

Relative Accuracy Test Audit Report

Indeck Energy Services, Inc.
EUCTGHRSG1 and EUCTGHRSG2
Niles, Michigan

Michigan Department of Environment,
Great lakes, and Energy
Permit to Install 75-16C
State Registration No. N6921

Report No. M241909A
May 7 and 8, 2024





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Project No. M241909A

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1.0 EXECUTIVE SUMMARY

Mostardi Platt conducted a Continuous Emissions Monitoring System (CEMS) Relative Accuracy Test Audit (RATA) test program for Indeck Niles Energy Center facility in Niles, Michigan, on the EUCTGHRSG1 and EUCTGHRSG2 on May 7 and 8, 2024. This report summarizes the results of the test program and test methods used in accordance with the Mostardi Platt Protocol P241909 dated February 23, 2024. Mostardi Platt is a self-certified air emissions testing body (AETB). A copy of Mostardi Platt's self-certification can be found in Appendix A.

The test location, test date, and test parameters are summarized below.

TEST INFORMATION		
Test Location	Test Date	Test Parameters
EUCTGHRSG1	May 7, 2024	Oxygen (O ₂), Nitrogen Oxides (NO _x), Carbon Monoxide (CO),
EUCTGHRSG2	May 8, 2024	

The purpose of the test program was to demonstrate the relative accuracies of EUCTGHRSG1 and EUCTGHRSG2 O₂, CO, and NO_x analyzers during a normal high load operating condition. The test results from this test program indicate that each CEMS component meets the United States Environmental Protection Agency (USEPA) annual performance specification for relative accuracy as published in 40 Code of Federal Regulations Part 75 (40CFR75).

Run 10 on EUCTGHRSG Unit 1 on May 7, 2024 inadvertently collected only 16 minutes of data, and therefore this run is not used in the RATA calculations.

Run 5 on EUCTGHRSG Unit 2 on May 8, 2024 did not pass the post test calibration check for CO, and therefore was not used in the RATA calculations. A full set of calibrations was performed prior to Run 6, and Runs 1 through 4, and 6 through 10 were used in the RATA calculations.

RATA RESULTS					
Test Location	Date	Parameter	Units	Relative Accuracy Acceptance Criteria	Relative Accuracy (RA)
EUCTGHRSG1	5/7/24	NO _x	ppmvd @ 15%	≤ 20.0% of mean reference method value	12.24%
			lb/mmBtu	≤ ± 0.015 lb/mmBtu mean difference	0.001
			lb/hr	≤ 10.0% of the applicable standard of 27.4 lb/hr	8.78%
		O ₂	% dry	≤ 7.5% of the mean reference value	0.79%
		CO	ppmvd @ 15%	≤ ± 5 ppm mean difference	0.32
			lb/hr	≤ ± 5 ppm mean difference	0.32

RATA RESULTS					
Test Location	Date	Parameter	Units	Relative Accuracy Acceptance Criteria	Relative Accuracy (RA)
EUCTGHRSG2	5/8/24	NO _x	ppmvd @ 15%	≤ 20.0% of mean reference method value	12.50%
			lb/mmBtu	≤ 7.5% of mean reference method value	0.00%
			lb/hr	≤ 10.0% of the applicable standard of 27.4 lb/hr	4.38%
		O ₂	% dry	≤ 7.5% of the mean reference value	0.46%
		CO	ppmvd @ 15%	≤ ± 5 ppm mean difference	0.24
			lb/hr	≤ ± 5 ppm mean difference	0.24

The gas cylinders used to perform the RATA are summarized below.

GAS CYLINDER INFORMATION				
Parameter	Gas Vendor	Cylinder Serial Number	Cylinder Value	Expiration Date
NO _x	Airgas	CC152851	4.904 ppm	4/8/2027
NO _x	Airgas	CC301144	9.028 ppm	10/23/2026
CO	Airgas	XC030393B	5.07 ppm	9/22/2031
CO	Airgas	SG9159325BAL	10.17 ppm	5/8/2031
O ₂	Airgas	EB0094213	12.03% (EUCTGHRSG1)	12/6/2031
O ₂	Airgas	ALM060979	12.10% (EUCTGHRSG2)	10/30/2031
O ₂	Airgas	SG9164904BAL	22.25%	5/23/2031

No deviations, additions, or exclusions from the test protocol, test methods, the Mostardi Platt Quality Manual, or ASTM D7036-12 occurred. The specific test conditions encountered did not interfere with the collection of the data.

The identifications of the individuals associated with the test program are summarized below.

TEST PERSONNEL INFORMATION		
Location	Address	Contact
Test Facility	Indeck-Niles Energy Center 2200 Progressive Drive Niles, Michigan 49120	Thomas Krysiak Environmental, Health and Safety Manager (716) 225-6478 (phone) tkrysiak@indeckenergy.com
Testing Company Supervisor	Mostardi Platt 888 Industrial Drive Elmhurst, Illinois 60126	Joshua R. Kukla Project Manager 630-993-2100 (phone) jkukla@mp-mail.com
Testing Company Personnel		Mr. Praveak Pradhan Test Engineer

Copies of the QI certifications for test personnel are included in Appendix B.

2.0 TEST METHODOLOGY

Emission testing was conducted following the USEPA methods specified in 40CFR75 and 40CFR60, Appendix A, in addition to the Mostardi Platt Quality Manual and the site-specific test plan. Schematics of the test section diagram and sampling train used are included in Appendix C and D respectively. Calculation and nomenclature are included in Appendix E. Copies of analyzer print-outs for each test run are included in Appendix F. CEM data and process data are included in Appendix G.

The following methodologies were used during the test program:

Method 3A Oxygen (O₂) Determination

Stack gas O₂ concentrations were determined in accordance with USEPA Method 3A, 40CFR60, Appendix A. A Thermo Scientific Model 48i analyzer was used to determine the O₂ concentrations in the manner specified in the Method. The instrument operates in the nominal range of 0% to 25% with the specific range determined by the high-level calibration gas. High-range calibrations were performed using USEPA Protocol gas. Zero nitrogen (a low ppm pollutant in balance nitrogen calibration gases) was introduced during other instrument calibrations to check instrument zero. High- and a mid-range % O₂ levels in balance nitrogen were also introduced. Zero and mid-range calibrations were performed using USEPA Protocol gas after each test run. Copies of the gas cylinder certifications are found in Appendix I. This testing met the performance specifications as outlined in the Method.

Method 7E Nitrogen Oxides (NO_x) Determination

Stack gas NO_x concentrations and emission rates were determined in accordance with USEPA Method 7E, 40CFR60, Appendix A. A Thermo Scientific Model 42i-HL Chemiluminescence Nitrogen Oxides Analyzer was used to determine nitrogen oxides concentrations, in the manner specified in the Method. The instrument operated in the nominal range of 0 ppm to 10 ppm with the specific range determined by the high-level span calibration gas.

The Model 42i operates on the principle that nitric oxide (NO) and ozone (O₃) react to produce a characteristic luminescence with an intensity linearly proportional to the NO concentration. Infrared light emission results when electronically excited NO₂ molecules decay to lower energy states. Specifically,



Nitrogen dioxide (NO₂) must first be transformed into NO before it can be measured using the chemiluminescent reaction. NO₂ is converted to NO by a stainless steel NO₂-to-NO converter heated to about 625°C. The flue gas sample is drawn into the Model 42i through the sample bulkhead. The sample flows through a capillary, and then to the mode solenoid valve. The solenoid valve routes the sample either straight to the reaction chamber (NO mode) or through the NO₂-to-NO converter and then to the reaction chamber (NO_x mode). A flow sensor prior to the reaction chamber measures the sample flow. Dry air enters the Model 42i through the dry air bulkhead, passes through a flow switch, and then through a silent discharge ozonator. The ozonator generates the ozone needed for the chemiluminescent reaction. At the reaction chamber, the ozone reacts with the NO in the sample to produce excited NO₂ molecules. A photomultiplier tube (PMT) housed in a thermoelectric cooler detects the luminescence generated during this reaction. From the reaction chamber, the exhaust travels through the ozone (O₃) converter to the pump and is released through the vent.

The NO and NO_x concentrations calculated in the NO and NO_x modes are stored in memory. The difference between the concentrations is used to calculate the NO₂ concentration. The Model 42i outputs NO, NO₂, and NO_x concentrations to the front panel display, the analog outputs, and also makes the data available over the serial or ethernet connection.

Stack gas was delivered to the analyzer via a Teflon® sampling line, heated to a minimum temperature of 250°F. Excess moisture in the stack gas was removed using a refrigerated condenser. The entire system was calibrated in accordance with the Method, using USEPA Protocol gases introduced at the probe, before and after each test run. This testing met the performance specifications as outlined in the Method.

A list of calibration gases used and the results of all calibration and other required quality assurance checks are found in Appendix H. Copies of the gas cylinder certifications are found in Appendix I. The NO₂ to NO converter test can be found in Appendix J. This testing met the performance specifications as outlined in the Method.

Method 10 Carbon Monoxide (CO) Determination

Stack gas CO concentrations and emission rates were determined in accordance with USEPA Method 10, 40CFR60, Appendix A. A Thermo Scientific Model 48i Gas Filter Correlation Analyzer was used to determine carbon monoxide concentrations, in the manner specified in the Method. The instrument operated in the nominal range of 0 ppm to 20 ppm with the specific range determined by the high-level span calibration gas.

The Model 48i operates on the principle that CO absorbs infrared radiation at a wavelength of 4.6 microns. Because infrared absorption is a non-linear measurement technique, it is necessary to transform the basic analyzer signal into a linear output. The Model 48i uses an internally stored calibration curve to accurately linearize the instrument output over any range up to a concentration of 10,000 ppm. The sample is drawn into the Model 48i through the sample bulkhead. The sample flows through the optical bench. Radiation from an infrared source is chopped and then passed through a gas filter alternating between CO and N₂. The radiation then passes through a narrow bandpass interference filter and enters the optical bench where absorption by the sample gas occurs. The infrared radiation then exits the optical bench and falls on an infrared detector. The CO gas filter acts to produce a reference beam which cannot be further attenuated by CO in the sample cell. The N₂ side of the filter wheel is transparent to the infrared radiation and therefore produces a measurement beam which can be absorbed by CO in the cell. The chopped detector signal is modulated by the alternation between the two gas filters with an amplitude related to the concentration of CO in the sample cell. Other gases do not cause modulation of the detector signal since they absorb the reference and measure beams equally. Thus, the GFC system responds specifically to CO. The Model 48i outputs the CO concentration to the front panel display, the analog outputs, and also makes the data available over the serial or Ethernet connection.

Stack gas was delivered to the analyzer via a Teflon® sampling line, heated to a minimum temperature of 250°F. Excess moisture in the stack gas was removed using a refrigerated condenser. The entire system was calibrated in accordance with the Method, using USEPA protocol gases introduced at the probe, before and after each test run.

A list of calibration gases used and the results of all calibration and other required quality assurance checks are found in Appendix H. Copies of the gas cylinder certifications are found in Appendix I. This testing met the performance specifications as outlined in the Method.

3.0 TEST RESULT SUMMARIES

3.1 EUCTGHRSG1 RATA Tables

Client: Indeck Energy Services, Inc.					Location: EUCTGHRSG Unit 1			
Facility: Niles Energy Center					Date: 5/7/24			
Project #: M241909					Test Method: 7E, 3A			
NOx ppmvd @ 15% O2 RATA								
CEM Analyzer Information								
NOx Monitor/Model:			Thermo iQ Series 42		NOx Serial # :		1201697936	
O2 Monitor/Model:			Thermo iQ Series 48		O2 Serial # :		1291697932	
1=accept 0=reject	Test Run	Test Date	Start Time	End Time	RM NOx ppmvd @ 15 %O2	CEM NOx ppmvd @ 15 %O2	(RM-CEM) Difference (di)	(RM-CEM) Difference ² (di ²)
1	1	05/07/24	09:18	09:38	1.6	1.4	0.2	0.04
1	2	05/07/24	09:58	10:18	1.7	1.5	0.2	0.04
1	3	05/07/24	10:36	10:56	1.6	1.4	0.2	0.04
1	4	05/07/24	11:38	11:58	1.6	1.4	0.2	0.04
1	5	05/07/24	12:18	12:38	1.7	1.5	0.2	0.04
1	6	05/07/24	12:55	13:15	1.7	1.5	0.2	0.04
1	7	05/07/24	14:00	14:20	1.6	1.4	0.2	0.04
1	8	05/07/24	14:38	14:58	1.6	1.4	0.2	0.04
1	9	05/07/24	15:20	15:40	1.6	1.4	0.2	0.04
0	10	05/07/24	16:22	16:42	1.6	1.5	0.1	0.01
n					9			
t(0.975)					2.306			
Mean Reference Method Value					1.633		RM avg	
Mean CEM Value					1.433		CEM avg	
Sum of Differences					1.800		di	
Mean Difference					0.200		d	
Sum of Differences Squared					0.360		di ²	
Standard Deviation					0.000		sd	
Confidence Coefficient 2.5% Error (1-tail)					0.000		cc	
Relative Accuracy					12.24		RA	

Client: Indeck Energy Services, Inc.					Location: EUCTGHRSG Unit 1			
Facility: Niles Energy Center					Date: 5/7/24			
Project #: M241909					Test Method: 7E, 3A			
Fuel Type: Natural Gas					Fuel Factor: 8710			
O2 based NOx lb/mmBtu RATA								
CEM Analyzer Information								
NO _x Monitor/Model:			Thermo iQ Series 42		NO _x Serial # :		1201697936	
O2 Monitor/Model:			Thermo iQ Series 48		O2 Serial # :		1291697932	
1=accept 0=reject	Test Run	Test Date	Start Time	End Time	RM NO _x lb/MMBtu	CEM NO _x lb/MMBtu	(RM-CEM) Difference (di)	(RM-CEM) Difference ² (di ²)
1	1	05/07/24	09:18	09:38	0.006	0.005	0.001	0.000001
1	2	05/07/24	09:58	10:18	0.006	0.005	0.001	0.000001
1	3	05/07/24	10:36	10:56	0.006	0.005	0.001	0.000001
1	4	05/07/24	11:38	11:58	0.006	0.005	0.001	0.000001
1	5	05/07/24	12:18	12:38	0.006	0.006	0.000	0.000000
1	6	05/07/24	12:55	13:15	0.006	0.005	0.001	0.000001
1	7	05/07/24	14:00	14:20	0.006	0.005	0.001	0.000001
1	8	05/07/24	14:38	14:58	0.006	0.005	0.001	0.000001
1	9	05/07/24	15:20	15:40	0.006	0.005	0.001	0.000001
0	10	05/07/24	16:22	16:42	0.006	0.005	0.001	0.000001
n					9			
t(0.025)					2.306			
Mean Reference Method Value					0.006		RM avg	
Mean CEM Value					0.005		CEM avg	
Sum of Differences					0.008		di	
Mean Difference					0.001		d	
Sum of Differences Squared					0.000		di ²	
Standard Deviation					0.000		sd	
Confidence Coefficient 2.5% Error (1-tail)					0.000		cc	
Relative Accuracy - APS					0.001		lb/mmBtu difference ^A	

^A Relative accuracy for low emission sources with NO_x emissions of ≤ 0.200 lbs/mmBtu based on a mean difference of +/- 0.015 lbs/mmBtu for annual RATA testing, or +/- 0.020 lbs/mmBtu for semi-annual RATA testing.

Client: Indeck Energy Services, Inc.					Location: EUCTGHRSG Unit 1			
Facility: Niles Energy Center					Date: 5/7/24			
Project #: M241909					Test Method: 7E, 2			
Applicable Standard: 27.4								
NO _x lb/hr RATA								
CEM Analyzer Information								
NO _x Monitor/Model:			Thermo iQ Series 42		NO _x Serial # :		1201697936	
1=accept 0=reject	Test Run	Test Date	Start Time	End Time	RM NO _x lb/hr	CEM NO _x lb/hr	(RM-CEM) Difference (di)	(RM-CEM) Difference ² (di ²)
1	1	05/07/24	09:18	09:38	20.21	17.87	2.34	5.4756
1	2	05/07/24	09:58	10:18	20.89	18.53	2.36	5.5696
1	3	05/07/24	10:36	10:56	20.03	17.66	2.37	5.6169
1	4	05/07/24	11:38	11:58	20.46	18.08	2.38	5.6644
1	5	05/07/24	12:18	12:38	20.89	18.53	2.36	5.5696
1	6	05/07/24	12:55	13:15	20.58	18.19	2.39	5.7121
1	7	05/07/24	14:00	14:20	20.16	17.81	2.35	5.5225
1	8	05/07/24	14:38	14:58	19.71	17.71	2.00	4.0000
1	9	05/07/24	15:20	15:40	19.96	17.73	2.23	4.9729
0	10	05/07/24	16:22	16:42	19.95	17.89	2.06	4.2436
n					9			
t(0.975)					2.306			
Mean Reference Method Value					20.321		RM avg	
Mean CEM Value					18.012		CEM avg	
Sum of Differences					20.780		di	
Mean Difference					2.309		d	
Sum of Differences Squared					48.104		di ²	
Standard Deviation					0.125		sd	
Confidence Coefficient 2.5% Error (1-tail)					0.096		cc	
Relative Accuracy - APS					8.78		RA	

Client: Indeck Energy Services, Inc.					Location: EUCTGHRSG Unit 1			
Facility: Niles Energy Center					Date: 5/7/24			
Project #: M241909					Test Method: 3A			
O ₂ % (dry) RATA								
CEM Analyzer Information								
O ₂ Monitor/Model:			Thermo iQ Series 48		O ₂ Serial # :		1291697932	
1=accept 0=reject	Test Run	Test Date	Start Time	End Time	RM O ₂ % (dry)	CEM O ₂ % (dry)	(RM-CEM) Difference (di)	(RM-CEM) Difference ² (di ²)
1	1	05/07/24	09:18	09:38	12.2	12.2	0.0	0.00
1	2	05/07/24	09:58	10:18	12.2	12.2	0.0	0.00
1	3	05/07/24	10:36	10:56	12.2	12.1	0.1	0.01
1	4	05/07/24	11:38	11:58	12.2	12.2	0.0	0.00
1	5	05/07/24	12:18	12:38	12.2	12.1	0.1	0.01
1	6	05/07/24	12:55	13:15	12.2	12.1	0.1	0.01
1	7	05/07/24	14:00	14:20	12.2	12.1	0.1	0.01
1	8	05/07/24	14:38	14:58	12.1	12.1	0.0	0.00
1	9	05/07/24	15:20	15:40	12.2	12.1	0.1	0.01
0	10	05/07/24	16:22	16:42	12.2	12.1	0.1	0.01
n					9			
t(0.025)					2.306			
Mean Reference Method Value					12.189		RM avg	
Mean CEM Value					12.133		CEM avg	
Sum of Differences					0.500		di	
Mean Difference					0.056		d	
Sum of Differences Squared					0.050		di ²	
Standard Deviation					0.053		sd	
Confidence Coefficient 2.5% Error (1-tail)					0.041		cc	
Relative Accuracy					0.79		RA	

Client: Indeck Energy Services, Inc.					Location: EUCTGHRSG Unit 1			
Facility: Niles Energy Center					Date: 5/7/24			
Project #: M241909					Test Method: 10, 3A			
CO ppmvd @ 15% O2 RATA								
CEM Analyzer Information								
CO Monitor/Model:			Thermo iQ Series 48		CO Serial # :		1291697932	
O2 Monitor/Model:			Thermo iQ Series 48		O2 Serial # :		1291697932	
1=accept 0=reject	Test Run	Test Date	Start Time	End Time	RM CO ppmvd @ 15 %O2	CEM CO ppmvd @ 15 %O2	(RM-CEM) Difference (di)	(RM-CEM) Difference ² (di ²)
1	1	05/07/24	09:18	09:38	0.1	0.0	0.1	0.01
1	2	05/07/24	09:58	10:18	0.2	0.0	0.2	0.04
1	3	05/07/24	10:36	10:56	0.1	0.0	0.1	0.01
1	4	05/07/24	11:38	11:58	0.2	0.0	0.2	0.04
1	5	05/07/24	12:18	12:38	0.3	0.0	0.3	0.09
1	6	05/07/24	12:55	13:15	0.3	0.0	0.3	0.09
1	7	05/07/24	14:00	14:20	0.3	0.0	0.3	0.09
1	8	05/07/24	14:38	14:58	0.4	0.0	0.4	0.16
1	9	05/07/24	15:20	15:40	0.3	0.0	0.3	0.09
0	10	05/07/24	16:22	16:42	0.3	0.0	0.3	0.09
n					9			
t(0.975)					2.306			
Mean Reference Method Value					0.244		RM avg	
Mean CEM Value					0.000		CEM avg	
Sum of Differences					2.200		di	
Mean Difference					0.244		d	
Sum of Differences Squared					0.620		di ²	
Standard Deviation					0.101		sd	
Confidence Coefficient 2.5% Error (1-tail)					0.078		cc	
Relative Accuracy - APS					0.32		ppm + cc difference ^A	

^A Relative accuracy based upon alternate performance standard of +/- 5 ppm CO plus the confidence coefficient.

Client: Indeck Energy Services, Inc.

Facility: Niles Energy Center

Project #: M241909

Location: EUCTGHRSG Unit 1

Date: 5/7/24

Test Method: 10, 2

Applicable Standard: 24.7

CO lb/hr RATA

CEM Analyzer Information

CO Monitor/Model:			Thermo iQ Series 48		CO Serial # :		1291697932	
1=accept 0=reject	Test Run	Test Date	Start Time	End Time	RM CO lb/hr	CEM CO lb/hr	(RM-CEM) Difference (di)	(RM-CEM) Difference ² (di ²)
1	1	05/07/24	09:18	09:38	1.09	0.13	0.96	0.9216
1	2	05/07/24	09:58	10:18	1.60	0.00	1.60	2.5600
1	3	05/07/24	10:36	10:56	1.05	0.00	1.05	1.1025
1	4	05/07/24	11:38	11:58	1.44	0.00	1.44	2.0736
1	5	05/07/24	12:18	12:38	2.26	0.00	2.26	5.1076
1	6	05/07/24	12:55	13:15	2.02	0.00	2.02	4.0804
1	7	05/07/24	14:00	14:20	2.26	0.00	2.26	5.1076
1	8	05/07/24	14:38	14:58	2.70	0.00	2.70	7.2900
1	9	05/07/24	15:20	15:40	2.02	0.00	2.02	4.0804
0	10	05/07/24	16:22	16:42	2.32	0.00	2.32	5.3824
n					9			
t(0.975)					2.306			
Mean Reference Method Value					1.827		RM avg	
Mean CEM Value					0.014		CEM avg	
Sum of Differences					16.310		di	
Mean Difference					1.812		d	
Sum of Differences Squared					32.324		di ²	
Standard Deviation					0.588		sd	
Confidence Coefficient 2.5% Error (1-tail)					0.452		cc	
Relative Accuracy - APS					9.17		RA	

3.2 EUCTGHRSG2 RATA Tables

Client: Indeck Energy Services, Inc.					Location: EUCTGHRSG Unit 2			
Facility: Niles Energy Center					Date: 5/8/24			
Project #: M241909					Test Method: 7E, 3A			
NOx ppmvd @ 15% O2 RATA								
CEM Analyzer Information								
NO _x Monitor/Model:			Thermo iQ Series 42		NO _x Serial # :		1201697936	
O ₂ Monitor/Model:			Thermo iQ Series 48		O ₂ Serial # :		1291697932	
1=accept 0=reject	Test Run	Test Date	Start Time	End Time	RM NOx ppmvd @ 15 %O2	CEM NOx ppmvd @ 15 %O2	(RM-CEM) Difference (di)	(RM-CEM) Difference ² (di ²)
1	1	05/08/24	08:42	09:02	0.8	0.7	0.1	0.01
1	2	05/08/24	09:19	09:39	0.8	0.7	0.1	0.01
1	3	05/08/24	09:57	10:17	0.8	0.7	0.1	0.01
1	4	05/08/24	11:00	11:20	0.8	0.7	0.1	0.01
0	5	05/08/24	11:46	12:06	0.8	0.7	0.1	0.01
1	6	05/08/24	14:34	14:54	0.8	0.7	0.1	0.01
1	7	05/08/24	15:38	15:58	0.8	0.7	0.1	0.01
1	8	05/08/24	16:19	16:39	0.8	0.7	0.1	0.01
1	9	05/08/24	16:55	17:15	0.8	0.7	0.1	0.01
1	10	05/08/24	17:44	18:04	0.8	0.7	0.1	0.01
n					9			
t(0.975)					2.306			
Mean Reference Method Value					0.800		RM avg	
Mean CEM Value					0.700		CEM avg	
Sum of Differences					0.900		di	
Mean Difference					0.100		d	
Sum of Differences Squared					0.090		di ²	
Standard Deviation					0.000		sd	
Confidence Coefficient 2.5% Error (1-tail)					0.000		cc	
Relative Accuracy					12.50		RA	

Client: Indeck Energy Services, Inc.					Location: EUCTGHRSG Unit 2			
Facility: Niles Energy Center					Date: 5/8/24			
Project #: M241909					Test Method: 7E, 3A			
Fuel Type: Natural Gas					Fuel Factor: 8710			
O2 based NOx lb/mmBtu RATA								
CEM Analyzer Information								
NO_x Monitor/Model:			Thermo iQ Series 42		NO_x Serial # :		1201697936	
O2 Monitor/Model:			Thermo iQ Series 48		O2 Serial # :		1291697932	
1=accept 0=reject	Test Run	Test Date	Start Time	End Time	RM NO_x lb/MMBtu	CEM NO_x lb/MMBtu	(RM-CEM) Difference (di)	(RM-CEM) Difference² (di²)
1	1	05/08/24	08:42	09:02	0.003	0.003	0.000	0.000000
1	2	05/08/24	09:19	09:39	0.003	0.003	0.000	0.000000
1	3	05/08/24	09:57	10:17	0.003	0.003	0.000	0.000000
1	4	05/08/24	11:00	11:20	0.003	0.003	0.000	0.000000
0	5	05/08/24	11:46	12:06	0.003	0.003	0.000	0.000000
1	6	05/08/24	14:34	14:54	0.003	0.003	0.000	0.000000
1	7	05/08/24	15:38	15:58	0.003	0.003	0.000	0.000000
1	8	05/08/24	16:19	16:39	0.003	0.003	0.000	0.000000
1	9	05/08/24	16:55	17:15	0.003	0.003	0.000	0.000000
1	10	05/08/24	17:44	18:04	0.003	0.003	0.000	0.000000
n					9			
t(0.025)					2.306			
Mean Reference Method Value					0.003		RM avg	
Mean CEM Value					0.003		CEM avg	
Sum of Differences					0.000		di	
Mean Difference					0.000		d	
Sum of Differences Squared					0.000		di²	
Standard Deviation					0.000		sd	
Confidence Coefficient 2.5% Error (1-tail)					0.000		cc	
Relative Accuracy					0.00		RA	

Client: Indeck Energy Services, Inc.					Location: EUCTGHRSG Unit 2			
Facility: Niles Energy Center					Date: 5/8/24			
Project #: M241909					Test Method: 7E, 2			
Applicable Standard: 27.4								
NO _x lb/hr RATA								
CEM Analyzer Information								
NO _x Monitor/Model:			Thermo iQ Series 42		NO _x Serial # :		1201697936	
1=accept 0=reject	Test Run	Test Date	Start Time	End Time	RM NO _x lb/hr	CEM NO _x lb/hr	(RM-CEM) Difference (di)	(RM-CEM) Difference ² (di ²)
1	1	05/08/24	08:42	09:02	10.62	9.34	1.28	1.6384
1	2	05/08/24	09:19	09:39	10.56	9.32	1.24	1.5376
1	3	05/08/24	09:57	10:17	10.56	9.34	1.22	1.4884
1	4	05/08/24	11:00	11:20	10.45	9.33	1.12	1.2544
0	5	05/08/24	11:46	12:06	10.39	9.33	1.06	1.1236
1	6	05/08/24	14:34	14:54	10.23	9.21	1.02	1.0404
1	7	05/08/24	15:38	15:58	10.28	9.35	0.93	0.8649
1	8	05/08/24	16:19	16:39	10.46	9.37	1.09	1.1881
1	9	05/08/24	16:55	17:15	10.32	9.31	1.01	1.0201
1	10	05/08/24	17:44	18:04	10.35	9.26	1.09	1.1881
n					9			
t(0.975)					2.306			
Mean Reference Method Value					10.426		RM avg	
Mean CEM Value					9.314		CEM avg	
Sum of Differences					10.000		di	
Mean Difference					1.111		d	
Sum of Differences Squared					11.220		di ²	
Standard Deviation					0.117		sd	
Confidence Coefficient 2.5% Error (1-tail)					0.090		cc	
Relative Accuracy - APS					4.38		RA	

Client: Indeck Energy Services, Inc.					Location: EUC TGHRS G Unit 2			
Facility: Niles Energy Center					Date: 5/8/24			
Project #: M241909					Test Method: 3A			
O ₂ % (dry) RATA								
CEM Analyzer Information								
O ₂ Monitor/Model:			Thermo iQ Series 48		O ₂ Serial # :		1291697932	
1=accept 0=reject	Test Run	Test Date	Start Time	End Time	RM O ₂ % (dry)	CEM O ₂ % (dry)	(RM-CEM) Difference (di)	(RM-CEM) Difference ² (di ²)
1	1	05/08/24	08:42	09:02	12.2	12.2	0.0	0.00
1	2	05/08/24	09:19	09:39	12.2	12.2	0.0	0.00
1	3	05/08/24	09:57	10:17	12.2	12.2	0.0	0.00
1	4	05/08/24	11:00	11:20	12.2	12.2	0.0	0.00
0	5	05/08/24	11:46	12:06	12.2	12.2	0.0	0.00
1	6	05/08/24	14:34	14:54	12.3	12.2	0.1	0.01
1	7	05/08/24	15:38	15:58	12.3	12.2	0.1	0.01
1	8	05/08/24	16:19	16:39	12.2	12.2	0.0	0.00
1	9	05/08/24	16:55	17:15	12.2	12.2	0.0	0.00
1	10	05/08/24	17:44	18:04	12.2	12.2	0.0	0.00
n					9			
t(0.025)					2.306			
Mean Reference Method Value					12.222		RM avg	
Mean CEM Value					12.200		CEM avg	
Sum of Differences					0.200		di	
Mean Difference					0.022		d	
Sum of Differences Squared					0.020		di ²	
Standard Deviation					0.044		sd	
Confidence Coefficient 2.5% Error (1-tail)					0.034		cc	
Relative Accuracy					0.46		RA	

Client: Indeck Energy Services, Inc.					Location: EUCTGHRSG Unit 2			
Facility: Niles Energy Center					Date: 5/8/24			
Project #: M241909					Test Method: 10, 3A			
CO ppmvd @ 15% O2 RATA								
CEM Analyzer Information								
CO Monitor/Model:			Thermo iQ Series 48		CO Serial # :		1291697932	
O ₂ Monitor/Model:			Thermo iQ Series 48		O ₂ Serial # :		1291697932	
1=accept 0=reject	Test Run	Test Date	Start Time	End Time	RM CO ppmvd @ 15 %O2	CEM CO ppmvd @ 15 %O2	(RM-CEM) Difference (di)	(RM-CEM) Difference ² (di ²)
1	1	05/08/24	08:42	09:02	0.3	0.0	0.3	0.09
1	2	05/08/24	09:19	09:39	0.1	0.0	0.1	0.01
1	3	05/08/24	09:57	10:17	0.3	0.0	0.3	0.09
1	4	05/08/24	11:00	11:20	0.1	0.0	0.1	0.01
0	5	05/08/24	11:46	12:06	0.2	0.0	0.2	0.04
1	6	05/08/24	14:34	14:54	0.1	0.0	0.1	0.01
1	7	05/08/24	15:38	15:58	0.2	0.0	0.2	0.04
1	8	05/08/24	16:19	16:39	0.2	0.0	0.2	0.04
1	9	05/08/24	16:55	17:15	0.1	0.0	0.1	0.01
1	10	05/08/24	17:44	18:04	0.2	0.0	0.2	0.04
n					9			
t(0.975)					2.306			
Mean Reference Method Value					0.178		RM avg	
Mean CEM Value					0.000		CEM avg	
Sum of Differences					1.600		di	
Mean Difference					0.178		d	
Sum of Differences Squared					0.340		di ²	
Standard Deviation					0.083		sd	
Confidence Coefficient 2.5% Error (1-tail)					0.064		cc	
Relative Accuracy - APS					0.24		ppm + cc difference ^A	

^A Relative accuracy based upon alternate performance standard of +/- 5 ppm CO plus the confidence coefficient.

Client: Indeck Energy Services, Inc.					Location: EUCTGHRSG Unit 2			
Facility: Niles Energy Center					Date: 5/8/24			
Project #: M241909					Test Method: 10, 2			
Applicable Standard: 24.7								
CO lb/hr RATA								
CEM Analyzer Information								
CO Monitor/Model:			Thermo iQ Series 48		CO Serial # :		1291697932	
1=accept 0=reject	Test Run	Test Date	Start Time	End Time	RM CO lb/hr	CEM CO lb/hr	(RM-CEM) Difference (di)	(RM-CEM) Difference ² (di ²)
1	1	05/08/24	08:42	09:02	2.64	0.00	2.64	6.9696
1	2	05/08/24	09:19	09:39	0.56	0.00	0.56	0.3136
1	3	05/08/24	09:57	10:17	1.95	0.00	1.95	3.8025
1	4	05/08/24	11:00	11:20	1.09	0.00	1.09	1.1881
0	5	05/08/24	11:46	12:06	1.65	0.00	1.65	2.7225
1	6	05/08/24	14:34	14:54	0.77	0.00	0.77	0.5929
1	7	05/08/24	15:38	15:58	1.32	0.00	1.32	1.7424
1	8	05/08/24	16:19	16:39	1.31	0.00	1.31	1.7161
1	9	05/08/24	16:55	17:15	0.90	0.00	0.90	0.8100
1	10	05/08/24	17:44	18:04	1.26	0.00	1.26	1.5876
n					9			
t(0.975)					2.306			
Mean Reference Method Value					1.311		RM avg	
Mean CEM Value					0.000		CEM avg	
Sum of Differences					11.800		di	
Mean Difference					1.311		d	
Sum of Differences Squared					18.723		di ²	
Standard Deviation					0.638		sd	
Confidence Coefficient 2.5% Error (1-tail)					0.490		cc	
Relative Accuracy - APS					7.29		RA	

4.0 CERTIFICATION

Mostardi Platt is pleased to have been of service to Indeck Energy Services, Inc. If you have any questions regarding this test report, please do not hesitate to contact us at 630-993-2100.

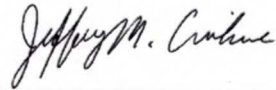
As the program manager, I hereby certify that this test report represents a true and accurate summary of emissions test results and the methodologies employed to obtain those results. The test program was performed in accordance with the site-specific test plan, test methods, the Mostardi Platt Quality Manual, and the ASTM D7036-12, as applicable.

MOSTARDI PLATT



Joshua R. Kukla

Program Manager



Jeffrey M. Crivlare

Quality Assurance

APPENDICES