Facilities Study Report

For

Physical Interconnection of

PJM Generation Interconnection Request

Project ID AG1-153

Heritage 500 kV

December 2024

Introduction

This Facilities Study has been prepared in accordance with the PJM Open Access Transmission Tariff Part VII, and, if applicable, the Application and Studies Agreement between the Project Developer and PJM Interconnection, LLC (PJM or Transmission Provider (TP)). The Transmission Owner (TO) is Virginia Electric and Power Company (VEPCO or Dominion).

A. Transmission Owner Facilities Study Summary

1. PROJECT DESCRIPTION

The Project Developer (PD) has proposed a Storage Generating Facility located in Brunswick, VA with a designated PJM Project ID of AG1-153. The installed facilities will have a total Maximum Facility Output (MFO) of 75 MW with 30 MW of this output being recognized by PJM as Capacity.

2. POINT OF INTERCONNECTION (POI)

AG1-153 is a new service request project that will interconnect with the Dominion transmission system via a direct connection into Heritage 500 kV substation by adding (1) additional breaker.

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 the line termination on the 3-pole structure outside the station.

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

B. Transmission Owner Facilities Study Results

The following is a description of the planned Transmission Owner facilities for the physical interconnection of the proposed AG1-153 project to the Dominion transmission system. These facilities shall be designed according to Dominion Applicable Technical Requirements and Standards. Once built, Dominion will own, operate, and maintain these Facilities.

1. TRANSMISSION OWNER INTERCONNECTION FACILITIES:

The Transmission Owner Interconnection Facilities will include, but not be limited to, the following:

One (1) new 500 kV engineered steel 3-pole structure is to be installed outside the fence of the Interconnection Substation, to terminate the Project Developer's generator lead line. The new 500kV circuit will hereby referred to as TL5XX. The new 500kV circuit between Heritage Substation and the developer substation will be owned by the developer, and the demarcation point will be the jumper loop on the proposed 3-pole structure.

Line conductor from the backbone structure to the bus position in the switchyard of the interconnection substation. The new 500kV circuit will be constructed with triple bundled 1351 ACSR "Dipper" conductor. The circuit will be shielded with DNO-10100 OPGW.

Purchase and install substation material – Transmission Owner Interconnection Facilities:

1. Three (3), 500kV, metering accuracy CCVT
2. Three (3), 500kV, 2000:5 metering accuracy CT
3. Conductor, connectors, conduits, control cables, foundations, steel structures and grounding material as per engineering standards

Purchase and install relay material – Transmission Owner Interconnection Facilities:

1. One (1), 1340 – 24" dual SEL-411L DCB/Fiber line panel
2. One (1), 1323 – 24" SEL-487E/735 PMU and PQ monitoring panel
3. One (1), 1425 – 24" dual SEL-735 transmission and generator interconnect metering panel
4. One (1), 4524 – revenue metering CT make-up box
5. One (1), 4506 – 3-phase CCVT potential make-up box with metering (P4)

Permanent Facilities to be Installed – Transmission Owner Interconnection Facilities:

1. Install one (1) TL5XX 500kV engineered steel single circuit double deadend 3-pole structure on foundations as follows:
    a. Structure 5XX/2
2. Install approximately 0.09 miles of TL5XX 3-phase triple bundled 1351 ACSR "Dipper" conductor from the ahead side of existing structure 5XX/1 (591/1) (585/166) to new structure 5XX/2.
3. Install the following spans of DNO-10100 OPGW as follows:
    a. Approximately 0.09 miles from the west shield mast of structure 5XX/1 (591/1) (585/166) to the west pole of new structure 5XX/2.
    b. Approximately 0.09 miles from the center shield mast of structure 5XX/1 (591/1) (585/166) to the east pole of new structure 5XX/2.
4. Install OPGW splices as follows:
    a. One (1) on the west side of structure 5XX/1 (591/1) (585/166).
    b. One (1) on the center of structure 5XX/1 (591/1) (585/166).
    c. One (1) on the west pole of structure 5XX/2.
    d. One (1) on the east pole of structure 5XX/2.

2. STAND ALONE NETWORK UPGRADES

Dominion's Technical Requirements for Generation Interconnect Substation (EP_REF_2200-23-00) prevents this project from having the option to build for the Stand Alone Network Upgrades.

3. NETWORK UPGRADES

The Network Upgrades will include, but not be limited to, the following:

Expanding existing TO substation:

Heritage Upgrade (NXXXX)

Heritage 500 kV substation will be expanded/upgraded to interconnect AG1-153 with the Dominion transmission system by adding one new breaker.

The objective of this project is to add one new line position and one new 500kV breaker at Dominion's Heritage Station to support the new storage facility built by Project Developer. Additional modifications will be required to accommodate this additional infrastructure.

Substation design and relay protection are based on Dominion's Facility Interconnection Requirements, NERC Compliance Procedure FAC-001 (version 23), that is posted on PJM's website. This standard meets or exceeds the PJM Transmission and Substation Design Subcommittee Technical Requirements and the PJM Protection Standards (PJM Manual 7).

The scope of work includes the following:

Purchase and Install Substation Material - Network Upgrade:

1. One (1), 500kV, 4000A, 50 kAIC, SF-6 circuit breaker
2. One (1), 500kV, 4000A, 3-phase double end break switch
3. Station stone as required
4. Station lighting as required
5. Steel structures as required including switch stands and bus supports
6. Foundations as required including equipment, and bus support stands
7. Conductors, connectors, conduits, control cables, cable trough, and grounding materials as per engineering standards

Purchase and Install Relay Protection Equipment – Network Upgrade:

1. One (1), 1510 – 24" dual SEL-351-7 transmission breaker with reclosing panel
2. One (1), 4510 – SEL-2411 breaker annunciator
3. One (1), 1515 – 500kV breaker panel (use with 1510)
4. One (1), 4536 – 500kV breaker condition monitor
5. One (1), 5609 – fiber optic management panel
6. One (1), 4526_A – circuit breaker fiber optic make-up box

4. OTHER SCOPE OF WORK

The Project Developer will supply and own metering equipment that will provide instantaneous net MW and MVar per unit values in accordance with PJM Manuals M-01 and M-14D, and Sections 8.1 through 8.5 of Appendix 2 to the GIA.

5. MILESTONE SCHEDULE FOR COMPLETION OF TO WORK

Facilities outlined in this report are estimated to take 62 months to construct, from the time the Generator 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
Detailed Design	1	10
Permitting	3	54
Construction	54	62

6. ASSUMPTIONS IN DEVELOPING SCOPE/COST/SCHEDULE

General Assumptions:

1. The estimated procurement lead time for breakers is based on current Dominion pre-ordered breaker production slots. These production slots will be assigned after the agreement is executed.
2. The preliminary construction schedule is dependent on outage availability.
3. We do not anticipate an expansion of the existing switchyard.

Conceptual Design Notes:

1. Currently, the scope and estimate assume Dominion standard spread footer foundations. Once the soil information is available and it is prudent to change the design to “helical pile foundations” the Dominion team should be informed to adjust the project estimate at the earliest possible opportunity.
2. Security and fence type – design level 1
3. Heritage Substation, the new developer substation, and the new 500kV circuit are all located on Dominion property. No additional ROW will be required.
4. This scope assumes that an outage can be acquired on Lines 585 and 591 during construction.
5. There is no existing LiDAR data for Heritage Sub, the new 500kV Line, or the new developer

substation location. New LiDAR data will be required for detailed design.

6. Grading may be required at proposed structure 5XX/2. Currently, the site slopes towards the existing retention pond.
7. Existing tensions were obtained from plan and profile drawings. However, the existing tensions between structure 509/1 and 509/2 are based on the GITX-2076 design model.

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 AG1-153 GIA, and in PJM Manuals M01 and M14D. The details of applicable revenue metering requirements are given in section 4.1.6 Metering and Telecommunications of Dominion's Facility Interconnection Connection Requirement NERC Standard FAC-001 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.

a. Hourly compensated MWh received from the Generating Facility to the TO;
b. Hourly compensated MVARh received from the Generating Facility to the TO;
c. Hourly compensated MWh delivered from the TO to the Generating Facility; and
d. Hourly compensated MVARh delivered from the TO to the Generating Facility.

The Project Developer will access revenue meter via wireless transceivers or fiber cabling to meter with RS-485 or Ethernet communication port for dial-up reads. Project Developer must provide revenue and real time data to PJM from Project Developer Market Operations Center per "PJM Telemetry Data Exchange Summary" document available at PJM.com.

8. LAND REQUIREMENTS FOR INTERCONNECTION SUBSTATION

Land requirements for the Interconnection Substation needed for this interconnection project must meet the requirements in Dominion's Facility Interconnection Requirements, NERC Compliance Procedure FAC-001 (version 23), that is posted on PJM's website.

The Project Developer would be responsible for the following expectations in the area of Real Estate.

- The land required for Dominion's substation and project specific areas around must be deeded over title-in-fee.
- Any additional land needed for Storm Water Management, Landscaping, and Wetlands/Wetlands Mitigation.
- Dominion Real Estate and Counsel will provide standard real estate checklist word document. Process needs to start at least 6 months prior to closing date.
- Required subdivision plat and associated documentation to be reviewed prior to subdividing parcel with the county.
- Suitable Access Road from Substation to a Virginia/North Carolina State Maintained Roadway.
- Dominion will require access road, transmission line and utilities easement to the Substation.

- Any other Land/Permitting requirements required by the Substation.

9. ENVIRONMENTAL AND PERMITING

The Project Developer would be responsible for the following expectations in the area of Environmental and Permitting.

- Assessment of environmental impacts related to the Interconnection Facility and/or Network Upgrades including:

  Environmental Impact Study requirements

  Environmental Permitting

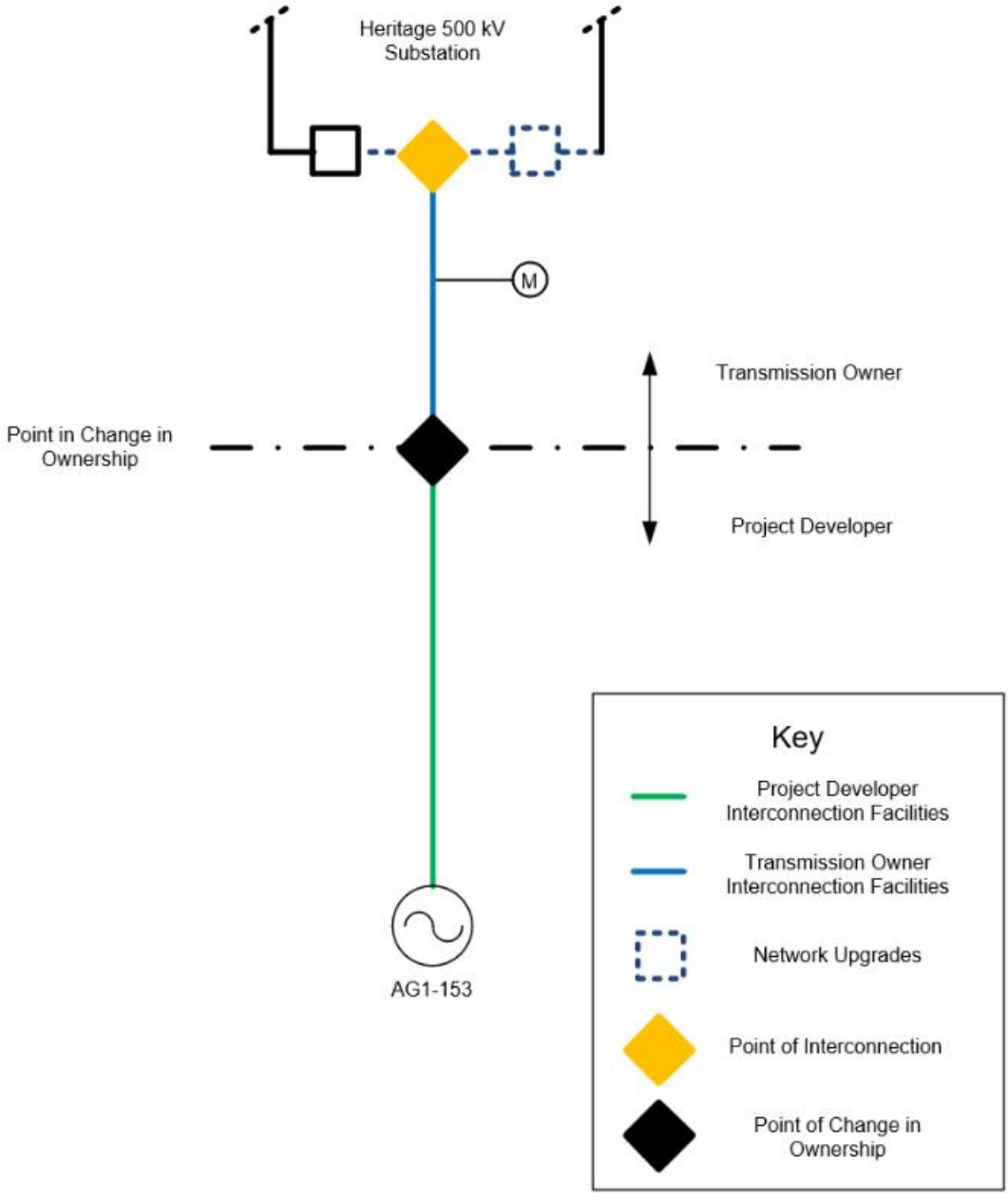
- Dominion will require a stormwater easement for substation specific stormwater design BMP's to allow access to and use of the facilities.

  A maintenance agreement should be in place in perpetuity for said stormwater facilities.

- Conditional Use Permit for Substation
- Any additional land needed for Storm Water Management, Landscaping, and Wetlands/Wetlands Mitigation
- Any other Permitting requirements required by the Substation

C. APPENDICES

Attachment #1: Single line Diagram for the Physical Interconnection



Attachment #2: Substation General Arrangement