

STATE OF MISSOURI



DEPARTMENT OF NATURAL RESOURCES

MISSOURI AIR CONSERVATION COMMISSION

PERMIT TO CONSTRUCT

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

Permit Number: **032008-006** Project Number: 2007-02-026

Parent Company: Emerald Renewable Energy

Parent Company Address: 15407 McGinty Road, Wayzata, MO 55391

Installation Name: Emerald Renewable Energy

Installation Address: West of the Intersection of County Road 181 and County Road 188

Location Information: Atchison County, S26, T65N, R42W

Application for Authority to Construct was made for:

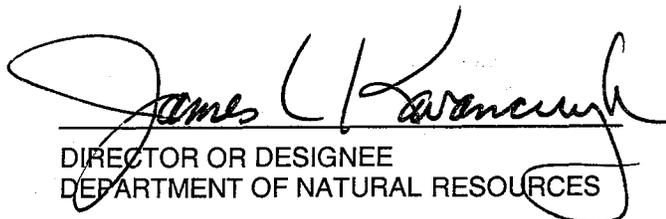
The construction of a new 115,500,000 gallons per year denatured ethanol plant. This review was conducted in accordance with Section (6), Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*.

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

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

MAR 10 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 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."

Emerald Renewable Energy
Atchison County, S26, T65N, R42W

1. Haul Road Control
Emerald Renewable Energy shall control fugitive emissions from all of the haul roads at this site by paving the haul roads.
 - A. Emerald Renewable Energy shall finish paving the haul roads before start of operations.
 - B. Emerald Renewable Energy 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. Emerald Renewable Energy shall pave the haul roads with materials such as asphalt, concrete, and/or other material(s). If Emerald Renewable Energy decides to use material(s) other than asphalt or concrete, Emerald Renewable Energy 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.

2. Silt Loading Control of Haul Roads
 - A. The silt loading shall not exceed 0.36 grams/meter² on any of the haul roads at this site.
 - B. Emerald Renewable Energy shall develop, maintain, and implement a Fugitive Dust Control Plan (FDCP) that will control emissions from haul roads to comply with Special Condition 2.A. The FDCP shall at a minimum include control and/or cleaning methods and establish documentation procedure for the control and/or cleaning methods.
 - C. Compliance with the silt loading limitation in Special Condition 2.A. shall be demonstrated by conducting a series (as defined in Appendix C of AP-42) of silt loading performance tests at least once per quarter while the plant is operational. The silt loading tests shall be representative (as defined in Appendix C of AP-42) and conducted in accordance with

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ASTM-C-136 method. Testing cannot be done immediately after cleaning. If there is a regular cleaning schedule, testing shall be done at the midpoint of the cleaning cycle (i.e. if cleaning is scheduled every eight (8) hours, then testing must be done at the midpoint of four (4) hours). A summary of the testing method is found in Appendix C of AP-42.

- D. For each day of operation, the owner or operator shall conduct a survey of the plant property and haul roads to determine if visible fugitive emissions are being generated and if these emissions are leaving the plant property. Documentation of all corrective actions and daily surveys shall be maintained in a log.

3. Truck Traffic, Truck Type, and Grain Unloading Limitations

- A. Emerald Renewable Energy shall limit the daily number of trucks going through each haul road as specified in Table 1. No other raw material or product truck traffic is authorized at this plant.

Table 1: Daily Truck Limits

Haul Road Type	Daily Truck Limit
Grain	85 Trucks
Ethanol	7 Trucks
Denaturant (Gasoline)	2 Trucks
DDGS	7 Trucks
Misc. Chemicals	3 Trucks

- B. Emerald Renewable Energy shall limit its shipments of grain, ethanol, denaturant, DDGS, and miscellaneous chemicals to between 6:00 am and 10:00 pm each day. Emerald Renewable Energy shall limit its unloading of grain from grain shipment trucks to between 6.00 am and 10:00 pm each day.
- C. Emerald Renewable Energy shall limit the annual number of trucks going though each haul road as specified in Table 2. No other raw material or product truck traffic is authorized at this plant. The annual limit is based on the number of trucks per calendar year. It is not a 12-month rolling total.

Table 2: Yearly Truck Limits

Haul Road Type	Yearly Truck Limit
Grain	31,025 Trucks
Ethanol	2,555 Trucks
Denaturant (Gasoline)	730 Trucks
DDGS	2,555 Trucks
Misc. Chemicals	1,095 Trucks

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

- D. To show compliance with Special Conditions 3.A. and 3.C., Emerald Renewable Energy shall keep a record of the daily and the annual truck traffic for each type of truck on each haul road at the installation. Attachment A, or equivalent form(s), shall be used for daily record keeping. Attachment B, or equivalent form(s), shall be used for annual record keeping.
 - E. Emerald Renewable Energy 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 Special Condition 3.D. show that the truck traffic limits have been exceeded.
4. Ethanol Production Limits
- A. Emerald Renewable Energy shall limit its annual denatured ethanol production rate to 115,500,000 gallons per twelve (12) consecutive month period.
 - B. To demonstrate compliance with Special Condition 4.A., Emerald Renewable Energy shall keep a record of the amount of ethanol produced per twelve (12) consecutive month period. Attachment C, or equivalent forms, shall be used for this purpose.
 - C. Emerald Renewable energy 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 Special Condition 4.B. show that the ethanol production limitations have been exceeded.
5. Emission Limitations
- A. Emission Limit of Particulate Matter Less than Ten Microns in Diameter (PM_{10}).
 - 1.) Emerald Renewable Energy shall not discharge PM_{10} into the atmosphere in excess of the listed amounts in Table 3.
 - 2.) The emission rates in Table 3 shall be verified through performance testing as detailed in Special Conditions 11 and 12.

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

Table 3: Emission Rate Limits for PM₁₀

Stack ID	Stack Description	Pounds per Hour (lbs/hr)
S001	Grain Unloading	1.54
S002	Reclaim	0.17
S003	Hammermills	0.99
S004	Blower to Filter Receiver	0.02
S005	Fluid Bed Cooler A	0.36
S006	Fluid Bed Cooler B	0.36
S007	DDGS Transfer	0.17
S008	DDGS Loadout (Truck)	0.12
S009	DDGS Loadout (Rail)	0.12
S010	RTO	10.17
S011	Package Boilers	2.28

- B. Emission Limit of Nitrogen Oxides (NO_x)
- 1.) Emerald Renewable Energy shall not discharge NO_x into the atmosphere 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 11 and 12.

Table 4: Emission Rate Limits for NO_x

Stack ID	Stack Description	Pounds per Hour (lbs/hr)
S010	RTO	9.72
S011	Package Boilers	12.00

- C. Emission Limit of Sulfur Oxides (SO_x)
- 1.) Emerald Renewable Energy shall not discharge SO_x into the atmosphere in excess of the listed amounts in Table 5.
 - 2.) The emission rates in Table 5 shall be verified through performance testing as specified in Special Conditions 11 and 12.

Table 5: Emission Rate Limits for SO_x

Stack ID	Stack Description	Pounds per Hour (lbs/hr)
S010	RTO	12.56
S011	Package Boilers	0.18

- D. Emission Limit of Hazardous Air Pollutants (HAPs)
- 1.) Emerald Renewable Energy shall emit less than twenty-five (25.0) tons of combined HAPs from this installation in any consecutive twelve (12) month period. Attachment D, *Monthly Total HAPs Emissions Tracking Record*, or equivalent form(s), shall be used to demonstrate compliance.
 - 2.) Emerald Renewable Energy shall emit less than ten (10.0) tons of

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

individual HAPs from this installation in any consecutive twelve (12) month period. Attachment E, *Monthly Individual HAPs Emissions Tracking Record*, or equivalent form(s), shall be used to demonstrate compliance.

- 3.) Emerald Renewable Energy shall not discharge acrolein into the atmosphere from the following stacks in excess of the listed amounts in Table 6.

Table 6: Emission Rate Limits for Acrolein

Stack ID	Stack Description	Pounds per Hour (lbs/hr)
S005	DDGS Cooler A	0.006
S006	DDGS Cooler B	0.006
S010	RTO	0.050

- 4.) The emission rates in Table 6 shall be verified through performance testing as specified in Special Conditions 11 and 12.
- 5.) Emerald Renewable Energy 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 Special Conditions D.1. and D.2. show that the emission limit has been exceeded.

E. Emission Limit of Volatile Organic Compounds (VOCs)

- 1.) Emerald Renewable Energy shall emit less than 100 tons of VOCs from this installation in any consecutive twelve (12) month period.
- 2.) Emerald Renewable Energy shall record the monthly and the sum of the most recent consecutive twelve (12) months VOC emissions in tons from this installation. Attachment F, *Monthly VOC Emissions Tracking Record*, or equivalent form(s), shall be used for this purpose. The emission rates used in Attachments F shall be determined by performance testing, as detailed in Special Conditions 11 and 12, or from emission factors from AP-42 or DENCO.
- 3.) Emerald Renewable Energy 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 Special Condition E.2. show that the emission limit has been exceeded.

F. Emission Limit of Carbon Monoxides (CO)

- 1.) Emerald Renewable Energy shall emit less than 100 tons of CO in any consecutive twelve (12) month period.

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

- 2.) Emerald Renewable Energy shall record the monthly and the sum of the most recent consecutive twelve (12) months CO emissions in tons from this installation. Attachment G, *Monthly CO Emissions Tracking Record*, or equivalent form(s), shall be used for this purpose. The emission rates used in Attachments G shall be determined by performance testing, as detailed in Special Conditions 11 and 12, or from emission factors from AP-42.
 - 3.) Emerald Renewable Energy 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 Special Condition F.2. show that the emission limit has been exceeded.
6. Control Measure – Buildings and Enclosures
- A. Grain unloading and handling operations (EU001 to EU014)
 - 1.) The grain unloading and handling operations shall be located in building(s) and exhausted to baghouses.
 - 2.) Emerald Renewable Energy shall prove 100% capture efficiency by maintaining the building under negative pressure.
 - 3.) Emerald Renewable Energy shall demonstrate negative pressure by using visual indicators such as streamers, talc puff test, negative pressure gauges, etc. at building openings. Each opening in the building must indicate the presence of negative pressure for compliance.
 - 4.) The negative pressure should be maintained such that no visible emissions are allowed to occur except those gases being drawn into the baghouse intakes. No visible emissions is indicated by zero percent (0%) opacity.
 - 5.) Emerald Renewable Energy shall perform a visible emissions check and a visual indicator check on the building at least once in every twenty-four (24) hour period. Results should be kept in a log.
 - 6.) For the grain unloading building, the visible emissions check and the visual indicator check shall be performed while the doors are open during truck/rail entry.
 - B. DDGS storage piles (no EU designation), DDGS loading operation (EU054, EU055), and DDGS handling equipment (EU049 to EU053)
 - 1.) The DDGS storage piles and the DDGS loading operation shall be located in an enclosed building. DDGS loading operation shall be vented to cartridge filter.
 - 2.) The DDGS handling equipment shall be enclosed by ductwork and

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exhausted to a baghouse.

- C. Reclaim process equipment (EU015 to EU018, EU023) and hammermills (EU019 to EU022)
 - 1.) The reclaim process equipment and the hammermills shall be enclosed by ductwork and exhausted to baghouses.
 - 2.) The enclosures shall be maintained under negative pressure to demonstrate 100% capture efficiency.
 - 3.) Emerald Renewable Energy shall demonstrate negative pressure by using visual indicators such as streamers, talc puff test, negative pressure gauges, etc. at openings that are not closed during normal operations. Each openings must indicate the presence of negative pressure for compliance.
 - 4.) The negative pressure should be maintained such that no visible emissions are allowed to occur except those gases being drawn into the baghouse intakes. No visible emissions is indicated by zero percent (0%) opacity.
 - 5.) Emerald Renewable Energy shall perform a visible emissions check and a visual indicator check on the enclosures at least once in every twenty-four (24) hour period. Results shall be kept in a log.

7. Control Equipment – Baghouses and Cartridge Filters

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

Table 7: Equipment to be Controlled by Baghouses

Emission Units	Emission Unit Description
EU001 to EU014	Grain Unloading, Handling, and Storage
EU015 to EU018, EU023	Reclaim Process Equipment
EU035	Transfer Blower
EU047	Fluid Bed Cooler A
EU048	Fluid Bed Cooler B
EU049 to EU053	DDGS Transfer Equipment

- B. Cartridge filters must be in use at all times when the following equipment are in operation.

Table 8: Equipment to be Controlled by Cartridge Filters

Emission Units	Emission Unit Description
EU054	DDGS Loadout by Truck
EU019 to EU022	Hammermills
EU055	DDGS Loadout by Rail

- C. The baghouses and cartridge filters and any related instrumentation or

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

equipment shall be operated and maintained in accordance with the manufacturer's specifications. The baghouses and cartridge filters shall be equipped with gauges or meters, which indicate the pressure drop across them. These gauges or meters shall be located such that Department of Natural Resources' employees may easily observe them.

- D. Replacement bags and cartridge filters shall be kept on hand at all times. The bags and cartridge filters shall be made of fibers appropriate for operating conditions expected to occur (i.e. temperature limits, acidic and alkali resistance, and abrasion resistance).
 - E. Emerald Renewable Energy shall monitor and record, in an operating and maintenance log, the operating pressure drop across the baghouses and cartridge filters 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.
 - F. Emerald Renewable Energy shall maintain an operating and maintenance log for the baghouses and cartridge filters 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.
8. Control Equipment – Wet Scrubber
- A. The wet scrubber must be in use at all times when the following equipment are in operation:

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

Table 9: Equipment to be Controlled by Wet Scrubbers

Emission Unit	Emission Unit Description
EU024	Slurry Tank 1
EU025	Slurry Tank 2
EU026	Yeast Tanks 1 & 2
EU027 to EU033	Fermenters 1 through 7
EU034	Beer Well

- B. The emissions from the scrubber shall be vented to the regenerative thermal oxidizer at all times.
- C. 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 and with a flow meter that indicates the 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.
- D. Emerald Renewable Energy 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.
- E. Emerald Renewable Energy 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 and conditions established in special conditions 11 and 12.
- F. Emerald Renewable Energy 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.

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

9. Control Equipment – Regenerative Thermal Oxidizers (RTO)
- A. The regenerative thermal oxidizers must be in use at any time when the following equipment are in operation.

Table 10: Equipment to be Controlled by RTOs

Emission Unit	Emission Point Description
EU024	Slurry Tank 1
EU025	Slurry Tank 2
EU026	Yeast Tanks 1 & 2
EU027 to EU033	Fermenters 1-7
EU034	Beer Well
EU036	Degasser
EU037	Rectifier Condenser
EU038	Molecular Sieve Unit
EU045	Dryer A
EU046	Dryer B

- B. The regenerative thermal oxidizers shall be operated and maintained in accordance with the manufacturer's specifications.
- C. Emission rates of PM₁₀, VOC, HAPs, CO and NO_x will be tested, as detailed in Special Condition 11, to verify that the thermal oxidizer is operating as assumed.
- D. The operating temperature of the regenerative thermal oxidizers shall be continuously monitored and recorded during operations. The operating temperature of the thermal oxidizer shall be maintained on a rolling 3-hour average to be no less than 50 degrees Fahrenheit below the average temperature of the oxidizer recorded during the compliance test specified in Special Condition 11, which demonstrated compliance with the emission limits. The acceptable temperature range may be reestablished by performing a new set of emission tests.
- E. Emerald Renewable Energy shall maintain an operating and maintenance log for regenerative thermal oxidizers which shall include the following:
- 1.) Incidents of malfunction, with impact on emissions, duration of events, probable cause, and corrective actions taken.
 - 2.) Maintenance activities, with inspection schedules, repair actions, and replacements.
 - 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.

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

10. Control Equipment – Flare

- A. A flare must be in use at all times during denatured ethanol truck loadout (EU039) and denatured ethanol rail loadout (EU040) to control emissions. A flare must be in use to control emissions from the Anaerobic Treatment Modules (ATM, EU044) when the waste gas is not being routed to the DDGS dryers.
- B. The flare shall be operated and maintained in accordance with the manufacturer's specifications.
- C. Emerald Renewable Energy 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 events, probable cause, and corrective actions taken.
 - 2.) Maintenance activities, with inspection schedules, repair actions, and replacements.
 - 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.
- D. The flare must be operated in accordance with 40 CFR Part 60.18, *General Control Device Requirements*. Emerald Renewable Energy shall maintain records that sufficiently indicate compliance with 40 CFR Part 60.18.

11. Performance Testing

- A. Emerald Renewable Energy shall conduct performance tests to verify the emission rates as follows:
 - 1.) The stacks listed in Special Conditions 5.A. Table 3 shall be tested to determine the PM₁₀ emission rates. These emission rates shall not exceed the amounts listed in Table 3.
 - 2.) The stacks listed in Special Conditions 5.B. Table 4 shall be tested to determine the NO_x emission rates. These emission rates shall not exceed the amounts listed in Table 4.
 - 3.) The stacks listed in Special Condition 5.C. Table 5 shall be tested to determine the SO_x emission rates. These emission rates shall not exceed the amounts listed in Table 5.
 - 4.) The stacks listed in Special Condition 5.D.3 Table 6 shall be tested to determine the acrolein emission rates. These emission rates shall not exceed the amounts listed in Table 6.

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

- 5.) The following stacks shall be tested to determine total HAP emission rates when all equipment controlled by these devices are in operation: The stacks for DDGS dryers/fluid bed coolers (S005 and S006), the regenerative thermal oxidizers (S010), and the package boilers #1 and #2 (S011). These emission rates shall be used to demonstrate compliance with Special Conditions 5.D.1..
 - 6.) The following stacks shall be tested to determine total VOC emission rates when all equipment controlled by these devices are in operation: The stacks for DDGS dryers/fluid bed coolers (S005 and S006), the regenerative thermal oxidizers (S010), and the package boilers #1 and #2 (S011). These emission rates shall be used to demonstrate compliance with Special Conditions 5.E.1.
 - 7.) The following stacks shall be tested to determine the emission rates of acetaldehyde, formaldehyde, and methanol when all equipment controlled by these devices are in operation: Stacks for the DDGS dryers/fluid bed coolers (S005 and S006) and the stack for the regenerative thermal oxidizers (S010). These emission rates shall be used to demonstrate compliance with Special Condition 5.D.2..
 - 8.) The following stacks shall be tested to determine the emission rates of CO when all equipment controlled by these devices are in operation: The stack for the regenerative thermal oxidizer (S010) and the stack for the two (2) package boilers (S011). These emission rates shall be used to demonstrate compliance with Special Condition 5.F.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.
- 1.) The wet scrubber.
 - 2.) The regenerative thermal oxidizer.
- C. The operating parameters discussed in Special Condition 11.B. shall be determined and agreed upon by the Air Pollution Control Program's Enforcement Section and Emerald Renewable Energy before the start of the performance tests.
- D. The operating parameters discussed in Special Condition 11.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

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

Program's Enforcement Section and Emerald Renewable Energy before the start of the performance tests.

- E. The performance tests for the regenerative thermal oxidizer (S010), which controls emissions from the wet scrubbers used for the fermentation process, shall be conducted for one of the following time periods
- 1.) A complete fermentation 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. Emerald Renewable Energy shall submit, in the proposed test plan outlined in Special Condition 12, sufficient data to determine the point(s) of 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 is not supplied supporting these maximum emission points, Emerald Renewable Energy must conduct testing for the time period outlined in Special Condition 11.E.1..
- F. The testing required 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 Emerald Renewable Energy and approved by the Director.
- G. All performance tests required shall be performed within sixty (60) days after achieving the maximum production rate of the installation, but no later than 180 days after initial start-up for commercial operation.
- H. All performance tests required shall be conducted in accordance with the stack test procedures outlined in Special Condition 12.
- I. Emerald Renewable Energy shall conduct performance tests to verify the emission rates as indicated in Special Condition 11.A. once every five (5) years from the date of the most recent performance tests, except for baghouse stacks (S001, S002, S003, S004, S005, S006, and S007). The baghouse stacks shall be tested once upon startup in accordance with

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

Special Condition 11.G.. No further testing will be necessary for the baghouses unless the stack tests do not show compliance with limits in this permit or the facility modifies the equipment or the process that could cause a change in emission rates from these stacks.

12. Proposed Test Plan and Final Test Report

- A. A completed proposed test plan form must be submitted to the Air Pollution Control Program thirty (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 plant 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 thirty (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. The emission factors developed through the stack testing requirements of special condition 11 shall be reported using the following units.

Table 11: Units of Emission Factors

Stack ID	Stack Description	Units
S001	Grain Unloading Baghouse	Lbs of pollutant/ton of grain
S002	Reclaim Baghouse	Lbs of pollutant/ton of grain
S003	Hammermill Baghouses	Lbs of pollutant/ton of grain
S004	Filter Receiver Baghouse	Lbs of pollutant/ton of grain
S005	DDGS Cooler A Baghouse	Lbs of pollutant/ton of DDGS
S006	DDGS Cooler B Baghouse	Lbs of pollutant/ton of DDGS
S007	DDGS Transfer Baghouse	Lbs of pollutant/ton of DDGS
S008	DDGS Truck Loadout	Lbs of pollutant/ton of DDGS
S009	DDGS Rail Loadout	Lbs of pollutant/ton of DDGS
S010	Regenerative Thermal Oxidizer	Lbs of pollutant/mmBTU input
S011	Package Boilers	Lbs of pollutant/mmBTU input

- E. If the performance testing required by Special Condition 11 of this permit indicates that any of the emission limits specified in this permit are being

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Project No.	2006-08-058

SPECIAL CONDITIONS:

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

exceeded, Emerald Renewable Energy must propose a remedial plan to the Air Pollution Control Program within thirty (30) days of submitting the performance test results. This plan must demonstrate how Emerald Renewable Energy will reduce the emission rates to show compliance with specified limits in this permit. Emerald Renewable Energy must implement any such plan immediately upon its approval by the Director and conduct stack testing.

13. 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 46,000 gallons per minute.
- C. Emerald Renewable Energy 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 0.001 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.
- 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 (24) consecutive months.

14. Emergency Equipment Requirements

- A. The operating hours of the emergency fire pump shall not exceed 300 hours 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 H, or equivalent form(s), shall be used to record the hours of

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Permit No.	
Project No.	2006-08-058

SPECIAL CONDITIONS:

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

operation. These records shall include the operating hours for that month and the total hours of operation for the previous 12-month period.

- C. Emerald Renewable Energy 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 14.B. indicate that the source exceeds the Special Condition 14.A..
15. Anaerobic Treatment Module (ATM) Operating Requirements
- A. The waste gas from the ATM shall be vented to a flare for a maximum of 876 hours during any consecutive 12-month period. When the waste gas from the ATM is not being vented through the flare, it shall be routed through the DDGS dryers.
 - B. Attachment I, or equivalent form(s), shall be used to record the hours in which the ATM is being vented to the flare. These records shall include the hours for that month and the total hours for the previous 12-month period.
 - C. Emerald Renewable Energy shall report to the Air Pollution Control Program's Enforcement Section at P. O. Box 176, Jefferson City, O 65102, no later than ten (10) days after the end of the month during which the records from Special Condition 15. B. indicate that the source exceeds Special Condition 15. A..
16. Operating Permit Requirements
Emerald Renewable Energy shall apply for and receive an Intermediate Operating Permit from the Air Pollution Control Program for this installation.
17. Requirements for Future Emission Alterations
If the emissions from this installation as permitted, ever increase above 100 tons per year for PM₁₀, NO_x, SO_x, VOC, or CO, when the production capacity is at or below 115,500,000 gallons denatured ethanol per year, then Emerald Renewable Energy will be required to conduct a New Source Review in accordance with 10 CSR 10-6.060(8).
18. 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.

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

Project Number: 2007-02-026
Installation ID Number: 005-0015
Permit Number:

Emerald Renewable Energy

Complete: March 1, 2007

Parent Company:
Emerald Renewable Energy – Rock Port, LLC
15407 McGinty Rd, Wayzata, MO 55391

Atchison County, S26, T65N, R42W

REVIEW SUMMARY

- Emerald Renewable Energy has applied for authority to construct a new 115.5 million gallons per year denatured 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 Dc, *Standards of Performance for Small Industrial-Commercial-Institutional-Steam Generating Units* does not apply because the boilers do not have a design rate between 10 MMBTU/hr and 100 MMBTU/hr.
 - 40 CFR Part 60, Subpart DD, *Standards of Performance for Grain Elevators*, does not apply to the grain storage and milling operation because the operation does not fit the definition of a grain storage elevator.
 - 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 SOCMI 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.
- None of the National Emission Standards for Hazardous Air Pollutants (NESHAPs) or currently promulgated Maximum Achievable Control Technology (MACT) regulations apply to the proposed equipment.
 - Baghouses, cartridge filters, wet scrubbers, and regenerative thermal oxidizers are being used to control the PM₁₀, VOC, NO_x, CO, and HAP emissions from the 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 pollutants are conditioned to minor source levels.
 - This installation is located in Atchison County, an attainment area for all criteria air pollutants.
 - This installation is 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 impacts of PM₁₀, SO_x, NO_x, and acrolein.
 - Emissions testing is required for the source.
 - 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

Emerald Renewable Energy is proposing to construct a new ethanol plant with a maximum production capacity of 115,500,000 gallons per year of denatured ethanol. The installation will use corn (grain) to produce denatured ethanol. The installation will also produce dried distillers grain with solubles (DDGS) as byproducts of the ethanol production process. No wet distillers grain with solubles (WDGS) will be produced.

This installation is a minor source and the permit is issued under 10 CSR 10-6.060 (6). An intermediate operating permit is required for this installation.

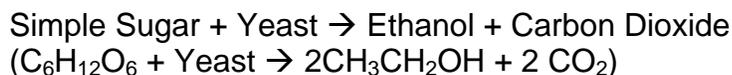
PROJECT DESCRIPTION

Emerald Renewable Energy has applied for authority to construct an 115,500,000 gallons per year denatured ethanol plant. The installation purchases corn (grain) and hauls it to the facility by truck and/or railcars. Grain delivered by trucks are sampled and graded at the plant entrance before being unloaded into two (2) truck-receiving pits. The truck and rail loading pits are located in a building with overhead doors at each end of the receiving area. The pits are fitted with conveyor belts, which feed the elevator leg and grain storage silos. The dump pits and associated grain transfer points are controlled by two (2) baghouses (S1, S2). The installation claimed a 100% capture efficiency for the baghouses and must demonstrate negative pressure in the building by installing visual indicators (i.e. pressure gauges, streamers, etc.).

The grain is transferred to hammermills to be crushed. During the milling process, the PM₁₀ emissions are vented to cartridge filters. A capture efficiency of 100% is applied to the hammermilling process because these emission sources are within enclosures that are operated under negative pressure while being aspirated to cartridge filters. Emerald Renewable Energy must install visual indicators (i.e. pressure gauges, streamers, etc.) to ensure negative pressure can be achieved in these enclosures. Milled grain is transferred from the hammermills to equipment for the liquefaction process.

The liquefaction process consists of three (3) steps: Mash preparation (pre-liquefaction), cooking (primary liquefaction), and dextrinization (secondary liquefaction). In the mash preparation step, the grain is blended with hot water and one-third of the alpha enzyme dose to produce a hot gelatinized slurry of between 29 and 33 % dissolved solids at about 185 degrees Fahrenheit (°F). Steam is injected into the mix tank to maintain temperature and anhydrous ammonia is introduced to maintain a pH of about 5.8. The mash from the mash preparation step is cooked using a steam-driven jet cooker that raises the temperature to between 221 °F and 225 °F. The mash is then held in two (2) cook tubes in series for a predetermined time to sterilize the mash and fully expose the starch cell to allow further enzymatic hydrolysis. The mash discharges into a flash vessel where the mash is cooled to secondary liquefaction temperatures. The remaining two-thirds of alpha enzyme is added to the mash as it leaves the flash vessel. The mash is held in a series of tanks to complete the dextrinization process, cooled through a series of heat exchangers, and pumped to the fermentation system.

The fermentation system consists of two (2) yeast propagators, seven (7) batch fermenters, and one (1) beer well. Gluco enzymes and urea are added to the mash from the liquefaction step. Yeast are added to convert the fermentable sugar to ethanol and carbon dioxide (CO₂). The chemical equation occurring during fermentation is



The fermented mash consists of approximately 10% ethanol and 90% water and leftover solids from grain and yeast. The emissions from the fermentation process are controlled by a CO₂ scrubber vented to a regenerative thermal oxidizer.

The fermented mash is then distilled to separate the ethanol from the residual grain solids. The distillation system consists of three (3) columns: Beer, rectifier, and stripper columns. The beer column strips the fermented mash (beer) of the alcohol content. The ethanol vapor leaving the beer column goes to the rectifier column where the ethanol is concentrated to 95% ethanol (190-proof). The stillage leaving the bottom of the beer column is cooled and then sent to separation system where liquid are evaporated to form wet cakes with approximately 35% solids. The solids are fed to the dryers followed by fluid bed coolers to produce DDGS. Emissions from the DDGS dryers/fluid bed coolers are controlled by baghouses (S5, S6). The DDGS is conveyed to a building for storage. The stored DDGS is conveyed to another building for loadout by trucks or rail. The emissions from the DDGS transfer is controlled by a baghouse (S7). The DDGS is loaded unto the trucks or railcars by using a self aspirated retractable spout that captures the emissions and sends them through cartridge filters (S8 for truck loadout, S9 for rail loadout).

190 proof ethanol vapors from the rectifier are condensed in the evaporators to provide heat to evaporate the thin stillage. A portion of the condensate is returned to the rectifier column as reflux, and the remainder is cooled and transferred to the 190 proof storage tank. The 190 proof ethanol is vaporized and sent through a sieve bed where water is removed and anhydrous (200-proof) ethanol vapor is produced. The anhydrous ethanol is cooled through a series of heat exchanges prior to transfer to a storage tank. The anhydrous ethanol is mixed with a denaturant (natural gas liquids) before being stored in denatured ethanol tanks. The denatured ethanol is transported offsite by either trucks or rail cars.

Emissions from the DDGS dryers/fluid bed coolers, the distillation process, and the solids separation process are controlled by two regenerative thermal oxidizers (S10). Emissions from the ethanol loadout are controlled by smokeless flares.

Steam is required for the process. The installation uses two (2) natural gas fired boilers with a maximum capacity of 150 mmBTU/hr each. There is a diesel-powered emergency firewater pump. The pump shall be limited to operating 300 hours per year to comply with 40 CFR Part 60 Subpart III, *Standards of Performance Compression Ignition Internal Combustion Engines*. There is a cooling tower at the installation and the recirculating water will be limited to 2,500 parts per million (ppm) of total dissolved solids (TDS) concentration.

An anaerobic treatment module (ATM) is utilized to treat process water so the water can be reused. The ATM uses anaerobic microorganisms to convert organic pollutants to CO₂ and methane. Typically, the ATM treats only the evaporator condensate. The design of the ATM allows the methane produced to be burned for steam generation or DDGS production. The system is provided with a flare to control the methane when not used for steam generation or DDGS production.

The installation will control fugitive emissions from haul roads by paving all haul roads and storage pile vehicular activity areas. A control efficiency of 90% is given for the paving of haul roads. Emerald Renewable Energy claimed a silt content of 0.36 g/m² on

all haul roads and shall conduct testing to ensure compliance.

EMISSIONS/CONTROLS EVALUATION

The pollutants of concern for this review are PM₁₀, SO_x, VOCs, CO, HAPs, and NO_x. The following tables provide the emissions summary for this project.

Table 8: Emissions Summary (tons per year)

Pollutant	Regulatory De Minimis Levels	Existing Potential Emissions	Existing Actual Emissions	Potential Emissions of the Application	*New Installation Conditioned Potential
PM ₁₀	15.0	N/A	N/A	77.47	77.47
SO _x	40.0	N/A	N/A	55.87	55.87
NO _x	40.0	N/A	N/A	96.23	96.23
VOC	40.0	N/A	N/A	98.43	<100
CO	100.0	N/A	N/A	97.54	<100
HAPs	10.0/25.0	N/A	N/A	16.02	<10.0/25.0

N/A = Not Applicable

*Emerald Renewable Energy shall track its VOC, CO, and total HAP emissions to ensure the conditioned potential is not exceeded.

The sources of these emissions are discussed below.

Grain Hauling

The PM₁₀ emissions from the haul roads were estimated by using the paved haul road equation from AP-42, Section 13.2.1. *Paved Roads*. A silt loading of 0.36 g/m² was used in the equation and Emerald Renewable Energy shall perform testing to ensure this loading is not exceeded. A control efficiency of 90% was given for paving of the haul roads.

Grain Handling and Storage

PM₁₀ will be emitted from the grain receiving, handling, storage, and milling processes. All of these processes occur in buildings/enclosures. A 100% capture efficiency is given for the buildings/enclosures. Emerald Renewable Energy shall install visual devices, such as vacuum pressure gauges, to ensure 100% capture can be achieved.

During grain receiving, handling, and storage, PM₁₀ emissions will be controlled by baghouses. PM₁₀ emissions from these sources were estimated using manufacturer's guarantees. During grain milling, PM₁₀ emissions will be controlled by vent filters. Each of the four (4) grain hammermills will have its own vent filters, but the PM₁₀ emissions will be vented through a single stack (S3). The PM₁₀ emissions from the stack (S3) were estimated using manufacturer's guarantee of 0.99 lbs/hr. Emerald Renewable Energy shall perform stack test(s) to ensure that the guarantees are not exceeded.

Fermentation, Distillation, Solids Separation, and DDSG Drying

Emissions from the fermentation, distillation, solids separation, and DDGS drying processes will be vented to two (2) RTOs. PM₁₀, NO_x, SO_x, CO, VOCs, and HAPs emissions are all expected from these processes. The emission rates used in the permit analysis are rates submitted by Emerald Renewable Energy, and the company shall conduct stack tests to ensure compliance with the submitted numbers.

DDGS Storage and Loadout

Since the DDGS is stored in a building and have moisture content greater than 10 percent (%), it is assumed that there will be no wind erosion of storage piles. There also should be negligible emissions from vehicular activity around the storage pile because the loaders will be used to push the storage pile around, but they will not pick up and unload DDGS. The only significant emissions from the DDGS building should be from the conveyor that loads DDGS into the building.

The DDGS from the storage building are conveyed to the DDGS loadout building. The PM₁₀ emissions from the DDGS handling equipment are controlled using a baghouse. The baghouse was given 99% control efficiency. The DDGS handling equipment are also enclosed by ductwork and a 90% capture efficiency was given for the enclosure. The DDGS are loaded into trucks or rail cars using a retractable spout and PM₁₀ emissions from this process are controlled by cartridge filters. The process was given 80% capture efficiency and a 95% control device efficiency.

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 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 efficiency of 98%. The PM₁₀ emissions are considered negligible since the flare is of a smokeless design. Other emissions from the flare are calculated using emission factors from AP-42, Section 13.5, *Industrial Flares*. Since performance tests are difficult for open flares, none are required for the flare to show emissions compliance. However, Emerald Renewable Energy 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.

Fugitive Emissions from Equipment Leaks

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 (EP-1500). Emerald Renewable Energy 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*.

Steam Generation

Steam is required for the ethanol production process. Emerald Renewable Energy will use two (2) natural gas fired boilers with a maximum capacity of 150 MMBTU/hr each. SO_x, PM₁₀, and VOC emissions were calculated by using emission factors from AP-42, Section 1.4, *Natural Gas Combustion*. NO_x and CO emissions were based on manufacturer's guarantee for natural gas combustion using low NO_x burners. Emerald Renewable Energy shall perform stack tests to demonstrate compliance with limits in the permit.

Non-Contact Cooling Tower

PM₁₀ emissions from the cooling tower were calculated with a mass balance approach using drift loss (0.001%), total dissolved solids (TDS) concentration in the recirculating water (2,500 ppm), and water circulation rate (46,000 gallons per minute) as suggested by AP-42, Section 13.4, *Cooling Towers*.

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 300 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.

Anaerobic Treatment Module

Emissions from the anaerobic treatment module are controlled by a smokeless, open flare. PM₁₀ were considered insignificant because the flare is of a smokeless design. Emissions of other pollutants were calculated by using emission factors from AP-42 Section 13.5, *Industrial Flares*.

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 pollutant are above de minimis levels..

APPLICABLE REQUIREMENTS

Emerald Renewable Power 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. The installation is required to apply for an operating permit within thirty days after startup of equipment. This operating permit, once issued will have a complete list of applicable requirements for your installation.

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 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

Preliminary modeling analysis were performed on PM₁₀, NO_x, SO_x, and CO to determine if a full impact model analysis is necessary. It was determined that full impact model analysis is required for PM₁₀, NO_x, and SO_x. The results of the analysis show that the concentration of PM₁₀, NO_x, and SO_x will be below the National Ambient Air Quality Standards and increment consumption. The acrolein levels were above the screen modeling action level (SMAL) of 0.04 tons per year, so ambient impact analysis was performed on acrolein. The result shows that the acrolein concentration is expected to be below the Risk Assessment Levels (5.50 µg/m³ on a 24-hour basis and 0.20 µg/m³ on an annual basis). Please see the attached memo dated November 30, 2007 for detailed information the analysis. Modeling was based on site-specific information such as emission rates and daily truck traffic patterns. Emerald Renewable Energy must abide by the limits set in this permit and any information submitted in the application for this project in order to ensure the accuracy and integrity of the modeling analysis.

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.

Chia-Wei Young
Environmental Engineer

Date

PERMIT DOCUMENTS

The following documents are incorporated by reference into this permit:

- The Application for Authority to Construct form, dated 1/31/2007, received 2/9/2007, designating Emerald Renewable Energy – Rock Port, LLC as the owner and operator of the installation.
- U.S. EPA document AP-42, *Compilation of Air Pollutant Emission Factors*, Fifth Edition.
- Kansas City Regional Office Site Survey, dated 3/9/2007
- Ambient Impact Analysis Memorandum, dated November 30, 2007

Attachment A – Daily Truck Tracking Sheet.

Emerald Renewable Energy
 Atchison County, S26, T55N, R42W
 Project Number: 2007-02-026
 Installation ID Number: 005-0015
 Permit Number:

This sheet covers truck traffic during _____
 (Date)

Type of Truck	¹ Truck Tally	² Daily Total (by Type)
1. Grain		
2. Ethanol		
3. Denaturant (Gasoline)		
4. DDGS		
5. Misc. Chemicals		

Notes

(1)The “Truck Tally” column is for marking the trucks as they arrive.

(2)The “Daily Total” Column is for the day’s total number of trucks that were counted. The following number of trucks indicate compliance: Grain (**85**), Ethanol (**7**), Denaturant (**2**), DDGS (**7**), Misc. Chemicals (**3**).

Attachment B – Total Monthly and Annual Truck Traffic

Emerald Renewable Energy
 Atchison County, S26, T55N, R42W
 Project Number: 2007-02-026
 Installation ID Number: 005-0015
 Permit Number:

This sheet covers truck traffic during _____
 (month, year)

Type of Truck	Current Monthly Total	Total from the Beginning of the Calendar Year to Current Month	¹ Current Annual Totals (by Type)	Annual Permit Limits
1. Grain				31,025
2. Ethanol				2,555
3. Denaturant (Gasoline)				730
4. DDGS				2,555
5. Misc. Chemicals				1,095

Note

(1)The “Current Annual Total” is the total number of trucks during a calendar year. It is **not** a 12-month rolling total. (i.e. if the “Current Monthly Total” is from July, the “Current Annual Total” is the number of trucks from January through July). It can be calculated by adding the “Current Monthly Total” and the “Total from the Beginning of the Calendar Year to Current Month.”

Attachment C – Total Annual Denatured Ethanol Production

Emerald Renewable Energy
 Atchison County, S26, T55N, R42W
 Project Number: 2007-02-026
 Installation ID Number: 005-0015
 Permit Number:

This sheet covers ethanol production from _____ through _____.
 (Day/Mo/Yr) (Day/Mo/Yr)

Month	Monthly Denatured Ethanol Production (Gallons)	¹ Annual Denatured Ethanol Production (Gallons/Yr)
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		

Note

(1)The 12-month ethanol totals (gallons) are a rolling total calculated by adding the month’s ethanol production to the monthly ethanol production of the previous eleven (11) months. A total of **115,500,000** gallons indicate compliance.

Attachment D – Total Annual HAPs Emissions Tracking Record

Emerald Renewable Energy
 Atchison County, S26, T55N, R42W
 Project Number: 2007-02-026
 Installation ID Number: 005-0015
 Permit Number:

This sheet covers ethanol production from _____ through _____
 (Day/mo/yr) (Day/mo/yr)

Emission Points	Description	Amount Processed This Month	Emission Factor	¹ Total Monthly Emissions (tons/month)
²Total Monthly Facility HAP Emissions (Tons) =				
³Total Annual (12-Month) Facility-Wide HAP Emissions (tons) =				

Notes

- (1) Monthly Emissions from each emission point is calculated by multiplying the amount processed by the emission factors. The emission factors can be obtained from three (3) sources where applicable: Stack testing results, EPA document AP-42, or DENCO.
- (2) Total HAP emissions for this month calculated by summing the monthly emissions from each emission point.
- (3) Total Annual (12-Month) Facility-Wide HAP emissions calculated by summing the total monthly HAP emission from the previous 12 months.

A 12-Month Total HAP emissions of less than 25 tons indicates compliance

Attachment E– Total Monthly and Annual Speciated HAPs Emission Tracking Record

Emerald Renewable Energy
 Atchison County, S26, T55N, R42W
 Project Number: 2007-02-026
 Installation ID Number: 005-0015
 Permit Number:

This sheet covers ethanol production from _____ through _____
 (Day/mo/yr) (Day/mo/yr)

Emission Points	Description	Amount Processed This Month	Emission Factor	Total Monthly Emissions (tons/month)	¹ HAP Species

Speciated Monthly and Annual HAPs Emissions Summary Table

HAP Species	Total Emissions This Month (Tons)	Monthly Emission in the Same Month of Prior Year (tons)	² Prior Month Annual Emissions (tons/yr)	³ Current Annual Emissions (tons/yr)

Notes

- (1) Each species is compiled individually. Attachment D addresses overall total HAP emissions.
- (2) Prior 12-Month Individual HAP emissions total can be taken from last month's Attachment E.
- (3) Current 12-Month individual HAP emissions can be calculated by the following: *[(total species emissions for this month) – (species emissions from same month of prior year) + (Prior month's annual species emissions0]*

A 12-Month Individual HAP emissions total of less than 10 tons indicates compliance

Attachment F – Monthly VOC Emissions Tracking Record

Emerald Renewable Energy
 Atchison County, S26, T55N, R42W
 Project Number: 2007-02-026
 Installation ID Number: 005-0015
 Permit Number:

This sheet covers ethanol production from _____ through _____
 (Day/month/yr) (Day/month/yr)

Emission Points	Description	Amount Processed This Month	Emission Factor	¹ Total Monthly Emissions (tons/month)
² Total Monthly Facility VOC Emissions (tons) =				
Total Monthly Facility VOC Emissions From This Month of Prior Year (tons) =				
Total (12-Month) Facility-Wide VOC Emissions From Previous Month (tons) =				
³ Total Annual (12-Month) Facility-Wide VOC Emissions (tons) =				

Notes

- (1) Monthly emissions from each emission point are calculated by multiplying the amount processed by the emission factors. The emission factors can be obtained from three (3) sources where applicable: Stack testing results, EPA document AP-42, or DENCO.
- (2) Total VOC emissions for this month are calculated by adding the individual emission point "Total Monthly Emissions" entries.
- (3) Current 12-month facility-wide VOC emissions can be calculated as follows: *Annual VOC Emissions – [(Total Month Facility VOC Emissions for This month)+(Prior Month's Total Annual VOC Emissions)-(Total Monthly Facility VOC Emissions From Same Month of Prior Year)]*

A 12-Month Total VOC emissions total of less than 100 tons indicates compliance

Attachment G – Monthly CO Emissions Tracking Record

Emerald Renewable Energy
 Atchison County, S26, T55N, R42W
 Project Number: 2007-02-026
 Installation ID Number: 005-0015
 Permit Number:

This sheet covers ethanol production from _____ through _____
 (Day/month/yr) (Day/month/yr)

Emission Points	Description	Amount Processed This Month	Emission Factor	¹ Total Monthly Emissions (tons/month)
² Total Monthly Facility CO Emissions (tons) =				
Total Monthly Facility CO Emissions From This Month of Prior Year (tons) =				
Total (12-Month) Facility-Wide CO Emissions From Previous Month (tons) =				
³ Total Annual (12-Month) Facility-Wide CO Emissions (tons) =				

Notes

(1) Monthly emissions from each emission point are calculated by multiplying the amount processed by the emission factors. The emission factors can be obtained from three (3) sources where applicable: Stack testing results, EPA document AP-42, or DENCO.

(2) Total CO emissions for this month are calculated by adding the individual emission point "Total Monthly Emissions" entries.

(3) Current 12-month facility-wide CO emissions can be calculated as follows: *Annual CO Emissions – [(Total Month Facility CO Emissions for This month)+(Prior Month’s Total Annual CO Emissions)-(Total Monthly Facility CO Emissions From Same Month of Prior Year)]*

A 12-Month Total CO emissions total of less than 100 tons indicates compliance

Mr. Shawn Peters
Environmental Manager
15407 McGinty Rd.
Wayzata, MO 55391

RE: New Source Review Permit - Project Number: 2007-02-026

Dear Mr. Peters:

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 and your new source review permit application is necessary for continued compliance. This facility is required to submit an operating permit application. Operation in accordance with the future operating permit is also necessary for continued compliance.

The reverse side of your permit certificate has important information concerning standard permit conditions and your rights and obligations under the laws and regulations of the State of Missouri.

If you have any questions regarding this permit, please contact Chia-Wei Young at the department's Air Pollution Control Program, P.O. Box 176, Jefferson City, MO 65102 or telephone (573) 751-4817. Thank you for your time and consideration.

Sincerely,

AIR POLLUTION CONTROL PROGRAM

Kendall B. Hale
New Source Review Unit Chief

KBH: cwyl

Enclosures

c: Southeast Regional Office
PAMS File 2006-08-058
Permit Number: