UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 7
901 NORTH 5TH STREET
KANSAS CITY, KANSAS 66101

SEP 12 2011

Marian Massoth, Air Permitting Chief
Kansas Department of Health and Environment
Bureau of Air
1000 SW Jackson, Suite 310
Topeka, KS 66612-1366

RE: Abengoa Bioenergy Biomass of Kansas, LLC Prevention of Significant Deterioration comments

Dear Ms. Massoth:

On August 11, 2011, the United States Environmental Protection Agency, Region 7 (EPA) received notification of the Kansas Department of Health and Environment's (KDHE) intent to issue a Prevention of Significant Deterioration (PSD) construction permit for Abengoa Bioenergy Biomass of Kansas, LLC (ABBK) to install a biomass to ethanol manufacturing and biomass to power cogeneration facility near Hugoton, Kansas. We have completed our review of the draft permit and have the following comments. We provide these comments to help ensure that the project meets federal Clean Air Act (CAA) requirements, that the permit will provide necessary information so that the basis for the decision is transparent and readily accessible to the public, and that the record provides adequate support for the permit decision.

General Comments

Comment 1.
Page 19. Section VI. The draft permit needs to clearly state that the source must comply with requirements in the permit. For example, the first paragraph of this section of the draft permit currently states, "The exceedance of any emission limitation established by or referenced in this permit may constitute a violation of the permit . . . ." We suggest that the permit state that all requirements and conditions included in or referenced in the permit shall be met, and the exceedance of any emission limitations established by or referenced in the permit constitute violations of the permit and ABBK may be subject to an enforcement action.

Comment 2.
Page 34. Section VIII.A.9. states: "Because the BACT limitations are more restrictive than the NSPS requirements, those NSPS emission limitations are subsumed into the BACT emission limitations in this permit. "Even if the SO_2 BACT limit and NSPS limits (and associated averaging times) for the boiler were identical, or one more stringent than the other, each remain independently enforceable and are not "subsumed" by the other. The quoted language above should be deleted from the permit.

Comment 3.
Page 35. Section VIII.A.10. states: "Because the BACT limitation is more restrictive than the MACT requirement for PM, the MACT emission limitation for PM is subsumed into the BACT emission limitation. "Even if the PM BACT limit and MACT limits (and associated averaging times) for the boiler were identical, or one more stringent than the other, each remains independently enforceable and are not "subsumed" by the other. The quoted language above should be deleted from the permit.

Comment 4.
Page 49. Section XI.A. states: "Compliance with the more stringent BACT limit(s) or other limits established in this permit shall be considered in compliance with any companion NSPS requirement. Failure to demonstrate compliance with a BACT limit is not a violation of NSPS limits unless the NSPS limit is exceeded. "While we understand the desire to streamline the compliance aspects of the permit, our past experience generally suggests that the PSD and NSPS (or MACT, SIP, or other emission limits) compliance determinations are almost always best made independently of each other. The only exception would be if every aspect of each limit, including averaging time, test methods, and exempt periods, are identical. We did not conduct an independent streamlining analysis for the ABBK permit, but we recommend that in the absence of a demonstration showing a limit-by-limit, component-by-component comparison, the broad statements about one limit satisfying the requirements of another be removed from the permit. There is no authority under the approved SIP to provide what amounts to an "NSPS shield" in a PSD permit, and if the final permit were to contain such a provision, EPA would not recognize it as affecting the source's obligation to comply with the NSPS. The NSPS are federal rules, and states have no authority to amend the rules.

Comment 5.
Page 14. Section V. is entitled "GHG BACT Determination". This section contains a number of requirements that look like emission limitations, but since they have been segregated from the "Air Emission Limitations" section of the permit, it is not clear whether these are meant to be enforceable limits under the permit or not. To remove any uncertainty, any GHG limits should either be integrated under the "Air Emission Limitations" in Section VI. or re-titled "GHG BACT Limitations. "The permit should make clear that the GHG limitations are enforceable and not just an informational component of the permit.

Comment 6.
We note that ABBK has revised the scope and design of this project several times since they submitted a preliminary application for a permit in July 2008. If ABBK makes additional design changes in the future that lead to changes in emissions, impacts on air quality, or control technologies, we believe such changes require KDHE to conduct a comprehensive analysis of the changes, and the public should have an opportunity to provide comment on any such changes.

Specific Comments

Comment 7.
Page 20. The 10/25 tpy limits in Section VI.D., which appear to be blanket emission limits, are not enforceable. Likewise, the VOC emission limits in Section VI.E. are not enforceable since they appear to be blanket emission limits. Therefore, these limits and the limits in Table 3 (the HAP limits) are not enforceable. Please see: http://www.epa.gov/ttn/atw/pte/june13_89.pdf The 1989 PTE guidance document (at page 3) states that blanket limits should not be used to control emissions as they are not enforceable as a practical matter. In order to remedy the problems associated with the blanket caps, we recommend consideration of the following:

The pollutant caps in Section VI.D. and associated record keeping requirements in XIII.B. attempt to limit individual and aggregate HAPs to below 10 and 25 tpy for the purpose of avoiding the 112(g) requirements. The caps are based on projections made by ABBK that HAP emissions from the combination of six types of equipment, including the biomass stoker boiler (EP-20001), EH fermentation CO_2 scrubber (EP-18185), flare (EP-09001), lignin-rich stillage storage (EP-19001FUG), fire pump engine (EP-06001EMG) and "small sources" (EP-02000, T2107, T2018, T2102, T2112, T2105, EP-02100 and EP-02100FUG), will remain below the HAP major source thresholds.

ABBK's HAP estimates rely on many assumptions, including high control equipment efficiencies and AP-42 emission factors. Any deviations in these assumptions, such as those described below, may result in exceedances of the HAP major source thresholds and the possibility that ABBK may not meet its 112(g) pre-construction obligations.

- The HAP estimate for the biomass boiler is 18.4 tons per year. ABBK estimates that HCl, when well controlled to 99%, accounts for 5.7 tpy or 31% of the emissions. Any degradation of the control efficiency, even to 98%, would put aggregate HAP emissions well above the 25 tpy 112(g) threshold.
- Four other HAPs, including acrolein, benzene, formaldehyde and styrene, account for 52% of the HAP emissions from the biomass boiler. ABBK estimates the stoker boiler will achieve a 70% destruction efficiency based on good combustion practices. If the HAP destruction efficiency falls short, or the AP-42 factors used to make the estimates substantially underestimate HAP emissions, then ABBK could emit well above the 25 tpy 112(g) threshold.
- AP-42 factors for acrolein and styrene are poorly rated at C and D, respectively. AP-42 describes such ratings as follows: C = tests are based on an unproven or new methodology, or are lacking a significant amount of background information, D = tests are based on a generally unacceptable method, but the method may provide an order-of-magnitude value for the source. Any significant deviation between actual emissions and emissions factors used in the avoidance analysis could put aggregate HAP emissions well above the 25 tpy 112(g) threshold.
- The draft permit contains no testing for acrolein, benzene, formaldehyde or styrene, even though these pollutants represent a significant portion of the HAP emissions from the stoker boiler. Given the uncertainty in the emission factors and significance of these individual HAPs, the permit should require ABBK to verify periodically that the emission levels used in the mass balance analysis remain valid. The draft permit currently requires testing for HF on a six- or 12-month frequency depending on how close the results are to a specified testing threshold. To ensure the mass balance HAP cap is met on an on-going basis, the final permit should include appropriate reference method testing for acrolein, benzene, formaldehyde and styrene on a periodic basis.
- Based on vendor estimates, the EH fermentation scrubber is projected to emit 1.68 tons per year HAPs, comprised primarily of acetaldehyde and smaller amounts of acrolein and methanol. Even though these emissions only account for approximately 7% of the 25 ton per year HAP cap, they are based on the continuing high performance of the scrubber to remove HAPs. Any significant deviation in the actual emission factors could put ABBK over the 112(g) thresholds. The draft permit currently requires testing following initial startup of the plant, once in each of the following two years and then every three years thereafter. If the initial or subsequent test results indicate that HAPs are significantly higher from the EH fermentation scrubber, then KDHE should reserve its ability to revise the permit to require more frequent testing to ensure compliance with the cap.

The limits in Section VI.D. and associated record keeping requirements in XIII.B., do not fully describe the methodology necessary to demonstrate compliance with the 112(g) avoidance caps. First, Table 3 in Section VI.D. should clearly identify, by emission point, which emission units are included in the cap. For example, the "small sources" category is comprised of eight different emission units which should clearly be identified. Second, the draft permit currently requires ABBK to keep records of HAP emissions for each "emission rate", but Section VI.D or XIII.B. should also clearly indicate that ABBK must sum all HAPs from all emission points specified in Table 3 when determining compliance with the 10 and 25 ton per year HAP limits. Lastly, any reference to "ton per year" in Section VI.D should be changed to "12 month rolling sums" to ensure that compliance can be determined at any monthly interval rather than at the end of a calendar year period.

Section VI.D.5, paragraphs b. through e. establish on-going testing requirements for HF, based on a 1.83 lb/hr test threshold specified in the draft permit. However, the basis for this limit is unclear. ABBK estimates HF emissions in its mass balance for the stoker boiler to be 0.15 lb/hr or 0.66 ton per year, uncontrolled. Controlled emissions, using 99% control, are estimated at 0.0015 lb/hr and 0.0066 ton per year, which represent about 0.04% of the expected potential HAPs from the boiler. Since it is not apparent from the mass balance calculations that HF is a critical pollutant for assuring that aggregate HAP emissions are below the 25 ton per year threshold, the "permit summary sheet" should describe the basis for the 1.83 lb/hr testing threshold, in particular where exceedance of this limit potentially triggers the need to install continuous emission monitoring equipment.

In the alternative, the project should undergo the appropriate 112(g) review before construction begins. It is likely that the technologies applied by ABBK to avoid 112(g) would also be representative of controls that would meet the technology requirements of 112(g). This would allow ABBK to accept HAP limits on individual process units that could be achieved on an on-going basis, without the risk of not meeting the 112(g) avoidance caps.

Many of these same comments apply to the VOC synthetic minor PSD avoidance cap in Section VI.E. and associated record keeping in XIII.C. The VOC portions of the final permit should be revised consistent with the HAP recommendations above (e.g. list all emission points in the cap, require all emissions to be summed, clarify that "tpy" means "12 month rolling sum", reserve right to require more frequent testing if appropriate).

Comment 8.

Page 34. A large proportion of boiler SO_2 is generated from the large amounts of EH thin stillage, and associated high sulfur content, fed to the stoker. All other fuel components, which account for about 70% of the feed, contain low amounts of sulfur. Should ABBK reduce the sulfur content of the thin stillage (e.g. as enzymes improve), or reduce the amount of this material fed to the boiler (e.g. if they find it more cost effective to ship off-site), the permit as currently written would allow ABBK to substantially reduce scrubber operation and still meet the BACT limit. For example, if ABBK fed no thin stillage to the boiler, the SO_2 inlet concentration would be approximately 0.68 lb/mmBtu, which would only require a 69% removal efficiency to meet the BACT limit. Section VIII.A.9.a. clearly specifies that ABBK must meet a BACT limit of 0.21 lb/mmBtu SO_2 but only hints at a 92% scrubber efficiency, expressed in parentheticals. To ensure that ABBK continues to operate the scrubber at peak performance during all periods of operation, the permit should carefully separate the emission limitation and scrubber reduction requirements to ensure they are both separately enforceable limits. In the alternative, if the 92% reduction is not achievable across the full range of fuels ABBK intends to burn, then KDHE should consider setting two (or more, as necessary) BACT limits based on the amount of sulfur and appropriate removal efficiency for each fuel regime fed to the boiler.

Comment 9.
Pages 15 and 18. Section V.B.2. and Table 2 excludes periods of start-up, shut-down, and malfunction from the BACT limits for the biomass-fired stoker boiler and the EH fermentation CO_2 scrubber. BACT applies at all times. The permit may specify different BACT limits that apply during startup and shut-down but cannot exclude BACT limits during those times.

Comment 10.
Page 33. Sections VIII.A.8.c. and VIII.A.9.c. state, in part, that "If the emission rate results from the initial performance test are less than the limit described above and deemed consistently achievable, the emission rate determined during the performance test will be the limit imposed." Based on our past experience, this "set high and optimize low" approach, often used when fuel variability and control performance are not well understood, is an ineffective method for encouraging applicants to operate their BACT controls to anything other than what the higher limits require. We recommend a more effective approach for dealing with any such uncertainties by establishing one or more BACT limits that reflect rigorous operation of the air pollution controls over all fuel ranges and acknowledge that if an applicant cannot meet the limit(s) after a reasonable optimization period, then the permitting agency will agree to re-assess BACT following opportunity for public notice and comment.

Comment 11.
A facility can have a significant net emissions increase of ozone if it emits either 40 tpy VOC or NO_x. The ABBK project will increase NO_x by more than 40 tpy but we could not find any discussion on ozone impacts related to NO_x emissions in KDHE's Permit Summary Sheet or in their Air Quality Impact Analysis. The final permit record should include such a discussion. The KDHE SIP has been updated to include the 2007 version of 40 C.F.R. Part 52.21(m)(1)(i)(a). Also, see footnote 1 for 40 C.F.R. Part 52.21(i) which states:

No *de minimis* air quality level is provided for ozone. However, any net emissions increase of 100 tons per year or more of volatile organic compounds or nitrogen oxides subject to PSD would be required to perform an ambient impact analysis, including the gathering of ambient air quality data.

Comment 12.
Page 32. The sulfuric acid mist limit in Section VIII.A.5. does not appear to be an enforceable limit. The permit should explain how sulfuric acid mist will be measured or calculated.

Comment 13.
Page 16 and 38. The GHG BACT section (Section V.B.3.) requires the boiler to have a CO_2 CEMS, but the permit monitoring section (Section VIII.B.1.) allows monitoring by either O_2 or CO_2 CEMS, which creates confusion. We recommend that a CO_2 CEMS be required under both the GHG BACT and the permit monitoring sections.

Comment 14.
Page 16. The permit refers to CO_2 CEMS in Sections V.B.3., V.B.4. and V.C.2., but does not define what components comprise the continuous emission monitoring system or what performance specifications they must meet. Gaseous CEMS typically only provide concentration data (e.g. ppm, %). To determine CO_2e mass, the gaseous CEMS would need to be combined with a volumetric stack flow meter or other valid means for estimating stack flow at the measurement location. Depending on the sampling technology used, a moisture adjustment might also be needed. The permit should clearly specify what combination of equipment, or equipment with other estimation techniques, will be used to verify compliance with the GHG BACT limits. The permit should also require that all measurement

equipment meet basic performance requirements for calibration drift, linearity, system response, relative accuracy and ongoing quality assurance like those found in the NSPS CEMS performance specifications (see 40 CFR Part 60, Appendix B) or Part 75 acid rain requirements. Section XII.A. may satisfy these requirements, but since continuous CO_2 mass measurement is not required by the NSPS and Part 75 does not apply to the boiler or fermentation scrubber, the permit should make clear that these requirements apply to the monitoring equipment required in Section V., irrespective of whether required otherwise. Adding a direct cross-reference to Section XII.A. from Section V. may help establish this link.

Comment 15.
Page 16. Section V.B.4. states that "CO_2e emissions shall be determined using a CO_2 CEMS." It is not clear how non-CO_2 GHGs that are included in the CO_2e limit, such as methane and N_2O, will be accounted for with a CO_2 monitor. We recommend that the permit record either clarify how non-CO_2 GHG emissions will be monitored or describe how these emissions will be accounted for in determining compliance with the CO_2e emissions limit. If monitoring is not chosen, please explain why such monitoring is not necessary.

Comment 16.
Page 15. "Day" is defined in Section VIII.A.4. for most pollutants (NO_2, SO_2 and CO). We recommend that the permit also define what "day" means for CO_2e for the 30-day limits in Section V.B.2.

Comment 17.
Page 17. Section V.D.1. specifies both a 1-hr and a 12 month CO_2e limit, but Section V.D.3. only requires the facility to keep monthly records of fuel use and use "appropriate emissions factors" to determine resulting CO_2e emissions. The permit should state the emission factors to be used to demonstrate compliance with the 12 month limit in Section V.D.3.a. and also explain how compliance with the hourly limit will be demonstrated.

Comment 18.
Page 7. Section III.A.3. is not clear if the CO_2e amount stated (i.e., 481,652 short tpy) is a limit or is simply provided for information. If it is a limit, it should be worded as "the total CO_2e based emissions from the biomass-fired stoker boiler shall not exceed 481,652 short tpy of CO_2e." If it is informational, the permit should state that the potential to emit is 481,652 tpy instead of stating the emissions from the boiler are 481,652 tpy.

Comment 19.
Page 7. The permit should clarify whether the fly ash and bottom ash amounts in Section III.B are limits or informational.

Comment 20.
Page 9. It is not clear if the 79.2 wet tons per hour in Section III.C.2. is a limit. If it is a limit, it should be worded "the agricultural residues and energy crops grinding operations shall have a maximum design rate to process 79.2 wet tons per hour."

Comment 21.
Page 15. Section V.B.2. The permit should specify performance specifications for the steam monitoring.

Comment 22.
Page 23. Section VI.I.3.a. establishes a "condensable" PM BACT limit on the EH fermentation CO_2 scrubber (EP-18185) of 0.10 lb/hr. To avoid any confusion as to how compliance with this limit is to be determined, the permit should include language on the appropriate Reference Test method to be used. Including something like the following "EH fermentation CO_2 scrubber (EP-18185) - BACT emissions of condensable PM are limited to 0.10 lb/hr, as determined by Reference Method 202 (Part 51, Appendix M).", would help to clarify. A footnote, similar to those used for Section VIII.A.11.d., would also be helpful.

Comment 23.
Page 23. Care should be taken when testing for compliance with the EH fermentation CO_2 scrubber limits in Section VI.I.3., since the process is a batch process. Testing should not be conducted during the lowest emission point in the batch cycle.

Comment 24.
Page 27. Section VII.A.3. The last sentence should read: "If modeling indicates a potential NAAQS or increment violation, mitigation shall be required."

Comment 25.
Pages 36 and 37. Section VIII.A.15. a. and b. The permit should state that the baghouse "must be" operational during the entire startup/shutdown period.

Comment 26.
Page 47. Section VIII. D.5. a. In addition to the requirements of this section, the permit should include a provision that requires performance testing for HCl, HF and mercury not later than 180 days after initial start-up of the biomass-fired stoker boiler.

Comment 27.
Pages 10 and 11. It is not clear why the number of pumps, valves, connectors, and pressure relief valves are specified in Sections III.D.1.d and III.D.2.g. We are concerned about the permit needing to be revised in the future if fewer or more such components are used. To encourage permit flexibility and minimize the amount of permit revisions in the future, we recommend either that these specific numbers be deleted or the permit record clarify why they are necessary.

Comment 28.
Page 6. Section III.A.1. states that the biomass-fired stoker boiler is rated at 500 MMBtu/hr maximum design heating input. The permit should state that ABBK shall install a biomass-fired stoker boiler with a rated heat input of 500 MMBtu/hr.

Comment 29.
Page 16. Section V.C.2. is not clear. Please clarify what is meant by "proposed emission limits". Explanations of how the applicant arrived at a BACT limit should be in the summary sheet and not in the permit.

Comment 30.
Pages 7 and 12. Section III.A.3. states that the biomass-fired boiler is the main source of anthropogenic GHG emissions at the facility. Section III.E.3. states that the EH fermentation CO_2 scrubber vent stream is the main source of biogenic GHG emissions at the facility. Since the CO_2 emissions from biomass combustion would be biogenic GHG emissions the statement that the EH fermentation CO_2 scrubber is

the main source of biogenic GHG emissions would not be correct. Neither of these statements are necessary for the permit and we suggest that they both be removed from the permit.

Comment 31.
Pages 3 and 14. Section I of the permit says that ABBK has a potential-to-emit in excess of 40 tons per year of VOC. This condition would have required the project to comply with K.A.R. 28-19-350 (Prevention of significant deterioration of air quality) for ozone due to the VOC emissions. The post-permit potential to emit for VOC is also listed in Section IV. (Table 1) as 29.1 tons per year (tpy). Assuming the potential-to-emit of 29.1 tpy of VOC is correct, we suggest that the potential-to-emit for VOC in Section I. be clarified to resolve the apparent discrepancy.

Again, we appreciate the opportunity to provide comments on this draft permit. Please feel free to contact me at (913) 551-7876 if you have any questions.

Sincerely,

Mark A. Smith, Chief
Air Permitting and Compliance Branch
Air and Waste Management Division