Test Report for Compliance Emissions Testing

Compassionate Advisors - Pincanna

EUGEN1 and EUGEN2

December 2, 2022

Prepared By:
Environmental Stack Testing
616-828-2745

TABLE OF CONTENTS

PAGE

FIGURES

TABLES

APPENDICES

1.0 INTRODUCTION

1.1 Identification, Location and Dates of Tests

Environmental Stack Testing (EST) was retained by Compassionate Advisors-Pincanna, LLC (CAP) to provide emissions air testing for carbon monoxide (CO), nitrogen oxides (NOX) and total volatile organic compounds not including methane or ethane (VOC) at the CAP facility located in Pinconning, Michigan. Testing at CAP was performed on October 10 and 11, 2022.

1.2 Purpose of Testing

The purpose of the testing is to verify compliance with emission limits specified in the Michigan Environment, Great Lakes and Energy (EGLE) Permit to Install (PTI) No. 195-19B, SRN P1098.

1.3 Project Contact Information

Location	Contact
Test Facility	Mr. K.C. Cooper 989.200.3238 KC.Cooper@pincanna.com
Test Company Representative	Ms. Brooke Gillespie 616.828.2745 Environmentalstacktesting@gmail.com
State Representative	Mr. Daniel J Drost 989.225.6052 DrosteD3@michigan.gov
State Representative	Mr. Adam Shaffer 989.225.4789 ShafferA1@michigan.gov

2.0 SUMMARY OF RESULTS

The testing was performed with the EUGEN1 and EUGEN2 operating at approximately 90 percent of capacity. It should be noted that EUGEN3 was not tested during the testing program due to a mechanical issue involved with the engine.

The average results are shown in the following table. The emission results are recorded in Grams per Brake Horsepower Hour (g/bhp-hr) along with corrected to 15 percent oxygen (O2). Comprehensive results are presented in Tables 1 and 2 at the end of this report.

Summary of EUGEN1 Emissions

Test Parameter	Concentration (@15%O2)	Permit Limit (@15% O2)	Emission Rate (G/bhp-hr)	Permit Limit (G/bhp-hr)
Nitrogen Oxides	7.61	82	0.05	1.0
Carbon Monoxide	0.2	270	0.0	0.7
Volatile Organic Compounds	-10.30	60	-0.72	0.4

Summary of EUGEN2 Emissions

Test Parameter	Concentration (@15%O2)	Permit Limit (@15% O2)	Emission Rate (G/bhp-hr)	Permit Limit (G/bhp-hr)
Nitrogen Oxides	69.39	82	0.84	1.0
Carbon Monoxide	1.2	270	0.0	0.7
Volatile Organic Compounds	-11.53	60	-1.3	0.4

3.0 SOURCE DESCRIPTION

CAP operates three natural gas fired engines that are used for electric generation for cannabis cultivation, extraction, processing, and distribution operations. EUGEN1 and EUGEN2 were included in the testing program performed on October 10th and 11th, 2022.

EUGEN1 is a natural gas fueled engine that was manufactured in 2019 and is rated to produce 650 kilowatts. EUGEN2 is a natural gas fueled engine that was manufactured in 2019 and is rated to produce 1,030 kilowatts.

EUGEN1 is equipped with AeriNOx SCR and an Oxicat oxidation catalyst for control of NOx, CO, VOC and formaldehyde.
EUGEN2 is equipped with an Oxicat oxidation catalyst for control of NOx and CO.

4.0 SAMPLING AND ANALYTICAL PROCEDURES

Triplicate one-hour test runs were performed for the following United States Environmental Protection Agency (U.S. EPA) Reference Test Methods:

- Method 1 – *Sample and Velocity Traverses for Stationary Sources*
- Method 2 - Determination of Stack Gas Velocity and Volumetric Flow Rate (Type S Pitot *Tube)*
- Method 3A – *Determination of Oxygen and Carbon Dioxide Concentrations in Emissions From Stationary sources (Instrumental Analyzer Procedure)*
- Method 4 - *Determination of Moisture Content in Stack Gases*
- Method 7E – *Determination of Nitrogen Oxides Emissions From Stationary Sources (Instrumental Analyzer Procedure)*
- Method 10 – *Determination of Carbon Monoxide Emissions From Stationary Sources*
- Method 18 – *Volatile Organic Compounds by Gas Chromatography*
- Method 25A - *Determination of Total Gaseous Organic Concentration Using a Flame Ionization Analyzer*

4.1 Traverse Points Location

The number of traverse and sampling points for the exhaust stacks were determined using U.S. EPA

Method 1 *Sample and Velocity Traverses for Stationary Sources.*

The stacks associated with EUGEN1 and EUGEN2 measured 15.5 inches in diameter at the sampling site. Four traverse points were selected for each of the two sampling ports. Schematics showing traverse point locations are shown in Figure 1.

4.2 Velocity and Temperature

The exhaust gas velocities and temperatures were determined using U.S. EPA Reference Method 2, Determination of Stack Gas Temperature and Velocity (Type S Pitot Tube). The stack gas velocity was measured using an S-Type pitot tube with an attached thermocouple probe. The Pitot tube was connected to an inclined water column manometer and checked for leaks at five inches of water. The stack gas temperature was measured using a K-Type thermocouple. The procedure described in Section 2.4 of Method 1 was employed to ensure the absence of cyclonic flow at each test site. This procedure known as the Nulling Technique, was employed by positioning the S-Type Pitot tube at each traverse point so that the face openings were perpendicular to the stack cross-sectional plane or at the "0° reference" point. Differential pressure (delta P) measurements were noted at each traverse point. If the observed delta P was zero, the cyclonic angle was recorded as 0°. If the delta P was not zero, the Pitot tube was rotated up to ± 90° angle until a zero or null reading was obtained. Each cyclonic angle was measured with a leveled protractor, reported to the nearest degree, and then averaged. In order for a test site to be considered non-cyclonic, the average must be less than 20 degrees. The average cyclonic angle for each sample location met the criteria for testing.

4.3 Molecular Weight

A calibrated O2 and CO2 analyzer was used to measure stack gas molecular weight utilizing U.S. EPA Method 3A, Determination of Oxygen and Carbon Dioxide Concentrations in Emissions from Stationary Sources (Instrumental Analyzer Procedure). The analyzer was calibrated at a minimum of three points; low-level gas (zero gas), mid-level gas (40-60% of calibration span) and high-level gas (concentration equal to the calibration span) for the testing.

4.4 Moisture

The stack gas moisture content was determined using U.S. EPA Reference Method 4, Determination of Moisture Content in Stack Gases. The sample passed through a series of four connected impingers. The first and second impingers initially contained 100 mL of water. The third impinger was empty and was used as a moisture knockout. The fourth impinger contained approximately 300 grams of indicating silica gel. The impingers were contained in an ice bath maintained at, or less than, 68 degrees F to assure condensation of the gas stream moisture. Any moisture that did not condense in the first three impingers was captured in the final impinger containing silica gel. Each impinger was measured volumetrically or gravimetrically before and after each test with the data subsequently entered into the moisture content calculations.

4.5 Nitrogen Oxides

A chemiluminescence analyzer was used to measure concentrations of nitrogen oxides in the dry sample gas following the guidelines of U.S. EPA Method 7E, Determination of Nitrogen Oxides from Stationary Sources (Instrumental Analyzer Procedure). The analyzer measures the concentration of NOx by converting NO2 to NO and then measuring the light emitted by the reaction of NO with ozone. The NOx sampling system was calibrated at three points; zero, mid range (40-60 percent of span), and high range (equal to the calibration span) for the testing.

4.6 Carbon Monoxide

The CO emissions were measured following the guidelines of U.S. EPA Reference Method 10, Determination of Carbon Monoxide Emissions from Stationary Sources (Instrumental Analyzer Procedure). The CO sampling system was calibrated at three points; zero, mid range (40-60 percent of span), and high range (equal to the calibration span) for the testing.

4.7 Volatile Organic Compounds

VOC concentrations were determined during the testing following the guidelines of U.S. EPA Reference Method 25A, Determination of Total Gaseous Organic Concentration Using a Flame Ionization Analyzer. The FIA uses two individual detectors and two individual electrometer amplifiers. A common sample is introduced into the detector (#1) directly via a sample capillary and into the detector (#2) via a proprietary design non-CH4 hydrocarbon cutter. The cutter oxidizes and

removes all hydrocarbons except the methane. Detector #1 therefore detects all VOC including methane, while detector #2 detects only methane (CH4). The outputs of the two detectors are coupled to individual electrometer amplifiers. The dual detector, dual electrometer design provides a real time analysis of CH4 and total VOC including methane. The analyzer was calibrated at four points; a zero gas (nitrogen), low range gas (25 to 35 percent of span), mid range gas (45 to 55 percent of span), and a high range gas (concentration equal to the calibration span) using methane gas standards. The non-methane cutter described above and in 40 CFR 1065.265, was used to extract methane concentration to be able to determine VOC concentrations that did not include methane.

Ethane sampling was conducted in accordance to U.S. EPA Method 18. Integrated bag samples were collected in Tedlar bags during each of the three sixty minute test runs. EST collected two Tedlar bag samples per run for each emission source. At completion of testing the Tedlar bag samples were delivered to the laboratory for analysis. The samples were analyzed by gas chromatograph for ethane in accordance with the method. All the quality assurance and quality control procedures listed in the methods were incorporated in the sampling and analysis.

5.0 QUALITY ASSURANCE

Each promulgated U.S. EPA reference method described above is accompanied by a statement indicating that to obtain reliable results, persons using these methods should have a thorough knowledge of the techniques associated with each. To that end, EST attempts to minimize any factors in the field that could increase error by implementing a quality assurance program into every testing activity segment. The pitot tubes and thermocouples used to measure the exhaust gas during this test program were calibrated according to the procedures outlined in the Quality Assurance Handbook for Air Pollution Measurement Systems: Volume III, Stationary Source-Specific Methods, Method 2, Type S Pitot Tube Inspection, and Calibration Procedure 2E Temperature Sensor.

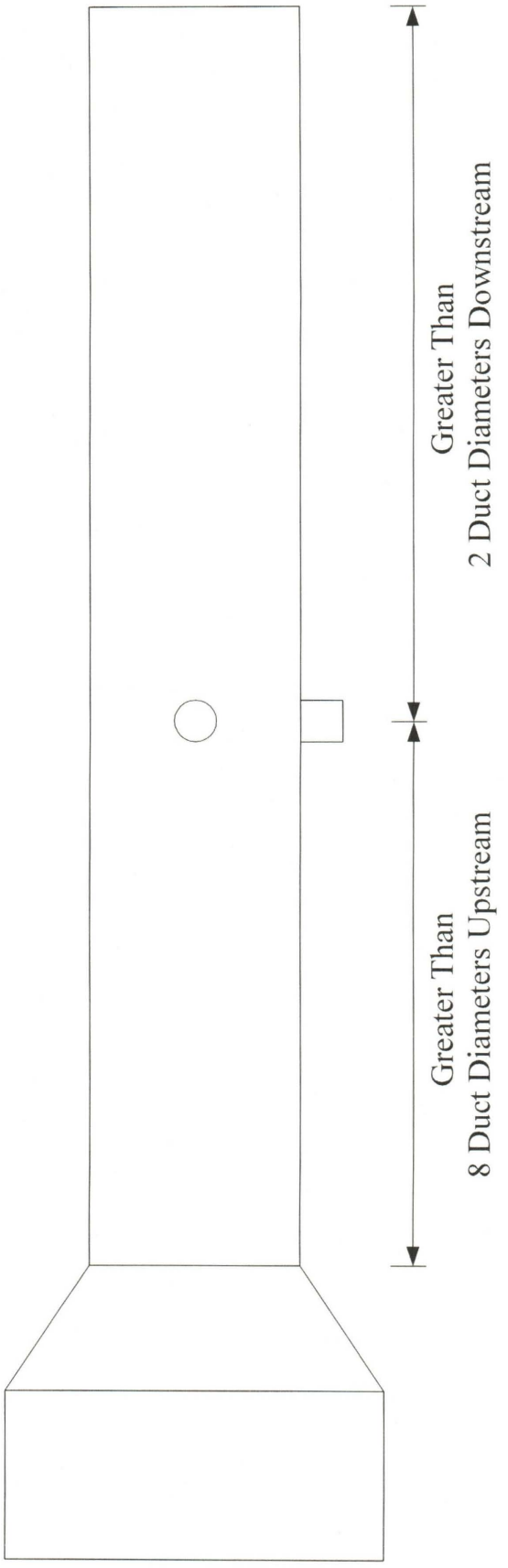
U.S. EPA Protocol No. 1 gas standards were used to calibrate the analyzers during the test program. These gases are certified according to the U.S. EPA Traceability Protocol for Assay & Certification of Gaseous Calibration Standards; Procedure G-1; September, 1997, and are certified to have a total relative uncertainty of ±1 percent.

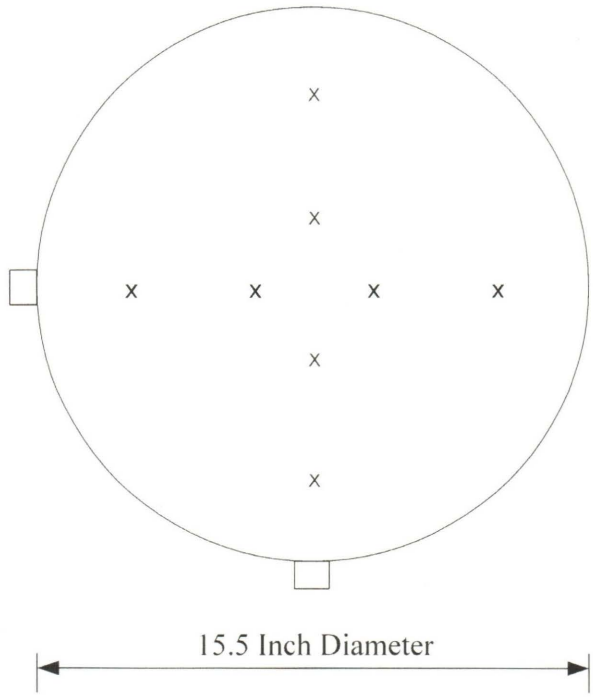
Data acquisition was provided using a data logger system programmed to collect and record at one minute intervals.

6.0 TEST RESULTS

Based on the data obtained during the test program, the NOx, CO and VOC emissions measured at EUGEN1 and EUGEN2 are below the specific limits described in PTI No. 195-19B, SRN P1098.

FIGURES





Traverse Point	Point Location Inches
1	1.0
2	3.9
3	11.6
4	14.5
Port Length	2.5

Figure # 1

Sampling And Traverse Point Location

Environmental Stack Testing

Compassionate Advisors-Pincanna

EUGEN1, EUGEN2, EUGEN3

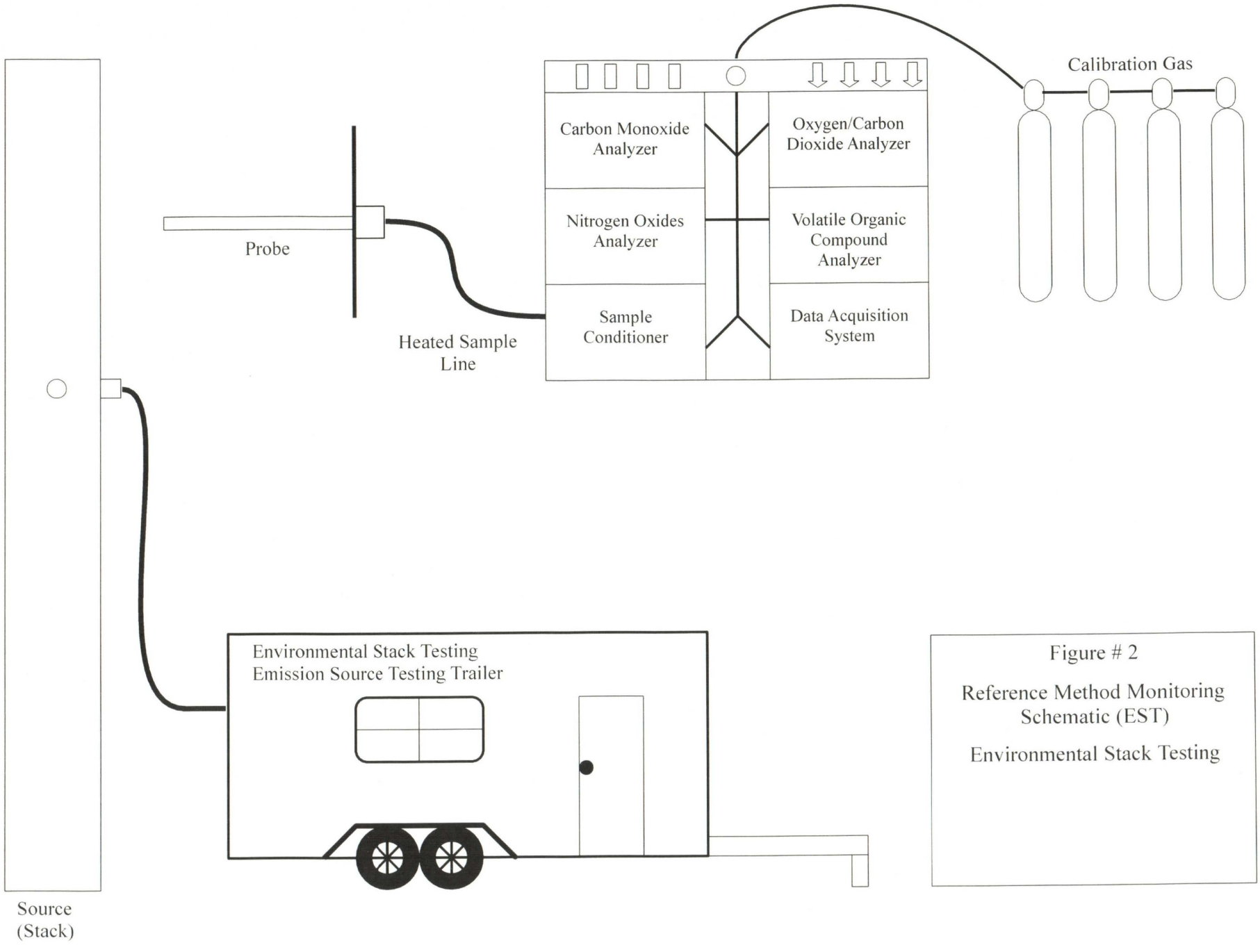


Figure # 2

Reference Method Monitoring Schematic (EST)

Environmental Stack Testing