IMPACT COMPLIANCE & TESTING

AIR EMISSION TEST REPORT

Title:	AIR EMISSION TEST REPORT FOR THE VERIFICATION OF AIR POLLUTANT EMISSIONS FROM NATURAL GAS FUELED TURBINES AND HEATERS
Report Date:	December 2, 2019
Test Date:	October 7-9, 2019

Facility Information	
Name: Street Address: City, County:	DCP Antrim Gas, LLC 6250 Old State Road Johannesburg, Otsego
Facility SRN:	N2940

Permit and Emission Unit Information	
ROP No.:	MI-ROP-N2940-2015
Emission Unit IDs:	EUTUR01-EUTUR02 EUPLANT2HEATER-EUPLANT5HEATER
Turbine Models:	Centaur 40-T4700

Testing Contractor	
Company:	Impact Compliance & Testing, Inc.
Mailing Address:	37660 Hills Tech Drive Farmington Hills, MI 48331
Phone:	(734) 464-3880
Project No.:	1900174

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

AIR EMISSION TEST REPORT
FOR THE
VERIFICATION OF AIR POLLUTANT EMISSIONS
FROM
NATURAL GAS FUELED TURBINES AND HEATERS

ANTRIM FACILITY
JOHANNESBURG, OTSEGO COUNTY

1.0 INTRODUCTION

DCP Operating Company, LP (DCP) owns and operates the South Chester Antrim CO_2 Removal Facility located in Johannesburg, Otsego County, Michigan. Natural gas (NG) is collected and CO2 is removed from it so the gas can be sold for use. Two (2) NG-fired Centaur 40-T4700 turbines, EUTUR01 and EUTUR02, and six (6) heat media heaters, EUPLANT1HEATER – EUPLANT6HEATER, are identified as emission units in Renewable Operating Permit (ROP) No. MI-ROP-N2940-2015 issued to Antrim by the State of Michigan Department of Environment, Great Lakes, and Energy-Air Quality Division (EGLE-AQD).

The conditions of MI-ROP-N2940-2015 allow for the installation and operation of two natural gas fired turbines and six heat media heaters.

- *The permittee shall verify NOx and CO emission rates from each turbine… The testing shall be completed at least once every five years.*

- *The permittee shall verify NOx emission rates from EUPLANT1HEATER, EUPLANT2HEATER, EUPLANT3HEATER, EUPLANT4HEATER, and EUPLANT5HEATER… The permittee shall verify CO emission rates from EUPLANT3HEATER, EUPLANT4HEATER, and EUPLANT5HEATER…The testing shall be completed at least once every five years.*

The emission performance test consisted of triplicate, one-hour sampling periods, per emission unit, to measure nitrogen oxides (NOx) and carbon monoxide (CO) exhaust gas concentrations for EUTUR01-EUTUR02, and EUPLANT2HEATER-EUPLANT5HEATER. EUPLANT1HEATER and EUPLANT6HEATER were not operating so they were not available for testing at this time. All emission units were tested for CO and NOx, but only NOx testing is required for EUPLANT2HEATER. Exhaust gas velocity, moisture, oxygen (O_2) content, and carbon dioxide (CO_2) content was determined for each test period to calculate pollutant mass emission rates.

The compliance test event was performed by Impact Compliance & Testing, Inc. (ICT), a Michigan-based environmental consulting and testing company. ICT representatives Tyler J. Wilson and Jory VanEss performed the field sampling and measurements October 7-9, 2019.

The exhaust gas sampling and analysis was performed using procedures specified in the Test Plan that was reviewed and approved by EGLE-AQD. EGLE-AQD representatives Mr. Dave Patterson and Ms. Sharon LeBlanc observed portions of the testing project.

Questions regarding this emission test report should be directed to:

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Report Certification

This test report was prepared by ICT based on field sampling data collected by ICT. Facility process data was collected and provided by DCP or ICT employees or representatives.

This test report has been reviewed by DCP representatives and approved for submittal to the EGLE-AQD.

I certify that the testing was conducted in accordance with the approved test plan unless otherwise specified in this report. I believe the information provided in this report and its attachments are true, accurate, and complete.

Report Prepared By:

Tyler J. Wilson
Senior Project Manager
Impact Compliance & Testing, Inc.

2.0 SUMMARY OF RESULTS

Emission testing was performed October 7-9, 2019 for four (4) natural gas fueled heat media heaters (identified as EUPLANT2HEATER-EUPLANT5HEATER) and two (2) natural gas fueled turbines to determine exhaust gas concentrations of NOx and CO. Exhaust gas velocity, moisture, oxygen (O_2) content, and carbon dioxide (CO_2) content measurements were performed for each test period to calculate pollutant mass emission rates.

The testing was performed while the emission units operated under normal operating parameters. Test results and applicable emission limits are provided in the following table. Data for each one-hour test period are presented in the summary tables at the end of this report. The test results demonstrate compliance with emission limits specified in ROP No. MI-ROP-N2940-2015.

2.1 Summary of measured air pollutant emission rates and permitted limits

Equipment	Pollutant	Results	Emission Limits
EUPLANT2HEATER	NOx CO	4.84 pph 0.00 pph	5.2 pph N/A pph
EUPLANT3HEATER	NOx CO	3.98 pph 0.00 pph	5.2 pph 3.0 pph
EUPLANT4HEATER	NOx CO	4.04 pph 0.00 pph	5.2 pph 3.0 pph
EUPLANT5HEATER	NOx CO	3.60 pph 0.00 pph	5.2 pph 3.0 pph
EUTUR01	NOx CO	105 ppm @ 15% O_2; 13.5 pph 0.00 ppm @ 15% O_2; 0.00 pph	167 ppm @ 15% O_2; 17.1 pph 50 ppm @ 15% O_2; 5.3 pph
EUTUR02	NOx CO	112 ppm @ 15% O_2; 14.7 pph 0.00 ppm @ 15% O_2; 0.00 pph	167 ppm @ 15% O_2; 17.1 pph 50 ppm @ 15% O_2; 5.3 pph

3.0 SOURCE AND SAMPLING LOCATION DESCRIPTION

3.1 General Process Description

DCP currently operates two (2) Centaur 40-T4700 turbines fueled with sweet natural gas (NG), with a capacity of 3.5 MW and four (4) NG-fired heat media heaters with a rated capacity of 51.231 MMBTU/hr.

3.2 Rated Capacities, Type and Quantity of Raw Materials Used

The turbines are fueled exclusively with sweet NG. A certain heat input rate is required to maintain base load conditions. Therefore, the actual volumetric flowrate of treated NG fuel is dependent on the fuel heating value, or methane content.

The heat media heaters are operated to heat a thermal oil to be used in the amine scrubbing processes.

3.3 Emission Control System Description

The emission units do not have add-on emission control equipment. The air-to-fuel ratio is controlled to maintain efficient fuel combustion, which minimizes air pollutant emissions. Exhaust gas is exhausted directly to the atmosphere through vertical exhaust stacks.

3.4 Sampling Locations (USEPA Method 1)

The exhaust stack sampling ports each emission unit satisfied the USEPA Method 1 criteria for a representative sample location. The inner diameter of the heater exhaust stacks is 74 inches at the sampling location. The inner diameter of the turbine exhaust stacks is 40 inches at the sampling location. The heater stacks are equipped with two (2) sample ports, opposed 90°, that provide a sampling location 180 inches (2.4 duct diameters) downstream and 180 inches (2.4 duct diameters) upstream from any flow disturbance. The turbine stacks are equipped with two (2) sample ports, opposed 90°, that provide a sampling location 192 inches (4.8 duct diameters) downstream and 120 inches (3.0 duct diameters) upstream from any flow disturbance.

Velocity pressure traverse locations for the sampling points were determined in accordance with USEPA Method 1 for each emission unit exhaust.

Figure 1 presents the emission test sampling and measurement locations.

4.0 <u>SAMPLING AND ANALYTICAL PROCEDURES</u>

A Stack Test Protocol for the compliance testing was prepared by ICT and reviewed by EGLE-AQD. This section provides a summary of the sampling and analytical procedures that were used during the test and presented in the Stack Test Protocol.

Appendix A provides a copy of the EGLE-AQD Approval Letter.

4.1 Exhaust Gas Velocity and Flowrate Determination (USEPA Method 2)

Exhaust stack gas velocities and volumetric flow rates for each emission unit were determined using USEPA Method 2 once for each 60-minute test period (near the beginning of that particular test period). An S-type Pitot tube connected to a red-oil manometer was used to determine velocity pressure. Gas temperature was measured using a K-type thermocouple mounted to the Pitot tube. The Pitot tube and connective tubing were leak-checked onsite, prior to the test event, to verify the integrity of the measurement system.

4.2 Exhaust Gas Molecular Weight Determination (USEPA Method 3A)

CO_2 and O_2 content in each emission unit exhaust were measured continuously throughout each one-hour test period in accordance with USEPA Method 3A. The CO_2 content of the exhaust was monitored using a non-dispersive infrared (NDIR) gas analyzer. The O_2 content of the exhaust was monitored using a gas analyzer that utilizes a Paramagnetic sensor.

During each one-hour sampling period, a continuous sample of the emission unit exhaust gas stream was extracted from the stack using a stainless steel probe connected to a Teflon® heated sample line. The sampled gas was conditioned by removing moisture prior to being introduced to the analyzer; therefore, measurement of O_2 and CO_2 concentrations correspond to standard dry gas conditions. The instruments were calibrated using appropriate calibration gases to determine accuracy and system bias (described in Section 5.0 of this document).

Figure 2 presents a diagram of the instrumental analyzer sampling train.

4.3 Exhaust Gas Moisture Content Determinations (Method 4)

Moisture content of the exhaust gas for each emission unit was determined in accordance with USEPA Method 4 using a chilled impinger sampling train. Exhaust gas moisture content measurements were performed concurrently with the instrumental analyzer sampling periods. At the conclusion of each sampling period the moisture gain in the impingers was determined gravimetrically by weighing each impinger to determine net weight gain.

Figure 3 presents a schematic of the moisture sampling train.

4.4 NOx and CO Concentration Measurements (USEPA Method 7E and 10)

NOx and CO pollutant concentrations in each emission unit exhaust were determined using a chemiluminescence NOx analyzer and a NDIR CO analyzer.

Three (3) one-hour sampling periods were performed for each emission unit exhaust during the test event. Throughout each one-hour test period, a continuous sample of the exhaust gas was extracted from the stack using the Teflon® heated sample line and gas conditioning system described in Section 4.2 of this document, and delivered to the instrumental analyzers. Instrument response for each analyzer was recorded on a data logging system that monitored the analog output of the instrumental analyzers continuously and logged data as one-minute averages. Prior to, and at the conclusion of each test, the instruments were calibrated using appropriate upscale calibration and zero gas to determine analyzer calibration error and system bias.

5.0 QA/QC ACTIVITIES

5.1 Flow Measurement

Prior to arriving onsite, the instruments used during the source test to measure exhaust gas properties and velocity (barometer, pyrometer, scale, and Pitot tube) were calibrated to specifications in the sampling methods.

The absence of cyclonic flow for each sampling location was verified using an S-type Pitot tube and oil manometer. The Pitot tube was positioned at each of the velocity traverse points with the planes of the face openings of the Pitot tube perpendicular to the stack cross-sectional plane. The Pitot tube was then rotated to determine the null angle (rotational angle as measured from the perpendicular, or reference, position at which the differential pressure is equal to zero).

5.2 NOx Converter Efficiency Test

The NO_2 – NO conversion efficiency of the TEI Model 42C instrumental analyzer was verified prior to the commencement of the performance tests. The instrument analyzer NO_2 – NO converter uses a catalyst at high temperatures to convert the NO_2 to NO for measurement. A USEPA Protocol 1 certified NO_2 calibration gas was used to verify the efficiency of the NO_2 – NO converter.

The NO_2 – NO conversion efficiency test satisfied the USEPA Method 7E criteria (the calculated NO_2 – NO conversion efficiency is greater than 90%).

5.3 Calibration Gas Divider Field Validation

A STEC Model SGD-710C 10-step gas divider was used to obtain appropriate calibration span gases. The ten-step STEC gas divider was NIST certified (within the last 12 months) with a primary flow standard in accordance with Method 205. When cut with an appropriate zero gas, the ten-step STEC gas divider delivered calibration gas values ranging from 0% to 100% (in 10% step increments) of the USEPA Protocol 1 calibration gas that was introduced into the system. The field evaluation procedures presented in Section 3.2 of Method 205 were followed prior to use of gas divider. The field evaluation yielded no errors greater than 2% of the triplicate measured average and no errors greater than 2% from the expected values.

5.4 Sampling System Response Time Determination

The response time of the sampling system was determined prior to the compliance test program (for each emission unit) by introducing upscale gas and zero gas, in series, into the sampling system using a tee connection at the base of the sample probe. The elapsed time for the analyzer to display a reading of 95% of the expected concentration was determined using a stopwatch.

Sampling periods did not commence until the sampling probe had been in place for at least twice the greatest system response time.

5.5 Instrumental Analyzer Interference Check

The instrumental analyzers used to measure NOx, CO, O_2, and CO_2 have had an interference response test performed prior to their use in the field, pursuant to the interference response test procedures specified in USEPA Method 7E. The appropriate interference test gases (i.e. gases that would be encountered in the exhaust gas stream) were introduced into each analyzer, separately and as a mixture with the analyte that each analyzer is designed to measure. All of the analyzers exhibited a composite deviation of less than 2.5% of the span for all measured interferent gases. No major analytical components of the analyzers have been replaced since performing the original interference tests.

5.6 Instrument Calibration and System Bias Checks

At the beginning of each field test day (and upon moving the test trailer from one emission unit to another), initial three-point instrument calibrations were performed for the NOx, CO, CO_2, and O_2 analyzers by injecting calibration gas directly into the inlet sample port for each instrument. System bias checks were performed prior to and at the conclusion of each sampling period by introducing the upscale calibration gas and zero gas into the sampling system (at the base of the stainless steel sampling probe prior to the particulate filter and Teflon® heated sample line) and determining the instrument response against the initial instrument calibration readings.

The instruments were calibrated with USEPA Protocol 1 certified concentrations of CO_2, O_2, NOx, and CO in nitrogen and zeroed using hydrocarbon free nitrogen. A STEC Model SGD-710C ten-step gas divider was used to obtain intermediate calibration gas concentrations as needed.

5.7 Determination of Exhaust Gas Stratification

A stratification test for the exhaust stack gas was performed as part of the first test period for each emission unit. The stainless steel sample probe was positioned at three (3) sample points across the stack diameter for the heaters and twelve (12) sample points across the stack diameter for the turbines (with regards to Subpart GG). Pollutant concentration data were recorded at each sample point for a minimum of twice the maximum system response time.

The recorded data for each exhaust stack gas indicate that the measured NOx concentrations did not vary by more than 5% of the mean across the stack diameter. Therefore, the stack gas (for each emission unit) was considered to be unstratified and the compliance test sampling was performed at a single sampling location within the each exhaust stack.

5.8 Meter Box Calibrations

The dry gas meter sampling console used for moisture testing was calibrated prior to and after the testing program. This calibration uses the critical orifice calibration technique presented in USEPA Method 5. The metering console calibration exhibited no data outside the acceptable ranges presented in USEPA Method 5.

The digital pyrometer in the metering console was calibrated using a NIST traceable Omega® Model CL 23A temperature calibrator.

Appendix E presents test equipment quality assurance data (NO_2 – NO conversion efficiency test data, instrument calibration and system bias check records, calibration gas certifications, interference test results, meter box calibration records, and field equipment calibration records).

6.0 TEST RESULTS AND DISCUSSION

6.1 Purpose and Objectives of the Tests

Renewable Operating Permit No. MI-ROP-N2940-2015 specifies the following:

- *The permittee shall verify NOx and CO emission rates from each turbine… The testing shall be completed at least once every five years.*

- *The permittee shall verify NOx emission rates from EUPLANT1HEATER, EUPLANT2HEATER, EUPLANT3HEATER, EUPLANT4HEATER, and EUPLANT5HEATER… The permittee shall verify CO emission rates from EUPLANT3HEATER, EUPLANT4HEATER, and EUPLANT5HEATER…The testing shall be completed at least once every five years.*

6.2 Operating Conditions During the Compliance Test

The turbine emission units were tested while operations occurred at the highest achievable operating load. The heat media heaters were tested under normal operating parameters.

The following process operating data were monitored and recorded during each test run at 15-minute intervals:

<u>Heaters</u>

- Fuel Pressure (psi)
- Outlet Temperature (°F)

Turbines

- Output (kW)
- Fuel Pressure (psi)

Appendix B provides process data collected during the compliance test periods.

6.3 Air Pollutant Sampling Results

The NG-fueled emission unit exhausts were each monitored for three (3) one-hour test periods, during which the NOx, CO, O_2, and CO_2 concentrations were measured using instrumental analyzers. The measured pollutant concentrations were adjusted based on instrument calibrations performed prior to and following each test period (drift and bias corrected pursuant to equations in specified in the USEPA reference test methods).

Exhaust gas moisture content was determined by gravimetric analysis of the weight gain in chilled impingers in accordance with USEPA Method 4. Exhaust gas velocity was measured once for each one-hour test period. The calculated exhaust gas volumetric flowrate was used to calculate NOx and CO mass emission rates based on the measured pollutant concentrations (parts per million by volume (ppmv)).

Tables 6.1-6.6 presents measured exhaust gas conditions and calculated air pollutant emission rates for each one-hour test period, for each emission unit.

Appendix C provides computer calculated and field data sheets for the test periods.

Appendix D provides raw instrumental analyzer response data for each test period.

6.4 Variations from Normal Sampling Procedures or Operating Conditions

The compliance tests for all pollutants were performed in accordance with the Stack Test Protocol dated September 3, 2019, the EGLE-AQD Approval Letter dated September 25, 2019, and the specified USEPA test methods.

Instrument calibrations and sampling period results satisfy the quality assurance verifications required by USEPA Methods 3A, 7E, and 10. No variations from the normal operating conditions of the emission units occurred during the testing program.

Table 6.1 Measured exhaust gas conditions and air pollutant emission rates for EUPLANT3HEATER

Test No. Test Date Test Period (24-hr clock)	1 10/7/19 1743-1843	2 10/7/19 1857-1957	3 10/7/19 2008-2108	Test Avg.
Fuel Pressure (psi)	14.8	15.4	15.6	15.2
Outlet Temperature (°F)	584	587	588	586
Exhaust gas composition				
CO_2 content (% vol)	9.35	9.21	9.20	9.25
O_2 content (% vol)	7.85	7.83	7.79	7.82
Moisture (% vol)	13.2	11.8	12.9	12.6
Exhaust gas flowrate				
Exhaust Temperature (°F)	557	555	561	558
Flowrate, dry basis (dscfm)	14,583	14,300	14,388	14,423
Nitrogen oxides emission rates				
NO_X conc. (ppmvd)	38.8	38.3	38.2	38.4
NO_X emissions (pph)	4.06	3.93	3.94	3.98
NO_X permit limit (pph)				***5.2***
Carbon monoxide emission rates				
CO conc. (ppmvd)	0.00	0.00	0.00	0.00
CO emissions (pph)	0.00	0.00	0.00	0.00
CO permit limit (pph)				***3.0***

Table 6.2 Measured exhaust gas conditions and air pollutant emission rates for EUPLANT5HEATER

Test No. Test Date Test Period (24-hr clock)	1 10/8/19 0653-0753	2 10/8/19 0808-0908	3 10/8/19 0921-1021	Test Avg.
Fuel Pressure (psi)	9.3	9.6	8.1	9.0
Outlet Temperature (^oF)	572	570	568	570
Exhaust gas composition				
CO_2 content (% vol)	11.3	11.5	12.1	11.6
O_2 content (% vol)	5.80	5.42	5.08	5.43
Moisture (% vol)	12.7	14.5	15.2	14.1
Exhaust gas flowrate				
Exhaust Temperature (^oF)	555	566	548	556
Flowrate, dry basis (dscfm)	12,551	13,000	14,051	13,200
Nitrogen oxides emission rates				
NO_X conc. (ppmvd)	39.5	39.4	35.6	38.2
NO_X emissions (pph)	3.56	3.67	3.59	3.60
NO_X permit limit (pph)				***5.2***
Carbon monoxide emission rates				
CO conc. (ppmvd)	0.00	0.00	0.00	0.00
CO emissions (pph)	0.00	0.00	0.00	0.00
CO permit limit (pph)				***3.0***

Table 6.3 Measured exhaust gas conditions and air pollutant emission rates for EUPLANT4HEATER

Test No. Test Date Test Period (24-hr clock)	1 10/8/19 1124-1224	2 10/8/19 1246-1346	3 10/8/19 1401-1501	Test Avg.
Fuel Pressure (psi)	12.0	12.6	12.2	12.3
Outlet Temperature (°F)	586	578	579	581
Exhaust gas composition				
CO_2 content (% vol)	9.50	9.55	9.29	9.45
O_2 content (% vol)	8.13	7.90	8.04	8.02
Moisture (% vol)	13.3	11.3	10.9	11.8
Exhaust gas flowrate				
Exhaust Temperature (°F)	619	625	618	621
Flowrate, dry basis (dscfm)	17,418	16,050	15,667	16,378
Nitrogen oxides emission rates				
NO_X conc. (ppmvd)	32.9	35.4	34.9	34.4
NO_X emissions (pph)	4.11	4.08	3.92	4.04
NO_X permit limit (pph)				***5.2***
Carbon monoxide emission rates				
CO conc. (ppmvd)	0.00	0.00	0.00	0.00
CO emissions (pph)	0.00	0.00	0.00	0.00
CO permit limit (pph)				***3.0***

Table 6.4 Measured exhaust gas conditions and air pollutant emission rates for EUTUR01

Test No. Test Date Test Period (24-hr clock)	1 10/9/19 0655-0755	2 10/9/19 0811-0911	3 10/9/19 0925-1025	Test Avg.
Output (kW)	2,004	1,992	1,986	1,994
Fuel Pressure (psi)	190	190	190	190
Exhaust gas composition				
CO_2 content (% vol)	1.66	1.74	1.70	1.70
O_2 content (% vol)	18.7	18.6	18.7	18.7
Moisture (% vol)	1.8	3.1	4.4	3.1
Exhaust gas flowrate				
Exhaust Temperature (°F)	600	600	600	600
Flowrate, dry basis (dscfm)	51,241	45,842	46,063	47,715
Nitrogen oxides emission rates				
NO_X conc. (ppmvd)	38.7	40.3	39.6	39.5
NO_X emissions (ppm[1])	105	105	106	105
NO_X permit limit (ppm[1])				***167***
NO_X emissions (pph)	14.2	13.3	13.1	13.5
NO_X permit limit (pph)				***17.1***
Carbon monoxide emission rates				
CO conc. (ppmvd)	0.00	0.00	0.00	0.00
CO emissions (ppm[1])	0.00	0.00	0.00	0.00
CO permit limit (ppm[1])				***50***
CO emissions (pph)	0.00	0.00	0.00	0.00
CO permit limit (pph)				***5.3***

Notes:
1. ppm dry @ 15% O_2

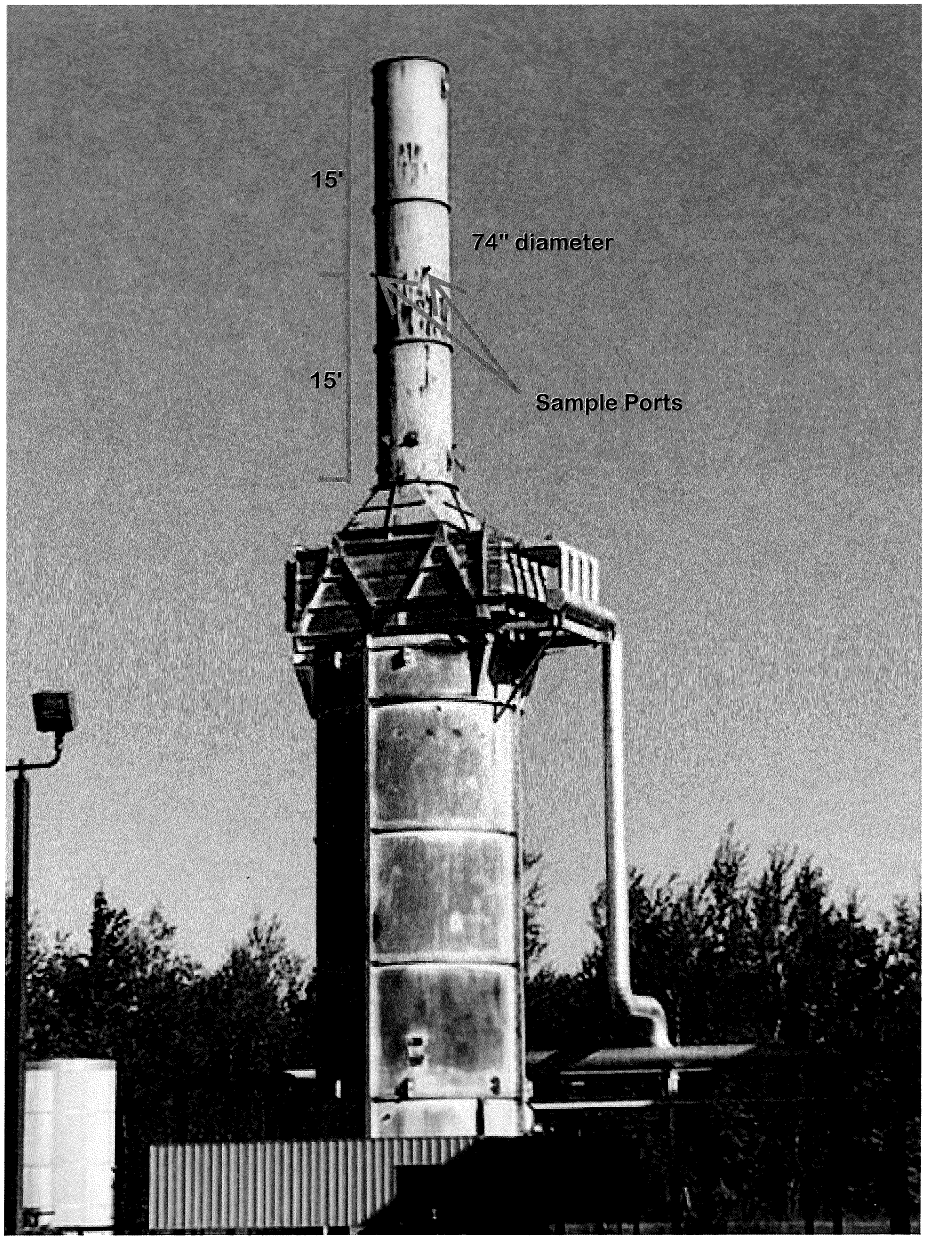
Table 6.5 Measured exhaust gas conditions and air pollutant emission rates for EUTUR02

Test No. Test Date Test Period (24-hr clock)	1 10/9/19 1042-1142	2 10/9/19 1156-1256	3 10/9/19 1311-1411	Test Avg.
Output (kW)	1,987	2,002	2,022	2,004
Fuel Pressure (psi)	190	189	188	189
Exhaust gas composition				
CO_2 content (% vol)	1.84	1.87	1.85	1.85
O_2 content (% vol)	18.5	18.6	18.6	18.6
Moisture (% vol)	3.1	7.5	4.1	4.9
Exhaust gas flowrate				
Exhaust Temperature (^oF)	630	630	630	630
Flowrate, dry basis (dscfm)	46,942	43,252	46,953	45,716
Nitrogen oxides emission rates				
NO_X conc. (ppmvd)	42.6	45.4	46.3	44.8
NO_X emissions (ppm[1])	106	115	116	112
NO_X permit limit (ppm[1])				***167***
NO_X emissions (pph)	14.3	14.1	15.6	14.7
NO_X permit limit (pph)				***17.1***
Carbon monoxide emission rates				
CO conc. (ppmvd)	0.00	0.00	0.00	0.00
CO emissions (ppm[1])	0.00	0.00	0.00	0.00
CO permit limit (ppm[1])				***50***
CO emissions (pph)	0.00	0.00	0.00	0.00
CO permit limit (pph)				***5.3***

Notes:
1. ppm dry @ 15% O_2

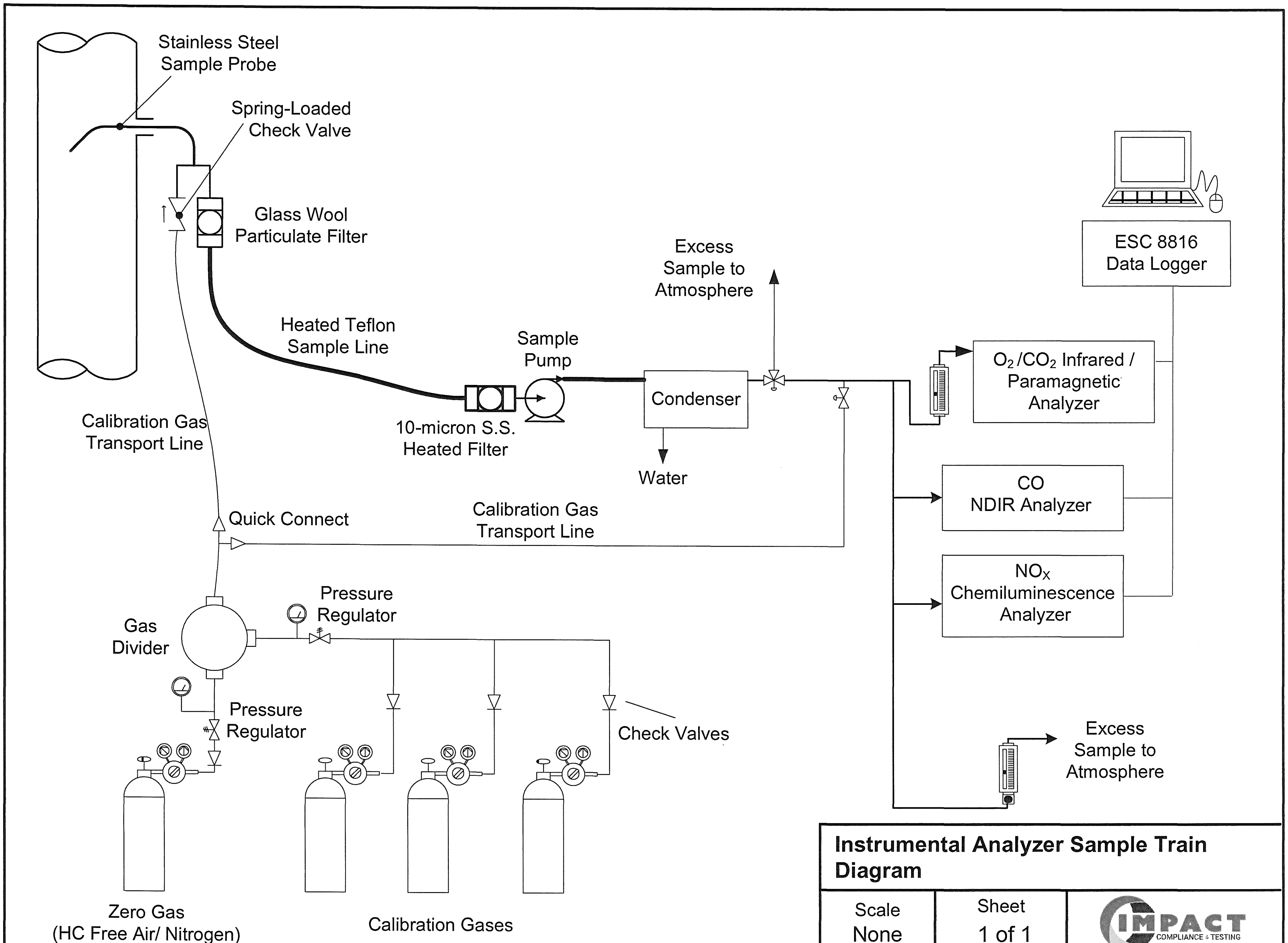
Table 6.6 Measured exhaust gas conditions and air pollutant emission rates for EUPLANT2HEATER

Test No. Test Date Test Period (24-hr clock)	1 10/9/19 1511-1611	2 10/9/19 1623-1723	3 10/9/19 1734-1834	Test Avg.
Fuel Pressure (psi)	12.5	12.2	13.0	12.6
Outlet Temperature (°F)	657	660	659	659
Exhaust gas composition				
CO_2 content (% vol)	8.37	8.39	8.39	8.38
O_2 content (% vol)	8.70	8.84	8.87	8.80
Moisture (% vol)	11.4	11.3	12.3	11.7
Exhaust gas flowrate				
Exhaust Temperature (°F)	602	607	628	612
Flowrate, dry basis (dscfm)	17,351	16,527	16,658	16,845
Nitrogen oxides emission rates				
NO_X conc. (ppmvd)	40.5	40.1	39.6	40.1
NO_X emissions (pph)	5.04	4.75	4.74	4.84
NO_X permit limit (pph)				***5.2***
Carbon monoxide emission rates				
CO conc. (ppmvd)	0.00	0.00	0.00	0.00
CO emissions (pph)	0.00	0.00	0.00	0.00
CO permit limit (pph)				***3.0***



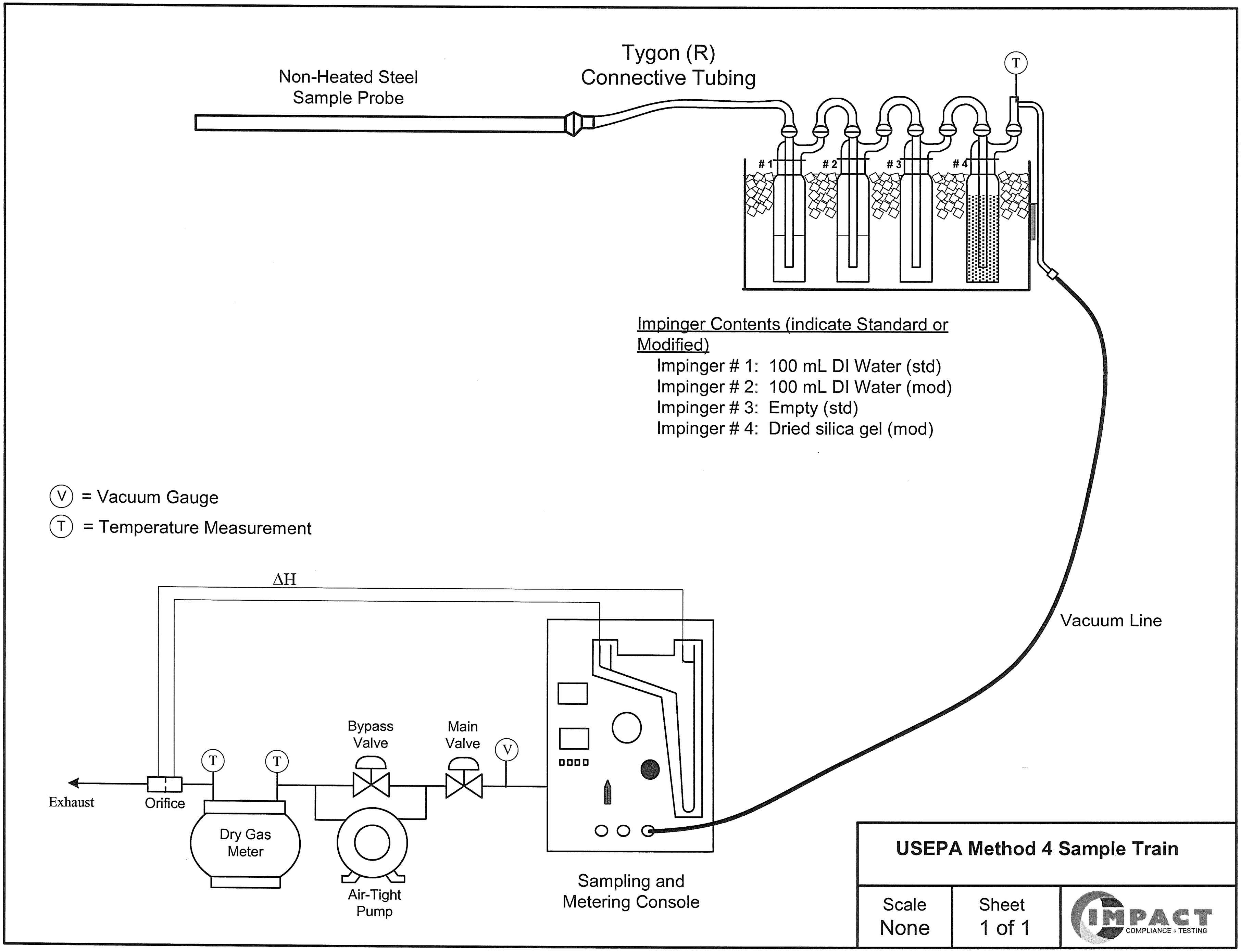
Representative Photo - Heat Media Heater
Diagram for EUPLANT2HEATER-EUPLANT5HEATER

Representative Photo – Turbine Exhaust Stack
Diagram for EUTUR01-EUTUR02



Instrumental Analyzer Sample Train Diagram

Scale	Sheet	
None	1 of 1	IMPACT COMPLIANCE & TESTING


Non-Heated Steel
Sample Probe
Tygon (R)
Connective Tubing
T
1
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3
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Impinger Contents (indicate Standard or Modified)
Impinger # 1: 100 mL DI Water (std)
Impinger # 2: 100 mL DI Water (mod)
Impinger # 3: Empty (std)
Impinger # 4: Dried silica gel (mod)
V = Vacuum Gauge
T = Temperature Measurement
ΔH
Vacuum Line
Bypass
Valve
Main
Valve
V
T
T
Exhaust
Orifice
Dry Gas
Meter
Air-Tight
Pump
Sampling and
Metering Console
USEPA Method 4 Sample Train
Scale
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Sheet
1 of 1
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