CPV Valley Energy Center
50 Braintree Hill Office Park
Suite 300
Braintree, MA 02184

February 25, 2019

Mr. Christopher M. Hogan
Chief, Major Project Management Unit
New York State Department of Environmental Conservation
Division of Environmental Permits
625 Broadway, 4th Floor
Albany, New York 12233-1750

Re: CPV Valley, LLC
Title V and Title IV Air Permit Applications
Response to Notice of Incomplete Applications

Dear Mr. Hogan:

This letter responds to your letter dated December 14, 2018, indicating that the Title V and Title IV Air Permit Applications submitted by CPV Valley, LLC ("CPV Valley") on August 29, 2018 (and received by the Department on August 30, 2018), as supplemented by our letter dated November 16, 2018, remains incomplete and requires additional information in order for the New York State Department of Environmental Conservation ("Department") to consider the applications complete. Pursuant to the requirements of your letter dated December 14, 2018, please find attached the Test Report and backup data from Air Hygiene dated February 22, 2019, for the Method 201A and Method 202 retest on fuel oil which was conducted by CPV Valley on February 05 – 07, 2019.

As previously stated, CPV Valley respectfully disagrees that the applications are incomplete; rather, the information sought by your December 14 letter is in the nature of supplemental information to assist the Department in its review, and as a result, CPV Valley is entitled to the benefit of the application shield contained in Environmental Conservation Law § 19-0311(5)(b) and guidance issued by the Environmental Protection Agency ("EPA") implementing the Title V application shield.

In addition to our disagreement regarding the status of CPV Valley's applications as stated above, we respectfully disagree with the statement in your letter that the application cannot be deemed complete until draft permits have been prepared and notice provided to the EPA. This statement is completely contradicted by the Department's past practice with respect to Title V and SPDES applications (especially renewal applications), which routinely have been allowed to languish for years without action by the Department, yet the facilities continue to operate. Moreover, notice to EPA does not generally occur until after the public comment period closes on the permit, and a responsiveness summary is prepared and forwarded to EPA as part of its 45-day review

period. While perhaps a Notice of Complete Application cannot be issued until the Department completes its review of the applications and issues draft permits, the applications are complete without necessity of a formal notice.

We trust the enclosed information fully responds to your December 14, 2018 letter. Please feel free to contact me should you have any questions.

Very truly yours,

Donald G. Atwood

DGA/rel
enclosures
cc: George Sweikert, RAPCE, Region 3
Kelly Turturro, Regional Director, Region 3
Khai Gibbs, Esq.
Mark Sanza, Esq.
Randy Orr, DEC HQ
Ruth Leistensnider, Esq.
Ben Stanley, DGC Ops
Sarasi Sam, DGC Ops

February 22, 2019

Jordan M. Haywood, MS, PE, QEP
Fellow Engineer – Technical Group Lead
Environmental Engineering
Siemens Energy, Inc.
4400 Alafaya Trail, MC Q2-286
Orlando, Florida 32826-2399

Re: CPV Valley Energy Center – ULSD Particulate Retest

Mr. Haywood,

Please find the attached report presenting the ULSD Particulate Results from Units 11 and 12 obtained during the February 5-7, 2019 testing event. The results of all measured pollutant emissions were below the required limits. All testing was performed without any real or apparent errors and testing was conducted according to the approved testing protocol.

Slightly negative filter weights were obtained for all runs; therefore, the Reportable Detection Limit (RDL) of 0.3mg was used to calculate the emission rates in the report. This approach provides a conservative compliance demonstration. Each individual filter weight is presented in the table below along with the total blank adjusted weights for the Method 201A PM2.5 fraction.

U 11			U12		
	Filter (mg)	Total PM 2.5 (mg)		Filter (mg)	Total PM 2.5 (mg)
R1	-0.5	1.44	R1	-0.5	0.94
R2	-1.0	1.14	R2	-0.1	2.24
R3	-0.3	1.64	R3	-0.5	1.04

Please contact me anytime with questions or comments and reports can be updated upon your request.

Sincerely,

Paul R. Little, QSTI
Director of Customer Service
Air Hygiene, Inc.
plittle@airhygiene.com

EMISSION COMPLIANCE TEST
ON ULSD FUEL
FOR THE
SIEMENS, SCC6-5000F, UNIT
#CTG-11 AND CTG-12
PREPARED FOR
CPV VALLEY, LLC
AT THE
CPV VALLEY ENERGY CENTER
MIDDLETOWN, NY
FEBRUARY 5-7, 2019

Permit No: 3-3356-00136/00001

Corporate Headquarters
1600 W Tacoma Street
Broken Arrow, Oklahoma 74012

AIR HYGIENE, INC.

(918) 307-8865 or (888) 461-8778
www.airhygiene.com

Remote Testing Offices
Las Vegas, NV 89156
Ft. Worth, TX 76028
Humble, TX 77338
Shreveport, LA 71115
Miami, FL 33101
Pittsburgh, PA 15205

EMISSION COMPLIANCE TEST
ON ULSD FUEL
FOR THE
SIEMENS, SCC6-5000F, UNIT
#CTG-11 AND CTG-12
PREPARED FOR
CPV VALLEY, LLC
AT THE
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MIDDLETOWN, NY
FEBRUARY 5-7, 2019

Prepared and Reviewed by:

Thomas K. Graham, PE, QSTI
Director of Education

Logan Tsotsoros
AHU Support Staff

Todd R. Sturgeon, QSTI
Sr. Manager – Test Reports

I, Cole McBride, QSTI
Sr. Project Manager
certify that this testing was conducted and this report was created in conformance with the requirements of ASTM D7036

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Table of Contents

APPENDICES

Emissions Compliance Test
on ULSD Fuel
Siemens, SCC6-5000F, Unit #CTG-11 and CTG-12
CPV Valley, LLC
CPV Valley Energy Center
Middletown, NY
February 5-7, 2019

1.0 INTRODUCTION

Air Hygiene International, Inc. (Air Hygiene) has completed the Emissions Compliance Test for particulate matter (PM) and opacity / visual emissions (VE) from the exhaust of the Siemens, SCC6-5000F, Unit #CTG-11 and CTG-12 for CPV Valley, LLC at the CPV Valley Energy Center in Middletown, NY. This report details the background, results, process description, and the sampling/analysis methodology of the stack sampling survey conducted on February 5-7, 2019.

1.1 TEST PURPOSE AND OBJECTIVES

The purpose of the test was to conduct a repeat of the initial compliance emission test to document levels of selected pollutants at base load on fuel oil. The information will be used to confirm compliance with the operating permit issued by the New York Department of Environmental Conservation (NYDEC). The specific objective was to determine the emission concentration of PM, flow, VE, H_2O, CO_2, and O_2 from the exhaust of CPV Valley, LLC's Siemens, SCC6-5000F, Unit #CTG-11 and CTG-12.

1.2 SUMMARY OF TEST PROGRAM

The following list details pertinent information related to this specific project:

1.2.1 Participating Organizations
- New York Department of Environmental Conservation (NYDEC)
- CPV Valley, LLC
- Siemens Energy, Inc.
- Air Hygiene

1.2.2 Industry
- Electric Utility / Electric Services

1.2.3 Air Permit Requirements
- Permit Number: 3-3356-00136/00001

1.2.4 Plant Location
- CPV Valley Energy Center in Middletown, NY
  - GPS Coordinates [Latitude 41.14750, Longitude -80.85333]
  - Physical Address: 3330 U.S. Route 6, Middletown, New York 10940
  - Federal Registry System / Facility Registry Service (FRS) No. – 110043332471
  - Source Classification Code (SCC)
    - 20100201 (CTGs)
    - 10100601 (DBs)

1.2.5 Equipment Tested
- Siemens, SCC6-5000F, Unit #CTG-11 and CTG-12

1.2.6 Emission Points

- Exhaust from the Siemens, SCC6-5000F, Unit #CTG-11 and CTG-12
- For all gases (CO_2, and O_2), one sample point in the exhaust duct from the Siemens, SCC6-5000F, Unit #CTG-11 and CTG-12
- For all PM testing, 12 sampling points in the exhaust duct from the Siemens, SCC6-5000F, Unit #CTG-11 and CTG-12

1.2.7 Emission Parameters Measured

- PM
- Flow
- VE (Opacity)
- H_2O
- CO_2
- O_2

1.2.8 Dates of Emission Test

- February 5-7, 2019

1.2.9 Federal Certifications

- Stack Testing Accreditation Council AETB Certificate No. 3796.02
- International Standard ISO/IEC 17025:2005 Certificate No. 3796.01

1.3 KEY PERSONNEL

CPV Valley, LLC:	Ben Stanley (b.stanley@dgc-ops.com)	845-649-8300
Siemens Energy, Inc.:	Jordan Haywood (Jordan.haywood@siemens.com)	407-736-3045
Air Hygiene:	Cole McBride (cmcbride@airhygiene.com)	918-307-8865
Air Hygiene:	Sean Barnes	918-307-8865
Air Hygiene:	Miguel Jimenez Martinez	918-307-8865
Air Hygiene:	Axel Garrido Martinez	918-307-8865
Air Hygiene:	Dana Albert	918-307-8865

2.0 SUMMARY OF TEST RESULTS

Results from the sampling conducted on CPV Valley, LLC's Siemens, SCC6-5000F, Unit #CTG-11 and CTG-12 located at the CPV Valley Energy Center on February 5-7, 2019 are summarized in the following table and relate only to the items tested.

TABLE 2.1
SUMMARY OF SIEMENS, SCC6-5000F, FUEL OIL RESULTS

Parameter	Base Load CTG-11	Base Load CTG-12	Permit Limits
Stack Flow (M2) (DSCFH)	48,514,014	50,114,796	--
Stack Moisture (% Method 4)	6.7	6.4	--
Total PM (mg)	7.78	6.23	--
Total PM (g/dscf)	1.07E-04	7.54E-05	--
Total PM (gr/dscf)	1.64E-03	1.16E-03	--
Total PM (kg/hr)	5.16	3.78	--
Total PM (lb/hr)	11.39	8.33	--
Total PM (ton/year) at 8760 hr/year	49.87	36.49	--
Total PM (lb/MMBtu)	0.0064	0.0045	0.0073
Total PM (mg/Nm^3)	3.762	2.664	--
CO_2 (%)	5.28	5.35	--
O_2 (%)	13.80	13.80	--

The results of all measured pollutant emissions were below the required limits. All testing was performed without any real or apparent errors. All testing was conducted according to the approved testing protocol.

On all runs where filter weights are below the Reportable Detection Limit (RDL) of 0.30mg, the RDL was used to determine the PM emissions rates.

3.0 SOURCE OPERATION

3.1 PROCESS DESCRIPTION

The CPV Valley Energy Center is located at 3330 U.S. Route 6 in Middletown, New York. CPV Valley Energy Center is an electric generation facility. The facility consists of two Siemens SCC6-5000F Combined Cycle Combustion Turbines (CTGs), designated as CTG-11 and CTG-12. Each CTG is rated for the turbine at 2,234 million British thermal units per hour (MMBtu/hr) based on higher heating value (HHV) on natural gas; and 2,145 MMBtu/hr (HHV) on ultra-low sulfur diesel (ULSD) fuel oil; and is rated at 500 MMBtu/hr on natural gas for the duct burner (DB). The CTGs are equipped with dry low NOx combustors, selective catalytic reduction (SCR), and catalytic oxidizers.

3.2 SAMPLING LOCATION

The stacks are vertical, circular, and measure 19 feet (ft) (228 inches) in diameter at the test ports which are approximately 175 ft above grade level with an exit elevation of approximately 275 ft above grade level. The test ports are located approximately 91.25 ft (1,095 inches) downstream and approximately 100 ft (1,200 inches) upstream from the nearest disturbances. All exhaust samples for gaseous emissions were continuously drawn from the exhaust system at the sample ports from a single point. For PM testing, an initial velocity traverse was performed across the stack from 12 total points. All PM sampling occurred from the same 12 points by leaving the probe at each for an equal amount of time in order to draw an isokinetic and representative sample.

4.0 SAMPLING AND ANALYTICAL PROCEDURES

4.1 TEST METHODS

The emission test on the Siemens, SCC6-5000F, Unit #CTG-11 and CTG-12 at the CPV Valley Energy Center was performed following United States Environmental Protection Agency (EPA) methods described by the Code of Federal Regulations (CFR). Table 4.1 outlines the specific methods performed on February 5-7, 2019.

TABLE 4.1
SUMMARY OF SAMPLING METHODS

Pollutant or Parameter	Sampling Method	Analysis Method
Sample Point Location	EPA Method 1	Equal Area Method
Stack Flow Rate	EPA Method 2	S-Type Pitot Tube
Oxygen	EPA Method 3A	Paramagnetic Cell
Carbon Dioxide	EPA Method 3A	Nondispersive Infrared Analyzer
Stack Moisture Content	EPA Method 4	Gravimetric Analysis
Opacity	EPA Method 9	Visual Observation
Particulate Matter	EPA Method 201A	Front Half Filterables
Particulate Matter	EPA Method 202	Back Half Condensables

4.2 INSTRUMENT CONFIGURATION AND OPERATIONS FOR GAS ANALYSIS

The sampling and analysis procedures used during these tests conform with the methods outlined in the Code of Federal Regulations (CFR), Title 40, Part 60, Appendix A, Methods 1, 2, 3A, 4, 9; 40 CFR 51, Appendix M, Methods 201A and 202.

Figure 4.1 depicts the sample system used for the real-time gas analyzer tests. The gas sample was continuously pulled through the probe and transported, via heat-traced Teflon® tubing, to a stainless steel minimum-contact condenser designed to dry the sample. Transportation of the sample, through Teflon® tubing, continued into the sample manifold within the mobile laboratory via a stainless steel/Teflon® diaphragm pump. From the manifold, the sample was partitioned to the real-time analyzers through rotameters that controlled the flow rate of the sample.

Figure 4.1 shows that the sample system was also equipped with a separate path through which a calibration gas could be delivered to the probe and back through the entire sampling system. This allowed for convenient performance of system bias checks as required by the testing methods.

All instruments were housed in an air-conditioned, trailer-mounted mobile laboratory. Gaseous calibration standards were provided in aluminum cylinders with the concentrations certified by the vendor. EPA Protocol No. 1 was used to determine the cylinder concentrations where applicable (i.e. NOx calibration gases).

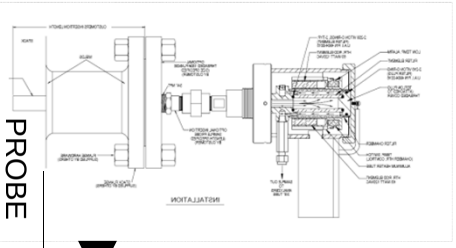
Table 4.2 provides a description of the analyzers used for the instrument portion of the tests. All data from the continuous monitoring instruments were recorded on a Logic Beach Portable Data Logging System which retrieves calibrated electronic data from each instrument every one second and reports an average of the collected data every 30 seconds.

Figure 4.2 represents the sample system used for the PM tests. The sample system included a heated stainless steel probe sheath with a glass liner and nozzle. The nozzle and probe assembly were inserted into the sample ports of the stack to extract gas measurements from the emission stream through a filter and glass impinger train in an isokinetic fashion. Differential pressure was monitored with S-type Pitot tubes and oil filled manometers. Total sample volumes were measured with dry gas meters. The resulting Method 2 velocity heads were combined with Method 3A (molecular weight) and Method 4 (moisture content) data to determine the stack gas volumetric flow rates. These results were combined with pollutant concentrations (i.e. mg/scf, parts per million, etc.) to determine emission rates (i.e. pounds per hour). Per the requirements of Method 202, the back half of the test train included a condenser and dry impinger train configuration. Sample collection included a nitrogen purge and hexane rinse. Glassware that was used to collect and analyze Method 202 condensable particulate samples was cleaned prior to the test with soap and water, and rinsed using tap water, deionized water, acetone, and finally, hexane. After cleaning, Air Hygiene incorporated a glassware bake at 300° C for six hours rather than the alternative of collecting a field train proof blank. During testing the temperature of the CPM filter assembly was maintain as close as possible to 85° F in accordance with EPA Method 202.

The stack gas analysis for O_2 and CO_2 concentrations was performed in accordance with procedures set forth in EPA Method 3A. The O_2 analyzer uses a paramagnetic cell detector and the CO_2 analyzer uses a continuous nondispersive infrared analyzer.

TABLE 4.2
ANALYTICAL INSTRUMENTATION

Parameter	Manufacturer and Model	Range	Sensitivity	Detection Principle
CO_2	SERVOMEX 1440	0-20%	0.1%	Nondispersive infrared
O_2	SERVOMEX 1440	0-25%	0.1%	Paramagnetic cell, inherently linear.



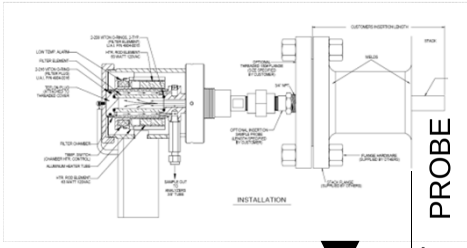
HEATED PROBE FILTER

PROBE

LEGEND

- Heated Teflon Tubing (pre-conditioned sample)
- Unheated Teflon Tubing (conditioned sample)
- Diluted Calibration Gas
- Calibration Gas
- Electronic Input/Output

HEATED PROBE FILTER



PROBE

PROCESS INLET OR 2ND STACK

dual line heated sample umbilical

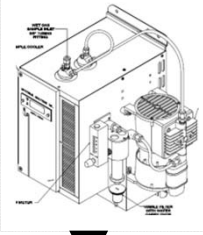
TEST TRAILER EXTERIOR

TEST TRAILER INTERIOR

DATA RECORDER

COMPUTER

GAS CONDITIONER

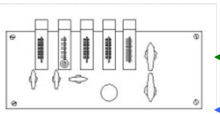


dual line heated sample umbilical

STACK EXHAUST

MOBILE SECONDARY ANALYZERS

MANIFOLD



GAS DILUTER

THC, VOC

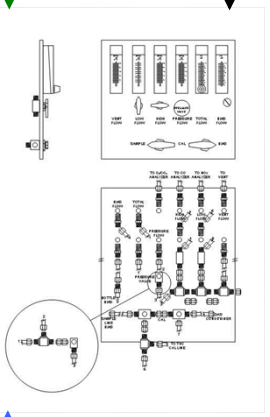
O_2, CO_2, NOx, CO, SO_2

HOT/WET ANALYZERS

COLD/DRY ANALYZERS

COLD/DRY ANALYZERS HOT/WET

O_2, CO_2, NOx, CO, SO_2



FLOW CONTROL MANIFOLD

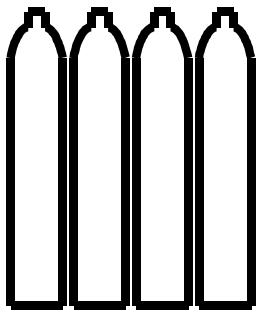
FTIR

THC, VOC

CONDITIONER

VENT

CALIBRATION/ BIAS GAS BOTTLES



VENT

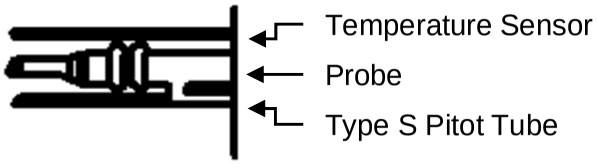
FIXED PRIMARY ANALYZERS

Shown fully equipped. Some labs may not contain these features and others may contain additional features specific to certain scopes.

AIR HYGIENE

Figure 4.1
EMISSIONS TESTING LAB

1600 W Tacoma Street
Broken Arrow, Oklahoma 74012
www.airhygiene.com
(888) 461-8778



View of Probe End
(from the bottom)

Wet Chemistry Assembly
(photo)

Glass
Filter
Holder

Temperature
Sensor

Liner
(inconel)

Temperature
Sensor

Stack
Wall

Condenser

Filter
Holder

Probe
Housing
(heated)

Temperature Sensor

Cold Box

Nozzle

Type S Pitot
Tube

Ice
Water
Bath

Recirc.
pump

Heated Area

Oil-Filler
Manometer

Impingers

Vacuum
Line

Hot Box

Vacuum
Gauge

Temperature
Sensor

Temperature
Sensor

Orifice

By-pass
Valve

Main
Valve

Dry Gas
Meter

Air-Tight
Pump

Oil-Filler
Manometer

Figure 4.2
METHOD 201a/202 ASSEMBLY

1600 W Tacoma Street
Broken Arrow, Oklahoma 74012
www.airhygiene.com
(888) 461-8778

APPENDIX A

TEST RESULTS AND CALCULATIONS

TABLE A.1: EMISSIONS TESTING SCHEDULE

Unit	Load	Component	Run	Date	Start	Stop	Time Sync
CTG-11	Base FO	Preliminaries	11-PM-FO-V1	02/05/19	9:07:00	9:20:00	DAHS
CTG-11	Base FO	PM	11-PM-FO-1	02/05/19	9:36:00	13:45:00	DAHS
CTG-11	Base FO	PM	11-PM-FO-2	02/05/19	13:51:00	17:56:00	DAHS
CTG-11	Base FO	PM	11-PM-FO-3	02/05/19	18:04:00	22:18:00	DAHS
CTG-12	Base FO	Preliminaries	2-PM-FO-V1	02/06/19	16:10:00	16:20:00	DAHS
CTG-12	Base FO	PM	2-PM-FO-1	02/06/19	16:35:00	20:55:00	DAHS
CTG-12	Base FO	PM	2-PM-FO-2	02/06/19	21:00:00	1:16:00	DAHS
CTG-12	Base FO	PM	2-PM-FO-3	02/07/19	1:25:00	5:33:00	DAHS

Note: DAHS Time (EST)

TABLE A.2
SIEMENS, SCC6-5000F, FUEL OIL BASE LOAD CTG-11 DATA SUMMARY

Parameter	Base Load, Run - 1-1	Base Load, Run - 1-2	Base Load, Run - 1-3	Average
Stack Flow (M2) (DSCFH)	48,710,578	48,267,944	48,563,519	48,514,014
Stack Moisture (% Method 4)	6.9	6.8	6.5	6.7
Total PM (mg)	7.09	9.79	6.48	7.78
Total PM (g/dscf)	9.55E-05	1.36E-04	8.83E-05	1.07E-04
Total PM (gr/dscf)	1.47E-03	2.10E-03	1.36E-03	1.64E-03
Total PM (kg/hr)	4.65	6.55	4.29	5.16
Total PM (lb/hr)	10.26	14.45	9.45	11.39
Total PM (ton/year) at 8760 hr/year	44.93	63.28	41.40	49.87
Total PM (lb/MMBtu)	0.0058	0.0082	0.0053	0.0064
Total PM (mg/Nm^3)	3.373	4.794	3.118	3.762
CO_2 (%)	5.30	5.25	5.30	5.28
O_2 (%)	13.80	13.79	13.80	13.80

TABLE A.3
SIEMENS, SCC6-5000F, FUEL OIL BASE LOAD CTG-12 DATA SUMMARY

Parameter	Base Load, Run - 2-1	Base Load, Run - 2-2	Base Load, Run - 2-3	Average
Stack Flow (M2) (DSCFH)	49,927,658	50,354,647	50,062,083	50,114,796
Stack Moisture (% Method 4)	6.4	6.4	6.3	6.4
Total PM (mg)	6.99	5.90	5.79	6.23
Total PM (g/dscf)	8.64E-05	7.02E-05	6.98E-05	7.54E-05
Total PM (gr/dscf)	1.33E-03	1.08E-03	1.08E-03	1.16E-03
Total PM (kg/hr)	4.31	3.53	3.49	3.78
Total PM (lb/hr)	9.51	7.79	7.70	8.33
Total PM (ton/year) at 8760 hr/year	41.63	34.13	33.72	36.49
Total PM (lb/MMBtu)	0.0052	0.0042	0.0042	0.0045
Total PM (mg/Nm^3)	3.050	2.479	2.463	2.664
CO_2 (%)	5.35	5.40	5.30	5.35
O_2 (%)	13.80	13.80	13.80	13.80

EXAMPLE CALCULATIONS (Reference Method 1 - Circular Stack)

Diameter of Stack (in.)

$$D(in.) = L_{fw} - L_{mw}$$

D (in.) = 235.25 in. - 7.25 in. = 228.00 in.

Stack Diameters Downstream

$$B_D\,(dia.) = \frac{B}{D}$$

B_D (dia.) = $\frac{1095.00 \text{ in.}}{228.00 \text{ in.}}$ = 4.80 diameters

Area of Stack (ft^2)

$$A_s\,(ft^2) = \pi \times \left(\frac{D}{2 \times 12}\right)^2$$

A_s (ft^2) = 3.14 x ($\frac{228.00 \text{ in.}}{2 \text{ x } 12\text{in./ft}}$)^2 = 283.53 ft^2

Stack Diameters Upstream

$$A_D\,(dia.) = \frac{A}{D}$$

A_D (dia.) = $\frac{1200.00 \text{ in.}}{228.00 \text{ in.}}$ = 5.26 diameters

Note: Lack of significant figures may cause rounding errors between actual calculations and example calculations.

EXAMPLE CALCULATIONS (Reference Method 3a) [Values from Run 1 test]

Carbon Monoxide Concentration (%)

$$\%CO = \frac{ppmCO}{10{,}000}$$

$$\%CO\ (\%) = \frac{0.00 \quad ppm}{10{,}000\ ppm/\%} = 0.0000\ \%$$

Nitrogen Concentration (%)

$$\%N_2 = 100 - \%CO_2 - \%O_2 - \%CO$$

$\%N_2$ (%) = 100 - 5.30 % - 13.80 % - 0.00 / 10,000 % = 80.9 %

Stack Dry Molecular Weight (lb/lb-mole)

$$M_d\,(lb/lb-mol) = \sum\left(\frac{MW_{comp}}{100} \times \%component\right)$$

M_d (lb/lb-mol) = ($\frac{44\ lb/lb\text{-}mol}{100}$ x 5.30 %) +

($\frac{32\ lb/lb\text{-}mol}{100}$ x 13.80 %) + ($\frac{28\ lb/lb\text{-}mol}{100}$ x [$\frac{0.00}{10{,}000}$ + 80.90]) = $\frac{29.40\ lb}{lb\text{-}mol}$

Stack Wet Molecular Weight (lb/lb-mole)

$$M_S\,(lb/lb-mol) = \left[M_d \times \left(1 - \frac{B_{WS}}{100}\right)\right] + \left[MW_{H_2O} \times \frac{B_{WS}}{100}\right]$$

M_S (lb/lb-mol) = { $\frac{29.40\ lb}{lb\text{-}mol}$ x (1 - $\frac{6.86\ \%}{100}$) } + { $\frac{18\ lb}{lb\text{-}mol}$ x $\frac{6.86\ \%}{100}$ } = $\frac{28.62\ lb}{lb\text{-}mol}$

Average Calculated Fuel Factor (F_o)

$$F_{o(avg)} = \frac{\left[20.9 - (\%O_2)_{avg} - (0.5 \times (\%CO)_{avg})\right]}{(\%CO_2)_{avg} + (\%CO)_{avg}}$$

$F_{o(avg)}$ = $\frac{20.9\% - 13.80\ \% - (0.5 \times 0.000\ \%)}{5.30\ \% + 0.000\ \%}$ = 1.340

Average Excess Air (%)

$$\%EA_{avg}\,(\%) = \frac{100 \times \left[(\%O_2)_{avg} - (0.5 \times (\%CO)_{avg})\right]}{(0.264 \times (N_2)_{avg}) - \left[(\%O_2)_{avg} - (0.5 \times (\%CO)_{avg})\right]}$$

$(\%EA)_{AVG}$ = $\frac{100 \times \{\ 13.80\ \% - (0.5 \times 0.000\ \%)\ \}}{(\ 0.264 \times 80.90\ \%) - \{\ 13.80\ \% - (0.5 \times 0.000\ \%)\}}$ = 182.60 %

Note: Lack of significant figures may cause rounding errors between actual calculations and example calculations.

EXAMPLE CALCULATIONS (Reference Method 2) [Values from Run 1 test]

Absolute Stack Pressure (in. Hg)

$$P_S\,(in.Hg) = P_b + \frac{P_{static}}{13.6}$$

P_s (in. Hg) = 29.42 in. Hg + $\frac{\text{-0.98 in. } H_2O}{\text{13.6 in. } H_2O/\text{in. Hg}}$ = 29.35 in. Hg

Average Stack Gas Velocity (ft/sec)

$$v_s\,(ft/\sec) = K_p \times C_p \times \left(\sqrt{\Delta p}\right)_{avg} \times \sqrt{\frac{(t_s)_{avg} + T_u}{P_s \times M_s}}$$

v_{sl} (ft/sec) =

$$\left(\frac{85.49\ \text{ft}\ \text{(lb/lb-mol)(in. Hg)}}{\text{sec}\ (^oR)(\text{in. } H_2O)}\right)^{1/2} \times 0.74 \times 1.24\ \text{in.}H_2O^{1/2} \times \sqrt{\frac{282.00 + 460\ ^oR}{29.35\ \text{in. Hg} \times 28.62\ \text{lb/lb-mol}}} = \frac{73.4\ \text{ft}}{\text{sec}}$$

Average Stack Dry Standard Flow Rate (dscfh)

$$Q_{sd}\,(dscfh) = \frac{60 \times 60 \times \left(1 - \frac{B_{ws}}{100}\right) \times v_s \times A_s \times T_{std} \times P_s}{(t_s + T_u) \times P_{std}}$$

Q_{sd} (dscf/hr) = $\frac{3600\ \text{sec}}{\text{hr}}$ x (1 - $\frac{6.86\ \%}{100}$) x $\frac{73.41\ \text{ft}}{\text{sec}}$ x 283.53 ft^2 x $\frac{68.00 + 460\ ^oR}{282.00 + 460\ ^oR}$ x $\frac{29.35\ \text{in. Hg}}{29.92\ \text{in. Hg}}$ = $\frac{48{,}710{,}578.43\ \text{dscf}}{\text{hr}}$

Average Stack Wet Flow Rate (acfm)

$$Q_{aw}\,(acfm) = 60 \times v_s \times A_s$$

Q_{aw} (acf/min) = $\frac{60\ \text{sec}}{\text{min}}$ x $\frac{73.41\ \text{ft}}{\text{sec}}$ x 283.53 ft^2 = $\frac{1{,}248{,}786.82\ \text{acf}}{\text{min}}$

Average Stack Wet Standard Flow Rate (ascfh)

$$Q_{sw}\,(ascfh) = \frac{60 \times Q_{aw} \times T_{std} \times P_s}{(t_s + T_u) \times P_{std}}$$

Q_{sw} (ascf/hr) = $\frac{60\ \text{min}}{\text{hr}}$ x $\frac{1{,}248{,}786.82\ \text{acf}}{\text{min}}$ x $\frac{68.00 + 460\ ^oR}{282.00 + 460\ ^oR}$ x $\frac{29.35\ \text{in. Hg}}{29.92\ \text{in. Hg}}$ = $\frac{52{,}298{,}065.65\ \text{ascf}}{\text{hr}}$

Note: Lack of significant figures may cause rounding errors between actual calculations and example calculations.

EXAMPLE CALCULATIONS (Reference Method 4) [Values from Run 1 test]

Water Volume Weighed (scf)

$$V_{wsg\,(std)}(scf) = W_t \times K_5$$

$V_{wsg(std)}$ = 115.90 g x 0.04715 ft^3/g = 5.465 scf

Standard Meter Volume (dscf)

$$V_{m(std)}(dscf) = \frac{K_1 \times Y \times V_m \times \left(P_b + \frac{\Delta H_{avg}}{13.6}\right)}{(t_m)_{avg} + T_u}$$

$$V_{m(std)} = \frac{\frac{17.65\ ^oR}{in.\ Hg} \times 0.89 \times 85.51\ dcf \times \left(29.42\ in.\ Hg + \frac{0.46\ in.\ H_2O}{13.6\ in.\ H_2O / in.\ Hg}\right)}{74.92\ ^oF + 460\ ^oR} = 74.20\ dscf$$

Calculated Moisture Content (%)

$$B_{ws(calc)}(\%) = 100 \times \frac{V_{wsg(std)}}{V_{wsg(std)} + V_{m(std)}}$$

$$B_{ws(calc)} = 100 \times \frac{5.46\ dscf}{5.46\ dscf + 74.20\ dscf} = 6.86\ \%$$

Saturated Moisture Content (%)

$$B_{ws(svp)}(\%) = 100 \times \frac{10^{6.691 - \frac{3144}{t_{s(avg)} + 390.86}}}{P_b + \frac{P_{static}}{13.6}} \leq 100$$

$$B_{ws(svp)} = 100 \times \frac{10^{\left(6.691 - \frac{3144}{282.00\ ^oF + 390.86}\right)}}{29.42\ in.\ Hg + \frac{-0.98\ in.\ H_2O}{13.6\ in.\ H_2O / in.\ Hg}} \leq 100 = 100.00\ \%$$

Note: Lack of significant figures may cause rounding errors between actual calculations and example calculations.

EXAMPLE CALCULATIONS (Isokinetic Sampling) [Values from Run 1 test]

Desired Orifice (in. H_2O) (first point)

$$\Delta H_d\,(in.H_2O) = K \times \Delta p$$

ΔH_d (in. H_2O) = x

in. H_2O = in. H_2O

Absolute Meter Pressure (in. Hg)

$$P_m\,(in.Hg) = P_b + \frac{\Delta H\,@}{13.6}$$

P_m (in. Hg) = 29.42 in. Hg + $\frac{1.84 \text{ in. } H_2O}{13.6 \text{ in. } H_2O/\text{in. Hg}}$ = 29.56 in. Hg

Recommended Nozzle Diameter (in.)

$$D_{ni}\,(in.) = \sqrt{\frac{C_n \times Q_m \times P_m}{(t_m + T_u) \times C_p} \times \left(\frac{1 - \frac{B_{wm}}{100}}{1 - \frac{B_{ws}}{100}}\right)} \times \sqrt{(t_s + T_u) \times \left[\frac{M_d \times \left(1 - \frac{B_{ws}}{100}\right) + \left(18 \times \frac{B_{ws}}{100}\right)}{P_s \times \Delta p_{avg}}\right]}$$

D_{ni} (in.) = $\sqrt{\frac{0.03575 \text{ (lb-mole•}^oR\text{•in. } H_2O)^{1/2}\text{•min•in.}^2}{\text{acf•in. Hg}^{3/4}\text{•lb}^{1/2}} \text{ x } 0.75 \text{ acf x } 29.56 \text{ in. Hg } \left(1 - \frac{0.00\ \%}{100}\right) \text{ x } \left(\frac{1 - \frac{0.00\ \%}{100}}{1 - \frac{6.86\ \%}{100}}\right) \text{ x } \left[\frac{}{\left(74.92\ ^oF + 460^oR\right) \text{x } 0.74}\right]}$

$\sqrt{(282.00\ ^oF + 460^oR) \text{ x } \frac{\frac{29.40 \text{ lb}}{\text{lb-mole}} \text{ x } \left(1 - \frac{6.86\ \%}{100}\right) + \left(\frac{18 \text{ lb}}{\text{lb-mol}} \text{ x } \frac{6.86\ \%}{100}\right)}{29.35 \text{ in. Hg x } 1.24 \text{ in. } H_2O}}$ = 0.221 in.

ΔP to ΔH Isokinetic Factor

$$K = C_k \times C_p^2 \times \Delta H\,@ \times D_{na}^4 \times \left[\frac{M_d \times \left(1 - \frac{B_{wm}}{100}\right) + \left(18 \times \frac{B_{wm}}{100}\right)}{M_d \times \left(1 - \frac{B_{ws}}{100}\right) + \left(18 \times \frac{B_{ws}}{100}\right)}\right] \times \left(\frac{1 - \frac{B_{ws}}{100}}{1 - \frac{B_{wm}}{100}}\right)^2 \times \left(\frac{t_m + T_u}{ts + T_u}\right) \times \frac{P_s}{P_m}$$

K = $\frac{849.8}{\text{in. } H_2O\text{•in.}^4}$ x 0.74 ^{2} x 1.84 in. H_2O x 0.14 ^{4} x $\left(\frac{1 - \frac{6.86\ \%}{100}}{1 - \frac{0.00\ \%}{100}}\right)^2$ x $\frac{74.92\ ^oF + 460^oR}{282.00\ ^oF + 460^oR}$) x

$\left(\frac{\frac{29.40 \text{ lb}}{\text{lb/mole}} \text{ x } \left(1 - \frac{0.00\ \%}{100}\right) + \left(\frac{18 \text{ lb}}{\text{lb-mol}} \text{ x } \frac{0.00\ \%}{100}\right)}{\frac{29.40 \text{ lb}}{\text{lb/mole}} \text{ x } \left(1 - \frac{6.86\ \%}{100}\right) + \left(\frac{18 \text{ lb}}{\text{lb-mol}} \text{ x } \frac{6.86\ \%}{100}\right)}\right)$ x $\frac{29.35 \text{ in. Hg}}{29.56 \text{ in. Hg}}$ = 0.22

Percent Isokinetic (%) (first point)

$$I\,(\%) = \frac{K_4 \times \left((t_s)_{avg} + T_u\right) \times V_{m(std)}}{\left(\Theta \times (v_{s(l)})_{avg} \times P_s \times \pi \times \left(\frac{D_{na}}{2} \times \frac{1}{12}\right)^2\right) \times \left(1 - \frac{B_{ws}}{100}\right)}$$

I (%) = $\frac{0.0945 \text{ min•in. Hg}}{\text{sec•}^oR}$ x (284.00 $^oF + 460\ ^oR$) x 6.42 dscf

21.75 min x $\frac{72.43 \text{ ft}}{\text{sec}}$ x 29.35 in. Hg x 3.14 x $\left(\frac{0.14 \text{ in.}}{2} \text{ x } \frac{\text{ft.}}{12 \text{ in.}}\right)^2$ x $\left(1 - \frac{6.86\ \%}{100}\right)$ = 95.33 %

Note: Lack of significant figures may cause rounding errors between actual calculations and example calculations.

EXAMPLE CALCULATIONS (Isokinetic Sampling) [Values from Run 1 test]

Cumulative Percent Isokinetic (%) (weighted average of all points)

$$I(\%) = \sum_{1-n} \frac{\left[I(\%) \times V_{m(std)}\right]_{1-n}}{V_{m(std)_{1-n}}}$$

Using Method 5, Eq 5-8 to determine intermediate isokinetics at each point, weighted averaging of the cumulative isokinetics is necessary since all points are not equal, and determined by using the dry standard meter volume collected at each point to weight the cumulative average. Intermediate isokinetics and dry standard meter volumes are found at each point. At each point the cumulative sum is found of each value and the quotient of the two used to determine the cumulative isokinetics for each residual point (n).

Pt	In (%)	x	Vm(std)n	=	I (%)n	Σ(I (%)n)	/	Σ(Vm(std)n)	=	I (%)
A-1	95.33	x	6.422	=	612.19	612.19	/	6.42	=	95.3
A-2	106.14	x	8.049	=	854.37	1466.55	/	14.47	=	101.3
A-3	103.25	x	7.834	=	808.87	2275.43	/	22.31	=	102.0
B-1	96.35	x	6.134	=	590.99	2866.42	/	28.44	=	100.8
B-2	104.08	x	6.151	=	640.20	3506.62	/	34.59	=	101.4
B-3	97.73	x	5.796	=	566.39	4073.01	/	40.39	=	100.9
C-1	103.71	x	6.050	=	627.43	4700.43	/	46.44	=	101.2
C-2	100.17	x	5.180	=	518.91	5219.35	/	51.62	=	101.1
C-3	90.89	x	4.720	=	428.95	5648.30	/	56.34	=	100.3
D-1	92.53	x	6.125	=	566.77	6215.06	/	62.46	=	99.5
D-2	91.74	x	6.073	=	557.11	6772.17	/	68.53	=	98.8
D-3	90.33	x	5.670	=	512.17	7284.34	/	74.20	=>	98.2
Last Pt										

Percent Isokinetic (%) (intermediate equation, all points)
[equivalent to taking an average of point-by-point isokinetics without weighting the average (e.g. all points equal)]

$$I(\%) = \frac{K_4 \times \left((t_s)_{avg} + T_u\right) \times V_{m(std)}}{\left(\Theta \times (v_{s(l)})_{avg} \times P_s \times \pi \times \left(\frac{D_{na}}{2} \times \frac{1}{12}\right)^2\right) \times \left(1 - \frac{B_{ws}}{100}\right)}$$

$$I(\%) = \frac{0.0945 \frac{\text{min} \cdot \text{in. Hg}}{\text{sec} \cdot {}^{o}\text{R}} \times (282.00 {}^{o}\text{F} + 460 {}^{o}\text{R}) \times 74.20 \text{ dscf}}{240.75 \text{ min} \times \frac{73.41 \text{ ft}}{\text{sec}} \times 29.35 \text{ in. Hg} \times 3.14 \times \left(\frac{0.14 \text{ in.}}{2} \times \frac{\text{ft.}}{12 \text{ in.}}\right)^2 \times \left(1 - \frac{6.86 \%}{100}\right)} = 97.93 \%$$

Raw Data Percent Isokinetic (%)
[utilizes the raw data equation for isokinetics from Method 5]

$$I(\%) = \frac{100\left((t_s)_{avg} + T_u\right)\left[K_4 V_{1c} + \frac{V_m Y}{(t_m)_{avg} + T_u}\left(P_{bar} + \frac{\Delta H}{13.6}\right)\right]}{60\left(\Theta \times (v_{s(l)})_{avg} \times P_s \times \pi \times \left(\frac{D_{na}}{2} \times \frac{1}{12}\right)^2\right)}$$

$$I(\%) = \frac{100 \times (282.00 {}^{o}\text{F} + 460 {}^{o}\text{R}) \times \left[\frac{0.002669 \text{ ft}^3 \cdot \text{in. Hg}}{\text{ml} \cdot {}^{o}\text{R}} \times 116.1 \text{ ml} + \frac{85.51 \text{ dcf} \times 0.893}{74.92 {}^{o}\text{F} + 460 {}^{o}\text{R}} \left(29.42 \text{ in Hg} + \frac{1.243}{13.6}\right)\right]}{60 \times 240.75 \text{ min} \times \frac{73.41 \text{ ft}}{\text{sec}} \times 29.35 \text{ in. Hg} \times 3.14 \times \left(\frac{0.14 \text{ in.}}{2} \times \frac{\text{ft.}}{12 \text{ in.}}\right)^2} = 98.05 \%$$

Note: Lack of significant figures may cause rounding errors between actual calculations and example calculations.

EXAMPLE CALCULATIONS (Gravimetric Analysis) [Values from Run 1 test]

Blank Concentration [Acetone Blank Weight of Solids] (mg/ml)

$$C_x(mg/ml) = \frac{1000 \times w_x}{v_x}$$

C_x (mg/ml) = $\frac{1000 \text{ mg}}{\text{g}}$ x $\frac{0.0029 \text{ g}}{280.00 \text{ ml}}$ = $\frac{0.0104 \text{ mg}}{\text{ml}}$

Method limited to 0.0001% of weight at 0.000791 mg/ml = $\frac{0.007910 \text{ mg}}{\text{ml}}$

Blank Adjustment [Acetone Blank Weight of Solids and Nozzle Wash PM>10] (mg)

$$W_x(mg) = v_x \times C_x$$

W_x (mg) = 55.00 ml x 0.0008 mg/ml = 0.04 mg < Sample Gain

Adjusted Sample Gain [Nozzle Wash PM>10] (mg)

$$m_{xadj}(mg) = m_x - W_x$$

m_{xadj} (mg) = 1.50 mg - 0.04 mg = 1.46 mg

0.1N NH_4OH Correction (mg)

$$m_c(mg) = 17.03 \times V_t \times N$$

m_c (mg) = 17.03 x 0.00 ml x 0.1 N = 0.00 mg

Note: Lack of significant figures may cause rounding errors between actual calculations and example calculations.

EXAMPLE CALCULATIONS (Analysis) [Values from Run 1 test - Total $PM_{10}/PM_{2.5}$ Mass]

Stack Total Concentration (g/dscf)

$$c_s(g/dscf) = 0.001 \times \frac{M_n}{V_{m(std)}}$$

c_s (g/dscf) = $\frac{\text{g}}{\text{1000 mg}} \times \frac{\text{7.09 mg}}{\text{74.20 dscf}} = \frac{\text{9.55E-05 g}}{\text{dscf}}$

Stack Total Concentration (gr/dscf)

$$c_s'(gr/dscf) = 0.001 \times \frac{M_n}{V_{m(std)}} \times \frac{7000}{453.592}$$

c'$_s$ (gr/dscf) = $\frac{\text{g}}{\text{1000 mg}} \times \frac{\text{7.09 mg}}{\text{74.20 dscf}} \times \frac{\text{7000 gr}}{\text{lb}} \times \frac{\text{lb}}{\text{453.592 g}} = \frac{\text{1.47E-03 gr}}{\text{dscf}}$

Total Emissions Rate (kg/hr)

$$E(kg/hr) = c_s \times Q_{sd} \times \frac{kg}{1000\ g}$$

E (kg/hr) = $\frac{\text{kg}}{\text{1000 g}} \times \frac{\text{9.55E-05 g}}{\text{dscf}} \times \frac{\text{48,710,578 dscf}}{\text{hr}} = \frac{\text{4.65 kg}}{\text{hr}}$

Total Emissions Rate (lb/hr)

$$E'(lb/hr) = \frac{M_n \times Q_{sd}}{V_{m(std)}} \times \frac{lb \times g}{453.592g \times 1000mg}$$

E' (lb/hr) = $\frac{\text{g}}{\text{1000 mg}} \times \frac{\text{lb}}{\text{453.592 g}} \times \frac{\text{7.09 mg}}{\text{74.20 dscf}} \times \frac{\text{48,710,578 dscf}}{\text{hr}} = \frac{\text{10.26 lb}}{\text{hr}}$

Total Emissions Rate (tpy)

$$E''(ton/yr) = E' \times \frac{8760}{2000}$$

E'' (tpy) = $\frac{\text{ton}}{\text{2000 lb}} \times \frac{\text{8,760 hr}}{\text{yr}} \times \frac{\text{10.26 lb}}{\text{hr}} = \frac{\text{44.93 ton}}{\text{yr}}$

Total Emissions Rate (lb/MMBtu)

Oxygen Based:

$$E'''(lb/MMBtu) = \frac{M_n \times F_d}{V_{m(std)} \times 1000 \times 453.592} \times \left(\frac{20.9}{20.9 - \%O_2}\right)$$

E''' (lb/MMBtu) = $\frac{\text{g}}{\text{1000 mg}} \times \frac{\text{lb}}{\text{453.592 g}} \times \frac{\text{7.09 mg}}{\text{74.20 dscf}} \times \frac{\text{9,288.45 dscf}}{\text{MMBtu}} \times \left(\frac{\text{20.9}}{\text{20.9 - 13.8 \%}}\right) = \frac{\text{0.0058 lb}}{\text{MMBtu}}$

Note: Lack of significant figures may cause rounding errors between actual calculations and example calculations.

EXAMPLE CALCULATIONS (Constant Flow, Variable Time Isokinetic QA/QC) [Values from Preliminary test]

Stack Gas Viscosity (μP) [based on preliminary data]

$$\mu(\mu P) = C_1 + C_2\sqrt{T_s} + C_3 T_s^{-2} + C4(\%O_{2,wet}) - C_5 B_{ws} + C_6 B_{ws} T_s^2$$

μ (μP) = -150.3162 μP + 13.4622 $\sqrt{\ 284\ + 460}$ + 3.86153x10^{6} (284 + 460)$^{-2}$ + 0.591123 (13.8 x (1 - 7.00 /100)
- 91.9723 (7.00 /100) + 1.51761x10^{-5} (7.00 /100)(284 + 460)^{2} = 225.54 μP

Cunningham Correction Factor
[based on preliminary data for a 2.25 micrometer diameter particle]

$$C = 1 + 0.0057193\left[\frac{\mu}{P_s D_{50}}\right]\left[\frac{T_s}{M_w}\right]^{0.5}$$

$$C = 1 + 0.0057193 \times \left(\frac{225.54\ \mu P}{29.36\ \text{in Hg} \times 2.25\ \mu m}\right)\left(\frac{284 + 460\ ^{o}R}{28.60\ \text{lb / lb-mole}}\right)^{0.5} = 1.10$$

First calculation set using Cyclone I or Cyclone I and IV, assuming N_{re}<3,162

Lower Limit Cut Diameter for Cyclone I (μm)
[assumes N_{re}<3,162]

$$D_{50LL}(\mu m) = 9.507 C^{0.3007}\left[\frac{M_w P_s}{T_s}\right]^{0.1993}$$

$$D_{50LL}\ (\mu m) = 9.507 \times 1.10^{\ 0.3007} \times \left(\frac{29.36\ \text{in Hg} \times 28.60\ \text{lb / lb-mole}}{284 + 460\ ^{o}R}\right)^{0.1993} = 10.02\ \mu m$$

Cut Diameter for Cyclone I for the Middle of the Overlap Zone (μm)
[assumes N_{re}<3,162]

$$D_{50T}(\mu m) = \left(\frac{11 + D_{50LL}}{2}\right)$$

$$D_{50T}\ (\mu m) = \frac{11 + 10.02\ \mu m}{2} = 10.51\ \mu m$$

Sampling Rate Using Both PM_{10} and $PM_{2.5}$ Cyclones (dscfm)
[assumes N_{re}<3,162]

$$Q_s(dscfm) = Q_I(dscfm) = 0.07296(\mu)\left[\frac{T_s}{M_w P_s}\right]^{0.2949}\left[\frac{1}{D_{50T}}\right]^{1.4102}$$

Qs (dscfm) =

$$0.07296 \times 225.54\ \mu P \times \left(\frac{284 + 460\ ^{o}R}{29.36\ \text{in Hg} \times 28.60\ \text{lb / lb-mole}}\right)^{0.2949} \times \left(\frac{1}{10.51\ \mu m}\right)^{1.4102} = 0.58\ \text{dscfm}$$

Reynolds Number (dimensionless)
[verification of N_{re}<3,162, using Cyclone I and IV]

$$N_{re} = 8.64 \times 10^5\left[\frac{P_s M_w}{T_s}\right]\left[\frac{Q_s}{\mu}\right]$$

Correct

$$N_{re} = 8.64 \times 10^5 \times \frac{29.36\ \text{in Hg} \times 28.60\ \text{lb / lb-mole}}{284 + 460\ ^{o}R} \times \frac{0.58\ \text{dscfm}}{225.54\ \mu P} = 2489.08 < 3{,}162$$

Note: Lack of significant figures may cause rounding errors between actual calculations and example calculations.

EXAMPLE CALCULATIONS (Constant Flow, Variable Time Isokinetic QA/QC) [Values from Preliminary test]

Second calculation set using Cyclone IV, assuming N_{re}<3,162

Particle Cut Diameter for N_{re} Less than 3,162 for Cyclone IV (µm)
[assumes N_{re}<3,162]

$$D_{50}(\mu m) = 0.0024302\left[\frac{\mu}{Q_s}\right]^{1.1791}\left[\frac{1}{C}\right]^{0.5}\left[\frac{T_s}{P_s M_w}\right]^{0.6790}$$

D_{50} (µm) =

0.0024302 x (225.54 µP / 0.58 dscfm)$^{1.1791}$ x (1 / 1.10)$^{0.5}$ x (284 + 460 °R / 29.36 in Hg x 28.60 lb / lb-mole)$^{0.6790}$ = 2.44 µm

Sampling Rate Using Only $PM_{2.5}$ Cyclone for N_{re} Less than 3,162 (dscfm)

$$Q_{IV}(dscfm) = 0.0060639\left(\frac{\mu}{C^{0.4242}}\right)\left[\frac{P_s M_w}{T_s}\right]^{-0.5759}\left[\frac{1}{D_{50}}\right]^{0.8481}$$

Q_{IV} (dscfm) =

0.0060639 x (225.54 µP / 1.10 $^{0.4242}$) x (29.36 in Hg x 28.60 lb / lb mole / 284 + 460 °R)$^{-0.5759}$ x (1 / 2.44 µm)$^{0.8481}$ = 0.58 dscfm

Reynolds Number (dimensionless)
[verification of N_{re}<3,162, using Cyclone IV only]

$$N_{re} = 8.64\times10^{5}\left[\frac{P_s M_w}{T_s}\right]\left[\frac{Q_s}{\mu}\right]$$

Correct

N_{re} = 8.64 x 10^5 x 29.36 in Hg x 28.60 lb / lb-mole / 284 + 460 °R x 0.58 dscfm / 225.54 µP = 2489.05 < 3,162

Third calculation set using Cyclone I or Cyclone I and IV, assuming N_{re}≥3,162

Lower Limit Cut Diameter for Cyclone I (µm)
[assumes N_{re}≥3,162]

$$D_{50LL}(\mu m) = 10.0959\,C^{0.4400}\left[\frac{M_w P_s}{T_s}\right]^{0.0600}$$

D_{50LL} (µm) = 10.0959 x 1.10 $^{0.4400}$ x (29.36 in Hg x 28.60 lb / lb-mole / 284 + 460 °R)$^{0.0600}$ = 10.60 µm

Cut Diameter for Cyclone I for the Middle of the Overlap Zone (µm)
[assumes N_{re}≥3,162]

$$D_{50T}(\mu m) = \left(\frac{11 + D_{50LL}}{2}\right)$$

D_{50T} (µm) = (11 + 10.60 µm) / 2 = 10.80 µm

Sampling Rate Using Both PM_{10} and $PM_{2.5}$ Cyclones (dscfm)
[assumes N_{re}≥3,162]

$$Q_s(dscfm) = Q_I(dscfm) = 0.07296(\mu)\left[\frac{T_s}{M_w P_s}\right]^{0.2949}\left[\frac{1}{D_{50T}}\right]^{1.4102}$$

Qs (dscfm) =

0.07296 x 225.54 µP x (284 + 460 °R / 29.36 in Hg x 28.60 lb / lb-mole)$^{0.2949}$ x (1 / 10.80 µm)$^{1.4102}$ = 0.55 dscfm

Note: Lack of significant figures may cause rounding errors between actual calculations and example calculations.

EXAMPLE CALCULATIONS (Constant Flow, Variable Time Isokinetic QA/QC) [Values from Preliminary test]
Fourth calculation set using Cyclone IV, assuming N_{re}≥3,162

Particle Cut Diameter for N_{re} Greater than or Equal to 3,162 for Cyclone IV (µm)
[assumes N_{re}≥3,162]

$$D_{50}(\mu m) = 0.019723 \left[\frac{\mu}{Q_s}\right]^{0.8058} \left[\frac{1}{C}\right]^{0.5} \left[\frac{T_s}{P_s M_w}\right]^{0.3058}$$

D_{50} (µm) =

0.019723 x (225.54 µP / 0.55 dscfm)$^{0.8058}$ x (1 / 1.10)$^{0.5}$

x (284 + 460 °R / 29.36 in Hg x 28.60 lb / lb-mole)$^{0.3058}$ = 2.30 µm

Meter Box Orifice Pressure Drop (in H_2O)

$$\Delta H(inH_2O) = \left[\frac{Q_s(1-B_{ws})P_s}{T_s}\right]^2 \left[\frac{1.083 T_m M_d \Delta H_@}{P_{bar}}\right]$$

ΔH (in H_2O) = (0.58 dscfm x (1 - 7.00 /100) x 29.36 in Hg / 284 + 460 °R)^2

x (1.083 x (85.00 + 460 °R) x 29.40 lb / lb-mole x 1.838 in H_2O / 29.43 in Hg) = 0.484 in H_2O

50 °F above stack temperature	T_{s+50} =	334	ΔH_{+50} =	0.425 in H_2O
50 °F below stack temperature	T_{s+50} =	234	ΔH_{+50} =	0.556 in H_2O

EXAMPLE CALCULATIONS (Constant Flow, Variable Time Isokinetic QA/QC) [Values from Preliminary test]

Average Probe Blockage Factor

$$b_f = \frac{22.0}{A}$$

b_f = 22.0 / 40828.14 in^2 = 5.39E-04

Velocity Pressure Adjusted for Blockage Factor (in H_2O) [point A-1]

$$\Delta p_{s2}(inH_2O) = \Delta p_{s1}\left[\frac{1}{(1-b_f)}\right]^2$$

Δp_s (in H_2O) = 2.63 in H_2O x (1 / (1 - 5.39E-04))^2 = 2.64 in H_2O

Velocity of Stack Gas Adjusted for Blockage Factor (ft/sec)

$$v_s = K_p C_p \left(\sqrt{(\Delta p)}\right)_{avg} \left[\sqrt{\frac{T_s}{P_s M_w}}\right]$$

v_s (ft/sec) =

85.49 ft/sec / lb/mole - °R x 0.74 x 1.34 x (284 + 460 °R / 29.36 in Hg x 28.60 lb / lb-mole)$^{0.5}$ = 78.96 ft/sec

Calculated Nozzle Diameter for Acceptable Sampling Rate (in)

$$D(in) = \left[\frac{3.056 Q_s}{v_s}\right]^{0.5}$$

D (in) = (3.056 x 0.58 dscfm / 78.96 ft/sec)$^{0.5}$ = 0.149 in

Note: Lack of significant figures may cause rounding errors between actual calculations and example calculations.

EXAMPLE CALCULATIONS (Constant Flow, Variable Time Isokinetic QA/QC) [Values from Preliminary test]

Velocity of Gas in Nozzle 3 (diam. = 0.142 in), (ft/sec)

$$v_n = \frac{\left(\frac{Q_s}{60\frac{\text{min}}{\text{sec}}}\right)}{A_n}$$

v_n (ft/sec) = $\frac{0.58 \text{ dscfm}}{60 \text{ min/sec}} \div 1.10\text{E-}04 \text{ ft}^2$ = 87.22 $\frac{\text{ft}}{\text{sec}}$

Minimum Nozzle Velocity to Stack Velocity Ratio Parameter (dimensionless)

Nozzle 3 (diam. = 0.142 in)

$$R_{\min} = \left[0.2457 + \left(0.3072 - \frac{0.2603\,(\mu)(Q_s)^{0.5}}{v_n^{1.5}}\right)^{0.5}\right]$$

R_{min} =

$$0.2457 + \left(0.3072 - \frac{0.2603 \times 225.54 \text{ µP} \times (0.58 \text{ dscfm})^{0.5}}{87.22 \text{ in}^{1.5}}\right)^{0.5} = 0.75$$

Maximum Nozzle Velocity to Stack Velocity Ratio Parameter (dimensionless)

Nozzle 3 (diam. = 0.142 in)

$$R_{\max} = \left[0.4457 + \left(0.5690 + \frac{0.2603\,(\mu)(Q_s)^{0.5}}{v_n^{1.5}}\right)^{0.5}\right]$$

R_{max} =

$$0.4457 + \left(0.5690 + \frac{0.2603 \times 225.54 \text{ µP} \times (0.58 \text{ dscfm})^{0.5}}{87.22 \text{ in}^{1.5}}\right)^{0.5} = 1.24$$

Minimum Gas Velocity for R_{min} Greater than or Equal to 0.5 (ft/sec) **Nozzle 3 (diam. = 0.142 in)**

$$v_{\min}\,(ft/\text{sec}) = v_n R_{\min}$$

v_{min} (ft/sec) = 87.22 $\frac{\text{ft}}{\text{sec}}$ x 0.75 = 65.26 $\frac{\text{ft}}{\text{sec}}$

Maximum Gas Velocity for R_{max} Less than 1.5 (ft/sec) **Nozzle 3 (diam. = 0.142 in)**

$$v_{\max}\,(ft/\text{sec}) = v_n R_{\max}$$

v_{max} (ft/sec) = 87.22 $\frac{\text{ft}}{\text{sec}}$ x 1.24 = 107.75 $\frac{\text{ft}}{\text{sec}}$

Note: Lack of significant figures may cause rounding errors between actual calculations and example calculations.

EXAMPLE CALCULATIONS (Constant Flow, Variable Time Isokinetic QA/QC) [Values from Preliminary test]

Minimum Velocity Pressure (in H_2O)

$$\Delta p_{min}\ (inH_2O) = 1.3686 \times 10^{-4}\left[\frac{P_s M_w}{T_s}\right]\left[\frac{v_{min}}{C_p}\right]^2$$

Δp_{min} (in H_2O) =

1.3686 x 10^{-4} x (29.36 in Hg x 28.60 lb / lb-mole / 284 + 460 °R) x (65.26 ft/sec / 0.74)^2 = 1.22 in H_2O

Maximum Velocity Pressure (in H_2O)

$$\Delta p_{max}\ (inH_2O) = 1.3686 \times 10^{-4}\left[\frac{P_s M_w}{T_s}\right]\left[\frac{v_{max}}{C_p}\right]^2$$

Δp_{max} (in H_2O) =

1.3686 x 10^{-4} x (29.36 in Hg x 28.60 lb / lb-mole / 284 + 460 °R) x (107.75 ft/sec / 0.74)^2 = 3.32 in H_2O

EXAMPLE CALCULATIONS (Constant Flow, Variable Time Isokinetic QA/QC) [Values from Run 1 test]

Average Probe Blockage Factor

$$b_f = \frac{22.0}{A}$$

b_f = 22.0 / 40828.14 in^2 = 5.39E-04

Velocity Pressure Adjusted for Blockage Factor (in H_2O) [point A-1]

$$\Delta p_{s2}\ (inH_2O) = \Delta p_{s1}\left[\frac{1}{(1 - b_f)}\right]^2$$

Δp_s (in H_2O) = 2.63 in H_2O x (1 / (1 - 5.39E-04))^2 = 2.64 in H_2O

Sampling Dwell Time at Each Point (minutes) [point A-1]

$$t_n(\text{min}) = \left[\frac{C_p\sqrt{\Delta p_n}}{C'_p\left(\sqrt{\Delta p_n}\right)_{avg}}\right]\left[\frac{t_r}{N_{tp}}\right]$$

t_n (min) = (0.74 x (2.63)$^{0.5}$ / 0.74 x 1.50) x (240.00 min / 12.00) = 21.69 minutes

Dry Gas Volume Sampled at Standard Conditions (dscf) [point A-1]

$$v_{ms}\ (dscf) = \left[\frac{528}{29.92}\right]\left[\gamma \cdot v_m\right]\left[\frac{\left(P_{bar} + \frac{\Delta H}{13.6}\right)}{T_m}\right]$$

v_{ms} (dscf) = (528 / 29.92) (0.893 x 7.36 dscf) x (29.42 in Hg + 0.47 in H_2O / 13.6 / 72.00 + 460 °R) = 6.42 dscf

Note: Lack of significant figures may cause rounding errors between actual calculations and example calculations.

EXAMPLE CALCULATIONS (Constant Flow, Variable Time Isokinetic QA/QC) [Values from Run 1 test]

Sample Flow Rate at Standard Conditions (dscfm)

$$Q_{sST}\,(dscfm) = \frac{v_{ms}}{\Theta}$$

Q_{sST} (dscfm) = 74.20 dscf / 240.75 min = 0.31 dscf / min

Sampling Rate (dscfm) [e.g. cyclone flow rate]

$$Q_s\,(dscfm) = \frac{29.92}{528} Q_{sST}\left[\frac{1}{(1-B_{ws})}\right]\left[\frac{T_s}{P_s}\right]$$

Q_s (dscfm) = 29.92 in Hg / 528 °R x 0.31 dscf / min x 1 / (1- 6.86 /100) x 282 + 460 °R / 29.35 in Hg = 0.47 dscfm

Reynolds Number (dimensionless)

$$N_{re} = 8.64 \times 10^5 \left[\frac{P_s M_w}{T_s}\right]\left[\frac{Q_s}{\mu}\right]$$

N_{re} = 8.64 x 10^5 x 29.35 in Hg x 28.62 lb / lb-mole / 282 + 460 °R x 0.47 dscfm / 225.27 µP = 2058.16

Actual Particle Cut Diameter for Cyclone I (µm)

$$D_{50}\,(\mu m) = 0.15625\left[\frac{T_s}{M_w P_s}\right]^{0.2091}\left[\frac{\mu}{Q_s}\right]^{0.7091}$$

D_{50} (µm) = 0.15625 x (282 + 460 °R / 29.35 in Hg x 28.62 lb / lb-mole)$^{0.2091}$ x (225.27 µP / 0.47 dscfm)$^{0.7091}$ = 12.04 µm

Actual Particle Cut Diameter for Cyclone IV is determined by:

Cunningham Correction Factor (dimensionless)
[for a 2.5 micrometer diameter particle (estimated size)]

$$C = 1 + 0.0057193\left[\frac{\mu}{P_s D_{50}}\right]\left[\frac{T_s}{M_w}\right]^{0.5}$$

C = 1 + 0.0057193 x (225.27 µP / 29.35 in Hg x 2.5 µm)(282 + 460 °R / 28.62 lb / lb-mole)$^{0.5}$ = 1.09

Particle Cut Diameter for N_{re} Less than 3,162 for Cyclone IV (µm)

$$D_{50}\,(\mu m) = 0.0024302\left[\frac{\mu}{Q_s}\right]^{1.1791}\left[\frac{1}{C}\right]^{0.5}\left[\frac{T_s}{P_s M_w}\right]^{0.6790}$$

D_{50} (µm) =

0.0024302 x (225.27 µP / 0.47 dscfm)$^{1.1791}$ x (1 / 1.09)$^{0.5}$

x (282 + 460 °R / 29.35 in Hg x 28.62 lb / lb-mole)$^{0.6790}$ = 3.07 µm

Note: Lack of significant figures may cause rounding errors between actual calculations and example calculations.

EXAMPLE CALCULATIONS (Constant Flow, Variable Time Isokinetic QA/QC) [Values from Run 1 test]

Re-calculated Particle Cut Diameter for N_{re} Less than 3,162 for Cyclone IV (µm)

D_{50-1} (µm) =

$$D_{50-1}(\mu m) = 0.0024302 \left[\frac{\mu}{Q_s}\right]^{1.1791} \left[\frac{1}{C}\right]^{0.5} \left[\frac{T_s}{P_s M_w}\right]^{0.6790}$$

0.0024302 x (225.27 µP / 0.47 dscfm)$^{1.1791}$ x (1 / 1.07)$^{0.5}$

x (282 + 460 ^{o}R / 29.35 in Hg x 28.62 lb / lb-mole)$^{0.6790}$ = 3.09 µm

Ratio (Z) Between D_{50} and D_{50-1} Values (dimensionless)

$$Z = \frac{D_{50-1}}{D_{50}} \qquad Z = \frac{3.09\ \mu m}{3.09\ \mu m} = 1.00 \qquad 0.99 \le \left[Z = \left(\frac{D_{50}}{D_{50-1}}\right)\right] \le 1.01$$

Note: Lack of significant figures may cause rounding errors between actual calculations and example calculations.

Nomenclature

- %CO = carbon monoxide concentration (%)
- $\%CO_2$ = carbon dioxide concentration (%)
- $\%N_2$ = nitrogen concentration (%)
- $\%O_2$ = oxygen concentration (%)
- $\%O_{2,wet}$ = Oxygen content of gas stream, % by volume of wet gas. (Note: The oxygen percentage used in Method 201A, Equation 3 is on a wet gas basis. That means that since oxygen is typically measured on a dry gas basis, the measured percent O2 must be multiplied by the quantity $(1 - B_{ws})$ to convert to the actual volume fraction. Therefore, $\%O_{2,wet} = (1 - B_{ws}) * \%O_{2,dry}$)
- $(\%EA)_{avg}$ = average excess air (%)
- $(F_o)_{avg}$ = average calculated fuel factor
- $[(\Delta p)^{0.5}]_{avg}$ = Average of square roots of the velocity pressures measured during the preliminary traverse, inches W.C.
- μ = Gas viscosity, micropoise
- 12.0 = Constant calculated as 60 percent of 20.5 square inch cross-sectional area of combined cyclone head, square inches
- 17.03 = mg/milliequivalents for ammonium ion
- 22.4 = liters of ideal gas per lb-mol of substance at 0^oC and 1 atm (ref. Civil Engineering Reference Manual, 7th ed. - Michael R. Lindeburg)
- 24.04 = liters of ideal gas per lb-mol of substance at 20^oC and 1 atm (ref. Civil Engineering Reference Manual, 7th ed. - Michael R. Lindeburg)
- 5.02×10^4 = constant derived from the molecular weight and correcting standard temperature and pressure (ref. Bay Area Air Quality Management District, Source Test Procedure ST-1B, Ammonia Integrated Sampling, Adopted January 20, 1982, Regulation 7-303)
- A = distance upstream (in.)
- A_D = stack diameters upstream (dia.)
- An = Area of nozzle, square feet
- A_s = area of stack (ft^2)
- B = distance downstream (in.)
- B_D = stack diameters downstream (dia.)
- b_f = Average blockage factor calculated in Equation 26, dimensionless
- B_{wm} = meter moisture content (%)
- B_{ws} = stack moisture content (%)
- C = Cunningham correction factor for particle diameter, Dp, and calculated using the actual stack gas temperature, dimensionless
- C_1 = -150.3162 (micropoise)
- C_2 = 18.0614 (micropoise/$K^{0.5}$) = 13.4622 (micropoise/$R^{0.5}$)
- C_3 = 1.19183×10^6 (micropoise/K^2) = 3.86153×10^6 (micropoise/R^2)
- C_4 = 0.591123 (micropoise)
- C_5 = 91.9723 (micropoise)
- C_6 = 4.91705×10^{-5} (micropoise/K^2) = 1.51761×10^{-5} (micropoise/R^2)
- C_a = Acetone blank concentration, mg/mg
- C_b = Concentration of NH3 ion in the back half of train (breakthrough)
- C_f = Concentration of NH3 ion in the front half of train (main catch)
- C_{fPM10} = Conc. of filterable PM_{10}, gr/dscf
- $C_{fPM2.5}$ = Conc. of filterable $PM_{2.5}$, gr/dscf
- C_k = K Factor Constant, 849.8
- C_n = nozzle diameter constant, 0.03575
- C_p' = Coefficient for the pitot used in the preliminary traverse, dimensionless
- C_p = Pitot coefficient for the combined cyclone pitot, dimensionless

Nomenclature

- C_{cpm} = Concentration of the condensable PM in the stack gas, dry basis, corrected to standard conditions, milligrams/dry standard cubic foot.
- C_r = Re-estimated Cunningham correction factor for particle diameter equivalent to the actual cut size diameter and calculated using the actual stack gas temperature, dimensionless
- D_{50} = Particle cut diameter, micrometers
- $D_{50(N+1)}$ = D_{50} value for cyclone IV calculated during the N+1 iterative step, micrometers
- D_{50-1} = Re-calculated particle cut diameters based on re-estimated C_r, micrometers
- D_{50LL} = Cut diameter for cyclone I corresponding to the 2.25 micrometer cut diameter for cyclone IV, micrometer
- D_{50N} = D_{50} value for cyclone IV calculated during the Nth iterative step, micrometers
- D_{50T} = Cyclone I cut diameter corresponding to the middle of the overlap zone shown in Method 201A, Figure 10 of Section 17, micrometers
- D_e = equivalent stack diameter (in.)
- ΔH@ = ΔH @ 0.75 scfm (in. H2O)
- ΔH_{avg} = average orifice pressure (in. H_2O)
- D_n = Inner diameter of sampling nozzle mounted on Cyclone I, inches
- D_{na} = actual nozzle diameter (in.)
- D_p = Physical particle size, micrometers
- Δp = velocity head (in. H_2O)
- Δp_1 = velocity head at first current traverse point (in. H_2O)
- $\Delta p'_1$ = velocity head at first preliminary traverse point (in. H_2O)
- Δp_{avg} = average pitot tube differential pressure (in. H_2O)
- Δp_n = velocity head at subsequent current traverse point (in. H_2O)
- Δp_{RM2} = method 2 velocity head (in. H_2O)
- D_s = diameter of stack (in.)
- F_d = fuel f-factor (dscf/MMBtu)
- f_{O2} = stack gas fraction of O_2, by volume, dry basis
- I = Percent isokinetic sampling, dimensionless
- K_1 = standard volume correction, 17.65^oR/in. Hg
- K_4 = isokinetic conversion constant, 0.0945min•in.Hg/sec•^oR
- K_5 = water mass to std water vapor, 0.04715 ft^3/g
- K_p = 85.49, ((ft/sec)/(pounds/mole -^oR))
- L = length of stack (in.)
- L_{fw} = distance to far wall of stack (in.)
- L_{nw} = distance to near wall of stack (in.) [reference]
- $m_{\#x}$ = weight measurements (g)
- M_1 = Milligrams of PM collected on the filter, less than or equal to 2.5 micrometers
- M_2 = Milligrams of PM recovered from Container #2 (acetone blank corrected), greater than 10 micrometers
- M_3 = Milligrams of PM recovered from Container #3 (acetone blank corrected), less than or equal to 10 and greater than 2.5 micrometers
- M_4 = Milligrams of PM recovered from Container #4 (acetone blank corrected), less than or equal to 2.5 micrometers
- m_a = Mass of residue of acetone after evaporation, mg
- m_c = Mass of the NH4+ added to sample to form ammonium sulfate, mg
- m_{cpm} = Mass of the total condensable PM, mg
- M_d = Molecular weight of dry gas, pounds/pound mole
- m_{fb} = Mass of total CPM in field train recovery blank, mg
- m_{fx} = final weight, avg of last two measurements (g)

Nomenclature

- mg = Milligram
- mg/L = Milligram per liter
- m_i = Mass of inorganic CPM, mg
- m_{ib} = Mass of inorganic CPM in field train recovery blank, mg
- M_n = total particulates (mg)
- m_o = Mass of organic CPM, mg
- m_{ob} = Mass of organic CPM in field train blank, mg
- m_r = Mass of dried sample from inorganic fraction, mg
- m_{tx} = tare weight (g)
- MW = molecular weight (lb/lb-mole)
- M_w = Molecular weight of wet gas, pounds/pound mole
- N = Normality of ammonium hydroxide titrant
- N_a = null angle (deg.)
- N_{re} = Reynolds number, dimensionless
- N_{tp} = Number of iterative steps or total traverse points
- P_b = P_{bar} = barometric pressure (in. Hg)
- P_{bar} = barometric pressure (in. Hg)
- ppmCO = carbon monoxide concentration (ppm)
- ppmv = Parts per million by volume
- ppmw = Parts per million by weight
- P_s = absolute stack pressure (in. Hg)
- P_{static} = static pressure (in. H_2O)
- P_{std} = standard pressure, 29.92 in. Hg
- Θ = total sampling time (min)
- Q_{aw} = average stack wet flow rate (ascf/min)
- Q_I = Sampling rate for cyclone I to achieve specified D_{50}
- Q_m = estimated orifice flow rate, 0.750 acfm, else Vm/Q from previous run
- Q_s = Sampling rate for cyclone I to achieve specified D_{50}
- $Q_{s(std)}$ = total cyclone flow rate at standard conditions (dscf/min)
- Q_{sd} = dry standard stack flow rate (dscfm)
- Q_{sST} = Dry gas sampling rate through the sampling assembly, dscfm
- Q_{sw} = wet standard stack flow rate (ascfm)
- R_{max} = Nozzle/stack velocity ratio parameter, dimensionless
- R_{min} = Nozzle/stack velocity ratio parameter, dimensionless
- t_1 = Sampling time at point 1, min
- t_m = average gas meter temperature (^oF)
- t_m = average meter temperature (^oF)
- T_m = Meter box and orifice gas temperature, ^oR
- t_n = Sampling time at point n, min
- t_r = Total projected run time, min
- T_s = Absolute stack gas temperature, ^oR
- T_{std} = standard temperature, 68^oF, 528^oR
- T_u = absolute temperature offset, 460^oR
- V_a = Volume of acetone blank, ml
- V_{aw} = Volume of acetone used in sample recovery wash, ml
- V_b = Volume of aliquot taken for IC analysis, ml
- V_c = Quantity of water captured in impingers and silica gel, ml
- V_f = final impinger volume (ml)
- V_i = initial impinger volume (ml)

Nomenclature

- V_{ic} = Volume of impinger contents sample, ml
- V_m = Dry gas meter volume sampled, acf
- $V_{m(std)}$ = standard meter volume (dscf)
- v_{max} = Maximum gas velocity calculated from Equations 18 or 19, ft/sec
- v_{max} = maximum nozzle velocity (ft/sec)
- V_{mf} = final dry gas meter reading (dcf)
- V_{mi} = initial dry gas meter reading (dcf)
- v_{min} = Minimum gas velocity calculated from Method 201A, Equations 16 or 17, ft/sec
- V_{ms} = Dry gas meter volume sampled, corrected to standard conditions, dscf
- v_n = Sample gas velocity in the nozzle, ft/sec
- v_{org} = organics wash volume (ml)
- V_p = Volume of water added during train purge
- v_s = average stack gas velocity (ft/sec)
- v_{sl} = local velocity (ft/sec)
- V_t = total impinger volume (ml) = ;(V_f-V_i)
- V_t = Volume of NH4OH titrant, ml
- $V_{w(std)}$ = volume of water vapor in gas sample at standard conditions (scf)
- v_x = blank volume (ml)
- W = width of stack (in.)
- $W_{2,3,4}$ = Weight of PM recovered from Containers #2, #3, and #4, mg
- W_a = Weight of blank residue in acetone used to recover samples, mg
- W_f = final impinger weight (g)
- W_i = initial impinger weight (g)
- W_t = total impinger weight (g) = ;(W_f-W_i)
- w_x = blank weight of solids (g)
- Y = meter calibration factor (a.k.a gamma)
- Z = Ratio between estimated cyclone IV D_{50} values, dimensionless
- γ = Dry gas meter gamma value, dimensionless
- ΔH = Meter box orifice pressure drop, inches W.C.
- ΔH@ = Pressure drop across orifice at flow rate of 0.75 scfm at standard conditions, inches W.C. (Note: Specific to each orifice and meter box.)
- Δp_1 = Velocity pressure measured at point 1, inches W.C.
- Δp_{avg} = Average velocity pressure, inches W.C.
- Δp_m = Observed velocity pressure using S-type pitot tube in preliminary traverse, inches W.C.
- Δp_{max} = Maximum velocity pressure, inches W.C.
- Δp_{min} = Minimum velocity pressure, inches W.C.
- Δp_n = Velocity pressure measured at point n during the test run, inches W.C.
- Δp_s = Velocity pressure calculated in Method 201a, Equation 25, inches W.C.
- Δp_{s1} = Velocity pressure adjusted for combined cyclone pitot tube, inches W.C.
- Δp_{s2} = Velocity pressure corrected for blockage, inches W.C.
- θ = Total run time, min
- ρ_a = Density of acetone, mg/ml (see label on bottle)
- Σ_n = total number of sampling points

APPENDIX B

EMISSION DATA RECORDS

EMISSION DATA RECORDS

Unit #CTG-11
Base Load
Unit Operating Data

US1177 - CPV-Valley - Unit 11 **CTG-1** **FO-Run 1**
DCS Data - 20190205 - 0930-2230

Date / Time	Unit 11 GT Power MW 11HAD00EU001	Unit 11 GT Power % 11MKA01EU902A	Unit 11 Total GT Liquid Fuel Oil Flow KPPH 11MBN10EU001	Unit 11 GT Exhaust O_2 % 11HNE10CQ109	Ambient Temp. °F 11MBL05CT101
2019/02/05 09:36:00:000	188.747	97.7	100.274	13.74	45.6
2019/02/05 09:37:00:000	189.183	97.7	100.274	13.74	45.1
2019/02/05 09:38:00:000	189.183	97.9	100.274	13.74	45.1
2019/02/05 09:39:00:000	189.183	97.8	100.274	13.74	45.1
2019/02/05 09:40:00:000	189.183	97.7	100.048	13.74	45.1
2019/02/05 09:41:00:000	189.183	97.6	100.048	13.74	45.1
2019/02/05 09:42:00:000	189.183	97.7	100.205	13.76	45.1
2019/02/05 09:43:00:000	189.183	97.7	100.205	13.76	45.1
2019/02/05 09:44:00:000	189.702	97.7	100.205	13.76	45.1
2019/02/05 09:45:00:000	189.702	97.5	100.372	13.76	45.6
2019/02/05 09:46:00:000	190.085	97.6	100.542	13.76	45.6
2019/02/05 09:47:00:000	190.085	97.5	100.542	13.73	45.6
2019/02/05 09:48:00:000	190.085	97.5	100.542	13.73	45.8
2019/02/05 09:49:00:000	189.728	97.7	100.410	13.73	45.8
2019/02/05 09:50:00:000	189.728	97.8	100.410	13.73	45.8
2019/02/05 09:51:00:000	189.728	97.7	100.410	13.73	45.8
2019/02/05 09:52:00:000	189.492	97.7	100.157	13.75	45.8
2019/02/05 09:53:00:000	189.492	97.6	100.157	13.75	45.1
2019/02/05 09:54:00:000	188.892	97.6	100.157	13.75	45.1
2019/02/05 09:55:00:000	189.049	97.6	99.944	13.75	45.1
2019/02/05 09:56:00:000	189.049	97.6	100.154	13.75	45.1
2019/02/05 09:57:00:000	189.049	97.5	100.021	13.74	45.1
2019/02/05 09:58:00:000	189.049	97.5	100.125	13.74	44.8
2019/02/05 09:59:00:000	189.049	97.6	100.125	13.74	44.8
2019/02/05 10:00:00:000	189.049	97.6	100.125	13.77	44.6
2019/02/05 10:01:00:000	189.296	97.7	100.319	13.77	44.6
2019/02/05 10:02:00:000	189.296	97.8	100.319	13.74	44.4
2019/02/05 10:03:00:000	189.296	97.8	100.319	13.74	44.4
2019/02/05 10:04:00:000	189.296	97.8	100.168	13.74	44.4
2019/02/05 10:05:00:000	189.296	97.7	100.168	13.74	44.4
2019/02/05 10:06:00:000	189.069	97.6	100.168	13.74	44.4
2019/02/05 10:07:00:000	189.069	97.5	100.168	13.74	44.4
2019/02/05 10:08:00:000	189.069	97.5	100.168	13.74	44.8
2019/02/05 10:09:00:000	189.069	97.5	100.168	13.74	45.1
2019/02/05 10:10:00:000	189.069	97.6	100.168	13.74	45.1
2019/02/05 10:11:00:000	189.114	97.7	100.270	13.74	45.6
2019/02/05 10:12:00:000	189.114	97.7	100.270	13.74	45.6
2019/02/05 10:13:00:000	189.303	97.6	100.270	13.74	45.8
2019/02/05 10:14:00:000	189.006	97.8	100.180	13.74	46.3
2019/02/05 10:15:00:000	189.006	97.6	100.180	13.74	46.3
2019/02/05 10:16:00:000	189.006	97.6	100.180	13.74	46.5
2019/02/05 10:17:00:000	188.584	97.7	100.063	13.74	46.5
2019/02/05 10:18:00:000	188.584	97.7	100.063	13.74	47.0
2019/02/05 10:19:00:000	188.904	97.6	100.172	13.74	47.2
2019/02/05 10:20:00:000	188.762	97.6	99.984	13.74	47.2
2019/02/05 10:21:00:000	188.762	97.7	99.984	13.75	47.2
2019/02/05 10:22:00:000	188.325	97.7	99.984	13.75	47.4
2019/02/05 10:23:00:000	188.394	97.6	99.984	13.75	47.4
2019/02/05 10:24:00:000	188.394	97.7	99.984	13.75	47.4
2019/02/05 10:25:00:000	188.394	97.8	99.984	13.75	47.4
2019/02/05 10:26:00:000	188.394	97.7	99.984	13.75	47.4
2019/02/05 10:27:00:000	188.600	98.0	100.139	13.75	47.4
2019/02/05 10:28:00:000	188.600	97.7	100.139	13.75	47.4
2019/02/05 10:29:00:000	188.600	97.7	100.022	13.75	47.4
2019/02/05 10:30:00:000	188.600	97.9	99.931	13.75	47.4
2019/02/05 10:31:00:000	188.600	97.9	99.931	13.75	47.6
2019/02/05 10:32:00:000	188.600	97.8	99.931	13.75	47.9

2019/02/05 10:33:00:000	188.277	98.0	99.931	13.75	47.9
2019/02/05 10:34:00:000	188.277	97.9	99.775	13.75	48.4
2019/02/05 10:35:00:000	187.837	97.9	99.775	13.75	48.4
2019/02/05 10:36:00:000	187.837	97.7	99.665	13.75	48.6
2019/02/05 10:37:00:000	188.079	97.8	99.665	13.75	49.1
2019/02/05 10:38:00:000	188.079	97.8	99.665	13.75	49.1
2019/02/05 10:39:00:000	187.875	97.9	99.665	13.75	49.5
2019/02/05 10:40:00:000	187.875	98.0	99.737	13.75	49.5
2019/02/05 10:41:00:000	187.875	97.8	99.678	13.75	49.5
2019/02/05 10:42:00:000	187.875	97.8	99.678	13.75	50.0
2019/02/05 10:43:00:000	187.619	97.9	99.565	13.75	50.0
2019/02/05 10:44:00:000	187.619	98.0	99.565	13.76	50.0
2019/02/05 10:45:00:000	187.619	98.0	99.565	13.76	50.0
2019/02/05 10:46:00:000	187.828	97.9	99.600	13.76	50.0
2019/02/05 10:47:00:000	187.828	97.9	99.600	13.76	50.0
2019/02/05 10:48:00:000	187.929	97.9	99.848	13.76	50.0
2019/02/05 10:49:00:000	187.929	98.2	99.654	13.76	50.0
2019/02/05 10:50:00:000	187.929	98.2	99.654	13.76	50.2
2019/02/05 10:51:00:000	187.929	98.0	99.607	13.74	50.7
2019/02/05 10:52:00:000	187.372	98.0	99.339	13.74	50.7
2019/02/05 10:53:00:000	187.372	98.0	99.434	13.74	51.2
2019/02/05 10:54:00:000	187.372	98.0	99.434	13.77	51.2
2019/02/05 10:55:00:000	187.372	98.0	99.630	13.77	51.2
2019/02/05 10:56:00:000	187.372	98.0	99.389	13.77	51.4
2019/02/05 10:57:00:000	187.372	98.1	99.488	13.77	51.9
2019/02/05 10:58:00:000	187.372	98.1	99.488	13.75	51.9
2019/02/05 10:59:00:000	186.956	98.1	99.488	13.75	51.9
2019/02/05 11:00:00:000	186.956	98.0	99.338	13.75	51.9
2019/02/05 11:01:00:000	186.956	98.2	99.338	13.77	51.9
2019/02/05 11:02:00:000	186.956	98.0	99.338	13.77	52.3
2019/02/05 11:03:00:000	186.956	98.0	99.338	13.77	52.3
2019/02/05 11:04:00:000	186.956	98.1	99.338	13.77	52.5
2019/02/05 11:05:00:000	186.956	98.0	99.338	13.77	52.8
2019/02/05 11:06:00:000	186.956	97.9	99.338	13.77	52.8
2019/02/05 11:07:00:000	186.956	97.8	99.267	13.77	52.5
2019/02/05 11:08:00:000	186.956	98.0	99.267	13.77	52.8
2019/02/05 11:09:00:000	186.225	97.8	99.138	13.77	52.8
2019/02/05 11:10:00:000	186.225	97.7	98.972	13.75	53.0
2019/02/05 11:11:00:000	186.225	97.8	98.972	13.77	53.2
2019/02/05 11:12:00:000	185.685	97.9	98.972	13.77	53.5
2019/02/05 11:13:00:000	186.085	98.0	98.781	13.77	53.5
2019/02/05 11:14:00:000	186.085	97.9	99.023	13.77	53.5
2019/02/05 11:15:00:000	186.085	98.0	99.023	13.78	53.5
2019/02/05 11:16:00:000	186.085	98.1	98.828	13.78	53.7
2019/02/05 11:17:00:000	186.085	98.0	98.828	13.76	54.0
2019/02/05 11:18:00:000	185.526	97.8	98.828	13.76	54.0
2019/02/05 11:19:00:000	185.526	97.9	98.828	13.76	54.2
2019/02/05 11:20:00:000	185.779	97.6	98.828	13.78	54.2
2019/02/05 11:21:00:000	185.779	97.9	98.828	13.78	54.6
2019/02/05 11:22:00:000	185.779	98.0	98.731	13.78	54.6
2019/02/05 11:23:00:000	185.566	98.0	98.894	13.78	54.9
2019/02/05 11:24:00:000	185.792	98.0	98.894	13.78	54.9
2019/02/05 11:25:00:000	185.792	98.2	98.894	13.78	54.9
2019/02/05 11:26:00:000	186.205	98.3	99.135	13.76	55.1
2019/02/05 11:27:00:000	186.205	98.3	99.023	13.76	55.1
2019/02/05 11:28:00:000	186.205	98.3	99.023	13.76	55.3
2019/02/05 11:29:00:000	186.146	98.3	99.023	13.76	55.3
2019/02/05 11:30:00:000	186.146	98.2	98.878	13.76	55.3
2019/02/05 11:31:00:000	185.784	98.2	99.064	13.79	55.3
2019/02/05 11:32:00:000	186.112	98.2	99.064	13.79	55.3
2019/02/05 11:33:00:000	186.112	98.3	99.296	13.77	55.1
2019/02/05 11:34:00:000	186.112	98.2	99.020	13.77	55.1
2019/02/05 11:35:00:000	186.112	98.2	99.020	13.77	55.1
2019/02/05 11:36:00:000	185.807	98.2	98.856	13.77	55.1
2019/02/05 11:37:00:000	185.807	98.0	98.856	13.76	55.1
2019/02/05 11:38:00:000	185.807	98.1	98.856	13.79	55.1
2019/02/05 11:39:00:000	185.807	98.0	98.856	13.79	55.1
2019/02/05 11:40:00:000	185.466	98.1	98.856	13.76	55.1

2019/02/05 11:41:00:000	185.466	98.0	98.856	13.76	55.3
2019/02/05 11:42:00:000	185.466	98.1	98.631	13.76	55.3
2019/02/05 11:43:00:000	185.466	97.9	98.709	13.79	55.6
2019/02/05 11:44:00:000	185.466	98.0	98.949	13.79	55.6
2019/02/05 11:45:00:000	185.466	98.1	98.833	13.76	56.3
2019/02/05 11:46:00:000	185.466	98.2	98.833	13.76	56.3
2019/02/05 11:47:00:000	185.466	98.1	98.823	13.76	56.8
2019/02/05 11:48:00:000	184.930	98.1	98.600	13.76	56.8
2019/02/05 11:49:00:000	184.930	97.9	98.383	13.78	57.0
2019/02/05 11:50:00:000	184.619	98.0	98.383	13.78	57.2
2019/02/05 11:51:00:000	184.619	98.0	98.383	13.78	57.2
2019/02/05 11:52:00:000	184.619	98.0	98.463	13.78	57.2
2019/02/05 11:53:00:000	184.619	98.1	98.463	13.78	57.4
2019/02/05 11:54:00:000	184.848	98.1	98.463	13.78	57.4
2019/02/05 11:55:00:000	184.848	98.1	98.629	13.78	57.4
2019/02/05 11:56:00:000	184.421	97.9	98.423	13.78	57.4
2019/02/05 11:57:00:000	184.421	97.9	98.157	13.78	57.4
2019/02/05 11:58:00:000	184.421	98.0	98.040	13.78	57.9
2019/02/05 11:59:00:000	183.898	98.1	98.115	13.78	58.4
2019/02/05 12:00:00:000	183.898	98.0	98.115	13.78	58.4
2019/02/05 12:01:00:000	183.898	98.0	98.115	13.78	58.4
2019/02/05 12:02:00:000	183.411	97.9	98.115	13.78	58.4
2019/02/05 12:03:00:000	183.411	98.1	97.851	13.78	59.1
2019/02/05 12:04:00:000	183.411	98.1	97.851	13.78	59.8
2019/02/05 12:05:00:000	182.862	97.8	97.619	13.78	59.8
2019/02/05 12:06:00:000	183.347	97.9	97.853	13.78	59.8
2019/02/05 12:07:00:000	183.858	98.0	98.201	13.82	59.1
2019/02/05 12:08:00:000	184.396	98.1	98.373	13.78	58.6
2019/02/05 12:09:00:000	184.396	98.1	98.373	13.78	58.6
2019/02/05 12:10:00:000	184.396	98.1	98.373	13.78	58.6
2019/02/05 12:11:00:000	184.176	98.3	98.373	13.78	59.1
2019/02/05 12:12:00:000	184.176	98.1	98.252	13.78	59.1
2019/02/05 12:13:00:000	183.891	98.0	97.992	13.77	59.6
2019/02/05 12:14:00:000	183.891	97.9	98.253	13.77	59.6
2019/02/05 12:15:00:000	183.891	98.0	98.121	13.77	59.8
2019/02/05 12:16:00:000	183.705	98.1	98.121	13.77	59.8
2019/02/05 12:17:00:000	183.705	98.1	97.947	13.77	59.8
2019/02/05 12:18:00:000	183.266	98.0	97.947	13.82	59.8
2019/02/05 12:19:00:000	183.266	98.0	97.947	13.77	59.8
2019/02/05 12:20:00:000	183.266	98.0	97.776	13.77	59.8
2019/02/05 12:21:00:000	183.266	98.0	97.776	13.77	60.0
2019/02/05 12:22:00:000	183.266	98.1	98.118	13.80	60.0
2019/02/05 12:23:00:000	183.858	98.0	98.118	13.80	59.8
2019/02/05 12:24:00:000	183.858	98.1	98.118	13.80	59.3
2019/02/05 12:25:00:000	184.037	98.0	98.301	13.78	59.3
2019/02/05 12:26:00:000	184.037	98.0	98.151	13.78	59.3
2019/02/05 12:27:00:000	184.037	98.0	98.151	13.78	59.3
2019/02/05 12:28:00:000	183.776	98.0	98.151	13.78	59.3
2019/02/05 12:29:00:000	183.776	97.9	98.151	13.78	59.3
2019/02/05 12:30:00:000	183.776	97.9	97.935	13.78	59.3
2019/02/05 12:31:00:000	183.539	97.9	98.157	13.78	59.3
2019/02/05 12:32:00:000	183.539	97.9	97.962	13.78	59.3
2019/02/05 12:33:00:000	183.539	97.9	97.962	13.78	59.3
2019/02/05 12:34:00:000	183.539	98.1	97.962	13.77	59.3
2019/02/05 12:35:00:000	183.348	97.9	97.962	13.77	59.6
2019/02/05 12:36:00:000	183.348	97.9	97.663	13.77	59.6
2019/02/05 12:37:00:000	183.041	97.9	97.646	13.78	59.8
2019/02/05 12:38:00:000	183.041	97.9	97.757	13.78	60.0
2019/02/05 12:39:00:000	183.533	97.9	97.851	13.78	60.0
2019/02/05 12:40:00:000	183.533	97.9	97.979	13.78	60.0
2019/02/05 12:41:00:000	182.978	97.9	97.979	13.78	60.0
2019/02/05 12:42:00:000	183.378	98.0	97.786	13.78	60.0
2019/02/05 12:43:00:000	183.378	97.9	97.786	13.78	60.2
2019/02/05 12:44:00:000	182.983	97.9	97.786	13.78	60.2
2019/02/05 12:45:00:000	183.455	98.1	97.953	13.78	60.2
2019/02/05 12:46:00:000	183.455	98.1	97.953	13.78	60.0
2019/02/05 12:47:00:000	183.455	98.1	97.953	13.78	60.0
2019/02/05 12:48:00:000	183.267	98.0	97.808	13.78	60.0

2019/02/05 12:49:00:000	182.528	98.0	97.808	13.77	60.2
2019/02/05 12:50:00:000	182.528	98.0	97.808	13.77	60.7
2019/02/05 12:51:00:000	182.528	97.8	97.671	13.77	60.7
2019/02/05 12:52:00:000	182.528	98.0	97.671	13.77	60.7
2019/02/05 12:53:00:000	182.866	98.0	97.671	13.77	60.7
2019/02/05 12:54:00:000	182.866	97.9	97.671	13.79	60.7
2019/02/05 12:55:00:000	182.866	98.0	97.671	13.79	60.7
2019/02/05 12:56:00:000	182.866	97.8	97.823	13.79	60.7
2019/02/05 12:57:00:000	183.282	98.1	97.944	13.79	60.2
2019/02/05 12:58:00:000	183.282	98.0	97.944	13.79	60.2
2019/02/05 12:59:00:000	183.630	98.0	97.944	13.79	60.0
2019/02/05 13:00:00:000	183.630	98.0	97.944	13.79	60.0
2019/02/05 13:01:00:000	183.310	97.9	97.999	13.77	59.8
2019/02/05 13:02:00:000	183.310	98.0	97.833	13.77	59.8
2019/02/05 13:03:00:000	183.310	97.9	97.833	13.77	59.8
2019/02/05 13:04:00:000	183.310	97.7	97.833	13.78	59.8
2019/02/05 13:05:00:000	183.310	97.8	97.833	13.78	59.8
2019/02/05 13:06:00:000	182.880	97.8	97.833	13.78	59.8
2019/02/05 13:07:00:000	182.880	97.8	97.833	13.78	59.8
2019/02/05 13:08:00:000	182.880	97.7	97.661	13.78	59.8
2019/02/05 13:09:00:000	182.880	97.7	97.661	13.78	60.0
2019/02/05 13:10:00:000	182.880	97.8	97.661	13.78	60.0
2019/02/05 13:11:00:000	182.880	97.8	97.723	13.78	60.2
2019/02/05 13:12:00:000	182.880	97.9	97.723	13.78	60.2
2019/02/05 13:13:00:000	182.880	97.9	97.761	13.78	60.2
2019/02/05 13:14:00:000	183.185	97.8	97.761	13.78	60.2
2019/02/05 13:15:00:000	183.185	97.8	97.945	13.80	60.2
2019/02/05 13:16:00:000	183.185	97.9	97.945	13.80	60.2
2019/02/05 13:17:00:000	183.780	97.9	97.945	13.80	60.2
2019/02/05 13:18:00:000	183.531	98.0	97.945	13.80	60.2
2019/02/05 13:19:00:000	183.531	97.9	97.945	13.78	60.2
2019/02/05 13:20:00:000	183.531	98.0	98.091	13.78	60.2
2019/02/05 13:21:00:000	183.531	98.0	98.013	13.78	60.2
2019/02/05 13:22:00:000	183.293	98.1	98.013	13.78	60.2
2019/02/05 13:23:00:000	183.293	98.0	97.990	13.78	60.2
2019/02/05 13:24:00:000	183.677	98.0	97.990	13.78	60.2
2019/02/05 13:25:00:000	183.677	98.0	98.089	13.78	60.2
2019/02/05 13:26:00:000	183.677	98.0	98.089	13.78	60.0
2019/02/05 13:27:00:000	183.428	98.0	98.089	13.78	60.0
2019/02/05 13:28:00:000	183.428	98.0	97.993	13.78	60.0
2019/02/05 13:29:00:000	183.428	97.9	97.856	13.78	60.0
2019/02/05 13:30:00:000	182.926	97.9	97.856	13.78	60.0
2019/02/05 13:31:00:000	183.379	97.9	97.856	13.78	60.0
2019/02/05 13:32:00:000	183.379	97.9	97.930	13.78	60.0
2019/02/05 13:33:00:000	183.379	98.0	97.930	13.78	60.0
2019/02/05 13:34:00:000	183.379	98.0	98.093	13.78	60.2
2019/02/05 13:35:00:000	183.463	98.0	98.093	13.78	60.2
2019/02/05 13:36:00:000	183.463	97.9	97.990	13.78	60.2
2019/02/05 13:37:00:000	183.463	98.0	97.990	13.76	60.2
2019/02/05 13:38:00:000	183.245	97.9	97.808	13.76	60.2
2019/02/05 13:39:00:000	183.245	97.9	97.808	13.78	60.2
2019/02/05 13:40:00:000	183.060	97.9	98.022	13.78	60.2
2019/02/05 13:41:00:000	183.060	97.9	97.838	13.78	60.2
2019/02/05 13:42:00:000	183.476	97.9	97.838	13.78	60.2
2019/02/05 13:43:00:000	183.476	98.0	97.979	13.78	60.2
2019/02/05 13:44:00:000	183.476	97.9	97.979	13.80	60.2
2019/02/05 13:45:00:000	183.308	97.9	97.904	13.80	60.2
AVERAGE:	**185.73**	**97.91**	**98.85**	**13.77**	**54.43**

US1177 - CPV-Valley - Unit 11 **CTG-1** **FO-Run 2**
DCS Data - 20190205 - 0930-2230

Date / Time	Unit 11 GT Power MW 11HAD00EU001	Unit 11 GT Power % 11MKA01EU902A	Unit 11 Total GT Liquid Fuel Oil Flow KPPH 11MBN10EU001	Unit 11 GT Exhaust O_2 % 11HNE10CQ109	Ambient Temp. °F 11MBL05CT101
2019/02/05 13:51:00:000	183.017	97.9	97.883	13.78	60.5
2019/02/05 13:52:00:000	183.017	97.8	97.883	13.78	60.5
2019/02/05 13:53:00:000	183.017	97.8	97.883	13.79	60.5
2019/02/05 13:54:00:000	183.017	97.8	97.718	13.79	60.5
2019/02/05 13:55:00:000	182.810	97.8	97.718	13.79	60.5
2019/02/05 13:56:00:000	182.810	97.8	97.718	13.79	60.5
2019/02/05 13:57:00:000	183.266	97.8	97.803	13.79	60.5
2019/02/05 13:58:00:000	183.266	97.9	97.803	13.79	60.5
2019/02/05 13:59:00:000	182.954	97.9	97.913	13.79	60.5
2019/02/05 14:00:00:000	182.954	97.9	97.913	13.79	60.5
2019/02/05 14:01:00:000	183.153	98.0	97.865	13.79	60.5
2019/02/05 14:02:00:000	183.153	97.5	97.865	13.79	60.5
2019/02/05 14:03:00:000	183.153	97.8	98.062	13.79	60.5
2019/02/05 14:04:00:000	183.153	97.9	97.891	13.78	60.5
2019/02/05 14:05:00:000	183.153	97.7	97.891	13.78	60.5
2019/02/05 14:06:00:000	182.781	97.8	97.891	13.78	60.5
2019/02/05 14:07:00:000	183.091	97.9	97.891	13.78	60.5
2019/02/05 14:08:00:000	183.091	98.0	97.891	13.78	60.5
2019/02/05 14:09:00:000	183.091	97.8	97.891	13.78	60.5
2019/02/05 14:10:00:000	183.017	97.7	97.891	13.78	60.5
2019/02/05 14:11:00:000	183.017	97.9	97.891	13.78	60.5
2019/02/05 14:12:00:000	183.251	98.0	97.921	13.81	60.0
2019/02/05 14:13:00:000	183.675	98.2	98.061	13.77	60.0
2019/02/05 14:14:00:000	183.675	98.0	98.278	13.77	59.8
2019/02/05 14:15:00:000	183.675	98.0	98.141	13.77	59.8
2019/02/05 14:16:00:000	183.675	98.0	98.141	13.77	59.8
2019/02/05 14:17:00:000	183.675	98.1	98.141	13.77	59.8
2019/02/05 14:18:00:000	183.675	98.0	98.141	13.80	59.8
2019/02/05 14:19:00:000	183.675	98.0	98.141	13.80	59.8
2019/02/05 14:20:00:000	183.675	97.9	98.141	13.80	59.8
2019/02/05 14:21:00:000	183.675	98.0	98.141	13.80	59.6
2019/02/05 14:22:00:000	183.675	98.0	98.318	13.79	59.6
2019/02/05 14:23:00:000	183.675	98.0	98.215	13.79	59.6
2019/02/05 14:24:00:000	184.177	98.0	98.215	13.79	59.6
2019/02/05 14:25:00:000	183.958	98.0	98.215	13.79	59.6
2019/02/05 14:26:00:000	183.958	98.0	98.066	13.79	59.6
2019/02/05 14:27:00:000	183.496	98.0	98.223	13.78	59.6
2019/02/05 14:28:00:000	183.728	98.0	98.035	13.78	59.6
2019/02/05 14:29:00:000	183.728	97.9	98.187	13.78	59.6
2019/02/05 14:30:00:000	183.728	98.0	98.187	13.78	59.6
2019/02/05 14:31:00:000	183.728	97.9	98.073	13.78	59.6
2019/02/05 14:32:00:000	183.728	97.9	98.073	13.78	59.6
2019/02/05 14:33:00:000	183.728	98.1	98.262	13.78	59.6
2019/02/05 14:34:00:000	183.728	97.9	98.015	13.78	59.6
2019/02/05 14:35:00:000	183.728	98.0	98.156	13.78	59.6
2019/02/05 14:36:00:000	183.141	97.9	98.063	13.78	59.6
2019/02/05 14:37:00:000	183.141	97.8	97.976	13.80	59.6
2019/02/05 14:38:00:000	183.442	97.9	97.976	13.80	59.6
2019/02/05 14:39:00:000	183.442	98.0	98.159	13.80	59.6
2019/02/05 14:40:00:000	183.442	97.9	98.159	13.79	59.6
2019/02/05 14:41:00:000	183.442	97.9	98.005	13.79	59.6
2019/02/05 14:42:00:000	183.764	97.8	98.106	13.79	59.6
2019/02/05 14:43:00:000	183.764	98.0	98.106	13.79	59.6
2019/02/05 14:44:00:000	184.214	98.0	98.318	13.79	59.6
2019/02/05 14:45:00:000	184.214	98.0	98.318	13.79	59.3
2019/02/05 14:46:00:000	184.214	97.8	98.318	13.79	59.3

2019/02/05 14:47:00:000	184.117	97.9	98.318	13.79	59.3
2019/02/05 14:48:00:000	184.117	98.0	98.318	13.77	59.3
2019/02/05 14:49:00:000	183.795	97.9	98.091	13.77	59.3
2019/02/05 14:50:00:000	183.795	97.9	98.352	13.77	59.3
2019/02/05 14:51:00:000	183.795	97.8	98.061	13.77	59.3
2019/02/05 14:52:00:000	183.105	97.9	98.248	13.77	59.3
2019/02/05 14:53:00:000	182.975	97.9	98.213	13.77	59.3
2019/02/05 14:54:00:000	183.038	98.0	98.213	13.77	59.3
2019/02/05 14:55:00:000	183.450	98.2	98.213	13.77	59.3
2019/02/05 14:56:00:000	183.034	97.9	98.213	13.77	59.3
2019/02/05 14:57:00:000	184.134	97.6	98.213	13.78	59.3
2019/02/05 14:58:00:000	183.523	98.2	98.213	13.78	59.6
2019/02/05 14:59:00:000	183.523	98.1	98.213	13.78	59.6
2019/02/05 15:00:00:000	183.031	97.7	98.087	13.78	59.8
2019/02/05 15:01:00:000	183.031	97.9	97.866	13.78	60.0
2019/02/05 15:02:00:000	183.031	97.9	97.910	13.78	60.0
2019/02/05 15:03:00:000	183.031	97.8	97.910	13.78	60.2
2019/02/05 15:04:00:000	183.031	97.8	97.910	13.78	60.2
2019/02/05 15:05:00:000	183.031	97.9	97.910	13.78	60.2
2019/02/05 15:06:00:000	183.031	97.9	98.066	13.78	60.2
2019/02/05 15:07:00:000	183.769	97.8	98.066	13.78	60.0
2019/02/05 15:08:00:000	183.158	97.9	98.066	13.78	60.0
2019/02/05 15:09:00:000	183.158	97.9	97.967	13.78	60.0
2019/02/05 15:10:00:000	183.158	97.8	97.967	13.78	60.0
2019/02/05 15:11:00:000	182.868	97.8	97.715	13.78	60.0
2019/02/05 15:12:00:000	182.868	97.8	97.715	13.78	60.0
2019/02/05 15:13:00:000	182.868	97.8	97.821	13.78	60.0
2019/02/05 15:14:00:000	182.655	97.9	97.821	13.80	60.0
2019/02/05 15:15:00:000	183.061	97.8	97.821	13.80	60.0
2019/02/05 15:16:00:000	183.061	97.9	98.038	13.80	60.0
2019/02/05 15:17:00:000	183.168	97.9	98.038	13.80	60.0
2019/02/05 15:18:00:000	183.168	98.0	98.038	13.80	60.0
2019/02/05 15:19:00:000	183.168	97.9	97.880	13.78	60.0
2019/02/05 15:20:00:000	183.168	97.9	97.880	13.78	60.0
2019/02/05 15:21:00:000	183.168	97.9	97.880	13.78	60.0
2019/02/05 15:22:00:000	183.017	97.8	97.880	13.78	60.0
2019/02/05 15:23:00:000	183.497	97.9	97.880	13.78	60.0
2019/02/05 15:24:00:000	183.497	98.0	98.127	13.81	60.0
2019/02/05 15:25:00:000	183.497	98.1	98.127	13.78	60.0
2019/02/05 15:26:00:000	183.497	98.0	97.976	13.78	60.0
2019/02/05 15:27:00:000	183.497	98.1	98.170	13.78	60.0
2019/02/05 15:28:00:000	183.497	98.1	98.023	13.78	60.0
2019/02/05 15:29:00:000	182.885	98.0	98.023	13.78	60.0
2019/02/05 15:30:00:000	182.885	98.0	97.877	13.78	60.0
2019/02/05 15:31:00:000	182.943	98.0	97.877	13.78	60.0
2019/02/05 15:32:00:000	182.943	98.2	97.877	13.78	60.2
2019/02/05 15:33:00:000	182.943	98.1	97.995	13.78	60.2
2019/02/05 15:34:00:000	182.943	98.0	97.738	13.79	60.5
2019/02/05 15:35:00:000	182.943	98.1	97.697	13.79	60.7
2019/02/05 15:36:00:000	182.943	97.9	97.919	13.79	60.7
2019/02/05 15:37:00:000	182.943	97.8	97.919	13.79	60.7
2019/02/05 15:38:00:000	183.522	98.1	98.174	13.79	60.5
2019/02/05 15:39:00:000	183.522	98.1	97.975	13.79	60.5
2019/02/05 15:40:00:000	183.522	98.1	98.098	13.79	60.2
2019/02/05 15:41:00:000	183.733	98.0	98.098	13.79	60.0
2019/02/05 15:42:00:000	183.733	98.0	98.151	13.79	60.0
2019/02/05 15:43:00:000	183.733	98.0	98.151	13.79	60.0
2019/02/05 15:44:00:000	183.733	98.0	98.151	13.79	60.0
2019/02/05 15:45:00:000	183.733	98.1	98.151	13.79	60.0
2019/02/05 15:46:00:000	183.733	98.2	98.151	13.79	60.0
2019/02/05 15:47:00:000	183.733	98.2	98.151	13.79	59.8
2019/02/05 15:48:00:000	183.416	98.2	98.292	13.79	59.8
2019/02/05 15:49:00:000	183.800	98.1	98.047	13.79	59.8
2019/02/05 15:50:00:000	183.800	98.0	98.124	13.79	59.8
2019/02/05 15:51:00:000	183.800	98.0	98.124	13.79	59.8
2019/02/05 15:52:00:000	183.383	98.1	98.124	13.79	59.8
2019/02/05 15:53:00:000	183.383	97.9	98.124	13.79	59.8
2019/02/05 15:54:00:000	183.383	98.0	97.978	13.79	59.8

2019/02/05 15:55:00:000	183.548	98.0	98.215	13.79	59.8
2019/02/05 15:56:00:000	183.548	98.0	98.075	13.79	59.8
2019/02/05 15:57:00:000	183.548	98.1	98.075	13.79	59.8
2019/02/05 15:58:00:000	183.548	98.0	98.075	13.79	59.8
2019/02/05 15:59:00:000	183.316	97.9	98.075	13.79	59.8
2019/02/05 16:00:00:000	183.316	97.7	97.927	13.77	59.8
2019/02/05 16:01:00:000	182.867	97.9	97.927	13.79	59.8
2019/02/05 16:02:00:000	183.215	98.1	97.927	13.79	59.8
2019/02/05 16:03:00:000	183.215	97.9	97.927	13.79	59.8
2019/02/05 16:04:00:000	183.215	97.9	97.927	13.79	59.8
2019/02/05 16:05:00:000	183.215	98.0	98.088	13.79	59.8
2019/02/05 16:06:00:000	183.215	98.0	98.088	13.79	59.8
2019/02/05 16:07:00:000	183.562	97.9	98.088	13.79	59.8
2019/02/05 16:08:00:000	183.562	98.1	98.088	13.79	59.9
2019/02/05 16:09:00:000	183.562	98.0	98.088	13.79	59.8
2019/02/05 16:10:00:000	183.509	98.0	98.088	13.79	59.8
2019/02/05 16:11:00:000	183.509	97.8	98.088	13.78	59.8
2019/02/05 16:12:00:000	183.274	98.0	97.965	13.78	59.8
2019/02/05 16:13:00:000	183.274	98.1	97.965	13.78	60.0
2019/02/05 16:14:00:000	183.274	97.9	97.965	13.78	60.0
2019/02/05 16:15:00:000	183.274	98.1	97.965	13.78	60.0
2019/02/05 16:16:00:000	183.274	97.9	97.965	13.78	60.0
2019/02/05 16:17:00:000	183.274	97.9	97.965	13.80	60.0
2019/02/05 16:18:00:000	183.274	97.9	97.965	13.80	60.0
2019/02/05 16:19:00:000	183.997	98.1	98.313	13.80	59.8
2019/02/05 16:20:00:000	183.997	98.1	98.313	13.80	59.8
2019/02/05 16:21:00:000	183.997	98.2	98.313	13.78	59.6
2019/02/05 16:22:00:000	183.997	98.2	98.313	13.78	59.6
2019/02/05 16:23:00:000	184.140	98.1	98.313	13.78	59.6
2019/02/05 16:24:00:000	184.140	98.1	98.313	13.78	59.3
2019/02/05 16:25:00:000	184.140	98.1	98.313	13.80	59.3
2019/02/05 16:26:00:000	184.520	98.2	98.550	13.80	59.3
2019/02/05 16:27:00:000	184.216	98.2	98.460	13.77	59.3
2019/02/05 16:28:00:000	184.216	98.0	98.296	13.77	59.3
2019/02/05 16:29:00:000	184.216	98.1	98.296	13.77	59.3
2019/02/05 16:30:00:000	184.216	98.1	98.402	13.79	59.1
2019/02/05 16:31:00:000	184.216	98.0	98.402	13.79	59.1
2019/02/05 16:32:00:000	184.216	98.2	98.402	13.79	59.1
2019/02/05 16:33:00:000	184.216	98.1	98.402	13.79	59.1
2019/02/05 16:34:00:000	184.592	98.1	98.402	13.79	59.1
2019/02/05 16:35:00:000	184.202	98.0	98.402	13.79	59.1
2019/02/05 16:36:00:000	184.202	98.1	98.402	13.78	59.1
2019/02/05 16:37:00:000	184.202	98.1	98.402	13.78	59.1
2019/02/05 16:38:00:000	184.202	98.0	98.402	13.78	59.1
2019/02/05 16:39:00:000	183.749	98.1	98.402	13.78	59.1
2019/02/05 16:40:00:000	183.749	98.1	98.267	13.78	59.1
2019/02/05 16:41:00:000	183.749	98.0	98.004	13.78	59.1
2019/02/05 16:42:00:000	183.404	98.0	98.231	13.81	59.1
2019/02/05 16:43:00:000	183.404	98.0	98.169	13.81	59.1
2019/02/05 16:44:00:000	183.451	98.1	98.169	13.78	59.1
2019/02/05 16:45:00:000	183.451	97.9	98.169	13.78	59.1
2019/02/05 16:46:00:000	183.785	98.2	98.169	13.78	59.1
2019/02/05 16:47:00:000	183.785	98.0	98.169	13.81	59.1
2019/02/05 16:48:00:000	183.785	98.0	98.482	13.81	59.1
2019/02/05 16:49:00:000	184.137	98.3	98.210	13.77	59.1
2019/02/05 16:50:00:000	184.137	98.2	98.373	13.77	59.1
2019/02/05 16:51:00:000	184.423	98.2	98.639	13.79	59.1
2019/02/05 16:52:00:000	184.423	98.3	98.530	13.79	58.8
2019/02/05 16:53:00:000	184.423	98.3	98.530	13.79	58.8
2019/02/05 16:54:00:000	184.423	98.3	98.530	13.79	58.8
2019/02/05 16:55:00:000	184.423	98.1	98.404	13.78	58.8
2019/02/05 16:56:00:000	184.423	98.3	98.596	13.78	58.8
2019/02/05 16:57:00:000	184.624	98.2	98.596	13.78	58.8
2019/02/05 16:58:00:000	184.624	98.4	98.596	13.78	58.6
2019/02/05 16:59:00:000	184.624	98.3	98.596	13.78	58.6
2019/02/05 17:00:00:000	184.438	98.2	98.522	13.78	58.6
2019/02/05 17:01:00:000	184.438	98.2	98.331	13.78	58.6
2019/02/05 17:02:00:000	184.438	98.2	98.560	13.78	58.4

2019/02/05 17:03:00:000	184.438	98.1	98.600	13.78	58.1
2019/02/05 17:04:00:000	184.438	98.2	98.600	13.78	58.1
2019/02/05 17:05:00:000	184.789	98.3	98.600	13.78	57.7
2019/02/05 17:06:00:000	184.789	98.2	98.600	13.78	57.7
2019/02/05 17:07:00:000	184.789	98.1	98.600	13.78	57.7
2019/02/05 17:08:00:000	184.789	98.3	98.600	13.78	57.7
2019/02/05 17:09:00:000	185.266	98.2	98.600	13.78	57.7
2019/02/05 17:10:00:000	185.000	98.2	98.600	13.78	57.7
2019/02/05 17:11:00:000	185.000	98.1	98.600	13.78	57.7
2019/02/05 17:12:00:000	185.000	98.2	98.723	13.78	57.7
2019/02/05 17:13:00:000	185.000	98.4	98.723	13.78	57.4
2019/02/05 17:14:00:000	185.251	98.3	98.723	13.78	57.4
2019/02/05 17:15:00:000	185.251	98.2	98.926	13.78	57.4
2019/02/05 17:16:00:000	185.598	98.1	98.710	13.78	57.4
2019/02/05 17:17:00:000	185.598	98.2	99.214	13.79	57.2
2019/02/05 17:18:00:000	185.598	98.2	98.934	13.79	57.0
2019/02/05 17:19:00:000	185.598	98.2	98.934	13.79	57.0
2019/02/05 17:20:00:000	185.598	98.2	98.934	13.76	56.8
2019/02/05 17:21:00:000	185.598	98.1	98.934	13.76	56.8
2019/02/05 17:22:00:000	185.199	98.2	98.721	13.76	56.8
2019/02/05 17:23:00:000	185.199	98.0	98.721	13.79	56.8
2019/02/05 17:24:00:000	185.199	98.0	98.721	13.79	56.8
2019/02/05 17:25:00:000	185.199	98.0	98.917	13.79	56.8
2019/02/05 17:26:00:000	185.199	98.4	98.917	13.79	56.8
2019/02/05 17:27:00:000	185.199	98.0	98.891	13.79	56.8
2019/02/05 17:28:00:000	185.199	98.2	98.891	13.76	56.8
2019/02/05 17:29:00:000	185.199	98.2	98.801	13.76	56.8
2019/02/05 17:30:00:000	185.199	98.3	98.801	13.78	56.8
2019/02/05 17:31:00:000	185.199	98.3	98.801	13.78	56.8
2019/02/05 17:32:00:000	185.714	98.4	98.928	13.78	56.8
2019/02/05 17:33:00:000	185.714	98.4	98.928	13.78	57.0
2019/02/05 17:34:00:000	185.247	98.3	98.928	13.78	57.0
2019/02/05 17:35:00:000	185.379	98.4	99.052	13.78	57.0
2019/02/05 17:36:00:000	185.674	98.3	98.815	13.77	57.0
2019/02/05 17:37:00:000	185.674	98.5	99.064	13.77	57.0
2019/02/05 17:38:00:000	185.926	98.4	99.064	13.77	57.0
2019/02/05 17:39:00:000	186.459	98.4	99.253	13.79	57.0
2019/02/05 17:40:00:000	186.459	98.6	99.531	13.75	57.0
2019/02/05 17:41:00:000	186.459	98.5	99.345	13.75	57.0
2019/02/05 17:42:00:000	186.170	98.5	99.109	13.75	57.0
2019/02/05 17:43:00:000	185.758	98.5	99.109	13.75	57.0
2019/02/05 17:44:00:000	185.758	98.5	98.938	13.75	57.0
2019/02/05 17:45:00:000	185.475	98.5	98.938	13.79	57.0
2019/02/05 17:46:00:000	185.842	98.5	98.938	13.79	57.0
2019/02/05 17:47:00:000	185.842	98.5	99.110	13.79	57.0
2019/02/05 17:48:00:000	185.842	98.6	99.110	13.76	57.0
2019/02/05 17:49:00:000	185.842	98.4	98.944	13.76	57.0
2019/02/05 17:50:00:000	185.562	98.4	98.944	13.76	57.0
2019/02/05 17:51:00:000	185.562	98.3	98.944	13.76	57.0
2019/02/05 17:52:00:000	185.151	98.2	98.719	13.76	57.0
2019/02/05 17:53:00:000	185.151	98.4	98.761	13.76	57.0
2019/02/05 17:54:00:000	185.324	98.2	99.081	13.79	57.0
2019/02/05 17:55:00:000	185.590	98.2	98.963	13.79	57.0
2019/02/05 17:56:00:000	185.590	98.3	98.963	13.79	57.0
AVERAGE:	**183.96**	**98.05**	**98.28**	**13.79**	**59.14**

US1177 - CPV-Valley - Unit 11 **CTG-1** **FO-Run 3**
DCS Data - 20190205 - 0930-2230

Date / Time	Unit 11 GT Power MW 11HAD00EU001	Unit 11 GT Power % 11MKA01EU902A	Unit 11 Total GT Liquid Fuel Oil Flow KPPH 11MBN10EU001	Unit 11 GT Exhaust O_2 % 11HNE10CQ109	Ambient Temp. °F 11MBL05CT101
2019/02/05 18:04:00:000	185.79056	98.26271	98.958176	13.783094	56.28972
2019/02/05 18:05:00:000	185.79056	98.222824	99.09959	13.783094	56.28972
2019/02/05 18:06:00:000	186.22624	98.222824	99.09959	13.783094	56.017582
2019/02/05 18:07:00:000	185.80287	98.05367	99.09959	13.783094	56.017582
2019/02/05 18:08:00:000	185.80287	98.06835	99.09959	13.783094	56.017582
2019/02/05 18:09:00:000	185.80287	98.14893	99.09959	13.783094	56.017582
2019/02/05 18:10:00:000	185.80287	98.06761	98.96416	13.783094	56.017582
2019/02/05 18:11:00:000	185.97339	98.22699	99.11804	13.783094	56.017582
2019/02/05 18:12:00:000	185.97339	98.22699	99.11804	13.783094	55.8099
2019/02/05 18:13:00:000	185.97339	98.22699	98.94857	13.783094	55.8099
2019/02/05 18:14:00:000	185.97339	98.10479	99.18906	13.783094	55.8099
2019/02/05 18:15:00:000	185.97339	98.24565	99.08339	13.7722435	55.8099
2019/02/05 18:16:00:000	186.18225	98.24565	99.08339	13.7722435	55.8099
2019/02/05 18:17:00:000	186.18225	98.295105	99.15314	13.7722435	55.8099
2019/02/05 18:18:00:000	186.18225	98.21989	99.15314	13.7722435	55.595055
2019/02/05 18:19:00:000	186.18225	98.21989	99.207924	13.7722435	55.595055
2019/02/05 18:20:00:000	186.50623	98.22814	99.207924	13.7722435	55.595055
2019/02/05 18:21:00:000	186.50623	98.29692	99.329185	13.7722435	55.330086
2019/02/05 18:22:00:000	186.50623	98.27659	99.329185	13.7722435	55.330086
2019/02/05 18:23:00:000	186.50623	98.27659	99.329185	13.7722435	55.330086
2019/02/05 18:24:00:000	186.50623	98.35314	99.17149	13.7722435	55.129562
2019/02/05 18:25:00:000	186.50623	98.35314	99.294785	13.7722435	55.129562
2019/02/05 18:26:00:000	186.50623	98.316956	99.294785	13.7722435	54.864586
2019/02/05 18:27:00:000	186.50623	98.308044	99.40205	13.784903	54.864586
2019/02/05 18:28:00:000	186.80696	98.308044	99.40205	13.784903	54.864586
2019/02/05 18:29:00:000	186.80696	98.21869	99.40205	13.784903	54.656906
2019/02/05 18:30:00:000	186.80696	98.228485	99.40205	13.784903	54.391937
2019/02/05 18:31:00:000	186.80696	98.36995	99.40205	13.784903	54.391937
2019/02/05 18:32:00:000	186.80696	98.330605	99.58887	13.784903	54.391937
2019/02/05 18:33:00:000	187.21149	98.08882	99.58887	13.784903	54.17709
2019/02/05 18:34:00:000	187.21149	98.18019	99.444	13.7722435	53.97657
2019/02/05 18:35:00:000	186.82578	98.24194	99.58055	13.7722435	53.97657
2019/02/05 18:36:00:000	187.0327	98.24872	99.342224	13.7722435	53.69011
2019/02/05 18:37:00:000	187.0327	98.12821	99.57231	13.7722435	53.69011
2019/02/05 18:38:00:000	187.0327	98.204315	99.35277	13.7722435	53.69011
2019/02/05 18:39:00:000	187.0327	98.269226	99.50455	13.7722435	53.69011
2019/02/05 18:40:00:000	187.0327	98.269226	99.50455	13.7722435	53.69011
2019/02/05 18:41:00:000	187.0327	98.24575	99.552536	13.793945	53.482426
2019/02/05 18:42:00:000	187.55626	98.196785	99.615265	13.793945	53.482426
2019/02/05 18:43:00:000	187.3432	98.215126	99.615265	13.793945	53.482426
2019/02/05 18:44:00:000	187.3432	98.14365	99.615265	13.784903	53.224617
2019/02/05 18:45:00:000	187.3432	98.20007	99.68576	13.784903	53.224617
2019/02/05 18:46:00:000	187.3432	98.21269	99.68576	13.784903	53.016937
2019/02/05 18:47:00:000	187.53343	98.06541	99.68576	13.784903	53.016937
2019/02/05 18:48:00:000	187.53343	98.24604	99.68576	13.784903	52.816414
2019/02/05 18:49:00:000	187.53343	98.24604	99.77063	13.7722435	52.816414
2019/02/05 18:50:00:000	187.53343	98.26552	99.77063	13.7722435	52.816414
2019/02/05 18:51:00:000	187.53343	98.2198	99.68555	13.7722435	52.544273
2019/02/05 18:52:00:000	187.53343	98.111496	99.68555	13.7722435	52.544273
2019/02/05 18:53:00:000	187.53343	98.13068	99.68555	13.7722435	52.544273
2019/02/05 18:54:00:000	188.06987	98.20113	99.88967	13.7722435	52.544273
2019/02/05 18:55:00:000	188.06987	98.2318	99.88967	13.7722435	52.071625
2019/02/05 18:56:00:000	188.06987	98.232666	99.88967	13.7722435	52.071625
2019/02/05 18:57:00:000	188.06987	98.160904	99.88967	13.783094	51.85678
2019/02/05 18:58:00:000	188.06987	98.425125	100.037346	13.783094	51.58464
2019/02/05 18:59:00:000	188.06987	98.38232	100.037346	13.763202	51.58464

2019/02/05 19:00:00:000	188.73228	98.28639	100.037346	13.763202	51.58464
2019/02/05 19:01:00:000	188.49579	98.21776	100.037346	13.763202	51.384117
2019/02/05 19:02:00:000	187.96921	98.21776	100.037346	13.763202	51.384117
2019/02/05 19:03:00:000	188.67001	98.24969	100.17961	13.763202	51.384117
2019/02/05 19:04:00:000	188.24931	98.1956	100.06308	13.763202	51.183598
2019/02/05 19:05:00:000	188.24931	98.2701	100.06308	13.763202	51.183598
2019/02/05 19:06:00:000	188.24931	98.20702	100.21736	13.763202	50.904305
2019/02/05 19:07:00:000	188.49739	98.08424	100.0519	13.763202	50.904305
2019/02/05 19:08:00:000	188.49739	98.16719	100.16143	13.7722435	50.710945
2019/02/05 19:09:00:000	188.49739	98.210304	100.16143	13.7722435	50.710945
2019/02/05 19:10:00:000	188.49739	98.28882	100.16143	13.7722435	50.43165
2019/02/05 19:11:00:000	188.49739	98.28422	100.16143	13.7722435	50.43165
2019/02/05 19:12:00:000	188.49739	98.18922	100.16143	13.763202	50.43165
2019/02/05 19:13:00:000	188.49739	98.257484	100.22811	13.763202	50.43165
2019/02/05 19:14:00:000	188.8702	98.13994	100.22811	13.763202	50.23829
2019/02/05 19:15:00:000	188.6851	98.205055	100.22928	13.763202	50.23829
2019/02/05 19:16:00:000	188.6851	98.205055	100.22928	13.763202	50.02344
2019/02/05 19:17:00:000	188.6851	98.22041	100.22928	13.763202	50.02344
2019/02/05 19:18:00:000	188.8249	98.119156	100.22928	13.763202	50.02344
2019/02/05 19:19:00:000	188.8249	98.09104	100.34366	13.763202	49.74415
2019/02/05 19:20:00:000	188.8249	98.27873	100.18266	13.763202	49.74415
2019/02/05 19:21:00:000	189.25992	98.20931	100.38988	13.7722435	49.74415
2019/02/05 19:22:00:000	188.77042	98.20931	100.38988	13.7722435	49.74415
2019/02/05 19:23:00:000	188.77042	98.20931	100.2104	13.7722435	49.74415
2019/02/05 19:24:00:000	189.19063	98.19988	100.44827	13.7722435	49.74415
2019/02/05 19:25:00:000	188.86674	98.11003	100.256	13.7722435	49.543625
2019/02/05 19:26:00:000	188.86674	98.11003	100.256	13.7722435	49.271492
2019/02/05 19:27:00:000	188.86674	98.1295	100.256	13.7722435	49.271492
2019/02/05 19:28:00:000	189.13876	98.089615	100.34214	13.7722435	49.271492
2019/02/05 19:29:00:000	189.13876	98.17537	100.34214	13.7722435	49.271492
2019/02/05 19:30:00:000	189.13876	98.107315	100.34214	13.7722435	49.07097
2019/02/05 19:31:00:000	189.13876	98.11757	100.34214	13.7722435	49.07097
2019/02/05 19:32:00:000	189.13876	98.190346	100.34214	13.742404	49.07097
2019/02/05 19:33:00:000	189.13876	98.18007	100.421555	13.742404	48.791668
2019/02/05 19:34:00:000	189.13876	98.18007	100.421555	13.7722435	48.791668
2019/02/05 19:35:00:000	189.13876	98.18007	100.421555	13.7722435	48.791668
2019/02/05 19:36:00:000	189.36537	98.18007	100.421555	13.7722435	48.59831
2019/02/05 19:37:00:000	189.36537	98.13603	100.421555	13.7722435	48.59831
2019/02/05 19:38:00:000	189.36537	98.243454	100.421555	13.7722435	48.59831
2019/02/05 19:39:00:000	189.36537	98.243454	100.421555	13.7722435	48.39779
2019/02/05 19:40:00:000	189.36537	98.2287	100.62865	13.7722435	48.39779
2019/02/05 19:41:00:000	189.36537	98.37103	100.485245	13.7722435	48.39779
2019/02/05 19:42:00:000	189.7686	98.29015	100.62427	13.742404	48.10417
2019/02/05 19:43:00:000	189.7686	98.16125	100.62427	13.742404	48.10417
2019/02/05 19:44:00:000	189.7686	98.364	100.62427	13.763202	47.910812
2019/02/05 19:45:00:000	189.7686	98.25215	100.76246	13.763202	47.910812
2019/02/05 19:46:00:000	190.04521	98.16719	100.76246	13.763202	47.63151
2019/02/05 19:47:00:000	190.04521	98.20092	100.76246	13.763202	47.63151
2019/02/05 19:48:00:000	190.04521	98.2447	100.76246	13.763202	47.63151
2019/02/05 19:49:00:000	190.38998	98.22176	100.873764	13.763202	47.430992
2019/02/05 19:50:00:000	190.38998	98.22176	100.873764	13.763202	47.430992
2019/02/05 19:51:00:000	190.08553	98.15827	100.85541	13.753255	47.430992
2019/02/05 19:52:00:000	190.08553	98.15827	100.85541	13.753255	47.430992
2019/02/05 19:53:00:000	190.08553	98.0274	100.79603	13.753255	47.230476
2019/02/05 19:54:00:000	190.08553	98.12886	100.79603	13.753255	47.230476
2019/02/05 19:55:00:000	190.08553	98.04528	100.79603	13.753255	47.230476
2019/02/05 19:56:00:000	190.41264	98.19961	100.79603	13.753255	47.230476
2019/02/05 19:57:00:000	190.41264	98.148346	100.79603	13.753255	46.951176
2019/02/05 19:58:00:000	189.71852	98.121155	100.79603	13.763202	46.951176
2019/02/05 19:59:00:000	190.18234	98.11988	100.79603	13.763202	46.951176
2019/02/05 20:00:00:000	190.18234	98.086586	100.79603	13.763202	46.750656
2019/02/05 20:01:00:000	190.18234	98.0111	100.73544	13.763202	46.750656
2019/02/05 20:02:00:000	190.18234	98.0111	100.73544	13.763202	46.478516
2019/02/05 20:03:00:000	190.18234	98.07386	100.81442	13.763202	46.478516
2019/02/05 20:04:00:000	190.18234	98.15746	100.81442	13.763202	46.478516
2019/02/05 20:05:00:000	190.36708	98.08174	100.924034	13.763202	46.277996
2019/02/05 20:06:00:000	190.36708	97.99559	100.924034	13.763202	45.991543
2019/02/05 20:07:00:000	190.36708	98.09223	100.924034	13.763202	45.991543

2019/02/05 20:08:00:000	190.36708	97.976456	100.83074	13.763202	45.78386
2019/02/05 20:09:00:000	190.36708	98.03564	100.83074	13.763202	45.78386
2019/02/05 20:10:00:000	190.5529	98.03564	100.83074	13.763202	45.78386
2019/02/05 20:11:00:000	190.5529	98.04311	100.917435	13.763202	45.5905
2019/02/05 20:12:00:000	190.5529	97.96828	100.917435	13.763202	45.31836
2019/02/05 20:13:00:000	190.5529	97.96828	100.917435	13.763202	45.31836
2019/02/05 20:14:00:000	190.5529	98.08512	100.917435	13.763202	45.31836
2019/02/05 20:15:00:000	190.5529	98.01135	100.917435	13.751447	45.31836
2019/02/05 20:16:00:000	190.5529	98.02193	100.994934	13.751447	45.31836
2019/02/05 20:17:00:000	190.5529	97.937065	100.994934	13.763202	45.11784
2019/02/05 20:18:00:000	190.63223	98.1169	100.994934	13.763202	45.11784
2019/02/05 20:19:00:000	190.63223	97.92512	100.994934	13.763202	44.838547
2019/02/05 20:20:00:000	190.83371	98.00469	101.10498	13.763202	44.838547
2019/02/05 20:21:00:000	191.19753	98.00469	101.10498	13.763202	44.838547
2019/02/05 20:22:00:000	191.19753	98.00469	101.27205	13.751447	44.65235
2019/02/05 20:23:00:000	191.19753	98.00469	101.01778	13.751447	44.65235
2019/02/05 20:24:00:000	190.84511	98.00469	101.11963	13.751447	44.65235
2019/02/05 20:25:00:000	191.35112	98.04517	101.11963	13.751447	44.65235
2019/02/05 20:26:00:000	191.35112	98.16702	101.21869	13.751447	44.65235
2019/02/05 20:27:00:000	191.23988	98.094315	101.21869	13.751447	44.65235
2019/02/05 20:28:00:000	191.23988	98.08353	101.21869	13.751447	44.65235
2019/02/05 20:29:00:000	191.23988	98.08353	101.21869	13.751447	44.65235
2019/02/05 20:30:00:000	191.23988	98.13689	101.21869	13.751447	44.42318
2019/02/05 20:31:00:000	190.9808	98.048416	101.10523	13.751447	44.42318
2019/02/05 20:32:00:000	190.9808	97.97806	101.30704	13.751447	44.42318
2019/02/05 20:33:00:000	191.03677	97.99989	101.20749	13.751447	44.158203
2019/02/05 20:34:00:000	191.03677	97.98257	101.20749	13.751447	44.158203
2019/02/05 20:35:00:000	191.03677	97.88062	101.10036	13.751447	44.158203
2019/02/05 20:36:00:000	191.186	97.9746	101.17392	13.751447	44.158203
2019/02/05 20:37:00:000	191.186	97.9746	101.17392	13.751447	44.158203
2019/02/05 20:38:00:000	191.186	97.9746	101.30795	13.751447	43.950523
2019/02/05 20:39:00:000	191.49066	97.95196	101.22249	13.751447	43.950523
2019/02/05 20:40:00:000	191.49066	97.95196	101.22249	13.751447	43.950523
2019/02/05 20:41:00:000	191.2453	97.95196	101.22249	13.751447	43.950523
2019/02/05 20:42:00:000	191.2453	97.87531	101.22249	13.751447	43.685555
2019/02/05 20:43:00:000	191.2453	97.91912	101.22249	13.751447	43.685555
2019/02/05 20:44:00:000	191.74075	97.91912	101.22249	13.751447	43.48503
2019/02/05 20:45:00:000	191.74075	97.844604	101.27553	13.751447	43.48503
2019/02/05 20:46:00:000	191.34274	97.9365	101.27553	13.751447	43.19857
2019/02/05 20:47:00:000	191.635	97.81095	101.27553	13.751447	43.19857
2019/02/05 20:48:00:000	191.635	97.85493	101.419846	13.751447	43.19857
2019/02/05 20:49:00:000	191.635	97.898674	101.32858	13.751447	43.19857
2019/02/05 20:50:00:000	191.3485	97.854485	101.32858	13.751447	43.01237
2019/02/05 20:51:00:000	191.46904	97.804375	101.32858	13.751447	43.01237
2019/02/05 20:52:00:000	191.46904	97.934074	101.32858	13.751447	43.01237
2019/02/05 20:53:00:000	191.76273	97.86622	101.32858	13.751447	42.797527
2019/02/05 20:54:00:000	191.76273	97.90843	101.32858	13.751447	42.5254
2019/02/05 20:55:00:000	191.76273	97.884445	101.32858	13.751447	42.5254
2019/02/05 20:56:00:000	191.76273	97.88702	101.521545	13.751447	42.5254
2019/02/05 20:57:00:000	191.99667	97.92345	101.521545	13.751447	42.5254
2019/02/05 20:58:00:000	191.99667	97.824066	101.37071	13.751447	42.324875
2019/02/05 20:59:00:000	191.99667	97.86081	101.37071	13.751447	42.324875
2019/02/05 21:00:00:000	191.99667	97.65726	101.37071	13.751447	42.05274
2019/02/05 21:01:00:000	191.70647	97.84764	101.40919	13.751447	42.05274
2019/02/05 21:02:00:000	192.21191	97.98962	101.40919	13.733362	42.05274
2019/02/05 21:03:00:000	192.21191	97.87367	101.625946	13.733362	42.05274
2019/02/05 21:04:00:000	192.21191	97.7961	101.45931	13.733362	42.05274
2019/02/05 21:05:00:000	192.05652	97.88944	101.607056	13.742404	41.845055
2019/02/05 21:06:00:000	192.05652	97.93344	101.607056	13.742404	41.845055
2019/02/05 21:07:00:000	192.27031	97.99749	101.55348	13.742404	41.845055
2019/02/05 21:08:00:000	192.27031	97.87114	101.55348	13.742404	41.64453
2019/02/05 21:09:00:000	192.27031	97.9162	101.55348	13.742404	41.64453
2019/02/05 21:10:00:000	192.27031	97.90424	101.67436	13.742404	41.64453
2019/02/05 21:11:00:000	192.27031	97.970566	101.67436	13.742404	41.379562
2019/02/05 21:12:00:000	192.54459	97.94997	101.67436	13.742404	41.379562
2019/02/05 21:13:00:000	192.54459	97.94997	101.67436	13.742404	41.379562
2019/02/05 21:14:00:000	192.54459	97.87051	101.562126	13.742404	41.379562
2019/02/05 21:15:00:000	192.38908	97.8658	101.562126	13.742404	41.16472

2019/02/05 21:16:00:000	192.38908	97.8658	101.63147	13.742404	41.16472
2019/02/05 21:17:00:000	192.38908	97.8658	101.63147	13.742404	40.899742
2019/02/05 21:18:00:000	192.68533	97.90577	101.84311	13.742404	40.899742
2019/02/05 21:19:00:000	192.68533	97.85648	101.733284	13.742404	40.899742
2019/02/05 21:20:00:000	192.32362	97.84821	101.733284	13.742404	40.899742
2019/02/05 21:21:00:000	192.32362	97.76504	101.57942	13.742404	40.899742
2019/02/05 21:22:00:000	192.32362	97.830505	101.63588	13.742404	40.899742
2019/02/05 21:23:00:000	192.70378	97.90151	101.63588	13.742404	40.6849
2019/02/05 21:24:00:000	192.70378	97.8249	101.79544	13.742404	40.6849
2019/02/05 21:25:00:000	192.70378	97.871056	101.79544	13.742404	40.412766
2019/02/05 21:26:00:000	192.70378	97.871056	101.79544	13.742404	40.412766
2019/02/05 21:27:00:000	192.70378	97.78645	101.68276	13.742404	40.412766
2019/02/05 21:28:00:000	192.70378	97.82778	101.68276	13.742404	40.412766
2019/02/05 21:29:00:000	192.70378	97.86525	101.7885	13.742404	40.212246
2019/02/05 21:30:00:000	192.70378	97.823975	101.65338	13.742404	40.212246
2019/02/05 21:31:00:000	192.70378	97.75238	101.65338	13.742404	40.212246
2019/02/05 21:32:00:000	192.70378	97.81184	101.790405	13.742404	40.212246
2019/02/05 21:33:00:000	192.70378	97.79266	101.790405	13.742404	40.212246
2019/02/05 21:34:00:000	192.70378	97.845024	101.790405	13.742404	40.212246
2019/02/05 21:35:00:000	193.1268	97.845024	101.67282	13.742404	40.212246
2019/02/05 21:36:00:000	192.785	97.77468	101.807495	13.751447	40.212246
2019/02/05 21:37:00:000	192.785	97.80305	101.807495	13.751447	40.004562
2019/02/05 21:38:00:000	192.785	97.80305	101.807495	13.751447	40.004562
2019/02/05 21:39:00:000	192.785	97.80305	101.807495	13.733362	40.004562
2019/02/05 21:40:00:000	193.10042	97.853424	101.807495	13.733362	40.004562
2019/02/05 21:41:00:000	193.10042	97.80623	101.807495	13.733362	39.732426
2019/02/05 21:42:00:000	193.10042	97.8182	101.807495	13.733362	39.732426
2019/02/05 21:43:00:000	193.10042	97.88175	101.91078	13.733362	39.732426
2019/02/05 21:44:00:000	193.10042	97.88175	101.91078	13.733362	39.732426
2019/02/05 21:45:00:000	193.10042	97.92959	101.91078	13.753255	39.732426
2019/02/05 21:46:00:000	193.10042	97.84771	101.91078	13.753255	39.531902
2019/02/05 21:47:00:000	193.6054	97.94441	101.91078	13.753255	39.531902
2019/02/05 21:48:00:000	193.42654	97.954575	102.04561	13.732458	39.531902
2019/02/05 21:49:00:000	193.42654	97.954575	102.04561	13.732458	39.531902
2019/02/05 21:50:00:000	193.42654	97.954575	101.896545	13.732458	39.531902
2019/02/05 21:51:00:000	192.9756	97.91598	101.896545	13.732458	39.531902
2019/02/05 21:52:00:000	193.3525	98.04188	102.00524	13.742404	39.531902
2019/02/05 21:53:00:000	193.3525	97.91353	102.00524	13.742404	39.531902
2019/02/05 21:54:00:000	193.3525	98.06444	102.00524	13.742404	39.531902
2019/02/05 21:55:00:000	193.3525	98.01629	102.00524	13.742404	39.531902
2019/02/05 21:56:00:000	193.3525	98.011215	101.97663	13.742404	39.531902
2019/02/05 21:57:00:000	193.13203	97.94647	101.97663	13.742404	39.531902
2019/02/05 21:58:00:000	193.13203	97.96927	101.926056	13.742404	39.531902
2019/02/05 21:59:00:000	193.13203	97.89351	101.807106	13.742404	39.531902
2019/02/05 22:00:00:000	193.13203	97.8033	101.83211	13.742404	39.531902
2019/02/05 22:01:00:000	193.13203	97.913925	102.09593	13.742404	39.531902
2019/02/05 22:02:00:000	193.13203	97.913925	101.95363	13.742404	39.531902
2019/02/05 22:03:00:000	193.3658	97.913925	101.95363	13.742404	39.531902
2019/02/05 22:04:00:000	193.3658	97.913925	101.95363	13.742404	39.259773
2019/02/05 22:05:00:000	193.3658	97.95555	101.95363	13.742404	39.259773
2019/02/05 22:06:00:000	193.3658	97.79687	101.95363	13.742404	39.259773
2019/02/05 22:07:00:000	192.95103	97.81693	101.95363	13.742404	39.259773
2019/02/05 22:08:00:000	193.0164	97.91017	101.90026	13.742404	39.259773
2019/02/05 22:09:00:000	193.0164	97.82708	101.90026	13.742404	39.259773
2019/02/05 22:10:00:000	193.0164	97.822044	101.90026	13.742404	39.259773
2019/02/05 22:11:00:000	193.38867	97.93443	101.90026	13.742404	39.259773
2019/02/05 22:12:00:000	193.38867	97.68427	101.90026	13.742404	39.259773
2019/02/05 22:13:00:000	193.09297	97.891624	101.95509	13.742404	39.259773
2019/02/05 22:14:00:000	193.09297	97.90284	101.95509	13.742404	39.259773
2019/02/05 22:15:00:000	193.09297	97.87167	101.85295	13.742404	39.259773
2019/02/05 22:16:00:000	193.09297	97.87167	101.85295	13.753255	39.05209
2019/02/05 22:17:00:000	193.36871	97.894615	102.05736	13.753255	39.05209
2019/02/05 22:18:00:000	193.36871	97.894615	102.05736	13.753255	39.05209
AVERAGE:	**190.25**	**98.05**	**100.80**	**13.76**	**46.40**

EMISSION DATA RECORDS

Unit #CTG-11
Base Load
PM Data

METHOD 201A (FRONT) AND 202 (BACK) - RESULTS

Plant Name	CPV Valley Energy Center
Sampling Location	CTG-11 Stack
Project #	sie-19-middletown.ny-comp#1

Historical Data	**11-PM-FO-1**	**11-PM-FO-2**	**11-PM-FO-3**	**Average**	**Units**	**Limits**
Run Start Time	09:36	13:51	18:04		hh:mm	
Run Stop Time	13:45	17:56	22:18		hh:mm	
Test Date	02/05/19	02/05/19	02/05/19		mm/dd/yy	
Load	Base FO	Base FO	Base FO		% or w/DB	--
Meter Calibration Factor	0.893	1.017	0.893			
Pitot Tube Coefficient	0.7350	0.7290	0.7350			
Average Nozzle Diameter	0.142	0.142	0.142		in	
Stack Test Data	**11-PM-FO-1**	**11-PM-FO-2**	**11-PM-FO-3**	**Average**	**Units**	**Limits**
Initial Meter Volume	814.900	0.000	900.860		ft^3	
Final Meter Volume	900.410	73.038	984.660		ft^3	
Total Meter Volume	85.510	73.038	83.800	80.783	ft^3	
Total Sampling Time	240.75	236.25	239.00	238.67	min	
Average Meter Temperature	74.92	75.00	70.67	73.53	°F	
Average Stack Temperature	282.00	282.92	283.25	282.72	°F	
Barometric Pressure	29.42	29.39	29.46	29.42	in Hg	
Stack Static Pressure	-0.98	-0.98	-0.98	-0.98	in H_2O	
Absolute Stack Pressure	29.35	29.32	29.39	29.35	in Hg	
Average Orifice Pressure Drop	0.46	0.45	0.48	0.46	in H_2O	
Absolute Meter Pressure	29.56	29.52	29.60	29.56	in Hg	
Avg Square Root Pitot Pressure	1.24	1.24	1.24	1.24	$\sqrt{(in\ H_2O)}$	
Moisture Content Data	**11-PM-FO-1**	**11-PM-FO-2**	**11-PM-FO-3**	**Average**	**Units**	**Limits**
Impinger Water Weight Gain	100.50	89.00	93.80	94.43	g	
Silica Gel Weight Gain	15.40	22.90	15.20	17.83	g	
Total Water Volume Collected	116.11	112.10	109.20	112.47	ml	
Standard Water Vapor Volume	5.46	5.28	5.14	5.29	scf	
Standard Meter Volume	74.2	72.1	73.4	73.2	dscf	
Standard Metric Meter Volume	2.1	2.0	2.1	2.1	dscm	
Calculated Stack Moisture	6.86	6.82	6.54	6.74	%	
Saturated Stack Moisture	100.00	100.00	100.00	100.00	%	
Reported Stack Moisture Content	6.86	6.82	6.54	6.74	%	
Gas Analysis Data	**11-PM-FO-1**	**11-PM-FO-2**	**11-PM-FO-3**	**Average**	**Units**	**Limits**
Carbon Dioxide Content	5.3	5.3	5.3	5.3	%	
Oxygen Content	13.8	13.8	13.8	13.8	%	
Carbon Monoxide Content	0.0	0.0	0.0	0.0	ppm	
Nitrogen Content	80.9	81.0	80.9	80.9	%	
Stack Dry Molecular Weight	29.40	29.39	29.40	29.40	lb/lb-mole	
Stack Wet Molecular Weight	28.62	28.61	28.65	28.63	lb/lb-mole	
Calculated Fuel Factor	1.340	1.354	1.340	1.345		
Fuel F-Factor	9288.45	9288.45	9288.45	9288.45	dscf/MMBtu	
Percent Excess Air	182.6	181.8	182.6	182.3	%	

METHOD 201A (FRONT) AND 202 (BACK) - RESULTS

Plant Name	CPV Valley Energy Center
Sampling Location	CTG-11 Stack
Project #	sie-19-middletown.ny-comp#1

Volumetric Flow Rate Data	**11-PM-FO-1**	**11-PM-FO-2**	**11-PM-FO-3**	**Average**	**Units**	**Limits**
Average Stack Gas Velocity	73.41	72.87	72.96	73.08	ft/sec	
Stack Cross-Sectional Area	283.53	283.53	283.53	283.53	ft²	
Actual Stack Flow Rate	1,248,787	1,239,702	1,241,205	1,243,231	acfm	
Wet Standard Stack Flow Rate	52,298	51,801	51,964	52,021	wkscfh	
Dry Standard Stack Flow Rate	48,710,578	48,267,944	48,563,519	48,514,014	dscfh	
Percent of Isokinetic Rate	98.2	98.1	98.3	98.2	%	
Emission Rate Data	**11-PM-FO-1**	**11-PM-FO-2**	**11-PM-FO-3**	**Average**	**Units**	**Limits**
Total $PM_{10}/PM_{2.5}$ Mass	7.09	9.79	6.48	7.78	mg	--
Total $PM_{10}/PM_{2.5}$ Concentration	9.55E-05	1.36E-04	8.83E-05	1.07E-04	g/dscf	--
	1.47E-03	2.10E-03	1.36E-03	1.64E-03	gr/dscf	--
Total $PM_{10}/PM_{2.5}$ Emission Rate	4.65	6.55	4.29	5.16	kg/hr	--
	10.26	14.45	9.45	11.39	lb/hr	--
	44.93	63.28	41.40	49.87	tpy	--
	0.0058	0.0082	0.0053	0.0064	lb/MMBtu	0.0073
Filterable PM_{10} Mass	1.54	1.95	2.64	2.04	mg	--
Filterable PM_{10} Concentration	2.08E-05	2.70E-05	3.59E-05	2.79E-05	g/dscf	--
	3.21E-04	4.17E-04	5.55E-04	4.31E-04	gr/dscf	--
Filterable PM_{10} Emission Rate	1.01	1.30	1.75	1.35	kg/hr	--
	2.23	2.87	3.85	2.98	lb/hr	--
	9.78	12.58	16.86	13.07	tpy	--
	0.0013	0.0016	0.0022	0.0017	lb/MMBtu	--
Filterable $PM_{2.5}$ Mass	2.24	2.44	2.24	2.31	mg	--
Filterable $PM_{2.5}$ Concentration	3.02E-05	3.39E-05	3.05E-05	3.15E-05	g/dscf	--
	4.67E-04	5.22E-04	4.71E-04	4.87E-04	gr/dscf	--
Filterable $PM_{2.5}$ Emission Rate	1.47	1.63	1.48	1.53	kg/hr	--
	3.25	3.60	3.27	3.37	lb/hr	--
	14.22	15.78	14.33	14.78	tpy	--
	0.0018	0.0020	0.0018	0.0019	lb/MMBtu	--
Condensable $PM_{2.5}$ Mass	3.30	5.40	1.60	3.43	mg	--
Condensable $PM_{2.5}$ Concentration	4.45E-05	7.49E-05	2.18E-05	4.71E-05	g/dscf	--
	6.86E-04	1.16E-03	3.36E-04	7.26E-04	gr/dscf	--
Condensable $PM_{2.5}$ Emission Rate	2.17	3.62	1.06	2.28	kg/hr	--
	4.78	7.97	2.33	5.03	lb/hr	--
	20.92	34.91	10.22	22.02	tpy	--
	0.0027	0.0045	0.0013	0.0028	lb/MMBtu	--
RM 201A Quality Control	**11-PM-FO-1**	**11-PM-FO-2**	**11-PM-FO-3**	**Average**	**Units**	**Limits**
Cyclone Flow Rate	0.47	0.47	0.47	0.47	ft³/min	
Stack Viscosity	225.27	225.51	225.84	225.54	µP	
Cunningham Correction Factor	1.07	1.07	1.07	1.07		
Recalculated D50-1 for CIV	3.09	3.13	3.12	3.12		
Recalculated Cunninham	1.07	1.07	1.07	1.07		
Lower Limit Cut Diameter, CI (NRE<3162), D50LL	3.09	3.13	3.13	3.12		
Reynolds Number	2058.16	2034.47	2041.33	2,044.65		
Z	1.00	1.00	1.00	1.00		
No. Sampling Pts. Outside Dp	0	0	0	0	points	

METHOD 201A (FRONT) AND 202 (BACK) SOURCE SAMPLING TITLE PAGE

Source Information	
Plant Name	CPV Valley Energy Center
Sampling Location	CTG-11 Stack
Fuel Type	Oil, Distillate

Test Information			
Project #		sie-19-middletown.ny-comp#1	
Operator		CM	
Date for Preliminary Run	(mm/dd/yy)	02/05/19	
Standard Temperature		68	°F
Standard Pressure		29.92	in Hg
Required Sample Vol.	indust. spec.	50	scf
Run Duration	chk Subpart	240	minutes
Unit Number		CTG-11	
Base Run Number		11-PM-FO	
Number of Ports Available		4	
Number of Ports Used		4	
Port Inside Diameter		6.00	in
Stack Shape		Circular	

Test Equipment Information					
Run		**1**	**2**	**3**	
Test Date	(mm/dd/yy)	02/05/19	02/05/19	02/05/19	
Load		Base FO	Base FO	Base FO	% or w/DB
Fuel F-Factor		9288.45	9288.5	9288.5	dscf/MMBtu
Meter Box Number	from ACS	samp-cp-0019	samp-cp-0025	samp-cp-0019	
Meter Calibration Factor	(Y)	0.893	1.017	0.893	
Orifice Meter Coefficient	($\Delta H_{@}$)	1.838	1.820	1.838	in H_2O
Pitot Identification	from ACS	5272/10	P-983/10	5272/10	
Pitot Tube Coefficient	(C_p)	0.7350	0.7290	0.7350	
Nozzle Number	from ACS	3	3	3	must match cyc nozz tab (e.g. 3, 4, etc.)
Nozzle Diameter	(D_n)	0.142	0.142	0.142	in
Probe Number	from ACS	samp-hp-0149	samp-hp-00148	samp-hp-0149	
Probe Length		120.0	120.0	120.0	in
(SS, Glass ….) Liner Material	from list	glass	glass	glass	
Sample Case / Oven Number	from ACS	samp-bh-0034	samp-bh-0035	samp-bh-0034	
Impinger Case Number	from ACS	samp-cc-0012	samp-cc-0027	samp-cc-0012	

Testing Company Information	
Company Name	Air Hygiene International, Inc. (Tulsa, Oklahoma)
Address	1600 W Tacoma Street
City, State Zip	Broken Arrow, Oklahoma 74012
Project Manager	Cole McBride
Phone Number	(918) 307-8865
Fax Number	(918) 307-9131

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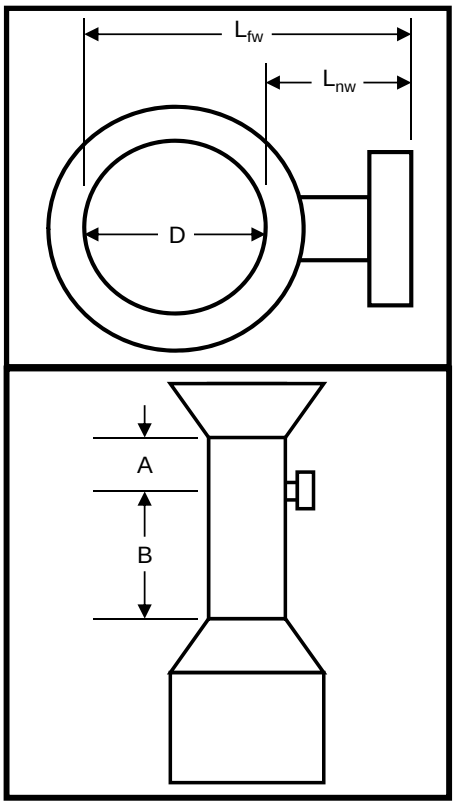
METHOD 1 - SAMPLE AND VELOCITY TRAVERSES FOR CIRCULAR SOURCES

Plant Name	CPV Valley Energy Center	**Date**	02/05/19
Sampling Location	CTG-11 Stack	**Stack Type**	Circular
Operator	CM	**Ports Available**	4
Project #	sie-19-middletown.ny-comp#1	**Ports Used**	4
Stack Size	Large (>24 inch diameter)	**Port ID (inches)**	6.00

Circular Stack or Duct Diameter			
Distance to Far Wall of Stack	(L_{fw})	235.25	in
Distance to Near Wall of Stack	(L_{nw})	7.25	in
Diameter of Stack	(D)	228.00	in
Area of Stack	(A_s)	283.53	ft²

Distance from Port to Disturbances			
Distance Upstream	(A)	1200.00	in
Diameters Upstream	(A_D)	5.26	diameters
Distance Downstream	(B)	1095.00	in
Diameters Downstream	(B_D)	4.80	diameters



Number of Traverse Points Required			
Diameters to Flow Disturbance		**Minimum Number of[1] Traverse Points**	
Down Stream	**Up Stream**	**Particulate Points**	**Velocity Points**
2.00-4.99	0.50-1.24	24	16
5.00-5.99	1.25-1.49	20	16
6.00-6.99	1.50-1.74	16	12
7.00-7.99	1.75-1.99	12	12
>= 8.00	>=2.00	8 or 12[2]	8 or 12[2]
Upstream Spec		12	12
Downstream Spec		24	16
Traverse Pts Required		24	16

[1] Check Minimum Number of Points for the Upstream and Downstream conditions, then use the largest.

[2] 8 for Circular Stacks 12 to 24 inches
12 for Circular Stacks over 24 inches

○ Method 1 Trav

◉ 12 Point PM Trav (M201a ONLY)

○ Velocity

Number of Traverse Points Used			
4	**Ports by**	3	**Across**
12	**Pts Used**	12	**Required**

Location of Traverse Points in Circular Stacks									
Traverse Point Number	(Fraction of Stack Dimension from Inside Wall to Traverse Point) Number of Traverse Points Across the Stack								
	2	4	6	8	10	12	14	16	18
1	.146	.067	.044	.032	.026	.021	.018	.016	.014
2	.854	.250	.146	.105	.082	.067	.057	.049	.044
3		.750	.296	.194	.146	.118	.099	.085	.075
4		.933	.704	.323	.226	.177	.146	.125	.109
5			.854	.677	.342	.250	.201	.169	.146
6			.956	.806	.658	.356	.269	.220	.188
7				.895	.774	.644	.366	.283	.236
8				.968	.854	.750	.634	.375	.296
9					.918	.823	.731	.625	.382
10					.974	.882	.799	.717	.618
11						.933	.854	.780	.704
12						.979	.901	.831	.764

Traverse Point Locations			
Traverse Point Number	**Fraction of Stack Diameter**	**Distance from Inside Wall**	**Distance Including Reference Length**
		in	in
1	0.044	10	17 2/8
2	0.146	33 2/8	40 4/8
3	0.296	67 4/8	74 6/8
4			
5			
6			
7			
8			
9			

METHOD 2 - DETERMINATION OF STACK GAS VELOCITY AND VOLUMETRIC FLOW RATE

Plant Name	CPV Valley Energy Center			
Sampling Location	CTG-11 Stack			
Operator	CM			
Project #	sie-19-middletown.ny-comp#1			
Pitot Leak Check	x	**PreTest**	x	**PostTest**

Preliminary Run Date	02/05/19		
Stack Type	Circular		
Ports Available	4		
Thermocouple ID	samp-hp-0149		
Pitot Coefficient	0.8232	**Pitot Identification**	4183

Stack Dimensions			
Area of Stack	(A_s)	283.53	ft²
Diameter of Stack	(D)	228.00	in

Pressures			
Barometric Pressure	(P_b)	29.43	in Hg
Static Pressure	(P_{static})	-0.98	in H_2O
Absolute Stack Pressure	(P_s)	29.36	in Hg

Stack Gas Composition			
Composition Data:	**Actual Composition**		
Carbon Dioxide Concentration	(%CO_2)	5.30	%vd
Oxygen Concentration	(%O_2)	13.80	%vd
Carbon Monoxide Concentration	(ppmCO)	0.00	ppmvd
Nitrogen Concentration	(%N_2)	80.90	%vd
Stack Moisture Content	(B_{ws})	7.00	%
Stack Dry Molecular Weight	(M_d)	29.40	lb/lb-mole
Stack Wet Molecular Weight	(M_w)	28.60	lb/lb-mole

Results			
Avg Stack Gas Velocity	(v_s)	78.96	ft/sec
Avg Stack Dry Std Flow Rate	(Q_{sd})	52,211,822	dscf/hr
Avg Stack Dry Std Flow Rate	(Q_{sd})	870,197	dscf/min
Avg Stack Wet Flow Rate	(Q_{aw})	1,343,271	acf/min
Avg Stack Wet Std Flow Rate	(Q_{sw})	56,141,745	ascf/hr

40 CFR 60, Method 2G, Section 8.11.1 (but applies to all Method 2 type static pressure measurements):
If a Type S probe is used for this measurement, position the probe at or between any traverse point(s) and rotate the probe until a null differential pressure reading is obtained. Disconnect the tubing from one of the pressure ports; read and record the ΔP. For pressure devices with one-directional scales, if a deflection in the positive direction is noted with the negative side disconnected, then the static pressure is positive. Likewise, if a deflection in the positive direction is noted with the positive side disconnected, then the static pressure is negative.

Stack Cross Section Schematic

Velocity Traverse Data					
Run Number		11-PM-FO-V1			
Run Time		09:07	**Start**	09:20	**End**
Traverse Point	**Velocity Head** (Δp)	**Null Angle** (N_a)	**Zero Deg Pressure** ($0°_a$)	**Stack Temp** (t_s)	**Local Velocity** ($v_{s(l)}$)
	in H_2O	deg	in H_2O	°F	ft/sec
A-1	2.10	-15	0.40	284	96.00
A-2	2.30	15	0.40	285	100.53
A-3	2.30	-10	0.20	285	100.53
B-1	2.00	-5	0.10	282	93.56
B-2	1.80	-10	0.20	284	88.88
B-3	1.30	-10	0.20	283	75.48
C-1	1.50	-5	0.10	283	81.08
C-2	1.40	-5	0.10	284	78.38
C-3	1.30	-10	0.20	283	75.48
D-1	1.70	-10	0.20	283	86.31
D-2	1.90	-10	0.20	285	91.37
D-3	2.00	-15	0.35	284	93.68
Average	1.80	10		284	
	1.34	**= Square roots of Δp**			
Standard deviation of null angles =				3.7	

METHOD 3a - DETERMINATION OF DRY MOLECULAR WEIGHT BY ANALYZER

Plant Name	CPV Valley Energy Center	**Preliminary Run Date**	02/05/19		
Sampling Location	CTG-11 Stack	**Operator**	CM		
Project #	sie-19-middletown.ny-comp#1	**# of Ports Used**	1 (gas probe)		
Fuel Type	Oil, Distillate	**Min. Fuel Factor**	1.260	**Max. Fuel Factor**	1.413

Gas Analysis Data

Run Number	11-PM-FO-1		**Date**	02/05/19	**Run Start Time**	09:36	**Run Stop Time**	13:45
Sample Analysis Time	**CO_2 Conc.**	**O_2 Conc.**	**CO Conc.**	**N_2 Conc.**	**Dry Molecular Weight**	**Calculated Fuel Factor**	**Excess Air**	**Fuel Factor in Range**
	($\%CO_2$)	($\%O_2$)	(ppmCO)	($\%N_2$)	(M_d)	$(F_o)_{avg}$	$(\%EA)_{avg}$	
hh:mm	%	%	ppm	%	lb/lb-mole		%	
04:09	5.3	13.8	0.0	80.9	29.40	1.340	182.6	YES

Gas Analysis Data

Run Number	11-PM-FO-2		**Date**	02/05/19	**Run Start Time**	13:51	**Run Stop Time**	17:56
Sample Analysis Time	**CO_2 Conc.**	**O_2 Conc.**	**CO Conc.**	**N_2 Conc.**	**Dry Molecular Weight**	**Calculated Fuel Factor**	**Excess Air**	**Fuel Factor in Range**
	($\%CO_2$)	($\%O_2$)	(ppmCO)	($\%N_2$)	(M_d)	$(F_o)_{avg}$	$(\%EA)_{avg}$	
hh:mm	%	%	ppm	%	lb/lb-mole		%	
04:05	5.3	13.8	0.0	81.0	29.39	1.354	181.8	YES

Gas Analysis Data

Run Number	11-PM-FO-3		**Date**	02/05/19	**Run Start Time**	18:04	**Run Stop Time**	22:18
Sample Analysis Time	**CO_2 Conc.**	**O_2 Conc.**	**CO Conc.**	**N_2 Conc.**	**Dry Molecular Weight**	**Calculated Fuel Factor**	**Excess Air**	**Fuel Factor in Range**
	($\%CO_2$)	($\%O_2$)	(ppmCO)	($\%N_2$)	(M_d)	$(F_o)_{avg}$	$(\%EA)_{avg}$	
hh:mm	%	%	ppm	%	lb/lb-mole		%	
04:14	5.3	13.8	0.0	80.9	29.40	1.340	182.6	YES

METHOD 4 - DETERMINATION OF MOISTURE CONTENT IN STACK GASES

Plant Name	CPV Valley Energy Center	**Preliminary Run Date**	02/05/19
Sampling Location	CTG-11 Stack	**Operator**	CM
Project #	sie-19-middletown.ny-comp#1	**Ports Used**	4

Scale Daily Calibration					
Scale Number	SAMP-SC-0016	**Standard**	**Result**	**Difference**	**Pass/Fail**
Date		(g)	(g)	(g)	(± 0.5 g)
Preliminary Date	02/05/19	500	499.5	-0.5	Pass
Test Day 1	02/05/19	500	499.6	-0.4	Pass

Moisture Content Data									
Run Number	11-PM-FO-1		**Date**	02/05/19	**Start Time**	09:36	**Stop Time**	13:45	
Meter Box Number	samp-cp-0019				**Meter Cal Factor**	(Y)	0.893		
Total Meter Volume	(V_m)	85.510	dcf		**Barometric Pressure**	(P_b)	29.42	in Hg	
Average Stack Temp	$(t_s)_{avg}$	282	°F		**Stack Static Pressure**	(P_{static})	-0.98	in H_2O	
Average Meter Temp	$(t_m)_{avg}$	75	°F		**Avg Orifice Pressure**	$(\Delta H)_{avg}$	0.46	in H_2O	
	Impinger 1	**Impinger 2**	**Impinger 3**	**Impinger 4**	**Impinger 5**	**Impinger 6**	**Impinger 7**	**Impinger 8**	
	(g)	(g)	(g)	(g)					
Contents	Dry	Dry	DI Water	Sil Gel					
Final Value (V_f),(W_f)	440.70	607.40	725.00	900.00					
Initial Value (V_i),(W_i)	358.50	604.60	709.50	884.60					
Net Value (V_n),(W_n)	82.2	2.8	15.5	15.4					
Results									
Total Weight	(W_t)	115.90	g		**Water Vol Weighed**	$(V_{wsg(std)})$	5.465	scf	
Std Meter Volume	$(V_{m(std)})$	74.199	dscf		**Sat. Moisture Content**	$(B_{ws(svp)})$	100.00	%	
Calc Moisture Content	$(B_{ws(calc)})$	6.86	%		**Final Moisture Content**	(B_{ws})	6.86	%	

Moisture Content Data									
Run Number	11-PM-FO-2		**Date**	02/05/19	**Start Time**	13:51	**Stop Time**	17:56	
Meter Box Number	samp-cp-0025				**Meter Cal Factor**	(Y)	1.017		
Total Meter Volume	(V_m)	73.038	dcf		**Barometric Pressure**	(P_b)	29.39	in Hg	
Average Stack Temp	$(t_s)_{avg}$	283	°F		**Stack Static Pressure**	(P_{static})	-0.98	in H_2O	
Average Meter Temp	$(t_m)_{avg}$	75	°F		**Avg Orifice Pressure**	$(\Delta H)_{avg}$	0.45	in H_2O	
	Impinger 1	**Impinger 2**	**Impinger 3**	**Impinger 4**	**Impinger 5**	**Impinger 6**	**Impinger 7**	**Impinger 8**	
	(g)	(g)	(g)	(g)					
Contents	Dry	Dry	DI Water	Sil Gel					
Final Value (V_f),(W_f)	432.70	606.40	704.00	948.80					
Initial Value (V_i),(W_i)	361.20	605.20	687.70	925.90					
Net Value (V_n),(W_n)	71.5	1.2	16.3	22.9					
Results									
Total Weight	(W_t)	111.90	g		**Water Vol Weighed**	$(V_{wsg(std)})$	5.276	scf	
Std Meter Volume	$(V_{m(std)})$	72.090	dscf		**Sat. Moisture Content**	$(B_{ws(svp)})$	100.00	%	
Calc Moisture Content	$(B_{ws(calc)})$	6.82	%		**Final Moisture Content**	(B_{ws})	6.82	%	

Moisture Content Data									
Run Number	11-PM-FO-3		**Date**	02/05/19	**Start Time**	18:04	**Stop Time**	22:18	
Meter Box Number	samp-cp-0019				**Meter Cal Factor**	(Y)	0.893		
Total Meter Volume	(V_m)	83.800	dcf		**Barometric Pressure**	(P_b)	29.46	in Hg	
Average Stack Temp	$(t_s)_{avg}$	283	°F		**Stack Static Pressure**	(P_{static})	-0.98	in H_2O	
Average Meter Temp	$(t_m)_{avg}$	71	°F		**Avg Orifice Pressure**	$(\Delta H)_{avg}$	0.48	in H_2O	
	Impinger 1	**Impinger 2**	**Impinger 3**	**Impinger 4**	**Impinger 5**	**Impinger 6**	**Impinger 7**	**Impinger 8**	
	(g)	(g)	(g)	(g)					
Contents	Dry	Dry	DI Water	Sil Gel					
Final Value (V_f),(W_f)	445.50	612.70	732.30	915.20					
Initial Value (V_i),(W_i)	360.40	611.30	725.00	900.00					
Net Value (V_n),(W_n)	85.1	1.4	7.3	15.2					
Results									
Total Weight	(W_t)	109.00	g		**Water Vol Weighed**	$(V_{wsg(std)})$	5.139	scf	
Std Meter Volume	$(V_{m(std)})$	73.400	dscf		**Sat. Moisture Content**	$(B_{ws(svp)})$	100.00	%	
Calc Moisture Content	$(B_{ws(calc)})$	6.54	%		**Final Moisture Content**	(B_{ws})	6.54	%	

METHOD 201A (FRONT) AND 202 (BACK) SOURCE SAMPLING TITLE PAGE ISOKINETIC SAMPLING DATA

Plant Name	CPV Valley Energy Center
Sampling Location	CTG-11 Stack
Project #	sie-19-middletown.ny-comp#1

Date	02/05/19
Operator	CM
Run Number	11-PM-FO-1

Filter #
18082922
0818-188

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Coefficient / ID	(C_p)	0.7350	5272/10
Average Stack Temp	(t_s)	282.0	°F
Average Meter Temp	(t_m)	74.9	
Orifice Meter Coefficient	($\Delta H@$)	1.838	in H_2O
Square Root ΔP	($\Delta p^{1/2}_{avg}$)	1.24	in H_2O
Stack Moisture Content	(B_{ws})	6.86	%
Stack Dry Molecular Weight	(M_d)	29.40	lb/lb-mole
Estimated Orifice Flow Rate	(Q_m)	0.75	acfm
ΔP to ΔH Isokinetic Factor	(K)	0.22	

Leak Checks					
Train	**Pre**	0.000	ft³/min@	15.0	in Hg
PASS	**Post**	0.000	ft³/min@	10.0	in Hg
Pitot	**Pre (+)**	4.3	in H_2O for	30.0	sec
PASS	**Pre (-)**	5.2	in H_2O for	30.0	sec
	Post (+)	4.2	in H_2O for	30.0	sec
	Post (-)	5.0	in H_2O for	30.0	sec

Sampling Equipment			
Meter Box Number	samp-cp-0019		
Meter Cal Factor	(Y)	0.893	
Nozzle Number	3		
Average Nozzle Diameter	(D_{na})	0.1420	in
Suggested Nozzle Diameter	(D_{ni})	0.2205	in
Probe Number	samp-hp-0149		in
Probe Length	120		in
Liner Material	glass		
Sample Case / Oven Number	samp-bh-0034		
Impinger Case Number	samp-cc-0012		

Pressures			
Barometric Pressure	(P_b)	29.42	in Hg
Stack Static Pressure	(P_{static})	-0.98	in H_2O
Absolute Stack Pressure	(P_s)	29.35	in Hg
Absolute Meter Pressure	(P_m)	29.56	in Hg

Nozzle Measurements			**ID: 3**	
Pre	0.141	0.143	0.142	**PASS**
Post	0.141	0.143	0.142	**PASS**

Barometer ID
SAMP-WE-0027
Scale ID
SAMP-SC-0016

Run Time			
Start	09:36	**End**	13:45

Weights	**Imp 1**	**Imp 2**	**Imp 3**	**Imp 4**	**Imp 5**	**Imp 6**	**Imp 7**	**Imp 8**
Pre	358.5	604.6	709.5	884.6				
Post	440.7	607.4	725.0	900.0				

Wash Volumes					ml
					ml

Identification Nos.		samp-cp-0019	samp-cp-0019	samp-cp-0019			samp-hp-0149	samp-hp-0149	samp-bh-0034	samp-cc-0012	1030	3105	samp-cp-0019		samp-cp-0019				
Traverse Point #	**Sampling Time (Θ)**	**Timer Time**	**Dry Gas Meter Reading (V_m)**	**Velocity Head (Δp)**	**Desired Orifice ΔH (ΔH_d)**	**Actual Orifice ΔH (ΔH_a)**	**Stack Temp (t_s)**	**Probe Temp (248±25°F)**	**Filter Temp (248±25°F)**	**Impinger Exit Temp (≤68°F)**	**Cond. Temp (≤85°F)**	**CPM Filter Temp (76.5±8.5°F)**	**Meter Inlet Temp (t_{mi})**	**Meter Outlet Temp (t_{mo})**	**Pump Vacuum**	**Square Root ΔP ($\Delta p^{1/2}$)**	**Local Stack Velocity (v_s)$_l$**	**Cumul. Meter Volume (V_m)$_{std}$**	**Cumul. Percent IsoKinetic (I)**	**Est-Run Meter Volume (V_m)$_{std}$**
	min	hh:mm:ss	ft³	in H_2O	in H_2O	in H_2O	°F	°F	°F	°F	°F	°F	°F	°F	in Hg	√(in H_2O)	ft/sec	dscf	%	dscf
A-1	0.0	00:00:00	814.900	1.50	0.484	0.47	284	240	247	47	55	68	72	72	2.0	1.22	72.43	6.422	95.3	71.080
A-2	21.8	00:21:45	822.260	1.70	0.484	0.47	284	241	247	44	59	69	74	74	2.0	1.30	77.11	14.471	101.3	77.851
A-3	44.8	00:44:45	831.520	1.70	0.484	0.47	283	240	244	50	66	77	75	75	2.0	1.30	77.06	22.305	102.0	79.261
B-1	67.8	01:07:45	840.550	1.40	0.484	0.47	282	242	251	50	66	73	75	75	2.0	1.18	69.88	28.439	100.8	76.929
B-2	89.0	01:29:00	847.620	1.30	0.484	0.47	284	243	244	49	68	72	75	75	2.0	1.14	67.43	34.590	101.4	76.052
B-3	109.5	01:49:30	854.710	1.30	0.484	0.47	279	241	243	49	62	68	75	75	2.0	1.14	67.20	40.386	100.9	74.792
C-1	130.0	02:10:00	861.390	1.60	0.484	0.47	285	241	244	54	54	69	74	74	2.0	1.26	74.86	46.436	101.2	75.409
C-2	148.3	02:28:15	868.350	1.40	0.484	0.45	281	247	258	51	66	72	74	74	2.0	1.18	69.83	51.616	101.1	75.085
C-3	165.5	02:45:30	874.310	1.40	0.484	0.45	275	242	262	51	66	79	75	75	2.0	1.18	69.55	56.336	100.3	74.215
D-1	182.8	03:02:45	879.750	1.80	0.484	0.45	283	238	240	61	42	71	78	78	2.0	1.34	79.29	62.461	99.5	74.351
D-2	202.3	03:22:15	886.850	1.80	0.484	0.45	283	232	238	54	49	69	75	75	2.0	1.34	79.29	68.534	98.8	74.406
D-3	221.8	03:41:45	893.850	1.70	0.484	0.45	281	230	243	54	60	71	77	77	2.0	1.30	76.95	74.204	98.2	74.204
Last Pt	240.8	04:00:45	900.410																	
Final Val	240.8	04:00:45	900.410											**Max Vac**	2.0	**Final Values**		74.204	98.2	
Average Values				1.55		0.46	282	240	247	51	59	72	75	75		1.24	73.41			
													75							

Notes:

METHOD 201A (FRONT) AND 202 (BACK) SOURCE SAMPLING TITLE PAGE ISOKINETIC SAMPLING DATA

Plant Name	CPV Valley Energy Center
Sampling Location	CTG-11 Stack
Project #	sie-19-middletown.ny-comp#1

Date	02/05/19
Operator	CM
Run Number	11-PM-FO-2

Filter #
18082921
0818-188

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Coefficient / ID	(C_p)	0.7290	P-983/10
Average Stack Temp	(t_s)	282.9	°F
Average Meter Temp	(t_m)	75.0	
Orifice Meter Coefficient	($\Delta H@$)	1.820	in H_2O
Square Root ΔP	($\Delta p^{1/2}_{avg}$)	1.24	in H_2O
Stack Moisture Content	(B_{ws})	6.82	%
Stack Dry Molecular Weight	(M_d)	29.39	lb/lb-mole
Estimated Orifice Flow Rate	(Q_m)	0.31	acfm
ΔP to ΔH Isokinetic Factor	(K)	0.21	

Leak Checks					
Train	**Pre**	0.000	ft³/min@	15.0	in Hg
PASS	**Post**	0.000	ft³/min@	10.0	in Hg
Pitot	**Pre (+)**	3.0	in H_2O for	30.0	sec
PASS	**Pre (-)**	3.5	in H_2O for	30.0	sec
	Post (+)	4.0	in H_2O for	30.0	sec
	Post (-)	3.7	in H_2O for	30.0	sec

Sampling Equipment			
Meter Box Number	samp-cp-0025		
Meter Cal Factor	(Y)	1.017	
Nozzle Number	3		
Average Nozzle Diameter	(D_{na})	0.1420	in
Suggested Nozzle Diameter	(D_{ni})	0.1419	in
Probe Number	samp-hp-00148		in
Probe Length	120		in
Liner Material	glass		
Sample Case / Oven Number	samp-bh-0035		
Impinger Case Number	samp-cc-0027		

Pressures			
Barometric Pressure	(P_b)	29.39	in Hg
Stack Static Pressure	(P_{static})	-0.98	in H_2O
Absolute Stack Pressure	(P_s)	29.32	in Hg
Absolute Meter Pressure	(P_m)	29.52	in Hg

Nozzle Measurements			**ID:**	**3**
Pre	0.142	0.142	0.142	**PASS**
Post	0.142	0.142	0.142	**PASS**

Barometer ID
SAMP-WE-0027
Scale ID
SAMP-SC-0016

Run Time			
Start	13:51	**End**	17:56

Weights	**Imp 1**	**Imp 2**	**Imp 3**	**Imp 4**	**Imp 5**	**Imp 6**	**Imp 7**	**Imp 8**
Pre	361.2	605.2	687.7	925.9				
Post	432.7	606.4	704.0	948.8				

Wash Volumes					
					ml
					ml

Identification Nos.		samp-cp-0025	samp-cp-0025	samp-cp-0025			samp-hp-00148	samp-hp-00148	samp-bh-0035	samp-cc-0027	1035	7770	samp-cp-0025		samp-cp-0025					
Traverse Point #	**Sampling Time (Θ)**	**Timer Time**	**Dry Gas Meter Reading (V_m)**	**Velocity Head (Δp)**	**Desired Orifice ΔH (ΔH_d)**	**Actual Orifice ΔH (ΔH_a)**	**Stack Temp (t_s)**	**Probe Temp (248±25°F)**	**Filter Temp (248±25°F)**	**Impinger Exit Temp (≤68°F)**	**Cond. Temp (≤85°F)**	**CPM Filter Temp (76.5±8.5°F)**	**Meter Inlet Temp (t_{mi})**	**Meter Outlet Temp (t_{mo})**	**Pump Vacuum**	**Square Root ΔP ($\Delta p^{1/2}$)**	**Local Stack Velocity (v_s)$_l$**	**Cumul. Meter Volume (V_m)$_{std}$**	**Cumul. Percent IsoKinetic (I)**	**Est-Run Meter Volume (V_m)$_{std}$**
	min	hh:mm:ss	ft³	in H_2O	in H_2O	in H_2O	°F	°F	°F	°F	°F	°F	°F	°F	in Hg	√(in H_2O)	ft/sec	dscf	%	dscf
A-1	0.0	00:00:00	0.000	1.70	0.484	0.45	284	256	255	68	66	68	72	72	3.0	1.30	76.52	6.967	99.1	76.556
A-2	21.5	00:21:30	7.019	1.60	0.484	0.45	284	254	252	58	60	85	76	76	3.0	1.26	74.24	13.871	102.0	77.564
A-3	42.3	00:42:15	14.027	1.70	0.484	0.45	282	255	251	60	62	70	76	76	3.0	1.30	76.42	21.174	102.6	78.469
B-1	63.8	01:03:45	21.440	1.30	0.484	0.45	283	241	243	60	63	71	75	75	3.0	1.14	66.87	26.692	100.4	74.406
B-2	84.8	01:24:45	27.030	1.30	0.484	0.45	282	243	249	56	67	75	76	76	3.0	1.14	66.83	32.219	98.9	71.978
B-3	105.8	01:45:45	32.640	1.30	0.484	0.45	279	243	247	63	62	69	75	75	3.0	1.14	66.69	38.080	98.7	70.977
C-1	126.8	02:06:45	38.578	1.60	0.484	0.45	284	254	263	58	62	68	76	76	3.0	1.26	74.24	43.342	97.7	70.618
C-2	145.0	02:25:00	43.920	1.50	0.484	0.45	283	256	250	59	62	70	75	75	3.0	1.22	71.83	48.501	97.5	70.512
C-3	162.5	02:42:30	49.146	1.30	0.484	0.45	282	254	254	57	64	71	75	75	3.0	1.14	66.83	53.302	97.9	70.349
D-1	179.0	02:59:00	54.010	1.80	0.484	0.45	285	229	254	58	63	70	75	75	3.0	1.34	78.79	60.223	98.9	71.766
D-2	198.3	03:18:15	61.022	1.80	0.484	0.45	285	234	252	57	66	72	74	74	3.0	1.34	78.79	66.376	98.6	72.098
D-3	217.5	03:37:30	67.245	1.70	0.484	0.45	282	255	252	54	61	71	75	75	3.0	1.30	76.42	72.094	98.1	72.094
Last Pt	236.3	03:56:15	73.038																	
Final Val	236.3	03:56:15	73.038											**Max Vac**	3.0	**Final Values**		72.094	98.1	
Average Values				1.55		0.45	283	248	252	59	63	72	75	75		1.24	72.87			
													75							

Notes:

METHOD 201A (FRONT) AND 202 (BACK) SOURCE SAMPLING TITLE PAGE ISOKINETIC SAMPLING DATA

Plant Name	CPV Valley Energy Center
Sampling Location	CTG-11 Stack
Project #	sie-19-middletown.ny-comp#1

Date	02/05/19
Operator	CM
Run Number	11-PM-FO-3

Filter #
18082929
0818-188

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Coefficient / ID	(C_p)	0.7350	5272/10
Average Stack Temp	(t_s)	283.3	°F
Average Meter Temp	(t_m)	70.7	
Orifice Meter Coefficient	($\Delta H@$)	1.838	in H_2O
Square Root ΔP	($\Delta p^{1/2}_{avg}$)	1.24	in H_2O
Stack Moisture Content	(B_{ws})	6.54	%
Stack Dry Molecular Weight	(M_d)	29.40	lb/lb-mole
Estimated Orifice Flow Rate	(Q_m)	0.31	acfm
ΔP to ΔH Isokinetic Factor	(K)	0.22	

Leak Checks					
Train	**Pre**	0.000	ft³/min@	15.0	in Hg
PASS	**Post**	0.000	ft³/min@	12.0	in Hg
Pitot	**Pre (+)**	3.5	in H_2O for	30.0	sec
PASS	**Pre (-)**	3.7	in H_2O for	30.0	sec
	Post (+)	4.2	in H_2O for	30.0	sec
	Post (-)	4.1	in H_2O for	30.0	sec

Sampling Equipment			
Meter Box Number	samp-cp-0019		
Meter Cal Factor	(Y)	0.893	
Nozzle Number	3		
Average Nozzle Diameter	(D_{na})	0.1420	in
Suggested Nozzle Diameter	(D_{ni})	0.1416	in
Probe Number	samp-hp-0149		in
Probe Length	120		in
Liner Material	glass		
Sample Case / Oven Number	samp-bh-0034		
Impinger Case Number	samp-cc-0012		

Pressures			
Barometric Pressure	(P_b)	29.46	in Hg
Stack Static Pressure	(P_{static})	-0.98	in H_2O
Absolute Stack Pressure	(P_s)	29.39	in Hg
Absolute Meter Pressure	(P_m)	29.60	in Hg

Nozzle Measurements			**ID:**	**3**
Pre	0.141	0.143	0.142	**PASS**
Post	0.141	0.143	0.142	**PASS**

Barometer ID
SAMP-WE-0027
Scale ID
SAMP-SC-0016

Run Time			
Start	18:04	**End**	22:18

Weights	**Imp 1**	**Imp 2**	**Imp 3**	**Imp 4**	**Imp 5**	**Imp 6**	**Imp 7**	**Imp 8**
Pre	360.4	611.3	725.0	900.0				
Post	445.5	612.7	732.3	915.2				

Wash Volumes					
					ml
					ml

Identification Nos.		samp-cp-0019	samp-cp-0019	samp-cp-0019			samp-hp-0149	samp-hp-0149	samp-bh-0034	samp-cc-0012	1030	3105	samp-cp-0019		samp-cp-0019				
Traverse Point #	**Sampling Time (Θ)**	**Timer Time**	**Dry Gas Meter Reading (V_m)**	**Velocity Head (Δp)**	**Desired Orifice ΔH (ΔH_d)**	**Actual Orifice ΔH (ΔH_a)**	**Stack Temp (t_s)**	**Probe Temp (248±25°F)**	**Filter Temp (248±25°F)**	**Impinger Exit Temp (≤68°F)**	**Cond. Temp (≤85°F)**	**CPM Filter Temp (76.5±8.5°F)**	**Meter Inlet Temp (t_{mi})**	**Meter Outlet Temp (t_{mo})**	**Pump Vacuum**	**Square Root ΔP ($\Delta p^{1/2}$)**	**Local Stack Velocity (v_s)$_l$**	**Cumul. Meter Volume (V_m)$_{std}$**	**Cumul. Percent IsoKinetic (I)**	**Est-Run Meter Volume (V_m)$_{std}$**
	min	hh:mm:ss	ft³	in H_2O	in H_2O	in H_2O	°F	°F	°F	°F	°F	°F	°F	°F	in Hg	√(in H_2O)	ft/sec	dscf	%	dscf
A-1	0.0	00:00:00	900.860	1.70	0.484	0.48	286	243	249	48	43	68	69	69	2.0	1.30	77.11	6.528	90.8	71.738
A-2	21.8	00:21:45	908.290	1.60	0.484	0.48	284	244	248	48	49	69	70	70	2.0	1.26	74.71	13.457	97.0	75.232
A-3	42.8	00:42:45	916.190	1.60	0.484	0.48	279	242	250	48	57	68	70	70	2.0	1.26	74.46	20.832	101.3	78.101
B-1	63.8	01:03:45	924.600	1.30	0.484	0.48	282	234	244	49	56	77	70	70	2.0	1.14	67.25	27.261	102.0	76.651
B-2	85.0	01:25:00	931.930	1.30	0.484	0.48	284	245	244	47	53	76	71	71	2.0	1.14	67.34	32.986	100.5	74.198
B-3	106.3	01:46:15	938.470	1.30	0.484	0.48	281	240	238	47	54	75	70	70	2.0	1.14	67.21	38.993	100.0	73.093
C-1	127.5	02:07:30	945.320	1.50	0.484	0.48	284	240	251	48	57	75	71	71	2.0	1.22	72.34	44.630	99.9	73.184
C-2	145.8	02:25:45	951.760	1.50	0.484	0.48	284	243	250	46	56	74	72	72	2.0	1.22	72.34	49.776	99.0	72.540
C-3	164.0	02:44:00	957.650	1.30	0.484	0.48	282	243	239	46	56	73	71	71	2.0	1.14	67.25	54.547	98.8	72.026
D-1	181.0	03:01:00	963.100	1.80	0.484	0.48	281	234	242	45	48	75	71	71	2.0	1.34	79.08	60.780	98.3	72.450
D-2	200.5	03:20:30	970.220	1.80	0.484	0.48	287	234	243	44	46	78	72	72	2.0	1.34	79.40	66.904	97.7	72.682
D-3	220.0	03:40:00	977.230	1.70	0.484	0.48	285	233	247	43	56	82	71	71	2.0	1.30	77.06	73.408	98.3	73.408
Last Pt	239.0	03:59:00	984.660																	
Final Val	239.0	03:59:00	984.660											**Max Vac**	2.0	**Final Values**		73.408	98.3	
Average Values				1.53		0.48	283	240	245	47	53	74	71	71		1.24	72.96			
													71							

Notes:

EMISSION DATA RECORDS

Unit #CTG-11
Base Load
Opacity Data

VISUAL EMISSIONS OBSERVATION FORM

Method Used (Circle One): **Method 9** | 203A | 203B | Other: _____

Company Name: CPV Valley LLC
Facility Name: CPV Valley Energy Center
Street Address: 3330 US Route 6
City: Middletown | State: NY | Zip: 10940

Process: CTG-1 | Unit #: [illegible] | Operating Mode: [illegible]
Control Equipment: | Operating Mode: FD

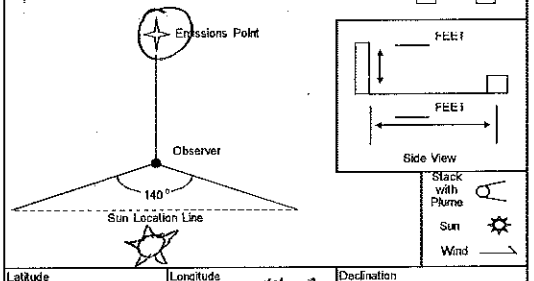
Describe Emissions Point: Top of the stack
Height of Emiss. Pt. Start: 275ft End: 275ft | Height of Emiss. Pt. Rel. to Observer Start: 260 ft End: 260 ft
Distance to Emiss. Pt. Start: 2500ft End: 2500 ft | Direction to Emiss. Pt. (Degrees) Start: 272° End: 272°

Vertical Angle to Obs. Pt. Start: 17° End: 17° | Direction to Obs. Pt. (Degrees) Start: 272° End: 272°
Distance and Direction to Observation Point from Emission Point Start: 0 ft 0° End: Same

Describe Emissions Start: clear End: clear
Emission Color Start: clear End: clear | Water Droplet Plume Start: none End: none

Describe Plume Background Start: partly cloudy End: partly cloudy
Background Color Start: white End: white | Sky Conditions Start: partlye cloudy End:
Wind Speed Start: 6MPH End: 8MPH | Wind Direction Start: WSW End: WSW
Ambient Temp. Start: 57°F End: 60°F | Wet Bulb Temp. 44°F | RH Percent 61%

Source Layout Sketch ✓ | Draw North Arrow | ☐ TN ☐ MN



Latitude: 41.406961 | Longitude: -74.429463 | Declination:

Additional Information:

Form Number (AHI Project Code): | Page 1 of 2
Continued on Form Number (AHI Project Code):

Observation Date: 02/05/19 | Time Zone: Eastern | Start Time: 11:45 | End Time: 12:45

Min \ Sec	0	15	30	45	Comments
1	0	0	0	0	
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3	0	0	0	0	
4	0	0	0	0	
5	0	0	0	0	
6	0	0	0	0	
7	0	0	0	0	
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25	0	0	0	0	
26	0	0	0	0	
27	0	0	0	0	
28	0	0	0	0	
29	0	0	0	0	
30	0	0	0	0	

Observer's Name (Print): Axel Garrido-Martinez
Observer's Signature: | Date: 02/05/19
Organization: Air Hygiene
Certified By: Compliance Assurance Associates | Date: 01/04/19

VISUAL EMISSIONS OBSERVATION FORM

Method Used (Circle One): **Method 9** | 203A | 203B | Other: _____

Company Name: CPV Valley LLC
Facility Name: CPV Valley Energy Center
Street Address: 3330 US Route 6
City: Middletown | State: NY | Zip: 10940

Process: CTG-1 | Unit #: GT | Operating Mode:
Control Equipment: | Operating Mode: FO

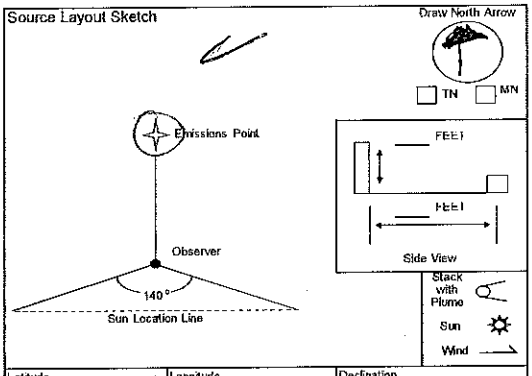
Describe Emissions Point: Top of the stack
Height of Emiss. Pt. Start 275ft End 275ft | Height of Emiss. Pt. Ref. to Observer Start 260ft End 260ft
Distance to Emiss. Pt. Start 2500ft End 2500ft | Direction to Emiss. Pt. (Degrees) Start 272° End 272°

Vertical Angle to Obs. Pt. Start 17° End 17° | Direction to Obs. Pt. (Degrees) Start 272° End 272°
Distance and Direction to Observation Point from Emission Point Start off 0° End same

Describe Emissions Start clear End clear
Emission Color Start clear End clear | Water Droplet Plume Start none End none

Describe Plume Background Start partly cloudy End partly cloudy
Background Color Start white End white | Sky Conditions Start partly cloudy End partly cloudy
Wind Speed Start 6mph End 8mph | Wind Direction Start WSW End NSW
Ambient Temp. Start 57°F End 60°F | Wet Bulb Temp. 46°F | RH Percent 61%

Source Layout Sketch



Latitude: 41.406961 | Longitude: -74.429963 | Declination:

Additional Information:

Form Number (AHI Project Code): | Page 2 of 2
Continued on Form Number (AHI Project Code):

Observation Date: 02/05/19 | Time Zone: Eastern | Start Time: 11:45 | End Time: 12:45

Min. \ Sec.	0	15	30	45	Comments
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3	0	0	0	0	
4	0	0	0	0	
5	0	0	0	0	
6	0	0	0	0	
7	0	0	0	0	
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23	0	0	0	0	
24	0	0	0	0	
25	0	0	0	0	
26	0	0	0	0	
27	0	0	0	0	
28	0	0	0	0	
29	0	0	0	0	
30	0	0	0	0	

Observer's Name (Print): Axel Garrido-Martinez
Observer's Signature: | Date: 02/05/19
Organization: Air Hygiene
Certified By: Compliance Assurance Associates | Date: 01/04/19

VISUAL EMISSIONS OBSERVATION FORM

Method Used (Circle One): **Method 9** | 203A | 203B | Other: _____

Company Name: CPV Valley LLC
Facility Name: CPV Valley Energy Center
Street Address: 3330 US Route 6
City: Middletown | State: NY | Zip: 10940

Process: CTG-1 | Unit #: 1 | Operating Mode:
Control Equipment: | Operating Mode: FO

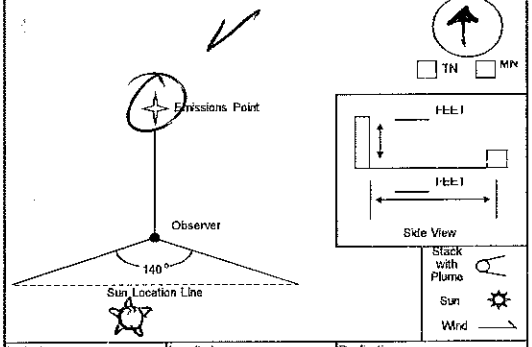
Describe Emissions Point: Top of the Stack
Height of Emiss. Pt. Start: 275ft End: 275ft | Height of Emiss. Pt. Rel. to Observer Start: 260ft End: 260ft
Distance to Emiss. Pt. Start: 2500ft End: 2500ft | Direction to Emiss. Pt. (Degrees) Start: 272° End: 272°

Vertical Angle to Obs. Pt. Start: 17° End: 17° | Direction to Obs. Pt. (Degrees) Start: 272° End: 272°
Distance and Direction to Observation Point from Emission Point Start: off 0° End: same

Describe Emissions Start: clear End: clear
Emission Color Start: clear End: clear | Water Droplet Plume Start: none End: none

Describe Plume Background Start: partly cloudy End: partly cloudy
Background Color Start: white End: blue | Sky Conditions Start: partly cloudy End: partly cloudy
Wind Speed Start: 8mph End: 8mph | Wind Direction Start: WSW End: WSW
Ambient Temp. Start: 60°F End: 60°F | Wet Bulb Temp.: 44°F | RH Percent: 61%

Source Layout Sketch



Latitude: 41.406961 | Longitude: -74.429963 | Declination:

Additional Information:

Form Number (AHI Project Code) | Page 1 of 2
Continued on Form Number (AHI Project Code)

Observation Date: 02/05/19 | Time Zone: Eastern | Start Time: 12:50 | End Time: 13:50

Sec. / Min.	0	15	30	45	Comments
1	0	0	0	0	
2	0	0	0	0	
3	0	0	0	0	
4	0	0	0	0	
5	0	0	0	0	
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25	0	0	0	0	
26	0	0	0	0	
27	0	0	0	0	
28	0	0	0	0	
29	0	0	0	0	
30	0	0	0	0	

Observer's Name (Print): Axel Garrido-Martinez
Observer's Signature: | Date: 02/05/19
Organization: Air Hygiene
Certified By: Compliance Assurance Associates | Date: 01/04/19

VISUAL EMISSIONS OBSERVATION FORM

Method Used (Circle One): Method 9 | 203A | 203B | Other: _____

Company Name: CPV Valley LLC
Facility Name: CPV Valley Energy Center
Street Address: 3330 US Route 6
City: Middletown | State: NY | Zip: 10940

Process: CTG-1 | Unit #: 1 | Operating Mode:
Control Equipment: | Operating Mode: FD

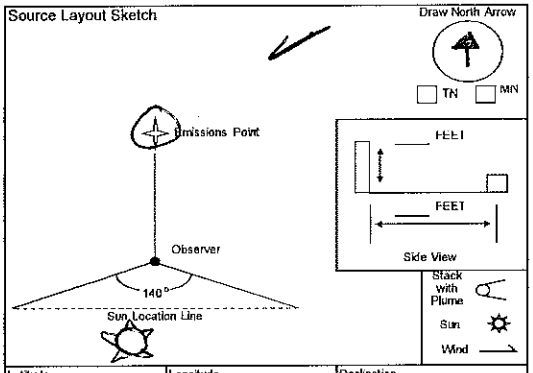
Describe Emissions Point: Top of the Stack
Height of Emiss. Pt. Start: 275 ft | End: 275 ft | Height of Emiss. Pt. Rel. to Observer Start: 260 ft | End: 260 ft
Distance to Emiss. Pt. Start: 2500 ft | End: 2500 ft | Direction to Emiss. Pt. (Degrees) Start: 272° | End: 272°

Vertical Angle to Obs. Pt. Start: 17° | End: 17° | Direction to Obs. Pt. (Degrees) Start: 272° | End: 272°
Distance and Direction to Observation Point from Emission Point Start: Off 0° | End: Same

Describe Emissions Start: clear | End: clear
Emission Color Start: clear | End: clear | Water Droplet Plume Start: none | End: none

Describe Plume Background Start: partly cloudy | End: partly cloudy
Background Color Start: white | End: blue | Sky Conditions Start: partly cloudy | End: partly cloudy
Wind Speed Start: 8mph | End: 8mph | Wind Direction Start: WSW | End: WSW
Ambient Temp. Start: 60°F | End: 60°F | Wet Bulb Temp.: 44°F | RH Percent: 61%

Source Layout Sketch



Latitude: 41.406961 | Longitude: -74.429463 | Declination:

Additional Information:

Form Number (AHI Project Code): | Page 2 of 2
Continued on Form Number (AHI Project Code):

Observation Date: 02/05/19 | Time Zone: Eastern | Start Time: 12:50 | End Time: 13:50

Min \ Sec	0	15	30	45	Comments
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3	0	0	0	0	
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5	0	0	0	0	
6	0	0	0	0	
7	0	0	0	0	
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25	0	0	0	0	
26	0	0	0	0	
27	0	0	0	0	
28	0	0	0	0	
29	0	0	0	0	
30	0	0	0	0	

Observer's Name (Print): Axel Garrido Martinez
Observer's Signature: | Date: 02/05/19
Organization: Air Hygiene
Certified By: Compliance Assurance Associates | Date: 01/04/19

Method Used (Circle One): Method 9 | 203A | 203B | Other: _____

VISUAL EMISSIONS OBSERVATION FORM

Company Name: CPV Valley LLC
Facility Name: CPV Valley Energy Center
Street Address: 3330 US Route 6
City: Middletown | State: N.Y | Zip: 10940

Process: CTG-1 | Unit #: 1 | Operating Mode: FO
Control Equipment: | Operating Mode:

Describe Emissions Point: Top of the stack

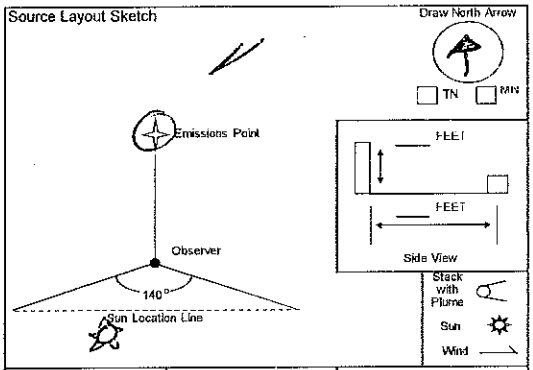
	Start	End
Height of Emiss. Pt.	275ft	275ft
Height of Emiss. Pt. Rel. to Observer	260ft	260ft
Distance to Emiss. Pt.	2560ft	2560ft
Direction to Emiss. Pt. (Degrees)	272°	272°
Vertical Angle to Obs. Pt.	17°	17°
Direction to Obs. Pt. (Degrees)	272°	272°

Distance and Direction to Observation Point from Emission Point: Start 0ft 0° | End same

	Start	End
Describe Emissions	clear	clear
Emission Color	clear	clear
Water Droplet Plume	none	none

	Start	End
Describe Plume Background	partly cloudy	partly cloudy
Background Color	blue	blue
Sky Conditions	partly cloudy	partly cloudy
Wind Speed	12mph	12mph
Wind Direction	WSW	WNW
Ambient Temp.	60°F	59°F
Wet Bulb Temp.	44°F	
RH Percent	55%	

Source Layout Sketch



Latitude: 41.406961 | Longitude: -74.429963 | Declination:

Additional Information:

Form Number (AHI Project Code): | Page 1 of 2
Continued on Form Number (AHI Project Code):

Observation Date: 02/05/19 | Time Zone: Eastern | Start Time: 14:00 | End Time: 15:00

Min. \ Sec.	0	15	30	45	Comments
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6	0	0	0	0	
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26	0	0	0	0	
27	0	0	0	0	
28	0	0	0	0	
29	0	0	0	0	
30	0	0	0	0	

Observer's Name (Print): Axel Garrido-Martinez
Observer's Signature: | Date: 02/05/19
Organization: Air Hygiene
Certified By: Compliance Assurance Associates | Date: 01/04/19

VISUAL EMISSIONS OBSERVATION FORM

Method Used (Circle One): **Method 9** | 203A | 203B | Other: _____

Company Name: CPV Valley LLC
Facility Name: CPP Valley Energy Center
Street Address: 3330 US Route 6
City: Middletown | State: NY | Zip: 10940

Process: CT-1 | Unit #: [redacted] | Operating Mode:
Control Equipment: | Operating Mode: FO

Describe Emissions Pont: Top of the stack

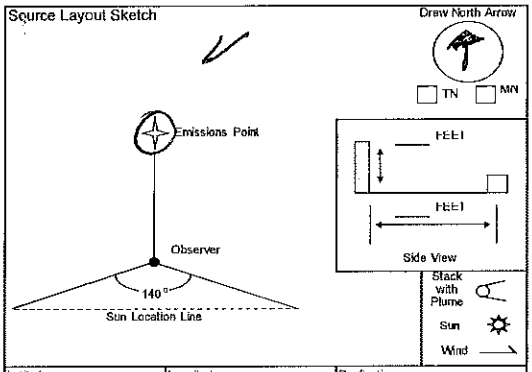
Height of Emiss. Pt. Start 275 ft End 275 ft | Height of Emiss. Pt. Rel. to Observer Start 260 ft End 260 ft
Distance to Emiss. Pt. Start 2500 ft End 2500 ft | Direction to Emiss. Pt. (Degrees) Start 272° End 272°

Vetical Angle to Obs. Pt. Start 17° End 17° | Direction to Obs. Pt. (Degrees) Start 272° End 272°
Distance and Direction to Observation Point from Emission Point Start off 0° End same

Describe Emissions Start clear End clear
Emission Color Start clear End clear | Water Droplet Plume Start none End none

Describe Plume Background Start partly cloudy End partly cloudy
Background Color Start blue End blue | Sky Conditions Start partly cloudy End partly cloudy
Wind Speed Start 12 mph End 12 mph | Wind Direction Start WSW End WSW
Ambient Temp. Start 60°F End 59°F | Wet Bulb Temp. 44°F | RH Percent 55%

Source Layout Sketch



Latitude 41.406961 | Longitude -74.429963 | Declination

Additional Information

Form Number (AHI Project Code) | Page 2 of 2
Continued on Form Number (AHI Project Code)

Observation Date 02/05/19 | Time Zone Eastern | Start Time 14:00 | End Time 15:00

Min \ Sec	0	15	30	45	Comments
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27	0	0	0	0	
28	0	0	0	0	
29	0	0	0	0	
30	0	0	0	0	

Observer's Name (Print): Axel Garrido-Martinez
Observer's Signature: [signature] | Date 02/05/19
Organization: Air Hygiene
Certified By: Compliance Assurance Associates | Date 01/04/19

EMISSION DATA RECORDS

Unit #CTG-12
Base Load
Unit Operating Data

US1177 - CPV-Valley - Unit 12 **CTG-2** **FO Run1**
DCS Data - 20190206-1630 - 20190207-0540

Date / Time	Unit 12 GT Power MW 12HAD00EU001	Unit 12 GT Power % 12MKA01EU902A	Unit 12 Total GT Liquid Fuel Oil Flow KPPH 12MBN10EU001	Unit 12 GT Exhaust O_2 % 12HNE10CQ109	Ambient Temp. °F 12MBL05CT101
2019/02/06 16:35:00:000	193.937	97.0	101.904	0.00	34.2
2019/02/06 16:36:00:000	194.209	97.0	101.904	13.68	34.0
2019/02/06 16:37:00:000	194.209	97.1	102.045	13.79	34.0
2019/02/06 16:38:00:000	193.847	96.9	101.681	13.83	34.2
2019/02/06 16:39:00:000	193.476	96.9	101.681	13.83	34.2
2019/02/06 16:40:00:000	193.476	96.8	101.681	13.86	34.4
2019/02/06 16:41:00:000	194.459	97.2	101.983	13.86	34.4
2019/02/06 16:42:00:000	194.131	97.2	101.983	13.86	34.2
2019/02/06 16:43:00:000	194.131	97.1	101.755	13.86	34.4
2019/02/06 16:44:00:000	193.835	97.0	101.846	13.86	34.4
2019/02/06 16:45:00:000	193.835	97.0	101.846	13.86	34.2
2019/02/06 16:46:00:000	193.835	96.8	101.846	13.85	34.0
2019/02/06 16:47:00:000	194.191	97.2	101.846	13.85	34.2
2019/02/06 16:48:00:000	194.191	96.7	101.846	13.85	34.2
2019/02/06 16:49:00:000	193.772	97.0	101.846	13.85	34.2
2019/02/06 16:50:00:000	194.603	97.1	101.984	13.85	34.0
2019/02/06 16:51:00:000	194.208	97.0	101.984	13.85	34.0
2019/02/06 16:52:00:000	194.208	97.0	101.834	13.85	34.0
2019/02/06 16:53:00:000	194.208	97.0	101.834	13.85	34.0
2019/02/06 16:54:00:000	193.945	97.0	101.910	13.85	33.8
2019/02/06 16:55:00:000	194.599	97.0	101.910	13.85	33.5
2019/02/06 16:56:00:000	194.198	96.9	101.910	13.85	33.5
2019/02/06 16:57:00:000	194.198	97.0	101.910	13.85	33.5
2019/02/06 16:58:00:000	194.198	97.0	101.910	13.86	33.3
2019/02/06 16:59:00:000	194.198	96.9	101.910	13.86	33.0
2019/02/06 17:00:00:000	194.198	96.9	101.910	13.86	33.0
2019/02/06 17:01:00:000	194.198	97.0	101.910	13.86	33.0
2019/02/06 17:02:00:000	194.198	96.7	101.910	13.86	32.8
2019/02/06 17:03:00:000	194.198	97.0	101.910	13.86	32.8
2019/02/06 17:04:00:000	194.198	97.0	102.047	13.84	32.8
2019/02/06 17:05:00:000	194.403	97.0	101.869	13.84	32.8
2019/02/06 17:06:00:000	194.403	96.9	101.960	13.87	32.6
2019/02/06 17:07:00:000	194.403	96.9	102.052	13.87	32.6
2019/02/06 17:08:00:000	194.403	96.7	102.052	13.83	32.8
2019/02/06 17:09:00:000	193.777	96.6	101.874	13.83	33.0
2019/02/06 17:10:00:000	193.191	96.4	101.740	13.83	33.3
2019/02/06 17:11:00:000	192.439	96.3	101.665	13.83	33.3
2019/02/06 17:12:00:000	192.439	96.3	101.413	13.83	33.3
2019/02/06 17:13:00:000	192.159	96.3	101.413	13.83	33.3
2019/02/06 17:14:00:000	191.993	96.4	101.413	13.83	33.3
2019/02/06 17:15:00:000	191.993	96.5	101.413	13.83	33.3
2019/02/06 17:16:00:000	191.993	96.5	101.413	13.83	33.3
2019/02/06 17:17:00:000	191.993	96.6	101.413	13.83	33.3
2019/02/06 17:18:00:000	193.211	97.1	101.413	13.84	33.8
2019/02/06 17:19:00:000	193.211	97.0	101.776	13.90	33.8
2019/02/06 17:20:00:000	194.300	97.2	102.020	13.90	33.8
2019/02/06 17:21:00:000	194.300	97.0	102.183	13.85	33.3
2019/02/06 17:22:00:000	193.795	96.7	101.983	13.85	32.8
2019/02/06 17:23:00:000	192.797	96.4	101.747	13.81	32.6
2019/02/06 17:24:00:000	192.156	96.2	101.599	13.81	32.3
2019/02/06 17:25:00:000	192.156	96.1	101.406	13.81	32.1
2019/02/06 17:26:00:000	191.602	96.4	101.406	13.84	32.1
2019/02/06 17:27:00:000	191.602	96.4	101.209	13.84	32.1
2019/02/06 17:28:00:000	191.991	96.6	101.391	13.84	32.3
2019/02/06 17:29:00:000	191.340	96.5	101.391	13.84	32.3
2019/02/06 17:30:00:000	191.340	96.6	101.136	13.84	32.6
2019/02/06 17:31:00:000	191.340	96.6	101.369	13.85	33.0
2019/02/06 17:32:00:000	191.340	96.6	101.369	13.85	33.5
2019/02/06 17:33:00:000	191.734	96.6	101.369	13.85	33.3
2019/02/06 17:34:00:000	191.734	96.5	101.369	13.85	33.0
2019/02/06 17:35:00:000	191.389	96.7	101.369	13.85	33.8
2019/02/06 17:36:00:000	191.706	96.6	101.369	13.87	33.8
2019/02/06 17:37:00:000	191.706	96.7	101.369	13.87	34.0
2019/02/06 17:38:00:000	191.706	96.6	101.369	13.87	34.0
2019/02/06 17:39:00:000	191.129	96.6	101.369	13.83	34.0
2019/02/06 17:40:00:000	191.129	96.6	101.185	13.83	33.5

2019/02/06 17:41:00:000		191.129	96.6	101.185	13.85	33.3
2019/02/06 17:42:00:000		191.447	96.6	101.333	13.85	33.0
2019/02/06 17:43:00:000		191.447	96.5	101.333	13.85	32.8
2019/02/06 17:44:00:000		191.447	96.6	101.333	13.85	32.6
2019/02/06 17:45:00:000		191.447	96.6	101.496	13.85	32.8
2019/02/06 17:46:00:000		191.447	96.4	101.359	13.85	32.8
2019/02/06 17:47:00:000		191.447	96.5	101.288	13.85	33.0
2019/02/06 17:48:00:000		191.447	96.5	101.288	13.85	32.8
2019/02/06 17:49:00:000		191.121	96.6	101.288	13.85	32.6
2019/02/06 17:50:00:000		191.121	96.6	101.173	13.85	32.6
2019/02/06 17:51:00:000		191.121	96.6	101.173	13.85	32.6
2019/02/06 17:52:00:000		191.121	96.5	101.252	13.85	32.8
2019/02/06 17:53:00:000		191.630	96.6	101.473	13.87	32.6
2019/02/06 17:54:00:000		191.630	96.6	101.473	13.87	32.6
2019/02/06 17:55:00:000		191.630	96.5	101.318	13.87	32.6
2019/02/06 17:56:00:000		191.327	96.5	101.318	13.85	32.3
2019/02/06 17:57:00:000		191.327	96.6	101.318	13.85	32.3
2019/02/06 17:58:00:000		191.327	96.5	101.318	13.85	32.3
2019/02/06 17:59:00:000		191.327	96.5	101.318	13.85	32.3
2019/02/06 18:00:00:000		191.327	96.4	101.461	13.85	32.6
2019/02/06 18:01:00:000		191.557	96.4	101.461	13.85	32.6
2019/02/06 18:02:00:000		191.557	96.5	101.461	13.85	32.6
2019/02/06 18:03:00:000		191.948	96.3	101.461	13.85	32.3
2019/02/06 18:04:00:000		191.484	96.3	101.461	13.85	32.3
2019/02/06 18:05:00:000		191.484	96.3	101.461	13.85	32.6
2019/02/06 18:06:00:000		191.484	96.6	101.284	13.85	32.8
2019/02/06 18:07:00:000		191.806	96.4	101.485	13.85	32.8
2019/02/06 18:08:00:000		191.806	96.4	101.485	13.85	32.6
2019/02/06 18:09:00:000		192.266	96.3	101.757	13.85	32.1
2019/02/06 18:10:00:000		192.266	96.2	101.441	13.85	31.9
2019/02/06 18:11:00:000		192.266	96.2	101.691	13.83	31.5
2019/02/06 18:12:00:000		192.266	96.1	101.609	13.83	31.2
2019/02/06 18:13:00:000		191.987	96.1	101.453	13.83	31.2
2019/02/06 18:14:00:000		191.987	96.2	101.453	13.83	31.2
2019/02/06 18:15:00:000		191.987	96.3	101.453	13.83	31.2
2019/02/06 18:16:00:000		191.987	96.3	101.453	13.83	31.0
2019/02/06 18:17:00:000		191.680	96.3	101.453	13.84	30.7
2019/02/06 18:18:00:000		191.680	96.2	101.453	13.84	30.7
2019/02/06 18:19:00:000		191.831	96.3	101.440	13.84	31.2
2019/02/06 18:20:00:000		191.831	96.4	101.440	13.84	31.7
2019/02/06 18:21:00:000		191.831	96.4	101.374	13.84	31.7
2019/02/06 18:22:00:000		191.831	96.4	101.374	13.85	31.7
2019/02/06 18:23:00:000		191.831	96.4	101.374	13.85	31.7
2019/02/06 18:24:00:000		191.831	96.2	101.374	13.85	31.9
2019/02/06 18:25:00:000		191.831	96.4	101.374	13.85	31.9
2019/02/06 18:26:00:000		191.831	96.4	101.550	13.85	32.1
2019/02/06 18:27:00:000		191.771	96.5	101.303	13.85	32.1
2019/02/06 18:28:00:000		191.771	96.4	101.303	13.84	31.9
2019/02/06 18:29:00:000		191.771	96.3	101.415	13.84	31.9
2019/02/06 18:30:00:000		191.771	96.5	101.415	13.84	31.9
2019/02/06 18:31:00:000		191.771	96.4	101.415	13.84	31.9
2019/02/06 18:32:00:000		191.771	96.4	101.415	13.84	32.1
2019/02/06 18:33:00:000		191.771	96.4	101.415	13.84	32.1
2019/02/06 18:34:00:000		191.771	96.4	101.415	13.85	31.9
2019/02/06 18:35:00:000		191.991	96.3	101.415	13.85	31.9
2019/02/06 18:36:00:000		192.378	96.3	101.590	13.85	31.9
2019/02/06 18:37:00:000		192.378	96.3	101.590	13.85	31.5
2019/02/06 18:38:00:000		192.378	96.3	101.590	13.83	31.2
2019/02/06 18:39:00:000		191.916	96.2	101.343	13.83	31.5
2019/02/06 18:40:00:000		191.916	96.3	101.472	13.83	31.9
2019/02/06 18:41:00:000		191.916	96.3	101.472	13.83	31.9
2019/02/06 18:42:00:000		191.916	96.3	101.472	13.84	31.9
2019/02/06 18:43:00:000		191.916	96.4	101.472	13.84	31.9
2019/02/06 18:44:00:000		192.087	96.3	101.472	13.84	31.7
2019/02/06 18:45:00:000		192.087	96.2	101.472	13.84	31.5
2019/02/06 18:46:00:000		192.087	96.2	101.594	13.84	31.5
2019/02/06 18:47:00:000		192.087	96.2	101.462	13.84	31.5
2019/02/06 18:48:00:000		192.087	96.2	101.462	13.84	31.5
2019/02/06 18:49:00:000		192.087	96.3	101.462	13.84	31.5
2019/02/06 18:50:00:000		191.868	96.2	101.690	13.84	31.9
2019/02/06 18:51:00:000		192.308	96.2	101.460	13.84	31.9
2019/02/06 18:52:00:000		192.308	96.2	101.460	13.84	31.7
2019/02/06 18:53:00:000		191.979	96.3	101.460	13.82	31.9
2019/02/06 18:54:00:000		191.527	96.2	101.251	13.82	31.9
2019/02/06 18:55:00:000		191.527	96.2	101.429	13.85	31.9
2019/02/06 18:56:00:000		191.843	96.3	101.429	13.85	31.5
2019/02/06 18:57:00:000		191.843	96.3	101.429	13.85	31.2
2019/02/06 18:58:00:000		191.843	96.3	101.429	13.83	31.5
2019/02/06 18:59:00:000		191.278	96.3	101.049	13.83	31.7

2019/02/06 19:00:00:000		191.704	96.3	101.267	13.83	31.7
2019/02/06 19:01:00:000		191.629	96.3	101.267	13.83	31.9
2019/02/06 19:02:00:000		191.629	96.4	101.267	13.83	31.9
2019/02/06 19:03:00:000		191.260	96.4	101.267	13.85	31.5
2019/02/06 19:04:00:000		191.617	96.3	101.267	13.85	31.5
2019/02/06 19:05:00:000		191.617	96.5	101.465	13.85	31.5
2019/02/06 19:06:00:000		191.617	96.6	101.313	13.85	31.7
2019/02/06 19:07:00:000		191.617	96.4	101.388	13.84	31.7
2019/02/06 19:08:00:000		192.017	96.2	101.388	13.84	31.5
2019/02/06 19:09:00:000		192.017	96.3	101.514	13.84	31.5
2019/02/06 19:10:00:000		192.271	96.3	101.514	13.84	31.2
2019/02/06 19:11:00:000		192.271	96.2	101.514	13.84	31.0
2019/02/06 19:12:00:000		192.271	96.2	101.602	13.84	31.0
2019/02/06 19:13:00:000		192.549	96.2	101.602	13.84	30.7
2019/02/06 19:14:00:000		192.549	96.1	101.602	13.84	30.2
2019/02/06 19:15:00:000		192.549	96.1	101.602	13.84	30.0
2019/02/06 19:16:00:000		192.153	96.1	101.335	13.84	30.0
2019/02/06 19:17:00:000		192.153	96.2	101.461	13.84	29.8
2019/02/06 19:18:00:000		192.153	96.2	101.461	13.84	29.8
2019/02/06 19:19:00:000		192.153	96.2	101.461	13.84	29.8
2019/02/06 19:20:00:000		192.641	96.2	101.561	13.84	29.5
2019/02/06 19:21:00:000		192.641	96.2	101.710	13.82	29.5
2019/02/06 19:22:00:000		192.641	96.1	101.542	13.82	29.3
2019/02/06 19:23:00:000		192.641	96.1	101.542	13.82	29.3
2019/02/06 19:24:00:000		192.183	96.1	101.542	13.82	29.1
2019/02/06 19:25:00:000		192.680	96.1	101.542	13.83	29.1
2019/02/06 19:26:00:000		192.680	96.1	101.650	13.83	29.1
2019/02/06 19:27:00:000		192.680	96.0	101.650	13.83	28.9
2019/02/06 19:28:00:000		192.680	96.1	101.565	13.83	28.9
2019/02/06 19:29:00:000		192.680	96.1	101.565	13.83	28.9
2019/02/06 19:30:00:000		192.680	96.1	101.565	13.83	28.9
2019/02/06 19:31:00:000		192.461	96.1	101.441	13.83	28.9
2019/02/06 19:32:00:000		192.461	96.1	101.732	13.83	28.9
2019/02/06 19:33:00:000		193.024	96.2	101.732	13.83	28.9
2019/02/06 19:34:00:000		193.024	95.9	101.511	13.83	28.9
2019/02/06 19:35:00:000		192.571	95.9	101.511	13.83	28.9
2019/02/06 19:36:00:000		192.571	95.9	101.511	13.83	28.9
2019/02/06 19:37:00:000		192.571	95.9	101.511	13.83	28.9
2019/02/06 19:38:00:000		192.571	96.2	101.511	13.82	28.9
2019/02/06 19:39:00:000		192.268	96.0	101.511	13.82	29.1
2019/02/06 19:40:00:000		192.268	96.1	101.511	13.82	29.3
2019/02/06 19:41:00:000		192.268	96.0	101.345	13.82	29.5
2019/02/06 19:42:00:000		191.677	96.0	101.345	13.82	30.0
2019/02/06 19:43:00:000		191.677	96.1	101.345	13.82	30.0
2019/02/06 19:44:00:000		192.090	96.2	101.345	13.82	30.0
2019/02/06 19:45:00:000		192.582	96.1	101.412	13.84	29.8
2019/02/06 19:46:00:000		192.582	96.2	101.490	13.84	29.3
2019/02/06 19:47:00:000		192.582	96.1	101.650	13.84	29.3
2019/02/06 19:48:00:000		192.582	96.1	101.650	13.84	29.1
2019/02/06 19:49:00:000		192.582	95.9	101.487	13.84	29.1
2019/02/06 19:50:00:000		192.582	96.1	101.487	13.83	29.1
2019/02/06 19:51:00:000		192.168	96.1	101.487	13.83	29.3
2019/02/06 19:52:00:000		193.147	96.3	101.544	13.83	29.3
2019/02/06 19:53:00:000		193.147	96.1	101.884	13.83	29.3
2019/02/06 19:54:00:000		192.809	96.1	101.716	13.83	29.1
2019/02/06 19:55:00:000		192.809	96.0	101.560	13.83	28.9
2019/02/06 19:56:00:000		192.809	96.0	101.560	13.83	29.1
2019/02/06 19:57:00:000		192.182	96.0	101.339	13.81	29.1
2019/02/06 19:58:00:000		192.182	96.1	101.339	13.81	29.3
2019/02/06 19:59:00:000		192.182	96.1	101.339	13.81	29.3
2019/02/06 20:00:00:000		192.182	96.2	101.473	13.84	29.3
2019/02/06 20:01:00:000		192.842	96.1	101.866	13.84	29.1
2019/02/06 20:02:00:000		192.424	96.1	101.543	13.84	29.1
2019/02/06 20:03:00:000		192.424	96.1	101.342	13.81	29.3
2019/02/06 20:04:00:000		192.050	96.0	101.559	13.85	29.3
2019/02/06 20:05:00:000		192.405	96.1	101.559	13.85	29.3
2019/02/06 20:06:00:000		192.405	96.2	101.483	13.82	29.3
2019/02/06 20:07:00:000		192.058	96.2	101.483	13.82	29.5
2019/02/06 20:08:00:000		192.058	96.2	101.483	13.82	29.8
2019/02/06 20:09:00:000		192.419	96.1	101.483	13.82	29.8
2019/02/06 20:10:00:000		192.419	96.2	101.483	13.84	29.8
2019/02/06 20:11:00:000		192.419	96.4	101.483	13.84	29.8
2019/02/06 20:12:00:000		192.419	96.3	101.540	13.84	30.0
2019/02/06 20:13:00:000		192.419	96.1	101.540	13.84	30.0
2019/02/06 20:14:00:000		192.419	95.9	101.540	13.83	30.0
2019/02/06 20:15:00:000		192.419	96.2	101.540	13.83	30.0
2019/02/06 20:16:00:000		192.325	96.2	101.433	13.83	30.0
2019/02/06 20:17:00:000		192.325	96.0	101.433	13.83	29.8
2019/02/06 20:18:00:000		191.918	96.1	101.433	13.83	30.0

2019/02/06 20:19:00:000		191.918	96.3	101.520	13.83	30.0
2019/02/06 20:20:00:000		191.918	96.1	101.177	13.83	30.0
2019/02/06 20:21:00:000		192.283	96.4	101.572	13.83	29.5
2019/02/06 20:22:00:000		192.283	96.4	101.572	13.83	29.3
2019/02/06 20:23:00:000		192.559	96.4	101.659	13.83	29.1
2019/02/06 20:24:00:000		192.559	96.2	101.659	13.83	28.9
2019/02/06 20:25:00:000		192.559	96.3	101.659	13.83	28.9
2019/02/06 20:26:00:000		192.945	96.2	101.659	13.83	28.9
2019/02/06 20:27:00:000		192.681	96.2	101.659	13.83	28.9
2019/02/06 20:28:00:000		192.681	96.2	101.659	13.83	29.1
2019/02/06 20:29:00:000		192.398	96.2	101.649	13.83	29.1
2019/02/06 20:30:00:000		192.398	96.2	101.649	13.83	29.1
2019/02/06 20:31:00:000		192.398	96.4	101.649	13.83	29.1
2019/02/06 20:32:00:000		192.398	96.2	101.649	13.83	29.3
2019/02/06 20:33:00:000		192.398	96.2	101.583	13.83	29.3
2019/02/06 20:34:00:000		192.491	96.0	101.583	13.83	29.5
2019/02/06 20:35:00:000		192.491	96.2	101.583	13.83	29.3
2019/02/06 20:36:00:000		192.491	96.1	101.335	13.83	29.1
2019/02/06 20:37:00:000		192.066	96.2	101.442	13.83	29.1
2019/02/06 20:38:00:000		192.066	96.2	101.442	13.83	29.3
2019/02/06 20:39:00:000		192.066	96.1	101.550	13.83	29.3
2019/02/06 20:40:00:000		192.066	96.3	101.550	13.83	29.3
2019/02/06 20:41:00:000		192.249	96.4	101.550	13.83	29.3
2019/02/06 20:42:00:000		192.249	96.2	101.759	13.83	29.5
2019/02/06 20:43:00:000		192.249	96.3	101.544	13.83	29.5
2019/02/06 20:44:00:000		192.249	96.2	101.544	13.83	29.8
2019/02/06 20:45:00:000		191.945	96.2	101.544	13.83	30.0
2019/02/06 20:46:00:000		191.945	96.5	101.544	13.83	30.0
2019/02/06 20:47:00:000		191.945	96.3	101.417	13.83	30.2
2019/02/06 20:48:00:000		191.945	96.4	101.417	13.83	30.7
2019/02/06 20:49:00:000		192.370	96.4	101.762	13.83	30.5
2019/02/06 20:50:00:000		192.370	96.4	101.534	13.83	30.0
2019/02/06 20:51:00:000		192.804	96.1	101.865	13.83	29.8
2019/02/06 20:52:00:000		192.804	96.4	101.706	13.83	29.5
2019/02/06 20:53:00:000		192.528	96.3	101.706	13.83	29.5
2019/02/06 20:54:00:000		192.373	96.1	101.483	13.83	29.8
2019/02/06 20:55:00:000		192.373	96.3	101.563	13.83	29.8
AVERAGE:		**192.38**	**96.39**	**101.54**	**13.79**	**31.33**

US1177 - CPV-Valley - Unit 12 **CTG-2** **FO Run 2**
DCS Data - 20190206-1630 - 20190207-0540

Date / Time	Unit 12 GT Power MW 12HAD00EU001	Unit 12 GT Power % 12MKA01EU902A	Unit 12 Total GT Liquid Fuel Oil Flow KPPH 12MBN10EU001	Unit 12 GT Exhaust O_2 % 12HNE10CQ109	Ambient Temp. °F 12MBL05CT101
2019/02/06 21:00:00:000	192.405	96.0	101.540	13.83	29.3
2019/02/06 21:01:00:000	192.405	96.0	101.346	13.83	29.3
2019/02/06 21:02:00:000	191.978	96.2	101.598	13.83	29.5
2019/02/06 21:03:00:000	192.579	96.3	101.598	13.83	29.8
2019/02/06 21:04:00:000	192.198	96.3	101.428	13.81	29.8
2019/02/06 21:05:00:000	192.198	96.2	101.428	13.81	29.8
2019/02/06 21:06:00:000	192.198	96.2	101.632	13.84	29.5
2019/02/06 21:07:00:000	192.636	96.2	101.632	13.84	29.3
2019/02/06 21:08:00:000	192.636	96.2	101.712	13.84	29.1
2019/02/06 21:09:00:000	192.636	96.2	101.712	13.82	29.1
2019/02/06 21:10:00:000	192.636	96.0	101.712	13.82	28.9
2019/02/06 21:11:00:000	192.636	96.1	101.712	13.82	28.7
2019/02/06 21:12:00:000	192.636	96.2	101.712	13.82	28.7
2019/02/06 21:13:00:000	192.636	96.0	101.635	13.82	28.7
2019/02/06 21:14:00:000	192.636	96.0	101.635	13.82	28.7
2019/02/06 21:15:00:000	192.636	95.9	101.635	13.82	28.7
2019/02/06 21:16:00:000	192.636	96.0	101.635	13.82	28.9
2019/02/06 21:17:00:000	192.253	95.9	101.635	13.82	29.1
2019/02/06 21:18:00:000	191.700	96.1	101.412	13.81	29.3
2019/02/06 21:19:00:000	191.700	96.0	101.412	13.81	29.5
2019/02/06 21:20:00:000	191.700	96.1	101.202	13.81	29.5
2019/02/06 21:21:00:000	191.700	96.1	101.344	13.84	29.8
2019/02/06 21:22:00:000	191.700	96.1	101.344	13.84	29.8
2019/02/06 21:23:00:000	191.700	96.2	101.399	13.84	30.0
2019/02/06 21:24:00:000	191.700	96.2	101.399	13.83	30.2
2019/02/06 21:25:00:000	191.700	96.2	101.602	13.83	30.2
2019/02/06 21:26:00:000	191.951	96.2	101.377	13.83	30.0
2019/02/06 21:27:00:000	191.951	96.3	101.626	13.83	29.8
2019/02/06 21:28:00:000	192.213	96.2	101.487	13.83	29.8
2019/02/06 21:29:00:000	192.213	96.2	101.487	13.83	30.0
2019/02/06 21:30:00:000	192.213	96.2	101.487	13.83	30.0
2019/02/06 21:31:00:000	192.213	96.2	101.538	13.83	29.8
2019/02/06 21:32:00:000	192.213	96.1	101.775	13.83	29.8
2019/02/06 21:33:00:000	192.594	96.2	101.526	13.83	29.8
2019/02/06 21:34:00:000	192.594	96.1	101.702	13.83	29.8
2019/02/06 21:35:00:000	192.098	96.0	101.542	13.83	29.5
2019/02/06 21:36:00:000	192.098	96.1	101.542	13.83	29.5
2019/02/06 21:37:00:000	192.098	96.0	101.526	13.83	29.5
2019/02/06 21:38:00:000	192.098	96.2	101.526	13.83	29.8
2019/02/06 21:39:00:000	192.098	96.1	101.526	13.82	29.8
2019/02/06 21:40:00:000	191.871	96.1	101.340	13.82	29.8
2019/02/06 21:41:00:000	191.871	96.1	101.340	13.82	29.5
2019/02/06 21:42:00:000	191.871	96.2	101.340	13.82	29.5
2019/02/06 21:43:00:000	191.543	96.2	101.468	13.82	29.5
2019/02/06 21:44:00:000	191.997	96.3	101.468	13.82	29.5
2019/02/06 21:45:00:000	191.997	96.3	101.325	13.83	29.5
2019/02/06 21:46:00:000	191.616	96.3	101.349	13.83	29.5
2019/02/06 21:47:00:000	191.616	96.2	101.349	13.83	29.5
2019/02/06 21:48:00:000	192.012	96.2	101.612	13.83	29.5
2019/02/06 21:49:00:000	191.678	96.3	101.428	13.83	29.5
2019/02/06 21:50:00:000	191.678	96.2	101.428	13.83	29.8
2019/02/06 21:51:00:000	191.995	96.3	101.428	13.83	29.8
2019/02/06 21:52:00:000	191.995	96.3	101.532	13.83	29.5
2019/02/06 21:53:00:000	191.995	96.3	101.532	13.83	29.8
2019/02/06 21:54:00:000	191.995	96.3	101.355	13.83	29.8
2019/02/06 21:55:00:000	191.995	96.2	101.534	13.83	30.0
2019/02/06 21:56:00:000	191.995	96.2	101.534	13.83	30.0
2019/02/06 21:57:00:000	192.443	96.3	101.742	13.83	30.2
2019/02/06 21:58:00:000	192.218	96.3	101.486	13.83	30.2
2019/02/06 21:59:00:000	192.218	96.3	101.700	13.83	30.0
2019/02/06 22:00:00:000	192.218	96.2	101.561	13.83	29.8
2019/02/06 22:01:00:000	192.218	96.2	101.561	13.83	29.8
2019/02/06 22:02:00:000	192.218	96.2	101.561	13.83	29.8
2019/02/06 22:03:00:000	192.218	96.3	101.561	13.83	29.8
2019/02/06 22:04:00:000	192.218	96.2	101.561	13.83	30.0
2019/02/06 22:05:00:000	192.218	96.2	101.561	13.82	30.0

2019/02/06 22:06:00:000		191.667	96.2	101.561	13.82	30.0
2019/02/06 22:07:00:000		192.360	96.2	101.561	13.82	30.0
2019/02/06 22:08:00:000		191.839	96.2	101.561	13.82	30.0
2019/02/06 22:09:00:000		192.327	96.2	101.561	13.82	30.0
2019/02/06 22:10:00:000		191.897	96.2	101.561	13.82	29.8
2019/02/06 22:11:00:000		191.897	96.2	101.561	13.83	29.8
2019/02/06 22:12:00:000		192.571	96.4	101.561	13.83	29.8
2019/02/06 22:13:00:000		192.317	96.2	101.561	13.83	29.5
2019/02/06 22:14:00:000		192.317	96.2	101.561	13.83	29.5
2019/02/06 22:15:00:000		192.317	96.2	101.649	13.83	29.5
2019/02/06 22:16:00:000		192.317	96.3	101.649	13.83	29.5
2019/02/06 22:17:00:000		192.317	96.1	101.649	13.83	29.5
2019/02/06 22:18:00:000		192.317	96.1	101.499	13.83	29.8
2019/02/06 22:19:00:000		192.317	96.1	101.641	13.83	29.8
2019/02/06 22:20:00:000		192.317	96.0	101.641	13.83	29.8
2019/02/06 22:21:00:000		192.317	96.3	101.641	13.83	29.5
2019/02/06 22:22:00:000		192.317	96.2	101.542	13.82	29.5
2019/02/06 22:23:00:000		192.317	96.2	101.542	13.82	29.5
2019/02/06 22:24:00:000		191.801	96.2	101.542	13.82	29.8
2019/02/06 22:25:00:000		191.961	96.2	101.359	13.82	29.8
2019/02/06 22:26:00:000		191.961	96.2	101.505	13.82	29.3
2019/02/06 22:27:00:000		192.008	96.2	101.505	13.84	29.3
2019/02/06 22:28:00:000		192.486	96.3	101.658	13.84	29.1
2019/02/06 22:29:00:000		192.486	96.3	101.515	13.84	29.1
2019/02/06 22:30:00:000		192.486	96.3	101.597	13.84	28.9
2019/02/06 22:31:00:000		192.486	96.3	101.597	13.82	28.7
2019/02/06 22:32:00:000		192.486	96.2	101.597	13.82	28.4
2019/02/06 22:33:00:000		192.486	96.2	101.597	13.82	28.4
2019/02/06 22:34:00:000		192.486	96.2	101.597	13.84	28.4
2019/02/06 22:35:00:000		192.154	96.2	101.597	13.84	28.4
2019/02/06 22:36:00:000		192.647	96.4	101.597	13.84	28.4
2019/02/06 22:37:00:000		192.647	96.2	101.671	13.84	28.2
2019/02/06 22:38:00:000		192.857	96.2	101.671	13.82	28.2
2019/02/06 22:39:00:000		192.494	96.2	101.671	13.82	28.4
2019/02/06 22:40:00:000		192.494	96.2	101.671	13.82	28.7
2019/02/06 22:41:00:000		192.494	96.2	101.656	13.82	28.9
2019/02/06 22:42:00:000		192.494	96.1	101.656	13.82	28.9
2019/02/06 22:43:00:000		192.494	96.2	101.542	13.82	29.1
2019/02/06 22:44:00:000		191.829	96.2	101.542	13.82	29.3
2019/02/06 22:45:00:000		192.582	96.2	101.542	13.82	29.3
2019/02/06 22:46:00:000		192.033	96.3	101.542	13.82	29.1
2019/02/06 22:47:00:000		192.080	96.2	101.542	13.82	29.1
2019/02/06 22:48:00:000		192.632	96.2	101.542	13.82	29.1
2019/02/06 22:49:00:000		192.286	96.2	101.542	13.82	29.1
2019/02/06 22:50:00:000		192.286	96.2	101.542	13.84	29.1
2019/02/06 22:51:00:000		192.286	96.2	101.542	13.84	29.3
2019/02/06 22:52:00:000		192.286	96.4	101.542	13.84	29.3
2019/02/06 22:53:00:000		192.286	96.3	101.542	13.82	29.5
2019/02/06 22:54:00:000		192.286	96.2	101.315	13.82	29.5
2019/02/06 22:55:00:000		191.751	96.2	101.315	13.82	29.5
2019/02/06 22:56:00:000		191.891	96.3	101.565	13.85	29.3
2019/02/06 22:57:00:000		192.214	96.3	101.565	13.85	29.3
2019/02/06 22:58:00:000		192.214	96.3	101.565	13.84	29.3
2019/02/06 22:59:00:000		192.214	96.3	101.565	13.84	29.5
2019/02/06 23:00:00:000		192.214	96.3	101.565	13.84	29.3
2019/02/06 23:01:00:000		192.214	96.2	101.565	13.84	29.3
2019/02/06 23:02:00:000		192.307	96.3	101.565	13.82	29.3
2019/02/06 23:03:00:000		192.307	96.3	101.332	13.82	29.5
2019/02/06 23:04:00:000		192.307	96.3	101.648	13.82	29.8
2019/02/06 23:05:00:000		192.307	96.3	101.471	13.82	29.8
2019/02/06 23:06:00:000		192.307	96.3	101.664	13.85	29.3
2019/02/06 23:07:00:000		192.307	96.3	101.433	13.85	29.3
2019/02/06 23:08:00:000		192.522	96.3	101.621	13.83	29.5
2019/02/06 23:09:00:000		192.522	96.4	101.467	13.83	29.5
2019/02/06 23:10:00:000		192.522	96.2	101.467	13.83	29.5
2019/02/06 23:11:00:000		192.245	96.3	101.601	13.83	29.5
2019/02/06 23:12:00:000		192.245	96.3	101.473	13.83	29.8
2019/02/06 23:13:00:000		192.245	96.3	101.473	13.83	29.8
2019/02/06 23:14:00:000		192.245	96.4	101.473	13.83	29.8
2019/02/06 23:15:00:000		192.606	96.4	101.473	13.83	29.5
2019/02/06 23:16:00:000		192.606	96.4	101.473	13.84	29.8
2019/02/06 23:17:00:000		192.606	96.3	101.602	13.84	29.8
2019/02/06 23:18:00:000		192.606	96.2	101.602	13.84	29.8
2019/02/06 23:19:00:000		192.460	96.3	101.602	13.84	29.8
2019/02/06 23:20:00:000		192.460	96.3	101.413	13.84	30.0
2019/02/06 23:21:00:000		192.460	96.3	101.566	13.82	30.0
2019/02/06 23:22:00:000		192.460	96.3	101.566	13.82	29.8
2019/02/06 23:23:00:000		192.460	96.3	101.463	13.82	29.8
2019/02/06 23:24:00:000		192.460	96.3	101.568	13.82	30.0

2019/02/06 23:25:00:000		192.460	96.2	101.568	13.83	30.0
2019/02/06 23:26:00:000		192.460	96.3	101.568	13.83	29.8
2019/02/06 23:27:00:000		192.460	96.3	101.421	13.83	29.8
2019/02/06 23:28:00:000		192.460	96.4	101.656	13.83	29.5
2019/02/06 23:29:00:000		192.460	96.4	101.452	13.83	29.5
2019/02/06 23:30:00:000		192.460	96.3	101.452	13.83	29.8
2019/02/06 23:31:00:000		192.460	96.3	101.452	13.83	29.8
2019/02/06 23:32:00:000		192.252	96.1	101.452	13.83	29.8
2019/02/06 23:33:00:000		192.252	96.3	101.633	13.83	29.8
2019/02/06 23:34:00:000		192.489	96.3	101.633	13.83	29.5
2019/02/06 23:35:00:000		192.489	96.4	101.631	13.83	29.5
2019/02/06 23:36:00:000		192.489	96.2	101.500	13.83	29.5
2019/02/06 23:37:00:000		192.227	96.5	101.500	13.83	29.3
2019/02/06 23:38:00:000		192.227	96.0	101.333	13.83	29.5
2019/02/06 23:39:00:000		192.227	96.3	101.517	13.83	29.8
2019/02/06 23:40:00:000		192.644	96.3	101.517	13.85	29.8
2019/02/06 23:41:00:000		192.188	96.2	101.589	13.83	30.0
2019/02/06 23:42:00:000		192.795	96.3	101.589	13.83	30.0
2019/02/06 23:43:00:000		192.795	96.2	101.589	13.83	30.0
2019/02/06 23:44:00:000		192.795	96.3	101.589	13.83	30.0
2019/02/06 23:45:00:000		192.297	96.2	101.589	13.83	30.2
2019/02/06 23:46:00:000		192.808	96.2	101.429	13.83	30.0
2019/02/06 23:47:00:000		192.589	96.2	101.639	13.83	30.0
2019/02/06 23:48:00:000		192.589	96.2	101.595	13.83	30.0
2019/02/06 23:49:00:000		192.589	96.2	101.595	13.83	29.8
2019/02/06 23:50:00:000		192.261	96.2	101.522	13.83	29.5
2019/02/06 23:51:00:000		192.261	96.2	101.522	13.83	29.5
2019/02/06 23:52:00:000		192.843	96.2	101.522	13.83	29.8
2019/02/06 23:53:00:000		192.682	96.2	101.522	13.83	29.8
2019/02/06 23:54:00:000		192.682	96.4	101.522	13.82	29.8
2019/02/06 23:55:00:000		192.349	96.3	101.522	13.82	30.0
2019/02/06 23:56:00:000		192.802	96.2	101.522	13.82	30.0
2019/02/06 23:57:00:000		192.541	96.2	101.522	13.83	30.0
2019/02/06 23:58:00:000		192.541	96.1	101.355	13.83	30.0
2019/02/06 23:59:00:000		191.975	96.2	101.569	13.83	30.0
2019/02/07 00:00:00:000		192.603	96.3	101.569	13.83	30.2
2019/02/07 00:01:00:000		192.603	96.2	101.430	13.83	30.2
2019/02/07 00:02:00:000		192.603	96.3	101.549	13.83	30.0
2019/02/07 00:03:00:000		192.603	96.4	101.549	13.83	29.8
2019/02/07 00:04:00:000		192.603	96.1	101.549	13.83	29.8
2019/02/07 00:05:00:000		192.415	96.2	101.312	13.83	29.8
2019/02/07 00:06:00:000		192.415	96.2	101.412	13.83	30.0
2019/02/07 00:07:00:000		192.415	96.1	101.412	13.83	30.0
2019/02/07 00:08:00:000		192.675	96.4	101.583	13.83	30.0
2019/02/07 00:09:00:000		192.675	96.3	101.583	13.83	30.0
2019/02/07 00:10:00:000		192.675	96.3	101.583	13.83	29.8
2019/02/07 00:11:00:000		192.249	96.3	101.425	13.83	29.5
2019/02/07 00:12:00:000		192.249	96.1	101.425	13.83	29.8
2019/02/07 00:13:00:000		192.249	96.1	101.425	13.83	29.8
2019/02/07 00:14:00:000		192.249	96.3	101.425	13.83	29.8
2019/02/07 00:15:00:000		192.555	96.2	101.587	13.83	29.8
2019/02/07 00:16:00:000		192.555	96.2	101.587	13.83	29.5
2019/02/07 00:17:00:000		191.998	96.2	101.434	13.83	29.5
2019/02/07 00:18:00:000		191.998	96.2	101.434	13.83	29.8
2019/02/07 00:19:00:000		192.316	96.3	101.292	13.83	29.8
2019/02/07 00:20:00:000		192.316	96.3	101.416	13.83	29.8
2019/02/07 00:21:00:000		192.316	96.3	101.416	13.83	29.8
2019/02/07 00:22:00:000		192.316	96.3	101.416	13.83	29.8
2019/02/07 00:23:00:000		192.316	96.3	101.416	13.83	29.8
2019/02/07 00:24:00:000		192.316	96.3	101.647	13.83	29.8
2019/02/07 00:25:00:000		192.316	96.4	101.417	13.83	29.8
2019/02/07 00:26:00:000		192.316	96.2	101.606	13.83	29.8
2019/02/07 00:27:00:000		192.519	96.2	101.355	13.83	29.8
2019/02/07 00:28:00:000		192.519	96.3	101.439	13.83	29.8
2019/02/07 00:29:00:000		192.519	96.1	101.439	13.83	29.8
2019/02/07 00:30:00:000		192.035	96.2	101.439	13.83	30.0
2019/02/07 00:31:00:000		192.525	96.5	101.523	13.83	30.0
2019/02/07 00:32:00:000		192.525	96.3	101.523	13.83	30.2
2019/02/07 00:33:00:000		192.398	96.4	101.610	13.83	30.2
2019/02/07 00:34:00:000		192.398	96.2	101.231	13.83	30.2
2019/02/07 00:35:00:000		192.398	96.3	101.457	13.83	30.2
2019/02/07 00:36:00:000		192.398	96.3	101.457	13.83	30.2
2019/02/07 00:37:00:000		192.398	96.3	101.225	13.83	30.0
2019/02/07 00:38:00:000		192.121	96.3	101.472	13.83	30.0
2019/02/07 00:39:00:000		192.283	96.3	101.472	13.83	30.0
2019/02/07 00:40:00:000		192.283	96.3	101.472	13.83	30.0
2019/02/07 00:41:00:000		192.283	96.3	101.472	13.83	29.8
2019/02/07 00:42:00:000		192.478	96.4	101.609	13.83	30.0
2019/02/07 00:43:00:000		192.478	96.4	101.442	13.83	30.0

2019/02/07 00:44:00:000	192.478	96.3	101.442	13.83	30.2
2019/02/07 00:45:00:000	192.478	96.3	101.603	13.84	30.0
2019/02/07 00:46:00:000	192.478	96.3	101.496	13.84	29.8
2019/02/07 00:47:00:000	192.478	96.4	101.496	13.84	29.8
2019/02/07 00:48:00:000	192.478	96.3	101.496	13.84	29.8
2019/02/07 00:49:00:000	192.478	96.3	101.496	13.82	29.5
2019/02/07 00:50:00:000	192.478	96.3	101.496	13.82	29.8
2019/02/07 00:51:00:000	192.478	96.3	101.496	13.83	29.8
2019/02/07 00:52:00:000	192.478	96.3	101.496	13.83	29.5
2019/02/07 00:53:00:000	192.478	96.2	101.496	13.83	29.8
2019/02/07 00:54:00:000	192.478	96.4	101.496	13.83	30.0
2019/02/07 00:55:00:000	192.478	96.3	101.496	13.83	30.0
2019/02/07 00:56:00:000	192.478	96.3	101.496	13.83	30.0
2019/02/07 00:57:00:000	192.788	96.5	101.688	13.83	30.2
2019/02/07 00:58:00:000	192.788	96.2	101.470	13.83	30.2
2019/02/07 00:59:00:000	192.367	96.1	101.242	13.82	30.0
2019/02/07 01:00:00:000	192.367	96.2	101.395	13.82	30.0
2019/02/07 01:01:00:000	192.367	96.2	101.395	13.84	30.0
2019/02/07 01:02:00:000	192.367	96.5	101.696	13.84	29.5
2019/02/07 01:03:00:000	192.598	96.4	101.696	13.84	29.5
2019/02/07 01:04:00:000	192.598	96.3	101.587	13.81	29.5
2019/02/07 01:05:00:000	192.598	96.3	101.491	13.81	29.3
2019/02/07 01:06:00:000	192.598	96.5	101.491	13.83	29.3
2019/02/07 01:07:00:000	192.598	96.3	101.677	13.83	29.1
2019/02/07 01:08:00:000	192.598	96.2	101.381	13.83	29.1
2019/02/07 01:09:00:000	192.598	96.2	101.559	13.83	29.3
2019/02/07 01:10:00:000	192.382	96.2	101.356	13.83	29.5
2019/02/07 01:11:00:000	192.382	96.1	101.516	13.83	29.5
2019/02/07 01:12:00:000	192.382	96.3	101.408	13.83	29.8
2019/02/07 01:13:00:000	192.382	96.3	101.408	13.83	30.0
2019/02/07 01:14:00:000	192.031	96.2	101.588	13.83	30.0
2019/02/07 01:15:00:000	192.230	96.2	101.443	13.83	30.0
2019/02/07 01:16:00:000	192.230	96.3	101.443	13.81	30.2
AVERAGE:	**192.33**	**96.24**	**101.52**	**13.83**	**29.66**

US1177 - CPV-Valley - Unit 12 **CTG-2** **FO Run 3**
DCS Data - 20190206-1630 - 20190207-0540

Date / Time	Unit 12 GT Power MW 12HAD00EU001	Unit 12 GT Power % 12MKA01EU902A	Unit 12 Total GT Liquid Fuel Oil Flow KPPH 12MBN10EU001	Unit 12 GT Exhaust O_2 % 12HNE10CQ109	Ambient Temp. °F 12MBL05CT101
2019/02/07 01:25:00:000	192.335	96.3	101.512	13.83	29.1
2019/02/07 01:26:00:000	192.335	96.2	101.512	13.83	29.1
2019/02/07 01:27:00:000	192.607	96.4	101.512	13.83	29.3
2019/02/07 01:28:00:000	192.607	96.2	101.416	13.83	29.3
2019/02/07 01:29:00:000	192.291	96.3	101.416	13.83	29.3
2019/02/07 01:30:00:000	192.291	96.3	101.577	13.83	29.3
2019/02/07 01:31:00:000	192.507	96.3	101.437	13.83	29.3
2019/02/07 01:32:00:000	192.507	96.3	101.437	13.83	29.1
2019/02/07 01:33:00:000	192.507	96.3	101.437	13.83	29.1
2019/02/07 01:34:00:000	192.507	96.3	101.437	13.83	29.3
2019/02/07 01:35:00:000	192.507	96.3	101.546	13.83	29.5
2019/02/07 01:36:00:000	192.423	96.3	101.304	13.83	29.8
2019/02/07 01:37:00:000	192.423	96.3	101.414	13.83	29.8
2019/02/07 01:38:00:000	192.423	96.3	101.414	13.83	29.8
2019/02/07 01:39:00:000	192.423	96.3	101.606	13.83	29.8
2019/02/07 01:40:00:000	192.423	96.3	101.367	13.83	29.8
2019/02/07 01:41:00:000	192.423	96.3	101.572	13.83	30.0
2019/02/07 01:42:00:000	192.423	96.3	101.472	13.84	30.0
2019/02/07 01:43:00:000	192.423	96.4	101.472	13.84	30.0
2019/02/07 01:44:00:000	192.677	96.3	101.472	13.84	29.5
2019/02/07 01:45:00:000	192.677	96.3	101.472	13.84	29.5
2019/02/07 01:46:00:000	192.581	96.3	101.472	13.83	29.5
2019/02/07 01:47:00:000	192.581	96.3	101.472	13.83	29.3
2019/02/07 01:48:00:000	192.581	96.1	101.472	13.83	29.1
2019/02/07 01:49:00:000	192.581	96.3	101.694	13.83	29.1
2019/02/07 01:50:00:000	192.581	96.3	101.496	13.83	28.9
2019/02/07 01:51:00:000	192.581	96.3	101.496	13.83	28.9
2019/02/07 01:52:00:000	192.581	96.3	101.496	13.83	29.1
2019/02/07 01:53:00:000	192.581	96.3	101.496	13.83	29.3
2019/02/07 01:54:00:000	192.581	96.3	101.496	13.83	29.1
2019/02/07 01:55:00:000	192.581	96.3	101.496	13.83	28.9
2019/02/07 01:56:00:000	192.581	96.3	101.496	13.83	29.1
2019/02/07 01:57:00:000	192.581	96.4	101.496	13.84	28.9
2019/02/07 01:58:00:000	192.581	96.3	101.496	13.84	28.9
2019/02/07 01:59:00:000	192.418	96.3	101.323	13.84	28.7
2019/02/07 02:00:00:000	192.418	96.3	101.464	13.83	28.9
2019/02/07 02:01:00:000	192.418	96.3	101.464	13.83	29.1
2019/02/07 02:02:00:000	192.638	96.3	101.464	13.83	29.1
2019/02/07 02:03:00:000	192.638	96.3	101.590	13.83	29.1
2019/02/07 02:04:00:000	192.638	96.3	101.381	13.83	29.1
2019/02/07 02:05:00:000	192.638	96.3	101.556	13.83	29.3
2019/02/07 02:06:00:000	192.638	96.2	101.556	13.83	29.3
2019/02/07 02:07:00:000	192.537	96.2	101.467	13.83	29.8
2019/02/07 02:08:00:000	192.537	96.2	101.467	13.83	29.8
2019/02/07 02:09:00:000	192.537	96.2	101.467	13.83	30.2
2019/02/07 02:10:00:000	192.537	96.3	101.467	13.83	30.2
2019/02/07 02:11:00:000	192.287	96.3	101.367	13.83	30.2
2019/02/07 02:12:00:000	192.287	96.4	101.367	13.83	30.2
2019/02/07 02:13:00:000	192.287	96.2	101.367	13.83	30.2
2019/02/07 02:14:00:000	192.031	96.3	101.367	13.83	30.0
2019/02/07 02:15:00:000	192.694	96.3	101.532	13.83	30.0
2019/02/07 02:16:00:000	192.388	96.3	101.293	13.83	30.2
2019/02/07 02:17:00:000	192.388	96.1	101.554	13.83	30.2
2019/02/07 02:18:00:000	192.388	96.3	101.480	13.83	30.5
2019/02/07 02:19:00:000	192.388	96.3	101.480	13.83	30.5
2019/02/07 02:20:00:000	192.388	96.2	101.396	13.83	30.5
2019/02/07 02:21:00:000	192.388	96.3	101.396	13.83	30.2
2019/02/07 02:22:00:000	192.388	96.2	101.396	13.83	30.0
2019/02/07 02:23:00:000	192.388	96.3	101.455	13.83	30.0
2019/02/07 02:24:00:000	192.388	96.2	101.455	13.83	30.0
2019/02/07 02:25:00:000	192.388	96.3	101.455	13.83	30.0
2019/02/07 02:26:00:000	192.388	96.3	101.455	13.83	30.0
2019/02/07 02:27:00:000	192.388	96.2	101.455	13.83	30.0
2019/02/07 02:28:00:000	192.388	96.2	101.455	13.84	30.0
2019/02/07 02:29:00:000	192.388	96.3	101.379	13.84	30.0
2019/02/07 02:30:00:000	192.388	96.1	101.379	13.84	30.0

2019/02/07 02:31:00:000		192.388	96.2	101.379	13.84	30.2
2019/02/07 02:32:00:000		192.353	96.2	101.379	13.83	30.0
2019/02/07 02:33:00:000		192.353	96.1	101.379	13.83	30.0
2019/02/07 02:34:00:000		192.353	96.3	101.379	13.83	30.0
2019/02/07 02:35:00:000		192.353	96.2	101.532	13.83	30.0
2019/02/07 02:36:00:000		192.353	96.3	101.334	13.83	30.0
2019/02/07 02:37:00:000		192.353	96.3	101.445	13.83	29.8
2019/02/07 02:38:00:000		192.353	96.3	101.445	13.83	29.8
2019/02/07 02:39:00:000		192.353	96.3	101.445	13.83	29.5
2019/02/07 02:40:00:000		192.353	96.3	101.445	13.83	29.5
2019/02/07 02:41:00:000		192.353	96.3	101.445	13.83	29.8
2019/02/07 02:42:00:000		192.327	96.3	101.445	13.83	29.8
2019/02/07 02:43:00:000		192.327	96.4	101.445	13.83	29.5
2019/02/07 02:44:00:000		192.327	96.3	101.445	13.83	29.5
2019/02/07 02:45:00:000		192.327	96.2	101.445	13.83	29.8
2019/02/07 02:46:00:000		192.499	96.3	101.445	13.83	29.8
2019/02/07 02:47:00:000		192.499	96.3	101.445	13.83	29.8
2019/02/07 02:48:00:000		192.499	96.2	101.240	13.83	30.0
2019/02/07 02:49:00:000		192.319	96.3	101.502	13.83	30.0
2019/02/07 02:50:00:000		192.319	96.2	101.502	13.83	30.0
2019/02/07 02:51:00:000		192.534	96.2	101.564	13.83	30.0
2019/02/07 02:52:00:000		192.534	96.4	101.256	13.83	30.0
2019/02/07 02:53:00:000		192.085	96.1	101.268	13.83	30.0
2019/02/07 02:54:00:000		192.085	96.2	101.522	13.83	29.8
2019/02/07 02:55:00:000		192.689	96.2	101.456	13.83	29.5
2019/02/07 02:56:00:000		192.523	96.3	101.456	13.83	29.8
2019/02/07 02:57:00:000		192.343	96.1	101.456	13.83	29.8
2019/02/07 02:58:00:000		192.343	96.2	101.308	13.83	29.8
2019/02/07 02:59:00:000		192.343	96.2	101.511	13.84	30.0
2019/02/07 03:00:00:000		192.343	96.3	101.511	13.84	30.0
2019/02/07 03:01:00:000		192.343	96.3	101.367	13.84	30.0
2019/02/07 03:02:00:000		192.343	96.3	101.554	13.84	30.0
2019/02/07 03:03:00:000		192.343	96.2	101.364	13.82	30.0
2019/02/07 03:04:00:000		192.343	96.4	101.524	13.82	29.8
2019/02/07 03:05:00:000		192.164	96.2	101.332	13.82	29.8
2019/02/07 03:06:00:000		192.164	96.2	101.487	13.84	29.5
2019/02/07 03:07:00:000		192.612	96.3	101.487	13.84	29.5
2019/02/07 03:08:00:000		192.389	96.2	101.487	13.84	29.3
2019/02/07 03:09:00:000		192.389	96.2	101.410	13.84	29.3
2019/02/07 03:10:00:000		192.389	96.2	101.410	13.84	29.5
2019/02/07 03:11:00:000		192.389	96.2	101.410	13.83	29.5
2019/02/07 03:12:00:000		192.304	96.2	101.410	13.83	29.5
2019/02/07 03:13:00:000		192.304	96.2	101.410	13.83	29.5
2019/02/07 03:14:00:000		192.304	96.4	101.410	13.83	29.5
2019/02/07 03:15:00:000		192.304	96.3	101.410	13.83	29.5
2019/02/07 03:16:00:000		192.304	96.3	101.410	13.83	29.3
2019/02/07 03:17:00:000		192.304	96.4	101.410	13.83	29.3
2019/02/07 03:18:00:000		192.304	96.3	101.410	13.83	29.5
2019/02/07 03:19:00:000		192.304	96.3	101.410	13.83	29.5
2019/02/07 03:20:00:000		192.304	96.3	101.410	13.83	29.5
2019/02/07 03:21:00:000		192.304	96.3	101.410	13.83	29.5
2019/02/07 03:22:00:000		192.304	96.1	101.410	13.83	29.5
2019/02/07 03:23:00:000		192.304	96.3	101.510	13.83	29.5
2019/02/07 03:24:00:000		192.491	96.3	101.510	13.83	29.3
2019/02/07 03:25:00:000		192.491	96.3	101.510	13.83	29.1
2019/02/07 03:26:00:000		192.491	96.2	101.323	13.83	29.3
2019/02/07 03:27:00:000		192.197	96.2	101.589	13.83	29.1
2019/02/07 03:28:00:000		192.197	96.2	101.488	13.83	29.3
2019/02/07 03:29:00:000		192.197	96.3	101.263	13.83	29.1
2019/02/07 03:30:00:000		192.272	96.3	101.448	13.83	29.1
2019/02/07 03:31:00:000		192.272	96.2	101.448	13.83	29.1
2019/02/07 03:32:00:000		192.272	96.2	101.448	13.84	29.3
2019/02/07 03:33:00:000		192.272	96.3	101.448	13.84	29.1
2019/02/07 03:34:00:000		192.499	96.3	101.448	13.84	29.3
2019/02/07 03:35:00:000		192.499	96.3	101.448	13.84	29.5
2019/02/07 03:36:00:000		192.499	96.3	101.448	13.83	29.5
2019/02/07 03:37:00:000		192.234	96.3	101.448	13.83	29.5
2019/02/07 03:38:00:000		192.234	96.3	101.370	13.83	29.3
2019/02/07 03:39:00:000		192.234	96.2	101.510	13.83	29.3
2019/02/07 03:40:00:000		192.349	96.3	101.510	13.83	29.3
2019/02/07 03:41:00:000		192.349	96.3	101.416	13.83	29.8
2019/02/07 03:42:00:000		192.349	96.3	101.416	13.83	29.8
2019/02/07 03:43:00:000		192.349	96.2	101.416	13.83	29.8
2019/02/07 03:44:00:000		192.349	96.2	101.416	13.83	29.8
2019/02/07 03:45:00:000		191.798	96.2	101.416	13.83	29.8
2019/02/07 03:46:00:000		192.382	96.3	101.416	13.83	29.5
2019/02/07 03:47:00:000		192.382	96.3	101.520	13.83	29.5
2019/02/07 03:48:00:000		192.382	96.2	101.390	13.84	29.3
2019/02/07 03:49:00:000		192.137	96.2	101.390	13.84	29.3

2019/02/07 03:50:00:000		192.137	96.2	101.390	13.84	29.1
2019/02/07 03:51:00:000		192.374	96.2	101.478	13.84	29.1
2019/02/07 03:52:00:000		192.374	96.2	101.365	13.84	29.8
2019/02/07 03:53:00:000		192.013	96.3	101.365	13.84	29.8
2019/02/07 03:54:00:000		192.013	96.3	101.365	13.84	29.8
2019/02/07 03:55:00:000		192.324	96.3	101.513	13.84	29.8
2019/02/07 03:56:00:000		192.324	96.3	101.513	13.84	29.8
2019/02/07 03:57:00:000		192.324	96.4	101.421	13.83	29.5
2019/02/07 03:58:00:000		192.324	96.3	101.421	13.83	29.5
2019/02/07 03:59:00:000		192.324	96.3	101.421	13.83	29.8
2019/02/07 04:00:00:000		192.324	96.3	101.421	13.83	30.0
2019/02/07 04:01:00:000		192.324	96.2	101.421	13.83	30.2
2019/02/07 04:02:00:000		192.324	96.3	101.421	13.83	30.2
2019/02/07 04:03:00:000		192.177	96.2	101.308	13.84	30.2
2019/02/07 04:04:00:000		192.177	96.3	101.397	13.84	30.0
2019/02/07 04:05:00:000		192.177	96.2	101.397	13.84	30.2
2019/02/07 04:06:00:000		192.177	96.3	101.397	13.84	30.5
2019/02/07 04:07:00:000		192.177	96.2	101.397	13.84	30.7
2019/02/07 04:08:00:000		192.177	96.3	101.397	13.83	30.5
2019/02/07 04:09:00:000		192.177	96.3	101.397	13.83	30.2
2019/02/07 04:10:00:000		192.177	96.2	101.397	13.83	30.0
2019/02/07 04:11:00:000		192.177	96.1	101.397	13.83	29.8
2019/02/07 04:12:00:000		192.177	96.3	101.397	13.83	30.0
2019/02/07 04:13:00:000		192.177	96.3	101.397	13.84	30.0
2019/02/07 04:14:00:000		192.177	96.2	101.397	13.84	29.8
2019/02/07 04:15:00:000		192.177	96.2	101.397	13.84	30.0
2019/02/07 04:16:00:000		192.177	96.3	101.397	13.84	30.0
2019/02/07 04:17:00:000		192.177	96.2	101.397	13.84	30.0
2019/02/07 04:18:00:000		192.177	96.2	101.397	13.84	30.0
2019/02/07 04:19:00:000		192.177	96.3	101.397	13.84	30.0
2019/02/07 04:20:00:000		192.177	96.3	101.397	13.84	30.2
2019/02/07 04:21:00:000		192.177	96.3	101.397	13.84	30.2
2019/02/07 04:22:00:000		192.177	96.4	101.397	13.84	30.2
2019/02/07 04:23:00:000		192.177	96.3	101.485	13.84	30.5
2019/02/07 04:24:00:000		192.177	96.3	101.220	13.83	30.7
2019/02/07 04:25:00:000		191.792	96.5	101.431	13.83	31.0
2019/02/07 04:26:00:000		191.792	96.3	101.302	13.83	31.0
2019/02/07 04:27:00:000		191.883	96.3	101.302	13.83	31.0
2019/02/07 04:28:00:000		191.883	96.4	101.271	13.84	31.0
2019/02/07 04:29:00:000		191.883	96.5	101.271	13.84	30.7
2019/02/07 04:30:00:000		191.883	96.4	101.395	13.84	31.0
2019/02/07 04:31:00:000		191.883	96.4	101.395	13.84	31.0
2019/02/07 04:32:00:000		192.534	96.4	101.395	13.84	30.7
2019/02/07 04:33:00:000		191.912	96.5	101.514	13.84	30.7
2019/02/07 04:34:00:000		191.912	96.3	101.514	13.84	30.7
2019/02/07 04:35:00:000		192.211	96.4	101.326	13.84	30.5
2019/02/07 04:36:00:000		192.211	96.3	101.326	13.84	30.7
2019/02/07 04:37:00:000		191.770	96.2	101.425	13.84	30.7
2019/02/07 04:38:00:000		191.770	96.4	101.425	13.84	30.5
2019/02/07 04:39:00:000		192.510	96.4	101.425	13.84	30.2
2019/02/07 04:40:00:000		192.107	96.7	101.588	13.84	30.0
2019/02/07 04:41:00:000		192.107	96.4	101.429	13.84	30.0
2019/02/07 04:42:00:000		192.107	96.4	101.429	13.84	29.8
2019/02/07 04:43:00:000		192.107	96.4	101.429	13.84	29.8
2019/02/07 04:44:00:000		191.960	96.4	101.429	13.84	30.2
2019/02/07 04:45:00:000		191.960	96.4	101.429	13.84	30.5
2019/02/07 04:46:00:000		192.285	96.4	101.593	13.84	30.5
2019/02/07 04:47:00:000		192.285	96.4	101.571	13.84	30.5
2019/02/07 04:48:00:000		192.175	96.4	101.571	13.84	30.2
2019/02/07 04:49:00:000		192.175	96.3	101.407	13.84	30.2
2019/02/07 04:50:00:000		192.175	96.3	101.679	13.84	30.2
2019/02/07 04:51:00:000		191.561	96.4	101.327	13.84	30.5
2019/02/07 04:52:00:000		191.561	96.4	101.327	13.83	30.7
2019/02/07 04:53:00:000		191.561	96.3	101.274	13.83	30.5
2019/02/07 04:54:00:000		191.561	96.4	101.274	13.85	30.5
2019/02/07 04:55:00:000		191.561	96.4	101.227	13.85	30.7
2019/02/07 04:56:00:000		191.561	96.4	101.227	13.85	30.7
2019/02/07 04:57:00:000		191.561	96.4	101.339	13.85	30.7
2019/02/07 04:58:00:000		191.561	96.4	101.339	13.85	30.5
2019/02/07 04:59:00:000		191.561	96.5	101.339	13.85	30.5
2019/02/07 05:00:00:000		191.501	96.1	101.339	13.85	30.7
2019/02/07 05:01:00:000		191.501	96.1	101.339	13.85	30.7
2019/02/07 05:02:00:000		191.718	96.5	101.339	13.84	30.7
2019/02/07 05:03:00:000		191.718	96.4	101.466	13.84	30.5
2019/02/07 05:04:00:000		191.987	96.4	101.466	13.84	30.2
2019/02/07 05:05:00:000		191.987	96.4	101.377	13.84	30.0
2019/02/07 05:06:00:000		191.987	96.5	101.588	13.84	29.8
2019/02/07 05:07:00:000		191.987	96.5	101.475	13.84	29.5
2019/02/07 05:08:00:000		191.987	96.3	101.475	13.84	29.3

2019/02/07 05:09:00:000		192.103	96.3	101.555	13.84	29.3
2019/02/07 05:10:00:000		192.103	96.3	101.275	13.84	29.3
2019/02/07 05:11:00:000		192.103	96.2	101.492	13.84	29.3
2019/02/07 05:12:00:000		192.525	96.3	101.492	13.84	29.1
2019/02/07 05:13:00:000		192.525	96.3	101.492	13.84	29.1
2019/02/07 05:14:00:000		192.111	96.2	101.492	13.84	28.9
2019/02/07 05:15:00:000		192.111	96.2	101.492	13.84	28.9
2019/02/07 05:16:00:000		192.111	96.3	101.340	13.84	28.9
2019/02/07 05:17:00:000		192.111	96.0	101.321	13.84	28.9
2019/02/07 05:18:00:000		192.111	96.4	101.336	13.84	28.9
2019/02/07 05:19:00:000		192.111	96.2	101.434	13.84	29.1
2019/02/07 05:20:00:000		192.111	96.3	101.434	13.84	29.1
2019/02/07 05:21:00:000		192.111	96.3	101.434	13.84	28.9
2019/02/07 05:22:00:000		192.111	96.2	101.434	13.84	28.9
2019/02/07 05:23:00:000		192.111	96.3	101.434	13.84	28.7
2019/02/07 05:24:00:000		192.111	96.3	101.610	13.83	28.7
2019/02/07 05:25:00:000		192.111	96.1	101.388	13.83	28.7
2019/02/07 05:26:00:000		192.111	96.4	101.388	13.83	28.7
2019/02/07 05:27:00:000		192.111	96.2	101.533	13.83	28.7
2019/02/07 05:28:00:000		192.731	96.3	101.467	13.83	28.7
2019/02/07 05:29:00:000		192.263	96.2	101.467	13.83	28.4
2019/02/07 05:30:00:000		192.263	96.3	101.467	13.83	28.4
2019/02/07 05:31:00:000		192.263	96.3	101.467	13.83	28.4
2019/02/07 05:32:00:000		192.263	96.2	101.467	13.83	28.4
2019/02/07 05:33:00:000		192.263	96.1	101.330	13.83	28.4
AVERAGE:		**192.27**	**96.28**	**101.43**	**13.84**	**29.75**

EMISSION DATA RECORDS

Unit #CTG-12
Base Load
PM Data

METHOD 201A (FRONT) AND 202 (BACK) - RESULTS

Plant Name	CPV Valley Energy Center
Sampling Location	CTG-12 Stack
Project #	sie-19-middletown.ny-comp#1

Historical Data	**12-PM-FO-1**	**12-PM-FO-2**	**12-PM-FO-3**	**Average**	**Units**	**Limits**
Run Start Time	16:35	21:00	01:25		hh:mm	
Run Stop Time	20:55	01:16	05:33		hh:mm	
Test Date	02/06/19	02/06/19	02/07/19		mm/dd/yy	
Load	Base FO	Base FO	Base FO		% or w/DB	--
Meter Calibration Factor	0.893	1.017	0.893			
Pitot Tube Coefficient	0.7290	0.7350	0.7290			
Average Nozzle Diameter	0.142	0.142	0.142		in	
Stack Test Data	**12-PM-FO-1**	**12-PM-FO-2**	**12-PM-FO-3**	**Average**	**Units**	**Limits**
Initial Meter Volume	985.160	77.810	162.630		ft^3	
Final Meter Volume	1077.530	162.130	257.590		ft^3	
Total Meter Volume	92.370	84.320	94.960	90.550	ft^3	
Total Sampling Time	246.25	248.25	246.75	247.08	min	
Average Meter Temperature	72.75	73.42	73.42	73.19	°F	
Average Stack Temperature	280.75	284.00	281.75	282.17	°F	
Barometric Pressure	29.58	29.59	29.55	29.57	in Hg	
Stack Static Pressure	-1.10	-1.10	-1.10	-1.10	in H_2O	
Absolute Stack Pressure	29.50	29.51	29.47	29.49	in Hg	
Average Orifice Pressure Drop	0.48	0.48	0.48	0.48	in H_2O	
Absolute Meter Pressure	29.72	29.72	29.69	29.71	in Hg	
Avg Square Root Pitot Pressure	1.27	1.28	1.28	1.28	$\sqrt{(in\ H_2O)}$	
Moisture Content Data	**12-PM-FO-1**	**12-PM-FO-2**	**12-PM-FO-3**	**Average**	**Units**	**Limits**
Impinger Water Weight Gain	102.90	106.30	105.20	104.80	g	
Silica Gel Weight Gain	14.10	16.30	13.40	14.60	g	
Total Water Volume Collected	117.21	122.82	118.81	119.62	ml	
Standard Water Vapor Volume	5.52	5.78	5.59	5.63	scf	
Standard Meter Volume	80.9	84.0	83.0	82.7	dscf	
Standard Metric Meter Volume	2.3	2.4	2.4	2.3	dscm	
Calculated Stack Moisture	6.38	6.44	6.31	6.38	%	
Saturated Stack Moisture	100.00	100.00	100.00	100.00	%	
Reported Stack Moisture Content	6.38	6.44	6.31	6.38	%	
Gas Analysis Data	**12-PM-FO-1**	**12-PM-FO-2**	**12-PM-FO-3**	**Average**	**Units**	**Limits**
Carbon Dioxide Content	5.4	5.4	5.3	5.4	%	
Oxygen Content	13.8	13.8	13.8	13.8	%	
Carbon Monoxide Content	0.0	0.0	0.0	0.0	ppm	
Nitrogen Content	80.9	80.8	80.9	80.9	%	
Stack Dry Molecular Weight	29.41	29.42	29.40	29.41	lb/lb-mole	
Stack Wet Molecular Weight	28.68	28.68	28.68	28.68	lb/lb-mole	
Calculated Fuel Factor	1.327	1.315	1.340	1.327		
Fuel F-Factor	9290.27	9290.27	9290.27	9290.27	dscf/MMBtu	
Percent Excess Air	182.9	183.2	182.6	182.9	%	

METHOD 201A (FRONT) AND 202 (BACK) - RESULTS

Plant Name	CPV Valley Energy Center
Sampling Location	CTG-12 Stack
Project #	sie-19-middletown.ny-comp#1

Volumetric Flow Rate Data	**12-PM-FO-1**	**12-PM-FO-2**	**12-PM-FO-3**	**Average**	**Units**	**Limits**
Average Stack Gas Velocity	74.35	75.33	74.67	74.78	ft/sec	
Stack Cross-Sectional Area	283.53	283.53	283.53	283.53	ft²	
Actual Stack Flow Rate	1,264,801	1,281,505	1,270,259	1,272,189	acfm	
Wet Standard Stack Flow Rate	53,331	53,818	53,435	53,528	wkscfh	
Dry Standard Stack Flow Rate	49,927,658	50,354,647	50,062,083	50,114,796	dscfh	
Percent of Isokinetic Rate	101.5	103.7	103.7	103.0	%	
Emission Rate Data	**12-PM-FO-1**	**12-PM-FO-2**	**12-PM-FO-3**	**Average**	**Units**	**Limits**
Total $PM_{10}/PM_{2.5}$ Mass	6.99	5.90	5.79	6.23	mg	--
Total $PM_{10}/PM_{2.5}$ Concentration	8.64E-05	7.02E-05	6.98E-05	7.54E-05	g/dscf	--
	1.33E-03	1.08E-03	1.08E-03	1.16E-03	gr/dscf	--
Total $PM_{10}/PM_{2.5}$ Emission Rate	4.31	3.53	3.49	3.78	kg/hr	--
	9.51	7.79	7.70	8.33	lb/hr	--
	41.63	34.13	33.72	36.49	tpy	--
	0.0052	0.0042	0.0042	0.0045	lb/MMBtu	0.0073
Filterable PM_{10} Mass	1.85	1.75	1.54	1.71	mg	--
Filterable PM_{10} Concentration	2.28E-05	2.08E-05	1.86E-05	2.07E-05	g/dscf	--
	3.52E-04	3.22E-04	2.87E-04	3.20E-04	gr/dscf	--
Filterable PM_{10} Emission Rate	1.14	1.05	0.93	1.04	kg/hr	--
	2.51	2.31	2.05	2.29	lb/hr	--
	11.00	10.13	8.98	10.03	tpy	--
	0.0014	0.0013	0.0011	0.0013	lb/MMBtu	--
Filterable $PM_{2.5}$ Mass	2.74	2.65	1.85	2.41	mg	--
Filterable $PM_{2.5}$ Concentration	3.39E-05	3.15E-05	2.23E-05	2.92E-05	g/dscf	--
	5.23E-04	4.86E-04	3.44E-04	4.51E-04	gr/dscf	--
Filterable $PM_{2.5}$ Emission Rate	1.69	1.59	1.11	1.46	kg/hr	--
	3.73	3.50	2.46	3.23	lb/hr	--
	16.34	15.32	10.76	14.14	tpy	--
	0.0020	0.0019	0.0013	0.0018	lb/MMBtu	--
Condensable $PM_{2.5}$ Mass	2.40	1.50	2.40	2.10	mg	--
Condensable $PM_{2.5}$ Concentration	2.97E-05	1.78E-05	2.89E-05	2.55E-05	g/dscf	--
	4.58E-04	2.75E-04	4.46E-04	3.93E-04	gr/dscf	--
Condensable $PM_{2.5}$ Emission Rate	1.48	0.90	1.45	1.28	kg/hr	--
	3.26	1.98	3.19	2.81	lb/hr	--
	14.30	8.68	13.98	12.32	tpy	--
	0.0018	0.0011	0.0017	0.0015	lb/MMBtu	--
RM 201A Quality Control	**12-PM-FO-1**	**12-PM-FO-2**	**12-PM-FO-3**	**Average**	**Units**	**Limits**
Cyclone Flow Rate	0.50	0.52	0.51	0.51	ft³/min	
Stack Viscosity	225.42	226.11	225.71	225.75	µP	
Cunningham Correction Factor	1.08	1.08	1.08	1.08		
Recalculated D50-1 for CIV	2.89	2.78	2.81	2.83		
Recalculated Cunninham	1.08	1.08	1.08	1.08		
Lower Limit Cut Diameter, CI (NRE<3162), D50LL	2.89	2.78	2.81	2.83		
Reynolds Number	2186.48	2247.15	2233.61	2,222.41		
Z	1.00	1.00	1.00	1.00		
No. Sampling Pts. Outside Dp	0	0	0	0	points	

METHOD 201A (FRONT) AND 202 (BACK) SOURCE SAMPLING TITLE PAGE

Source Information	
Plant Name	CPV Valley Energy Center
Sampling Location	CTG-12 Stack
Fuel Type	Oil, Distillate

Test Information			
Project #		sie-19-middletown.ny-comp#1	
Operator		CM	
Date for Preliminary Run	(mm/dd/yy)	02/06/19	
Standard Temperature		68	°F
Standard Pressure		29.92	in Hg
Required Sample Vol.	indust. spec.	50	scf
Run Duration	chk Subpart	240	minutes
Unit Number		CTG-12	
Base Run Number		12-PM-FO	
Number of Ports Available		4	
Number of Ports Used		4	
Port Inside Diameter		6.00	in
Stack Shape		Circular	

Test Equipment Information					
Run		**1**	**2**	**3**	
Test Date	(mm/dd/yy)	02/06/19	02/06/19	02/07/19	
Load		Base FO	Base FO	Base FO	% or w/DB
Fuel F-Factor		9290.27	9290.27	9290.27	dscf/MMBtu
Meter Box Number	from ACS	samp-cp-0019	samp-cp-0025	samp-cp-0019	
Meter Calibration Factor	(Y)	0.893	1.017	0.893	
Orifice Meter Coefficient	($\Delta H_@$)	1.838	1.820	1.838	in H_2O
Pitot Identification	from ACS	P-983/10	5272/10	P-983/10	
Pitot Tube Coefficient	(C_p)	0.7290	0.7350	0.7290	
Nozzle Number	from ACS	3	3	3	must match cyc nozz tab (e.g. 3, 4, etc.)
Nozzle Diameter	(D_n)	0.142	0.142	0.142	in
Probe Number	from ACS	samp-hp-0148	samp-hp-0149	samp-hp-0148	
Probe Length		120.0	120.0	120.0	in
(SS, Glass ….) Liner Material	from list	glass	glass	glass	
Sample Case / Oven Number	from ACS	samp-bh-0034	samp-cp-0035	samp-bh-0034	
Impinger Case Number	from ACS	samp-cc-0027	samp-cc-0012	samp-cc-0027	

Testing Company Information	
Company Name	Air Hygiene International, Inc. (Tulsa, Oklahoma)
Address	1600 W Tacoma Street
City, State Zip	Broken Arrow, Oklahoma 74012
Project Manager	Cole McBride
Phone Number	(918) 307-8865
Fax Number	(918) 307-9131

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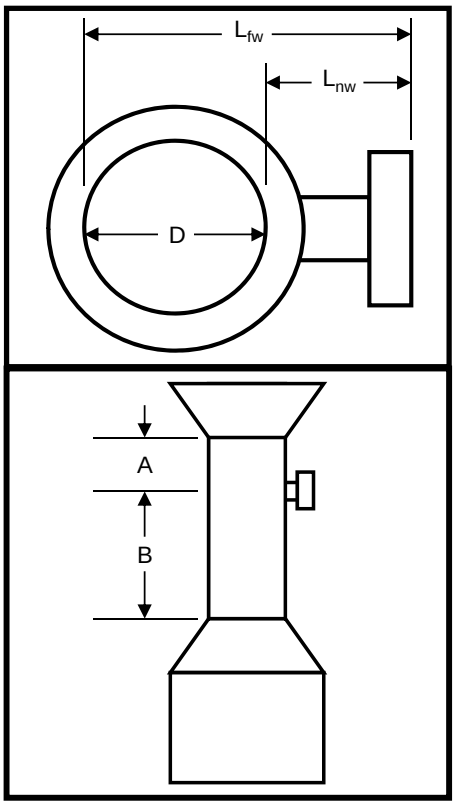
METHOD 1 - SAMPLE AND VELOCITY TRAVERSES FOR CIRCULAR SOURCES

Plant Name	CPV Valley Energy Center	**Date**	02/06/19
Sampling Location	CTG-12 Stack	**Stack Type**	Circular
Operator	CM	**Ports Available**	4
Project #	sie-19-middletown.ny-comp#1	**Ports Used**	4
Stack Size	Large (>24 inch diameter)	**Port ID (inches)**	6.00

Circular Stack or Duct Diameter			
Distance to Far Wall of Stack	(L_{fw})	235.25	in
Distance to Near Wall of Stack	(L_{nw})	7.25	in
Diameter of Stack	(D)	228.00	in
Area of Stack	(A_s)	283.53	ft²

Distance from Port to Disturbances			
Distance Upstream	(A)	1200.00	in
Diameters Upstream	(A_D)	5.26	diameters
Distance Downstream	(B)	1095.00	in
Diameters Downstream	(B_D)	4.80	diameters



Number of Traverse Points Required			
Diameters to Flow Disturbance		**Minimum Number of[1] Traverse Points**	
Down Stream	**Up Stream**	**Particulate Points**	**Velocity Points**
2.00-4.99	0.50-1.24	24	16
5.00-5.99	1.25-1.49	20	16
6.00-6.99	1.50-1.74	16	12
7.00-7.99	1.75-1.99	12	12
>= 8.00	>=2.00	8 or 12[2]	8 or 12[2]
Upstream Spec		12	12
Downstream Spec		24	16
Traverse Pts Required		24	16

[1] Check Minimum Number of Points for the Upstream and Downstream conditions, then use the largest.

[2] 8 for Circular Stacks 12 to 24 inches
12 for Circular Stacks over 24 inches

○ Method 1 Trav

◉ 12 Point PM Trav (M201a ONLY)

○ Velocity

Number of Traverse Points Used			
4	**Ports by**	3	**Across**
12	**Pts Used**	12	**Required**

Location of Traverse Points in Circular Stacks									
Traverse Point Number	(Fraction of Stack Dimension from Inside Wall to Traverse Point) Number of Traverse Points Across the Stack								
	2	4	6	8	10	12	14	16	18
1	.146	.067	.044	.032	.026	.021	.018	.016	.014
2	.854	.250	.146	.105	.082	.067	.057	.049	.044
3		.750	.296	.194	.146	.118	.099	.085	.075
4		.933	.704	.323	.226	.177	.146	.125	.109
5			.854	.677	.342	.250	.201	.169	.146
6			.956	.806	.658	.356	.269	.220	.188
7				.895	.774	.644	.366	.283	.236
8				.968	.854	.750	.634	.375	.296
9					.918	.823	.731	.625	.382
10					.974	.882	.799	.717	.618
11						.933	.854	.780	.704
12						.979	.901	.831	.764

Traverse Point Locations			
Traverse Point Number	**Fraction of Stack Diameter**	**Distance from Inside Wall**	**Distance Including Reference Length**
		in	in
1	0.044	10	17 2/8
2	0.146	33 2/8	40 4/8
3	0.296	67 4/8	74 6/8
4			
5			
6			
7			
8			
9			

METHOD 2 - DETERMINATION OF STACK GAS VELOCITY AND VOLUMETRIC FLOW RATE

Plant Name	CPV Valley Energy Center			
Sampling Location	CTG-12 Stack			
Operator	CM			
Project #	sie-19-middletown.ny-comp#1			
Pitot Leak Check	x	**PreTest**	x	**PostTest**

Preliminary Run Date	02/06/19		
Stack Type	Circular		
Ports Available	4		
Thermocouple ID	samp-hp-0148		
Pitot Coefficient	0.8232	**Pitot Identification**	4183

Stack Dimensions			
Area of Stack	(A_s)	283.53	ft²
Diameter of Stack	(D)	228.00	in

Pressures			
Barometric Pressure	(P_b)	29.58	in Hg
Static Pressure	(P_{static})	-1.10	in H_2O
Absolute Stack Pressure	(P_s)	29.50	in Hg

Stack Gas Composition			
Composition Data:	**Estimated Composition**		
Carbon Dioxide Concentration	(%CO_2)	4.90	%vd
Oxygen Concentration	(%O_2)	12.40	%vd
Carbon Monoxide Concentration	(ppmCO)	0.00	ppmvd
Nitrogen Concentration	(%N_2)	82.70	%vd
Stack Moisture Content	(B_{ws})	6.50	%
Stack Dry Molecular Weight	(M_d)	29.28	lb/lb-mole
Stack Wet Molecular Weight	(M_w)	28.55	lb/lb-mole

Results			
Avg Stack Gas Velocity	(v_s)	75.04	ft/sec
Avg Stack Dry Std Flow Rate	(Q_{sd})	50,419,306	dscf/hr
Avg Stack Dry Std Flow Rate	(Q_{sd})	840,322	dscf/min
Avg Stack Wet Flow Rate	(Q_{aw})	1,276,562	acf/min
Avg Stack Wet Std Flow Rate	(Q_{sw})	53,924,391	ascf/hr

40 CFR 60, Method 2G, Section 8.11.1 (but applies to all Method 2 type static pressure measurements):
If a Type S probe is used for this measurement, position the probe at or between any traverse point(s) and rotate the probe until a null differential pressure reading is obtained. Disconnect the tubing from one of the pressure ports; read and record the ΔP. For pressure devices with one-directional scales, if a deflection in the positive direction is noted with the negative side disconnected, then the static pressure is positive. Likewise, if a deflection in the positive direction is noted with the positive side disconnected, then the static pressure is negative.

Stack Cross Section Schematic

Velocity Traverse Data					
Run Number		12-PM-FO-V1			
Run Time		16:10	**Start**	16:20	**End**
Traverse Point	**Velocity Head** (Δp)	**Null Angle** (N_a)	**Zero Deg Pressure** ($0°_a$)	**Stack Temp** (t_s)	**Local Velocity** ($v_{s(l)}$)
	in H_2O	deg	in H_2O	°F	ft/sec
A-1	1.90	-5	0.10	278	90.81
A-2	1.90	-5	0.10	278	90.81
A-3	1.80	0	0.00	280	88.51
B-1	1.40	-5	0.10	278	77.95
B-2	1.40	0	0.00	278	77.95
B-3	1.20	0	0.00	279	72.22
C-1	2.10	0	0.00	280	95.60
C-2	1.70	0	0.00	280	86.02
C-3	1.20	-5	0.10	280	72.27
D-1	2.10	-5	0.10	280	95.60
D-2	1.90	0	0.00	281	91.00
D-3	1.40	0	0.00	281	78.11
Average	1.67	2		279	
	1.28	**= Square roots of Δp**			
Standard deviation of null angles =				2.6	

METHOD 3a - DETERMINATION OF DRY MOLECULAR WEIGHT BY ANALYZER

Plant Name	CPV Valley Energy Center	**Preliminary Run Date**	02/06/19		
Sampling Location	CTG-12 Stack	**Operator**	CM		
Project #	sie-19-middletown.ny-comp#1	**# of Ports Used**	1 (gas probe)		
Fuel Type	Oil, Distillate	**Min. Fuel Factor**	1.260	**Max. Fuel Factor**	1.413

Gas Analysis Data

Run Number	12-PM-FO-1		**Date**	02/06/19	**Run Start Time**	16:35	**Run Stop Time**	20:55
Sample Analysis Time	**CO_2 Conc.**	**O_2 Conc.**	**CO Conc.**	**N_2 Conc.**	**Dry Molecular Weight**	**Calculated Fuel Factor**	**Excess Air**	**Fuel Factor in Range**
	($\%CO_2$)	($\%O_2$)	(ppmCO)	($\%N_2$)	(M_d)	$(F_o)_{avg}$	$(\%EA)_{avg}$	
hh:mm	%	%	ppm	%	lb/lb-mole		%	
04:20	5.4	13.8	0.0	80.9	29.41	1.327	182.9	YES

Gas Analysis Data

Run Number	12-PM-FO-2		**Date**	02/06/19	**Run Start Time**	21:00	**Run Stop Time**	01:16
Sample Analysis Time	**CO_2 Conc.**	**O_2 Conc.**	**CO Conc.**	**N_2 Conc.**	**Dry Molecular Weight**	**Calculated Fuel Factor**	**Excess Air**	**Fuel Factor in Range**
	($\%CO_2$)	($\%O_2$)	(ppmCO)	($\%N_2$)	(M_d)	$(F_o)_{avg}$	$(\%EA)_{avg}$	
hh:mm	%	%	ppm	%	lb/lb-mole		%	
04:16	5.4	13.8	0.0	80.8	29.42	1.315	183.2	YES

Gas Analysis Data

Run Number	12-PM-FO-3		**Date**	02/07/19	**Run Start Time**	01:25	**Run Stop Time**	05:33
Sample Analysis Time	**CO_2 Conc.**	**O_2 Conc.**	**CO Conc.**	**N_2 Conc.**	**Dry Molecular Weight**	**Calculated Fuel Factor**	**Excess Air**	**Fuel Factor in Range**
	($\%CO_2$)	($\%O_2$)	(ppmCO)	($\%N_2$)	(M_d)	$(F_o)_{avg}$	$(\%EA)_{avg}$	
hh:mm	%	%	ppm	%	lb/lb-mole		%	
04:08	5.3	13.8	0.0	80.9	29.40	1.340	182.6	YES

METHOD 4 - DETERMINATION OF MOISTURE CONTENT IN STACK GASES

Plant Name	CPV Valley Energy Center	**Preliminary Run Date**	02/06/19
Sampling Location	CTG-12 Stack	**Operator**	CM
Project #	sie-19-middletown.ny-comp#1	**Ports Used**	4

Scale Daily Calibration					
Scale Number	SAMP-SC-0016	**Standard**	**Result**	**Difference**	**Pass/Fail**
Date		(g)	(g)	(g)	(± 0.5 g)
Preliminary Date	02/06/19	500	499.9	-0.1	Pass
Test Day 1	02/06/19	500	499.8	-0.2	Pass

Moisture Content Data									
Run Number	12-PM-FO-1		**Date**	02/06/19	**Start Time**	16:35	**Stop Time**	20:55	
Meter Box Number	samp-cp-0019				**Meter Cal Factor**	(Y)	0.893		
Total Meter Volume	(V_m)	92.370	dcf		**Barometric Pressure**	(P_b)	29.58	in Hg	
Average Stack Temp	$(t_s)_{avg}$	281	°F		**Stack Static Pressure**	(P_{static})	-1.10	in H_2O	
Average Meter Temp	$(t_m)_{avg}$	73	°F		**Avg Orifice Pressure**	$(\Delta H)_{avg}$	0.48	in H_2O	
	Impinger 1	**Impinger 2**	**Impinger 3**	**Impinger 4**	**Impinger 5**	**Impinger 6**	**Impinger 7**	**Impinger 8**	
	(g)	(g)	(g)	(g)					
Contents	Dry	Dry	DI Water	Sil Gel					
Final Value (V_f),(W_f)	459.20	610.30	709.20	962.90					
Initial Value (V_i),(W_i)	363.00	608.80	704.00	948.80					
Net Value (V_n),(W_n)	96.2	1.5	5.2	14.1					
Results									
Total Weight	(W_t)	117.00	g		**Water Vol Weighed**	$(V_{wsg(std)})$	5.517	scf	
Std Meter Volume	$(V_{m(std)})$	80.918	dscf		**Sat. Moisture Content**	$(B_{ws(svp)})$	100.00	%	
Calc Moisture Content	$(B_{ws(calc)})$	6.38	%		**Final Moisture Content**	(B_{ws})	6.38	%	

Moisture Content Data									
Run Number	12-PM-FO-2		**Date**	02/06/19	**Start Time**	21:00	**Stop Time**	01:16	
Meter Box Number	samp-cp-0025				**Meter Cal Factor**	(Y)	1.017		
Total Meter Volume	(V_m)	84.320	dcf		**Barometric Pressure**	(P_b)	29.59	in Hg	
Average Stack Temp	$(t_s)_{avg}$	284	°F		**Stack Static Pressure**	(P_{static})	-1.10	in H_2O	
Average Meter Temp	$(t_m)_{avg}$	73	°F		**Avg Orifice Pressure**	$(\Delta H)_{avg}$	0.48	in H_2O	
	Impinger 1	**Impinger 2**	**Impinger 3**	**Impinger 4**	**Impinger 5**	**Impinger 6**	**Impinger 7**	**Impinger 8**	
	(g)	(g)	(g)	(g)					
Contents	Dry	Dry	DI Water	Sil Gel					
Final Value (V_f),(W_f)	463.10	610.30	734.60	891.20					
Initial Value (V_i),(W_i)	360.30	609.10	732.30	874.90					
Net Value (V_n),(W_n)	102.8	1.2	2.3	16.3					
Results									
Total Weight	(W_t)	122.60	g		**Water Vol Weighed**	$(V_{wsg(std)})$	5.781	scf	
Std Meter Volume	$(V_{m(std)})$	84.047	dscf		**Sat. Moisture Content**	$(B_{ws(svp)})$	100.00	%	
Calc Moisture Content	$(B_{ws(calc)})$	6.44	%		**Final Moisture Content**	(B_{ws})	6.44	%	

Moisture Content Data									
Run Number	12-PM-FO-3		**Date**	02/07/19	**Start Time**	01:25	**Stop Time**	05:33	
Meter Box Number	samp-cp-0019				**Meter Cal Factor**	(Y)	0.893		
Total Meter Volume	(V_m)	94.960	dcf		**Barometric Pressure**	(P_b)	29.55	in Hg	
Average Stack Temp	$(t_s)_{avg}$	282	°F		**Stack Static Pressure**	(P_{static})	-1.10	in H_2O	
Average Meter Temp	$(t_m)_{avg}$	73	°F		**Avg Orifice Pressure**	$(\Delta H)_{avg}$	0.48	in H_2O	
	Impinger 1	**Impinger 2**	**Impinger 3**	**Impinger 4**	**Impinger 5**	**Impinger 6**	**Impinger 7**	**Impinger 8**	
	(g)	(g)	(g)	(g)					
Contents	Dry	Dry	DI Water	Sil Gel					
Final Value (V_f),(W_f)	461.80	610.10	714.10	976.30					
Initial Value (V_i),(W_i)	362.80	608.80	709.20	962.90					
Net Value (V_n),(W_n)	99.0	1.3	4.9	13.4					
Results									
Total Weight	(W_t)	118.60	g		**Water Vol Weighed**	$(V_{wsg(std)})$	5.592	scf	
Std Meter Volume	$(V_{m(std)})$	82.999	dscf		**Sat. Moisture Content**	$(B_{ws(svp)})$	100.00	%	
Calc Moisture Content	$(B_{ws(calc)})$	6.31	%		**Final Moisture Content**	(B_{ws})	6.31	%	

METHOD 201A (FRONT) AND 202 (BACK) SOURCE SAMPLING TITLE PAGE ISOKINETIC SAMPLING DATA

Plant Name	CPV Valley Energy Center
Sampling Location	CTG-12 Stack
Project #	sie-19-middletown.ny-comp#1

Date	02/06/19
Operator	CM
Run Number	12-PM-FO-1

Filter #
18082923
10818188

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Coefficient / ID	(C_p)	0.7290	P-983/10
Average Stack Temp	(t_s)	280.8	°F
Average Meter Temp	(t_m)	72.8	
Orifice Meter Coefficient	($\Delta H@$)	1.838	in H_2O
Square Root ΔP	($\Delta p^{1/2}_{avg}$)	1.27	in H_2O
Stack Moisture Content	(B_{ws})	6.38	%
Stack Dry Molecular Weight	(M_d)	29.41	lb/lb-mole
Estimated Orifice Flow Rate	(Q_m)	0.75	acfm
ΔP to ΔH Isokinetic Factor	(K)	0.22	

Leak Checks					
Train	**Pre**	0.000	ft³/min@	15.0	in Hg
PASS	**Post**	0.000	ft³/min@	12.0	in Hg
Pitot	**Pre (+)**	4.2	in H_2O for	30.0	sec
PASS	**Pre (-)**	5.1	in H_2O for	30.0	sec
	Post (+)	4.6	in H_2O for	30.0	sec
	Post (-)	3.8	in H_2O for	30.0	sec

Sampling Equipment			
Meter Box Number	samp-cp-0019		
Meter Cal Factor	(Y)	0.893	
Nozzle Number	3		
Average Nozzle Diameter	(D_{na})	0.1420	in
Suggested Nozzle Diameter	(D_{ni})	0.2208	in
Probe Number	samp-hp-0148		in
Probe Length	120		in
Liner Material	glass		
Sample Case / Oven Number	samp-bh-0034		
Impinger Case Number	samp-cc-0027		

Pressures			
Barometric Pressure	(P_b)	29.58	in Hg
Stack Static Pressure	(P_{static})	-1.10	in H_2O
Absolute Stack Pressure	(P_s)	29.50	in Hg
Absolute Meter Pressure	(P_m)	29.72	in Hg

Nozzle Measurements			**ID: 3**	
Pre	0.142	0.142	0.142	**PASS**
Post	0.142	0.142	0.142	**PASS**

Barometer ID
SAMP-WE-0027
Scale ID
SAMP-SC-0016

Run Time			
Start	16:35	**End**	20:55

Weights	**Imp 1**	**Imp 2**	**Imp 3**	**Imp 4**	**Imp 5**	**Imp 6**	**Imp 7**	**Imp 8**
Pre	363.0	608.8	704.0	948.8				
Post	459.2	610.3	709.2	962.9				

Wash Volumes					
					ml
					ml

Identification Nos.		samp-cp-0019	samp-cp-0019	samp-cp-0019			samp-hp-0148	samp-hp-0148	samp-bh-0034	samp-cc-0027	1035	7770	samp-cp-0019		samp-cp-0019				
Traverse Point #	**Sampling Time (Θ)**	**Timer Time**	**Dry Gas Meter Reading (V_m)**	**Velocity Head (Δp)**	**Desired Orifice ΔH (ΔH_d)**	**Actual Orifice ΔH (ΔH_a)**	**Stack Temp (t_s)**	**Probe Temp (248±25°F)**	**Filter Temp (248±25°F)**	**Impinger Exit Temp (≤68°F)**	**Cond. Temp (≤85°F)**	**CPM Filter Temp (76.5±8.5°F)**	**Meter Inlet Temp (t_{mi})**	**Meter Outlet Temp (t_{mo})**	**Pump Vacuum**	**Square Root ΔP ($\Delta p^{1/2}$)**	**Local Stack Velocity (v_s)$_l$**	**Cumul. Meter Volume (V_m)$_{std}$**	**Cumul. Percent IsoKinetic (I)**	**Est-Run Meter Volume (V_m)$_{std}$**
	min	hh:mm:ss	ft³	in H_2O	in H_2O	in H_2O	°F	°F	°F	°F	°F	°F	°F	°F	in Hg	√(in H_2O)	ft/sec	dscf	%	dscf
A-1	0.0	00:00:00	985.160	1.80	0.486	0.48	282	240	249	38	37	68	72	72	2.0	1.34	78.30	7.562	103.7	86.611
A-2	21.5	00:21:30	993.780	1.80	0.486	0.48	280	242	248	38	39	69	73	73	2.0	1.34	78.20	14.882	102.0	85.226
A-3	43.0	00:43:00	1002.140	1.70	0.486	0.48	278	241	248	39	39	69	74	74	2.0	1.30	75.89	22.223	103.7	85.844
B-1	63.8	01:03:45	1010.540	1.40	0.486	0.48	280	225	246	38	41	68	74	74	2.0	1.18	68.97	28.219	104.6	84.485
B-2	82.3	01:22:15	1017.400	1.40	0.486	0.48	281	233	244	37	41	69	73	73	2.0	1.18	69.01	34.138	105.0	83.439
B-3	100.8	01:40:45	1024.160	1.30	0.486	0.48	280	245	246	37	42	69	73	73	2.0	1.14	66.46	39.252	104.3	81.567
C-1	118.5	01:58:30	1030.000	1.90	0.486	0.48	279	265	249	38	42	68	73	73	2.0	1.38	80.29	47.115	103.6	82.284
C-2	141.0	02:21:00	1038.980	1.80	0.486	0.48	283	250	249	39	45	70	73	73	2.0	1.34	78.36	54.575	103.1	82.448
C-3	163.0	02:43:00	1047.500	1.30	0.486	0.48	278	252	248	39	45	70	72	72	2.0	1.14	66.37	59.882	102.7	81.134
D-1	181.8	03:01:45	1053.550	1.90	0.486	0.48	283	251	248	39	58	72	72	72	2.0	1.38	80.50	67.602	102.2	81.503
D-2	204.3	03:24:15	1062.350	1.80	0.486	0.48	283	252	248	40	60	74	72	72	2.0	1.34	78.36	74.708	101.5	81.312
D-3	226.3	03:46:15	1070.450	1.50	0.486	0.48	282	253	246	43	62	75	72	72	2.0	1.22	71.48	80.919	101.5	80.919
Last Pt	246.3	04:06:15	1077.530																	
Final Val	246.3	04:06:15	1077.530											**Max Vac**	2.0	**Final Values**		80.919	101.5	
Average Values				1.63		0.48	281	246	247	39	46	70	73	73		1.27	74.35			
													73							

Notes:

METHOD 201A (FRONT) AND 202 (BACK) SOURCE SAMPLING TITLE PAGE ISOKINETIC SAMPLING DATA

Plant Name	CPV Valley Energy Center
Sampling Location	CTG-12 Stack
Project #	sie-19-middletown.ny-comp#1

Date	02/06/19
Operator	CM
Run Number	12-PM-FO-2

Filter #
18082930
10818188

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Coefficient / ID	(C_p)	0.7350	5272/10
Average Stack Temp	(t_s)	284.0	°F
Average Meter Temp	(t_m)	73.4	
Orifice Meter Coefficient	($\Delta H@$)	1.820	in H_2O
Square Root ΔP	($\Delta p^{1/2}_{avg}$)	1.28	in H_2O
Stack Moisture Content	(B_{ws})	6.44	%
Stack Dry Molecular Weight	(M_d)	29.42	lb/lb-mole
Estimated Orifice Flow Rate	(Q_m)	0.33	acfm
ΔP to ΔH Isokinetic Factor	(K)	0.22	

Leak Checks					
Train	**Pre**	0.000	ft³/min@	15.0	in Hg
PASS	**Post**	0.000	ft³/min@	11.0	in Hg
Pitot	**Pre (+)**	4.5	in H_2O for	30.0	sec
PASS	**Pre (-)**	4.1	in H_2O for	30.0	sec
	Post (+)	4.0	in H_2O for	30.0	sec
	Post (-)	3.9	in H_2O for	30.0	sec

Sampling Equipment			
Meter Box Number	samp-cp-0025		
Meter Cal Factor	(Y)	1.017	
Nozzle Number	3		
Average Nozzle Diameter	(D_{na})	0.1420	in
Suggested Nozzle Diameter	(D_{ni})	0.1455	in
Probe Number	samp-hp-0149		in
Probe Length	120		in
Liner Material	glass		
Sample Case / Oven Number	samp-cp-0035		
Impinger Case Number	samp-cc-0012		

Pressures			
Barometric Pressure	(P_b)	29.59	in Hg
Stack Static Pressure	(P_{static})	-1.10	in H_2O
Absolute Stack Pressure	(P_s)	29.51	in Hg
Absolute Meter Pressure	(P_m)	29.72	in Hg

Nozzle Measurements			**ID:**	**3**
Pre	0.141	0.143	0.142	**PASS**
Post	0.141	0.143	0.142	**PASS**

Barometer ID
SAMP-WE-0027
Scale ID
SAMP-SC-0016

Run Time			
Start	21:00	**End**	01:16

Weights	**Imp 1**	**Imp 2**	**Imp 3**	**Imp 4**	**Imp 5**	**Imp 6**	**Imp 7**	**Imp 8**
Pre	360.3	609.1	732.3	874.9				
Post	463.1	610.3	734.6	891.2				

Wash Volumes					ml
					ml

Identification Nos.		samp-cp-0025	samp-cp-0025	samp-cp-0025			samp-hp-0149	samp-hp-0149	samp-cp-0035	samp-cc-0012	1030	3105	samp-cp-0025		samp-cp-0025					
Traverse Point #	**Sampling Time (Θ)**	**Timer Time**	**Dry Gas Meter Reading (V_m)**	**Velocity Head (Δp)**	**Desired Orifice ΔH (ΔH_d)**	**Actual Orifice ΔH (ΔH_a)**	**Stack Temp (t_s)**	**Probe Temp (248±25°F)**	**Filter Temp (248±25°F)**	**Impinger Exit Temp (≤68°F)**	**Cond. Temp (≤85°F)**	**CPM Filter Temp (76.5±8.5°F)**	**Meter Inlet Temp (t_{mi})**	**Meter Outlet Temp (t_{mo})**	**Pump Vacuum**	**Square Root ΔP ($\Delta p^{1/2}$)**	**Local Stack Velocity (v_s)$_l$**	**Cumul. Meter Volume (V_m)$_{std}$**	**Cumul. Percent IsoKinetic (I)**	**Est-Run Meter Volume (V_m)$_{std}$**
	min	hh:mm:ss	ft³	in H_2O	in H_2O	in H_2O	°F	°F	°F	°F	°F	°F	°F	°F	in Hg	√(in H_2O)	ft/sec	dscf	%	dscf
A-1	0.0	00:00:00	77.810	1.80	0.486	0.48	282	236	242	40	46	69	72	72	2.0	1.34	78.93	7.626	103.8	88.048
A-2	21.5	00:21:30	85.440	1.70	0.486	0.48	285	240	240	42	49	70	72	72	2.0	1.30	76.86	14.941	104.4	87.274
A-3	42.5	00:42:30	92.760	1.70	0.486	0.48	285	239	243	40	51	71	72	72	2.0	1.30	76.86	22.507	105.8	87.989
B-1	63.5	01:03:30	100.330	1.40	0.486	0.48	285	227	241	38	50	71	73	73	2.0	1.18	69.75	28.612	106.7	86.620
B-2	82.0	01:22:00	106.450	1.30	0.486	0.48	283	230	242	38	50	71	72	72	2.0	1.14	67.13	34.178	106.6	84.848
B-3	100.0	01:40:00	112.020	1.40	0.486	0.48	284	233	241	38	49	71	72	72	2.0	1.18	69.71	40.165	106.8	84.143
C-1	118.5	01:58:30	118.010	1.90	0.486	0.48	284	225	242	36	47	70	72	72	2.0	1.38	81.21	47.990	105.3	84.344
C-2	141.3	02:21:15	125.840	1.80	0.486	0.48	284	228	240	38	48	71	76	76	2.0	1.34	79.04	55.450	104.5	84.321
C-3	163.3	02:43:15	133.360	1.40	0.486	0.48	284	225	241	38	48	71	76	76	2.0	1.18	69.71	61.491	104.4	83.530
D-1	182.8	03:02:45	139.450	1.90	0.486	0.48	284	226	241	38	47	71	74	74	2.0	1.38	81.21	70.063	104.8	84.639
D-2	205.5	03:25:30	148.060	1.80	0.486	0.48	284	236	241	39	48	70	75	75	2.0	1.34	79.04	77.517	104.2	84.587
D-3	227.5	03:47:30	155.560	1.60	0.486	0.48	284	236	240	40	48	70	75	75	2.0	1.26	74.52	84.046	103.7	84.046
Last Pt	248.3	04:08:15	162.130																	
Final Val	248.3	04:08:15	162.130											**Max Vac**	2.0	**Final Values**		84.046	103.7	
Average Values				1.64		0.48	284	232	241	39	48	71	73	73		1.28	75.33			
													73							

Notes:

METHOD 201A (FRONT) AND 202 (BACK) SOURCE SAMPLING TITLE PAGE ISOKINETIC SAMPLING DATA

Plant Name	CPV Valley Energy Center
Sampling Location	CTG-12 Stack
Project #	sie-19-middletown.ny-comp#1

Date	02/07/19
Operator	CM
Run Number	12-PM-FO-3

Filter #
18082931
10818188

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Coefficient / ID	(C_p)	0.7290	P-983/10
Average Stack Temp	(t_s)	281.8	°F
Average Meter Temp	(t_m)	73.4	
Orifice Meter Coefficient	($\Delta H@$)	1.838	in H_2O
Square Root ΔP	($\Delta p^{1/2}_{avg}$)	1.28	in H_2O
Stack Moisture Content	(B_{ws})	6.31	%
Stack Dry Molecular Weight	(M_d)	29.40	lb/lb-mole
Estimated Orifice Flow Rate	(Q_m)	0.34	acfm
ΔP to ΔH Isokinetic Factor	(K)	0.22	

Leak Checks					
Train	**Pre**	0.000	ft³/min@	15.0	in Hg
PASS	**Post**	0.000	ft³/min@	10.0	in Hg
Pitot	**Pre (+)**	4.2	in H_2O for	30.0	sec
PASS	**Pre (-)**	3.5	in H_2O for	30.0	sec
	Post (+)	4.3	in H_2O for	30.0	sec
	Post (-)	4.0	in H_2O for	30.0	sec

Sampling Equipment			
Meter Box Number	samp-cp-0019		
Meter Cal Factor	(Y)	0.893	
Nozzle Number	3		
Average Nozzle Diameter	(D_{na})	0.1420	in
Suggested Nozzle Diameter	(D_{ni})	0.1482	in
Probe Number	samp-hp-0148		in
Probe Length	120		in
Liner Material	glass		
Sample Case / Oven Number	samp-bh-0034		
Impinger Case Number	samp-cc-0027		

Pressures			
Barometric Pressure	(P_b)	29.55	in Hg
Stack Static Pressure	(P_{static})	-1.10	in H_2O
Absolute Stack Pressure	(P_s)	29.47	in Hg
Absolute Meter Pressure	(P_m)	29.69	in Hg

Nozzle Measurements			**ID:**	**3**
Pre	0.142	0.142	0.142	**PASS**
Post	0.142	0.142	0.142	**PASS**

Barometer ID
SAMP-WE-0027
Scale ID
SAMP-SC-0016

Run Time			
Start	01:25	**End**	05:33

Weights	**Imp 1**	**Imp 2**	**Imp 3**	**Imp 4**	**Imp 5**	**Imp 6**	**Imp 7**	**Imp 8**
Pre	362.8	608.8	709.2	962.9				
Post	461.8	610.1	714.1	976.3				

Wash Volumes					ml
					ml

Identification Nos.		samp-cp-0019	samp-cp-0019	samp-cp-0019			samp-hp-0148	samp-hp-0148	samp-bh-0034	samp-cc-0027	1035	7770	samp-cp-0019		samp-cp-0019				
Traverse Point #	**Sampling Time (Θ)**	**Timer Time**	**Dry Gas Meter Reading (V_m)**	**Velocity Head (Δp)**	**Desired Orifice ΔH (ΔH_d)**	**Actual Orifice ΔH (ΔH_a)**	**Stack Temp (t_s)**	**Probe Temp (248±25°F)**	**Filter Temp (248±25°F)**	**Impinger Exit Temp (≤68°F)**	**Cond. Temp (≤85°F)**	**CPM Filter Temp (76.5±8.5°F)**	**Meter Inlet Temp (t_{mi})**	**Meter Outlet Temp (t_{mo})**	**Pump Vacuum**	**Square Root ΔP ($\Delta p^{1/2}$)**	**Local Stack Velocity (v_s)$_l$**	**Cumul. Meter Volume (V_m)$_{std}$**	**Cumul. Percent IsoKinetic (I)**	**Est-Run Meter Volume (V_m)$_{std}$**
	min	hh:mm:ss	ft³	in H_2O	in H_2O	in H_2O	°F	°F	°F	°F	°F	°F	°F	°F	in Hg	√(in H_2O)	ft/sec	dscf	%	dscf
A-1	0.0	00:00:00	162.630	1.80	0.486	0.48	284	250	241	43	44	69	73	73	2.0	1.34	78.45	7.444	102.2	85.432
A-2	21.5	00:21:30	171.140	1.80	0.486	0.48	284	251	245	47	47	70	73	73	2.0	1.34	78.45	15.255	104.8	87.540
A-3	43.0	00:43:00	180.070	1.70	0.486	0.48	284	250	247	48	50	70	73	73	2.0	1.30	76.24	22.524	105.3	87.182
B-1	63.8	01:03:45	188.380	1.50	0.486	0.48	280	252	248	37	53	71	73	73	2.0	1.22	71.42	28.752	106.0	86.257
B-2	82.3	01:22:15	195.500	1.40	0.486	0.48	283	253	246	52	53	72	73	73	2.0	1.18	69.14	34.525	106.5	85.192
B-3	100.0	01:40:00	202.100	1.30	0.486	0.48	281	251	248	51	52	71	73	73	2.0	1.14	66.53	39.791	106.4	83.740
C-1	117.3	01:57:15	208.120	1.80	0.486	0.48	282	250	244	48	48	71	73	73	2.0	1.34	78.34	47.769	106.1	84.343
C-2	139.8	02:19:45	217.240	1.80	0.486	0.48	283	251	246	48	50	72	73	73	2.0	1.34	78.40	55.641	105.7	84.619
C-3	162.3	02:42:15	226.240	1.40	0.486	0.48	279	250	248	48	50	72	73	73	2.0	1.18	68.95	62.027	105.8	83.979
D-1	182.3	03:02:15	233.540	1.90	0.486	0.48	281	251	247	48	50	72	73	73	2.0	1.38	80.44	69.322	104.4	83.542
D-2	204.8	03:24:45	241.880	1.80	0.486	0.48	283	252	248	52	53	71	75	75	2.0	1.34	78.40	76.485	103.6	83.232
D-3	226.8	03:46:45	250.100	1.50	0.486	0.48	277	250	247	47	48	70	76	76	2.0	1.22	71.28	83.001	103.7	83.001
Last Pt	246.8	04:06:45	257.590																	
Final Val	246.8	04:06:45	257.590											**Max Vac**	2.0	**Final Values**		83.001	103.7	
Average Values				1.64		0.48	282	251	246	47	50	71	73	73		1.28	74.67			
													73							

Notes:

EMISSION DATA RECORDS

Unit #CTG-12
Base Load
Opacity Data

VISUAL EMISSIONS OBSERVATION FORM

Method Used (Circle One): **Method 9** | 203A | 203B | Other: _____

Form Number (AHI Project Code) | Page 1 of 2

Continued on Form Number (AHI Project Code)

Company Name	CPV Valley LLC
Facility Name	CPV Valley Energy Center
Street Address	3330 US Route 6
City	Middletown
State	NY
Zip	10940

Process	Unit # CTG-2	Operating Mode
Control Equipment		Operating Mode FD

Describe Emissions Point: Top of the Stack

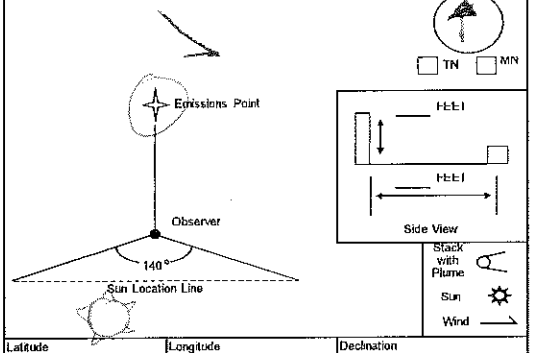
Height of Emiss. Pt. Start 275ft	End 275ft	Height of Emiss. Pt. Rel. to Observer Start 260ft	End 260ft
Distance to Emiss. Pt. Start 2560 ft	End 2560ft	Direction to Emiss. Pt. (Degrees) Start 272°	End 272°

Vertical Angle to Obs. Pt. Start 17°	End 17°	Direction to Obs. Pt. (Degrees) Start 272°	End 272°
Distance and Direction to Observation Point from Emission Point Start 0ft 0°		End Same	

Describe Emissions Start clear		End clear	
Emission Color Start clear	End clear	Water Droplet Plume Start none	End none

Describe Plume Background Start cloudy	End cloudy		
Background Color Start gray/white	End gray/white	Sky Conditions Start overcast	End overcast
Wind Speed Start 6mph	End 5mph	Wind Direction Start SE	End ESE
Ambient Temp. Start 41°F	End 38°F	Wet Bulb Temp. 30°F	RH Percent 65%

Source Layout Sketch



Latitude	Longitude	Declination
41.406716	-74.430780	

Additional Information:

Min. \ Sec.	0	15	30	45	Comments
1	0	0	0	0	
2	0	0	0	0	
3	0	0	0	0	
4	0	0	0	0	
5	0	0	0	0	
6	0	0	0	0	
7	0	0	0	0	
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13	0	0	0	0	
14	0	0	0	0	
15	0	0	0	0	
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17	0	0	0	0	
18	0	0	0	0	
19	0	0	0	0	
20	0	0	0	0	
21	0	0	0	0	
22	0	0	0	0	
23	0	0	0	0	
24	0	0	0	0	
25	0	0	0	0	
26	0	0	0	0	
27	0	0	0	0	
28	0	0	0	0	
29	0	0	0	0	
30	0	0	0	0	

Observation Date: 02/06/19 | Time Zone: Eastern | Start Time: 16:10 | End Time: 17:10

Observer's Name (Print)	Axel Garrido-Martinez
Observer's Signature	Date 02/06/19
Organization	Air Hygiene
Certified By: Compliance Assurance Associates	Date 01/04/19

Method Used (Circle One)
Method 9 | 203A | 203B | Other: _____

VISUAL EMISSIONS OBSERVATION FORM

Company Name: CPV Valley LLC
Facility Name: CPV Valley Energy Center
Street Address: 333° US Route 6
City: Middletown | State: NY | Zip: 10940

Process: CTG-2 | Unit # | Operating Mode
Control Equipment | Operating Mode: FD

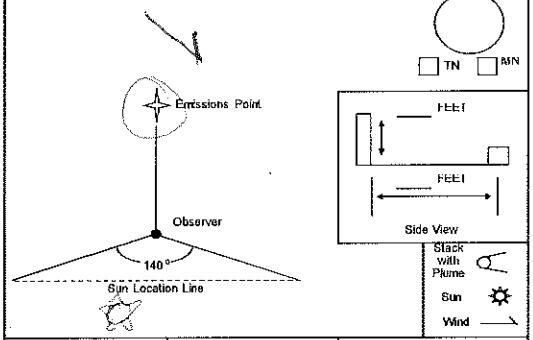
Describe Emissions Pont: Top of the Stack
Height of Emiss. Pt. Start 275ft End 275ft | Height of Emiss. Pt. Rel. to Observer Start 266ft End 266ft
Distance to Emiss. Pt. Start 2560ft End 2500ft | Direction to Emiss. Pt. (Degrees) Start 272° End 272°

Vetical Angle to Obs. Pt. Start 19° End 19° | Direction to Obs. Pt. (Degrees) Start 272° End 272°
Distance and Direction to Observation Point from Emission Point Start off 0° End same

Describe Emissions Start clear End clear
Emission Color Start clear End clear | Water Droplet Plume Start none End none

Describe Plume Background Start cloudy End cloudy
Background Color Start gray/white End gray/white | Sky Conditions Start overcast End overcast
Wind Speed Start 6 mph End | Wind Direction Start SE End
Ambient Temp. Start 41°F End | Wet Bulb Temp. 30°F | RH Percent 65%

Source Layout Sketch



Latitude 41.406716 | Longitude -74.420780 | Declination

Additional Information

Form Number (AHI Project Code) | Page 2 of 2
Continued on Form Number (AHI Project Code)
Observation Date 02/06/19 | Time Zone Eastern | Start Time 16:10 | End Time 17:10

Min \ Sec	0	15	30	45	Comments
1	0	0	0	0	
2	0	0	0	0	
3	0	0	0	0	
4	0	0	0	0	
5	0	0	0	0	
6	0	0	0	0	
7	0	0	0	0	
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23	0	0	0	0	
24	0	0	0	0	
25	0	0	0	0	
26	0	0	0	0	
27	0	0	0	0	
28	0	0	0	0	
29	0	0	0	0	
30	0	0	0	0	

Observer's Name (Print): Axel Garrido-Martinez
Observer's Signature | Date 02/06/19
Organization: Air Hygiene
Certified By: Compliance Analytical Associates | Date 01/14/19

VISUAL EMISSIONS OBSERVATION FORM

Method Used (Circle One): Method 9 | 203A | 203B | Other: _____

Company Name: CPV Valley LLC
Facility Name: CPV Valley Energy Center
Street Address: 3330 US Route 6
City: Middletown | State: NY | Zip: 10940

Process | Unit #: CTG-2 | Operating Mode:
Control Equipment | Operating Mode: F-2

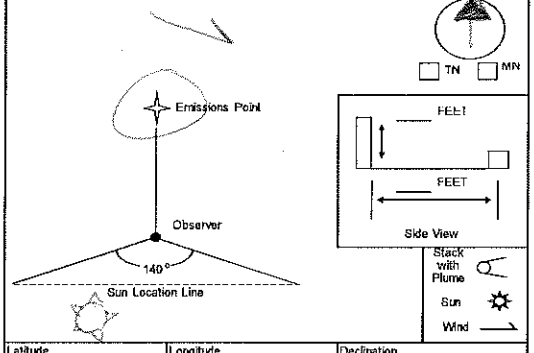
Describe Emissions Point: Top of the stack
Height of Emiss. Pt. Start: 275ft End: 275ft | Height of Emiss. Pt. Rel. to Observer Start: 260ft End: 260ft
Distance to Emiss. Pt. Start: 2500ft End: 2500 ft | Direction to Emiss. Pt. (Degrees) Start: 272° End: 272°

Vertical Angle to Obs. Pt. Start: 17° End: 17° | Direction to Obs. Pt. (Degrees) Start: 272° End: 272°
Distance and Direction to Observation Point from Emission Point Start: ~~N/A~~ 0 | End: same

Describe Emissions Start: clear End: clear
Emission Color Start: clear End: clear | Water Droplet Plume Start: none End: none

Describe Plume Background Start: cloudy End: cloudy
Background Color Start: gray End: gray | Sky Conditions Start: overcast End: overcast
Wind Speed Start: 5mph End: 5mph | Wind Direction Start: ESE End: ESE
Ambient Temp. Start: 38°F End: 36°F | Wet Bulb Temp. 32°F | RH Percent 76%

Source Layout Sketch



Latitude: 41.406716 | Longitude: -74.430780 | Declination:

Additional Information:

Form Number (AHI Project Code): | Page 1 of 2
Continued on Form Number (AHI Project Code):

Observation Date: 02/06/19 | Time Zone: Eastern | Start Time: 17:10 | End Time: 17:40

Min \ Sec	0	15	30	45	Comments
1	0	0	0	0	
2	0	0	0	0	
3	0	0	0	0	
4	0	0	0	0	
5	0	0	0	0	
6	0	0	0	0	
7	0	0	0	0	
8	0	0	0	0	
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26	0	0	0	0	
27	0	0	0	0	
28	0	0	0	0	
29	0	0	0	0	
30	0	0	0	0	

Observer's Name (Print): Axel Garrido-Martinez
Observer's Signature | Date: 02/06/19
Organization: Air Hygiene
Certified By: Compliance Assurance Associates | Date: 2/04/19

APPENDIX C

CALIBRATION GAS CERTIFICATIONS

CALIBRATION GAS CERTIFICATIONS

Unit #CTG-11
Cylinder Certifications

Assay Laboratory: Red Ball TGS
555 Craig Kennedy Way
Shreveport, LA 71107
800-551-8150

CERTIFICATE OF ANALYSIS
(Zero Ambient Nitrogen)

Cylinder Number:	EB0093392	**Certification Date:**	09/25/2018
Product ID Number:	121026	**Expiration Date:**	09/23/2026
Cylinder Pressure:	1900 PSIG	**MFG Facility:**	RBTGS-Shreveport-LA
COA #	EB0093392.20180925-0	**Lot Number:**	EB0093392.20180925
Customer PO. NO.:		**Tracking Number:**	095496285
Customer:		**Previous Certification Dates:**	

This mixture is for laboratory use only, not for drug, household or other use.
This mixture is certified in Mole % to be within ±2% of the actual number reported with a confidence of 95%.
This mixture was manufactured by scale; weights traceable to N.I.S.T. Certificate #822/266926-02.
Do Not Use This Cylinder Below 100 psig (0.7 Megapascal).

Composing Material: Zero Ambient Nitrogen, Cert., Sz152

Component	Specification	Concentration
Nitrogen	Balance	Balance
Oxygen as Impurity	<1.0 PPM	<1.0 PPM
Carbon Dioxide as Impurity	<0.5 PPM	<0.5 PPM
Carbon Monoxide as Impurity	<0.5 PPM	<0.5 PPM
Total Oxides of Nitrogen as Impurity	<0.1 PPM	<0.1 PPM
Sulfur Dioxide as Impurity	<0.1 PPM	<0.1 PPM
Total Hydrocarbons as Impurity	<0.1 PPM	<0.1 PPM

Red Ball Technical Gas Service
PGVP Vendor ID # G12018
Information and Ordering
800-551-8150
Fax (318-425-6309)

Accreditation #62754

Anthony Cyr
Assistant Operations Manager

Version 02-B, Revised on 2015-05-27

RED BALL TECHNICAL GAS SERVICES

PJLA Calibration and Testing
Accreditation #62754

Red Ball Technical Gas Service
555 Craig Kennedy Way
Shreveport, LA 71107
800-551-8150
PGVP Vendor ID # G12018

EPA PROTOCOL GAS CERTIFICATE OF ANALYSIS

Cylinder Number:	CC722709	**Certification Date**:	11/27/2018
Product ID Number:	124606	**Expiration Date:**	11/25/2026
Cylinder Pressure:	1900 PSIG	**MFG Facility:**	- Shreveport - LA
COA #	CC722709.20181121-0	**Lot Number:**	CC722709.20181121
Customer PO. NO.:		**Tracking Number:**	098499919
Customer:		**Previous Certification Dates:**	

This calibration standard has been certified per the May 2012 EPA Traceability Protocol, Document EPA-600/R-12/531, using procedure G1.

Do Not Use This Cylinder Below 100 psig (0.7 Megapascal).

Certified Concentration(s)

Component	Concentration	Uncertainty	Analytical Principle	Assayed On
Carbon Dioxide	**9.00 %**	±0.05 %	NDIR	11/27/2018
Oxygen	**11.99 %**	±0.08 %	MPA	11/27/2018
Nitrogen	Balance			

Analytical Measurement Data Available Online.

Reference Standard(s)

Serial Number	Lot	Expiration	Type	Balance	Component	Concentration	Uncertainty(%)	NIST Reference
EB0003672	EB0003672.20180118	07/21/2026	GMIS	N2	O2	11.97 %	0.507	071001
EB0032246	EB0032246.20170209	08/05/2025	GMIS	N2	O2	24 %	0.502	071001
EB0097768	EB0097768.20171018	02/06/2026	GMIS	N2	CO2	24.8 %	0.398	C1309410.01

Analytical Instrumentation

Component	Principle	Make	Model	Serial	MPC Date
CO2	NDIR	Thermo	410i	1162980025	11/26/2018
O2	MPA	Thermo	410i	1162980025	11/06/2018

SMART-CERT

This is to certify the gases referenced have been calibrated/tested, and verified to meet the defined specifications. This calibration/test was performed using Gases or Scales that are traceable through National Institute of Standards and Technology (NIST) to the International System of Units (SI). The basis of compliance stated is a comparison of the measurement parameters to the specified or required calibration/testing process. The expanded uncertainties use a coverage factor of k=2 to approximate the 95% confidence level of the measurement, unless otherwise noted. This calibration certificate applies only to the item described and shall not be reproduced other than in full, without written approval from Red Ball Technical Gas Services. If not included, the uncertainty of calibrations are available upon request and were taken into account when determining pass or fail.

Amisha Jewitt
Analytical Chemist
Assay Laboratory: Red Ball TGS
Version 02-J, Revised on 2018-09-17

Red Ball Technical Gas Service
555 Craig Kennedy Way
Shreveport, LA 71107
800-551-8150
PGVP Vendor ID # G12018

PJLA Calibration and Testing
Accreditation #62754

EPA PROTOCOL GAS CERTIFICATE OF ANALYSIS

Cylinder Number:	EB0057286	**Certification Date**:	09/25/2018
Product ID Number:	124605	**Expiration Date:**	09/23/2026
Cylinder Pressure:	1900 PSIG	**MFG Facility:**	- Shreveport - LA
COA #	EB0057286.20180919-0	**Lot Number:**	EB0057286.20180919
Customer PO. NO.:		**Tracking Number:**	074329340
Customer:		**Previous Certification Dates:**	

This calibration standard has been certified per the May 2012 EPA Traceability Protocol, Document EPA-600/R-12/531, using procedure G1.

Do Not Use This Cylinder Below 100 psig (0.7 Megapascal).

Certified Concentration(s)

Component	Concentration	Uncertainty	Analytical Principle	Assayed On
Carbon Dioxide	**18.7 %**	±0.13 %	NDIR	09/24/2018
Oxygen	**21.0 %**	±0.11 %	MPA	09/25/2018
Nitrogen	Balance			

Analytical Measurement Data Available Online.

Reference Standard(s)

Serial Number	Lot	Expiration	Type	Balance	Component	Concentration	Uncertainty(%)	NIST Reference
EB0004987	EB0004987.20180323	07/15/2026	GMIS	N2	CO2	19.5 %	0.767	101001
EB0032246	EB0032246.20170209	08/05/2025	GMIS	N2	O2	24 %	0.502	071001
EB0097768	EB0097768.20171018	02/06/2026	GMIS	N2	CO2	24.8 %	0.398	C1309410.01

Analytical Instrumentation

Component	Principle	Make	Model	Serial	MPC Date
CO2	NDIR	Thermo	410i	1162980025	09/18/2018
O2	MPA	Thermo	410i	1162980025	09/04/2018

SMART-CERT

This is to certify the gases referenced have been calibrated/tested, and verified to meet the defined specifications. This calibration/test was performed using Gases or Scales that are traceable through National Institute of Standards and Technology (NIST) to the International System of Units (SI). The basis of compliance stated is a comparison of the measurement parameters to the specified or required calibration/testing process. The expanded uncertainties use a coverage factor of k=2 to approximate the 95% confidence level of the measurement, unless otherwise noted. This calibration certificate applies only to the item described and shall not be reproduced other than in full, without written approval from Red Ball Technical Gas Services. If not included, the uncertainty of calibrations are available upon request and were taken into account when determining pass or fail.

Amisha Jewitt
Analytical Chemist
Assay Laboratory: Red Ball TGS
Version 02-J, Revised on 2018-09-17

CALIBRATION GAS CERTIFICATIONS

Unit #CTG-12
Cylinder Certifications

Assay Laboratory: Red Ball TGS
555 Craig Kennedy Way
Shreveport, LA 71107
800-551-8150

CERTIFICATE OF ANALYSIS
(Zero Ambient Nitrogen)

Cylinder Number:	EB0030162	**Certification Date:**	07/03/2018
Product ID Number:	121026	**Expiration Date:**	07/01/2026
Cylinder Pressure:	1900 PSIG	**MFG Facility:**	RBTGS-Shreveport-LA
COA #	EB0030162.20180703-0	**Lot Number:**	EB0030162.20180703
Customer PO. NO.:		**Tracking Number:**	048388830
Customer:		**Previous Certification Dates:**	

This mixture is for laboratory use only, not for drug, household or other use.
This mixture is certified in Mole % to be within ±2% of the actual number reported with a confidence of 95%.
This mixture was manufactured by scale; weights traceable to N.I.S.T. Certificate #822/266926-02.
Do Not Use This Cylinder Below 100 psig (0.7 Megapascal).

Composing Material: Zero Ambient Nitrogen, Cert., Sz152

Component	Specification	Concentration
Nitrogen	Balance	Balance
Oxygen as Impurity	<1.0 PPM	<1.0 PPM
Carbon Dioxide as Impurity	<0.5 PPM	<0.5 PPM
Carbon Monoxide as Impurity	<0.5 PPM	<0.5 PPM
Total Oxides of Nitrogen as Impurity	<0.1 PPM	<0.1 PPM
Sulfur Dioxide as Impurity	<0.1 PPM	<0.1 PPM
Total Hydrocarbons as Impurity	<0.1 PPM	<0.1 PPM

Red Ball Technical Gas Service
PGVP Vendor ID # G12018
Information and Ordering
800-551-8150
Fax (318-425-6309)

Accreditation #62754

Anthony Cyr
Analytical Chemist

Red Ball Technical Gas Service
555 Craig Kennedy Way
Shreveport, LA 71107
800-551-8150
PGVP Vendor ID # G12018

PJLA Calibration and Testing
Accreditation #62754

EPA PROTOCOL GAS CERTIFICATE OF ANALYSIS

Cylinder Number:	CC721564	**Certification Date**:	09/18/2018
Product ID Number:	124606	**Expiration Date:**	09/16/2026
Cylinder Pressure:	1900 PSIG	**MFG Facility:**	- Shreveport - LA
COA #	CC721564.20180910-0	**Lot Number:**	CC721564.20180910
Customer PO. NO.:		**Tracking Number:**	098508518
Customer:		**Previous Certification Dates:**	

This calibration standard has been certified per the May 2012 EPA Traceability Protocol, Document EPA-600/R-12/531, using procedure G1.

Do Not Use This Cylinder Below 100 psig (0.7 Megapascal).

Certified Concentration(s)

Component	Concentration	Uncertainty	Analytical Principle	Assayed On
Carbon Dioxide	**8.92 %**	±0.08 %	NDIR	09/17/2018
Oxygen	**11.98 %**	±0.06 %	MPA	09/18/2018
Nitrogen	Balance			

Analytical Measurement Data Available Online.

Reference Standard(s)

Serial Number	Lot	Expiration	Type	Balance	Component	Concentration	Uncertainty(%)	NIST Reference
EB0016197	EB0016197.20180205	05/13/2026	GMIS	N2	CO2	15 %	0.76	101001
EB0034340	EB0034340.20170209	05/09/2026	GMIS	N2	O2	20 %	0.5	071001
EB0087453	EB0087453.20170424	11/25/2025	GMIS	N2	CO2	9.51 %	0.724	C1309410.01

Analytical Instrumentation

Component	Principle	Make	Model	Serial	MPC Date
CO2	NDIR	Thermo	410i	1162980025	09/06/2018
O2	MPA	Thermo	410i	1162980025	08/30/2018

SMART-CERT

This is to certify the gases referenced have been calibrated/tested, and verified to meet the defined specifications. This calibration/test was performed using Gases or Scales that are traceable through National Institute of Standards and Technology (NIST) to the International System of Units (SI). The basis of compliance stated is a comparison of the measurement parameters to the specified or required calibration/testing process. The expanded uncertainties use a coverage factor of k=2 to approximate the 95% confidence level of the measurement, unless otherwise noted. This calibration certificate applies only to the item described and shall not be reproduced other than in full, without written approval from Red Ball Technical Gas Services. If not included, the uncertainty of calibrations are available upon request and were taken into account when determining pass or fail.

Amisha Jewitt
Analytical Chemist
Assay Laboratory: Red Ball TGS
Version 02-J, Revised on 2018-09-17

RED BALL TECHNICAL GAS SERVICES

PJLA Calibration and Testing
Accreditation #62754

Red Ball Technical Gas Service
555 Craig Kennedy Way
Shreveport, LA 71107
800-551-8150
PGVP Vendor ID # G12018

EPA PROTOCOL GAS CERTIFICATE OF ANALYSIS

Cylinder Number:	CC722516	**Certification Date**:	11/07/2018
Product ID Number:	124605	**Expiration Date:**	11/05/2026
Cylinder Pressure:	1900 PSIG	**MFG Facility:**	- Shreveport - LA
COA #	CC722516.20181102-0	**Lot Number:**	CC722516.20181102
Customer PO. NO.:		**Tracking Number:**	098499274
Customer:		**Previous Certification Dates:**	

This calibration standard has been certified per the May 2012 EPA Traceability Protocol, Document EPA-600/R-12/531, using procedure G1.

Do Not Use This Cylinder Below 100 psig (0.7 Megapascal).

Certified Concentration(s)

Component	Concentration	Uncertainty	Analytical Principle	Assayed On
Carbon Dioxide	**18.9 %**	±0.16 %	NDIR	11/07/2018
Oxygen	**21.0 %**	±0.12 %	MPA	11/07/2018
Nitrogen	Balance			

Analytical Measurement Data Available Online.

Reference Standard(s)

Serial Number	Lot	Expiration	Type	Balance	Component	Concentration	Uncertainty(%)	NIST Reference
EB0004987	EB0004987.20180323	07/15/2026	GMIS	N2	CO2	19.5 %	0.767	101001
EB0032246	EB0032246.20170209	08/05/2025	GMIS	N2	O2	24 %	0.502	071001

Analytical Instrumentation

Component	Principle	Make	Model	Serial	MPC Date
CO2	NDIR	Thermo	410i	1162980025	10/24/2018
O2	MPA	Thermo	410i	1162980025	11/06/2018

SMART-CERT

This is to certify the gases referenced have been calibrated/tested, and verified to meet the defined specifications. This calibration/test was performed using Gases or Scales that are traceable through National Institute of Standards and Technology (NIST) to the International System of Units (SI). The basis of compliance stated is a comparison of the measurement parameters to the specified or required calibration/testing process. The expanded uncertainties use a coverage factor of k=2 to approximate the 95% confidence level of the measurement, unless otherwise noted. This calibration certificate applies only to the item described and shall not be reproduced other than in full, without written approval from Red Ball Technical Gas Services. If not included, the uncertainty of calibrations are available upon request and were taken into account when determining pass or fail.

Amisha Jewitt
Analytical Chemist
Assay Laboratory: Red Ball TGS
Version 02-J, Revised on 2018-09-17

APPENDIX D

QUALITY ASSURANCE AND QUALITY CONTROL DATA

QA/QC PROGRAM

AIR HYGIENE ensures the quality and validity of its emission measurement and reporting procedures through a rigorous quality assurance (QA) program. The program is developed and administered by an internal QA team and encompasses six major areas:

1. Field Qualifications
2. QA reviews of reports, laboratory work, and field testing;
3. Equipment calibration and maintenance;
4. Chain-of-custody;
5. Training; and
6. Knowledge of current test methods

Field Qualifications

Air Hygiene personnel are required to gain and maintain competence with testing methods and techniques according to their job titles and the roles they play during field testing events. Qualifications for each job description include:

Staff Technician - An entry level position with responsibility to test on the stack by performing duties that include: keep trucks and trailers stocked and clean, travel to and from job site, be the "hands of the test" on the stack; stay on a stack during the sample test, set up and tear down equipment on-site, perform maintenance on equipment in the shop and on-site.

Test Technician or Specialist - Acts as the "hands of the test" on the stack by performing duties that include: stay on a stack during the sample test, migrate to the testing trailer and learn the different analyzers and testing methods used on site, set up and tear down testing equipment on site, learn the system for testing from Testing Managers and Project Managers, travel to and from job site; including driving responsibilities under DOT requirements, follow directions of Testing Managers and Project Managers, learn the proper way to conduct on-site test of stationary stacks

Test Manager or Engineer - Directs and coordinates all aspects of a successful test by performing the following duties personally or through subordinate supervisors including: operating analyzers and consoles during testing along with QA/QC procedures, supervise set up and tear down of equipment on site, writing, reviewing, and revising final test reports, working with the client or state personnel while on the job site, managing pre-test checklists and onsite testing procedures, diagnose and repair any problems that may arise with the equipment, safely operate a man lift and drive a truck with or without a trailer, act as crew leader in the field, write protocols and reports, maintain project log of services performed on the job, verify all equipment needed for a job was loaded on the trailer. Test Managers must hold at least one QSTI certificate.

Project Manager - Directs and coordinates all aspects of a successful test by performing the following duties personally or through subordinate supervisors including: operating analyzers and consoles during testing along with QA/QC procedures, supervise set up and tear down of equipment on site, writing, reviewing, and revising final test reports, working with the client or state personnel while on the job site, managing pre-test checklists and onsite testing procedures, diagnose and repair any problems that may arise with the equipment, safely operate a man lift and drive a truck with or without a trailer, act as crew leader in the field, write protocols and reports, maintain project log of services performed on the job, verify all equipment needed for a job was loaded on the trailer. Project Managers typically hold QSTI certificates in Groups 1 through 4.

QA Reviews

Air Hygiene's review procedure includes review of each source test report, along with laboratory and fieldwork, by the QA Team. The most important review is the one that takes place before a test program begins. The QA Team works closely with technical division personnel to prepare and review test protocols. Test protocol review includes selection of appropriate test procedures, evaluation of interferences or other restrictions that might preclude use of standard test procedures, and evaluation and/or development of alternate procedures.

Equipment Calibration and Maintenance

The equipment used to conduct the emission measurements is maintained according to the manufacturer's instructions to ensure proper operation. In addition to the maintenance program, calibrations are carried out on each measurement device according to the schedule outlined by the Environmental Protection Agency. Quality control checks are also conducted in the field for each test program. In conformance with ASTM D7036 Section 15.3.15, all metering and monitoring equipment meets or exceeds the uncertainty criteria contained in the method language that pertains to that equipment.

Chain-of-Custody

Air Hygiene maintains full chain-of-custody documentation on all samples and data sheets. In addition to normal documentation of changes between field sample custodians, laboratory personnel, and field test personnel, Air Hygiene documents every individual who handles any test component in the field (e.g., probe wash, impinger loading and recovery, filter loading and recovery, etc.). Samples are stored in a locked area to which only Air Hygiene personnel have access. Field data sheets are secured at Air Hygiene's offices upon return from the field.

Training

Personnel's training is essential to ensure quality testing. Air Hygiene has formal and informal training programs, which include:

1. Attendance at EPA-sponsored training courses
2. Enrollment in EPA correspondence courses
3 A requirement for all technicians to read and understand Air Hygiene's QA manual
4. In-house training and QA meetings on a regular basis
5. Maintenance of training records

Knowledge of Current Test Methods

With the constant updating of standard test methods and the wide variety of emerging test procedures, it is essential that any qualified source tester keep abreast of new developments. Air Hygiene subscribes to services, which provide updates on EPA reference methods, rules, and regulations. Additionally, source test personnel regularly attend and present papers at testing and emission-related seminars and conferences. Air Hygiene personnel maintain membership in the Air and Waste Management Association and the American Industrial Hygiene Association.

Reproduction and Distribution Policy

Reproducing portions of this test report may omit critical or substantial documentation or be taken out of context and due care must be exercised in this regard. Furthermore, this test report and its associated data shall not be reproduced in full or in part without the written consent of the customer.

COMBUSTION TESTING QUALITY ASSURANCE ACTIVITIES

In conformance with ASTM D7036 Section 15.3.11 and 13, all testing was performed without any real or apparent errors, with the exception of those that would be listed in Section 2.0 of this report. In addition, all testing was conducted according to the approved testing protocol, test methods, Air Hygiene Quality Manual, or ASTM D7036, with the exception of specifics noted in Section 2.0 of this report. A number of quality assurance activities were undertaken before, during, and after this testing project. This section of the report combined with the documentation in Appendix C describes each of those activities.

Each instrument's response was checked and adjusted in the field prior to the collection of data via multi-point calibration. The instrument's linearity was checked by adjusting its zero and span responses to zero nitrogen and an upscale calibration gas in the range of the expected concentrations. The instrument response was then challenged with other calibration gases of known concentration and accepted as being linear if the response of the other calibration gases agreed within plus or minus two percent of the range of predicted values. NO_2 to NO conversion was checked via direct connect with an EPA Protocol certified concentration of NO_2 in a balance of air or nitrogen. Conversion was verified to be between 90 and 110 percent.

After each test run, the analyzers were checked for zero and span drift. This allowed each test run to be bracketed by calibrations and documents the precision of the data just collected. The criterion for acceptable data is that the instrument drift is no more than three percent of the full-scale response. The quality assurance worksheets in the following pages summarize all multipoint calibration checks and zero to span checks performed during the tests. These worksheets (as prepared from the data records of Appendix A) show that no drifts in excess of three percent occurred in the zero to span checks following each test run.

The sampling systems were leak checked by demonstrating that a vacuum greater than 10 in Hg could be held for at least one minute with a decline of less than one inch of Hg. A leak test was conducted after the sample system was set up and before the system was dismantled. This test was conducted to ensure that ambient air had not diluted the sample. Any leakage detected prior to the tests would be repaired and another leak check conducted before testing commenced. No leaks were found during the pre or post-test leak checks.

The absence of leaks in the sampling system was also verified by a sampling system bias check. The sampling system's integrity was tested by comparing the responses of the analyzers to the calibration gases introduced via two paths. The first path was directly into the analyzer and the second path via the sample system at the sample probe. Any difference in the instrument responses by these two methods was attributed to sampling system bias or leakage. The criterion for acceptance is agreement within five percent of the span of the analyzer.

The control gases used to calibrate the instruments were analyzed and certified by the compressed gas vendors to plus or minus one percent accuracy for all gases. EPA Protocol No. 1 was used, where applicable to assign the concentration values traceable to the National Institute of Standards and Technology (NIST), Standard Reference Materials (SRM's). The gas calibration sheets as prepared by the vendor are contained in Appendix C.

Air Hygiene collected and reported the enclosed test data in accordance with the procedures and quality assurance activities described in this test report. Air Hygiene makes no warranty as to the suitability of the test methods. Air Hygiene also assumes no liability relating to the interpretation and use of the test data.

INSTRUMENTAL ANALYSIS
QUALITY ASSURANCE DATA

Date: February 5-7, 2019
Company: CPV Valley, LLC
Location: Middletown, NY
Techs: CM / DA / BL / CM / ZVN / MJ

Sample System Leak Check

Date	Sample System	Leak Rate (l/min)
February 5-7, 2019	1	0

STACK TESTING ACCREDITATION COUNCIL

American Association for Laboratory Accreditation

Accredited Air Emission Testing Body

A2LA has accredited

AIR HYGIENE INTERNATIONAL, INC.

In recognition of the successful completion of the joint A2LA and Stack Testing Accreditation Council (STAC) evaluation process, this laboratory is accredited to perform testing activities in compliance with ASTM D7036:2004 - Standard Practice for Competence of Air Emission Testing Bodies.

Presented this 10th day of October 2017

President and CEO
For the Accreditation Council
Certificate Number 3796.02
Valid to August 31, 2019

This accreditation program is not included under the A2LA ILAC Mutual Recognition Arrangement.

Accredited Laboratory

A2LA has accredited

AIR HYGIENE INTERNATIONAL, INC.

Broken Arrow, OK

for technical competence in the field of

Environmental Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 *General requirements for the competence of testing and calibration laboratories*. This laboratory also meets the R219 – Specific Requirements – TNI Field Sampling and Measurement Organization Accreditation Program. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (*refer to joint ISO-ILAC-IAF Communiqué dated 8 January 2009*).

Presented this 10th day of October 2017

President and CEO
For the Accreditation Council
Certificate Number 3796.01
Valid to August 31, 2019

For the types of tests to which this accreditation applies, please refer to the laboratory's Environmental Scope of Accreditation.

SOURCE EVALUATION SOCIETY

Qualified Source Testing Individual

LET IT BE KNOWN THAT

JAMES COLE McBRIDE

HAS SUCCESSFULLY PASSED A COMPREHENSIVE EXAMINATION AND SATISFIED EXPERIENCE REQUIREMENTS IN ACCORDANCE WITH THE GUIDELINES ISSUED BY THE SES QUALIFIED SOURCE TEST INDIVIDUAL REVIEW BOARD FOR

MANUAL GAS VOLUME MEASUREMENTS AND ISOKINETIC PARTICULATE SAMPLING METHODS

ISSUED THIS 9TH DAY OF OCTOBER 2018 AND EFFECTIVE UNTIL OCTOBER 8TH, 2023

Peter R. Westlin, QSTI/QSTO Review Board

J. Wade Bice, QSTI/QSTO Review Board

Peter S. Pakalnis, QSTI/QSTO Review Board

Karen D. Kajiya-Mills , QSTI/QSTO Review Board

Tina Sanderson, QSTI/QSTO Review Board

Bruce Randall QSTI/QSTO Review Board

CERTIFICATE NO. 2013-794

SOURCE EVALUATION SOCIETY

Qualified Source Testing Individual

LET IT BE KNOWN THAT

JAMES COLE McBRIDE

HAS SUCCESSFULLY PASSED A COMPREHENSIVE EXAMINATION AND SATISFIED EXPERIENCE REQUIREMENTS IN ACCORDANCE WITH THE GUIDELINES ISSUED BY THE SES QUALIFIED SOURCE TEST INDIVIDUAL REVIEW BOARD FOR

GASEOUS POLLUTANTS INSTRUMENTAL SAMPLING METHODS

ISSUED THIS 2ND DAY OF MARCH 2018 AND EFFECTIVE UNTIL MARCH 1ST, 2023

Peter R. Westlin, QSTI/QSTO Review Board

Peter S. Pakalnis, QSTI/QSTO Review Board

Theresa Lowe, QSTI/QSTO Review Board

J. Wade Bice, QSTI/QSTO Review Board

Karen D. Kajiya-Mills , QSTI/QSTO Review Board

Bruce Randall QSTI/QSTO Review Board

CERTIFICATE NO. 2013-794

Compliance Assurance Associates Inc.

Helping Industry Comply with Environmental Regulations

This is to acknowledge that

Axel Garrido Martinez

BRO190104-16529

Certificate verification is available at www.Compliance.Assurance.com/certs.php using the last name and 16529

successfully participated in Visible Emissions Evaluation field training and certification and pursuant to US EPA 40 CFR 60 Appendix A, Reference Method 9, as amended, is certified to evaluate Visible Emissions for a period of six (6) months from the date of this certification.

Anthony Ferro - Field Manager	Broken Arrow, OK	01/04/2019
	Location	Date

Compliance Assurance Associates, Inc. 682 Orvil Smith Rd, Harvest, AL, 35749. 901-381-9960. compliance-assurance.com

QUALITY ASSURANCE AND QUALITY CONTROL DATA

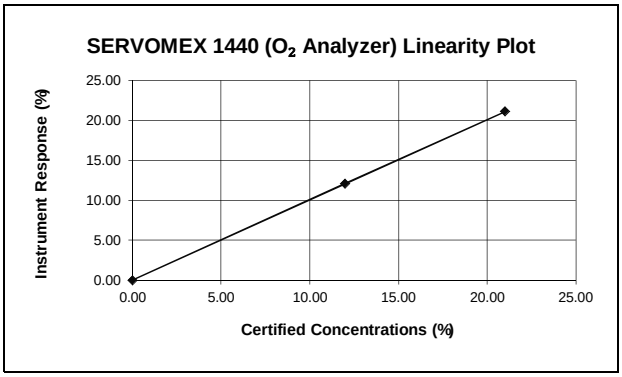
Unit #CTG-11
Daily Analyzer Calibrations

Calibration Date: February 5, 2019
Client: CPV Valley LLC

Location: CPV Valley Energy Center - Unit CTG-11

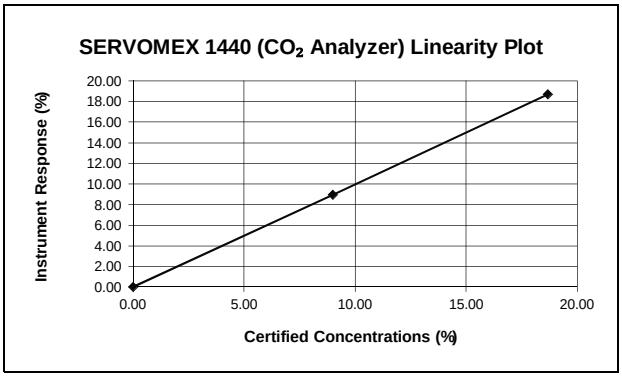
O_2 Span (%) = 21.00

SERVOMEX 1440 (O_2 Analyzer)				
Certified Concentration (%)	**Instrument Response (%)**	**Calibration Error (%)**	**Absolute Conc. (%)**	**Pass (±2%, ≤0.5%)**
0.00	0.02	0.10	0.02	YES (%)
11.99	12.07	0.38	0.08	YES (%)
21.00	21.10	0.48	0.10	YES (%)
Linearity = 0.996				



CO_2 Span (%) = 18.70

SERVOMEX 1440 (CO_2 Analyzer)				
Certified Concentration (%)	**Instrument Response (%)**	**Calibration Error (%)**	**Absolute Conc. (%)**	**Pass (±2%, ≤0.5%)**
0.00	0.04	0.21	0.04	YES (%)
9.00	8.98	-0.11	0.02	YES (%)
18.70	18.67	-0.16	0.03	YES (%)
Linearity = 1.004				



QUALITY ASSURANCE AND QUALITY CONTROL DATA

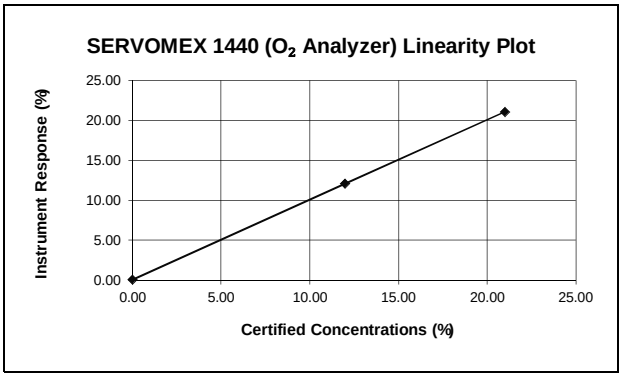
Unit #CTG-12
Daily Analyzer Calibrations

Calibration Date: February 6, 2019
Client: CPV Valley LLC

Location: CPV Valley Energy Center - Unit CTG-12

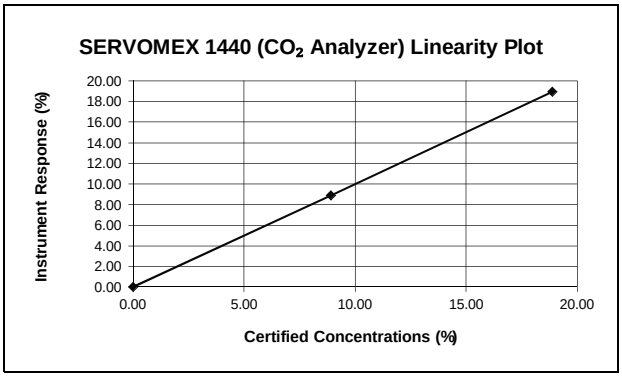
O_2 Span (%) = 21.00

SERVOMEX 1440 (O_2 Analyzer)				
Certified Concentration (%)	**Instrument Response (%)**	**Calibration Error (%)**	**Absolute Conc. (%)**	**Pass (±2%, ≤0.5%)**
0.00	0.08	0.38	0.08	YES (%)
11.98	12.11	0.62	0.13	YES (%)
21.00	21.08	0.38	0.08	YES (%)
Linearity = 1.000				



CO_2 Span (%) = 18.90

SERVOMEX 1440 (CO_2 Analyzer)				
Certified Concentration (%)	**Instrument Response (%)**	**Calibration Error (%)**	**Absolute Conc. (%)**	**Pass (±2%, ≤0.5%)**
0.00	0.03	0.16	0.03	YES (%)
8.92	8.91	-0.05	0.01	YES (%)
18.90	18.93	0.16	0.03	YES (%)
Linearity = 1.000				

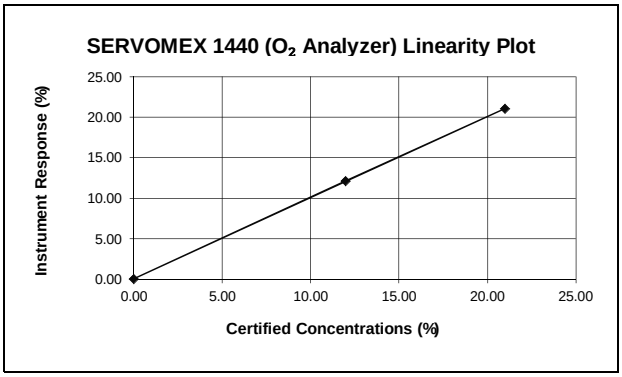


Calibration Date: February 7, 2019
Client: CPV Valley LLC

Location: CPV Valley Energy Center - Unit CTG-12

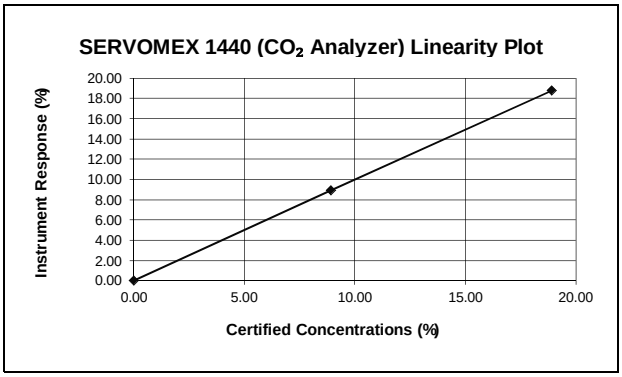
O2 Span (%) = 21.00

SERVOMEX 1440 (O_2 Analyzer)				
Certified Concentration (%)	Instrument Response (%)	Calibration Error (%)	Absolute Conc. (%)	Pass (±2%, ≤0.5%)
0.00	0.04	0.19	0.04	YES (%)
11.98	12.06	0.38	0.08	YES (%)
21.00	21.05	0.24	0.05	YES (%)
Linearity = 0.999				



CO2 Span (%) = 18.90

SERVOMEX 1440 (CO_2 Analyzer)				
Certified Concentration (%)	Instrument Response (%)	Calibration Error (%)	Absolute Conc. (%)	Pass (±2%, ≤0.5%)
0.00	0.01	0.05	0.01	YES (%)
8.92	8.92	0.00	0.00	YES (%)
18.90	18.75	-0.79	0.15	YES (%)
Linearity = 1.009				



QUALITY ASSURANCE AND QUALITY CONTROL DATA

Unit #CTG-11
Summary PM Laboratory Analysis

SAMPLE ANALYTICAL DATA SHEET

Plant Name	CPV Valley Energy Center
Sampling Location	CTG-11 Stack
Project #	sie-19-middletown.ny-comp#1

Analytical Data		**Run**	11-PM-FO-1	
Sample Leakage Evident	NO	**Estimated Leak Volume**	0.00	(mg)

Sample Type	Sample Number	Date	Time
Filter	Maxxam		
Nozzle Wash PM>10	Maxxam		
Cyclone Wash 2.5<PM<10	Maxxam		
Cyclone Exit to Front Half of Filter Wash (<2.5)	Maxxam		
Inorganic Impinger Contents	Maxxam		
Organic Impinger Contents	Maxxam		

Blank and Titration Concentrations				
Blank Type	**Weight**	**Volume**	**Concentration**	**Mass**
	(g)	(ml)	(mg/ml)	(mg)
Acetone Blank Weight of Solids	0.0029	280.0000	0.000791	--
DI Water Blank Weight of Solids	0.0002	270.8124	0.000739	--
Hexane Blank Weight of Solids	0.0028	303.4901	0.009226	--

Gravimetric Concentrations			**Run**		1	**Start Time**	09:36
Sample Portion	**Final**	**Tare**	**Gain**	**Volume**	**Blank Adjustment**	**Adjusted Gain**	
	(g)	(g)	(mg)	(ml)	(mg)	(mg)	
Filter			0.3000	--	--	0.3000	
Filter Beaker				--	--		
Nozzle Wash PM>10			1.5000	55.0000	0.0435	1.4565	
Cyclone Wash 2.5<PM<10			1.6000	72.0000	0.0570	1.5430	
Cyclone Exit to Front Half of Filter Wash (<2.5)			2.0000	71.0000	0.0562	1.9438	
Inorganic Impinger Contents			3.2000	361.0832	0.9286	2.2714	
Organic Impinger Contents			2.1000	333.8392	1.0714	1.0286	

SAMPLE ANALYTICAL DATA SHEET

Plant Name	CPV Valley Energy Center
Sampling Location	CTG-11 Stack
Project #	sie-19-middletown.ny-comp#1

Analytical Data		**Run**	11-PM-FO-2	
Sample Leakage Evident	NO	**Estimated Leak Volume**	0.00	(mg)

Sample Type	Sample Number	Date	Time
Filter	Maxxam		
Nozzle Wash PM>10	Maxxam		
Cyclone Wash 2.5<PM<10	Maxxam		
Cyclone Exit to Front Half of Filter Wash (<2.5)	Maxxam		
Inorganic Impinger Contents	Maxxam		
Organic Impinger Contents	Maxxam		

Blank and Titration Concentrations				
Blank Type	**Weight**	**Volume**	**Concentration**	**Mass**
	(g)	(ml)	(mg/ml)	(mg)
Acetone Blank Weight of Solids	0.0029	280.0000	0.000791	--
DI Water Blank Weight of Solids	0.0002	270.8124	0.000739	--
Hexane Blank Weight of Solids	0.0028	303.4901	0.009226	--

Gravimetric Concentrations			**Run**	2	**Start Time**	13:51
Sample Portion	**Final**	**Tare**	**Gain**	**Volume**	**Blank Adjustment**	**Adjusted Gain**
	(g)	(g)	(mg)	(ml)	(mg)	(mg)
Filter			0.3000	--	--	0.3000
Filter Beaker				--	--	
Nozzle Wash PM>10			1.8000	70.0000	0.0554	1.7446
Cyclone Wash 2.5<PM<10			2.0000	68.0000	0.0538	1.9462
Cyclone Exit to Front Half of Filter Wash (<2.5)			2.2000	75.0000	0.0593	2.1407
Inorganic Impinger Contents			5.1000	341.0231	0.9286	4.1714
Organic Impinger Contents			2.3000	257.9666	1.0714	1.2286

SAMPLE ANALYTICAL DATA SHEET

Plant Name	CPV Valley Energy Center
Sampling Location	CTG-11 Stack
Project #	sie-19-middletown.ny-comp#1

Analytical Data		**Run**	11-PM-FO-3		
Sample Leakage Evident	NO	**Estimated Leak Volume**		0.00	(mg)

Sample Type	Sample Number	Date	Time
Filter	Maxxam		
Nozzle Wash PM>10	Maxxam		
Cyclone Wash 2.5<PM<10	Maxxam		
Cyclone Exit to Front Half of Filter Wash (<2.5)	Maxxam		
Inorganic Impinger Contents	Maxxam		
Organic Impinger Contents	Maxxam		

Blank and Titration Concentrations				
Blank Type	**Weight**	**Volume**	**Concentration**	**Mass**
	(g)	(ml)	(mg/ml)	(mg)
Acetone Blank Weight of Solids	0.0029	280.0000	0.000791	--
DI Water Blank Weight of Solids	0.0002	270.8124	0.000739	--
Hexane Blank Weight of Solids	0.0028	303.4901	0.009226	--

Gravimetric Concentrations			**Run**		3	**Start Time**	18:04
Sample Portion	**Final**	**Tare**	**Gain**	**Volume**	**Blank Adjustment**	**Adjusted Gain**	
	(g)	(g)	(mg)	(ml)	(mg)	(mg)	
Filter			0.3000	--	--	0.3000	
Filter Beaker				--	--		
Nozzle Wash PM>10			1.6000	73.0000	0.0577	1.5423	
Cyclone Wash 2.5<PM<10			2.7000	78.0000	0.0617	2.6383	
Cyclone Exit to Front Half of Filter Wash (<2.5)			2.0000	73.0000	0.0577	1.9423	
Inorganic Impinger Contents			1.6000	330.9930	0.9286	0.6714	
Organic Impinger Contents			2.0000	273.1411	1.0714	0.9286	

SAMPLE ANALYTICAL DATA SHEET

Plant Name	CPV Valley Energy Center
Sampling Location	CTG-11 Stack
Project #	sie-19-middletown.ny-comp#1

Analytical Data		**Run**	11-PM-FO-FB		
Sample Leakage Evident	NO	**Estimated Leak Volume**		0.00	(mg)

Sample Type	Sample Number	Date	Time
Inorganic Impinger Contents	Maxxam		
Organic Impinger Contents	Maxxam		

Gravimetric Concentrations					
Sample Portion	**Final**	**Tare**	**Gain**		**Actual Gain**
	(g)	(g)	(mg)		(mg)
Inorganic Impinger Contents	0.0013	0.0000	0.9286	max 2 mg total blank adjustment, proportioned	1.3000
Organic Impinger Contents	0.0015	0.0000	1.0714		1.5000

QUALITY ASSURANCE AND QUALITY CONTROL DATA

Unit #CTG-12
Summary PM Laboratory Analysis

SAMPLE ANALYTICAL DATA SHEET

Plant Name	CPV Valley Energy Center
Sampling Location	CTG-12 Stack
Project #	sie-19-middletown.ny-comp#1

Analytical Data		**Run**	12-PM-FO-1	
Sample Leakage Evident	NO	**Estimated Leak Volume**	0.00	(mg)

Sample Type	Sample Number	Date	Time
Filter	Maxxam		
Nozzle Wash PM>10	Maxxam		
Cyclone Wash 2.5<PM<10	Maxxam		
Cyclone Exit to Front Half of Filter Wash (<2.5)	Maxxam		
Inorganic Impinger Contents	Maxxam		
Organic Impinger Contents	Maxxam		

Blank and Titration Concentrations				
Blank Type	**Weight**	**Volume**	**Concentration**	**Mass**
	(g)	(ml)	(mg/ml)	(mg)
Acetone Blank Weight of Solids	0.0029	280.0000	0.000791	--
DI Water Blank Weight of Solids	0.0002	270.8124	0.000739	--
Hexane Blank Weight of Solids	0.0028	303.4901	0.009226	--

Gravimetric Concentrations			**Run**		1	**Start Time**	16:35
Sample Portion	**Final**	**Tare**	**Gain**	**Volume**	**Blank Adjustment**	**Adjusted Gain**	
	(g)	(g)	(mg)	(ml)	(mg)	(mg)	
Filter			0.3000	--	--	0.3000	
Filter Beaker				--	--		
Nozzle Wash PM>10			1.5000	78.0000	0.0617	1.4383	
Cyclone Wash 2.5<PM<10			1.9000	69.0000	0.0546	1.8454	
Cyclone Exit to Front Half of Filter Wash (<2.5)			2.5000	73.0000	0.0577	2.4423	
Inorganic Impinger Contents			2.5000	341.0231	0.9286	1.5714	
Organic Impinger Contents			1.9000	303.4901	1.0714	0.8286	

SAMPLE ANALYTICAL DATA SHEET

Plant Name	CPV Valley Energy Center
Sampling Location	CTG-12 Stack
Project #	sie-19-middletown.ny-comp#1

Analytical Data		**Run**	12-PM-FO-2		
Sample Leakage Evident	NO	**Estimated Leak Volume**		0.00	(mg)

Sample Type	Sample Number	Date	Time
Filter	Maxxam		
Nozzle Wash PM>10	Maxxam		
Cyclone Wash 2.5<PM<10	Maxxam		
Cyclone Exit to Front Half of Filter Wash (<2.5)	Maxxam		
Inorganic Impinger Contents	Maxxam		
Organic Impinger Contents	Maxxam		

Blank and Titration Concentrations				
Blank Type	**Weight**	**Volume**	**Concentration**	**Mass**
	(g)	(ml)	(mg/ml)	(mg)
Acetone Blank Weight of Solids	0.0029	280.0000	0.000791	--
DI Water Blank Weight of Solids	0.0002	270.8124	0.000739	--
Hexane Blank Weight of Solids	0.0028	303.4901	0.009226	--

Gravimetric Concentrations			**Run**	2	**Start Time**	21:00
Sample Portion	**Final**	**Tare**	**Gain**	**Volume**	**Blank Adjustment**	**Adjusted Gain**
	(g)	(g)	(mg)	(ml)	(mg)	(mg)
Filter			0.3000	--	--	0.3000
Filter Beaker				--	--	
Nozzle Wash PM>10			1.8000	62.0000	0.0490	1.7510
Cyclone Wash 2.5<PM<10			1.8000	62.0000	0.0490	1.7510
Cyclone Exit to Front Half of Filter Wash (<2.5)			2.4000	65.0000	0.0514	2.3486
Inorganic Impinger Contents			1.8000	341.0231	0.9286	0.8714
Organic Impinger Contents			1.7000	318.6646	1.0714	0.6286

SAMPLE ANALYTICAL DATA SHEET

Plant Name	CPV Valley Energy Center
Sampling Location	CTG-12 Stack
Project #	sie-19-middletown.ny-comp#1

Analytical Data		**Run**	12-PM-FO-3		
Sample Leakage Evident	NO	**Estimated Leak Volume**		0.00	(mg)

Sample Type	Sample Number	Date	Time
Filter	Maxxam		
Nozzle Wash PM>10	Maxxam		
Cyclone Wash 2.5<PM<10	Maxxam		
Cyclone Exit to Front Half of Filter Wash (<2.5)	Maxxam		
Inorganic Impinger Contents	Maxxam		
Organic Impinger Contents	Maxxam		

Blank and Titration Concentrations				
Blank Type	**Weight**	**Volume**	**Concentration**	**Mass**
	(g)	(ml)	(mg/ml)	(mg)
Acetone Blank Weight of Solids	0.0029	280.0000	0.000791	--
DI Water Blank Weight of Solids	0.0002	270.8124	0.000739	--
Hexane Blank Weight of Solids	0.0028	303.4901	0.009226	--

Gravimetric Concentrations			**Run**		3	**Start Time**	01:25
Sample Portion	**Final**	**Tare**	**Gain**	**Volume**	**Blank Adjustment**	**Adjusted Gain**	
	(g)	(g)	(mg)	(ml)	(mg)	(mg)	
Filter			0.3000	--	--	0.3000	
Filter Beaker				--	--		
Nozzle Wash PM>10			1.5000	74.0000	0.0585	1.4415	
Cyclone Wash 2.5<PM<10			1.6000	74.0000	0.0585	1.5415	
Cyclone Exit to Front Half of Filter Wash (<2.5)			1.6000	66.0000	0.0522	1.5478	
Inorganic Impinger Contents			2.6000	341.0231	0.9286	1.6714	
Organic Impinger Contents			1.8000	318.6646	1.0714	0.7286	

SAMPLE ANALYTICAL DATA SHEET

Plant Name	CPV Valley Energy Center
Sampling Location	CTG-12 Stack
Project #	sie-19-middletown.ny-comp#1

Analytical Data		**Run**	12-PM-FO-FB		
Sample Leakage Evident	NO	**Estimated Leak Volume**		0.00	(mg)

Sample Type	Sample Number	Date	Time
Inorganic Impinger Contents	Maxxam		
Organic Impinger Contents	Maxxam		

Gravimetric Concentrations					
Sample Portion	**Final**	**Tare**	**Gain**		**Actual Gain**
	(g)	(g)	(mg)		(mg)
Inorganic Impinger Contents	0.0013	0.0000	0.9286	max 2 mg total blank adjustment, proportioned	1.3000
Organic Impinger Contents	0.0015	0.0000	1.0714		1.5000

QUALITY ASSURANCE AND QUALITY CONTROL DATA

Maxxam Laboratory Analysis Report

Prepared for: Air Hygiene International Inc

Project: SIE-19-MIDDLETOWN.NY-COMP#1

Analytical Data Package

Analysis: Method 201A, Method 202

Maxxam Job #: B935711

Maxxam Analytics International
6740 Campobello Rd.
Mississauga, Ontario, Canada
L5N 2L8
1-800-668-0639
www.maxxam.ca

I hereby certify that to the best of my knowledge all analytical data presented in this report:

- Has been checked for completeness.
- Is accurate, legible and error free.
- Has been conducted in accordance with approved SOP's and that all deviations are clearly listed in the Case Narrative.
- This report has been generated in .pdf format.

Review Performed By:

Maxxam Analytics International
6740 Campobello Rd.
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Glossary of Terms

- ***MDL*** represents the Minimum Detection Limit below which the laboratory cannot confirm the presence of the analyte to the 95% confidence level.
- ***RDL*** represents the Reportable Detection Limit and is usually set at a value equivalent to the lowest calibration standard
- ***Acceptance Criteria*** are values used by the laboratory to determine that a process is in control.
- ***Accuracy*** is the degree of agreement of a measured value with the true or expected value.
- ***Calibration Standards*** are a set of solutions containing the analytes of interest at a specified concentration.
- ***Calibration Verification Standard*** consists of a calibration standard solution of intermediate concentration (mid-point initial calibration level) used to access whether the initial calibration is still valid
- ***Certified Reference Material*** is a stable homogenous material that is certified by repetitive analysis from a supplier who is certified to generate said materials.
- ***Internal Standard*** a deuterated or ^{13}C-labelled analyte that is added to a sample extract prior to instrumental analysis to compensate for injection variablity.
- ***Isomer*** is a member of a group of compounds that differ from each other only in the locations of a specific number of common substituent atoms or groups of atoms on the parent compound.
- ***Method Blank*** is a laboratory control sample using reagents that are known to be free of contamination.
- ***Precision*** is the degree of agreement between the data generated from repetitive measurements under specific conditions.
- ***Quality Assurance*** is a system of activities whose purpose is to provide the producer or user of a product with the assurance that the product meets a defined standard of quality.
- ***Quality Control*** is the overall system of activities whose purpose is to control the quality of a product so that it meets the needs of the end user.
- ***RSD*** is the relative standard deviation.
- ***Blank Spike*** is a laboratory control sample that has been fortified with native analytes of interest.
- ***Window Defining Mixture*** is a solution containing only the earliest and latest eluting congeners within each homologous group of target analytes on a specified GC column.
- ***RPD*** or Relative Percent Difference. A measure used to compare duplicate sample analysis.
- ***EMPC/NDR –*** Peak detected does not meet ratio criteria and has resulted in a higher detection limit.

1.0 Project Narrative

Maxxam Analytics International
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PROJECT NARRATIVE

Maxxam Analytics
Client Project #: SIE-19-MIDDLETOWN.NY-COMP#1

Client: Air Hygiene International Inc
Client Project: SIE-19-MIDDLETOWN.NY-COMP#1

I. SAMPLE RECEIPT/ANALYSIS

a) Sample Listing

Maxxam ID	Client Sample ID	Date Sampled	Date Received	Date Prepped	Date Run
<2.5um Particulates in Rinse					
IYI880	M201A- UNIT 1- R1	2019/02/05	2019/02/08	2019/02/11	2019/02/13
IYI881	M201A- UNIT 1- R2	2019/02/05	2019/02/08	2019/02/11	2019/02/13
IYI882	M201A- UNIT 1- R3	2019/02/05	2019/02/08	2019/02/11	2019/02/13
IYI944	M201A- UNIT 2- R1	2019/02/06	2019/02/08	2019/02/11	2019/02/13
IYI945	M201A- UNIT 2- R2	2019/02/07	2019/02/08	2019/02/11	2019/02/13
IYI946	M201A- UNIT 2- R3	2019/02/07	2019/02/08	2019/02/11	2019/02/13
>10um Particulates in Rinse					
IYI880	M201A- UNIT 1- R1	2019/02/05	2019/02/08	2019/02/11	2019/02/13
IYI881	M201A- UNIT 1- R2	2019/02/05	2019/02/08	2019/02/11	2019/02/13
IYI882	M201A- UNIT 1- R3	2019/02/05	2019/02/08	2019/02/11	2019/02/13
IYI944	M201A- UNIT 2- R1	2019/02/06	2019/02/08	2019/02/11	2019/02/13
IYI945	M201A- UNIT 2- R2	2019/02/07	2019/02/08	2019/02/11	2019/02/13
IYI946	M201A- UNIT 2- R3	2019/02/07	2019/02/08	2019/02/11	2019/02/13
2.5 um Particulates on Filter					
IYI880	M201A- UNIT 1- R1	2019/02/05	2019/02/08	N/A	2019/02/11
IYI881	M201A- UNIT 1- R2	2019/02/05	2019/02/08	N/A	2019/02/11
IYI882	M201A- UNIT 1- R3	2019/02/05	2019/02/08	N/A	2019/02/11
IYI944	M201A- UNIT 2- R1	2019/02/06	2019/02/08	N/A	2019/02/11
IYI945	M201A- UNIT 2- R2	2019/02/07	2019/02/08	N/A	2019/02/11
IYI946	M201A- UNIT 2- R3	2019/02/07	2019/02/08	N/A	2019/02/11
2.5-10um Particulates in Rinse					
IYI880	M201A- UNIT 1- R1	2019/02/05	2019/02/08	2019/02/11	2019/02/13
IYI881	M201A- UNIT 1- R2	2019/02/05	2019/02/08	2019/02/11	2019/02/13
IYI882	M201A- UNIT 1- R3	2019/02/05	2019/02/08	2019/02/11	2019/02/13
IYI944	M201A- UNIT 2- R1	2019/02/06	2019/02/08	2019/02/11	2019/02/13
IYI945	M201A- UNIT 2- R2	2019/02/07	2019/02/08	2019/02/11	2019/02/13
IYI946	M201A- UNIT 2- R3	2019/02/07	2019/02/08	2019/02/11	2019/02/13
Extractable Condensables (M202)					
IYI954	M202- HEXANE BLANK	2019/02/05	2019/02/08	2019/02/11	2019/02/12
IYI958	M202- FB	2019/02/05	2019/02/08	2019/02/11	2019/02/12
IYI960	M202- UNIT 1- R1	2019/02/05	2019/02/08	2019/02/11	2019/02/12
IYI961	M202- UNIT 1- R2	2019/02/05	2019/02/08	2019/02/11	2019/02/12
IYI962	M202- UNIT 1- R3	2019/02/05	2019/02/08	2019/02/11	2019/02/12
IYI963	M202- UNIT 2- R1	2019/02/06	2019/02/08	2019/02/11	2019/02/12
IYI964	M202- UNIT 2- R2	2019/02/07	2019/02/08	2019/02/11	2019/02/12
IYI965	M202- UNIT 2- R3	2019/02/07	2019/02/08	2019/02/11	2019/02/12
Non Extractable Condensibles (M202)					
IYI953	M202- DI WATER BLANK	2019/02/05	2019/02/08	2019/02/11	2019/02/12
IYI958	M202- FB	2019/02/05	2019/02/08	2019/02/11	2019/02/12
IYI960	M202- UNIT 1- R1	2019/02/05	2019/02/08	2019/02/11	2019/02/12

IYI961	M202- UNIT 1- R2	2019/02/05	2019/02/08	2019/02/11	2019/02/12
IYI962	M202- UNIT 1- R3	2019/02/05	2019/02/08	2019/02/11	2019/02/12
IYI963	M202- UNIT 2- R1	2019/02/06	2019/02/08	2019/02/11	2019/02/12
IYI964	M202- UNIT 2- R2	2019/02/07	2019/02/08	2019/02/11	2019/02/12
IYI965	M202- UNIT 2- R3	2019/02/07	2019/02/08	2019/02/11	2019/02/12
Particulates/Acetone Rinse (M5/315/M201)					
IYI879	M201A- ACETONE BLANK	2019/02/05	2019/02/08	2019/02/11	2019/02/13

Run Date is defined as the date of injection of the last calibration standard (12 hours or less) prior to the samples analyzed within that run sequence. Therefore the time of calibration injection that defines the run date is always within 12 hours of the time of sample injection.

b) Shipping Problems: none encountered

c) Documentation Problems: none encountered

II. SAMPLE PREP:

No problems encountered

III. SAMPLE ANALYSIS:

See also comments within the appropriate Certificate of Analysis

a) Hold Times: all within recommended hold times

b) Instrument Calibration: all within control limits

c) Quality Control: All applicable QC meets control criteria, except where otherwise noted.

d) All analytes requiring manual intergration(s) are noted on the sample chromatograms

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for other than the conditions detailed above.

In addition, I certify, that to the best of my knowledge and belief, the data as reported are true and accurate. Release of the data contained in this data package has been authorized by the cognizant laboratory official or his/her designee, as verified by this signature.

Julian Tong - Project Manager Assistant

2019/02/19
Date

2.0 Summary Report

Maxxam Analytics International
6740 Campobello Rd.
Mississauga, Ontario, Canada
L5N 2L8
1-800-668-0639
www.maxxamanalytics.com

Your Project #: SIE-19-MIDDLETOWN.NY-COMP#1

Attention: Data Reports

Air Hygiene International Inc
1600 West Tacoma Street
Broken Arrow, OK
USA 74012

Report Date: 2019/02/15
Report #: R5596311
Version: 3 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

MAXXAM JOB #: B935711
Received: 2019/02/08, 16:00

Sample Matrix: Stack Sampling Train
Samples Received: 16

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Extractable Condensables (M202)	8	2019/02/11	2019/02/12	BRL SOP-00118	EPA 202 m
Non Extractable Condensibles (M202)	8	2019/02/11	2019/02/12	BRL SOP-00118 / BRL SOP-00109	EPA 202 m
>10um Particulates in Rinse	6	2019/02/11	2019/02/13	BRL SOP-00109	EPA M201A
2.5-10um Particulates in Rinse	6	2019/02/11	2019/02/13	BRL SOP-00109	EPA M201A
2.5 um Particulates on Filter	6	N/A	2019/02/11	BRL SOP-00109	EPA M201A
<2.5um Particulates in Rinse	6	2019/02/11	2019/02/13	BRL SOP-00109	EPA M201A
Particulates/Acetone Rinse (M5/315/M201)	1	2019/02/11	2019/02/13	BRL SOP-00109	EPA 5/315 m
Final Volume of Acetone Probe Rinse	7	N/A	2019/02/13	BRL SOP-00109	
Weight of Solvent from Impingers	8	N/A	2019/02/12		
Weight of Water from Impingers	8	N/A	2019/02/12		

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Your Project #: SIE-19-MIDDLETOWN.NY-COMP#1

Attention: Data Reports

Air Hygiene International Inc
1600 West Tacoma Street
Broken Arrow, OK
USA 74012

Report Date: 2019/02/15
Report #: R5596311
Version: 3 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

MAXXAM JOB #: B935711
Received: 2019/02/08, 16:00

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Clayton Johnson, Project Manager - Air Toxics, Source Evaluation
Email: CJohnson@maxxam.ca
Phone# (905)817-5769

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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EPA M201A - PARTICULATES (STACK SAMPLING TRAIN)

Maxxam ID		IYI880	IYI881	IYI882			
Sampling Date		2019/02/05	2019/02/05	2019/02/05			
	UNITS	M201A- UNIT 1-R1	M201A- UNIT 1-R2	M201A- UNIT 1-R3	RDL	MDL	QC Batch
> 10 Particulate Weight in Acetone Rinse	mg	1.5	1.8	1.6	0.5	0.1	5969030
< 2.5 Particulate Weight in Acetone Rinse	mg	2.0	2.2	2.0	0.5	0.5	5969026
2.5 - 10 Particulate Weight in Acetone Rinse	mg	1.6	2.0	2.7	0.5	0.5	5969028
< 2.5 Particulate Weight on Filter	mg	(-0.50000) ND	(-1.00000) ND	(-0.30000) ND	0.30	0.30	5969345
Acetone Rinse Volume (10)	ml	55	70	73	1	N/A	5969031
Acetone Rinse Volume (2.5 - 10)	ml	72	68	78	1	N/A	5969031
Acetone Rinse Volume (2.5)	ml	71	75	73	1	N/A	5969031

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Maxxam ID		IYI944	IYI945	IYI946			
Sampling Date		2019/02/06	2019/02/07	2019/02/07			
	UNITS	M201A- UNIT 2-R1	M201A- UNIT 2-R2	M201A- UNIT 2-R3	RDL	MDL	QC Batch
> 10 Particulate Weight in Acetone Rinse	mg	1.5	1.8	1.5	0.5	0.1	5969030
< 2.5 Particulate Weight in Acetone Rinse	mg	2.5	2.4	1.6	0.5	0.5	5969026
2.5 - 10 Particulate Weight in Acetone Rinse	mg	1.9	1.8	1.6	0.5	0.5	5969028
< 2.5 Particulate Weight on Filter	mg	(-0.50000) ND	(-0.10000) ND	(-0.50000) ND	0.30	0.30	5969345
Acetone Rinse Volume (10)	ml	78	62	74	1	N/A	5969031
Acetone Rinse Volume (2.5 - 10)	ml	69	62	74	1	N/A	5969031
Acetone Rinse Volume (2.5)	ml	73	65	66	1	N/A	5969031

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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EPA M202 CONDENSIBLE PM (STACK SAMPLING TRAIN)

Maxxam ID		IYI953	IYI954	IYI958	IYI960			
Sampling Date		2019/02/05	2019/02/05	2019/02/05	2019/02/05			
	UNITS	M202- DI WATER BLANK	M202- HEXANE BLANK	M202- FB	M202- UNIT 1-R1	RDL	MDL	QC Batch
Weight	g	270	N/A	260	360	0.1	0.1	5969211
Weight of Solvent	g	N/A	200	110	220	0.1	N/A	5969199
Miscellaneous Parameters								
Inorganic Condensibles	mg	(0.20000) ND	N/A	1.3	3.2	0.5	0.1	5969210
Organic Condensibles	mg	N/A	2.8	1.5	2.1	1.0	0.20	5969198

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Maxxam ID		IYI961	IYI962	IYI963	IYI964			
Sampling Date		2019/02/05	2019/02/05	2019/02/06	2019/02/07			
	UNITS	M202- UNIT 1-R2	M202- UNIT 1-R3	M202- UNIT 2-R1	M202- UNIT 2-R2	RDL	MDL	QC Batch
Weight	g	340	330	340	340	0.1	0.1	5969211
Weight of Solvent	g	170	180	200	210	0.1	N/A	5969199
Miscellaneous Parameters								
Inorganic Condensibles	mg	5.1	1.6	2.5	1.8	0.5	0.1	5969210
Organic Condensibles	mg	2.3	2.0	1.9	1.7	1.0	0.20	5969198

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Maxxam ID		IYI965			
Sampling Date		2019/02/07			
	UNITS	M202- UNIT 2-R3	RDL	MDL	QC Batch
Weight	g	340	0.1	0.1	5969211
Weight of Solvent	g	210	0.1	N/A	5969199
Miscellaneous Parameters					
Inorganic Condensibles	mg	2.6	0.5	0.1	5969210
Organic Condensibles	mg	1.8	1.0	0.20	5969198

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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Maxxam Job #: B935711
Report Date: 2019/02/15

Air Hygiene International Inc
Client Project #: SIE-19-MIDDLETOWN.NY-COMP#1

RESULTS OF ANALYSES OF STACK SAMPLING TRAIN

Maxxam ID		IYI879			
Sampling Date		2019/02/05			
	UNITS	**M201A- ACETONE BLANK**	**RDL**	**MDL**	**QC Batch**
Acetone Rinse Particulate Weight in Acetone Rinse	mg	2.9	0.5	0.1	5969025
Acetone Rinse Volume	ml	280	1	1	5969031

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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TEST SUMMARY

Maxxam ID: IYI879 **Collected:** 2019/02/05
Sample ID: M201A- ACETONE BLANK **Shipped:**
Matrix: Stack Sampling Train **Received:** 2019/02/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Particulates/Acetone Rinse (M5/315/M201)	BAL	5969025	2019/02/11	2019/02/13	Farag Farag
Final Volume of Acetone Probe Rinse		5969031	N/A	2019/02/13	Farag Farag

Maxxam ID: IYI880 **Collected:** 2019/02/05
Sample ID: M201A- UNIT 1- R1 **Shipped:**
Matrix: Stack Sampling Train **Received:** 2019/02/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
>10um Particulates in Rinse	BAL	5969030	2019/02/11	2019/02/13	Farag Farag
2.5-10um Particulates in Rinse	BAL	5969028	2019/02/11	2019/02/13	Farag Farag
2.5 um Particulates on Filter	BAL	5969345	N/A	2019/02/11	Brenda Moore
<2.5um Particulates in Rinse	BAL	5969026	2019/02/11	2019/02/13	Farag Farag
Final Volume of Acetone Probe Rinse		5969031	N/A	2019/02/13	Farag Farag

Maxxam ID: IYI881 **Collected:** 2019/02/05
Sample ID: M201A- UNIT 1- R2 **Shipped:**
Matrix: Stack Sampling Train **Received:** 2019/02/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
>10um Particulates in Rinse	BAL	5969030	2019/02/11	2019/02/13	Farag Farag
2.5-10um Particulates in Rinse	BAL	5969028	2019/02/11	2019/02/13	Farag Farag
2.5 um Particulates on Filter	BAL	5969345	N/A	2019/02/11	Brenda Moore
<2.5um Particulates in Rinse	BAL	5969026	2019/02/11	2019/02/13	Farag Farag
Final Volume of Acetone Probe Rinse		5969031	N/A	2019/02/13	Farag Farag

Maxxam ID: IYI882 **Collected:** 2019/02/05
Sample ID: M201A- UNIT 1- R3 **Shipped:**
Matrix: Stack Sampling Train **Received:** 2019/02/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
>10um Particulates in Rinse	BAL	5969030	2019/02/11	2019/02/13	Farag Farag
2.5-10um Particulates in Rinse	BAL	5969028	2019/02/11	2019/02/13	Farag Farag
2.5 um Particulates on Filter	BAL	5969345	N/A	2019/02/11	Brenda Moore
<2.5um Particulates in Rinse	BAL	5969026	2019/02/11	2019/02/13	Farag Farag
Final Volume of Acetone Probe Rinse		5969031	N/A	2019/02/13	Farag Farag

Maxxam ID: IYI944 **Collected:** 2019/02/06
Sample ID: M201A- UNIT 2- R1 **Shipped:**
Matrix: Stack Sampling Train **Received:** 2019/02/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
>10um Particulates in Rinse	BAL	5969030	2019/02/11	2019/02/13	Farag Farag
2.5-10um Particulates in Rinse	BAL	5969028	2019/02/11	2019/02/13	Farag Farag
2.5 um Particulates on Filter	BAL	5969345	N/A	2019/02/11	Brenda Moore
<2.5um Particulates in Rinse	BAL	5969026	2019/02/11	2019/02/13	Farag Farag
Final Volume of Acetone Probe Rinse		5969031	N/A	2019/02/13	Farag Farag

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TEST SUMMARY

Maxxam ID: IYI945 **Collected:** 2019/02/07
Sample ID: M201A- UNIT 2- R2 **Shipped:**
Matrix: Stack Sampling Train **Received:** 2019/02/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
>10um Particulates in Rinse	BAL	5969030	2019/02/11	2019/02/13	Farag Farag
2.5-10um Particulates in Rinse	BAL	5969028	2019/02/11	2019/02/13	Farag Farag
2.5 um Particulates on Filter	BAL	5969345	N/A	2019/02/11	Brenda Moore
<2.5um Particulates in Rinse	BAL	5969026	2019/02/11	2019/02/13	Farag Farag
Final Volume of Acetone Probe Rinse		5969031	N/A	2019/02/13	Farag Farag

Maxxam ID: IYI946 **Collected:** 2019/02/07
Sample ID: M201A- UNIT 2- R3 **Shipped:**
Matrix: Stack Sampling Train **Received:** 2019/02/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
>10um Particulates in Rinse	BAL	5969030	2019/02/11	2019/02/13	Farag Farag
2.5-10um Particulates in Rinse	BAL	5969028	2019/02/11	2019/02/13	Farag Farag
2.5 um Particulates on Filter	BAL	5969345	N/A	2019/02/11	Brenda Moore
<2.5um Particulates in Rinse	BAL	5969026	2019/02/11	2019/02/13	Farag Farag
Final Volume of Acetone Probe Rinse		5969031	N/A	2019/02/13	Farag Farag

Maxxam ID: IYI953 **Collected:** 2019/02/05
Sample ID: M202- DI WATER BLANK **Shipped:**
Matrix: Stack Sampling Train **Received:** 2019/02/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Non Extractable Condensibles (M202)	BAL	5969210	2019/02/11	2019/02/12	Farag Farag
Weight of Water from Impingers		5969211	N/A	2019/02/12	Farag Farag

Maxxam ID: IYI954 **Collected:** 2019/02/05
Sample ID: M202- HEXANE BLANK **Shipped:**
Matrix: Stack Sampling Train **Received:** 2019/02/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Extractable Condensables (M202)	BAL	5969198	2019/02/11	2019/02/12	Farag Farag
Weight of Solvent from Impingers		5969199	N/A	2019/02/12	Farag Farag

Maxxam ID: IYI958 **Collected:** 2019/02/05
Sample ID: M202- FB **Shipped:**
Matrix: Stack Sampling Train **Received:** 2019/02/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Extractable Condensables (M202)	BAL	5969198	2019/02/11	2019/02/12	Farag Farag
Non Extractable Condensibles (M202)	BAL	5969210	2019/02/11	2019/02/12	Farag Farag
Weight of Solvent from Impingers		5969199	N/A	2019/02/12	Farag Farag
Weight of Water from Impingers		5969211	N/A	2019/02/12	Farag Farag

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TEST SUMMARY

Maxxam ID: IYI960 **Collected:** 2019/02/05
Sample ID: M202- UNIT 1- R1 **Shipped:**
Matrix: Stack Sampling Train **Received:** 2019/02/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Extractable Condensables (M202)	BAL	5969198	2019/02/11	2019/02/12	Farag Farag
Non Extractable Condensibles (M202)	BAL	5969210	2019/02/11	2019/02/12	Farag Farag
Weight of Solvent from Impingers		5969199	N/A	2019/02/12	Farag Farag
Weight of Water from Impingers		5969211	N/A	2019/02/12	Farag Farag

Maxxam ID: IYI961 **Collected:** 2019/02/05
Sample ID: M202- UNIT 1- R2 **Shipped:**
Matrix: Stack Sampling Train **Received:** 2019/02/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Extractable Condensables (M202)	BAL	5969198	2019/02/11	2019/02/12	Farag Farag
Non Extractable Condensibles (M202)	BAL	5969210	2019/02/11	2019/02/12	Farag Farag
Weight of Solvent from Impingers		5969199	N/A	2019/02/12	Farag Farag
Weight of Water from Impingers		5969211	N/A	2019/02/12	Farag Farag

Maxxam ID: IYI962 **Collected:** 2019/02/05
Sample ID: M202- UNIT 1- R3 **Shipped:**
Matrix: Stack Sampling Train **Received:** 2019/02/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Extractable Condensables (M202)	BAL	5969198	2019/02/11	2019/02/12	Farag Farag
Non Extractable Condensibles (M202)	BAL	5969210	2019/02/11	2019/02/12	Farag Farag
Weight of Solvent from Impingers		5969199	N/A	2019/02/12	Farag Farag
Weight of Water from Impingers		5969211	N/A	2019/02/12	Farag Farag

Maxxam ID: IYI963 **Collected:** 2019/02/06
Sample ID: M202- UNIT 2- R1 **Shipped:**
Matrix: Stack Sampling Train **Received:** 2019/02/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Extractable Condensables (M202)	BAL	5969198	2019/02/11	2019/02/12	Farag Farag
Non Extractable Condensibles (M202)	BAL	5969210	2019/02/11	2019/02/12	Farag Farag
Weight of Solvent from Impingers		5969199	N/A	2019/02/12	Farag Farag
Weight of Water from Impingers		5969211	N/A	2019/02/12	Farag Farag

Maxxam ID: IYI964 **Collected:** 2019/02/07
Sample ID: M202- UNIT 2- R2 **Shipped:**
Matrix: Stack Sampling Train **Received:** 2019/02/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Extractable Condensables (M202)	BAL	5969198	2019/02/11	2019/02/12	Farag Farag
Non Extractable Condensibles (M202)	BAL	5969210	2019/02/11	2019/02/12	Farag Farag
Weight of Solvent from Impingers		5969199	N/A	2019/02/12	Farag Farag
Weight of Water from Impingers		5969211	N/A	2019/02/12	Farag Farag

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TEST SUMMARY

Maxxam ID: IYI965
Sample ID: M202- UNIT 2- R3
Matrix: Stack Sampling Train

Collected: 2019/02/07
Shipped:
Received: 2019/02/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Extractable Condensables (M202)	BAL	5969198	2019/02/11	2019/02/12	Farag Farag
Non Extractable Condensibles (M202)	BAL	5969210	2019/02/11	2019/02/12	Farag Farag
Weight of Solvent from Impingers		5969199	N/A	2019/02/12	Farag Farag
Weight of Water from Impingers		5969211	N/A	2019/02/12	Farag Farag

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GENERAL COMMENTS

All water samples were received in plastic bottles, transferred into amber glass bottles for oven evaporation

Sample IYI879 [M201A- ACETONE BLANK] : Acetone fraction: Observed traces of oily residue

Sample IYI880 [M201A- UNIT 1- R1] : Acetone fraction: Observed traces of oily residue

Sample IYI881 [M201A- UNIT 1- R2] : Negative weight observed

LFT Loose filter material in the petri dish
F T Filter torn

Acetone fraction: Observed traces of oily residue

Sample IYI882 [M201A- UNIT 1- R3] : Acetone fraction: Observed traces of oily residue

Sample IYI944 [M201A- UNIT 2- R1] : Acetone fraction: Observed traces of oily residue

Sample IYI945 [M201A- UNIT 2- R2] : Acetone fraction: Observed traces of oily residue

Sample IYI946 [M201A- UNIT 2- R3] : Acetone fraction: Observed traces of oily residue

Sample IYI953 [M202- DI WATER BLANK] : INORGANIC EXTRACTION : No material found in Teflon dish.

Sample IYI954 [M202- HEXANE BLANK] : ORGANIC EXTRACTION : Oily material found in vial.

Sample IYI958 [M202- FB] : ORGANIC EXTRACTION : Oily material found in vial.
INORGANIC EXTRACTION : Whitish residue found in Teflon dish.

Sample IYI960 [M202- UNIT 1- R1] : ORGANIC EXTRACTION : Oily material found in vial.
INORGANIC EXTRACTION : Yellowish residue found in Teflon dish.

Sample IYI961 [M202- UNIT 1- R2] : ORGANIC EXTRACTION : Oily material found in vial.
INORGANIC EXTRACTION : Whitish residue found in Teflon dish.

Sample IYI962 [M202- UNIT 1- R3] : ORGANIC EXTRACTION : Oily material found in vial.
INORGANIC EXTRACTION : Whitish residue found in Teflon dish.

Sample IYI963 [M202- UNIT 2- R1] : ORGANIC EXTRACTION : Oily material found in vial.
INORGANIC EXTRACTION : Whitish residue found in Teflon dish.

Sample IYI964 [M202- UNIT 2- R2] : ORGANIC EXTRACTION : Oily material found in vial.
INORGANIC EXTRACTION : Whitish residue found in Teflon dish.

Sample IYI965 [M202- UNIT 2- R3] : ORGANIC EXTRACTION : Oily material found in vial.
INORGANIC EXTRACTION : Whitish residue found in Teflon dish.

Results relate only to the items tested.

Maxxam Job #: B935711
Report Date: 2019/02/15

Air Hygiene International Inc
Client Project #: SIE-19-MIDDLETOWN.NY-COMP#1

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
5969025	FF	Method Blank	Acetone Rinse Particulate Weight in Acetone Rinse	2019/02/13	(0.10000) ND, RDL=0.5		mg	
5969026	FF	Method Blank	< 2.5 Particulate Weight in Acetone Rinse	2019/02/13	(0.10000) ND, RDL=0.5		mg	
5969028	FF	Method Blank	2.5 - 10 Particulate Weight in Acetone Rinse	2019/02/13	(0.10000) ND, RDL=0.5		mg	
5969030	FF	Method Blank	> 10 Particulate Weight in Acetone Rinse	2019/02/13	(0.10000) ND, RDL=0.5		mg	
5969198	FF	Spiked Blank	Organic Condensibles	2019/02/12		98	%	70 - 130
5969198	FF	Method Blank	Organic Condensibles	2019/02/12	(0.30000) ND, RDL=1.0		mg	
5969210	FF	Method Blank	Inorganic Condensibles	2019/02/12	(0.10000) ND, RDL=0.5		mg	

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

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VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Brenda Moore, Team Lead, Inorganic

Frank Mo, B.Sc., Inorganic Lab. Manager

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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3.0 Sample Custody

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6740 Campobello Rd.
Mississauga, Ontario, Canada
L5N 2L8
1-800-668-0639
www.maxxamanalytics.com

B935711 Rush Analysis 3-5 days

Requested Standard Analysis - 5-10 business days after receipt at lab

SAMPLE DESCRIPTION AND LABELING RECORD

Contact Information (deliver results to)
Name: Cole McBride
Phone: (918) 307-8865
Email: cmcbride@airhygiene.com

Air Hygiene International, Inc.
1600 W Tacoma Street
Broken Arrow, Oklahoma 74012
(888) 461-8778
www.airhygiene.com

Project Number:	sie-19-middletown.ny-comp#1	Laboratory Analysis Requested:
Person Taking Samples:	CM	Gravimetric

Sample Number	Location	Date	Volume	Analysis Method			
				RM 201A	RM 202	--	--
1-PM-FO-1-F	Unit 1-PM-FO - Run 1 - Filter	2/5/11	N/A	X			
1-PM-FO-1-C2	Unit 1-PM-FO - Run 1 - Nozzle Wash PM>10			X			
1-PM-FO-1-C3	Unit 1-PM-FO - Run 1 - Cyclone Wash 2.5<PM<10			X			
1-PM-FO-1-C4	Unit 1-PM-FO - Run 1 - Cyclone Exit to Front Half of Filter Wash (<2.5)		N/A	X			
1-PM-FO-1-C5	Unit 1-PM-FO - Run 1 - Inorganic Impinger Contents				X		
1-PM-FO-1-C6	Unit 1-PM-FO - Run 1 - Organic Impinger Contents				X		
1-PM-FO-1-CPM	Unit 1-PM-FO - Run 1 - CPM Filter		N/A		X		
1-PM-FO-2-F	Unit 1-PM-FO - Run 2 - Filter		N/A	X			
1-PM-FO-2-C2	Unit 1-PM-FO - Run 2 - Nozzle Wash PM>10			X			
1-PM-FO-2-C3	Unit 1-PM-FO - Run 2 - Cyclone Wash 2.5<PM<10			X			
1-PM-FO-2-C4	Unit 1-PM-FO - Run 2 - Cyclone Exit to Front Half of Filter Wash (<2.5)		N/A	X			
1-PM-FO-2-C5	Unit 1-PM-FO - Run 2 - Inorganic Impinger Contents				X		
1-PM-FO-2-C6	Unit 1-PM-FO - Run 2 - Organic Impinger Contents				X		
1-PM-FO-2-CPM	Unit 1-PM-FO - Run 2 - CPM Filter		N/A		X		
1-PM-FO-3-F	Unit 1-PM-FO - Run 3 - Filter		N/A	X			
1-PM-FO-3-C2	Unit 1-PM-FO - Run 3 - Nozzle Wash PM>10			X			
1-PM-FO-3-C3	Unit 1-PM-FO - Run 3 - Cyclone Wash 2.5<PM<10			X			
1-PM-FO-3-C4	Unit 1-PM-FO - Run 3 - Cyclone Exit to Front Half of Filter Wash (<2.5)		N/A	X			
1-PM-FO-3-C5	Unit 1-PM-FO - Run 3 - Inorganic Impinger Contents				X		
1-PM-FO-3-C6	Unit 1-PM-FO - Run 3 - Organic Impinger Contents				X		
1-PM-FO-3-CPM	Unit 1-PM-FO - Run 3 - CPM Filter		N/A		X		
1-PM-FO-FB-C3	Unit 1-PM-FO - Run FB - CPM Filter	FB	N/A	X			
1-PM-FO-FB-C4	Unit 1-PM-FO - Run FB - Organic Impinger Contents	FB		X			
1-PM-FO-FB-C5	Unit 1-PM-FO - Run FB - Inorganic Impinger Contents	FB			X		
1-PM-FO-B1-Acetone	Unit 1-PM-FO - Blank - Acetone	2/5/11	200		X		
1-PM-FO-B2-DI Water	Unit 1-PM-FO - Blank - DI Water		200	X			
1-PM-FO-B3-Hexane	Unit 1-PM-FO - Blank - Hexane		200		X		

Signature	Date	Time	Signature	Date	Time
Eric Bamu	2/5/11	22:50	FIDELE NTAMWEMEZI	2019/02/08	16:00

sie-19-middleton.ny-comp#1-CTG1-PM

SD&L

B935711 Rush Analysis 3-5 days

Requested Standard Analysis - 5-10 business days after receipt at lab

SAMPLE DESCRIPTION AND LABELING RECORD

Contact Information (deliver results to)
Name: Cole McBride
Phone: (918) 307-8865
Email: cmcbride@airhygiene.com

Air Hygiene International, Inc.
1600 W Tacoma Street
Broken Arrow, Oklahoma 74012
(888) 461-8778
www.airhygiene.com

Project Number: sie-19-middletown.ny-comp#1

Person Taking Samples: CM

Sample Number	Location	Date	Volume	Laboratory Analysis Requested: Gravimetric Analysis Method RM 201A	RM 202	--	--
2-PM-FO-1-F	Unit 2-PM-FO - Run 1 - Filter	2/6/19	N/A	X			
2-PM-FO-1-C2	Unit 2-PM-FO - Run 1 - Nozzle Wash PM>10			X			
2-PM-FO-1-C3	Unit 2-PM-FO - Run 1 - Cyclone Wash 2.5<PM<10			X			
2-PM-FO-1-C4	Unit 2-PM-FO - Run 1 - Cyclone Exit to Front Half of Filter Wash (<2.5)		N/A	X			
2-PM-FO-1-C5	Unit 2-PM-FO - Run 1 - Inorganic Impinger Contents				X		
2-PM-FO-1-C6	Unit 2-PM-FO - Run 1 - Organic Impinger Contents				X		
2-PM-FO-1-CPM	Unit 2-PM-FO - Run 1 - CPM Filter		N/A		X		
2-PM-FO-2-F	Unit 2-PM-FO - Run 2 - Filter	2/7/19	N/A	X			
2-PM-FO-2-C2	Unit 2-PM-FO - Run 2 - Nozzle Wash PM>10			X			
2-PM-FO-2-C3	Unit 2-PM-FO - Run 2 - Cyclone Wash 2.5<PM<10			X			
2-PM-FO-2-C4	Unit 2-PM-FO - Run 2 - Cyclone Exit to Front Half of Filter Wash (<2.5)		N/A	X			
2-PM-FO-2-C5	Unit 2-PM-FO - Run 2 - Inorganic Impinger Contents				X		
2-PM-FO-2-C6	Unit 2-PM-FO - Run 2 - Organic Impinger Contents				X		
2-PM-FO-2-CPM	Unit 2-PM-FO - Run 2 - CPM Filter		N/A		X		
2-PM-FO-3-F	Unit 2-PM-FO - Run 3 - Filter		N/A	X			
2-PM-FO-3-C2	Unit 2-PM-FO - Run 3 - Nozzle Wash PM>10			X			
2-PM-FO-3-C3	Unit 2-PM-FO - Run 3 - Cyclone Wash 2.5<PM<10			X			
2-PM-FO-3-C4	Unit 2-PM-FO - Run 3 - Cyclone Exit to Front Half of Filter Wash (<2.5)		N/A	X			
2-PM-FO-3-C5	Unit 2-PM-FO - Run 3 - Inorganic Impinger Contents				X		
2-PM-FO-3-C6	Unit 2-PM-FO - Run 3 - Organic Impinger Contents				X		
2-PM-FO-3-CPM	Unit 2-PM-FO - Run 3 - CPM Filter		N/A		X		

Signature	Date	Time	Signature	Date	Time
[signature]	2/7/19	05:00	FIDELE NTAMWEMEZI [signature]	2019/02/08	16:00
Signature	Date	Time	Signature	Date	Time

sie-19-middleton.ny-comp#1-CTG2-PM

SD&L

4.0 Sample Chromatograms

Maxxam Analytics International
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Mississauga, Ontario, Canada
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Method 201A – Determination of PM_{10} Emissions

Maxxam Analytics International
6740 Campobello Rd.
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1-800-668-0639
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Inorganic Analysis Action / Comment Form

Client ID	Air Hygiene
Maxxam Job #	B935711
Maxxam Sample ID's (start)	IYI880-01R

Analytical Worksheet(s)			
	Filters	5969345	5969028
	Solvent Rinse	5969026	5969030
	Solvent Volumes	5969031	
		5969025	

Analysis	Particulates
Analyst ID	B Moore / F Farag

Actions:	*Impacted Sample ID's
Bottle discrepancies	No
Filters damaged	Yes
Solvent rinse anomalies	No
Water impinger anomalies	N/A
Filter blank submitted	No
Solvent blank submitted	No
Water blank submitted	N/A
Other	

Comments

See data sheets for any anomalies of samples

Filter
Particulate Weight Log

Job #	B935711	Metals	No	supplier	Pall	N/A		
Client	Air Hygiene	Filter Blank Submitted	No	p/n	61631	N/A		
Analysis	Particulate Weight on Filte	Date of Dessication	2019/02/08	lot #	T83173	N/A	Type	
Balance ID	220-BALANAL4	Time of Dessication	6:20 PM				M5	
Condition	Dickson THDX S/N 621301S							

DE Edges of filter frayed FT Filter torn FCL Filter contains liquid after dessicatio
LPC Loose particulate material in filter contain LFT Loose filter materia

Increment 1

Analyst	B Moore	B Moore	B Moore					
Weighing Date	2018/08/30	2019/02/11	2019/02/11					
Weighing Time	1:23 PM	11:11 AM	5:37 PM					
Temperature (ºC)	20	22	22					
Humidity (%)	40	43	37					

Worksheet #	#	Maxxam #	Filter Condition	Filter ID #	Pre Weight gm	Weight #1 gm	Weight #2 gm	Weight #3 gm	Weight #4 gm	Weight #5 gm	Weight #6 gm	Weight #7 gm	Final Weight gm	Particulate mg	RDL mg
5969345	1	IYI880-01R	NORMAL	18082922	0.11355	0.1131	0.1131						0.1131	-0.5	0.3
5969345	2	IYI881-01R	*FT**LFT*	18082921	0.11155	0.1108	0.1106						0.1106	-1.0	0.3
5969345	3	IYI882-01R	NORMAL	18082929	0.11240	0.1121	0.1121						0.1121	-0.3	0.3
5969345	4	IYI944-01R	NORMAL	18082923	0.11405	0.1136	0.1135						0.1135	-0.5	0.3
5969345	5	IYI945-01R	NORMAL	18082930	0.11345	0.1133	0.1133						0.1133	-0.1	0.3
5969345	6	IYI946-01R	NORMAL	18082931	0.11330	0.1128	0.1128						0.1128	-0.5	0.3
	7														
	8														
	9														
	10														
				zero	0.0000	0.0000	0.0000								
				0.3000 gm	0.3000	0.3000	0.3000								
	11														
	12														
	13														
	14														
	15														
	16														
	17														
	18														
	19														
	20														
				zero											
				0.3000 gm											
	21														
	22														
	23														
	24														
	25														
	26														
	27														
	28														
	29														
	30														
				zero											
				0.3000 gm											
	31														
	32														
	33														
	34														
	35														
	36														
	37														
	38														
	39														
	40														
				zero											
				0.3000 gm											

Filters are placed in a dessicator for 24 hours minimum prior to beginning weighing cycle.
Filters are not to be exposed to lab atmosphere for > 2 minutes at a relative humidity ≥ 50 %.

Solvent
Particulate Weight Log

Job #	B935711
Client	Air Hygiene
Analysis	Particulate Weight in Acetone Rins
Test Code	PARTACE-TR (as per M5)
Balance ID	220-BALANAL5
Condition	Dickson THDX S/N 621301S

Metals	No
Reagent Blank Submitted	Yes
Date of Dessication	2019/02/11
Time of Dessication	1:00 PM

Solvent	Acetone
Lab Supplier	Caledon
lot #	103158

Analyst	Farag	Farag	Farag						
Weighing Date	2019/02/11	2019/02/12	2019/02/13						
Weighing Time	8:19 AM	1:14 AM	10:03 AM						
Temperature (ºC)	21	22	21						
Humidity (%)	42	41	40						

reagent blank correction
IYI879-01R
2.9

Worksheet #	#	Maxxam #	Bottle Full gm	Bottle Empty gm	Solvent Volume mL	Vial ID	Pre Weight gm	Weight #1 gm	Weight #2 gm	Weight #3 gm	Weight #4 gm	Weight #5 gm	Weight #6 gm	Weight #7 gm	Final Weight gm	Particulate mg	RDL mg
5969025	1	Blank	252.2	173.7	99.4	K16	24.7772	24.7772	24.7773						24.7773	0.1	
5969025	2	IYI879-01R	251.8	34.5000	275.1	K17	24.8243	24.8271	24.8272		Traces of oily residue				24.8272	2.9	0.5
	3																
	4																
	5																
	6																
	7																
	8																
	9																
	10																
	11																
		zero	0.0	0.0		zero	0.0000	0.0000	0.0000								
		100.0 gm	100.0	100.0		0.3000 gm	0.2998	0.2998	0.2998								
	12																
	13																
	14																
	15																
	16																
	17																
	18																
	19																
	20																
	21																
		zero				zero											
		100.0 gm				0.3000 gm											
	22	Blank															
	23																
	24																
	25																
	26																
	27																
	28																
	29																
	30																
	31																
	32																
		zero				zero											
		100.0 gm				0.3000 gm											
	33																
	34																
	35																
	36																
	37																
	38																
	39																
	40																
	41																
	42																
		zero				zero											
		100.0 gm				0.3000 gm											

Unusual residue appearance is noted in the appropriate cell.
Vials are not to be exposed to lab atmosphere for > 2 minutes at a relative humidity ~~>~~50%. The residue appearance is noted.

Solvent
Particulate Weight Log

Job #	B935711
Client	Air Hygiene
Analysis	Particulate Weight in Acetone Rins
Test Code	PARTACE-TR (as per M5)
Balance ID	220-BALANAL5
Condition	Dickson THDX S/N 621301

Metals	No
Reagent Blank Submitted	No
Date of Dessication	2019/02/11
Time of Dessication	1:00 PM

Solvent	Acetone
Lab Supplier	Caledon
lot #	103158

Analyst	Farag	Farag	Farag					
Weighing Date	2019/02/11	2019/02/12	2019/02/13					
Weighing Time	8:31 AM	1:15 PM	10:04 AM					
Temperature (ºC)	21	22	21					
Humidity (%)	42	41	40					

reagent blank correction
N/A

Worksheet #	#	Maxxam #	Bottle Full gm	Bottle Empty gm	Solvent Volume mL	Vial ID	Pre Weight gm	Weight #1 gm	Weight #2 gm	Weight #3 gm	Weight #4 gm	Weight #5 gm	Weight #6 gm	Weight #7 gm	Final Weight gm	Particulate mg	RDL mg
5969026	1	Blank	252.2	173.7	99.4	K16	24.7772	24.7772	24.7773						24.7773	0.1	0.5
5969026	2	N/A															
5969026	3	IYI880-02R	89.8	34.0	70.6	K18	24.9561	24.9582	24.9581		Traces of oily residue				24.9581	2.0	0.5
5969026	4	IYI881-02R	93.8	34.2	75.4	K19	24.9512	24.9530	24.9534		Traces of oily residue				24.9534	2.2	0.5
5969026	5	IYI882-02R	92.0	34.2	73.2	K20	24.8419	24.8440	24.8439		Traces of oily residue				24.8439	2.0	0.5
5969026	6	IYI944-02R	92.0	34.1	73.3	K21	24.8413	24.8437	24.8438		Traces of oily residue				24.8438	2.5	0.5
5969026	7	IYI945-02R	85.4	34.2	64.8	K22	24.8617	24.8645	24.8641		Traces of oily residue				24.8641	2.4	0.5
5969026	8	IYI946-02R	86.3	34.2	65.9	K23	24.7085	24.7098	24.7101		Traces of oily residue				24.7101	1.6	0.5
	9																
	10																
	11																
		zero	0.0	0.0		zero	0.0000	0.0000	0.0000								
		100.0 gm	100.0	100.0		0.3000 gm	0.2998	0.2998	0.2998								
	12																
	13																
	14																
	15																
	16																
	17																
	18																
	19																
	20																
	21																
		zero				zero											
		100.0 gm				0.3000 gm											
	22	Blank															
	23																
	24																
	25																
	26																
	27																
	28																
	29																
	30																
	31																
	32																
		zero				zero											
		100.0 gm				0.3000 gm											
	33																
	34																
	35																
	36																
	37																
	38																
	39																
	40																
	41																
	42																
		zero				zero											
		100.0 gm				0.3000 gm											

Unusual residue appearance is noted in the appropriate cell.
Vials are not to be exposed to lab atmosphere for > 2 minutes at a relative humidity ~~>~~50%. The residue appearance is noted.

Solvent
Particulate Weight Log

Job #	B935711
Client	Air Hygiene
Analysis	Particulate Weight in Acetone Rins
Test Code	PARTACE-TR (as per M5)
Balance ID	220-BALANAL5
Condition	Dickson THDX S/N 621301

Metals	No
Reagent Blank Submitted	No
Date of Dessication	2019/02/11
Time of Dessication	1:00 PM

Solvent	Acetone
Lab Supplier	Caledon
lot #	103158

Analyst	Farag	Farag	Farag					
Weighing Date	2019/02/11	2019/02/12	2019/02/13					
Weighing Time	8:32 AM	1:24 PM	10:12 AM					
Temperature (ºC)	21	22	21					
Humidity (%)	42	41	40					

reagent blank correction
N/A

Worksheet #	#	Maxxam #	Bottle Full gm	Bottle Empty gm	Solvent Volume mL	Vial ID	Pre Weight gm	Weight #1 gm	Weight #2 gm	Weight #3 gm	Weight #4 gm	Weight #5 gm	Weight #6 gm	Weight #7 gm	Final Weight gm	Particulate mg	RDL mg
5969028	1	Blank	252.2	173.7	99.4	K16	24.7772	24.7772	24.7773						24.7773	0.1	0.5
5969028	2	N/A															
5969028	3	IYI880-03R	91.3	34.3	72.2	K24	24.8839	24.8858	24.8855		Traces of oily residue				24.8855	1.6	0.5
5969028	4	IYI881-03R	88.0	34.3	68.0	K25	24.7719	24.7739	24.7739		Traces of oily residue				24.7739	2.0	0.5
5969028	5	IYI882-03R	95.8	34.5	77.6	K26	25.0484	25.0511	25.0511		Traces of oily residue				25.0511	2.7	0.5
5969028	6	IYI944-03R	88.8	34.3	69.0	K27	24.8442	24.8459	24.8461		Traces of oily residue				24.8461	1.9	0.5
5969028	7	IYI945-03R	83.4	34.2	62.3	K28	24.9406	24.9420	24.9424		Traces of oily residue				24.9424	1.8	0.5
5969028	8	IYI946-03R	92.6	34.2	73.9	K29	25.0416	25.0431	25.0432		Traces of oily residue				25.0432	1.6	0.5
	9																
	10																
	11																
		zero	0.0	0.0		zero	0.0000	0.0000	0.0000								
		100.0 gm	100.0	100.0		0.3000 gm	0.2998	0.2998	0.2998								
	12																
	13																
	14																
	15																
	16																
	17																
	18																
	19																
	20																
	21																
		zero				zero											
		100.0 gm				0.3000 gm											
	22	Blank															
	23																
	24																
	25																
	26																
	27																
	28																
	29																
	30																
	31																
	32																
		zero				zero											
		100.0 gm				0.3000 gm											
	33																
	34																
	35																
	36																
	37																
	38																
	39																
	40																
	41																
	42																
		zero				zero											
		100.0 gm				0.3000 gm											

Unusual residue appearance is noted in the appropriate cell.
Vials are not to be exposed to lab atmosphere for > 2 minutes at a relative humidity ~~>~~≥50%. The residue appearance is noted.

Solvent
Particulate Weight Log

Job #	B935711
Client	Air Hygiene
Analysis	Particulate Weight in Acetone Rins
Test Code	PARTACE-TR (as per M5)
Balance ID	220-BALANAL5
Condition	Dickson THDX S/N 621301

Metals	No
Reagent Blank Submitted	No
Date of Dessication	2019/02/11
Time of Dessication	1:00 PM

Solvent	Acetone
Lab Supplier	Caledon
lot #	103158

Analyst	Farag	Farag	Farag					
Weighing Date	2019/02/11	2019/02/12	2019/02/13					
Weighing Time	8:32 AM	1:28 PM	10:15 AM					
Temperature (ºC)	22	22	21					
Humidity (%)	41	41	40					

reagent blank correction
N/A

Worksheet #	#	Maxxam #	Bottle Full gm	Bottle Empty gm	Solvent Volume mL	Vial ID	Pre Weight gm	Weight #1 gm	Weight #2 gm	Weight #3 gm	Weight #4 gm	Weight #5 gm	Weight #6 gm	Weight #7 gm	Final Weight gm	Particulate mg	RDL mg
5969030	1	Blank	252.2	173.7	99.4	K16	24.7772	24.7772	24.7773						24.7773	0.1	0.5
5969030	2	N/A															
5969030	3	IYI880-04R	77.9	34.2	55.3	K30	24.9929	24.9942	24.9944		Traces of oily residue				24.9944	1.5	0.5
5969030	4	IYI881-04R	90.0	34.4	70.4	K31	24.9143	24.9164	24.9161		Traces of oily residue				24.9161	1.8	0.5
5969030	5	IYI882-04R	92.2	34.2	73.4	K32	24.9527	24.9543	24.9543		Traces of oily residue				24.9543	1.6	0.5
5969030	6	IYI944-04R	96.0	34.2	78.2	K33	25.2362	25.2379	25.2377		Traces of oily residue				25.2377	1.5	0.5
5969030	7	IYI945-04R	83.7	34.4	62.4	K34	25.2078	25.2101	25.2096		Traces of oily residue				25.2096	1.8	0.5
5969030	8	IYI946-04R	92.9	34.2	74.3	K35	24.9161	24.9176	24.9176		Traces of oily residue				24.9176	1.5	0.5
	9																
	10																
	11																
		zero	0.0	0.0		zero	0.0000	0.0000	0.0000								
		100.0 gm	100.0	100.0		0.3000 gm	0.2998	0.2998	0.2998								
	12																
	13																
	14																
	15																
	16																
	17																
	18																
	19																
	20																
	21																
		zero				zero											
		100.0 gm				0.3000 gm											
	22	Blank															
	23																
	24																
	25																
	26																
	27																
	28																
	29																
	30																
	31																
	32																
		zero				zero											
		100.0 gm				0.3000 gm											
	33																
	34																
	35																
	36																
	37																
	38																
	39																
	40																
	41																
	42																
		zero				zero											
		100.0 gm				0.3000 gm											

Unusual residue appearance is noted in the appropriate cell.
Vials are not to be exposed to lab atmosphere for > 2 minutes at a relative humidity ≥50%. The residue appearance is noted.

Method 202 – Determination of Condensible Particulate Emissions from Stationary Sources

Maxxam Analytics International
6740 Campobello Rd.
Mississauga, Ontario, Canada
L5N 2L8
1-800-668-0639
www.maxxamanalytics.com

METHOD-202 ANALYSIS ACTION/COMMENT FORM

Client ID	Air Hygiene
Maxxam Job #	B935711

Analytical Worksheet(s) - solvent	**5969198**
Analytical Worksheet(s) - water	**5969210**

Analysis	**Method 202**
Analyst ID - solvent	F Farag
Analyst ID - water	F Farag

ACTIONS		*COMMENTS
Bottle discrepancies	No	
Solvent rinse anomalies	No	
Water impinger anomalies	No	
Solvent blank submitted	Yes	
Water blank submitted	Yes	
Filter anomalies	No	
Other		

** Please note any action or anomalies impacting this set of samples*

GENERAL COMMENTS:

Extractable CPM (Method-202)

Job #	B935711
Client	Air Hygiene
Analysis	Condensibles
Balance ID	220-BALANAL5
Condition	Fisher S/N 170291073

Solvent Blank Submitted	Yes	
Date of Dessication	2019/02/12	
Time of Dessication	12:00 PM	
Date/Time of Extraction	2019/02/12	9:31 AM

Solvent	Hexane	Acetone
Lab Supplier	Fisher	Caledon
lot #	185340	103158

Spike ID	MOGC202#	21	Vial #	V-1
Solvent Spike				Acetone
Date Prepared				2019/01/09
Date Expired				2019/07/09

Spike Mean	93.48			
Std. Deviation	4.76			
Spike Range	Min:	79.2	Max:	107.8

Analyst	F Farag	F Farag	F Farag					
Weighing Date	2019/02/12	2019/02/13	2019/02/14					
Weighing Time	8:57 AM	3:40 PM	12:03 PM					
Temperature (ºC)	21.6	21.7	21.7					
Humidity (%)	24	25	25					

Worksheet #	#	Maxxam #	Residue Appearance	Solvent Weight Before g	Solvent Weight After g	Solvent Weight g	Pre Weight g	Weight #1 g	Weight #2 g	Weight #3 g	Weight #4 g	Weight #5 g	Weight #6 g	Weight #7 g	Final Weight g	Residue mg	RDL mg
5969198	1	Blank				200 ml	11.7804	11.7808	11.7807						11.7807	0.3	1.0
5969198	2	Spike				200 ml	11.7883	11.8278	11.8276						11.8276	98.3 %	1.0
5969198	3	Spike:D1				200 ml	N/A	N/A	N/A							##### ##	1.0
5969198	4	IYI954-01R	Oily	481.1	282.8	198	11.7944	11.7976	11.7972						11.7972	2.8	1.0
5969198	5	IYI958-02R	Oily	388.2	280.3	108	11.8252	11.8268	11.8267						11.8267	1.5	1.0
5969198	6	IYI960-02R	Oily	505.6	283.8	222	11.8350	11.8374	11.8371						11.8371	2.1	1.0
5969198	7	IYI961-02R	Oily	451.4	282.6	169	11.8113	11.8135	11.8136						11.8136	2.3	1.0
5969198	8	IYI962-02R	Oily	464.7	282.4	182	11.8155	11.8177	11.8175						11.8175	2.0	1.0
5969198	9	IYI963-02R	Oily	477.3	280.4	197	11.8017	11.8036	11.8036						11.8036	1.9	1.0
5969198	10	IYI964-02R	Oily	494.4	283.2	211	11.8330	11.8348	11.8347						11.8347	1.7	1.0
5969198	11	IYI965-02R	Oily	491.9	282.7	209	11.9083	11.9103	11.9101						11.9101	1.8	1.0
	12																
	13																
			zero	0.0	0.0	zero	0.0000	0.0000	0.0000								
			100.0 gm	100.0	100.0	0.3000	0.2998	0.2998	0.2998								
	14																
	15																
	16																
	17																
	18																
	19																
	20																
	21																
	22																
	23																
			zero			zero											
			100.0 gm			0.3000											

NOTE: Vials are not to be exposed to lab atmosphere for > 2 minutes at a relative humidity of 50 %

Appearance of residue is noted in the Residue column (Oily residues, color of residues etc.)

COMMENTS:

Non-Extractable CPM (Method-202)

Job #	B935711
Client	Air Hygiene
Analysis	Non-Extractable Condensibles
Balance ID	220-BALANAL5
Condition	Fisher S/N 170291073

Water Blank Submitted	Yes	
Date of Dessication	2019/02/13	
Time of Dessication	7:00 AM	
Date/Time of Transfer	2019/02/12	10:34 AM

NH_4OH Supplier	
p/n	
lot #	
Normailty	

Analyst	F Farag	F Farag	F Farag				
Weighing Date	2019/02/12	2019/02/14	2019/02/15				
Weighing Time	9:10 AM	12:19 PM	8:00 AM				
Temperature (°C)	22.0	21.7	21.7				
Humidity (%)	25	25	25				

Worksheet #	#	Maxxam #	Residue Appearance	Water Weight Before g	Water Weight After g	Water Weight g	Neutralization Required	Volume of 0.1 N NH_4OH used ml	Pre Weight g	1st Weight after 24hrs desiccation g	2nd Weight after 6hrs of 1st wt. g	3rd Weight after 24hrs desiccation g (Not Applicable)	4th Weight after 6hrs of 3rd wt. g	5th Weight after 6hrs of 4th wt. g	6th Weight after 6hrs of 5th wt. g	Final Weight g	Non Extractable Condensibles mg	RDL mg
5969210	1	Blank				200 ml	No	0	2.2927	2.2927	2.2928					2.2928	0.1	0.5
		Spike				200 ml												
		Spike:D1				200 ml												
5969210	2	IYI953-01R	N/A	305.7	34.1	272	No	0	2.2736	2.2736	2.2738					2.2738	0.2	0.5
5969210	3	IYI958-01R	Whitish	312.9	57.5	255	No	0	2.3051	2.3065	2.3064					2.3064	1.3	0.5
5969210	4	IYI960-01R	Yellowish	418.3	58.7	360	No	0	2.3554	2.3585	2.3586					2.3586	3.2	0.5
5969210	5	IYI961-01R	Whitish	399.0	58.4	341	No	0	2.3605	2.3660	2.3656					2.3656	5.1	0.5
5969210	6	IYI962-01R	Whitish	389.5	58.7	331	No	0	2.3190	2.3205	2.3206					2.3206	1.6	0.5
5969210	7	IYI963-01R	Whitish	396.6	57.6	339	No	0	2.2717	2.2742	2.2742					2.2742	2.5	0.5
5969210	8	IYI964-01R	Whitish	398.9	58.6	340	No	0	2.2632	2.2648	2.2650					2.2650	1.8	0.5
5969210	9	IYI965-01R	Whitish	401.7	58.6	343	No	0	2.3056	2.3081	2.3082					2.3082	2.6	0.5
	10																	
	11																	
			zero	0.0	0.0			zero	0.0000	0.0000	0.0000							
			100.0 gm	100.0	100.0			0.3000	0.2998	0.2998	0.2998							
	12																	
	13																	
	14																	
	15																	
	16																	
	17																	
	18																	
	19																	
	20																	
	21																	
			zero					zero										
			100.0 gm					0.3000										

NOTE: Vials are not to be exposed to lab atmosphere for > 2 minutes at a relative humidity of 50 %.

Appearance of residue is noted in the Residue column (Oily residues, color of residues etc.)

COMMENTS:

Weight of Solvent (Method-202)

Job #	B935711
Client	Air Hygiene
Analysis	Weight of Solvent
Balance ID	220-BALANAL10

Worksheet #	#	Maxxam #		Solvent Weight g	RDL g
5969199	1	IYI954-01R		198	0.1
5969199	2	IYI958-02R		108	0.1
5969199	3	IYI960-02R		222	0.1
5969199	4	IYI961-02R		169	0.1
5969199	5	IYI962-02R		182	0.1
5969199	6	IYI963-02R		197	0.1
5969199	7	IYI964-02R		211	0.1
5969199	8	IYI965-02R		209	0.1
	9				
5969199	10				0.1
	11				
	12				
	13				
	14				
	15				
	16				
	17				
	18				
	19				
	20				

Weight of Water (Method-202)

Job #	B935711
Client	Air Hygiene
Analysis	Weight
Balance ID	220-BALANAL10

Worksheet #	#	Maxxam #		Water Weight g	RDL g
5969211	1	IYI953-01R		272	0.1
5969211	2	IYI958-01R		255	0.1
5969211	3	IYI960-01R		360	0.1
5969211	4	IYI961-01R		341	0.1
5969211	5	IYI962-01R		331	0.1
5969211	6	IYI963-01R		339	0.1
5969211	7	IYI964-01R		340	0.1
5969211	8	IYI965-01R		343	0.1
	9				
	10				
	11				
	12				
	13				
	14				
	15				
	16				
	17				
	18				
	19				
	20				

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Maxxam Analytics International
6740 Campobello Rd.
Mississauga, Ontario, Canada
L5N 2L8
1-800-668-0639
www.maxxamanalytics.com

APPENDIX E

FUEL ANALYSIS RECORDS

Client: CPV Valley LLC
Location: CPV Valley Energy Center
Date: February 5, 2019
Project #: sie-19-middletown.ny-comp#1

Fuel Oil - Fuel Analysis

Characteristics of Fuel Gas		
Molecular Weight of oil =	15.142	lb/lb-mole
Btu per lb. of oil =	19,643.00	gross (HHV)
Btu per lb. of oil =	18,348.000	net (LHV)
Density of fuel oil[2] =	52.3632	lb/cu. ft
Density of fuel oil[2] =	7.0000	lb/gal
Specific Gravity =	0.8405	@ 68 deg F

Standardized to 68 deg F and 14.696 psia

Component	Wt%
carbon	85.46
oxygen	0.00
hydrogen	14.19
nitrogen	0.30
helium	0.00
sulfur	0.01
Total	**99.96**

Fuel Oil HHV Conv.	
HHV (Btu/lb)	19,643.00
HHV (Btu/SCF)	1,028,569

Fuel Oil LHV Conv.	
LHV (Btu/lb)	18,348.00
LHV (Btu/SCF)	960,759

F-Factor (SCF dry exhaust per MMBtu [HHV]) =	**9,288.45**
(Based on EPA RM-19) at 68 deg F and 14.696 psia	

F-Factor Calculation:

F-Factor = 1,000,000*((3.64*%H)+(1.53*%C)+(0.57*%S)+(0.14*%N)-(0.46*%O))/GCV

GCV = Gross Btu per lb. of gas (HHV)

%H, %C, %S, %N, & %O are percent weight values calculated from fuel analysis and have units of (scf/lb)/%

Density of fuel oil based on lab analysis or specific gravity multiplied by density of water at 68 deg F and 14.696 psia.

References:

[1] ASTM D 3588

[2] Civil Engineering Reference Manual, 7th ed. - Michael R. Lindeburg

[3] Mark's Standard Handbook for Mechanical Engineers, 10th ed. - Eugene A. Avallone, Theodore Baumeister III

[4] Introduction to Fluid Mechanics, 3rd ed. - William S. Janna

[5] GPA Reference Bulletin 181-86, revised 1986, reprinted 1995

Client: CPV Valley LLC
Location: CPV Valley Energy Center
Date: February 6, 2019
Project #: sie-19-middletown.ny-comp#1

Fuel Oil - Fuel Analysis

Characteristics of Fuel Gas		
Molecular Weight of oil =	15.104	lb/lb-mole
Btu per lb. of oil =	19,686.00	gross (HHV)
Btu per lb. of oiil =	18,376.000	net (LHV)
Density of fuel oil[2] =	52.2323	lb/cu. ft
Density of fuel oil[2] =	6.9825	lb/gal
Specific Gravity =	0.8384	@ 68 deg F

Standardized to 68 deg F and 14.696 psia

Component	Wt%
carbon	85.34
oxygen	0.00
hydrogen	14.36
nitrogen	0.30
helium	0.00
sulfur	0.01
Total	**100.01**

Fuel Oil HHV Conv.	
HHV (Btu/lb)	19,686.00
HHV (Btu/SCF)	1,028,245

Fuel Oil LHV Conv.	
LHV (Btu/lb)	18,376.00
LHV (Btu/SCF)	959,821

F-Factor (SCF dry exhaust per MMBtu [HHV]) =	**9,290.27**
(Based on EPA RM-19) at 68 deg F and 14.696 psia	

F-Factor Calculation:

F-Factor = 1,000,000*((3.64*%H)+(1.53*%C)+(0.57*%S)+(0.14*%N)-(0.46*%O))/GCV

GCV = Gross Btu per lb. of gas (HHV)

%H, %C, %S, %N, & %O are percent weight values calculated from fuel analysis and have units of (scf/lb)/%

Density of fuel oil based on lab analysis or specific gravity multiplied by density of water at 68 deg F and 14.696 psia.

References:

[1] ASTM D 3588

[2] Civil Engineering Reference Manual, 7th ed. - Michael R. Lindeburg

[3] Mark's Standard Handbook for Mechanical Engineers, 10th ed. - Eugene A. Avallone, Theodore Baumeister III

[4] Introduction to Fluid Mechanics, 3rd ed. - William S. Janna

[5] GPA Reference Bulletin 181-86, revised 1986, reprinted 1995

Certificate of Analysis

SINCE 1985

Quality Controlled Through Analysis

10630 FALLSTONE RD. HOUSTON, TEXAS 77099
P.O. BOX 741905, HOUSTON, TEXAS 77274

TEL: (281) 495-2400
FAX: (281) 495-2410

CLIENT:	Valley Energy Center	**REQUESTED BY:**	Ms. Sarasi Sam
CLIENT PROJECT:	Sample "A"02-25-2018-05-09	**PURCHASE ORDER NO:**	CC
LABORATORY NO:	89471-001	**REPORT DATE:**	February 20, 2019
SAMPLE:	Sample # 1 2019-02-05 10:00		

TEST **RESULT**

Heat of Combustion of Liquid Hydrocarbon Fuel by Bomb Calorimeter, ASTM D 4809

	Results, BTU/lb
Gross Heat of Combustion	19,643
Net Heat of Combustion (From Gross Heat and Hydrogen)	18,348

Parameter	***Results***
Sulfur by X-Ray Fluorescence Spectroscopy. LOD = 0.01 wt%, ASTM D 4294, wt. %	<0.010
Density by Digital Density Meter @ 15ºC, Density @15ºC, ASTM D 4052, g/cm³	0.8425
Density by Digital Density Meter @ 30ºC, Density @30ºC, ASTM D 4052, g/cm³	0.8319
Density by Digital Density Meter @ 45ºC, Density @45ºC, ASTM D 4052, g/cm³	0.8213
Viscosity, Kinematic, at 60°F, cSt, ASTM D 445.d, cSt	4.29
Viscosity, Kinematic, at 70°F, cSt, ASTM D 445.d, cSt	3.75
Viscosity, Kinematic, at 100°F, cSt, ASTM D 445.d, cSt	2.62

Carbon, Hydrogen and Nitrogen in Petroleum Products, Instrumental, ASTM D 5291.a

	Results, wt. %
Carbon	85.46
Hydrogen	14.19
Nitrogen	<0.3

Respectfully submitted
For Texas OilTech Laboratories, L.P.

Roland Gore
Associate Laboratory Director

Cert. No.: 0005085, 17025
Quality Management System Certified to ISO 9001:2008, and ISO 17025:2005

Certificate of Analysis

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10630 FALLSTONE RD. HOUSTON, TEXAS 77099
P.O. BOX 741905, HOUSTON, TEXAS 77274

TEL: (281) 495-2400
FAX: (281) 495-2410

CLIENT:	Valley Energy Center	**REQUESTED BY:**	Ms. Sarasi Sam
CLIENT PROJECT:	Sample "A"02-25-2018-05-09	**PURCHASE ORDER NO:**	CC
LABORATORY NO:	89471-002	**REPORT DATE:**	February 20, 2019
SAMPLE:	Sample # 2 2019-02-05 10:00		

TEST **RESULT**

Heat of Combustion of Liquid Hydrocarbon Fuel by Bomb Calorimeter, ASTM D 4809

	Results, BTU/lb
Gross Heat of Combustion	19,652
Net Heat of Combustion (From Gross Heat and Hydrogen)	18,357

Parameter	***Results***
Sulfur by X-Ray Fluorescence Spectroscopy. LOD = 0.01 wt%, ASTM D 4294, wt. %	<0.010
Density by Digital Density Meter @ 15ºC, Density @15ºC, ASTM D 4052, g/cm³	0.8425
Density by Digital Density Meter @ 30ºC, Density @30ºC, ASTM D 4052, g/cm³	0.8319
Density by Digital Density Meter @ 45ºC, Density @45ºC, ASTM D 4052, g/cm³	0.8212
Viscosity, Kinematic, at 60°F, cSt, ASTM D 445.d, cSt	4.29
Viscosity, Kinematic, at 70°F, cSt, ASTM D 445.d, cSt	3.75
Viscosity, Kinematic, at 100°F, cSt, ASTM D 445.d, cSt	2.62

Carbon, Hydrogen and Nitrogen in Petroleum Products, Instrumental, ASTM D 5291.a

	Results, wt. %
Carbon	85.51
Hydrogen	14.19
Nitrogen	<0.3

Respectfully submitted
For Texas OilTech Laboratories, L.P.

Roland Gore
Associate Laboratory Director

Certificate of Analysis

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10630 FALLSTONE RD. HOUSTON, TEXAS 77099
P.O. BOX 741905, HOUSTON, TEXAS 77274

TEL: (281) 495-2400
FAX: (281) 495-2410

CLIENT:	Valley Energy Center	**REQUESTED BY:**	Ms. Sarasi Sam
CLIENT PROJECT:	Sample "A"02-25-2018-05-09	**PURCHASE ORDER NO:**	CC
LABORATORY NO:	89471-003	**REPORT DATE:**	February 20, 2019
SAMPLE:	Sample # 3 2019-02-06 14:00		

TEST **RESULT**

Heat of Combustion of Liquid Hydrocarbon Fuel by Bomb Calorimeter, ASTM D 4809

	Results, BTU/lb
Gross Heat of Combustion	19,686
Net Heat of Combustion (From Gross Heat and Hydrogen)	18,376

Parameter	***Results***
Sulfur by X-Ray Fluorescence Spectroscopy. LOD = 0.01 wt%, ASTM D 4294, wt. %	<0.010
Density by Digital Density Meter @ 15ºC, Density @15ºC, ASTM D 4052, g/cm³	0.8404
Density by Digital Density Meter @ 30ºC, Density @30ºC, ASTM D 4052, g/cm³	0.8298
Density by Digital Density Meter @ 45ºC, Density @45ºC, ASTM D 4052, g/cm³	0.8192
Viscosity, Kinematic, at 60°F, cSt, ASTM D 445.d, cSt	4.39
Viscosity, Kinematic, at 70°F, cSt, ASTM D 445.d, cSt	3.83
Viscosity, Kinematic, at 100°F, cSt, ASTM D 445.d, cSt	2.67

Carbon, Hydrogen and Nitrogen in Petroleum Products, Instrumental, ASTM D 5291.a

	Results, wt. %
Carbon	85.34
Hydrogen	14.36
Nitrogen	<0.3

Respectfully submitted
For Texas OilTech Laboratories, L.P.

Roland Gore
Associate Laboratory Director

Certificate of Analysis

SINCE 1985

Quality Controlled Through Analysis

10630 FALLSTONE RD. HOUSTON, TEXAS 77099
P.O. BOX 741905, HOUSTON, TEXAS 77274

TEL: (281) 495-2400
FAX: (281) 495-2410

CLIENT:	Valley Energy Center	**REQUESTED BY:**	Ms. Sarasi Sam
CLIENT PROJECT:	Sample "A"02-25-2018-05-09	**PURCHASE ORDER NO:**	CC
LABORATORY NO:	89471-004	**REPORT DATE:**	February 20, 2019
SAMPLE:	Sample # 4 2019-02-06 14:00		

TEST **RESULT**

Heat of Combustion of Liquid Hydrocarbon Fuel by Bomb Calorimeter, ASTM D 4809

	Results, BTU/lb
Gross Heat of Combustion	19,688
Net Heat of Combustion (From Gross Heat and Hydrogen)	18,378

Parameter	***Results***
Sulfur by X-Ray Fluorescence Spectroscopy. LOD = 0.01 wt%, ASTM D 4294, wt. %	<0.010
Density by Digital Density Meter @ 15ºC, Density @15ºC, ASTM D 4052, g/cm³	0.8404
Density by Digital Density Meter @ 30ºC, Density @30ºC, ASTM D 4052, g/cm³	0.8298
Density by Digital Density Meter @ 45ºC, Density @45ºC, ASTM D 4052, g/cm³	0.8192
Viscosity, Kinematic, at 60°F, cSt, ASTM D 445.d, cSt	4.39
Viscosity, Kinematic, at 70°F, cSt, ASTM D 445.d, cSt	3.83
Viscosity, Kinematic, at 100°F, cSt, ASTM D 445.d, cSt	2.67

Carbon, Hydrogen and Nitrogen in Petroleum Products, Instrumental, ASTM D 5291.a

	Results, wt. %
Carbon	85.29
Hydrogen	14.36
Nitrogen	<0.3

Respectfully submitted
For Texas OilTech Laboratories, L.P.

Roland Gore
Associate Laboratory Director

APPENDIX F

EQUIPMENT CALIBRATION RECORDS

METERING SYSTEM DRY GAS METER CALIBRATION SHEET
EPA Reference Method
Metering System Pre-Test Calibration
Air Hygiene Assett ID: samp-cp-0019

Filename: Z:\QAQC\Calibrations\PM-Equipment\M-5 Consoles\Calibration Sheet v4.1\Current\[SAMP-CP-0019 Calibration 1-25-19.xls]Original (5 point)
Make: Apex
Model #: XC-522
Serial #: 1103025

Date: 01/25/19
Barometric Pressure: 29.43 (in. Hg)
Theoretical Critical Vacuum: 13.88 (in. Hg)

DRY GAS METER READINGS

ΔH (in. H2O)	Time (min)	Volume Initial (ft³)	Volume Final (ft³)	Volume Total (ft³)	Initial Temperature Inlet (°F)	Initial Temperature Outlet (°F)
0.33	17.00	773.750	779.640	5.890	73.0	73.0
0.63	12.00	779.640	785.610	5.970	74.0	74.0
1.10	10.00	785.610	792.340	6.730	75.0	75.0
1.90	10.00	792.340	801.060	8.720	76.0	76.0
3.50	10.00	801.060	812.920	11.860	77.0	77.0

Final Temperature Inlet (°F)	Final Temperature Outlet (°F)	Orifice Serial# (number)	K' Orifice Coefficient (see above)	Actual Vacuum (in. Hg)	Ambient Temperature Initial (°F)	Ambient Temperature Final (°F)	Ambient Temperature Average (°F)
74.0	74.0	140	0.2353	16.0	70.6	70.8	70.7
75.0	75.0	148	0.3368	16.0	70.8	71.0	70.9
76.0	76.0	155	0.4555	16.0	70.9	70.9	70.9
78.0	78.0	163	0.5955	16.0	71.0	71.2	71.1
79.0	79.0	173	0.8121	16.0	71.2	71.2	71.2

RESULTS

DRY GAS METER VOLUME CORRECTED Vm(std) (ft³)	DRY GAS METER VOLUME CORRECTED Vm(std) (liters)	ORIFICE VOLUME CORRECTED Vcr(std) (ft³)	ORIFICE VOLUME CORRECTED Vcr(std) (liters)	ORIFICE VOLUME NOMINAL Vcr (ft³)
5.736	162.45	5.110	144.7	5.224
5.808	164.47	5.162	146.2	5.279
6.542	185.28	5.818	164.8	5.950
8.470	239.87	7.605	215.4	7.780
11.544	326.94	10.370	293.7	10.611

DRY GAS METER CALIBRATION FACTOR Y Variation (number)	DRY GAS METER CALIBRATION FACTOR Y Value (number)	ORIFICE CALIBRATION FACTOR ΔH@ Value (in. H2O)	ORIFICE CALIBRATION FACTOR ΔH@ Value (mm H2O)	ORIFICE CALIBRATION FACTOR ΔH@ Variation (in. H2O)
-0.002	0.891	2.000	50.79	0.162
-0.004	0.889	1.861	47.26	0.023
-0.004	0.889	1.773	45.03	-0.065
0.005	0.898	1.787	45.40	-0.050
0.005	0.898	1.767	44.89	-0.070
AVERAGE:	**0.893**	**1.838**	46.67	**PASSED**

Notes:

For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter,acceptable tolerance of individual values from the average is +/- 0.02. For Orifice Calibration Factor dH@, the orifice differential pressure in inches of H_20 that equates to 0.75 cfm of air at 68 °F and 29.92 inches of Hg, acceptable tolerance of individual values from the average is +/- 0.2. For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above. The Critical Orifice Coefficient, K', must be entered in English units, (ft)^3*(deg R)^0.5/((in.Hg)*(min)).

SIGNATURE: Craig McCarty

DATE: 01/25/19 01/25/19

METERING SYSTEM THERMOCOUPLE CALIBRATION SHEET
EPA Reference Method
Metering System Pre-Test Calibration
Air Hygiene Assett ID: samp-cp-0019

Filename: Z:\QAQC\Calibrations\PM-Equipment\M-5 Consoles\Calibration Sheet v4.1\Current\[SAMP-CP-0019 Calibration 1-25-19.xls]Original (5 point)
Make: Apex
Model #: XC-522
Serial #: 1103025

Date: 01/25/19
Barometric Pressure: 29.53 (in. Hg)
Temperature (ASTM cal): 70.20 (°F)

Thermocouple	100 (°F)		600 (°F)		1200 (°F)	
	Reading	% Error	Reading	% Error	Reading	% Error
Stack	101.00	0.50	603.00	0.50	1203.00	0.25
Probe	101.00	0.50	603.00	0.50	1203.00	0.25
Filter	101.00	0.50	603.00	0.50	1203.00	0.25
Dryer	101.00	0.50	603.00	0.50	1203.00	0.25
Aux.	101.00	0.50	603.00	0.50	1203.00	0.25

Note: Calibrated against an ALTEK Thermocouple Source Series 22, ID: samp-tc-0003
Direct temperature output calibrated to ASTM and IPTS standards as outlined in ALTEK Data Sheet 22.

Thermocouple	70.20 (°F)		Responded to heating/cooling with the anticipated outcome?
	Reading	(±°F)	
DGM In	71.0	0.80	yes
DGM Out	71.0	0.80	yes

Note: Calibrated against Reference Thermometer ID: a070717

SIGNATURE: Craig McCarty DATE: 01/25/19 01/25/19

Standard for Calibration of Console Thermocouple Systems

40 CFR, Part 60
Appendix A, Method 5
10.3.2 The temperature data recorded in the field shall be considered valid. If, during calibration, the absolute temperature measured with the sensor being calibrated and the reference sensor **agree within 1.5 percent**, the temperature data taken in the field shall be considered valid.

Standard for Calibration of Individual Thermocouples

EMC, ALT-011: After each test run series, check the accuracy (and, hence, the calibration) of each thermocouple system at ambient temperature, or any other temperature, within the range specified by the manufacturer, using a reference thermometer (either ASTM reference thermometer or a thermometer that has been calibrated against an ASTM reference thermometer). The temperatures of the thermocouple and reference thermometers shall **agree to within ±2°F**.

Check the continuity of the thermocouple by subjecting it to a change in the temperature (e.g.., removing it from the stack or touching an ice cube). This step will also check for loose connections and reversed connections (noted by a wrong change in the temperature).

PROBE (STACK), HOTBOX (FILTER), AND GOOSENECK (EXIT) THERMOCOUPLE CALIBRATION SHEET
EPA Reference Method
Metering System Pre-Test Calibration

Air Hygiene Assett ID(s): **Probe:** samp-hp-0086 **Hotbox:** samp-bh-0012 **Gooseneck:** samp-ad-0028

Filename: Z:\QAQC\Calibrations\PM-Equipment\M-5 Consoles\Calibration Sheet v4.1\Current\[SAMP-CP-0019 Calibration 1-25-19.xls]Original (5 point)

Barometric Pressure: 29.53

Thermo-couples		Temps (°F)	Signature		Date	
Stack	Ref	70.00	Craig McCarty		01/25/19	01/25/19
	Read	71.00				
	±°F	1.00				
Probe	Ref	70.00	Craig McCarty		01/25/19	01/25/19
	Read	71.00				
	±°F	1.00				
Filter	Ref	70.00	Craig McCarty		01/25/19	01/25/19
	Read	70.00				
	±°F	0.00				
Cond.	Ref	70.00	Craig McCarty		01/25/19	01/25/19
	Read	70.00				
	±°F	0.00				
CPM	Ref	70.00	Craig McCarty		01/25/19	01/25/19
	Read	70.00				
	±°F	0.00				
Exit	Ref	70.00	Craig McCarty		01/25/19	01/25/19
	Read	70.00				
	±°F	0.00				

Note: Calibrated against Reference Thermometer ID: a070717

Thermocouple	Responded to heating/cooling with the anticipated outcome?
Stack	yes
Probe	yes
Filter	yes
Cond.	yes
CPM	yes
Exit	yes

Standard for Calibration of Individual Thermocouples

EMC, ALT-011: After each test run series, check the accuracy (and, hence, the calibration) of each thermocouple system at ambient temperature, or any other temperature, within the range specified by the manufacturer, using a reference thermometer (either ASTM reference thermometer or a thermometer that has been calibrated against an ASTM reference thermometer). The temperatures of the thermocouple and reference thermometers shall **agree to within ±2°F**.

Check the continuity of the thermocouple by subjecting it to a change in the temperature (e.g.., removing it from the stack or touching an ice cube). This step will also check for loose connections and reversed connections (noted by a wrong change in the temperature).

METERING SYSTEM DRY GAS METER CALIBRATION SHEET
EPA Reference Method
Metering System Post-Test Calibration
Air Hygiene Assett ID: samp-cp-0019

Filename: Z:\QAQC\Calibrations\PM-Equipment\M-5 Consoles\Calibration Sheet v4.1\Current\[SAMP-CP-0019 Calibration 1-25-19.xls]2-19-19 (3 point)
Make: Apex
Model #: XC-522
Serial #: 1103025

Date: 02/19/19
Barometric Pressure: 29.26 (in. Hg)
Theoretical Critical Vacuum: 13.80 (in. Hg)

DRY GAS METER READINGS

ΔH (in. H2O)	Time (min)	Volume Initial (ft³)	Volume Final (ft³)	Volume Total (ft³)	Initial Temperature Inlet (°F)	Initial Temperature Outlet (°F)
1.90	10.00	642.030	650.710	8.680	70.0	70.0
1.90	10.00	650.710	659.390	8.680	71.0	71.0
1.90	10.00	659.390	668.070	8.680	73.0	73.0

Final Temperature Inlet (°F)	Final Temperature Outlet (°F)	Orifice Serial# (number)	K' Orifice Coefficient (see above)	Actual Vacuum (in. Hg)	Ambient Temperature Initial (°F)	Ambient Temperature Final (°F)	Ambient Temperature Average (°F)
71.0	71.0	163	0.5955	16.0	69.8	69.7	69.8
73.0	73.0	163	0.5955	16.0	69.7	69.9	69.8
		163	0.5955	16.0	69.9		

RESULTS

DRY GAS METER VOLUME CORRECTED Vm(std) (ft³)	DRY GAS METER VOLUME CORRECTED Vm(std) (liters)	ORIFICE VOLUME CORRECTED Vcr(std) (ft³)	ORIFICE VOLUME CORRECTED Vcr(std) (liters)	ORIFICE VOLUME NOMINAL Vcr (ft³)
8.485	240.31	7.570	214.4	7.770
8.462	239.63	7.570	214.4	7.770
8.446	239.18	7.569	214.4	7.771

DRY GAS METER CALIBRATION FACTOR Y Variation (number)	DRY GAS METER CALIBRATION FACTOR Y Value (number)	ORIFICE CALIBRATION FACTOR ΔH@ Value (in. H2O)	ORIFICE CALIBRATION FACTOR ΔH@ Value (mm H2O)	ORIFICE CALIBRATION FACTOR ΔH@ Variation (in. H2O)
-0.002	0.892	1.815	46.10	0.004
0.000	0.895	1.810	45.98	-0.001
0.002	0.896	1.807	45.90	-0.004
AVERAGE:	**0.894**	**1.811**	45.99	**PASSED**
LAST 5-PT:	**0.893**	**1.838**	**PASSED**	5-PT Date:
% DIFF:	**0.1%**	**1.5%**		01/25/19

40 CFR - CHAPTER I - PART 60
Appendix A, Method 5
10.3.2 Calibration After Use
After each field use, the calibration of the metering system shall be checked by performing three calibration runs at a single, intermediate orifice setting (based on the previous field test)....Calculate the average value of the DGM calibration factor. If the value has changed by more than 5 percent, recalibrate the meter over the full range of orifice settings, as detailed in Section 10.3.1.

10.3.3 Acceptable Variation in Calibration
If the DGM coefficient values obtained before and after a test series differ by more than 5 percent, the test series shall either be voided, or calculations for the test series shall be performed using whichever meter coefficient value (i.e., before or after) gives the lower value of total sample volume.

Notes: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter,acceptable tolerance of individual values from the average is +/- 0.02. For Orifice Calibration Factor dH@, the orifice differential pressure in inches of H_20 that equates to 0.75 cfm of air at 68 °F and 29.92 inches of Hg, acceptable tolerance of individual values from the average is +/- 0.2. For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above. The Critical Orifice Coefficient, K', must be entered in English units, (ft)^3*(deg R)^0.5/((in.Hg)*(min)).

SIGNATURE: Craig McCarty DATE: 02/19/19 02/19/19

METERING SYSTEM THERMOCOUPLE CALIBRATION SHEET
EPA Reference Method
Metering System Post-Test Calibration
Air Hygiene Assett ID: samp-cp-0019

Filename: Z:\QAQC\Calibrations\PM-Equipment\M-5 Consoles\Calibration Sheet v4.1\Current\[SAMP-CP-0019 Calibration 1-25-19.xls]2-19-19 (3 point)
Make: Apex
Model #: XC-522
Serial #: 1103025

Date: 02/19/19
Barometric Pressure: 29.26 (in. Hg)
Temperature (ASTM cal): 69.80 (°F)

Thermocouple	100 (°F)		600 (°F)		1200 (°F)	
	Reading	% Error	Reading	% Error	Reading	% Error
Stack	101.00	0.50	602.00	0.33	1203.00	0.25
Probe	101.00	0.50	602.00	0.33	1203.00	0.25
Filter	101.00	0.50	602.00	0.33	1203.00	0.25
Dryer	101.00	0.50	602.00	0.33	1203.00	0.25
Aux.	101.00	0.50	602.00	0.33	1203.00	0.25

Note: Calibrated against an ALTEK Thermocouple Source Series 22, ID: samp-tc-0003
Direct temperature output calibrated to ASTM and IPTS standards as outlined in ALTEK Data Sheet 22.

Thermocouple	69.80 (°F)		Responded to heating/cooling with the anticipated outcome?
	Reading	(±°F)	
DGM In	70.0	0.20	yes
DGM Out	70.0	0.20	yes

Note: Calibrated against Reference Thermometer ID: a070717

SIGNATURE: Craig McCarty DATE: 02/19/19 02/19/19

Standard for Calibration of Console Thermocouple Systems

40 CFR, Part 60
Appendix A, Method 5
10.3.2 The temperature data recorded in the field shall be considered valid. If, during calibration, the absolute temperature measured with the sensor being calibrated and the reference sensor **agree within 1.5 percent**, the temperature data taken in the field shall be considered valid.

Standard for Calibration of Individual Thermocouples

EMC, ALT-011: After each test run series, check the accuracy (and, hence, the calibration) of each thermocouple system at ambient temperature, or any other temperature, within the range specified by the manufacturer, using a reference thermometer (either ASTM reference thermometer or a thermometer that has been calibrated against an ASTM reference thermometer). The temperatures of the thermocouple and reference thermometers shall **agree to within ±2°F**.

Check the continuity of the thermocouple by subjecting it to a change in the temperature (e.g.., removing it from the stack or touching an ice cube). This step will also check for loose connections and reversed connections (noted by a wrong change in the temperature).

PROBE (STACK), HOTBOX (FILTER), AND GOOSENECK (EXIT) THERMOCOUPLE CALIBRATION SHEET
EPA Reference Method
Metering System Post-Test Calibration

Air Hygiene Assett ID(s): **Probe:** samp-hp-0086 **Hotbox:** samp-bh-0012 **Gooseneck:** samp-ad-0028

Filename: Z:\QAQC\Calibrations\PM-Equipment\M-5 Consoles\Calibration Sheet v4.1\Current\[SAMP-CP-0019 Calibration 1-25-19.xls]2-19-19 (3 point)

Barometric Pressure: 29.26

Thermo-couples		Temps (°F)	Signature		Date	
Stack	Ref	69.80	Craig McCarty		02/19/19	02/19/19
	Read	70.00				
	±°F	0.20				
Probe	Ref	69.80	Craig McCarty		02/19/19	02/19/19
	Read	70.00				
	±°F	0.20				
Filter	Ref	69.80	Craig McCarty		02/19/19	02/19/19
	Read	70.00				
	±°F	0.20				
Cond.	Ref	69.80	Craig McCarty		02/19/19	02/19/19
	Read	70.00				
	±°F	0.20				
CPM	Ref	69.80	Craig McCarty		02/19/19	02/19/19
	Read	70.00				
	±°F	0.20				
Exit	Ref	69.80	Craig McCarty		02/19/19	02/19/19
	Read	70.00				
	±°F	0.20				

Note: Calibrated against Reference Thermometer ID: a070717

Thermocouple	Responded to heating/cooling with the anticipated outcome?
Stack	yes
Probe	yes
Filter	yes
Cond.	yes
CPM	yes
Exit	yes

Standard for Calibration of Individual Thermocouples

EMC, ALT-011: After each test run series, check the accuracy (and, hence, the calibration) of each thermocouple system at ambient temperature, or any other temperature, within the range specified by the manufacturer, using a reference thermometer (either ASTM reference thermometer or a thermometer that has been calibrated against an ASTM reference thermometer). The temperatures of the thermocouple and reference thermometers shall **agree to within ±2°F**.

Check the continuity of the thermocouple by subjecting it to a change in the temperature (e.g.., removing it from the stack or touching an ice cube). This step will also check for loose connections and reversed connections (noted by a wrong change in the temperature).

METERING SYSTEM DRY GAS METER CALIBRATION SHEET
EPA Reference Method
Metering System Pre-Test Calibration
Air Hygiene Assett ID: samp-cp-0025

Filename: Z:\QAQC\Calibrations\PM-Equipment\M-5 Consoles\Calibration Sheet v4.1\Current\[SAMP-CP-0025 Calibration 6-6-18.xls]Original (5 point)
Make: apex
Model #: XC-522D
Serial #: 1604005

Date: 06/06/18
Barometric Pressure: 29.23 (in. Hg)
Theoretical Critical Vacuum: 13.79 (in. Hg)

DRY GAS METER READINGS

ΔH (in. H2O)	Time (min)	Volume Initial (ft³)	Volume Final (ft³)	Volume Total (ft³)	Initial Temperature Inlet (°F)	Initial Temperature Outlet (°F)
0.31	17.00	0.001	5.141	5.140	72.0	72.0
0.61	12.00	5.141	10.330	5.189	72.0	72.0
1.10	10.00	10.330	16.222	5.892	74.0	74.0
1.90	10.00	16.222	23.904	7.682	77.0	77.0
3.50	10.00	23.904	34.397	10.493	78.0	78.0

Final Temperature Inlet (°F)	Final Temperature Outlet (°F)	Orifice Serial# (number)	K' Orifice Coefficient (see above)	Actual Vacuum (in. Hg)	Ambient Temperature Initial (°F)	Ambient Temperature Final (°F)	Ambient Temperature Average (°F)
72.0	72.0	140	0.2353	16.0	71.8	71.8	71.8
74.0	74.0	148	0.3368	16.0	71.8	72.1	72.0
76.0	76.0	155	0.4555	16.0	72.1	72.5	72.3
78.0	78.0	163	0.5955	16.0	72.5	73.3	72.9
80.0	80.0	173	0.8121	16.0	73.3	73.4	73.4

RESULTS

DRY GAS METER VOLUME CORRECTED Vm(std) (ft³)	DRY GAS METER VOLUME CORRECTED Vm(std) (liters)	ORIFICE VOLUME CORRECTED Vcr(std) (ft³)	ORIFICE VOLUME CORRECTED Vcr(std) (liters)	ORIFICE VOLUME NOMINAL Vcr (ft³)
4.986	141.19	5.070	143.6	5.229
5.027	142.38	5.122	145.1	5.284
5.694	161.26	5.771	163.4	5.958
7.404	209.69	7.540	213.5	7.793
10.126	286.77	10.279	291.1	10.632

DRY GAS METER CALIBRATION FACTOR Y Variation (number)	DRY GAS METER CALIBRATION FACTOR Y Value (number)	ORIFICE CALIBRATION FACTOR ΔH@ Value (in. H2O)	ORIFICE CALIBRATION FACTOR ΔH@ Value (mm H2O)	ORIFICE CALIBRATION FACTOR ΔH@ Variation (in. H2O)
0.000	1.017	1.901	48.28	0.080
0.002	1.019	1.823	46.29	0.002
-0.003	1.013	1.791	45.50	-0.029
0.002	1.018	1.804	45.82	-0.016
-0.001	1.015	1.783	45.30	-0.037
AVERAGE:	**1.017**	**1.820**	46.24	**PASSED**

Notes:

For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter,acceptable tolerance of individual values from the average is +/- 0.02. For Orifice Calibration Factor dH@, the orifice differential pressure in inches of H_20 that equates to 0.75 cfm of air at 68 °F and 29.92 inches of Hg, acceptable tolerance of individual values from the average is +/- 0.2. For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above. The Critical Orifice Coefficient, K', must be entered in English units, (ft)^3*(deg R)^0.5/((in.Hg)*(min)).

SIGNATURE: Craig McCarty

DATE: 06/06/18 06/06/18

METERING SYSTEM THERMOCOUPLE CALIBRATION SHEET
EPA Reference Method
Metering System Pre-Test Calibration
Air Hygiene Assett ID: samp-cp-0025

Filename: Z:\QAQC\Calibrations\PM-Equipment\M-5 Consoles\Calibration Sheet v4.1\Current\[SAMP-CP-0025 Calibration 6-6-18.xls]Original (5 point)
Make: apex
Model #: XC-522D
Serial #: 1604005

Date: 06/06/18
Barometric Pressure: 29.23 (in. Hg)
Temperature (ASTM cal): 72.00 (°F)

Thermocouple	100 (°F)		600 (°F)		1200 (°F)	
	Reading	% Error	Reading	% Error	Reading	% Error
Stack	100.00	0.00	601.00	0.17	1202.00	0.17
Probe	100.00	0.00	601.00	0.17	1202.00	0.17
Filter	100.00	0.00	601.00	0.17	1202.00	0.17
Dryer	100.00	0.00	601.00	0.17	1202.00	0.17
Aux.	100.00	0.00	601.00	0.17	1202.00	0.17

Note: Calibrated against an ALTEK Thermocouple Source Series 22, ID: samp-tc-0003
Direct temperature output calibrated to ASTM and IPTS standards as outlined in ALTEK Data Sheet 22.

Thermocouple	72.00 (°F)		Responded to heating/cooling with the anticipated outcome?
	Reading	(±°F)	
DGM In	72.0	0.00	yes
DGM Out	72.0	0.00	yes

Note: Calibrated against Reference Thermometer ID: a070717

SIGNATURE: Craig McCarty DATE: 06/06/18 06/06/18

Standard for Calibration of Console Thermocouple Systems

40 CFR, Part 60
Appendix A, Method 5
10.3.2 The temperature data recorded in the field shall be considered valid. If, during calibration, the absolute temperature measured with the sensor being calibrated and the reference sensor **agree within 1.5 percent**, the temperature data taken in the field shall be considered valid.

Standard for Calibration of Individual Thermocouples

EMC, ALT-011: After each test run series, check the accuracy (and, hence, the calibration) of each thermocouple system at ambient temperature, or any other temperature, within the range specified by the manufacturer, using a reference thermometer (either ASTM reference thermometer or a thermometer that has been calibrated against an ASTM reference thermometer). The temperatures of the thermocouple and reference thermometers shall **agree to within ±2°F**.

Check the continuity of the thermocouple by subjecting it to a change in the temperature (e.g.., removing it from the stack or touching an ice cube). This step will also check for loose connections and reversed connections (noted by a wrong change in the temperature).

PROBE (STACK), HOTBOX (FILTER), AND GOOSENECK (EXIT) THERMOCOUPLE CALIBRATION SHEET
EPA Reference Method
Metering System Pre-Test Calibration

Air Hygiene Assett ID(s): **Probe:** samp-hp-0086 **Hotbox:** samp-bh-0012 **Gooseneck:** samp-ad-0028

Filename: Z:\QAQC\Calibrations\PM-Equipment\M-5 Consoles\Calibration Sheet v4.1\Current\[SAMP-CP-0025 Calibration 6-6-18.xls]Original (5 point)

Barometric Pressure: 29.21

Thermo-couples		Temps (°F)	Signature		Date	
Stack	Ref	72.00	Craig McCarty		06/06/18	06/06/18
	Read	72.00				
	±°F	0.00				
Probe	Ref	72.00	Craig McCarty		06/06/18	06/06/18
	Read	71.00				
	±°F	1.00				
Filter	Ref	72.00	Craig McCarty		06/06/18	06/06/18
	Read	72.00				
	±°F	0.00				
Cond.	Ref	72.00	Craig McCarty		06/06/18	06/06/18
	Read	71.00				
	±°F	1.00				
CPM	Ref	72.00	Craig McCarty		06/06/18	06/06/18
	Read	71.00				
	±°F	1.00				
Exit	Ref	72.00	Craig McCarty		06/06/18	06/06/18
	Read	72.00				
	±°F	0.00				

Note: Calibrated against Reference Thermometer ID: a070717

Thermocouple	Responded to heating/cooling with the anticipated outcome?
Stack	yes
Probe	yes
Filter	yes
Cond.	yes
CPM	yes
Exit	yes

Standard for Calibration of Individual Thermocouples

EMC, ALT-011: After each test run series, check the accuracy (and, hence, the calibration) of each thermocouple system at ambient temperature, or any other temperature, within the range specified by the manufacturer, using a reference thermometer (either ASTM reference thermometer or a thermometer that has been calibrated against an ASTM reference thermometer). The temperatures of the thermocouple and reference thermometers shall **agree to within ±2°F**.

Check the continuity of the thermocouple by subjecting it to a change in the temperature (e.g.., removing it from the stack or touching an ice cube). This step will also check for loose connections and reversed connections (noted by a wrong change in the temperature).

METERING SYSTEM DRY GAS METER CALIBRATION SHEET
EPA Reference Method
Metering System Post-Test Calibration
Air Hygiene Assett ID: samp-cp-0025

Filename: Z:\QAQC\Calibrations\PM-Equipment\M-5 Consoles\Calibration Sheet v4.1\Current\[SAMP-CP-0025 Calibration 6-6-18.xls]2-19-19 (3 point)
Make: apex
Model #: XC-522D
Serial #: 1604005

Date: 02/19/19
Barometric Pressure: 29.46 (in. Hg)
Theoretical Critical Vacuum: 13.90 (in. Hg)

DRY GAS METER READINGS

ΔH (in. H2O)	Time (min)	Volume Initial (ft³)	Volume Final (ft³)	Volume Total (ft³)	Initial Temperature Inlet (°F)	Initial Temperature Outlet (°F)
1.90	10.00	0.001	7.576	7.575	70.0	70.0
1.90	10.00	7.576	15.184	7.608	73.0	73.0
1.90	10.00	15.184	22.815	7.631	74.0	74.0

Final Temperature Inlet (°F)	Final Temperature Outlet (°F)	Orifice Serial# (number)	K' Orifice Coefficient (see above)	Actual Vacuum (in. Hg)	Ambient Temperature Initial (°F)	Ambient Temperature Final (°F)	Ambient Temperature Average (°F)
73.0	73.0	163	0.5955	16.0	68.5	68.9	68.7
74.0	74.0	163	0.5955	16.0	68.9	69.2	69.1
76.0	76.0	163	0.5955	16.0	69.2	69.4	69.3

RESULTS

DRY GAS METER VOLUME CORRECTED Vm(std) (ft³)	DRY GAS METER VOLUME CORRECTED Vm(std) (liters)	ORIFICE VOLUME CORRECTED Vcr(std) (ft³)	ORIFICE VOLUME CORRECTED Vcr(std) (liters)	ORIFICE VOLUME NOMINAL Vcr (ft³)
7.442	210.75	7.630	216.1	7.762
7.446	210.87	7.627	216.0	7.765
7.448	210.91	7.625	216.0	7.767

DRY GAS METER CALIBRATION FACTOR Y Variation (number)	DRY GAS METER CALIBRATION FACTOR Y Value (number)	ORIFICE CALIBRATION FACTOR ΔH@ Value (in. H2O)	ORIFICE CALIBRATION FACTOR ΔH@ Value (mm H2O)	ORIFICE CALIBRATION FACTOR ΔH@ Variation (in. H2O)
0.001	1.025	1.796	45.61	0.005
0.000	1.024	1.790	45.47	0.000
-0.001	1.024	1.786	45.37	-0.005
AVERAGE:	**1.025**	**1.791**	45.48	**PASSED**
LAST 5-PT:	**1.017**	**1.820**	**PASSED**	5-PT Date:
% DIFF:	**0.8%**	**1.7%**		06/06/18

40 CFR - CHAPTER I - PART 60
Appendix A, Method 5
10.3.2 Calibration After Use
After each field use, the calibration of the metering system shall be checked by performing three calibration runs at a single, intermediate orifice setting (based on the previous field test)....Calculate the average value of the DGM calibration factor. If the value has changed by more than 5 percent, recalibrate the meter over the full range of orifice settings, as detailed in Section 10.3.1.

10.3.3 Acceptable Variation in Calibration
If the DGM coefficient values obtained before and after a test series differ by more than 5 percent, the test series shall either be voided, or calculations for the test series shall be performed using whichever meter coefficient value (i.e., before or after) gives the lower value of total sample volume.

Notes: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter,acceptable tolerance of individual values from the average is +/- 0.02. For Orifice Calibration Factor dH@, the orifice differential pressure in inches of H_20 that equates to 0.75 cfm of air at 68 °F and 29.92 inches of Hg, acceptable tolerance of individual values from the average is +/- 0.2. For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above. The Critical Orifice Coefficient, K', must be entered in English units, (ft)^3*(deg R)^0.5/((in.Hg)*(min)).

SIGNATURE: Craig McCarty DATE: 02/19/19 02/19/19

METERING SYSTEM THERMOCOUPLE CALIBRATION SHEET
EPA Reference Method
Metering System Post-Test Calibration
Air Hygiene Assett ID: samp-cp-0025

Filename: Z:\QAQC\Calibrations\PM-Equipment\M-5 Consoles\Calibration Sheet v4.1\Current\[SAMP-CP-0025 Calibration 6-6-18.xls]2-19-19 (3 point)
Make: apex
Model #: XC-522D
Serial #: 1604005

Date: 02/19/19
Barometric Pressure: 29.45 (in. Hg)
Temperature (ASTM cal): 68.20 (°F)

Thermocouple	100 (°F)		600 (°F)		1200 (°F)	
	Reading	% Error	Reading	% Error	Reading	% Error
Stack	101.00	0.50	602.00	0.33	1203.00	0.25
Probe	101.00	0.50	602.00	0.33	1203.00	0.25
Filter	101.00	0.50	602.00	0.33	1203.00	0.25
Dryer	101.00	0.50	602.00	0.33	1203.00	0.25
Aux.	101.00	0.50	602.00	0.33	1203.00	0.25

Note: Calibrated against an ALTEK Thermocouple Source Series 22, ID: samp-tc-0003
Direct temperature output calibrated to ASTM and IPTS standards as outlined in ALTEK Data Sheet 22.

Thermocouple	68.20 (°F)		Responded to heating/cooling with the anticipated outcome?
	Reading	(±°F)	
DGM In	68.0	0.20	
DGM Out	68.0	0.20	

Note: Calibrated against Reference Thermometer ID: a070717

SIGNATURE: Craig McCarty DATE: 02/19/19 02/19/19

Standard for Calibration of Console Thermocouple Systems

40 CFR, Part 60
Appendix A, Method 5
10.3.2 The temperature data recorded in the field shall be considered valid. If, during calibration, the absolute temperature measured with the sensor being calibrated and the reference sensor **agree within 1.5 percent**, the temperature data taken in the field shall be considered valid.

Standard for Calibration of Individual Thermocouples

EMC, ALT-011: After each test run series, check the accuracy (and, hence, the calibration) of each thermocouple system at ambient temperature, or any other temperature, within the range specified by the manufacturer, using a reference thermometer (either ASTM reference thermometer or a thermometer that has been calibrated against an ASTM reference thermometer). The temperatures of the thermocouple and reference thermometers shall **agree to within ±2°F**.

Check the continuity of the thermocouple by subjecting it to a change in the temperature (e.g.., removing it from the stack or touching an ice cube). This step will also check for loose connections and reversed connections (noted by a wrong change in the temperature).

PROBE (STACK), HOTBOX (FILTER), AND GOOSENECK (EXIT) THERMOCOUPLE CALIBRATION SHEET
EPA Reference Method
Metering System Post-Test Calibration

Air Hygiene Assett ID(s): **Probe:** samp-hp-0086 **Hotbox:** samp-bh-0012 **Gooseneck:** samp-ad-0028

Filename: Z:\QAQC\Calibrations\PM-Equipment\M-5 Consoles\Calibration Sheet v4.1\Current\[SAMP-CP-0025 Calibration 6-6-18.xls]2-19-19 (3 point)

Barometric Pressure: 29.45

Thermo-couples		Temps (°F)	Signature		Date	
Stack	Ref	68.20	Craig McCarty		02/19/19	02/19/19
	Read	68.00				
	±°F	0.20				
Probe	Ref	68.20	Craig McCarty		02/19/19	02/19/19
	Read	69.00				
	±°F	0.80				
Filter	Ref	68.20	Craig McCarty		02/19/19	02/19/19
	Read	69.00				
	±°F	0.80				
Cond.	Ref	68.20	Craig McCarty		02/19/19	02/19/19
	Read	68.00				
	±°F	0.20				
CPM	Ref	68.20	Craig McCarty		02/19/19	02/19/19
	Read	68.00				
	±°F	0.20				
Exit	Ref	68.20	Craig McCarty		02/19/19	02/19/19
	Read	69.00				
	±°F	0.80				

Note: Calibrated against Reference Thermometer ID: a070717

Thermocouple	Responded to heating/cooling with the anticipated outcome?
Stack	yes
Probe	yes
Filter	yes
Cond.	yes
CPM	yes
Exit	yes

Standard for Calibration of Individual Thermocouples

EMC, ALT-011: After each test run series, check the accuracy (and, hence, the calibration) of each thermocouple system at ambient temperature, or any other temperature, within the range specified by the manufacturer, using a reference thermometer (either ASTM reference thermometer or a thermometer that has been calibrated against an ASTM reference thermometer). The temperatures of the thermocouple and reference thermometers shall **agree to within ±2°F**.

Check the continuity of the thermocouple by subjecting it to a change in the temperature (e.g.., removing it from the stack or touching an ice cube). This step will also check for loose connections and reversed connections (noted by a wrong change in the temperature).

APEX SOURCE TESTING EQUIPMENT INSTRUMENTS

Apex Instruments, Inc.
204 Technology Park Lane
Fuquay-Varina, NC 27526

S-TYPE PITOT TUBE CALIBRATION SHEET

Reference USEPA Reference Method 2 (40CFR60, App. A, Meth. 2)

PITOT SERIAL#	4183	**CALIBRATION DATE:**	11-Jan-13
PITOT TYPE:	S-Type	**BAROMETRIC PRESSURE:**	29.74 in Hg
STD. PITOT TYPE:	Ellipsoidal	**STATIC PRESSURE**	1.4 in H_2O
Cp(std):	0.990	**BLOCKAGE %:**	N/A
PROBE SERIAL#	NICK	**CORRECTION FACTOR:**	1.00

SIDE "A" CALIBRATION

RUN NO.	Δ Pstd in H_2O	Δ Ps in H_2O	Cp(s)	DEVIATION Cp(s) - avg.Cp(s)
1	0.560	0.810	0.823	0.000
2	0.560	0.810	0.823	0.000
3	0.560	0.810	0.823	0.000
		"A" AVERAGE	0.823	0.0000 (must be ≤ 0.01)

SIDE "B" CALIBRATION

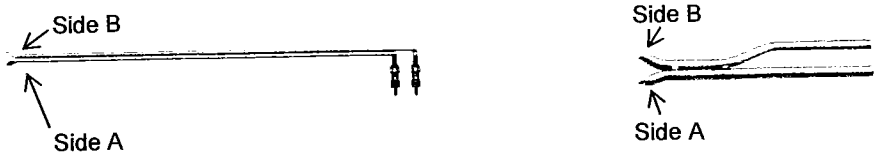
RUN NO.	Δ Pstd in H_2O	Δ Ps in H_2O	Cp(s)	DEVIATION Cp(s) - avg.Cp(s)
1	0.560	0.810	0.823	0.000
2	0.560	0.810	0.823	0.000
3	0.560	0.810	0.823	0.000
		"B" AVERAGE	0.823	0.0000 (must be ≤ 0.01)

ACCEPTANCE CRITERIA

AVERAGE 0.0000 AVG. Cp (A) - AVG. Cp (B) must be ≤ 0.01

If the Average and both Deviation Averages "A" & "B" are ≤ 0.01, then the OVERALL AVERAGE below may be used.
*** If NOT, use the "A" Average OR "B" Average.**

OVERALL AVERAGE 0.8232



I certify that the above pitot tube was tested in accordance with the US EPA Method 2 standards. See the Code of Federal Regulations, Title 40, Part 60, Appendix A, Method 2, Item 4.

Print Name: Nick Allen

Signature:

Date 1.11.13

Environmental Supply Company, Inc.
Quality Source Sampling Systems & Accessories

Wind Tunnel Pitot Calibration

S-type Pitot ID:	**A5272**	Date:	**2-Mar-15**
Standard Pitot ID:	**001**	Personnel:	**KMR MF**
Cp(std):	**0.99**	Cp(actual):	**0.735**
Part Number:		P_{bar}(in Hg):	**29.71**
Test Velocity (fps):	**50**	T(°F):	**55**
Wind Tunnel Location:	**Calera, AL**	Tunnel Size:	**20" x 40"**
Customer:	**Air Hygiene**		

A-SIDE

ΔP_{std} (in. H_2O)	ΔP_s (in. H_2O)	Cp(s)	Deviation*
0.5610	**1.0196**	**0.734**	0.002
0.5601	**1.0163**	**0.735**	-0.001
0.5590	**1.0123**	**0.736**	0.000
	AVERAGE	**0.735**	0.001
		Std deviation	0.002

NOTES:

1. **Pitot calibrated with an Environmental Supply Co. PM10 cyclone.**
2. **C_p is only valid when used with PM10 cyclone.**
3. **C_p is only valid with 1" spacing from PM10 cyclone.**

$$Cp(s) = Cp(std)\sqrt{\frac{\Delta P(std)}{\Delta P(s)}}$$

*Deviation = {Cp(s) - *AVG* Cp(s)} {must be <0.010}

Standard deviation of the deviations must be less than 0.02 for both sides.

Pitot tube S/N A5272 was calibrated in accordance with the CFR 40, Part 60 Appendix A, Method 2, Section 10.

Signature

3/2/15
Date

708 E. Club Blvd., Durham, North Carolina 27704 www.environsupply.com 919-956-9688 FAX: 919-682-0333

Environmental Supply Company, Inc.
Quality Source Sampling Systems & Accessories

Wind Tunnel Pitot Calibration

S-type Pitot ID:	**P-983**	Date:	**2-Nov-15**
Standard Pitot ID:	**001**	Personnel:	**KMR**
Cp(std):	**0.99**	Cp(actual):	**0.729**
Part Number:		P_{bar}(in Hg):	**29.31**
Test Velocity (fps):	**50**	T(°F):	**67**
Wind Tunnel Location:	**Calera, AL**	Tunnel Size:	**20" x 40"**
Customer:	**Air Hygiene**		

A-SIDE

ΔP_{std} (in. H_2O)	ΔP_s (in. H_2O)	Cp(s)	Deviation*
0.554	**1.021**	**0.729**	0.002
0.554	**1.022**	**0.729**	-0.001
0.555	**1.022**	**0.730**	0.000
	AVERAGE	**0.729**	0.001
		Std deviation	0.002

NOTES:

1. **Pitot calibrated with an Apex Instruments PM10 cyclone.**
2. **C_p is only valid when used with PM10 cyclone.**
3. **C_p is only valid with 1" spacing from PM10 cyclone.**

$$Cp(s) = Cp(std)\sqrt{\frac{\Delta P(std)}{\Delta P(s)}}$$

*Deviation = {Cp(s) - *AVG* Cp(s)} {must be <0.010}

Standard deviation of the deviations must be less than 0.02 for both sides.

Pitot tube S/N P-983 was calibrated in accordance with the CFR 40, Part 60 Appendix A, Method 2, Section 10.

David Hen
Signature

11/2/15
Date

708 E. Club Blvd., Durham, North Carolina 27704 www.environsupply.com 919-956-9688 FAX: 919-682-0333

Field Balance Weight Verfication
Annual 500g Field Balance Stock Weight vs. 500g ISO 17025 Traceable Weight
Air Hygiene Asset ID: samp-sc-0016

Filename: Z:\QAQC\Calibrations\Field Balance Weights\2018\[samp-sc-0016_213.xlsm]Balance
Make: Ohaus
Model #: Scout Pro SP2001-US
Serial #: 7126210013
Field Weight #: sc-0016
Trailer #: 213

ISO 17025 Weight ID LABS-WT-0005
ISO S/N 1000128090
ISO Cal Due 8/16/2018

ISO 17025 Certfified Weight (g)	Field Balance Weight (g)	± g
500.00	500.00	0.00

must be <0.5

John Bengs (signature) 07/02/18 (date)

ISO 17025 Certfified Weight (g)	Field Balance Weight (g)	± g
500.00	500.10	0.10

must be <0.5

John Bengs (signature) 07/02/18 (date)

ISO 17025 Certfified Weight (g)	Field Balance Weight (g)	± g
500.10	500.10	0.00

must be <0.5

John Bengs (signature) 07/02/18 (date)

Note: Calibrated against ISO 17025 Certified weight LABS-WT-0005

EPA Method 4 - Section 10.3, EPA Method 5 - Section 10.7, EPA Method 202 - Section 10.3: Field Balance Calibration Check. Check the calibration of the balance used to weigh impingers with a weight that is at least 500g or within 50g of a loaded impinger. The weight must be ASTM E617-13 "Standard Specification for Laboratory Weights and Precision Mass Standards" Class 6 (or better). Daily before used, the field balance must meausure within ±0.5g of the certified mass. If the daily balance calibration check fails, perform corrective measures and repeat the check before using balance.

ISO 17025 Certified 500g Weight is certified annually. Certified weight is used to verify Class 6 or better weight that accompanies each field balance on the balance it will be used. Acceptance critieria is certified weight must be within ±0.5g of Class 6 or better weight.

WEATHER STATION CALIBRATION SHEET
Temperature, Barometric Pressure, and Relative Humidity Periodic Calibration
Air Hygiene Asset ID: samp-we-0027

Filename: Z:\QAQC\Calibrations\Weather Stations\2019\[SAMP-WE-0027_213.xlsm]112013
Make: Kestrel
Model #: 4000
Serial #: 704981
ISO 17025 Weather Station ID .SAMP-WE-0033
ISO 17025 S/N A026334
ISO 17025 Cal Due 8/3/2019

ASTM Temp (deg F) (±1.5°)	Thermo. (deg F)	± deg F	ASTM Barometer (in. Hg) (±0.1 in Hg)	Barometric (in. Hg)	± in. Hg	Time
71.80	73.00	1.20	29.37	29.35	0.02	13:53

Miguel J — *(signature)* — 01/02/19 — *(date)*

ASTM Temp (deg F) (±1.5°)	Thermo. (deg F)	± deg F	ASTM Barometer (in. Hg) (±0.1 in Hg)	Barometric (in. Hg)	± in. Hg	Time
72.10	73.30	1.20	29.36	29.35	0.01	14:08

Miguel J — *(signature)* — 01/02/19 — *(date)*

ASTM Temp (deg F) (±1.5°)	Thermo. (deg F)	± deg F	ASTM Barometer (in. Hg) (±0.1 in Hg)	Barometric (in. Hg)	± in. Hg	Time
72.30	72.90	0.60	29.36	29.35	0.01	14:23

Miguel J — *(signature)* — 01/02/19 — *(date)*

ASTM Temp (+C9:I39deg F) (±1.5	Thermo. (deg F)	± deg F	ASTM Barometer (in. Hg) (±0.1 in Hg)	Barometric (in. Hg)	± in. Hg	Time
72.30	73.00	0.70	29.35	29.34	0.01	14:38

Miguel J — *(signature)* — 01/02/19 — *(date)*

Note: Verified against ISO 17025 Traceable Barometer and Thermometer (SAMP-WE-0033).

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end of report