



## 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: 042008-008 Project Number: 2007-02-037

Parent Company: Renewable Energy Holding Company, LLC

Parent Company Address: 901 St. Louis Street, 20<sup>th</sup> Floor, Springfield, MO 65806

Installation Name: GBE Ethanol Plant Rogersville

Installation Address: Border Crossing Road Hwy 60, Rogersville, MO 65742

Location Information: Webster County, S14 &15, T28N, R19W

Application for Authority to Construct was made for:  
Gulfstream Bioflex Biofuels Energy, LLC (GBE) has requested authorization to construct 101.2 million gallon per year fuel grade denatured ethanol plant in Rogersville, Missouri. 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.

APR 24 2008

\_\_\_\_\_  
EFFECTIVE DATE

A handwritten signature in black ink, appearing to read "James L. Karamanchuk".  
\_\_\_\_\_  
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.

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:

Project Number: 2007-02-037

Parent Company:

Renewable Energy Holding Company, LLC

Parent Company Address: 901 St. Louis Street, 20<sup>th</sup> Floor, Springfield, MO 65806

Installation Name:

GBE Ethanol Plant Rogersville

Installation Address:

Border Crossing Road Hwy 60, Rogersville, MO 65742

Location Information:

Webster County, S14 &15, T28N, R19W

Application for Authority to Construct was made for:

Gulfstream Bioflex Biofuels Energy, LLC (GBE) has requested authorization to construct 101.2 million gallon per year fuel grade denatured ethanol plant in Rogersville, Missouri. 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.

EFFECTIVE DATE

DIRECTOR OR DESIGNEE  
DEPARTMENT OF NATURAL RESOURCES

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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."*

GBE Ethanol Plant Rogersville  
Webster County, S14 &15, T28N, R19W

1. Haul Road Control  
GBE Ethanol Plant Rogersville shall control fugitive emissions from all of the haul roads at this site by paving and washing/cleaning the haul roads.
  - A. GBE Ethanol Plant Rogersville shall finish paving the haul roads before start of operations.
  - B. GBE Ethanol Plant Rogersville 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. GBE Ethanol Plant Rogersville 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, GBE Ethanol Plant Rogersville 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. GBE Ethanol Plant Rogersville shall water, wash, and/or otherwise clean all of the haul roads as necessary to achieve control of fugitive emissions from these areas while the plant is operating.
  - F. GBE Ethanol Plant Rogersville shall maintain a daily log detailing when watering/cleaning was performed and methods used to water/clean the haul roads.
  
2. Silt Loading Control of Haul Roads
  - A. The silt loading shall not exceed 0.10 grams/meter<sup>2</sup> on all of the haul roads at this site.
  - B. The GBE Ethanol Plant Rogersville 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, establish the

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**SPECIAL CONDITIONS:**

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

- frequency of those controls 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 2A shall be demonstrated by conducting a series (as defined in Appendix C of AP42) 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 AP42) and conducted in accordance with ASTM-C-136 method. Testing can not be done immediately after cleaning. If cleaning is scheduled every 8 hours then testing must be done at the mid point of 4 hours. A summary of this 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 leaving the plant property. Documentation of all corrective actions and daily surveys shall be maintained in a log.

**3. Truck Traffic/Type Limitations**

- A. GBE Ethanol Plant Rogersville shall limit the daily number of trucks going through each haul road as specified in Table 1.

**Table 1: Daily Truck Limits**

Haul Road Type	Daily Truck Limit Harvest Season June – November
Grain	250
Ethanol	144
Denaturant (Gasoline)	4
DDGS	70
Misc. Chemicals	2

- B. GBE Ethanol Plant Rogersville shall limit the annual number of trucks going though each haul road as specified in Table 2.

**Table 2: Yearly Truck Limits**

Haul Road Type	Yearly Truck Limit
Grain	50,000
Ethanol	12,500
Denaturant (Gasoline)	1,200
DDGS	15,000
Misc. Chemicals	600

- C. Hopper trucks are the only type of trucks that GBE Ethanol Plant Rogersville shall use for grain hauling. No straight trucks shall be used.
- D. GBE Ethanol Plant Rogersville shall not haul wet distiller's grain with solubles (WDGS) by trucks.

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#### SPECIAL CONDITIONS:

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

- E. To show compliance with Special Conditions 3.A. and 3.B., GBE Ethanol Plant Rogersville shall keep a record of the daily and the sum of the most recent twelve (12) month 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 record keeping of the sum of the most recent twelve (12) month period.
  
- 4. Grain Receiving Operational Limits
  - A. GBE Ethanol Plant Rogersville shall limit its daily grain receiving rate to 8,064 tons of grain per day from trucks and 26,880 tons of grain per day from rail.
  
  - B. To demonstrate compliance with Special Condition 4.A., GBE Ethanol Plant Rogersville shall keep a record of the daily weight (tons) of grain received per day. Attachment C, or equivalent form(s), shall be used for this purpose.
  
- 5. Ethanol Production Limits
  - A. GBE Ethanol Plant Rogersville shall limit its annual denatured ethanol production rate to 101,200,000 gallons per twelve (12) consecutive month period.
  
  - B. To demonstrate compliance with Special Condition 5.A., GBE Ethanol Plant Rogersville shall keep a record of the amount of ethanol produced per twelve (12) consecutive month period. Attachment D, or equivalent forms, shall be used for this purpose.
  
- 6. Emission Limitations
  - A. Emission Limit of Particulate Matter Less than Ten Microns in Diameter (PM<sub>10</sub>)
    - 1.) GBE Ethanol Plant Rogersville shall not discharge PM<sub>10</sub> into the atmosphere from the following emission points 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 13 and 14.

**SPECIAL CONDITIONS:**

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

**Table 3: Emission Rate Limits for PM<sub>10</sub>**

Emission Point	Stack ID	Stack Description	Pounds per Hour (lbs/hr)
BH-01	BH-01	Baghouse 1, Grain Receiving	0.0073
BH-02	BH-02	Baghouse 2, Grain Receiving	0.0073
BH-03	BH-03	Baghouse 3, Grain Receiving	0.0020
BH-04	BH-04	Baghouse 4, Grain Handling and Milling	0.1109
BH-05	BH-05	Baghouse 5, DDGS Loadout	0.0001
D-01	D-01	Integrated Thermal Oxidation/Flue Gas Recirculation Systems Dryer #1	2.4
D-02	D-02	Integrated Thermal Oxidation/Flue Gas Recirculation Systems Dryer #2	2.4
BL-01	BL-01	Boiler 01	1.1175
BL-02	BL-02	Boiler 02	1.1175
BL-03	BL-03	Boiler 03	1.1175
CT-01	CT-01	Cooling Tower 01	1.562
CT-02	CT-01	Cooling Tower 02	1.562
CT-03	CT-03	Cooling Tower 03	1.562
CT-04	CT-04	Cooling Tower 04	1.562
SC-01	SC-01	Fermentation Scrubber	0.1
SC-02	SC-02	Distillation Scrubber	0.1

**B. Emission Limit of Nitrogen Oxides (NO<sub>x</sub>)**

- 1.) GBE Ethanol Plant Rogersville shall not discharge NO<sub>x</sub> 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 13 and 14.

**Table 4: Emission Rate Limits for NO<sub>x</sub>**

Stack ID	Stack Description	Pounds per Hour (lbs/hr)
BL-01	Boiler #1	1.65
BL-02	Boiler #2	1.65
BL-03	Boiler #3	1.65
D-01	Integrated Thermal Oxidation/Flue Gas Recirculation Systems Dryer	6.71
D-02	Integrated Thermal Oxidation/Flue Gas Recirculation Systems Dryer	6.71

**C. Emission Limit of Hazardous Air Pollutants (HAPs)**

- 1.) GBE Ethanol Plant Rogersville shall emit less than twenty-five (25.0) tons of combined HAPs from this installation in any consecutive twelve (12) month period. Attachment E, *Monthly Total*

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**SPECIAL CONDITIONS:**

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

- HAPs Emissions Tracking Record*, or equivalent form(s), shall be used to demonstrate compliance.
- 2.) GBE Ethanol Plant Rogersville shall emit less than ten (10.0) tons of individual HAPs from this installation in any consecutive twelve (12) month period. Attachment F, *Monthly Individual HAPs Emissions Tracking Record*, or equivalent form(s), shall be used to demonstrate compliance.
- D. Emission Limit of Volatile Organic Compounds (VOCs)
- 1.) GBE Ethanol Plant Rogersville shall emit less than 100 tons of VOCs from this installation in any consecutive twelve (12) month period.
  - 2.) GBE Ethanol Plant Rogersville shall record the monthly and the sum of the most recent consecutive twelve (12) months VOC emissions in tons from this installation. Attachment G, *Monthly VOC 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 13 and 14.
  - 3.) GBE Ethanol Plant Rogersville 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 D.2. shows that the emission limit has been exceeded.
- E. Emission Limit of Carbon Monoxides (CO)
- 1.) GBE Ethanol Plant Rogersville shall emit less than 100 tons of CO in any consecutive twelve (12) month period.
  - 2.) GBE Ethanol Plant Rogersville shall record the monthly and the sum of the most recent consecutive twelve (12) months CO emissions in tons from this installation. Attachment H, *Monthly CO Emissions Tracking Record*, or equivalent form(s), shall be used for this purpose. The emission rates used in Attachments H shall be determined by performance testing, as detailed in Special Conditions 13 and 14, or from emission factors from AP-42 or DENCO.
  - 3.) GBE Ethanol Plant Rogersville 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. shows that the emission limit has been exceeded.

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**SPECIAL CONDITIONS:**

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

- F. Emission Limit of Sulfur Oxides (SO<sub>2</sub>)
  - 1.) GBE Ethanol Plant Rogersville shall not discharge SO<sub>2</sub> into the atmosphere from the following stacks 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 13.

**Table 5: Emission Rate Limits for SO<sub>2</sub>**

Stack ID	Stack Description	Pounds per Hour (lbs/hr)
D-01	Integrated Thermal Oxidation/Flue Gas Recirculation Systems Dryer	0.0016
D-02	Integrated Thermal Oxidation/Flue Gas Recirculation Systems Dryer	0.0016
SC-01	Fermentation Scrubber	0.00
SC-02	Distillation Scrubber	0.00
BI-01	Boiler #1	0.0026
BI-02	Boiler #2	0.0026
BI-03	Boiler #3	0.0026

- 3.) GBE Ethanol Plant Rogersville shall only burn natural gas, which contains less than 8 pounds per million Btu of SO<sub>2</sub>. GBE Ethanol Plant Rogersville shall supply certification to show compliance with this condition from all suppliers of natural gas. A mass balance calculation can be submitted for SO<sub>2</sub> as the concentration of sulfur in the fuel has a direct impact on emissions. A calculation can be submitted with the actual sulfur content of the fuel and all sulfur emissions reporting as SO<sub>2</sub> to show compliance, for the boilers. Upon approval of the calculation by the Director, the initial compliance testing of the boilers is not needed for SO<sub>2</sub>.
- 7. Control Measure – 100% Capture Efficiency
  - A. The grain handling and milling (BH-04) equipment shall be enclosed by ductwork and the grain milling equipment shall be located in a building. The enclosures/buildings shall be maintained under negative pressure and exhausted to baghouses.
  - B. GBE Ethanol Plant Rogersville shall demonstrate negative pressure by using visual indicators, such as negative pressure gauges, at each openings of the enclosure.
  - C. GBE Ethanol Plant Rogersville shall perform a visual indicator check for each emission source at least once in every 24-hour period while the grain

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**SPECIAL CONDITIONS:**

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

handling, grain storage, and grain milling equipment are in operation.

8. Control Measure – 95% Capture Efficiency

- A. The grain receiving baghouses (BH-01, BH-02, BH-03 and BH-05) equipment shall be enclosed by ductwork and the equipment shall be located in a building. The enclosures/buildings shall be maintained under negative pressure and exhausted to baghouses.
- B. GBE Ethanol Plant Rogersville shall demonstrate negative pressure by using visual indicators, such as negative pressure gauges, at each openings of the enclosure.
- C. GBE Ethanol Plant Rogersville shall perform a visual indicator check for each emission source at least once in every 24-hour period while the grain receiving and DDGS loadout are in operation.
- D. DDGS storage building doors are to remain closed during all routine operation. Exceptions are only for maintenance activities.

9. 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 Point Description	Equipment
BH-01	Baghouse 1, Grain Receiving	2-grain receiving pit
BH-02	Baghouse 2, Grain Receiving	1-grain receiving pit
BH-03	Baghouse 3, Grain Receiving	grain conveyors/elevators (grain receiving pits to storage silos), 3 storage silos
BH-04	Baghouse 4, Grain Handling and Milling	grain conveyors/elevators (storage silos to scalper), 1 scalper, 3 hammermills, 1 grain bulk weigher
BH-05	Baghouse 5, DDGS Loadout	DDGS truck loadout, DDGS rail loadout, 1 DDGS conveyor

- 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. These gauges or meters shall be located such that Department of Natural Resources' employees may easily observe them.

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**SPECIAL CONDITIONS:**

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

- 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. GBE Ethanol Plant Rogersville 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. GBE Ethanol Plant Rogersville 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.
10. Control Equipment – Wet Scrubbers
- A. A wet scrubber must be in use at all times when the following equipment is in operation:

**Table 6: Equipment to be Controlled by Wet Scrubbers**

Emission Point	Emission Point Description
SC-01	1 prefermenter tank, 6 fermenter tanks, 1 beer well, 1 liquefaction tank
SC-02	2 200 proof condensers, 2 molecular sieves, 1 rectifier, 1 stripper, 1 beer column, 1 whole stillage tank, 1 thin stillage tank, 4 centrifuges

- B. The scrubbers and any related instrumentation or equipment shall be operated and maintained in accordance with the manufacturer's specifications. Each scrubber shall be equipped with a gauge or meter that indicates the pressure drop across the scrubber. Each scrubber shall

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#### SPECIAL CONDITIONS:

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

- be equipped 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.
- C. The use of batch fermentation process diminishes scrubber performance and is not authorized at this site. The fermentation step must be operated in the continuous fermentation scheme as described in this permit.
- D. GBE Ethanol Plant Rogersville 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 and conditions determined in Special Condition 13.B..
- E. GBE Ethanol Plant Rogersville 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 determined in Special Condition 13.B..
- F. GBE Ethanol Plant Rogersville 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.
11. Control Equipment – Integrated Thermal Oxidation/Flue Gas Recirculation Systems.
- A. The integrated thermal oxidation/flue gas recirculation system must be in use at all times when the dried distiller's grain with solubles (DDGS) dryers (D-01, D-02) are in operation or any time that regulated PM<sub>10</sub>, VOC, or HAP emissions are possible from the dryers.
- B. The integrated thermal oxidation/flue gas recirculation system shall be operated and maintained in accordance with the manufacturer's specifications.

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### SPECIAL CONDITIONS:

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

- C. The operating temperature of the integrated thermal oxidation/flue gas recirculation system shall be continuously monitored and recorded during operations. The temperature must be maintained within 50 degrees of the tested temperature.
  - D. GBE Ethanol Plant Rogersville shall maintain an operating and maintenance log for the integrated thermal oxidation/flue gas recirculation system 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.
12. Control Equipment – Flare
- A. The flare must be in use at all times during denatured ethanol truck/rail load out (FI-01).
  - B. The flare shall be operated and maintained in accordance with the manufacturer's specifications. The flare must be operated in accordance with 40 CFR Part 60.18, *General Control Device Requirements*. GBE Ethanol Plant Rogersville shall maintain records that sufficiently indicate compliance with 40 CFR Part 60.18.
  - C. GBE Ethanol Plant Rogersville 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.
13. Performance Testing
- A. GBE Ethanol Plant Rogersville shall conduct performance tests as stated in Table 7 and the following to verify the emission rates:
    - 1.) The following stacks shall be tested to determine the VOC and total

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### SPECIAL CONDITIONS:

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

- HAP emission rates when all equipment controlled by these devices are in operation: The wet scrubber stacks for main fermentation, and distillation (SC-01, SC-02); The integrated thermal oxidation/flue gas recirculation system for the DDGS Dryers (D-01, D-02). These emission rates shall be used to demonstrate compliance with Special Conditions 6.C.1., and 6.D.1..
- 2.) The following stacks shall be tested to determine the emission rates of acetaldehyde, acrolein, formaldehyde, and methanol when all equipment controlled by these devices is in operation: The wet scrubber stacks fermentation, and distillation (SC-01, SC-02). The integrated thermal oxidation/flue gas recirculation for the DDGS Dryers (D-01, D-02). These emission rates shall be used to demonstrate compliance with Special Condition 6.C.1 and 6.C.2..
  - 3.) The following stacks shall be tested to determine the emission rates of CO when all equipment controlled by these devices is in operation: The integrated thermal oxidation/flue gas recirculation system for the DDGS Dryers (D-01, D-02); The Boilers (BL-01, BL-02, BL-03). These emission rates shall be used to demonstrate compliance with Special Condition 6.E.1..
  - 4.) The stacks listed in Special Conditions 6.A. shall be tested to determine the PM<sub>10</sub> emission rates. These emission rates shall not exceed the amounts listed in Special Condition 6.A. Table 3.
  - 5.) The stacks listed in Special Conditions 6.B. shall be tested to determine the NO<sub>x</sub> emission rates. These emission rates shall not exceed the amounts listed in Special Condition 6.B. Table 4.
  - 6.) The integrated thermal oxidation/flue gas recirculation for the DDGS Dryers (D-01, D-02) and the scrubbers (SC-01 and SC-02) shall be tested to determine the SO<sub>2</sub> content of these streams. These emission rates shall not exceed the amounts listed in Special Condition 6.F. Table 5.

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**SPECIAL CONDITIONS:**

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

**Table 7: Testing Requirements**

Column A	Column B	Column C	Column D	Column E	Column F
Emission Point	Description	Pollutant	Units	Attachments	Special Condition
BH-01	Baghouse	PM <sub>10</sub>	lb of pollutant/hr, lb of pollutant/ton of grain	N/A	6.A.1. and 6.A.2.
BH-02	Baghouse	PM <sub>10</sub>	lb of pollutant/hr, Lb of pollutant/ton of grain	N/A	6.A.1. and 6.A.2.
BH-03	Baghouse	PM <sub>10</sub>	lb of pollutant/hr, Lb of pollutant/ton of grain	N/A	6.A.1. and 6.A.2.
BH-04	Baghouse	PM <sub>10</sub>	lb of pollutant/hr, lb of pollutant/ton of grain	N/A	6.A.1. and 6.A.2.
BH-05	Baghouse	PM <sub>10</sub>	lb of pollutant/hr, lb of pollutant/ton of DDGS	N/A	6.A.1. and 6.A.2.
CT-01	Cooling Tower	PM <sub>10</sub>	lb of pollutant/hr	N/A	6.A.1. and 6.A.2.
CT-02	Cooling Tower	PM <sub>10</sub>	lb of pollutant/hr	N/A	6.A.1. and 6.A.2.
CT-03	Cooling Tower	PM <sub>10</sub>	lb of pollutant/hr	N/A	6.A.1. and 6.A.2.
CT-04	Cooling Tower	PM <sub>10</sub>	lb of pollutant/hr	N/A	6.A.1. and 6.A.2.
BI-01	Boiler #1	VOC, HAP, CO, PM <sub>10</sub> , NO <sub>x</sub> , SO <sub>x</sub>	lb of pollutant/hr, lb of pollutant/MMBTU	E, F, G, H	6.A.1., 6.A.2., 6.B1., 6.B2., 6C. 1., 6C2., 6D1., 6D2., 6E.1., 6E.2., 6.F.1., 6F.2.,
BI-02	Boiler #2	VOC, HAP, CO, PM <sub>10</sub> , NO <sub>x</sub> , SO <sub>x</sub>	lb of pollutant/hr, lb of pollutant/MMBTU	E, F, G, H	6.A.1., 6.A.2., 6.B1., 6.B2., 6C. 1., 6C2., 6D1., 6D2., 6E.1., 6E.2., 6.F.1., 6F.2.,
BI-03	Boiler #3	VOC, HAP, CO, PM <sub>10</sub> , NO <sub>x</sub> , SO <sub>x</sub>	lb of pollutant/hr, lb of pollutant/MMBTU	E, F, G, H	6.A.1., 6.A.2., 6.B1., 6.B2., 6C. 1., 6C2., 6D1., 6D2., 6E.1., 6E.2., 6.F.1., 6F.2.,

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**SPECIAL CONDITIONS:**

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

**Table 7: Testing Requirement continued.**

Column A	Column B	Column C	Column D	Column E	Column F
Emission Point	Description	Pollutant	Units	Attachments	Special Condition
SC-01	Scrubber	VOC, HAP, PM <sub>10</sub> , SO <sub>x</sub>	lb of pollutant/hr, lb of pollutant/gallon of ethanol	E, F, G, H	6.A.1., 6.A.2., 6.B1., 6.B2., 6C. 1., 6C2., 6D1., 6D2., 6E.1., 6E.2., 6.F.1., 6F.2.,
SC-02	Scrubber	VOC, HAP, PM <sub>10</sub> , SO <sub>x</sub>	lb of pollutant/hr, lb of pollutant/gallon of ethanol	E, F, G, H	6.A.1., 6.A.2., 6.B1., 6.B2., 6C. 1., 6C2., 6D1., 6D2., 6E.1., 6E.2., 6.F.1., 6F.2.,
D-01	Integrated Thermal Oxidizer Dryer	VOC, HAP, CO, PM <sub>10</sub> , NO <sub>x</sub> , SO <sub>x</sub>	lb of pollutant/hr, lbs of pollutant/ton of DDGS	E, F, G, H	6.A.1., 6.A.2., 6.B1., 6.B2., 6C. 1., 6C2., 6D1., 6D2., 6E.1., 6E.2., 6.F.1., 6F.2.,
D-02	Integrated Thermal Oxidizer Dryer	VOC, HAP, CO, PM <sub>10</sub> , NO <sub>x</sub> , SO <sub>x</sub>	lb of pollutant/hr, lbs of pollutant/ton of DDGS	E, F, G, H	6.A.1., 6.A.2., 6.B1., 6.B2., 6C. 1., 6C2., 6D1., 6D2., 6E.1., 6E.2., 6.F.1., 6F.2.,

- 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 Scrubbers (SC-01, SC-02).
  - 2.) The Thermal Oxidizer/Flue Gas Recirculation System (D-01, D-02).
- C. The operating parameters discussed in Special Condition 13.B. shall be determined and agreed upon by the Air Pollution Control Program's Enforcement Section and GBE Ethanol Plant Rogersville before the start of the performance tests.
- D. The operating parameters discussed in Special Condition 13.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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**SPECIAL CONDITIONS:**

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

Program's Enforcement Section and GBE Ethanol Plant Rogersville before the start of the performance tests.

- E. The performance tests for the fermentation wet scrubber (SC-01) shall be conducted for the following time periods: During period(s) of maximum emissions. GBE Ethanol Plant Rogersville shall submit, in the proposed test plant outlined in Special Condition 14, 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, GBE Ethanol Plant Rogersville must conduct retesting to verify maximum emissions.
  - 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 GBE Ethanol Plant Rogersville 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 14.
  - I. GBE Ethanol Plant Rogersville shall conduct performance tests to verify the emission rates as indicated in Special Condition 13.A. once every five (5) years from the date of the most recent performance tests, except for baghouse stacks. The baghouse stacks shall be tested once upon startup in accordance with Special Condition 13.G.. No further testing will be necessary 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.
14. 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

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#### SPECIAL CONDITIONS:

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

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 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 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 13 of this permit indicates that any of the emission limits specified in this permit are being exceeded, GBE Ethanol Plant Rogersville 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 GBE Ethanol Plant Rogersville will reduce the emission rates to show compliance with specified limits in this permit. GBE Ethanol Plant Rogersville must implement any such plan immediately upon its approval by the Director and conduct stack testing.
15. 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 38,500 gallons per minute or 9.625 gallons per minute per cell.
  - C. GBE Ethanol Plant Rogersville shall keep records of the monthly and 12-month rolling averages of the amount of water circulated.
  - D. The evaporative loss from the towers shall not exceed 548 gallons per minute or 1.4% percent of the water circulation rate. Verification of evaporative loss shall be by manufacturer's guaranteed evaporative loss and shall be kept onsite and be made readily available to Department of Natural Resources' employees upon request.

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#### SPECIAL CONDITIONS:

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

- E. The total dissolved solids (TDS) concentration in the circulated cooling water shall not exceed a TDS concentration of 2,100 parts per million (ppm). A TDS sample shall be collected monthly 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.
16. Emergency Equipment Requirements
- A. The operating hours of the emergency fire pump shall not exceed 100 hours in any consecutive 12-month period. To facilitate the record keeping for this condition, the emergency fire pump shall be equipped with a non-resettable running time meter. Stack testing is not required for the emergency firewater pump.
  - B. Attachment I, 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.
17. Operating Permit Requirements
- GBE Ethanol Plant Rogersville shall apply for and receive at least an Intermediate Operating Permit from the Air Pollution Control Program for this installation.
18. Requirements for Future Emission Alterations
- If the emissions from this installation as permitted, ever increase above 100 tons per year for PM<sub>10</sub>, NO<sub>x</sub>, SO<sub>x</sub>, VOC, or CO, when the production capacity is at or below 101.2 million gallons denatured ethanol per year, then GBE Ethanol Plant Rogersville will be required to conduct a New Source Review in accordance with 10 CSR 10-6.060(8).
19. Record Keeping Requirements
- All records required by this permit shall be kept onsite for no less than five years and shall be made available to any Department of Natural Resources' personnel upon request.
20. GBE Ethanol Plant Rogersville 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 or testing from any Special Condition in this permit indicate that the source exceeds the limit.

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

Project Number: 2007-02-037  
Installation ID Number: 225-0042  
Permit Number:

GBE Ethanol Plant Rogersville  
Border Crossing Road Hwy. 60  
Rogersville, MO 65742

Complete: 10/01/2007  
Reviewed: 02/22/2008

Parent Company:  
Renewable Energy Holding Company, LLC  
901 St. Louis Street, 20<sup>th</sup> Floor  
Springfield, MO 65806-2592

Webster County, S14 &15, T28N, R19W

REVIEW SUMMARY

- Gulfstream Bioflex Biofuels Energy, LLC (GBE) Ethanol Plant Rogersville has requested authorization to construct 101.2 million gallon per year fuel grade denatured ethanol plant in Rogersville, Missouri.
- 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, 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, wet scrubbers, vacuum jet and condensers, and integrated thermal oxidizers are being used to control the PM<sub>10</sub>, VOC, NO<sub>x</sub>, 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 Webster 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 PM<sub>10</sub> and NO<sub>x</sub>.
  - 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

GBE Ethanol Plant Rogersville is proposing to construct a new ethanol plant with a maximum production capacity of 101.2 million 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 a byproduct of the ethanol production process.

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.

No permits have been issued to GBE Ethanol Plant Rogersville from the Air Pollution Control Program.

## PROJECT DESCRIPTION

The GBE Ethanol Plant in Rogersville will process a maximum of 1,202,894 tons per year (TPY) of corn grain. The grain will be delivered by rail car and truck according to market availability. The maximum delivery rate by rail is 1120 tons per hour (TPH) while the maximum delivery rate of grain by truck is 336 TPH. Delivery will occur in an enclosed building with doors to hoppers with air intakes and a total of three (3) baghouses (BH-01, BH-02 and BH-03) to collect Particulate Matter (PM) emissions. The grain will then be conveyed to 380,302 bushel capacity storage silos prior to entering the process line. From the silos the grain will be conveyed to a scalper and then to hammermills. Maximum combined hammermill output will be 154 TPH. After leaving the grain receiving area, all grain handling, storage and milling contact air will be controlled by negative pressure and a single baghouse (BH-04).

After leaving the hammermills, water will be added to the milled grain to make a slurry, which will be heated and injected with enzymes, and becomes a mash. After the resultant mash will be cooled, additional enzymes and yeast will be incorporated with the cooled mash in the fermentation tanks. Fermentation will produce a beer mixture, which will contain approximately 12% ethanol by weight. The VOC emissions from the fermentation process area are controlled by a wet scrubber with a 99.4% removal efficiency (SC-01). The fermentation step, as designed by Vogelbusch for the GBE facility in Rogersville, utilizes a continuous fermentation scheme that can best be described as a "continuous cascade" train. This train consists of a prefermenter, six main fermenters, and a beer well. Mash containing fermentable carbohydrates is continuously fed forward at controlled rates to the prefermenter and to the first main fermenter. The prefermenter overflows to the first fermenter, maintaining a constant yeast growth rate in the prefermenter. Overflow from the first main fermenter will be fed forward to the second main fermenter and so on through all six main fermenters in succession. Ethanol concentrations increase at a constant rate in each fermenter in the train. Each tank in the train will be maintained at a precise level and carefully temperature-controlled ( $\pm 1^{\circ}\text{F}$ ) to ensure that a constant alcohol concentration in

maintained in each. As a result, a stable flow of finished beer with little ethanol concentration variability can be delivered to the beerwell for further processing in distillation. Because of the steady-state operation, the quantity and quality of the waste gas directed to the CO<sub>2</sub> scrubber is stable and constant. Consequently, emissions vented from a Vogelbusch-designed continuous fermentation scrubber are expected to fluctuate very little and are predictable.

The fermented beer will be distilled in a series of distillation columns producing 190 proof ethanol and whole stillage. The 190 proof ethanol will be pumped through molecular sieves to remove the remaining water. The VOC emissions from the distillation process area will be controlled by a wet scrubber with a 99.67 % VOC removal efficiency (SC-02). The sieved 200 proof ethanol is briefly stored in shift tanks (TK-01, TK-02) for quality control, and then combined with natural gasoline (TK-04) to produce fuel grade denatured ethanol containing 5% natural gasoline by weight. The final product will be stored in two 1,100,00 gallon tanks (TK-05, TK-06) before shipping by truck or rail as the marked demands. Ethanol loadout and waste water treatment will be controlled by a smokeless flare. Maximum denatured ethanol production at 110% of plant design will be 101.2 million gallons per year.

The whole stillage that remains after the 190 proof ethanol is produced will be centrifuged to roughly separate liquids and solids. The liquids or thin stillage will be condensed to a syrup product through a series of evaporators. The VOC emissions from the stillage process areas will be controlled by the distillation scrubber. The solids will be processed through two indirect fired dryers (D-01, D-02) to remove excess water.

The indirect fired dryers will be in a closed loop system where steam generated from evaporating the moisture out of the whole stillage will be pulled back in by a fan, and is reheated and reused. The off-gas from the dryer goes into a thermal oxidizer that is integrated with the furnace. After drying, the centrifuged solids will be mixed with the thin stillage syrup to produce DDGS with an average moisture content of 15%. The DDGS will be conveyed to an enclosed storage building before being shipped by truck or rail as market demands. PM emissions from the DDGS loadout points will be controlled by an air intake and a baghouse (BH-05). Maximum DDGS production at 110% of plant design will be 316,800 TPY.

Additional process or support equipment for the plant will be three 150 MMBtu per Hour natural gas fired boilers (BL-01, BL-02 and BL-03), one 38,500 gallon per minute cooling tower with four cells (CT-01, CT-02, CT-03 CT-04) and one 829 HP diesel fueled firewater pump (PM-01).

Fugitive emission for the plant include north end receiving and loadout (FG-01), south end receiving and loadout (FG-02), DDGS storage (FG-05), denatured ethanol loadout (FG-04) equipment leaks (FG-03) and plant roads. The receiving and loadout building will have a total of six doors, 4 for trucks and 2 for rail. These are identified as FG-01b, FG-01c, FG-02b and FG-02c for the truck doors, and FG-01a and FG-02a for the rail doors. The truck door dimensions will be 16 feet high by 12 feet wide and the rail door dimensions will be 16 feet high by 12 feet wide and the rail door dimensions will be 24 feet high by 16 feet wide. The DDGS storage building doorway (FG-05) dimensions are 16 feet wide by 20 feet tall.

## EMISSIONS/CONTROLS EVALUATION

The pollutants of concern for this review are PM<sub>10</sub>, SO<sub>x</sub>, VOCs, CO, HAPs, and NO<sub>x</sub>. The following tables provide the emissions summary for this project. The emissions summary is based on 100% DDGS production because this is the worst-case scenario

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 <sub>10</sub>	15.0	N/A	N/A	35.02	35.02
Sox	40.0	N/A	N/A	0.0437	0.0437
NOx	40.0	N/A	N/A	74.25	74.25
VOC	40.0	N/A	N/A	96.78	<100
CO	100.0	N/A	N/A	91.11	<100
HAPs	10.0/25.0	N/A	N/A	9.07	<10.0/25.0

N/A = Not Applicable

Note: GBE Ethanol Plant Rogersville 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 PM<sub>10</sub> 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.

### *Grain Handling and Storage*

PM<sub>10</sub> will be emitted from the grain receiving, handling, storage, and milling processes. During these processes PM<sub>10</sub> emissions will be controlled by baghouses, and the baghouses are given a device control efficiency of 99.8% for estimating emissions. The site provided manufacture data indicating that baghouse efficiency for various particle sizes. The milling process uses hammermills to reduce the size of the grain. Industry data shows specialized hammermills can generate particles less than 90 microns in diameter. The efficiency of collection of particles of 10 micron size was assigned a value 99.8 percent. The baghouses using this collection efficiency must pass stack tests to verify the pound per hour rate collected.

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. GBE Ethanol Plant Rogersville shall install

visual devices, such as vacuum pressure gauges, to ensure 100% capture can be achieved.

Emissions from grain receiving, storage, and handling were calculated using PM<sub>10</sub> emission factors from EPA document AP-42, *Compilation of Air Pollutant Emission Factors*, Fifth Edition, Section 9.9.1 and taking into account the various capture and control efficiencies. Even though emissions from the grain receiving baghouse (BH-01, BH-02 and BH-03) and grain handling and milling baghouse are based on AP-42 numbers, stack tests are still required for these stacks because the ambient impact modeling analysis is based on these numbers. Any exceedances of the AP-42 based value will cause the ambient impact levels to be above the predicted values.

#### *Fermentation and Distillation*

VOCs and HAPs will be emitted from the fermentation and distillation processes. Traces of condensible PM<sub>10</sub> may also be emitted. The fermentation and distillation processes are controlled by wet scrubbers. Potential emissions of VOC and HAPs were taken from manufacturer's guarantee. GBE Ethanol Plant Rogersville shall perform stack tests to ensure that the manufacturer's guarantee is not exceeded. Due to lack of data on condensible PM<sub>10</sub> emissions, 0.10 lbs/hr is assumed and the GBE Ethanol Plant Rogersville shall perform stack testing to ensure it is not exceeded.

#### *DDGS Drying, Storage, and Loadout*

VOCs, HAPs, CO, NO<sub>x</sub>, SO<sub>x</sub> and PM<sub>10</sub> will be emitted from the operations of the DDGS Dryer (D-01, D-02). The potential emissions of these pollutants were calculated either from vendor data or emission factors given in AP-42, Section 1.4, *Natural Gas Combustion*. VOC and HAPs emissions are controlled by an integrated thermal oxidation system. This integrated thermal oxidation/flue gas recirculation system recycles the waste stream back into the dryer burner to control VOC and HAPs emissions. The NO<sub>x</sub>, CO, SO<sub>x</sub>, and PM<sub>10</sub> emissions are not controlled by any control devices.

The DDGS is stored in an enclosed building until it is shipped offsite by truck or rail. The doors of this building are required to be closed during routine operation and the doors are limited to 16 feet wide by 20 feet tall. During DDGS Loadout, the particulate emissions will be controlled by a baghouse and the baghouse is given a device control efficiency of 99.8%. Fugitive PM<sub>10</sub> emissions are expected and a capture efficiency of 95% is assumed for DDGS loadout.

#### *WDGS Storage, Handling, and Loadout*

The WDGS will be stored in an open storage area, from which it can be sent to the dryers to be dried into DDGS. The WDGS storage and handling is expected to have negligible PM<sub>10</sub> emissions due to its high moisture content. However, VOC and HAPs will be emitted from the WDGS. No truck traffic is authorized for WGDS shipment off site.

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

#### *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 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, GBE Ethanol Plant Rogersville 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.

Tanker trucks previously carried natural gasoline. All rail cars are assumed to be operating under dedicated normal service.

#### *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 (FG-03). GBE Ethanol Plant Rogersville 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. GBE Ethanol Plant Rogersville will use two (2) natural gas fired boilers with a maximum capacity of 150 MMBTU/hr each. SO<sub>x</sub> and PM<sub>10</sub> emissions were calculated by using emission factors from AP-42, Section 1.4, *Natural Gas Combustion*. NO<sub>x</sub>, CO, and VOC emissions were based on vendor information. The applicant shall perform stack tests to demonstrate compliance with limits in the permit.

#### *Non-Contact Cooling Tower*

PM<sub>10</sub> emissions from the cooling tower were calculated with a vendor supplied evaporative loss of 548 gallons per minute, an emission factor recommended by AP-42, Section 13.4, *Cooling Towers* and a water circulation rate (38,500 gallons per minute).  $((\text{Evaporative Loss (gal/min)} * 60 \text{ (min/hr)}) / 1,000) * \text{Emission Factor (lb/1,000 gal)} = \text{Emissions (lb/hr)}$  and  $(\text{Annual Drift (1,000 gal/yr)} * \text{Emission Factor (lb/1,000 gal)}) / 2,000 \text{ lb/ton} = \text{Emissions (TPY)}$

### *Emergency Firewater Pump*

A diesel-powered emergency firewater pump is permitted for the plant with a 100 hour limit on an annual basis. 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 100 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.

### *Sulfur Dioxide Emissions*

Sulfur Dioxide (SO<sub>2</sub>) emission are lower then expected. Recent Nebraska testing indicates that SO<sub>2</sub> emissions may be higher than calculated because of sulfur emission from process pH control. Testing of the dryer exhaust is required in this permit to verify SO<sub>2</sub> emission from the dryer. Other reasons that may explain the lower sulfur dioxide emissions are utilizing a natural gas with sulfur content of 0.1ppm. This information was provided to GBE Ethanol Plant Rogersville per discussions with Southern Star Central Gas Pipeline, Inc. This sulfur content was used in the boilers and dryers emission factors for SO<sub>2</sub> possibly explaining the lower rate. Stack testing of the Sulfur Dioxide (SO<sub>2</sub>) emissions are required when the drying of the DDGS and calculation of the sulfur from the combustion of natural gas in the boilers based of fuel certificates of sulfur content from fuel certification are Special Conditions of this permit. Also, recordkeeping of the sulfur dioxide emitted is required.

## 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 NO<sub>x</sub>, VOC, PM10 are above de minimis levels but condition to below major source levels.

## APPLICABLE REQUIREMENTS

GBE Ethanol Plant Rogersville 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

The following sections give a summary of the Ambient Air Quality Impact Analysis conducted for GBE Ethanol Plant Rogersville. Please see the attached memo dated February 14, 2008 (*Ambient Air Quality Impact Analysis (AAQIA) for Gulfstream Bioflex Energy, LLC*) for more information.

### *Preliminary Impact Analysis*

In order to determine whether a full impact model analysis is necessary, a preliminary model analysis was performed. The preliminary analysis was performed using the AERMOD modeling system. For PM<sub>10</sub>, if modeling results exceed the significance level of 1.0 µg/m<sup>3</sup> on an annual basis and 5.0 µg/m<sup>3</sup> on a 24-hour basis, full impact modeling would be necessary. For NO<sub>x</sub>, if modeling results exceed the significance level of 1.0 µg/m<sup>3</sup> on an annual basis, full impact modeling would be necessary. It was determined that the modeled impact for both pollutants exceeds the significance level, and a full impact analysis must be conducted for both.

*NAAQS Evaluation and Increment Consumption was deemed to pass. Any modification to the facility design that could impact the release parameters and/or emission rates must be submitted to the permitting authority for review. If the agency determines that the changes are significant, the facility will be required to submit an updated AAQIA that continues to demonstrate compliance with the NAAQS and Increment standards.*

The modeling analysis was based on site-specific information such as emission rates and daily truck traffic patterns. GBE Ethanol Plant Rogersville 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.

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Timothy Paul Hines  
Environmental Engineer

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Date

#### PERMIT DOCUMENTS

The following documents are incorporated by reference into this permit:

- The Application for Authority to Construct form, dated February 12, 2007, received February 15, 2007, designating Renewable Energy Holding Company, LLC as the owner and operator of the installation.
- Revised application information received on July 19, 2007 and on August 17, 2007 and October 01, 2007.
- U.S. EPA document AP-42, *Compilation of Air Pollutant Emission Factors*, Fifth Edition.
- Southwest Regional Office Site Survey.



















Mr. Charles Luna  
Vice President  
GBE Ethanol Plant Rogersville  
HCR1 Box 509  
Pontiac, MO 65729

RE: New Source Review Permit - Project Number: 2007-02-037

Dear Mr. Luna:

Enclosed with this letter is your permit to construct. Please study it carefully. Also, note the special conditions, if any, on the accompanying pages. The document entitled, "Review of Application for Authority to Construct," is part of the permit and should be kept with this permit in your files.

Operation in accordance with these conditions, your new source review permit application and with your amended operating permit is necessary for continued compliance.

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

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

Sincerely,

AIR POLLUTION CONTROL PROGRAM

Kendall B. Hale  
New Source Review Unit Chief

KBH:thl

Enclosures

c: Southwest Regional Office  
PAMS File 2007-02-037  
Permit Number: