COMPLIANCE TEST REPORT
Wakefield Compressor Station (CS7)
EU-UNIT701 (Unit 701)

March 21, 2024

Prepared for:

TC Energy

TC Energy Great Lakes Gas Transmission LP
Wakefield, MI
Permit MI-ROP-N2168-2021X
State Registration No. N2168

Prepared by:

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

PN: 050818.0018

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PREFACE

I, Karl Mast, do hereby certify that the source emissions testing conducted at TC Energy in Wakefield, 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.

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 TC Energy Great Lakes Gas Transmission LP's Wakefield Compressor Station in Wakefield, MI.

Karl Mast
Test Supervisor

SUMMARY

The compliance emissions testing program was performed on Unit 701 to comply with the established NOx standards pursuant to testing requirements specified in Permit MI-ROP-N2168-2021X, R 336.1201(3), 40 CFR 60, Subpart GG, 40 CFR 60.332, and 40 CFR 60.335. A summary of the test results is given below:

EU-UNIT701							
Parameter	**High Load**	**Mid-High Load**	**Mid-Low Load**	**Low Load**	**Average**	**Limit**	**Pass/ Fail**
NOx ppmvd @ 15% O_2	151.5341	136.0179	126.0173	119.6013	133.2927	184	Pass
NOx lb/hr	115.0651	94.2122	79.8887	68.2100	89.3440	123	Pass

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1. INTRODUCTION

This report presents the results of the source emissions testing conducted by Environmental Quality Management, Inc. (EQM) for TC Energy's Great Lakes Gas Transmissions LP's (GLGT) Wakefield Compressor Station, near Wakefield, MI, which is in Gogebic County. The primary purpose of this testing program was to conduct emissions testing to determine compliance with operating permit No. MI-ROP-N2168-2021X, (R 336.1201(3)), 40 CFR 60, Subpart GG, 40 CFR 60.332, and 40 CFR 60.335 for the on Unit 701 at GLGT 's gas compressor facility.

To ensure that compliance with the emission limits is maintained, the Air Compliance Team of TC Energy's GLGT (GLGT) contracted Environmental Quality Management, Inc. (EQM) to perform source emissions testing on Unit 701. The primary purpose of this testing program was to conduct emissions testing to determine compliance with permit No. MI-ROP-N2168-2021X at GLGT's gas compressor facility.

EQM's responsibility was to conduct the compliance testing for the NO_x and O_2 emission rates and perform data reduction for conformance evaluation. GLGT'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 Unit 701 was performed on March 21, 2024 from 10:44 A.M. to 5:44 P.M.

The following requirements were specific for the testing program:

1. Equipment calibrations performed and calibration data provided.
2. Twelve (12) twenty (20) -minute, minimum, O_2, and NO_x test runs performed at Unit 701 pursuant to EPA, Title 40, Code of Federal Regulations, Part 60 (40 CFR 60), Appendix A and Subpart GG.
3. Process manufacturing operations maintained at 4 evenly spaced loads 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 O_2 and NO_x, emissions determinations.

5. Stratification was found to be less than 5% in the turbine exhaust.

The testing program was approved by and/or coordinated with Pedro Amieva, TC Energy's GLGT, LP. The emission testing was managed by Karl Mast, Manager Air Emissions, EQM and performed by Zach Hill, Field Activity Lead, EQM and Eli Mergl, Test Technician I, EQM. The emission testing was observed by Drew Yesmunt, Michigan EGLE.

2. TEST RESULTS SUMMARY

The compliance testing was performed on Unit 701 system in accordance with the requirements of the Code of Federal Regulations, Title 40, Part 60, Appendix A and Subpart GG. A summary of the test results is given below:

Table 1. EU-UNIT701 Summary Results

Parameter	High Load	Mid-High Load	Mid-Low Load	Low Load	Average	Limit	Pass/ Fail
NOx ppmvd @ 15% O_2	151.5341	136.0179	126.0173	119.6013	133.2927	184	Pass
NOx lb/hr	115.0651	94.2122	79.8887	68.2100	89.3440	123	Pass

Based on the information provided above, Unit 701 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 2-11.

Table 2. Engine Operating & Ambient Conditions-Unit 701 High Load

Run	1	2	3	
Date	03/21/24	03/21/24	03/21/24	
Time	10:44	11:04	11:24	
Engine Operating Conditions	HIGH	HIGH	HIGH	Averages
Unit Horsepower from Control Panel	18,291.0	18,344.5	18,413.7	18,349.7
% Load	59.0	59.2	59.4	59.2
Unit Speed (rpm) CT/GG/GP/Jet	8,853.4	8,866.8	8,858.8	8,859.6
% CT Speed	53.8	53.9	53.9	53.9
Gas Compressor Speed (rpm) PT/Booster	5,015.0	5,001.0	4,987.0	5,001.0
% PT Speed	68.2	68.0	67.9	68.0
Turbine Exhaust Temp T5	1,359.0	1,359.0	1,359.0	1,359.0
Compressor Suction Pressure (PSIG)	652.5	639.1	633.2	641.6
Compressor Suction Temperature (°F)	35.1	35.6	36.1	35.6
Compressor Discharge Pressure (PSIG)	846.4	861.2	870.6	859.4
Compressor Discharge Temperature (°F)	74.4	79.5	82.7	78.9
Compressor Flow (MMSCF/D)	1416.0	1280.8	1193.3	1,296.7
Heat Rate (BTU(LHV)/HP-hr)	10,219.1	10,199.5	10,065.1	10,161.2
Ambient Conditions				
Ambient Temperature (°F)	23.71	24.72	24.72	24.38
Barometric Pressure (psi)	14.05	14.05	14.05	14.05
Ambient Relative Humidity (%)	54.00	51.00	51.00	52.00
Absolute Humidity (grains/LB)	10.61	10.46	10.46	10.51

Table 3. Emissions Concentrations/Calculated Emissions, & Flow Data-High Load

Run	1	2	3	
Date	03/21/24	03/21/24	03/21/24	
Time	10:44	11:04	11:24	
Emissions Concentrations & Calculated Mass Emissions				
NO_X ppm (BIAS Corrected)	139.540	140.000	140.130	139.890
NO_X g/BHP-HR	2.8465	2.8609	2.8258	2.8444
NO_X LB/HR	114.7825	115.7001	114.7127	115.0651
NO_X (ppm @ 15% O_2)	150.7850	151.8382	151.9792	151.5341
NO_X (ppm @ 15% O_2, ISO)	156.6014	157.1297	157.2856	157.0056
NOx LB/MMBTU	0.5549	0.5587	0.5592	0.5576
NO_X Tons/Year	502.7476	506.7663	502.4416	503.9851
NO_X LB/SCF Fuel	5.76E-04	5.80E-04	5.80E-04	5.79E-04
NO_X LB/MMSCF Fuel	575.8698	579.8924	580.4308	578.7310
% O_2 (BIAS Corrected)	15.440	15.460	15.460	15.453
Calculated Flows				
Fuel Flow - (SCFM)	3328.6667	3332.0000	3300.5000	3320.3889
Fuel Flow - (SCFH)	199720.00	199920.00	198030.00	199223.3333
Air Flow (SCFM)	110337.1427	110849.7595	109801.8101	110329.5707
Exhaust Flow Method 19 (scfm)	114591.2733	115127.7386	114039.3461	114586.1194
Exhaust Flow Method 19 (lbm/min)	5109.8929	5133.7504	5085.2175	5109.6203
Exhaust Flow Carbon Balance (lbm/min)	8800.9504	8840.9064	8757.3264	8799.7277
Air flow Beshouri (scfm)	114508.8794	115028.7464	113941.2898	114492.9719
BSAC, #/BHP-hr	27.4923	27.5395	27.1766	27.4028
Fuel Flow Measurements				
Fuel Flow From Screen(MSCFH)	199.72	199.92	198.03	199.22
** 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 4. Engine Operating & Ambient Conditions -Unit 701 Mid-High Load

Run	10	11	12	
Date	03/21/24	03/21/24	03/21/24	
Time	16:45	17:05	17:25	
Engine Operating Conditions	MID HIGH	MID HIGH	MID HIGH	Averages
Unit Horsepower from Control Panel	16,584.7	16,859.5	16,778.1	16,740.8
% Load	53.5	54.4	54.1	54.0
Unit Speed (rpm) CT/GG/GP/Jet	8,780.9	8,791.6	8,786.3	8,786.3
% CT Speed	53.4	53.4	53.4	53.4
Gas Compressor Speed (rpm) PT/Booster	4,863.0	4,897.0	4,896.0	4,885.3
% PT Speed	66.2	66.6	66.6	66.5
Turbine Exhaust Temp T5	1,316.0	1,324.0	1,322.0	1,320.7
Compressor Suction Pressure (PSIG)	616	614	612.2	613.9
Compressor Suction Temperature (°F)	37	37	37.1	37.1
Compressor Discharge Pressure (PSIG)	827	829	829.2	828.6
Compressor Discharge Temperature (°F)	80	81	81.5	81.0
Compressor Flow (MMSCF/D)	1157	1151	1145.3	1,151.1
Heat Rate (BTU(LHV)/HP-hr)	10,164.4	10,150.3	10,163.8	10,159.5
Ambient Conditions				
Ambient Temperature (°F)	29.3	30.6	27.74	29.22
Barometric Pressure (psi)	14.01	14.01	14.01	14.01
Ambient Relative Humidity (%)	32.0	36.0	38.00	35.33
Absolute Humidity (grains/LB)	7.95	9.42	8.85	8.74

Table 5. Emissions Concentrations/Calculated Emissions, & Flow Data – Unit 701 Mid-High Load

Run	10	11	12	
Date	03/21/24	03/21/24	03/21/24	
Time	16:45	17:05	17:25	
Emissions Concentrations & Calculated Mass Emissions				
NO_X ppm (BIAS Corrected)	131.390	132.060	130.540	131.330
NO_X g/BHP-HR	2.5627	2.5586	2.5370	2.5528
NO_X LB/HR	93.6967	95.0995	93.8403	94.2122
NO_X (ppm @ 15% O_2)	136.4790	136.4543	135.1204	136.0179
NO_X (ppm @ 15% O_2, ISO)	139.1909	139.0026	136.8877	138.3604
NOx LB/MMBTU	0.5022	0.5021	0.4972	0.5005
NO_X Tons/Year	410.3914	416.5360	411.0203	412.6492
NO_X LB/SCF Fuel	5.21E-04	5.21E-04	5.16E-04	5.19E-04
NO_X LB/MMSCF Fuel	521.2334	521.1388	516.0443	519.4722
% O_2 (BIAS Corrected)	15.220	15.190	15.200	15.203
Calculated Flows				
Fuel Flow - (SCFM)	3002.0000	3047.5000	3036.8333	3028.7778
Fuel Flow - (SCFH)	180120.00	182850.00	182210.00	181726.6667
Air Flow (SCFM)	95690.5463	96635.2408	96464.3786	96263.3886
Exhaust Flow Method 19 (scfm)	99342.7627	100318.6056	100142.8583	99934.7422
Exhaust Flow Method 19 (lbm/min)	4428.9835	4473.0169	4464.9769	4455.6591
Exhaust Flow Carbon Balance (lbm/min)	7641.5304	7718.1898	7704.1374	7687.9525
Air flow Beshouri (scfm)	99423.7038	100421.1167	100238.2823	100027.7009
BSAC, #/BHP-hr	26.2959	26.1227	26.2030	26.2072
Fuel Flow Measurements				
Fuel Flow From Screen(MSCFH)	180.12	182.85	182.21	181.73
** BASED ON FUEL SPECIFIC DRY F-FACTOR CALCULATION	Run 10	Run 11	Run 12	
* BASED ON CARBON BALANCE (STOICH. + O2)				
- A/F IS TOTAL MASS RATIO				

Table 6. Engine Operating & Ambient Conditions -Unit 701 Mid-Low Load

Run	7	8	9	
Date	03/21/24	03/21/24	03/21/24	
Time	15:35	15:55	16:15	
Engine Operating Conditions	MID LOW	MID LOW	MID LOW	Averages
Unit Horsepower from Control Panel	14,782.5	14,968.7	14,851.1	14,867.4
% Load	47.7	48.3	47.9	48.0
Unit Speed (rpm) CT/GG/GP/Jet	8,665.4	8,689.6	8,670.8	8,675.3
% CT Speed	52.7	52.8	52.7	52.7
Gas Compressor Speed (rpm) PT/Booster	4,687.0	4,725.0	4,687.0	4,699.7
% PT Speed	63.8	64.3	63.8	63.9
Turbine Exhaust Temp T5	1,262.0	1,272.0	1,264.0	1,266.0
Compressor Suction Pressure (PSIG)	621.9	621.6	623	622.1
Compressor Suction Temperature (°F)	37.2	37.2	37	37.2
Compressor Discharge Pressure (PSIG)	819.3	821.2	821	820.5
Compressor Discharge Temperature (°F)	77.5	77.9	78	77.7
Compressor Flow (MMSCF/D)	1112.8	1116.7	1102	1,110.5
Heat Rate (BTU(LHV)/HP-hr)	10,457.7	10,528.4	10,424.6	10,470.2
Ambient Conditions				
Ambient Temperature (°F)	28.06	28.42	27.7	28.05
Barometric Pressure (psi)	14.02	14.02	14.01	14.02
Ambient Relative Humidity (%)	33.00	30.00	35.0	32.67
Absolute Humidity (grains/LB)	7.78	7.18	8.12	7.69

Table 7. Emissions Concentrations/Calculated Emissions, & Flow Data – Unit 701 Mid-Low Load

Run	7	8	9	
Date	03/21/24	03/21/24	03/21/24	
Time	15:35	15:55	16:15	
Emissions Concentrations & Calculated Mass Emissions				
NO_X ppm (BIAS Corrected)	116.230	114.730	113.980	114.980
NO_X g/BHP-HR	2.4670	2.4425	2.4027	2.4374
NO_X LB/HR	80.3988	80.6033	78.6640	79.8887
NO_X (ppm @ 15% O_2)	127.7015	125.5857	124.7647	126.0173
NO_X (ppm @ 15% O_2, ISO)	130.0531	127.6309	126.9821	128.2221
NOx LB/MMBTU	0.4699	0.4621	0.4591	0.4637
NO_X Tons/Year	352.1468	353.0424	344.5484	349.9125
NO_X LB/SCF Fuel	4.88E-04	4.80E-04	4.76E-04	4.81E-04
NO_X LB/MMSCF Fuel	487.7106	479.6302	476.4948	481.2785
% O_2 (BIAS Corrected)	15.530	15.510	15.510	15.517
Calculated Flows				
Fuel Flow - (SCFM)	2753.0000	2806.5000	2757.0000	2772.1667
Fuel Flow - (SCFH)	165180.00	168390.00	165420.00	166330.0000
Air Flow (SCFM)	92769.6244	94224.9569	92563.0523	93185.8779
Exhaust Flow Method 19 (scfm)	96362.0003	97870.1294	96143.9325	96792.0208
Exhaust Flow Method 19 (lbm/min)	4296.0317	4363.0577	4286.4271	4315.1722
Exhaust Flow Carbon Balance (lbm/min)	7396.1804	7513.0013	7380.4898	7429.8905
Air flow Beshouri (scfm)	96231.4637	97751.4161	96027.3131	96670.0643
BSAC, #/BHP-hr	28.6012	28.6885	28.4057	28.5652
Fuel Flow Measurements				
Fuel Flow From Screen(MSCFH)	165.18	168.39	165.42	166.33
** BASED ON FUEL SPECIFIC DRY F-FACTOR CALCULATION	Run 7	Run 8	Run 9	
* BASED ON CARBON BALANCE (STOICH. + O2)				
- A/F IS TOTAL MASS RATIO				

Table 8. Engine Operating & Ambient Conditions -Unit 701 Low Load

Run	4	5	6	
Date	03/21/24	03/21/24	03/21/24	
Time	14:15	14:35	14:55	
Engine Operating Conditions	LOW	LOW	LOW	Averages
Unit Horsepower from Control Panel	13,564.2	12,887.7	12,887.0	13,113.0
% Load	43.8	41.6	41.6	42.3
Unit Speed (rpm) CT/GG/GP/Jet	8,555.3	8,523.1	8,541.9	8,540.1
% CT Speed	52.0	51.8	51.9	51.9
Gas Compressor Speed (rpm) PT/Booster	4,538.0	4,474.0	4,485.0	4,499.0
% PT Speed	61.7	60.9	61.0	61.2
Turbine Exhaust Temp T5	1,209.0	1,196.0	1,202.0	1,202.3
Compressor Suction Pressure (PSIG)	618.7	624.6	626.8	623.3
Compressor Suction Temperature (°F)	37.4	37.5	37.5	37.5
Compressor Discharge Pressure (PSIG)	819.3	814.5	812.3	815.3
Compressor Discharge Temperature (°F)	78	76.2	75.3	76.6
Compressor Flow (MMSCF/D)	992.0	1003.4	1047.5	1,014.3
Heat Rate (BTU(LHV)/HP-hr)	10,464.2	10,749.9	10,831.8	10,681.9
Ambient Conditions				
Ambient Temperature (°F)	26.93	27.74	27.86	27.51
Barometric Pressure (psi)	14.03	14.03	14.03	14.03
Ambient Relative Humidity (%)	34.00	32.00	32.00	32.67
Absolute Humidity (grains/LB)	7.65	7.44	7.48	7.52

Table 9. Emissions Concentrations/Calculated Emissions, & Flow Data – Unit 701 Low Load

Run	4	5	6	
Date	03/21/24	03/21/24	03/21/24	
Time	14:15	14:35	14:55	
Emissions Concentrations & Calculated Mass Emissions				
NO_X ppm (BIAS Corrected)	105.120	101.660	102.170	102.983
NO_X g/BHP-HR	2.3462	2.3539	2.3791	2.3597
NO_X LB/HR	70.1591	66.8802	67.5907	68.2100
NO_X (ppm @ 15% O_2)	121.3714	118.5364	118.8961	119.6013
NO_X (ppm @ 15% O_2, ISO)	123.8812	120.6259	120.9522	121.8198
NOx LB/MMBTU	0.4466	0.4362	0.4375	0.4401
NO_X Tons/Year	307.2967	292.9353	296.0473	298.7597
NO_X LB/SCF Fuel	4.64E-04	4.53E-04	4.54E-04	4.57E-04
NO_X LB/MMSCF Fuel	463.5352	452.7077	454.0814	456.7747
% O_2 (BIAS Corrected)	15.790	15.840	15.830	15.820
Calculated Flows				
Fuel Flow - (SCFM)	2527.6667	2467.1667	2485.8333	2493.5556
Fuel Flow - (SCFH)	151660.00	148030.00	149150.00	149613.3333
Air Flow (SCFM)	89465.7232	88178.3048	88672.0377	88772.0219
Exhaust Flow Method 19 (scfm)	92976.4119	91647.7596	92159.0372	92261.0696
Exhaust Flow Method 19 (lbm/min)	4145.0469	4085.7453	4108.5507	4113.1143
Exhaust Flow Carbon Balance (lbm/min)	7122.9894	7018.6348	7058.3068	7066.6437
Air flow Beshouri (scfm)	92676.9845	91319.2291	91835.4012	91943.8716
BSAC, #/BHP-hr	30.0600	31.1826	31.3590	30.8672
Fuel Flow Measurements				
Fuel Flow From Screen(MSCFH)	151.66	148.03	149.15	149.61
** BASED ON FUEL SPECIFIC DRY F-FACTOR CALCULATION	Run 4	Run 5	Run 6	
* BASED ON CARBON BALANCE (STOICH. + O2) - A/F IS TOTAL MASS RATIO				

3. FACILITY AND PROCESS DESCRIPTION

TC Energy's GLGT Wakefield Compressor Station (CS7) is in Wakefield, MI and operates a natural gas fired compressor station. The plant is located at 400 Great Lakes Road, Wakefield, MI. The Unit 701 is a General Electric Model LM2500 GE Stationary Gas Turbine.

Table 10. Unit 701 Production Data (HP)

Load Condition	Run 1	Run 2	Run 3	AVERAGE	% Load
High	18,291.0	18,344.5	18,413.7	18,349.7	59.2
Mid-High	16,584.7	16,859.5	16,778.1	16,740.8	54.0
Mid-Low	14,782.5	14,968.7	14,851.1	14,867.4	48.0
Low	13,564.2	12,887.7	12,887.0	13,113.0	42.3

Table 11. Unit 701 General Information

General Information

Date:	21-Mar-24
Company:	TC Energy
Station:	Wakefield
Unit:	701
Engine Type:	GE Model LM2500

CT Rated RPM:	16450	RPM
PT Rated RPM:	7350	RPM
Rated BHP:	31000	BHP

Permit Limits

	ppmvd@15%	g/Bhp-Hr	lb/hr	TPY
NOx:	184		</=123	
CO:				
VOC:				
H2CO:				

Limits are actuallly listed as average values

Fuel Gas Analysis

Constituent	Mole Percent
Nitrogen	0.400
Carbon Dioxide	0.571
Methane	94.788
Ethane	4.099
Propane	0.132
I-Butane	0.006
N-Butane	0.004
I-Pentane	0.001
N-Pentane	0.000
Hexane +	0.000
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

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 19 - Determination of Volumetric Flow Rate From Stationary Sources

USEPA Methods 3A and 7E 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 Unit 701 are as follows:

NO_x concentrations will be reported in the units of ppm dry volume corrected to 15% Oxygen.

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

$$F_d = \frac{\left[(3.64 \cdot H_{Wt\%} \cdot 100) + (1.53 \cdot C_{Wt\%} \cdot 100)\right]}{\frac{GCV}{\rho_{FuelGas}}} \cdot 10^6 + \frac{\left[(0.14 \cdot N_{2Wt\%} \cdot 100) - (0.46 \cdot O_{2Wt\%} \cdot 100)\right]}{\frac{GCV}{\rho_{FuelGas}}} \cdot 10^6$$

Where:

F_d:	Fuel specific F-factor, dscf/MMBtu
$H_{Wt\%}$:	Hydrogen weight percent
$C_{Wt\%}$:	Carbon weight percent
$N_{2Wt\%}$:	Nitrogen weight percent
$O_{2Wt\%}$:	Oxygen weight percent
GCV:	Heating value of the fuel, BTU/dscf
$\rho_{Fuel\ Gas}$:	Density of the fuel gas, lb/scf

No_x Corrected to 15% O_2

$$NO_x = NO_{x\,obs} x \frac{5.9}{20.9 - \%O_2}$$

Where:

E_m: Pollutant concentration corrected to 15% O_2, ppm
NO_x: Pollutant concentration, ppm
$\%O_2$: Oxygen concentration in percent, measured on a dry basis

Quality Assurance: Field quality assurance, the quality assurance/ quality control procedures as outlined in the test methods will be followed. Calibration gases shall be USEPA Protocol 1 certified. Analyzer calibrations will be performed at the beginning of each test day along with the required system pre- and post-test calibration. The final test report will include the complete data recorder output used to calculate emission rates.

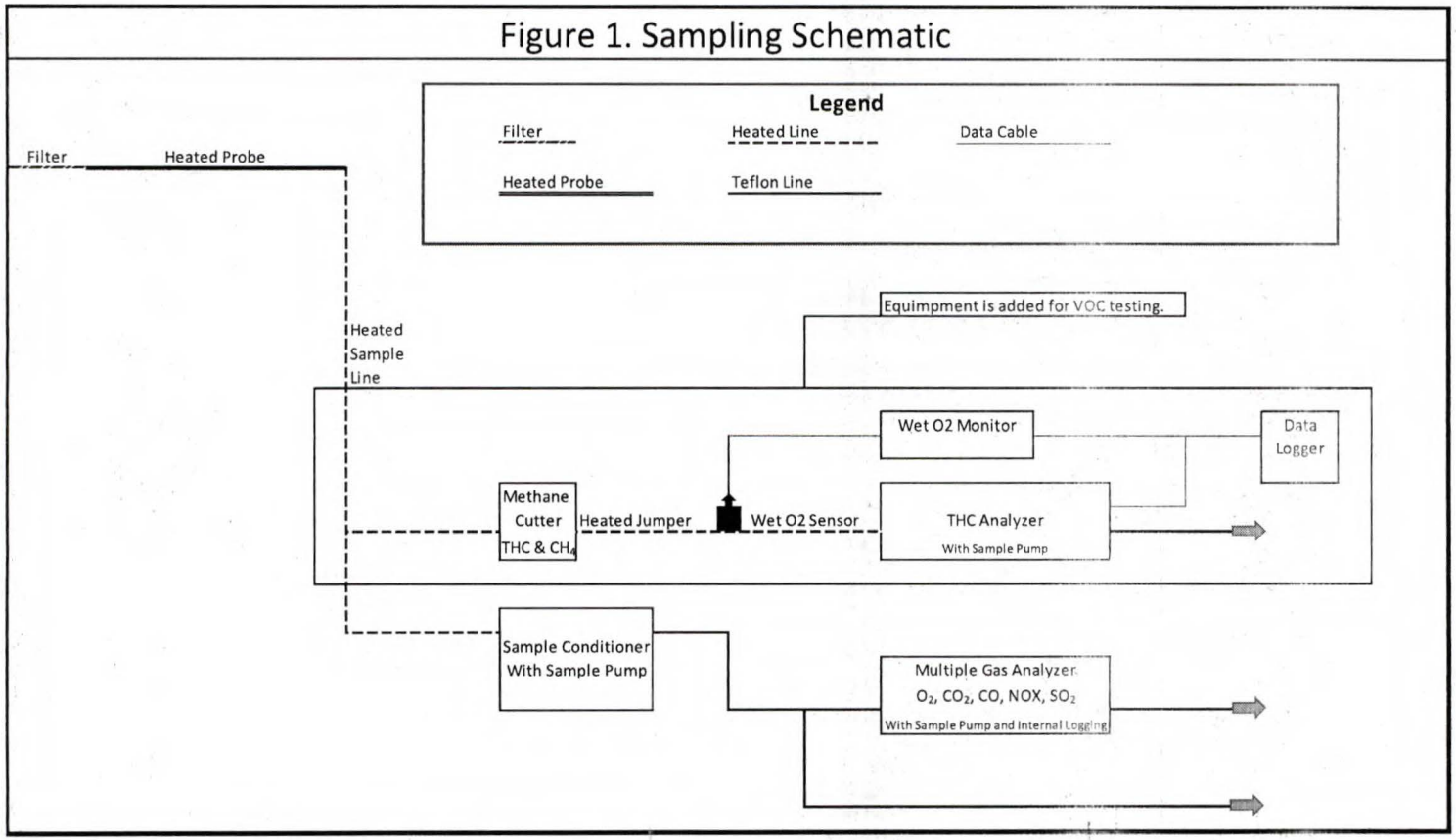
Mass Emissions Calculations, lb/hr

$$\frac{NO_x\,lb}{hr} = C_d \times F_d \times \frac{20.9}{20.9 - \%O_2} \times Q_h \times \frac{GCV}{10^6}$$

Where:

Cd: Pollutant concentration, lb/scf
Fd: Fuel specific F-factor, dscf/MMBtu
Qh: Fuel flow, scf/hr
%O2: Oxygen concentration in percent, measured on a dry basis
GCV: Upper dry heating value of fuel, Btu/dscf

Figure 1. Sampling Schematic



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

6. CONCLUSIONS

An Emissions Test was conducted on the internal combustion reciprocating engine Unit 701 at TC Energy's GLGT LP's Wakefield Compressor Station located in Wakefield, Michigan. The testing was conducted on March 21, 2024.

During the testing, Unit 701 conformed to the requirements of Code of Federal Regulations, Title 40, Part 60, Appendix A and Subpart GG.

The usefulness and/or significance of the emissions values presented in this document as they relate to the compliance status of the Unit 701 emissions shall be determined by others.

For additional information pertaining to the testing program see Appendix D of this report.