PJM Generator Interconnection Request
Queue #O36
Honey Brook 12.47 kV
Feasibility/Impact Study Report

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Honey Brook 12.47kV Feasibility/Impact Study

General

The Lancaster Landfill-Granger Energy of Honey Brook is located in Honey Brook, Salisbury, and Caernarvon Townships, Lancaster County near Narvon, Pennsylvania. Granger Energy of Honey Brook proposes to install 1.6 MW of generation comprised of one 1.6 MW methane fired (landfill gas) synchronous generator. Considering existing load at this proposed customer facility of 350 kW, approximately 1.25 MW of generation will be delivered to the PPL Electric Utilities (PPL EU) system when the generation-facility is at peak output. The 12.47 kV feeder tap location is located in the vicinity of PPL pole grid coordinate 50216-S-28782. The customer's requested in-service date of December 31, 2005 is not feasible. The customer expects the generation to go in service shortly after obtaining the necessary permits required for project approval and construction.

The intent of this study is to determine cost and construction time estimates for reinforcements required to facilitate the addition of the new generating plant to the PPL/PJM system. The reinforcements include the direct connection of the generator to the system and any network or local upgrades necessary to maintain the reliability of the PPL EU system.

Direct Connection Requirements

Granger Energy of Honey Brook is still considering configuration options for the 1.6 MW generator. A typical generation facility intertie requirement diagram is shown in Figure 1. The nearest PPL EU distribution facility to the proposed generation is an existing 12.47 kV three-phase distribution line. No known 12.47 kV line reinforcements are required for connection at this time.

The following relay and control upgrades will be required at the PPL EU Honey Brook substation in order to accommodate the generation:

1. Direct Transfer Trip (phone line or radio based DTT). It appears that Radio based DTT is an option for this facility.
2. Voltage check and synchronous check relay functions
3. Three line connected potential transformers
4. Modifications to the controls of the Honey Brook 34-1 12 kV circuit breaker

Direct transfer trip will be required between the 12.47 kV circuit breaker at Honey Brook and the generator to avoid islanding the generation on PPL EU load. Also, a voltage check & synchronous check relay is required to supervise reclosing of the 12.47 kV circuit breaker. This project was estimated both on the basis of a phone line based DTT and radio based DTT. Radio based DTT is the preferred option. Radio based DTT is generally lower cost, but this will require a site survey to verify line of sight communications path. This site survey will be completed as part of engineering during ISA/CSA phase of the project.

The new facility main transformer high-side connection (Wye or Delta primary connection) was not specified. PPL EU recommends selecting a Wye connected primary winding. PPL EU will require additional high side protection to accept a Delta high-side connection. The current PPL interconnection

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requirements are based on the use of a Wye high-side main transformer. Delta high-side connection requirements will require three (3) 12 kV PT's configured with an open delta low side winding.

DELTA high-side transformer connections are not the PPL EU preferred connection because it may lead to significant over-voltages during islanded backfeed conditions. Therefore, additional review (during the impact study phase) will need to be completed if a Delta high-side transformer connection is selected or required for this project.

The cost for the relay and control modifications at Honey Brook is estimated to be $250,000 for phone line DTT or $215,000 for radio based DTT. To engineer and complete the above modifications under normal working conditions, PPL will require about 8-10 months from the time that the ISA agreement is executed and PPL receives authorization to proceed from PJM. Consequently, the requested in service date is not feasible. Please see the "Remarks" section at the end of this document for additional information. The following is PPL EU's quarterly cost estimate for the project assuming radio based DTT:

O36 Granger Energy of Honeybrook - Modifications to the Circuit Breaker (Customer Owned 12.47 kV Construction is Not Included)

Quarterly Estimated Cash Flow - Radio Based DTT

2006 Quarter	Project Coordination Labor		Eng & Drafting Labor		Construction & Test Labor		Materials & Equipment	Net-Metering	Total
	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Direct	
Q1	$2,700	$1,883	$15,022	$7,089					**$26,694**
Q2	$2,700	$1,883	$15,022	$7,089	$19,510	$17,170	$3,037		**$66,411**
Q3	$2,700	$1,883	$15,022	$7,089	$19,510	$17,170	$3,037	$6,300	**$72,711**
Q4	$2,700	$1,883	$3,600	$1,284	$19,510	$17,170	$3,037		**$49,184**

$215,000

The following is PPL EU's quarterly cost estimate for the project assuming phone based DTT:

O36 Granger Energy of Honeybrook - Modifications to the Circuit Breaker (Customer Owned 12.47 kV Construction is Not Included)

Quarterly Estimated Cash Flow - Phone Line DTT

2006 Quarter	Project Coordination Labor		Eng & Drafting Labor		Construction & Test Labor		Materials & Equipment	Net-Metering	Total
	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Direct	
Q1	$4,937	$2,350	$16,445	$7,764					**$31,496**
Q2	$4,937	$2,350	$16,445	$7,764	$20,667	$18,667	$8,106		**$78,936**
Q3	$4,937	$2,350	$16,445	$7,764	$20,667	$18,667	$8,106	$6,300	**$85,236**
Q4	$989	$470	$3,921	$1,512	$20,667	$18,667	$8,106		**$54,332**

$250,000

The estimates do not include any metering or the required inter-tie protection equipment costs. Refer to the PPL interconnection requirements located at the PJM website. PPL considers Granger Energy of Honey Brook a "Type 2" generator.

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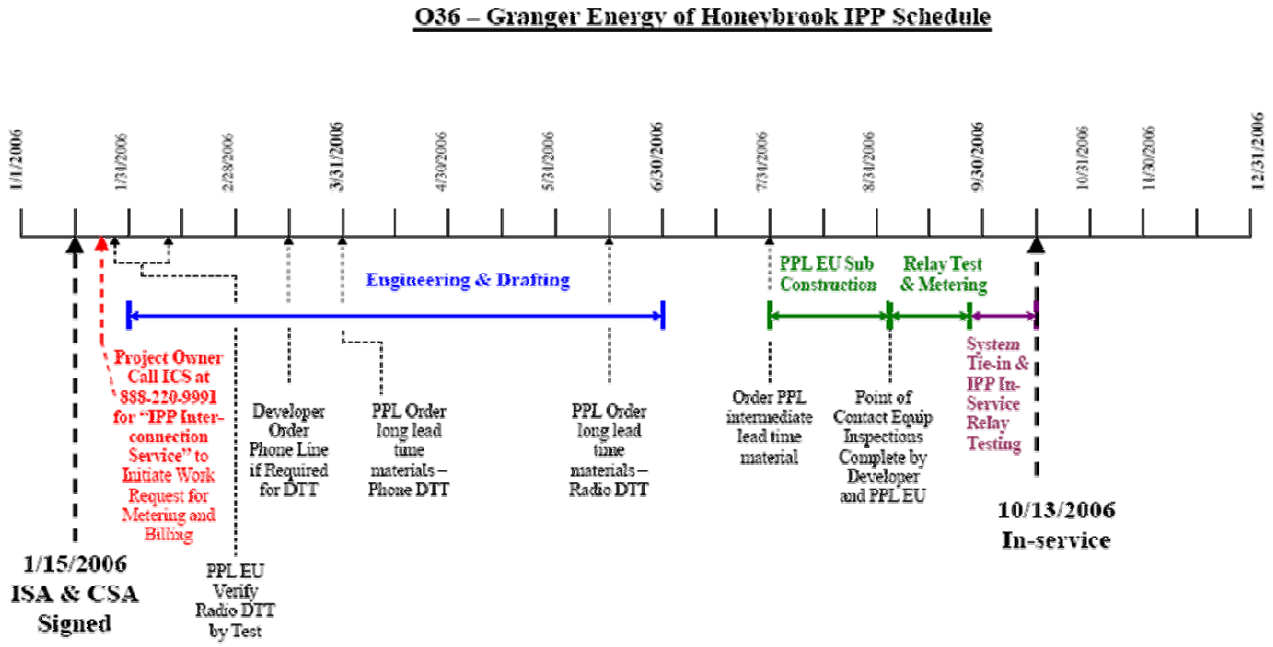
The following is PPL EU's proposed schedule for the project:



Note that the schedule starts in January 2006 assuming the developer signs the ISA/CSA very early in January. The proposed schedule will move out in time in proportion to any delay in signing the interconnection agreements.

The customer will be required to install the following equipment at the site:

- Phone line or radio based DTT. Phone line based DTT (matching PPL EU equipment) with applicable structure is not the preferred equipment, if a suitable location for an antenna to support a radio based DTT can be found. If so, the radio based DTT is preferred, and a suitable structure for the antenna DTT equipment is required. A site survey will be required to determine if the radio-based equipment can be used.

- Inter-tie protective relaying (Beckwith M-3520 preferred). Note that failure of the microprocessor-based relay will block all protective relaying. For this reason, we request a second relay be installed. If only one relay is installed, failure of the relay will require isolation of the generation from the PPL EU system. Use of a Delta High side connection would require additional relaying.

- CT's and PT's for the above relays.

- Metering equipment arrangements at the generator and at the point of contact/interconnection will be determined and PPL EU will identify costs after sufficient one-lines, switchgear and system operating detail have been developed and reviewed.

- Phone lines for the above DTT, if the radio based DTT can not be used. Please note protective relay grade phone circuits are special, and may take 3 to 6 months to obtain. The customer is responsible for all monthly lease costs for this option.

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- Suitable protection for the above phone lines, based on IEEE 487-2000.

Remarks:

- Based on preliminary information, if a suitable location can be found for the antenna, the radio based DTT communication is expected to function properly at this location. However, a detailed line-of-sight survey will be completed to confirm this if the customer chooses to proceed to the ISA/CSA phase of the project.

- The customer's originally requested in-service date of 12/31/05 is not feasible. PPL EU will require approximately 10 months from the signing of the ISA & CSA to the project in-service date. This is to allow adequate time for engineering, drafting, long lead time materials, construction and testing.

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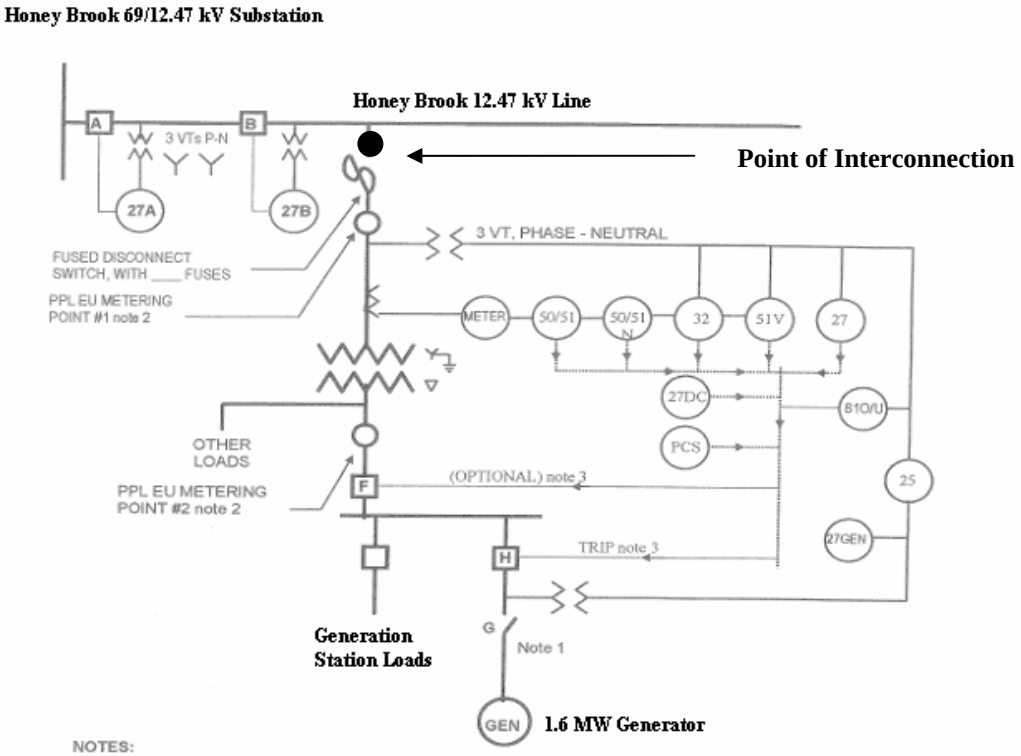
Figure 1 - Queue #O36 – Honey Brook 69-12kV

Granger Energy of Honey Brook 12.47 kV



NOTES:

1. The safety switch (G) must be lockable in the open position, and must be located between the generator and the metering point #2, and provide a visible break.

2. Contact PPL EU for specific metering requirements.

3. The relaying must trip one of the breakers "F" or "H", with the other breaker acting as backup in case the first did not trip. The choice of which breaker to trip will usually be determined by the operation of the plant, and PPL EU reclosing practice.

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