

STATE OF MISSOURI



DEPARTMENT OF NATURAL RESOURCES

MISSOURI AIR CONSERVATION COMMISSION

PERMIT TO CONSTRUCT (DRAFT)

Under the authority of RSMo 643 and the Federal Clean Air Act the applicant is authorized to construct the air contaminant source(s) described below, in accordance with the laws, rules and conditions as set forth herein.

Permit Number:

Project Number: 2007-07-052

Parent Company: American Energy Producers Inc

Parent Company Address: 11 N Folger St, Carrollton, MO 64633

Installation Name: American Energy Producers Inc

Installation Address: U.S. Highway 65 North, Carrollton, MO 64633

Location Information: Carrol County, S4, T54N, R23W

Application for Authority to Construct was made for:
Installation of a 60 million gallon per year biodiesel production facility with two 95 MMBTU/hr boilers. This review was conducted in accordance with Sections 6 and 8 of 10 CSR 10-6.060, *Construction Permits Required*.

Standard Conditions (on reverse) are applicable to this permit.

Standard Conditions (on reverse) and Special Conditions are applicable to this permit.

EFFECTIVE DATE

DIRECTOR OR DESIGNEE
DEPARTMENT OF NATURAL RESOURCES

STANDARD CONDITIONS:

Permission to construct may be revoked if you fail to begin construction or modification within 18 months from the effective date of this permit. Permittee should notify the Air Pollution Control Program if construction or modification is not started within 18 months after the effective date of this permit, or if construction or modification is suspended for one year or more.

You will be in violation of 10 CSR 10-6.060 if you fail to adhere to the specifications and conditions listed in your application, this permit and the project review. In the event that there is a discrepancy between the permit application and this permit, the conditions of this permit shall take precedence. Specifically, all air contaminant control devices shall be operated and maintained as specified in the application, associated plans and specifications.

You must notify the department's Air Pollution Control Program of the anticipated date of start up of this (these) air contaminant source(s). The information must be made available not more than 60 days but at least 30 days in advance of this date. Also, you must notify the Department of Natural Resources Regional office responsible for the area within which you are located with 15 days after the actual start up of this (these) air contaminant source(s).

A copy of this permit and permit review shall be kept at the installation address and shall be made available to Department of Natural Resources' personnel upon request.

You may appeal this permit or any of the listed special conditions to the Administrative Hearing Commission (AHC), P.O. Box 1557, Jefferson City, MO 65102, as provided in RSMo 643.075.6 and 621.250.3. If you choose to appeal, you must file a petition with the AHC within 30 days after the date this decision was mailed or the date it was delivered, whichever date was earlier. If any such petition is sent by registered mail or certified mail, it will be deemed filed on the date it is mailed. If it is sent by any method other than registered mail or certified mail, it will be deemed filed on the date it is received by the AHC.

If you choose not to appeal, this certificate, the project review and your application and associated correspondence constitutes your permit to construct. The permit allows you to construct and operate your air contaminant source(s), but in no way relieves you of your obligation to comply with all applicable provisions of the Missouri Air Conservation Law, regulations of the Missouri Department of Natural Resources and other applicable federal, state and local laws and ordinances.

The Air Pollution Control Program invites your questions regarding this air pollution permit. Please contact the Construction Permit Unit at (573) 751-4817. If you prefer to write, please address your correspondence to the Missouri Department of Natural Resources, Air Pollution Control Program, P.O. Box 176, Jefferson City, MO 65102-0176, attention: Construction Permit Unit.

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SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

The special conditions listed in this permit were included based on the authority granted the Missouri Air Pollution Control Program by the Missouri Air Conservation Law (specifically 643.075) and by the Missouri Rules listed in Title 10, Division 10 of the Code of State Regulations (specifically 10 CSR 10-6.060). For specific details regarding conditions, see 10 CSR 10-6.060 paragraph (12)(A)10. "Conditions required by permitting authority."

American Energy Producers Inc
Carrol County, S4, T54N, R23W

1. BACT Control Equipment and Emission Limitation – Condensation/Scrubbing System for Biodiesel Production Processes
 - A. The condensation/scrubbing system must be in use at all times when the biodiesel production equipment is in operation and shall be operated and maintained in accordance with the manufacturer's specifications.
 - B. The condensation/scrubbing system shall consist of a water-cooled shell and tube heat exchanger (condenser number 1), a glycol/water refrigerated shell and tube heat exchanger (condenser number 2), a soy oil scrubber and a water scrubber, in series.
 - C. The vapor outlet of the glycerine methanol stripper and the vapor outlet of the biodiesel methanol stripper shall be ducted to the condensation/scrubbing system described in Special Condition 1.B.
 - D. The vapor outlet of the rectification vent condenser shall be routed to the soy oil scrubber and the water scrubber, in series.
 - E. American Energy Producers Inc shall continuously monitor and record liquid inlet temperatures for both of the condensers. The water inlet temperature for condenser number 1 shall not exceed 90 degrees F. The glycol/water mixture inlet temperature for condenser number 2 shall not exceed 40 degrees F.
 - F. American Energy Producers Inc shall continuously 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. The flow rate 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

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SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

Resources employees upon request.

- G. American Energy Producers Inc shall maintain an operating and maintenance log for the condensation/scrubbing system which shall include the following:
 - 1) Incidents of malfunction, with impact on emissions, duration of event, probable cause, and corrective actions; and
 - 2) Maintenance activities, with inspection schedule, repair actions, and replacements, etc.
 - 3) A written record of regular inspection schedule, the date and results of all inspections including any actions or maintenance activities that result from that inspection.
 - H. Volatile organic compound emissions from the biodiesel process vent (EP-14) shall not exceed 0.5 lbs/hr, as demonstrated by an initial stack test.
2. BACT Work Practice – Haul Road Fugitive Emissions Control
- A. American Energy Producers Inc shall control fugitive emissions by paving all haul roads. Maintenance and/or repair of the road surface shall be conducted as necessary to ensure that the physical integrity of the pavement is adequate to achieve control of fugitive emissions from these roads. American Energy Producers Inc shall periodically water, wash and/or otherwise clean all of the haul roads as necessary to achieve control of fugitive emissions from these roads.
3. BACT for Cooling Towers
- A. The cooling towers shall be equipped with high efficiency drift eliminators that are designed to reduce drift to less than 0.0005 percent. Verification of drift loss shall be by manufacturer's guaranteed drift loss and shall be kept on site and made readily available to Department of Natural Resources' employees upon request.
 - B. The cooling tower(s) shall be operated and maintained in accordance with the manufacturer's specifications. Manufacturer's specifications shall be kept on site and made readily available to Department of Natural Resources' employees.

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The permittee is authorized to construct and operate subject to the following special conditions:

- C. The cooling water circulation rate shall not exceed 450,000 gallons per hour.
- D. American Energy Producers Inc shall keep records of the monthly and 12-month rolling averages of the amount of water circulated.
- E. The total dissolved solids (TDS) concentration in the circulated cooling water shall not exceed a TDS concentration of 600 parts per million (ppm). A TDS sample shall be collected and the results recorded on a weekly basis to verify the TDS concentration.

4. Leak Detection and Repair (LDAR) – BACT Work Practice

American Energy Producers Inc shall develop and implement a leak detection and repair (LDAR) program for the biodiesel production processes that meets the requirements of 40 CFR Part 60, Subpart VV, *Standards of Performance for Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry*. American Energy Producers Inc shall provide a copy of the LDAR program and documentation regarding observations and/or repairs made in accordance with the LDAR program to Department of Natural Resources employees upon request.

5. Operational and Emission Limits for the Boilers

The following emission limits apply to each of the two 95 MMBTU/hr boilers. American Energy Producers Inc shall not exceed the following operational and emission limits:

- A. Heat input shall not exceed 95 MMBTU/hr.
- B. Each boiler shall utilize less than 678,500 gallons of fuel oil for any consecutive 12-month period. The fuel oil shall be No. 2 fuel oil with a sulfur content not to exceed 0.05 percent.
- C. When burning fuel oil PM emissions shall be limited to 0.0236 lbs/MMBTU, test method average. (Note: This is a BACT emission limit.)
- D. When burning fuel oil PM₁₀ emissions shall be limited to 0.0164 lbs/MMBTU, test method average. (Note: This is a BACT emission limit.)
- E. When burning fuel oil VOC emissions shall be limited to 0.001 lbs/MMBTU, test method average. (Note: This is a BACT emission limit.)
- F. When burning fuel oil NO_x emissions shall be limited to 0.04 lbs/MMBTU, test method average.
- G. When burning natural gas PM₁₀ emissions shall be limited to 0.0072

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SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

- H. lbs/MMBTU, test method average. (Note: This is a BACT emission limit.)
When burning natural gas PM emissions shall be limited to 0.0072 lbs/MMBTU, test method average. (Note: This is a BACT emission limit.)
 - I. lbs/MMBTU, test method average. (Note: This is a BACT emission limit.)
When burning natural gas VOC emissions shall be limited to 0.0055 lbs/MMBTU, test method average. (Note: This is a BACT emission limit.)
 - J. lbs/MMBTU, test method average.
When burning natural gas NO_x emissions shall be limited to 0.1 lbs/MMBTU, test method average.
6. Emissions Control for the Methanol Storage Tanks – BACT Work Practice
- Breathing losses from the methanol storage tanks (EP-24) shall be controlled by nitrogen blanketing. Working losses from the methanol storage tanks shall be controlled during truck or railcar unloading by use of a vapor balance system.
7. Baghouse Control for EP-16. (Note: This is a BACT emission limit.)
- A. American Energy Producers Inc shall control emissions from the diatomaceous earth hopper and silica hopper (EP- 16) using a baghouse as specified in the permit application. The baghouse shall be operated and maintained in accordance with the manufacturer's specifications. The baghouse shall be equipped with a gauge or meter, which indicates the pressure drop across the control device. These gauges or meters shall be located such that the DNR employees may easily observe them. Replacement filters for the baghouses and drum filters shall be kept on hand at all times. The bags shall be made of fibers appropriate for operating conditions expected to occur (i.e. temperature limits, acidic and alkali resistance, and abrasion resistance).
 - B. American Energy Producers Inc shall monitor and record the operating pressure drop across the baghouses and drum filters at least once every 24 hours. The operating pressure drop shall be maintained within the design conditions specified by the manufacturer's performance warranty.
 - C. American Energy Producers Inc shall maintain an operating and maintenance log for the baghouse which shall include the following:
 - 1. Incidents of malfunction, with impact on emissions, duration of event, probable cause, and corrective actions; and
 - 2. Maintenance activities, with inspection schedule, repair actions, and replacements, etc.
8. Performance Testing

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SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

- A. Initial performance testing shall be conducted in order to verify compliance with special conditions 1.H and special conditions 1.C through 1.J.
 - B. The performance tests shall be conducted within 60 days of achieving the maximum production rate, but no later than 180 days after initial startup.
 - C. The date on which performance tests are conducted shall be pre-arranged with the Air Pollution Control Program a minimum of 30 days prior to the proposed test so that a pretest meeting may be arranged if necessary, and to assure that the test date is acceptable for an observer to be present. A completed Proposed Test Plan form (copy enclosed) may serve the purpose of notification and must be approved by the Air Pollution Control Program prior to conducting the required emission testing.
 - D. Two (2) copies of a written report of the performance test results shall be submitted to the Director of the Air Pollution Control Program within 30 days of completion of any required testing. The report must include legible copies of the raw data sheets, analytical instrument laboratory data, and complete sample calculations from the required EPA method for at least one (1) sample run.
9. Operational Monitoring and Recordkeeping
- A. American Energy Producers Inc shall monitor and record natural gas and fuel oil usage for the two boilers in order to demonstrate compliance with special condition 5.A.
 - B. The fire pump engine shall (EP-21) shall operate less than 500 hours per year. American Energy Producers Inc shall log the hours of operation to demonstrate compliance with this condition.
 - C. American Energy Producers Inc shall analyze a representative sample of fuel oil from the fuel oil storage tank for sulfur content at least once per year. As an alternative, American Energy Producers may obtain certified analyses from the fuel oil provider.
 - D. All records required by this permit shall be maintained on-site for at least 5 years and shall be provided to Department of Natural Resources employees upon request.
10. Restriction of Public Access – Fencing or Physical Barrier to Restrict Public

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SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

Access to Property

American Energy Producers shall preclude public access to property that is considered within the non-ambient air zone with respect to the air quality impact analysis conducted for this permit. Installation and maintenance of a fence or other physical barrier shall be the means to preclude public access.

REVIEW OF APPLICATION FOR AUTHORITY TO CONSTRUCT AND OPERATE
SECTION (Sections 6,7 and 9) REVIEW

Project Number: 2007-07-052

Installation ID Number: 033-0034

Permit Number:

American Energy Producers Inc
U.S. Highway 65 North
Carrollton, MO 64633

Parent Company:
American Energy Producers Inc
11 N Folger St
Carrollton, MO 64633

Carroll County, S4, T54N, R23W

REVIEW SUMMARY

- American Energy Producers Inc has applied for authority to install a 60 million gallon per year biodiesel production facility with two 95 MMBTU/hr boilers.
- American Energy Producers Inc has also applied for authority to construct a 3000 ton per day soybean processing facility adjacent to (and integrated with) the biodiesel production facility. The Air Pollution Control Program and American Energy Producers are still working on the certain aspects of the soybean processing facility permit. The Air Pollution Control Program intends to issue the soybean processing facility permit in the first half of 2008.
- Hazardous Air Pollutant (HAP) emissions are expected from the proposed equipment. The HAP of concern from biodiesel production process is methanol.
- New Source Performance Standards (NSPS) apply to this installation. Specifically, 40 CFR Part 60 Subpart Kb, *Standards of Performance for Volatile Organic Liquid Storage Vessels*, applies to the storage tanks. NSPS Subpart RRR, for VOC Emissions from SO2MI Reactor Processes, applies to the biodiesel plant. NSPS Subpart NNN, for VOC Emissions from SO2MI Reactor Distillation Operations, applies to the biodiesel plant NSPS Subpart VV, for Equipment Leaks of VOC in the SO2MI, applies to the biodiesel plant and NSPS Subpart Dc for Industrial, Commercial, Institutional Steam Generating Units applies to the boilers.
- The Maximum Achievable Control Technology (MACT) standard, 40 CFR Part 63, Subpart FFFF, National Emission Standards for Miscellaneous Organic Chemical Production and Processes (MON) applies to the biodiesel plant since the installation is major for HAPs.
- A condensation/scrubbing system is being used to control methanol emissions from biodiesel production.

- This review was conducted in accordance with Sections 6 and 8 of 10 CSR 10-6.060, *Construction Permits Required*. Potential emissions of HAPs are above major source levels; however Section 9 of 10 CSR 10-6.060 does not apply since the biodiesel production processes are subject to MACT requirements. Potential emissions of volatile organic compounds (VOC) are greater than 250 tons per year for this installation when considering emissions from the soybean processing operations. This makes the installation a “major” installation with regard to prevention of significant deterioration (PSD) requirements. Potential emissions of particulate matter (PM) and particulate matter with an aerodynamic diameter less than ten microns (PM₁₀) are also above PSD significance levels when considering the entire installation (i.e., soybean processing, biodiesel production and steam generation).
- This installation is located in Carroll County, an attainment area for all criteria air pollutants.
- The biodiesel production portion of this installation is in the named source category of “Chemical Processing Plant”; however, the installation as a whole is not considered a named installation. See the installation/project description and 10 CSR 10-6.020(3) (B), Table 2 for further detail.
- Ambient air quality modeling was performed by the applicant and by the Air Pollution Control Program, to determine the ambient impact of PM₁₀ and to look at potential risks associated with methanol and hexane emissions. Results of the modeling predict PM₁₀ ambient impact below the increment standard (see 10 CSR 10-6.060(6) (A) 3 and 10 CSR 10-6.060(11) (A)) and below the national ambient air quality standard (see 10 CSR 10-6.010). Results of the modeling also demonstrate that there is no unacceptable risk related to methanol and hexane emissions.
- Emission testing may be required per NSPS standards and the special conditions of this permit.
- A Part 70 Operating Permit application is required for this installation within 1 year of equipment startup.
- Approval of this permit is recommended with special conditions.

INSTALLATION DESCRIPTION

This is a new installation to be located along Highway 65, approximately two miles southeast of Tina, Missouri. American Energy Producers Inc plans to focus on biodiesel production initially and then move forward with construction and operation of soybean processing operations.

The American Energy Producers Inc. facility will consist of a soybean processing plant, a biodiesel manufacturing plant, two 95 MMBTU/hr boilers and ancillary equipment. The soybean processing plant includes material handling operations (such as

unloading, crushing, conveying, pelletization and storage), soy meal conditioning (thermal/mechanical), solvent extraction (with hexane), distillation for solvent recovery and refining and bleaching processes (for oil that is to be used for biodiesel production).

The proposed front-end capacity of the soybean processing plant is 3,000 tons of soybeans per day. Products from the soybean processing plant include crude soy oil, refined and bleached soy oil, soy meal and soy hulls.

The biodiesel plant includes chemical reaction vessels, soy oil storage tanks, methanol storage tanks, glycerine storage tanks, biodiesel storage tanks and other process equipment. The primary feedstock for the biodiesel plant is refined and bleached soy oil from the soybean processing plant, but purchased soy oil may also be used as well as other feedstock, such as animal fat and waste cooking oil. Biodiesel is produced from the base-catalyzed transesterification of soy oil with methanol. The by-product of this reaction is glycerine. The proposed capacity for biodiesel production is 164,383 gallons per day.

The two boilers, each rated at 95 MMBTU/hr, will be fired primarily with natural gas, but will also be capable of burning # 2 fuel oil. Ancillary equipment includes cooling towers, a fire pump engine and fuel oil storage tanks.

This permit excludes the installation of soybean processing operations since the Air Pollution Control Program and American Energy Producers Inc are still working on certain aspects of this permit relating to the best available control technology (BACT) emission limitations. However, pre-construction monitoring for ozone has been completed by the applicant and n-hexane risk analysis modeling based on the applicant's proposed BACT emission rates has also been completed.

PSD Applicability Discussion

For the purpose of PSD applicability determination, the biodiesel plant, soybean processing plant and steam generating boilers are all considered as part of the same installation due to support facility and common control issues. Further explanation and discussion of the implications to follow.

Installation is defined at 10 CSR 10-6.020(2) (l) 7. as,

“All source operations including activities that result in fugitive emissions, that belong to the same industrial grouping (that have the same 2-digit code as described in the Standard Industrial Classification Manual, 1987), and any marine vessels while docked at the installation, located on one (1) or more contiguous or adjacent properties and under the control of the same person (or persons under common control)”

However, as explained in the Federal Register notice that redefined source:

“Each source is to be classified according to its primary activity, which is determined by its principal product or group of products produced or distributed, or services rendered. Thus, one source classification encompasses both primary

and support facilities, even when the latter includes units with a different two-digit SIC code.” See 45 FR 52695.

Portions of this installation are described by at least two SIC codes: The appropriate SIC code for a soybean processing plant is 2075. SIC code 2075 is for establishments primarily engaged in manufacturing soybean oil, cake, and meal, and soybean protein isolates and concentrates, or in processing purchased soybean oil other than into edible cooking oils. The appropriate SIC code for a biodiesel plant is 2869. SIC code 2869 is for establishments primarily engaged in manufacturing industrial organic chemicals, not elsewhere classified.

Once the entire installation is constructed and in operation soybean processing operations will more than likely represent the main revenue source and a review of emissions estimates shows that the main pollutant-emitting activity is also soybean processing. Therefore soybean processing is considered the primary activity for the installation as a whole. Soybean processing operations, in turn support the production of biodiesel, since refined and bleached soy oil from soybean processing will be the primary feedstock for the biodiesel plant. The primary activity (soybean processing) is supporting a secondary activity (biodiesel production). Or, another perspective would be to say that a group of products (derived from soybeans) are produced at this installation. The group of products includes crude soy oil, refined and bleached soy oil, soy meal, soy hulls and biodiesel fuel. 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.

The two boilers will provide process steam to the soybean processing and biodiesel plants and will exist solely to support these operations, therefore the boilers must be considered as part of the installation as a whole.

With regard to PSD permitting requirements, potential emissions of volatile organic compounds (VOC) are greater than 250 tons per year for this installation when considering emissions from the soybean processing operations. This makes the installation a “major” installation with regard to prevention of significant deterioration (PSD) requirements. Potential emissions of particulate matter (PM) and particulate matter with an aerodynamic diameter less than ten microns (PM₁₀) are also above PSD significance levels when considering the entire installation (i.e., soybean processing, biodiesel production and steam generation). Therefore BACT control technology review requirements apply for VOC, PM and PM₁₀ for soybean processing, biodiesel production and steam generation.

PROJECT DESCRIPTION

This permit is for the biodiesel production processes, two 95 MMBTU/hr boilers, cooling towers, fuel storage tanks and a fire pump engine - emission points 14 through 30 of the application. The soybean processing plant, emission points 1 through 13 will be

addressed in a separate, but related, permitting action. However, the Air Pollution Control Program is permitting the completion of all underground utilities and foundation work for the installation as a whole as part of this project/permit.

EMISSIONS/CONTROLS EVALUATION

The emission factors and control efficiencies used in this analysis were obtained from a variety of sources, as follows:

- Methanol and VOC emissions from equipment leaks were estimated using the procedures outlined in USEPA’s *Protocol for Equipment Leak Emission Estimates*, November 1995.
- Methanol emission from the biodiesel process vent were estimated by considering the thermodynamic properties of the vent stream and assuming 95 percent control through the two scrubbers. Emissions testing is required to quantify the VOC emission rate through the biodiesel process vent.
- PM₁₀ and VOC emissions from the boilers used in the potential to emit calculations are equivalent to the BACT emission limitations.
- PM₁₀ emissions from the fire pump engine and cooling towers were estimated in accordance with applicable Sections of USEPA AP-42.

Potential emissions of the application represent the potential of the new equipment, assuming continuous operation (8760 hours per year.) The following table provides an emissions summary for this project.

Table 1: Emissions Summary (tons per year) –
(Does not include Soybean Processing)

Pollutant	Regulatory <i>De Minimis</i> Levels	Existing Potential Emissions	Existing Actual Emissions	Potential Emissions of the Application
PM ₁₀	15.0	N/A	N/A	10.55
SO _x	40.0	N/A	N/A	< 40
NO _x	40.0	N/A	N/A	< 40
VOC	40.0	N/A	N/A	28.71
CO	100.0	N/A	N/A	62.5
Methanol	10.0	N/A	N/A	20.58
HAPs	10.0/25.0	N/A	N/A	28.88

*N/A = Not Applicable

PERMIT RULE APPLICABILITY

This review was conducted in accordance with Sections 6 and 8 of Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*.

APPLICABLE REQUIREMENTS

American Energy Producers Inc shall comply with the following applicable requirements. The Missouri Air Conservation Laws and Regulations should be consulted for specific record keeping, monitoring, and reporting requirements. Compliance with these emission standards, based on information submitted in the application, has been verified at the time this application was approved. For a complete list of applicable requirements for your installation, please consult your operating permit.

GENERAL REQUIREMENTS

- *Submission of Emission Data, Emission Fees and Process Information, 10 CSR 10-6.110*
The emission fee is the amount established by the Missouri Air Conservation Commission annually under Missouri Air Law 643.079(1). Submission of an Emissions Inventory Questionnaire (EIQ) is required June 1 for the previous year's emissions.
- *Operating Permits, 10 CSR 10-6.065*
- *Restriction of Particulate Matter to the Ambient Air Beyond the Premises of Origin, 10 CSR 10-6.170*
- *Restriction of Emission of Visible Air Contaminants, 10 CSR 10-6.220*
- *Restriction of Emission of Odors, 10 CSR 10-3.090*

SPECIFIC REQUIREMENTS

- *Restriction of Emission of Particulate Matter From Industrial Processes, 10 CSR 10-6.400*
- *New Source Performance Regulations, 10 CSR 10-6.070 – New Source Performance Standards (NSPS) for Volatile Organic Liquid Storage Vessels, 40 CFR Part 60, Subpart Kb.*
- *New Source Performance Regulations, 10 CSR 10-6.070 – New Source Performance Standards (NSPS) for VOC Emissions from SOCFI Distillation Operations, 40 CFR Part 60, Subpart NNN*
- *New Source Performance Regulations, 10 CSR 10-6.070 – New Source Performance Standards (NSPS) for VOC Emissions from SOCFI Reactor Processes, 40 CFR Part 60, Subpart RRR.*
- *New Source Performance Regulations, 10 CSR 10-6.070 – New Source Performance Standards (NSPS) for Equipment Leaks of VOC in the SOCFI, 40 CFR Part 60, Subpart VV.*
- *New Source Performance Regulations, 10 CSR 10-6.070 – New Source Performance Standards (NSPS) for Volatile Organic Compound (VOC)*

Emissions from the Synthetic Organic Chemical Manufacturing Industry (SOCMI) Distillation Operations, 40 CFR Part 60, Subpart NNN.

- *MACT Regulations, 10 CSR 10-6.075 – National Emissions Standards for Hazardous Air Pollutants: Miscellaneous Organic Chemical Manufacturing, 40 CFR Part 63, Subpart FFFF.*
- *Restriction of Emission of Sulfur Compounds, 10 CSR 10-6.260*
- *Maximum Allowable Emissions of Particulate Matter From Fuel Burning Equipment Used for Indirect Heating, 10 CSR 10-3.060*

BEST AVAILABLE CONTROL TECHNOLOGY (BACT) ANALYSIS

Applicability and Scope

With regard to PSD requirements this installation is considered a “major stationary source” since potential emissions of VOC exceeds 250 tons per year when accounting for emissions from soybean processing. Potential emissions of PM and PM₁₀ are also above PSD significance levels when considering the entire installation (i.e., soybean processing, biodiesel production and steam generation). Therefore BACT control technology review requirements apply for VOC, PM and PM₁₀, for soybean processing, biodiesel production and steam generation. The BACT determinations for soybean processing operations will be established in a separate permitting action.

Definition of BACT

BACT is defined at 10 CSR 10-6.020(2)(B), item 5, as follows:

An emission limitation (including a visible emission limit) based on the maximum degree of reduction for each pollutant which would be emitted from any proposed installation or major modification which the director on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for the installation or major modification through application of production processes or available methods, systems, and techniques, including fuel cleaning or treatment or innovative fuel combustion techniques for control of the pollutant. In no event shall application of BACT result in emissions of any pollutant which would exceed the emissions allowed by any applicable emissions control regulation, including New Source Performance Standards established in 10 CSR 10-6.070 and 40 CFR Part 60 and National Emission Standards for Hazardous Air Pollutants established in 10 CSR 10-6.080 and 40 CFR Part 61. If the director determines that technological or economic limitations on the application of measurement methodology to a particular emissions unit would make the imposition of an emission limitation infeasible, a design, equipment, work practice, operational standard, or combination thereof, may be prescribed instead to satisfy the requirement for the application of best available control technology. This standard, to the degree possible, shall set

forth the emissions reduction achievable by implementation of such design, equipment, work practice or operation and shall provide for compliance by means which achieve equivalent results.

BACT for Biodiesel Production Processes

The primary pollutant of concern from biodiesel production is methanol. There will also be hexane emissions since hexane is present in significant concentrations in the vegetable oil that is used as a feedstock for biodiesel production. Methanol and hexane are classified as VOC.

Methanol is used in the transesterification reaction that produces biodiesel. At several points downstream of the transesterification reaction vessels methanol is separated by stripping and distillation processes, the vapors are routed to a series of condensers and two absorption columns. The condensers and absorption columns serve to recover methanol for re-use and to control VOC emissions. VOC that is not recovered through the condensers and absorption columns is emitted through the biodiesel process vent. VOC is also emitted through equipment leaks from equipment such as tanks, pumps valves flanges, piping connections, etc. Emissions estimates indicate that equipment leaks comprise the majority of emissions for biodiesel production.

Additional VOC control technologies were considered by the applicant with relation to the biodiesel process vent: these include thermal processes (regenerative thermal oxidizer, incinerator, flare), carbon adsorption and biofiltration. Carbon adsorption and biofiltration were ruled out as technically infeasible. Thermal processes were ruled out due to economic considerations and collateral environmental impact (i.e., emissions from combustion process). Potential emissions from the biodiesel vent, for the system, as proposed, are approximately 2 tons per year. Annualized control costs for addition of a flare were estimated at \$61,000/ton of VOC removed. See Appendix E of the application for the cost estimate.

The applicant recommended leak detection and repair (LDAR) as a BACT work practice that serves to minimize equipment leaks.

Follow-up correspondence to the application states that the methanol storage tanks will utilize nitrogen blanketing to reduce or eliminate breathing losses. A vapor balance system will be utilized when transferring methanol from a truck or railcar to the methanol storage tanks to reduce or eliminate working losses.

The applicant did not find any other BACT determinations regarding biodiesel production. In lieu of this, the applicant provided information regarding BACT determinations for the chemical process industry. The Air Pollution Control Program is aware of one permit review that examined BACT considerations for a biodiesel plant. This permit was issued to Louis Dreyfus Industries, Claypool, Indiana in January 2006. The state BACT determination for the Louis Dreyfus permit was as follows:

One soy oil absorber followed by a water scrubber with combined VOC control efficiency of 99% and a VOC emission rate of 0.30 lbs/hr without methanol

unloading and 0.63 lbs/hr with methanol unloading.

The capacity for biodiesel production at the Louis Dreyfus plant is 80 million gallons per year.

With all of the above in mind, the APCP determined that BACT for VOC with regard to biodiesel production as follows:

Table 2: VOC BACT Equipment, Methods, Systems and Techniques for Biodiesel

Emission Source	BACT Equipment, Method, System or Technique
Biodiesel Production (glycerine stripper and biodiesel stripper vapors)	<ul style="list-style-type: none">• Two-stage condensation for methanol recovery.• Uncondensed vapors routed to soy oil absorber and then water scrubber.
Methanol Rectification Vent Condenser	<ul style="list-style-type: none">• Uncondensed vapors routed to soy oil absorber and then water scrubber.
Methanol Storage	<ul style="list-style-type: none">• Nitrogen blanketing to reduce or eliminate breathing losses.• Working losses controlled by vapor balance system during filling of tank(s).
Equipment Leaks	<ul style="list-style-type: none">• Subpart VV leak detection and repair (LDAR) program.

The VOC BACT emission rate for the biodiesel process vent is 0.5 lbs/hr and is subject to verification through stack testing.

BACT for the minimal PM and PM₁₀ sources associated with biodiesel production (i.e., silica and diatomaceous earth hoppers) is baghouse control.

BACT for Boilers

Steam is provided for the soybean solvent extraction and biodiesel production processes by two 95 MMBTU/hr boilers. The primary fuel will be natural gas but the boilers will also be permitted to burn fuel oil, up to 1000 hrs for each boiler.

In terms of PM and PM₁₀ emissions, natural gas is relatively clean burning when compared to solid fuels such as coal. None of the less than 100 MMBTU/hr units in the RACT/BACT/LAER clearinghouse table provided in the application as Table E-7 indicated add-on controls such as a baghouse, cyclone or wet scrubber. For boilers in this size range with limited fuel oil usage, add-on controls such as a baghouse, cyclone or wet scrubber would not be economically feasible.

The BACT emission rates for VOC, PM and PM₁₀ listed in Special Condition 5. are based on a review of other recently permitted boilers and consideration of AP-42 emission factors.

The use of good combustion practices has been indicated as a BACT work practice to minimize VOC emissions. Good combustion practices include practices such as operating with sufficiently high flame temperatures, adequate combustion air, and proper air/fuel mixing.

BACT for Cooling Towers

Particulate emissions occur from the cooling towers as a result of the solids in the water being entrained in the air stream. These droplets of water are known as drift. The most efficient way to remove drift from cooling towers is by installing drift eliminators. Thus, BACT for PM₁₀ from the cooling tower was determined to be high efficiency drift eliminators with a 0.0005 percent drift.

STAFF RECOMMENDATION

On the basis of this review conducted in accordance with Section (Sections 6,7 and 9), Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*, I recommend permit issuance with special conditions.

DRAFT

Stephen R. Jaques, P.E.
Environmental Engineer

Date

PERMIT DOCUMENTS

The following documents are incorporated by reference into this permit:

- The Application for Authority to Construct form, dated July 2007, received July 3, 2007, designating American Energy Producers Inc as the owner and operator of the installation.
- U.S. EPA document AP-42, *Compilation of Air Pollutant Emission Factors*, Fifth Edition.