hydrologic Soil Group (HSG) A classification, indicating the soils are well drained and generally have a high infiltration rate. The depth to the water table is listed as greater than 80 inches. The depth to bedrock is listed to be within 4 feet of the surface. The site appears to have been filled most notable in the south and western areas to achieve grades. Therefore, fill materials should be anticipated.

Geologic Formation/Group

The site is located in the Allegheny Plateau of the Appalachian Plateaus Province, which is characterized by a rugged, hilly landscape with nearly horizontal layers of Paleozoic sedimentary rock. These rocks mainly consist of sandstones, shales, and conglomerates. The Geologic Map of West Virginia maps the site

to be underlain by the Conemaugh Formation. The Conemaugh is known for its cyclothemic sequences of primarily shale and sandstone, but also consisting of minor amounts of limestone, clay, siltstone, and thin, non-persistent coal beds.

Karst

The site is underlain by the Conemaugh formation which does contain minor amounts of limestone bedrock which can be prone to karst conditions. The West Virginia Geological Survey does not have any mapped sinkholes within the vicinity of the prospective site. A determination of karst risk should be discussed in the site geotechnical report to better understand the risk. Based on available mapping there is low risk of karst.

Landslide Susceptibility

The West Virigina landslide tool, which maps landslides that have occurred in the past, but none within the site vicinity. The landslide tool indicates that there is a medium to high risk of landslides around the substation, specifically beyond the southern edge where grades drop downwards. TAMI was utilized to generate elevation profiles for the potential site area. The ground surface within the station is relatively level however grades outside of the station slope downward from east west, approximately 10 feet at the east towards the station, and 25 feet west of the station. Overall it appears that the site was filled along the south and western sides to achieve a level grade for the station. The grades are relatively level to the north of the station but drop steeply approximately 40 feet beyond the south side of the station. Given the sloping conditions, the likely occurrence of a landslide is moderate to high outside of the station, however if the new equipment is located inside the station fence line and no work is to take place outside of the fence, the occurrence would be low.

Resource mapping

The West Virginia Geological and Economic Survey Underground and Surface Coal Mines map indicates that there are several coal mines located within the area of the existing substation, but none located directly below the station. The risk of coal mining extending below the existing site is estimated to be moderate.

Environmental Hazards:

Based on FEMA and U.S. Fish and Wildlife Service maps there are wetlands located adjacent to the site, including the existing City of Thomas Reservoir Dam. A flood zone is present to the south and west of the site, but is located downslope of the site. Based on the review of available wetlands and flood mapping, there appears to be a low risk at the site for flooding. Flooding could occur near the station creating some access concerns. An environmental study should still be performed to confirm this prior to construction.

Past Development:

The past development assessment of the site was based on aerial photography. Based on aerial photography dating back to 1956, the site appears to have been developed by the existing substation sometime between the years of 1966 to 1986. Unfortunately, no aerial photographs are available between that period. The substation group and/or region should also be consulted to determine if there are any known issues at the site.

Recommendations, Geotechnical Opinion, and Estimating

List of Observations/ Williams 138kV

1. This site is part of the Conemaugh Formation
2. Low risk potential for karst
3. Low risk for landslide inside station. Moderate to high risk outside of station
4. Low to moderate environmental impact risk
5. Mining activity recorded in the area but not below the substation

Preliminary Geotechnical Opinion

The geotechnical conditions of this site seem to conclude that it is relatively moderate to low-risk location for the improvements to the existing substation. Additional due diligence will be required to determine the extent of the coal mining and additional costs might be expected to determine the extent and any potential interference with the prospective substation site. This would include additional borings. If mining is encountered, higher foundation costs would be expected to mitigate mining. The above estimate was based on available online resources and did not take into account any documentation of the substation design/construction.