

***PJM Generator Interconnection
Request Queue #D10
NIH 25 MW (Energy Only)
Facilities Study Report***

January 2002
Docs #163209

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INTRODUCTION

Description of Project

Project #D10 is a National Institutes of Health 25 MW(maximum) Energy-only Generator Interconnection Request. #D10 is a single oil-fired combustion turbine located at the National Institutes of Health in Bethesda, Maryland.

Developer's Milestone Schedule

The Interconnect Customer has established the following major milestone dates:

Testing of substation work	May 2002
Testing of generator installation	August 2002
Commercial operation	March 2003

Description of Facilities included in the Study

Lines

Not Applicable

Substation

Project #D10 will connect to the Interconnection Customer's own 13.8 kV substation, known as the NIH West Substation or NIH Building 46. This building is a joint use substation equipped with PEPCo owned metal-clad switchgear on one side of the building and the Customer's switchgear on the other side of the building. PEPCo refers to the substation as NIH Substation No. 167. See the one line diagram in Attachment A.

This study is only applicable for connection to PEPCo's NIH Substation No. 167. No other connection to any other existing or future NIH substations is permitted.

Protection

No protective relaying on the PEPCo System will be replaced as a result of the interconnection.

Other

PEPCo regulates the voltage at the NIH Substation 167 bus using Radial Load Bus Voltage Control (RLBVC) and the three substation transformers equipped with load tap changers connected for phase angle control. If at certain load conditions, the PEPCo system operator feels that additional help is needed he will call the Interconnection Customer to

request a change in the unit's voltage level or to adjust the VAR support. The set-point level for the generating unit automatic voltage regulator will need to be addressed before the unit is placed in service. It is expected that the machine will regulate its output voltage to 13.8 kV, but the final value will be determined to match the preferred voltage level at the substation as controlled by the RLBVC program. Both parties recognize that there may be some adjustments when the unit is operating under varying load conditions.

SUMMARY OF RESULTS

Total Cost of Facilities Included and Allocation

Cost to Witness Testing of Customer's Relaying	\$10,000
Fire Protection Modifications Costs.....	\$10,000
(Back up estimates being prepared)	

Summary of Construction Schedules and Overall Construction Schedule for Facilities included in this Report

Substation Work (Fire Protection)	June to October 2002
Acceptance Testing	May 2002 to December 2002

Comparison of Facilities Construction Schedule with Project Developers Milestone Schedule

The above construction schedule aligns with the Interconnection Customer's proposed Milestones.

FACILITIES STUDY RESULTS

PEPCO's NIH Substation No. 167 Modifications

Since the Feasibility/Impact Study was issued there has not been any change with project #D10's proposed connection. However the need for tone transfer trip has been reevaluated since the Feasibility / Impact Study. The original recommended transfer trip scheme was complex and costly. PEPCO's NIH Substation is supplied via two different substations making it unlikely that both source substations will be completely lost. The possibility of false trips removing this hospital and health care facility from service are great. In lieu of tone transfer trip NIH will operate their generator with a speed/frequency control set higher than the synchronous speed. If the generator ever operated outside the frequency set point, it would indicate an isolating situation and overfrequency relaying would force the generator offline. This protection is in addition to standard generator protection.

(Although this was discussed in the meeting the latest drawings do not show all these interlocks discussed below. A follow up call has been placed and the customer is still in the process of making the changes to the plans to show the interlocks.) As a back up to this frequency monitoring, #D10 also intends to trip the intertie breakers under either of the following two conditions:

1. All three of the transformer secondary breakers from PEPCo to NIH are open or
2. The transformer secondary breaker supplying the "A" bus and the "A" bus intertie circuit breaker are both opened.

In order to provide to the Customer the status of PEPCo breakers, auxiliary contacts will be wired to send the status to the customer's switchgear. These will be hard wired connections due to the short distance between equipment.

No PEPCo metering upgrades will be required as the Interconnection Customer will be metered directly via PJM. A telephone line will be installed by the Interconnection Customer to allow PEPCo to retrieve revenue billing data remotely.

Permits Required

Not applicable

Electrical Design

No major change to the Electrical Design is required. The contacts showing the status of the source breakers mentioned above is the first minor work related item. Since the NIH Substation is a joint use facility and the Interconnection Customer is adding a 25 MVA oil filled isolation transformer, the existing

PEPCO fire protection will be modified. This includes tapping into the existing deluge system and adding an alarm point to the fire protection control cabinet.

Structural Design

No structural changes are required by PEPCo. Structural Drawings detailing the fire protection piping will be prepared by the Interconnection Customer for PEPCo's review and concurrence. A PEPCo Inspector will be present while the Customer's contractor is performing work in the substation.

Material Specification and List

Materials to be provided by the Customer.

Engineering Design Schedule

Final Drawings Approved for Interconnection and Fire Protection Modifications
- April 2002.

September - December 2002 Fire Protection Modifications

Interconnection Customer's 15 kV Substation

Purpose and Necessity

To provide connection for the Interconnection Customer's generation to the Potomac Electric Power Company System the existing Customer circuit breaker located at the West Substation or Building 46, Bus A, Cubicle W4 will be modified. The Interconnection Customer's proposed relaying is in conformance with *Engineering Guidelines and Performance Standards for Parallel Operation of Generation Equipment on the Potomac Electric Power Company System, Revision E*. It is also in conformance with "*PJM Relay Philosophy and Design Standards*".

Protective Relaying

The intertie breaker will be protected by a Schwietzer Engineering Directional Overcurrent Relay or SEL-351 relay including the following protective functions: Phase Overcurrent (50/51), Ground Overcurrent (50N/51N), Power Directional (67), Undervoltage (27), Overvoltage (59) and Frequency (81). A Schwietzer current differential SEL-587 and lockout relays will also be in operation on this circuit. Existing bus current differential relays will remain on the intertie breaker.

The synchronizing circuit breaker in Building 11 will also have a SEL-351 relay and lockout relay.

Metering

PJM revenue metering will be at the NIH West Substation Bus A, PJM Revenue Metering Current Transformers and Potential Transformers will be added to the load side of intertie breaker, cubicle W4. Schumberger Q1000 Metering will be used.

The existing PEPCo three-wire revenue metering is adequate as far as PEPCo is concerned since only three phase loads will be supplied.

No PEPCo metering upgrades will be required as the Interconnection Customer will be metered directly via PJM. Pepco has no need to get the kilowatt-hour metering information directly; instead Pepco will request permission from NIH to retrieve the data sent to PJM.

Real-time metering data is not required to be sent directly to Pepco. NIH is installing metering that can send the data (watts, vars, volts and amps) directly to PJM. Pepco will request permission to have access to the data.

ATTACHMENT A

ONE LINE DIAGRAM

