

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

B172972465

FACILITY: GRAND RAPIDS WASTEWATER TREATMENT PLANT		SRN / ID: B1729
LOCATION: 1300 MARKET AVE SW, GRAND RAPIDS		DISTRICT: Grand Rapids
CITY: GRAND RAPIDS		COUNTY: KENT
CONTACT: Andrew Meyer , Wastewater Operations and Maintenance Supervisor		ACTIVITY DATE: 07/02/2024
STAFF: Eric Grinstern	COMPLIANCE STATUS: Compliance	SOURCE CLASS: SM OPT OUT
SUBJECT: Scheduled compliance inspection		
RESOLVED COMPLAINTS:		

Facility Description

The City of Grand Rapids Water Resource Recovery Facility is a wastewater treatment facility that also operates an anerobic digester.

The anaerobic digester portion of the facility consists of three (3) biodigesters, two (2) combined heat and power engines, gas cleanup system, flares, various tanks for blending and thickening sludge, as well as other ancillary equipment.

Regulatory Analysis

The facility holds one (1) permit, Opt-Out PTI No. 37-19B, which contains synthetic minor limits (FGCHP, short-term limits) for Carbon Monoxide, and Hazardous Air Pollutants, specifically, Formaldehyde. In addition to the permit the facility has emission units that are subject to the provisions of the New Source Performance Standards (NSPS) promulgated in 40 CFR Part 60 Subpart JJJJ for Stationary Spark Ignition Internal Combustion Engines, and subject to the National Emissions Standards for Hazardous Air Pollutants (NESHAP) for Stationary Reciprocating Internal Combustion Engines 40 CFR Part 63 Subpart ZZZZ. The NSPS and NESHAP requirements are incorporated into PTI No. 37-19B. The facility is also subject to Consent Order, AQD No. 2020-16. The consent order requires compliance with PTI No. 37-19B.

Compliance Evaluation

At the facility, AQD Staff consisting of Eric Grinstern (EG) met with Andrew Meyer, Acting WW Plant Superintendent, Environmental Services. Andrew accompanied EG on an inspection of the digester operations and provided requested records required by PTI No. 37-19B.

Below is an evaluation of compliance based on PTI No. 37-19B.

EUCONDYS

This emission unit is for the biogas conditioning system, using a membrane filtering technology to condition the biogas into renewable natural gas. It consists of parallel

absorption vessels for H₂S removal and media adsorption for VOC and siloxane removal. Water and CO₂ are also removed. Renewable natural gas is compressed after processing. Processed gas can either route to the flares, the engines or a natural gas pipeline. There is a bypass after the H₂S removal system to the flares. Currently all of the gas is routed to the natural gas pipeline or the flares. No gas was being burned in the flares at the time of the inspection. Gases (primarily CO₂) removed by the membrane system are exhausted through a vent pipe adjacent to the conditioning system.

The facility was required to submit a Preventative Maintenance/Malfunction Abatement Plan (PM/MAP) for the emission unit. The PM/MAP was previously submitted.

The facility is required to keep records of the H₂S concentration of the biogas after the H₂S conditioning portion of EUCONDsys. The facility provided records of the H₂S content of the conditioned biogas. The records show an increase in the H₂S content of the gas after the conditioner in the month of June 2024. Readings as high as 36 ppm were observed. Andrew explained that the media gets exhausted, then they switch to the alternate vessel and schedule to have the media changed out in the offline unit. After switching vessels on July 11, 2024, the H₂S readings averaged around 0.5 ppm. The biogas is further cleaned up in the upgrading skids prior to going to the natural gas pipeline.

FGSLTANKS

This flexible group is for sludge blending tanks and volute thickening units prior to the digesters. Emissions from all of the tanks are controlled by a communal biofilter odor control system. This communal biofilter odor control system also reduces sulfur-bearing compounds. No odors were detected around this system during the inspection.

This unit was operational at the time of the inspection, and per GRWRRF staff they monitor daily differential pressures across the filter as well as check the pH weekly. These checks are required by the PM/MAP that was previously submitted to AQD. EG observed the system and the paper records adjacent to the biofilter during the inspection. The records state that readings are required 1st shift every Monday. Observation of the records showed intermittent dates where readings were missing. All of the pH readings were between 5.0 and 6.0. Additionally, EG observed the pressure differential gauges associated with the biofilter, as well as the water flow gauge associated with the biofilter media sprayer.

FGDIGESTERS

This flexible group is for three (3) digester tanks that have a combined biogas maximum production rate of 800 cubic feet per minute with a 60% methane content. The gas made from these digesters routes to the conditioning system or to the flares. The gas made by the digesters can either go to the storage sphere or to the flares. The facility does not send any gas to the flares that has not gone through H₂S removal. None of the gas was going to the flares at the time of the inspection.

GRWRRF was required to submit a PM/MAP for the digesters, for which one was previously submitted to AQD.

FGDS

This flexible group covers the digested sludge transfer (DST) tanks, CO₂ release (CO₂R) tanks, and the Schwing Nutrient Removal System. The DST tank and the CO₂R tank are both vented to an activated carbon system to control odors and sulfur-bearing compounds.

A PM/MAP is also required for the activated carbon system, which was previously submitted to AQD. During the inspection no odors were noted in the area of FGDS.

FGCHP

This flexible group is for three (3) combined heat and power engines each with a nominal rating of 1.411 MW (12.07 MMBTU/hr), used for electricity generation and heat for a heat loop for the digester tanks and incidental building heat. Each engine is equipped with an oxidation catalyst for control of CO, VOC, and Formaldehyde. These units are subject to the provisions of 40 CFR Part 60 Subpart JJJJ for stationary reciprocating internal combustion engines.

The facility only installed two (2) of the three (3) permitted combined heat and power (CHPs) units.

The emission limits that each engine is subject to is outlined in Table 1, below. Unless otherwise noted, the emission limits apply to each CHP individually. Most recently the facility had performance testing conducted on July 18, 2023. Testing was suspended after the first run of testing when the testers determined that the formaldehyde emission rate on Unit 3 was exceeding the emission limit. Testing showed an emission rate of 0.078 pounds per hour, which is greater than the limit of 0.056 pound per hour. The facility was issued a Violation Notice on August 3, 2023, for the documented exceedance of the formaldehyde emission limit. The facility re-tested the CHPs on September 29, 2023, after conducting supplemental maintenance on the top end of each CHP and replacing the catalyst on each unit. Results from re-testing documented compliance with the permitted emission limits

Table 1: Emission limits applicable to each unit

Pollutant	Emission Limit	Actual Emissions	Averaging Time
NOx	0.55 g/bhp-hr	CHP1: 0.45 CHP3: 0.47 Determined via stack testing conducted on September 29, 2023	Hourly
NOx	1.0 g/hp-hr or 82 ppmvd @ 15% O2	CHP1: 41 ppmvd CHP3: 44 ppmvd Determined via stack testing conducted on September 29, 2023	Hourly
CO	0.44 g/bhp-hr	CHP1: 0.02 CHP3: 0.01 Determined via stack testing conducted on September 29, 2023	Hourly
CO	2.0 g/hp-hr or 270 ppmvd @ 15% O2	CHP1: 2.92 ppmvd CHP3: 1.28 ppmvd Determined via stack testing conducted on September 29, 2023	Hourly
VOC	0.105 g/bhp-hr	CHP1: 0.02 CHP3: 0.02 Determined via stack testing conducted on September 29, 2023	Hourly

VOC	0.7 g/hp-hr	CHP1: 1.95 ppmvd	Hourly
	Or	CHP3: 2.01 ppmvd	
	60 ppmvd @15%O₂	Determined via stack testing conducted on September 29, 2023	
Formaldehyde	0.056 pph	CHP1: 0.023 pph	Hourly
		CHP3: 0.021 pph	
		Determined via stack testing conducted on September 29, 2023	
Formaldehyde	0.25 tons per year (tpy)	0.1 tpy CHP1	12-month rolling time period as determined at the end of each calendar month
		0.1 tpy CHP3	
		Ending in June 2024	

Only pipeline quality natural gas or renewable natural gas from the facility that meets the requirements of entry into the natural gas pipeline is allowed to be combusted in these units. GRWRRF is only burning natural gas from the pipeline, and currently has no plans to burn RNG.

GRWRRF was required to submit a PM/MAP for these units within 45 days of issuance of the permit. The PM/MAP was previously submitted to AQD.

The stacks for each of the units is required to have a maximum diameter of 15.4 inches and a minimum height of 32.8 feet. The stacks were not measured but appeared to meet the requirements.

FGFLARES

This flexible group is for two (2) open flares that may burn raw biogas, biogas with H₂S removed, or off-spec renewable natural gas. The flares were not in use at the time of the inspection.

GRWRRF is limited to 103.68 million scf per year based upon a 12-month rolling time period of H₂S conditioned biogas and pipeline quality natural gas burned. They are also limited to burning 34.56 million scf per year, based upon a 12-month rolling time period of raw biogas (the facility has not sent any raw biogas to the flares) As of June

2024, a 12-month total of 9.2 million cubic feet of H₂S conditioned biogas had been burned, and no raw biogas.

SO₂ emissions from the flare are limited to 3.57 tons per year (tpy) based upon a 12-month rolling time period. As of June 2024, the SO₂ emissions were 0.86 tpy.

The Flares are also required to have a PM/MAP. The facility previously submitted a plan to the AQD. The stacks for each of the flares is required to be a maximum diameter of 48 inches and a minimum height of 28.5 feet. The stacks were not measured but appear to meet the requirements.

FGSPACEHEAT

This flexible group covers two (2) natural gas, direct-fired heating units, one (1) natural gas-fired water heater, and four (4) natural gas-fired boilers. Only pipeline quality natural gas or renewable natural gas from the facility that meets the requirements of entry into the natural gas pipeline are allowed to be combusted in these units.

The maximum heat input for each unit in this flexible group is required to be kept. AQD staff previously determined that the nameplate capacities for these units did not exceed 12.4 MMBTU per hour on a fuel heat input basis.

FGSTORAGETANKS

This flexible group consists of eight (8) storage tanks for various liquids. These storage tanks include a 1,000-gallon storage tank for engine lube oil, a 1,000-gallon storage tank for engine used oil, two (2) 1,000-gallon storage tanks for polymer resins, and two (2) 6,000-gallon storage tanks for sodium hydroxide. These tanks are required to be closed when not in use.

A MAP/PM plan is required for these storage tanks. The facility previously submitted a plan to the AQD.

FGSTORAGETOTES

This flexible group consists of three (3) storage tanks for various liquids including a 300-gallon storage tote for sodium hypochlorite, a 200-gallon storage tote for citric acid, and a 200-gallon or smaller storage tote for foam suppressant. These totes are required to be closed when not in use.

These totes are also required to have a PM/MAP. The facility previously submitted a plan to the AQD.

Compliance Determination

Based upon the observations and information obtained during this inspection and a subsequent review of the records, the City of Grand Rapids Water Resource Recovery Facility appears to be in compliance with PTI No. 37-19B and other applicable Air Quality Rules and Regulations.

NAME Eric Grinstern

DATE 07/26/2024

SUPERVISOR HH