

DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION
ACTIVITY REPORT: Scheduled Inspection

N598455283

FACILITY: PINE TREE ACRES, INC.		SRN / ID: N5984
LOCATION: 36600 29 MILE RD., LENOX		DISTRICT: Warren
CITY: LENOX		COUNTY: MACOMB
CONTACT: Steve Walters , Environmental Engineer		ACTIVITY DATE: 06/18/2020
STAFF: Robert Joseph	COMPLIANCE STATUS: Compliance	SOURCE CLASS: MAJOR
SUBJECT: Scheduled inspection of landfill.		
RESOLVED COMPLAINTS:		

Section 1 - Pine Tree Acres, Inc.

On June 18, May 14, and January 14-28, 2020, I, Michigan Department of Environment, Great Lakes, and Energy-Air Quality Division (EGLE-AQD) staff Robert Joseph, observed multiple stack tests and conducted a scheduled inspection of Pine Tree Acres, Inc. (SRN: N5984) located at 36600 29 Mile Road, Lenox Township, Michigan 48048. The purpose of the inspection was to determine the facility's compliance with the requirements of the Federal Clean Air Act; Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act, 1994 PA 451, Michigan Department of Environment, Great Lakes, and Energy-Air Quality Division (EGLE-AQD) Administrative Rules, and conditions of the facility's Renewable Operating Permit (ROP) MI-ROP-N5984-2019.

Opening Introduction

I arrived at the facility each day shortly before 10 a.m. and met with Steve Walter, Facility Engineer, and Richard Kunze, WMRE Landfill Gas Engine Supervisor, I introduced myself and presented my identification and credentials and stated the purpose of my visit. I asked Steve to provide me some general information of the landfill facility. Steve indicated that Pine Tree Acres, Inc. (PTA) is a subsidiary of Waste Management Renewable Energy (WMRE) of Michigan. The hours of operation of the facility is 6am-4pm, Monday-Friday and most Saturdays 7am-11pm. There are approximately 18 employees at the facility. The facility began operations in 1987 and operates roughly 286 days a year.

The facility is a type II sanitary municipal landfill which is a discrete area of land that receives household waste. It also receives other types of non-hazardous wastes such as commercial solid waste, non-hazardous sludge, conditionally exempt small quantity generator waste, construction and demolition debris, and industrial nonhazardous solid waste. The facility also accepts asbestos waste and has a recycling center. Pine Tree Acres is subject to the National Standards of Performance for Municipal Solid Waste Landfills, 40 CFR Part 60 Subpart WWW, and the National Emission Standards for Hazardous Air Pollutants for Municipal Solid Waste Landfills, 40 CFR Part 63 Subpart AAAA.

The facility was issued a permit to construct a landfill expansion on May 8, 2015 and commenced construction of the expansion on May 15, 2015. An initial design capacity and NMOC emission rate report was submitted November 23, 2016, and a GCCS design plan was submitted on November 17, 2017. Due to the expansion of the facility in 2015 which permitted seven (7) landfill cells, the landfill became subject to the National Standards of Performance for Municipal Solid Waste Landfills, 40 CFR Part 60 Subpart XXX on May 23, 2019. These regulations are applicable to landfills that have commenced construction, reconstruction, or modification after July 17, 2014.

The facility has four flares (2-enclosed flares, #4 and #6, and 2-open flares, #3 and #5) for landfill gas combustion when the landfill gas is not being routed to the eight reciprocating internal combustion engines (Caterpillar G3520C, 2,233 bhp at 100% load) to produce electricity (1.6 MW gross electrical output). The engines drive an associated generator set to produce electricity. The facility is a major source of Hazardous Air Pollutants (HAPs). The facility's engines are subject to the National Emission Standards for Hazardous Air Pollutant (NESHAP) for Stationary Reciprocating Internal Combustion Engines, 40 CFR Part 63 Subpart ZZZZ, and the National Standards of Performance for Stationary Spark Ignition Internal Combustion Engines, 40 CFR Part 60 Subpart JJJJ.

The facility's waste collection comes from Wayne, Oakland, Macomb and Washtenaw counties. In addition, approximately 75% of the facility's waste collection comes from Canada. Approximately 8,626 tons is accepted daily to the facility.

Facility Tour

The landfill gas (LFG) is collected through an active landfill gas collection system, which consists of wells, headers, and gas mover equipment. Risers are also installed to tie-in the collectors. The collected LFG can be sent to one of the four flares for combustion, sent to the facility's gas to energy engine plant (which is utilized by Consumers Energy for 10% renewable energy), sold off-site to the GM Orion Assembly Plant for combustion in their boilers/engines, or sent to Sumpter Energy Associates, Inc. (formerly N8004) which it combined with in 2019 to become a single area source and is listed as Section 2 in the facility's permit. Sumpter Energy Associates, Inc. is a gas-to-energy plant which houses nine reciprocating internal combustion engines.

The site currently has 21 active landfill cells which comprise 313.6 acres. The facility is projected to have approximately another 20-years of service. There are four cells which are unconstructed and will provide another 63.6 acres. Total landfill area, active, and unconstructed is 377.2 acres. Also, 203 acres are used for conservation easement. All cells that are covered have 2-synthetic liners except for cell one.

The facility has permit conditions for the following emission units: EU-ABESTOS, EULANDFILL, EU-ACTIVECOLLECTION, EU-TREATMENTSYSTEM, EU-FLARES 3-6, EU-COLDCLEANER, and EU-ICENGINES 1-8.

The following flexible groups have separate permit conditions for both Subparts WWW and XXX: FG-LANDFILL, FG-ACTIVECOLLECTION, FG-TREATMENTSYSTEM, FG-ENCLOSED FLARES, and FG-OPENFLARES. The following have Subparts WWW and XXX written into their flexible groups: FG-FLARES, FG-COLDCLEANERS, FG-ICENGINES, FG-RICEMACT, FG-RICENSPS.

Environmental Compliance per MI-ROP-N5984-2019:

Records were viewed on site and submitted via email and referred to when applicable below. Flexible groups are sectioned below per the Subpart XXX ROP requirements. Subpart WWW requirements which are not included in the Subpart XXX requirements are included a under each applicable Subpart XXX section where needed.

EU-ASBESTOS

The facility currently accepts friable asbestos and documents its location via GPS (Global Positioning System). The facility submitted a document to the AQD in March 2019 and April 2020 indicating potential asbestos disturbance during landfill gas well expansion. The facility indicated that any asbestos containing materials encountered would be wetted when removed to inhibit dust generation and will be properly containerized for disposal onsite in the active fill area.

III. PROCESS/OPERATIONAL RESTRICTION(S)

I did not detect any asbestos fugitive emissions while on-site. The facility maintains a natural barrier which adequately deters access by the general public. The facility places topsoil and aggregate over the asbestos area daily and uses a petroleum-based cover to minimize dust generation.

IV. DESIGN/EQUIPMENT PARAMETERS

There are no areas in the landfill where asbestos is placed by itself. The asbestos is placed in active waste cell areas with other waste. Its location is documented to prevent unnecessary disturbance or damage to the waste during future construction.

VI. MONITORING/RECORDKEEPING

The facility maintains waste shipment records of all asbestos containing waste received. It lists the name, address and phone number of the waste generator and transporter. PTA documents the location, depth, and quantity of asbestos containing waste. There are no asbestos containing areas excluded from the collection.

FG-LANDFILL

I. EMISSION LIMITS

There were six locations each that initially exceeded 500 ppm during the first and second quarter scans in 2019. One location was not successfully remediated. PTA expanded the gas collection system within 120 days per 60.755(c)(4)(v). The facility's semi-annual report indicates the locations of the new infrastructure. There were (58) locations that initially exceeded 500 ppm during the third quarter scan, and (13) locations that exceeded 500 ppm during the fourth quarter scan. Based on the 10-day re-monitoring event, PTA records indicates the locations were successfully remediated and under 500 ppm.

Pollutant	Limit	Time Period/ Operating Scenario	Equipment
1. Methane concentration	Less than 500 ppm above background level	Calendar quarter	Surface of Landfill

III. PROCESS/OPERATIONAL RESTRICTIONS

The facility has provided a SSM plan describing how emissions will be minimized during periods of startup, shutdown, and malfunction. According to facility's records, there were 43 start-up gas collection and control system events, zero shutdown events, and one malfunction event that occurred during the first half of 2019. All were consistent with the SSM plan. There were 126 start-up gas collection and control system events, zero shutdown events, and zero malfunction events that occurred during the second half of 2019. There were no plan revisions.

IV. DESIGN/EQUIPMENT PARAMETERS

The facility currently has a network of devices such as wells, piping and a blower system to capture the landfill gas, and maintains four flares; #4 and #6 are enclosed flares and #3 and #5 are open flares. All are designed in accordance to 40 CFR part 60. The facility's treatment system is outlined in the preventative maintenance plan listing the operating parameters and maintenance schedule.

V. TESTING/SAMPLING

The facility performs quarterly scans of the landfill areas and the results and exceedances are documented in the facility's semi-annual reports.

VI. MONITORING/RECORDKEEPING

The facility monitors the cover integrity of the gas well collection system on a monthly basis and intermittently each week. PTA provided monthly cover integrity records indicating repairs with additional clay or an excavator when landfill areas became exposed. The facility also maintains on-site records of the design capacity for the current amount of solid waste in place and the year-by-year waste acceptance rate. The facility accepted 2,816,609 tons in 2019 and 2,224,173 tons thus far in 2020. The facility has not converted design capacity from volume to mass or mass to volume. The facility's maximum design capacity was noted in a letter to the AQD as 81,251,000 yd³. The facility does not add any liquids to the waste mass as described in the ROP. Leachate forms from the waste mass and is captured within a collection pipe that is constructed outside the waste area.

FG-ACTIVECOLLECTION

III. PROCESS/OPERATIONAL RESTRICTIONS

In the event the collection or control system is inoperable, the gas mover system shuts down and all valves in the collection and control system contributing to venting of the gas to the atmosphere is closed within one hour per the Startup, Shutdown, and Malfunction plan. There have not been any such events that were not consistent with the plan.

The facility operates the gas collection system for all waste that has been in-place for 5 years. There are approximately 436 gas wells in operation. Facility equipment includes blowers, vertical wells, horizontal wells, and risers. There have not been any documented events of a fire. In the first half of 2019, there were 104 well exceedances for temperature, pressure, oxygen. 59 could not resolved within 15 calendar days. Facility

expanded the gas collection by adding new wells or submitted higher operating value requests to the AQD for approval.

The system was never down for more than five days. In the second half of 2019, there were 146 well exceedances for temperature, pressure, oxygen. 55 could not be resolved within 15 calendar days. The system was never down for more than five days. PTA added 35 new vertical and 28 horizontal wells during this time period along with associated header and lateral conveyance piping. The facility is required to operate each interior wellhead in the collection system with a landfill gas temperature less than 55°C (131°F), negative pressure, and with an oxygen level less than 5 percent (Subpart WWW only for oxygen).

IV. DESIGN/EQUIPMENT PARAMETERS

The facility monitors the well collection field, and if necessary, adjustments are made to handle the gas flow rate by either adjusting the parameters of a specific well or installing additional wells or risers. Geosynthetic liners are placed over a clay liner for horizontal wells. All collected gases are sent either to the facility's flares for combustion, sent to the facility's gas-to-energy engine plant (which is utilized by Consumers Energy), or sold off-site to the GM Orion Assembly Plant for combustion in their boilers/engines, or sent to Sumpter Energy Associates Inc.

The facility has installed a series of horizontal, vertical, and horizontal wells capable of controlling and extracting gas per the landfill regulations (Subpart WWW and XXX). There are approximately 436 gas collection wells onsite. Each well is equipped with a sample port and thermometer to measure the subsurface temperature. The facility submits their gas collection control system designs plans to the EGLE-MMD for approval and it is reviewed by the AQD also. The facility also accepts asbestos waste and has designated areas within the landfill where this is placed. There are no documented areas that are excluded from gas control.

The facility's vertical wells are constructed of PVC (polyvinyl chloride) and the horizontal wells are constructed of HDPE (polyethylene). The wells are perforated to allow for gas entry. Horizontal wells are placed in areas of shallow waste to allow for greater gas collection. Vertical wells are placed in areas where the waste is deep and in areas where the well can be adjusted vertically to allow for gas collection at varying heights.

Pea gravel is used as aggregate to support the wells and allows for the filtration of leachate to percolate through the waste. The collected LFG is sent either to one of the four facility flares, sent to the facility's gas-to-energy plant where eight reciprocating internal combustion engines are located, routed off-site to the GM Orion Assembly Plant, or sent to Sumpter Energy Associates Inc. The gas mover equipment is sized to handle current flow rates.

VI. MONITORING/RECORDKEEPING

The facility measures gauge pressure in the gas collection header at each individual well monthly. The facility monitors each well monthly for temperature, pressure and oxygen. The facility has requested a higher operating values for temperature for a number of wells. The facility is required to submit a root cause analysis, corrective action plan, and implementation timeline (beginning and end dates) for all exceedances expected to exceed 120-days. Notifications are required by the facility at 15-days and 60-days per Subparts WWW and XXX, respectively, when not corrected within those timeframes.

The facility maintains an up to date plot showing each existing and planned collector in the system. The facility also maintains dates of the newly installed collectors. Records were reviewed for recent new collectors installed during 2019. The facility also maintains a record of all exceedances within the gas control system. The facility maintains a diagram of all vertical wells, horizontal wells and other gas extraction devices such as risers, including the locations of areas excluded from collection and the proposed sites for the future collection system expansion.

Additional components of the gas collection and control system include the following; Knockout Pot Filters designed to remove moisture droplets and particulate debris, central blower station with (4) 7-stage blowers, each designed to deliver 2,300-5,000 standard ft³/min from 80 inches water column vacuum to 7 lbs/in² gage discharge pressure, gas-to-air aftercoolers and a filtering vessel (filtration system) designed to remove entrained moisture. The facility bases the density of wells on waste acceptance rates and expected gas generation. All asbestos is placed in marked locations within the landfill and documented. There are no waste areas where gas collectors are excluded, and the present gas mover equipment is adequate to handle the gas flow rates. Dates of the landfill gas well installations are maintained within the facility's database, and the age of the waste

in which the landfill gas wells were installed is also documented.

FG-TREATMENTS SYSTEM

This emission unit treats landfill gas before it is delivered off-site and to Flares #4 and #6. Hydrogen Sulfide (H₂S) removal consists of both primary (Thiopaq) and back-up (SulfaTreat) control system. The facility primarily uses the Thiopaq system. Treatment capacity of each control is 15,000 ft³/min at 600 ppm inlet concentration.

The process consists of four 70,000 tanks which use FeO (iron oxide) as a media. The gas is first scrubbed with a mild alkaline solution which then flows to a 25,000-gallon bioreactor tank. Bacteria is killed off at 105 degrees F. Elemental sulfur (S) is separated from the liquid phase as a concentrated sludge by centrifuge. The facility's permit requires H₂S concentration not to exceed 269 ppm.

The three blower stations (knockout pot filters, central blower station and filter vessel) incorporate filtration, compression, and dewatering. The operating and maintenance plan indicate complete combustion when the treated gas is delivered to the facility's engines and other users. There are no atmospheric vents associated with PTA's treatment system. Moisture is removed via treatment and is managed by PTA's leachate system in accordance with Part 115.

III. PROCESS/OPERATIONAL RESTRICTIONS

The facility operated the treatment system at all times and there was one documented instances (1.9 hours) in 2019 when the treatment system was not operating for more than one hour due to gas well construction. There are no atmospheric vents associated with PTA's treatment system. The facility maintains a backup treatment system, SulfaTreat, which is an H₂S removal system should the primary treatment, Thiopaq, malfunction.

VI. MONITORING/RECORDKEEPING

Per facility records and the semi-annual reports, there have not been any control or treatment exceedances. The facility maintains records of all maintenance activities per the preventative maintenance plan (PMP). The gas scrubber liquid level and bioreactor pH are checked daily and all systems related to the treatment system are checked daily, monthly, or weekly. PTA does not have a bypass of the control system so landfill gas was not discharged directly to the ambient air. The facility previously provided a gas collection and control system diagram and does so on request. The facility provided an updated malfunction abatement plan for the H₂S removal system during their recent ROP renewal in 2019.

FG-ENCLOSED FLARE

Pollutant	Limit	Time Period/ Operating Scenario	Equipment
1. NMOC	20 ppmv dry as hexane at 3% oxygen-OR-98% weight reduction or more	Hourly	Enclosed Flares

The above emission limits apply to the facility's two enclosed flares, #4 (3,000 ft³/min) and #6 (6,000 ft³/min). The NMOC performance test for each flare test on January 14, 2020, and June 18, 2020, respectively, for flares #4 and #6, were 0.54 ppmv for flare #4 and 0.33 ppmv for flare #6. Both were determined at 20 ppmv dry as hexane at 3% oxygen.

III. PROCESS/OPERATIONAL RESTRICTIONS

The facility only sends treated landfill gas to Flares #4 and #6 after it has gone through the Thiopaq treatment system per the malfunction abatement plan for H₂S removal. These flares are designed to reduce NMOC by 98%. PTA's data recorder downloads the operating parameters every ten minutes. These flares only currently operate when the facility's gas-to-energy plant is down for maintenance due to the volume of landfill gas.

VI. MONITORING/RECORDKEEPING

These flares are not equipped with a bypass control system. Both flares are equipped with a gas flow measuring device to continuously record the actual gas flow. The facility has a system, referred to as the Golder Watch system, to monitor the flares and compressor remotely. The facility provided the data recorder readings for 2019 and 2020. Each flare was only in-operation during each flare's respective stack test. The flares are calibrated every 18-months by the manufacturer. Flare #4 is an enclosed flare with a 4,000 ft³/min capacity and receives treated H₂S landfill gas via the central blower skid. A flare alarm sounds if a temperature of 2,000 F is reached and is air assisted. Flare #6 is an enclosed flare with a 6,000 ft³/min capacity and receives treated H₂S landfill gas via the central blower skid. A flare alarm sounds if a temperature of 2,050 F is reached and is air assisted.

The following data was observed for #4 and #6 during the performance test:

FLARE #4

Combustion zone temperature: 1,638 F
Fuel flowrate: 2,625 ft³/min
LFG methane content: 54.2%LFG
Lower heating value: 493 Btu/ft³
Exhaust temperature: 1,633 F

FLARE #6

Combustion zone temperature: 1,601 F
Fuel flowrate: 2,620 ft³/min
LFG methane content: 49.0%
LFG Lower heating value: 446 Btu/ft³
Exhaust temperature: 1,550 F

VII. REPORTING

The facility's semi-annual reports for 2019 did not list any exceedances with the flares. These two flares are the primary flares used when combustion is needed.

FG-OPENFLARE

I. Emission Limit

Flares #3 or #5 were only in-operation during their respective visible emission tests.

III. PROCESS/OPERATIONAL RESTRICTIONS

PTA does not have a bypass of the control system so landfill gas was not discharged directly to the ambient air.

IV. DESIGN/EQUIPMENT PARAMETERS

The flares are calibrated every 18-months by the manufacturer and do not have a bypass.

V. TESTING/SAMPLING

There were no visible emissions during the performance test for both flares #3 and #5 on January 14, 2020.

VI. MONITORING/RECORDKEEPING

Flare #3 is a non-assisted flare and has a 3,000 standard ft³/min capacity and Flare #5 is used as a backup only. It has a 2,100 ft³/min capacity. Both flares receive untreated H₂S landfill gas via the central blower skid. Records indicate the flare #5 operated intermittently in 2019 and 2020. The flares #3 and #5 operate (non-assisted) with a net heating value of 17.12 MJ/m³ (standard) which is greater than the required value of 7.45 MJ/m³ (standard). The exit velocity for the flares is not greater than the permitted maximum velocity (V_{max}).

The facility does not have a bypass of the control system, therefore, there have not been any instances where landfill gas was discharged directly to ambient air.

The last performance test for Flare #5 was conducted in October 2009, and in February 2010 for Flare #3. The facility monitors and records the data of the flares through the Golder Watch system which provides continuous monitoring of the flares. Both flares are non-assisted. The Golder Watch system monitors the presence of a flame in the flares. The following values are documented for Flares 3 and 5;

Parameter	Flare 3	Flare 5
Net Heating Value	18.28 MJ/m³	17.81 MJ/m³
Exit Velocity	88.7 ft/s	94.6 ft/s
V_{max}	88.7 ft/s	96.8 ft/s

FG-FLARES

I. EMISSION LIMITS

Pollutant	Limit	Time Period/Operating Scenario	Stack Test Flare #4 (01/27/14)	Stack Test Flare #6 (06/18/20)
1. SO ₂	8.1 lb/hr	hour	3.13 lb/hr	—
2. SO ₂	16.1 lb/hr	hour	—	4.24 lb/hr
3. NO _x	0.06 lb/MMBtu	hour	0.05 lb/MMBtu	0.05 lb/MMBtu
4. CO	0.2 lb/MMBtu	hour	0.08 lb/MMBtu	0.05 lb/MMBtu*
5. PM	1.4 lb/hr	hour	0.63 lb/hr	
6. PM	2.9 lb/hr	hour		2.26 lb/hr
7. PM ₁₀	1.4 lb/hr	hour	1.02 lb/hr	
8. PM ₁₀	2.9 lb/hr	hour		2.26 lb/hr
9. Visible Emissions	20% Opacity	According to Method	0	0

*The CO emission rate exceeded the permit limit when initially tested on May 14, 2020 with a value of 1.37 lb/MMBtu. The facility determined it was due to condensation build-up due to Flare #6 inactivity. A violation notice will be issued once the test report is reviewed. The facility will be required to update its MAP to monitor this and remove this excess after extended periods of shutdown. All other pollutants (except PM due to probe malfunction) were tested on May 14, 2020 and passed. All pollutants were re-tested including PM on June 18, 2020 and were below the permit limits.

III. PROCESS/OPERATIONAL RESTRICTION(S)

The facility maintains records for the usage of Flare #5. Records show it has only been in-use when the other flares are off-line. The facility recently updated their malfunction abatement plan (MAP). The enclosed flares are operated per 40 CFR 60.752(b)(2)(iii)(B), "A control system designed and operated to reduce NMOC by 98 weight-percent, or, when an enclosed combustion device is used for control, to either reduce NMOC by 98 weight percent or reduce the outlet NMOC concentration to less than 20 parts per million by volume, dry basis as hexane at 3 percent oxygen. The reduction efficiency or parts per million by volume shall be established by an initial performance test." These parameters meet the permit requirement.

The facility operates the enclosed flare at all times when the collected gas is routed to the enclosed flare. There are no documented instances when the flare was not operating when emissions are vented. The flares are designed for unattended operation via automatic spark, pilot flame, and thermocouple.

IV. DESIGN/EQUIPMENT PARAMETERS

The facility submitted the updated malfunction abatement plan and a description of the H₂S removal process during their ROP renewal and at the time of inspection.

VI. MONITORING/RECORDKEEPING

The facility maintains monthly SO₂ mass emission calculation records. The frequency is based a 269 ppm limit. Permit limits are 8.1 lb/r and 16.1 lb/hr, respectively, for flares #4 and #6.

Year	Flare 4 (lb/hr)	Flare 6 (lb/hr)
2019 high	(March) 5.99	(Dec) 6.25
2020 high		
	(Jan) 4.69	(Jan) 4.70

Flare #4 and Flare #6 both have 12-month rolling flow totals in 2019 of 54,201 MCF and 17,652 MCF, respectively. Flare #3 and Flare #5 have 12-month rolling flow totals in 2019 of 34 MCF and 35, 219 MCF, respectively. Flare #3 and #5 have had a monthly high of 567 MCF and 13,781 MCF the last two years, respectively.

The facility calibrates, maintains, and operates the enclosed flares according to the manufacturer's specifications, including a temperature monitoring device equipped with a continuous recorder and having a minimum accuracy of plus or minus 1 percent of the temperature being measured expressed in degrees. The flares were calibrated at the onset of their use and have not required calibration again since then. A propane tank is available to light the flares if necessary. An automatic spark and pilot flame along with a thermocouple indicate the presence of a flame.

FG-COLDCLEANERS

The coldcleaner is utilized by the facility is located in the landfill garage and used for maintenance purposes.

II. MATERIAL LIMITS

The facility does not use any of cleaning solvents listed in this condition that are more than 5% by weight.

III. PROCESS/OPERATIONAL RESTRICTION(S)

The facility indicated that routine maintenance is performed on each cold cleaner as recommended.

IV. DESIGN/EQUIPMENT PARAMETERS

The cold cleaner air/vapor interface is less than 10 ft² (3 ft x 2 ft x 1.4 ft) and its emissions are released into the general plant environment. The device is equipped with a device for draining parts. The Reid vapor pressure of the chemical is less 0.3 lb/in² and the facility indicates that no solvents are agitated or heated.

VI. MONITORING/RECORDKEEPING

There was no documentation indicating the facility has heated solvent during its use. The following information was recorded; Serial #0021359, Model number #906201, Date of Installation 03/18/2000, solvent naphtha (petroleum) medium aliphatics manufactured by the Zep Manufacturing Company. Reid vapor pressure at 20 degrees Celsius (68 Fahrenheit) varies between 0.02 and 0.09 lb/in² per manufacturer specification. The facility maintains a copy of the written operating procedures for the cold cleaner.

FG-ICENGINES

All information for the facility's engines is monitored and recorded through the facility's database known as SCADA. (Supervisory Control and Data Acquisition).

I. EMISSION LIMITS

Pollutant	Limit	1	2	3	4	5	6	7	8
1. CO	3.3 g/bhp-hr	2.08	2.10	2.47	2.17	2.27	1.93	2.13	2.26
2. CO	16.3 lbs/hr	10.4	10.5	12.4	10.9	11.4	9.75	10.8	11.4
3. NOx	0.6 g/bhp-hr	0.43	0.46	0.43	0.40	0.41	0.40	0.41	0.41
4. NOx	3.0 lbs/hr	2.15	2.3	2.14	2.01	2.05	2.03	2.09	2.07
5. SO ₂ (30-day average)	1.57 lbs/hr	1.18	1.12	1.15	1.34	1.18	1.19	1.38	1.25
6. PM	0.24 g/bhp-hr	0.07	0.07	0.09	0.12	0.11	0.09	0.09	0.10
7. PM	1.2 lb/hr	0.35	0.37	0.46	0.61	0.56	0.47	0.44	0.52
8. PM10	0.24 g/bhp-hr	0.07	0.07	0.09	0.12	0.11	0.09	0.09	0.10
9. PM10	1.2 lb/hr	0.35	0.37	0.46	0.61	0.56	0.47	0.44	0.52
10. VOC	1.0 lb/hr	0.42	0.58	0.74	0.54	0.52	0.44	0.52	0.65
11. Visible Emissions	10% Opacity	0	0	0	0	0	0	0	0
12. Formaldehyde	2.07 lb/hr	1.58	1.51	1.58	1.71	1.65	1.49	1.72	1.87

All within the permit limit. Stack test conducted during the period January 14 -28, 2020.

II. MATERIAL LIMIT

There does not appear to be any exceedance of the facility's H₂S limit as concentrations have varied between 43 and 201 ppm during 2019 and 2020.

III. PROCESS/OPERATIONAL RESTRICTION(S)

The facility only burns landfill gas that has been treated via the Thiopaq and SulfaTreat system. The facility provided an updated malfunction abatement/preventative maintenance plan during the facility's recent ROP renewal in 2019.

The plan on file includes the following; identification of the equipment and the supervisory personnel responsible for overseeing it, the description of the items and the frequency of the inspection and repairs, the identification of the equipment and operating parameters that are monitored to detect a malfunction or failure, the identification of the major replacement parts that are maintained in inventory for quick replacement, and a description of the corrective procedures or operational changes that are taken in the event of a malfunction or failure to achieve compliance with the applicable emission limits. The facility submitted the most recent updated malfunction abatement plan in 2019 for the hydrogen sulfide removal system (H₂S) during the recent 2019 ROP renewal.

IV. DESIGN/EQUIPMENT PARAMETER(S)

The engines air/fuel ratio controller is installed, maintained and operated in a satisfactory manner. The air/fuel ratio controller is inspected daily by the facility. The facility monitors and adjusts the engine's air/fuel ratio as needed to ensure that the engines operate at their maximum design output. Each engine is equipped with an automatic air-to-fuel ratio controller for NO_x and CO emission control, and each engine has a digital metering display to monitor and record the monthly hours of operation.

V. TESTING/SAMPLING

The facility performed the required testing for all engines in the table in section I. The hydrogen sulfide concentration has varied between 43 ppm and 201 ppm in 2019 and 2020.

VI. MONITORING/RECORDKEEPING

The facility continuously monitors, in a satisfactory manner, the total landfill gas fuel usage of the engines. The total flow rate to the engines has varied between 62,000 MSCF and 175,000 MSCF in 2019 and 2020. The facility maintains a log of all maintenance activities conducted according to the malfunction

abatement/preventative maintenance plan. Some activities include an oil and filter change, spark plug replacement, high voltage maintenance on all the engines at various times. The activities are maintained electronically. The facility maintains monthly SO₂ mass emission calculations.

The engine with the highest monthly emission rate in 2019 was Engine #1 at 1.13 lbs/hr in February, and the engine with the highest emission rate thus far in 2020 is Engine #7 at 1.07 lbs/hr in January. The engine with the most hours of operation in 2019 was Engine #4 with 741 hours in December, and the engine with the highest engine hours thus far in 2020 is Engine #2 with 735 hours in March.

The engines were manufactured by Caterpillar in 2010, and have the model number G3520C and are lean burn 4 stroke engines. Each have 2,233 brake-horse power with an engine displacement of 86 liters. The initial start-up date for the engines is February 2011. Compliance tests were last performed by the facility in January 2020. Tests are required every five years per Section V. Testing/Sampling, and yearly per Subpart JJJJ.

The facility conducts weekly H₂S testing to verify compliance with the permit concentration limit of 269 ppm. The facility calculates the amount of landfill gas combusted on a 12-month rolling basis. The 2019 year ending 12-month rolling total is 1,549,800 MCF, and the 2020 12-month rolling total through May is 1,443,685 MCF. The facility previously provided me the manufacturer's data for the engines, along with the specifications and maintenance procedures. This is outlined in the maintenance activities per the PM/MAP plan and are documented by the facility and entered electronically.

FG-RICEMACT

III. PROCESS/OPERATIONAL RESTRICTION(S)

Each engine operates in a manner which reasonably minimizes HAP emissions. The average air-to-fuel ratio varies between 7 and 8. The engines are turbo-charged, after-cooled, and are of a lean burn design. They are equipped with air-to-fuel ratio controllers which maintain a constant fuel to air mixture.

Each engine operates in a manner which minimizes time spent at idle during startup and minimizes the startup time to a period needed for appropriate and safe loading of each engine. After the engine oil has obtained a minimum operating temperature, the engines can be loaded to a desired load. There was no indication or documentation which indicates the idle times have exceeded 30 minutes.

IV. DESIGN/EQUIPMENT PARAMETER(S)

The facility uses the engine with the highest kW output and corresponding fewest engine hours to determine the engine with the highest fuel consumption. Each engine maintains separate fuel use meters to record the daily fuel usage.

VI. MONITORING/RECORDKEEPING

Each engine is monitored for fuel usage and the flow is measured for the eight engine plant. The flow to the eight engines during the first half of 2019 was 936,452 MCF with a heating value of 518 BTU/SCF, and the flow in the second half of 2019 was 613,496 MCF with a heating value of 505 BTU/SCF. The heating value is based on a methane concentration of 49.7% and the higher heating value of methane at 1,012 BTU/ft³.

FG-RICENSPS

I. EMISSION LIMIT(S)

Pollutant	Limit
1. NOx	2.0 g/hp-hr²
2. CO	5.0 g/hp-hr²
3. VOC	1.0 g/hp-hr²

All emission limits above are met and noted in FG-ICENGINES Emission Limit table.

III. PROCESS/OPERATIONAL RESTRICTION(S)

The engines are operated and maintained to meet the emission limits established over the entire life of the engine. The engines appear to be operating per the permit limits and are in-compliance when tested.

IV. DESIGN/EQUIPMENT PARAMETER(S)

There were no known or documented problems with the facility's engine hour meters during 2019 or 2020

V. TESTING/SAMPLING

Testing is performed on a yearly basis per Subpart JJJJ. Testing last occurred in January 2020.

VI. MONITORING/RECORDKEEPING

As noted in Section III above, all engines operate in a certified manner. The facility monitors and records the operating hours of each engine. This information is continuously monitored and documented.

Conclusion

Based on the AQD inspection and current records review, and the re-test results of Flare #6, Pine Tree Acres, Inc. is in compliance with the requirements of the Federal Clean Air Act; Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act, 1994 PA 451, Michigan Department of Environment, Great Lakes, and Energy -Air Quality Division (EGLE-AQD) Administrative Rules, and conditions of the facility's Renewable Operating Permit (ROP) MI-ROP-N5984-2019.

NAME Robert Joseph

DATE 07/08/20

SUPERVISOR Sebastianykallemkal