

US EPA ARCHIVE DOCUMENT

LeDoux, Erica

From: Eric Quiat [equiat@zephyrenv.com]
Sent: Friday, August 09, 2013 11:09 AM
To: LeDoux, Erica
Cc: Tammy Lasater; Robinson, Jeffrey; Magee, Melanie; Braganza, Bonnie
Subject: Responses to Formosa Utilities GHG Application Questions
Attachments: Steam Turbine Conversion & Generic Heat rate ratio.pdf

Erica,

Please see responses to your remaining questions on the Utilities GHG application in bold, blue text below. Attachments are provided, and mentioned, where applicable. Please let me know if you have any follow up questions.

Regards,

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From: LeDoux, Erica
Sent: Wednesday, July 10, 2013 2:46 PM
To: 'Eric Quiat'
Cc: Tammy Lasater / FDDE; Robinson, Jeffrey; Magee, Melanie; Braganza, Bonnie
Subject: Formosa GHG Application Gas Turbines Project

Eric,

This email is a follow-up to our phone conversation for additional information needed to clarify the response received for the Formosa Gas Turbine project. Please provide the following data:

1. Please define what comprises the "Heat Rate –Ratio" used on the GE gas turbine performance curve, and how it relates to efficiency. Does this ratio contain both the heat and power components? Is it power to heat or heat to power? Is it HHV or LHV? Typically, we have received an Efficiency vs. % Load performance curve for gas turbines for GHG applications. This format translates well to the public.

The heat rate-ratio presented in the performance curve reflects the ratio of expected heat rate at partial load to the heat rate at full load. The ratio shows that at lower loads the efficiency is less and that the behavior of the ratio is not linear. The ratio is unit-less since it is a ratio calculated by dividing terms (heat rates) with the same units (Btu/kWh-LHV); please note the LHV basis.

2. The submitted gas turbine performance curve contains language stating that the information contained on the curve is proprietary information and should not be released without GE's consent. It is unclear if this is confidential business information (CBI). The information used to support the permit application should be public accessible. Please confirm if the information contained on the performance curve is CBI.

The performance curve is confidential and should not be included in the public file. A generic version of a heat rate ratio versus load graph is attached for inclusion in the public file.

3. Please provide the actual calculations which includes the historical annual performance data for the existing steam turbines used to calculate the steam turbine conversion rate of 14.11 lbs steam/MWh. This performance data is referenced on page 33 of the permit application. Also, any literature, technical resources and/or actual operating data used to derive the degradation (3%), performance (6%) and design (3.3%) margins. This data is to support the proposed limit of 11,650 BTU/kWh (HHV) for the combined cycle gas turbines.

A calculation of the average steam turbine conversion rate for the network of existing steam turbines at FPC TX's utility plant is attached.

The margins used to calculate the proposed 365-day rolling average combined cycle unit heat rate were obtained from a review of other GHG applications and discussions with the candidate licensor. The GHG application information for the following combined cycle units was obtained from the EPA Region 6 GHG application website: Calpine Deer Park Energy Center, Calpine Channel Energy Center and the La Paloma Energy Center.

Thank you,

Erica G. Le Doux, Environmental Engineer
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