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

B172963641

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: Todd Williams , Industrial Pretreatment Program Inspector		**ACTIVITY DATE:** 06/07/2022
STAFF: Kaitlyn DeVries	**COMPLIANCE STATUS:** Compliance	**SOURCE CLASS:** SM OPT OUT
SUBJECT: The purpose of this inspection was to determine compliance with Permit to Install (PTI) No. 37-19B, Consent Order AQD No. 2020-16, and other applicable air quality rules and regulations.		
RESOLVED COMPLAINTS:		

On Tuesday June 7, 2022, Department of Environment, Great Lakes, and Energy (EGLE) Air Quality Division (AQD) staff Kaitlyn DeVries (KD) conducted an unannounced, scheduled inspection of the City of Grand Rapids Water Resource Recovery Facility (WRRF) located at 1300 Market Street SW, Grand Rapids, Michigan. The purpose of this inspection was to determine compliance with Permit to Install (PTI) No. 37-19B, Consent Order AQD No. 2020-16, and other applicable air quality rules and regulations.

KD arrived on site at approximately 9:00 am and met with Mr. Todd Williams, Industrial Pretreatment Program Inspector. Also occurring that day was the required stack testing on the two (2) installed combined heat and power units. Further discussion of the testing can be found in the Compliance Evaluation section of this report. For the inspection, KD also met with Mr. Bill Kaiser, WRRF Superintendent and Mr. Jared Grabinski, Acting Wastewater Treatment Plant Superintendent. Mr. Grabinski accompanied KD on the walkthrough of the facility.

Facility Description

The City of Grand Rapids Water Resource Recovery Facility is a wastewater treatment facility that also operates an anerobic digester, for which this aforementioned PTI is for. Prior to issuance of the PTI, construction had commenced on the facility. Violation Notices were issued to the facility, but these Violations have been resolved upon issuance of the PTI. These violations, however, did result in the Consent Order, AQD No. 2020-16.

The anaerobic digester portion of the facility consists of three (3) biodigesters and three (3) combined heat and power engines as well as other equipment, such as flares for control and a gas processing system to turn the biogas into renewable natural gas. So far, only two (2) combined heat and power engines have been installed. Further description of the emission units will follow in the Compliance Evaluation portion of this report.

Regulatory Analysis

As previously mentioned, the facility holds one (1) permit, Opt-Out PTI No. 37-19B, which contains synthetic minor 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. Further discussion of these regulations can be found in the Compliance Evaluation portion of this report.

Compliance Evaluation

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. Mr. Grabinski indicated that this system is now up and running. It was not operational during the previous year's inspection. At the time of the inspection, all gas that was being produced was going through this system and back into the pipeline. No gas was being burned in the flares, or in the engines.

This emission unit required the submittal of a Preventative Maintenance/Malfunction Abatement Plan (PM/MAP). This was submitted to the AQD as part of the records request.

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 submitted to the AQD.

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. As of the date of the inspection only two (2) digesters had been seeded; however, Mr. Grabinski indicated that they were planning on seeding the third digester the next week. The two digesters that were in service utilized onsite waste, while the third digester would take in food type waste. The gas made by the digesters can either go to the storage sphere or to the flares (See FGFLARES for more information). The digesters were operating at 59.1% methane and 40.64% CO2. 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 received by the AQD on July 7, 2020. In addition to routine maintenance, operational parameters such as pH and process temperature are required to be recorded.

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.

KD was able to observe the activated carbon system and did not notice any odors stemming from the system. A PM/MAP is also required for the activated carbon system. At the time of this report, the AQD has only received a partial PM/MAP for this flexible group for the digested sludge transfer tank, but not the CO2R release tank or the activated carbon system. Per confirmation with Mr. Kaiser, the Schwing nutrient removal system and the CO2R is not in operation at this time, but will likely be complete in a few months. Mr. Kaiser ensured KD that a PM/MAP would be submitted at that time.

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.

GRWRRF has only two (2) of the three (3) permitted combined heat and power (CHPs) installed. After some difficulties getting these operational, the AQD was notified that the two (2) CHPs were operational as of February 1, 2022.

As previously mentioned, testing to verify emissions was underway while KD was onsite. 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.

Table 1: Emission limits applicable to each unit

Pollutant	**Emission Limit**	**Actual Emissions**	**Averaging Time**
NOx	0.55 g/bhp-hr	Determined via Stack Testing. Stack testing conducted on June 7, 2022, and awaiting results	Hourly
NOx	1. g/hp-hr or 82 ppmvd @ 15% O2	Determined via Stack Testing. Stack testing conducted on June 7, 2022, and awaiting results	Hourly
CO	0.44 g/bhp-hr	Determined via Stack Testing. Stack testing conducted on June 7, 2022, and awaiting results	Hourly
CO	1. g/hp-hr or 270 ppmvd @ 15% O2	Determined via Stack Testing. Stack testing conducted on June 7, 2022, and awaiting results	Hourly
VOC	0.105 g/bhp-hr	Determined via Stack Testing. Stack testing conducted on June 7, 2022, and awaiting results	Hourly
VOC	0.7 g/hp-hr Or 60 ppmvd @15%O_2	Determined via Stack Testing. Stack testing conducted on June 7, 2022, and awaiting results	Hourly
Formaldehyde	0.056 pph	Determined via Stack Testing. Stack testing conducted on June 7, 2022, and awaiting results	Hourly
Formaldehyde	0.25 tons per year (tpy)	0.06 tpy CHP1 0.05 tpy CHP3	12-month rolling time period as determined at the end of each calendar month

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. At the time of the inspection, GRWRRF was burning natural gas from the pipeline, and not their own renewable natural gas.

GRWRRF was required to submit a PM/MAP for these units within 45 days of issuance of the permit, for which the AQD received the plan on September 2, 2020.

The stack parameters, while not explicitly measured, appeared to be correct.

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 put into operation on May 25, 2021, per notification from Mr. Kaiser, as required. The flares were not in use at the time of the inspection, as the facility is cleaning the gas and injecting it back into the pipeline for sale to the gas company.

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. As of May 2022, only 46.24 million cubic feet of H2S conditioned biogas had been burned, and no raw biogas. The biogas has an average H2S content of 0.15 ppm, for which GRWRRF has a device to monitor and record the H2S concentration of the biogas and the volumetric flow rate of the gas burned in the flares. Records indicate the H2S concentration has spiked as high as 0.58 ppm.

SO2 emissions from the flare are limited to 3.57 tons per year (tpy) based upon a 12-month rolling time period. As of May 2022, the SO2 emissions were 0.19 tpy.

The Flares are also required to have a PM/MAP. GRWRRF submitted a plan to the AQD on June 15, 2020. The Stack parameters, while not explicitly measured, appeared to be correct.

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. KD was able to view the nameplate capacities for these units as the maximum combined design heat input capacity for FGSPACEHEAT shall 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. GRWRRF submitted a plan to the AQD on April 22, 2021. GRWRRF is following that plan.

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, for which GRWRRF submitted a plan to the AQD on April 22, 2020; GRWRRF is adhering to this plan.

Compliance Determination

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

NAME _____ DATE 0715/2022 SUPERVISOR _____