

MEMO (DRAFT)



DATE: December 19, 2012
TO: File, C-10550
Source ID: 1890231
FROM: Mindy Bowman
Susana Pjesky
RE: Abengoa Bioenergy Biomass of Kansas, LLC
Air Quality Impact Analysis (AQIA) Review

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Background

Abengoa Bioenergy Biomass of Kansas, LLC (ABBK) was issued an Air Emission Source Construction Permit by the Kansas Department of Health and Environment (KDHE) on September 16, 2011 for a biomass-to-ethanol and biomass-to-energy production facility. ABBK sent a letter dated March 15, 2012 and associated modeling files to KDHE to address changes in certain emission source locations. KDHE concurred with the conclusion presented in the March 15, 2012 letter that the changes would not significantly impact the previously modeled results relied upon for the September 16, 2011 Air Emission Source Construction Permit.

In October, 2012, ABBK submitted a request to modify the September 16, 2011 PSD Construction Permit. ABBK is proposing to add four (4) natural gas (NG)-fired emergency generator sets (EP-20010 through EP20040) that will be used for power production to support the boiler/steam turbine generator (STG) system and auxiliary utility support systems (such as cooling water, instrument air, raw water treatment, biomass fuel handling, etc.) during start-up, shutdown, and malfunction (SSM) events. The emergency power generators will produce electrical power for critical equipment when biomass-fired boiler power operation is interrupted. Modeling was conducted as part of the PSD Construction Permit application to consider ambient impacts of this proposed change.

Air Dispersion Modeling

The owner or operator of a proposed source or modification must demonstrate that allowable emission increases from the proposed source, in conjunction with all other applicable emissions increases or reductions, would not cause or contribute to air pollution in violation of:

- 1) any national ambient air quality standard (NAAQS) in any air quality control region; or
- 2) any applicable maximum allowable increase over the baseline concentration in any area.

The AERMOD modeling system Version 12060 was used to determine the maximum predicted ground-level concentration for each pollutant and applicable averaging period.

Per the modeling protocol, ABBK modeled the following pollutants and averaging times: 3-hour SO₂, 24-hour SO₂, 1-hour CO, 8-hour CO, 24-hour PM_{2.5}, and 24-hour PM₁₀. The screening modeling indicated the Significant Impact Level (SIL) was exceeded for 24-hour SO₂, 24-hour PM_{2.5}, and 24-hour PM₁₀. Therefore, refined modeling was conducted for these pollutants and averaging periods.

For details on dispersion modeling of proposed project, refer to the following modeling report submitted by ABBK: *Air Dispersion Modeling Supplement in Support of Prevention of Significant Deterioration Air Construction Permit Application Source ID No. 1890231* dated October, 2012. Sections 5 and 6 and Appendix C of the modeling report present the ABBK's modeled results. An additional supplement was submitted on December 12, 2012.

KDHE conducted modeling runs for the 24-hour PM_{2.5} to verify ABBK's modeled results. The PSD increment and National Ambient Air Quality Standards (NAAQS) modeling results for 24-hour PM_{2.5}, as shown in Table 15 of Appendix C of the modeling report, showed considerable discrepancy between the "Sept 16, 2011 AQIA results" and the "October 2012 AQIA modification results". KDHE modeling runs used the same modeling input parameters used by ABBK for both on-site and off-site (nearby) emission sources. KDHE used the center of the facility specified in the modeling report (i.e., Easting: 288,351.05 meters, Northing: 4,117,494.00 meters), which is about 100 meters different from the x-coordinate actually used by ABBK in their modeling runs.

As a response to KDHE's need for clarification of the "October 2012" modeling results and KDHE's request to re-run the cumulative modeling for 24-hour PM_{2.5}, ABBK sent a letter report dated December 12, 2012 with the following subject: *"Additional PM_{2.5} Model Analyses to Support October 2012 Modification Application for Abengoa Biomass of Kansas, LLC, Prevention of Significant Deterioration Air Construction Permit Application Source ID No. 189023"*.

ABBK summarized the modeled results in the December 2012 modeling runs on Table 4 of the letter report dated December 12, 2012. Tables 1 to 2 at the end of this memo show the 24-hour PM_{2.5} modeled results of KDHE and ABBK.

ABBK summarized in Table 6-8 of the modeling report dated October 2012 the increment consumption for the ABBK facility including the proposed changes:

- 12.22% of the 24-hour Class II maximum allowable increments for SO₂ are expected to be consumed
- 96.56% of the 24-hour PM_{2.5} Class II maximum allowable increment for PM_{2.5} is expected to be consumed.
- 96.27% of the 24-hour PM₁₀ Class II maximum allowable increments for PM₁₀ are expected to be consumed.

Conclusions

ABBK concludes that the modeled results of the previously modeled ABBK facility including the proposed project changes will not cause or contribute to any violations of applicable NAAQS and PSD Class II area increment. KDHE concurs with ABBK's conclusion.

Table 1. PM_{2.5} 24-hour NAAQS Modeling Results

Pollutant	Operating Scenario ^a	Modeler	Highest modeled concentration (µg/m ³)		Background concentration (µg/m ³)	Total concentration (µg/m ³)	NAAQS Standard (µg/m ³)	Remarks
PM _{2.5} 24-hour	NAQ141	KDHE	24.71	H1H	17.00	41.71	35	In KDHE modeling runs, three (3) receptors, located about 4 km southeast of the ABBK facility exceeded 24-hour PM _{2.5} NAAQS. ABBK facility does not cause or significantly contribute to a violation of the PM _{2.5} NAAQS.
	NAQ141	ABBK (Dec. 2012 AQIA)	26.80	H1H	17.00	43.80	35	from Table 4 of the letter report dated Dec. 12, 2012

^aNAQ141 consists of a boiler load of 141 MMBtu/hr with the fire water pump operational and the flare pilot on. NAQ141 is the worse-case scenario for 24-hour PM_{2.5} as reported in September 2011 AQIA review.

Table 2. PM_{2.5} 24-hour PSD Increment Modeling Results

Pollutant	Operating Scenario ^a	Modeler	Highest modeled concentration (µg/m ³)		PSD increment for Class II areas (µg/m ³)	Remarks
PM _{2.5} 24-hour	PSD141	KDHE	20.82	H2H	9	In KDHE modeling runs, 14 receptors exceeded 24-hour PM _{2.5} PSD increment. Thirteen (13) receptors are located about 4 km southeast of the ABBK facility. ABBK's contribution to these increment exceedances are less than the SIL of 1.2 µg/m ³ .
	PSD141	ABBK (Dec. 2012 AQIA)	26.47	H2H	9	from Table 4 of the letter report dated Dec. 12, 2012

^aNAQ141 consists of a boiler load of 141 MMBtu/hr with the fire water pump operational and the flare pilot on. NAQ141 is the worse-case scenario for 24-hour PM_{2.5} as reported in September 2011 AQIA review.