Generation Interconnection

Facilities Study Report

for

Queue Projects AC1-174/AC1-175

Losantville 345 kV

Randolph County, Indiana

December, 2020

1 Facilities Study Summary

1.1 Project Description

Riverstart Solar Park proposes to install PJM Projects AC1-174 and AC1-175, a 200 MW (76.5 MW Capacity) solar generating facility in Randolph County, Indiana (Figure 2). The point of interconnection for the generating facility will be via a direct connection to the PJM project U2-090 generation lead (Figure 1).

The requested backfeed date for the project is: 06/01/2021.

The requested in-service date for the project is: 12/01/2021.

1.2 Amendments/Changes to the Impact Study Report

The Point of Interconnection studied in the System Impact Study included a new separate generator lead to Losantville, terminating in a new position at Losantville formed by the addition of two 345 kV circuit breakers. At the start of the Facilities Study, Riverstart Solar requested that the Point of interconnection instead be formed by cutting into the existing U2-090 gen tie line, converting it to a 3-terminal line.

Note: This Facilities Study Report was prepared based on initial dates from the Interconnection Customer. Since then, the Interconnection Customer provided updated dates and the final schedule for the Transmission Owner work is shown below:

Activity	Dates
Engineering Start	12/14/2020
Material Ordered	12/14/2020
Construction Start	03/1/2021
Outage Requests Made By	12/31/2020
Outage Start	04/19/2021
Ready For Back Feed	05/19/2021

1.3 Interconnection Customer Schedule

PJM and AEP understand that the Interconnection Customer has established the following schedule dates:

Receive back feed power from AEP: 06/01/2021

Generation Commercial Operation Date: 12/01/2021

1.4 AEP's Scope of Work to Facilitate Interconnection

- It is understood that the Interconnection Customer is responsible for all of the connection costs associated with interconnecting the PJM project AC1-174/175 to the AEP transmission system. The cost of the customer's generating facility and the costs for any changes to the existing U2-090 generator lead to connect the AC1-174/175 generating facility to AEP's transmission system (Beyond the first span exiting the Losantville station) are not included in this report; these are assumed to be the Customer's responsibility.

- The customer will also be responsible for the cost of modifying or expanding the fiber-optic connection from the existing U2-090 telecom equipment to add connectivity for the AC1-174/175 facilities to the fiber demarcation point outside of AEP's Losantville 345 kV station. These costs are not included in this report. Changes inside the Losantville station and from the station to the demarcation point are included in the report.

1.5 Description of Transmission Owner Facilities Included in the Facilities Study

1.5.1 Direct Connection Work

- Provide connectivity to support direct fiber relaying between Losantville Station & Headwaters 1 Station. Relaying will utilize existing fiber. The customer will be responsible for the fiber work on the IPP side of the points of transition.
- AEP will need to review and update protection and control settings at the Losantville 345 kV substation.
- AEP will need to revise the protection scheme at the Losantville 345 kV substation on the generator lead, to accommodate the requested 3-terminal configuration.

1.5.2 Non-Direct Connection Work

1.5.3 Attachment Facilities Work

1.5.4 Network Upgrade Work

1.6 Total Cost of Transmission Owner Facilities Included in the Facilities Study:

Attachment Facilities	$0
Direct Connection Facilities	$310,000
Non-Direct Connection Facilities	$0
Network Upgrade Facilities	$0
Total Cost	$310,000

The estimates do not include the impact that delays in obtaining ROW, permits, or other approvals may have.

1.7 Summary of Schedule Milestones for Completion of Transmission Owner Work Included in Facilities Study:

Standard Process

Task	Dates
Engineering Start	08/01/2020
Material Ordered	10/01/2020
Construction Start (Grading & Below Grade)	NA
Construction Start (Above Grade)	04/01/2021
Outage Requests Made By	11/01/2020
Outage (Structure Foundations)	NA
Outage (Cut-in & Testing)	05/01/2021
Ready For Back Feed	06/01/2021
In-Service Date	12/01/2021

Assumptions

- **System conditions must allow scheduled outages to occur.**
- **The customer will have their construction and required checkout completed prior to the start of the cut-in and testing outage.**

Transmission Outage Plan

- **No transmission outage plan has been specified at this time**
- **Note that all BES outages are subject to both PJM and AEP Operations outage-scheduling requirements.**

2 Transmission Owner Facilities Study Results

2.1 Transmission Lines – New

2.2 Transmission Lines – Upgrades

2.3 Substation Facilities – New

2.4 Substation Facilities – Upgrades

- Convert the protection scheme for the existing U2-090 (Headwaters #1) generator lead at AEP's Losantville substation from a 2-terminal configuration to a 3-terminal configuration to allow the new IPP to connect on the existing line.
- Protective-relay settings at AEP's Losantville substation will need to be reviewed and updated to coordinate with the new generation substation. Due to the new generation source being added, Protective relay-settings for other nearby facilities including the remainder of the Losantville 345 kV substation will have to be reviewed and updated to account for the addition of the AC1-174/AC1-175 generation source.

2.5 Metering & Communications

A standard station communication scheme will be used. All metering equipment shall meet the requirements as specified by AEP in the "AEP Metering and Telemetering Requirements for AEP Transmission Customers" document (SS-490011). Communication requirements are published in the "AEP SCADA RTU Requirements at Transmission Interconnection Facilities" (SS-500000).

AEP will need to update the telecom equipment at Losantville on the Headwaters #1 generator lead for SCADA/EMS functionality. Fiber-optic cable will be extended to the AEP/AC1-174/175 point of interconnection. Relaying will utilize existing fiber.

The Generation Interconnection Agreement does not in or by itself establish a requirement for American Electric Power to provide power for consumption at the developer's facilities. A separate agreement may be reached with the local utility that provides service in the area to ensure that infrastructure is in place to meet this demand, and proper metering equipment in installed. The metering work above and cost indicated below does not include any potential work or cost to address metering requirements of the local service provider. It is the responsibility of the developer to contact the local service provider to determine if a local service agreement is required.

2.6 Environmental, Real Estate, and Permitting issues

The Interconnection customer is expected to obtain, at its' cost, all necessary permits and provisions for the IPP station.

2.6.1 System Modeling & Operating Requirements

In addition to the IPP modeling requirements imposed by PJM as part of the Generation Interconnection process, the following system modeling parameters will need to be supplied by the Interconnection Customer to AEP:

- None

2.7 Summary of Results of Study

Cost Estimates for AEP

Task	NUN	Engineering	Material	Construction	Other	TOTAL
Review area relay settings & Modify Generator lead P&C scheme to 3-terminal, including fiber jumper and wiring changes	n6820	$150,000	$3,000	$99,000	58,000	310,000
TOTAL		$150,000	$3,000	$99,000	58,000	310,000

2.8 Information Required for Interconnection Service Agreement

Description	Attachment Facilities	DCF Facility	NUF Facility	TOTAL
Direct Material		$2,600		$2,600
Direct Labor		$159,000		$159,000
Indirect Material		$500		$500
Indirect Labor		148,000		148,000
TOTAL		310,100		310,100

Figure 1: Point of Interconnection Losantville 345 kV Substation One-Line Diagram

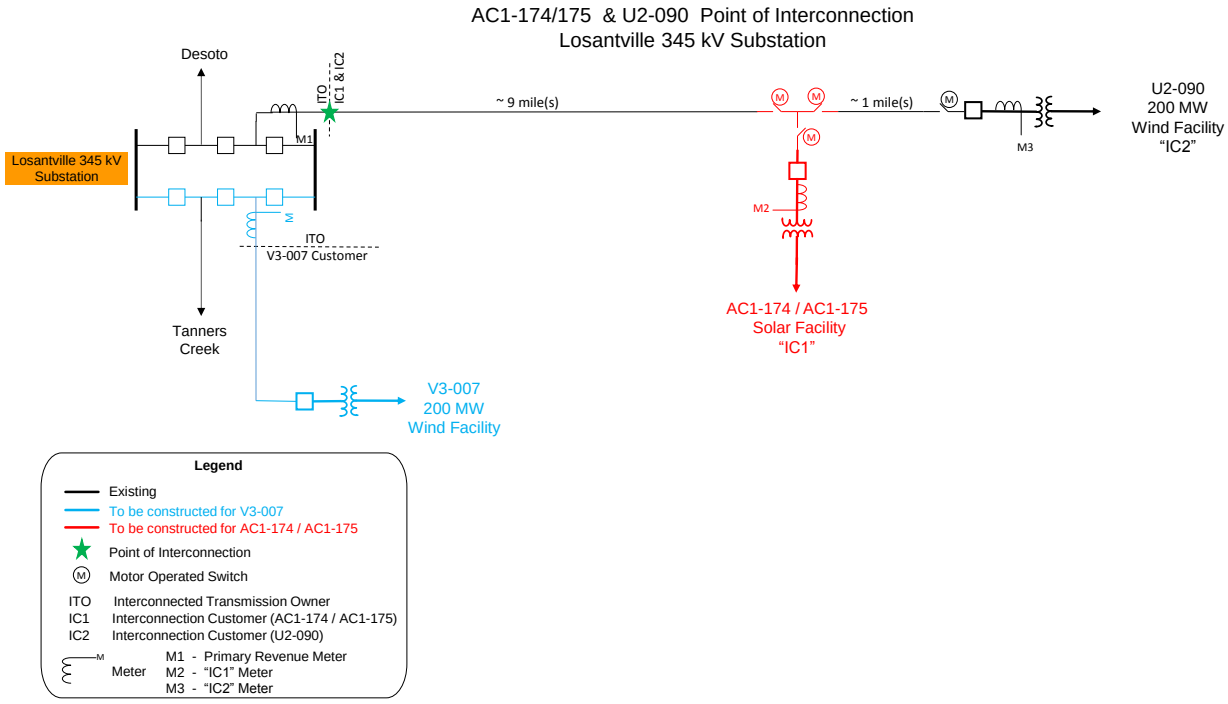

Figure 1: AC1-174/175 Point Of Interconnection One Line Diagram

The Point of Interconnection ("POI") is at Pole #1 of the generator lead line outside of Interconnected Transmission Owner's Losantville Substation with Headwaters Wind Farm LLC owning the first dead end structure, 345 kV generator lead line and remaining structures back to the U2-090 generation collector station. The Interconnection Customer shares the Point of Interconnection and the U2-090 Customer Interconnection Facilities with Headwaters Wind Farm LLC. The Headwaters Wind Farm LLC facility is subject to a separate Interconnection Service Agreement dated May 5, 2010 (PJM Queue U2-090).

Figure 2: Point of Interconnection Map

Figure 2: AC1-174/175 Point of Interconnection Map