COMPLIANCE TEST REPORT
ANR PIPELINE-GOODWELL COMPRESSOR STATION
COMBUSTION EUGDS TURBINE NO.6
COMBUSTION EUGDS TURBINE NO.7

Prepared for:

TransCanada
In business to deliver

TransCanada's ANR Pipeline Company
White Cloud, MI

Prepared by:

EQM

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

PN: 050614.0039

February 2016

PREFACE

I, Karl Mast, do hereby certify that the source emissions testing conducted at TransCanada in White Cloud, 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 ANR Pipeline's Goodwell Compressor Station in White Cloud, MI.

Karl Mast
Test Supervisor

SUMMARY

The compliance testing was performed on the Combustion Turbine No. 6 and Combustion Turbine No. 7 system in accordance with the requirements of the Title 40, Code of Federal Regulations, Part 60 (40 CFR 60.4320(a). The results of the testing are detailed in the following tables.

NOx Test Results (NOx 25 ppmvd @ 15% O2)				
Turbine	Rated Power (BHP)	Permit Limit NOx 25 ppmvd @ 15% O2	Measured Limit NOx 25 ppmvd @ 15% O2	Pass/Fail
No. 6	7,865	25	10.95	Pass
No. 7	7,865	25	15.49	Pass

CONTENTS

TABLES

FIGURES

APPENDICES

1. INTRODUCTION

This report presents the results of the source emissions testing conducted by Environmental Quality Management, Inc. (EQM) for TransCanada's ANR Pipleline (ANR) at Goodwell compressor station, near White Cloud, MI, which is located in Newaygo County.

The primary purpose of this testing program was to conduct emissions testing to determine compliance with operating permit No. MI-ROP-N5576-2015 for Combustion EUGDS Turbine No. 6 and Combustion EUGDS Turbine No. 7 at ANR Pipeline's gas compressor facility.

EQM's responsibility was to conduct the compliance testing for the O2 and NOx 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 TransCanada's process operations, and Compliance testing. The Compliance testing conducted on the Combustion Turbine No. 7 was performed on Tuesday, February 11, 2016, from 7:40 A.M. to 8:40 A.M. The Compliance testing conducted on the Combustion Turbine No. 6 was performed on Tuesday, February 11, 2016, from 8:50 A.M. To 9:50 A.M.

The following requirements were specific for the testing program:

1. Equipment calibrations performed and calibration data provided.
2. Three (3) twenty (20) -minute, minimum, O_2 and NOx test runs performed at the Combustion Turbine No. 6 and Combustion Turbine No. 7 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% 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 O_2 and NOx emissions determinations.
5. Stratification was found to be less than 5% in both turbine exhausts.

6. Diluent corrected stratification test was performed in accordance with Subpart KKKK.

The testing program was approved by and/or coordinated with Roy Cannon, TransCanada's ANR Pipeline Company. The emission testing was performed by Karl Mast, Manager, Emission Measurement and Project Manager, EQM, Jeff Cavanaugh, Test Technician, EQM. The emission testing was not observed.

2. TEST RESULTS SUMMARY

The compliance testing was performed on the Combustion Turbine No. 6 and Combustion Turbine No. 7 system 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. Test Results Summary-NO_x-Turbines No. 6 and No. 7

NOx Test Results (NOx 25 ppmvd @ 15% O2)				
Turbine	Rated Power (BHP)	Permit Limit NOx 25 ppmvd @ 15% O2	Measured Limit NOx 25 ppmvd @ 15% O2	Pass/Fail
No. 6	7,865	25	10.95	Pass
No. 7	7,865	25	15.49	Pass

Based on the information provided above, the Combustion Turbine No. 6 and Combustion Turbine No. 7 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 2-10.

Additional testing information may be found in Appendix A.

Table 2. Operating Parameters and Ambient Conditions-Turbine No. 6

Run	4	5	6	Load 2 Average
Date	02/11/16	02/11/16	02/11/16	
Time	850-909	910-929	930-949	
Condition	HIGH 6	HIGH 6	HIGH 6	
Operating Parameters				
Turbine				
Horsepower	9,234.0	9,288.0	9,173.0	9,231.7
% Ambient Load	117.4	118.1	116.6	117.4
CT RPM	14,950	14,945	14,950	14,948.3
% CT Speed	99.7	99.6	99.7	99.7
PT RPM	13,315	13,315	13,340	13,323.3
% PT Speed	93.1	93.1	93.3	93.2
Compressor				
Compressor Suction Pressure (PSIG)	226	226	223	225
Compressor Suction Temperature (°F)	40.0	39.0	39.0	39.3
Compressor Discharge Pressure (PSIG)	520	517	517	518
Compressor Discharge Temperature (°F)	193.0	193.0	192.0	192.7
Compressor Flow (MMSCF/D)	162.0	162.0	161.0	161.7
Ambient Conditions				
Ambient Temperature (°F)	15.00	15.00	15.00	15.00
Barometric Pressure ("Hg)	28.98	28.98	28.98	28.98
Ambient Relative Humidity (%)	79.00	79.00	79.00	79.00
Absolute Humidity (grains/LB)	10.57	10.57	10.57	10.57

Table 3. Emissions Concentrations & Calculated Mass Emissions/Calculated Emissions Concentrations/Calculated Flows-Turbine No. 6

Run	4	5	6	Load 2 Average
Date	02/11/16	02/11/16	02/11/16	
Time	850-909	910-929	930-949	
Condition	HIGH 6	HIGH 6	HIGH 6	
Emissions Concentrations & Calculated Mass Emissions				
NO_x ppm (BIAS Corrected)	10.03	9.97	9.63	9.88
NO_X g/BHP-HR	0.14	0.14	0.14	0.14
NOx lb/MMBTU factor	0.041	0.041	0.039	0.04
NO_X LB/HR	2.85	2.83	2.77	2.82
NO_X (ppm @ 15% O_2)	11.12	11.06	10.68	10.95
NOx LB/MMBTU	0.041	0.041	0.039	0.04
CO ppm (BIAS Corrected)	5.17	3.82	2.36	3.78
CO g/BHP-HR	0.04	0.03	0.02	0.03
CO LB/HR	0.89	0.66	0.41	0.66
CO (ppm @ 15% O_2)	5.73	4.24	2.62	4.20
% O_2 (BIAS Corrected)	15.58	15.58	15.58	15.58
Calculated Emissions Concentrations				
% O_2 (Wet)	16.82	16.83	16.62	16.8
Calculated Flows				
Fuel Flow - (SCFM)	1,100.0	1,100.0	1,116.7	1,106
Fuel Flow - (SCFH) From Screen	66,000	66,000	67,000	66,333
Exhaust Flow (LB/HR)	164,494	66,000	166,295	132,263
Exhaust Flow (WSCFM)	39,225	39,225	39,820	39,423
Air Flow (WSCFM)	38,025	38,025	38,602	38,218
Heat Rate (BTU/HP-HR)	6,794	6,755	6,943	6,831

Table 4. Operating Parameters and Ambient Conditions-Turbine No. 7

Run	1	2	3	Load 1 Average
Date	02/11/16	02/11/16	02/11/16	
Time	740-759	800-819	820-839	
Condition	HIGH 7	HIGH 7	HIGH 7	
Operating Parameters				
Turbine				
Horsepower	9,455.0	9,478.0	9,407.0	9,446.7
% Ambient Load	120.2	120.5	119.6	120.1
CT RPM	14,950.0	14,950.0	14,945.0	14,948.3
% CT Speed	99.7	99.7	99.6	99.7
PT RPM	13,236.0	13,330.0	13,330.0	13,298.7
% PT Speed	92.6	93.2	93.2	93.0
Compressor				
Compressor Suction Pressure (PSIG)	233.0	228.0	228.0	229.7
Compressor Suction Temperature (°F)	38.0	40.0	39.0	39.0
Compressor Discharge Pressure (PSIG)	524.0	520.0	521.0	521.7
Compressor Discharge Temperature (°F)	185.0	189.0	187.0	187.0
Compressor Flow (MMSCF/D)	174.0	171.0	171.0	172.0
Ambient Conditions				
Ambient Temperature (°F)	13.00	13.00	13.00	13.00
Barometric Pressure ("Hg)	28.95	28.95	28.95	28.95
Ambient Relative Humidity (%)	86.00	86.00	86.00	86.00
Absolute Humidity (grains/LB)	10.55	10.55	10.55	10.55

Table 5. Emissions Concentrations & Calculated Mass Emissions/Calculated Emissions Concentrations/Calculated Flows-Turbine No. 7

Run	1	2	3	Load 1 Average
Date	02/11/16	02/11/16	02/11/16	
Time	740-759	800-819	820-839	
Condition	HIGH 7	HIGH 7	HIGH 7	
Emissions Concentrations & Calculated Mass Emissions				
NO_x ppm (BIAS Corrected)	13.86	13.98	15.25	14.36
NO_X g/BHP-HR	0.21	0.21	0.23	0.22
NOx lb/MMBTU factor	0.055	0.056	0.061	0.06
NO_X LB/HR	4.45	4.45	4.85	4.58
NO_X (ppm @ 15% O_2)	14.90	15.11	16.48	15.49
NOx LB/MMBTU	0.055	0.056	0.061	0.06
CO ppm (BIAS Corrected)	8.24	15.79	14.70	12.91
CO g/BHP-HR	0.08	0.15	0.14	0.12
CO LB/HR	1.61	3.06	2.85	2.51
CO (ppm @ 15% O_2)	8.86	17.06	15.88	13.93
% O_2 (BIAS Corrected)	15.41	15.44	15.44	14.86
Calculated Emissions Concentrations				
% O_2 (Wet)	14.50	14.53	14.53	13.86
Calculated Flows				
Fuel Flow - (SCFM)	1,283.3	1,266.7	1,266.7	1,272
Fuel Flow - (SCFH) From Screen	77,000	76,000	76,000	76,333
Exhaust Flow (LB/HR)	179,000	177,602	177,602	178,068
Exhaust Flow (WSCFM)	45,763	45,169	45,169	45,367
Air Flow (WSCFM)	43,003	42,675	42,675	42,784
Heat Rate (BTU/HP-HR)	7,742	7,622	7,680	7,681

Table 6. Gas Composition-AGA Standard Conditions-Turbines No. 6 & No. 7

GAS COMPOSITION	(Based on AGA standard conditions of 14.73 psia and 60 F)					
Constituent	**Mol. Fraction**	**MW**	**weighted MW**	**DENSITY**	**Weighted Density**	
NITROGEN	0.013542	28.0134	0.3794	0.07399	0.00100	
CARBON DIOX.	0.006596	44.01	0.2903	0.11624	0.00077	
METHANE	0.90874	16.04315	14.5791	0.04237	0.03850	
ETHANE	0.063259	30.0703	1.9022	0.07942	0.00502	
PROPANE	0.00628	44.0975	0.2769	0.11647	0.00073	
I-BUTANE	0.00032	58.1246	0.0186	0.15352	0.00005	
N-BUTANE	0.000468	58.1246	0.0272	0.15352	0.00007	
I-PENTANE	0.000062	72.1518	0.0045	0.19057	0.00001	
N-PENTANE	0.000026	72.1518	0.0019	0.19057	0.00000	
HEXANE +	0.000038	95.958	0.0036	0.32000	0.00001	
	0.9993	17.4836	17.4836		0.04618	
Upper Dry Heat Value	1053.24	btu/dscf				
Low Dry Heat Value	951	btu/dscf				
Specific Gravity	0.6048					
DENSITY	0.0462	lb/cf				
Total Carbons	1.064540492	Total H	4.074222			

Constituent	LHV ideal	LHV(i) ideal	LHV(i) real	HHV ideal	HHV(i) ideal	HHV(i) real
NITROGEN		0.00	0.00		0	0
CARBON DIOX.		0.00	0.00		0	0
METHANE	911.5	828.32	830.23	1012	919.64488	921.77
ETHANE	1622.4	102.63	102.87	1773.7	112.2024883	112.46
PROPANE	2320.3	14.57	14.61	2522.1	15.838788	15.88
I-BUTANE	3007.3	0.96	0.96	3260.5	1.04336	1.05
N-BUTANE	3017.8	1.41	1.42	3270.1	1.5304068	1.53
I-PENTANE	3707.6	0.23	0.23	4011.1	0.2486882	0.25
N-PENTANE	3715.5	0.10	0.10	4018.2	0.1044732	0.10
HEXANE +	4900.5	0.19	0.19	5288.8	0.2009744	0.20
		LHV real	950.60		HHV real	1053.24

Constituent	SG	SG(i) ideal	b	b(i)	
NITROGEN	0.96723	0.013098229	0.0044	5.95848E-05	
CARBON DIOX.	1.51955	0.010022952	0.0197	0.000129941	Compressibility
METHANE	0.55392	0.503369261	0.0116	0.010541384	0.997696909
ETHANE	1.03824	0.065678024	0.0239	0.00151189	
PROPANE	1.52256	0.009561677	0.0344	0.000216032	
I-BUTANE	2.00684	0.000642189	0.0458	0.000014656	
N-BUTANE	2.00684	0.000939201	0.0478	2.23704E-05	
I-PENTANE	2.49115	0.000154451	0.0581	3.6022E-06	
N-PENTANE	2.49115	6.47699E-05	0.0631	1.6406E-06	
HEXANE +	3.3127	0.000125883	0.0802	3.0476E-06	
	SG real	0.604802051		0.012504149	
					8.46546E-07

Table 7. Gas Composition-EPA Standard Conditions-Turbines No. 6 & No. 7

GAS COMPOSITION	(Based onEPA standard conditions of 14.696 psia and 68 F)					
Constituent	Mol. Fraction	MW	weighted MW			
NITROGEN	0.0135	28.0134	0.3794			
CARBON DIOX.	0.0066	44.01	0.2903			
METHANE	0.9087	16.04315	14.5791	Carbon Wt. % :	0.731332	
ETHANE	0.0633	30.0703	1.9022	Hydrogen Wt. % :	0.234898	
PROPANE	0.0063	44.0975	0.2769	Oxygen Wt. % :	0.012072	
I-BUTANE	0.0003	58.1246	0.0186	Nitrogen Wt. % :	0.021698	
N-BUTANE	0.0005	58.1246	0.0272		1.0000	
I-PENTANE	0.0001	72.1518	0.0045			
N-PENTANE	0.0000	72.1518	0.0019			
HEXANE +	0.0000	95.958	0.0036			
	0.9993	MW	17.4836			
Upper Dry Heat Value	1051	btu/dscf	Mole Weight	17.4836	btu/dscf	
Low Dry Heat Value	952	btu/dscf	A F-Factor (calc)	8700	dscf/MMbtu	
Specific Gravity	0.6048					
Density	0.0464	lb/scf				
Total Carbons	1.0645	Total H	4.0743			

Constituent	LHV ideal	LHV(i) ideal	LHV(i) real	HHV ideal	HHV(i) ideal	HHV(i) real
NITROGEN		0.00	0.00		0	0
CARBON DIOX.		0.00	0.00		0	0
METHANE	913	829.68	831.59	1010	917.8274	919.95
ETHANE	1624	102.73	102.97	1769.6	111.9431264	112.20
PROPANE	2322	14.58	14.62	2516.1	15.801108	15.84
I-BUTANE	3010	0.96	0.97	3251.9	1.040608	1.04
N-BUTANE	3020	1.41	1.42	3262.3	1.5267564	1.53
I-PENTANE	3711	0.23	0.23	4000.9	0.2480558	0.25
N-PENTANE	3718	0.10	0.10	4008.9	0.1042314	0.10
HEXANE +	4904	0.19	0.19	5278	0.200564	0.20
		LHV real	952.08		HHV real	1051.11

Constituent	SG	SG(i) ideal	b	b(i)		
NITROGEN	0.96723	0.013098229	0.0044	5.95848E-05		
CARBON DIOX.	1.51955	0.010022952	0.0197	0.000129941	Compressibility	
METHANE	0.55392	0.503369261	0.0116	0.010541384	0.997696909	
ETHANE	1.03824	0.065678024	0.0239	0.00151189		
PROPANE	1.52256	0.009561677	0.0344	0.000216032		
I-BUTANE	2.00684	0.000642189	0.0458	0.000014656		
N-BUTANE	2.00684	0.000939201	0.0478	2.23704E-05		
I-PENTANE	2.49115	0.000154451	0.0581	3.6022E-06		
N-PENTANE	2.49115	6.47699E-05	0.0631	1.6406E-06		
HEXANE +	3.3127	0.000125883	0.0802	3.0476E-06		
	SG real	0.604802051		0.012504149		

Table 8. Fuel Orifice-Turbines No. 6

ORIFICE FLOW CALCULATIONS				
Run Number	4	5	6	Load 2 Average
PIPE I.D.	3	3	3	3
ORIFICE I.D.	1.25	1.25	1.25	1.25
PRESS TAP? (1-UP,2-DN)	1	1	1	1
Enter type from list below				
Orifice Meter (upstream pressure tap):				
Orifice Meter (downstream pressure tap):				
Electronic Flow Meter (EFM):				
Venturi (Nozzle) Meter:				
Roots Meter w/ Accumulator:				
Pipe I.D.:				
Orifice I.D.:				
SP. GRAVITY	0.6048021	0.6048021	0.6048021	0.604802051
BETA	0.4166667	0.4166667	0.4166667	0.416666667
K	0.6139271	0.6139271	0.6139271	0.613927129
K1	0.613438	0.613438	0.613438	0.613437985
Bc	305.99564	305.99564	305.99564	305.9956427
E	389.17858	389.17858	389.17858	389.1785811
kflang	0.6135276	0.6135276	0.6135276	0.613527568
Ko	0.6105865	0.6105865	0.6105865	0.610586459
Fb	322.63579	322.63579	322.63579	322.6357928
BB	0.0395375	0.0395375	0.0395375	0.039537478
Fpb	1	1	1	1
Ftb	1	1	1	1
Ftf	1.0632631	1.0632631	1.0632631	
FG	1.2858591	1.2858591	1.2858591	1.28585907
Fpv	1.001926	1.001926	1.001926	
QY	1	1	1	

Table 9. Fuel Orifice-Turbines No. 7

ORIFICE FLOW CALCULATIONS				
Run Number	**1**	**2**	**3**	**Load 1 Average**
PIPE I.D.	3	3	3	3
ORIFICE I.D.	1.25	1.25	1.25	1.25
PRESS TAP? (1-UP,2-DN)	1	1	1	1
Enter type from list below				
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			
Orifice I.D.:	1.25			
SP. GRAVITY	0.604802051	0.604802051	0.604802051	0.604802051
BETA	0.416666667	0.416666667	0.416666667	0.416666667
K	0.613927129	0.613927129	0.613927129	0.613927129
K1	0.613437985	0.613437985	0.613437985	0.613437985
Bc	305.9956427	305.9956427	305.9956427	305.9956427
E	389.1785811	389.1785811	389.1785811	389.1785811
kflang	0.613527568	0.613527568	0.613527568	0.613527568
Ko	0.610586459	0.610586459	0.610586459	0.610586459
Fb	322.6357928	322.6357928	322.6357928	322.6357928
BB	0.039537478	0.039537478	0.039537478	0.039537478
Fpb	1	1	1	1
Ftb	1	1	1	1
Ftf	1.063263101	1.063263101	1.063263101	
FG	1.28585907	1.28585907	1.28585907	1.28585907
Fpv	1.001923984	1.001923984	1.001923984	
QY	1	1	1	

3. PROCESS DESCRIPTION

TransCanada's ANR Goodwell Compressor Station is located in White Cloud, Michigan and operates two Solar Centaur 60, 7,865 hp natural gas fired turbines with low NO_x burner for NO_x control labeled EUGDS Turbine 6 and EUGDS Turbine 7. The plant is located at 6759 East Five Mile Road, White Cloud, MI

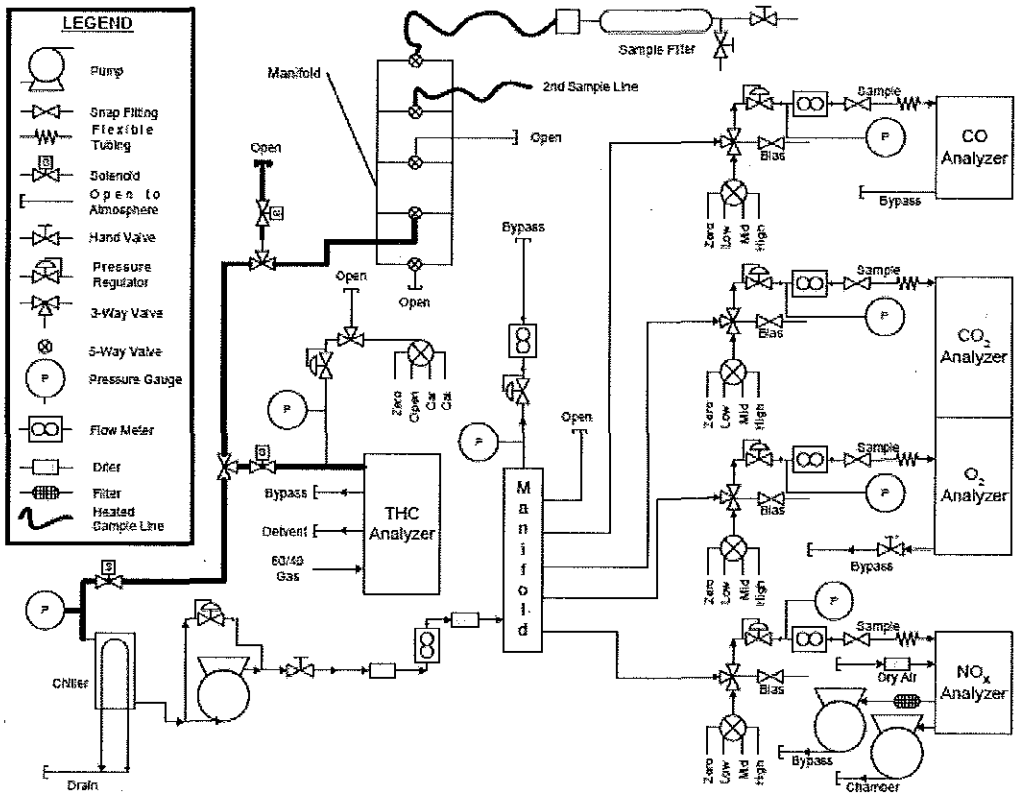
The Solar Centaur 60 gas turbine is a simple cycle, natural gas fired, split-shaft turbine. In a simple cycle turbine, filtered atmosphere air is first compressed by the axial flow compressor. The hot compressed air is then fired with natural gas in the combustor. The hot exhaust gases expand through two turbine stages. The gas producer (G.P.) turbine drives the axial flow air while the power turbine (P.T.) drives the centrifugal pipeline compressor. The pipeline gas compressor moves natural gas through the pipeline by compressing it from an initial "suction" state to a more compressed "discharge" state.

The following tables provide a summary of the production rates for the Turbines No. 6 and No. 7 during the test:

Table 10. Production Data-Brake Horse Power (BHP)

Turbine No. 6 and No. 7 Brake Horse Power (BHP)		
Run No.	**Turbine No. 6**	**Turbine No. 7**
1	9234	9455
2	9288	9478
3	9173	9407
Average	9232	9447
Rated BHP	7,865	7,865

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)

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 Units No. 6 and No. 7 are 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

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

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

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

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

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 Turbine 6 and Turbine 7 at TransCanada's ANR Pipeline Company's Goodwell Compressor Station located in White Cloud, MI. The testing was conducted on February 11, 2016.

During the course of the testing, the Turbine 6 and Turbine 7 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 Turbine 6 and Turbine 7 emissions shall be determined by others.

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

A. FIELD TEST DATA