PJM Generation Interconnection

ComEd Facilities Study Report

For

Queue Positons #AA1-146 & AA2-030

TSS 155 Nelson 345kV

Revision 0

December 2020

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A. FACILITIES STUDY INTRODUCTION

1. PROJECT DESCRIPTION

Invenergy Nelson Expansion LLC, the Interconnection Customer (IC), has proposed the construction of two 190 MW natural gas fueled turbine generators to an existing generating facility. This upgraded facility located in Lee County, IL will interconnect with the ComEd transmission system.

The natural gas-fired facility, including TSS 942 Nelson Energy Center collector substation, interconnects to TSS 155 Nelson 345kV Substation via transmission line L94201. The increased generation will require replacement of L15507 138kV breaker, CCVTs, and 138kV high bus between disconnect switches between L15507 138kV breaker and TR84 138kV breaker. The proposed increased generation is shown on the planning diagram in Attachment #1.

2. AMENDMENTS TO THE IMPACT STUDY DATA OR IMPACT STUDY RESULTS

2.1 Not applicable.

3. INTERCONNECTION CUSTOMER SCHEDULE

The schedule which is based upon the assumption that a CPCN (Certificate of Public Convenience and Necessity), from the ICC (Illinois Commerce Commission) will not be required. Additionally, the customer schedule for the collector substation will need to be coordinated with the construction of the interconnection substation construction by ComEd (See Milestone Schedule page 6).

4. SCOPE OF WORK BY INTERCONNECTION CUSTOMER (IC)

4.1. The IC is responsible for construction of the additional 380 MW natural gas generation, which includes the following:

- 4.1.1 Two (2) 190MW GE 7FH2 combustion turbine generators
- 4.1.2 Two (2) 18kV circuit breakers
- 4.1.3 Two (2) 18kV-345kV Step-up transformers (GSU's)
- 4.1.4 Two (2) 345kV circuit breakers and disconnect switches
- 4.1.5 Relaying per ComEd standards

4.2. The IC 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.

5. DESCRIPTION OF FACILITIES INCLUDED IN THE FACILITIES STUDY

5.1 TSS 155 Nelson & TSS 107 Dixon Substations (N4601)

5.1.1 138kV breaker for L15507 will be replaced with a 138kV breaker with minimum rating of 3000A continuous and 63kA interrupting capacity. Motor operated disconnect switches (MOD) will be replaced on both sides of breaker.

5.1.2 Coupling capacitor voltage transformer (CCVT) to be replaced on each phase of breaker line side.

5.1.3 Steel and foundation for MODs and CCVTs will be replaced. Breaker foundation to be reused for new breaker.

5.1.4 High bus between disconnect switches for the L15507 138kV breaker and the TR84 138kV breaker to be replaced. The A-frame bus connecting the high bus to low bus near the TR83 138kV breaker to be replaced with flexible conductor. The manually operated disconnect switch and related structure and foundations to be removed and replaced with new custom steel bus support and foundation. Bus support to include vertical V-break motor-operated disconnect on breaker side of structure. Conduit, and control and power cables will need to be added to change from manual operated disconnect to motor operated.

5.1.5 Fault current bus evaluation and grounding study for TSS 155 Nelson and TSS 107 Dixon.

5.1.6 Relay setting review related to increase in fault current for TSS 155 Nelson and TSS 107 Dixon.

5.1.7 ComEd will be responsible to evaluate the adequacy of existing station batteries and battery chargers due to new SEL-2440 installed in breaker control cabinet.

5.1.8 Existing L15507 line relaying to be maintained.

5.1.9 Settings on L94201 to be reviewed for upgrades at TSS 942

5.1.10 No fiber/communication scope needed between TSS 155 Nelson and TSS 942 Nelson Energy Center or on L15507.

6. TOTAL COSTS OF TRANSMISSION OWNER FACILITIES INCLUDED IN FACILITY STUDY

The estimated total cost of AA1-146 & AA2-030 project for network upgrades is $1,800,756. The developer is ultimately responsible for all ComEd costs incurred on the project.

NETWORK #	SITE LOCATION	TOTAL PROJECT COST
N4601	**TSS 155 Nelson Interconnection Station Upgrade**	$1,800,756
	Total Cost of ComEd Work	$1,800,756

NOTE: Costs are based on 2020 rates and do not reflect potential increase of labor or material costs.

7. SUMMARY OF MILESTONE SCHEDULES FOR COMPLETION OF WORK INCLUDED IN FACILITY STUDY

Description	Start	Finish
Prepare Project Diagram & Specifications	Day 1	Day 75
Project Design	Day 75	Day 225
Material Procurement	Day 200	Day 450
Construction at TSS 155 Nelson	Day 450	Day 510
Testing and Commissioning	Day 510	Day 540

The above Milestone Schedule starting date is when the Interconnection Services Agreement and the Construction Services Agreement (if applicable) is executed and deposit received. The schedules are based upon the assumption that the CPCN from the ICC will not be required. The exact Milestone Schedule will be negotiated and determined upon the execution of the Interconnection Services Agreement and Construction Services Agreement.

B. TRANSMISSION OWNER (COMED) FACILITIES STUDY RESULTS

1. TRANMISSION LINES -NEW

   1.1 Not applicable.

2. TRANSMISSION LINES - UPGRADES

   2.1 Not applicable.

3. NEW SUBSTATION / SWITCHYARD FACILITIES

   3.1 Not applicable.

4. UPGRADES TO EXISTING SUBSTATION / SWITCHYARD FACILITIES

   ComEd will be responsible for performing design, procurement, construction and testing to upgrade existing protective relaying and SCADA for 345kV L.94201 from TSS 155 Nelson to TSS 942 Nelson Energy Center.

   4.1 At TSS 155 Nelson for 138kV L15507: (N4601)

   For 138kV L15507, replace circuit breaker with new 138kV circuit breaker capable of 3000A continuous and 63kA interrupting. Reuse existing breaker foundation for new breaker. Replace motor operated disconnect switches with associated steel and foundations on both sides of breaker. Replace coupling capacitor voltage transformers on line side of breaker and associated steel and foundation. Install SEL-2440 in control cabinet for monitoring. There is no fiber/communication scope required for this upgrade.

   High bus between disconnect switches for the L15507 138kV breaker and the TR84 138kV breaker to be replaced. The A-frame bus connecting the high bus to low bus near the TR83 138kV breaker to be replaced with flexible conductor. The manually operated disconnect switch and related structure and foundations to be removed and replaced with new custom steel bus support and foundation. Bus support to include vertical V-break motor-operated disconnect on breaker side of structure. Conduit, and controls and power cables will need to be added to change from manual operated disconnect to motor operated.

5. METERING

   5.1 Existing metering on L94201 will provide necessary metering for additional AA1-146 and AA2-030 connections. Metering requirements will be revisited in detailed design

6. ENVIRONMENTAL, REAL ESTATE, AND PERMITING ISSUES

   6.1 Not applicable.

7. SUMMARY OF RESULTS OF STUDY

7.1 Cost Estimate:

The following estimate is a breakdown of the costs of the ComEd work for #AA1-146 & #AA2-030 network upgrades.

NETWORK #	SITE LOCATION	Direct Material	Indirect Material	Direct Labor	Indirect Labor	TOTAL PROJECT COST
N4601	**TSS 155 Nelson Interconnection Station Upgrade**	$307,402	$19,419	$1,130,066	$343,869	$1,800,756
	Total Cost					**$1,800,756**

Note:

Costs are based on 2020 rates and do not reflect potential increase of labor or material costs.

[1] IL sales taxes not reflected in this cost estimate.

[2] Carrying charges are anticipated to be zero.

Given that costs associated with this project, it will be invoiced on a quarterly basis prior to work being completed; carrying charges are anticipated to be zero.

7.2 Milestone Schedule

Description	Start	Finish
Prepare Project Diagram & Specifications	Day 1	Day 75
Project Design	Day 75	Day 225
Material Procurement	Day 200	Day 450
Construction at TSS 155 Nelson	Day 450	Day 510
Testing and Commissioning	Day 510	Day 540

8. ASSUMPTIONS IN DEVELOPING COSTS AND SCHEDULES

8.1 The Schedule start date is based on ISA/CSA contract being executed by all parties and deposit received.

8.2 Cost Estimates assume that work will be performed during normal weekdays and with no overtime.

8.3 Foundation design assumes typical soil conditions at locations and will be subject to change after soil boring tests.

8.4 The IC will be responsible to request and bear the cost for relocation of existing transmission or distribution lines (including structures) that may be required for transmission line crossings, the transport of any large equipment, such as turbines, rotors, turbine structures, cranes, etc.

8.5 Back feed date is not yet approved. 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.

8.6 Customer to upload as- built drawings to ComEd drawing system (Meridian).

8.7 This Facility Study is time dependent. If the project is not into construction within one year of the issuance, the Facility Study will be void and the project re-studied, requiring completion of a new Facility Study.

C. APPENDIX

Attachment #1: High Level Planning Diagram Depicting Interconnection Facilities and Points of Ownership/Demarcation

Attachment #1: High Level Planning Diagram Depicting Interconnection facilities and Ownership/Demarcation