



**Comments and Responses on the American Energy Producers, Inc.
Prevention of Significant Deterioration (PSD) Permit
Project Number 2006-04-052
Carroll County Biodiesel Plant**

A draft PSD permit for installation of a 60 million gallon per year biodiesel production facility with two 95 MMBTU/hr boilers for American Energy Producers, Inc. in Carroll county was placed on public notice December 18, 2007. The only comments received during the public notice period were from American Energy Producers and the United States Environmental Protection Agency (EPA) Region VII. The comments and the Air Pollution Control Program (APCP) response to each comment are presented in this document.

This document and the attachments will be posted at
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In a letter dated January 9, 2008 American Energy Producers submitted comments pertaining to the draft prevention of significant deterioration (PSD) permit. APCP responds to the American Energy Producers comments as follows:

AEPI Comment # 1: Special Conditions 1A through 1G – BACT Control Equipment

It appears that MDNR considers the condensers and scrubbers as add-on control devices required by BACT. AEPI believes that these condensers and scrubbers are an integral part of the process, not add-on control devices. This is evident in the BACT analysis submitted in the PSD application (see pp. 30-33 of PSD application).

It is true that the operation of these condensers has an impact on VOC emissions; however that can be said for many types of process equipment that are not evaluated under BACT (e.g. an economizer on a boiler). It is also true that in other chemical processes these types of devices are evaluated as add-on control devices. However, the condensers and scrubbers in question are part of the manufacturer's design for a process to make biodiesel; it would not be feasible to remove these devices in lieu of a different VOC reduction technology if it were dictated by the regulatory process. To identify the condensation/scrubbing system as BACT control equipment implies that this equipment was compared to other control options (e.g. incineration, carbon adsorption, etc.) using the top-down methodology prescribed by EPA, which is difficult because it is not feasible to evaluate the biodiesel process without the use of this equipment. Ultimately, this equipment is a standard component of a biodiesel production process and is not installed as a result of environmental regulations. Note that the same type of methanol recovery system is used on other biodiesel plants not subject to PSD and required to evaluate BACT.

AEPI contends that BACT for the biodiesel process vent emissions is good operating practices, and requests removal of all references in the permit to the condensation/scrubbing system as BACT control equipment (see special condition 1, p. 9 and pp. 16-17 of permit).

In addition, AEPI proposes the following modifications to conditions 1E and 1F:

- E. “American Energy Producers, Inc. shall monitor and record liquid inlet temperatures for both of the condensers at least once per operating shift. The condensers shall be equipped with a device that indicates the liquid inlet temperature. The liquid inlet temperatures for each condenser shall be maintained at or below the design conditions specified by the manufacturer’s performance warranty or operating parameter recommendations. American Energy Producers Inc shall provide documentation regarding the manufacturer’s performance warranty or operating parameter recommendations to Department of Natural Resources employees upon request.”

- F. “American Energy Producers, Inc. shall monitor and record the flow rate of cooling water and glycol/water mixture through the condensers and the flow rate of oil and water through the scrubbers at least once per operating shift. The condensers and scrubbers shall be equipped with devices that indicate the flow rate through the equipment. The flow rates shall be maintained within the design conditions specified by the manufacturer’s performance warranty or operating parameter recommendations. American Energy Producers Inc shall provide documentation regarding the manufacturer’s performance warranty or operating parameter recommendations to Department of Natural Resources employees upon request.”

Response to AEP Comment # 1

APCP believes that the condensers and scrubbers serve a dual function, to recover methanol and to minimize emissions, therefore it is appropriate to consider the capabilities and operating parameters for these devices as part of the best available control technology BACT review. APCP believes that this is consistent with the spirit and intent of the BACT regulations, see specifically the definition of BACT at 10 CSR 10-6.020(2)(B)5. APCP considered American Energy Producers’ suggested revisions to special conditions 1.E and 1.F., conducted some further analyses and amended the special conditions.

With regard to special condition 1.E. APCP believes that the exit temperature of the uncondensed vapors is a more appropriate parameter to monitor and limit (as compared to the inlet temperatures of liquids entering the condensers) since this is a more direct measure of the methanol concentration leaving the condensation process as un-condensed vapor.

With regard to special condition 1.F., the monitoring frequency for liquid flow rates through the condensers and scrubbers has been changed to once-per-shift rather than continuous, per American Energy Producers suggestion. This change is not expected to result in any appreciable increase in emissions.

AEP Comment # 2 – Special Condition 1.H – VOC BACT Limit

AEPI requests modification of condition 1H to the following:

“Volatile organic compound emissions from the biodiesel process vent (EP-14) shall not exceed 0.5 lbs/hr, as demonstrated by the average of three one-hour runs during an initial performance test.”

Response to AEP Comment # 2

The permit was amended per American Energy Producers’ suggestion. This is consistent with the intent of the draft permit.

AEP Comment # 3 – Special Condition 3 – BACT for Cooling Towers

Since submittal of the original application, AEPI has obtained more detailed information from cooling tower vendors and determined that the use of high efficiency drift eliminators designed to reduce drift to less than 0.0005% are not economically feasible as BACT for this project. AEPI proposes to install drift eliminators designed to reduce drift to less than 0.001% as BACT on the cooling tower.

The difference between these two values is an extra layer of eliminators provided by the manufacturer, which represent an additional capital cost of \$45,000. This additional cost represents an incremental cost of approximately \$19,000 per ton of additional PM₁₀ removed, making the additional control cost prohibitive (see attached calculations). Consequently, AEPI requests modification to condition 3A to reflect 0.001% drift.

In addition, the emission rate used in the PM₁₀ air quality analysis for the cooling towers was erroneously calculated using the AP-42 default drift of 0.02%. The application also reflected a low flow rate for the tower and a low TDS concentration for the cooling water. Attached is a revised Table D7 that calculates an emission rate based on 0.001% drift, 16,500 gallons per minute of flow and an outlet TDS concentration of 1050 mg/L. Given the significant change in the percent drift, the calculations yield an emission rate much lower than the rate reflected in the PM₁₀ air quality analysis (0.087 lb/hr compared to 0.45 lb/hr). Given the decrease in emissions, no revised air quality analysis is warranted.

Given the minimal emissions associated with the cooling tower (0.38 tpy of PM₁₀), AEPI considers the requirements to monitor flow and TDS content of the cooling water overly burdensome and requests the removal of conditions 3C, 3D & 3E from the permit. For example, a flow rate of 25,000 gpm and a TDS concentration of 2000 mg/L yields PM₁₀ emissions totaling 1.1 tpy, which is only a 0.7 tpy increase above the already conservative design calculation and still well below the emission rate reflected in the air quality analysis.

Response to AEP Comment # 3

APCP concurs with American Energy Producers’ assessment and has changed the permit accordingly.

AEPI Comment # 4 – Special Condition 5 – Operational Limits for the Boilers

AEPI questions the purpose of condition 5A, as this is the maximum capacity of the boilers. Further, condition 9A requires AEPI to monitor natural gas and fuel oil usage in order to demonstrate compliance with this limit. AEPI contends that it is unnecessary and overly burdensome to track individual fuel usage for each boiler on an hourly basis. AEPI requests removal of condition 5A from the permit, and removal of the reference to 5A in condition 9A.

AEPI requests removal of the limitation for each boiler to utilize less than 678,500 gallons of fuel in any consecutive 12 month period from condition 5B, as well as conditions 5F and 5J, which place NO_x emission limitations on the boilers. In the permit application, AEPI estimated potential NO_x emissions from the boilers based on these limitations (combusting less than 678,500 gallons of fuel oil per boiler, an emission factor of 0.0403 lb NO_x /MMBTU when combusting natural gas and an emission factor of 0.10 lb NO_x /MMBTU when combusting fuel oil). AEPI does not feel it is appropriate to include these parameters as operational constraints within the permit. The regulatory basis for limiting NO_x emissions from AEPI is that emissions remain below the PSD significance level of 40 tons per year. As written, the permit places further constraints on the plant for which there is no regulatory basis. For example, AEPI could exceed any one of the conditions in question without emitting greater than 40 tons of NO_x in a consecutive 12 month period.

AEPI will conduct initial performance testing to develop NO_x emission factors from the boilers which will be used in conjunction with tracking of fuel use to calculate actual NO_x emissions from the boiler. These emissions will be summed with actual emissions from the emergency fire pump engine to obtain total NO_x emissions from the installation. AEPI suggests the following language in lieu of conditions 5B, 5F and 5J:

“NO_x emissions from the entire installation shall not exceed 40 tons in any consecutive twelve month period. American Energy Producers shall conduct performance testing to develop NO_x emission factors for the combustion of natural gas and fuel oil in the boilers. These factors shall be used to calculate actual emissions from the boilers in order to verify compliance with the 12 month rolling emission limitation.”

Response to AEP Comment # 4

APCP is retaining the fuel throughput limitations and associated monitoring/recordkeeping. Fuel usage records will be necessary to demonstrate compliance with the revised NO_x limitation (special condition 6). APCP is replacing the NO_x emission limitations that were in the draft permit with an installation-wide 40 ton per year limitation per American Energy Producers' suggestion. The end result is the same in terms of NO_x emissions.

AEPI Comment # 5 – Special Condition 8 – Performance Testing

Condition 8A does not make sense as written. AEPI assumes the condition should reference conditions 5C through 5J rather than 1C through 1J.

AEPI requests the addition of a condition clarifying that AEPI need only test one of the two identical boilers to verify compliance with emission limitations specified in condition 5, and that test results will be considered representative of both boilers.

Response to AEP Comment # 5

Condition 8.A., which is now condition 9.A., was amended to correct the mistake and to add a reference to the new special condition 6 and clarifying language added regarding boiler performance testing.

Comment #6 – Body of permit

AEPI requests removal of the following sentence from page 12 of the permit:

“There are significant financial incentives (such as the Missouri qualified biodiesel producer incentive fund) related to biodiesel production. The soybean processing plant might not be financially viable if not for such incentives. This is another reason to consider all operations as one installation.”

AEPI is not contesting MDNR’s decision to consider the biodiesel & soybean extraction plants one installation; however this statement regarding the financial viability of the project is inaccurate and should be removed from the permit.

AEPI also requests the following revision of a statement on page 16 of the permit:

“There will also be hexane emissions since hexane is present in the vegetable oil that is used as a feedstock for biodiesel production.”

It is inaccurate to state that a significant amount of hexane is present in the vegetable oil.

Response to Comment # 6

The review summary language was amended. The discussion of financial incentives for biodiesel production was removed. The “same installation” determination does not rely on this type of consideration alone. The sentence about hexane content in the vegetable oil was changed to refer to “residual” hexane.

In a letter dated January 17, 2008 EPA region VII submitted comments pertaining to the draft prevention of significant deterioration (PSD) permit. APCP responds to the EPA comments as follows:

EPA Comment # 1

The practice required by the draft permit in Special Conditions 2.A., states that AEPI periodically water, wash and/or otherwise clean all of the haul roads as necessary to achieve control of fugitive emissions from these roads. In order to be enforceable as a practical matter, the condition should include a specific watering frequency or average standard.

Response

The permit condition requires AEPI to “control fugitive emissions by paving all haul roads.” In addition, AEPI is required to “periodically water... as necessary to achieve control of fugitive emissions from these roads.” This wording is consistent with previously issued PSD permits and APCP does not believe a schedule of watering is necessary. Therefore, APCP is not making any changes to the permit at this time.

EPA Comment # 2

Meteorological Data: Wind directions are reported to the nearest 10 degrees at National Weather Service (NWS), FAA, and military meteorological stations. These can be, and should be, randomized the AERMET preprocessor for the AERMOD dispersion model. Receptors located on a 10-degree radial from a source will have higher concentrations than receptors that are not on a 10-degree radial, i.e., concentrations on a radial will be over predicted while concentrations off the radial will be under predicted, because of a higher frequency towards a receptor on a 10-degree radial. The meteorological wind directions were not randomized.

Response

Staff with the Department’s Air Pollution Control Program concur with the statement that the wind directions should be randomized when executing the AERMET meteorological preprocessor. Due to the amount of computational time needed to generate model results for PM₁₀, the Air Quality Modeling Unit opted to perform a model analysis to determine the sensitivity of the model results to changes in the meteorological data when applying the randomization routine in AERMET. Because the preliminary analysis focuses primarily on the impact from the proposed facility, the model input files that were developed for the preliminary analysis, as detailed in the response to comment #4, were used to perform the sensitivity analysis.

The only alteration to the input file was the use of the updated meteorological data files to account for wind randomization. Difference plots were created for the 24-hour and annual averaging periods in order to determine the maximum concentration difference for each receptor within the modeling domain between the original air quality study and the sensitivity analysis. Figure 1, entitled “**AEP Wind Difference Plot, 24-hour 1st High Concentration,**” graphically displays the results of the short term analysis and indicates the maximum 24-hour concentration difference of 2.837µg/m³ occurs to the north of the proposed facility. Figure 2, entitled “**AEP Wind Difference Plot, Annual Concentration,**” graphically displays the results of the long term analysis and indicates the maximum annual concentration difference of 0.11078µg/m³ also occurs to the north of the proposed facility. It is important to note that although these receptors experience the greatest concentration difference, they are not the maximum impact receptors. As originally modeled, the 24-hour NAAQS and increment concentrations were 7.125 µg/m³ and 11.772 µg/m³, and the annual NAAQS and increment concentrations were 22.81 µg/m³ and 22.63 µg/m³ respectively at this location. All of these values are well below the applicable standards and violations are not likely to occur.

The 24-hour maximum impact receptor, as originally modeled, experienced an ambient concentration of 25.715 $\mu\text{g}/\text{m}^3$. Based upon the results of the sensitivity analysis, the ambient impact at the maximum concentration receptor decreased to 24.97 $\mu\text{g}/\text{m}^3$.

The annual maximum impact receptor, as originally modeled, experienced an ambient concentration of 4.9 $\mu\text{g}/\text{m}^3$. Based upon the results of the sensitivity analysis, the ambient impact at the maximum concentration receptor increased to 5.066 $\mu\text{g}/\text{m}^3$.

Given that the overall impact is minimal in areas of maximum impact, the Air Quality Modeling Unit has determined that the results obtained from the model inputs submitted in the modeling memorandum dated January 10, 2008, are conservative and should be protective of the increment and National Ambient Air Quality Standards for PM_{10} . As such, further review was deemed unnecessary.

EPA Comment # 3

The permit states that there will be a barrier to prevent access to the property but there are no specifics as to where the barrier will be. There is a warning in the modeling memo that the fence must be on the fence property boundary that was modeled. The permit should specify the location of the fence based on the modeling.

Response

Special condition 10., which is now special condition 11, was revised to be more specific with regard to the fence location.

EPA Comment # 4

There has been a change in emissions for AEPI point sources Boiler 1(STCK1), Silica Baghouse (STCK14), Fire Pump Engine (STCK15), Boiler 2 (STCK16), Meal Loadout Baghouse (STCK17), as well as changes in the meteorological data. Except for a slight decrease in emissions from Silica Baghouse (Stack14), there were increases in the point source emissions modeled by MDNR. There was also an increase in emissions for volume sources Bean Silo Vent 1 (VOL1) and Bean Silo Vent 2 (VOL2) The initial SZ parameter for these sources was also changed in the increment and NAAQS, but not in the Significant Area Impact (SIA), analyses to reflect a more realistic scenario. The predicted concentrations in the AEPI analyses for the SIA were higher but it not possible to compare predicted concentrations because of the legitimate changes. The basis for the changes should be documented for the record.

Response

Any changes in emission rates that have not already been addressed in the modeling efforts, will be addressed in the second phase of permitting for the soybean processing plant. The initial SZ parameter for these sources was also changed in the increment and NAAQS, but not in the Significant Area Impact (SIA), analyses to reflect a more realistic scenario. The predicted concentrations in the AEPI analyses for the SIA were higher but it is not possible to compare predicted concentrations because of the legitimate changes.

EPA Comment # 5

The haul roads were modeled as being used for only 12 hours per day (0800 AM – 0800 PM) but there is nothing in the permit that limits haul road traffic to these hours. Also, there should be a limit of number of trucks, or emission limits based on the number of trucks, in the permit. The meal loadout baghouse was modeled with different emission rates for the two 12-hour periods. These limitations must be in the permit.

Response

This issue will be addressed in the second phase of permitting for the soybean processing plant.

EPA Comment # 6

The modeling review that MDNR did was very complete and professional but the permit did not include all of the modeling recommendations.

Response

The second phase permit for the soybean processing plant will contain additional conditions as recommended by the modeling memorandum.

EPA Comment # 7

AEP used upper air data from Springfield, MO, that were also used for the recent AECI analyses. MDNR in its modeling used upper air data from the Lincoln, IL, radiosonde station. The selection/agreement on what meteorological data to use in the analyses should have been made in the pre-application meeting with the company/consultant. The reason for the change should have been in the modeling memo.

Response

Staff with the departments' Air Pollution Control Program, concur with the statement that AEP utilized upper air data from Springfield, MO, whereas the MDNR used upper air data from Lincoln, IL. MDNR staff mistakenly sent AEP upper air data from Springfield, MO. In an effort to save time and resources, MDNR staff decided to move forward and perform the modeling with upper air data from Lincoln, IL, without requesting the same of AEP.

EPA Comment # 8

The modeling memo describes the project for a 50 million gallons per year bio-diesel production facility while the permit describes it as 60 million gallon per year project. This should be clarified.

Response

The change in capacity was announced at about the same time that the draft permit was placed on public notice. The increased capacity will be reflected in the revised modeling memo.