STATE OF MISSOURI PERMIT BOOK

DEPARTMENT OF NATURAL RESOURCES

MISSOURI AIR CONSERVATION COMMISSION

PERMIT TO CONSTRUCT

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: 072015-019 Project Number: 2015-03-047
Installation Number: 217-0043

Parent Company: Archer Daniels Midland Company

Parent Company Address: 4666 Faries Parkway, Decatur, IL 62525

Installation Name: Archer Daniels Midland Processing - Deerfield

Installation Address: 17700 South Highway T, Deerfield, MO 64741

Location Information: Vernon County, S9, T35N, R33W

Application for Authority to Construct was made for:
Increase production of biodiesel plant to 50,000,000 gallons per year. This review was conducted in accordance with Section (5) of Missouri State Rule 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.

Alana L. Hess

Prepared by
Alana Hess
New Source Review Unit

Kyra L. Moore

Director or Designee
Department of Natural Resources

JUL 29 2015

Effective Date

STANDARD CONDITIONS:

Permission to construct may be revoked if you fail to begin construction or modification within two years from the effective date of this permit. The permittee should notify the Air Pollution Control Program if construction or modification is not started within two years 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 these air contaminant sources. The information must be made available within 30 days of actual startup. Also, you must notify the Department of Natural Resources' regional office responsible for the area within which you are located within 15 days after the actual start up of these air contaminant sources.

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 sources(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.

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."

ADM - Deerfield
Vernon County, S9. T35N, R33W

1. Superseding Condition
   A. The conditions of this permit supersede Special Condition 3.A of Construction Permit 092013-013, Special Condition 5.B of Construction Permit 062008-006A, and the first Special Condition 2 of Construction Permit 062008-006 previously issued by the Air Pollution Control Program.

2. Operational Limitation
   A. ADM – Deerfield shall limit biodiesel production to 50,000,000 gallons per consecutive 12-month period.

   B. ADM – Deerfield shall maintain records of the quantity of biodiesel produced each year and shall calculate the quantity of biodiesel produced during each 12-month period using Attachment A or an equivalent form approved by the Air Pollution Control Program.

3. VOC Emission Limitation
   A. ADM – Deerfield shall emit less than 250.0 tons of VOC from the entire installation in any consecutive 12-month period.

   B. ADM – Deerfield shall maintain records of monthly emissions from all VOC sources at the installation. At the end of each month, ADM – Deerfield shall calculate 12-month rolling total VOC emissions from the entire installation. Calculations shall be performed using Attachment B or an equivalent form approved by the Air Pollution Control Program.

4. Methanol Control Equipment
   A. ADM – Deerfield shall control emissions from the biodiesel plant using a water absorber on the reactor and a condenser on the methanol recovery system as specified in permit application 2007-09-016. The water absorber and condenser shall be operated and maintained in accordance with the manufacturer's specifications.

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

B. ADM – Deerfield shall maintain an operating and maintenance log for the water absorber and condenser which shall include:

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.

C. ADM – Deerfield shall maintain a copy of the manufacturer's specifications to document that the water absorber and condenser are being operated within the parameters set forth by the manufacturer(s).

5. Record Keeping and Reporting Requirements

A. ADM – Deerfield shall maintain all records required by this permit for not less than five years and shall make them available immediately to any Missouri Department of Natural Resources' personnel upon request. These records shall include SDS for all materials used.

B. ADM – Deerfield shall report to the Air Pollution Control Program's Compliance/Enforcement Section, P.O. Box 176, Jefferson City, MO 65102, no later than ten days after the end of the month during which records indicate an exceedance of Special Conditions 2.A or 3.A.

REVIEW OF APPLICATION FOR AUTHORITY TO CONSTRUCT AND OPERATE
SECTION (5) REVIEW
Project Number: 2015-03-047
Installation ID Number: 217-0043
Permit Number:

Installation Address:
ADM – Deerfield
17700 South Highway T
Deerfield, MO 64741

Parent Company:
Archer Daniels Midland Company
4666 Faries Parkway
Decatur, IL 62525

Vernon County, S9, T35N, R33W

REVIEW SUMMARY

- ADM – Deerfield has applied for authority to increase biodiesel production to 50,000,000 gallons per year.

- The application was deemed complete on June 11, 2015.

- HAP emissions are expected from the proposed equipment. Methanol is emitted from the biodiesel production process. Increased biodiesel production will require more steam resulting in increased natural gas combustion from EU-17 Nebraska Boiler compared to the baseline period. The primary HAP of concern from the combustion of natural gas is hexane.

- 40 CFR Part 60, Subpart Db – *Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units* applies to EU-17 Nebraska Boiler.

- 40 CFR Part 60, Subpart Dc – *Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units* applies to EU-21 Backup Boiler.

- 40 CFR Part 60, Subpart Kb – *Standards of Performance for Volatile Organic Liquid Storage Vessels* is applicable to the methanol storage tanks, TK-743A and TK-743B.

- 40 CFR Part 60, Subpart VVa – *Standards of Performance for Equipment Leaks of VOC from SOCMI* applies to the biodiesel plant. Emissions are reported under EU-02 LDAR Fugitives.

- 40 CFR Part 60, Subpart NNN – *Standards of Performance for VOC Emissions From SOCMI Distillation Operations* applies to the distillation operations at the biodiesel plant.

- 40 CFR Part 60, Subpart RRR – *Standards of Performance for VOC Emissions From SOCMI Reactor Processes* applies to the biodiesel plant. As the affected facility operates with a vent stream flow rate of less than 0.011 scm/min, the affected

facility is exempt from all provisions of this subpart except for the test method and procedure and the recordkeeping and reporting requirements in §§60.704(g) and 70.705 (h), (l)(4), and (o).

- 40 CFR Part 63, Subpart Q – *National Emission Standards for Hazardous Air Pollutants for Industrial Process Cooling Towers* is not applicable as the installation does not use chromium-based water treatment chemicals.

- 40 CFR Part 63, Subpart FFFF – *National Emission Standard for Hazardous Air Pollutants: Miscellaneous Organic Chemical Manufacturing* applies to the biodiesel plant.

- 40 CFR Part 63, Subpart ZZZZ – *National Emission Standards for Hazardous Air Pollutants Stationary Reciprocating Internal Combustion Engine* applies to the two 375 HP emergency fire pump engines and the 685 HP emergency generator.

- 40 CFR Part 63, Subpart DDDDD – *National Emission Standards for Hazardous Air Pollutants for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters* applies to EU-17 Nebraska Boiler and EU-21 Backup Boiler.

- A water absorber is used to reduce methanol emissions from the biodiesel reactor. A condenser is used to reduce methanol emissions from the methanol recovery system.

- This review was conducted in accordance with Section (5) of Missouri State Rule 10 CSR 10-6.060 *Construction Permits Required*. Potential emissions of all pollutants are below de minimis levels. A permit was required as at maximum design capacity the debottlenecked biodiesel plant exceeds the insignificant emission exemption levels of 10 CSR 10-6.061(3)(A)3.A.

- This installation is located in Vernon County, an attainment area for all criteria pollutants.

- The biodiesel plant is on the List of Named Installations found in 10 CSR 10-6.020(3)(B), Table 2, Item #20 Chemical Process Plants. The biodiesel plant's major source level is 100 tons per year and fugitive emissions are counted towards major source applicability. The soybean oil extraction plant is not a named source; therefore, the major source level for the entire installation (biodiesel plant and soybean oil extraction plant combined) is 250 tons per year and only the fugitive emissions from the biodiesel plant are counted towards major source applicability.

- Ambient air quality modeling was not performed since potential emissions of the application are below de minimis levels. Project potential emissions are below the screening model action levels for hexane and methanol; therefore, individual HAP modeling was not performed.

- Emissions testing is not required by this permit; however, emissions testing may be required by an applicable NSPS or MACT.

- ADM – Deerfield is required to amend their initial Part 70 operating permit application, Project 2009-08-069, within one year of completing the physical modifications to the biodiesel plant to reflect the conditions of this permit.

- Approval of this permit is recommended with special conditions.

INSTALLATION DESCRIPTION

ADM – Deerfield consists of a soybean oil extraction plant and a biodiesel manufacturing plant. A turbine to be owned and operated by the Missouri Public Utility Alliance was permitted (No. 092008-004), but never constructed. The soybean oil extraction plant includes soybean handling operations (e.g. unloading, crushing, conveying, pelletizing, and storage), soybean conditioning (thermal/mechanical), solvent extraction (using hexane), distillation for solvent recovery and refining and bleaching processes (for oil that is to be used for biodiesel production).
The maximum production rate of the soybean plant is 730,000 tons per year. Products from the soybean plant include crude oil, refined oil, bleached oil, meals, and hulls.

The biodiesel plant includes chemical reaction vessels, storage tanks, and other process equipment. The primary feedstock for the biodiesel plant is refined and bleached soybean oil from the soybean extraction plant but other oil such as purchased soybean oil, animal fat, and waste cooking oil may be used as well. Biodiesel is produced from the base-catalyzed transesterification of soybean oil with methanol. Glycerin is produced as a by-product of the process. The capacity of the biodiesel plant is currently 41.6 million gallons per year.

The installation is a synthetic minor source for construction permits and a major source for operating permits.

The following New Source Review permits have been issued to ADM – Deerfield by the Air Pollution Control Program:

Table 1: Permit History

Permit Number	Description
022007-004	Section (6) permit for the installation of a 2,000 tons per day soybean oil extraction plant, a 33,000,000 gallon biodiesel plant, and a combined heat and power combustion turbine with a heat recovery steam generator
062008-006	Supersedes 022007-004. Section (6) permit for the installation of a 2,000 tons per day soybean oil extraction plant, a 33,000,000 gallon per year biodiesel plant, a combined heat and power combustion turbine with a heat recovery steam generator, and a 149 MMBtu/hr natural gas fired boiler
062008-006A	Increases biodiesel production to 41,600,000 gallons per year
092008-004	Missouri Public Utility Alliance's permit for the 141.4 MMBtu/hr combined heat and power combustion turbine with a heat recovery steam generator
032012-007	Temporary permit - expired
092013-013	Installation of EU-21, a 28.6 MMBtu/hr natural gas fired boiler

PROJECT DESCRIPTION

ADM – Deerfield has applied for authority to increase biodiesel production at their biodiesel plant to 50,000,000 gallons per year. ADM plans to increase the physical biodiesel production rate by replacing ~20% of the existing pumps and increasing the diameter of some piping. As a result of the physical biodiesel production increase, the installation will have increased (debottlenecked) emissions from the entire biodiesel plant and will be installing four new tanks.

ADM – Deerfield will not be making any modifications to the existing soybean oil extraction plant as part of this project. The existing soybean oil extraction plant will continue to comply with the 730,000 tons per year processing limit specified by Special Condition 5.A of Construction Permit 062008-006A. ADM will increase the amount of soybean oil shipped to the biodiesel to accommodate the increased biodiesel production rate.

Table 2 contains an equipment list for the entire installation and indicates which plant (biodiesel, soybean oil extraction, or both) an emission source is associated with and how each emission source was evaluated by this project.

Table 2: ADM – Deerfield Emission Sources

Biodiesel Plant		
Emission Source	**Description**	**Project Status**
EU-02	LDAR Fugitives	New/Unaffected[1]
EU-14	Biodiesel Continuous Process Vent	Existing/Unaffected[2]
EU-22	Biodiesel Filtration Batch Process Vent	New/ Increased Utilization[3]

[1] ADM anticipates the addition of 37 new flanges and 5 new valves associated with the piping for the new sodium methylate storage tank, TK-745B.
[2] ADM believes the biodiesel plant production increase will not increase the methanol concentration of the water in the water absorber, will not increase the water circulation rate, will not increase the operating temperature of the water absorber, and will not increase the air flow rate through the vacuum vent.
[3] At the current production rate of 41,600,000 gallons per year, ADM purges the existing filter (old filter) once every 24 hours. At the increased production rate of 50,000,000 gallons per year, the installation will require a new filter. The new larger filter will require purging every 36 hours. While the new filter is being purged the old filter will be used. Due to the increased processing rate the old filter will need to be purged once every 18 hours.

EU-23	Biodiesel Loadout	Increased Utilization
TK-702B	2,000,000 gallon Crude Soybean Oil Tank	New[4]
TK-742C	463,847 gallon Biodiesel Storage Tank	New
TK-744B	100,464 gallon Crude Glycerin Storage Tank	New[5]
TK-745B	9,000 gallon Sodium Methylate Storage Tank	New
TK-743A	40,000 gallon Methanol Storage Tank	Increased Utilization
TK-743B	40,000 gallon Methanol Storage Tank	Increased Utilization
TK-745A	9,000 gallon Sodium Methylate Storage Tank	Existing/Unaffected
TK-742A	463,847 gallon Biodiesel Storage Tank	Existing/Unaffected
TK-742B	463,847 gallon Biodiesel Storage Tank	Existing/Unaffected
TK-701A	38,000 gallon Biodiesel Filtration Holding Tank	Increased Utilization
TK-701B	38,000 gallon Biodiesel Filtration Surge Tank	Increased Utilization
TK-741A	95,047 Biodiesel Day Tank	Increased Utilization
TK-741B	95,047 Biodiesel Day Tank	Increased Utilization
TK-741C	95,047 Biodiesel Day Tank	Increased Utilization
TK-741D	95,047 Biodiesel Day Tank	Increased Utilization
TK-746	11,750 gallon Hydrochloric Acid Storage Tank	Existing/Unaffected
TK-701D	36,842 gallon Soapstock Storage Tank	Increased Utilization[6]
TK-702A	919,082 gallon Crude Soybean Oil Bulk Storage Tank	Existing/Unaffected
TK-744A	100,464 gallon Crude Glycerin Storage Tank	Existing/Unaffected[5]
TK-430	11,970 gallon Bio Extend Anti-Oxidant Additive Tank	Increased Utilization
-	7,500 gallon Used Oil Storage Tank	Increased Utilization
-	1,000 gallon Diesel Tank	Increased Utilization
-	6,076 gallon Caustic Soda Storage Tank	Increased Utilization[7]
TK-701C	38,000 gallon Once Refined Soybean Oil Surge Tank	Existing/Unaffected[4]
TK-721A	61,490 gallon Refined and Bleached Soybean Oil	Existing/Unaffected[4]
TK-721B	61,490 gallon Refined and Bleached Soybean Oil	Existing/Unaffected[4]
TK-722	33,935 gallon Refined Soybean Oil Feed Tank	Existing/Unaffected[4]
TK-435	1,000 gallon Biodiesel Slurry Tank	Increased Utilization
-	1,250 gallon Soybean Oil Slurry Tank	Existing/Unaffected[4]
-	1,000 gallon Soybean Oil Precoat Tank	Existing/Unaffected[4]
TK-450	1,000 gallon Biodiesel Precoat Tank	Increased Utilization
Soybean Oil Extraction Plant		
Emission Source	**Description**	**Project Status**
EU-03	Soybean Preparation	Existing/Unaffected
EU-04A	Bean Conditioning	Existing/Unaffected

[4] Soybean oil has a smoke point greater than 250°C; therefore, no emissions are expected from this source.
[5] Crude glycerin has a boiler point greater than 250°C; therefore, no emissions are expected from this source.
[6] Soapstock is not considered a VOC emission source.
[7] Caustic soda is an inorganic compounds; therefore, no VOC emissions are expected from this source.

EU-04B	Flaking	Existing/Unaffected
EU-05	Meal Grinding	Existing/Unaffected
EU-06	Hull Grinding	Existing/Unaffected
EU-07	Meal Storage	Existing/Unaffected
EU-08A1	Soybean Truck Unloading & Transfer	Existing/Unaffected
EU-08A2	Soybean Rail Unloading & Transfer	Existing/Unaffected
EU-08B1	Meal/Hull Truck Loadout	Existing/Unaffected
EU-08B2	Meal/Hull Rail Loadout	Existing/Unaffected
EU-16A	Meal Dryer	Existing/Unaffected
EU-16B	Meal Cooler	Existing/Unaffected
EU-20	Total Extraction Solvent Losses	Existing/Unaffected
TK-746	Hydrochloric Acid Storage	Existing/Unaffected
Shared Emission Sources		
Emission Source	**Description**	**Project Status**
EU-17	Nebraska Boiler	Increased utilization[8]
EU-18	Haul Road	Increased utilization[9]
EU-21	Backup Boiler	Unaffected[10]
-	Cooling Tower	Existing/Unaffected
-	375 HP Diesel Emergency Fire Pump Engine	Existing/Unaffected
-	375 HP Diesel Emergency Fire Pump Engine	Existing/Unaffected
-	685 HP Diesel Emergency Generator	Existing/Unaffected

The entire installation (soybean oil extraction plant and biodiesel plant combined) wishes to remain a synthetic minor source for construction permits; therefore, VOC emissions from the entire installation are limited to 250 tons per year by Special Condition 3.A. Potential emissions of all other criteria pollutants are naturally below the 250 tons per year major source level.

The major source level for the biodiesel plant is 100 tons per year. Potential emissions of all criteria pollutants from the biodiesel plant and shared emission sources are naturally below the 100 tons per year major source level.

EMISSIONS/CONTROLS EVALUATION

EU-02 LDAR Fugitives

Potential emissions were calculated based on the number of components, methanol concentration in the fluid handled by the component, and emission factors obtained from EPA's "Protocol for Equipment Leak Emission Estimates" (November 1995) Table 2-1. As LDAR monitoring is required by NSPS VVa, control efficiencies of 61% for valves in light liquid service and 45% for pumps in light liquid service were included in

[8] The Nebraska Boiler is not being physically modified as part of this project; therefore, the MHDR of the boiler remains 149 MMBtu/hr. This boiler produces steam for both the biodiesel plant and soybean oil extraction plant.

[9] No new haul roads will be constructed as part of this project; however, the existing haul roads associated with the biodiesel plant will see increased utilization. The installation reports haul road emissions from both the biodiesel plant and the soybean oil extraction plant under EU-18.

[10] The Backup Boiler is only used for short periods of time when the Nebraska Boiler is not functioning due to malfunction and/or maintenance activities. ADM does not believe this project will result in increased utilization of this boiler. This boiler is not being physically modified as part of this project; therefore, the MHDR of the boiler remains 28.6 MMBtu/hr.

emissions calculations (obtained from “Protocol for Equipment Leak Emission Estimates” Table 5-2.

EU-14 Biodiesel Continuous Process Vent

The biodiesel continuous process vent emits vapors from the water absorber which is used to control emissions from the biodiesel reactor. The source of the circulating water in the water absorber is water separated in the methanol rectification column. From the manufacturer’s design specification, the parameters that impact the final vent emission rate are the methanol concentration in the circulating water of the water absorber, the recirculation rate, temperature, and the mass air flow through the system that results from the vacuum system in-leakage. At the manufacturer’s design conditions, potential emissions from the biodiesel continuous process vent were determined to be 0.1134 pounds VOC per hour. As this project will not affect any of the manufacturer’s design conditions, potential VOC emissions are not expected to increase.

EU-17 Nebraska Boiler and EU-21 Backup Boiler

Based on an analysis of past steam usage by the biodiesel plant performed by ADM, a maximum of 0.36 pounds of steam is necessary to produce a pound of biodiesel. The biodiesel production increase will require ~ 23,700,000 pounds of additional steam which equates to a 4.5% increase in demand on EU-17 Nebraska Boiler over baseline actual usage. EU-17 Nebraska Boiler is not currently fully utilized and will be able to produce the additional steam without any physical modifications to increase the MHDR of 149 MMBtu/hr. EU-21 Backup Boiler is only used for short periods of time when EU-17 Nebraska boiler is not functioning due to malfunction and/or maintenance activities. ADM does not believe this project will increase utilization of EU-21 Backup Boiler. No physical modifications of EU-21 Backup Boiler will occur and the MHDR of the boiler remains 28.6 MMBtu/hr. Both boilers exclusively combust natural gas. The emission factors and control efficiencies used in this analysis were obtained from the EPA document AP-42, *Compilation of Air Pollutant Emission Factors*, Fifth Edition, Section 1.4 “Natural Gas Combustion” (July 1998), with the exception of the NO_x emission factor for EU-17 which was obtained from CEMS data. EU-17 Nebraska Boiler employs no controls. EU-21 Backup Boiler was given credit for being equipped with low NO_x burners and flue gas recirculation.

EU-22 Paved Haul Roads

Emissions from the 0.528 mile paved haul road were calculated using Equation 2 from the EPA document AP-42, *Compilation of Air Pollutant Emission Factors*, Fifth Edition, Section 13.2.1 “Paved Haul Roads” (January 2011), a silt loading of 1.1 g/m^2, a mean vehicle weight of 27.2 tons, and 105 days per year with at least 0.01” of precipitation. ADM – Deerfield has capabilities to ship and receive by truck or rail. In order to be conservative in calculating project emissions, ADM was asked to base their projected actual emissions on 100% shipping and receiving by truck.

EU-23 Biodiesel Loadout

Potential emissions from biodiesel loadout were estimated using Equation 1 from the EPA document AP-42, *Compilation of Air Pollutant Emission Factors*, Fifth Edition, Section 5.2 “Transportation and Marketing of Petroleum Liquids” (July 2008), a saturation factor of 0.6 for submerged loading with dedicated normal service, an

average annual temperature of 53.06°F (516°R) obtained from TANK4.0.9d for the nearest major city of Springfield, MO, and the vapor pressure and molecular weight of distillate fuel oil #2 were used as a vapor pressure for biodiesel at the average annual temperature was unavailable.

TK-702B Crude Soybean Oil Storage Tank and TK-744B Crude Glycerin Storage Tank
Soybean oil and glycerin were not considered to be emission sources by this permit. Volatile organic compounds are generally expected from materials with boiling points of less than 250°C; however, soybean oil has a smoke point greater than 250°C and glycerin has a boiling point greater than 250°C.

TK-742C Biodiesel Storage Tank and TK-745B Sodium Methylate Storage Tank
Emissions were estimated using TANK4.0.9d. As biodiesel and sodium methylate are not in the TANK4.0.9d database, biodiesel emissions were estimated using distillate fuel oil #2 and sodium methylate was estimated using methanol.

As this project is a modification of an existing biodiesel plant, emissions from sources experiencing increase utilization were calculated as the difference between potential emissions after the project and baseline actual emissions. The baseline period was established to be the calendar years of 2013 and 2014. Emissions from new sources were calculated as the potential to emit of the source. Project emissions are available in Table 3.

Table 3: Net Emissions Increase for the Project

Pollutant	PTE (tpy)	BAE (tpy)	NEI (tpy)
PM_{10}	2.57	2.34	0.23
$PM_{2.5}$	2.39	2.21	0.18
PM	1.75	1.37	0.38
SO_x	0.18	0.17	0.01
NO_x	34.79	31.67	3.13
VOC	11.64	10.27	1.22
CO	25.83	24.01	1.83
HAP	9.56	8.62	0.79
Hexane	0.55	0.51	0.04
Methanol	8.98	8.08	0.75

Table 4 provides an emissions summary for this project. Existing potential emissions for ADM – Deerfield were taken from Construction Permit 092013-013. Existing actual emissions were taken from the installation's 2014 EIQ. Potential emissions of the application represent the potential of the net emissions increase associated with the project.

Table 4: Emissions Summary (tons per year)

Pollutant	Regulatory *De Minimis* Levels	Existing Potential Emissions	Existing Actual Emissions (2014 EIQ)	Potential Emissions of the Application	New Installation Conditioned Potential
PM	25.0	N/D	N/A	0.38	N/A
PM_{10}	15.0	41.03	14.28	0.23	N/A
$PM_{2.5}$	10.0	N/D	9.56	0.18	N/A
SO_x	40.0	2.58	0.17	0.01	N/A
NO_x	40.0	196.78[11]	30.53	3.13	N/A
VOC	40.0	<250.0	120.07	1.22	<250.0
CO	100.0	99.91	23.65	1.83	N/A
HAPs	25.0	159.63	78.65	0.79	N/A
Hexane	10.0	151.93	70.24	0.04	N/A
Methanol	10.0	7.7[12]	7.88	0.75	N/A

N/A = Not Applicable; N/D = Not Determined

The SMALs for hexane and methanol are each 10.0 tons per year. As the potential emissions increases of the project for hexane and methanol are below their respective SMALs; no modeling was conducted.

PERMIT RULE APPLICABILITY

This review was conducted in accordance with Section (5) of Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*. Potential emissions of all pollutants are below de minimis levels. A permit was required as at maximum design capacity the debottlenecked biodiesel plant exceeds the insignificant emission exemption levels of 10 CSR 10-6.061(3)(A)3.A.

APPLICABLE REQUIREMENTS

ADM – Deerfield shall comply with the following requirements applicable to the biodiesel plant. 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.

GENERAL REQUIREMENTS

- 10 CSR 10-6.065 *Operating Permits*
- 10 CSR 10-6.110 *Submission of Emission Data, Emission Fees and Process Information*

[11] This value includes the combined heat and power combustion turbine which was never constructed. The only NO_x emissions sources at the installation are EU-17 Nebraska Boiler, EU-21 Backup Boiler, two 375 HP diesel Emergency Fire Pump Engines, and a 685 HP diesel Emergency Generator. The as-built NO_x potential to emit of the installation was calculated to be 86.42 tons per year.

[12] Construction Permit 062008-006A states that the 7.7 tons per year methanol only includes fugitive emissions from equipment leaks and does not include methanol emissions from the storage tanks, biodiesel continuous process vent, or biodiesel filtration batch process vent.

- 10 CSR 10-6.165 *Restriction of Emission of Odors*

- 10 CSR 10-6.170 *Restriction of Particulate Matter to the Ambient Air Beyond the Premises of Origin*

- 10 CSR 10-6.220 *Restriction of Emission of Visible Air Contaminants*

SPECIFIC REQUIREMENTS

- 10 CSR 10-6.070 *New Source Performance Regulations*
    - 40 CFR Part 60, Subpart Db – *Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units* applies to EU-17 Nebraska Boiler.
    - 40 CFR Part 60, Subpart Dc – *Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units* applies to EU-21 Backup Boiler.
    - 40 CFR Part 60, Subpart Kb – *Standards of Performance for Volatile Organic Liquid Storage Vessels* applies to the methanol storage tanks, TK-743A and TK-743B.
    - 40 CFR Part 60, Subpart VVa – *Standards of Performance for Equipment Leaks of VOC from SOCMI* applies to the biodiesel plant. Emissions are reported under EU-02 LDAR Fugitives.
    - 40 CFR Part 60, Subpart NNN – *Standards of Performance for VOC Emissions From SOCMI Distillation Operations* applies to the distillation operations at the biodiesel plant.
    - 40 CFR Part 60, Subpart RRR – *Standards of Performance for VOC Emissions From SOCMI Reactor Processes* applies to the reactor processes at the biodiesel plant. As the reactor processes at the biodiesel plant operate with a vent stream flow rate of less than 0.011 scm/min, the reactor processes at the biodiesel plant are exempt from all provisions of 40 CFR Part 60, Subpart RRR except for the test method and procedure and the recordkeeping and reporting requirements in §§60.704(g) and 70.705 (h), (l)(4), and (o).

- 10 CSR 10-6.075 *Maximum Achievable Control Technology Regulations*
    - 40 CFR Part 63, Subpart FFFF – *National Emission Standard for Hazardous Air Pollutants: Miscellaneous Organic Chemical Manufacturing* applies to the biodiesel plant.
    - 40 CFR Part 63, Subpart ZZZZ – *National Emission Standards for Hazardous Air Pollutants Stationary Reciprocating Internal Combustion Engine* applies to the two 375 HP Emergency Fire Pump Engines and the 685 HP Emergency Generator.
    - 40 CFR Part 63, Subpart DDDDD – *National Emission Standards for Hazardous Air Pollutants for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters* applies to EU-17 Nebraska Boiler and EU-21 Backup Boiler.

STAFF RECOMMENDATION

On the basis of this review conducted in accordance with Section (5) of Missouri State Rule 10 CSR 10-6.060 *Construction Permits Required*, I recommend this permit be granted with special conditions.

PERMIT DOCUMENTS

The following documents are incorporated by reference into this permit:

- The Application for Authority to Construct form, dated March 9, 2015, received March 12, 2015, designating Archer Daniels Midland Company as the owner and operator of the installation.

Attachment A – Biodiesel Production Compliance Worksheet

ADM - Deerfield
Vernon County, S9, T35N, R33W
Project Number: 2015-03-047
Installation ID Number: 217-0043
Permit Number: _____

This sheet covers the period from _____ to _____.
(month, year) (month, year)

Date (Month/Year)	Monthly Biodiesel Produced (gallons)	12-Month Rolling Total Biodiesel Produced[1] (gallons)

[1] 12-Month Rolling Total Biodiesel Produced (gallons) = the sum of the 12 most recent month's Monthly Biodiesel Produced (gallons). The installation is in compliance if 12-Month Rolling Total Biodiesel Produced is less than 50,000,000 gallons.

Attachment B – VOC Compliance Worksheet

ADM - Deerfield
Vernon County, S9, T35N, R33W
Project Number: 2015-03-047
Installation ID Number: 217-0043
Permit Number: _____

This sheet covers the period from _____ to _____.
(month, year) (month, year)

Emission Source	Monthly Usage	VOC Emission Factor	Monthly VOC Emissions[1] (tons)
EU-02 LDAR Fugitives	[2]	[3]	0.66
EU-14 Biodiesel Continuous Process Vent	8,760 hours/yr	0.1134 lb/hr	0.04
EU-17 Nebraska Boiler	MMscf	5.5 lb/MMscf	
EU-20 Soybean Oil Extraction Plant	gallons of solvent lost[4]	[5]	
EU-21 Backup Boiler	MMscf	5.5 lb/MMscf	
EU-22 Biodiesel Filtration Batch Process Vent	Old filter purged every 18 hours, new filter purged every 36 hours	Old filter: 0.793 lb/purge New filter: 1.2587 lb/purge	0.02
EU-23 Biodiesel Loadout	50,000,000 gal/yr	0.030136 lb/1,000 gallons	0.06
TK-742A, TK-742B, & TK-742C Biodiesel Storage Tanks	50,000,000 gal/yr	TANKS4.0.9d	0.02
TK-745A & TK-745B Sodium Methylate Storage Tanks	471,250 gal/yr	TANKS4.0.9d	0.02
TK-743A & TK-743B Methanol Storage Tanks	6,200,000 ga/yr	TANKS4.0.9d	0.01[6]
TK-701A & TK-701B Biodiesel Filtration Tanks	50,000,000 gal/yr	TANKS4.0.9d	0.03
TK-741A, TK-741B, TK-741C, & TK-741D Biodiesel Day Tanks	50,000,000 gal/yr	TANKS4.0.9d	0.01
TK-435 & TK-450 Biodiesel Slurry Tank	50,000,000 gal/yr	TANKS4.0.9d	0.01
375 HP Emergency Fire Pump Engine	500 hours per year	0.36 lb/MMBtu	0.02
375 HP Emergency Fire Pump Engine	500 hours per year	0.36 lb/MMBtu	0.02
685 HP Emergency Generator	500 hours per year	7.05×10^{-4} lb/HP-hr	0.01
Installation Monthly VOC Emissions[7] (tons):			
Installation 12-Month Rolling Total VOC Emissions[8] (tons):			

[1] Monthly VOC Emissions (tons) for each emission source is calculated as the monthly usage x VOC emission factor x 0.0005 ton/lb.

[2] LDAR Components:

System	Flanges/Thread Conn.	Valves	Pumps	Agitators
Sodium Methylate Storage	95	26	0	0

Methanol Storage Tanks	113	35	1	0
Soy Oil Absorber	43	6	0	0
Biodiesel Reaction	90	28	0	2
Biodiesel Wash Water	76	21	0	1
Biodiesel Stripper/Condensers	24	7	0	0
Glycerine Stripper	169	58	2	0
Water-Methanol Distillation	109	54	0	0
Vent Recovery & Rework	14	4	0	0
Nitrogen Blanket On All Vessels	84	24	0	0

[3] LDAR Emission Factors (lb/hr/component):

System	Methanol Conc. Wt%	Flanges/ Thread Conn.	Valves	Pumps	Agitators	Biodiesel Plant Total
Sodium Methylate Storage	70.00%	2.82E-03	6.22E-03	-	-	
Methanol Storage Tanks	100.00%	4.03E-03	8.88E-03	4.39E-02	-	
Soy Oil Absorber	0.02%	9.83E-07	2.16E-06	-	-	
Biodiesel Reaction	15.28%	6.16E-04	1.36E-03	-	6.70E-03	
Biodiesel Wash Water	0.08%	3.18E-06	7.00E-06	-	3.45E-05	
Biodiesel Stripper/Condensers	68.84%	2.78E-03	6.12E-03	-	-	
Glycerine Stripper	33.73%	1.36E-03	3.00E-03	1.48E-02	-	
Water-Methanol Distillation	64.53%	2.60E-03	5.73E-03	-	-	
Vent Recovery & Rework	0.02%	9.83E-07	2.16E-06	-	-	
LDAR Control Effectiveness:		0%	61%	45%	45%	
Potential Monthly Emissions (tons):		0.50	0.15	0.01	0.003	0.66

[4] Determined as specified by §63.2853.
[5] Solvent density (lb/gal) as obtained from the solvent SDS.
[6] Includes 95% control efficiency for vapor balancing required by §63.2535(c).
[7] Installation Montly VOC Emissions (tons) = the sum of each emissions source's Monthly VOC Emissions (tons)
[8] Installation 12-Month Rolling Total VOC Emissions (tons) = the sum of all Installation Monthly VOC Emissions (tons) for the 12 most recent consecutive months.

APPENDIX A

Abbreviations and Acronyms

% ..... percent
ºF ..... degrees Fahrenheit
acfm ..... actual cubic feet per minute
BACT ..... Best Available Control Technology
BMPs ..... Best Management Practices
Btu..... British thermal unit
CAM ..... Compliance Assurance Monitoring
CAS..... Chemical Abstracts Service
CEMS ..... Continuous Emission Monitor System
CFR ..... Code of Federal Regulations
CO ..... carbon monoxide
CO_2..... carbon dioxide
CO_2e..... carbon dioxide equivalent
COMS..... Continuous Opacity Monitoring System
CSR..... Code of State Regulations
dscf ..... dry standard cubic feet
EIQ ..... Emission Inventory Questionnaire
EP..... Emission Point
EPA ..... Environmental Protection Agency
EU..... Emission Unit
fps ..... feet per second
ft ..... feet
GACT ..... Generally Available Control Technology
GHG ..... Greenhouse Gas
gpm..... gallons per minute
gr..... grains
GWP..... Global Warming Potential
HAP..... Hazardous Air Pollutant
hr..... hour
hp ..... horsepower
lb ..... pound
lbs/hr..... pounds per hour
MACT ..... Maximum Achievable Control Technology
$\mu g/m^3$..... micrograms per cubic meter
m/s ..... meters per second
Mgal ..... 1,000 gallons
MW ..... megawatt
MHDR..... maximum hourly design rate
MMBtu.... Million British thermal units
MMCF..... million cubic feet
MSDS ..... Material Safety Data Sheet
NAAQS... National Ambient Air Quality Standards
NESHAPs National Emissions Standards for Hazardous Air Pollutants
NO_x..... nitrogen oxides
NSPS..... New Source Performance Standards
NSR..... New Source Review
PM ..... particulate matter
$PM_{2.5}$..... particulate matter less than 2.5 microns in aerodynamic diameter
PM_{10}..... particulate matter less than 10 microns in aerodynamic diameter
ppm..... parts per million
PSD ..... Prevention of Significant Deterioration
PTE..... potential to emit
RACT..... Reasonable Available Control Technology
RAL ..... Risk Assessment Level
SCC..... Source Classification Code
scfm ..... standard cubic feet per minute
SDS ..... Safety Data Sheet
SIC..... Standard Industrial Classification
SIP..... State Implementation Plan
SMAL ..... Screening Model Action Levels
SO_x..... sulfur oxides
SO_2..... sulfur dioxide
tph..... tons per hour
tpy ..... tons per year
VMT..... vehicle miles traveled
VOC..... Volatile Organic Compound

Mr. John Baumgartner
Plant Manager
ADM - Deerfield
17700 South Highway T
Deerfield, MO 64741

RE: New Source Review Permit - Project Number: 2015-03-047

Dear Mr. Baumgartner:

Enclosed with this letter is your permit to construct. Please study it carefully and refer to Appendix A for a list of common abbreviations and acronyms used in the permit. Also, note the special conditions on the accompanying pages. The document entitled, "Review of Application for Authority to Construct," is part of the permit and should be kept with this permit in your files. Operation in accordance with these conditions, your new source review permit application, and amending your initial Part 70 operating permit application, Project 2009-08-069, is necessary for continued compliance. The reverse side of your permit certificate has important information concerning standard permit conditions and your rights and obligations under the laws and regulations of the State of Missouri.

If you were adversely affected by this permit decision, you may be entitled to pursue an appeal before the administrative hearing commission pursuant to §§621.250 and 643.075.6 RSMo. To appeal, you must file a petition with the administrative hearing commission 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 administrative hearing commission, whose contact information is: Administrative Hearing Commission, Truman State Office Building, Room 640, 301 W. High Street, P.O. Box 1557, Jefferson City, Missouri 65102, phone: 573-751-2422, fax: 573-751-5018, website: www.oa.mo.gov/ahc.

If you have any questions regarding this permit, please do not hesitate to contact Alana Hess, at the Department of Natural Resources' Air Pollution Control Program, P.O. Box 176, Jefferson City, MO 65102 or at (573) 751-4817. Thank you for your attention to this matter.

Sincerely,

AIR POLLUTION CONTROL PROGRAM

Susan Heckenkamp
New Source Review Unit Chief

SH:ahl

Enclosures

c: Southwest Regional Office
PAMS File: 2015-03-047
Permit Number: