
**COMPLIANCE TEST REPORT
ANR PIPELINE-HAMILTON COMPRESSOR STATION #13
TURBINES EUHM015 (1311) AND EUHM016 (1312)**

July 6, 2022

Prepared for:



RECEIVED

AUG 10 2022

AIR QUALITY DIVISION

TC Energy's ANR Pipeline Company
4193 134th Avenue
Hamilton, MI

PTI No. 98-20
SRN: N5574

Prepared by:



Environmental Quality Management, Inc.
1280 Arrowhead Court
Suite 2
Crown Point, IN 46307
(219) 661-9900
www.eqm.com

PN: 050812.0030

July 2022



PREFACE

I, Karl Mast, do hereby certify that the source emissions testing conducted at TC Energy's ANR Pipeline Company in Hamilton, MI was performed in accordance with the procedures set forth by the United States Environmental Protection Agency, and that the data and results submitted within this report are an exact representation of the testing.

A handwritten signature in black ink that reads 'Karl Mast'.

Karl Mast
Test Supervisor

I, Karl Mast, do hereby attest that all work on this project was performed under my direct supervision, and that this report accurately and authentically presents the source emissions testing conducted at ANR Pipeline's Hamilton Compressor Station #13 in Hamilton, MI.

A handwritten signature in black ink that reads 'Karl Mast'.

Karl Mast
Test Supervisor



SUMMARY

The compliance testing was performed on the Stationary Turbine systems in accordance with the requirements of the Title 40, Code of Federal Regulations, Part 60 (40 CFR 60, Subpart KKKK). The results of the testing are detailed in the following table.

EUHM015 (1311) - Test Results						
Parameter	Run 1	Run 2	Run 3	Average	Limit	Pass/Fail
NO _x ppmvd @ 15% O ₂	4.9948	5.1475	5.2059	5.1161	25	Pass
NO _x Lbs/Hr	2.7866	2.8718	2.8839	2.8474	9.8	Pass
CO Lbs/Hr	2.8332	2.8888	2.8197	2.8472	10	Pass

EUHM016 (1312) - Test Results						
Parameter	Run 1	Run 2	Run 3	Average	Limit	Pass/Fail
NO _x ppmvd @ 15% O ₂	4.5174	4.5433	4.4538	4.5048	25	Pass
NO _x Lbs/Hr	2.5202	2.5704	2.5198	2.5368	9.8	Pass
CO Lbs/Hr	2.7635	2.8613	2.7753	2.8000	10	Pass



CONTENTS

Preface..... ii

Summary.....iii

1 Introduction 1

2 Test Results Summary..... 3

3 Facility and Process Conditions..... 8

4 Test Procedures 13

5 Quality Assurance Procedures 17

6 Conclusions 18

TABLES

1 EUHM015 Test Results Summary 3

2 EUHM016 Test Results Summary 3

3 EUHM015 Operating Parameters/Ambient Conditions 4

4 EUHM015 Emission Concentrations/Calculated Mass Emissions
& Concentrations/Calculated Flows 5

5 EUHM016 Operating Parameters/Ambient Conditions 6

6 EUHM016 Emission Concentrations/Calculated Mass Emissions
& Concentrations/Calculated Flows 7

7 EUHM015 Production Data..... 8

8 EUHM016 Production Data..... 9

9 EUHM015 General Information 10

10 EUHM016 General Information 11

FIGURES

1 Flow Schematic..... 12



APPENDICES

- A – Field Test Data
- B – Process Operating Data
- C – Gas Certifications
- D – Sample Calculation
- E – Correspondence



1. INTRODUCTION

This report presents the results of the source emissions testing conducted by Environmental Quality Management, Inc. (EQM) for TC Energy's ANR Pipeline (ANR) at Hamilton compressor station #13, near Hamilton, MI, which is located in Allegan County.

The primary purpose of this testing program was to conduct emissions testing that is required by Permit to Install 98-20, FGTURBINES and in order to comply with [40 CFR 60, Subpart KKKK] for the Turbines EUHM015 (1311) and EUHM016 (1312) at ANR Pipeline's gas compressor facility.

EQM's responsibility was to conduct the compliance testing for the O₂, CO and NO_x emissions rates and perform data reduction for conformance evaluation. ANR Pipeline's responsibility was to maintain process operating parameters and to assist in providing process operating data per compliance test requirements.

The following report provides information pertaining to TC Energy's process operations, and compliance testing. The compliance testing conducted on the stationary Turbine EUHM015 (1311) was performed on July 6, 2022, from 11:25 A.M. to 2:42 P.M. The compliance testing conducted on the stationary Turbine EUHM016 (1312) was performed on July 6, 2022, from 4:20 P.M. to 7:34 P.M.

The following requirements were specific for the testing program:

1. Equipment calibrations performed and calibration data provided.
2. Three (3) sixty (60) -minute, minimum, O₂, CO, and NO_x test runs performed at the turbines at maximum achievable load and speed according to pipeline conditions pursuant to EPA, Title 40, Code of Federal Regulations, Part 60, Appendix A.
3. Process manufacturing operations maintained at 100% +/- 5% of capacities and production and fuel consumption rates recorded during the emissions testing periods.
4. All testing and analyses performed in accordance with current EPA test methodologies and analytical procedures for O₂, CO and NO_x emissions determinations.
5. Stratification was found to be less than 5% in the turbine exhaust(s).
6. Diluent corrected stratification test was performed in accordance with Subpart KKKK.



The testing program was approved by and/or coordinated with Pedro Amieva, TC Energy's ANR Pipeline Company. The emission testing was overseen by Karl Mast, Manager, Emission Measurement and Project Manager, EQM. The emissions testing was performed by Zach Hill, Field Testing Activities Lead and Jeremy Howe, Michigan EGLE and Cody Yazzie, Michigan EGLE.



2. TEST RESULTS SUMMARY

The compliance testing was performed on the stationary EUHM015 and EUHM016 systems in accordance with the requirements of the Title 40, Code of Federal Regulations, Part 60 (40 CFR 60, Appendix A). A summary of the test results is given below:

Table 1. EUHM015 (1311)-Test Results						
Parameter	Run 1	Run 2	Run 3	Average	Limit	Pass/Fail
NO _x ppmvd @ 15% O ₂	4.9948	5.1475	5.2059	5.1161	25	Pass
NO _x Lbs/Hr	2.7866	2.8718	2.8839	2.8474	9.8	Pass
CO Lbs/Hr	2.8332	2.8888	2.8197	2.8472	10	Pass

Table 2. EUHM016 (1312)-Test Results						
Parameter	Run 1	Run 2	Run 3	Average	Limit	Pass/Fail
NO _x ppmvd @ 15% O ₂	4.5174	4.5433	4.4538	4.5048	25	Pass
NO _x Lbs/Hr	2.5202	2.5704	2.5198	2.5368	9.8	Pass
CO Lbs/Hr	2.7635	2.8613	2.7753	2.8000	10	Pass

Based on the information provided above, the stationary turbines EUHM015 and EUHM016 met the acceptance criteria during the course of the testing. A complete list of performance parameters for each test run that was performed at the stack sampling locations can be found in Table 3-10. Additional testing information may be found in Appendix A.



Table 3. Operating Parameters and Ambient Conditions-EUHM015 (1311)

Run	1	2	3	
Date	07/06/22	07/06/22	07/06/22	
Time	11:25	12:34	13:43	
Engine Operating Conditions	High	High	High	Averages
Unit Horsepower from Control Panel	19,502.0	19,454.0	19,191.0	19,382.3
% Load	83.1	82.9	81.8	82.6
Unit Speed (rpm) CT/GG/GP/Jet	11,107.8	11,107.8	11,107.8	11,107.8
% CF Speed	99.0	99.0	99.0	99.0
Gas Compressor Speed (rpm) PT/Booster	8,186.0	8,132.0	8,033.0	8,117.0
% PT Speed	92.4	91.8	90.7	91.7
Turbine Exhaust Temp T5	1,357.0	1,356.0	1,357.0	1,356.7
Compressor Suction Pressure (PSIG)	573.0	592.0	593.0	586.0
Compressor Suction Temperature (°F)	80.0	82.0	81.0	81.0
Compressor Discharge Pressure (PSIG)	662.0	684.0	703.0	683.0
Compressor Discharge Temperature (°F)	120.0	120.0	121.0	120.3
Compressor Flow (MMSCF/D)	1227.0	1275.0	1234.0	1,245.3
Heat Rate (BTU(LHV)/HP-hr)	7,021.0	7,038.4	7,084.6	7,048.0
Ambient Conditions				
Ambient Temperature (°F)	76.00	78.00	78.00	77.33
Barometric Pressure (psi)	14.33	14.33	14.33	14.33
Ambient Relative Humidity (%)	87.00	74.00	70.00	77.00
Absolute Humidity (grains/LB)	120.92	109.59	103.51	111.34



Table 4. Emissions Concentrations & Calculated Mass Emissions/Calculated Emissions Concentrations/Calculated Flows-EUHM015 (1311)

Run	1	2	3	
Date	07/06/22	07/06/22	07/06/22	
Time	11:25	12:34	13:43	
Emissions Concentrations & Calculated Mass Emissions				
NO _x ppm (BIAS Corrected)	4.580	4.720	4.800	4.700
NO _x LB/HR	2.7866	2.8718	2.8839	2.8474
NO _x (ppm @ 15% O ₂)	4.9948	5.1475	5.2059	5.1161
NO _x (ppm @ 15% O ₂ , ISO)	5.9227	5.8849	5.8535	5.8870
NO _x LB/MMBTU	0.0184	0.0190	0.0192	0.0189
NO _x Tons/Year	12.2053	12.5784	12.6315	12.4718
NO _x LB/SCF Fuel	1.97E-05	2.03E-05	2.05E-05	2.01E-05
NO _x LB/MMSCF Fuel	19.6638	20.2649	20.4947	20.1412
CO ppm (BIAS Corrected)	7.650	7.800	7.710	7.720
CO LB/HR	2.8332	2.8888	2.8197	2.8472
CO LB/MMBTU **	0.0187	0.0191	0.0188	0.0189
CO (ppm @ 15% O ₂)	8.3429	8.5065	8.3619	8.4038
CO (ppm @ 15% O ₂ , ISO)	9.8927	9.7250	9.4022	9.6733
CO Tons/Year	12.4096	12.6529	12.3503	12.4709
CO LB/SCF Fuel	2.00E-05	2.04E-05	2.00E-05	2.01E-05
CO LB/MMSCF Fuel	19.9929	20.3849	20.0386	20.1388
% O ₂ (BIAS Corrected)	15.490	15.490	15.460	15.480
Calculated Flows				
Fuel Flow - (SCFM)	2366.6667	2366.6667	2350.0000	2361.1111
Fuel Flow - (SCFH)	142000.0	142000.0	141000.0	141666.6667
Exhaust Flow (LB/HR)	323240.7955	322568.7718	318829.3903	321546.3192
Exhaust Flow (SCFM)	86765.5644	86765.5644	85775.9735	86435.7008
Exhaust Flow Method 19 (scfm)	84756.7104	84756.7104	83695.7154	84403.0454
Exhaust Flow Method 19 (lbm/min)	3975.6836	3972.4943	3921.0741	3956.4173
Exhaust Flow Carbon Balance (lbm/min)	6497.2845	6497.2845	6417.2988	6470.6226
Air flow Beshouri (scfm)	84531.8012	84531.8012	83491.1604	84184.9209
BSAC, #/BHP-hr	19.0594	19.1064	19.1269	19.0976
Fuel Flow Measurements				
Fuel Flow From Screen(MSCFH)	142.0	142.0	141.0	141.6667
** BASED ON FUEL SPECIFIC DRY F-FACTOR CALCULATION	Run 1	Run 2	Run 3	
* BASED ON CARBON BALANCE (STOICH. + O₂)				
- A/F IS TOTAL MASS RATIO				



Table 5. Operating Parameters and Ambient Conditions-EUHM016 (1312)

Run	1	2	3	
Date	07/06/22	07/06/22	07/06/22	
Time	16:20	17:30	18:35	
Engine Operating Conditions	High	High	High	Averages
Unit Horsepower from Control Panel	20,460.0	20,552.0	20,591.0	20,534.3
% Load HP	87.2	87.6	87.8	87.5
Unit Speed (rpm) CT/GG/GP/Jet	11,107.8	11,107.8	11,107.8	11,107.8
% CT Speed	99.0	99.0	99.0	99.0
Gas Compressor Speed (rpm) PT/Booster	8,063.0	8,064.0	8,049.0	8,058.7
% PT Speed	91.0	91.1	90.9	91.0
Turbine Exhaust Temp T5	1,371.0	1,374.0	1,375.0	1,373.3
Compressor Suction Pressure (PSIG)	589.0	589.0	588.0	588.7
Compressor Suction Temperature (°F)	79.0	79.0	79.0	79.0
Compressor Discharge Pressure (PSIG)	723.0	728.0	731.0	727.3
Compressor Discharge Temperature (°F)	123.0	123.0	123.0	123.0
Compressor Flow (MMSCF/D)	1224.0	1218.0	1218.0	1,220.0
Heat Rate (BTU(LHV)/HP-hr)	6,692.3	6,756.2	6,743.4	6,730.6
Ambient Conditions				
Ambient Temperature (°F)	79.00	79.00	79.00	79.00
Barometric Pressure (psi)	14.34	14.34	14.34	14.34
Ambient Relative Humidity (%)	62.00	60.00	72.00	64.67
Absolute Humidity (grains/LB)	94.52	91.38	110.11	98.67



Table 6. Emissions Concentrations & Calculated Mass Emissions/Calculated Emissions Concentrations/Calculated Flows-EUHM016 (1312)

Run	1	2	3	
Date	07/06/22	07/06/22	07/06/22	
Time	16:20	17:30	18:35	
Emissions Concentrations & Calculated Mass Emissions				
NO _x ppm (BIAS Corrected)	4.280	4.320	4.250	4.2833
NO _x LB/HR	2.5202	2.5704	2.5198	2.5368
NO _x (ppm @ 15% O ₂)	4.5174	4.5433	4.4538	4.5048
NO _x (ppm @ 15% O ₂ , ISO)	4.9422	4.9278	5.0822	4.9841
NO _x LB/MMBTU	0.0167	0.0167	0.0164	0.0166
NO _x Tons/Year	11.0386	11.2584	11.0366	11.1112
NO _x LB/SCF Fuel	1.78E-05	1.79E-05	1.75E-05	1.77E-05
NO _x LB/MMSCF Fuel	17.7841	17.8863	17.5340	17.7348
CO ppm (BIAS Corrected)	7.710	7.900	7.690	7.7667
CO LB/HR	2.7635	2.8613	2.7753	2.8000
CO LB/MMBTU **	0.0183	0.0186	0.0181	0.0183
CO (ppm @ 15% O ₂)	8.1376	8.3084	8.0588	8.1682
CO (ppm @ 15% O ₂ , ISO)	8.9029	9.0114	9.1957	9.0367
CO Tons/Year	12.1042	12.5323	12.1558	12.2641
CO LB/SCF Fuel	1.95E-05	1.99E-05	1.93E-05	1.96E-05
CO LB/MMSCF Fuel	19.5008	19.9102	19.3121	19.5744
% O ₂ (BIAS Corrected)	15.310	15.290	15.270	15.290
Calculated Flows				
Fuel Flow - (SCFM)	2366.7	2400.0	2400.0	2388.8889
Fuel Flow - (SCFH)	142000.0	144000.0	144000.0	143333.3333
Exhaust Flow (LB/HR)	313619.1149	317083.9666	315782.5498	315495.2104
Exhaust Flow (SCFM)	84152.5964	85095.8144	84855.4888	84701.2999
Exhaust Flow Method 19 (scfm)	82027.5140	82886.2791	82591.8341	82501.8757
Exhaust Flow Method 19 (lbm/min)	3839.2000	3878.5241	3869.9018	3862.5420
Exhaust Flow Carbon Balance (lbm/min)	6295.9464	6362.7372	6341.0068	6333.2302
Air flow Beshouri (scfm)	81912.3269	82781.2969	82498.5768	82397.4002
BSAC, #/BHP-hr	17.5878	17.6930	17.5974	17.6261
Fuel Flow Measurements				
Fuel Flow From Screen(MSCFH)	142.0	144.0	144.0	143.3333
** BASED ON FUEL SPECIFIC DRY F-FACTOR CALCULATION	Run 1	Run 2	Run 3	
* BASED ON CARBON BALANCE (STOICH. + O2)				
- A/F IS TOTAL MASS RATIO				



3. PROCESS DESCRIPTION

TC Energy’s ANR Hamilton Compressor Station is located in Hamilton, MI and operates two turbines that are rated 23,485 hp (according to one plate that was able to be located on the equipment), 181.21 MMBtu/hr at 32°F natural gas-fueled Solar Titan 130 turbine with dry-low-NOx (SoLoNOx) control. The plant is located at 4193 134th Avenue, Hamilton, MI.

The following tables provide a summary of the production rates for the EUHM015 and EUHM016 systems during the test:

Table 7. EUHM015 (1311) Production Data					
Parameter	Run 1	Run 2	Run 3	Average	Rated
CT RPM	11,107.8	11,107.8	11,107.8	11,107.8	11,220
CT Speed %	99.0	99.0	99.0	99.0	N/A
PT RPM	8,186.0	8,132.0	8,033.0	8,117.0	8,856
PT Speed %	92.4	91.8	90.7	91.7	N/A
Horsepower	19,502.0	19,454.0	19,191.0	19,382.3	23,465
HP Load %	83.1	82.9	81.8	82.6	N/A



Table 8. EUHM016 (1312) Production Data					
Parameter	Run 1	Run 2	Run 3	Average	Rated
CT RPM	11,107.8	11,107.8	11,107.8	11,107.8	11,220
CT Speed %	99.0	99.0	99.0	99.0	N/A
PT RPM	8,063.0	8,064.0	8,049.0	8,058.7	8,856
PT Speed %	91.0	91.1	90.9	91.0	N/A
Horsepower	20,460.0	20,552.0	20,591.0	20,534.3	23,465
HP Load %	87.2	87.6	87.8	87.5	N/A

Additional information may be found in Appendix B.



Table 9. EUHM015 General Information

General Information	
Date:	6-Jul-22
Company:	TC Energy
Station:	Hamilton
Unit:	1311
Engine Type:	Titan 130
CT Rated RPM:	11220 RPM
PT Rated RPM:	8856 RPM
Rated BHP:	23465 BHP

Fuel Gas Analysis	
Constituent	Mole Percent
Nitrogen	1.075
Carbon Dioxide	0.468
Methane	89.936
Ethane	8.019
Propane	0.454
I-Butane	0.020
N-Butane	0.023
I-Pentane	0.003
N-Pentane	0.002
Hexane +	0.003
Total	100.00

Fuel Meter Type	
Enter Type from List Below	2
Orifice Meter (upstream pressure tap):	1
Orifice Meter (downstream pressure tap):	2
Electronic Flow Meter (EFM):	3
Venturi (Nozzle) Meter:	4
Roots Meter w Accumulator:	5
Pipe I.D.:	3.068
Orifice I.D.:	1.5



Table 10. EUHM016 General Information

General Information	
Date:	6-Jul-22
Company:	TC Energy
Station:	Hamilton
Unit:	1312
Engine Type:	Titan 130
CT Rated RPM:	11220 RPM
PT Rated RPM:	8856 RPM
Rated BHP:	23465 BHP

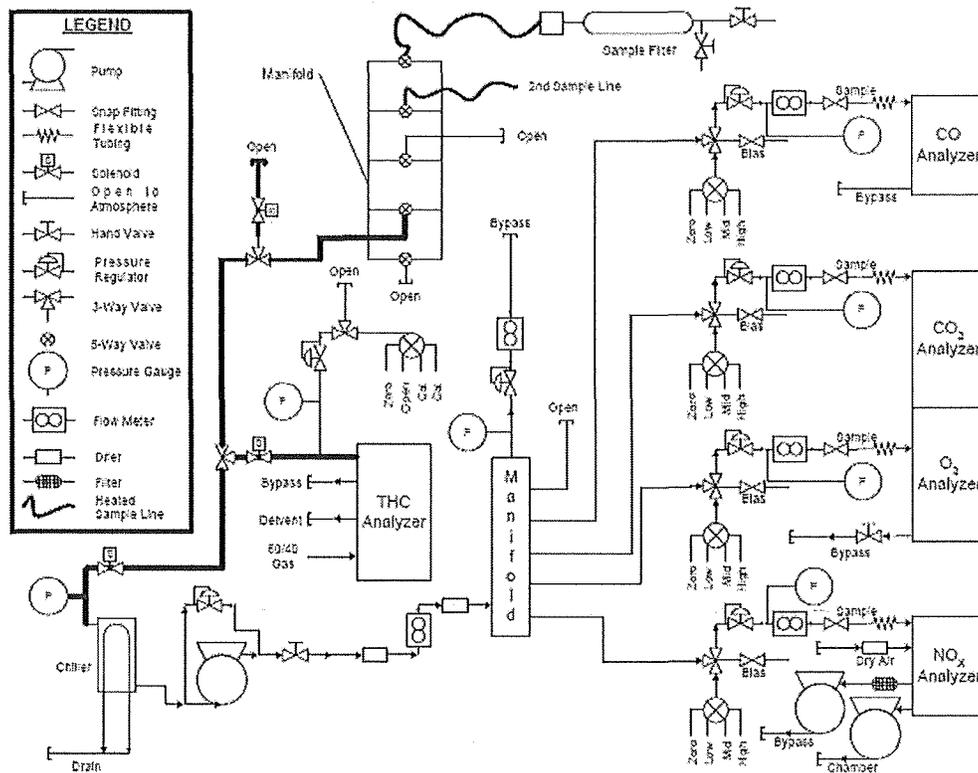
Fuel Gas Analysis	
Constituent	Mole Percent
Nitrogen	1.075
Carbon Dioxide	0.468
Methane	89.936
Ethane	8.019
Propane	0.454
1-Butane	0.020
N-Butane	0.023
IPentane	0.003
N-Pentane	0.002
Hexane +	0.003
Total	100.00

Fuel Meter Type	
Enter Type from List Below	2
Orifice Meter (upstream pressure tap):	1
Orifice Meter (downstream pressure tap):	2
Electronic Flow Meter (EFM):	3
Venturi (Nozzle) Meter:	4
Roots Meter w/ Accumulator:	5
Pipe I.D.:	3.068
Orifice I.D.:	1.5

Permit Limits	
NOx	25
CO	10
VOC	
H2O	

Limits are actually listed as average values

Figure 1. Flow Schematic



Additional Information pertaining to the Fuel Flows may be found in Appendix B.



4. TEST PROCEDURES

EQM and EQM's affiliates and subcontractors use current U.S. EPA accepted testing methodologies in their Air Quality Programs as listed in the U.S. Code of Federal Regulations, Title 40, Part 60, Appendix A. For this testing program, the following specific methodologies were utilized:

- U.S. EPA Method 3A – Determination of Oxygen and Carbon Dioxide Concentrations in Emissions From Stationary Sources (Instrumental Analyzer Procedure)
- U.S. EPA Method 7E – Determination of Nitrogen Oxides Emissions From Stationary Sources (Instrumental Analyzer Procedure)
- U.S. EPA Method 10 – Determination of Carbon Monoxide Emissions From Stationary Sources (Instrumental Analyzer Procedure)
- U.S. EPA Method 19 – Determination of Volumetric Flow Rate from Stationary Sources

USEPA Methods 3A, 7E and 19 were performed at the Exhaust Stack sampling location by continuously extracting a gas sample from the stack through a single point stainless steel sample probe. The extracted sample was pulled through a series of filters to remove any particulate matter. Directly after the probe, the sample was conditioned by a series of refrigeration dryers to remove moisture from the gas stream. After the refrigeration dryers, the sample was transported through a Teflon® line to the analyzers. The flow of the stack gas sample was regulated at a constant rate to minimize drift.

At the start of the day, each monitor was checked for calibration error by introducing zero, mid-range and high-range EPA Protocol 1 gases to the measurement system at a point upstream of the analyzers. In this report, the calibration error test is referred to as instrument calibration. The gas was injected into the sampling valve located at the outlet of the sampling probe. The bias test was conducted before and after each consecutive test run by introducing zero and upscale calibration gases for each monitor. The upscale calibration gases used for each monitor were the high calibration gases.

Measurement System Performance Specifications were as follows:

- Analyzer Calibration Error - Less than +/- 2% of the span of the zero, mid-range and high-range calibration gases.
- Sampling System Bias - Less than +/-5% of the span for the zero, mid-range and high-range calibration gases.
- Zero Drift - Less than +/-3% of the span over the period of each test run.



- Calibration Drift - Less than +/-3% of the span over the period of each set of runs.

Calculations that were used in this testing event for the TR01 is as follows:

Calibration Correction

$$C_{GAS} = (C_R - C_O) \frac{C_{MA}}{C_M - C_O}$$

Where:

- C_{GAS}: Corrected flue gas concentration (ppmvd)
- C_R: Flue gas concentration (ppmvd)
- C_O: Average of initial and final zero checks (ppmvd)
- C_M: Average of initial and final span checks (ppmvd)
- C_{MA}: Actual concentration of span gas (ppmvd)

EPA F-Factor

Mass emissions calculations: the F-Factor Method and guidance from Part 75 was used to calculate the mass emissions rates

$$EM = Cd \times Fd \times \frac{20.9}{(20.9 - \%O_2)} \times Qh \times \frac{GCV}{10^6}$$

Where:

- EM: Pollutant emission rate, lb/hr
- CD: Pollutant concentration, lb/scf
- Fd: Fuel specific F-Factor, dscf/MMBtu
- %O₂: Oxygen concentration, dry basis
- Qh: Fuel rate from calibrated AGA specified Meter, scfh
- GVC: Heating value of the fuel, Btu/scf



Mass Emissions (g/bhp-hr)

$$Em = Cd \times Fd \times \frac{20.9}{(20.9 - \%O_2)} \times Qh \times \frac{GCV}{10^6} \times \frac{4536}{BHP}$$

Where:

- E_m : Pollutant concentration NO_x (g/bhp-hr)
 C_d : Pollutant concentration NO_x lb/scf
 $\%O_2$: Oxygen concentration in percent, measured on a dry basis
 F_d : Fuel specific F-factor, dscf/MMBtu
 Q_h : Fuel rate, scf/hr
 GCV : Heating value of the fuel, BTU/dscf

To convert from ppmvd NO_x to lb/scf NO_x , multiply the ppmvd value by 1.194×10^{-8}

To convert from ppmvd CO to lb/scf CO, multiply the ppmvd value by 7.268×10^{-8}

Lbs/MMBTU Factor

The lbs/MMBtu factor will be calculated using the pollutant concentration and the fuel specific F-factor as shown

$$Em = Cd \times Fd \times \frac{20.9}{(20.9 - \%O_2)}$$

Where:

- E_m : Pollutant concentration (lb/MMBtu)
 C_d : Pollutant concentration lb/scf
 $\%O_2$: Oxygen concentration in percent, measured on a dry basis
 F_d : Fuel specific F-factor, dscf/MMBtu



Mass Emissions Calculations lb/hr

$$NO_{x\frac{lb}{hr}} = C_d \times F_d \times \frac{209}{209 - \%O_2} \times Q_h \times \frac{GCV}{10^6}$$

Where:

- C_d*: Pollutant concentration lb/scf
- F_d*: Fuel specific F-factor, dscf/MMBtu
- Q_h*: Fuel flow, scf/hr
- %O₂*: Oxygen concentration in percent, measured on a dry basis
- GCV*: Heating value of the fuel, BTU/dscf

NO_x Corrected to 15% O₂

$$Em = NO_x \left(\frac{5.9}{20.9 - \%O_2} \right)$$

Where:

- Em*: Pollutant concentration corrected to 15% O₂, ppm
- NO_x*: Pollutant concentration, ppm
- %O₂*: Oxygen concentration in percent, measured on a dry basis



5. QUALITY ASSURANCE PROCEDURES

Each reference method presented in the U.S. Code of Federal Regulations details the instrument calibration requirements, sample recovery and analysis, data reduction and verification, types of equipment required, and the appropriate sampling and analytical procedures to ensure maximum performance and accuracy. EQM and EQM's affiliates and subcontractors adhere to the guidelines for quality control set forth by the United States Environmental Protection Agency. These procedures are outlined in the following documents:

- Code of Federal Regulations, Title 40, Part 51
- Code of Federal Regulations, Title 40, Part 60
- Quality Assurance Handbook, Volume 1, EPA 600/9-76-005
- Quality Assurance Handbook, Volume 2, EPA 600/4-77-027a
- Quality Assurance Handbook, Volume 3, EPA 600/4-77-027b

RECEIVED

AUG 10 2022

AIR QUALITY DIVISION



6. CONCLUSIONS

An Emissions Test was conducted on the Turbines EUHM015 and EUHM016 at TC Energy's ANR Pipeline Company's Hamilton Compressor Station located in Hamilton, MI. The testing was conducted on July 5, 2022 on the EUHM015 and July 8, 2022 on The EUHM016.

During the course of the testing, the Turbine EUHM015 and Turbine EUHM016 conformed to the requirements of Code of Federal Regulations, Title 40, Part 60, Appendix A.

The usefulness and/or significance of the emissions values presented in this document as they relate to the compliance status of the Turbines EUHM015 and EUHM016 emissions shall be determined by others. For additional information pertaining to the testing program see Appendix E of this report.