Facilities Study Report

For

Physical Interconnection of

PJM Generation Interconnection Request

Project ID AH1-718

Nelson 345kV

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 ComEd.

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

A. Transmission Owner Facilities Study Summary

1. PROJECT DESCRIPTION

The Project Developer (PD) has proposed a storage uprate to a planned/existing natural gas Generating Facility located in Lee County, IL with a designated PJM Project ID of AH1-718.

This project is an uprate to the existing AA1-146/AA2-030 project(s) with the same Point of Change in Ownership.

The AH1-718 project is a 11.0 MW uprate (38.0 MW Capacity uprate) to the previous project(s). The total installed facilities will have a capability of 391 MW with 352 MW of this output being recognized by PJM as Capacity.

2. POINT OF INTERCONNECTION (POI)

The Generating Facility will interconnect with the ComEd transmission system via a direct connection into the TSS 155 Nelson 345 kV Substation Fenceline.

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 inside the TSS 155 Nelson Substation Fenceline.

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:

4.1. The PD is responsible for a 11MW uprate of the existing turbines.

4.2. At TSS942 Nelson Energy Center, in general, developer relaying, etc. to follow section 6.1 (Design F) of latest version of EED interconnection guidelines (for Generator Greater than 10MW) Rev 2: Effective 12/16/2021, with the following project specific notes:

4.2.1 ComEd Protection and Control Engineering must review all developer relay protection design drawings and relay settings.

4.2.2 Developer equipment impedance and/or test data must be provided to ComEd Protection and Control Engineering for all lines, transformers, and solar inverters to model in a short circuit program.

4.3. Generation Project Developer to provide uprated transformer test reports for the 345kV-13.8kV and 345kV-18.0kV step up transformers. Test reports must include %Z impedance and load loss, including type of Inverter/s used for ComEd short circuit modeling.

4.4. All changes to topology, including generation, must be modeled during the Phase 1 study for PRC-027 compliance. A protection system coordination study is required for new BES buses or when there is a 15% (or greater) change in the fault current for an existing BES bus. Settings changes may be required per the outcome of this coordination study.

4.5. The PD will be responsible to request and bear the cost of any outages required on existing transmission or distribution lines that may be required for the transport of any large equipment, i.e. turbines, rotors, turbine structures, etc.

4.6. Power output from the developer site shall be in accordance with the power quality standards contained in IEEE Standard 519. The generating units and all associated equipment at the developer site shall not introduce any distortion of ComEd's waveform or telephone or carrier interference that is inconsistent or conflicts with such standard.

4.7. The steady state voltage study for stability analysis will be performed by PJM.

B. Transmission Owner Facilities Study Results

The following is a description of the planned Transmission Owner facilities for the physical interconnection of the proposed AH1-718 project to ComEd transmission system. These facilities shall be designed according to ComEd Applicable Technical Requirements and Standards. Once built, ComEd will own, operate, and maintain these Facilities.

1. TRANSMISSION OWNER INTERCONNECTION FACILITIES

The ComEd Interconnection Facilities will include, but not be limited to, the following which are existing at TSS 155 Nelson for L.94201 and shall be verified for the addition of the AH1-718:

- A 345kV dead-end structure and foundation within the fence of the Project Developer's facility, to terminate the Project Developer's generator lead line.
- Line conductor from the dead-end structure to the bus position in the switchyard of the Project Developer's facility.
- One (1) Motor Operated Disconnect (MOD) switch.
- CT/PT, meters, and associated equipment to meter L.94201
- Foundation and structures

2. STAND ALONE NETWORK UPGRADES

Not applicable.

3. NETWORK UPGRADES

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

Expanding existing TO substation:

TSS 155 Nelson Upgrade

The existing substation TSS 155 Nelson 345kV, will be upgraded to interconnect the project with the ComEd transmission system.

1. TSS 155 Nelson
    - Review and reset relay setting for L15501, L15502, L15503, L15504, L94201, TR81, TR82 and TR84. Retain existing relays.
    - At TSS155 and at TSS942, update Fault data in CAPE, check for PRC-027 requirements
    - Modify mimic boards as required. No new panel installation is anticipated as part of this scope.
    - No control building expansion is anticipated. Any required work is expected to be limited to documentation updates, wiring verification, and configuration/testing associated with metering/telemetry.

Upgrades to neighboring facilities:

- TSS937 Lee Energy Center
    - Review and reset relay settings for 345kV L15501. Retain existing relays.
- TSS111 Electric Junction
    - Review and reset relay settings for 345kV L15502. Retain existing relays.
- ESS H471 Sterling Steel
    - Review and reset relay settings for 345kV L15504. Retain existing relays.
- TSS942 Nelson Energy Center

- Review and reset relay settings for 345kV L94201. Retain existing relays.

- TSS 940 Cordova Energy Center
  - Review and reset relay settings for 345kV L15503. Retain existing relays.

4. OTHER SCOPE OF WORK

Review and update, if required, the ComEd-owned AMI metering and revenue grade metering for generator outputs and auxiliary power requirements. Revenue grade metering must meet the requirements established by the published EED interconnection guidelines. The metering equipment will be verified to properly meter the output when the generation is online as well as metering power supplied from the ComEd system for generator auxiliary power requirements when the generation is offline. Metering shall include registration of the generator output and auxiliary power usage. Telemetry to ComEd TSO (including CB status, MW, MVAR, MWh, and voltage values) will be verified and configured as required using existing infrastructure; no new hardware installation is anticipated as part of this scope.

5. MILESTONE SCHEDULE FOR COMPLETION OF WORK

Facilities outlined in this report are estimated to take 12 months to complete, from the time the Generation Interconnection Agreement is fully executed. This schedule may be impacted by the timeline for engineering coordination, procurement of any long-lead items if subsequently identified, and the ability to obtain outages to test and place the facilities in service.

Description	Start month	Finish month
Detailed Design	1	6
Execution	7	12

6. ASSUMPTIONS IN DEVELOPING SCOPE/COST/SCHEDULE

- This study is based on the Phase 2 System Impact Report for PJM Generation Interconnection New Service Request Project AH1-718. The steady-state voltage study for stability analysis will be performed by PJM during the Facility Phase. The PJM study could identify upgrades to the ComEd system that would become part of this project's scope of work. It is assumed that all associated network upgrades, as listed in the above System Impact study, are complete prior to this project being placed in service.
- This cost estimates assume that work will be performed during normal weekdays and with no overtime. Transmission line outages for construction have not been identified, but generally are available from September to May. These outages are controlled by PJM.

- Costs are based on 2026 rates and do not reflect a potential increase in Labor or Material costs after 2026.
- ComEd cost estimate is valid for six (6) months after Facilities Study release by PJM.
- The Project Developer will be responsible to request and bear the cost for relocation of existing transmission or distribution lines (including structures and other facilities) that may be required for transmission line crossings, the transport of any large equipment, such as turbines, rotors, turbine structures, cranes, etc. Formal submittal of this request to ComEd's TSO for ultimate review by PJM can be made 7 months prior to back feed request date.
- All upgrades to facilities included in this document will be required to meet latest ComEd standards.
- Upgrades are subject to change based on detailed design development.
- ComEd will complete pre-design and post construction survey for the transmission and substation upgrades, as required. This includes, but is not limited to, the LIDAR survey and video imaging for transmission lines. Costs associated with this are at the expense of the Project Developer. Pre-design survey must be completed prior to detailed engineering.
- This Facilities Study is time dependent. If the project is not into construction within one year of the issuance, the study will be void and the project re-studied, requiring the completion of a new Facilities Study.
- This facilities study report (FSR) assumes that generator output and plant auxiliary power consumption can both be metered with revenue accuracy as described. The final revenue metering configuration and equipment will be confirmed, and may be revised, during detailed engineering following execution of the Generator Interconnection Agreement (GIA).

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 AH1-718 GIA, and in PJM Manuals M01 and M14D. The details of applicable revenue metering requirements are given in the 'ComEd Interconnection Guidelines" posted on PJM website.

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

REVENUE METERING FOR PJM AND COMED
The revenue meter measures the wholesale energy output (Hourly compensated net MWH and Hourly compensated net MVARH) of the Generating Facility.
The metering equipment, including revenue meter and CT/PT shall be installed, at Project Developer's expense, at the interconnection substation on ComEd side of the Point of Change in Ownership.
ComEd shall own, operate, maintain, inspect, and test all the metering equipment as set forth in 'Testing of Metering Equipment' section of the PJM Tariff, at the Project Developer's expense.

REAL-TIME METERING FOR PJM

The Project Developer shall install, own, operate, maintain, inspect, and test real-time metering equipment to measure and transmit directly to PJM the real time MW, MVAR, voltage and status of electrical equipment such as circuit breakers and Motor Operated Disconnect switches, in conformance with the requirements listed in PJM Manuals M-01 and M-14D, at the Project Developer's expense.

RETAIL METERING FOR COMED
The AMI Meter measures the energy consumption by the Project Developer at transmission level and hence shall be designed to measure low MW flow.
The metering equipment including AMI Meter and CT/PT shall be installed at the interconnection substation on ComEd side of the POI, at the Project Developer's expense.
ComEd shall own, operate, maintain, inspect, and test all the metering equipment as set forth in the 'ComEd Interconnection Guidelines'.

BATTERY CHARGE METER FOR COMED
FERC Order 841 designates inflow to charge battery storage facility as wholesale power. To separately measure the power inflow to charge the battery and bill it at wholesale rate, the Project Developer needs to install the following equipment.
Battery Charge Meter including Current Transformer/Potential Transformer (CT/PT) at the output terminal of the battery storage facility to measure power inflow from transmission system to charge the battery storage facility.
Fiber cable to provide communication link to transmit Battery Charge Meter data to the ComEd SCADA system.

8. LAND REQUIREMENTS FOR INTERCONNECTION SUBSTATION

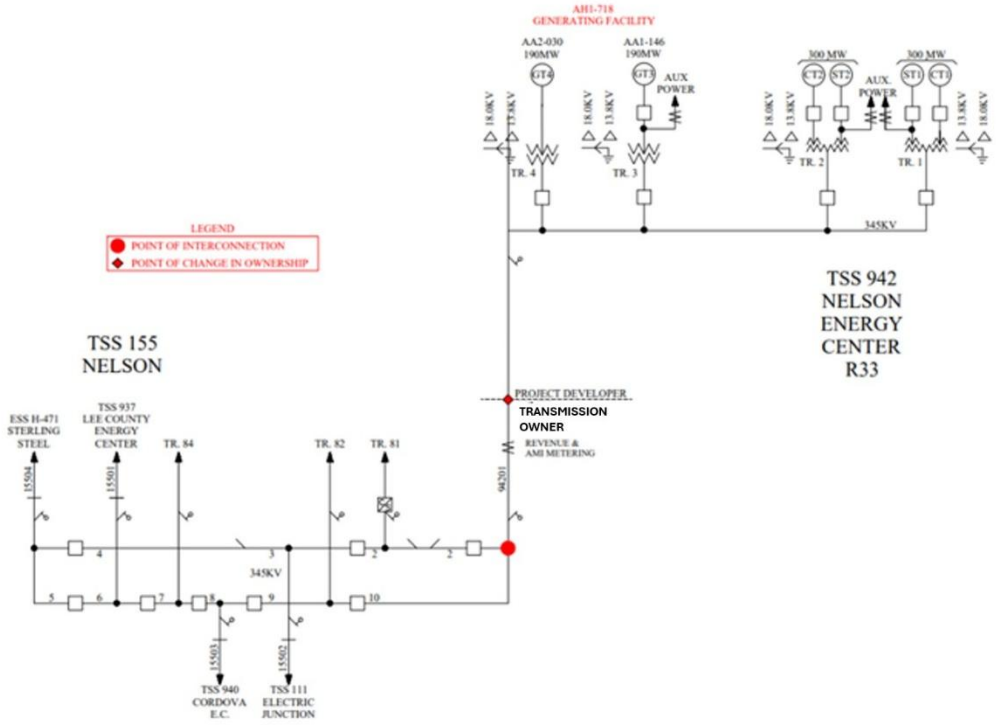
No additional easements, access rights, or temporary or permanent real property rights or acquisitions were identified as required for network upgrades to the ComEd system or for the project to interconnect at this location within this study. However, as further needs are assessed in detailed engineering, design and/or construction activities, if it is determined that there is a need for easements, access rights, or temporary or permanent real property rights or acquisitions, the developer is fully responsible for the costs to acquire these required land rights. Also, as necessary, the schedule will be adjusted accordingly to account for the necessary time to obtain these required land rights. All easements, access rights, or temporary or permanent real property rights or acquisitions shall comply with all ComEd requirements as detailed in "Land requirements for Interconnection Substations".

9. ENVIRONMENTAL AND PERMITING

- No environmental concerns and/or permitting requirements were identified as needed by this study. However, should detailed engineering and design and/or construction activities identify the need for an environmental study and/or permit requirements, the developer is fully responsible for the costs related to any environmental study, any actions to address the identified environmental impacts and the permits. Also, the schedule will be adjusted accordingly to account for the necessary time to perform the environmental study, address the identified environmental impacts and to obtain the permits, if applicable. All environmental studies, actions to address environmental impacts and permit actions shall comply with all ComEd requirements as detailed in "ComEd Environmental Requirements for Third Party Developers", and with all local, city, county, state, and federal requirements.

C. APPENDICES

Attachment #1: Single line Diagram for the Physical Interconnection


AH1-718
GENERATING FACILITY
AA2-030
190MW
AA1-146
190MW
GT4
GT5
AUX
POWER
300 MW
ST2
ST2
AUX.
POWER
ST1
ST1
300 MW
18.0KV
13.8KV
TR. 4
TR. 3
TR. 2
TR. 1
345KV
LEGEND
POINT OF INTERCONNECTION
POINT OF CHANGE IN OWNERSHIP
TSS 942
NELSON
ENERGY
CENTER
R33
TSS 155
NELSON
PROJECT DEVELOPER
TRANSMISSION
OWNER
REVENUE &
AMI METERING
94201
ESS H-471
STERLING
STEEL
TSS 937
LEE COUNTY
ENERGY
CENTER
TR. 84
TR. 82
TR. 81
15504
15501
345KV
15503
15502
TSS 940
CORDOVA
E.C.
TSS 111
ELECTRIC
JUNCTION