

STATE OF MISSOURI



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: **07 2 0 0 9 - 0 0 5** Project Number: 2008-12-016

Parent Company: Archer Daniels Midland CO.

Parent Company Address: P.O. Box 1470, Decatur, IL 62526

Installation Name: ADM Mexico

Installation Address: 400 East Holt Street, Mexico, MO 65265

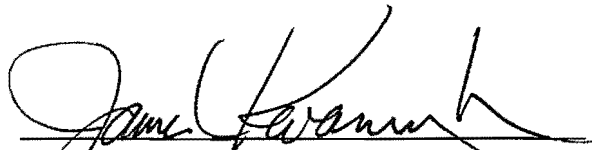
Location Information: Audrain County, S28, T51N, R9W

Application for Authority to Construct was made for:
 The construction of a new sodium methylate production process. This review was conducted in accordance with Section (5), 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.

JUL - 2 2009

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 two years from the effective date of this permit. 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 departments' Air Pollution Control Program of the anticipated date of start up of this (these) air contaminant source(s). 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 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."

ADM Mexico
Audrain County, S28, T51N, R9W

1. Emission Limitation
 - A. ADM Mexico shall emit less than 1.92 pounds of methanol per ton of sodium methyate from the seal pot stack (EP-35).
 - B. ADM Mexico shall demonstrate compliance with the limitation in special condition 1.A by testing. Testing shall be conducted according to the requirements found in special condition 2.
2. Stack Testing Requirements
 - A. ADM Mexico shall conduct performance testing for emission point EP-35 to demonstrate compliance with the limit in special condition 1.A. The test shall be performed according to 10 CSR 10-6.030 Sampling Methods for Air Pollution Sources, or any method approved by the Air Pollution Control Program.
 - B. During the test, ADM Mexico shall record the production rate of sodium methyate.
 - C. During the test, ADM Mexico shall record the following operating parameters in the seal pot.
 - (1) The flow rate of water to the seal pot nozzle
 - (2) The level of water in the seal pot
 - (3) The exiting temperature of seal pot vent
 - D. During the test, ADM Mexico shall record the following operating parameters in the condenser
 - (1) The inlet and exit temperatures of condenser fluid
 - (2) The exiting condenser vapor temperature
 - E. The initial performance test shall be conducted within 60 days of reaching maximum production of the initial phase but not more than 180 days of the

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SPECIAL CONDITIONS:

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

start of operation.

- F. The initial performance test date(s) shall be pre-arranged with the Air Pollution Control Program a minimum of 30 days prior to the proposed test date so that a pre-test meeting may be arranged if necessary, and to assure that the test date is acceptable for an observer from the Air Pollution Control Program to be present. A proposed test plan shall be submitted to the Air Pollution Control Program a minimum of 30 days prior to the proposed test date. The test plan must be approved by the Air Pollution control Program prior to the test date.

3. Process Requirements

- A. ADM Mexico shall operate a seal pot as described in the permit application to control methanol emissions from the methanol pump tank.
- (1) ADM Mexico shall establish operating parameters based on the values recorded as required by special condition 2.C and operate the seal pot within the established parameters.
- (a) ADM Mexico shall maintain the rate of water through the seal pot at one of the rates listed below:
1. At or above the rate recorded during the performance test as specified in special condition 2.C, divided by the production rate recorded during the performance test as specified in special condition 2.B, multiplied by the current sodium methylate production rate (see equation below).

$$F_O = F_T / P_T * P_O$$
where
 F_O = Operational seal pot water flow rate
 F_T = Tested seal pot water flow rate
 P_O = Operational sodium methylate production rate
 P_T = Tested sodium methylate production rate
 2. At or above the rate specified in the permit application, which is 375.4 pounds per hour.
- (2) ADM Mexico shall maintain an operating and maintenance log for the seal pot which shall include:
- (a) Incidents of malfunction, with impact on emissions, duration of event, probable cause, and corrective actions
 - (b) Maintenance activities, with inspection schedule, repair actions, and replacements, etc.
- B. ADM Mexico shall operate a condenser as described in the permit application to control methanol emissions from the methanol pump tank.

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SPECIAL CONDITIONS:

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

- (1) ADM Mexico shall establish operating parameters based on the values recorded as required by special condition 2.D and operate the condenser within the established parameters.
- (2) ADM Mexico shall record the fluid pressure at the entrance and exit of the condenser to verify that the fluid flow is maintained.
- (3) ADM Mexico shall maintain an operating and maintenance log for the condenser that shall include:
 - (a) Incidents of malfunction, with impact on emissions, duration of event, probable cause, and corrective actions
 - (b) Maintenance activities, with inspection schedule, repair actions, and replacements, etc.

4. MACT Requirement

ADM Mexico shall comply with all applicable requirements of 40 CFR Part 63, Subpart F, *National Emission Standards for Organic Hazardous Air Pollutants From the Synthetic Organic Chemical Manufacturing Industry*.

REVIEW OF APPLICATION FOR AUTHORITY TO CONSTRUCT AND OPERATE
SECTION (5) REVIEW

Project Number: 2008-12-016
Installation ID Number: 007-0002
Permit Number:

ADM Mexico
400 East Holt Street
Mexico, MO 65265

Complete: December 16, 2008

Parent Company:
Archer Daniels Midland CO.
P.O. Box 1470
Decatur, IL 62526

Audrain County, S28, T51N, R9W

REVIEW SUMMARY

- ADM Mexico has applied for authority to construct a new sodium methylate production process.
- Hazardous Air Pollutant (HAP) emissions are expected from the proposed equipment. The HAP of concern from this process is methanol.
- None of the New Source Performance Standards (NSPS) apply to the proposed equipment.
- None of the National Emission Standards for Hazardous Air Pollutants (NESHAPs) regulations applies to this installation. The Maximum Achievable Control Technology (MACT) standard, 40 CFR Part 63, Subpart F, *National Emission Standards for Organic Hazardous Air Pollutants From the Synthetic Organic Chemical Manufacturing Industry* applies to the proposed equipment.
- A condenser and seal pot are being used to control the methanol emissions from the equipment in this permit.
- This review was conducted in accordance with Section (5) of Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*. Potential emissions of methanol, which is both a volatile organic compound (VOC) and a HAP, are below de minimis levels.
- This installation is located in Audrain County, an attainment area for all criteria air pollutants.
- This installation is not on the List of Named Installations [10 CSR 10-6.020(3)(B), Table 2].

- Ambient air quality modeling was not performed since potential emissions of the application are below de minimis and screening model action levels.
- Emissions testing is required for the hydrogen seal pot.
- 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

The ADM soybean processing facility in Mexico, Missouri consists of an oil extraction plant and a biodiesel plant. The installation is considered an existing major source of air pollutants for new source review purposes and a Part 70 source for operating permit purposes. The installation has a Part 70 operating permit (permit number OP2000-146) that expired on March 6, 2007. A renewal application for this permit was received on September 6, 2006 and is under technical review.

The following permits have been issued to ADM from the Air Pollution Control Program (the Program).

Table 1: Previously Issued Construction Permits

Permit Number	Description
0284-007	Construction of a boiler
0795-002	Construction of a new soybean dehulling system
032006-010	Construction of a 36 million gallon per year biodiesel production plant
102006-015	Amend biodiesel loading
102006-015A	Add storage tanks

PROJECT DESCRIPTION

ADM Mexico has applied for authority to construct a new sodium methylate process. The process will be capable of producing 1,650,000 pounds of sodium methylate a year or about 188 pounds of sodium methylate per hour. The major components of the process consist of two horizontal pump tanks that circulate the solutions of methanol and sodium hydroxide to a reaction cell skid that contains an electrically charged membrane. The sodium ions from the sodium hydroxide solution cross the membrane and react with the methanol to form sodium methylate. Sodium methylate, unreacted methanol and hydrogen gas return to the methanol pump tank. Sodium methylate is removed from the solution and sent to two day tanks for use at the biodiesel plant. The hydrogen gas and any evaporated methanol are released from the pump tank. Before the gas is released into the atmosphere, it passes through a condenser to recover the evaporated methanol. After the condenser, the gas passes through a seal pot. The seal pot operates by spraying water through an atomizing nozzle in the vent piping. The water settles in the seal pot. The seal pot acts to maintain pressure within the process while allowing gasses generated by the process to be released. The seal pot can be

operated with either process water from the biodiesel plant or water from the city utility. The biodiesel process water contains some methanol (typically 500-2000 ppm), so testing should be conducted while using the process water. Uncondensed methanol left in the gas stream is absorbed by the water. Gas from the sodium hydroxide pump tank is also vented to a seal pot. The only compounds released from the sodium hydroxide pump tank are oxygen and possibly sodium hydroxide, neither are regulated pollutants.

EMISSIONS/CONTROLS EVALUATION

Emissions from the seal pot were calculated using a mass balance approach and assuming 99% of the methanol in the gas stream is absorbed by the water in the seal pot. Based on calculations provided by the equipment manufacturer, the expected methanol emissions would be 2.9 pounds per day. ADM Mexico applied a 50% safety factor to this value to account for upsets or other nonideal performance in methanol absorption. Applying this factor resulted in a daily emission rate of 4.4 pounds of methanol per day or 0.80 tons per year. Emissions were also estimated from equipment leaks using emission factors developed by the Texas Commission on Environmental Quality (TCEQ). These factors are based on the same data used to develop the equipment leak factors found in the United States Environmental Protection Agency (EPA) Emission Inventory Improvement Program document *Technical Support Series, Volume 2: Point Sources*, Chapter 4 “Preferred and Alternative Methods for Estimating Air Emissions from Equipment Leaks,” November 1996. The TCEQ factors separate the EPA data into two groups, facilities with ethylene and facilities without ethylene. Emissions from equipment leaks were calculated by counting the number of valves and connectors in the plant and multiplying the sum of each type by the appropriate TCEQ factor. Emissions from fugitive leaks total 8.4 tons of methanol per year. The potential emissions of the application represent the emissions from the seal pot and equipment leaks assuming continuous operation. The existing potential emissions are the sum of the existing potential emissions and the potential emissions of the application scaled based on the 40 ton per year VOC limit in table 3 of permit 102006-015. The following table provides an emissions summary for this project.

Table 2: Emissions Summary (tons per year)

Pollutant	Regulatory <i>De Minimis</i> Levels	Existing Potential Emissions	Existing Actual Emissions (2008 EIQ)	Potential Emissions of the Application
PM ₁₀	15.0	494.0	54.8	N/A
SO _x	40.0	312.1	0.1	N/A
NO _x	40.0	132.9	24.5	N/A
VOC	40.0	322.1	190.3	9.2
CO	100.0	58.9	20.6	N/A
Methanol	10.0	3.7	N/D	9.2
Total HAPs	25	245.6	84.3	*9.2

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

*The only HAP emitted from sodium methylate production is methanol.

Existing Potential emissions taken from permit: 102006-015

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 methanol are below de minimis levels.

APPLICABLE REQUIREMENTS

ADM Mexico 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

- *Maximum Achievable Control Technology (MACT) Regulations*, 10 CSR 10-6.075, *National Emission Standards for Organic Hazardous Air Pollutants From the Synthetic Organic Chemical Manufacturing Industry*, 40 CFR Part 63, Subpart F

STAFF RECOMMENDATION

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

Michael Mittermeyer
Environmental Engineer

Date

PERMIT DOCUMENTS

The following documents are incorporated by reference into this permit:

- The Application for Authority to Construct form, dated November 25, 2008, received December 5, 2008, designating Archer Daniels Midland CO. as the owner and operator of the installation.
- U.S. EPA document AP-42, *Compilation of Air Pollutant Emission Factors*, Fifth Edition.
- Northeast Regional Office Site Survey, dated December 31, 2008.

Mr. Ken Doellman
Regional Environmental Manager
ADM Mexico
2100 Gardner Expressway
Quincy, IL 62305

RE: New Source Review Permit - Project Number: 2008-12-016

Dear Mr. Doellman:

Enclosed with this letter is your permit to construct. Please study it carefully. Also, note the special conditions, if any, 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 with your amended operating permit 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 have any questions regarding this permit, please contact Michael Mittermeyer, at the Departments' 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

Kendall B. Hale
New Source Review Unit Chief

KBH:mml

Enclosures

c: Northeast Regional Office
PAMS File: 2008-12-016

Permit Number: