

AIR EMISSION SUMMARY

The air contaminant sources listed below comprise the Permit to Install for Pinnacle Road Landfill Gas Processing Plant, located in Montgomery County. The sources listed below shall not exceed the emission limits/control requirements contained in the table. This condition in no way limits the applicability of any other state or federal regulations. Additionally, this condition does not limit the applicability of additional special terms and conditions of this permit.

<u>Ohio EPA Source #</u>	<u>Source Description</u>	<u>BAT Determination</u>	<u>Applicable Federal and OAC Rules</u>	<u>Permit Allowable Mass Emissions and Control &amp; Usage Requirements</u>
P001	Landfill gas processing plant to produce pipeline quality natural gas (methane), with thermal incinerator control; and flare control for periods of start-up	*	3745-31-05	A control system shall be designed and operated to reduce non-methane organic compounds (NMOC) by 98%, by weight (See A.1.);  no visible emissions from the flare;  1.2 lbs/hour and 5.26 TPY non-methane organic compounds (NMOC);  0.5 lb/hour and 2.19 TPY hazardous air pollutants (HAPs)
B001	12 mmBtu/hr (1626 bhp) landfill gas/natural gas-fired compressor engine	**	3745-17-11 (B)(5)(b)  3745-31-05	0.062 lb particulate/mmBtu actual heat input  0.001 lb SO2/mmBtu actual heat input (see A.6)  10% opacity visible emissions, as a six-minute average, except as provided by rule;  5.37 lbs/hr and 23.52 TPY nitrogen oxides (NOx);  9.85 lbs/hr and 43.14 TPY carbon monoxide (CO); 3.58 lbs/hr and 15.68 TPY non-methane organic compounds (NMOC)
			3745-17-07 (A)(1)	less stringent than the opacity limit above
			3745-18-06(G)	less stringent than the SO2 limit above

\*BAT is determined to be compliance with applicable OAC rules and specified allowable mass emission rates; use of

thermal incinerator to control NMOCs; monitoring and recording of the thermal incinerator combustion chamber temperature; use of an open flare during all periods of start-up; flare pilot flame monitoring; record keeping; reporting; and stack testing.

\*\*BAT is determined to be compliance with applicable OAC rules and specified allowable mass emission rates; use of air/fuel mixture controller; burning of only natural gas or pipeline quality landfill gas or process gas from the methane/CO2 separator in the compressor engine; record keeping; reporting; and stack testing.

<u>Pollutant</u>	TOTAL PERMIT TO INSTALL ALLOWABLE EMISSIONS	
	<u>Tons/Year</u>	
Nitrogen oxides (Nox)	23.52	
Carbon monoxide (CO)	43.14	
Non-methane organic compounds (NMOC)	20.94	
Hazardous Air Pollutants (HAPs)	2.19	

## ADDITIONAL SPECIAL TERMS & CONDITIONS

### A. Additional Special Terms and Conditions

#### Emissions Unit P001

1. The permittee shall route all collected gas to a treatment system that processes collected gas for subsequent sale or use. All emissions from any atmospheric vent from the gas treatment system shall be routed to a thermal incinerator that is designed and operated to reduce non-methane organic compounds (NMOC) by 98 weight-percent.
2. The landfill gas processing plant shall produce pipeline quality natural gas (methane) from the landfill gas collected by the Pinnacle Road Landfill and Recycling Facility (Ohio EPA Facility Landfill ID 0857101458) landfill gas extraction system.
3. During all periods of start-up of the landfill gas processing plant, the landfill gas shall be collected and routed to a flare control system.
4. During all periods of start-up when the landfill gas is routed to the flare control system, the flare shall be designed for and operated with no visible emissions, except for periods not to exceed a total of 5 minutes during any two consecutive hours.
5. The collection and control system may be capped or removed provided that all of the following conditions are met:
  - a. The landfill shall be no longer accepting solid waste and be permanently closed under the requirements of 40 CFR 258.60. A closure report shall be submitted to the Director (the appropriate Ohio EPA District Office or local air agency as provided in term and condition D.5).
  - b. The collection and control system shall have been in operation a minimum of 15 years.
  - c. Following the procedures specified in 40 CFR 60.754(b), the calculated NMOC gas produced by the landfill shall be less than 50 megagrams per year on three successive test dates. The test dates shall be no less than 90 days apart, and no more than 180 days apart.

#### Emissions Unit B001

6. The compressor shall be exempt from the SO<sub>2</sub> mass emission limitation during any day in which the only fuel burned is natural gas having a heat content greater than 950 Btu per standard cubic foot and a sulfur content less than 0.6 pound per million standard cubic feet.

### B. Operational Restrictions

#### Emissions Unit P001

1. The permittee shall not process more than 5.4 million standard cubic feet per day of landfill gas on a dry basis. Dry basis means the collected landfill gas with the free water removed.
2. Prior to the completion of the initial performance test, the average combustion temperature within the thermal incinerator, for any 3-hour block of time when the emissions unit is in operation, shall not be below 1350 degrees Fahrenheit.
3. After the initial performance test is completed, the average combustion temperature within the thermal incinerator, for any 3-hour block of time when the emissions unit is in operation, shall not be more than 50 degrees Fahrenheit below the average temperature during the most recent emission test that demonstrated compliance.

4. The flare control system shall be operated with a flame present at all times.
5. The net heating value of the gas being combusted shall be 300 Btu/scf or greater.
6. The exit velocity of the flare shall be less than 60 ft/sec.

#### Emissions Unit B001

7. The permittee shall burn only natural gas, pipeline quality gas produced by the landfill gas processing, and/or process gas from the methane/CO<sub>2</sub> separator in the compressor engine.
8. In the event that the landfill gas collection system is inoperable, the compressor shall be shut down and all valves in the collection and control system contributing to venting of the gas to the atmosphere shall be closed within one hour.
9. The permittee shall maintain and operate an air/fuel mixture controller on the gas fired landfill gas compressor engine.

#### C. Monitoring and/or Record Keeping Requirements

1. Each record of any monitoring data, test data, and support information required pursuant to this permit shall be retained for a period of five years from the date the record was created. Support information shall include, but not be limited to, all calibration and maintenance records and all original strip-chart recordings for continuous monitoring instrumentation, and copies of all reports required by the permit. Such records may be maintained in computerized form.

#### Emissions Unit P001

2. The permittee shall maintain daily records of the amount of landfill gas processed, on a dry basis.
3. The permittee shall operate and maintain a continuous temperature monitor and recorder which measures and records the combustion temperature within the thermal incinerator when the emissions unit is in operation. Units shall be in degrees Fahrenheit. The monitoring and recording devices shall be capable of accurately measuring the desired parameter. The temperature monitor and recorder shall be installed, calibrated, operated and maintained in accordance with the manufacturer's recommendations, with any modifications deemed necessary by the permittee.
4. The permittee shall collect and record the following information for each day:
  - a. Prior to the completion of the initial performance test, all 3-hour blocks of time during which the average combustion temperature within the thermal incinerator, when the emissions unit was in operation, was below 1350 degrees Fahrenheit.
  - b. Following completion of the initial performance test, all 3-hour blocks of time during which the average combustion temperature within the thermal incinerator, when the emissions unit was in operation, was more than 50 degrees Fahrenheit below the average temperature during the most recent emission test that demonstrated compliance.
  - c. A log of the downtime for the capture (collection) system, thermal incinerator, and thermal incinerator monitoring and recording equipment, when the emissions unit was in operation.
5. The permittee shall operate and maintain a heat sensing device, such as an ultraviolet beam sensor or thermocouple at the pilot light to indicate the continuous presence of a flame on the flare control system. The heat sensing device shall be installed, calibrated, operated and maintained in accordance with the manufacturer's recommendations, instructions and operating manuals. The permittee shall record all periods of operation during which a flame or flare pilot flame is absent.
6. During periods of start-up when the permittee routes landfill gas to the flare control system, the permittee shall maintain a record of the quantity of landfill gas burned and the length of time during which landfill gas was routed to the flare system.

7. The permittee shall install, calibrate, maintain, and operate a gas flow measuring device that shall record the flow to the control device (both the thermal incinerator and the flare) at least every 15 minutes.
8. The permittee shall keep for at least 5 years up-to-date, readily accessible records of the following information for the emissions unit:
  - a. Continuous records of the equipment operating parameters.
  - b. Records for any periods of operation during which the parameter boundaries established during the most recent performance test are exceeded.
  - c. Records of all collection and control system exceedances of the operational standards and the reading in the subsequent month whether or not the second reading is an exceedance with an identification of the location of each exceedance.
  - d. Records of all visible emission readings, heat content determinations, flow rate or bypass flow rate measurements, exit velocity determinations made during the initial performance test, and all continuous records of the flare pilot flame.
9. The permittee shall keep up-to-date, readily accessible records for the life of the control equipment of the data measured during the initial performance test of compliance determination. Records of subsequent tests or monitoring shall be maintained for a minimum of 5 years. Records of the control device vendor specifications shall be maintained until removal.

#### Emissions Unit B001

10. For each day the permittee burns a fuel other than natural gas, pipeline quality gas produced by the landfill gas processing, and/or process gas from the methane/CO<sub>2</sub> separator, the permittee shall maintain a record of the type and quantity of fuel burned in the compressor engine.
11. The permittee shall collect a representative sample of the gaseous fuel burned in the compressor and either analyze or have analyzed, the fuel sample for heat content and sulfur content. This sampling and analysis shall be completed once per calendar month in accordance with ASTM methods D1072, D3031, or D3246.
12. The permittee shall develop and maintain a quality assurance manual for the gas fired, stationary, internal combustion engine powering the landfill gas compressor and the components of the landfill gas compressor within three months of initial operation of the engine.
13. The permittee shall maintain a log of records detailing the operation of the gas fired, stationary, internal combustion engine powering the landfill gas compressor. The records shall include any quality assurance or maintenance performed, all monitoring of the engine and the engine's components, a record of each date and time when the engine operated out of quality assurance limits along with the type of fuel the engine was burning, and the steps taken to correct the problem. This log shall be available for review during regular business hours at the facility by the Director or his representative.

#### D. Reporting Requirements

##### Emissions Unit P001

1. The permittee shall submit quarterly deviation (excursion) reports which identify all days during which more than 5.4 million standard cubic feet of landfill gas, on a dry basis, was processed by these emissions units.
2. The permittee shall submit quarterly deviation (excursion) reports which identify all 3-hour blocks of time during which the average combustion temperature within the thermal incinerator does not comply with the temperature limitation specified above.
3. The permittee shall submit quarterly deviation (excursion) reports which identify each period during which the flame sensor indicated that a flame was not present on the flare control system.

4. These quarterly deviation (excursion) reports shall be submitted in the following manner:
  - a. Reports of any required monitoring and/or record keeping information shall be submitted to the appropriate Ohio EPA District Office or local air agency.
  - b. Except as otherwise may be provided in the terms and conditions for a specific emissions unit, quarterly written reports of (a) any deviations (excursions) from emission limitations, operational restrictions, and control device operating parameter limitations that have been detected by the testing, monitoring, and record keeping requirements specified in this permit, (b) the probable cause of such deviations, and (c) any corrective actions or preventative measures which have been or will be taken, shall be submitted to the appropriate Ohio EPA District Office or local air agency. If no deviations occurred during a calendar quarter, the permittee shall submit a quarterly report, which states that no deviations occurred during that quarter. The reports shall be submitted quarterly, i.e., by January 31, April 30, July 31, and October 31 of each year and shall cover the previous calendar quarter. (These quarterly reports shall exclude deviations resulting from malfunctions reported in accordance with OAC rule 3745-15-06.)
5. The permittee shall submit an equipment removal report to the Director (appropriate Ohio EPA District Office or local air agency) 30 days prior to removal or cessation of operation of the control equipment. The equipment removal report shall contain all of the following:
  - a. A copy of the closure report submitted within 30 days of waste acceptance cessation.
  - b. A copy of the initial performance test report demonstrating that the 15 year minimum control period has expired.
  - c. Dated copies of three successive NMOC emission rate reports demonstrating that the landfill is no longer producing 50 megagrams or greater of NMOC per year.

The Administrator may request additional information as may be necessary to verify that all of the conditions for removal of the control equipment have been met.

6. Any breakdown or malfunction of the thermal incinerator and/or flare resulting in the emission of uncontrolled process gas or raw landfill gas shall be reported to the Director (the appropriate Ohio EPA District Office or local air agency) within one hour after the occurrence, or as soon as reasonably possible, in accordance with the requirements specified in OAC rule 3745-15-06, and immediate remedial measures shall be undertaken to correct the problem and prevent further emission to the atmosphere.

#### Emissions Unit B001

7. The permittee shall submit deviation (excursion) reports which identify each day when a fuel other than natural gas, pipeline quality gas produced by these emissions units, or process gas from the Methane/CO<sub>2</sub> separator was burned in the gas fired, stationary, internal combustion engine powering the landfill gas compressor. These reports shall be submitted within 30 days after the deviation occurred.
8. The permittee shall submit quarterly reports detailing the results of the sampling and analysis of the gaseous fuel burned in the compressor. These reports shall contain, at a minimum, the analyzed heat content and sulfur content in weight percent.

#### E. Test Methods and Compliance Determinations

1. Compliance with the emission limitations in these terms and conditions for emissions unit P001 shall be determined in accordance with the following methods:
  - a. Emission Limitation -  
98 weight-percent destruction of NMOC  
  
Applicable Compliance Method -  
Compliance shall be determined in accordance with 40 CFR Part 60, Appendix A, Methods 18 or 25.

- b. Emission Limitation -  
1.20 lbs/hour NMOC

Applicable Compliance Method -

Compliance shall be based upon stack testing in accordance with the test methods and procedures specified in 40 CFR Part 60, Appendix A, Methods 18 or 25.

- c. Emission Limitation -  
5.26 tons/year NMOC

Applicable Compliance Method -

The 5.26 TPY limitation was developed by multiplying the 1.20 lbs/hour limitation by the maximum operating schedule of 8,760 hours/year and dividing by 2,000 pounds per ton. Therefore, provided compliance is shown with the hourly limitation, compliance will also be shown with the annual limitation.

- d. Emission Limitation -  
0.5 lb/hour HAPs

Applicable Compliance Method -

Compliance shall be determined using USEPA's Landfill Air Emissions Estimation Model Program, version 1.1. It is assumed that the destruction of HAPs will be accomplished by the thermal incinerator and that all collected gas from the landfill is routed to the landfill gas processing plant.

- e. Emission Limitation -  
2.19 TPY HAPs

Applicable Compliance Method -

Compliance shall be determined using USEPA's Landfill Air Emissions Estimation Model Program, version 1.1. The 2.19 TPY limitation was developed by multiplying the 0.5 lb/hour limitation by the maximum operating schedule of 8,760 hours/year and dividing by 2,000 pounds per ton. Therefore, provided compliance is shown with the hourly limitation, compliance will also be shown with the annual limitation.

- f. Emission Limitation -  
no visible emissions from the flare control system, except for periods not to exceed a total of 5 minutes during any 2 consecutive hours

Applicable Compliance Method -

Compliance shall be determined by visible emission evaluations performed in accordance with 40 CFR 60.18(e) using the test methods and procedures specified in USEPA Reference Method 22.

2. Compliance with the emission limitations in these terms and conditions for emissions unit B001 shall be determined in accordance with the following methods:

- a. Emission Limitation -  
0.062 lb particulate/mmBtu actual heat input

Applicable Compliance Method -

If required, compliance shall be based upon stack testing in accordance with OAC rule 3745-17-03(B)(10).

- b. Emission Limitation -  
0.001 lb SO<sub>2</sub>/mmBtu actual heat input

Applicable Compliance Method -

Compliance shall be based upon fuel sampling and analysis as required in Additional Special Term and Condition C.11. and the equations in OAC rule 3745-18-04(F).

- c. Emission Limitation -  
5.37 lbs/hour nitrogen oxides

Applicable Compliance Method -  
Compliance shall be based upon stack testing in accordance with the test methods and procedures specified in 40 CFR Part 60, Appendix A, Methods 7, 7A, or 7B.

- d. Emission Limitation -  
23.52 tons/year nitrogen oxides

Applicable Compliance Method -  
The 23.52 TPY limitation was developed by multiplying the 5.37 lbs/hour limitation by the maximum operating schedule of 8,760 hours/year divided by 2,000 pounds per ton. Therefore, provided compliance is shown with the hourly limitation, compliance will also be shown with the annual limitation.

- e. Emission Limitation -  
9.85 lbs/hour carbon monoxide

Applicable Compliance Method -  
Compliance shall be based upon stack testing in accordance with the test methods and procedures specified in 40 CFR Part 60, Appendix A, Method 10B.

- f. Emission Limitation -  
43.14 tons/year carbon monoxide

Applicable Compliance Method -  
The 43.14 TPY limitation was developed by multiplying the 9.85 lbs/hour limitation by the maximum operating schedule of 8,760 hours/year divided by 2,000 pounds per ton. Therefore, provided compliance is shown with the hourly limitation, compliance will also be shown with the annual limitation.

- g. Emission Limitation -  
3.58 lbs/hour non-methane organic compounds

Applicable Compliance Method -  
Compliance shall be based upon stack testing in accordance with the test methods and procedures specified in 40 CFR Part 60, Appendix A, Methods 18 or 25.

- h. Emission Limitation -  
15.68 tons/year non-methane organic compounds

Applicable Compliance Method -  
The 15.68 TPY limitation was developed by multiplying the 3.58 lbs/hour limitation by the maximum operating schedule of 8,760 hours/year and dividing by 2,000 pounds per ton. Therefore, provided compliance is shown with the hourly limitation, compliance will also be shown with the annual limitation.

- i. Emission Limitation -  
10% opacity visible emissions limitation, six-minute average

Applicable Compliance Method -  
Compliance shall be determined by visible emission evaluations performed in accordance with OAC rule 3745-17-03(B)(1) using the test methods and procedures specified in USEPA Reference Method 9.

- 3. The permittee shall conduct, or have conducted, an initial performance test for emissions unit P001 in accordance with the following requirements:
  - a. The performance test shall be conducted within 60 days after achieving the maximum production rate, but not later than 180 days after initial startup of the landfill gas processing plant.
  - b. The performance test shall be conducted to demonstrated compliance with the minimum 98 weight-percent destruction of NMOC.

- c. Method 25 or Method 18 of appendix A of this part shall be used to determine compliance with 98 weight-percent efficiency. If using Method 18 of appendix A of this part, the minimum list of compounds to be tested shall be those published in the most recent Compilation of Air Pollutant Emission Factors (AP-42). The following equation shall be used to calculate efficiency:

$$\text{Control efficiency} = (\text{NMOC}_{\text{in}} - \text{NMOC}_{\text{out}}) / (\text{NMOC}_{\text{in}})$$

where:  $\text{NMOC}_{\text{in}}$  = mass of NMOC entering control system  
 $\text{NMOC}_{\text{out}}$  = mass of NMOC exiting control system

- d. The test(s) shall be conducted while the emissions unit is operating at or near its maximum capacity, unless otherwise specified or approved by the appropriate Ohio EPA District Office or local air agency.
4. The permittee shall determine the net heating value of the gas being combusted in the flare control system by using the following equation:

$$H_T = K \sum_{i=1} C_i H_i$$

where:

$H_T$  = net heating value of the sample, MJ/scm; where the net enthalpy per mole of offgas is based on combustion at 25°C and 760 mm Hg, but the standard temperature for determining the volume corresponding to one mole is 20°C;

$K$  = constant,  $1.740 \times 10^{-7}$  (1/ppm)(g mole/scm)(MJ/kcal) where the standard temperature for (g mole/scm) is 20°C;

$C_i$  = concentration of sample component  $i$  in ppm on a wet basis, as measured for organics by Reference Method 18 and hydrogen and carbon monoxide by ASTM D1946-77;

$H_i$  = net heat of combustion of sample component  $i$ , kcal/g mole at 25°C and 760 mm Hg. The heats of combustion may be determined using ASTM D2382-76 if published values are not available or cannot be calculated.

5. The actual exit velocity of a flare shall be determined by dividing the volumetric flowrate (in units of standard time and pressure), as determined by Reference Methods 2, 2A, 2C, or 2D as appropriate; by the unobstructed (free) cross sectional area of the flare tip.
6. The permittee shall conduct, or have conducted, an initial performance test for emissions unit B001 in accordance with the following requirements:
- a. The performance test shall be conducted within 60 days after achieving the maximum production rate, but not later than 180 days after initial startup of the landfill gas processing plant.
- b. The performance test shall be conducted to demonstrate compliance with the allowable mass emission rates for NO<sub>x</sub>, CO, and NMOC.
- c. The following test methods shall be employed to demonstrate compliance with the allowable mass emission rates: for NO<sub>x</sub>, Method 7, 7A, or 7B of 40 CFR Part 60, Appendix A; for CO, Method 10 of 40 CFR Part 60, Appendix A; and for NMOC, Method 25 from 40 CFR Part 60, Appendix A.
- d. The test(s) shall be conducted while the emissions unit is operating at or near its maximum capacity, unless otherwise specified or approved by the appropriate Ohio EPA District Office or local air agency.
7. Not later than 30 days prior to the proposed test date(s), the permittee shall submit an "Intent to Test" notification to the appropriate Ohio EPA District Office or local air agency. The "Intent to Test" notification shall describe in detail the proposed test methods and procedures, the emissions unit operating parameters, the time(s) and date(s) of the test(s), and the person(s) who will be conducting the test(s). Failure to submit such notification for review and approval prior to the test(s) may result in Ohio

EPA District Office's or local air agency's refusal to accept the results of the emission test(s).

8. Personnel from the appropriate Ohio EPA District Office or local air agency shall be permitted to witness the test(s), examine the testing equipment, and acquire data and information necessary to ensure that the operation of the emissions unit and the testing procedures provide a valid characterization of the emissions from the emissions unit and/or performance of the control equipment.
9. A comprehensive written report on the results of the emissions test(s) shall be signed by the person(s) responsible for the test(s) and submitted to the appropriate Ohio EPA District Office or local air agency within 30 days following completion of the test(s). The permittee may request additional time for the submittal of the written report, where warranted, with prior approval from the appropriate Ohio EPA District Office or local air agency.

Prepared by: Julie L. Mesloh  
Date: October 6, 1998