Generation Interconnection

Impact Study Report

for

Queue Project AE1-050

GAVIN UNIT 1 765 KV

18 MW Capacity / 18 MW Energy

August, 2019

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1 Preface

The intent of the System Impact Study is to determine a plan, with approximate cost and construction time estimates, to connect the subject generation interconnection project to the PJM network at a location specified by the Interconnection Customer. As a requirement for interconnection, the Interconnection Customer may be responsible for the cost of constructing: Network Upgrades, which are facility additions, or upgrades to existing facilities, that are needed to maintain the reliability of the PJM system. All facilities required for interconnection of a generation interconnection project must be designed to meet the technical specifications (on PJM web site) for the appropriate transmission owner.

In some instances an Interconnection Customer may not be responsible for 100% of the identified network upgrade cost because other transmission network uses, e.g. another generation interconnection or merchant transmission upgrade, may also contribute to the need for the same network reinforcement. The possibility of sharing the reinforcement costs with other projects may be identified in the Feasibility Study, but the actual allocation will be deferred until the System Impact Study is performed.

The System Impact Study estimates do not include the feasibility, cost, or time required to obtain property rights and permits for construction of the required facilities. The project developer is responsible for the right of way, real estate, and construction permit issues. For properties currently owned by Transmission Owners, the costs may be included in the study.

An Interconnection Customer with a proposed new Customer Facility that has a Maximum Facility Output equal to or greater than 100 MW shall install and maintain, at its expense, phasor measurement units (PMUs). See Section 8.5.3 of Appendix 2 to the Interconnection Service Agreement as well as section 4.3 of PJM Manual 14D for additional information.

2 General

Gavin Power, LLC proposes to increase the output of Gavin Unit 1 from 1331 MW to 1349 MW (MFO and Capacity). This unit was previously addressed in PJM queue positions P61 and #AB1-058. Gavin is a coal-fired generating facility located in Gallia County, Ohio. This upgrade request has been assigned PJM queue number AE1-050 (see Figure 1). The point of interconnection is a direct connection to AEP's Gavin 765 kV station.

This is the first phase of a steam path upgrade of Gavin Unit 1's low pressure turbines C and D, including new outer blade carriers. No transformer or generator parameters are changing.

The requested in service date is December 6, 2020. This study does not imply AEP's commitment to this in-service date.

The objective of this System Impact Study is to determine budgetary cost estimates and approximate construction timelines for identified transmission facilities required to connect the proposed generating facilities to the AEP transmission system. These reinforcements include the Attachment Facilities, Local Upgrades, and Network Upgrades required for maintaining the reliability of the AEP transmission system.

Queue Number	**AE1-050**
Project Name	GAVIN UNIT 1 765 KV
Interconnection Customer	Gavin Power, LLC
State	Ohio
County	Gallia
Transmission Owner	AEP
MFO	1349
MWE	18
MWC	18
Fuel	Coal
Base case Study Year	2022

2.1 Point of Interconnection

2.2 The Point of Interconnection for AE1-050 will be AEP transmission system at the Gavin 765kV switchyard.Cost Summary

The AE1-050 project will be responsible for the following costs:

Description	Total Cost
Attachment Facilities	$0
Direct Connection Network Upgrade	$0
Non Direct Connection Network Upgrades	$0
Allocation for New System Upgrades	$0
Contribution for Previously Identified Upgrades	$0
Total Costs	$0

3 Transmission Owner Scope of Work

The attachment facilities would be part of the Interconnection Customer scope of work because the modification or facility construction would be made within the existing facilities of Gavin #1 765 kV.

Note: It is assumed that the existing 765 kV revenue metering and generator lead will be adequate for the additional generation in this request.

4 Attachment Facilities

There are no Attachment Facilities required to support this interconnection.

5 Direct Connection Cost Estimate

There are no Direct Connection Facilities required to support this interconnection.

6 Non-Direct Connection Cost Estimate

There are no Non-Direct Connection Facilities required to support this interconnection.

7 Incremental Capacity Transfer Rights (ICTRs)

No ICTRs are granted for this project

8 Interconnection Customer Requirements

It is understood that Gavin Power is responsible for all costs associated with this interconnection. The Gavin Power's generating plant costs are not included in this report; these are assumed to be Gavin Power's responsibility.

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 is installed. It is the responsibility of the developer to contact the local service provider to determine if a local service agreement is required.

Requirement from the PJM Open Access Transmission Tariff:

1. An Interconnection Customer entering the New Services Queue on or after October 1, 2012 with a proposed new Customer Facility that has a Maximum Facility Output equal to or greater than 100 MW shall install and maintain, at its expense, phasor measurement units (PMUs). See Section 8.5.3 of Appendix 2 to the Interconnection Service Agreement as well as section 4.3 of PJM Manual 14D for additional information.
2. The Interconnection Customer may be required to install and/or pay for metering as necessary to properly track real time output of the facility as well as installing metering which shall be used for billing purposes. See Section 8 of Appendix 2 to the Interconnection Service Agreement as well as Section 4 of PJM Manual 14D for additional information.

9 Schedule

9.1 Schedule

It is anticipated that the time between receipt of executed agreements and Commercial Operation may range from 12 to 18 months if no line work is required. If line work is required, construction time would be between 24 to 36 months after signing an interconnection Agreement.

9.2 Conclusion

Based upon the results of this System Impact Study, the increase of 18.0 MW (18.0 MW Capacity) generation requested in PJM queue position AE1-050 to the existing 1331 MW Gavin Unit 1 MFO and Capacity will not require additional interconnection charges.

10 Revenue Metering and SCADA Requirements

10.1 PJM Requirements

The Interconnection Customer will be required to install equipment necessary to provide Revenue Metering (KWH, KVARH) and real time data (KW, KVAR) for IC's generating Resource. See PJM Manuals M-01 and M-14D, and PJM Tariff Section 8 of Attachment O.

10.2 AEP Requirements

The Interconnection Customer will be required to comply with all AEP Revenue Metering Requirements for Generation Interconnection Customers. The Revenue Metering Requirements may be found within the "Requirements for Connection of New Facilities or Changes to Existing Facilities Connected to the AEP Transmission System" document located at the following link:

http://www.pjm.com/~/media/planning/plan-standards/private-aep/aep-interconnection-requirements.ashx

11 Network Impacts

The Queue Project AE1-050 was evaluated as an 18.0 MW (Capacity 18.0 MW) injection into the Gavin 765 kV substation in the AEP area. Project AE1-050 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AE1-050 was studied with a commercial probability of 1.00. Potential network impacts were as follows:

Summer Peak Load Flow

12 Generation Deliverability

(Single or N-1 contingencies for the Capacity portion only of the interconnection)

None

13 Multiple Facility Contingency

(Double Circuit Tower Line, Fault with a Stuck Breaker, and Bus Fault contingencies for the full energy output)

None

14 Contribution to Previously Identified Overloads

(This project contributes to the following contingency overloads, i.e. "Network Impacts", identified for earlier generation or transmission interconnection projects in the PJM Queue)

None

15 Potential Congestion due to Local Energy Deliverability

PJM also studied the delivery of the energy portion of this interconnection request. Any problems identified below are likely to result in operational restrictions to the project under study. The developer can proceed with network upgrades to eliminate the operational restriction at their discretion by submitting a Merchant Transmission Interconnection request.

None

16 Light Load Analysis

None

17 Steady-State Voltage Requirements

(Summary of the VAR requirements based upon the results of the steady-state voltage studies)

To be evaluated during the Facilities Study Phase

18 Stability and Reactive Power Requirement for Low Voltage Ride Through

(Summary of the VAR requirements based upon the results of the dynamic studies)

To be evaluated during the Facilities Study Phase

19 System Reinforcements

ID	Index	Facility	Upgrade Description	Cost	Cost Allocated to AE1-050	NUN
			TOTAL COST	$0		

None

20 Flow Gate Details

The following appendices contain additional information about each flowgate presented in the body of the report. For each appendix, a description of the flowgate and its contingency was included for convenience. However, the intent of the appendix section is to provide more information on which projects/generators have contributions to the flowgate in question. Although this information is not used "as is" for cost allocation purposes, it can be used to gage other generators impact. It should be noted the generator contributions presented in the appendices sections are full contributions, whereas in the body of the report, those contributions take into consideration the commercial probability of each project.

Affected Systems

21 Affected Systems

21.1 LG&E

None

21.2 MISO

MISO Impacts to be determined during later study phases (as applicable).

21.3 TVA

None

21.4 Duke Energy Progress

None

21.5 NYISO

None

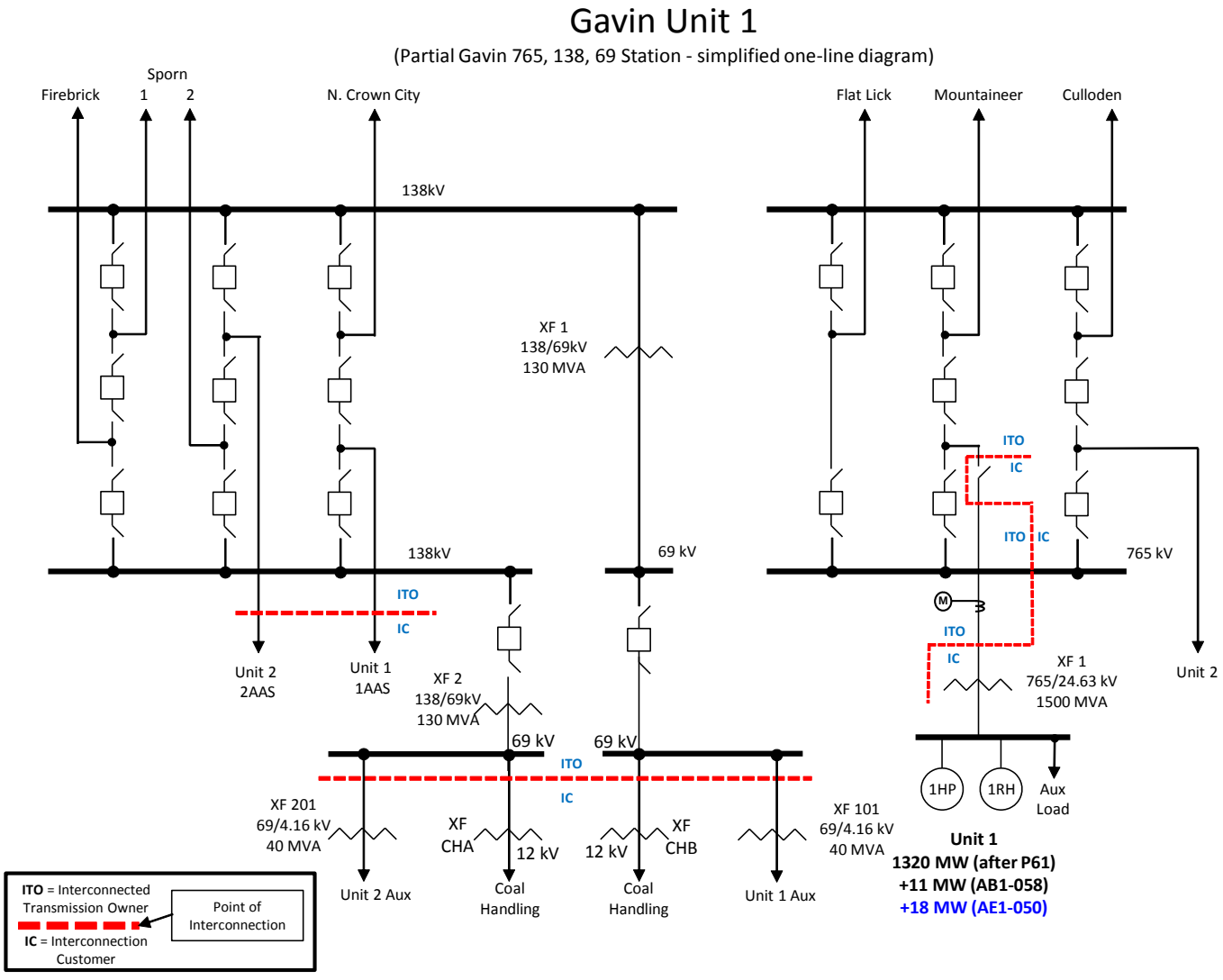
Short Circuit

22 Short Circuit

The following Breakers are over-duty

None

23 Figure 1: AE1-050 Point of Interconnection (Gavin 765 kV) Single-Line Diagram



24 Figure 2: AE1-050 Point of Interconnection (Gavin 765 kV)