Facilities Study Report

For

Physical Interconnection of

PJM Generation Interconnection Request
Project ID AH1-695

"Three Mile Island 230 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 Mid-Atlantic Interstate Transmission, LLC (MAIT), a FirstEnergy company.

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 has proposed a nuclear Generating Facility located in Dauphin County, Pennsylvania. The installed facilities for AH1-695 will have a total Maximum Facility Output (MFO) of 859 MW with 803 MW of this output being recognized by PJM as Capacity.

2. POINT OF INTERCONNECTION (POI)

The Generating Facility will interconnect with the MAIT transmission system via existing breaker position at Three Mile Island 230 kV substation (TMI-230).

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

3. POINT OF CHANGE IN OWNERSHIP (PCO)

The Point of Change in Ownership (PCO) will be located at the Project Developer-owned disconnect switch structure outside the existing Three Mile Island substation fence line.

4. SCOPE OF PROJECT DEVELOPER 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:

- Disconnect Switches 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 Transmission Owner facilities for physical interconnection of the proposed AH1-695 project to MAIT transmission system. These facilities shall be designed according to FirstEnergy Applicable Technical Requirements and Standards. Once built, MAIT will own, operate, and maintain these Facilities.

1. TRANSMISSION OWNER INTERCONNECTION FACILITIES (TOIF)

1.1 New Interconnection Substation Line Terminal

Construct one (1) span of 230kV circuit from TM1-230 to the Project Developer's dead-end structure at the Point of Change in Ownership outside the substation.

- Installations
    - 0.1 miles of double bundled conductor 1590 kcmil 45/7 ACSR shielded by (1) 7#8 Alumoweld and (1) OPGW
- Siting/Licensing Assumptions
    - Letter of Notification (LON) may be required.
- General Notes/Assumptions
    - Assume minimal social and ecological impacts.
    - Assume no local opposition to the project.
    - Assumed 3 station bay attachments to account for all A-Frame insulators required
    - Assumed no ground survey will be required for design and as-built
- Ancillary Scope of Work
    - Project Management
        - Provide project management, coordination, administration, scheduling, material management and project development if required.

1.2 AH1-695 Generator Substation

Energize and integrate generator interconnection facilities to the transmission system. Decommission the SS-1 panel in the plant control room and transfer SS-1 panel to Project Developer.

- Relay and Controls Scope of Work
    - Add and Integrate the new AH1-695 generation facility to the FE System.
- Additional Equipment to be Removed
    - Miscellaneous meters and controls in SS-1 Panel in TMI plant control room.

- General Notes/Assumptions
    - None
- 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 Three Mile Island 230 kV Substation

- Description of Work
    - Install, replace and remove substation equipment to support the interconnection of AH1-695 generator facilities.
- Below Grade Scope of Work
    - Install cable conduit and control cables for new equipment.
    - Install foundations for new equipment and new bus support structures.
    - Removal of (1) existing CB foundations.
- Above Grade Scope of Work
    - Install (1) 3 phase CCVT including stand.
    - Install (2) new 230kv CB (one will reuse an existing foundation).
    - Install (2) 1590 ACSR conductor drops from each breaker bushing.
    - Install (2) freestanding 3-phase CTs including new stands.
    - Replace (4) 230 kV Bus and bus disconnect switches.
    - Install (1) bus support structure for bus 4 connection.
    - Install (1) bus support structure for bus 8 connection.
    - Install new 4" AL bus from each switch pad.
    - Install (2) junction boxes.
    - Replace overhead strain bus with (2) 1590 ACSR (45/7) conductors and associated terminal

assemblies.

- Replace downcomer assembly with (2) 1590 ACSR (45/7) and insulator supports mounted on takeoff structure.
- Install (3) new insulator bus supports on existing downcomer structure (below takeoff structure).

- Relay and Controls Scope of Work
  - Install (3) new relay panel for (6) SEL-2411 relays for primary and backup CCEC I/O exchange (total qty. of (12) SEL-2411).
  - Install (2) new SEL-411L relays and (1) lot of AR relays for Unit #1 generation line relaying on existing panel BR1.
  - Install (2) new SEL-451 relays and (2) LORs for generation breaker failure and control on existing panel BR2.
  - Install (1) new SEL-735, (2) control switches, and (2) maintenance switches on existing panel BC2.
  - Install the following equipment on existing panels (panels to be determined during detailed design):
  - (2) LORs for Bus #4 and Bus #8
  - (3) SEL-735 meters for 1051, 1091, and 1092 lines
  - (2) LORs for breaker failure schemes of 1091 and 1092 lines
  - (2) SEL-735 meters for Bank #1 and Bank #2 bus tie lines
  - (1) SEL-3350 data concentrator for sending analog data to CCEC.
- Removals
  - Remove the following from existing panels
    - Generator line backup lead relays
    - UF relays and associated aux relays and timers
    - Generation breaker failure relays and associated lockouts, timers, indicating lights, and cutoff switches
    - Generation breaker control switches and demand ammeters
    - Jackson 1051 line metering, breaker failure lockouts, and associated aux relays
    - Middletown Jct 1091 metering, breaker failure lockouts and associated aux relays
    - Bank #1 Satec PM 174 meter
- Scope of Work Assumptions
  - Assume new relays will fit into existing relay panels and new panels will fit in existing control house
  - For removal of existing relays, assumed approximately 160 hours of removal labor hours (2 electricians x 2 weeks)

- For removal of existing strain and rigid bus, assumed $30,0000 allowance
- Assumed installation of approximately 156' of strain bus and approximately 160' of rigid low bus
- Assumed installation of (1) new SEL-451 for dual speed breaker failure, synch check, and reclosing for B105102 on existing panel BR5 has been completed.
- Assumed replacement of 230 kV bus differential relays with primary and backup SEL-487B has been completed.

- Ancillary Scope of Work
  - Project Management
    - Provide project management, coordination, administration, scheduling, material management and project development if required
  - Real Estate & Right-Of-Way
    - Review drawings and provide support for any work that occurs outside the FE substation fence, including new conduit/wiring for new fiber to generator.
  - Real estate estimate has been included for:
    - Internal support including document review, project planning meetings, subcontractor oversight and assistance with transfer of assets if required.
    - External support for GIS support, general project support, and minimal construction support and damage settlements/releases.
    - We have not included acquisition labor or cost of potential priority tree rights unless specified as needed in the scope and assumptions.
    - Direct damage payments are not included in estimate.
  - Information Technology
    - SCADA work at TMI 230 Substation to support breakers, relays, meters, GOAB, and disconnect switch installation.
    - Install/Test approximately 0.08 miles of 96F/SM from the TMI 230kV Control House to the AH1-695 PCO.
  - Testing and Commissioning
    - Test and commission all relays and power equipment.

3.2 Three Mile Island 500 kV Substation

- Relay & Control Scope of Work
  - Review and update relay settings.
- Scope of Work Assumptions:
  - Using existing relays.
- 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 for revised relay settings.

3.3 Jackson Substation

- Relay & Control Scope of Work
  - Review and update relay settings.
- Scope of Work Assumptions:
  - Using existing relays.
- 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 for revised relay settings.

3.4 Middletown Junction Substation

- Relay & Control Scope of Work
  - Review and update relay settings.
- Scope of Work Assumptions:
  - Using existing relays.
- 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 for revised relay settings.

4. Other Scope of Work

4.1 Revenue Metering

- Above Grade Scope of Work
    - Install (3) free-standing CTs on existing downcomer structure (below takeoff structure) for Aux Transformer 1A metering.
    - Install (3) free-standing CTs on existing downcomer structure (below takeoff structure) for Aux Transformer 1B metering.
    - Replace downcomer assembly and 795 ACSR (26/7) conductor drop to connect to each new CT for Aux Transformer 1A and 1B metering.
    - Install (1) 795 ACSR (26/7) conductor jumper from each new CT to existing bus for Aux Transformer 1A and 1B metering.
    - Install (3) Ion 8650 meters for Unit 1 GSU, Aux Xfmr #1A and Aux Xfmr #1B metering.
- Scope of Work Assumptions:
    - Assumed there is sufficient space on existing panels for ION meters.
- Ancillary Scope of Work
    - Project Management
        - Provide project management, coordination, administration, scheduling, material management and project development if required.
    - Revenue Metering
        - Provide metering support for the installation of the (3) Ion meters for Unit 1 GSU, and the TMI Aux Transformers 1A and 1B.
    - Testing and Commissioning
        - Testing and commissioning services as required.

5. MILESTONE SCHEDULE FOR COMPLETION OF MAIT WORK

Facilities outlined in this report are estimated to take 49 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.

Description	Start Month	Finish Month
Preliminary Engineering	1	2
Detailed Engineering	5	38
Equipment Delivery	40	40
Construction	41	47
Testing and Commissioning	45	49

6. ASSUMPTIONS IN DEVELOPING SCOPE/COST/SCHEDULE

6.1 Scope Assumptions:

- Project Developer will coordinate design and alignment of proposed 230 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 230 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 230 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 230 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 MAIT Transmission System by a Power Transformer with a winding configuration meeting the requirements in FirstEnergy's "Requirements for Transmission Connected Facilities" document.

6.2 Cost Estimate Assumptions:

- The cost estimates provided in this report were developed as of April 16, 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, MAIT 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.
- MAIT reserves the right to charge the Project Developer operation and maintenance expenses to maintain the Project Developer attachment facilities, including metering facilities, owned by MAIT. 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.
- MAIT'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 MAIT 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 AH1-695 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, and 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 PERMITING

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

- Environmental permitting, Real Estate acquisition, and notifications to the state's Public Utilities Commission (PUC) vary, some up to twelve (12) months after preliminary engineering is completed to secure the required approvals.
- Prior to agreement by Project Developer to purchase the property, a Phase 1 Environmental Assessment should be conducted for the entire site to avoid assumption of environmental liabilities by Project Developer or Transmission Owner.
- The Transmission Owner interconnection substation may involve environmental surveys, permits, approvals and plans with federal, state, and/or local agencies.
- 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

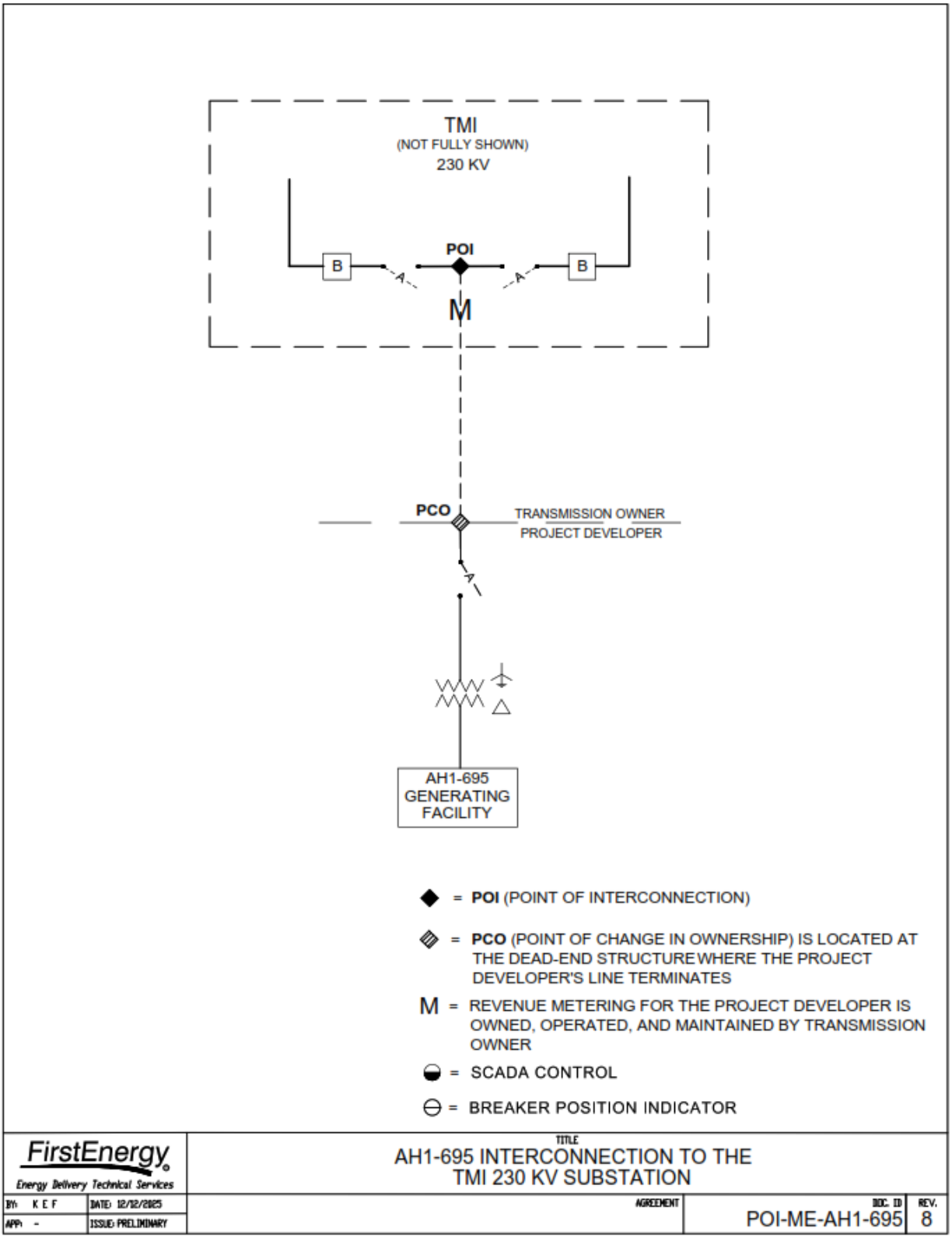
to start of construction. Following construction and energization, confirmation of permit closeout shall be provided to the satisfaction of Transmission Owner, prior to transfer of ownership. If any of these elements are not included in the final agreement between Transmission Owner and Project Developer, 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 required to install an access road from the new interconnection substation to the nearest public road (must be approved by Transmission Owner) and obtain access rights for Transmission Owner. Project Developer is responsible to maintain access road and ensure unimpeded access for Transmission Owner at all times.
- 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.
- If Project Developer owns the project property, in fee title, Transmission Owner will require a fee property transfer for the interconnection substation site which may require subdivision approval, together with permanent access rights to and from the substation, as well as a perpetual easement for any transmission lines to the substation. Project Developer is responsible for all costs, including but not limited to subdivision, associated with the property transfer.
- If Project Developer leases the project property, the Project Developer will be required to obtain fee property from the underlying fee property owner, on behalf of Transmission Owner, for the interconnection substation site, together with permanent access rights to and from the substation, as well as a perpetual easement for any transmission lines to the substation.
- All property rights must be surveyed and metes and bounds descriptions prepared for incorporation into Transmission Owner's document forms, for transfer of title.
- The Transmission Owner interconnection substation and transmission line loop will involve PUC notification/approval.
- 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:

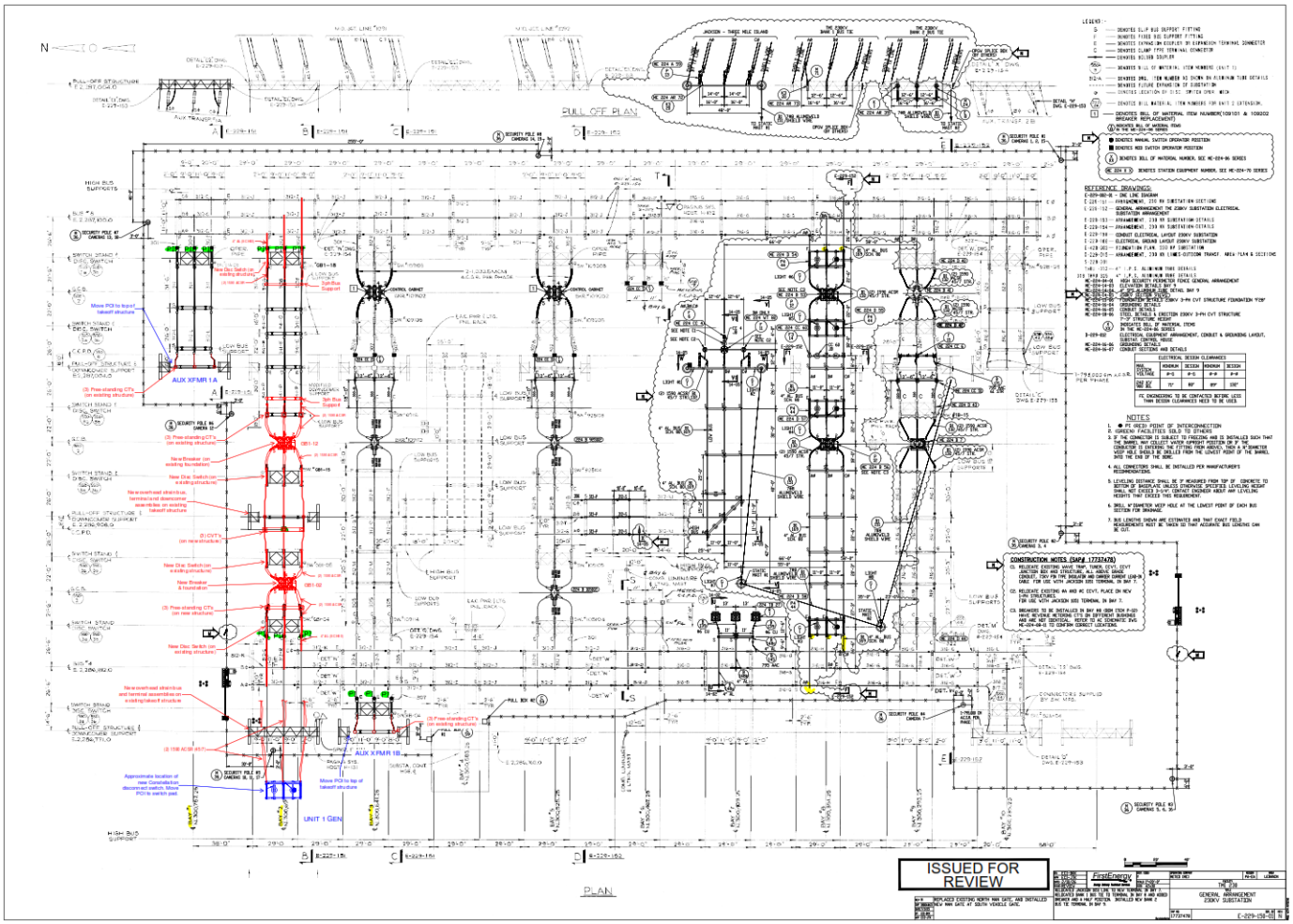
  https://www.firstenergycorp.com/help/safety/real-estate-power-lines/transmission-right-of-way.html#ROWform

C. APPENDICES

ATTACHMENT #1: SINGLE LINE DIAGRAM FOR THE PHYSICAL INTERCONNECTION



ATTACHMENT #2: SUBSTATION GENERAL ARRANGEMENT



ATTACHMENT #3: PROTECTION SCOPE

Generator Facility Protection Requirements:

All proposed generation interconnection points and load-serving delivery points must comply with the technical requirements detailed in the FirstEnergy "Requirements For Transmission Connected Facilities" document.

The Project Developer shall not order equipment prior to FE approval of their Single Line Diagram and assumes financial responsibility for equipment ordered prior to approval of the updated Single Line Diagram which is not approved for use at the interconnection.

These requirements only include the requirements for the generator to connect to the FE system. Other Requirements for the Generation Owner from other agencies including but not limited to NERC, PJM or NRC are at the sole responsibility of the Generation Owner.

The following are the protection requirements the generator must meet to interconnect to FirstEnergy's Transmission system:

1. Relay Communication Channels

    a. Install direct fiber optics communication channels between the FirstEnergy owned 230kV TMI substation and the Project Developer owned Control Room to be used for relay communication based high speed tripping.

    b. Install a minimum of twelve SEL-2411 relays to communicate interconnection signaling such as trip and close signals between the generator's protection and control design and the FE owned GB1-12 and GB1-02. A different number of redundant SEL-2411 devices may be necessary to support the bidirectional interconnection signaling requirements of both the generator and FirstEnergy.

2. Transformer Requirements and Transformer Protection:

    a. All 230kV GSU Transformers at the Project Developer owned substation shall be Grounded WYE High (Utility) side and a Delta Low side
    b. 230kV Transformer protection shall consist of primary current differential schemes, backup current differential schemes utilizing separate current transformers, and an independent transformer neutral overcurrent relay.
    c. Primary and backup protection shall be completely independent, including separate current transformers, potential transformer windings (where applicable) and DC control circuits.

3. Line Requirements for the 230kV Line between FirstEnergy Owned TMI 230kV Substation and Project Developer Owned Substation

    a. New 230kV Line to TMI 230kV substation from Project Developer owned substation Protection:
        i. Project Developer shall install (1) set of three phase, 230kV, dual winding CCVT/PT 2000:1 ratio required on the 230kV Line Side.
        ii. New 230kV Line between FirstEnergy TMI 230kV substation and Project Developer owned substation shall be protected by Primary and Backup Line Differential scheme utilizing SEL-411L relays.
        iii. Install One (1) SEL-411L line differential relaying with fiber optic interface for Primary Line Protection of incoming new line from FirstEnergy TMI 230kV

Substation. Relay to be connected to Project Developer's CTs located on the 230kV side of the GSU. (Part Number and firmware for this relay to be coordinated with FirstEnergy)

iv. Install One (1) SEL-411L line differential relaying with fiber optic interface for Backup Line Protection of incoming new line from FirstEnergy TMI 230kV Substation. Relay to be connected to Project Developer's CTs located on the 230kV side of the GSU. (Part Number and firmware for this relay to be coordinated with FirstEnergy)

v. All primary line relaying CTs are required to be connected on the inner bushing of the protected equipment. If insufficient CTs exist on the GSU for independent protective relays, then additional CTs will need to be added.

vi. All backup line relaying CTs are required to be connected on the outer bushing of the protected equipment. If insufficient CTs exist on the GSU for independent protective relays, then additional CTs will need to be added.

vii. The line protection shall trip the generator, the two FE Owned breakers and initiate breaker failure-to-trip schemes.

4. Miscellaneous Requirements

a. Faults within any 230kV piece of equipment must be detected by two (primary and backup) independent high-speed zones of protection.

b. The relaying system shall have a reliable source of DC 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

c. All relays, relay schemes, and relay settings that include 230kV voltages or currents or trip any 230kV circuit breakers shall require the review and approval of FirstEnergy.

d. Transformer(s) and Generator(s) testing reports including sequence impedances, Subtransient, Transient and Synchronous impedances must be submitted to FE as soon as they are available prior to completed relay coordination studies or any Project Developer requests for fault current data.

e. Line impedance and characteristic data must be submitted to FE as soon as they are available prior to completed relay coordination studies or any Project Developer requests for fault current data.

f. FirstEnergy will complete detailed relay coordination studies to identify off-site relay setting changes required due to this generation interconnection. This may result in additional individual relay replacements being required. These relay replacements will be done at the cost of the Generation Owner.

g. Relays, Digital Fault Recorders and other equipment owned by FirstEnergy shall be for the sole use and ownership of FirstEnergy and are not provided for the shared use of the Generator Owner.

During the conceptual and project development phase of this generation connection, agreements must be made on the operating permissions of each entity for the FE owned transformer breakers.

During the conceptual and project development phase of this generation connection, agreements need to be made on the interactions between the generator relays and the FE owned transformer breakers.

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

FE Protection Requirements

To coordinate with the proposed POI, the following upgrades/changes need to be made at the FirstEnergy substations.

- TMI 230
    - 230kV connection to Nuclear Generator
        1. Add (1) SEL-411L for primary line differential using one independent set (3) of CTs on each of GB1-12 and GB1-02.
        2. Add (1) SEL-411L for Backup line differential using one independent set (3) of CTs on each of GB1-12 and GB1-02.
        3. Add (2) SEL-451 for breaker failure, Open Breaker Flashover, and FE sync check permission for GB1-12 and GB1-02 breakers.
        4. Add (8) SEL-2411 to support the bidirectional interconnection signaling requirements of both the generator and FirstEnergy for the GB1-12 and GB1-02 breakers
        5. Add (4) SEL-2411 for substation breaker status, underfrequency tripping, auxiliary transformer bank #1A & #1B tripping.
        6. Add (1) 3 phase CCVT on the line exit going to the Generators GSU.

NOTE: if insufficient CTs exist on GB1-12 and GB1-02 for independent protective relays then additional CTs will need to be added.

    - 230kV 1091 line to Middletown Junction
        - Use the existing relays with setting changes
    - 230kV 1092 line to Middletown Junction
        - Use the existing relays with setting changes
    - 230kV 1051 line to Jackson
        - Use the existing relays with setting changes
    - 230kV Low side of Bank 500/230kV Bank 1 at TMI 500
        - Use the existing relays with setting changes
- Middletown Junction
    - 230kV 1091 line to TMI 230kV
        - Use the existing relays with setting changes
    - 230kV 1092 line to TMI 230kV
        - Use the existing relays with setting changes
- Jackson
    - 230kV 1051 line to TMI 230kV
        - Use the existing relays with setting changes
- TMI 500
    - 500/230kV Bank 1
        - Use the existing relays with setting changes
- Communication equipment

- The communication between Jackson and TMI 230 is presently over PLC. However, fiber-based relaying is preferred if available. If there is fiber available, then the protection scheme will change, and FirstEnergy will not need powerline carrier equipment.
- The communication between Middletown Junction and TMI 230 (1091) is currently over fiber and will be over fiber for this project.
- The communication between Middletown Junction and TMI 230 (1092) is currently over fiber and will be over fiber for this project.
- The communication between TMI 500 and TMI 230 (Bank 1) is currently over fiber and will be over fiber for this project.

*NOTE: Based on the new Generation interconnection there may be additional settings changes for neighboring lines and substations due to the increase of fault current to the power system. There may be additional setting changes to neighboring utilities due to the increase of fault current that will need to be coordinated according to PRC-27.

Short Circuit Data

230 kV

Positive Seq. Impedance = 0.28863 + j3.52608 Ω

Zero Seq. Impedance = 0.85703 + j4.28624 Ω

Single Line to Ground Fault Current = 34,879 A

Three Phase Fault Current = 37,534 A

Fault values are from the current system condition at TMI 230 substation without the proposed Generation project. The faults provided are bolted, symmetrical values for normal system conditions. It should be similar short circuit values at the interconnection point with the extension but future changes 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

Observation & Concern Table:

Category	Source	Risk	Comment
Surficial Soil Survey	USDA Soil Survey	Moderate	Fine grained soil
Geologic Formation/Group	PA/USGS Geologic Survey	Low	Gettysburg Formation
Karst	USGS/ TAMI 2	Low	No karst
Landslide Susceptibility	GIS/Google Earth/FEMA Risk Map	low	Low risk
Coal Mining and Oil and Gas Wells	PA Geologic Survey/TAMI 2	Low	No coal mining. No gas wells in the area
Environmental Hazard	US Wetland Maps/FEMA	Moderate	Moderate risk of flooding
Past Development	TAMI/GIS MAP/Historic Aerials	Moderate	Developed by generating plant and substation

Site Background / Geologic Hazards Potential

This review was conducted to determine potential geologic hazards and risks at the existing generator developer (Three Mile Island 230kV Substation) location (AH1-695). The reviewed location is in Londonderry Township, Dauphin County, Pennsylvania. This includes a proposed expansion to the existing Three Mile Island Substation. The proposed expansion would reuse the existing 230 breakers, replace DS, and update protection for a new line. The Three Mile Island Substation is operated by Met-Ed. The substation expansion was reviewed for surficial soils survey, geologic formation/group, karst, landslide susceptibility, coal mining and oil and gas wells resource mapping, environmental hazards, and past 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 the Chavies fine sandy loam (CnA). The chavies fine sandy loam are typically alluvial fine grained sandy silts and clays, or clayey or silty sands (CL, ML, SM, SC). Fill from prior construction activities should also be anticipated at the site.

Geologic Formation/Group

The site is located in the Gettysburg-Newark Lowland Section of the Piedmont Physiographic Province. The Gettysburg-Newark Lowland Section consists mainly of rolling low hills and valleys developed on red sedimentary rock. There are also isolated higher hills developed on diabase, baked sedimentary rock (hornfels), and conglomerates. The United States Geological Survey Geologic Map indicates the site to be

underlain by the Jurassic and Triassic age Gettysburg Formation. The Gettysburg Formation is composed of reddish-brown to maroon silty mudstone and shale and soft, red-brown, medium- to fine-grained sandstone, with minor amounts of yellowish-brown shale and sandstone and thin beds of impure limestone.

Karst

The site is underlain by the Gettysburg Formation which is not a karst related formation. The Transmission Asset Mapping Interface (TAMI 2) was reviewed, and karst is not present at the site. The risk of karst related issues is low.

Landslide Susceptibility

The Pennsylvania Department of Conservation and Natural Resources Landslides in Pennsylvania map indicates the Gettysburg-Newark Lowland Section is generally low risk for landslides, the lowest classification in the state. TAMI surficial profiles also indicate that the site is relatively level and as a result, the likely occurrence of a landslide is low.

Resource mapping

The Pennsylvania Department of Protection Mine Map Site was reviewed for any coal mining (past or present) that has occurred in the site vicinity. No coal mining has occurred at the site or the site vicinity. In addition, no natural gas wells are located in the surrounding area of the site.

Environmental Hazards

The Susquehanna River runs along both the east and west sides of Three Mile Island. Based on FEMA National Flood Hazard, the site is listed as 0.2 percent annual chance flood hazard. An environmental study should still be conducted to confirm this prior to construction, however, there appears to be a moderate risk that the site is prone to flooding. Any prior flood events should be reviewed as part of the environmental study.

Past Development

The past development assessment of the site was based on aerial photography dating back to 1956 and available information online on the construction of the generating station. The Three Mile Island generating station was constructed between 1968 to 1969. Prior to the generating station, Three Mile Island was used for farming. As a result of the construction of the generating station and substation, there appears to be moderate risk associated with the past development at the site.

Recommendations & Geotechnical Opinion

List of Observations/Concerns Interconnection Facilities – Three Mile Island 230 kV AH1-695:

1. This site is part of the Gettysburg Formation

2. Low potential for karst
3. Low risk for landslides
4. Moderate environmental impact risk
5. No mining activity in the area. No gas wells are present in the site area.
6. Moderate risk as the site was heavily developed by generating station and substation

Preliminary Geotechnical Opinion

The geotechnical conditions of this site seem to conclude that it is relatively low to moderate risk location for the improvements to the existing substation, due to the potential flooding issues at the site as well as the past development of the site. The above estimate was based on available online resources; no geotechnical data was available from the site's construction.