



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: **052008-003** Project Number: 2007-12-049

Parent Company: Mississippi Valley BioEnergy, LLC

Parent Company Address: 10723 Old Route A, Centertown, MO 65023

Installation Name: Mississippi Valley BioEnergy, LLC

Installation Address: US Highway 24 & County Road 346
West Quincy, MO 63471

Location Information: Marion County, S10, T39N, R5W

Application for Authority to Construct was made for a new ethanol production facility with the capacity to produce 115 million gallons of undenatured ethanol annually. This review was conducted in accordance with Section (6), Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*.

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

MAY 28 2008

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 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."

Mississippi Valley BioEnergy, LLC
Marion County, S10, T39N, R5W

1. Emission Limitation

A. Mississippi Valley BioEnergy, LLC shall emit less than ten (10.0) tons of any individual Hazardous Air Pollutants (HAPs), twenty-five (25.0) tons of combined HAPs, 0.04 tons of acrolein, and nine (9.0) tons of acetaldehyde from this installation in any consecutive twelve (12) month period.

- 1) Mississippi Valley BioEnergy, LLC shall record the monthly and the sum of the most recent consecutive twelve (12) months HAP emissions in tons from this installation. These records shall be kept on-site for five (5) years and shall be made available for inspection to Department of Natural Resources personnel upon request. Attachment A, Monthly Individual HAPs Tracking Record and Attachment B, Monthly Combined HAP Emission Tracking Record or equivalent forms shall be used for this purpose. The emission rates shall be verified through performance testing, as detailed in Special Condition 7.
- 2) Mississippi Valley BioEnergy, LLC shall report to the Enforcement Section, P.O. Box 176 Jefferson City, MO 65102, no later than ten (10) days after the end of the month during which the records required by Special Condition 1.A(1) show that the emission limitation has been exceeded.

B. Mississippi Valley BioEnergy, LLC shall not discharge nitrogen oxides (NO_x) into the atmosphere from the following stacks in excess of the listed amounts:

Emission	Description	Emissions
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SPECIAL CONDITIONS:

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

Point		
SV04	Four DDGS Dryers, Two Cooling Drums, Two Thermal Oxidizer/Heat Recovery Steam Generators (TO/HRSG)	22.00 Lbs/hr
SV06	Ethanol Loadout Flare and Its Pilot Flame	0.0334 Lbs/1000 gal ethanol

These emission rates shall be verified through performance testing, as detailed in Special Condition 7.

- C. Mississippi Valley BioEnergy, LLC shall not discharge sulfur oxides (SO_x) into the atmosphere from the following stack in excess of the listed amount:

Emission Point	Description	Lbs/hr
SV04	Four DDGS Dryers, Two Cooling Drums, Two Thermal Oxidizer/Heat Recovery Steam Generators (TO/HRSG)	18.07

This emission rate shall be verified through performance testing, as detailed in Special Condition 7.

- D. Mississippi Valley BioEnergy LLC shall not discharge particulate matter less than 10 microns in aerodynamic diameter (PM₁₀) into the atmosphere from the following stacks in excess of the listed amounts:

Emission Point	Description	Lbs/hr
SV01	Two Truck Grain Dump Pit/Augers, Four Grain Elevators, Two Fill Conveyors, Four Grain Silos, Two Emptying Conveyors, One Rail Grain Dump Pit/Auger, Scalper, Surge Bin, Hammermill Feed	2.06
SV02	Four Hammermills	1.18
SV03	Seven Fermenters	0.10
SV04	Four DDGS Dryers, Two Cooling Drums, Two Thermal Oxidizer/Heat Recovery Steam Generators (TO/HRSG)	10.81
SV05	DDGS Cooling Drag, DDGS Storage Drag, DDGS Storage, DDGS Storage Floor Drag, Reclaim Leg, DDGS Cross Conveyor, Truck/Rail Conveyor, Truck/Rail Load Spout	0.39

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SPECIAL CONDITIONS:

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

SV07	Two Cooling Drums	1.29
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These emission rates shall be verified through performance testing, as detailed in Special Condition 7.

2. Control Equipment - Baghouses

- A. The baghouses listed below must be in use at all times when the associated equipment is in operation:

Control ID No.	Emission Point	Emission Unit Controlled
CE01	SV01	Two Truck Grain Dump Pit/Augers, Four Grain Elevators, Two Fill Conveyors, Four Grain Silos, Two Emptying Conveyors, One Rail Grain Dump Pit/Auger, Scalper, Surge Bin, Hammermill Feed
CE02	SV02	Four Hammermills
CE08	SV05	DDGS Cooling Drag, DDGS Storage Drag, DDGS Storage, DDGS Storage Floor Drag, Reclaim Leg, DDGS Cross Conveyor, Truck/Rail Conveyor, Truck/Rail Load Spout
CE10	SV07	Two Cooling Drums

- B. The baghouses and any related instrumentation or equipment shall be operated and maintained in accordance with the manufacturer's specifications. The baghouses shall be equipped with a gauge or meter that indicates the pressure drop across each baghouse. This gauge or meter shall be located in such a way it may be easily observed by Department of Natural Resources employees.
- C. Replacement bags for all baghouses 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).
- D. Mississippi Valley BioEnergy, LLC shall monitor and record the operating pressure drop across the baghouses at least once in every twenty-four (24) hour period when the associated equipment is operated. The operating pressure drop shall be maintained within the normal operating range specified by the manufacturer's performance warranty. If the pressure drop reading should fall outside of this normal operating range,

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SPECIAL CONDITIONS:

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

then the associated equipment shall be shut down as quickly as is reasonably practical. Corrective actions shall be taken to address the cause of the non-normal pressure drop and the baghouses shall be returned to normal operation before re-starting the equipment.

- E. Mississippi Valley BioEnergy, LLC shall inspect the baghouses at least once every six (6) months and at a minimum, conduct the following activities:
 - 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. Control Equipment – Fermentation Wet Scrubber

- A. The scrubber listed below must be in use at all times when the associated equipment is in operation:

Control ID No.	Emission Point	Emission Unit controlled
CE03	SV03	Fermenters #1 - #7 and Beer Well

- B. The scrubber and any related instrumentation or equipment shall be operated and maintained in accordance with the manufacturer's specifications. The scrubber shall be equipped with a gauge or meter that indicates the pressure drop across the scrubber. The scrubber shall be equipped with a flow meter that indicates the flow through the scrubber. This gauge and meter shall be located in such a way they may be easily observed by Department of Natural Resources employees.
- C. Mississippi Valley BioEnergy, LLC shall monitor and record the operating pressure drop across the scrubber at least once every twenty-four (24) hours. The operating pressure drop shall be maintained within the design conditions specified by the manufacturer's performance warranty.
- D. Mississippi Valley BioEnergy, LLC shall monitor and record the flow rate through the scrubber at least once every twenty-four (24) hours. The flow rate shall be maintained within the design conditions specified by the manufacturer's performance warranty.
- E. Mississippi Valley BioEnergy, LLC shall maintain an operating and maintenance log for the scrubber which shall include the following:
 - 1) Incidents of malfunction, with impact on emissions, duration of

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

- 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.

4. Control Equipment - Multicyclone

- A. The multicyclone must be in use at all times when the DDGS Dryers (EUs 54, 55, 58, 59) are in operation. The multicyclone shall be operated and maintained in accordance with the manufacturer's specifications.
- B. The multicyclone shall be equipped with a gauge or meter that indicates the pressure drop across the multicyclone. Mississippi Valley BioEnergy, LLC shall monitor and record the operating pressure drop across the multicyclone at least once every twenty-four (24) hours. The operating pressure drop shall be maintained within the design conditions specified by the manufacturer's performance warranty.
- C. Mississippi Valley BioEnergy, LLC shall maintain an operating and maintenance log for the multicyclone 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.

5. Control Equipment –Thermal Oxidizer (TO) (CE07)

- A. The TO must be in use at all times when the associated equipment is in operation:

Control ID No.	Emission Point	Emission Units Controlled
CE07	SV04	Mixer, Slurry Tanks, Flash Tank, Cook Tubes, Liquefaction Tanks, Yeast Tanks, Beer Column, Side Stripper, Rectifier Column, Evaporators, Whole Stillage Tank, Thin Stillage Tank, Syrup Tank, Centrifuges (six units), 190 Proof Condenser, Molecular Sieves, 200 Proof Condenser

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

- B. The TO must be in use at all times when the regulated VOC, CO, or HAP emissions are possible. The TO shall be operated and maintained in accordance with the manufacturer's specifications. Emission rates of PM₁₀, NO_x, SO_x, VOCs, HAPs and CO will be tested, as detailed in Special Condition 7, to verify the TO is operating as assumed.
 - C. The operating temperature of the TO shall be continuously monitored and recorded during operation. The operating temperature of the thermal oxidizer shall be maintained on a rolling 3-hour average within 50 degrees Fahrenheit of the average temperature of the oxidizer recorded during the compliance test specified in Special Condition 7 which demonstrated compliance with the emission limits. The acceptable temperature range may be reestablished by performing a new set of emission tests. The most recent sixty (60) months of records shall be maintained on-site and shall be made immediately available to Missouri Department of Natural Resources personnel upon request.
 - D. Mississippi Valley BioEnergy, LLC shall maintain an operating and maintenance log for the TO 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.
6. Control Measure – 98.0% Capture Efficiency
- A. The grain and DDGS storage and handling equipment shall be enclosed by ductwork and the grain milling equipment shall be located in a building. The enclosures/buildings shall be maintained under negative pressure and exhausted to baghouses.
 - B. Mississippi Valley BioEnergy, LLC shall demonstrate negative pressure by using visual indicators, such as negative pressure gauges, at each openings of the enclosure.
 - C. Mississippi Valley BioEnergy, LLC shall perform a visual indicator check for each emission point at least once in every 24-hour period while the grain milling equipment and grain and DDGS handling and storage equipment are in operation.

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

- D. Mississippi Valley BioEnergy, LLC shall maintain a log which records the results of 6.C.

7. Performance Testing

- A. Mississippi Valley BioEnergy, LLC shall conduct performance tests on the stacks listed in the table below to verify the emission rates used in the review of this project. The emission rates for the pollutants listed shall be determined in the units specified and used to demonstrate compliance with Special Condition 1.

Emission Point	Description	Pollutant	Units
SV03	CO ₂ scrubber	VOC	lb of pollutant/hr, lb of pollutant/gallon of EtOH produced
SV03	CO ₂ scrubber	combined HAPs	lb of pollutant/hr, lb of pollutant/gallon of EtOH produced
SV04	TO/HRSG	VOC	lb of pollutant/hr, lbs of pollutant/gallon of EtOH produced, lb of pollutant/ton DDGS produced, lb of pollutant/MMBTU
SV04	TO/HRSG	combined HAPs	lb of pollutant/hr, lbs of pollutant/gallon of EtOH produced, lb of pollutant/ton DDGS produced, lb of pollutant/MMBTU
SV03	CO ₂ scrubber	acrolein and acetaldehyde	lb of pollutant/hr, lb of pollutant/gallon of EtOH produced
SV04	TO/HRSG	acrolein and acetaldehyde	lb of pollutant/hr, lbs of pollutant/gallon of EtOH produced, lb of pollutant/ton DDGS produced, lb of pollutant/MMBTU
SV04	TO/HRSG	CO	lb of pollutant/hr, lbs of pollutant/gallon of EtOH produced, lb of pollutant/ton DDGS produced, lb of pollutant/MMBTU
SV04	TO/HRSG	NO _x	lb of pollutant/hr, lbs of pollutant/gallon of EtOH produced, lb of pollutant/ton DDGS produced,

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

			lb of pollutant/MMBTU
SV05	Baghouse	NO _x	lb of pollutant/hr, lb of pollutant/ton of DDGS
SV06	Loadout Flare	NO _x	lb of pollutant/hr, lb of pollutant/gallon of EtOH produced, lb of pollutant/MMBTU
SV04	TO/HRSG	SO _x	lb of pollutant/hr, lbs of pollutant/gallon of EtOH produced, lb of pollutant/ton DDGS produced, lb of pollutant/MMBTU
SV05	Baghouse	SO _x	lb of pollutant/hr, lb of pollutant/ton of DDGS
SV01	Grain Handling Baghouse	PM ₁₀	lb of pollutant/hr, lb of pollutant/ton of grain
SV02	Baghouse	PM ₁₀	lb of pollutant/hr, lb of pollutant/ton of grain
SV03	CO ₂ Scrubber	PM ₁₀	lb of pollutant/hr, lb of pollutant/gallon of EtOH produced
SV04	TO/HRSG	PM ₁₀	lb of pollutant/hr, lbs of pollutant/gallon of EtOH produced, lb of pollutant/ton DDGS produced, lb of pollutant/MMBTU
SV05	Baghouse	PM ₁₀	lb of pollutant/hr, lb of pollutant/ton of DDGS
SV07	Baghouse	PM ₁₀	lb of pollutant/hr, lb of pollutant/ton of DDGS

- B. The performance tests for the CO₂ scrubber (SV03) shall be conducted for one of the following time periods:
- 1.) A complete cycle, defined as the time period between load-in and load-out of material. For the fermentation process, where many fermenters are used, the time period to be tested is the complete cycle for one fermenter.

Or

- 2.) During period(s) of maximum emissions. Mississippi Valley BioEnergy, LLC shall submit, in the proposed test plant outlined in Special Condition 8, sufficient data to determine the point(s) of

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SPECIAL CONDITIONS:

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

maximum emissions. These points must be approved by the Air Pollution Control Program's compliance/assistance section prior to conducting the tests. If sufficient data are not supplied supporting these maximum emission points, Mississippi Valley BioEnergy, LLC must conduct testing for the time period outlined in Special Condition 7.B.1.

- C. The testing required in Special Condition 7.A(3) through 7.A(6) may be limited to conducting tests on a representative piece(s) of each type of equipment upon approval by the Director. In addition, an alternate method(s) of quantifying the emission rates of criteria air pollutants from these sources may be used in place of the above testing requirement if requested by Mississippi Valley BioEnergy, LLC and approved by the Director.
- D. These tests shall be performed within sixty (60) days after achieving the maximum production rate of the installation, but not later than 180 days after initial start-up for commercial operation and shall be conducted in accordance with the stack test procedures outlined in Special Condition 8.

8. Proposed Test Plan

- A. A completed Proposed Test Plan Form must be submitted to the Air Pollution Control Program 30 days prior to the proposed test date so that the Air Pollution Control Program may arrange a pretest meeting, if necessary, and assure that the test date is acceptable for an observer to be present. The Proposed Test Plan may serve the purpose of notification and must be approved by the Director prior to conducting the required emission testing.
- B. Two (2) copies of a written report of the performance test results shall be submitted to the Director 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 U.S. EPA Method for at least one (1) sample run.
- C. The test report is to fully account for all operational and emission parameters addressed both in the permit conditions as well as in any other applicable state or federal rules or regulations.
- D. If the performance testing required by Special Condition 7 of this permit indicates that any of the emission limits specified in Special Condition 1 are being exceeded, Mississippi Valley BioEnergy, LLC must propose a plan to the Air Pollution Control Program within thirty (30) days of

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SPECIAL CONDITIONS:

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

submitting the performance test results. This plan must demonstrate how Mississippi Valley BioEnergy, LLC will reduce the emission rates below those stated in Special Condition 1. Mississippi Valley BioEnergy, LLC shall implement any such plan immediately upon its approval by the Director.

9. Operating Permit Requirements

Mississippi Valley BioEnergy, LLC shall apply for and receive an Intermediate Operating Permit from the Air Pollution Control Program for this installation.

10. Emergency Equipment Requirements

- A. The total operating hours of the emergency generator shall not exceed 100 hours in any consecutive 12-month period. To facilitate the record keeping for this condition, the emergency generator shall be equipped with a non-resettable running time meter.
- B. The total operating hours of the emergency fire pump shall not exceed 100 hours in any consecutive 12-month period. To facilitate the record keeping for this condition, the fire pump shall be equipped with a non-resettable running time meter.
- C. Attachment C or an equivalent form shall be used to record the hours of operation. Mississippi Valley BioEnergy, LLC shall maintain all records required by this permit for not less than five (5) years and shall make them available immediately to any Missouri Department of Natural Resources personnel upon request. These records shall include the operating hours for that month and the total hours of operation for the previous 12-month period.
- D. Mississippi Valley BioEnergy, LLC shall report to the Air Pollution Control Program's Enforcement Section, P.O. Box 176, Jefferson City, Missouri 65102, no later than ten (10) days after the end of the month during which the records from Special Condition 11.C indicate that the source exceeds the Special Condition 11.A or 11.B.

11. Pavement of Haul Roads

- A. Mississippi Valley BioEnergy, LLC shall pave the specified haul roads (FS06) with materials such as asphalt, concrete, and/or other material(s) after receiving approval from the Program. The pavement will be applied in accordance with industry standards for such pavement so as to achieve "Control of Fugitive Emissions" while the plant is operating.

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

- B. Maintenance and/or repair of the surfaces will be conducted as necessary to ensure that the physical integrity of the pavement is adequate to achieve control of fugitive emissions from these areas while the plant is operating.
- C. Mississippi Valley BioEnergy, LLC shall periodically water, wash and/or otherwise clean all of the paved portions of the haul road as necessary to achieve control of fugitive emissions from these areas while the plant is operating.

12. Grain Receiving and DDGS Loadout

- A. Only hopper trucks shall be used for receiving grain by truck.
- B. The tons received per day during the harvest season, as defined as the months of March through November, and during the non-harvest season, as defined as the months of December through February, shall be limited to the following amounts:

	Harvest Season (tons per day)	Non-Harvest Season (tons per day)
Grain Receiving	3,750	4,250
DDGS Loadout	125	125

- C. Mississippi Valley BioEnergy, LLC shall keep records to ensure the limits of this Special Condition and use Attachment D or other equivalent forms for this purpose.
- D. Mississippi Valley BioEnergy, LLC shall report to the Air Pollution Control Program Enforcement Section (P. O. Box 176, Jefferson City, MO 65102) no later than ten (10) days after the end of the month during which the required records show that these limitations have been exceeded.

13. Haul Road Traffic

- A. Haul road traffic shall only be permitted from 6:00 a.m. until 6:00 p.m. during the non-harvest season, as defined as the months of December through February, and from 6:00 a.m. until 8 p.m. during the harvest season, as defined as the months of March through November.
- B. The daily number of trucks allowed to drive on each segment of haul road shall be limited to the following amounts:

Truck Type	Harvest Season	Non-Harvest Season
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The permittee is authorized to construct and operate subject to the following special conditions:

	(trucks per day)	(trucks per day)
Grain Receiving	170	150
DDGS Loadout	5	5
Ethanol Loadout	20	20
Denaturant Delivery	2	2

- C. Mississippi Valley BioEnergy, LLC shall keep records to ensure the limits of this Special Condition and use Attachment E or other equivalent forms for this purpose.
- D. Mississippi Valley BioEnergy, LLC shall report to the Air Pollution Control Program Enforcement Section (P. O. Box 176, Jefferson City, MO 65102) no later than ten (10) days after the end of the month during which the required records show that these limitations have been exceeded.

14. Ethanol Production and Loadout Limits

- A. Mississippi Valley BioEnergy, LLC shall limit its annual undenatured ethanol production rate to 115,000,000 gallons per twelve (12) consecutive month period.
- B. Mississippi Valley BioEnergy, LLC shall limit its product loadout to non-dedicated trucks or railcars to 96.8 MMgal denatured ethanol per year.
- C. To demonstrate compliance, Mississippi Valley BioEnergy, LLC shall keep a record of the amounts of (a) undenatured ethanol produced and (b) denatured ethanol shipped by non-dedicated trucks or railcars per twelve (12) consecutive month period. Attachment F, or equivalent forms, shall be used for this purpose.

15. Cooling Tower Operating Requirements

- A. 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.
- B. The cooling water circulation rate shall not exceed 3,000,000 gallons per hour.
- C. The drift loss from the towers shall not exceed 0.005 percent of the water circulation rate. 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.
- D. The total dissolved solids (TDS) concentration in the circulated cooling water shall not exceed a TDS concentration of 2,500 parts per million

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

(ppm) for any 12 consecutive calendar month period. A TDS sample shall be collected at least once per calendar month.

16. Control Equipment – Ethanol Loadout Flare

- A. The ethanol loadout flare (CE09) must be in use at all times to control emissions from denatured ethanol truck loadout. The flare shall be operated and maintained in accordance with the manufacturer's specifications.
- B. Mississippi Valley BioEnergy, LLC shall maintain an operating and maintenance log for the flare 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.
 - 4) A written record of the total number of hours the flare is used including the date and time of the usage.

REVIEW OF APPLICATION FOR AUTHORITY TO CONSTRUCT AND OPERATE
SECTION (6) REVIEW

Project Number: 2007-12-049
Installation ID Number: 217-0045
Permit Number:

Mississippi Valley BioEnergy, LLC
US Highway 24 & County Road 346
West Quincy, MO 63471

Complete: July 16, 2007

Reviewed: July 16, 2007

Parent Company:
Mississippi Valley BioEnergy, LLC
10723 Old Route A
Centertown, MO 65023

Marion County, S10, T39N, R5W

REVIEW SUMMARY

- Mississippi Valley BioEnergy, LLC has applied for authority to construct a new ethanol production facility with the capacity to produce 115 million gallons of undenatured anhydrous ethanol annually.
- HAPs of concern from this process are acetaldehyde, acrolein, formaldehyde and methanol. The main HAPs of concern are acrolein and acetaldehyde. The SMAL levels for acrolein and acetaldehyde were exceeded. Acrolein passed dispersion modeling, so no limits were required for this HAP. Acetaldehyde did not pass dispersion modeling, so a limit to below the SMAL level (9.0 tons per 12-month rolling total) was voluntarily taken.
- New Source Performance Standards (NSPSs) Subparts Kb, Dc, and VVa 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 TK1-TK6; Subpart Dc, *Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units* applies to the TO/HRSGs (EU57 and EU61); Subpart VV, *Standards of Performance for Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry (SOCMI)* applies to this installation.
- The NSPSs that do not apply to this installation are NSPS Subparts DD, NNN, RRR, and XX. Specifically, 40 CFR Part 60 Subpart DD does not apply. 40 CFR Part 60 Subpart NNN, *Standards of Performance for Volatile Organic Compound Emissions from SOCMI Distillation Operations*, and Subpart RRR, *Standards of Performance for Volatile Organic Compound Emissions from SOCMI Reactor Processes*, do **not** apply to this installation. Subparts NNN and RRR contain the provision that they do not apply to ethanol plants that use a biological process to ferment the starches in corn into ethanol. 40 CFR Part 60 Subpart XX, *Standards of Performance for Bulk Gasoline Terminals*, does **not** apply since the fuel ethanol (alcohol/petroleum distillate blend) manufactured by the installation does not satisfy the Subpart XX

definition of gasoline.

- The following air pollution control equipment is used:
 - CE01 – Grain Handling Baghouse
 - CE02 – Hammermill Baghouse
 - CE03 – CO₂ Scrubber
 - CE04 – Multiclones (1, 2)
 - CE05 – Multiclones (3, 4)
 - CE06 – TO/HRSG
 - CE07 – TO/HRSG
 - CE08 – DDGS Baghouse
 - CE09 – Ethanol Loadout Flare
 - CE10 – Cooling Drum Baghouse
 - CE11 – Methanator Flare
- Emissions testing is required for equipment in this permit.
- This review was conducted in accordance with Section (6) of Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*. Potential emissions of PM₁₀, NO_x, SO_x, and VOC are above de minimis levels.
- Ambient air quality modeling was performed to determine the ambient impact of PM₁₀, NO_x, SO₂, acrolein, and formaldehyde. Ambient air quality modeling was not necessary for acetaldehyde because the installation took a limit to the Screen Model Action Level.
- This installation is located in Marion 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].
- An Intermediate Operating Permit is required for this installation within 90 days of equipment startup.
- Approval of this permit is recommended with special conditions.

INSTALLATION/PROJECT DESCRIPTION

The purpose of this project is to construct a new ethanol production facility with the capacity to produce 115 million gallons of undenatured ethanol annually. As this is a new facility, no permits have been issued to Mississippi Valley BioEnergy, LLC from the Air Pollution Control Program.

Grain is loaded in by railcar or truck, dumped into receiving pits, and conveyed by augers, conveyors, elevators, and then transfer conveyors to three dump pits inside the

building. The dump pits are fitted with conveyor belts that feed the elevator leg and storage silos. The corn is then transferred to a scalper to remove debris and then to a surge bin. Hammermills then to break the grain into very small pieces, smaller than what roll crushers would accomplish in a typical wet corn milling process. The corn is now ready for wetting and subsequent fermentation.

The milled corn is mixed with condensate from the process condensate tank and hot well (not shown in process flow diagram) in the slurry tank. The slurry is cooked in the cook tube and then sent to the liquefaction tanks to be liquefacted with enzymes and to complete the soaking of the grain. The resultant mash is cooled while still in the liquefaction tanks. This mixture is then mixed with liquid yeast from the yeast tanks, and fed to seven fermenters, each operated as a batch process, where saccharification continues from the liquefaction tanks and occurs simultaneously with fermentation. The fermentation process reduces the oxygen content while increasing the ethanol content. The final fermentation product, called beer, is held in the beerwell before proceeding to distillation.

The beerwell serves as a surge tank to connect fermentation/saccharification with distillation. The beer is sent through a pre-heater and then to the beer still, whose function is to separate the ethanol from the residual grain solids. The beer is distilled in a three-column distillation process consisting of a beer stripper, side stripper, and rectifier column. The products of the distillation column are hydrous ethanol (a mixture of ethanol and water, where some of the water is bound to the ethanol molecules) and whole stillage, consisting of solids and water. The stripper and rectifier are used to remove non-ethanol alcohols and other undesirable byproducts not separated by the distillation column, and these fermentation byproducts are sent to the TO. The hydrous ethanol is dehydrated in the molecular sieves to remove any remaining water to produce a 200-proof ethanol product. Product is denatured with gasoline, loaded out under flare control, and shipped via tanker truck and railcar.

The whole stillage contains both dissolved and undissolved solids and is centrifuged to produce a wet cake and supernatant/centrate, called thin stillage. The wet cake is dried in the DDGS dryer, then cooled in the DDGS cooler. The thin stillage passes through an evaporation system, the condensate from which feeds the slurry tank, and the concentrated liquid, called dissolved solids syrup (DSS) is added to the DDGS dryers. There are four DDGS dryers which can only run off of natural gas. Each is rated at 40 MMBtu/hr and uses low-NO_x burners.

If the wetcake is not dried, the WDGS is conveyed from the centrifuges to the optional wetcake loadout where it is transported to local cattle feed operations. If it is dried, the DDGS is sent to a storage building, from which it is transferred to elevator by front end loaders to loadout spouts for shipping by truck or rail.

Steam is required for process heat. The plant will use two 120-MMBtu/hr natural gas fired Thermal Oxidizer/Heat Recovery Steam Generators (TO/HRSGs) (EU57 and EU61) for this purpose. For the facility's cooling requirements, a set of four cooling towers with a combined flow rate of 50,000 gallon/minute (FS05) will be used.

Emergency equipment will be available. A 2.18 MMBtu/hr-capacity water pump (EU74) will be used only in the case of a power loss or fire. This unit will undergo periodic testing.

EMISSIONS/CONTROLS EVALUATION

The pollutants of concern for the purpose of this review are PM₁₀, NO_x, SO_x, VOCs, CO, and HAPs. The emissions summary is based on 100% DDGS production because this is the worst-case scenario. Emissions from WDGS production are expected to be less than the emissions from DDDGS production because various equipment such as the DDGS dryers, will not be in operating during WDGS production.

Table 1: Emissions Summary (tons per year)

Pollutant	Regulatory De Minimis Levels	Existing Potential Emissions	Existing Actual Emissions (EIQ)	Potential Emissions of the Application	New Installation Conditioned Potential
PM ₁₀	15.0	N/A	N/A	86.53	N/A
SO _x	40.0	N/A	N/A	87.11	N/A
NO _x	40.0	N/A	N/A	98.89	N/A
VOC	40.0	N/A	N/A	99.40	N/A
CO	100.0	N/A	N/A	98.27	N/A
HAPs	25.0	N/A	N/A	18.6	25
acetaldehyde	10.0	N/A	N/A	9.7	** <9.0
acrolein	10.0	N/A	N/A	0.86	N/A

N/A = Not Applicable

** The emission of acetaldehyde is voluntarily limited to below its SMAL level.

Grain Handling and Storage

PM₁₀ is primarily emitted from the grain handling, storage, milling and drying processes. The emission factors for estimating PM₁₀ emissions from these processes were obtained from the EPA document AP-42, *Compilation of Air Pollutant Emission Factors*, Fifth Edition, Section 9.9.1 *Grain Elevators and Processes* (5/98). Baghouses (CE01, CE02, CE08, and CE10) with manufacturer-guaranteed emissions of 0.005 grains/dry standard cubic foot are used to control PM₁₀ emissions from grain and DDGS handling and milling operations and the cooling drum (EUs 1-22, 56, 60, and 62-69). These operations will be tested to verify emissions.

Fermentation and Distillation

VOCs and HAPs are primarily emitted from fermentation and distillation processes (EU 23-52: mixer, two slurry tanks, flash tank, cook tubes, four liquefaction tanks, two yeast tanks, beer column, side stripper, rectifier column, evaporators, whole stillage tank, thin stillage tank, syrup tank, six centrifuges, 190 proof condenser, molecular sieves, and 200 proof condenser). The emissions from these units will be controlled by CE06 and CE07, the two TO/HRSGs and will be vented to the atmosphere through SV04.

The potential emissions of PM₁₀, VOC and HAPs emitted from these processes were estimated by the applicant by using emissions from similar sources. Therefore,

emissions from these processes will be verified through testing and included when determining compliance with the HAPs limits in this permit.

Fugitive leaks will be controlled in accordance with *New Source Performance Standards (NSPS) for Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry*, 40 CFR Part 60, Subpart VV.

DDGS Drying and Storage

PM₁₀ is emitted from the DDGS as it undergoes drying, and VOCs, HAPs, SO_x, CO and PM₁₀ are emitted from the combustion used for drying. These emissions are sent through CE04 and CE05, the multiclones, and then sent through CE06 and CE07, the two TO/HRSGs, and then to stack SV04. The multicyclones are used to control PM₁₀ emissions from the DDGS as it dries with an expected control efficiency of 90%. VOC and HAP emissions from the DDGS dryer are controlled with the TO/HRSG.

The DDGS is pneumatically transferred to an enclosed storage building and loaded out onto railcars and trucks. Emissions from the handling and loading out of DDGS are controlled by baghouses using negative pressure.

For the DDGS dryers, the PM₁₀ emission rate came from the manufacturer's guarantee for the baghouse controlling these emission units, the NO_x, SO₂, and CO came from process engineering estimates, and the rest of the emissions came from industry data for similar sources.

Tanks and Loadout

VOCs are emitted from storage tanks and truck/rail loadout, with truck loadout being controlled by flare. Fugitive leaks will be controlled in accordance with *New Source Performance Standards (NSPS) for Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry*, 40 CFR Part 60, Subpart VV. Storage tank emissions were calculated using TANKS 4.0.

Emissions due to combustion of the loadout pilot flare were taken from emission factors found in AP-42 Section 1.4 *External Combustion Sources* (5th Edition). Loadout emissions were determined using AP-42, Section 5.2, *Transportation and Marketing of Petroleum Liquids*. It was assumed that up to 96.8 MMgal per year of denatured ethanol could be loaded into non-dedicated trucks or railcars as a worst case scenario. Therefore, loading loss emissions were calculated using gasoline as the displaced vapor for up to 96.8 MMgal annually, with the remainder of the 121 MMgal annual denatured ethanol production limitation being required to be loaded into dedicated units.

Haul Roads

Unpaved haul road emissions were obtained from AP-42, Section 13.2.2, *Unpaved Roads* (9/98). A control efficiency of 95% is given to the haul roads for paving and washing. Seasonal (harvest and non-harvest) limits on the number of trucks per day were taken in order to comply with ambient air quality standards.

Combustion Summary

Combustion emissions for the installation were calculated from the following sources.

- *DDGS Dryers (EUs 54, 55, 58, and 59)* – The PM₁₀ emission rate came from the manufacturer's guarantee for the baghouse controlling these emission unit, the NO_x, SO₂, and CO came from process engineering estimates, and the rest of the emissions came from industry data.
- *TO/HRSGs (EUs 57 and 61)* – All emissions were calculated using industry data.
- *Ethanol Loadout Pilot Flame* – All emission were calculated using emission factors found in AP-42 Section 1.4 *External Combustion Sources* (5th Edition).
- *Emergency fire pump (EU74)* – The emission factors for all criteria pollutants came from AP-42 Section 3.3 *Gasoline and Diesel Industrial Engines*.

Testing by ethanol plants in other states have shown that HAP emissions from the scrubbers can be emitted in larger quantities than expected. Based upon these findings, it is necessary to limit HAP emissions to ensure the installation does not exceed major levels. Since there are currently no MACT standards that apply to ethanol plants, this project would be subjected to a Section (9) review without a 10/25-ton per year limit for HAPs. The HAPs of concern from these processes are acetaldehyde, acrolein, formaldehyde and methanol. However, acetaldehyde is the HAP with the greatest emission rate.

Performance tests required by this permit will verify the emission rate of the aforementioned HAPs and determine compliance with the emission limitation given in Special Condition 1(C). If these limitations are exceeded, the applicant will be required to curtail production or install control equipment to meet these limitations.

This is a new installation. Therefore, no existing potential or actual emissions were determined. The installation conditioned potential emissions were based upon findings from other ethanol plants. Special conditions for emissions of VOC, HAPs and CO are required for review under Section (6) of Missouri State Rule 10 CSR 10-6.060 rather than for major source review under Section (8) or Section (9). These limitations were requested by the applicant. The following table provides an emissions summary for this project.

PERMIT RULE APPLICABILITY

This review was conducted in accordance with Section (6) of Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*. Potential emissions of PM₁₀, NO_x, SO_x, VOCs, and CO are above de minimis levels.

APPLICABLE REQUIREMENTS

Mississippi Valley BioEnergy, LLC 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 April 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 Small Industrial-Commercial-Institutional Steam Generating Units*, 40 CFR Part 60, Subpart Dc
- *New Source Performance Regulations*, 10 CSR 10-6.070 – *New Source Performance Standards (NSPS) for Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry*, 40 CFR Part 60, Subpart VVa
- *New Source Performance Regulations*, 10 CSR 10-6.070 – *New Source Performance Standards (NSPS) for Volatile Organic Liquid Storage Vessels for Which Construction, Reconstruction or Modification Commenced After July 23, 1984*, 40 CFR Part 60, Subpart Kb.
- *Maximum Allowable Emissions of Particulate Matter From Fuel Burning*

Equipment Used for Indirect Heating, 10 CSR 10-3.060

AMBIENT AIR QUALITY IMPACT ANALYSIS

Ambient air quality modeling was performed to determine the ambient impact of PM₁₀, SO₂, NO_x, acrolein, and formaldehyde because they are above the de minimis levels, as was VOC. No model is currently available, however, which can accurately predict ambient ozone concentrations caused by this installation's VOC emissions. Refer to the modeling memorandum from Dawn Froning with subject "Mississippi Valley BioEnergy, LLC Ambient Air Quality Impact Analysis (AAQIA) April 10, 2008 Submittal" for further details.

The SMAL levels for acrolein and acetaldehyde were exceeded. Acrolein passed dispersion modeling, so no limits were required for this HAP. Acetaldehyde did not pass dispersion modeling, so a limit to below the SMAL level was voluntarily taken.

STAFF RECOMMENDATION

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

Jeannie Kozak
Environmental Engineer

Date

PERMIT DOCUMENTS

The following documents are incorporated by reference into this permit:

- The Application for Authority to Construct form, dated and received July 16, 2007, designating Mississippi Valley BioEnergy, LLC as the owner and operator of the installation.
- U.S. EPA document AP-42, *Compilation of Air Pollutant Emission Factors*, Fifth Edition.
- Southwest Regional Office Site Survey, dated July 31, 2007.

**Attachment A: Monthly Individual HAP Emission Tracking Record –
Limiting Acetaldehyde to Below SMAL Levels**

Mississippi Valley BioEnergy, LLC
 Marion County, S10, T39N, R5W
 Project Number: 2007-12-049
 Installation ID Number: 217-0045
 Permit Number: _____

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

HAP Name: _____ CAS No.: _____

Copy this sheet as needed

Column A	Column B	Column C	Column D	Column E
Emission Point(s)	Description	Amount Processed	Individual HAP Emission Factor	(a) Individual HAP Emissions (tons)

(b) Total Individual HAP Emissions Calculated for this Month in Tons:	
(c) 12-Month Individual HAP Emissions Total From Previous Month's Attachment A, in Tons:	
(d) Monthly Individual HAP Emissions Total (b) from Previously year's Attachment A, In Tons:	
(e) Current 12-month Total of Individual HAP Emissions in Tons : [(b) + (c) - (d)]	

- (a) $[Column E] = [Column C] \times [Column D] \times 0.0005$. Emission factor obtained from performance tests required by this permit.
- (b) Summation of [Column E] in Tons;
- (c) 12-Month Individual HAP emissions total (e) from last month's Attachment A, in Tons;
- (d) Monthly Individual HAP emissions total (b) from previous year's Attachment A, in Tons;
- (e) Calculate the new 12-month Individual HAP emissions total.

A 12-Month Individual acetaldehyde emissions total (e) of less than 9.0 tons indicates compliance.

Ms. Susan McNay
President
Mississippi Valley BioEnergy, LLC
10723 Old Route A
Centertown, MO 65023

RE: New Source Review Permit - Project Number: 2007-12-049

Dear Ms. McNay:

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 future 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 do not hesitate to contact Ms. Jeannie Kozak with the department's Air Pollution Control Program, P.O. Box 176, Jefferson City, MO 65102 or by phone at (573) 751-4817.

Thank you,

AIR POLLUTION CONTROL PROGRAM

Kendall B. Hale
New Source Review Unit Chief

KBH:jkl

Enclosures

c: Southwest Regional Office
PAMS File 2007-12-049

Permit Number: