DEPARTMENT OF ENVIRONMENTAL QUALITY AIR QUALITY DIVISION ACTIVITY REPORT: On-site Inspection

P115773400		
FACILITY: Brightmark Willow Point RNG, LLC		SRN / ID: P1157
LOCATION: 5301 Flannigan Road, ORLEANS		DISTRICT: Grand Rapids
CITY: ORLEANS		COUNTY: IONIA
CONTACT: Lillian Burns , Senior Manager, Environmental Compliance		ACTIVITY DATE: 09/04/2024
STAFF: Eric Grinstern	COMPLIANCE STATUS: Non Compliance	SOURCE CLASS: MINOR
SUBJECT: Scheduled compliance inspection		
RESOLVED COMPLAINTS:		

Facility Description

Brightmark Willow Point is an anaerobic digester facility located at the Willow Point Dairy Farm in Ionia County. The facility uses dairy manure to generate gas that is processed through gas clean-up equipment to produce renewable natural gas that is injected into a natural gas pipeline located offsite.

The process starts with manure being added into their enclosed anaerobic digester. The company requested the flexibility to use ferric chloride (Sulfafix) to reduce the H₂S in the digester gas which will overall decrease the SO₂ emissions. The Sulfafix reacts with the H₂S in the digester and holds the H₂S in the digestate as a precipitate. The facility installed the ferric chloride system but has not used it yet. Additionally, the facility has determined that they are going to redesign the system prior to using ferric chloride. The solids or digestate will be discharged into the existing lagoon and further processed by the farm to be used as bedding. The biogas from the digester is routed into EUGCU which contains a gas cleaning and upgrading unit. Once the gas is processed to meet the gas standards it will enter the pipeline.

A boiler is used to heat the digester and is fueled by pipeline natural gas and not the renewable natural gas from the facility. The gas cleaning and upgrading unit processes the digester gas to meet pipeline quality specifications. The gas cleaning and upgrading unit includes the following equipment:

- Feed Compressor
- Six absorber vessels with media
- Vacuum compressor
- Two tanks (tail gas buffer, product gas buffer)
- Product compressor

Regulatory Analysis

Brightmark Willow Point is a minor source currently operating under permit to install (PTI) No. 185-20. The permit addresses a gas cleaning and upgrading unit (EUGCU) that is controlled by a thermal oxidizer, as well as a flare (EUFLARE) that burns off-spec gas or excess digester gas. The facility has a 5.0 MMBtu/hr natural gas-fired boiler that is used to heat the digester. The boiler was exempted from review at the time of permitting under Rule 282(2)(b)(i). Compliance Evaluation

Prior to entering the facility, a survey around the facility was conducted. No visible emissions were noted, and only normal odors associated with a dairy farm were noted. At the facility, AQD staff consisting of Eric Grinstern met with the operator of the facility, Ken Pant. Brightmark contracts with NAES to operate the facility. The facility has previously determined through the presence of odors and via drone testing that the digester cover was leaking. The facility stopped feeding the digester and stopped operating the system in July 2024. The digester roof was removed starting on August 2 to allow for replacement. The digester is concrete and has foam on top of the digester to form a roof. At the time of the inspection the final layers of the foam roof were being spray applied. Any gas being generated by the digester as it was being brought back online was being routed to the flare.

The facility was issued a Violation Notice on October 27, 2023, to address violations documented by an inspection conducted on September 19, 2023. The VN addressed the following violations:

EUGCU – Exceedance of the permitted H2S concentration of the biogas to the thermal oxidizer (TO), based on a monthly average.

FGFLARE – Failure to maintain and operate a device to monitor and record H2S concentration of the biogas sent to EUFLARE and the TO of EUGCU from December 2022 through April 2023. The facility has resolved this violation and is now monitoring the H2S concentration.

Below is an evaluation of compliance based on PTI No. 185-20.

FGFLARE

Emission units: EUGCU, EUFLARE.

EUGCU: A gas cleaning and upgrading unit to upgrade the raw anaerobic digester gas. Emissions controlled by a thermal oxidizer.

EUFLARE: A digester gas flare that burns off-spec gas and excess digester gas.

Emission Limits

Restricts the emission of SO2 to 39.9 tpy based on a 12-month rolling time period. Compliance with the emission limit for SO2 is demonstrated through the requirement to calculate and record the monthly and 12-month rolling total SO2 emissions. SO2 emissions are calculated based on the requirement that the facility monitor the volumetric flow rate of gas to FGFLARE, as well as the H2S concentration of gas burned in FGFLARE. The facility has previously disclosed that they believe the H2S meters are providing readings that on average are higher than the actual concentrations, resulting in calculated SO2 emissions higher than the actual emissions.

The highest recorded SO2 emissions for the previous 12 months occurred in May 2024 with 7.14 tons. SO2 emissions for the most recent 12-month period were 45.81 tons, which exceeds the limit of 39.9 tpy. Once again, the facility believes the H2S meters are providing readings higher than the actual levels and have stated that they are taking periodic Draeger samples that document lower H2S concentrations than the installed monitors.

Material Limits

Restricts the amount of biogas burned to 160.3 MMscf/yr for FGFLARE. The facility provided records documenting a total of 71.54 MMscf, based on a 12month rolling time period ending in August 2024. This is the total amount of biogas burned in the utility flare as well as the thermal oxidizer.

Restricts the amount of biogas burned to 65.7 MMscf/yr into the thermal oxidizer of EUGCU. The facility records document a total of 29.80 MMscf, based on a 12-month rolling time period ending in August 2024, of biogas burned in the thermal oxidizer.

Compliance with the throughput limit is demonstrated by the requirement for facility to record the total volume of biogas burned in each EUFLARE and EUGCU on a monthly and 12-month rolling time period. The facility provided requested records documenting compliance.

The H2S concentration of biogas to EUFLARE is restricted to 2,950 ppmv, based on a calendar month average. The instantaneous H2S concentration of the biogas is limited to 3,500 ppmv. The facility provided records documenting a monthly H2S average high of 14,146 ppmv (including startup) in May 2024. For the previous 12-months, all but three months had average H2S concentrations exceeding the limit. The facility has stated that the meters are providing higher than actual H2S readings.

The H2S concentration of biogas to EUGCU (to TO) is restricted to 7,200 ppmv, based on a calendar month average. The instantaneous H2S concentration of the biogas (to the TO) is limited to 8,685 ppmv. The facility provided records documenting a monthly H2S average high of 12,640 ppmv (including startup) in May 2024. For the previous 12months, all but five months had average H2S concentrations exceeding the limit. Review of the provided facility records showed H2S concentrations exceeding the 8,685 ppmv limit. The facility has stated that the meters are providing higher than actual H2S readings.

The facility is restricted to burn only natural gas, or gas produced by the anaerobic digester (digester biogas) in EUFLARE. The facility is using propane to ignite the flare, after which the pilot burns natural gas.

Process/Operational Restrictions

Restricts the volumetric feed rate for FGFLARES to a maximum of 305 standard cubic feet per minute and the volumetric feed rate (tail gas) for EUGCU to a maximum of 125 standard cubic feet per minute. Compliance with the feed rate limit is demonstrated by the requirement that the facility install a device to monitor and record the volumetric feed rate of digester gas burned in each emission unit on a continuous basis. During the inspection there was no feed from EUGCU to the TO. All of the gas from the digester was going to the flare. The flow rate from the digester to the flare was 59.26 SCFM.

Requires the submittal of PM/MAP for FG within 90-days of completion of installation of the equipment. A PM/MAP has been submitted.

Requires the submittal and operation under a nuisance minimization plan for FGFLARE within 90-days of permit issuance. A nuisance minimization plan was submitted.

Design/Equipment Parameters

Requires the installation of a device to monitor and record the volumetric flow rate of digester gas burned in each emission unit within FGFLARE, on a continuous basis.

The facility has a device installed to monitor and record the volumetric flow rate of gas to each emission unit.

Requires the installation of a device to monitor and record the H2S concentration in EUFLARE and EUGCU, at a minimum of once per day. The facility has installed H2S monitors, however, the facility has previously stated that the H2S meters are not operating properly. The facility believes that the average H2S concentrations are lower than what is measured, and provided details regarding the impact of the pressure swing adsorber system has on H2S readings. The facility is working to resolve the problem and has ordered a new SulfiLogger meter for one of their other facilities to see it it will provide a solution.

Requires operating the TO with a minimum temperature of 1450 degrees F and monitoring and recording the TO temperature on a continuous basis. TO temperature records were reviewed while onsite. Temperature records prior to the system shutdown showed compliance with the minimum temperature of 1450 degrees F. Venting to the TO with high methane content gas during system restarts causes it to overheat. Instead, the gas is vented to the flare. The facility has a purchase order in to have the TO modified to allow for the combustion of high methane content gas. The facility has modified the TO to allow gas with a higher methane content to be combusted in the TO and plans another modification to increase the methane content of gas that can be combusted in the TO.

Monitoring/Recordkeeping

The facility is required to maintain records of the H2S concentration of the biogas routed to EUFLARE and EUGCU. The facility is maintaining H2S concentration records.

Requires the facility to maintain records of the total volume of gas burned in EUFLARE and EUGCU on a monthly and 12-month rolling time period. The facility is maintaining the required records.

Requires the facility to calculate the monthly average H2S concentration in the biogas sent to EUFLARE. The facility is maintaining monthly average H2S concentration records.

Requires the facility to calculate and record the monthly and 12-month rolling total SO2 mass emissions from FGFLARE. The facility is maintaining the records.

Stack/Vent Restrictions

The stack SVGCU is required to be a maximum of 36 inches in diameter and have a minimum height of 18 feet. The stack SVFLARE is required to be a maximum of 6 inches in diameter and have a minimum height of 15 feet. Measurement of both stacks with a digital hypsometer was conducted during the last inspection, which showed that they met the stack/vent restrictions.

Miscellaneous

During the previous inspection staff observed a flare associated with the digester tank. The flare is a backup/pressure relief flare. While it is possible the flare qualifies for exemption from permitting under Rule 285(2)(g), the facility still intends to submit a PTI application to permit the flare.

CONCLUSION

Based on this inspection, the facility appears to be in compliance with applicable air quality rules and regulations, with the exception of the following:

PTI No. 185-20, FGFLARE, IV.3. - Operation of EUGCU without the thermal oxidizer operating in a satisfactory manner. During the inspection it was determined that during start-up the methane content of the gas is too high in some situations to vent to the TO. Venting to the TO with high methane content gas causes it to overheat. Instead, the gas is vented to the flare.

PTI No. 185-20, FGFLARE, II.1. - Exceedance of the SO2 limit on a tons per 12-month rolling time period.

PTI No. 185-20, FGFLARE, II.3. and II.6 - Exceedance of the calendar month average and maximum H2S concentration limit for biogas combusted in EUFLARE.

PTI No. 185-20, FGFLARE, II.4. and II.7 - Exceedance of the calendar month average and maximum H2S concentration limit for biogas combusted in the TO of EUGCU.

A Violation Notice will be issued to address the documented violations.

NAME <u>Fric Grinstern</u> DATE 09/12/2024 SUPERVISOR HH