

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: 042008 - 004 Project Number: 2006-10-057

Parent Company: Show Me Ethanol, LLC

Parent Company Address: 26530 East Highway 24, Carrollton, MO 64633

Installation Name: Show Me Ethanol, LLC

Installation Address: 26530 East Highway 24, Carrollton, MO 64633

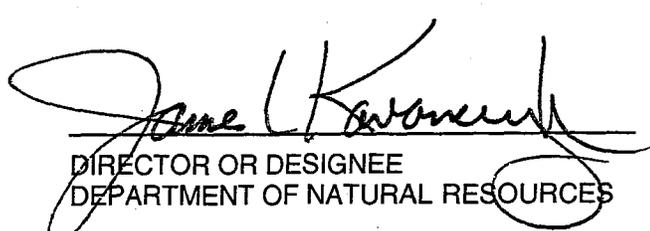
Location Information: Carroll County, S35, T53N, R23W

Application for Authority to Construct was made for:
Installation of a 60.5 million gallon per year denatured, fuel-grade ethanol plant adjacent to Ray Carroll Grain Elevator. Ray Carroll Grain Elevator will increase their production in order to supply grain to the new ethanol plant. 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.

APR - 9 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 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."

Show Me Ethanol, LLC
Carroll County, S35, T53N, R23W

1. Haul Road Control
Show Me Ethanol, LLC shall control fugitive emissions from all of the haul roads at this site by paving and washing/cleaning the haul roads.
 - A. Show Me Ethanol, LLC shall finish paving the haul roads before start of operations.
 - B. Show Me Ethanol, LLC shall inform the Air Pollution Control Program, in writing within fifteen (15) days, of the date when operation has commenced at this site and of the date when the paving has been completed
 - C. Show Me Ethanol, LLC shall pave the haul roads with materials such as asphalt, concrete, and/or other material(s). If materials other than asphalt or concrete are used, Show Me Ethanol, LLC must receive approval from the Air Pollution Control Program. The pavement shall be applied in accordance with industry standards for such pavement so as to achieve control of fugitive emissions while the plant is operating.
 - D. Maintenance and/or repair of the road surface shall be conducted as necessary to ensure that the physical integrity of the pavement is adequate to achieve control of fugitive emissions from these areas.
 - E. Show Me Ethanol, 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.

2. Grain Receiving Operational Limits
 - A. Show Me Ethanol, LLC shall limit its truck daily grain receiving rate to 829 tons of grain per day.

 - B. To demonstrate compliance with Special Condition 2.A., Show Me Ethanol, LLC shall keep a record of the daily weight (tons) of grain received by truck per day. Attachment A, or equivalent form(s), shall be used for this purpose.

 - C. Show Me Ethanol, LLC shall not receive grain either by truck or from the Ray-Carroll grain elevator during the hours of 7 pm to 7 am (i.e. night

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SPECIAL CONDITIONS:

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

hours). This hourly limitation applies to the haul roads for grain, fugitive emissions for grain receiving and the grain receiving baghouse (P30).

- D. Show Me Ethanol, LLC shall not loadout DDGS during the hours of 7 pm to 7 am (i.e. night hours). This hourly limitation applies to the haul roads for DDGS, fugitive emissions for DDGS loading, and the DDGS baghouse (P90).

3. Ethanol Production Limits

- A. Show Me Ethanol, LLC shall limit its annual denatured ethanol production rate to 60,500,000 gallons per twelve (12) consecutive month period.
- B. To demonstrate compliance with Special Condition 3.A., Show Me Ethanol, LLC shall keep a record of the amount of ethanol produced per twelve (12) consecutive month period. Attachment B, or equivalent forms, shall be used for this purpose.

4. Emission Limitations

- A. Emission Limit of Particulate Matter Less than Ten Microns in Diameter (PM₁₀)
 - 1.) Show Me Ethanol, LLC shall not discharge PM₁₀ into the atmosphere from the following stacks in excess of the listed amounts in Table 1.
 - 2.) The emission rates in Table 1 shall be verified through performance testing as detailed in Special Conditions 10 and 11.

Table 1: Emission Rate Limits for PM₁₀

Stack ID	Stack Description	Pounds per Hour (lbs/hr)
S10	Thermal Oxidizer/Dryers	3.3750
S30	Hammermill Baghouse	0.7511
S40	Fermentation Scrubber	0.0360
S70	Cooling Cyclone	0.9429
S90	DDGS Loadout Baghouse	0.1598

- B. Emission Limit of Nitrogen Oxides (NO_x)
 - 1.) Show Me Ethanol, LLC shall not discharge NO_x into the atmosphere from the following stacks in excess of the listed amounts in Table 2.
 - 2.) The emission rates in Table 2 shall be verified through performance testing as specified in Special Conditions 10 and 11.

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SPECIAL CONDITIONS:

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

Table 2: Emission Rate Limits for NO_x

Stack ID	Stack Description	Pounds per Hour (lbs/hr)
S10	Thermal Oxidizer/Dryers	17.5

- C. Emission Limit of Hazardous Air Pollutants (HAPs)
- 1.) Show Me Ethanol, LLC shall emit less than twenty-five (25.0) tons of combined HAPs from this installation in any consecutive twelve (12) month period. Attachment C, *Monthly Total HAPs Emissions Tracking Record*, or equivalent form(s), shall be used to demonstrate compliance. The emission rates used in Attachments C shall be determined by performance testing, as detailed in Special Conditions 10 and 11.
 - 2.) Show Me Ethanol, LLC shall emit less than ten (10.0) tons of individual HAPs from this installation in any consecutive twelve (12) month period. Attachment D, *Monthly Individual HAPs Emissions Tracking Record*, or equivalent form(s), shall be used to demonstrate compliance. The emission rates used in Attachments D shall be determined by performance testing, as detailed in Special Conditions 10 and 11.
- D. Emission Limit of Carbon Monoxides (CO)
- 1.) Show Me Ethanol, LLC shall not discharge CO into the atmosphere from the following stacks in excess of the listed amounts in Table 3.
 - 2.) The emission rates in Table 3 shall be verified through performance testing as specified in Special Conditions 10 and 11.

Table 3: Emission Rate Limits for CO

Stack ID	Stack Description	Pounds per Hour (lbs/hr)
S10	Thermal Oxidizer/Dryers	21.38

- E. Emission Limit of Sulfur Oxides (SO₂)
- 1.) Show Me Ethanol, LLC shall not discharge SO₂ into the atmosphere from the following stacks in excess of the listed amounts in Table 4.
 - 2.) The emission rates in Table 4 shall be verified through performance testing as specified in Special Conditions 10 and 11.

Table 4: Emission Rate Limits for SO₂

Stack ID	Stack Description	Pounds per Hour (lbs/hr)
S10	Thermal Oxidizer/Dryers	10.28

5. Control Measure – 100% Capture Efficiency

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SPECIAL CONDITIONS:

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

- A. The grain storage, handling and process equipment, and grain milling equipment associated with the ethanol plant shall be enclosed by ductwork or located in a building. The enclosures/buildings shall be maintained under negative pressure and exhausted to baghouses.
- B. Show Me Ethanol, LLC shall demonstrate negative pressure by using visual indicators, such as negative pressure gauges, at each openings of the enclosure.
- C. Show Me Ethanol, LLC shall perform a visual indicator check for each emission point at least once in every 24-hour period while the grain handling, grain storage, and grain milling equipment are in operation.
- D. Show Me Ethanol, LLC shall maintain an operating and maintenance log for the grain storage, handling equipment and process equipment which shall include the following:
 - 1.) Incidents of malfunction, with impact on emissions, duration of event, probable cause, and corrective actions.
 - 2.) Maintenance activities, with inspection schedule, repair actions, and replacements, etc.
 - 3.) A record of regular inspection schedule, the date and results of all inspections, including any actions or maintenance activities that result from the inspections. Either paper copy or electronic formats are acceptable.

6. Control Equipment – Baghouses

- A. The baghouses must be in use at all times when the following equipment are in operation:

Table 5: Equipment to be Controlled by Baghouses

Emission Point	Emission Unit Description	Type of Control
P30	Hammermills (2), Grain receiving, handling and storage	Baghouse C30
P70	DDGS Cooling System Cyclone	Baghouse C70
P90	DDGS Loading	Baghouse C90

- 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 gauges or meters, which indicate the pressure drop across the baghouses or baghouse. These gauges or meters shall be located such that Department of Natural

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

Resources' employees may easily observe them.

- C. Replacement bags for the 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. Show Me Ethanol, LLC shall monitor and record, in an operating and maintenance log, the operating pressure drop across the baghouses at least once every 24 hours. Either paper copy or electronic formats of the log are acceptable. The operating pressure drop shall be maintained within the design conditions specified by the manufacturer's performance warranty. If the pressure drop reading shall fall outside of this normal operating range, then the associated equipment shall be shut down as quickly as is feasible and corrective action taken to address the cause of the pressure drop problem. The problem shall be corrected and the baghouse shall be operational before restarting the equipment.
- E. Show Me Ethanol, LLC shall maintain an operating and maintenance log for the baghouses which shall include the following:
 - 1.) Incidents of malfunction, with impact on emissions, duration of event, probable cause, and corrective actions
 - 2.) Maintenance activities, with inspection schedule, repair actions, and replacements, etc.
 - 3.) A record of regular inspection schedule, the date and results of all inspections, including any actions or maintenance activities that result from the inspections. Either paper copy or electronic formats are acceptable.

7. Control Equipment – Wet Scrubbers

- A. The wet scrubbers must be in use at all times when the following equipment is in operation:

Table 6: Equipment to be Controlled by Wet Scrubbers

Equipment Controlled by Wet Scrubbers	Wet Scrubber Description
Four Fermentation Tanks and One Beer Well	Packed Bed CO2 Scrubber (C40)

- B. The scrubbers and any related instrumentation or equipment shall be operated and maintained in accordance with the manufacturer's specifications and the conditions determined from condition 10.B. Each scrubber shall be equipped with a gauge or meter that indicates the

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

pressure drop across the scrubber. Each scrubber shall be equipped with a water flow meter that indicates the water flow through the scrubber. These gauges and meters shall be located in such a way they may be easily observed by Department of Natural Resources' personnel.

- C. Show Me Ethanol, LLC shall monitor and record the operating pressure drop across each 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. Show Me Ethanol, LLC shall monitor and record the water flow rate through the scrubber at least once every twenty-four (24) hours. The water flow rate shall be maintained within the design conditions specified by the manufacturer's performance warranty.
 - E. Show Me Ethanol, 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 event, probable cause, and corrective actions.
 - 2.) Maintenance activities, with inspection schedule, repair actions, and replacements, etc.
 - 3.) A record of regular inspection schedule, the date and results of all inspections, including any actions or maintenance activities that result from the inspection. Either paper copy or electronic formats are acceptable.
8. Control Equipment –Thermal Oxidizer.
- A. The thermal oxidizer (TO) must be in use at all times when the DDGS dryers, HRSG, and distillation process are in operation or any time that regulated PM₁₀, volatile organic compounds (VOC) or hazardous air pollutant (HAP) emissions are possible. The thermal oxidizer shall be operated and maintained in accordance with the manufacturer's specifications. Emission rates of PM₁₀, VOC, HAPs, CO, SO_x and NO_x will be tested, as detailed in Special Conditions 10, to verify the thermal oxidizer is operating as assumed.
 - B. The operating temperature of the thermal oxidizer 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 Conditions 11 which demonstrated compliance with the emission limits. The acceptable

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

temperature range may be reestablished by performing a new set of emission tests.

- C. Show Me Ethanol, LLC shall maintain an operating and maintenance log for the thermal oxidizer 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.

- 9. Control Equipment – Flares
 - A. The fuel loadout flare (P50) must be in use at all times during denatured ethanol truck loadout into dedicated truck tanks, and natural gasoline delivery truck loadout. Emissions from the Methanator will be directed to the thermal oxidizer/dryers (P10), or the biomethanator flare (P60). The flares shall be operated and maintained in accordance with the manufacturer's specifications.

 - B. The fuel loadout flare (P50) may be operated for a total of 3300 hours per year.

 - C. Show Me Ethanol, 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 operated including the date and time of the operation.

- 10. Performance Testing
 - A. Show Me Ethanol, LLC shall conduct performance tests on the stacks listed in Table 7 Column A. The emission rates for the pollutants listed in Column C shall be determined using the units described in Column D. The tested emission rates shall be used in the Attachments described in Column E (if applicable) for compliance with the special conditions described in Column F.

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SPECIAL CONDITIONS:

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

Table 7: Testing Requirement

Column A	Column B	Column C	Column D	Column E	Column F
Emission Point	Description	Pollutant	Units	Attachments	Special Condition
P10	Thermal Oxidizer	VOC, HAP, CO, PM ₁₀ , NO _x , SO _x	lb of pollutant/hr, lbs of pollutant/gallon of EtOH produced, lb of pollutant/ton DDGS produced, lb of pollutant/MMBTU	D, E	5.A.1., 5.B.1., 5.C.1., 5.C.2., 5.D.1., 5.E. 1.
P30	Baghouse	PM ₁₀	lb of pollutant/hr, lb of pollutant/ton of grain	N/A	5.A.1.
P40	Packed Bed CO ₂ Scrubber	VOC, HAPs, PM ₁₀	lb of pollutant/hr, lb of pollutant/gallon of EtOH produced	D, E	5.A.1., 5.C.1., 5.C.2., 5.D.1.
P70	Baghouse	PM ₁₀	lb of pollutant/hr, lb of pollutant/ton of DDGS	N/A	5.A.1.
P90	Baghouse	PM ₁₀	lb of pollutant/hr, lb of pollutant/ton of DDGS	N/A	5.A.1.

- B. The operating parameters (i.e. water flowrate, pH level, amount of additives, temperature, pressure, etc.) at which the stack tests are conducted shall be used to set the appropriate values used in actual operations of the following control devices/equipment.
- 1.) The CO₂ Scrubber
 - 2.) The Thermal Oxidizer
- C. The operating parameters in Special Condition 10.B. shall be determined and agreed upon by the Air Pollution Control Program's Enforcement Section and Show Me Ethanol, LLC before the start of the performance tests.
- D. The operating parameters in Special Condition 10.B. shall be recorded on record keeping sheet(s) and be made available to Department of Natural Resources personnel upon request. The frequency of the record keeping is dependent upon the parameters being kept and should be determined and agreed upon by the Air Pollution Control Program's Enforcement Section and Show Me Ethanol, LLC before the start of the performance tests.
- E. The performance tests for the fermentation wet scrubber shall be conducted for one of the following time periods:
- 1.) A complete cycle, defined as the time period between transferring the contents of one fermenter to the beer well and transferring the contents of the next fermenter; or

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SPECIAL CONDITIONS:

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

- 2.) During period(s) of representative emissions. Show Me Ethanol, LLC shall submit, in the proposed test plan outlined in Special Condition 11, sufficient data to determine the point(s) of representative emissions. The representative emissions are the average of 3 points identified as highest airflow, lowest airflow, and mid-range airflow going up or down the pressure curve. Testing will consist of three (3) 1-hour runs at each of the 3 points. These points must be approved by the Air Pollution Control Program's compliance/assistance section prior to conducting the tests. If sufficient data is not supplied supporting these representative emission points, Show Me Ethanol, LLC must conduct testing for the time period outlined in Special Condition 10.E.1.
 - F. The testing required in Special Condition 10.A 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 (e.g. PM₁₀) from these sources may be used in place of the above testing requirement if requested by Show Me Ethanol, LLC and approved by the Director.
 - G. 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 12.
 - H. Show Me Ethanol, LLC shall conduct performance tests to verify the emission rates as indicated in Special Condition 10.A once every 5 years from the date of the most recent performance tests.
11. Proposed Test Plan and Final Test Report
 - 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 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,

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SPECIAL CONDITIONS:

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

analytical instrument laboratory data, and complete sample calculations from the required U.S. EPA Method for at least one 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 10 of this permit indicates that any of the emission limits specified in Special Condition 4 are being exceeded, Show Me Ethanol, LLC must propose a plan to the Air Pollution Control Program within thirty (30) days of submitting the performance test results. This plan must demonstrate how Show Me Ethanol, LLC will reduce the emission rates below those stated in Special Condition 5. Show Me Ethanol, LLC shall implement any such plan immediately upon its approval by the Director.
12. Cooling Tower Requirements
- A. The cooling tower(s) shall be operated and maintained in accordance with the manufacturer's specifications. Manufacturer's specifications shall be kept onsite and made readily available to Department of Natural Resources' Employees.
 - B. The cooling water circulation rate shall not exceed 25,000 gallons per minute.
 - C. Show Me Ethanol, LLC shall keep records of the monthly and 12-month rolling averages of the amount of water circulated.
 - D. 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 onsite and be made readily available to Department of Natural Resources' employees upon request.
 - E. The total dissolved solids (TDS) concentration in the circulated cooling water shall not exceed a TDS concentration of 2,500 parts per million (ppm). A TDS sample shall be collected and the results recorded monthly to verify the TDS concentration. Monthly sampling can not occur within 48 hours of each sampling event.
 - F. The requirements for TDS Sample collection may be eliminated or the frequency reduced upon written approval by the Air Pollution Control Program if TDS sampling results demonstrate compliance for twenty-four

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

(24) consecutive months.

13. Emergency Equipment Requirements

- A. The operating hours of the emergency fire pump shall not exceed 500 hours each in any consecutive 12-month period. To facilitate the record keeping for this condition, the emergency fire pump shall be equipped with a non-resettable running time meter.
- B. Attachment E, or equivalent form(s), shall be used to record the hours of operation. These records shall include the operating hours for that month and the total hours of operation for the previous 12-month period.
- C. Show Me Ethanol, LLC shall report to the Air Pollution Control Program's Enforcement Section at P.O. Box 176, Jefferson City, MO, 65102, no later than ten (10) days after the end of the month during which the records from Special Condition 13.B. indicate that the source exceeds the Special Condition 13.A.

14. Operational Start-Up Restriction

Show Me Ethanol, LLC shall not begin commercial production of ethanol prior to complete construction of all emission control/reduction equipment required at Ray-Carroll County Grain Growers, Inc. (see Table 8).

Table 8: List of emission control/reduction equipment required in Project 2006-11-066

Special Condition	Control/Reduction Equipment
2	Paving of haul roads
4.A	Installation of a cloth drop sleeve on fertilizer truck loadout
4.B	Enclosing the fertilizer storage bays
6.A	Installation of a mineral oil suppression system
6.B	Installation of a cloth drop sleeve on grain truck loadout

15. Reporting Requirements

Show Me Ethanol, LLC shall report to the Air Pollution Control Program's 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 the special conditions of this permit show that the limitations of this permit have been exceeded.

16. Record Keeping Requirements

All records required by this permit shall be kept onsite for no less than five (5) years and shall be made available to any Department of Natural Resources' personnel upon request.

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SPECIAL CONDITIONS:

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

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

Project Number: 2006-10-057
Installation ID Number: 033-0023
Permit Number: 042008-004

Show Me Ethanol, LLC
26530 Highway 24 East
Carrollton, MO 64633

Complete: April 16, 2007
Reviewed: March 31, 2008

Parent Company:
Show Me Ethanol, LLC
26530 Highway 24 East
Carrollton, MO 64633

Carroll County, S35, T53N, R23W

REVIEW SUMMARY

- Show Me Ethanol, LLC has applied for authority to install a 60.5 million gallon per year denatured, fuel-grade ethanol plant.
- Hazardous Air Pollutant (HAP) emissions are expected from the proposed equipment. HAPs of concern from this process are acetaldehyde, acrolein, formaldehyde and methanol.
- The following New Source Performance Standards (NSPS) **apply** to this installation:
 - 40 CFR Part 60, Subpart Kb, *Standards of Performance for Volatile Organic Liquid Storage Vessels*, applies to the storage tanks.
 - 40 CFR Part 60, Subpart VV, *Standards of Performance for Equipment Leaks of VOC in the Synthetic Organic Manufacturing Industry (SOCMI)* apply to the installation.
 - 40 CFR Part 60, Subpart IIII, *Standards of Performance for Compression Ignition Internal Combustion Engines* apply to the emergency firewater pump.
 - 40 CFR Part 60, Subpart Db, *Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units* apply to the boilers.
- The following New Source Performance Standards (NSPS) **do not apply** to this installation.
 - 40 CFR Part 60, Subpart DD, *Standards of Performance for Grain Elevators*, since the permanent storage capacity of at this installation is less than 2.5 million bushels.
 - 40 CFR, Subpart III, *Standards of Performance for VOC Emissions from SOCMI Air Oxidation Unit Processes* does not apply to this installation because it does not produce any chemicals listed in §60.617 of the subpart as a product, co-product, by-product, or intermediate.
 - 40 CFR, Subpart NNN, *Standards of Performance for VOC Emissions from SOCMI Distillation Operations* does not apply to this installation because the EPA

- did not consider bio-processes in the development of this subpart.
- 40 CFR, Subpart RRR, *Standards of Performance for VOC Emissions from SOCM/ Reactor Processes* does not apply to this installation because the EPA did not consider bio-processes in the development of this subpart.
- 40 CFR, Subpart XX, *Standards of Performance for Bulk Gasoline Terminals*, does not apply to this installation since the fuel ethanol manufactured by the installation does not satisfy the Subpart XX definition of gasoline.
- Baghouses, cyclones, scrubbers, and a thermal oxidizer are being used to control the emissions from the equipment in this permit.
- Ray -Carroll County Grain Growers, Inc. and Show Me Ethanol, LLC are considered one installation for purposes of construction permitting. Therefore, the emissions of both facilities were reviewed under one project.
- 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, VOC, NO_x, SO_x and CO are above de minimis levels and below major source levels.
- This installation is located in Carroll 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 performed to determine the ambient impact of PM₁₀, NO_x, SO_x and CO.
- Emissions testing is required for the equipment.
- 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 DESCRIPTION

Show Me Ethanol, LLC (Show Me Ethanol) is proposing to install and operate a 60.5 million gallon per year fuel grade ethanol manufacturing facility adjacent to Ray-Carroll County Grain Growers, Inc. (Ray-Carroll), an existing grain elevator and fertilizer plant in Carrollton, Missouri. Each company submitted an application to obtain a construction permit for their individual company: Show Me Ethanol for a new ethanol plant (Project #2006-10-057) and Ray-Carroll for an increase in production of grain (Project #2006-11-066). Although Ray Carroll is an existing installation and Show Me Ethanol is a new installation, after evaluating both applications, it was determined that both companies should be considered a single installation for permitting purposes.

Therefore, the emissions from both companies were reviewed together under one project determination.

Installation is defined by 10 CSR 10-6.020 (2)(l)(7) as the following:

“All source operations including activities that result in fugitive emissions, that belong to the same industrial grouping ..., and any marine vessels while docked at the installation, located on one (1) or more contiguous or adjacent properties and under the control of the same person...”

However, the definition of “support facility” as clarified in the August 7, 1980, preamble to the Prevention of Significant Deterioration (PSD) regulations (45 FR 52695) states:

“Each source is to be classified according to its primary activity, which is determined by its principal product or group of products produced or distributed, or services rendered. Thus, one source classification encompasses both primary and support facilities, even when the latter includes units with a different two-digit SIC code. Support facilities are typically those which convey, store, or otherwise assist in the production of the principal product. Where a single unit is used to support two otherwise distinct sets of activities, the unit is to be included within the source which relies most heavily on its support...”

Therefore, in defining the source where a potential support relationship exists between two facilities, the difference in SIC codes becomes irrelevant and the only factors remaining to be considered are whether the facilities are contiguous or adjacent and under the control of the same person.

In this case, Ray-Carroll and Show Me Ethanol are located on adjacent properties. In addition, there is a planned business relationship between the two facilities. Ray-Carroll will function as the primary receiving mechanism of the raw material (i.e. grain) used to manufacture the product for Show Me Ethanol (i.e. ethanol). According to the application, although Show Me Ethanol will be able to receive grain, they will only receive grain “during events when the Ray-Carroll grain elevator is down”. Therefore, Ray-Carroll is considered a support facility of Show Me Ethanol.

For permitting purposes, Ray-Carroll and Show Me Ethanol meet the requirements for being and are considered one (1) installation. As a result, the new ethanol plant and the subsequent increase in grain production at Ray-Carroll were reviewed as one project to determine permit applicability. However, for operational clarity at each of the respective plants, Ray-Carroll and Show Me Ethanol will each receive a separate permit. For a detailed description of the construction activities at the existing grain elevator, please refer to Project #2006-11-066.

In addition to ethanol, the ethanol plant will produce distiller’s dried grains and solubles (DDGS) for animal feed as a by-product of the alcohol manufacturing process. No previous air permits have been issued to Show Me Ethanol by the Air Pollution Control Program.

PROJECT DESCRIPTION

Show Me Ethanol will receive grain (primarily corn) by mechanical conveyor from the adjacent Ray-Carroll grain elevator. Grain will be stored at the Show Me Ethanol plant in approximately six grain storage bin or silos of less than 1.0 million bushels storage capacity. During events when the Ray Carroll grain elevator is down, grain will be received at the Show Me Ethanol plant in onsite dump pits. From grain receiving, grain will be stored in a day storage bin with a storage capacity of 5,000 bushels prior to being conveyed to 2 hammermills where it is dry milled into process powder and mechanically conveyed to the mixer. Emission from the storage and milling operations are controlled by a baghouse.

In the mixer, the corn powder is mixed with recycled process water from the cook water tank to form slurry. This slurry is then cooked in order to liquefy and breakdown the starch into sugars. After cooking, the slurry is then cooled with non-contact water and conveyed to fermenter process vessels where the fermentation process, along with added yeast, converts the sugars to ethanol and carbon dioxide. The fermentation process produces a fermented mash called beer. The fermented slurry (or beer) is pumped from the fermented to the beer well. The beer well is a process vessel that provides a continuous flow of beer slurry to the distillation column. The carbon dioxide from the fermenters and the beer well pass through a high efficiency water scrubber in order to remove residual amounts of ethanol and other volatile organic compounds (VOCs). The scrubber is capable of sodium bisulfite injection to further reduce VOCs and HAPs, if required to meet proposed emission limitations. The water from the fermentation scrubber is pumped to the cook water tank to be recycled in the process.

The beer contains approximately 10% ethanol in addition to non-fermentable corn solids. The ethanol is separated from the beer by distillation and subsequently leaves the distillation section as 190 proof ethanol where it is stored in an internal floating roof tank. The 190 proof ethanol at this point contains residual water. Therefore, the 190 proof ethanol then passes through a molecular sieve in order to remove any remaining water, thereby producing 200 proof ethanol to be stored in an internal floating roof tank. The 200 proof ethanol is then mixed with a denaturant (natural gasoline or unleaded gasoline) and stored in an internal floating roof tank for truck or rail loadout.

The distillation process removes the ethanol from the beer, non-fermentable corn solids, and water. The residue mash (whole stillage) leaving distillation is transferred from the base of the distillation column to the stillage processing area. The whole stillage then passes through a centrifuge process to remove the majority of water. The underflow from the centrifuge is called wet distillers grains (WDGS). The WDGS will be sold as wet cake, partially dried or dried in one of two dryers to produce a product called Dried Distillers Grains and Solubles (DDGS). The DDGS upon leaving the dryers is cooled prior to storage and loadout onto railcars or trucks. DDGS loadout is ventilated to a high efficiency baghouse for control of PM₁₀ emissions.

The overflow from the centrifuge, called thin stillage, enters an evaporator to reduce water content. The concentrated stream from the evaporator is mixed with the centrifuge underflow stream before entering the dryer. The water stream from the evaporators goes to the methanator. The methanator is an anaerobic biological water treatment system that converts organic material in the process water into fuel gas (primarily methane) which supplements the fuel gas for the dryers. When the TO and dryers are not in operation, the methane is routed to the methanator's flare. The water from the methanator is recycled to the cook water tank for reuse in the process.

The storage tanks onsite will include two (2) 750,000 Gallon Tanks (internal floating roof), three 165,000 Gallon Tanks (internal floating roof), one 165,000 Gallon Tank (internal floating roof) and one (1) Anhydrous Ammonia Storage Tanks (18,000 gallon pressure vessel).

EMISSIONS/CONTROLS EVALUATION

The pollutants of concern for the purpose of this review are PM₁₀, VOCs, CO, HAPs, SO_x and NO_x. These emissions are discussed according to the processes that emit them: Grain Handling and Storage, Fermentation and Distillation, DDGS Drying and Storage, Storage Tanks and Ethanol Loadout, Cooling Tower, Haul Roads and Emergency Fire pump.

Grain Handling and Storage

PM₁₀ will be emitted from the grain receiving, handling, storage, and milling processes. During these processes, PM₁₀ emissions will be controlled by baghouses, and the applicant has proposed to use a grain loadout of 0.005 gr/dscf to estimate emissions from their baghouses based on manufacture's data. Because the ambient impact modeling analysis is based on these numbers, these operations will be tested to verify emissions.

All of these processes occur in enclosures. For grain receiving, a 95% capture efficiency is given to the aspiration system venting to the baghouse. A 100% capture efficiency cannot be given because grain receiving occurs in a building with overhead doors that will be opening and closing on a consistent basis. For grain milling, a 100% capture efficiency is given for the enclosure. Show Me Ethanol shall install visual devices, such as vacuum pressure gauges, to ensure 100% capture can be achieved.

Fermentation and Distillation

VOCs and HAPs will be emitted from the fermentation and distillation processes. Condensable PM₁₀ may also be emitted. The fermentation processes are controlled by wet scrubbers and the distillation processes are controlled by the thermal oxidizer. Potential emissions of VOC and HAPs were estimated by the applicant. Show Me Ethanol shall perform stack tests to ensure that the estimated emission rates are not exceeded. Due to lack of data on condensable PM₁₀ emissions, 0.10 lbs/hr is assumed at the scrubber, and the Show Me Ethanol shall perform stack testing to ensure it is not exceeded.

Fugitive VOC emissions will occur from plant piping, such as valves and pumps in light and heavy service, gas valves, compressor seals, pressure relief valves, sampling connections, and connectors. Show Me Ethanol will perform Leak Detection and Repair (LDAR) in accordance with NSPS, Subpart VV (40 CFR 60.480 through 60.489). Fugitive emissions from the components within the plant piping system were estimated based on EPA's Synthetic Organic Chemical Manufacturing Industry (SOCMI) emission factors in EPA document 453/R-95-017, *Protocol for Equipment Leak and Emission Estimates*.

DDGS Drying and Storage

The WDGS will be stored in an open storage area, from which it can be loaded onto trucks for delivery to customers or be sent to the dryers to be dried into DDGS. The WDGS storage and handling is expected to have negligible PM₁₀ emissions due to its high moisture content. However, VOC and HAPs will be emitted from the WDGS. The production of DDGS is expected to have higher emissions than the production of WDGS because certain equipment, such as the DDGS dryer, will not be in operation for the production of WDGS. As such, for permitting purposes, potential emissions are based on all WDGS being converted to DDGS.

Distillers Grain is dried using drum dryers. VOCs, HAPs, and PM₁₀ are emitted from DDGS drying. VOC and HAP emissions from the DDGS dryers are controlled using the thermal oxidizer. Heat from the thermal oxidizer will pass through a heat recovery steam generator prior to discharge to the atmosphere.

PM₁₀, VOCs, NO_x, sulfur oxides (SO_x) and carbon monoxide (CO) are emitted from the combustion of natural gas. The emission factors used to determine combustion emissions from the thermal oxidizer (150 MMBtu/hr) and the dryers (2-50 MMBtu/hr burners) were obtained from AP-42, Section 1.4, *Natural Gas Combustion* (3/98). However, AP-42 emission factors are not appropriate for the thermal oxidizer and the dryers which use off-gases from the ethanol production process as fuel in addition to natural gas. The applicant has provided emission factors for the thermal oxidizer and the dryers based on manufacturer's guarantees. Therefore, testing is required to demonstrate compliance with emission limits of this permit.

Storage Tanks and Ethanol Loadout

VOCs will be emitted from the storage tanks and truck/rail loadout. Storage Tank Emissions were calculated using TANKS 4.0. Emissions from ethanol truck loadout are controlled by a smokeless, open flare. Loadout Emissions were determined using AP-42, Section 5.2, *Transportation and Marketing of Petroleum Liquids* and giving a capture and control device efficiency for the flare supplied by the vendor. Since performance tests are difficult for open flares, none are required for the flare to show emissions compliance. However, Show Me Ethanol shall operate the flare in accordance with 40 CFR 60.18 *General Control Device Requirements* and maintain records sufficient to show compliance with 40 CFR 60.18.

The denatured ethanol can be shipped by truck or rail. When shipping by truck, non-dedicated tanker trucks will be used. Therefore, loading loss emissions were calculated

using gasoline as the displaced vapor. All rail cars are assumed to be operating under dedicated normal service.

Cooling Tower

Cooling tower emissions were determined using AP-42, Section 13.4, *Wet Cooling Towers*. Cooling tower emissions were calculated assuming that the total dissolved solid content in the cooling tower is 2,750 parts per million and the drift loss is 0.005 percent.

Haul Roads

The PM₁₀ emissions from the haul roads were estimated by using haul road equations from AP-42, Section 13.2.2. *Unpaved Roads*. The emissions will be controlled by paving the haul roads and watering/cleaning these haul roads. A control efficiency of 95% is given to the haul roads for the combination of paving and washing/cleaning.

Emergency Firewater Pump

A diesel-powered emergency firewater pump is permitted for the plant. Potential emissions of criteria pollutants from the pump were estimated using emission factors from AP-42, Section 3.3, *Gasoline and diesel Industrial Engines* and based on 500 hours of operation per year. NSPS subpart IIII applies to any fire pump engines manufactured as a certified National Fire Protection Association (NFPA) after July 1, 2006.

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 limitations given in Special Condition 4. 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 major source threshold levels. Special conditions for emissions of HAPs are required for review under Section (6) of Missouri State Rule 10 CSR 10-6.060 rather than for major source review under Section (9). The following table provides an emissions summary for this project.

Table 9: 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	31.36	N/A
SO _x	40.0	N/A	N/A	45.10	N/A
NO _x	40.0	N/A	N/A	78.42	N/A
VOC	40.0	N/A	N/A	97.91	<100
CO	100.0	N/A	N/A	98.38	<100
HAPs	10.0/25.0	N/A	N/A	12.25	<10/<25

N/A = Not Applicable

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, VOC, NO_x, SO_x and CO are above de minimis levels and below major source levels.

APPLICABLE REQUIREMENTS

Show Me Ethanol, 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 Grain Elevators, 40 CFR Part 60, Subpart DD.*
- *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 VV.*
- *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.*
- *New Source Performance Regulations, 10 CSR 10-6.070 – New Source Performance Standards (NSPS) for Stationary Compression Ignition Internal Combustion Engines, 40 CFR Part 60, Subpart IIII.*
- *New Source Performance Regulations, 10 CSR 10-6.070 – New Source Performance Standards (NSPS) for Industrial-Commercial-Institutional Steam Generating Units, 40 CFR Part 60, Subpart Db.*
- *Restriction of Emission of Sulfur Compounds, 10 CSR 10-6.260*
- *Maximum Allowable Emissions of Particulate Matter From Fuel Burning Equipment Used for Indirect Heating, 10 CSR 10-3.060*

AMBIENT AIR QUALITY IMPACT ANALYSIS

Show Me Ethanol, LLC submitted an Ambient Air Quality Impact Analysis (AAQIA) to demonstrate attainment of the National Ambient Air Quality Standard (NAAQS) for PM₁₀, SO_x, NO_x, and CO. The Air Pollution Control Program Technical Support Section, Modeling Unit reviewed and approved this refined modeling analysis. Based on the emission rates listed in Special Condition 4, the model shows that emissions from Show Me Ethanol, LLC. will not cause or contribute to any NAAQS or Prevention of Significant Deterioration (PSD) increment violations. For further details on the modeling, please refer to the memo titled “Ambient Air Quality Impact Analysis (AAQIA) for Show Me Ethanol, LLC – May 25, 2007 Submittal”.

Ambient air quality modeling was not performed for the VOC or HAP emissions occurring from the ethanol process at this installation. No Screen3 model is currently available which can accurately predict ambient ozone concentrations caused by this installation’s VOC emissions. The maximum HAP emissions expected from these

sources were below their respective Screen Modeling Action Level for each of HAP being emitted. Therefore, no additional HAP modeling was performed.

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.

Emily Wilbur
Environmental Engineer

Date

PERMIT DOCUMENTS

The following documents are incorporated by reference into this permit:

- The Application for Authority to Construct form, dated November 1, 2006, received November 27, 2006, designating Show Me Ethanol, LLC 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.

Mr. Greg Thomas
General Manager
Show Me Ethanol, LLC
26530 East Highway 24
Carrollton, MO 64633

RE: New Source Review Permit - Project Number: 2006-10-057

Dear Mr. Thomas:

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 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 Emily Wilbur at the departments' Air Pollution Control Program, P.O. Box 176, Jefferson City, MO 65102 or (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:ewl

Enclosures

c: Northeast Regional Office
PAMS File: 2006-10-057

Permit Number: