Generation Interconnection Combined Feasibility/Impact Study Report

For

PJM Generation Interconnection Request Queue Position Z1-065

Willey 34.5kV Project

April 2014

Combined Feasibility/Impact Study Report

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Introduction

This Combined Feasibility/Impact Study report provides the documentation of an assessment that has been performed by PJM Interconnection, LLC (PJM) and Duke Energy Ohio/Kentucky in response to a request made by RES Energy Storage Holdings, LLC for the connection of a 6.0 MW (0.0 MW Capacity) battery connecting to the DEOK system for the purpose of participating in the PJM Regulation Market. The requested Commercial Operation Date (COD) for this project is December 31, 2014.

Network Impacts

The Queue Project #Z1-065 was studied as a 6.0 MW (Capacity 0.0 MW) injection at Willey 34.5 kV substation in the DEOK area. Project #Z1-065 was evaluated for compliance with reliability criteria for summer peak conditions in 2017. Potential network impacts were as follows:

Generator Deliverability

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

None

Light Load Analysis

Light Load Studies to be conducted during later study phases (applicable to wind, coal, nuclear, and pumped storage projects)

Multiple Facility Contingency

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

None

Short Circuit

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

No overdutied breakers were reported by DEOK

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)

Not required

Stability and Reactive Power Requirement
(Results of the dynamic studies should be inserted here)

Not required

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

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.

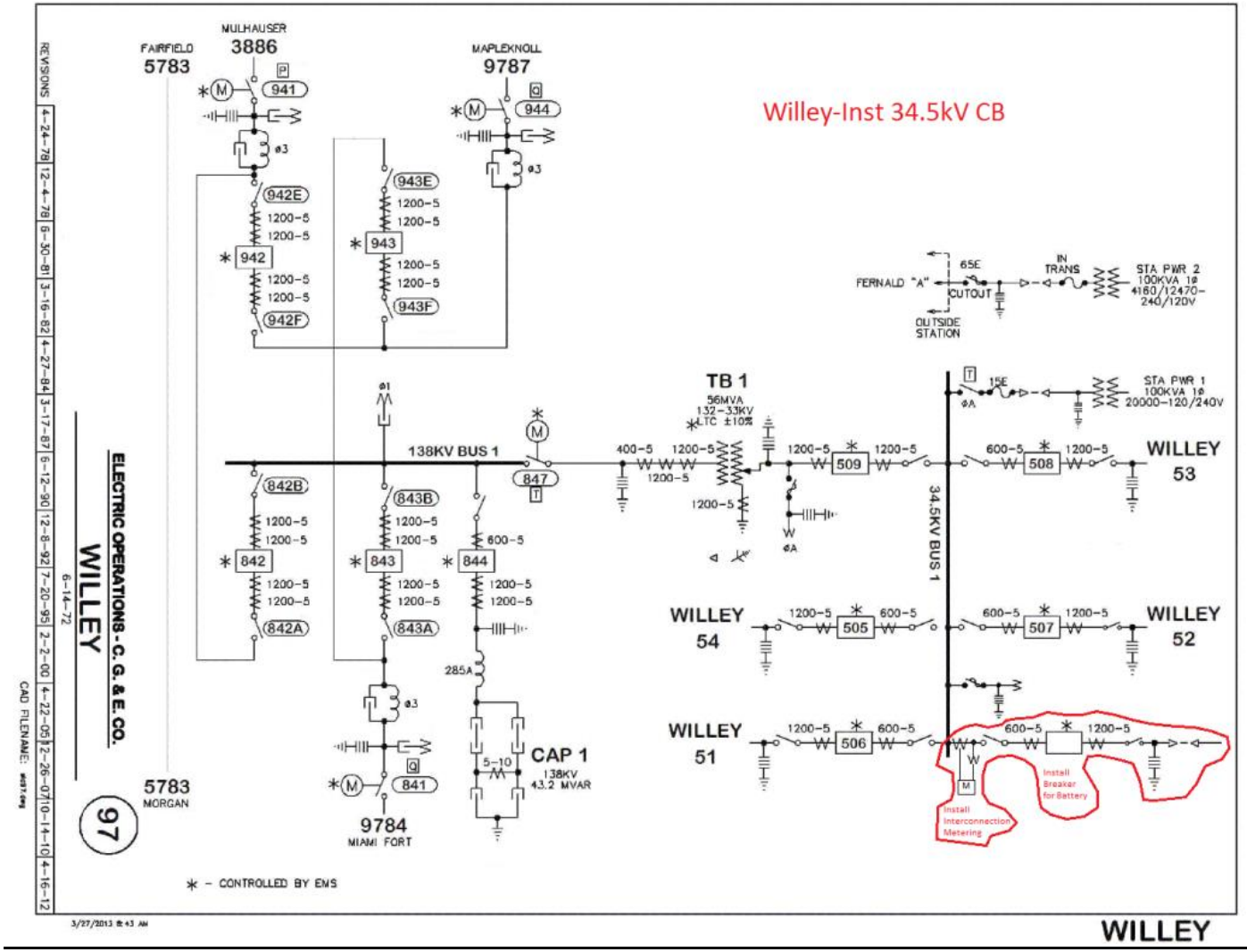
Only the most severely overloaded conditions are listed. There is no guarantee of full delivery of energy for this project by fixing only the conditions listed in this section. With a Transmission Interconnection Request, a subsequent analysis will be performed, which will study all overload conditions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

None

Direct Connection Facilities

RES will be required to install interconnection metering and an appropriate sized breaker for this battery as shown in the attached "Direct Connection" drawing prepared by DEOK. The DEOK cost estimate for this work is $488,798 (+/- 20%). RES will also be responsible to purchase and install the underground line up to the riser inside the substation.

DEOK Direct Connections



Project Single Line Diagrams