

Indiantown Cogeneration, L.P.

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September 10th, 2014

RECEIVED

SEP 16 2014

DIVISION OF AIR
RESOURCE MANAGEMENT

Mr. Errin Pichard
Florida Department of Environmental Protection
Division of Air Resource Management
2600 Blair Stone Road MS 5500.
Tallahassee, FL 33401

Re: Indiantown Cogeneration L.P. Third Quarter of 2014 Linearity, Opacity Audit & Cylinder Gas Audit Report {Permit Nos: 0850102 (PSD-FL-168)}

Dear Mr. Pichard

Attached please find the Third Quarter of 2014 Linearity/Calibration Gas Audits (CGA), Opacity Audits and summary of the audit results for Indiantown Cogeneration, L.P. (ICLP) Main Boiler CEMDAS, Auxiliary Boilers and reactors A & B. These audits were performed following the guidelines established in 40CFR60/75, Appendix B.

Summary of Cylinder Gas Audit Results

Parameter	Low Gas Error	Mid Gas Error	High Gas Error	Limit
SO2 Inlet A	1.00	0.00		15
CO2 Inlet A	2.00	1.00		15
SO2 Inlet B	1.00	0.00		15
CO2 Inlet B	1.00	0.00		15
NOX Aux	0.00	0.00		15
O2 Aux	2.00	2.00		15
CO Lo Aux	3.00	1.00		15
CO Hi Aux	2.00	0.00		15
NOX Main	0.40	0.60	1.10	5.0
SO2 Main	4.40	2.60	0.70	5.0
CO2 Main	0.40	0.70	0.70	5.0
Opacity Cal Error	0.00	0.03	0.41	3.0

Linearity Audit (Main Boiler)

- The quarterly Linearity Audit for the Third Quarter 2014 was completed on August 26th, 2014 for the Main Boiler's sulfur dioxide, nitrogen oxides, and carbon dioxide analyzers. All were within tolerances.

Cylinder Gas Audits Reactor A & B

- The quarterly CGA's for the Third Quarter 2014 was completed on August 26th, 2014 for Reactors A & B Sulfur dioxide and carbon dioxide. All were found within tolerances.

Cylinder Gas Audits Auxiliary Boilers

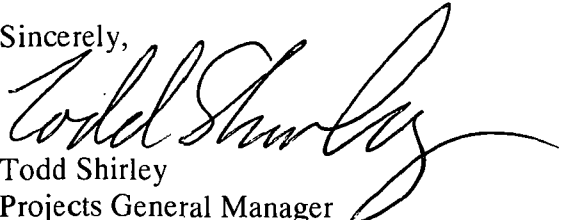
The quarterly CGA's for the Third Quarter 2014 was completed on August 27th, 2014 for the Auxiliary NOX, Carbon Monoxide and Oxygen. All were within tolerances.

Opacity Audit (Main Boiler)

- The opacity meter was tested on August 28th, 2014 and found to be within the 3% tolerance in all ranges.

Attached are the Audit reports for your review. In accordance to Chapter 62-213-440(1)(b)3-c, F.A.C., I certify that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Should you have any questions please contact Nicholas Laryea at (772) 597-6535.

Sincerely,


Todd Shirley
Projects General Manager

cc: Lee Hoefert (DEP South East District)
File # 2.4.1

Main Boiler Linearity

LINEARITY PERFORMANCE AUDIT

FOR

Indiantown Cogeneration

Indiantown, FL

**Units: Main Emission unit E001
DILUTION EXTRACTIVE**

Third Quarter 2014

PREPARED BY:

Indiantown Cogeneration

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Section 1 Introduction

Facility Location: Indiantown Cogeneration, L.P. operates the Indiantown Cogeneration Plant, which is located in Martin County at 13303 SW Silver Fox Lane, Indiantown, Florida.

The Indiantown Cogeneration Plant is a cogeneration facility which generates electricity for sale and exports steam to the Louis Dreyfus Citrus Processing Plant. The Facility includes one high-pressure pulverized coal main boiler (PC boiler) rated at 3,422 million British thermal units (MMBtu)/hour heat input, and has a nominal net electrical power output of approximately 330 megawatts (MW). It is permitted to fire natural gas, propane, or No. 2 fuel oil for startup, shutdown, or load changes.

Also included are two natural gas (or propane) fired identical auxiliary boilers used for supplying steam to the steam host during times when the PC boiler is offline, as well as during PC boiler startup and shutdown periods. The two identically sized packaged water-tube steam boilers have a combined rated maximum capacity of 350 MMBtu/hr.

Steam produced by the auxiliary boilers is not used to generate electricity. In addition, the facility has a variety of ancillary equipment needed to support operations as a coal-fired cogeneration plant.

Indiantown Cogeneration of Indiantown, Florida conducted this quarter's linearity test audit at Indiantown Cogeneration on August 26th 2014 by Keith Kowalski. The audit of the Continuous Emission Monitoring System was conducted for NO_x, SO₂ and CO₂.

Our assessment of these results indicates that all of the analyzers evaluated during this test program meet the criteria for the linearity test requirements for 40 CFR 75 Section 3. Support Data summarizes the results for the Linearity Test Audit

Reviewed by: Nicholas Langer

Date: 9/9/2014

Summary of Cylinder Gas Audit Results

Parameter	Low Gas	Mid Gas	High Gas
CO2	0.4	0.7	0.7
SO2	4.4	2.6	0.7
NOx	0.4	0.6	1.1

Section 2 Linearity Test Audit Procedures

Each Continuous Emission Monitor (CEM) must be audited four out of four calendar quarters of the year, and anytime there is a major repair. As a part of the Quality Control (QC) and Quality Assurance (QA) procedures, the quality of the data produced is evaluated by response accuracy compared to known standards.

This quarter's linearity was conducted in accordance with the QA/QC procedure outlined in 40 CFR 75, Appendix A.

The audit consisted of challenging the CEM with an audit gas of known concentration with 3 upscale levels of gas; Low level concentration: 20-30% of span, Mid level concentration: 50-60% of span, High level concentration: 80-100% of span. The audit cylinders contain pollutant or diluent gas certified in accordance with U.S. EPA protocol 1.

The audit gases were introduced into the entire sampling and analysis system through the normal part of the daily QC gases.

The procedure was conducted as follows:

- 1 Audit cylinder 1 was connected to the system.
- 2 Manual span was initiated for approximately 15 minutes until a stable response was achieved.
- 3 Values were recorded as the system was allowed to operate in a normal sampling and analysis manner without adjustment
- 4 The first audit cylinder was removed and replaced by audit cylinder 2.
- 5 Manual span was initiated for approximately 15 minutes until a stable response was achieved.
- 6 The second audit cylinder was removed and replaced by audit cylinder 3.
- 7 Manual span was initiated for approximately 15 minutes until a stable response was achieved.
- 8 This series of steps was repeated through three audit runs.

For each audit cylinder (or audit point), the error in linearity for each calibration (low, mid, and high levels) was determined. The average of the linearity at each level was determined for SO₂ and NO_x pollutant concentration monitors by the following equations:

$$LE = \frac{|R-A|}{R} \times 100 \text{ or } |R-A| \leq 5 \text{ ppm}$$

For CO₂ or O₂ monitors:

$$LE = |R-A| \leq 5\% \text{ or } |R-A| \leq 0.5\% \text{ CO}_2 \text{ or O}_2$$

which ever is less restrictive per audit level

LE = Linearity Error

$$LE \leq 5\%$$

R = Reference Value for High, Mid, or Low Range Gas A = Average Response of the Monitors Value

Section 3 Support Data

Main Boiler CO2 Linearity

Indiantown CoGen

Test Information

Test Date: 8/26/2014
 Facility: Indiantown CoGen
 Unit: Main Boiler
 ORIS: 050976
 Test Reason(s):
 Aborted: No

Analyzer Information

Range: Single
 Instrument Span: 20 %CO2
 Component ID: 140
 Monitoring System ID: C10
 Manufacturer: California Analytical
 Model: ZRH-1
 Serial Number: A7B3749T

Run Number	Time	Reference Gas	CEMS Response	Cylinder Information	
Low Gas					
1	9:18 AM	4.920	4.950	Allowable Reference Values: 4-6 %CO2 (20-30% of span) Cylinder ID: EB-0034815 Expiration date: 2/18/2017 EPA vendor ID: E12013 Cylinder contains: CO2,NO,SO2,BALN	
2	9:48 AM	4.920	4.860		
3	10:18 AM	4.920	4.890		
Mean (%CO2)		4.920	4.900		
Mean Difference (%CO2)		0.020	Limit: 0.5 Passed		
Linearity Error		0.4%	Limit: 5.0% Passed		
Mid Gas					
1	9:28 AM	10.800	10.670		
2	9:58 AM	10.800	10.740		
3	10:28 AM	10.800	10.770		
Mean (%CO2)		10.800	10.727		
Mean Difference (%CO2)		0.073	Limit: 0.5 Passed		
Linearity Error		0.7%	Limit: 5.0% Passed		
High Gas					
1	9:38 AM	17.700	17.870		
2	10:08 AM	17.700	17.770		
3	10:38 AM	17.700	17.840		
Mean (%CO2)		17.700	17.827		
Mean Difference (%CO2)		0.127	Limit: 0.5 Passed		
Linearity Error		0.7%	Limit: 5.0% Passed		

Linearity Error (LE) Determination: $LE = (|R-A| / R) * 100$

R = Reference gas value

A = Mean of actual CEMS responses

Main Boiler SO2 Linearity

Indiantown CoGen

Test Information

Test Date: 8/26/2014
Facility: Indiantown CoGen
Unit: Main Boiler
ORIS: 050976
Test Reason(s):
Aborted: No

Analyzer Information

Range: Single
Instrument Span: 140 ppm
Component ID: 160
Monitoring System ID: S10
Manufacturer: Thermo Environmental Inst
Model: 43I
Serial Number: CM07260055

Run Number	Time	Reference Gas	CEMS Response	Cylinder Information	
Low Gas					
1	9:18 AM	33.800	32.630	Allowable Reference Values: 28-42 ppm (20-30% of span) Cylinder ID: EB-0034815 Expiration date: 2/18/2017 EPA vendor ID: E12013 Cylinder contains: CO2,NO,SO2,BALN	
2	9:48 AM	33.800	31.740		
3	10:18 AM	33.800	32.610		
Mean (ppm)		33.800	32.327		
Mean Difference (ppm)		1.473	Limit: 5 Passed		
Linearity Error		4.4%	Limit: 5.0% Passed		
Mid Gas					
1	9:28 AM	73.400	72.430		Allowable Reference Values: 70-84 ppm (50-60% of span) Cylinder ID: EB-0020382 Expiration date: 2/18/2021 EPA vendor ID: E12013 Cylinder contains: CO2,NO,SO2,BALN
2	9:58 AM	73.400	71.010		
3	10:28 AM	73.400	71.090		
Mean (ppm)		73.400	71.510		
Mean Difference (ppm)		1.890	Limit: 5 Passed		
Linearity Error		2.6%	Limit: 5.0% Passed		
High Gas					
1	9:38 AM	126.000	123.710	Allowable Reference Values: 112-140 ppm (80-100% of span) Cylinder ID: CC-117904 Expiration date: 7/15/2021 EPA vendor ID: E12013 Cylinder contains: CO2,NO,SO2,BALN	
2	10:08 AM	126.000	126.170		
3	10:38 AM	126.000	125.550		
Mean (ppm)		126.000	125.143		
Mean Difference (ppm)		0.857	Limit: 5 Passed		
Linearity Error		0.7%	Limit: 5.0% Passed		

Linearity Error (LE) Determination: $LE = (|R-A| / R) * 100$

R = Reference gas value

A = Mean of actual CEMS responses

Main Boiler NOx Linearity

Indiantown CoGen

Test Information

Test Date: 8/26/2014
 Facility: Indiantown CoGen
 Unit: Main Boiler
 ORIS: 050976
 Test Reason(s):
 Aborted: No

Analyzer Information

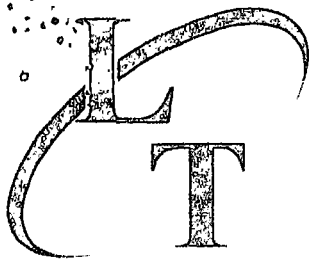
Range: Single
 Instrument Span: 250 ppm
 Component ID: 110
 Monitoring System ID: N10
 Manufacturer: Thermo Environmental Inst
 Model: 42I
 Serial Number: CM072660054

Run Number	Time	Reference Gas	CEMS Response	Cylinder Information	
Low Gas					
1	9:18 AM	64.200	64.020	Allowable Reference Values: 50-75 ppm (20-30% of span) Cylinder ID: EB0034815 Expiration date: 2/18/2017 EPA vendor ID: E12013 Cylinder contains: CO2,NO,SO2,BALN	
2	9:48 AM	64.200	64.600		
3	10:18 AM	64.200	64.720		
Mean (ppm)		64.200	64.447		
Mean Difference (ppm)		0.247	Limit: 5 Passed		
Linearity Error		0.4%	Limit: 5.0% Passed		
Mid Gas					
1	9:28 AM	131.000	131.700		Allowable Reference Values: 125-150 ppm (50-60% of span) Cylinder ID: EB-0020382 Expiration date: 2/18/2021 EPA vendor ID: E12013 Cylinder contains: CO2,NO,SO2,BALN
2	9:58 AM	131.000	132.010		
3	10:28 AM	131.000	131.760		
Mean (ppm)		131.000	131.823		
Mean Difference (ppm)		0.823	Limit: 5 Passed		
Linearity Error		0.6%	Limit: 5.0% Passed		
High Gas					
1	9:38 AM	232.000	229.310	Allowable Reference Values: 200-250 ppm (80-100% of span) Cylinder ID: CC-117904 Expiration date: 7/15/2021 EPA vendor ID: E12013 Cylinder contains: CO2,NO,SO2,BALN	
2	10:08 AM	232.000	229.510		
3	10:38 AM	232.000	229.500		
Mean (ppm)		232.000	229.440		
Mean Difference (ppm)		2.560	Limit: 5 Passed		
Linearity Error		1.1%	Limit: 5.0% Passed		

Linearity Error (LE) Determination: $LE = (|R-A| / R) * 100$

R = Reference gas value

A = Mean of actual CEMS responses



LIQUID TECHNOLOGY CORPORATION
"INDUSTRY LEADER IN SPECIALTY GASES"

Certificate of Analysis

MAIN
DAILY ZERO
1/15/14

Customer Indiantown Cogen, LP (Indiantown, FL)
Date February 19, 2013
Delivery Receipt DR-45823
Product: Nitrogen, CEMS Grade
Lot Number: LTB123-PG

Mixture Specifications

Cylinder Number EB-0034814

<u>Components</u>	<u>Requested</u>	<u>Actual</u>
Moisture	2.0 ppm	< 2.0 ppm
Hydrocarbons	0.1 ppm	< 0.1 ppm
Oxygen	1.0 ppm	< 1.0 ppm
Carbon Monoxide	1.0 ppm	< 1.0 ppm
Carbon Dioxide	1.0 ppm	< 1.0 ppm
Nitrogen	99.9995%	99.9995%

Cylinder Data

Cylinder Valve: CGA 580
Cylinder Volume: 140 Cubic Feet
Cylinder Pressure: 2000 psig, 70°F
Expiration Date: February 19, 2016

Certified by:

David Scott

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LIQUID TECHNOLOGY CORPORATION

"INDUSTRY LEADER IN SPECIALTY GASES"

11/84

MAIN
DAILY SPAN
6/26/14

Certificate of Analysis
- EPA PROTOCOL GAS -

Customer: Indiantown Cogen, LP (Indiantown, FL)
Date: July 18, 2013
Delivery Receipt: DR-47678
Gas Standard: 225 ppm NO, 125 ppm SO2, 18.0% CO2/Nitrogen - EPA PROTOCOL
Final Analysis Date: July 15, 2013
Expiration Date: July 15, 2021
DO NOT USE BELOW 100 psig

Analytical Data:
EPA Protocol, Section No. 2.2, Procedure G-2.

Reported Concentrations
Nitric Oxide: 232 ppm +/- 0.33 ppm
Sulfur Dioxide: 126 ppm +/- 1.2 ppm
Carbon Dioxide: 17.7% +/- 0.17%
Nitrogen: Balance
Total NOx: 233 ppm

** Total NOx for Reference Use Only **

Reference Standards

SRM/GMIS:	GMIS/GMIS	GMIS/GMIS	GMIS/GMIS
Cylinder Number:	ND-45697/ND-45699	CC-54548/CC-251490	EB-0026839/CC-185129
Concentration:	97.46 ppm/245.47 ppm NO	102.43 ppm/507.87 ppm SO2	6.84%/13.92% CO2
Expiration Date:	01/12/14 - 08/23/20	06/14/20 - 11/02/20	10/03/20 - 06/24/13

Certification Instrumentation

Component:	Nitric Oxide	Sulfur Dioxide	Carbon Dioxide
Make/Model:	Nicolet 6700	Nicolet 6700	Nicolet 6700
Serial Number:	APW1100563	APW1100563	APW1100563
Principal of Measurement:	FTIR	FTIR	FTIR
Last Calibration:	July 03, 2013	July 03, 2013	June 27, 2013

Cylinder Data

Cylinder Number:	CC-117904	Cylinder Volume:	126 Cubic Feet
Cylinder Outlet:	CGA 660	Cylinder Pressure:	1800 psig, 70°F

Analytical Uncertainty and NIST Traceability are in compliance with EPA-600/R-12/531.

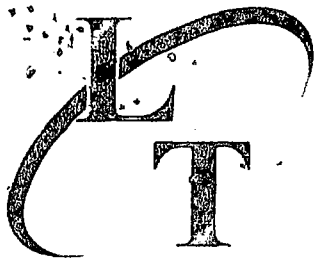
Certified by:

David Scott

PGVP Vendor ID: E12013

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WWW.LIQUIDTECHCORP.COM
APOPKA, FL • HOUSTON, TX



LIQUID TECHNOLOGY CORPORATION
"INDUSTRY LEADER IN SPECIALTY GASES"

*MAIN
LOW & LOW
8/23/13*

Certificate of Analysis
- EPA PROTOCOL GAS -

<u>Customer</u>	<u>Indiantown Cogen, LP (Indiantown, FL)</u>
<u>Date</u>	<u>February 19, 2013</u>
<u>Delivery Receipt</u>	<u>DR-45823</u>
<u>Gas Standard</u>	<u>64.0 ppm NO, 33.0 ppm SO₂, 5.00% CO₂/Nitrogen - EPA PROTOCOL</u>
<u>Final Analysis Date</u>	<u>February 18, 2013</u>
<u>Expiration Date</u>	<u>February 18, 2017</u> ✓

DO NOT USE BELOW 100 psig

Analytical Data:
EPA Protocol, Section No. 2.2, Procedure G-1.

Reported Concentrations
Nitric Oxide: 64.2 ppm +/- 0.34 ppm
Sulfur Dioxide: 33.8 ppm +/- 0.33 ppm
Carbon Dioxide: 4.92% +/- 0.04%
Nitrogen: Balance
Total NOx: 64.8 ppm

** Total NOx for Reference Use Only **

Reference Standards

SRM/GMIS:	GMIS/GMIS	GMIS/GMIS	GMIS
Cylinder Number:	CC-88803/ND-45697	EB-0031141/EB-0014698	EB-0015844
Concentration:	49.52 ppm NO/97.46 ppm NO	25.25 ppm SO ₂ /50.67 ppm SO ₂	4.935% CO ₂
Expiration Date:	07/18/13 - 01/12/14	11/01/16 - 04/12/13	10/03/20

Certification Instrumentation

Component:	Nitric Oxide	Sulfur Dioxide	Carbon Dioxide
Make/Model:	Nicolet 6700	Nicolet 6700	Nicolet 6700
Serial Number:	APW1100563	APW1100563	APW1100563
Principal of Measurement:	FTIR	FTIR	FTIR
Last Calibration:	January 30, 2013	January 30, 2013	January 30, 2013

Cylinder Data

Cylinder Number:	EB-0034815 ✓	Cylinder Volume:	138 Cubic Feet
Cylinder Outlet:	CGA 660	Cylinder Pressure:	1975 psig, 70°F

Analytical Uncertainty and NIST Traceability are in compliance with EPA-600/R-12/531.

Certified by: 
David Scott

PGVP Vendor ID: E12013

"UNMATCHED EXCELLENCE"



LIQUID TECHNOLOGY CORPORATION

"INDUSTRY LEADER IN SPECIALTY GASES"

✓ 4/16/14
MAIN CEMIS
LIN. MID

Certificate of Analysis - EPA PROTOCOL GAS -

Customer Indiantown Cogen, LP (Indiantown, FL)
Date February 19, 2013
Delivery Receipt DR-45823
Gas Standard 131 ppm NO, 75 ppm SO₂, 11.0% CO₂/Nitrogen - EPA PROTOCOL
Final Analysis Date February 18, 2013
Expiration Date February 18, 2021

DO NOT USE BELOW 100 psig

Analytical Data:
EPA Protocol, Section No. 2.2, Procedure G-1.

Reported Concentrations
Nitric Oxide: 131 ppm +/- 0.49 ppm
Sulfur Dioxide: 73.4 ppm +/- 0.73 ppm
Carbon Dioxide: 10.8% +/- 0.07%
Nitrogen: Balance
Total NO_x: 132 ppm
 ** Total NO_x for Reference Use Only **

Reference Standards

SRM/GMIS:	GMIS/GMIS	GMIS/GMIS	GMIS
Cylinder Number:	ND-45697/ND-45515	EB-0014698/CC-54548	CC-185129
Concentration:	97.46 ppm NO/246.26 ppm NO	50.67 ppm SO ₂ /102.43 ppm SO ₂	13.92% CO ₂
Expiration Date:	01/12/14 - 08/23/20	04/12/13 - 04/12/13	06/24/13


Certification Instrumentation

Component:	Nitric Oxide	Sulfur Dioxide	Carbon Dioxide
Make/Model:	Nicolet 6700	Nicolet 6700	Nicolet 6700
Serial Number:	APW1100563	APW1100563	APW1100563
Principal of Measurement:	FTIR	FTIR	FTIR
Last Calibration:	January 30, 2013	January 30, 2013	January 30, 2013

Cylinder Data

Cylinder Number:	EB-0020382	Cylinder Volume:	136 Cubic Feet
Cylinder Outlet:	CGA 660	Cylinder Pressure:	1950 psig, 70°F

Analytical Uncertainty and NIST Traceability are in compliance with EPA-600/R-12/531.

Certified by: 
David Scott

PGVP Vendor ID: E12013

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Opacity Audits

OPACITY PERFORMANCE AUDIT

FOR

Indiantown Cogeneration

Indiantown, FL

Units: Main Emission unit E001

**DURAG
MODEL CEMOP-290 OPACITY CEMS**

Third Quarter 2014

PREPARED BY:

Indiantown Cogeneration

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APPENDIX A MODEL CEMOP-290 AUDIT DATA FORMS

APPENDIX B FILTER DATA AND FIELD CERTIFICATION SHEETS

I. Introduction

Indiantown Cogen conducted an opacity performance audit on Durag Model CEMOP-290 opacity system. The testing was performed on August 28, 2014 by Keith Kowalski of Indiantown Cogen. The performance testing consists of:

1. Zero and Span Check
2. Transmissometer Dust Accumulation Check
3. Optical Alignment Check
4. Calibration Error Check

Procedures from U.S. EPA "Performance Audit Procedures for Opacity Monitors" were followed and are covered in Section 2. All raw data, calculated data and final summary are presented. The results indicate compliance for all specifications.

Facility Location: Indiantown Cogeneration, L.P. operates the Indiantown Cogeneration Plant, which is located in Martin County at 13303 SW Silver Fox Lane, Indiantown, Florida.

The Indiantown Cogeneration Plant is a cogeneration facility which generates electricity for sale and exports steam to the Louis Dreyfus Citrus Processing Plant. The Facility includes one high-pressure pulverized coal main boiler (PC boiler) rated at 3,422 million British thermal units (MMBtu)/hour heat input, and has a nominal net electrical power output of approximately 330 megawatts (MW). It is permitted to fire natural gas, propane, or No. 2 fuel oil for startup, shutdown, or load changes.

Also included are two natural gas (or propane) fired identical auxiliary boilers used for supplying steam to the steam host during times when the PC boiler is offline, as well as during PC boiler startup and shutdown periods. The two identically sized packaged water-tube steam boilers have a combined rated maximum capacity of 350 MMBtu/hr.

Steam produced by the auxiliary boilers is not used to generate electricity. In addition, the facility has a variety of ancillary equipment needed to support operations as a coal-fired cogeneration plant.

Reviewed by: Nicholas Langer

Date: 9/9/2014

**PERFORMANCE AUDIT PROCEDURES FOR THE
DURAG INC. OPACITY MONITOR**

II. Durag Inc. Model CEMOP-290

The instrument is manufactured by the Durag Corporation and distributed by Monitoring Solutions, Inc.

A. CEMS Description

The Durag Inc. CEMOP-290 opacity monitoring system consists of four major components: the Transmissometer, the terminal control box, the air-purging system and the remote control unit and data acquisition equipment. The Transmissometer component consists of an optical transmitter/receiver (transceiver) unit mounted on one side of a stack or duct and a retro reflector unit mounted on the opposite side. The transceiver unit contains the light source, the photodiode detector, and the associated electronics. The transceiver uses a single-lamp, single detector system to determine effluent opacity. An LED light source is modulated electronically at 2 KHz to eliminate any ambient light interference. The modulated beam is configured to alternately produce reference and measurement signals so that the effects of variations in the optical and electronic components of the CEMS are minimized.

The display terminal control box mounted beside the transceiver unit provides on-stack readout of the opacity output from the transceiver and can be used as a diagnostic tool.

The air purging system serves a threefold purpose: 1) it provides an air window to keep exposed optical surfaces clean; 2) it protects the optical surfaces from condensation of stack gas moisture; and 3) it minimizes thermal conduction from the stack to the instrument. A standard installation has one air-purging system for each the transceiver and the retro reflector units.

The remote control unit communicates with the remote display unit via an RS 422 cable.

The opacity monitor measures the amount of light transmitted through the effluent from the transceiver to the retro reflector and back again. The control unit uses the effluent transmittance to calculate the optical density of the effluent at the monitor location, or the “path” optical density. In order to provide stack exit opacity data, the path optical density must be corrected. The correction factor is expressed as the ratio of the stack exit inside diameter to the inside diameter of the stack at the Transmissometer location. This ratio is called the “stack correction factor” (SCF) by Durag Inc. The following equations illustrate the relationship between this ratio, path optical density, and stack exit opacity.

$$L_x/L_t = \text{stack correction factor}$$

where: L_x = stack exit inside diameter (ft)

L_t = the stack inside diameter (or the duct width) at the monitor location (ft)

$$OP_x = 1 - \left(1 - \frac{\text{Opacity}}{100}\right)^{\text{corr. factor}}$$

OP_x = stack exit opacity (%)

B. Performance Audit Procedures

Preliminary Data

1. Obtain the stack exit inside diameter and the stack or duct inside diameter or width at the monitor location. Record these values in Blanks 1 and 2 of the Durag Inc. CEMOP-Performance Audit Data Sheet.

Note: Effluent handling system dimensions may be acquired from the following sources listed in descending order of reliability: 1) physical measurements, 2) construction drawings, 3) opacity monitor installation/certification documents, and 4) source personnel recollections.

2. Calculate the stack correction factor (divide the value in Blank 1 by the value in Blank 2). Record the result in Blank 3.

3. Record the source-cited stack correction factor in Blank 4.

Note: The stack correction factor is preset by the manufacturer using information supplied by the source. The value recorded in Blank 4 should be the value source personnel agree should be set inside the monitor.

4. Obtain the reference zero and span calibration values. Record these values in Blank 5 and Blank 6, respectively.

Note: The reference zero and span calibration values may not be the same as the values recorded during instrument installation and/or certification. The zero and span values recorded in Blank 5 and Blank 6 should be the reference values recorded during the most recent clear-path calibration of the CEMS.

Error Checks

The following steps describe the error codes for the Durag Inc. CEMOP-290 remote control unit. Unless otherwise noted, the audit can continue with error codes being present, provided the source has been informed of the fault conditions.

Error code 100 = Transceiver blower fault
Error code 200 = Transceiver filter plugged
Error code 300 = Reflector blower fault
Error code 400 = Reflector filter plugged

Note: If a FAULT occurred, an error code should be displaying on the stack mounted display and on the remote display. An explanation of the error codes can be found in the manual.

Instrument Range Check

5. Check the opacity CEMS measurement range by pressing the MOD button (the LED on the button will light up) and using the PLUS button to cycle through the displays.
6. Record the instrument range in Blank 11.

Reference Signal, Zero and Span Checks

7. Initiate the calibration cycle by pressing the arrow and plus buttons simultaneously and holding for approximately 5 seconds.

Note: The monitor will automatically cycle through the internal zero, external zero, span and stack taper ratio modes.

8. Record the internal zero milliamp value displayed on the control panel display in Blank 12.

Note: The internal zero checks the instrument reference signal. Since the instrument provides a full scale output of 4 to 20 milliamps, a value of 4 milliamps displayed on the control unit display represents a zero condition. After 1 1/2 minutes in the internal zero mode, the monitor will automatically switch to the external zero mode.

9. Record the external zero value (in milliamps) displayed on the control unit display in Blank 13. Record the external zero value (in percent opacity) displayed on the opacity data recorder in Blank 14.

Note: During the zero calibration check, the zero mirror is moved into the path of the measurement beam by a servomotor. The zero mechanism is designed to present the transceiver with a simulated clear-path condition. The daily zero check does not test the actual clear-path zero, nor does it provide a check of cross-stack parameters such as the optical alignment of the Transmissometer or drift in the reflectance of the retro reflector. The actual clear-path zero can only be checked during clear-stack or off-stack calibration of the CEMS. In addition to simulating the instrument clear-path zero, the zero mechanism allows the amount of dust on the transceiver optics (primary lens and zero mirror) to be quantified. After 1 1/2 minutes in the external zero mode, the CEMS will automatically enter the span mode.

10. Record in Blank 15 the span value (in milliamps) displayed on the control unit panel meter. Record the span value (in percent opacity) displayed on the data recorder in Blank 16. Go to the Transmissometer location.

Note: During the span calibration check, a servomotor moves a span filter into the path of the measurement beam while the zero mirror is in place. The span mechanism is designed to provide an indication of the upscale accuracy of the CEMS relative to the simulated clear-path zero. The monitor will output its stack correction factor (SCF) for 1 ½ minutes when the span portion of the calibration cycle is completed. The CEMS automatically returns to the measurement mode when the SCF portion of the calibration cycle is complete.

Retro reflector Dust Accumulation Check

11. Record the effluent opacity prior to cleaning the retroreflector optics in Blank 17.
12. Open the transceiver housing, inspect and clean the retroreflector optics, and close the housing.
13. Record the post-cleaning effluent opacity in Blank 18. Go to the transceiver location.

Transceiver Dust Accumulation Check

14. Record the pre-cleaning effluent opacity in Blank 19.
15. Open the transceiver, clean the optics (primary lens and zero mirror) and close the transceiver.
16. Record the post-cleaning effluent opacity in Blank 20.

Alignment Check

17. Determine the monitor alignment by looking through the alignment port of the side of the transceiver.
18. Observe whether the image is centered in the cross hairs and record this information (YES or NO) in Blank 21.

Calibration Error Check

The calibration error check is performed using three neutral density filters. Performing the calibration error check on-stack using the filters determines the linearity of the instrument response relative to the current clear-path zero setting. This calibration error check does not determine the accuracy of the actual instrument clear-path zero or the status of any cross-stack parameters. A true calibration check is performed by moving the on-stack components to a location with minimal ambient opacity, making sure that the proper path length and alignments are attained, and then placing the calibration filters in the measurement path.

19. Put the monitor in Filter Audit mode
20. Record the audit filter serial numbers and opacity values in Blanks 22, 23, and 24.
21. Remove the filters from their protective covers, inspect and if necessary, clean them.
22. Insert the low range neutral density filter into the filter slot located in front of the heated lens.
23. Wait approximately two minutes or until a clear value has been recorded and displayed on the data recorder.

Note: The audit data should be taken from a data recording/reporting device that presents instantaneous opacity (or opacity data with the shortest available integration period).
24. Record the CEMS response to the low range neutral density filter.
25. Remove the low range filter and insert the mid range neutral density filter.
26. Wait approximately two minutes and record the CEMS response to the mid range neutral density filter.
27. Remove the mid range filter and insert the high range filter.
28. Wait approximately two minutes and record the CEMS response to the high range neutral density filter.

29. Remove the high range filter, wait approximately two minutes, and record the zero value.
30. Repeat steps 29 through 36 until a total of five opacity readings are obtained for each neutral density filter.
31. If six-minute integrated opacity data are recorded, repeat steps 28 through 36 once more, changing the waiting periods to 13 minutes.
32. Record the six-minute integrated data.

Note: In order to acquire valid six-minute averaged opacity data, each filter must remain in for at least two consecutive six-minute periods; the first period will be invalid because it was in progress when the filter was inserted. A waiting period of 13 minutes is recommended.

33. When the calibration error check is complete, return the monitor to measuring mode. Close the transceiver head and the weather cover, and return to the CEMS control unit.

Final Control Unit Adjustment Reset

34. Return to the control unit location and reset the opacity instrument range to its original setting (Blank 11) if necessary.
35. Obtain a copy of the audit data from the data recorder.
36. Transcribe the calibration error response data from the data recorder to Blanks 25 through 50 of the audit form and complete the audit data calculations.

C. Interpretation of Audit Results

This section is designed to help the auditor interpret the CEMOP-290 performance audit results.

Stack Exit Correlation Error Check

The path length correction error in Blank 51 should be within $\pm 2\%$. This error exponentially affects the opacity readings, resulting in over - or underestimation of the stack exit opacity. The most common error in computing the optical path length correction factor is the use of the flange-to-flange distance in place of the stack/duct inside diameter at the monitor location. This error will result in underestimation of the stack exit opacity and can be identified by comparing the monitor optical path length to the flange-to-flange distance; the flange-to-flange distance should be greater by approximately two to four feet.

Error code analysis

Error codes are typically associated with parameters that the monitor manufacturer feels are critical to CEMS function, and to the collection of valid opacity data. The parameters associated with each of the error codes are found in the manufacturer's manual. With the exception of alarms that warn of elevated opacity levels (alarm or warning lamps), the error codes indicate that the CEMS is not functioning properly.

Control Panel Meter Error (Optional)

The accuracy of the control panel meter is important at sources using the meter during monitor adjustment and calibration. The accuracy of the control panel meter (Blank 52 and Blank 54) is determined by comparing the zero and span reference values to the panel meter output recorded during the CEMS calibration check.

Zero and Span Checks

The CEMOP-290 internal zero (Blank 12) should be set to indicate 0% opacity (equivalent to 3.7 - 4.3 mA). An external zero error (Blank 53) greater than 4% opacity is usually due to excessive dust accumulation on the optical surfaces, electronic drift or an electronic/mechanical offset of the data recorder. Excessive dust on the optical surfaces sufficient to cause a significant zero error would be indicated by the difference in the internal and external zero values and/or window alarm. Instrument span error (Blank 55) may be caused by the same problems that cause zero errors and may be identified in a similar fashion. A span error may also be caused by an inaccurately named span filter.

If the zero and span errors are due to a data recorder offset, both errors will be in the same direction and will be of the same magnitude.

The external zero displayed on the control unit panel meter also indicates the level of dust accumulation on the zero retroreflector and transceiver measurement window. The difference between the internal and external zero responses should equal the amount of dust found on the transceiver optics (Blank 75). To convert the zero responses to a value that represents lens dusting in percent opacity, use the following equation.

$$\text{Meter response in \% opacity} = 6.25 [(\text{Blank } 13) - (\text{Blank } 12)]$$

Transmissometer Dust Accumulation Check

The results of the dust accumulation check (Blank 58) should not exceed 4%. A dust accumulation value of more than 4% opacity indicates that the air flow of the purge system and/or the cleaning frequency of the optical surfaces are inadequate. When determining the optical surface dust accumulation, the auditor should note whether the effluent opacity is relatively stable (within $\pm 2\%$ opacity) before and after cleaning the optical surfaces. If the effluent opacity is fluctuating by more than $\pm 2\%$, the dust accumulation analysis should be omitted.

Optical Alignment Check

When the transceiver and retroreflector are misaligned, a portion of the measurement beam that should be returned to the measurement detector is misdirected, resulting in a positive bias in the data reported by the CEMS. One of the most common causes of misalignment is vibration which may cause the on-stack components to shift slightly on the instrument mounting flanges. Another common cause of misalignment is thermal expansion and contraction of the structure on which the transmissometer is mounted. If the CEMS is being audited while the unit is off-line (cold stack), the results of the alignment analysis may not be representative of the alignment of the instrument when the stack or duct is at normal operating temperature.

Calibration Error

Calibration error results (Blanks 68, 69 and 70) in excess of $\pm 3\%$ are indicative of a non-linear or miss calibrated instrument. However, the absolute calibration accuracy of the monitor can be determined only when the instrument clear-path zero value is known. If the zero and span data are out-of-specification, the calibration error data will often be biased in the direction of the zero and span errors. Even if the zero and span data indicate that the CEMS is calibrated properly, the monitor may still be inaccurate due to error in the clear-path zero adjustment. The optimum calibration procedure involves using neutral density filters during clear-stack or off-stack CEMS calibration. This procedure would establish both the absolute calibration accuracy and linearity of the CEMS. If this procedure is impractical, and it is reasonable to assume that the clear-path zero is set correctly, the monitor's calibration can be set using either the neutral density filters or the internal zero and span values.

**APPENDIX A
MODEL CEMOP-290 AUDIT DATA FORMS**

AUDIT DATA SHEET
DURAG MODEL CEMOP-290 OPACITY CEMS

Corporation:	Indiantown Cogeneration LP	Plant / Site:	Indiantown Cogeneration LP
Process Unit/Stack Identification:	Main Stack		
Auditor:	Keith Kowalski	Representing:	Indiantown Cogeneration LP
Attendees:	N/A	Representing:	N/A
Remote serial number:	412557		
Transceiver serial number:	413254	Flange to flange distance:	22' 0.75"
Reflector serial number:	413259		
Date:	8/28/2014		

Preliminary Data

1 Stack exit inside diameter (FT) = Lx	16
2 Stack (or duct) inside diameter at the transmissometer location (FT) = Lt	17.166
3 Calculated optical path length correction factor = Lx/Lt	0.93207503
4 Source-cited optical path length correction factor	0.9375
5 Source-cited zero automatic calibration value (% opacity)	0.00 %
6 Source-cited span automatic calibration value (% opacity)	80.00 %

[GO TO CONTROL UNIT / DATA RECORDER LOCATION]

[INSPECT DATA RECORDING SYSTEM AND MARK WITH "OPACITY AUDIT," AUDITOR'S NAME, AFFILIATION, DATE, SOURCE, PROCESS UNIT/STACK IDENTIFICATION, AND THE TIME OF DAY.]

Error codes

7 Blower [Loss of purge air blower power Error 100, 300]		ON	OFF
8 Filter [Inadequate purge air flow Error 200, 400]			X
9 Window [Excessive dirt on transceiver window]			X
10 Fault [Additional CEMS fault has occurred. Note fault code on panel meter and consult the instrument manual.]			X

ON	OFF
	X
	X
	X
	X

Instrument Range Check

11 Instrument range setting	100 %
-----------------------------	-------

Zero Check

12 Internal zero value (milliamps) [Wait for two minutes for automatic change to external zero mode.]	4.00 mA
13 Panel meter zero calibration value (milliamps)	4.00 mA
14 Opacity data recorder zero calibration value (% Op) [Wait two minutes for automatic change to external span mode.]	0.00 %

AUDIT DATA SHEET
 DURAG MODEL CEMOP-290 OPACITY CEMS
 (Continued)

Span Check

15 Panel meter span calibration value (milliamps) 16.80 mA
 16 Opacity data recorder span calibration value (% Op) 80.00 %
 [Go to transmissometer location.]

Retroreflector Dust Accumulation Check

17 Pre-cleaning effluent opacity (% Op) 0.01 %
 [Inspect and clean optical surface.]
 18 Post-cleaning effluent opacity (% Op) 0.01 %
 [Go to transceiver location.]

Transceiver Dust Accumulation Check

19 Pre-cleaning effluent opacity (% Op) 0.01 %
 [Inspect and clean optical surface.]
 20 Post-cleaning effluent opacity (% Op) 0.01 %

Optical Alignment Check (Optional)

[LOOK THROUGH ALIGNMENT SIGHT AND DETERMINE IF BEAM IMAGE IS CENTERED.]

21 Is the image centered?

YES	NO
X	

[Record audit filter data.]

Filter	Serial NO.	% Opacity	SCF%
22 LOW	RW22	8.40	7.90
23 MED	YH45	16.10	15.17
24 HIGH	YH46	25.70	24.31

AUDIT DATA SHEET
 DURAG MODEL CEMOP-290 OPACITY CEMS
 (Continued)

[Remove the audit filters from the protective covers, inspect, and clean each filter.]

[Insert a filter, wait approximately 2 minutes, and record the opacity value reported by the opacity data recorder. Repeat the process 5 times for each filter.]

<u>ZERO</u>	<u>LOW</u>	<u>MID</u>	<u>HIGH</u>	<u>ZERO</u>
<u>0.00</u>	<u>7.80</u>	<u>15.10</u>	<u>23.90</u>	<u>0.10</u>
	<u>7.80</u>	<u>15.10</u>	<u>23.90</u>	<u>0.10</u>
	<u>7.80</u>	<u>15.10</u>	<u>23.90</u>	<u>0.10</u>
	<u>7.80</u>	<u>15.10</u>	<u>23.90</u>	<u>0.10</u>
	<u>7.80</u>	<u>15.10</u>	<u>23.90</u>	<u>0.10</u>

[If six-minute integrated data are also available, allow 13 minutes each for an additional run of the ZERO, LOW, MID, HIGH, and ZERO readings.]

<u>ZERO</u>	<u>LOW</u>	<u>MID</u>	<u>HIGH</u>	<u>ZERO</u>
<u>0.10</u>	<u>7.80</u>	<u>15.10</u>	<u>23.90</u>	<u>0.10</u>

[Close the transceiver head and the weather cover.]

[Return to control unit location.]

[Obtain a copy of the audit data from the opacity data recorder, and ensure that the data can be clearly read and interpreted.]

[Read and transcribe final calibration error data.]

<u>ZERO</u>	<u>LOW</u>	<u>MID</u>	<u>HIGH</u>	<u>ZERO</u>
25 <u>0.00</u>	26 <u>7.80</u>	27 <u>15.10</u>	28 <u>23.90</u>	29 <u>0.10</u>
	30 <u>7.80</u>	31 <u>15.10</u>	32 <u>23.90</u>	33 <u>0.10</u>
	34 <u>7.80</u>	35 <u>15.10</u>	36 <u>23.90</u>	37 <u>0.10</u>
	38 <u>7.80</u>	39 <u>15.10</u>	40 <u>23.90</u>	41 <u>0.10</u>
	42 <u>7.80</u>	43 <u>15.10</u>	44 <u>23.90</u>	45 <u>0.10</u>

[Six-minute average data, if applicable.]

<u>ZERO</u>	<u>LOW</u>	<u>MID</u>	<u>HIGH</u>	<u>ZERO</u>
46 <u>0.10</u>	47 <u>7.80</u>	48 <u>15.10</u>	49 <u>23.90</u>	50 <u>0.10</u>

AUDIT DATA SHEET
 DURAG MODEL CEMOP-290 OPACITY CEMS
 (Continued)

Calculation of Audit Results

Stack exit correlation error (%):

	0.9375		0.932075032		
51	Blank 4	-----	Blank 3	*100=	0.58203125
	Blank 3		0.932075		

Zero Error (% Op.):

		4		0	
52 Panel Meter	6.25 *	(Blank 13	---- 4.0)	--- Blank 5	=== <u>0.00 %</u>

		0		0	
53 Opacity Data Recorder		Blank 14	-----	Blank 5	=== <u>0.00</u>

Span Error (% Op.):

		16.8		80	
54 Panel Meter	6.25 *	(Blank 15	---- 4.0)	--- Blank 6	=== <u>0.00 %</u>

		80		80	
55 Opacity Data Recorder		Blank 16	-----	Blank 6	=== <u>0.00</u>

Optical Surface Dust Accumulation (% OP):

		0.011		0.011	
56 Retroreflector		Blank 17	-----	Blank 18	=== <u>0.00 %</u>

		0.011		0.011	
57 Transceiver		Blank 19	-----	Blank 20	=== <u>0.00 %</u>

		0		0	
58 Total		Blank 56	+	Blank 57	=== <u>0.00 %</u>

Optical Path length Correction Factor and Zero Offset Correction of Audit Filters:

		0.9375			
59 LOW:	(1---	8.4 Blank 4	* (1-	Blank 45)	*100=
	100))	Blank 22))		100)	<u>7.79631495 %</u>

		0.9375			
60 MID:	(1---	16.1 Blank 4	* (1-	Blank 45)	*100=
	100))	Blank 23))		100)	<u>15.0744199 %</u>

		0.9375			
61 HIGH:	(1---	25.7 Blank 4	* (1-	Blank 45)	*100=
	100))	Blank 24))		100)	<u>24.3076458 %</u>

DURAG MODEL CEMOP-290 OPACITY CEMS
Performance Audit Data Summary

Auditor	Keith Kowalski	Date	08/28/14
Source	Indiantown Cogeneration LP	Unit	Main Stack

PARAMETER	Blank No.	Audit Results	Specifications
Blower failure	7	0 X	OFF
Filter Block	8	0 X	OFF
Window	9	0 X	OFF
Fault	10	0 X	OFF
Stack Exit Correlation Error	51	0.58	+/- 2% Op
Internal Zero Error	Panel	52	0.00
	Data	53	0.00
Internal Span Error	Panel	54	0.00
	Data	55	0.00
Optical Alignment Analysis	21	X 0	Centered
Optical Surface Dust Accumulation			
Retroreflector	56	0.00	<= 2% Op
Transceiver	57	0.00	<= 2% Op
Total	58	0.00	<= 4% Op
Calibration Error Analysis			
Mean Error			
Low	62	0.00	
	71a	0.00	
Mid	63	0.03	
	72a	0.03	
High	64	-0.41	
	73a	-0.41	
Confidence Interval			
Low	65	0.00	
Mid	66	0.00	
High	67	0.00	
Calibration Error			
Low	68	0.00	<= 3% Op
Mid	69	0.03	<= 3% Op
High	70	0.41	<= 3% Op

CeDAR 1-Minute Data

Indiantown CoGen

Data for 8/28/2014 9:45 AM thru 8/28/2014 12:45 PM

Timestamp	(Main Boiler) Opacity % 1-Min Avg	(Main Boiler) Opacity % 6-Min Avg
8/28 9:45	1.2	--
8/28 9:46	1.2	--
8/28 9:47	1.3	--
8/28 9:48	1.2	1.2
8/28 9:49	1.2	--
8/28 9:50	1.2	--
8/28 9:51	1.2	--
8/28 9:52	1.2	--
8/28 9:53	1.2	--
8/28 9:54	1.2	1.2 <15>
8/28 9:55	1.2	--
8/28 9:56	1.2	--
8/28 9:57	1.2 <15>	--
8/28 9:58	1.2 <15>	--
8/28 9:59	1.2 <15>	--
8/28 10:00	1.2 <15>	1.1 <15>
8/28 10:01	1.2 <15>	--
8/28 10:02	1.2 <15>	--
8/28 10:03	1.1 <15>	--
8/28 10:04	1.1 <15>	--
8/28 10:05	1.0 <15>	--
8/28 10:06	1.1 <15>	0.6 <15>
8/28 10:07	0.4 <15>	--
8/28 10:08	0.1 <15>	--
<u>8/28 10:09</u>	<u>0.1 <15></u>	--
8/28 10:10	0.1 <15>	--
8/28 10:11	2.1 <15>	--
<u>8/28 10:12</u>	<u>7.8 <15></u>	11.4 <15>
8/28 10:13	7.7 <15>	--
8/28 10:14	7.6 <15>	--
8/28 10:15	15.1 <15>	--
<u>8/28 10:16</u>	<u>15.1 <15></u>	--
8/28 10:17	14.9 <15>	--
8/28 10:18	22.4 <15>	12.3 <15>
<u>8/28 10:19</u>	<u>23.9 <15></u>	--
8/28 10:20	23.9 <15>	--
8/28 10:21	3.6 <15>	--
8/28 10:22	0.1 <15>	--
<u>8/28 10:23</u>	<u>0.1 <15></u>	--
8/28 10:24	5.9 <15>	10.5 <15>
8/28 10:25	7.8 <15>	--
<u>8/28 10:26</u>	<u>7.8 <15></u>	--
8/28 10:27	11.2 <15>	--
8/28 10:28	15.1 <15>	--
<u>8/28 10:29</u>	<u>15.1 <15></u>	--
8/28 10:30	16.9 <15>	13.6 <15>

	Timestamp	(Main Boiler) Opacity % 1-Min Avg	(Main Boiler) Opacity % 6-Min Avg
	8/28 10:31	23.9 <15>	--
<u>RUN #2 HIGH</u>	8/28 10:32	<u>23.9 <15></u>	--
	8/28 10:33	17.0 <15>	--
	8/28 10:34	0.1 <15>	--
<u>RUN #3 ZERO</u>	8/28 10:35	<u>0.1 <15></u>	--
	8/28 10:36	1.4 <15>	9.0 <15>
	8/28 10:37	7.8 <15>	--
<u>RUN #3 LOW</u>	8/28 10:38	<u>7.8 <15></u>	--
	8/28 10:39	6.8 <15>	--
	8/28 10:40	15.0 <15>	--
	8/28 10:41	15.1 <15>	--
<u>RUN #3 MID</u>	8/28 10:42	<u>15.1 <15></u>	15.1 <15>
	8/28 10:43	19.9 <15>	--
	8/28 10:44	23.9 <15>	--
<u>RUN #3 HIGH</u>	8/28 10:45	<u>23.9 <15></u>	--
	8/28 10:46	8.0 <15>	--
	8/28 10:47	0.1 <15>	--
<u>RUN #4 ZERO</u>	8/28 10:48	<u>0.1 <15></u>	7.4 <15>
	8/28 10:49	4.2 <15>	--
	8/28 10:50	7.8 <15>	--
<u>RUN #4 LOW</u>	8/28 10:51	<u>7.8 <15></u>	--
	8/28 10:52	9.6 <15>	--
	8/28 10:53	15.1 <15>	--
<u>RUN #4 MID</u>	8/28 10:54	<u>15.1 <15></u>	16.7 <15>
	8/28 10:55	14.8 <15>	--
<u>RUN #4 HIGH</u>	8/28 10:56	<u>23.9 <15></u>	--
	8/28 10:57	23.8 <15>	--
	8/28 10:58	22.4 <15>	--
	8/28 10:59	0.0 <15>	--
<u>RUN #5 ZERO</u>	8/28 11:00	<u>0.1 <15></u>	5.9 <15>
	8/28 11:01	0.1 <15>	--
	8/28 11:02	7.0 <15>	--
	8/28 11:03	7.8 <15>	--
<u>RUN #5 LOW</u>	8/28 11:04	<u>7.8 <15></u>	--
	8/28 11:05	12.4 <15>	--
	8/28 11:06	15.1 <15>	18.1 <15>
<u>RUN #5 MID</u>	8/28 11:07	<u>15.1 <15></u>	--
	8/28 11:08	19.0 <15>	--
	8/28 11:09	23.9 <15>	--
<u>RUN #5 HIGH</u>	8/28 11:10	<u>23.9 <15></u>	--
	8/28 11:11	11.8 <15>	--
	8/28 11:12	0.1 <15>	0.1 <15>
	8/28 11:13	0.1 <15>	--
	8/28 11:14	0.1 <15>	--
	8/28 11:15	0.1 <15>	--
	8/28 11:16	0.1 <15>	--
	8/28 11:17	0.1 <15>	--
	8/28 11:18	0.1 <15>	0.1 <15> ZERO
	8/28 11:19	0.1 <15>	--
	8/28 11:20	0.1 <15>	--

Timestamp	(Main Boiler) Opacity % 1-Min Avg	(Main Boiler) Opacity % 6-Min Avg	
8/28 11:21	0.1 <15>	--	
8/28 11:22	0.1 <15>	--	
8/28 11:23	0.1 <15>	--	
8/28 11:24	0.1 <15>	5.5 <15>	
8/28 11:25	1.7 <15>	--	
8/28 11:26	7.8 <15>	--	
8/28 11:27	7.8 <15>	--	
8/28 11:28	7.8 <15>	--	
8/28 11:29	7.8 <15>	--	
8/28 11:30	7.8 <15>	7.8 <15>	Low
8/28 11:31	7.8 <15>	--	
8/28 11:32	7.8 <15>	--	
8/28 11:33	7.8 <15>	--	
8/28 11:34	7.8 <15>	--	
8/28 11:35	7.8 <15>	--	
8/28 11:36	7.8 <15>	10.0 <15>	
8/28 11:37	7.8 <15>	--	
8/28 11:38	7.8 <15>	--	
8/28 11:39	7.1 <15>	--	
8/28 11:40	14.5 <15>	--	
8/28 11:41	15.1 <15>	--	
8/28 11:42	15.1 <15>	15.1 <15>	
8/28 11:43	15.1 <15>	--	
8/28 11:44	15.1 <15>	--	
8/28 11:45	15.1 <15>	--	
8/28 11:46	15.1 <15>	--	
8/28 11:47	15.1 <15>	--	
8/28 11:48	15.1 <15>	15.1 <15>	MID
8/28 11:49	15.1 <15>	--	
8/28 11:50	15.1 <15>	--	
8/28 11:51	15.1 <15>	--	
8/28 11:52	15.1 <15>	--	
8/28 11:53	15.1 <15>	--	
8/28 11:54	19.3 <15>	23.1 <15>	
8/28 11:55	23.9 <15>	--	
8/28 11:56	23.9 <15>	--	
8/28 11:57	23.9 <15>	--	
8/28 11:58	23.9 <15>	--	
8/28 11:59	23.9 <15>	--	
8/28 12:00	23.9 <15>	23.9 <15>	HIGH
8/28 12:01	23.9 <15>	--	
8/28 12:02	23.9 <15>	--	
8/28 12:03	23.9 <15>	--	
8/28 12:04	23.9 <15>	--	
8/28 12:05	23.8 <15>	--	
8/28 12:06	23.8 <15>	9.3 <15>	
8/28 12:07	23.9 <15>	--	
8/28 12:08	8.0 <15>	--	
8/28 12:09	0.1 <15>	--	
8/28 12:10	0.1 <15>	--	

Timestamp	(Main Boiler) Opacity % 1-Min Avg	(Main Boiler) Opacity % 6-Min Avg	
8/28 12:11	0.1 <15>	--	
8/28 12:12	0.1 <15>	0.1 <15>	ZERO
8/28 12:13	0.1 <15>	--	
8/28 12:14	0.1 <15>	--	
8/28 12:15	0.1 <15>	--	
8/28 12:16	0.1 <15>	--	
8/28 12:17	0.1 <15>	--	
8/28 12:18	0.1 <15>	0.2 <15>	
8/28 12:19	0.1 <15>	--	
8/28 12:20	0.1 <15>	--	
8/28 12:21	0.1 <15>	--	
8/28 12:22	0.1 <15>	--	
8/28 12:23	0.7 <15>	--	
8/28 12:24	1.0 <15>	1.2 <15>	
8/28 12:25	1.1 <15>	--	
8/28 12:26	1.1 <15>	--	
8/28 12:27	1.1 <15>	--	
8/28 12:28	1.2 <15>	--	
8/28 12:29	1.2	--	
8/28 12:30	1.2	1.3	
8/28 12:31	1.3	--	
8/28 12:32	1.3	--	
8/28 12:33	1.2	--	
8/28 12:34	1.3	--	
8/28 12:35	1.3	--	
8/28 12:36	1.3	1.3	
8/28 12:37	1.3	--	
8/28 12:38	1.3	--	
8/28 12:39	1.3	--	
8/28 12:40	1.3	--	
8/28 12:41	1.3	--	
8/28 12:42	1.3	1.3	
8/28 12:43	1.3	--	
8/28 12:44	1.3	--	
8/28 12:45	1.3	--	
Average (all)	7.9	8.0	
Total (all)	--	--	
Minimum (all)	0.0	0.1	
Maximum (all)	23.9	23.9	
Average (valid values only)	1.3	1.3	
Total (valid values only)	--	--	
Count (valid values only)	29	4	

<15> = Preventative Maintenance

**APPENDIX B
FILTER DATA AND FIELD CERTIFICATION SHEETS**

CAL CHECK

11600 Black Horse Run, Raleigh, North Carolina 27613 Phone (919) 847-1898 FAX (919) 847-8005

REPORT OF CERTIFICATION OF NEUTRAL DENSITY AUDIT FILTERS

Report prepared for: **Indiantown Cogeneration, L.P.**

Date of Filter Certification: **April 22, 2014**

Date of Filter Expiration: **April 21, 2015**

Monitor Make/Model: **Durag D-R 290**

Audit Device/Filter Slot Angle of Incidence: **10 Degrees**

Path-Length Correction: **1.000 (Straight Stack)**

Table 1-1: Individual Filter Certification Data

Serial Number	Opacity Value (%)	Transmittance (%)	Optical Density	Previous Opacity (%)	Change in Opacity (%)	Accuracy (%)
RW22	8.4	91.6	0.0380	8.5	0.1	± 0.5
YH45	16.1	83.9	0.0764	16.1	0.0	± 0.5
YH46	25.7	74.3	0.1288	25.6	0.1	± 0.5

Eileen Rosenquest

Eileen Rosenquest
Instrument Operator

****See second page for Instrument Information and Details of Certification****

"Your Clear Choice for Opacity Monitor On-Stack Testing"
Visit us on the web at **www.calcheck.com**



printed on recycled paper

CAL CHECK

REPORT OF CERTIFICATION OF NEUTRAL DENSITY AUDIT FILTERS(Cont.)

Report prepared for: **Indiantown Cogeneration, L.P.**

▪ Calibration of Spectrophotometer

Instrument:

Spectrophotometer: Varian Cary 50 Serial Number: EL0309-7553

Testing Range: 380nm to 780nm

SRM Reference Material:

Calibration Filters: NIST 930D SRM Serial No's: Blank; 30-1505; 20-1505; 10-1505

Date of SRM Certification: 02-06-14 Laboratory Environment: 72 deg F +/- 4 deg F

▪ Description of Certification

Cal Check certifies filters per 40 CFR Part 60, Appendix B, "Performance Specification 1", section 7.1.2. Opacity values are determined and assigned to each filter by use of a laboratory-based spectrophotometer exceeding the specifications set forth in section 6.3 of Performance Specification 1, and certified accurate daily using National Institute of Standards and Technology (NIST) 930D Standard Reference Materials (SRM).

Each opacity audit filter is placed into the sample chamber at an angle equal to the corresponding opacity monitors' audit device or filter slot. Once positioned, each filter is analyzed (or scanned) from 380nm to 780nm, rotated 90 degrees in the plane of the glass surface and analyzed again from 380nm to 780nm. Once all the data has been accumulated, averaged transmission values at 10nm intervals are multiplied by the corresponding weighting factor as specified in Table 1-1 of Performance Specification 1 to obtain the 'Source C Human Eye Response' transmittance. From this value, the single-pass opacity value and optical density value is determined and assigned to the filter.

For newer opacity monitors that employ monochromatic light sources, such as LED's or laser's, and installed after the promulgation of the latest version of Performance Specification 1, Section 7.6 (i.e., those installed and certified after April 9, 2001), the determination of filter opacity can be determined from the operating range of said light source. This provision was established in Performance Specification 1 to account for different types of neutral density glass used for certification of monochromatic light source-based monitors.



Eileen Rosenquest

Instrument Operator



Auxiliary Boilers

CGA

CYLINDER GAS AUDIT

FOR

Indiantown Cogeneration

Indiantown, FL

**Unit: Emission Unit ID No. 007
Auxiliary Boiler
FULL EXTRACTIVE**

Third Quarter 2014

PREPARED BY:

Indiantown Cogeneration

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<i>Section 2</i>	<i>Cylinder Gas Audit Procedures</i>
<i>Section 3</i>	<i>Cylinder Gas Audit Data Sheets</i>
<i>Section 4</i>	<i>Cylinder Gas Certification Sheets</i>

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Section 1 Introduction

Facility Location: Indiantown Cogeneration, L.P. operates the Indiantown Cogeneration Plant, which is located in Martin County at 13303 SW Silver Fox Lane, Indiantown, Florida.

The Indiantown Cogeneration Plant is a cogeneration facility which generates electricity for sale and exports steam to the Louis Dreyfus Citrus Processing Plant. The Facility includes one high-pressure pulverized coal main boiler (PC boiler) rated at 3,422 million British thermal units (MMBtu)/hour heat input, and has a nominal net electrical power output of approximately 330 megawatts (MW). It is permitted to fire natural gas, propane, or No. 2 fuel oil for startup, shutdown, or load changes.

Also included are two natural gas (or propane) fired identical auxiliary boilers used for supplying steam to the steam host during times when the PC boiler is offline, as well as during PC boiler startup and shutdown periods. The two identically sized packaged water-tube steam boilers have a combined rated maximum capacity of 350 MMBtu/hr.

Steam produced by the auxiliary boilers is not used to generate electricity. In addition, the facility has a variety of ancillary equipment needed to support operations as a coal-fired cogeneration plant.

Indiantown Cogeneration, of Indiantown, Florida conducted this quarters Cylinder Gas Audit at Indiantown Cogeneration in Indiantown, FL on August 27th 2014 by Keith Kowalski.

The audit of the Auxiliary Boilers Continuous Emission Monitoring System was conducted for NO_x, O₂, and CO. Our assessment of this quarter CGA results indicates that all of the analyzers evaluated during this test program meet the accuracy requirements as outlined in 40 CFR 60, Appendix F. Table 1.1 summarizes the results for the cylinder gas audit.

Reviewed by: Nicholas Lange

Date: 9/9/2014

Parameter	Low Gas Error	Mid Gas Error
AUX O2	2	2
AUX CO LOW	3	1
AUX CO HIGH	2	0
AUX NOx	0	0
	PASS	PASS

Section 2

Cylinder Gas Audit Procedures

Each Continuous Emission Monitor (CEM) must be audited three out of four calendar quarters of each year. As a part of the Quality Control (QC) and Quality Assurance (QA) procedures, the quality of data produced is evaluated by response accuracy compared to known standards.

The CGA for this quarter was conducted in accordance with the QA/QC procedure outlined in 40 CFR 60, Appendix F.

The Audit consisted of challenging the CEM with an audit gas of known concentration with 2 upscale levels of gas, at 20-30% of the system span and at 50-60% of the system span (CFR60, Appendix F 5.1.2). The audit cylinders contain pollutant of diluent gas certified in accordance with U.S. EPA protocol 1.

The audit gases were introduced into the entire sampling and analysis system through the normal part of the daily QC gases.

The procedure was conducted as follows:

1. Audit cylinder 1 was connected to the system.
2. Manual span was initiated until a stable response was achieved.
3. Values were recorded as the system was allowed to operate in a normal sampling and analysis manner without adjustment.
4. The first audit cylinder was removed and replaced by audit cylinder 2.
5. Manual span was initiated for approximately 15 minutes until a stable response was achieved.
6. This series of steps was repeated through three audit runs.

Cylinder Gas Audit for Auxiliary Boilers E. U. ID No. 007

For each audit cylinder (or audit point), the percent accuracy was determined. The average of the accuracy was determined by the following equation:

$$A = \frac{(Cm - Ca) \times 100}{Ca}$$

Where:

- A = Accuracy of CEMS (%)
- Cm = Average CEMS response during audit in applicable standard or concentration (ppm or %)
- Ca = Average audit (cylinder gas certified value) in units of applicable standard or concentration (ppm or %)

Accuracy (A) value of $\pm 15\%$ or less is considered acceptable for criteria pollutants or diluent gas (40 CFR60 Appendix F 5.3.2(2)).

Section 3

Cylinder Gas Audit Data Sheets

Aux Boilers (Aux Boiler A) O2 CGA

Indiantown CoGen

Test Information

Test Date: 8/27/2014
 Facility: Indiantown CoGen
 Unit: Aux Boilers (Aux Boiler A)

Analyzer Information

Range: Single
 Instrument Span: 25 %O2
 Manufacturer: Siemens
 Model: Oxymat 6E
 Serial Number: 7MB20231EA20-0BD1

Run Number	Time	Reference Gas	CEMS Response	Cylinder Information	
Low Gas					
1	12:27 PM	4.940	5.030	Allowable Reference Values: 4-6 %O2 Cylinder ID: CC-251541 Expiration date: 8/14/2015 EPA vendor ID: E12012 Cylinder contains: CO,O2,BALN	
2	12:37 PM	4.940	5.020		
3	12:47 PM	4.940	5.030		
Mean (%O2)		4.940	5.027		
Mean Difference (%O2)		0.087	Limit: N/A		
CEMS Accuracy		2%	Limit: 15% Passed		
Mid Gas					
1	12:32 PM	10.200	10.030		
2	12:42 PM	10.200	10.030		
3	12:52 PM	10.200	10.030		
Mean (%O2)		10.200	10.030		
Mean Difference (%O2)		0.170	Limit: N/A		
CEMS Accuracy		2%	Limit: 15% Passed		

Linearity Error (CEMS Accuracy) Determination (A): $A = (|C_m - C_a| / C_a) * 100$

C_a = Reference gas value

C_m = Mean of actual CEMS responses

Aux Boilers (Aux Boiler A) CO/L CGA

Indiantown CoGen

Test Information

Test Date: 8/27/2014
 Facility: Indiantown CoGen
 Unit: Aux Boilers (Aux Boiler A)

Analyzer Information

Range: Low
 Instrument Span: 200 ppm
 Manufacturer: Siemens
 Model: Ultramat 6E
 Serial Number: 7MB20231EA20-0BD1

Run Number	Time	Reference Gas	CEMS Response	Cylinder Information	
Low Gas					
1	11:49 AM	50.800	52.200	Allowable Reference Values: 40-60 ppm (20-30% of span) Cylinder ID: CC-56761 Expiration date: 1/28/2022 EPA vendor ID: E12013 Cylinder contains: CO,NO,BALN	
2	11:59 AM	50.800	52.300		
3	12:09 PM	50.800	52.200		
Mean (ppm)		50.800	52.233		
Mean Difference (ppm)		1.433	Limit: 5 Passed		
CEMS Accuracy		3%	Limit: 15% Passed		
Mid Gas					
1	11:54 AM	110.000	111.080		
2	12:04 PM	110.000	111.040		
3	12:14 PM	110.000	111.140		
Mean (ppm)		110.000	111.087		
Mean Difference (ppm)		1.087	Limit: 5 Passed		
CEMS Accuracy		1%	Limit: 15% Passed		

Linearity Error (CEMS Accuracy) Determination (A): $A = (|C_m - C_a| / C_a) * 100$
C_a = Reference gas value
C_m = Mean of actual CEMS responses

Aux Boilers (Aux Boiler A) CO/H CGA

Indiantown CoGen

Test Information

Test Date: 8/27/2014
Facility: Indiantown CoGen
Unit: Aux Boilers (Aux Boiler A)

Analyzer Information

Range: High
Instrument Span: 1000 ppm
Manufacturer: Siemens
Model: Ultramat 6E
Serial Number: 7MB20231EA20-0BD1

Run Number	Time	Reference Gas	CEMS Response	Cylinder Information	
Low Gas					
1	12:27 PM	264.000	268.000	Allowable Reference Values: 200-300 ppm (20-30% of span) Cylinder ID: CC-251541 Expiration date: 8/14/2015 EPA vendor ID: E12012 Cylinder contains: CO,O2,BALN	
2	12:37 PM	264.000	269.000		
3	12:47 PM	264.000	268.600		
Mean (ppm)		264.000	268.533		
Mean Difference (ppm)		4.533	Limit: 5 Passed		
CEMS Accuracy		2%	Limit: 15% Passed		
Mid Gas					
1	12:32 PM	549.000	550.800		
2	12:42 PM	549.000	550.600		
3	12:52 PM	549.000	550.400		
Mean (ppm)		549.000	550.600		
Mean Difference (ppm)		1.600	Limit: 5 Passed		
CEMS Accuracy		0%	Limit: 15% Passed		

Linearity Error (CEMS Accuracy) Determination (A): $A = (|C_m - C_a| / C_a) * 100$
C_a = Reference gas value
C_m = Mean of actual CEMS responses

Aux Boilers (Aux Boiler A) NOx CGA

Indiantown CoGen

Test Information

Test Date: 8/27/2014
 Facility: Indiantown CoGen
 Unit: Aux Boilers (Aux Boiler A)

Analyzer Information

Range: Single
 Instrument Span: 300 ppm
 Manufacturer: Thermo Environmental
 Model: 42i-HL
 Serial Number: 0617417188

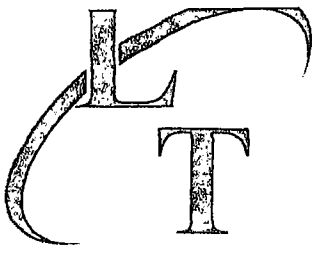
Run Number	Time	Reference Gas	CEMS Response	Cylinder Information	
Low Gas					
1	11:49 AM	73.800	74.400	Allowable Reference Values: 60-90 ppm (20-30% of span) Cylinder ID: CC-56761 Expiration date: 1/28/2022 EPA vendor ID: E12013 Cylinder contains: CO,NO,BALN	
2	11:59 AM	73.800	73.890		
3	12:09 PM	73.800	73.660		
Mean (ppm)		73.800	73.983		
Mean Difference (ppm)		0.183	Limit: 5 Passed		
CEMS Accuracy		0%	Limit: 15% Passed		
Mid Gas					
1	11:54 AM	158.000	158.080		
2	12:04 PM	158.000	156.930		
3	12:14 PM	158.000	156.840		
Mean (ppm)		158.000	157.283		
Mean Difference (ppm)		0.717	Limit: 5 Passed		
CEMS Accuracy		0%	Limit: 15% Passed		

Linearity Error (CEMS Accuracy) Determination (A): $A = (|C_m - C_a| / C_a) * 100$

C_a = Reference gas value

C_m = Mean of actual CEMS responses

Section 4
Cylinder Gas Certification Sheets



LIQUID TECHNOLOGY CORPORATION

"INDUSTRY LEADER IN SPECIALTY GASES"

8/21/14
AUX BLR
ZERO

Certificate of Analysis

Customer Indiantown Cogen, LP (Indiantown, FL)
Date July 09, 2014
Delivery Receipt DR-52308
Product: Nitrogen, CEMS Grade
Lot Number: LTF254-PG

Mixture Specifications

Cylinder Number EB-0040528

<u>Components</u>	<u>Requested</u>	<u>Actual</u>
Moisture	2.0 ppm	< 2.0 ppm
Hydrocarbons	0.1 ppm	< 0.1 ppm
Oxygen	1.0 ppm	< 1.0 ppm
Carbon Monoxide	1.0 ppm	< 1.0 ppm
Carbon Dioxide	1.0 ppm	< 1.0 ppm
Nitrogen	99.9995%	99.9995%

Cylinder Data

Cylinder Valve: CGA 580
 Cylinder Volume: 140 Cubic Feet
 Cylinder Pressure: 2000 psig, 70°F
 Expiration Date: July 09, 2017

Certified by:

Cole Dylewski

"UNMATCHED EXCELLENCE"



LIQUID TECHNOLOGY CORPORATION
"INDUSTRY LEADER IN SPECIALTY GASES"

Aux

Certificate of Analysis
- EPA PROTOCOL GAS -

In Service
7-8-14
DALEY MID

Customer Indiantown Cogen, LP (Indiantown, FL)
Date January 30, 2014
Delivery Receipt DR-50055
Gas Standard 165 ppm NO, 110 ppm CO/Nitrogen - EPA PROTOCOL
Final Analysis Date January 28, 2014
Expiration Date January 28, 2022

Components Nitric Oxide, Carbon Monoxide
Balance Gas Nitrogen

Analytical Data:
EPA Protocol, Section No. 2.2, Procedure G-1

DO NOT USE BELOW 100 psig

Reported Concentrations
Nitric Oxide: 158 ppm +/- 1.2 ppm
Carbon Monoxide: 110 ppm +/- 1.0 ppm
Nitrogen: Balance
Total Oxides of Nitrogen: 158 ppm

** Total NOX for Reference Use Only **

Reference Standards:

SRM/GMIS:	GMIS/GMIS	GMIS/GMIS
Cylinder Number:	ND-45697/ND-45699	EB-0015869/CC-185111
Concentration:	97.47 ppm NO/245.47 ppm NO	106.09 ppm CO/245.47 ppm CO
Expiration Date:	08/23/20 - 08/23/20	12/07/20 - 12/07/20

Certification Instrumentation

Component:	Nitric Oxide	Carbon Monoxide
Make/Model:	Nicolet 6700	Nicolet 6700
Serial Number:	APW1200289	APW1200289
Principal of Measurement:	FTIR	FTIR
Last Calibration:	January 02, 2014	December 29, 2013

Cylinder Data

Cylinder Serial Number:	EB-0041776	Cylinder Outlet:	CGA 660
Cylinder Volume:	136 Cubic Feet	Cylinder Pressure:	1950 psig, 70°F

Analytical Uncertainty and NIST Traceability are in compliance with EPA-600/R-12/531.

Certified by: *Cole Dylewski*

Cole Dylewski

PGVP Vendor ID: E12014



LIQUID TECHNOLOGY CORPORATION

"INDUSTRY LEADER IN SPECIALTY GASES"

Certificate of Analysis - EPA PROTOCOL GAS -

AUX
In DAILY HI
Service
6-13-14

<u>Customer</u>	Indiantown Cogen, LP (Indiantown, FL)
<u>Date</u>	January 30, 2014
<u>Delivery Receipt</u>	DR-50055
<u>Gas Standard</u>	910 ppm Carbon Monoxide/Nitrogen - EPA PROTOCOL GAS
<u>Final Analysis Date</u>	January 21, 2014
<u>Expiration Date</u>	January 21, 2022

DO NOT USE BELOW 100 psig

Analytical Data:
EPA Protocol, Section No. 2.2, Procedure G-1.

Reported Concentrations
Carbon Monoxide: 913 ppm +/- 4.8 ppm
Nitrogen: Balance

Reference Standards

SRM/GMIS	GMIS	GMIS
Cylinder Number:	CC-233798	CC-231443
Concentration:	733.96 ppm CO/Nitrogen	1040.327 ppm CO/Nitrogen
Expiration Date:	01/01/21	12/01/14

Certification Instrumentation

Component:	Carbon Monoxide
Make/Model:	Nicolet 6700
Serial Number:	APW1200289
Principal of Measurement:	FTIR
Last Calibration:	December 29, 2013

Cylinder Data

Cylinder Number:	EB-0053426	Cylinder Volume:	136 Cubic Feet
Cylinder Outlet:	CGA 350	Cylinder Pressure:	1950 psig, 70°F
Expiration Date:	January 21, 2022		

Analytical Uncertainty and NIST Traceability are in compliance with EPA-600/R-12/531.

Certified by:

Cole Dylewski
Cole Dylewski

PGVP Vendor ID: E12014



LIQUID TECHNOLOGY CORPORATION
"INDUSTRY LEADER IN SPECIALTY GASES"

*Aug
BLR
In Service
8-30-12
CGA 2020*

Certificate of Analysis
- EPA PROTOCOL GAS -

Customer Indiantown Cogen, L.P (Indiantown, FL)
Date August 21, 2012
Delivery Receipt DR-43491
Gas Standard 250 ppm CO, 5.00% Oxygen/Nitrogen - EPA PROTOCOL
Final Analysis Date August 14, 2012
Expiration Date August 14, 2015 ✓

DO NOT USE BELOW 150 psig

Cylinder Data
Cylinder Serial Number: CC-251541 ✓ Cylinder Outlet: CGA 590
Cylinder Volume: 133 Cubic Feet Cylinder Pressure: 1900 psig, 70°F
Expiration Date: August 14, 2015

Analytical Data
EPA Protocol, Section No. 2.2, Procedure G-1

Replicate Concentrations
Carbon Monoxide: 264 ppm +/- 2.6 ppm
Oxygen: 4.94% +/- 0.04%
Nitrogen: Balance

Reference Standard(s):
SRM/GMIS: GMIS GMIS
Cylinder Number: CC-250294 CC-185111
Concentration: 4.95% Oxygen 257.469 ppm CO
Expiration Date: 04/06/14 10/22/12

Certification Instrumentation
Component: Oxygen Carbon Monoxide
Make/Model: Servomex 244a Horiba - VIA 510
Serial Number: 1847 UUBKWXYY
Principal of Measurement: Paramagnetic NDIR
Last Calibration: July 30, 2012 July 28, 2012

Analytical uncertainty and NIST Traceability are in compliance with EPA-600/R-97/121.

Certified by: *Kailey J. Dickens*
Kailey J. Dickens

PGVP Vendor ID: EI2012

"UNMATCHED EXCELLENCE"



LIQUID TECHNOLOGY CORPORATION

"INDUSTRY LEADER IN SPECIALTY GASES"

Certificate of Analysis
- EPA PROTOCOL GAS -

8/7/14
CGA
LO
Aux BLR

Customer: Indiantown Cogen, LP (Indiantown, FL)
Date: January 30, 2014
Delivery Receipt: DR-50055
Gas Standard: 75.0 ppm NO, 50.0 ppm CO/Nitrogen - EPA PROTOCOL
Final Analysis Date: January 28, 2014
Expiration Date: January 28, 2022

Components: Nitric Oxide, Carbon Monoxide
Balance Gas: Nitrogen

Analytical Data: DO NOT USE BELOW 100 psig
EPA Protocol, Section No. 2.2, Procedure G-1

Reported Concentrations
Nitric Oxide: 73.8 ppm +/- 0.26 ppm
Carbon Monoxide: 50.8 ppm +/- 0.50 ppm
Nitrogen: Balance
Total Oxides of Nitrogen: 74.9 ppm

** Total NOX for Reference Use Only **

Reference Standards:

SRM/GMIS: GMIS/GMIS GMIS
Cylinder Number: ND-45700/CC-252014 EB-0017129
Concentration: 49.256 ppm NO/97.245 ppm NO 50.81 ppm CO
Expiration Date: 08/23/20 - 03/21/21 09/28/20

Certification Instrumentation

Component: Nitric Oxide Carbon Monoxide
Make/Model: Nicolet 6700 Nicolet 6700
Serial Number: APW1200289 APW1200289
Principal of Measurement: FTIR FTIR
Last Calibration: January 02, 2014 December 29, 2013

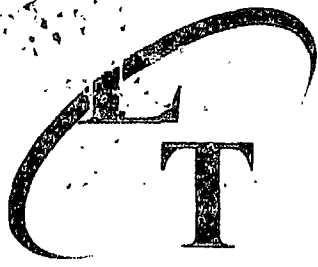
Cylinder Data

Cylinder Serial Number: CC-56761 Cylinder Outlet: CGA 660
Cylinder Volume: 133 Cubic Feet Cylinder Pressure: 1900 psig, 70°F

Analytical Uncertainty and NIST Traceability are in compliance with EPA-600/R-12/531.

Certified by: Cole Dylewski
Cole Dylewski

PGVP Vendor ID: E12014



LIQUID TECHNOLOGY CORPORATION
"INDUSTRY LEADER IN SPECIALTY GASES"

AUX BUX

AUX In Service
3-2-12
CGA CO MID

Certificate of Analysis
- EPA PROTOCOL GAS -

Customer Indiantown Cogen, LP (Indiantown, FL)
Date February 28, 2012
Delivery Receipt DR-40497
Gas Standard 550 ppm CO, 10.0% Oxygen/Nitrogen - EPA PROTOCOL
Final Analysis Date February 27, 2012
Expiration Date February 27, 2015 ✓

DO NOT USE BELOW 150 psig

Cylinder Data
Cylinder Serial Number: CC-125616 ✓
Cylinder Volume: 133 Cubic Feet
Expiration Date: February 27, 2015
Cylinder Outlet: CGA 590
Cylinder Pressure: 1900 psig, 70°F

Analytical Data
EPA Protocol, Section No. 2.2, Procedure G-1

Replicate Concentrations
Carbon Monoxide: 549 ppm +/- 5.4 ppm
Oxygen: 10.2% +/- 0.10%
Nitrogen: Balance

Reference Standard(s):
SRM/GMIS: GMIS GMIS
Cylinder Number: CC-231332 CC-159116
Concentration: 10.087% Oxygen 509.64 ppm CO
Expiration Date: 03/07/13 09/23/12

Certification Instrumentation
Component: Oxygen Carbon Monoxide
Make/Model: Servomex 244a Horiba - VIA 510
Serial Number: 1847 UUBKWXYZ
Principal of Measurement: Paramagnetic NDIR
Last Calibration: February 06, 2012 February 07, 2012

Analytical uncertainty and NIST Traceability are in compliance with EPA-600/R-97/121.

Certified by:
Adam Strickland

PGVP Vendor ID: E12012

"UNMATCHED EXCELLENCE"

Reactors A & B

CGA

CYLINDER GAS AUDIT

FOR

Indiantown Cogeneration

Indiantown, FL

**Unit: Reactor Emission Unit ID Nos. 001
Inlet A and B
DILUTION EXTRACTIVE**

Third Quarter 2014

PREPARED BY:

Indiantown Cogeneration

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Section 1

Introduction

Facility Location: Indiantown Cogeneration, L.P. operates the Indiantown Cogeneration Plant, which is located in Martin County at 13303 SW Silver Fox Lane, Indiantown, Florida.

The Indiantown Cogeneration Plant is a cogeneration facility which generates electricity for sale and exports steam to the Louis Dreyfus Citrus Processing Plant. The Facility includes one high-pressure pulverized coal main boiler (PC boiler) rated at 3,422 million British thermal units (MMBtu)/hour heat input, and has a nominal net electrical power output of approximately 330 megawatts (MW). It is permitted to fire natural gas, propane, or No. 2 fuel oil for startup, shutdown, or load changes.

Also included are two natural gas (or propane) fired identical auxiliary boilers used for supplying steam to the steam host during times when the PC boiler is offline, as well as during PC boiler startup and shutdown periods. The two identically sized packaged water-tube steam boilers have a combined rated maximum capacity of 350 MMBtu/hr.

Steam produced by the _____ auxiliary boilers is not used to generate electricity. In addition, the facility has a variety of ancillary equipment needed to support operations as a coal-fired cogeneration plant.

Indiantown Cogenerating, of Indiantown, Florida conducted this quarter's Cylinder Gas Audit at Indiantown Cogeneration in Indiantown, FL on August 26th 2014 by Keith Kowalski.

The audit of the Continuous Emission Monitoring System was conducted for SO₂ & CO₂. Our assessment of this quarter CGA results indicates that all of the analyzers evaluated during this test program meet the accuracy requirements as outlined in 40 CFR 60, Appendix F. Table 1.1 summarizes the results for the cylinder gas audit.

Reviewed by:

Nicholas Langes

Date:

9/9/2014

Summary of Cylinder Gas Audit Results

Table 1-1

Parameter	Low Gas Error	Mid Gas Error
Reactor A CO2	2	1
Reactor A SO2	1	0
Reactor B CO2	1	0
Reactor B SO2	1	0

Section 2

Cylinder Gas Audit Procedures

Each Continuous Emission Monitor (CEM) must be audited three out of four calendar quarters of each year. As a part of the Quality Control (QC) and Quality Assurance (QA) procedures, the quality of data produced is evaluated by response accuracy compared to known standards.

The CGA for this quarter was conducted in accordance with the QA/QC procedure outlined in 40 CFR 60, Appendix F.

The Audit consisted of challenging the CEM with an audit gas of known concentration with 2 upscale levels of gas, at 20-30% of the system span and at 50-60% of the system span. The audit cylinders contain pollutant of diluent gas certified in accordance with U.S. EPA protocol 1.

The audit gases were introduced into the entire sampling and analysis system through the normal part of the daily QC gases.

The procedure was conducted as follows:

1. Audit cylinder 1 was connected to the system.
2. Manual span was initiated until a stable response was achieved.
3. Values were recorded as the system was allowed to operate in a normal sampling and analysis manner without adjustment.
4. The first audit cylinder was removed and replaced by audit cylinder 2.
5. Manual span was initiated for approximately 15 minutes until a stable response was achieved.
6. This series of steps was repeated through three audit runs.

For each audit cylinder (or audit point), the percent accuracy was determined. The average of the accuracy was determined by the following equation:

$$A = \frac{(Cm - Ca) \times 100}{Ca}$$

Where:

- A = Accuracy of CEMS (%)
Cm = Average CEMS response during audit in applicable standard or concentration (ppm or %)
Ca = Average audit (cylinder gas certified value) in units of applicable standard or concentration (ppm or %)

Accuracy (A) value of $\pm 15\%$ or less is considered acceptable for criteria pollutants or diluent gas. 40 CFR 60 appendix F 5.3.2. (2).

Section 3
Cylinder Gas Audit Data Sheets

Section 4
Cylinder Gas Certification Sheets

Reactor A CO2 CGA

Indiantown CoGen

Test Information

Test Date: 8/26/2014
Facility: Indiantown CoGen
Unit: Reactor A

Analyzer Information

Range: Single
Instrument Span: 20 %CO2
Manufacturer: California Analytical
Model: ZRH1 DFY2-6BAYY
Serial Number: A9E3765T

Run Number	Time	Reference Gas	CEMS Response	Cylinder Information
Low Gas				
1	12:25 PM	6.320	6.400	Allowable Reference Values: 5-8 %CO2 Cylinder ID: CC-231362 Expiration date: 3/4/2021 EPA vendor ID: E12013 Cylinder contains: CO2,NO,SO2,BALN
2	12:47 PM	6.320	6.500	
3	1:09 PM	6.320	6.350	
Mean (%CO2)		6.320	6.417	
Mean Difference (%CO2)		0.097	<i>Limit: N/A</i>	Cylinder contains: CO2,NO,SO2,BALN
CEMS Accuracy		2%	<i>Limit: 15% Passed</i>	
Mid Gas				
1	12:36 PM	11.800	11.650	Allowable Reference Values: 10-14 %CO2 Cylinder ID: EB-0014601 Expiration date: 2/12/2021 EPA vendor ID: E12013 Cylinder contains: CO2,NO,SO2,BALN
2	12:58 PM	11.800	11.720	
3	1:20 PM	11.800	11.820	
Mean (%CO2)		11.800	11.730	
Mean Difference (%CO2)		0.070	<i>Limit: N/A</i>	Cylinder contains: CO2,NO,SO2,BALN
CEMS Accuracy		1%	<i>Limit: 15% Passed</i>	

Linearity Error (CEMS Accuracy) Determination (A): $A = (|C_m - C_a| / C_a) * 100$

C_a = Reference gas value

C_m = Mean of actual CEMS responses

Reactor A SO2 CGA

Indiantown CoGen

Test Information

Test Date: 8/26/2014
 Facility: Indiantown CoGen
 Unit: Reactor A

Analyzer Information

Range: Single
 Instrument Span: 2000 ppm
 Manufacturer: Thermo Environmental
 Model: 43i
 Serial Number: CM13040011

Run Number	Time	Reference Gas	CEMS Response	Cylinder Information
Low Gas				Allowable Reference Values: 400-600 ppm (20-30% of span) Cylinder ID: CC-231362 Expiration date: 3/4/2021 EPA vendor ID: E12013 Cylinder contains: CO2,NO,SO2,BALN
1	12:25 PM	524.000	526.000	
2	12:47 PM	524.000	532.300	
3	1:09 PM	524.000	530.800	
Mean (ppm)		524.000	529.700	
Mean Difference (ppm)		5.700	Limit: 5	
CEMS Accuracy		1%	Limit: 15% Passed	
Mid Gas				
1	12:36 PM	1140.000	1137.700	
2	12:58 PM	1140.000	1136.000	
3	1:20 PM	1140.000	1142.500	
Mean (ppm)		1140.000	1138.733	
Mean Difference (ppm)		1.267	Limit: 5 Passed	
CEMS Accuracy		0%	Limit: 15% Passed	

Linearity Error (CEMS Accuracy) Determination (A): $A = (|C_m - C_a| / C_a) * 100$

C_a = Reference gas value

C_m = Mean of actual CEMS responses

Reactor B CO2 CGA

Indiantown CoGen

Test Information

Test Date: 8/27/2014
 Facility: Indiantown CoGen
 Unit: Reactor B

Analyzer Information

Range: Single
 Instrument Span: 20 %CO2
 Manufacturer: California Analytical
 Model: ZRH1 DFY2-6BAYY
 Serial Number: A9E3767T

Run Number	Time	Reference Gas	CEMS Response	Cylinder Information
Low Gas				
1	9:05 AM	6.320	6.350	Allowable Reference Values: 5-8 %CO2 Cylinder ID: CC-231362 Expiration date: 3/4/2021 EPA vendor ID: E12013 Cylinder contains: CO2,NO,SO2,BALN
2	9:27 AM	6.320	6.250	
3	9:49 AM	6.320	6.220	
Mean (%CO2)		6.320	6.273	
Mean Difference (%CO2)		0.047	Limit: N/A	
CEMS Accuracy		1%	Limit: 15% Passed	
Mid Gas				
1	9:16 AM	11.800	11.750	Allowable Reference Values: 10-14 %CO2 Cylinder ID: EB-0014601 Expiration date: 2/12/2021 EPA vendor ID: E12013 Cylinder contains: CO2,NO,SO2,BALN
2	9:38 AM	11.800	11.840	
3	10:00 AM	11.800	11.890	
Mean (%CO2)		11.800	11.827	
Mean Difference (%CO2)		0.027	Limit: N/A	
CEMS Accuracy		0%	Limit: 15% Passed	

Linearity Error (CEMS Accuracy) Determination (A): $A = (|C_m - C_a| / C_a) * 100$

C_a = Reference gas value

C_m = Mean of actual CEMS responses

Reactor B SO2 CGA

Indiantown CoGen

Test Information

Test Date: 8/27/2014
Facility: Indiantown CoGen
Unit: Reactor B

Analyzer Information

Range: Single
Instrument Span: 2000 ppm
Manufacturer: Thermo Environmental
Model: 43i
Serial Number: CM13040012

Run Number	Time	Reference Gas	CEMS Response	Cylinder Information
Low Gas				Allowable Reference Values: 400-600 ppm (20-30% of span) Cylinder ID: CC-231362 Expiration date: 3/4/2021 EPA vendor ID: E12013 Cylinder contains: CO2,NO,SO2,BALN
1	9:05 AM	524.000	530.000	
2	9:27 AM	524.000	523.800	
3	9:49 AM	524.000	526.200	
Mean (ppm)		524.000	526.667	
Mean Difference (ppm)		2.667	Limit: 5 Passed	
CEMS Accuracy		1%	Limit: 15% Passed	
Mid Gas				
1	9:16 AM	1140.000	1146.000	
2	9:38 AM	1140.000	1134.200	
3	10:00 AM	1140.000	1134.800	
Mean (ppm)		1140.000	1138.333	
Mean Difference (ppm)		1.667	Limit: 5 Passed	
CEMS Accuracy		0%	Limit: 15% Passed	

Linearity Error (CEMS Accuracy) Determination (A): $A = (|C_m - C_a| / C_a) * 100$

C_a = Reference gas value

C_m = Mean of actual CEMS responses



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"INDUSTRY LEADER IN SPECIALTY GASES"

INLET
DAILY
ZERO
7/17/14

Certificate of Analysis

<u>Customer</u>	<u>Indiantown Cogen, LP (Indiantown, FL)</u>
<u>Date</u>	<u>January 30, 2014</u>
<u>Delivery Receipt</u>	<u>DR-50055</u>
<u>Product:</u>	<u>Nitrogen, CEMS Grade</u>
<u>Lot Number:</u>	<u>LTA164-PG</u>

Mixture Specifications

Cylinder Number EB-0053533

<u>Components</u>	<u>Requested</u>	<u>Actual</u>
Moisture	2.0 ppm	< 2.0 ppm
Hydrocarbons	0.1 ppm	< 0.1 ppm
Oxygen	1.0 ppm	< 1.0 ppm
Carbon Monoxide	1.0 ppm	< 1.0 ppm
Carbon Dioxide	1.0 ppm	< 1.0 ppm
Nitrogen	99.9995%	99.9995%

Cylinder Data

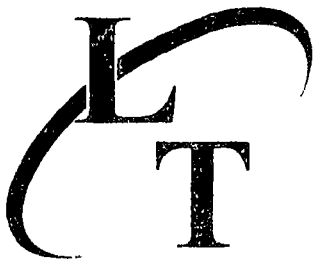
Cylinder Valve:	CGA 580
Cylinder Volume:	140 Cubic Feet
Cylinder Pressure:	2000 psig, 70°F
Expiration Date:	January 30, 2017

Certified by:

Cole Dylewski

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"INDUSTRY LEADER IN SPECIALTY GASES"

INLET
DAILY
SPAN

Certificate of Analysis
- EPA PROTOCOL GAS -

Customer Indiantown Cogen, LP (Indiantown, FL)
Date January 30, 2014
Delivery Receipt DR-50055
Gas Standard 1800 ppm SO2, 17.0% CO2/Nitrogen - EPA PROTOCOL
Final Analysis Date January 30, 2014
Expiration Date January 30, 2022

DO NOT USE BELOW 100 psig

Analytical Data:
EPA Protocol, Section No. 2.2, Procedure G-2.

Reported Concentrations
Sulfur Dioxide: 1805 ppm +/- 6.0 ppm
Carbon Dioxide: 16.7% +/- 0.16%
Nitrogen: Balance

Reference Standards

SRM/GMIS:	GMIS/GMIS	GMIS/GMIS
Cylinder Number:	CC-54550/CC-185372	EB-0026839/CC-185129
Concentration:	746.54 ppm SO2/912.01 ppm SO2	6.847% CO2/13.92% CO2
Expiration Date:	02/06/21 - 01/03/21	10/03/20 - 06/24/15

Certification Instrumentation

Component:	Sulfur Dioxide	Carbon Dioxide
Make/Model:	Nicolet 6700	Nicolet 6700
Serial Number:	APW1100563	APW1100563
Principal of Measurement:	FTIR	FTIR
Last Calibration:	January 15, 2014	January 08, 2014

Cylinder Data

Cylinder Number:	EB-0045679	Cylinder Volume:	135 Cubic Feet
Cylinder Outlet:	CGA 660	Cylinder Pressure:	1900 psig, 70°F

Analytical Uncertainty and NIST Traceability are in compliance with EPA-600/R-12/531.

Certified by: *Cole Dylewski*

Cole Dylewski

PGVP Vendor ID: E12014



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"INDUSTRY LEADER IN SPECIALTY GASES"

7/5/13 INLET

Certificate of Analysis - EPA PROTOCOL GAS -

CGA 660

Customer Indiantown Cogen, LP (Indiantown, FL)
Date March 05, 2013
Delivery Receipt DR-46115
Gas Standard 517 ppm SO₂, 6.50% CO₂/Nitrogen - EPA PROTOCOL
Final Analysis Date March 04, 2013
Expiration Date March 04, 2021 ✓

DO NOT USE BELOW 100 psig

Analytical Data:
 EPA Protocol, Section No. 2.2, Procedure G-1.

Reported Concentrations
Sulfur Dioxide: 524 ppm +/- 1.5 ppm
Carbon Dioxide: 6.32% +/- 0.06%
Nitrogen: Balance

** Total NOx for Reference Use Only **

Reference Standards

SRM/GMIS:	GMIS/GMIS	GMIS
Cylinder Number:	CC-251490/CC-185372	EB-0026839
Concentration:	507.87 ppm SO ₂ /912.00 ppm SO ₂	6.847% CO ₂
Expiration Date:	04/12/13 - 01/11/15	10/03/20

Certification Instrumentation

Component:	Sulfur Dioxide	Carbon Dioxide
Make/Model:	Horiba - VIA 510	Horiba - VIA 510
Serial Number:	XXS2J5YW	SN075GSF
Principal of Measurement:	NDIR	NDIR
Last Calibration:	February 21, 2013	February 13, 2013

Cylinder Data

Cylinder Number:	CC-231362	Cylinder Volume:	136 Cubic Feet
Cylinder Outlet:	CGA 660	Cylinder Pressure:	1950 psig, 70°F

Analytical Uncertainty and NIST Tracability are in compliance with EPA-600/R-12/531.

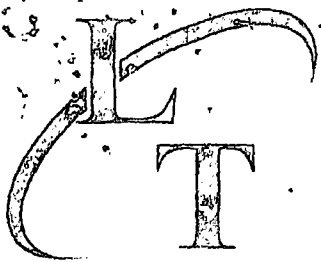
Certified by:

David Scott

PGVP Vendor ID: E12013

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"INDUSTRY LEADER IN SPECIALTY GASES"

*INLET
CGA MID
IN SVC.
3/6/13*

Certificate of Analysis - EPA PROTOCOL GAS -

<u>Customer</u>	Indiantown Cogen, LP (Indiantown, FL)
<u>Date</u>	February 19, 2013
<u>Delivery Receipt</u>	DR-45823
<u>Gas Standard</u>	1113 ppm SO ₂ , 12.0% CO ₂ /Nitrogen - EPA PROTOCOL
<u>Final Analysis Date</u>	February 12, 2013
<u>Expiration Date</u>	February 12, 2021 ✓

DO NOT USE BELOW 100 psig

Analytical Data:
EPA Protocol, Section No. 2.2, Procedure G-1.

Reported Concentrations
Sulfur Dioxide: 1140 ppm +/- 11.4 ppm
Carbon Dioxide: 11.8% +/- 0.07% ✓
Nitrogen: Balance
 ** Total NO_x for Reference Use Only **

Reference Standards

SRM/GMIS:	GMIS/GMIS	GMIS/GMIS
Cylinder Number:	CC-231460/CC-184275	EB-0026839/CC-185129
Concentration:	1015.69 ppm SO ₂ /1513.19 ppm SO ₂	6.847% CO ₂ /13.92% CO ₂
Expiration Date:	12/02/12 - 01/11/15	10/03/20 - 06/24/13

Certification Instrumentation

Component:	Sulfur Dioxide	Carbon Dioxide
Make/Model:	Nicolet 6700	Nicolet 6700
Serial Number:	APW1100563	APW1100563
Principal of Measurement:	FTIR	FTIR
Last Calibration:	January 30, 2013	January 30, 2013

Cylinder Data

Cylinder Number:	EB-0014601 ✓	Cylinder Volume:	126 Cubic Feet
Cylinder Outlet:	CGA 660	Cylinder Pressure:	1800 psig, 70°F

Analytical Uncertainty and NIST Traceability are in compliance with EPA-600/R-12/531.

Certified by: 
David Scott

PGVP Vendor ID: E12013

"UNMATCHED EXCELLENCE"