



MAR 18 2020

Mr. Chris Roach
Director
Roeslein Alternative Energy, LLC
9200 Watson Road, Suite 200
St. Louis, MO 63126

RE: New Source Review Permit Amendment – Permit Number: 052018-001A
Project Number: 2019-09-006; Installation Number: 075-0026

Dear Mr. Roach:

Roeslein Alternative Energy, LLC (RAE) operates an existing biogas collection, cleaning, and compression system at Murphy Brown of Missouri's Ruckman Farm in Gentry County. There are currently nine swine waste lagoons on site with impermeable geomembrane gas collection covers, which provide an oxygen deficient environment to facilitate anaerobic digestion and produce biogas. The biogas is then collected in underground piping and sent to a pressure swing adsorption system, where renewable natural gas is separated out and compressed.

In Construction Permit No. 052018-001, RAE was required to control hydrogen sulfide (H₂S) emissions from the generated biogas using a thermal oxidizer and lagoon flares; however, the combustion of H₂S generates sulfur oxide (SO_x) emissions. During the initial permitting process, RAE made conservative assumptions regarding the amount of biogas that would be generated on an annual basis and during peak generation periods. This caused the estimated SO_x emissions to exceed 100 tons per year, which is greater than the intermediate source threshold. Construction Permit No. 052018-001, therefore, required RAE to obtain a Part 70 Operating Permit.

Since Construction Permit No. 052018-001 has been issued, RAE has been collecting data to better define annual biogas generation rates and peak biogas collection periods. The gas composition parameters have also been measured and improved. Table 1 provides a summary of the measured data, compared to the original projections from Construction Permit No. 052018-001.

Table 1: Updated Biogas Generation Data

| Operating Period | Original Projection | | Update from Measured Data | |
|------------------|---------------------|-----------------|---------------------------|-----------------|
| | Duration | Generation Rate | Duration | Generation Rate |
| Normal | 75 day/yr | 75 scfm | 205 day/yr | 35 scfm |
| Peak | 200 day/yr | 177 scfm | 70 day/yr | 150 scfm |
| Winter | 90 day/yr | ≤ 5 scfm | 90 day/yr | ≤ 5 scfm |

The biogas itself was measured to contain 0.20% H₂S, 61.2% CH₄, and 32.0% CO₂, compared to the preliminary estimates of 0.25% H₂S, 56.1% CH₄, and 29.4% CO₂. H₂S sampling was performed according to the methods and frequency outlined in Special Condition 5 of Construction Permit No. 052018-001; therefore, the current H₂S concentration is based on at least five samples taken since the last

permit was issued. Along with the biogas constituent data, analysis of the biogas generation data shows that there are fewer peak biogas generation days during the year and biogas collection during the off-peak period is significantly lower than originally expected. This yields a decrease in overall potential emissions. Specifically, this shows that the amount of H₂S generated is less than originally projected, and subsequently, the amount of SO_x generated due to combustion is significantly less. SO_x emissions are now expected to be below 100 tons per year, as long as RAE continues to adhere to the requirements of Special Conditions 2, 3, and 4 in Construction Permit No. 052018-001.

Table 2 provides an updated summary of installation emissions, which include combustion emissions from the flares, thermal oxidizer, generators, compressors, and line heaters, as well as fugitive emissions from the membrane covers. Existing potential emissions were taken from Construction Permit No. 052018-001. Existing actual emissions were taken from the installation's most recent EIQ. Potential emissions of the project were calculated using the same methods as described in Construction Permit No. 052018-001, but with the updated biogas composition and generation parameters. Because the project encompasses the entire installation, the potential emissions of the installation are equal to the potential emissions of the project.

Table 2: Updated Emissions Summary (tons per year)

| Pollutant | De Minimis Level | Existing Potential Emissions | Existing Actual Emissions (2018 EIQ) | Potential Emissions of the Project | Potential Emissions of the Installation |
|-------------------|------------------|------------------------------|--------------------------------------|------------------------------------|---|
| PM | 25.0 | 3.08 | N/D | 0.22 | 0.22 |
| PM ₁₀ | 15.0 | 3.08 | 0.30 | 0.22 | 0.22 |
| PM _{2.5} | 10.0 | 3.08 | 0.30 | 0.22 | 0.22 |
| SO _x | 40.0 | 110.19 | 10.88 | 37.69 | 37.69 |
| NO _x | 40.0 | 23.32 | 5.33 | 18.24 | 18.24 |
| VOC | 40.0 | 10.25 | 1.42 | 10.15 | 10.15 |
| CO | 100.0 | 96.99 | 11.00 | 89.79 | 89.79 |
| H ₂ S | 10.0 | 8.56 | N/D | 1.47 | 1.47 |
| Total HAPs* | 25.0 | 4.43 | 0.46 | 2.76 | 2.76 |

N/D = Not Determined

*All individual HAPs have a potential to emit below their respective Screening Model Action Levels

As shown in Table 2, the potential emissions of all criteria pollutants have decreased since using the updated parameters. The updated SO_x emissions are now below 100 tons per year, which is below the threshold that requires RAE to obtain an operating permit; therefore, RAE is no longer required to obtain a Part 70 operating permit, as specified in Construction Permit No. 052018-001.

All special conditions of Construction Permit No. 052018-001 are still valid and apply to the installation because there have been no changes to the equipment or operation. The ambient air quality modeling performed for the installation in the previous construction permit is still representative of the installation since no input parameters have changed, but the emission rates entered into the model have decreased, making the results quite conservative.

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If you were adversely affected by this permit decision, you may be entitled to pursue an appeal before the administrative hearing commission pursuant to Sections 621.250 and 643.075.6 RSMo. To appeal, you must file a petition with the administrative hearing commission within thirty 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.

If you have any questions regarding this amendment, please contact the Air Pollution Control Program at 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



Kendall B. Hale
Permits Section Chief

KBH:rsa

Enclosures

c: Kansas City Regional Office
PAMS File: 2019-09-006