

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: 102017-014

Project Number: 2017-04-035
Installation Number: 007-0054

Parent Company: Missouri Ethanol, LLC

Parent Company Address: 809 North Pine, Laddonia, MO 63352

Installation Name: Missouri Ethanol, LLC d/b/a POET Biorefining - Laddonia

Installation Address: 809 North Pine, Laddonia, MO 63352

Location Information: Audrain County, S36, T52N, R7W

Application for Authority to Construct was made for:
Installation of a seventh 570,000 gallon fermentation tank. 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.

Derrall B. Hale for

Prepared by
Alana Hess
New Source Review Unit

Kyra L. Moody

Director or Designee
Department of Natural Resources

OCT 24 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. Permittee should notify the Enforcement and Compliance Section of 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 Enforcement and Compliance Section of 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 within 30 days of actual startup. Also, you must notify the Department's Northeast Regional Office within 15 days after the actual start up of this (these) air contaminant source(s).

A copy of the permit application and this permit and permit review shall be kept at the installation address and shall be made available to Department's 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 using the contact information below.

Contact Information:
Missouri Department of Natural Resources
Air Pollution Control Program
P.O. Box 176
Jefferson City, MO 65102-0176
(573) 751-4817

The regional office information can be found at the following website:
<http://dnr.mo.gov/regions/>

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."

**POET Biorefining - Laddonia
 Audrain County, S36, T52N, R7W**

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.B, 2.C, 4, 6, 8.A.1, 8.A.2, 8.A.3, 8.A.5, and 14 of Construction Permit 102005-015A
 - 2) Special Conditions 2, 3, and 6 of Construction Permit 102005-015C.

2. **Installation-wide Limitations**
 - A. POET Biorefining – Laddonia shall emit less than 100.0 tons of CO in any consecutive 12-month period from the entire installation (see Table 1).

Table 1: POET Biorefining – Laddonia CO Emission Sources

Emission Source	Description
EP-09	DDGS Dryers (2), Centrifuges (5), and RTO
EP-13	Boiler #1
EP-14	Boiler #2
EP-15 and EP-16	Denatured Ethanol Loadout Flare

- B. POET Biorefining – Laddonia shall not produce denatured ethanol in excess of 68,000,000 gallons in any consecutive 12-month period.
 - C. POET Biorefining – Laddonia shall monitor and record monthly and 12-month rolling total emissions of CO using Attachment A or an equivalent form.
 - D. POET Biorefining – Laddonia shall monitor and record monthly and 12-month rolling total denatured ethanol production using Attachment B or an equivalent form.

3. **Control Equipment – Wet Scrubber**
 - A. A wet scrubber shall be used to control VOC and HAP emissions from the Fermentation and Distillation Processes. The Fermentation Process consists of (7) 570,000 gallon fermentation tanks, a beer well, a slurry tank, and a yeast propagation tank. The Distillation Process consists of a

SPECIAL CONDITIONS:

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

beer stripper, a rectifier, a side stripper, a 200-proof rundown tank, a reboiler, a regeneration tank, and a 190-proof rundown tank. POET Biorefining – Laddonia shall not bypass the wet scrubber for more than 40 hours in any consecutive 12-month rolling total period.

- B. The scrubber and any related instrumentation or equipment shall be operated and maintained in accordance with the scrubber manufacturer's specifications. The scrubber shall be equipped with a gauge or meter that indicates the pressure drop across the scrubber. The scrubber shall be equipped with a flow meter that indicates the liquid flow rate through the scrubber. These gauges or meters shall be located such that Department of Natural Resources' employees may easily observe them.
- C. POET Biorefining – Laddonia shall monitor and record the pressure drop across the scrubber at least once every 24 hours. The pressure drop shall be maintained within the normal operating range specified by the scrubber manufacturer.
- D. POET Biorefining – Laddonia shall monitor and record the liquid flow rate through the scrubber at least once every 24 hours. The liquid flow rate shall be maintained at a value greater than or equal to the average liquid flow rate during the most recent performance test¹.
- E. POET Biorefining – Laddonia shall maintain onsite documentation from the scrubber manufacturer indicating the normal operating range for the scrubber.
- F. POET Biorefining – Laddonia shall maintain an operating and maintenance log for the scrubber which shall include the following:
 - 1) Incidents of malfunction, with impact on emissions (tons), duration of event, probable cause, and corrective actions; and
 - 2) Maintenance activities, with inspection schedule, repair actions, and replacements, etc.
- G. POET Biorefining – Laddonia shall maintain records of monthly and 12-month rolling total hours of wet scrubber bypass using Attachment D or an equivalent form.

¹ During the May 2016 performance test, the liquid flow rate through the scrubber was 45.7 gpm during RTO bypass and 36.1 gpm during RTO operation; therefore, the liquid flow rate shall remain greater than or equal to 45.7 gpm during RTO bypass and greater than 36.1 gpm during RTO operation until the next performance test.

SPECIAL CONDITIONS:

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

4. **Control Equipment – Regenerative Thermal Oxidizer (RTO)**
 - A. POET Biorefining – Laddonia shall control emissions from the scrubber and the DDGS Dryers using an RTO. POET Biorefining – Laddonia shall not bypass the RTO for more than 500 hours in any consecutive 12-month rolling total period. POET Biorefining – Laddonia shall not operate the DDGS Dryers during RTO bypass.
 - B. POET Biorefining – Laddonia shall maintain records of monthly and 12-month rolling total hours of RTO bypass using Attachment C or an equivalent form.
 - C. The operating temperature of the RTO shall be continuously monitored and recorded. The operating temperature of the RTO shall be maintained on a rolling three-hour average within $\pm 50^{\circ}\text{F}$ of the average operating temperature of the RTO during the most recent RTO performance test².
 - D. POET Biorefining – Laddonia shall maintain an operating and maintenance log for the RTO which shall include the following:
 - 1) Incidents of malfunction, with impact on emissions (tons), duration of event, probable cause, and corrective actions; and
 - 2) Maintenance activities, with inspection schedule, repair actions, and replacements, etc.
5. **Performance Testing**
 - A. POET Biorefining – Laddonia shall conduct performance tests every five years³ to establish the VOC, combined HAP, Acetaldehyde, Acrolein, Formaldehyde, and Methanol emission rates from the Bypass Stack (EP-08), the RTO (EP-09), and the Fluid Bed Cooler (EP-10).
 - B. POET Biorefining – Laddonia shall conduct performance tests every five years³ to establish the CO emission rate from the RTO (EP-09).
 - C. Testing shall occur at production rates representative of normal operating conditions. The maximum production rate after the performance testing shall be limited to 110% of the average production rate during the performance testing event.
 - D. One electronic copy of a written report of the performance test results

² During the May 2016 performance test, the average operating temperature of the RTO was 1,651.3°F; therefore, the three-hour average operating temperature of the RTO shall be within $\pm 50^{\circ}\text{F}$ of 1,651.3°F until the next performance test.

³ The most recent performance tests were conducted in May 2016; therefore, the next performance tests are required by May 2021.

SPECIAL CONDITIONS:

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

shall be submitted to stacktesting@dnr.mo.gov within 60 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.

- E. 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, specifically:
 - 1) The production rate during each performance test run. Production rates for the Bypass Stack (EP-08) and the RTO (EP-09) shall be indicated in terms of gallons of beer. Production rates for the Fluid Bed Cooler (EP-10) shall be indicated in terms of tons of DDGS.
 - 2) The pressure drop across the scrubber and the liquid flow rate through the scrubber during each performance test run for the Bypass Stack (EP-08) and the RTO (EP-09).
 - 3) The operating temperature of the RTO (EP-09) during each performance test run.

- 6. Record Keeping and Reporting Requirements
 - A. POET Biorefining – Laddonia 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 - Laddonia 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.

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

Project Number: 2017-04-035
Installation ID Number: 007-0054
Permit Number: 102017 - 014

Installation Address:

Missouri Ethanol, LLC d/b/a POET Biorefining - Laddonia
809 North Pine
Laddonia, MO 63352

Parent Company:

Missouri Ethanol, LLC
809 North Pine
Laddonia, MO 63352

Audrain County, S36, T52N, R7W

REVIEW SUMMARY

- POET Biorefining - Laddonia has applied for authority to construct a seventh 570,000 gallon fermentation tank.
- The application was deemed complete on April 18, 2017.
- HAP emissions are expected from the proposed equipment. The beer in the seventh fermentation tank will emit Acetaldehyde, Acrolein, Formaldehyde, and Methanol.
- 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 the seventh fermentation tank. The fermentation tank is equipped with a closed vent system and routed to a scrubber which meets the requirements of §60.112b(a)(3).
- 40 CFR Part 60, Subpart VVa – *Standards of Performance for Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry for Which Construction, Reconstruction, or Modification Commenced After November 7, 2006* is applicable to the new pump seal, light liquid valves, and connectors associated with the seventh fermentation tank.
- 40 CFR Part 63, Subpart VVVVV – *National Emission Standards for Hazardous Air Pollutants for Chemical Manufacturing Area Sources* may apply to the seventh fermentation tank. This regulation applies if any liquid or gas stream contains acetaldehyde at concentrations greater than 0.1 percent by weight.
- None of the currently promulgated NESHAP regulations apply to the proposed equipment.

- A scrubber is being used to control VOC and HAP emissions from the seventh fermentation tank as required by Special Condition 3. An RTO is being used to control VOC and HAP emissions from the scrubber as required by Special Condition 4. Leak detection and repair (LDAR) is required by 40 CFR Part 60, Subpart VVa to control VOC and HAP emissions from the new pump seal, light liquid valves, and connectors associated with the seventh fermentation tank.
- This review was conducted in accordance with Section (5) of Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*. Potential emissions of the project are below de minimis levels. A permit was required to include the seventh fermentation tank in the installation's 68,000,000 gallons per year denatured ethanol production limit and to institute practically enforceable control device requirements on the seventh fermentation tank.
- This installation is located in Audrain County, an attainment area for all criteria pollutants.
- This installation is on the List of Named Installations found in 10 CSR 10-6.020(3)(B), Table 2 Item #20 Chemical process plants; however, the installation is not one of the stationary sources listed in §52.21(b)(1)(i)(a) as ethanol production facilities that produce ethanol by natural fermentation included in NAICS codes 325193 or 312140 are not included in the chemical process plant category.
- Ambient air quality modeling was not performed since potential emissions of the application are below de minimis levels.
- Emissions testing is required for the equipment as a part of this permit. Testing may also be required as part of other state, federal, or applicable rules.
- A Part 70 Operating Permit application is required for this installation within one year of commencement of operations.
- Approval of this permit is recommended with special conditions.

INSTALLATION DESCRIPTION

POET Biorefining – Laddonia operates an ethanol production plant in Laddonia, MO. Up to 25 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 fermentation tanks. Emissions from the fermentation process are normally controlled by both a scrubber and an RTO. When the scrubber is bypassed, emissions from the

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

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. When the scrubber is bypassed, emissions from the distillation process vent directly to atmosphere. When the RTO is bypassed, emissions from the scrubber are vented to the atmosphere. During RTO bypass, emissions from the scrubber are vented to the atmosphere.

Scrubber bypass is limited to 40 hours per year. RTO bypass is limited to 500 hours per year.

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 or railcars for distribution. The DDGS loadout system is controlled by a baghouse to minimize emissions. Process steam is produced by two natural gas-fired boilers. Additional steam is also supplied by one Heat Recovery steam generator that is associated with a natural gas fired turbine operated by the Missouri Joint Municipal Electric Utility Commission (see Project 2006-06-002).

A 250,000-gallon storage tank is available for 190 proof ethanol. The 200 proof ethanol is stored in two 1,500,000 gallon ethanol storage tanks. Denaturant (gasoline) is stored in a 250,000 gallon tank. The 200 proof ethanol is mixed with the denaturant at the truck and rail loadouts for delivery to customers through the loadout system, emissions are controlled by a flare. A 115,000 gallon storage tank can serve as either a denaturant tank or ethanol tank, but is typically empty.

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

Table 2: Permit History

Permit Number	Description
022003-004	Installation of a 30,000,000 gallons per year denatured ethanol plant
022003-004A	Extension of Permit 022003-004
102005-015	Installation of a 56,000,000 gallons per year denatured ethanol plant
102005-015A	Increase production to 68,000,000 gallons per year denatured ethanol
102005-015B	Clarifies that grain includes wheat, corn, oats, rice, soybeans, and sorghum
102005-015C	Changes to acrolein limits

PROJECT DESCRIPTION

The seventh fermentation tank will be used to increase the batch length of the fermentation process and is expected to increase ethanol yield per bushel of grain. The installation is not requesting an increase in their denatured ethanol production limit; therefore, the increased yield would result in a decrease in grain throughput. As grain throughput is expected to decrease, no emissions increase is expected from grain handling operations. The six existing fermentation tanks were required to vent to a scrubber and then to an RTO. The seventh fermentation tank is also being required to vent to the scrubber and RTO. Although the new fermentation tank will experience working losses, these working losses will be offset by decreased working losses from the six existing fermentations; therefore, no emissions increase due to working losses from the fermentation tanks are expected as a result of this project. The new fermentation tank will experience breathing losses which will result in VOC and HAP emissions increases to EP-08 Bypass Stack and VOC, HAP, and CO emissions increases to EP-09 DDGS Dryers (2), Centrifuges (5), and RTO. As there will be no increase in denatured ethanol production, no emissions increases are expected from the ethanol storage tanks or ethanol truck loadout. As there will be a decrease in grain throughput, there will also be a decrease in DDGS production; therefore, no emissions increase is expected from DDGS operations.

The seventh fermentation will require the installation of an additional pump seal, 14 light liquid valves, and approximately 50 connectors. These additional components will result in VOC and HAP emissions increases from equipment leaks.

This project may result in a decrease in PM, PM₁₀, and PM_{2.5} emissions due to the decrease in grain throughput and DDGS production; however, insufficient information was submitted with the application to accurately calculate the emissions decreases. The installation may submit information at a later date to determine these decreases and amend this permit to include the decreases.

As this project is not expected to affect fuel combustion, no NO_x or SO_x emissions increases are expected.

Special Condition 2.B of Construction Permit 102005-015A contained a 100 tons per year VOC emission limit on the installation to allow the installation to be a synthetic minor NSR source. This limit is being superseded as it is not necessary. Potential to emit calculations indicate that the installation is a natural minor source of VOC.

Special Condition 2.C of Construction Permit 102005-015A contained a 100 tons per year CO emission limit on the installation to allow the installation to be a synthetic minor NSR source. This limit is being superseded and re-instated to include the CO emissions increase associated with this project.

Special Conditions 2, 3, and 6 of Construction Permit 102005-015C contained 10.0 tons per year individual HAP and 25.0 tons per year combined HAP limits on the installation

to allow the installation to be a synthetic area HAP source. These limits are being superseded as they are not necessary. Potential to emit calculations indicate that the installation is a natural area source of HAPs.

Special Condition 4 of Construction Permit 102005-015A required the installation to control emissions from the fermentation process using a wet scrubber. This requirement was superseded and re-instated to clarify that the fermentation process now includes seven fermentation tanks and that all seven tanks are required to vent to the scrubber.

Special Condition 6 of Construction Permit 102005-015A required the installation to control emissions from the DDGS Dryers using an RTO. This requirement was superseded and re-instated to clarify that the RTO is also required to control emissions from the scrubber.

Special Conditions 8.A.1 of Construction Permit 102005-015A required the installation to test the VOC and combined HAP emission rates from the scrubber, thermal oxidizer, and fluid bed cooler every five years to obtain emission factors for use in complying with the installation's synthetic minor VOC and combined HAP limits. This requirement was superseded as the installation is a natural minor VOC source and a natural area HAP source while properly controlled; however, stack testing is required by Special Condition 4 every five years to confirm that the installation remains a natural minor VOC source and a natural area HAP source.

Special Condition 8.A.2 of Construction Permit 102005-015A required the installation to test the Acetaldehyde, Acrolein, Formaldehyde, and Methanol emission rates from the scrubber, thermal oxidizer, and fluid bed cooler to obtain emission factors for use in complying with the installation's synthetic minor individual HAP limits. This requirement was superseded as the installation is a natural area source of Acetaldehyde, Acrolein, Formaldehyde, and Methanol.

Special Condition 8.A.3 of Construction Permit 102005-015A required the installation to test the CO emission rate from the thermal oxidizer to obtain an emission factor for use in complying with the installation's synthetic minor CO limit. This requirement was superseded and re-instated to clarify that the stack tested CO emission factor will still be required to comply with the new synthetic minor CO limit.

Special Condition 8.A.5 of Construction Permit 102015-015A required the installation to test the destruction efficiency of the Loadout Flare (EP-15) for use in complying with the installation's synthetic minor VOC and HAP limits. This requirement was superseded as the installation is a natural minor source of VOC and a natural area source of HAP.

Special Condition 14 of Construction Permit 102005-015A limited the installation's denatured ethanol production to 68,000,000 gallons per year. This requirement was superseded and re-instated to clarify that denatured ethanol production is still limited to 68,000,000 gallons per year.

EMISSIONS/CONTROLS EVALUATION

Potential breathing losses from the seventh fermentation tank were determined using EPA's software TANKS4.0.9d. At the beginning of the fermentation process the fermentation tank contains no ethanol. At the end of the fermentation process the fermentation tank contains on average 19.5 weight percent ethanol. To be conservative it was assumed that the tank contains 20 weight percent of ethanol at all times.

Potential equipment leak losses from the new pump seal, light liquid valves, and connectors were determined using emission factors obtained from EPA's "Protocol for Equipment Leak Emission Estimates" (November 1995) Table 2-1. The emission factors in Table 2-1 are based on processing of material containing 100 weight percent VOC. As the beer does not contain 100 weight percent VOC, the emission factors were multiplied by the VOC content of the beer which was conservatively assumed to be 24 weight percent. Due to the LDAR requirements in NSPS VVa, 75% control was applied to the pump seal, 88% control was applied to the light liquid valves, and 93% control was applied to the relief valves as indicated in EPA's "Protocol for Equipment Leak Emission Estimates" (November 1995) Table 5-2.

Based on the speciation profile from the installation's May 2016 stack test results for EP-08 Bypass Stack (i.e. scrubber), VOC emissions from the fermentation process contain 85 weight percent ethanol, 0.01 weight percent methanol, 0.03 weight percent formaldehyde, 3.3 weight percent acetaldehyde, and 0.1 weight percent acrolein.

It was conservatively assumed that all VOC emissions could convert into CO emissions in the RTO stack.

The following table provides an emissions summary for this project. Existing potential emissions were re-calculated for the installation by updating the potential to emit in Attachment B of Operating Permit OP2015-001 with the installation's May 2016 stack test results. Existing actual emissions were taken from the installation's 2016 EIQ. Potential emissions of the project represent the potential of the new equipment, assuming continuous operation (8760 hours per year).

Table 3: Emissions Summary (tpy)

Pollutant	Regulatory <i>De Minimis</i> Levels	Existing Potential Emissions	Existing Actual Emissions ⁴ (2016 EIQ)	Potential Emissions of the Project	New Installation Conditioned Potential
PM	25.0	131.22	N/A	N/D	N/A
PM ₁₀	15.0	<50.0	38.01	N/D	N/A
PM _{2.5}	10.0	49.33	16.57	N/D	N/A
SO _x	40.0	0.90	0.47	N/A	N/A

⁴ The installation made an error when reporting their HAP emissions for EP-09 in their 2016 EIQ which resulted in an over-reporting of actual HAP emissions. This over-reporting of actual HAP emissions from EP-09 causes the installation's actual HAP emissions to appear larger than their potential HAP emissions.

Pollutant	Regulatory De Minimis Levels	Existing Potential Emissions	Existing Actual Emissions ¹ (2016 EIQ)	Potential Emissions of the Project	New Installation Conditioned Potential
NOx	40.0	44.08	43.68	N/A	N/A
VOC	40.0	89.58	49.59	0.68	N/A
CO	100.0	<100	61.34	0.63	<100
HAPs	25.0	8.60	4.39	0.02	N/A
Acetaldehyde (75-07-0)	10.0 ⁵	1.23	1.58	0.02	N/A
Formaldehyde (50-00-0)	10.0 ⁶	0.38	0.75	1.77E-04	N/A
Methanol (67-56-1)	10.0 ⁷	0.60	0.71	5.32E-05	N/A
Acrolein (107-02-8)	10.0 ⁸	0.59	0.22	6.56E-04	N/A

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

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 the project are below de minimis levels. A permit was required to include the seventh fermentation tank in the installation's 68,000,000 gallons per year denatured ethanol production limit and to institute practically enforceable control device requirements on the seventh fermentation tank.

APPLICABLE REQUIREMENTS

POET Biorefining – Laddonia 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 10-6.050 *Start-Up, Shutdown, and Malfunction Conditions*
- 10 CSR 10-6.065 *Operating Permits*
- 10 CSR 10-6.070 *New Source Performance Regulations*
 - 40 CFR Part 60, Subpart VVa – *Standards of Performance for Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry for Which Construction, Reconstruction, or Modification Commenced After November 7, 2006*

⁵ The SMAL for Acetaldehyde is 9 tons per year.

⁶ The SMAL for Formaldehyde is 2 tons per year.

⁷ The SMAL for Methanol is also 10 tons per year.

⁸ The SMAL for Acrolein is 0.04 tons per year.

- 10 CSR 10-6.075 *Maximum Achievable Control Technology Regulations*
 - 40 CFR Part 63, Subpart VVVVVV – *National Emission Standards for Hazardous Air Pollutants for Chemical Manufacturing Area Sources* may apply.
- 10 CSR 10-6.110 *Submission of Emission Data, Emission Fees and Process Information*
- 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*

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 April 10, 2017 received April 18, 2017, designating Missouri Ethanol, LLC as the owner and operator of the installation.

Attachment A - CO Compliance Worksheet

POET Biorefining - Laddonia
 Audrain County, S36, T52N, R7W
 Project Number: 2017-04-035
 Installation ID Number: 007-0054
 Permit Number: 102017-014

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

Emission Source	Description	Amount Processed	CO Emission Factor	Emission Factor Source	Monthly CO Emissions ⁹ (tons)
EP-09	DDGS Dryers (2), Centrifuges (5), and RTO	Mgal beer	0.09879 lb/Mgal	May 2016 Stack Test ¹⁰ +project emissions	
EP-13	Boiler #1	MMscf natural gas	84 lb/MMscf	AP-42 Table 1.4-1	
EP-14	Boiler #2	MMscf natural gas			
EP-15 & EP-16	Denatured Ethanol Truck Loadout	2 MMBtu/hr	0.31 lb/MMBtu	AP-42 Table 13.5-2	0.23
EP-09, EP-13, EP-14, EP-15, & EP-16	Start-up, Shutdown, and Malfunction CO Emissions ¹¹				
A) Installation-wide Total Monthly CO Emissions¹² (tons):					
B) 12-Month Rolling Total Installation-wide CO Emissions from Previous Month's Attachment A (tons):					
C) Installation-wide Total Monthly CO Emissions from Previous Year's Attachment A (tons):					
12-Month Rolling Total Installation-wide CO Emissions¹³ (tons):					

⁹ Monthly CO Emissions (tons) = Amount Processed x CO Emission Factor x 0.0005 ton/lb.

¹⁰ This stack test was conducted at a beer production rate of 725 gpm; therefore, at beer production rates in excess of 805 gpm this emission factor will no longer be considered representative and may not be used to demonstrate compliance. This stack test was conducted at an RTO combustion chamber temperature of 1,651.3°F; therefore, at RTO combustion chamber temperatures below 1,601.3°F this emission factor will no longer be considered representative and may not be used to demonstrate compliance. This stack test was conducted at a scrubber flow rate of 36.1 gpm; therefore, at scrubber flow rates below 36.1 gpm this emission factor will no longer be considered representative and may not be used to demonstrate compliance.

¹¹ The sum of all start-up, shutdown, and malfunction CO emissions during the calendar month for EP-09, EP-13, EP-14, EP-15, and EP-16 as reported to the Air Pollution Control Program's Compliance/Enforcement Section in accordance with the provisions of 10 CSR 10-6.050.

¹² Installation-wide Total Monthly CO Emissions (tons) = the sum of each emission source's Monthly CO Emissions (tons).

¹³ 12-Month Rolling Total Installation-wide CO Emissions (tons) = A + B - C. **12-Month Rolling Total Installation-wide CO Emissions of less than or equal to 100.0 tons indicates compliance with Special Condition 2.A.**

Attachment B – Denatured Ethanol Production Compliance Worksheet

POET Biorefining - Laddonia
 Audrain County, S36, T52N, R7W
 Project Number: 2017-04-035
 Installation ID Number: 007-0054
 Permit Number: **102017-014**

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

Date (Month/Year)	Monthly Denatured Ethanol Production (gallons)	12-Month Rolling Total Denatured Ethanol Production ¹⁴ (gallons)

¹⁴ 12-Month Rolling Total Denatured Ethanol Production (gallons) = the sum of the 12 most recent Monthly Denatured Ethanol Production (gallons). **12-Month Rolling Total Denatured Ethanol Production of less than or equal to 68,000,000 gallons indicates compliance with Special Condition 2.B.**

Attachment C – RTO Bypass Worksheet

POET Biorefining - Laddonia
Audrain County, S36, T52N, R7W
Project Number: 2017-04-035
Installation ID Number: 007-0054
Permit Number: 102017 - 014

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

Date (Month/Year)	Monthly RTO Bypass Operation (hours)	12-Monthly Rolling Total RTO Bypass Operation ¹⁵ (hours)

¹⁵ 12-Month Rolling Total RTO Bypass Operation (hours) = the sum of the 12 most recent Monthly RTO Bypass Operation (hours). **12-Month Rolling Total RTO Bypass Operation of less than or equal to 500 hours demonstrates compliance with Special Condition 4.A.**

Attachment D – Scrubber Bypass Worksheet

POET Biorefining - Laddonia
 Audrain County, S36, T52N, R7W
 Project Number: 2017-04-035
 Installation ID Number: 007-0054
 Permit Number: 1 0 2 0 1 7 - 0 1 4

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

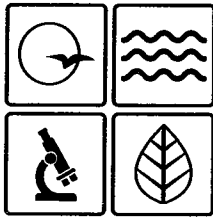
Date (Month/Year)	Monthly Scrubber Bypass Operation (hours)	12-Monthly Rolling Total Scrubber Bypass Operation ¹⁶ (hours)

¹⁶ 12-Month Rolling Total Scrubber Bypass Operation (hours) = the sum of the 12 most recent Monthly Scrubber Bypass Operation (hours). **12-Month Rolling Total Scrubber Bypass Operation of less than or equal to 40 hours demonstrates compliance with Special Condition 3.A.**

APPENDIX A

Abbreviations and Acronyms

%percent	m/smeters per second
°Fdegrees Fahrenheit	Mgal1,000 gallons
acfmactual cubic feet per minute	MWmegawatt
BACTBest Available Control Technology	MHDRmaximum hourly design rate
BMPsBest Management Practices	MMBtuMillion British thermal units
BtuBritish thermal unit	MMCFmillion cubic feet
CAMCompliance Assurance Monitoring	MSDSMaterial Safety Data Sheet
CASChemical Abstracts Service	NAAQSNational Ambient Air Quality Standards
CEMSContinuous Emission Monitor System	NESHAPs National Emissions Standards for Hazardous Air Pollutants
CFRCode of Federal Regulations	NO_xnitrogen oxides
COcarbon monoxide	NSPSNew Source Performance Standards
CO₂carbon dioxide	NSRNew Source Review
CO_{2e}carbon dioxide equivalent	PMparticulate matter
COMSContinuous Opacity Monitoring System	PM_{2.5}particulate matter less than 2.5 microns in aerodynamic diameter
CSRCode of State Regulations	PM₁₀particulate matter less than 10 microns in aerodynamic diameter
dscfdry standard cubic feet	ppmparts per million
EIQEmission Inventory Questionnaire	PSDPrevention of Significant Deterioration
EPEmission Point	PTEpotential to emit
EPAEnvironmental Protection Agency	RACTReasonable Available Control Technology
EUEmission Unit	RALRisk Assessment Level
fpsfeet per second	SCCSource Classification Code
ftfeet	scfmstandard cubic feet per minute
GACTGenerally Available Control Technology	SDSSafety Data Sheet
GHGGreenhouse Gas	SICStandard Industrial Classification
gpmgallons per minute	SIPState Implementation Plan
grgrains	SMALScreening Model Action Levels
GWPGlobal Warming Potential	SO_xsulfur oxides
HAPHazardous Air Pollutant	SO₂sulfur dioxide
hrhour	tphtons per hour
hphorsepower	tpytons per year
lbpound	VMTvehicle miles traveled
lbs/hrpounds per hour	VOCVolatile Organic Compound
MACTMaximum Achievable Control Technology	
µg/m³micrograms per cubic meter	



Missouri Department of dnr.mo.gov

NATURAL RESOURCES

Eric R. Greitens, Governor

Carol S. Comer, Director

OCT 24 2017

Mr. Stephen Murphy
General Manager (Ladsonia)
POET Biorefining - Ladsonia
809 North Pine
Ladsonia, MO 63352

RE: New Source Review Permit - Project Number: 2017-04-035

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 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.

This permit may include requirements with which you may not be familiar. If you would like the department to meet with you to discuss how to understand and satisfy the requirements contained in this permit, an appointment referred to as a Compliance Assistance Visit (CAV) can be set up with you. To request a CAV, please contact your local regional office or fill out an online request. The regional office contact information can be found at the following website: <http://dnr.mo.gov/regions/>. The online CAV request can be found at <http://dnr.mo.gov/cav/compliance.htm>.

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, United States 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.



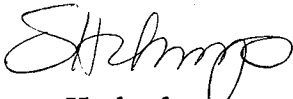
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Mr. Stephen Murphy
Page Two

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: 2017-04-035

Permit Number: 102017 - 014