Indiantown Cogeneration, L.P.

PO Box 1799
13303 SW Silver Fox Lane
Indiantown, FL 34956
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April 1st, 2013

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. First Quarter of 2013 Linearity, Opacity Audit & Cylinder Gas Audit Report {Permit Nos: 0850102 (PSD-FL-168)}***

Dear Mr. Pichard

Attached please find the First Quarter of 2013 Linearity/Calibration Gas Audits (CGA), Opacity Audits and summary of the audit results for Indiantown Cogeneration, L.P. (ICLP) Main Boiler CEMDAS and Inlet 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	4.00	3.00		15
CO2 Inlet A	4.00	3.00		15
SO2 Inlet B	2.00	1.00		15
CO2 Inlet B	2.00	2.00		15
NOX Aux	N/A	N/A		15
O2 Aux	N/A	N/A		15
CO Lo Aux	N/A	N/A		15
CO Hi Aux	N/A	N/A		15
NOX Main	2.80	0.30	0.30	5.0
SO2 Main	4.30	1.30	2.70	5.0
CO2 Main	0.45*	2.50	3.00	5.0
Opacity Cal Error	0.30	0.30	0.60	3.0

- * Alternate method passed at 0.45 ppm

Linearity Audit (Main Boiler)

- The quarterly Linearity Audit for the First Quarter 2013 was completed on March 7th, 2013 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 First Quarter 2013 was completed on March 7th, 2013 for Reactors A & B Sulfur dioxide and carbon dioxide. All were found within tolerances.

Cylinder Gas Audits Auxiliary Boilers

This is a RATA Quarter.

Opacity Audit (Main Boiler)

- The opacity meter was tested on March 8th, 2013 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) 597-6500 x 19.

Sincerely,

Todd Shirley
Projects General Manager

cc: Lee Hoefert (DEP South East District)
Kellee Fletcher
Nicholas Laryea
File # 2.4.1

Main Boiler
Linearity

LINEARITY PERFORMANCE AUDIT

FOR

Indiantown Cogeneration

Indiantown, FL
Units: Main Emission unit E001
DILUTION EXTRACTIVE

First Quarter 2013
PREPARED BY:

Indiantown Cogeneration

Section 1 Introduction

Facility Location: Indiantown Cogeneration, L.P. operates the Indiantown Cogeneration Plant, which is located in Martin County at 3303 SW Sliver 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 March 07 2013 by Eric Rammel. The audit of the Continuous Emission Monitoring System was conducted for NOx, 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 Lanyea

Date: 3/20/2013

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Summary of Cylinder Gas Audit Results

Parameter	Low Gas	Mid Gas	High Gas
CO2	.45	2.5	3.0
SO2	4.3	1.3	2.7
NOx	2.8	.3	.3

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 SO_2 and NOx pollutant concentration monitors by the following equations:

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

For CO_2 or O_2 monitors:

$$LE = [R-A] \leq 5\% \text{ or } |R-A| \leq 0.5\% \text{ CO2 or O2}$$

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 NOx Linearity

Indiantown CoGen

Test Information

Test Date:	**3/7/2013**
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					Allowable Reference Values: 50-75 ppm (20-30% of span)
1	12:48 PM	64.100	65.880		Cylinder ID: CC185304
2	1:18 PM	64.100	65.890		Expiration date: 8/30/2013
3	1:48 PM	64.100	65.870		EPA vendor ID: E12011
	Mean (ppm)	64.100	65.880		Cylinder contains: CO2,NO,SO2,BALN
	Mean Difference (ppm)	1.780	*Limit: 5*	*Passed*	
	Linearity Error	2.8%	*Limit: 5.0%*	*Passed*	
Mid Gas					Allowable Reference Values: 125-150 ppm (50-60% of span)
1	12:58 PM	131.000	131.330		Cylinder ID: CC-166604
2	1:28 PM	131.000	131.410		Expiration date: 4/23/2014
3	1:58 PM	131.000	131.280		EPA vendor ID: E12012
	Mean (ppm)	131.000	131.340		Cylinder contains: CO2,NO,SO2,BALN
	Mean Difference (ppm)	0.340	*Limit: 5*	*Passed*	
	Linearity Error	0.3%	*Limit: 5.0%*	*Passed*	
High Gas					Allowable Reference Values: 200-250 ppm (80-100% of span)
1	1:08 PM	214.000	213.430		Cylinder ID: CC56344
2	1:38 PM	214.000	213.990		Expiration date: 2/18/2021
3	2:08 PM	214.000	212.940		EPA vendor ID: E12013
	Mean (ppm)	214.000	213.453		Cylinder contains: CO2,NO,SO2,BALN
	Mean Difference (ppm)	0.547	*Limit: 5*	*Passed*	
	Linearity Error	0.3%	*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:	**3/7/2013**
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					Allowable Reference Values: 28-42 ppm (20-30% of span)
1	12:48 PM	33.800	35.070		Cylinder ID: CC185304
2	1:18 PM	33.800	35.350		Expiration date: 8/30/2013
3	1:48 PM	33.800	35.340		EPA vendor ID: E12011
	Mean (ppm)	33.800	35.253		Cylinder contains: CO2,NO,SO2,BALN
	Mean Difference (ppm)	1.453	*Limit: 5*	*Passed*	
	Linearity Error	4.3%	*Limit: 5.0%*	*Passed*	
Mid Gas					Allowable Reference Values: 70-84 ppm (50-60% of span)
1	12:58 PM	75.200	75.940		Cylinder ID: CC-166604
2	1:28 PM	75.200	76.290		Expiration date: 4/23/2014
3	1:58 PM	75.200	76.270		EPA vendor ID: E12012
	Mean (ppm)	75.200	76.167		Cylinder contains: CO2,NO,SO2,BALN
	Mean Difference (ppm)	0.967	*Limit: 5*	*Passed*	
	Linearity Error	1.3%	*Limit: 5.0%*	*Passed*	
High Gas					Allowable Reference Values: 112-140 ppm (80-100% of span)
1	1:08 PM	129.000	124.510		Cylinder ID: CC56344
2	1:38 PM	129.000	126.150		Expiration date: 2/18/2021
3	2:08 PM	129.000	125.830		EPA vendor ID: E12013
	Mean (ppm)	129.000	125.497		Cylinder contains: CO2,NO,SO2,BALN
	Mean Difference (ppm)	3.503	*Limit: 5*	*Passed*	
	Linearity Error	2.7%	*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 CO2 Linearity

Indiantown CoGen

Test Information

Test Date:	**3/7/2013**
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	12:48 PM	4.940	5.370		Allowable Reference Values: 4-6 %CO2 (20-30% of span)
2	1:18 PM	4.940	5.400		Cylinder ID: CC185304
3	1:48 PM	4.940	5.410		Expiration date: 8/30/2013
	Mean (%CO2)	4.940	5.393		EPA vendor ID: E12011
	Mean Difference (%CO2)	0.453	*Limit: 0.5*	*Passed*	Cylinder contains: CO2,NO,SO2,BALN
	Linearity Error	9.2%	*Limit: 5.0%*		
Mid Gas					
1	12:58 PM	10.800	11.050		Allowable Reference Values: 10-12 %CO2 (50-60% of span)
2	1:28 PM	10.800	11.070		Cylinder ID: CC-166604
3	1:58 PM	10.800	11.100		Expiration date: 4/23/2014
	Mean (%CO2)	10.800	11.073		EPA vendor ID: E12012
	Mean Difference (%CO2)	0.273	*Limit: 0.5*	*Passed*	Cylinder contains: CO2,NO,SO2,BALN
	Linearity Error	2.5%	*Limit: 5.0%*	*Passed*	
High Gas					
1	1:08 PM	18.100	17.530		Allowable Reference Values: 16-20 %CO2 (80-100% of span)
2	1:38 PM	18.100	17.500		Cylinder ID: CC56344
3	2:08 PM	18.100	17.640		Expiration date: 2/18/2021
	Mean (%CO2)	18.100	17.557		EPA vendor ID: E12013
	Mean Difference (%CO2)	0.543	*Limit: 0.5*		Cylinder contains: CO2,NO,SO2,BALN
	Linearity Error	3.0%	*Limit: 5.0%*	*Passed*	

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

R = Reference gas value

A = Mean of actual CEMS responses

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"INDUSTRY LEADER IN SPECIALTY GASES"

Mar. CEMS

IN Service 10-19-11

Certificate of Analysis
- EPA PROTOCOL GAS -

Customer	Indiantown Cogen, LP (Indiantown, FL)
Date	August 30, 2011
Delivery Receipt	DR-38427
Gas Standard	*63.0 ppm NO, 35.0 ppm SO2, 5.00% CO2/Nitrogen - EPA PROTOCOL*
Final Analysis Date	August 30, 2011
Expiration Date	August 30, 2013

DO NOT USE BELOW 150 psig

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

linearity

Reported Concentrations
Nitric Oxide: 64.1 ppm +/- 0.64 ppm
Sulfur Dioxide: 33.8 ppm +/- 0.33 ppm
Carbon Dioxide: 4.94% +/- 0.04%
Nitrogen: Balance
Total NOx: 64.1 ppm
** Total NOx for Reference Use Only **

Reference Standards

SRM/GMIS:	GMIS/GMIS	GMIS/GMIS	GMIS
Cylinder Number:	CC-233272/EB-0017545	CC-233316/CC-233274	CC-159026
Concentration:	49.23 ppm NO/96.85 ppm NO	10.67 ppm/53.31 ppm SO2	4.974% CO2
Expiration Date:	04/14/13 - 04/25/13	05/03/12 - 09/20/12	10/14/12

Certification Instrumentation

Component:	Nitric Oxide	Sulfur Dioxide	Carbon Dioxide
Make/Model:	Nicolet - NEXUS 470	Nicolet - NEXUS 470	Nicolet - NEXUS 470
Serial Number:	AEP9900154	AEP9900154	AEP9900154
Principal of Measurement:	FTIR	FTIR	FTIR
Last Calibration:	August 10, 2011	August 10, 2011	August 10, 2011

Cylinder Data

Cylinder Number:	CC-185304	Cylinder Volume:	133 Cubic Feet
Cylinder Outlet:	CGA 660	Cylinder Pressure:	1900 psig, 70°F

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

Certified by: *Adam Strickland*

PGVP Vendor ID: E12011

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"INDUSTRY LEADER IN SPECIALTY GASES"

In Service 5-11-12

Main

Certificate of Analysis
- EPA PROTOCOL GAS -

Customer	Indiantown Cogen, LP (Indiantown, FL)
Date	April 24, 2012
Delivery Receipt	DR-42043
Gas Standard	130 ppm NO, 76.0 ppm SO2, 11.0% CO2/Nitrogen - EPA PROTOCOL
Final Analysis Date	April 23, 2012
Expiration Date	April 23, 2014

DO NOT USE BELOW 150 psig

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

Reported Concentrations
Nitric Oxide: 131 ppm +/- 1.3 ppm
Sulfur Dioxide: 75.2 ppm +/- 0.75 ppm
Carbon Dioxide: 10.8% +/- 0.10%
Nitrogen: Balance
Total NOx: 131 ppm
** Total NOx for Reference Use Only **

Reference Standards

SRM/GMIS:	GMIS/GMIS	GMIS/GMIS	GMIS
Cylinder Number:	EB-0023236/CC-88793	EB-0014653	CC-165377
Concentration:	96.27 ppm NO/262.42 ppm NO	103.89 ppm SO2	9.924% CO2
Expiration Date:	01/12/14 - 01/13/14	12/01/12	10/14/12

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:	April 06, 2012	April 06, 2012	April 06, 2012

Cylinder Data

Cylinder Number:	CC-166604	Cylinder Volume:	133 Cubic Feet
Cylinder Outlet:	CGA 660	Cylinder Pressure:	1900 psig, 70°F

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

Certified by: *Adam Strickland*

PGVP Vendor ID: E12012

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"INDUSTRY LEADER IN SPECIALTY GASES"

3/7/13

Certificate of Analysis

- EPA PROTOCOL GAS -

DAILY SPAN

Customer	Indiantown Cogen, LP (Indiantown, FL)
Date	February 19, 2013
Delivery Receipt	DR-45823
Gas Standard	222 ppm NO, 131 ppm SO2, 18.0% 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: 214 ppm +/- 0.32 ppm

Sulfur Dioxide: 129 ppm +/- 0.89 ppm

Carbon Dioxide: 18.1% +/- 0.06%

Nitrogen: Balance

Total NOx: 216 ppm

** Total NOx for Reference Use Only **

Reference Standards

SRM/GMIS:	GMIS/GMIS	GMIS/GMIS	GMIS
Cylinder Number:	ND-45697/ND-45515	CC-54548/CC-251490	CC-184404
Concentration:	96.46 ppm NO/246.26 ppm NO	102.43 ppm SO2/507.87 ppm SO2	19.87% CO2
Expiration Date:	01/12/14 - 08/23/20	04/12/13 - 04/12/13	02/04/13

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:	CC-56344	Cylinder Volume:	131 Cubic Feet
Cylinder Outlet:	CGA 660	Cylinder Pressure:	1875 psig, 70°F

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

Certified by: David Scott

David Scott

PGVP Vendor ID: E12013

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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

First Quarter 2013

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 3303 SW Sliver 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 a Cylinder Gas Audit at Indiantown Cogeneration in Indiantown, FL on March 6 & 7, 2012 conducted by Eric Rammel.

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 Lanyes

Date: 3/20/2013

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

Reactor A CO2 CGA

Indiantown CoGen

Test Information

Test Date:	**3/6/2013**
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	2:10 PM	6.490	6.780		Allowable Reference Values: 5-8 %CO2
2	2:32 PM	6.490	6.780		Cylinder ID: CC6414
3	2:54 PM	6.490	6.750		Expiration date: 7/6/2013
	Mean (%CO2)	6.490	6.770		EPA vendor ID: F12012
	Mean Difference (%CO2)	0.280	*Limit: N/A*		Cylinder contains: CO2,NO,SO2,BALN
	CEMS Accuracy	4%	*Limit: 15%*	*Passed*	
Mid Gas					
1	2:21 PM	11.800	12.220		Allowable Reference Values: 10-14 %CO2
2	2:43 PM	11.800	12.200		Cylinder ID: EB-0014601
3	3:05 PM	11.800	12.200		Expiration date: 2/12/2021
	Mean (%CO2)	11.800	12.207		EPA vendor ID: E12013
	Mean Difference (%CO2)	0.407	*Limit: N/A*		Cylinder contains: CO2,NO,SO2,BALN
	CEMS Accuracy	3%	*Limit: 15%*	*Passed*	

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

Ca = Reference gas value

Cm = Mean of actual CEMS responses

Reactor A SO2 CGA

Indiantown CoGen

Test Information

Test Date:	**3/6/2013**
Facility:	Indiantown CoGen
Unit:	Reactor A

Analyzer Information

Range:	Single
Instrument Span:	2000 ppm
Manufacturer:	Thermo Environmental
Model:	43C
Serial Number:	43C-64046-342

Run Number	Time	Reference Gas	CEMS Response		Cylinder Information
Low Gas					Allowable Reference Values: 400-600 ppm (20-30% of span)
1	2:10 PM	517.300	539.800		Cylinder ID: CC6414
2	2:32 PM	517.300	539.800		Expiration date: 7/6/2013
3	2:54 PM	517.300	537.500		EPA vendor ID: F12012
	Mean (ppm)	517.300	539.033		Cylinder contains: CO2,NO,SO2,BALN
	Mean Difference (ppm)	21.733	*Limit: 5*		
	CEMS Accuracy	4%	*Limit: 15%*	*Passed*	
Mid Gas					Allowable Reference Values: 1000-1200 ppm (50-60% of span)
1	2:21 PM	1140.000	1171.000		Cylinder ID: EB-0014601
2	2:43 PM	1140.000	1171.900		Expiration date: 2/12/2021
3	3:05 PM	1140.000	1170.400		EPA vendor ID: E12013
	Mean (ppm)	1140.000	1171.100		Cylinder contains: CO2,NO,SO2,BALN
	Mean Difference (ppm)	31.100	*Limit: 5*		
	CEMS Accuracy	3%	*Limit: 15%*	*Passed*	

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

Ca = Reference gas value

Cm = Mean of actual CEMS responses

Reactor B CO2 CGA

Indiantown CoGen

Test Information

Test Date:	**3/7/2013**
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	3:18 PM	6.490	6.630		Allowable Reference Values: 5-8 %CO2
2	3:40 PM	6.490	6.640		
3	4:02 PM	6.490	6.650		Cylinder ID: CC6414
	Mean (%CO2)	6.490	6.640		Expiration date: 7/6/2013
	Mean Difference (%CO2)	0.150	*Limit: N/A*		EPA vendor ID: F12012
	CEMS Accuracy	2%	*Limit: 15%*	*Passed*	Cylinder contains: CO2,NO,SO2,BALN
Mid Gas					
1	3:29 PM	11.800	12.030		Allowable Reference Values: 10-14 %CO2
2	3:51 PM	11.800	12.040		
3	4:13 PM	11.800	12.050		Cylinder ID: EB-0014601
	Mean (%CO2)	11.800	12.040		Expiration date: 2/12/2021
	Mean Difference (%CO2)	0.240	*Limit: N/A*		EPA vendor ID: E12013
	CEMS Accuracy	2%	*Limit: 15%*	*Passed*	Cylinder contains: CO2,NO,SO2,BALN

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

Ca = Reference gas value

Cm = Mean of actual CEMS responses

Reactor B SO2 CGA

Indiantown CoGen

Test Information

Test Date:	**3/7/2013**
Facility:	Indiantown CoGen
Unit:	Reactor B

Analyzer Information

Range:	Single
Instrument Span:	2000 ppm
Manufacturer:	Thermo Environmental
Model:	43C
Serial Number:	43C-64047-342

Run Number	Time	Reference Gas	CEMS Response		Cylinder Information
Low Gas					Allowable Reference Values: 400-600 ppm (20-30% of span)
1	3:18 PM	517.300	528.500		Cylinder ID: CC6414
2	3:40 PM	517.300	528.500		Expiration date: 7/6/2013
3	4:02 PM	517.300	529.800		EPA vendor ID: F12012
	Mean (ppm)	517.300	528.933		Cylinder contains: CO2,NO,SO2,BALN
	Mean Difference (ppm)	11.633	*Limit: 5*		
	CEMS Accuracy	2%	*Limit: 15%*	*Passed*	
Mid Gas					Allowable Reference Values: 1000-1200 ppm (50-60% of span)
1	3:29 PM	1140.000	1150.000		Cylinder ID: EB-0014601
2	3:51 PM	1140.000	1153.300		Expiration date: 2/12/2021
3	4:13 PM	1140.000	1152.100		EPA vendor ID: E12013
	Mean (ppm)	1140.000	1151.800		Cylinder contains: CO2,NO,SO2,BALN
	Mean Difference (ppm)	11.800	*Limit: 5*		
	CEMS Accuracy	1%	*Limit: 15%*	*Passed*	

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

Ca = Reference gas value

Cm = Mean of actual CEMS responses

Section 4
Cylinder Gas Certification Sheets

PRAXAIR

CGA 10 Inlet

Inserve
9-27-10

Praxair Distribution Mid-Atlantic
145 Chimneyville Rd.
Bethlehem, PA 18015
Telephone: (610) 317-1608
Facsimile: (610) 758-8382

DocNumber: 000005096

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

Customer & Order Information:

PDI WHSE DISTRIBUTION ORLAN
403 ZELL DR
ORLANDO FL 328240

Praxair Order Number: 02392292
Customer P. O. Number: 117278 91
Customer Reference Number:

Fill Date: 6/24/2010
Part Number: NI CD6.5S1E-AS
Lot Number: 917017503
Cylinder Style & Outlet: AS CGA660
Cylinder Pressure & Volume: 2000 psig 140 cu. ft.

Certified Concentration:

Expiration Date:	7/6/2013		NIST Traceable
Cylinder Number:	CC6414		Analytical Uncertainty:
517.3	ppm	SULFUR DIOXIDE	± 1 %
6.49	%	CARBON DIOXIDE	± 1 %
	Balance	NITROGEN	

Certifcation Information: *Certification Date:* 7/6/2010 *Term:* 36 Months *Expiration Date:* 7/6/2013

This cylinder was certified according to the 1997 EPA Traceability Protocol, Document #EPA-600/R-97/121, using Procedure G1
Do Not Use this Standard if Pressure is less than 150 PSIG

Analytical Data: *(R=Reference Standard, Z=Zero Gas, C=Gas Candidate)*

1 . Component: SULFUR DIOXIDE

Requested Concentration: 500 ppm
Certified Concentration: 517 3 ppm
Instrument Used: SIEMENS ULTRAMAT 6E S/N:J2-36
Analytical Method: NON-DISPERSIVE INFRARED
Last Multipoint Calibration: 6/23/2010

First Analysis Data:						Date:	6/29/2010
Z:	0	R:	506.6	C:	514.5	Conc:	517.41
R:	506 5	Z:	0	C:	514.3	Conc:	517.21
Z:	0	C:	514.6	R:	505.9	Conc:	517.51
UOM:	PPM			Mean Test Assay:			517.38 PPM

Reference Standard Type: GMIS
Ref. Std. Cylinder # : CC154814
Ref. Std. Conc: 509.2 PPM
Ref. Std. Traceable to SRM # : 1661a
SRM Sample # : 94-H-1
SRM Cylinder # : FF20869

Second Analysis Data:						Date:	7/6/2010
Z:	0	R:	510.8	C:	518.6	Conc:	516.98
R:	510.9	Z:	0	C:	519.1	Conc:	517.47
Z:	0	C:	519	R:	510.7	Conc:	517.37
UOM:	PPM			Mean Test Assay:			517.28 PPM

2 . Component: CARBON DIOXIDE

Requested Concentration. 6.5 %
Certified Concentration: 6.49 %
Instrument Used: SIEMENS ULTRAMAT 5E SN: D2-412
Analytical Method: NON-DISPERSIVE INFRARED
Last Multipoint Calibration: 6/17/2010

First Analysis Data:						Date:	6/30/2010
Z:	0	R:	7.96	C:	6.48	Conc:	6.488
R:	7.96	Z:	0	C:	6.48	Conc:	6.488
Z:	0	C:	6 48	R:	7.96	Conc:	6.488
UOM:	%			Mean Test Assay:			6.488 %

Reference Standard Type: GMIS
Ref. Std. Cylinder # : CC167881
Ref. Std. Conc: 7.97 %
Ref. Std. Traceable to SRM # : 1674b
SRM Sample # : 7-G-27
SRM Cylinder # . CAL017236

Second Analysis Data:						Date:	
Z:	0	R:	0	C:	0	Conc:	0
R:	0	Z:	0	C:	0	Conc:	0
Z:	0	C:	0	R:	0	Conc:	0
UOM:	%			Mean Test Assay:			0 %

Analyzed by:

Michelle Kostik

Certified by:

Robin Morgan

LIQUID TECHNOLOGY CORPORATION

"INDUSTRY LEADER IN SPECIALTY GASES"

CGA 660 IN SVC. 3/6/13

Certificate of Analysis

- EPA PROTOCOL GAS -

Customer	Indiantown Cogen, LP (Indiantown, FL)
Date	February 19, 2013
Delivery Receipt	DR-45823
Gas Standard	1113 ppm SO2, 12.0% CO2/Nitrogen - EPA PROTOCOL
Final Analysis Date	February 12, 2013
Expiration Date	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 NOx 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 SO2/1513.19 ppm SO2	6.847% CO2/13.92% CO2
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

David Scott

PGVP Vendor ID: E12013

2048 APEX COURT APOPKA, FLORIDA 32703 ~ PHONE (407)-292-2990 FAX (407)-292-3313
WWW.LIQUIDTECHCORP.COM

Opacity Audits

OPACITY PERFORMANCE AUDIT

FOR

Indiantown Cogeneration

Indiantown, FL

Units: Main Emission unit E001

DURAG
MODEL CEMOP-290 OPACITY CEMS

First Quarter 2013

PREPARED BY:

Indiantown Cogeneration

TABLE OF CONTENTS

I. Introduction

Indiantown Cogen conducted an opacity performance audit on Durag Model CEMOP-290 opacity system. The testing was performed on March 8 2013 by Eric Rammel 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 3303 SW Sliver 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 Langley

Date: 3/20/2013

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 = 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)

$$OP_X = 1-(1-\frac{Opacity}{100})^{corr.factor}$$

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 ±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 names 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.

Meter response in % opacity = 6.25 [(Blank 13) - (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 ±2% opacity) before and after cleaning the optical surfaces. If the effluent opacity is fluctuating by more that ±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 ±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:	Eric Rammel	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:	3/8/2013		

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

	ON	OFF
7 Blower [Loss of purge air blower power Error 100, 300]		X
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

Instrument Range Check

11	Instrument range setting	100 %

Zero Check

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

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

Span Check

15	Panel meter span calibration value (milliamps)	11.50 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)	0.70 %
	[Inspect and clean optical surface.]	
18	Post-cleaning effluent opacity (% Op)	0.00 %
	[Go to transceiver location.]	

Transceiver Dust Accumulation Check

19	Pre-cleaning effluent opacity (% Op)	0.00 %
	[Inspect and clean optical surface.]	
20	Post-cleaning effluent opacity (% Op)	0.00 %

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	RX55	8.50	7.99
23	MED	YA28	11.50	10.82
24	HIGH	RX56	23.20	21.92

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.]

ZERO	LOW	MID	HIGH	ZERO
0.00	7.70	10.50	21.30	0.00
	7.70	10.60	21.40	0.00
	7.80	10.60	21.40	0.00
	7.80	10.60	21.40	0.00
	7.80	10.60	21.40	0.00

[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.]

ZERO	LOW	MID	HIGH	ZERO
0.00	8.30	10.70	21.40	0.00

[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.]

	ZERO		LOW		MID		HIGH		ZERO
25	0.00	26	7.70	27	10.50	28	21.30	29	0.00
		30	7.70	31	10.60	32	21.40	33	0.00
		34	7.80	35	10.60	36	21.40	37	0.00
		38	7.80	39	10.60	40	21.40	41	0.00
		42	7.80	43	10.60	44	21.40	45	0.00

[Six-minute average data, if applicable.]

	ZERO		LOW		MID		HIGH		ZERO
46	0.00	47	8.30	48	10.70	49	21.40	50	0.00

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

Calculation of Audit Results

Stack exit correlation error (%):

51 $\dfrac{\text{Blank 4} - \text{Blank 3}}{\text{Blank 3}} = \dfrac{0.9375 - 0.932075032}{0.932075} * 100 =$ 0.58203125

Zero Error (% Op.):

52 Panel Meter: 6.25 * (Blank 13 (4) - 4.0) --- Blank 5 (0) === 0.00 %

53 Opacity Data Recorder: Blank 14 (0) ------ Blank 5 (0) === 0.00

Span Error (% Op.):

54 Panel Meter: 6.25 * (Blank 15 (11.5) - 4.0) --- Blank 6 (80) === -33.13 %

55 Opacity Data Recorder: Blank 16 (80) ------ Blank 6 (80) === 0.00

Optical Surface Dust Accumulation (% OP):

56 Retroreflector: Blank 17 (0.7) ---------- Blank 18 (0) === 0.70 %

57 Transceiver: Blank 19 (0) ---------- Blank 20 (0) === 0.00 %

58 Total: Blank 56 (0.7) + Blank 57 (0) === 0.70 %

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

59 LOW: $(1 - \dfrac{\text{Blank 22}}{100}) * (1 - \dfrac{\text{Blank 45}}{100}) * 100 =$ 7.99058368 %

60 MID: $(1 - \dfrac{\text{Blank 23}}{100}) * (1 - \dfrac{\text{Blank 45}}{100}) * 100 =$ 10.8216739 %

61 HIGH: $(1 - \dfrac{\text{Blank 24}}{100}) * (1 - \dfrac{\text{Blank 45}}{100}) * 100 =$ 21.922456 %

DURAG MODEL CEMOP-290 OPACITY CEMS

Performance Audit Data Summary

Auditor	Eric Rammel	Date	03/08/13
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		+/- 4% Op
	Data	53	0.00		+/- 4% Op
Internal Span Error	Panel	54	-33.13		+/- 4% Op
	Data	55	0.00		+/- 4% Op
Optical Alignment Analysis		21	X	3	Centered
Optical Surface Dust Accumulation					
Retroreflector		56	0.70		<= 2% Op
Transceiver		57	0.00		<= 2% Op
Total		58	0.70		<= 4% Op
Calibration Error Analysis					
Mean Error					
	Low	62	-0.23		
		71a	0.31		
	Mid	63	-0.24		
		72a	-0.12		
	High	64	-0.54		
		73a	-0.52		
Confidence Interval					
	Low	65	0.07		
	Mid	66	0.06		
	High	67	0.06		
Calibration Error					
	Low	68	0.30		<= 3% Op
	Mid	69	0.30		<= 3% Op
	High	70	0.60		<= 3% Op

n	Low range Difference			Delta L	Delta L ^2
1	7.7	7.990584		-0.29	0.084
	Blank 26	- Blank59	=		
2	7.7	7.990584		-0.29	0.084
	Blank30	- Blank59	=		
3	7.8	7.990584		-0.19	0.036
	Blank34	- Blank59	=		
4	7.8	7.990584		-0.19	0.036
	Blank38	- Blank59	=		
5	7.8	7.990584		-0.19	0.036
	Blank42	- Blank59	=		
			Sum	-1.15	0.278
				DL	DL2

MEAN ERROR = ME low

$$ME\ low = \frac{DL}{n}$$

62 ME low = -0.23058

Confidence Interval = CI low

CI low = ((n*DL2)-(DL)^2)^0.5*0.2776

65 CI low = 0.067998

Calibration Error = CE low

CE low = ME low + CI low

68 CE low = 0.298582

$$E(6)\ low = \frac{8.3}{\text{Blank 47}} - \frac{7.991}{\text{Blank 59}}$$

71 E(6) low = 0.309416

n	Low range Difference			Delta M	Delta M ^2
1	10.5	10.82167		-0.32	0.103
	Blank 27	- Blank60	=		
2	10.6	10.82167		-0.22	0.049
	Blank31	- Blank60	=		
3	10.6	10.82167		-0.22	0.049
	Blank35	- Blank60	=		
4	10.6	10.82167		-0.22	0.049
	Blank39	- Blank60	=		
5	10.6	10.82167		-0.22	0.049
	Blank43	- Blank60	=		
			Sum	-1.21	0.3
				DM	DM2

MEAN ERROR = ME mid

$$ME\ mid = \frac{DM}{n}$$

63 ME mid = -0.24167

Confidence Interval = CI mid

CI mid = ((n*DM2)-(DM)^2)^0.5*0.2776

66 CI mid = 0.05552

Calibration Error = CE mid

CE mid = ME mid + CI mid

69 CE mid = 0.297194

$$E(6)\ mid = \frac{10.7}{\text{Blank 48}} - \frac{10.82}{\text{Blank 60}}$$

72 E(6) mid = -0.12167

n	Low range Difference			Delta H	Delta H ^2
1	21.3	21.92246		-0.62	0.387451
	Blank 28	- Blank61	=		
2	21.4	21.92246		-0.52	0.27296
	Blank32	- Blank61	=		
3	21.4	21.92246		-0.52	0.27296
	Blank35	- Blank61	=		
4	21.4	21.92246		-0.52	0.27296
	Blank40	- Blank61	=		
5	21.4	21.92246		-0.52	0.27296
	Blank44	- Blank61	=		
			Sum	-2.71	1.479293
				DH	DH2

MEAN ERROR = ME high

$$ME\ high = \frac{DH}{n}$$

64 ME high = -0.54246

Confidence Interval = CI high

CI high = ((n*DH2)-(DH)^2)^0.5*0.2776

67 CI high = 0.05552

Calibration Error = CE high

CE high = ME high + CI high

70 CE high = 0.597976

$$E(6)\ high = \frac{21.4}{\text{Blank 49}} - \frac{21.92}{\text{Blank 61}}$$

73 E(6) high = -0.52246

CeDAR 1-Minute Data

Indiantown CoGen

Data for 3/8/2013 10:30 AM thru 3/8/2013 1:30 PM

Timestamp	(Main Boiler) Opacity % 1-Min Avg	(Main Boiler) Opacity % 6-Min Avg	
3/8 10:30	0.9	0.9	
3/8 10:31	0.9	--	
3/8 10:32	0.9	--	
3/8 10:33	0.8	--	
3/8 10:34	0.8	--	
3/8 10:35	0.9	--	
3/8 10:36	0.9	0.8	
3/8 10:37	0.8	--	
3/8 10:38	0.8	--	
3/8 10:39	0.9	--	
3/8 10:40	0.8	--	
3/8 10:41	0.9	--	
3/8 10:42	0.8	0.5 <14>	
3/8 10:43	0.1	--	
3/8 10:44	0.0 <14>	--	
3/8 10:45	0.0 <14>	--	
3/8 10:46	53.1 <14>	--	
3/8 10:47	59.3 <14>	--	
3/8 10:48	17.9 <14>	1.0 <15>	
3/8 10:49	1.0 <14>	--	
3/8 10:50	1.0	--	
3/8 10:51	0.8 <15>	--	
3/8 10:52	0.9 <15>	--	
3/8 10:53	1.7 <15>	--	
3/8 10:54	1.4 <15>	1.0 <15>	
3/8 10:55	1.1 <15>	--	
3/8 10:56	1.1 <15>	--	
3/8 10:57	1.1 <15>	--	
3/8 10:58	1.2 <15>	--	
3/8 10:59	0.0 <15>	--	
3/8 11:00	0.0 <15>	1.6 <15>	
3/8 11:01	0.0 <15>	--	RUN 1 ZERO
3/8 11:02	0.0 <15>	--	
3/8 11:03	0.0 <15>	--	
3/8 11:04	2.2 <15>	--	
3/8 11:05	7.7 <15>	--	
3/8 11:06	7.7 <15>	11.3 <15>	RUN 1 LOW
3/8 11:07	7.1 <15>	--	
3/8 11:08	10.6 <15>	--	
3/8 11:09	10.5 <15>	--	RUN 1 MID
3/8 11:10	10.6 <15>	--	
3/8 11:11	21.3 <15>	--	
3/8 11:12	21.3 <15>	7.3 <15>	RUN 1 HIGH
3/8 11:13	13.3 <15>	--	
3/8 11:14	0.0 <15>	--	
3/8 11:15	0.0 <15>	--	RUN 2 ZERO

Timestamp	(Main Boiler) Opacity % 1-Min Avg	(Main Boiler) Opacity % 6-Min Avg	
3/8 11:16	1.6 <15>	--	
3/8 11:17	7.8 <15>	--	RUN 2 LOW
3/8 11:18	7.7 <15>	11.1 <15>	
3/8 11:19	7.5 <15>	--	
3/8 11:20	10.6 <15>	--	
3/8 11:21	10.6 <15>	--	RUN 2 MID
3/8 11:22	8.8 <15>	--	
3/8 11:23	21.4 <15>	--	
3/8 11:24	21.3 <15>	7.6 <15>	RUN 2 HIGH
3/8 11:25	14.2 <15>	--	
3/8 11:26	0.0 <15>	--	
3/8 11:27	0.0 <15>	--	RUN 3 ZERO
3/8 11:28	2.4 <15>	--	
3/8 11:29	7.8 <15>	--	
3/8 11:30	7.8 <15>	9.8 <15>	RUN 3 LOW
3/8 11:31	8.3 <15>	--	
3/8 11:32	10.6 <15>	--	
3/8 11:33	10.6 <15>	--	RUN 3 MID
3/8 11:34	10.6 <15>	--	
3/8 11:35	11.0 <15>	--	
3/8 11:36	21.4 <15>	13.1 <15>	
3/8 11:37	21.4 <15>	--	RUN 3 HIGH
3/8 11:38	21.4 <15>	--	
3/8 11:39	14.4 <15>	--	
3/8 11:40	0.0 <15>	--	
3/8 11:41	0.0 <15>	--	RUN 4 ZERO
3/8 11:42	0.0 <15>	4.5 <15>	
3/8 11:43	2.3 <15>	--	
3/8 11:44	7.8 <15>	--	
3/8 11:45	7.8 <15>	--	RUN 4 LOW
3/8 11:46	7.8 <13>	--	
3/8 11:47	6.9 <13>	--	
3/8 11:48	10.6 <13>	14.5 <13>	
3/8 11:49	10.6 <13>	--	RUN 4 MID
3/8 11:50	10.6 <13>	--	
3/8 11:51	12.2 <13>	--	
3/8 11:52	21.4 <13>	--	
3/8 11:53	21.4 <13>	--	RUN 4 HIGH
3/8 11:54	21.4 <13>	5.9 <13>	
3/8 11:55	12.3 <13>	--	
3/8 11:56	0.0 <13>	--	
3/8 11:57	0.0 <13>	--	RUN 5 ZERO
3/8 11:58	0.0 <13>	--	
3/8 11:59	2.0 <13>	--	
3/8 12:00	7.8 <13>	8.7 <13>	
3/8 12:01	7.8 <13>	--	RUN 5 LOW
3/8 12:02	7.8 <13>	--	
3/8 12:03	7.4 <13>	--	
3/8 12:04	10.6 <13>	--	
3/8 12:05	10.6 <13>	--	RUN 5 MID

Timestamp	(Main Boiler) Opacity % 1-Min Avg	(Main Boiler) Opacity % 6-Min Avg	
3/8 12:06	10.6 <13>	17.0 <13>	
3/8 12:07	12.1 <13>	--	
3/8 12:08	21.4 <13>	--	
3/8 12:09	21.4 <13>	--	RUN 5 HIGH
3/8 12:10	21.4 <13>	--	
3/8 12:11	15.0 <13>	--	
3/8 12:12	0.0 <13>	0.0 <13>	
3/8 12:13	0.0 <13>	--	
3/8 12:14	0.0 <13>	--	
3/8 12:15	0.0 <13>	--	
3/8 12:16	0.0 <13>	--	
3/8 12:17	0.0 <13>	--	
3/8 12:18	0.0 <13>	0.0 <13>	6 MIN ZERO
3/8 12:19	0.0 <13>	--	
3/8 12:20	0.0 <13>	--	
3/8 12:21	0.0 <13>	--	
3/8 12:22	0.0 <13>	--	
3/8 12:23	0.0 <13>	--	
3/8 12:24	0.0 <13>	4.3 <13>	
3/8 12:25	0.0 <13>	--	
3/8 12:26	2.4 <13>	--	
3/8 12:27	7.8 <13>	--	
3/8 12:28	7.8 <13>	--	
3/8 12:29	7.8 <13>	--	
3/8 12:30	7.8 <13>	7.8 <13>	
3/8 12:31	7.8 <13>	--	
3/8 12:32	7.8 <13>	--	
3/8 12:33	7.8 <13>	--	
3/8 12:34	7.8 <13>	--	
3/8 12:35	7.8 <13>	--	
3/8 12:36	7.8 <13>	8.3 <13>	6 MIN LOW
3/8 12:37	7.8 <13>	--	
3/8 12:38	7.8 <13>	--	
3/8 12:39	7.8 <13>	--	
3/8 12:40	7.6 <13>	--	
3/8 12:41	10.7 <13>	--	
3/8 12:42	10.7 <13>	10.7 <13>	
3/8 12:43	10.7 <13>	--	
3/8 12:44	10.7 <13>	--	
3/8 12:45	10.7 <13>	--	
3/8 12:46	10.7 <13>	--	
3/8 12:47	10.7 <13>	--	
3/8 12:48	10.7 <13>	10.7 <13>	6 MIN MID
3/8 12:49	10.7 <13>	--	
3/8 12:50	10.7 <13>	--	
3/8 12:51	10.7 <13>	--	
3/8 12:52	10.7 <13>	--	
3/8 12:53	10.7 <13>	--	
3/8 12:54	13.3 <13>	20.0 <13>	
3/8 12:55	21.4 <13>	--	

Timestamp	(Main Boiler) Opacity % 1-Min Avg	(Main Boiler) Opacity % 6-Min Avg	
3/8 12:56	21.4 <13>	--	
3/8 12:57	21.4 <13>	--	
3/8 12:58	21.4 <13>	--	
3/8 12:59	21.4 <13>	--	
3/8 13:00	21.4 <13>	21.4 <13>	6 MIN HIGH
3/8 13:01	21.4 <13>	--	
3/8 13:02	21.4 <13>	--	
3/8 13:03	21.4 <13>	--	
3/8 13:04	21.4 <13>	--	
3/8 13:05	21.5 <13>	--	
3/8 13:06	21.5 <13>	9.4 <13>	
3/8 13:07	21.5 <13>	--	
3/8 13:08	13.1 <13>	--	
3/8 13:09	0.0 <13>	--	
3/8 13:10	0.0 <13>	--	
3/8 13:11	0.0 <13>	--	
3/8 13:12	0.0 <13>	19.3 <29>	
3/8 13:13	0.0 <13>	--	
3/8 13:14	0.0 <29>	--	
3/8 13:15	0.0 <29>	--	
3/8 13:16	46.3 <29>	--	
3/8 13:17	69.6 <29>	--	
3/8 13:18	17.9 <29>	3.0 <29>	
3/8 13:19	0.0 <29>	--	
3/8 13:20	0.0 <13>	--	
3/8 13:21	0.0 <13>	--	
3/8 13:22	0.0 <13>	--	
3/8 13:23	0.0 <13>	--	
3/8 13:24	0.0 <13>	0.0 <13>	6 MIN ZERO
3/8 13:25	0.0 <13>	--	
3/8 13:26	0.0 <13>	--	
3/8 13:27	0.0 <13>	--	
3/8 13:28	0.0 <13>	--	
3/8 13:29	0.0 <13>	--	
3/8 13:30	0.0 <13>	0.0 <13>	
Average (all)	8.4	7.5	
Total (all)	--	--	
Minimum (all)	0.0	0.0	
Maximum (all)	69.6	21.4	
Average (valid values only)	0.8	0.9	
Total (valid values only)	--	--	
Count (valid values only)	15	2	

<13> = Down
<14> = Calibration
<15> = Preventative Maintenance
<29> = Process Down And Calibration

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: **December 4, 2012**
Date of Filter Expiration: December 3, 2013

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 (%)
RX55	8.5	91.5	0.0386	8.5	0.0	± 0.5
YA28	11.5	88.5	0.0531	11.4	0.1	± 0.5
RX56	23.2	76.8	0.1148	23.1	0.1	± 0.5