

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: 042017-011 Project Number: 2015-06-050
Installation Number: 121-0028

Installation Name: Northeast Missouri Grain Processors, Inc.
d/b/a POET Biorefining - Macon

Installation Address: 30211 Major Avenue, Macon, MO 63552

Location Information: Macon County, S17, T57N, R13W

Application for Authority to Construct was made for:
An increase in anhydrous ethanol production to 55,000,000 gallons per year, 75 hours per year of fermentation scrubber bypass, and increased grain handling associated with new grain loadout equipment. This review was conducted in accordance with Section (5) of 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.

Alana L. Hess

Prepared by
Alana Hess
New Source Review Unit

Kyra L. Moore

Director or Designee
Department of Natural Resources

APR 25 2017

Effective Date

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. The 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 these air contaminant sources. The information must be made available within 30 days of actual startup. Also, you must notify the Department of Natural Resources' Northeast Regional Office within 15 days after the actual start up of these air contaminant sources.

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 sources(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.

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(12)(A)10. "Conditions required by permitting authority."

Northeast Missouri Grain Processors, Inc. d/b/a POET Biorefining - Macon
Macon County, S17, T57N, R13W

1. Superseding Condition
 - A. The conditions of this permit supersede the following special conditions found in construction permits previously issued by the Air Pollution Control Program:
 - 1) Special Conditions 2 and 5 of Construction Permit 102012-011
 - 2) Special Conditions 2.A, 2.B, 2.C, 2.D, 3, 6, and 12 of Construction Permit 032003-008C.

2. NO_x Emission Limitations
 - A. Northeast Missouri Grain Processors, Inc. d/b/a POET Biorefining – Macon (POET Biorefining – Macon) shall emit less than 92.74 tons of NO_x in any consecutive 12-month rolling total period from the entire installation as shown in Table 1.

Table 1: NO_x Emission Sources at the Installation

Emission Source	Description
EP-06	DDGS Dryers & RTO
EP-08	Boiler #1
EP-09	Grain Dryer
EP-30	Boiler #2
EP-31	Flare

- B. POET Biorefining – Macon shall maintain records of monthly and 12-monthly rolling total NO_x emissions to demonstrate compliance with Special Condition 2.A using Attachment A or an equivalent form.
 - C. POET Biorefining – Macon shall conduct performance testing of EP-06 once every five years to determine the NO_x emission rate for demonstrating compliance with Special Condition 2.A. Performance testing shall be conducted according to Special Condition 11. Performance testing may be suspended by the Air Pollution Control Program's Compliance/Enforcement Section if three consecutive performance tests document the NO_x emission rate has changed by less than 10%.

SPECIAL CONDITIONS:

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

3. Operational Limitations

- A. POET Biorefining – Macon shall not exceed the daily and 12-month rolling total material handling limits in Table 2.

Table 2: Daily and 12-Month Rolling Total Material Handling Limits

Material	Daily Limit	12-Month Rolling Total Limit
Grain Receiving	6,300 tons	666,800 tons
DDGS, Wetcake, and Syrup	3,500 tons	N/A
DDGS	N/A	200,000 tons
Wetcake	N/A	80,000 tons
Anhydrous Ethanol	N/A	55,000,000 gallons
Denatured Ethanol	N/A	58,000,000 gallons
Syrup	N/A	20,000 tons
Denaturant	N/A	3,000,000 gallons
CO ₂	550 tons	135,000 tons
Chemicals (Enzymes, Urea, Acid, and Caustic)	N/A	1,600,000 gallons
Chemicals (Enzymes, Urea, Acid, and Caustic) and Denaturant	30,000 gallons	N/A

N/A = Not applicable.

- B. POET Biorefining – Macon shall maintain records of the amount of each material handled during each calendar day to demonstrate compliance with the daily material handling limits in Special Condition 3.A.
- C. POET Biorefining – Macon shall maintain records of the monthly and 12-monthly rolling total amount of each material handled to demonstrate compliance with the 12-month rolling total limits in Special Condition 3.A using Attachment B or an equivalent form.

4. Control Device Requirements – Scrubbers

- A. POET Biorefining – Macon shall control emissions from the 11 fermentation tanks and the beer well using a scrubber (C003). POET Biorefining – Macon shall not bypass the scrubber for more than 75 hours in any consecutive 12-month rolling total period. During scrubber bypass, emissions shall be routed to the RTO.
- B. POET Biorefining – Macon shall control emissions from the preblend tank, yeast propagation tanks, beer strippers, side strippers, rectifier, molecular sieves, and rundown tank using a scrubber (C004). During scrubber bypass the equipment shall be shutdown.
- C. The scrubbers and any related instrumentation or equipment shall be operated and maintained in accordance with the manufacturer's

SPECIAL CONDITIONS:

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

specifications. The scrubbers shall be equipped with a gauge or meter that indicates the pressure drop across each scrubber. The scrubbers shall be equipped with a flow meter that indicates the liquid flow through each scrubber. These gauges or meters shall be located in such a way that they may be easily observed by Department of Natural Resources' employees.

- D. POET Biorefining - Macon shall monitor and record the operating pressure drop across each scrubber at least once every 24 hours. The operating pressure drop shall be maintained within the design conditions specified by the manufacturer.
 - E. POET Biorefining - Macon shall monitor and record the liquid flow rate through each scrubber at least once every 24 hours. The liquid flow rate shall be maintained within the design conditions specified by the manufacturer.
 - F. POET Biorefining - Macon shall maintain a copy of the manufacturer's specifications for each scrubber onsite.
 - G. POET Biorefining – Macon shall maintain records of monthly and 12-month rolling total hours of scrubber bypass using Attachment C or an equivalent form.
 - H. POET Biorefining - Macon shall maintain an operating and maintenance log for each 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.; and
 - 3) A written record of regular inspection schedule, the date and results of all inspections including any actions or maintenance activities that result from that inspection.
5. Control Device Requirements – Regenerative Thermal Oxidizer (RTO)
- A. POET Biorefining – Macon shall control emissions from the fermentation scrubber (C003), the distillation scrubber (C004), and the DDGS Dryers using an RTO (C005C). POET Biorefining – Macon shall not bypass the RTO for more than 500 hours in any consecutive 12-month rolling total period. POET Biorefining – Macon shall not operate the DDGS Dryers during RTO bypass.
 - B. POET Biorefining – Macon shall maintain records of monthly and 12-month rolling total hours of RTO bypass using Attachment C or an equivalent form approved by the Air Pollution Control Program.

SPECIAL CONDITIONS:

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

- C. POET Biorefining – Macon shall continuously monitor and record the RTO operating temperature. The three-hour rolling average operating temperature of the RTO shall be maintained at $1657^{\circ}\text{F} \pm 50^{\circ}\text{F}$ while the CO_2 plant is offline and at $1671^{\circ}\text{F} \pm 50^{\circ}\text{F}$ while the CO_2 plant is online. The acceptable temperature range may be reestablished by conducting a new performance test. POET Biorefining – Macon shall submit an application to amend this permit no later than 60 days after the performance test date if subsequent performance testing indicates VOC emissions in excess of 3.64 lb/hr. The temperature gauge shall be located in such a way that it may be easily observed by Department of Natural Resources' employees.
 - D. POET Biorefining - Macon shall maintain an operating and maintenance log for the RTO 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.; and
 - 3) A written record of regular inspection schedule, the date and results of all inspections including any actions or maintenance activities that result from that inspection.
6. Haul Road Requirements
- A. Silt Loading Requirements for Paved Haul Roads
 - 1) POET Biorefining – Macon shall pave:
 - a) All portions of the haul road used for the delivery of denaturant and the shipping of denatured ethanol, wetcake, syrup.
 - b) 0.8 miles of the haul road used for grain delivery and grain shipment.
 - c) 0.4 miles of the haul road used for the delivery of chemicals (enzymes, urea, acids, and caustic).
 - d) 0.5 miles of the haul road used for the shipping of DDGS.
 - e) 0.5 miles of the haul road used for the shipping of corn oil.
 - f) 0.7 miles of the haul road used for the shipping of CO_2 .
 - 2) The silt loading on all paved haul roads shall not exceed 0.7 g/m^2 .
 - 3) Compliance with the silt loading limitation 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 during the first year after permit issuance. If the average silt loading is less than 75% of the limit (0.525 g/m^2) in four consecutive tests, test frequency shall be reduced to once per calendar year.
 - 4) The silt loading tests shall be representative (as defined in Appendix C of AP-42) and conducted in accordance with ASTM-C-

SPECIAL CONDITIONS:

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136 method. Testing cannot be done immediately after cleaning. If there is a regular cleaning schedule, testing shall be done no earlier than the midpoint of the cleaning cycle (i.e. if cleaning is scheduled every week, then testing shall be performed on the fourth, fifth, sixth, or seventh day of the week).

B. Chemical Dust Suppression Requirement

- 1) POET Biorefining - Macon shall apply chemical dust suppressant to the installation's haul roads as frequently as necessary to achieve compliance with 10 CSR 10-6.170 *Restriction of Particulate Matter to the Ambient Air Beyond the Premises of Origin*. The chemical dust suppressant agent shall be applied to the haul roads at the manufacturer's recommended application rate for the specific dust control agent to be used at this site. The chemical dust suppressant shall contain no VOC and no HAP.
- 2) Once each operating day, POET Biorefining – Macon shall conduct visible emissions observations at the property boundary.
- 3) POET Biorefining – Macon shall maintain the following records:
 - a) The results of each daily visible emissions observation at the property boundary.
 - b) The estimated surface area of the haul roads;
 - c) The time, date and the approximate amount of chemical dust suppressant agent applied; and
 - d) Records of breakdowns and repairs for the equipment used to apply the chemical dust suppressant agent.

7. PM₁₀ Emission Limitations

- A. POET Biorefining – Macon shall not discharge PM₁₀ into the atmosphere in excess of the amounts listed in Table 3.

Table 3: PM₁₀ Emission Limitations

Emission Source	Description	Primary PM₁₀ Emission Limits (lb/hr)
EP-01	Corn Receiving #1, Transfer, Storage, Conveyors, Scalper, and Surge Bin	2.11
EP-06	RTO	2.11
EP-07	DDGS Silo Bypass	0.151
EP-08	Boiler #1	0.06
EP-27	DDGS Fluid Bed Cooler	0.909
EP-28	DDGS Silo, Transfer, and Loading	0.151
EP-30	Boiler #2	0.079

SPECIAL CONDITIONS:

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

Emission Source	Description	Primary PM₁₀ Emission Limits (lb/hr)
EP-39	Loadout Conveyor	0.02
EP-40	Loadout Spout	0.08

- B. POET Biorefining – Macon shall conduct performance testing of EP-06 RTO once every five years to demonstrate compliance with Special Condition 7.A. The first performance test shall be conducted within 180 days of permit issuance. Performance testing shall be conducted according to Special Condition 11. Performance testing may be suspended if three consecutive performance tests document emission rates of less than 90% of the emission limit.
- C. POET Biorefining – Macon may use previously conducted performance test results to demonstrate compliance with the Primary PM₁₀ emission limits on EP-07, EP-08, EP-27, EP-28, and EP-30.
- D. POET Biorefining – Macon shall conduct performance testing of EP-01 within 180 days of permit issuance to demonstrate compliance with Special Condition 7.A.
- E. POET Biorefining – Macon shall conduct performance testing of EP-39 and EP-40 to demonstrate compliance with Special Condition 7.A within 60 days after achieving their maximum hourly production rate, but no later than 180 days after initial start-up for commercial operation.
8. Control Device Requirement – Flare
- A. POET Biorefining – Macon shall control VOC emissions from the ethanol loading rack(s) at all times loading is occurring using a flare.
- B. The flare shall be designed and operated to meet the requirements of §60.18(c) through (f).
- C. POET Biorefining - Macon shall maintain an operating and maintenance log for the flare which shall include the following:
- 1) Incidents of malfunction, with impact on emissions, duration of event, probable cause, and corrective actions;
 - 2) Maintenance activities, with inspection schedule, repair actions, and replacements, etc.; and
 - 3) A written record of regular inspection schedule, the date and results of all inspections including any actions or maintenance activities that result from that inspection.

SPECIAL CONDITIONS:

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

9. **Acrolein Modeling Analysis Restrictions**
POET Biorefining - Macon shall notify the Air Pollution Control Program before initial startup of any modifications to the facility design that could impact the release parameters specified in the Memorandums from the Modeling Unit titled, "AAQIA for POET Biorefining Macon Facility- Production Increase" (December 2015). POET Biorefining - Macon shall notify the Air Pollution Control Program of any modification which will increase the potential acrolein emission rate of any of the emission points identified in Tables 1, 2, and 3 of the AAQIA. In the event the Air Pollution Control Program determines that the changes are significant, POET Biorefining - Macon shall submit an updated AAQIA to the Air Pollution Control Program that continues to demonstrate compliance with Missouri's Acrolein RAL.

10. **Record Keeping and Reporting Requirements**
 - A. POET Biorefining - Macon shall maintain all records required by this permit for not less than five years and shall make them available immediately to any Missouri Department of Natural Resources' personnel upon request. These records shall include SDS for all materials used.

 - B. POET Biorefining - Macon shall report to the Air Pollution Control Program's Compliance/Enforcement Section, P.O. Box 176, Jefferson City, MO 65102, no later than 10 days after the end of the month during which any record required by this permit shows an exceedance of a limitation imposed by this permit.

11. **Performance Testing**
 - A. POET Biorefining - Macon shall conduct performance testing as required by Special Conditions 2.C, 7.B, and 7.D.

 - B. POET Biorefining - Macon may conduct performance testing as detailed in Special Condition 5.C to reset the three-hour rolling average operating temperature limit on the RTO.

 - C. Subsequent performance testing shall be conducted on the time schedules specified in Special Conditions 2.C and 7.B.

 - D. A completed Proposed Test Plan Form (enclosed) shall be submitted to the Air Pollution Control Program 30 days prior to the proposed test date so that the Air Pollution Control Program may arrange a pretest meeting, if necessary, and assure that the test date is acceptable for an observer to be present. The Proposed Test Plan may serve the purpose of notification and must be approved by the Director prior to conducting the required emission testing.

SPECIAL CONDITIONS:

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

- E. One electronic copy of a written report of the performance test results shall be submitted to the Director within 30 days of completion of any required testing. The report shall 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.
 - F. 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 including but not limited to:
 - 1) The beer feed rate (gpm)
 - 2) The pressure drop across the control devices (in H₂O)
 - 3) The liquid flow rate through the scrubbers (gpm)
 - 4) The operating temperature of the RTO (°F)
 - 5) The grain handling rate (tph)
 - 6) The DDGS production rate (tph)
 - 7) The fuel combustion rate (MMscf)
12. Control Device Requirement – Baghouse
- A. POET Biorefining – Macon shall control emissions from EP-38 Corn Receiving, EP-39 Loadout Conveyor, and EP-40 Loadout Spout using baghouses as specified in the permit application.
 - B. The baghouses shall be operated and maintained in accordance with the manufacturer's specifications. The baghouses shall be equipped with a gauge or meter, which indicates the pressure drop across the control devices. These gauges or meters shall be located such that Department of Natural Resources' employees may easily observe them.
 - C. Replacement filters 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. POET Biorefining – Macon shall monitor and record the operating pressure drop across the baghouses at least once every 24 hours. The operating pressure drop shall be maintained within the design conditions specified by the manufacturer.
 - E. POET Biorefining – Macon shall maintain a copy of the baghouse manufacturer's specifications on site.
 - F. POET Biorefining – Macon shall maintain an operating and maintenance log for the baghouses which shall include the following:

SPECIAL CONDITIONS:

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

- 1) Incidents of malfunction, with impact on emissions, duration of event, probable cause, and corrective actions; and
- 2) Maintenance activities, with inspection schedule, repair actions, and replacements, etc.

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

Project Number: 2015-06-050

Installation ID Number: 121-0028

Permit Number: 042017-011

Installation Address:

Northeast Missouri Grain Processors, Inc. d/b/a POET Biorefining - Macon
30211 Major Avenue
Macon, MO 63552

Macon County, S17, T57N, R13W

REVIEW SUMMARY

- POET Biorefining - Macon has applied for authority to increase anhydrous ethanol production, allow for fermentation scrubber bypass, and increase grain handling to allow for new grain loadout equipment.
- The application was deemed complete on March 20, 2017.
- HAP emissions are expected from the proposed equipment. HAPs are emitted from the ethanol production process, denaturant storage, and natural gas combustion. The main HAPs of concern from the installation are Hexane (110-64-3), Acetaldehyde (76-07-0), and Acrolein (107-02-8).
- 40 CFR Part 60, Subpart Dc – *Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units* applies to EP-08 Boiler #1 and EP-30 Boiler #2.
- 40 CFR Part 60, Subpart Kb – *Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984* applies to EP-11 190 Proof Ethanol Tank, EP-12 Denaturant Tank, EP-15 Denatured Ethanol Tank, and EP-32 Denatured Ethanol Tank.
- 40 CFR Part 60, Subpart VVa – *Standards of Performance for Equipment Leaks for VOC in the Synthetic Organic Chemicals Manufacturing Industry for Which Construction, Reconstruction, or Modification Commenced After November 7, 2006* applies to FS002 Equipment Leaks and FS005 Tank Leaks.
- None of the currently promulgated NESHAP and MACT regulations apply to the proposed equipment.
- Scrubbers are being used to control VOC and HAP emissions from the fermentation process and distillation process as required by Special Condition 4. An RTO is being

used to control VOC and HAP emissions from the DDGS Dryers, fermentation process, and distillation process as required by Special Condition 5. Chemical dust suppression is being used to control particulate emissions from unpaved haul roads as required by Special Condition 6. A flare is being used to control VOC and HAP emissions from EP-18 Ethanol Loadout as required by Special Condition 8. Baghouses are being used to control particulate emissions from EP-38, EP-39, and EP-40 as required by Special Condition 12. A baghouse is being used to control particulate emissions from EP-37 Hammermill #4 as required by Special Condition 4 of Construction Permit 102012-011. Baghouses are being used to control particulate emissions from EP-01, EP-07, EP-27, and EP-28 as required by Special Condition 5 of Construction Permit 032003-008C. Multi-cyclones are being used to control particulate emissions from the DDGS Dryers as required by Special Condition 8 of Construction Permit 032003-008C. Baghouses are being used to control particulate emissions from EP-34, EP-35, and EP-36 as required by Special Condition 1 of Construction Permit 102007-014.

- This review was conducted in accordance with Section (5) of Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*. Potential emissions of NO_x are conditioned below de minimis levels.
- This installation is located in Macon County an attainment area for all criteria pollutants.
- This installation is not on the List of Named Installations found in 10 CSR 10-6.020(3)(B), Table 2. The installation's major source level is 250 tons per year and fugitive emissions are not counted toward major source applicability.
- Ambient air quality modeling was performed to determine the ambient impact of Acrolein.
- Emissions testing is required by this permit.
- Approval of this permit is recommended with special conditions.

INSTALLATION DESCRIPTION

POET Biorefining – Macon operates an ethanol production plant in Macon, MO. Up to 19 million bushels of grain are processed to produce 200 proof ethanol. The grain is received and stored on site prior to cleaning and milling. The grain handling equipment is enclosed and vented to a baghouse with negative pressure. Once the grain is cleaned, it is then ground with hammermills. Emissions from each of the four hammermills and grain cleaners are controlled by a baghouse with negative pressure. The milled grain is then blended with water and enzymes to form a mash slurry for the fermentation process. Yeast and more enzymes are added to this mash in the 11 fermentation tanks. Emissions from the fermentation process are controlled by a scrubber and an RTO. When the RTO is bypassed, emissions from the scrubber are

vented to the atmosphere. When the scrubber is bypassed, emissions from the fermentation process are routed to the RTO.

After batch fermentation, the resultant ethanol mixture (beer) is distilled in a series of distillation columns. The resultant products are approximately 190 proof ethanol and whole stillage. Using molecular sieves, most of the remaining water will be removed from the ethanol to produce 200 proof ethanol. This is then combined with natural gasoline (denaturant) and shipped as denatured ethanol. Emissions from the distillation process are controlled by a scrubber and an RTO. During RTO bypass, emissions from the scrubber are vented to the atmosphere. When the scrubber is bypassed, emissions from the distillation process are routed to the RTO.

The whole stillage is centrifuged to yield thin stillage and solid fractions (wetcake). Emissions from the centrifuge are vented to the RTO. The thin stillage is further evaporated in a series of evaporators to produce a syrup. This syrup is combined with the centrifuged wetcake and dried and cooled in a series of ring driers to produce DDGS.

Two ring dryers are used to dry the DDGS. The air and water vapor from this process go through cyclones to collect additional DDGS product which has an added benefit of reducing the DDGS dust load before being vented to the RTO. The DDGS is stored and then loaded onto trucks for distribution. The DDGS load out system is controlled by a baghouse to minimize emissions. Process steam is produced by two natural gas-fired boilers.

Grain may be shipped out rather than processed to produced ethanol. The grain is conveyed from storage and loaded out using a telescoping spout.

A 67,000-gallon storage tank is available for 190 proof ethanol. The 200 proof ethanol is stored in a 180,000-gallon storage tank. Denaturant (gasoline) is stored in two storage tanks, one 49,000 gallons and the other 18,000 gallons. Denatured ethanol is stored in two storage tanks, one 180,000 gallons and the other 1,000,000 gallons. Emissions from truck loadout are controlled by a flare.

The following New Source Review permits have been issued to POET Biorefining – Macon from the Air Pollution Control Program:

Table 4: Permit History

Permit Number	Description
0399-011	Installation of a 15,000,000 gallons per year anhydrous ethanol manufacturing plant
0399-011A	Addition of another beer well
052002-001	Increase anhydrous ethanol production to 50,000,000 gallons per year
102007-014	Installation of four hammermills
032003-008	Increase anhydrous ethanol production to 50,000,000 gallons per year (replaces 052002-001)
032003-008A	Replace grain receiving pit, conveyors, storage bins, and flare
032003-008B	Replace RTO
032003-008C	Reevaluate PM ₁₀ emission limitations and modeling
102012-011	Install a hammermill and three fermentation tanks

PROJECT DESCRIPTION

POET Biorefining – Macon has requested to increase anhydrous ethanol production to 55,000,000 gallons per year. The requested anhydrous ethanol production increase will be realized without the installation of any new equipment. Table 5 contains an equipment/emission source list for the entire installation.

Table 5: Installation Equipment/Emission Source List

Emission Source	Description	Maximum Design Rate
EP-01	Corn Receiving #1, Transfer, Storage, and Conveyors	490 tph
	Scalper and Surge Bin	90 tph
EP-04	Fermentation Scrubber	633.3 gpm
EP-05	Distillation Scrubber	633.3 gpm
EP-06	DDGS Dryers & RTO	633.3 gpm, 68.5 MMBtu/hr natural gas for each dryer, 18 MMBtu/hr natural gas for the RTO
EP-07	DDGS Silo Bypass	22.83 tph, 3,500 acfm
EP-08	Boiler #1	60.5 MMBtu/hr natural gas
EP-09	Grain Dryer	31 MMBtu/hr natural gas, 60,000 tons per year
EP-11	190-Proof Ethanol Tank	67,000 gallon capacity, 60,500,000 gallons per year
EP-12	Denaturant Tank	49,000 gallon capacity
EP-13	Denaturant Tank	18,000 gallon capacity
EP-14	200-Proof Ethanol Tank	180,000 gallon capacity
EP-15	Denatured Ethanol Tank	180,000 gallon capacity
EP-17	Haul Roads	40,493 VMT per year
EP-18	Ethanol Loadout	58,000,000 gallons per year
EP-27	DDG Fluid Bed Cooler	633.33 gpm, 22.83 tph, 26,500 acfm
EP-28	DDGS Silo Transfer, and Loading	22.83 tph, 3,500 acfm
EP-30	Boiler #2	72.6 MMBtu/hr natural gas
EP-31	Flare	0.0567 MMBtu/hr
EP-32	Denatured Ethanol Tank	1,000,000 gallon capacity
EP-33	Corrosion Inhibitor Tank	1,000 gallon capacity
EP-34	Hammermill #1	22.83 tph, 12,000 acfm
EP-35	Hammermill #2	22.83 tph, 12,000 acfm
EP-36	Hammermill #3	22.83 tph, 12,000 acfm
EP-37	Hammermill #4	22.83 tph, 12,000 acfm
EP-38	Corn Receiving #2	560 tph
EP-39	Grain Loadout Conveyor	420 tph, 430 acfm
EP-40	Grain Loadout Spout	560 tph, 1,800 acfm
FS001	Grain Receiving and DDGS Handling Fugitives	490 tph grain, 30 tph DDGS
FS002	Equipment Leaks	See Table 8
FS003	Cooling Tower	18,500 gpm
FS005	Tank Leaks	See Table 9
FS006	Wet Cake Fugitives	60 tph
FS007	Grain Loadout Fugitives	560 tph

Potential emissions of the project were determined using an actual-to-potential calculation methodology. Baseline emissions were calculated using the average production rate during the two-year baseline period of August 2013 – July 2015, the baseline production rates are documented in Table 6.

Table 6: Baseline Production Rates

Material/Emission Source	Baseline Production/Usage Rate
Anhydrous Ethanol	43,806,025 gallons
Denatured Ethanol	46,111,605 gallons
Denaturant	2,305,580 gallons
Grain	456,823 tons
DDGS	22,464 tons
Syrup	22,464 tons
Wetcake	11,232 tons
CO ₂	71,488 tons
Chemicals	1,378,116 gallons
Boiler #1	204,217 MMBtu
Boiler #2	196,203 MMBtu
Grain Dryer	24,289 MMBtu, 47,619 tons
DDGS Dryers and RTO	496,390 MMBtu
RTO Bypass	213 hours

As the project involves no physical modifications, emission factors from the baseline period are the same as emission factors used to calculate potential emissions; therefore, project emissions were calculated based on the increased production rate (the difference between potential production/usage and baseline production/usage). Project emissions of NO_x exceed the de minimis level; therefore, the installation has accepted a limit of 92.74 tons per year of NO_x in order to avoid NO_x modeling (see Table 7).

Table 7: Project NO_x Emissions

NO_x Emission Source	Baseline Actual NO_x Emissions (tons)
EP-06 DDGS Dryers & RTO	31.92
EP-08 Boiler #1	10.01
EP-09 Grain Dryer	1.19
EP-30 Boiler #2	9.62
EP-31 Flare	N/D
Installation Baseline Actual NO_x Emissions (tons):	52.74
De Minimis Level (tons):	40.00
Installation NO_x Emission Limit (tons):	92.74

N/D = Not determined.

The installation was previously limited to 50,000,000 gallons per year of anhydrous ethanol production by Special Condition 2 of Construction Permit 102012-011; therefore, that special condition was superseded by this permit in order to accommodate the requested production increase.

The installation was previously required to operate the scrubbers at all times by Special Condition 5 of Construction Permit 102012-011 and Special Condition 6 of Construction

Permit 032003-008C; therefore, those special conditions were superseded by this permit in order to accommodate the requested 75 hours per year of scrubber bypass.

The installation was previously limited to 100 tons per year of VOC, 100 tons per year of CO, 10 tons per year of individual HAPs, and 25 tons per year of combined HAPs by Special Conditions 2.A, 2.B, and 2.C of Construction Permit 032003-008C. Those special conditions have been superseded as the installation's calculated PTE indicates that the installation naturally emits less than those limits.

Special Condition 2.D of Construction Permit 032003-008C contained PM₁₀ emission rate limits which were set by PM₁₀ modeling conducted in March of 2011. Those limits have been superseded as the production increase will increase PM₁₀ emissions from EP-01 and project emissions are based on the March 2015 RTO stack test which documented a lower PM₁₀ emission rate than previously permitted. The permitted PM₁₀ emission rates for EP-07, EP-08, EP-27, EP-28, and EP-30 were re-instated from Construction Permit 032003-008C unchanged. New PM₁₀ modeling was deemed unnecessary as this project is occurring more than four years after the previous modeling and PM₁₀ emissions from this project are below de minimis levels.

Special Condition 3 of Construction Permit 032003-008C contained daily and annual production limits which were the basis of the PM₁₀ modeling conducted in March of 2011. The daily limits have been re-instated in this permit unchanged. The annual limits have been modified in order to accommodate the requested production increase. New PM₁₀ modeling was deemed unnecessary as this project is occurring more than four years after the previous modeling and PM₁₀ emissions from this project are below de minimis levels.

Special Condition 12 of Construction Permit 032003-008C contained paved haul road silt loading requirements. This special condition was superseded and re-instated to clarify which haul roads are paved and require silt loading testing.

EMISSIONS/CONTROLS EVALUATION

VOC and HAP emissions from EP-27 DDG Fluid Bed Cooler were calculated using stack test results from a sister facility located in Alexandria, IN. The beer feed rate during the testing event at the sister facility was 720 gpm; therefore, the emission rates were scaled down to the maximum hourly design rate at POET Biorefining – Macon of 633.3 gpm.

Particulate emissions from EP-07 DDGS Silo Bypass, EP-27 DDGS Fluid Bed Cooler, EP-28 DDGS Storage Silo #1, EP-34 Hammermill #1, EP-35 Hammermill #2, EP-36 Hammermill #3, EP-37 Hammermill #4, EP-39 Loadout Conveyor, and EP-40 Loadout Spout are controlled by baghouses. The maximum grain outlet concentrations of the existing baghouses are provided in Table 8 and were used to calculate the PTE of these emission sources.

Table 8: Maximum Grain Outlet Concentration of the Baghouses

Emission Source	Description	Maximum Grain Outlet Concentration of the Baghouse (gr/dscf)
EP-07	DDGS Silo Bypass	0.005
EP-27	DDGS Fluid Bed Cooler	0.004
EP-28	DDGS Storage Silo #1	0.005
EP-34	Hammermill #1	0.004
EP-35	Hammermill #2	0.004
EP-36	Hammermill #3	0.004
EP-37	Hammermill #4	0.003
EP-39	Loadout Conveyor	0.005
EP-40	Loadout Spout	0.005

Particulate emissions from EP-01 Corn Receiving #1 (including receiving, conveying, storage bins, elevator, scalper, and surge bin) and EP-38 Corn Receiving #2 (including receiving and conveying) were calculated using emission factors obtained from the EPA document AP-42, *Compilation of Air Pollutant Emission Factors*, Fifth Edition, Section 9.9.1 "Grain Elevators & Processes" (May 2003). Emissions from these sources are routed to a baghouse. The overall control efficiency for the conveyors, storage bins, elevator, scalper, and surge bins was assumed to be 99%. The overall control efficiency for receiving was assumed to be 94.05%.

Emissions from EP-06 DDGS Dryers & RTO were calculated using stack tested emission rates from testing conducted in March of 2015 and November of 2015 on the RTO while the scrubbers were in operation. The beer feed rate during the testing event was 34,200 gph; therefore, the emission rates were scaled up to the maximum hourly design rate of 38,000 gph. These results are considered representative of the normal operating scenario of the installation in which the scrubbers are being used to control emissions from the distillation and fermentation processes and the RTO is being used to control emissions from the scrubbers, centrifuges, and DDGS Dryers.

During RTO bypass emissions from the scrubbers and centrifuges vent directly to the atmosphere. The DDGS Dryers are not allowed to operate during RTO bypass. Emissions from EP-04 Fermentation Scrubber were calculated using stack tested emission rates from testing conducted in February of 2014 at the installation. The beer feed rate during the February 2014 testing event was 31,800 gph; therefore, the emission rates were scaled up to the maximum hourly design rate of 38,000 gph. Emissions from EP-05 Distillation Scrubber were calculated using stack tested emission rates from testing conducted in August of 2003 at the installation. The beer feed rate during the August 2003 testing event was 460 gpm; therefore, the emission rates were scaled up to the maximum hourly design rate of 633.3 gpm. During the August 2003 stack testing event acetaldehyde was the only HAP tested. As emissions of acrolein, methanol, and formaldehyde are also expected from the distillation scrubber, emissions of these HAPs were determined by scaling the acrolein, methanol, and formaldehyde emission rates from the March 2015 RTO stack test results by the acetaldehyde emission rates in the March 2015 RTO stack test and the August 2003 distillation scrubber stack test. Emissions from the centrifuges were calculated using a material balance and are based on an average of 0.1 wt% VOC in the water within the

centrifuges, a maximum total flow rate through the centrifuges of 313,219 lb/hr (includes 14.5 wt% solids and 85.5 wt% water), and an emission rate/material loss rate of 0.35 wt%.

During scrubber bypass, emissions from the fermentation tanks, beer well, preblend tank, beer strippers, side strippers rectifier, molecular sieves, rundown tank, and DDGS Dryers are vented to the RTO. Emissions from the combustion of natural gas within the RTO and DDGS Dryers were calculated using emission rates from the March 2015 RTO stack test and emission factors from AP-42 Section 1.4 "Natural Gas Combustion" (July 1998). Fermentation and distillation process emissions were calculated using inlet scrubber testing from a sister facility in Portland, IN. The beer feed rate during the Portland, IN testing event was 839.9 gpm; therefore, the emission rates were scaled down to the maximum hourly design rate of 633.3 gpm. A conservative destruction efficiency of 98% for VOC and 95% for HAP was applied to the Portland, IN emission rates as the emissions at POET Biorefining – Macon will pass through the RTO before entering the atmosphere. Process emissions from the DDGS Dryers were determined by subtracting the scaled February 2014 Fermentation Scrubber stack test results and scaled August 2003 Distillation Scrubber stack test results from the scaled March 2015 RTO stack test results. Increased loading to the RTO will increase CO emissions. The installation has assumed that CO emissions will increase by 1.4 times the CO emission rate during the normal operating scenario. It is unclear if the installation's assumption is conservative; however, as the scrubber bypass scenario is limited to 75 hours per year and project CO emissions are far below the de minimis levels, the Air Pollution Control Program does not believe that testing is necessary to accurately quantify the CO emission rate during scrubber bypass. During scrubber bypass the yeast propagation tanks vent directly to the atmosphere. Emissions from the yeast propagation tanks were determined using Raoult's Law and assume the average ethanol concentration in the yeast propagation tanks is 5 wt%.

Emissions from EP-09 Grain Dryer were calculated using emission factors from AP-42 Sections 1.4 "Natural Gas Combustion" (July 1998) and 9.9.1 "Grain Elevators & Processes" (May 2003). During the baseline period 10.424 wt% of the grain received was dried; therefore, it was assumed that in the future the same percentage of grain will require drying.

Emissions from EP-08 Boiler #1 and EP-30 Boiler #2 were calculated using emission factors from AP-42 Section 1.4 "Natural Gas Combustion" (July 1998). Particulate emissions are limited to the rates established by Construction Permit 032003-008C which have been superseded and re-instated by this permit.

Emissions from FS002 Equipment Leaks were calculated using emission factors from EPA's "Protocol for Equipment Leak Emission Estimates" (November 1995) and are based on the equipment listed in Table 9.

Table 9: Equipment Leak Sources

Equipment Type	Number of Sources¹	Control Efficiency
Pump Seals	5 in beer service & 5 in VOC service	75% for NSPS VVa LDAR
Light Liquid Valves	94 in beer service & 159 in VOC service	88% for NSPS VVa LDAR
Gas Valves	68 in VOC service	92% for NSPS VVa LDAR
Pressure Relief Valves	5 in VOC service	100% for rupture disk assembly
Open Ended Lines	2 in beer service & 23 in VOC service	100% for blind, cap, plug or second valve
Connectors	307 in beer service & 706 in VOC service	93% for NSPS VVa LDAR

Emissions from EP-18 Ethanol Loadout were calculated using the loading loss equation from AP-42 Section 5.2 "Transportation and Marketing of Petroleum Liquids" (July 2008). The vapor collection system is assumed to be 98.7% effective as the installation is required to meet the requirements of NSPS VVa. Captured emissions are controlled by EP-31 Flare which was conservatively assumed to achieve 98% destruction efficiency. Emissions from the operation of the flare were calculated using emission factors obtained from AP-42 Section 13.5 "Industrial Flares" (April 2015).

Emissions from the tanks (EP-11, EP-12, EP-13, EP-14, EP-15, EP-32, and EP-33) were calculated using TANKS4.0.9d.

Emissions from FS005 Tank Farm Leaks were calculated using emission factors from EPA's "Protocol for Equipment Leak Emission Estimates" (November 1995) and are based on the equipment listed in Table 10.

Table 10: Tank Farm Leak Sources

Equipment Type	Number of Sources	Control Efficiency
Pump Seals	2 in denaturant service & 4 in ethanol service	75% for NSPS VVa LDAR
Light Liquid Valves	18 in denaturant service & 111 in ethanol service	88% for NSPS VVa LDAR
Gas Valves	5 in ethanol service	92% for NSPS VVa LDAR
Pressure Relief Valves	3 in denaturant service & 31 in ethanol service	100% for rupture disk assembly
Connectors	141 in denaturant service & 667 in ethanol service	93% for NSPS VVa LDAR

Emissions from FS001 DDGS Handling Fugitives were calculated using emission factors obtained from AP-42 Section 9.9.1 "Grain Elevators & Processes" (May 2003) and were given 3.7% control efficiency as the operations are enclosed within a shed.

¹ As beer contains less than 15 wt% of VOC; therefore, the emission factors for sources in beer service were reduced by 85%. Sources in VOC service were given no reduction.

Emissions from EP-17 Haul Roads were calculated using equations from AP-42 Section 13.2.2 "Unpaved Roads" (November 2006) and 13.2.1 "Paved Roads" (January 2011) and information from Construction Permit 032003-008C.

Emissions from FS003 Cooling Towers were calculated based on the maximum water circulation rate of 18,500 gpm, 0.005% drift loss, and a maximum TDS content of 1500 ppm. TDS monitoring is required by Special Condition 13.D of Construction Permit 032003-008C.

Emissions from FS006 Wet Cake Fugitives were calculated using emission factors obtained from stack testing conducted at DENCO in Morris, MN. The DENCO stack test provided emission factors in lb/ton of wet cake produced/hr of storage. The installation has indicated that the maximum storage length of a given batch of wet cake is 72 hours as the material spoils over time. Two analyses of wet cake were performed which indicated that the acrolein content of wetcake is below the detection level of the test method.

Emissions from FS007 Grain Loadout Fugitives were calculated assuming that the baghouse on EP-40 Loadout Spout only achieves 80% capture. Emissions were calculated by taking 20% of the emission factors obtained from AP-42 Section 9.9.1 "Grain Elevators & Processes" (May 2003).

Tables 11 and 12 provide an emissions summary for this project. Existing actual emissions were taken from the installation's 2014 EIQ. Potential emissions of the application represent the emissions increase from the baseline period, assuming continuous operation (8760 hours per year).

Table 11: Emissions Summary (tons per year)

Pollutant	Regulatory <i>De Minimis</i> Levels	Existing Actual Emissions (2014 EIQ)	Potential Emissions of the Application	New Installation Conditioned Potential
PM	25.0	N/D	15.91	56.93
PM ₁₀	15.0	25.18	10.65	33.60
PM _{2.5}	10.0	17.33	7.90	16.32
SO _x	40.0	0.12	0.39	0.82
NO _x	40.0	41.88	<40.0	<92.74
VOC	40.0	23.12	29.19	81.36
CO	100.0	44.01	44.36	70.66

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

The installation will still require an Intermediate operating permit after the issuance of this permit as the 92.74 tons per year NO_x emission limitation in Special Condition 2 is a voluntarily agreed to federally enforceable limitation which reduces the installation's NO_x PTE from 111.56 tons per year to below major source levels.

Table 12: HAP Emissions Summary (tons per year)

Pollutant	Regulatory De Minimis Levels	SMAL	Existing Actual Emissions (2014 EIQ)	New Installation Conditioned Potential
HAP	25.0	N/A	1.14	8.25
Hexane (110-54-3)	10.0	10	N/D	3.33
Acetaldehyde (75-07-0)	10.0	10	1.14	2.97
Formaldehyde (50-00-0)	10.0	2	N/D	1.14
Acrolein (107-02-8)	10.0	0.04	N/D	0.56
Methanol (67-56-1)	10.0	10	N/D	0.48
Benzene (71-43-2)	10.0	2	N/D	0.18
Toluene (108-88-3)	10.0	10	N/D	0.03
Xylene (1330-20-7)	10.0	10	N/D	0.01

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

Acrolein emissions exceeded the SMAL; therefore, the installation underwent acrolein modeling.

PERMIT RULE APPLICABILITY

This review was conducted in accordance with Section (5) of Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*. Potential emissions of NO_x are conditioned below de minimis levels.

APPLICABLE REQUIREMENTS

POET Biorefining – Macon shall comply with the following applicable requirements. The Missouri Air Conservation Laws and Regulations should be consulted for specific record keeping, monitoring, and reporting requirements. Compliance with these emission standards, based on information submitted in the application, has been verified at the time this application was approved. For a complete list of applicable requirements for your installation, please consult your operating permit.

- 10 CSR 10-6.065 *Operating Permits*
- 10 CSR 10-6.110 *Submission of Emission Data, Emission Fees and Process Information*
 - The installation is required to submit a full EIQ for the first full calendar year after the issuance of this permit.
- 10 CSR 10-6.165 *Restriction of Emission of Odors*
- 10 CSR 10-6.170 *Restriction of Particulate Matter to the Ambient Air Beyond the Premises of Origin*
- 10 CSR 10-6.220 *Restriction of Emission of Visible Air Contaminants*
- 10 CSR 10-6.070 *New Source Performance Regulations*
 - 40 CFR Part 60, Subpart Dc – *Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units*
 - 40 CFR Part 60, Subpart Kb – *Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage*

- *Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984*
 - *40 CFR Part 60, Subpart VVa – Standards of Performance for Equipment Leaks for VOC in the Synthetic Organic Chemicals Manufacturing Industry for Which Construction, Reconstruction, or Modification Commenced After November 7, 2006*
- *10 CSR 10-6.400 Restriction of Emission of Particulate Matter From Industrial Processes*

AMBIENT AIR QUALITY IMPACT ANALYSIS

Ambient air quality modeling was performed to determine the ambient impact of acrolein. Modeling was performed for three different operating scenarios (normal operation (i.e. no RTO or scrubber bypasses), RTO bypass, and scrubber bypass) using AERMOD. The highest modeled impacts are provided in the following table:

Table 13: Acrolein Modeling Results

Operating Scenario	Modeled Impact ($\mu\text{g}/\text{m}^3$)	RAL ($\mu\text{g}/\text{m}^3$)	Time Period
Normal	0.3	6.9	24-hour
	0.02	0.02	Annual
RTO Bypass	4.1	6.9	24-hour
	0.02	0.02	Annual
Scrubber Bypass	0.4	6.9	24-hour
	0.02	0.02	Annual

For more detailed information, see “AAQIA for POET Biorefining Macon Facility- Production Increase” (December 2015).

STAFF RECOMMENDATION

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

PERMIT DOCUMENTS

The following documents are incorporated by reference into this permit:

- The Application for Authority to Construct form, dated June 15, 2015, received June 16, 2015, designating Northeast Missouri Grain Processors, Inc. d/b/a POET Biorefining – Macon as the owner and operator of the installation.
- AAQIA for POET Biorefining Macon Facility – Production Increase (December 2015).

Attachment A – NO_x Compliance Worksheet

POET Biorefining – Macon
 Macon County, S17, T57N, R13W
 Project Number: 2015-06-050
 Installation ID Number: 121-0028
 Permit Number: 042017-011

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

Emission Source	Description	Monthly Usage	NO _x Emission Factor	Emission Factor Source	Monthly NO _x Emissions ² (tons)
EP-06	DDGS Dryers & RTO at a scrubber flow rate of 45 gpm	Gal beer produced	2.4678 x 10 ⁻⁴ lb/gal beer produced ³	March 2015 Stack Test	
EP-06	DDGS Dryer & RTO at a scrubber flow rate of 20 gpm	Gal beer produced	2.7602 x 10 ⁻⁴ lb/gal beer produced ⁴	November 2015 Stack Test	
EP-08	Boiler #1	MMscf	100 lb/MMscf	AP-42 Table 1.4-1	
EP-09	Grain Dryer	MMscf	100 lb/MMscf	AP-42 Table 1.4-1	
EP-30	Boiler #2	MMscf	100 lb/MMscf	AP-42 Table 1.4-1	
EP-31	Flare	0.0567 MMBtu/hr	0.068 lb/MMBtu	AP-42 Table 13.5-1	0.001
Installation Monthly NO_x Emissions⁵ (tons):					
Installation 12-Month Rolling Total NO_x Emissions⁶ (tons):					

² Monthly NO_x Emissions (tons) = Monthly Usage x NO_x Emission Factor x 0.0005 tons/lb.

³ This NO_x Emission Factor may be replaced by a newer stack tested emission factor. The newer stack tested emission factor shall be based on approved stack testing and shall be determined by dividing the stack tested hourly NO_x emission rate (lb/hr) by the beer production rate during the stack testing (gal/hr).

⁴ This NO_x Emission Factor may be replaced by a newer stack tested emission factor. The newer stack tested emission factor shall be based on approved stack testing and shall be determined by dividing the stack tested hourly NO_x emission rate (lb/hr) by the beer production rate during the stack testing (gal/hr).

⁵ Installation Monthly NO_x Emissions (tons) = the sum of the Monthly NO_x Emissions (tons) from each emission source.

⁶ Installation 12-Month Rolling Total NO_x Emissions (tons) = the sum of the 12 most recent Installation Monthly NO_x Emissions (tons) + the sum of all start-up, shutdown, and malfunction NO_x emissions as reported to the Air Pollution Control Program's Compliance/Enforcement Section during the same 12-month period. **Installation 12-Month Rolling Total NO_x Emissions of less than 92.74 tons indicates compliance with Special Condition 2.A.**

Attachment B –Material Handling Worksheet

POET Biorefining – Macon
Macon County, S17, T57N, R13W
Project Number: 2015-06-050
Installation ID Number: 121-0028
Permit Number: 042017-011

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

Material⁷:

Date (Month/Year)	Monthly Material Handling (tons)	12-Monthly Rolling Total Material Handling ⁸ (tons)

⁷ POET Biorefining – Macon shall maintain an Attachment B for each of the materials limited by Special Condition 3 (i.e. grain, DDGS, wetcake, anhydrous ethanol, denatured ethanol, syrup, denaturant, CO₂, and Chemicals [enzymes, urea, acid, and caustic]).

⁸ 12-Month Rolling Total Material Handling (tons) = the sum of the 12 most recent Monthly Material Handling (tons). **12-Month Rolling Total Material Handling of less than 666,800 tons grain, 200,000 tons DDGS, 80,000 tons wetcake, 55,000,000 gallons anhydrous ethanol, 58,000,000 gallons denatured ethanol, 20,000 tons syrup, 3,000,000 gallons denaturant, 135,000 tons CO₂, and 1,600,000 gallons chemicals (enzymes, urea, acid, and caustic) demonstrates compliance with Special Condition 3.A.**

Attachment C – Bypass Worksheet

POET Biorefining – Macon
 Macon County, S17, T57N, R13W
 Project Number: 2015-06-050
 Installation ID Number: 121-0028
 Permit Number: **042017-011**

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

Control Device⁹:

Date (Month/Year)	Monthly Bypass Operation (hours)	12-Monthly Rolling Total Bypass Operation ¹⁰ (hours)

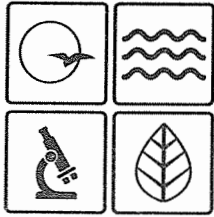
⁹ POET Biorefining – Macon shall maintain an Attachment C for each of the following control devices: Scrubber (C003) and RTO (C005C).

¹⁰ 12-Month Rolling Total Bypass Operation (hours) = the sum of the 12 most recent Monthly Bypass Operation (hours). **12-Month Rolling Total Bypass Operation of less than or equal to 75 hours for Scrubber (C003) and 500 hours for RTO (C005C) demonstrates compliance with Special Conditions 4.A and 5.A.**

APPENDIX A

Abbreviations and Acronyms

%	percent	m/s	meters per second
°F	degrees Fahrenheit	Mgal	1,000 gallons
acfm	actual cubic feet per minute	MW	megawatt
BACT	Best Available Control Technology	MHDR	maximum hourly design rate
BMPs	Best Management Practices	MMBtu ...	Million British thermal units
Btu	British thermal unit	MMCF	million cubic feet
CAM	Compliance Assurance Monitoring	MSDS	Material Safety Data Sheet
CAS	Chemical Abstracts Service	NAAQS ..	National Ambient Air Quality Standards
CEMS	Continuous Emission Monitor System	NESHAPs	National Emissions Standards for Hazardous Air Pollutants
CFR	Code of Federal Regulations	NO_x	nitrogen oxides
CO	carbon monoxide	NSPS	New Source Performance Standards
CO₂	carbon dioxide	NSR	New Source Review
CO_{2e}	carbon dioxide equivalent	PM	particulate matter
COMS	Continuous Opacity Monitoring System	PM_{2.5}	particulate matter less than 2.5 microns in aerodynamic diameter
CSR	Code of State Regulations	PM₁₀	particulate matter less than 10 microns in aerodynamic diameter
dscf	dry standard cubic feet	ppm	parts per million
EIQ	Emission Inventory Questionnaire	PSD	Prevention of Significant Deterioration
EP	Emission Point	PTE	potential to emit
EPA	Environmental Protection Agency	RACT	Reasonable Available Control Technology
EU	Emission Unit	RAL	Risk Assessment Level
fps	feet per second	SCC	Source Classification Code
ft	feet	scfm	standard cubic feet per minute
GACT	Generally Available Control Technology	SDS	Safety Data Sheet
GHG	Greenhouse Gas	SIC	Standard Industrial Classification
gpm	gallons per minute	SIP	State Implementation Plan
gr	grains	SMAL	Screening Model Action Levels
GWP	Global Warming Potential	SO_x	sulfur oxides
HAP	Hazardous Air Pollutant	SO₂	sulfur dioxide
hr	hour	tph	tons per hour
hp	horsepower	tpy	tons per year
lb	pound	VMT	vehicle miles traveled
lbs/hr	pounds per hour	VOC	Volatile Organic Compound
MACT	Maximum Achievable Control Technology		
µg/m³	micrograms per cubic meter		



Missouri Department of dnr.mo.gov

NATURAL RESOURCES

Eric R. Greitens, Governor

Carol S. Comer, Director

APR 25 2017

Mr. Steve Murphy
General Manager
Northeast Missouri Grain Processors, Inc. d/b/a POET Biorefining - Macon
30211 Major Avenue
Macon, MO 63552

RE: New Source Review Permit - Project Number: 2015-06-050

Dear Mr. Murphy:

Enclosed with this letter is your permit to construct. Please study it carefully and refer to Appendix A for a list of common abbreviations and acronyms used in the permit. Also, note the special conditions 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 revision of your intermediate operating permit application, Project 2010-05-083, 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 were adversely affected by this permit decision, you may be entitled to pursue an appeal before the administrative hearing commission pursuant to §§621.250 and 643.075.6 RSMo. To appeal, you must file a petition with the administrative hearing commission 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 administrative hearing commission, whose contact information is: Administrative Hearing Commission, U.S. Post Office Building, 131 West High Street, Third Floor, P.O. Box 1557, Jefferson City, Missouri 65102, phone: 573-751-2422, fax: 573-751-5018, website: www.oa.mo.gov/ahc.



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Mr. Steve Murphy
Page Two

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

Sincerely,

AIR POLLUTION CONTROL PROGRAM



Susan Heckenkamp
New Source Review Unit Chief

SH:ahj

Enclosures

c: Northeast Regional Office
PAMS File: 2015-06-050

Permit Number: 042017-011