

***Generation Interconnection  
Feasibility Study Report***

***For***

***PJM Generation Interconnection Request  
Queue Position AA2-141***

***Beverly 345 kV***

**August 2015**

## **Preface**

The intent of the Feasibility Study is to determine a plan, with high level estimated cost and construction time estimates, to connect the subject generation to the PJM network at a location specified by the Interconnection Customer (IC). The IC may request the interconnection of generation as a capacity resource or as an energy-only resource. As a requirement for interconnection, the IC may be responsible for the cost of constructing: (1) Direct Connections, which are new facilities and/or facilities upgrades needed to connect the generator to the PJM network, and (2) Network Upgrades, which are facility additions, or upgrades to existing facilities, that are needed to maintain the reliability of the PJM system.

In some instances a generator interconnection may not be responsible for 100% of the identified network upgrade cost because other transmission network uses, e.g. another generation interconnection, 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 Impact Study is performed.

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

# **AEP Analysis**

## **General**

Interconnection Customer proposes to increase the natural gas fired generation at its existing combined cycle Energy Facility, connected to AEP's Beverly 345 kV station, by 45 MW (45 MWC) (see Figure 1). The plant is currently assigned CIRs of 625 MWs, and thus, the proposed 45 MW increase will bring the total MFO of the Power Plant to 670 MW. Interconnection Customer described that the increase will be accomplished by modifications introduced to the control systems, and turbines. There will be no change to the electrical or inertial characteristics of the plant equipment including the GSUs. The location of the generating facility of PJM Project AA2-141 is Beverly, OH (see Figure 2).

Note that the CIR and MFO values stated above reflect the as-yet-unexecuted AA1-014 Interconnection Service Agreement.

The requested in service date is May 1, 2016.

The objective of this Feasibility 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 to maintain the reliability of the AEP transmission system. Stability analysis is not included as part of this study.

## **Attachment Facilities**

### **Station Cost:**

- No work is required.
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### **Protection and Relaying Cost:**

- No work is required.

## Local and Network Impacts

The impact of the proposed generating facility on the AEP Transmission System was assessed for adherence with applicable reliability criteria. AEP planning criteria require that the transmission system meet performance parameters prescribed in the AEP FERC Form 715<sup>1</sup> and Connection Requirements for AEP Transmission System<sup>2</sup>. Therefore, these criterion were used to assess the impact of the proposed facility on the AEP System. PJM project # AA2-141 was studied as a 45 MW (45 MW Capacity) increase at Beverly (Washington County 345 kV Energy Facility) 345 kV Substation consistent with the interconnection application. PJM Queue #AA2-141 project was evaluated for compliance with reliability criteria for summer peak conditions in 2019.

### Potential network impacts were as follows:

#### Normal System (2019 Summer Conditions Capacity Output)

- No problems identified

#### Single Contingency (2019 Summer Conditions Capacity Output)

- No problems identified

#### Multiple Contingency (2019 Summer Conditions Capacity Output)

- No problems identified

#### Contributions to Previously Identified Overloads (2019 Summer Conditions Capacity Output)

- No problem identified

#### Normal System (2019 Summer Conditions Full Output)

- No problem identified

#### Single Contingency (2019 Summer Conditions Full Output)

- No problem identified
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[https://www.aep.com/about/codeofconduct/oasis/transmissionstudies/GuideLines/2015%20AEP%20PJM%20FERC%20715\\_Final\\_Part%204.pdf](https://www.aep.com/about/codeofconduct/oasis/transmissionstudies/GuideLines/2015%20AEP%20PJM%20FERC%20715_Final_Part%204.pdf)

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[https://www.aep.com/about/codeofconduct/OASIS/TransmissionStudies/Requirements/AEP\\_Interconnection\\_Requirements\\_rev1.pdf](https://www.aep.com/about/codeofconduct/OASIS/TransmissionStudies/Requirements/AEP_Interconnection_Requirements_rev1.pdf)

#### Multiple Contingency (2019 Summer Conditions Full Output)

- No problem identified

#### Contributions to Previously Identified Overloads (2019 Summer Conditions Full Output)

- No problem identified

#### Short Circuit Analysis

Not Required

#### Stability Analysis

- Stability study to be performed during the System Impact Study stage.

#### Voltage Variations

- No problems identified

#### Additional Limitations of Concern

- No known additional limitations of concern.

#### **Conclusion**

Based upon the results of this Feasibility Study, the increase of 45 MW (45 MW Capacity) of generation at Beverly 345 kV Substation will not require additional Network upgrades.

## **Network Impacts**

The Queue Project AA2-141 was studied as a 45.0 MW (Capacity 45.0 MW) injection at Beverly 345kV substation in the AEP area. Project AA2-141 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AA2-141 was studied with a commercial probability of 53%. Potential network impacts were as follows:

## **Summer Peak Analysis - 2019**

### **Generator Deliverability**

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

None

### **Multiple Facility Contingency**

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

None

### **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

### **Steady-State Voltage Requirements**

*(Results of the steady-state voltage studies should be inserted here)*

To be determined

## **Affected System Analysis & Mitigation**

### **LGEE Impacts:**

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

### **MISO Impacts:**

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

### **Duke, Progress & TVA Impacts:**

Duke Carolina, Progress, & TVA Impacts to be determined during later study phases (as applicable).

### **OVEC Impacts:**

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

### **NYISO Impacts:**

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

### **Delivery of Energy Portion of Interconnection Request**

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.

Only the most severely overloaded conditions are listed. There is no guarantee of full delivery of energy for this project by fixing only the conditions listed in this section. With a Transmission Interconnection Request, a subsequent analysis will be performed, which will study all overload conditions associated with the overloaded element(s) identified.

Not Applicable

### **Light Load Analysis - 2019**

Light Load Studies to be conducted during later study phases (as required by PJM Manual 14B).

### **System Reinforcements**

#### **Short Circuit**

*(Summary form of Cost allocation for breakers will be inserted here if any)*

None

### **Stability and Reactive Power Requirement**

*(Results of the dynamic studies should be inserted here)*

To be determined

### **Summer Peak Load Flow Analysis Reinforcements**

#### **New System Reinforcements**

*(Upgrades required to mitigate reliability criteria violations, i.e. Network Impacts, initially caused by the addition of this project generation)*

None

#### **Contribution to Previously Identified System Reinforcements**

*(Overloads initially caused by prior Queue positions with additional contribution to overloading by this project. This project may have a % allocation cost responsibility which will be calculated and reported for the Impact Study)*

*(Summary form of Cost allocation for transmission lines and transformers will be inserted here if any)*

None

### **Light Load Load Flow Analysis Reinforcements**

Light Load Studies to be conducted during later study phases (as required by PJM Manual 14B).

#### **New System Reinforcements**

*(Upgrades required to mitigate reliability criteria violations, i.e. Network Impacts, initially caused by the addition of this project generation)*

None

#### **Contribution to Previously Identified System Reinforcements**

*(Overloads initially caused by prior Queue positions with additional contribution to overloading by this project. This project may have a % allocation cost responsibility which will be calculated and reported for the Impact Study)*

*(Summary form of Cost allocation for transmission lines and transformers will be inserted here if any)*

None



## AA2-141 Beverly 345kV

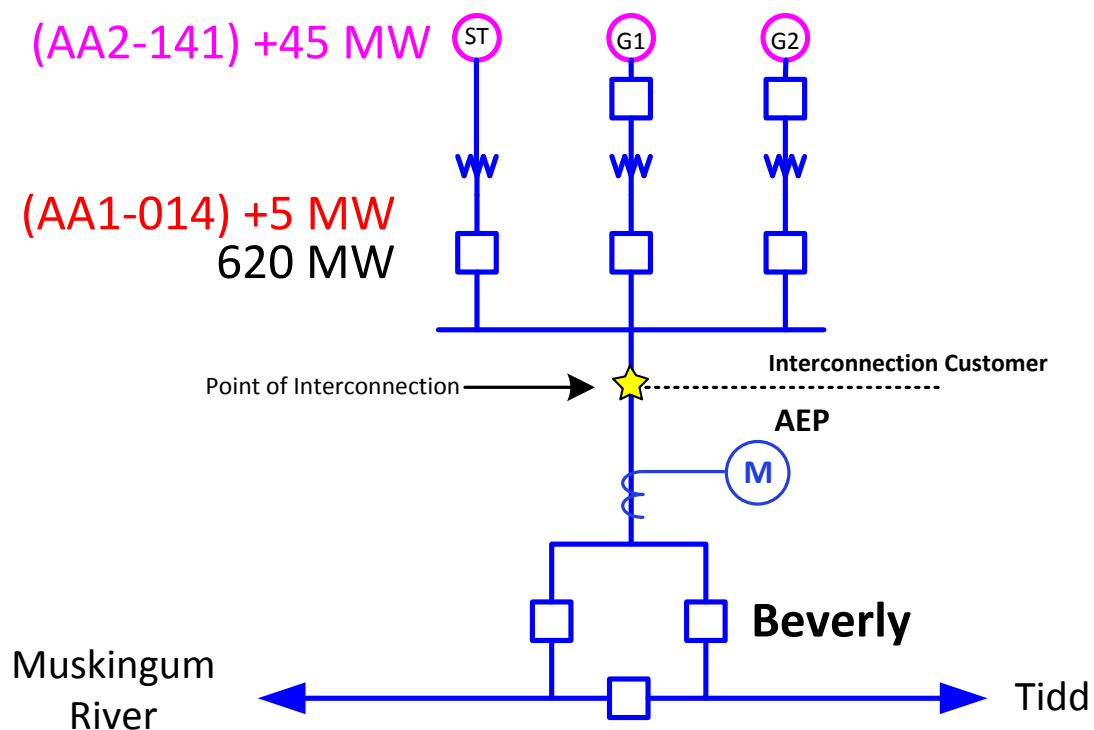


Figure 1



**Figure 2**