Report of a...

Cylinder Gas Audit

performed for...

Michigan Sugar Company
Bay City, Michigan

on

Gas Fired Boilers #6, #7 & #8

June 5 and July 12, 2018

022.44

Network Environmental, Inc.
Grand Rapids, MI

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I. INTRODUCTION

Network Environmental, Inc. was retained by Michigan Sugar Company of Bay City, Michigan to perform a Cylinder Gas Audit (CGA), for the second quarter of 2018, on the CEMS servicing gas fired Boilers #6, #7 and #8. The CEMS are comprised of an Oxides of Nitrogen (NO_x) Monitor and a Oxygen (O_2) Monitor.

The CGAs were performed on June 5, and July 12, 2018. CGAs for Units 6 and 8 were performed on June 5th and the CGA for Unit 7 was performed on July 12th. The NO_x analyzer, for Unit 7, was out for repair on June 5th. Stephan K. Byrd of Network Environmental, Inc. performed the testing.

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II. PRESENTATION OF RESULTS

II.1. TABLE 1
CGA RESULTS
MICHIGAN SUGAR COMPANY
BAY CITY, MICHIGAN
OXIDES OF NITROGEN MONITOR BOILER #6
JUNE 5, 2018

CEM	Run Number	CEM (HI)	CEM (LOW)
NO_x	1	121.4 PPM	51.7 PPM
	2	121.5 PPM	51.6 PPM
	3	121.4 PPM	51.5 PPM
	Average	121.4 PPM	51.6 PPM
	Accuracy	**-2.10 %**	**-4.44 %**
Average accuracy = -3.27 %			
Calibration Gas Concentrations: HI - NO_x = 124 ppm LOW - NO_x = 54.0 ppm			

II.2. TABLE 2
CGA RESULTS
MICHIGAN SUGAR COMPANY
BAY CITY, MICHIGAN
OXYGEN MONITOR BOILER #6
JUNE 5, 2018

CEM	Run Number	CEM (HI)	CEM (LOW)
O_2	1	11.8 %	5.8%
	2	11.8 %	5.7%
	3	11.8 %	5.8%
	Average	11.8 %	5.8%
	Accuracy	**-2.48 %**	**-2.36 %**
Average accuracy = -2.42 %			
Calibration Gas Concentrations: HI - O_2 = 12.1 % LOW – O_2 = 5.94%			

II.3 TABLE 3
CGA RESULTS
MICHIGAN SUGAR COMPANY
BAY CITY, MICHIGAN
OXIDES OF NITROGEN MONITOR BOILER #7
JULY 12, 2018

CEM	Run Number	CEM (HI)	CEM (LOW)
NO_x	1	121.7 PPM	51.5 PPM
	2	121.6 PPM	51.3 PPM
	3	121.5 PPM	51.4 PPM
	Average	121.6 PPM	51.4 PPM
	Accuracy	**-1.94 %**	**-4.81 %**
Average accuracy = -3.37 %			

Calibration Gas Concentrations:
HI - NO_x = 124 ppm LOW - NO_x = 54 ppm

II.4. TABLE 4
CGA RESULTS
MICHIGAN SUGAR COMPANY
BAY CITY, MICHIGAN
OXYGEN MONITOR BOILER #7
JULY 12, 2018

CEM	Run Number	CEM (HI)	CEM (LOW)
O_2	1	12.4 %	6.1 %
	2	12.4 %	6.1 %
	3	12.4 %	6.1 %
	Average	12.4 %	6.1 %
	Accuracy	**2.48 %**	**2.69 %**
Average accuracy = 2.59%			

Calibration Gas Concentrations:
HI - O_2 = 12.1 % LOW - O_2 = 5.94%

II.5. TABLE 5
CGA RESULTS
MICHIGAN SUGAR COMPANY
BAY CITY, MICHIGAN
OXIDES OF NITROGEN MONITOR BOILER #8
JUNE 5, 2018

CEM	Run Number	CEM (HI)	CEM (LOW)
NO_x	1	53.2 PPM	21.8 PPM
	2	53.1 PPM	21.9 PPM
	3	53.1 PPM	21.8 PPM
	Average	53.1 PPM	21.8 PPM
	Accuracy	**-1.67 %**	**-9.92 %**
Average accuracy = -5.80 %			

Calibration Gas Concentrations:
HI - NO_x = 54 ppm LOW - NO_x = 24.2 ppm

II.6. TABLE 6
CGA RESULTS
MICHIGAN SUGAR COMPANY
BAY CITY, MICHIGAN
OXYGEN MONITOR BOILER #8
JUNE 5, 2018

CEM	Run Number	CEM (HI)	CEM (LOW)
O_2	1	11.9 %	5.8 %
	2	11.9 %	5.8 %
	3	11.9 %	5.9 %
	Average	11.9 %	5.8 %
	Accuracy	**-1.65 %**	**-2.36 %**
Average accuracy = -2.01 %			

Calibration Gas Concentrations:
HI - O_2 = 12.1 % LOW - O_2 = 5.94 %

III. DISCUSSION OF RESULTS

The results of the CGA performed on the CEMS servicing Boilers #6, #7 and #8 can be found in Section II. Tables 1 through 6. The control limit for CGA accuracy is plus or minus 15% of the average audit value or plus or minus 5 ppm, whichever is greater.

III.1. Boiler #6 -

III.1.1. NO_x - The CGA results for the NO_x CEMS were -2.10% accuracy for the high NO_x gas and –4.44% for the low gas. The average accuracy for the NO_x monitor was –3.27%.

III.1.2. O_2 - The CGA results for the O_2 analyzer were -2.48% accuracy for the high O_2 gas and -2.36% for the low gas. The average accuracy for the O_2 monitor was -2.42%.

III.2. Boiler #7 -

III.2.1. NO_x - The CGA results for the NO_x CEMS were -1.94% accuracy for the high NO_x gas and -4.81% for the low gas. The average accuracy for the NO_x monitor was -3.37%.

III.2.2. O_2 - The CGA results for the O_2 analyzer were 2.48% accuracy for the high O_2 gas and 2.69% for the low gas. The average accuracy for the O_2 monitor was 2.59%.

III.3. Boiler #8 -

III.3.1. NO_x - The CGA results for the NO_x CEMS were -1.67% accuracy for the high NO_x gas and –9.92% for the low gas. The average accuracy for the NO_x monitor was -5.80%.

III.3.2. O_2 - The CGA results, for the O_2 analyzer, were -1.65% accuracy for the high O_2 gas and -2.36% for the low gas. The average accuracy for the O_2 monitor was -2.01%.

IV. AUDIT PROTOCOL

CGA - The CGA was performed in accordance with 40 CFR Part 60, Appendix F. Each monitor was challenged three times each with a high and low protocol gas. Once a stable reading was obtained, it was recorded. The three high and the three low readings for each monitor were averaged and compared to the protocol gas concentrations. The calculations were performed using Equation 1-1 from Appendix F. Audit gas certification sheets can be found in Appendix A.

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