Excerpt 21

Supplemental to Application: Additional Information for the PSD Application, dated September, 2011, AR I.B.3.a

September 9, 2011

Mr. Steven C. Riva,Chief
USEPA Region 2
Permitting Section, Air Programs Branch
290 Broadway
New York, NY 10007-1866

Subject: Responses to August 4, 2011 Comments
PSD Air Permit Application
Energy Answers Arecibo
Arecibo Renewable Energy Project

Dear Mr. Riva:

Attached for you review is our response to the questions, recommendations, and additional information requested in your August 4, 2011 letter pertaining to the BACT Analysis, proposed Supplemental Fuels, Greenhouse Gas (GHG) BACT Analysis, and emission rate calculations for the proposed Arecibo Renewable Energy Project (AREP) Prevention of Significant Deterioration (PSD) Preconstruction permit application.

Thank you for your prompt attention to this submittal. Should you require further information during your review of this request, please contact me at (347) 351-5248.

Sincerely,

ENERGY ANSWERS ARECIBO

Mark J. Green
Vice President

/Attachments

cc: John L. Hanisch – ARCADIS
Kevin R. Scott, PE – ARCADIS

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Arecibo Renewable Energy Project

Additional Information Requested by EPA for the PSD Air Permit Application

September 2011

due to the difference in fuels. Examples include a difference in excess air requirements to sustain proper combustion for wood and tires, especially considering the higher heat value and density for tires, when compared with the excess air required for PRF combustion. Due to these differences in fuels and potential boiler operating conditions, a direct comparison of the emission limits on SO_2 between the Grayling facility and Energy Answers Arecibo is not appropriate. When compared with other MSW or RDF fueled facilities, which represents the primary operating scenario for the AREP, the proposed BACT emission limit on SO_2 of 24 ppmvd @7% O_2 for Energy Answers is equal to or more stringent than others currently permitted.

Table 2.3: BACT Limit Comparison

Pollutant	Units (all @ 7% O2)	Averaging Period	Palm Beach	Fairfield	Arecibo
NOx	ppmvd	24 hour block arithmetic mean	50 45; 12 month rolling	45	45
CO	ppmvd	24 hour block arithmetic mean	100 80; 30 day rollling	150	75
SO2	ppmvd	24 hour geometric mean	24	24	24
HCl	ppmvd	24 hour block arithmetic mean if CEMS used	20 (1)	25	20
VOC (as propane)	ppmvd	defer to CO CEMS	7	10	7
PM	mg/dscm	3-hour average	12 (filterable)	10 (filterable)	10 (filterable)
PM10	mg/dscm	3-hour average	12 (2) (filterable)	24 (total)	24 (total)
PM2.5	mg/dscm	3-hour average	12 (2) (filterable)	10 (filterable)	22 (total)

Pollutant	Units (all @ 7% O2)	Averaging Period	Palm Beach	Fairfield	Arecibo
Lead (Pb)	ug/dscm	PT	125	75	75
Hg	ug/dscm	24 hour block arithmetic mean if CEMS used	25	17	17
Cadmium (Cd)	ug/dscm	PT	10	10	10
Opacity	percent	6 minute average	10	10	10
Ammonia Slip	ppmvd	PT	10	10	10
MWC Organics (dioxins/furans, total mass)	ng/dscm	PT	13 10 (2nd yr) 0.75 –10 (3rd yr) (3)	13	10
Fluorides as HF (as HF)	ppmvd	PT	NA (4) (3.5 PSD avoidance limit)	4.2	3.2
Sulfuric Acid Mist (as H2SO4)	ppmvd	PT	NA (5) (1.0 PSD avoidance limit)	3.8	1
Non-Biogenic GHG	tons/MM lb steam	12-month rolling average	NA	NA	72.2

1. Not a BACT limit
2. Permit states that the Department has not adopted rules regarding inclusion of Condensable PM/PM10/PM2.5 in particulate emissions. The 12.0 is based on filterable fraction only using Method 5. Page 8 Final Determination DEP file No. 0990234-017-AC (PSD-FL-413)
3. Final limit will be set based on stack testing
4. The final permit determined that the source was not subject to BACT for Flourides
5. Final limit will be set based on stack testing – Condition 20 Section 3.

1.5 Response:

Energy Answers proposes a BACT limit of 10 mg/dscm for total filterable PM. This is consistent with the information and proposed PM BACT provided in the February 2011 PSD application. Emission rate calculations distinguishing the PM as the filterable-only fraction are also attached in the response to Comment 4.1.

Additionally, Energy Answers reviewed the available information on the condensable portion of PM_{10} and $PM_{2.5}$. As shown in Table 5-22, Energy Answers is proposing BACT limits of 22 mg/dscm for $PM_{2.5}$ and 24 mg/dscm for PM_{10}. Unfortunately there are no comparable MSW combustor facility permits that currently contain an emission limit for the condensable portion of emission and there are currently no stack test data available for MSW facilities to use as a basis for evaluating BACT level of control for condensable particulate matter. At the present time, the control equipment vendor for this project will guarantee an outlet concentration of 30 mg/dscm for PM_{10} and $PM_{2.5}$, which is based on conservative engineering calculations. The guaranteed outlet concentrations represent the emissions level that could occur if all the theoretical condensable fractions materialize in the stack. Energy Answers is submitted a revised air modeling protocol and a revised preconstruction monitoring waiver request based on the proposed vendor guarantee and the revised proposed BACT emission levels. A dispersion modeling analysis will be conducted to demonstrate that these emission levels will not cause or contribute to exceedances of the National Ambient Air Quality Standards or PSD Increments.

1.6 EPA Comment:

The "Air control equipment - Manufacturer information" section of your submittal does not mention or provide the description of the oxidation catalyst. Therefore, please revise Section 2.10, including Figure 10.2, accordingly. The oxidation catalyst's manufacturer information should include, but not be limited to, the CO removal efficiency (%), and operating temperature. Moreover, since both NOx and CO will be reduced by the use of the Regenerating Selective Catalytic Reduction (RSCR) system, please provide a summary of the processes employed in reducing the two pollutants, and also the amount of fuel (propane or fuel oil) necessary to be combusted by the system.

1.6 Response:

Babcock Power has integrated oxidation catalyst along with SCR catalyst in its Regenerative SCR. Both catalysts are well matched to operate within the same temperature range of approximately 400 F to 600 F. The RSCR's burners are tuned to a set point temperature and maintain the desired temperature within the RSCR.

The oxidation catalyst is a platinum or platinum/palladium precious metal blend deposited on a high surface area substrate. Babcock Power has worked closely with its oxidation catalyst supplier for the RSCR, Sud-Chemie, to identify and develop a substrate appropriate for waste-to-energy/resource recovery, biomass and generally, solid-fuel fired applications that will ensure the reliable, long-term performance necessary for these applications (> 16,000 hours life). The exact construction and arrangement of this oxidation catalyst is proprietary to Babcock Power. And, of course, oxidation catalyst, itself, is Sud-Chemie's trade secret. This oxidation catalyst typically achieves ~50% removal of carbon monoxide. For volatile organic compounds (VOCs) removal is more difficult with the same catalyst achieving only about 30% VOC removal.

Each RSCR unit will include a fuel-oil fired burner with a maximum heat input rating of 4.5 MMBTU/hr. Under normal operating conditions, each burner is expected to operate at about 2.1 MMBTU/hr. Using an average heat value of 140,000 BTU/gallon of fuel oil yields an average fuel oil consumption rate of (2.1 MMBTU/hr ÷ 0.14 MMBTU/gal =) 15 gallons per hour each. The RSCR units will also have propane-fired pilot burners rated at 1.5 MMBTU/hr each. Using an average heat value of 90,500 BTU/gallon of propane yields an average propane consumption rate of (1.5 MMBTU/hr ÷ 0.0905 MMBTU/gallon =) 16.6 gallons per hour each.

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Appendix B

Revised GHG BACT Analysis

1. Introduction

Energy Answers' proposed Arecibo Renewable Energy Project (AREP) is designed to process Municipal Solid Waste (MSW) into Process Refuse Fuel (PRF) to generate electricity. The majority of the solid fuel combusted at the facility will be PRF. The facility design also provides for the ability to combust up to 20 percent Auto Shredder Residue (ASR), 20 percent Tire Derived Fuel (TDF), or 50 percent Processed Urban Wood Waste (PUWW). It is anticipated that when these materials are received, they will be blended with PRF up to these ratios until the supply is depleted. The facility would then revert to combusting 100 percent PRF.

The maximum daily amount of non-PRF fuel would be approximately 287 tons per day (TPD) of ASR, 330 TPD of TDF or 897 TPD of UWW. It is anticipated that the actual maximum of 35,000 to 70,000 tons per year of non-MSW fuels will be combusted. Since the actual amounts of the non-MSW fuels are not known at this time, the BACT analysis provides information based on the conservative assumption that any one of the proposed fuel blends could be used for an entire year.

On July 1, 2011, EPA published a Final Rulemaking Notice (76 FR 43490) deferring the applicability of PSD and Title V to the biomass fraction of MSW. Based on this deferral it is not necessary for the AREP facility to evaluate or implement Best Available Control Technology (BACT) for combustion of the biomass portion of MSW or PRF. However, the deferral clearly states that a facility that burns MSW or alternative fuels must still evaluate whether the proposed project triggers PSD and Title V for the non biogenic portion of the fuel. Energy Answers evaluated the proposed project considering the recent rule change. Based on the potential non biogenic portion of the GHG emissions, the facility is subject to PSD review and must submit a BACT analysis. Energy Answers proposes the BACT limits in Table 1.1 below for the proposed AREP.

Table 1.1 Proposed BACT limits

Source	Proposed BACT limit (Non Biogenic CO_2e)	Averaging Time	Monitoring and record keeping
Solid Fuel	74 tons/million lbs steam	12 month rolling average	Monitor total CO_2 and steam with CEMs and calculate non biogenic portion of CO_2e using fuel mix.
Boiler start-up & shut-down	163,273 lbs/hr per boiler	12 month rolling average	Fuel usage & emission factors

Source	Proposed BACT limit (Non Biogenic CO_2e)	Averaging Time	Monitoring and record keeping
Diesel Firewater Pump	386 lbs/hr	12 month rolling average	Fuel usage and AP-42 Emission Factors
Emergency Generator	778 lbs/hr	12 month rolling average	Fuel usage and AP-42 Emission Factors

2. Applicability Analysis

The proposed AREP is considered a major new source and is already subject to PSD for other constituents. Under the Tailoring Rule, the facility is subject to PSD for GHG if there is any potential increase in total CO_2 and if there is an increase of more than 75,000 tons per year of CO_2e. Since EPA deferred applicability for biogenic emissions, only the non biogenic portion of each fuel proposed for use at the facility are regulated and required to be included in the applicability analysis. As stated elsewhere, Energy Answers proposes to combust up to 20% Auto Shredder Residue (ASR), 20 % Tire Derived Fuel (TDF) and/or 50% Processed Urban Wood Waste (PUWW). The emission factors and for each of these fuels were provided in the June 2, 2011 submittal. In this submittal Energy Answers reviewed the emission factors and now proposes using the emission factor in 40 CFR Part 98 Subpart C Table C-1. Additionally, the emission factors for CH_4 and N_2O are addressed in the analysis. The other emission factors remain the same. Table 2.1 provides the list of the emission factors used in the analysis. The biogenic and non biogenic portion of each fuel using the ratios provided in the June 2, 2011 submittal are calculated based on the best estimates available from published references. These ratios have not changed since the previous submittal and are restated in Table 2.2 below.

Table 2.1 GHG Emission Factors for Supplemental Fuels

Fuel	Emission factor GHG (kg/mmBtu)	Source of Information
PRF	CO2: 90.7 CH4: 0.032 N2O: 0.0042	40 CFR Part 98 Table C-1 & C-2
TDF:	CO2: 85.97 CH4: 0.032 N2O: 0.0042	40 CFR Part 98 Table C-1 & C-2
ASR (as plastics)	CO2: 75.0 CH4: 0.032 N2O: 0.0042	40 CFR Part 98 Table C-1 & C-2
PUWW:	CO2: 93.8 CH4: 0.032 N2O: 0.0042	40 CFR Part 98 Table C-1 & C-2