



FGTANKS VOC Emissions Test Report

Prepared for:

Environmental Geo-Technologies, LLC

Romulus, Michigan

28470 Citrin Drive
Romulus, Michigan 48174

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JUN 03 2014
AIR QUALITY DIV.

Project No. 14-4524.00
May 21, 2014

BT Environmental Consulting, Inc.
4949 Fernlee Avenue
Royal Oak, Michigan 48073
(248) 548-8070



EXECUTIVE SUMMARY

BT Environmental Consulting, Inc. (BTEC) was retained by Environmental Geo-Technologies, LLC to conduct an emissions test program to evaluate the volatile organic compound (VOC) emission rate from the carbon absorption bed system outlet at the Environmental Geo-Technologies facility in Romulus, Michigan. The emissions test program was conducted on April 21, 2014.

The test program consisted of three 60-minute test runs at the FGTANKS outlet sampling location and was performed utilizing United States Environmental Protection Agency (USEPA) Test Methods 1, 2, 3, 4, and 25A. The average VOC emission rate measured during the emissions test program was 0.008 lbs/hr.

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1. Introduction

BT Environmental Consulting, Inc. (BTEC) was retained by Environmental Geo-Technologies, LLC to conduct an emissions test program to evaluate the volatile organic compound (VOC) emission rate from the carbon absorption bed system outlet at the Environmental Geo-Technologies facility in Romulus, Michigan. The emissions test program was conducted on April 21, 2014. The purpose of this report is to document the results of the emissions test program.

The Air Quality Division (AQD) of Michigan's Department of Environmental Quality has published a guidance document entitled "Format for Submittal of Source Emission Test Plans and Reports" (December 2013, see Appendix A). The following is a summary of the emissions test program and results in the format outlined by the AQD document.

1.a Identification, Location, and Dates of Test

Field sampling for the emissions test program was conducted on April 21, 2014 at the Environmental Geo-Technologies facility (28470 Citrin Drive, Romulus, Michigan 48174).

1.b Purpose of Testing

The emissions test was required by AQD Permit No. 539-97E. The purpose of the emissions test program was to evaluate VOC emission rates from FGTANKS.

1.c Source Description

Environmental Geo-Technologies is a waste treatment, storage, and disposal facility that (i) receives waste from a variety of generators, (ii) stores the waste for treatment, (iii) treats the waste for proper disposal, and (iv) injects the waste into two deep injection wells.

1.d Test Program Contact

The contact for information regarding the test program as well as the test report is:

Richard (Rick) J. Powals, P.E.
Chief Operating Officer
Environmental Geo-Technologies, LLC
28470 Citrin Drive
Romulus, Michigan 48174
(734) 946-1000



1.e Testing Personnel

Names and affiliations for personnel who were present during the testing program are summarized by Table 1.



2. Summary of Results

Sections 2.a through 2.d summarize the results of the emissions test program.

2.a Operating Data

Operating data is summarized in Appendix B.

2.b Applicable Permit

The applicable permit for this emissions test program is Permit No. 539-97E. The purpose of the emissions test program was to verify compliance with the hourly VOC mass emission limit for FGTANKS pursuant to Special Condition No. 1.6.

2.c Results

The results of the emissions test program are summarized by Table 2.

2.d Emission Regulation Comparison

Permit No. 539-97E limits VOC emissions from FGTANKS to not more than 4.3 pounds per hour. The average VOC emission rate during the emissions test program was 0.008 pounds per hour.

3. Source Description

Sections 3.a through 3.e provide a description of the process.

3.a Process Description

Customer-generated waste is received by Environmental Geo-Technologies by drums, totes, railcars, or tanker trucks and is offloaded to one of ten liquid receiving tanks. The waste is stored in one of these tanks until it can be treated in one of six waste treatment tanks. The waste is pumped from the receiving tanks to a treatment tank. At the treatment tank, acidic, basic, polymer, or conditioner materials are added (if necessary) to adjust pH and subsequent primary settling allowed. The waste is then pumped to a secondary storage tank and then injected into one of the deep wells.

3.b Process Flow Diagram

The waste treatment process is batch in nature and waste can be stored or treated in any of the tanks dedicated to that purpose. Consequently, a process flow diagram is not relevant.

3.c Raw and Finished Materials

Raw materials for the waste treatment process include customer-generated waste, acidic and basic inorganic materials for pH adjustment, and polymer or conditioner (flocculent) materials to assist in reducing solids content.

3.d Process Capacity

The capacity of each storage or treatment tank used by Environmental Geo-Technologies is summarized in Appendix C. EGT has the capacity to inject approximately 15,000 gallons of liquid per hour into the deep wells.

3.e Process Instrumentation

Because of the simplicity and batch nature of the processes, process instrumentation was not relevant to this emissions test program.

4. Sampling and Analytical Procedures

Sections 4.a through 4.d provide a summary of the sampling and analytical procedures used to verify VOC emission rates.

4.a Sampling Train and Field Procedures

Sampling and analytical procedures followed the following reference test methods codified at Title 40, Part 60, Appendix A of the Code of Federal Regulations (40 CFR 60, Appendix A):

- Method 1A - "*Sample and Velocity Traverses for Stationary Sources with Small Stacks or Ducts*" was used to determine the sampling locations and the stack traverse points.
- Method 2C - "*Determination of Stack Gas Velocity and Volumetric Flowrate in Small Stacks or Ducts*" was used to determine average exhaust gas velocity.
- Method 3 - "*Gas Analysis for Determination of Dry Molecular Weight*" (*Fyrite Method*) was used to evaluate the molecular weight of the exhaust gas.
- Method 4 - "*Determination of Moisture Content in Stack Gases*" (*wet-bulb/dry-bulb method*) was used to determine the moisture content of the exhaust gas.
- Method 25A - "*Determination of Total Gaseous Organic concentration using a flame ionization analyzer*" was used to determine the volatile organic compound concentration of the exhaust gas.

Stack gas velocity traverses were conducted in accordance with the procedures outlined in Methods 1A and 2C. A standard pitot tube and thermocouple was used to measure exhaust gas velocity pressures and temperatures during testing. A default pitot tube coefficient of 0.99 (dimensionless) was assigned for this testing.

Molecular weight determinations were conducted according to Method 3. The equipment used for this evaluation consisted of a one-way squeeze bulb with connecting tubing and a set of Fyrite[®] combustion gas analyzers. Moisture content was determined using the wet-bulb/dry bulb procedure of Method 4.

Method 25A was used to measure volatile organic compound concentration. A sample of the gas stream was drawn through a stainless-steel probe and a heated Teflon[®] sample line to prevent the condensation of any moisture from the sample before it enters the analyzer.



BTEC used a VIG Industries, Inc. Model 20 total hydrocarbon (THC) analyzer to monitor exhaust gas hydrocarbon concentration. The VIG Model 20 utilizes a flame ionization detector (FID) to determine the average concentration for THC (as propane). Because of a malfunction of the analyzer concentration data acquisition system, THC concentrations were manually recorded at one-minute intervals.

4.b Recovery and Analytical Procedures

Recovery and analytical procedures were not applicable to this emissions test program.

4.c Sampling Ports

Sampling ports were installed in a straight section of the exhaust duct in a location that easily meets the requirements of Method 1A.

4.d Traverse Points

Traverse point locations are illustrated by Figure 1.



5. Test Results and Discussion

Sections 5.a through 5.k provide a summary of the test results.

5.a Results Tabulation

The results of the emissions test program are summarized by Table 2. Exhaust gas flowrate measurements are summarized by the data sheets provided in Appendix D.

5.b Discussion of Results

Permit No. 539-97E limits VOC emissions from FGTANKS to not more than 4.3 pounds per hour. The average VOC emission rate during the emissions test program was 0.008 pounds per hour.

5.c Sampling Procedure Variations

No sampling procedure variations were used for the emissions test program.

5.d Process or Control Device Upsets

No upset conditions occurred during testing.

5.e Control Device Maintenance

Since EGT's first receipt of hazardous waste on January 14, 2014, the activated carbon canisters have been changed out twice.

5.f Audit Sample Analyses

No samples were collected as part of the test program.

5.g Calibration Sheets

Certificates of analysis for the calibration gases used during testing and other relevant equipment calibration documents are provided as Appendix E.

5.h Sample Calculations

Sample calculations are provided as Appendix F.

5.i Field Data Sheets

Field data sheets and miscellaneous field notes for this emissions test program are provided in Appendix D.



5.j Laboratory Data

Laboratory data is not applicable to this emissions test program.

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TABLES

Table 1
Test Personnel

Name and Title	Affiliation	Telephone
Richard (Rick) Powals, P.E. Chief Operating Officer	Environmental Geo-Technologies, LLC 28470 Citrin Drive Romulus, Michigan 48174	(734) 946-1000
Mr. Ken Lievense Project Manager	BTEC 4949 Fernlee Avenue Royal Oak, MI 48073	(248) 548-8070
Mr. Kenny Felder Environmental Technician	BTEC 4949 Fernlee Avenue Royal Oak, MI 48073	(248) 548-8070
Mr. Thomas Maza Environmental Quality Analyst	MDEQ-AQD 3058 W. Grand Blvd. Detroit, MI 48202	(313) 456-4709
Mr. Jonathon Lamb Environmental Quality Analyst	MDEQ-AQD 3058 W. Grand Blvd. Detroit, MI 48202	(313) 456-4683

Table 2
VOC Emission Rate
Environmental Geo Technologies
Romulus, MI
14-4524.00
Sampling Date: 4-21-14

Parameter	Run 1	Run 2	Run 3	Average
Test Run Date	4/21/2014	4/21/2014	4/21/2014	
Test Run Time	10:10-11:27*	11:37-12:37	12:47-13:47	
Outlet Flowrate (scfm)	344	353	354	350
Outlet VOC Concentration (ppmv as propane)	4.2	2.9	2.6	3.2
VOC Emission Rate as Propane (lb/hr)	0.010	0.007	0.006	0.008

*test ran longer due to analyzer flame out

scfm = standard cubic feet per minute

dscfm = dry standard cubic feet per minute

ppmv = parts per million on a volume-to-volume basis

lb/hr = pounds per hour

MW = molecular weight (C₃H₈ = 44.10)

24.14 = molar volume of air at standard conditions (70°F, 29.92" Hg)

35.31 = ft³ per m³

453600 = mg per lb

Co= Average of initial and final zero gases

Cma=Actual concentration of the calibration gas

Cm= Average of initial and final calibration gases

$C_c = K C_{meas}$

where C_c = Concentration as Carbon (ppmv), K= Carbon equivalent correction factor (3 for Propane)

and C_{meas} = concentration as measured (as propane)

¹emission rate calculated on dry basis

²emission rate calculated on wet basis

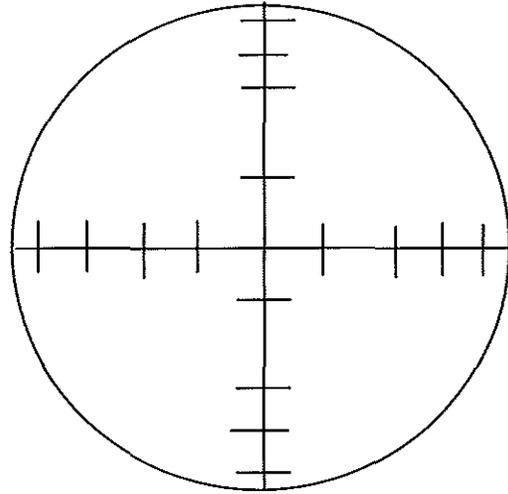
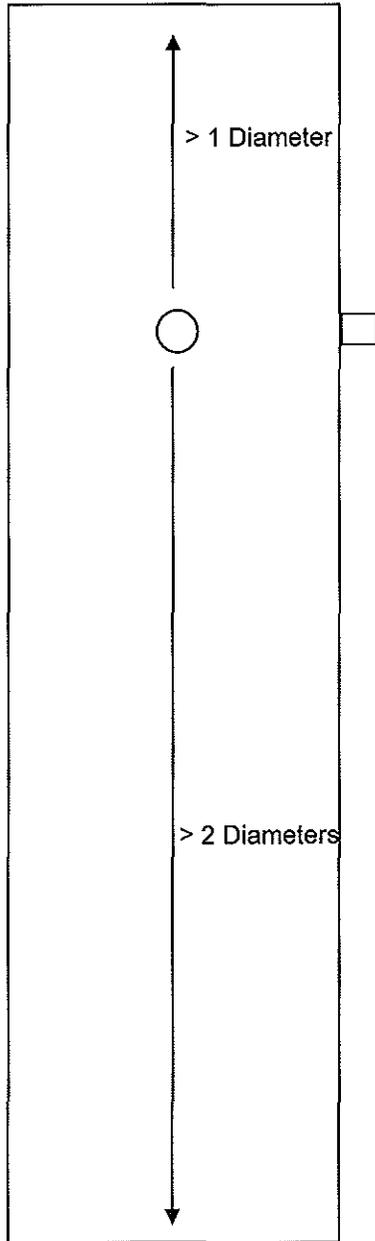
Equations

lb/hr = ppmv * MW/24.14 * 1/35.31 * 1/453,600 * scfm * 60 for VOC

lb/hr = ppmv * MW/24.14 * 1/35.31 * 1/453,600 * dcfm * 60

Conc_{@15%O₂} = Conc * (20.9 - 15)/(20.9 - %O₂)

FIGURE



Not to Scale

Points	Distance "
1	0.2
2	0.7
3	1.2
4	2.0
5	4.2
6	5.0
7	5.6
8	6.1

Figure 1

Site:
USEPA Method 1
Environmental Geo-Technologies
Romulus, Michigan

Sampling Date:
April 21, 2014

**BT Environmental Consulting,
Inc.**
4949 Fernlee Avenue
Royal Oak, Michigan