

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

N598430877

FACILITY: PINE TREE ACRES, INC.		SRN / ID: N5984
LOCATION: 36600 29 MILE RD., LENOX		DISTRICT: Southeast Michigan
CITY: LENOX		COUNTY: MACOMB
CONTACT: Steve Walters , Environmental Engineer		ACTIVITY DATE: 08/07/2015
STAFF: Rebecca Loftus	COMPLIANCE STATUS: Non Compliance	SOURCE CLASS: MAJOR
SUBJECT: Annual Compliance Inspection; See also SRN: N8004 - Sumpter Energy		
RESOLVED COMPLAINTS:		

On August 7, 2015, I, Rebecca Loftus, from the Department of Environmental Quality (DEQ), Air Quality Division (AQD), conducted an inspection of Pine Tree Acres, Inc., SRN: N5984, located at 36600 29 Mile Road, in Lenox Township, Michigan. The purpose of this inspection was to determine the facility's compliance with the Federal Clean Air Act, Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act of 1994, PA 451, as amended, Michigan's Air Pollution Control Rules, Permit to Install (PTI) No. 160-14, and Renewable Operating Permit (ROP) No. MI-ROP-N5984-2013.

Upon arriving at the facility, I met with Steve Walters, WM Environmental Engineer, Lee Bilinsky, now Gas Plant Manager, Courtney Fournier, WM Intern, and Jason Neumann, ARIA Energy Regional Manager (see report for N8004 - Sumpter Energy). Below is a summary of my findings during my inspection and file review of Pine Tree Acres.

Contacts

Steve Walters, Environmental Engineer, 586-749-6122, SWalter3@wm.com
Lee Bilinsky, Gas Plant Manager, 586-749-5182, LBilinsk@wm.com

Facility Overview

Pine Tree Acres, Inc. (operated by Waste Management of Michigan, Inc.) owns and operates a municipal solid waste landfill, named Pine Tree Acres Landfill (PTA), located at 36600 29 Mile Road, Lenox Township, Macomb County, Michigan. Sumpter Energy Associates (operated by Landfill Energy Systems) owns an electric generating facility that currently consists of nine internal combustion engines. Sumpter Energy receives its fuel, landfill gas (LFG), for nine internal combustion engines from Pine Tree Acres Landfill. The two companies have a contractual agreement in which PTA sells LFG to Sumpter Energy.

On February 11, 2008, an agreement was made between Michigan's Air Quality Division, the management of Pine Tree Acres, Inc., and the management of Sumpter Energy, which allowed the two entities to have separate Renewable Operating Permits. Together these entities comprise one single stationary source. Upon issuing the separate permits a new State Registration Number (SRN) was issued to Sumpter Energy Associates; the SRN for Pine Tree Acres, Inc. is N5984, and the SRN Sumpter Energy Associates is N8004.

PTA is a Type II Sanitary Landfill, which accepts and landfills municipal solid waste (MSW), bio-solids from wastewater treatment plants (sludge), and inert wastes such as construction debris, demolition debris, foundry sand, ash and low-level contaminated soils. The facility also accepts asbestos containing waste. Waste materials arrive in a variety of vehicles that have the potential to generate fugitive dust emissions; this is controlled by frequent wetting and sweeping of the entrance roads.

PTA owns approximately 500 acres in total. In 2010 PTA received approval for the expansion of Cells 19 through 23 and in 2018, PTA intends to expand eastward towards County Line Road with another 7 cells. At the time of my inspection, PTA was actively placing waste in cells 19, 20, and 22 and was beginning construction of cell 23.

PTA operates a landfill gas collection system consisting of multiple LFG wells, the LFG header system, the LFG treatment system, and two sulfur treatment systems. Currently, PTA is collecting LFG at flows rates of approximately 8,600 to 10,000 scfm. The collected LFG can be routed to two enclosed flares, two open flares, eight reciprocating internal combustion engines (RICEs), or an additional nine engines owned/operated by Sumpter Energy.

The landfill has a total of four flares: #4 and #6 are enclosed flares located near the main office building, #3 is a candle stick open flare located on the west side of the landfill, and #5 is a candle stick open flare located near cells 3 and 4.

On February 28, 2011, Pine Tree Acres, Inc. installed eight internal combustion engines, which are located across from the landfill, on the north side of 29 Mile Road. These engines are subject to 40 CFR, Part 60, Subpart JJJJ, New Source Performance Standards for Stationary Spark Ignition Internal Combustion Engines and 40 CFR, Part 63, Subpart ZZZZ, Maximum Achievable Control Technology Standards for Stationary Reciprocating Internal Combustion Engine

On February 13, 2015, PTA obtained a permit (PTI No. 160-14) which allowed an increase in H₂S concentrations/SO₂ emissions; this permit also includes formaldehyde limits for the eight engines (See more details in the PTI section below).

PTA is also 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, and is permitted under ROP No. MI-ROP-N5984-2013.

The ROP has enforceable limits/conditions for the following: EULANDFILL, EUALGCS, EUTREATMENTSYS, EUASBESTOS, EUCOLDCLEANER, FGFLARES, FGOPENFLARES, FGICENGINES, and FGRICEMACT.

PTI No. 160-14

In 2014, WM requested to increase allowable concentrations of total reduced sulfurs/hydrogen sulfide at PTA. The increase in TRS/H₂S would also increase the SO₂ emissions from the source. See the file for detailed notes on the proposal, modeling, and permit conditions (including the files for voided applications 151-13 and 69-14).

On February 20, 2015, PTI No 160-14 was issued to PTA. This permit has conditions for the sulfur treatment systems, WM's engines, WM's flares, and gas sent to Sumpter Energy's Phase I Engine Plant (Engines #1-7). New emission limits in the PTI (that were not in the ROP) include an increased SO₂ limit and a formaldehyde limit for the engines. The permit also includes a H₂S concentration limit of 269ppm for all combustion equipment operated by WM and Sumpter Energy's Phase I Plant. (Note: Sumpter Energy Phase II receives gas that does not have sulfur removed-see SRN: N8004 for details).

Compliance activities associated with the PTI conditions can be found in each section below.

Landfill/Gas Collection System

PTA's ROP has two sections covering the landfill and gas collection system, EULANDFILL and EUALGCS. During my inspection, WM provided me with copies of the surface methane monitoring reports, monthly integrity checks, waste acceptance rates/design capacity, the LFG NSPS parameters report, and a list of current wells under a NSPS variance. The records provided are needed to demonstrate compliance with the ROP and federal landfill regulations. Summaries of the reviewed reports have been provided below.

The 1st and 2nd quarterly surface methane scans were conducted on March 13, 2015, and June 11, 2015 (see attached reports/CD). For the 1st quarter, two locations at the landfill initially exceeded 500ppm methane (1200ppm, 1700ppm, near wells EW102 and EW159). After conducting remedial actions, the 10 day check showed the concentrations at 120ppm and 80ppm; and after 30days: 105ppm and 25ppm. For the 2nd quarter, five locations at the landfill initially exceeded 500ppm methane. After conducting remedial actions, the 10 day/30day checks showed the concentrations at 100ppm and below. Based on the results, the initial exceedances appear to be successfully remediated by PTA.

According to the records, WM conducts monthly integrity checks of the landfill cover. The records indicate the corrective action needed and when repairs occurred.

For 2014, PTA had the following acceptance rates: 1,356,524 Mg/year and 1,492,176 tons/year; slightly less than last year (see attached data).

PTA's wellfield currently consists of approximately 360 wells; most of which are subject to the NSPS. On a monthly basis, WM monitors temperature, oxygen, and pressure for each NSPS subject well (see the attached CD for May-June Data; all data is available electronically on-site). According to these records and PTA's semi-annual reports, WM properly documents instances in which wells have temperature, oxygen, and/or pressure exceedances. In the instances in which an exceedance cannot be corrected within 15 days, WM has requested higher operating variance, alternative timelines, and/or to decommission wells (see file for individual request). During my inspection, WM provided me with a list of the wells currently operating under a NSPS variance (see attached list).

Treatment Systems

As part of the LFG collection and control system, PTA's has LFG treatment systems which filter particulate matter, remove moisture, and compress the LFG; the treatment systems are designated in the ROP as EUTREATMENTSYS. These treatment systems are used to process the gas prior to it being sent to WM's eight Reciprocating Internal Combustion Engines and Sumpter Energy's nine engines. Maintenance activities are kept on-site in a binder and any malfunctions are reported in the semiannual reports.

Sulfur Treatment Systems

Due to the H₂S concentrations of the gas, PTA currently has two sulfur removal systems in which they can treat LFG: a non-renewable system – Sulfa Treat (currently used as back-up) and a renewable system – Thiopaq. The requirements for these systems can be found in the PTI and ROP.

PTA is required to treat the landfill gas so that H₂S concentrations do not exceed 269ppm. During my inspection, Mr. Walters provided me with copies of the daily H₂S readings (see attached). Daily readings are measure with dragger tubes and LFG drawn from Tedlar

sampling bags which provide steady pressure and flow. The readings are taken at the flares and at the WM engine plant. On a quarterly basis, WM sends samples to the lab to verify the daily dragger tube results.

During my inspection, Mr. Walters explained that WM is using the constructed slip stream bypass near Thiopaq to blend sulfur treated gas with untreated LFG before sending it to be combusted. Samples for H₂S can also be collected here as WM can control the flow.

Based on the provided records, the pretreatment values of H₂S range from 550ppm to 750ppm, and the post treatment values, obtained near the flares, are between 50ppm and 250ppm (below permit limits).

Mr. Bilinsky is now head operator for the Thiopaq Sulfur Treatment System. He explained that Thiopaq operations have greatly improved since closely monitoring flow for consistency. Sulfa Treat is now only used as back-up when Thiopaq is down due to maintenance or system upsets that kill off the bugs. Average flows to Thiopaq are 8600-9100 scfm. Mr. Bilinsky provided me with copies of the computer readouts for the treatment system (see attached CD) and was able to provide maintenance records of the equipment on-site.

Flares

PTA's is permitted to operate two enclosed flares and two open flares. The PTI and ROP have emission limits for SO₂, CO, NO_x, PM and Visible Emissions, as well as special conditions for testing, recordkeeping, maintenance activities, and operational restrictions.

Equipment	Type	Capacity (CFM)	Install Dates
Flare #3	open	3,000	Aug 2005/ Aug 2006
Flare #4	enclosed	3,000	2009
Flare #5	open - back up only	2,100	2009
Flare #6	enclosed	6,100	2009/2010

The flares are continuously monitored and the temperatures are recorded every 10 minutes (See "July Blower Skid Data Report" on attached CD). WM appropriately reports any flare downtime in their Annual/Semi-Annual reports. The emissions data is reported yearly in the Michigan Air Emissions Reporting System (MAERS). At the time of my inspection, Mr. Walters also provided me with the SO₂/H₂S report for each flare (see attached). As noted above, all post sulfur treatment readings are below the permit limit of 269ppm.

At the time of my inspection only Flare #6 was operating. Mr. Walters explained, PTA does not operate Flare #3 and Flare #5 is only used as back-up. The last stack tests on the enclosed flares were conducted in 2010. According to Mr. Walters, PTA will test the flares again in 2016 to demonstrate compliance with the limits in the PTI.

Observations during inspection:

	Flow (scfm)	Temp (°F)	Set Point Temp (°F)
Flare 6	3324	1660	1657
LES Engine Plant #2	1033	---	---

In 2013, WM installed the Golder Watch system at PTA, which allows them to monitor the flares and compressor remotely. This system also collects and stores greenhouse gas data.

Asbestos

PTA does accept asbestos containing waste. These activities are permitted in the ROP under EUASBESTOS. Mr. Walters explained, because of the increase in demolition waste, PTA is seeing an increase in asbestos containing waste; they are currently receiving 1-6 loads per day.

When asbestos waste is accepted, WM records the coordinates in there database so that in the future they can avoid drilling wells in those areas. If a well is needed in those areas, WM is required to submit a notification to the AQD before drilling occurs. At this time, PTA appears to be in compliance with the conditions listed in EUASBESTOS.

Cold Cleaners

PTA has one cold cleaner located in the landfill garage. This unit is permitted in the ROP under EUCOLDCLEANER and at this time, PTA appears to be in compliance with the conditions listed in the ROP.

Engines

The ROP has emission limits for CO, NOx, PM, VOC, and Visible Emissions, as well as special conditions for testing, recordkeeping, maintenance activities, and operational restrictions.

Engine Specifications

Emission Unit ID	Make	Model	Model Year	Fuel	Serial #	Max Engine Power (bhp)
EUICENGINE1	Lean Burn; 4 stroke	CAT G3520C	2010	LFG	GZJ00469	2333
EUICENGINE2	Lean Burn; 4 stroke	CAT G3520C	2010	LFG	GXJ00464	2333
EUICENGINE3	Lean Burn; 4 stroke	CAT G3520C	2010	LFG	GXJ00467	2333
EUICENGINE4	Lean Burn; 4 stroke	CAT G3520C	2010	LFG	GXJ00466	2333
EUICENGINE5	Lean Burn; 4 stroke	CAT G3520C	2010	LFG	GXJ00462	2333
EUICENGINE6	Lean Burn; 4 stroke	CAT G3520C	2010	LFG	GXJ00468	2333
EUICENGINE7	Lean Burn; 4 stroke	CAT G3520C	2010	LFG	GXJ00463	2333

Emission Unit ID	Make	Model	Model Year	Fuel	Serial #	Max Engine Power (bhp)
EUICENGINE8	Lean Burn; 4 stroke	CAT G3520C	2010	LFG	GXJ00465	2333

Mr. Bilinsky provided the following records via email: daily readings for all engine parameters, daily readings for LFG parameters/flow, monthly operating reports for each engine, and maintenance activity logs for each engine (see attached CDs for record details).

During my inspection, not all engines were operating at full load because of pressure issues believe to be caused by dewatering issues. Top-end maintenance is scheduled for the end of August/early September.

I recorded the following engine parameters during my inspection:

Total Plant (KW)	11944
Average Battery (volts)	25.5
Btu set point	522
Cylinder Temp Ranges (°F)	1100-1200

Gas Quality	%
CH4	50.0
CO2	39.1
Balance Gas	
N	8.4
O2	0.96

	Engine No. 1	Engine No. 2	Engine No. 3	Engine No. 4
Engine Hours	29294.93	29416.58	29504.87	29424.63
Actual Engine Speed (rpm)	1201	1201	1201	1201
Generator Total Real Power (Kw)	1591	1560	1604	1512
Engine Load Factor (%)	95-100	92-95	94-97	88-91
Actual Engine Ignition Timing (Deg.)	28	28	28	28
Dentation	0-1	0-1	0-1	0-1
Actual Oxygen (sensor)	OFF LINE	OFF LINE	OFF LINE	OFF LINE
Inlet Manifold Air Pressure ABS (psi)	46.9	47.1	46.6	43.3
Inlet Air Temperature (°F)	131	137	136	126
Engine Oil Temp (°F)	199	203	199	205
Engine Coolant Temp (°F)	230	226	230	217
Desired Engine Speed (rpm)	1200	1201	1201	1201
Throttle Actuator Position %	65-67	55-57	50-52	49-51
Engine Droop %	0	0	0	0
Air Flow Intake Manifold (scfm)	4436	4427	4295	4066
Air to Fuel Ratio	8.1	8.3	8.1	8.2
Gas Fuel Flow (scfm)	547	530	530	499
Fuel Valve %	54	53	53	52
Frequency (Hz)	59.9	59.9	59.9	59.9
Generator Ave RMS Voltage	4242	4247	4239	4233
Generator Total RMS current (Amps)	679	654	664	618
Power Factor	0.996	0.996	0.994	0.998

	Engine No. 5	Engine No. 6	Engine No. 7	Engine No. 8
Engine Hours	29397.53	29430.79	29391.97	29426.19
Actual Engine Speed (rpm)	1201	1201	1201	1201
Generator Total Real Power (Kw)	1568	1453	1504	1484
Engine Load Factor (%)	90-95	86-90	90-93	89-92
Actual Engine Ignition Timing (Deg.)	28	28	28	28
Dentation	0-1	0-1	0-1	0-1
Actual Oxygen (sensor)	OFF LINE	OFF LINE	OFF LINE	OFF LINE
Inlet Manifold Air Pressure ABS (psi)	45.8	43.3	43.2	45.2
Inlet Air Temperature (°F)	129	131	127	142
Engine Oil Temp (°F)	208	201	201	207
Engine Coolant Temp (°F)	225	233	225	223
Desired Engine Speed (rpm)	1201	1201	1200	1201
Throttle Actuator Position %	49-51	51-53	54-55	50-51
Engine Droop %	0	0	0	0
Air Flow Intake Manifold (scfm)	4349	4080	4141	4187
Air to Fuel Ratio	8.2	8.3	8.2	8.3
Gas Fuel Flow (scfm)	529	492	497	503
Fuel Valve %	54	52	52	53
Frequency (Hz)	59.9	59.9	60	60
Generator Ave RMS Voltage	4236	4168	4229	4226
Generator Total RMS current (Amps)	639	600	614	621
Power Factor	0.995	0.995	0.998	0.998

Based on my review of the records and my observations during the inspection, the engines are operating similar to the conditions during the last stack test, with the exception of load, and appear to be in compliance with the conditions of PTI No. 160-14 and the ROP.

In addition to the permit requirements, the engines are subject to the National Standards of Performance for Stationary Spark Ignition Internal Combustion Engines, 40 CFR Part 60 Subpart JJJJ (NSPS JJJJ) and the National Emission Standards for Hazardous Air Pollutant for Stationary Reciprocating Internal Combustion Engines, 40 CFR Part 63 Subpart ZZZZ (NESHAP ZZZZ). The initial notification for NSPS JJJJ was received on March 4, 2011, and the initial notification and annual report for NESHAP ZZZZ were received on January 11, 2013. Annual NESHAP ZZZZ reports are currently submitted with all other annual/semi-annual reports.

All eight engines were tested in April 2015 for NO_x, CO, and NMOC to demonstrate compliance with the NSPS and permit limits. Based on the test report and data received, all eight engines were in compliance with the permit limits during the test (See attached Summary for the test results).

The formaldehyde emissions were last tested in 2013; to show compliance with the new PTI, WM intends on including the following parameters in their April 2016 stack test: NSPS JJJJ (NO_x, CO, VOC, PM), SO₂ emissions, and formaldehyde emissions.

No engine Swap-outs have occurred at the WM Engine Plant. During my inspection, staff indicated that, for WM, a swap-out may occur after 50,000 hours on an engine.

MAERS

For 2014, PTA reported the following emissions:

Pollutant	Tons
CO	522.45
NMOC	91.02
NOx	82.61
PM10	53.14
PM2.5	5.25
SO2	33.70
VOC	31.15

Note: Formaldehyde emissions from the engines were not included in the reported VOC emissions.

Formaldehyde and HAP emissions

As of 2014, PTA's does not have formaldehyde limits in their permit. The AQD landfill work group and AQD management are continuing discussions on how to approach the industry-wide concern of formaldehyde emissions.

As noted in my previous inspection report, on December 7, 2012, Derenzo and Associates calculated the following source-wide PTE for HAPs. These calculations were based on updated emission factors provided by Caterpillar Inc., and included the eight engines operated at Pine Tree Acres, Inc., two enclosed flares, and nine engines operated at Sumpter Energy.

HCl: 9.2 TPY
Formaldehyde (HCHO): 115.2 TPY
Other Landfill gas HAPS: 6.9 TYP
Total HAPs: 131.3 TPY

Using the Caterpillar emission factors of 2.07 lbs/hr for the CAT 3520C Engines, and operating hours provided by PTA (68,384 hours), AQD staff calculated the 2013 formaldehyde emissions from the eight engines as 70.78 tons. For 2014, using 68,153 hours, formaldehyde emissions from the engines were approximately 70.54 tons.

Because of the new limits in the PTI, WM should be calculating actual formaldehyde emission for 2015 and future years.

MAP/PMP/SSM Updates

On April 26, 2013, the AQD received the Malfunction Abatement/Preventative Maintenance Plans required by the permit for the treatment systems, Flares 4 and 6, the sulfur removal system, and the landfill engines. On April 15, 2015, the AQD received updated plans (MAP/PMP/SSM) for the sulfur removal systems and the engines as required by the newly issued PTI. See Plans in File.

Other Equipment

Currently there are no emergency generators located on-site. The following equipment is on-site, but conditions are not included in the ROP as they are exempt pursuant to Rule 212(4):

Emission Unit ID	Description	Rule 212(3) or Rule 212(4) Exemption	Rule 201 Exemption
EUGASTANK	500 Gallon Unleaded Gasoline tank	R 336.1212(4)(c)	Rule 284(g)
EUDIESELTANK1	12,000 Gallon Diesel tank	R 336.1212(3)(e)	Rule 284(d)
EUDIESELTANK2	500 Gallon Diesel tank	R 336.1212(3)(e)	Rule 284(d)
EUHYDRAULIC	400 Gallon Hydraulic oil tank	R 336.1212(3)(e)	Rule 284(c)
EUTRANSMISSION	400 Gallon Transmission Fluid	R 336.1212(3)(e)	Rule 284(c)
EUUSED OIL	300 Gallon Used oil tank	R 336.1212(3)(e)	Rule 284(c)
EUSED OIL2	300 Gallon used oil tank	R 336.1212(3)(e)	Rule 284(c)
EUENGINEOIL	2000 Gallon engine oil tank	R 336.1212(3)(e)	Rule 284(c)
EUUSED OIL2	2000 gallon used oil tank	R 336.1212(3)(e)	Rule 284(c)
EUCAUSTICTANK	6,650 gallon caustic tank	R 336.1212(3)(e)	Rule 284 (h)
EUCOOLTANK	750 gallon coolant tank	R 336.1212(3)(e)	Rule 284(h)
EULEACHATE1	40,000 gallon above ground leachate storage tank	R336.1212(3)(f)	Rule 285(aa)
EULEACHATE2	400,000 gallon above ground leachate storage tank	R336.1212(3)(f)	Rule 285(aa)

Mr. Walters also provided the following list of heaters exempt from obtaining a permit to install pursuant to Rule 282(b)(i):

Equipment Type	Equipment Location	Maximum Rated Capacity of Equipment (MMBtu/hr)	Fuel Used to Run Equipment
Hot Water Heater	Gate/Scale House	0.04	Propane
Hot Water Heater	Maintenance Shop	1.04	Propane
Propane Heater	Gate/Scale House	0.065	Propane
Propane Heater	Maintenance Shop	0.1	Propane
Propane Heater	Maintenance Shop	0.1	Propane
Propane Heater	Maintenance Shop	0.1	Propane
Propane Heater	Maintenance Shop	0.1	Propane
Propane Heater	Recycling Facility	0.1	Propane
Propane Heater	Recycling Facility	0.1	Propane
Propane Heater	Maintenance Shop	0.441435	Propane
Propane Heater	Maintenance Shop	0.065	Propane

Additional Information

During my inspection, Mr. Walters wanted to clarify the permittee name on PTI No 160-14. The permittee name should be Pine Tree Acres, Inc. not Waste Management, Inc. He believed this confusion stemmed from the PTI application, where they inadvertently provided Waste Management, Inc. as the applicant name. Mr. Walters acknowledged that this correction will be made through the ROP process, but also wants the AQD to acknowledge

that this correction is underway and that the modified ROP will list Pine Tree Acres, Inc. as the permittee, as the current ROP does.

Because the ROP modification cannot be procced until all conditions in the PTI are met which requires a year's worth of SO2 data (February 13, 2016), at this time, the AQD acknowledges the correct permittee name is Pine Tree Acres, Inc.

Conclusions

Based on information gathered during the inspection and the records reviewed, PTA appears to be in compliance with the Federal Clean Air Act, Michigan's Air Pollution Control Rules, the conditions of ROP No. MI-ROP-N5984-2013 and PTI No. 160-14.

However, due to Sumpter Energy's violations, the source status is currently non-compliance (see SRN: N8004 for details on Sumpter Energy).

NAME Rebecca J. [Signature]

DATE 9/14/15

SUPERVISOR CJE