

Summary:

Air Hygiene was contracted by Cimarron Energy, Inc. to conduct a performance testing on Emission Combustion Device on Flare Unit, Size 48-HV (48HV ECD). The unit was tested on May 7th through May 14th at Cimarron Norman Facility at Norman, Oklahoma. The flare unit was re-tested to satisfy the specifications as described in United States Code of Federal Regulations Title 40, Part 60, Subpart OOOO (40 CFR 60, Subpart OOOO).

Testing Methods:

The production flare model was tested according to EPA source emissions test method

- o Method 1 – Sample and Velocity Traverse for Stationary Sources
- o Method 2 – Determination of Stack Gas Velocity and Volumetric Flow Rate
- o Method 2A – Direct Measurement of Gas Volume Through Pipes and Small Ducts
- o Method 3C – Determination of Carbon Dioxide, Methane, Nitrogen and Oxygen from stationary Sources
- o Method 4 – Determination of Moisture Content in Stack Gas
- o Method 10 – Determination of Carbon Monoxide Emission from Stationary Sources
- o Method 22 – Visual Determination of Fugitive Emissions from Material Sources and Smoke Emission from Flares
- o Method 25A – Determination of Total Gaseous Organic Concentration Using Flame Ionization Analyzer
- o ASTM D1945-03 – Standard Test Method for Analysis of Natural Gas by Gas Chromatography
- o ASTM D3588-98 – Standard Practice for Calculating Heat Value, Compressibility Factor, and Relative Density of Gaseous Fuels

Requirement Specification:

In accordance to 40 CFR 60 Subpart OOOO, §60.5413(d)(12)(i) through (vi), this report contains the following information.

- o A full schematic and dimensions of the flare unit are presented in page 2
- o The maximum net Heat Input Rating of the 48HV ECD is 13.6MMBtu/hr
- o The inlet gas fuel range for 0% (min. rate) and 100% (max. rate) are 13.68MSCFD and 101.27MSCFD, respectively
- o Air/Stream injection/assist is not applicable for 48HV ECD
- o The test parameter ranges below, as applicable to this unit
 - Fuel gas delivery pressure and temperature – See Appendix B
 - Fuel gas moisture range – See Appendix F
 - Purge gas usage range – Not applicable
 - Condensate liquid fuel separation range – No liquid in the gas
 - Combustion temperature range – See Appendix B
 - Excess combustion air range – See Table 2.1 - 2.4

- Flame arrestor – See blue print of the production flare unit on page 3
- Burner manifold pressure – See Appendix B
- Pilot flame indicator – See blue print of the production flare unit on page 3
- Pilot flame fuel usage – 12.5 SCFH from previous testing, not applicable for this testing
- Tip velocity range – 148ft/s at maximum flow capacity
- Momentum flux ratio – See Appendix B
- Exit temperature range – See Appendix B
- Weather condition - See Appendix B

Specified Testing Conclusion for Model 48HV ECD:

- o The device was tested with no visible emission
- o The device was tested with less than 10 ppm average as propane corrected to 3 percent carbon dioxide
- o The device was tested with less than 10 ppm average as carbon monoxide corrected to 3 percent carbon dioxide
- o The device was tested with higher than 150 percent excess air
- o The device was tested with higher than 95 percent destruction efficiency for VOC



AIR HYGIENE, INC.

Testing Solutions for a Better World

**STACK EMISSIONS STUDY
EPA 40 CFR PART 60 SUBPART OOOO
FOR THE
EMISSION COMBUSTION DEVICE ON FLARE
UNIT, SIZE 48-HV
PREPARED FOR
CIMARRON ENERGY, INC.
AT THE
NORMAN FACILITY
NORMAN, OKLAHOMA
MAY 7-14, 2014
RE-TEST**



Corporate Headquarters

1600 W Tacoma Street
Broken Arrow, OK 74012



AIR HYGIENE, INC.

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Remote Testing Offices

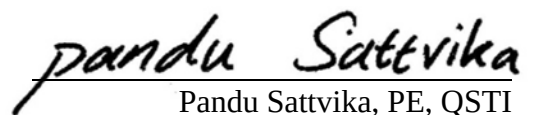
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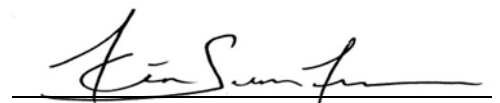


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**Stack Emissions Study
Emission Combustion Device on Flare Unit, Size 48-HV
Cimarron Energy, Inc.
Norman Facility
Norman, Oklahoma
May 7-14, 2014**

1.0 INTRODUCTION

Air Hygiene International, Inc. (Air Hygiene) has completed the emissions testing study for carbon monoxide (CO), total hydrocarbons (THC), flow, Visual Emission (VE), moisture (H₂O), carbon dioxide (CO₂), and oxygen (O₂) from the exhaust of the Emission Combustion Device on Flare Unit, Size 48-HV for Cimarron Energy, Inc. at the Norman Facility near Norman, Oklahoma. This report details the background, results, process description, and the sampling/analysis methodology of the stack sampling survey conducted on May 7-14, 2014.

1.1 TEST PURPOSE AND OBJECTIVES

The purpose of the test was to conduct compliance emission test to document levels of selected pollutants at four ramp-up ramp-down test loads (0-30-0%, 30-70-30%, 70-100-70, and 90-100%). The information will be used to confirm compliance with United States Code of Federal Regulations (CFR), Title 40 (40 CFR), Part 60 (40 CFR 60), Subpart OOOO. The specific objective was to determine the emission concentration of CO, THC, flow, visual emission, H₂O, CO₂, and O₂ from the exhaust of Cimarron Energy, Inc.'s Emission Combustion Device on Flare Unit, Size 48-HV.

1.2 SUMMARY OF TEST PROGRAM

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

- 1.2.1 Participating Organizations
 - Environment Protection Agency (EPA)
 - Cimarron Energy, Inc.
 - Air Hygiene
- 1.2.2 Industry
 - Oil and Natural Gas Transport and Processing
- 1.2.3 Air Permit and Federal Requirements
 - 40 CFR 60, Subpart OOOO
- 1.2.4 Plant Location
 - Norman Facility near Norman, Oklahoma
 - 1012 24th Avenue, Suite 100, NW, Norman, Oklahoma 73070
- 1.2.5 Equipment Tested
 - Emission Combustion Device on Flare Unit, Size 48-HV
- 1.2.6 Emission Points
 - For all gases, one sample point in the exhaust duct from the Emission Combustion Device on Flare Unit, Size 48-HV, determined according 40 CFR 60 Subpart OOOO
 - For all moisture, flow and fixed gas testing, 24 sampling points in the exhaust duct from the Emission Combustion Device on Flare Unit, Size 48-HV
 - For visual emission, one sample visual observation point from the exit of the exhaust duct to

- the atmosphere from the Emission Combustion Device on Flare Unit, Size 48-HV
- 1.2.7 Emission Parameters Measured
- CO
 - THC
 - Flow
 - Visual Emission
 - H₂O
 - CO₂
 - O₂
- 1.2.8 Dates of Emission Test
- May 7-14, 2014

1.3 KEY PERSONNEL

Cimarron Energy, Inc.:

Air Hygiene:

Air Hygiene:

Air Hygiene:

Tim Charlton

Min Sum Lee

Tim Page

Ashwin Ravi

405-928-7373

918-307-8865

918-307-8865

918-307-8865

2.0 SUMMARY OF TEST RESULTS

Results from the sampling conducted on Cimarron Energy, Inc.'s Emission Combustion Device on Flare Unit, Size 48-HV located at the Norman Facility on May 7-14, 2014 are summarized in the following table and relate only to the items tested.

TABLE 2.1
48HV ECD 0-30-0 LOAD DATA SUMMARY

Parameter	0-30-0 Load, Run - 48HV ECD R1	0-30-0 Load, Run - 48HV ECD R2	0-30-0 Load, Run - 48HV ECD R3	Average
Date (mm/dd/yy)	05/07/14	05/07/14	05/07/14	--
Start Time (hh:mm:ss)	13:45:06	15:09:06	16:27:06	--
End Time (hh:mm:ss)	14:49:00	16:12:00	17:32:00	--
Run Duration (min / run)	61	61	61	61
Bar. Pressure (in. Hg)	29.80	29.09	29.75	29.55
Amb. Temp. (°F)	85	91	83	86
Rel. Humidity (%)	42	26	24	31
Spec. Humidity (lb water / lb air)	0.010831	0.008270	0.005767	0.008289
Wind Speed (mph)	20.0	16.0	15.0	17.0
Wind Direction (°)	SSE	SSE	SSE	--
Inlet Gas Canister Pressure Start (inHg)	-28.46	-18.20	-9.50	--
Inlet Gas Canister Pressure Stop (inHg)	-18.20	-9.50	0.77	--
Gross Fuel Heating Value (Btu/ft ³)	2,549	2,549	2,549	2,549
Stack Flow (M2) (dscfh)	81,239	79,818	87,302	82,786
Stack Moisture (Method 4)	5.5	5.3	5.3	5.3
Gross Fuel Heating Value (Btu/ft ³)	2,548.9	2,548.9	2,548.9	2,548.90
Average Inlet Fuel Flowrate (SCFH)	998.3	978.9	1,025.9	1,001.04
Average Inlet Mass Fuel Flowrate (lb/hr)	116.0	113.7	119.1	116.26
% Excess Air	287.6	480.1	463.4	410.36
CO ₂ (%) - Modified method 3C	4.76	3.52	3.59	3.96
O ₂ (%) - Modified Method 3C	15.60	17.30	17.20	16.70
N ₂ (%) - Modified Method 3C	79.64	79.18	79.21	79.34
Visual Emission (mm:ss)	0:00	0:00	0:00	0.00
CO (ppmvd)	3.84	6.43	3.34	4.54
CO (ppm@3%CO ₂)	2.42	5.48	2.79	3.56
THC (ppmvw)	0.35	0.10	0.04	0.17
THC (ppm@3%CO ₂)	0.22	0.09	0.03	0.11
THC (lb/hr)	0.00	0.00	0.00	0.00
VOC Destruction Efficiency (%)	99.997	99.999	99.9996	99.999

TABLE 2.2
48HV ECD 30-70-30 LOAD DATA SUMMARY

Parameter	30-70-30 Load, Run - 48HV ECD R4	30-70-30 Load, Run - 48HV ECD R5	30-70-30 Load, Run - 48HV ECD R6	Average
Date (mm/dd/yy)	05/08/14	05/08/14	05/08/14	--
Start Time (hh:mm:ss)	13:46:00	15:05:00	16:25:00	--
End Time (hh:mm:ss)	14:50:00	16:08:00	17:27:00	--
Run Duration (min / run)	61	61	61	61
Bar. Pressure (in. Hg)	29.84	29.82	29.80	29.82
Amb. Temp. (°F)	77	83	85	82
Rel. Humidity (%)	45	40	25	37
Spec. Humidity (lb water / lb air)	0.008904	0.009648	0.006402	0.008318
Wind Speed (mph)	15.0	15.0	12.0	14.0
Wind Direction (--)	S	S	S	--
Inlet Gas Canister Pressure Start (inHg)	-28.62	-16.06	-8.46	--
Inlet Gas Canister Pressure Stop (inHg)	-16.06	-8.46	-1.86	--
Gross Fuel Heating Value (Btu/ft ³)	2,528	2,528	2,528	2,528
Stack Flow (M2) (dscfh)	128,077	135,858	129,256	131,064
Stack Moisture (Method 4)	6.2	5.7	6.3	6.1
Gross Fuel Heating Value (Btu/ft ³)	2,527.7	2,527.7	2,527.7	2,527.70
Average Inlet Fuel Flowrate (SCFH)	2,298.9	2,150.1	2,153.7	2,200.88
Average Inlet Mass Fuel Flowrate (lb/hr)	267.0	249.7	250.1	255.62
% Excess Air	253.5	288.1	247.6	263.06
CO ₂ (%) - Modified method 3C	5.14	4.74	5.23	5.04
O ₂ (%) - Modified Method 3C	15.10	15.60	15.00	15.23
N ₂ (%) - Modified Method 3C	79.76	79.60	79.77	79.71
Visual Emission (mm:ss)	0:00	0:00	0:00	0:00
CO (ppmvd)	3.33	1.48	0.44	1.75
CO (ppm@3%CO ₂)	1.94	0.94	0.26	1.05
THC (ppmww)	0.00	0.00	0.00	0.00
THC (ppm@3%CO ₂)	0.00	0.00	0.00	0.00
THC (lb/hr)	0.00	0.00	0.00	0.00
VOC Destruction Efficiency (%)	99.999	99.999	99.999	99.999

TABLE 2.3
48HV ECD 70-100-70 LOAD DATA SUMMARY

Parameter	70-100-70 Load, Run - 48HV ECD R7	70-100-70 Load, Run - 48HV ECD R8	70-100-70 Load, Run - 48HV ECD R9	Average
Date (mm/dd/yy)	05/09/14	05/09/14	05/09/14	--
Start Time (hh:mm:ss)	10:35:00	11:49:00	13:01:00	--
End Time (hh:mm:ss)	11:37:00	12:52:00	14:02:00	--
Run Duration (min / run)	61	61	61	61
Bar. Pressure (in. Hg)	29.97	29.97	29.96	29.97
Amb. Temp. (°F)	71	76	82	76
Rel. Humidity (%)	40	43	32	38
Spec. Humidity (lb water / lb air)	0.006353	0.008205	0.007412	0.007323
Wind Speed (mph)	4.0	5.0	5.0	4.7
Wind Direction (--)	NW	NW	NW	--
Inlet Gas Canister Pressure Start (inHg)	-28.61	-15.03	-7.56	--
Inlet Gas Canister Pressure Stop (inHg)	-15.03	-7.56	-1.94	--
Gross Fuel Heating Value (Btu/ft ³)	2,553	2,553	2,553	2,553
Stack Flow (M2) (dscfh)	218,382	258,078	246,941	241,134
Stack Moisture (Method 4)	5.5	5.4	5.2	5.3
Gross Fuel Heating Value (Btu/ft ³)	2,552.8	2,552.8	2,552.8	2,552.80
Average Inlet Fuel Flowrate (SCFH)	3,769.2	3,852.4	3,735.5	3,785.73
Average Inlet Mass Fuel Flowrate (lb/hr)	435.8	447.4	397.0	426.72
% Excess Air	259.4	241.6	230.2	243.74
CO ₂ (%) - Modified method 3C	5.03	5.25	5.43	5.24
O ₂ (%) - Modified Method 3C	15.20	14.90	14.70	14.93
N ₂ (%) - Modified Method 3C	79.77	79.80	79.87	79.81
Visual Emission (mm:ss)	0:00	0:00	0:00	0:00
CO (ppmvd)	5.61	1.99	5.89	4.50
CO (ppm@3%CO ₂)	3.35	1.13	3.25	2.58
THC (ppmww)	0.01	0.01	-0.01	0.00
THC (ppm@3%CO ₂)	0.00	0.00	0.00	0.00
THC (lb/hr)	0.00	0.00	0.00	0.00
VOC Destruction Efficiency (%)	99.999	99.999	99.999	99.999

TABLE 2.4
48HV ECD 90-100 LOAD DATA SUMMARY

Parameter	90-100 Load, Run 48HV ECD R10	90-100 Load, Run 48HV ECD R11	90-100 Load, Run 48HV ECD R12	Average
Date (mm/dd/yy)	05/09/14	05/14/14	05/14/14	--
Start Time (hh:mm:ss)	15:13:00	12:29:24	13:48:24	--
End Time (hh:mm:ss)	16:15:00	13:35:00	14:52:00	--
Run Duration (min / run)	61	61	61	61
Bar. Pressure (in. Hg)	29.92	30.36	30.29	30.19
Amb. Temp. (°F)	84	76	67	76
Rel. Humidity (%)	27	37	34	33
Spec. Humidity (lb water / lb air)	0.006672	0.006939	0.004694	0.006101
Wind Speed (mph)	7.0	16.0	13.0	12.0
Wind Direction (--)	NW	N	NW	--
Inlet Gas Canister Pressure Start (inHg)	-28.73	-16.83	-8.25	--
Inlet Gas Canister Pressure Stop (inHg)	-16.83	-8.25	-2.14	--
Gross Fuel Heating Value (Btu/ft ³)	2,543	2,543	2,543	2,543
Stack Flow (M2) (dscfh)	259,605	284,181	252,884	265,557
Stack Moisture (Method 4)	5.6	5.0	5.3	5.3
Gross Fuel Heating Value (Btu/ft ³)	2,543.2	2,543.2	2,543.2	2,543.20
Average Inlet Fuel Flowrate (SCFH)	4,175.3	4,397.1	4,385.4	4,319.26
Average Inlet Mass Fuel Flowrate (lb/hr)	484.9	507.8	509.3	500.67
% Excess Air	229.6	230.1	311.5	257.08
CO ₂ (%) - Modified method 3C	5.37	5.42	4.54	5.11
O ₂ (%) - Modified Method 3C	14.70	14.70	15.90	15.10
N ₂ (%) - Modified Method 3C	79.93	79.88	79.50	79.77
Visual Emission (mm:ss)	0:00	0:00	0:00	0:00
CO (ppmvd)	6.89	2.05	1.52	3.49
CO (ppm@3%CO ₂)	3.85	1.14	1.01	2.00
THC (ppmww)	-0.01	-0.01	0.02	0.00
THC (ppm@3%CO ₂)	-0.01	0.00	0.01	0.00
THC (lb/hr)	0.00	0.00	0.00	0.00
VOC Destruction Efficiency (%)	99.999	99.999	99.999	99.999

All testing was conducted according to the requirement of 40 CFR 60.5413 and 40 CFR 60.5412.

3.0 SOURCE OPERATION

3.1 PROCESS DESCRIPTION

The unit tested was Emission Combustion Device on Flare Unit, Size 48-HV (48HV ECD). It is a highly engineered product to provide essential environmental solution to oil and gas industry. It is a full suite of environmental of environmental equipment to control site emissions.

3.2 SAMPLING LOCATION

The sample ports were located approximately 34 feet above grade level on the exhaust system. The stack had a 39 inches inner diameter and was equipped with two, 3 inch ports oriented at 90 degrees. The ports were 8.6 duct diameters downstream from the flare tip and 1.1 duct diameters upstream from the stack exit to the atmosphere. THC and CO samples for gaseous emissions were continuously drawn from the exhaust system at one sample port with three sampling points located at 16.7 percent, 50 percent, and 83.3 percent of the stack diameter. All visual emission observation was made by viewing the point where the exhaust system exited to the atmosphere at the top of the exhaust stack. All fuel sampling was continuously drawn from the fuel supply system with silonite-coated stainless steel evacuated canister from a tap located at 8 pipe diameter, 24 inches upstream of any interference. All flow, fixed gases and moisture sampling was continuously drawn from the exhaust system at two ports with 24 points across the stack according to Method 1.

4.0 SAMPLING AND ANALYTICAL PROCEDURES

4.1 TEST METHODS

The emission test on the Emission Combustion Device on Flare Unit, Size 48-HV at the Norman Facility 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 May 7-14, 2014.

**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
Fuel Flow Rate	EPA Method 2A	Volume Displacement
CO ₂ , O ₂ , Methane	EPA Method 3C	Gas Chromatograph-TCD
Stack Moisture Content	EPA Method 4	Gravimetric Analysis or Section 16.4 FFactor Based Calculation
Carbon Monoxide	EPA Method 10	Nondispersive Infrared Analyzer
Visual Emission	EPA Method 22	Visual Observation

Pollutant or Parameter	Sampling Method	Analysis Method
Total Hydrocarbons	EPA Method 25A	Flame Ionization Detector
Fuel Content Analysis	ASTM D 1945-03, ASTM D 3588-98	Gas Chromatograph

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, 2a, 3c 4, 10, 22, 25a, ASTM D1945-03, and ASTM D3588-98.

Figure 4.1 depicts the sample system used for the CO, THC, CO₂, and O₂ tests. A heated stainless steel probe was inserted into the sample port of the stack to extract gas measurements from the emission stream at three points located at 16.7, 50, and 83.3 percent across the stack diameter. The gas sample was continuously pulled through the probe and transported, via heat-traced Teflon® tubing, 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 CO analyzers through rotameters that controlled the flow rate of the sample. Exhaust samples were routed to the THC analyzer prior to gas conditioning.

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. CO 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 Hyperlogger which retrieves calibrated electronic data from each instrument every one second and reports an average of the collected data every 30 seconds. Data records can be found in Appendix A and B of this report.

Figure 4.2 represents the sample system used for moisture and flow testing. An inconel probe with an inconel 3/8 inches tubing, pitots tube and thermocouple were inserted into the sample ports of the stack to extract gas measurements from the emission stream through a glass impinger train. Flow rates were monitored with oil filled manometers and total sample volumes were measured with a dry gas meter. Tedlar bags were collected at the exit of this train.

Three test runs for each of the firing rate at 0-30-0 percent, 30-70-30 percent, 70-100-70 percent, and 90-100 percent (ramp up, ramp down) of approximately 61 minutes each were conducted on the Emission Combustion Device on Flare Unit, Size 48-HV for CO, THC, CO₂, and O₂.

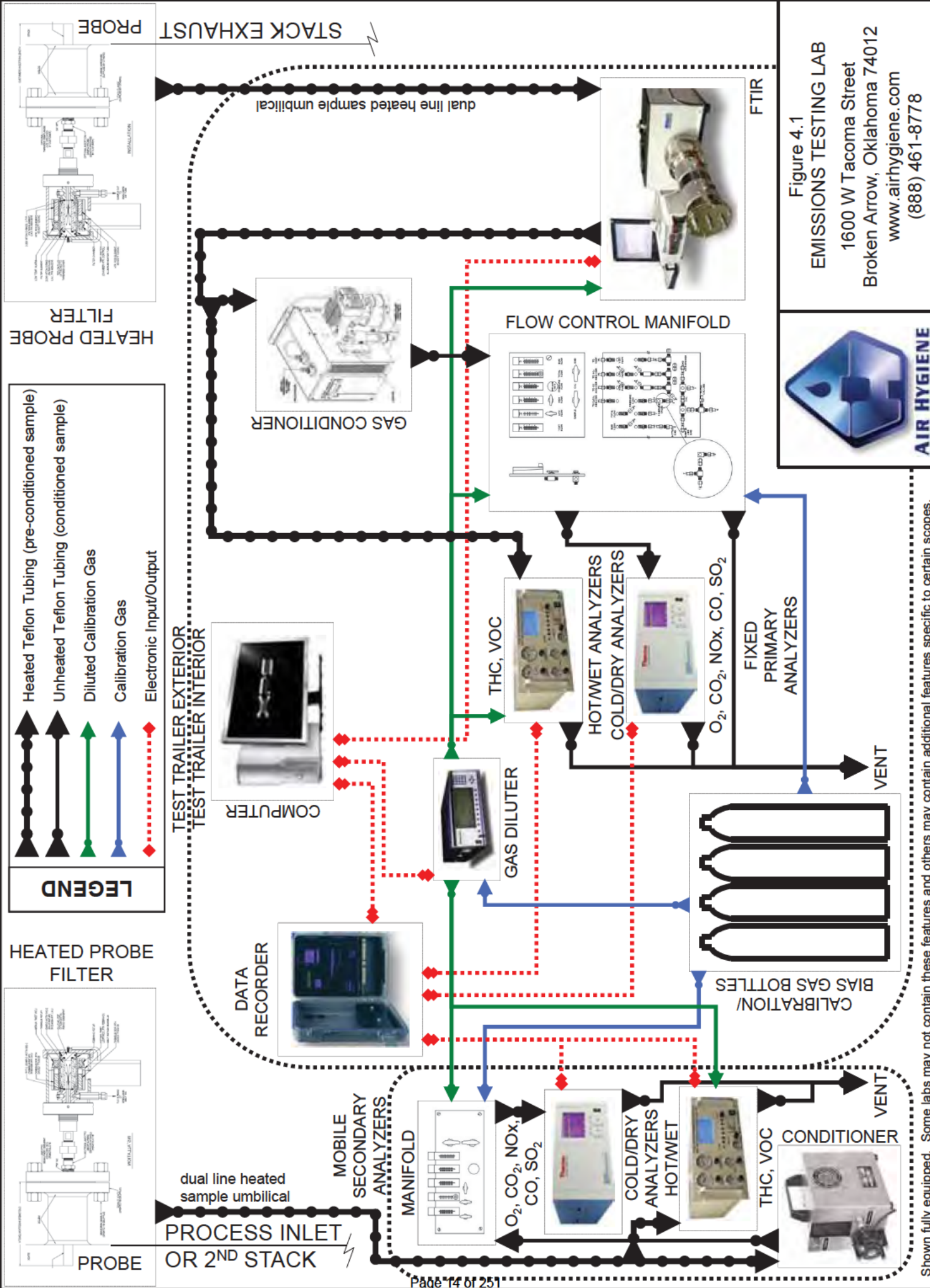
The stack gas analysis for O₂ and CO₂ concentrations was performed in accordance with procedures set forth in EPA Method 3C. The sample were collected in a tedlar bag and analyzed by GC-TCD at an offsite laboratory.

CO emission concentrations were quantified in accordance with procedures set forth in EPA Method 10. A continuous nondispersive infrared (NDIR) analyzer was used for this purpose.

THC emission concentrations were quantified in accordance with procedures set forth in EPA Method 25a. A continuous flame ionization (FID) analyzer was used for this purpose.

TABLE 4.2
ANALYTICAL INSTRUMENTATION

Parameter	Manufacturer and Model	Range	Sensitivity	Detection Principle
CO	Thermo 48C	User may select up to 10,000 ppm	0.1 ppm	Infrared absorption, gas filter correlation detector, microprocessor based linearization.
THC	VIG 210	User may select up to 10,000 ppm	0.1 ppm	Flame Ionization Detector



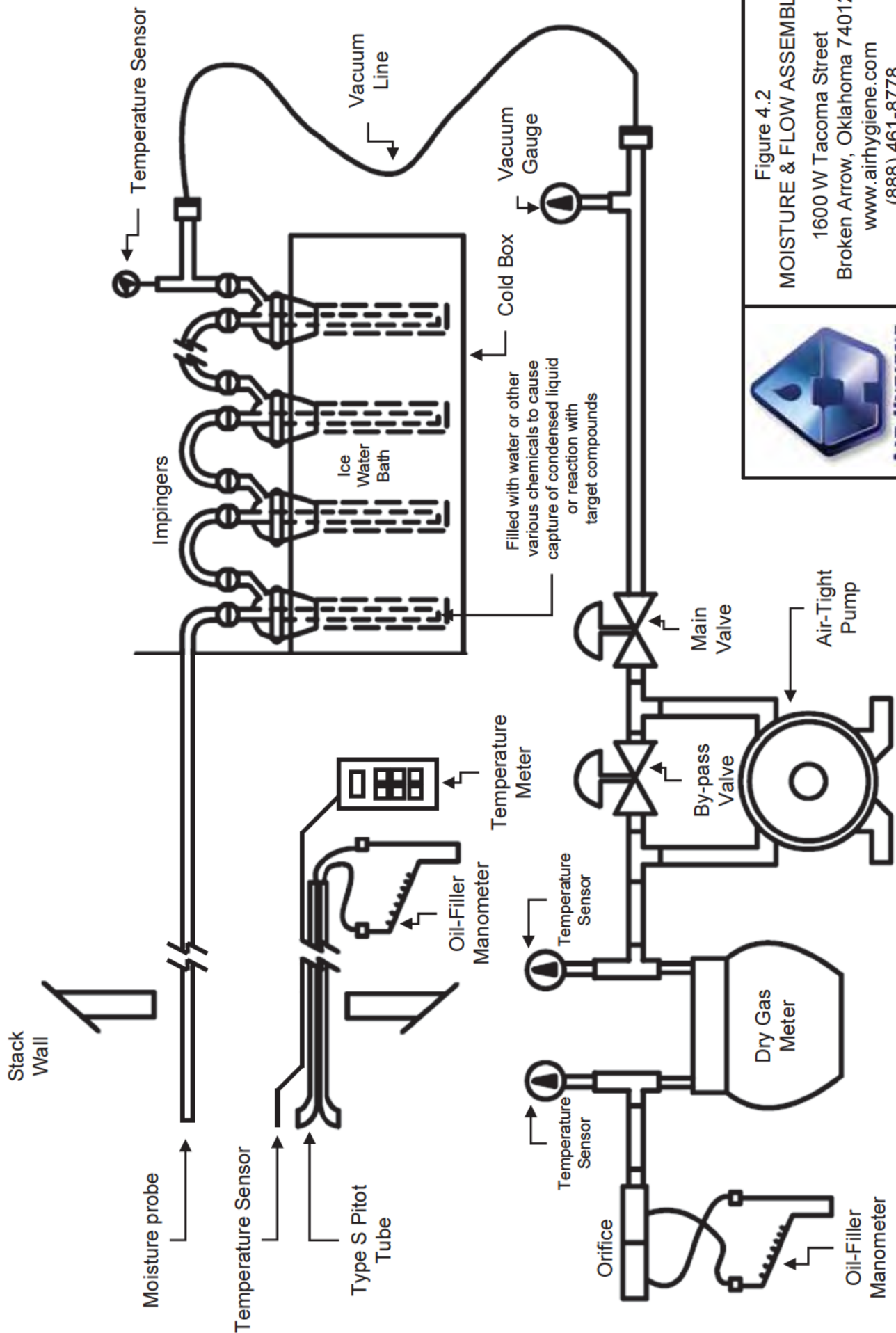


Figure 4.2
MOISTURE & FLOW ASSEMBLY
 1600 W Tacoma Street
 Broken Arrow, Oklahoma 74012
 www.airhygiene.com
 (888) 461-8778

APPENDIX A

TEST RESULTS AND CALCULATIONS

**TABLE A.1:
EMISSIONS TESTING SCHEDULE**

Unit	Load	Test Type	Run	Date	Start	Stop	Time Sync
48HV ECD	0-30-0	CO, THC & Fuel Sample	48HV ECD R1	05/07/14	13:45:06	14:49:00	CST
48HV ECD	0-30-0	CO, THC & Fuel Sample	48HV ECD R2	05/07/14	15:09:06	16:12:00	CST
48HV ECD	0-30-0	CO, THC & Fuel Sample	48HV ECD R3	05/07/14	16:27:06	17:32:00	CST
48HV ECD	30-70-30	CO, THC & Fuel Sample	48HV ECD R4	05/08/14	13:46:00	14:50:00	CST
48HV ECD	30-70-30	CO, THC & Fuel Sample	48HV ECD R5	05/08/14	15:05:00	16:08:00	CST
48HV ECD	30-70-30	CO, THC & Fuel Sample	48HV ECD R6	05/08/14	16:25:00	17:27:00	CST
48HV ECD	70-100-70	CO, THC & Fuel Sample	48HV ECD R7	05/09/14	10:35:00	11:37:00	CST
48HV ECD	70-100-70	CO, THC & Fuel Sample	48HV ECD R8	05/09/14	11:49:00	12:52:00	CST
48HV ECD	70-100-70	CO, THC & Fuel Sample	48HV ECD R9	05/09/14	13:01:00	14:02:00	CST
48HV ECD	90-100	CO, THC & Fuel Sample	48HV ECD R10	05/09/14	15:13:00	16:15:00	CST
48HV ECD	90-100	CO, THC & Fuel Sample	48HV ECD R11	05/14/14	12:29:24	13:35:00	CST
48HV ECD	90-100	CO, THC & Fuel Sample	48HV ECD R12	05/14/14	13:48:24	14:52:00	CST
48HV ECD	0-30-0	Fixed Gas & Moisture	0-30-0%-1	05/07/14	13:45:00	14:49:00	CST
48HV ECD	0-30-0	Fixed Gas & Moisture	0-30-0%-2	05/07/14	15:09:00	16:12:00	CST
48HV ECD	0-30-0	Fixed Gas & Moisture	0-30-0%-3	05/07/14	16:27:00	17:32:00	CST
48HV ECD	30-70-30	Fixed Gas & Moisture	30-70-30%-4	05/08/14	13:46:00	14:50:00	CST
48HV ECD	30-70-30	Fixed Gas & Moisture	30-70-30%-5	05/08/14	15:05:00	16:08:00	CST
48HV ECD	30-70-30	Fixed Gas & Moisture	30-70-30%-6	05/08/14	16:25:00	17:27:00	CST
48HV ECD	70-100-70	Fixed Gas & Moisture	70-100-70%-7	05/09/14	10:35:00	11:37:00	CST
48HV ECD	70-100-70	Fixed Gas & Moisture	70-100-70%-8	05/09/14	11:49:00	12:52:00	CST
48HV ECD	70-100-70	Fixed Gas & Moisture	70-100-70%-9	05/09/14	13:01:00	14:02:00	CST
48HV ECD	90-100	Fixed Gas & Moisture	90-100%-10	05/09/14	15:13:00	16:15:00	CST
48HV ECD	90-100	Fixed Gas & Moisture	90-100%-11	05/14/14	12:29:00	13:35:00	CST
48HV ECD	90-100	Fixed Gas & Moisture	90-100%-12	05/14/14	13:48:00	14:52:00	CST

EXAMPLE CALCULATIONS (INFORMATION)

Specific Humidity (RH_{sp})

Note: RH_{sp} (gr/lb) calculated using temperature, relative humidity, and barometric pressure with psychrometric chart, psychrometric calculator, or built in psychrometric algorithm.

$$RH_{sp} (lb/lb) = \left[\left(\frac{gr}{lb} \right) \times \frac{lb}{7000 gr} \right] \quad RH_{sp} = \frac{75.82 \text{ gr}}{lb} \times \frac{1 lb}{7000 gr} = 0.010831 \frac{lb H_2O}{lb Air}$$

EXAMPLE CALCULATIONS (CALIBRATION)

Calibration Error and Estimated Point, RM 25A, THC Analyzer

RM 25A, (12-17-09), 8.4 Calibration Error Test. Immediately prior to the test series (within 2 hours of the start of the test), introduce zero gas and high-level calibration gas at the calibration valve assembly. Adjust the analyzer output to the appropriate levels, if necessary. Calculate the predicted response for the low-level and mid-level gases based on a linear response line between the zero and high-level response. Then introduce low-level and mid-level calibration gases successively to the measurement system. ... These differences must be less than 5 percent of the respective calibration gas value. (calc for THC analyzer mid gas, if applicable)

$$E_p = \frac{C_{Dir(H)} - C_{Dir(Z)}}{C_{V(H)} - C_{V(Z)}} \times C_{Dir(M)} + C_{Dir(Z)} \quad \text{Eq. of a line } y=mx+b \quad E_p = \frac{8.40 \text{ ppm} - 0.03 \text{ ppm}}{8.48 \text{ ppm} - 0.00 \text{ ppm}} \times 5.04 \text{ ppm} + 0.03 = 5.00 \text{ ppm}$$

$$ACE = \left(\frac{C_{Dir} - C_V}{CS} \right) \times 100 \quad \text{Eq. 7E-1} \quad ACE_{THC} = \frac{5.00 \text{ ppm} - 5.00 \text{ ppm}}{5.04 \text{ ppm}} \times 100 = -0.09 \%$$

EXAMPLE CALCULATIONS (BIAS, DRIFT, AND CORRECTED RAW AVERAGE)

System Bias

RM 7E, (12-17-09), 12.3 System Bias. For non-dilution systems, use Equation 7E-2 to calculate the system bias separately for the low-level and upscale calibration gases. (calc for THC analyzer upscale gas, Run 1 initial bias, if applicable)

$$SB = \left(\frac{C_S - C_{Dir}}{CS} \right) \times 100 \quad \text{Eq. 7E-2} \quad SB = \frac{3.16 \text{ ppm} - 3.06 \text{ ppm}}{10.00 \text{ ppm}} \times 100 = 1.00 \%$$

Drift Assessment

RM 7E, (12-17-09), 12.5 Drift Assessment. Use Equation 7E-4 to separately calculate the low-level and upscale drift over each test run. (calc for THC analyzer upscale drift, Run 1, if applicable)

$$D = |SB_{final} - SB_i| \quad \text{Eq. 7E-4} \quad D = | -0.50 \% - 1.00 \% | = 1.50 \%$$

Alternative Drift and Bias

RM 7E, (12-17-09), 13.2 / 13.3 System Bias and Drift. Alternatively, the results are acceptable if $|C_S - C_{dir}|$ is ≤ 0.5 ppmv or if $|C_S - C_V|$ is ≤ 0.5 ppmv (as applicable). (calc for THC analyzer initial upscale, Run 1, if applicable)

$$SB / D_{Alt} = |C_S - C_{Dir}| \quad \text{Eq. Section 13.2 and 13.3} \quad SB / D_{Alt} = | 3.16 \text{ ppm} - 3.06 \text{ ppm} | = 0.10 \text{ ppm}$$

Bias Adjusted Average

RM 7E, (12-17-09), 12.6 Effluent Gas Concentration. For each test run, calculate C_{avg}, the arithmetic average of all valid THC concentration values (e.g., 1-minute averages). Then adjust the value of C_{avg} for bias, using Equation 7E-5b. (calc for THC analyzer, Run 1, if applicable)

$$C_{Gas} = (C_{Avg} - C_O) \times \left(\frac{C_{MA}}{C_M - C_O} \right) \quad \text{Eq. 7E-5b} \quad C_{Gas} = \left(0.39 \text{ ppm} - 0.04 \text{ ppm} \right) \times \left(\frac{3.04 \text{ ppm}}{3.09 \text{ ppm} - 0.04 \text{ ppm}} \right) = 0.35 \text{ ppm}$$

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

EXAMPLE CALCULATIONS (RUNS)

Diluent-Corrected Pollutant Concentration, CO₂ Based

Calculate the CO₂ corrected pollutant concentration, as follows: (calc for THC gas, Run 1, if applicable)

Uinsg Method 3C fixed gas analysis

$$C_{adj} = 0.37 \text{ ppm} \times \left(\frac{3.00 \%}{5.90 \%} \right) = 0.19 \text{ ppm@3\%CO}_2$$

EXAMPLE CALCULATIONS (RUNS)

Emissions Rate (lb/hr)

Calculation for pound per hour emission rate. Calculate, as follows: (calc for THC gas Run 1, if applicable)

$$E_{lb/hr} = \frac{C_{Gaz}}{10^6} \times \frac{Q_S \times MW}{G} \quad E_{lb/hr} = \frac{0.37 \text{ ppm}}{10^6 \text{ ppm/part}} \times \frac{81,239 \text{ SCFH} \times 44.00 \text{ lb/lb-mol}}{385.23 \text{ SCF/lb-mol}} = \frac{0.003 \text{ lb}}{\text{hr}}$$

VOC Destruction Efficiency

Calculation for VOC destruction Efficiency. Calculate, as follows: (calc for run 1, if applicable)

$$DE\% = \frac{115.950 - 0.003 \text{ lb/hr}}{115.950 \text{ lb/hr}} \times 100 = 99.997 \%$$

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

EXAMPLE CALCULATIONS (Reference Method 1 - Circular Stack)

Diameter of Stack (in.)

$$D(\text{in.}) = L_{fw} - L_{rw}$$

$$D(\text{in.}) = 47.00 \text{ in.} - 8.00 \text{ in.} = 39.00 \text{ in.}$$

Stack Diameters Downstream

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

$$B_D(\text{dia.}) = \frac{336.00 \text{ in.}}{39.00 \text{ in.}} = 8.62 \text{ diameters}$$

Area of Stack (ft²)

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

$$A_s(\text{ft}^2) = 3.14 \times \left(\frac{39.00 \text{ in.}}{2 \times 12 \text{ in./ft}} \right)^2 = 8.30 \text{ ft}^2$$

Stack Diameters Upstream

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

$$A_D(\text{dia.}) = \frac{65.00 \text{ in.}}{39.00 \text{ in.}} = 1.67 \text{ diameters}$$

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

Stack Dry Molecular Weight (lb/lb-mole)

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

$$M_d(\text{lb/lb-mol}) = \left(\frac{44 \text{ lb/lb-mol}}{100} \times 4.76 \% \right) +$$

$$\left(\frac{32 \text{ lb/lb-mol}}{100} \times 15.60 \% \right) + \left(\frac{28 \text{ lb/lb-mol}}{100} \times \left[\frac{0.00}{10,000} + 79.64 \right] \right) = \frac{29.39 \text{ lb}}{\text{lb-mol}}$$

Stack Wet Molecular Weight (lb/lb-mole)

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

$$M_s(\text{lb/lb-mol}) = \left\{ \frac{29.39 \text{ lb}}{\text{lb-mol}} \times \left(1 - \frac{5.49 \%}{100} \right) \right\} + \left\{ \frac{18 \text{ lb}}{\text{lb-mol}} \times \frac{5.49 \%}{100} \right\} = \frac{28.76 \text{ lb}}{\text{lb-mol}}$$

Average Excess Air (%)

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

$$(\%EA)_{avg} = \frac{100 \times \{ 15.60 \% - (0.5 \times 0.000 \%) \}}{(0.264 \times 79.64 \%) - \{ 15.60 \% - (0.5 \times 0.000 \%) \}} = 287.56 \%$$

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)

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

$$P_s (\text{in. Hg}) = 29.80 \text{ in. Hg} + \frac{0.00 \text{ in. H}_2\text{O}}{13.6 \text{ in. H}_2\text{O/in. Hg}} = 29.80 \text{ in. Hg}$$

Average Stack Gas Velocity (ft/sec)

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

$$v_{sl} (\text{ft/sec}) = \left(\frac{85.49 \text{ ft (lb/lb-mol)(in. Hg)}}{\text{sec (}^\circ\text{R)(in. H}_2\text{O)}} \right)^{1/2} \times 0.84 \times 0.09 \text{ in. H}_2\text{O}^{1/2} \times \sqrt{\frac{1216.21 + 460^\circ\text{R}}{29.80 \text{ in. Hg} \times 28.76 \text{ lb/lb-mol}}} = \frac{9.1 \text{ ft}}{\text{sec}}$$

Average Stack Dry Standard Flow Rate (dscfh)

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

$$Q_{sd} (\text{dscf/hr}) = \frac{3600 \text{ sec}}{\text{hr}} \times \left(1 - \frac{5.49 \%}{100}\right) \times \frac{9.17 \text{ ft}}{\text{sec}} \times 8.30 \text{ ft}^2 \times \frac{68.00 + 460^\circ\text{R}}{1,216.21 + 460^\circ\text{R}} \times \frac{29.80 \text{ in. Hg}}{29.92 \text{ in. Hg}} = \frac{81,239.41 \text{ dscf}}{\text{hr}}$$

Average Stack Wet Flow Rate (acfm)

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

$$Q_{aw} (\text{acf/min}) = \frac{60 \text{ sec}}{\text{min}} \times \frac{9.17 \text{ ft}}{\text{sec}} \times 8.30 \text{ ft}^2 = \frac{4,566.49 \text{ acf}}{\text{min}}$$

Average Stack Wet Standard Flow Rate (ascfh)

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

$$Q_{sw} (\text{ascf/hr}) = \frac{60 \text{ min}}{\text{hr}} \times \frac{4,566.49 \text{ acf}}{\text{min}} \times \frac{68.00 + 460^\circ\text{R}}{1,216.21 + 460^\circ\text{R}} \times \frac{29.80 \text{ in. Hg}}{29.92 \text{ in. Hg}} = \frac{85,959.68 \text{ ascf}}{\text{hr}}$$

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)

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

$$V_{wsg(std)} = 53.30 \text{ g} \times 0.04715 \text{ ft}^3/\text{g} = 2.510 \text{ scf}$$

Standard Meter Volume (dscf)

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

$$V_{m(std)} = \frac{17.65 \text{ }^\circ\text{R}}{\text{in. Hg}} \times 0.89 \times 50.49 \text{ dcf} \times \left(29.80 \text{ in. Hg} + \frac{1.60 \text{ in. H}_2\text{O}}{13.6 \text{ in. H}_2\text{O} / \text{in. Hg}} \right) = 43.25 \text{ dscf}$$

$$87.90 \text{ }^\circ\text{F} + 460 \text{ }^\circ\text{R}$$

Calculated Moisture Content (%)

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

$$B_{ws(calc)} = 100 \times \frac{2.51 \text{ dscf}}{2.51 \text{ dscf} + 43.25 \text{ dscf}} = 5.49 \%$$

Saturated Moisture Content (%)

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

$$B_{ws(svp)} = 100 \times \frac{10^{\left(6.691 - \frac{3144}{1216.21 \text{ }^\circ\text{F} + 390.86} \right)}}{29.80 \text{ in. Hg} + \frac{0.00 \text{ in. H}_2\text{O}}{13.6 \text{ in. H}_2\text{O} / \text{in. Hg}}} \leq 100 = 100.00 \%$$

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

RM 7E, (08-15-06), 12.1 Nomenclature. The terms used in the equations are defined as follows

ACE = Analyzer calibration error, percent of calibration span.
B_{WS} = Moisture content of sample gas as measured by Method 4 or other approved method, percent/100.
C_{avg} = Average unadjusted gas concentration indicated by data recorder for the test run.
C_D = Pollutant concentration adjusted to dry conditions.
C_{dir} = Measured concentration of a calibration gas (low, mid, or high) when introduced in direct calibration mode.
C_{Gas} = Average effluent gas concentration adjusted for bias.
C_M = Average of initial and final system calibration bias (or 2-point system calibration error) check responses for the upscale calibration gas.
C_{MA} = Actual concentration of the upscale calibration gas, ppmv.
C_O = Average of the initial and final system calibration bias (or 2-point system calibration error) check responses from the low-level (or zero) calibration gas.
C_S = Measured concentration of a calibration gas (low, mid, or high) when introduced in system calibration mode.
C_{SS} = Concentration of NO_x measured in the spiked sample.
C_{spike} = Concentration of NO_x in the undiluted spike gas.
C_{calc} = Calculated concentration of NO_x in the spike gas diluted in the sample.
C_v = Manufacturer certified concentration of a calibration gas (low, mid, or high).
C_w = Pollutant concentration measured under moist sample conditions, wet basis.
CS = Calibration span.
D = Drift assessment, percent of calibration span.
E_p = The predicted response for the low-level and mid-level gases based on a linear response line between the zero and high-level response.
Eff_{NO₂} = NO₂ to NO converter efficiency, percent.
H = High calibration gas, designator.
L = Low calibration gas, designator.
M = Mid calibration gas, designator.
NO_{Final} = The average NO concentration observed with the analyzer in the NO mode during the converter efficiency test in Section 16.2.2.
NO_xCorr = The NO_x concentration corrected for the converter efficiency.
NO_xFinal = The final NO_x concentration observed during the converter efficiency test in Section 16.2.2.
NO_xPeak = The highest NO_x concentration observed during the converter efficiency test in Section 16.2.2.
Q_{spike} = Flow rate of spike gas introduced in system calibration mode, L/min.
Q_{total} = Total sample flow rate during the spike test, L/min.
R = Spike recovery, percent.
SB = System bias, percent of calibration span.
SB_i = Pre-run system bias, percent of calibration span.
SB_f = Post-run system bias, percent of calibration span.
SB / D_{Alt} = Alternative absolute difference criteria to pass bias and/or drift checks.
SCE = System calibration error, percent of calibration span.
SCE_i = Pre-run system calibration error, percent of calibration span.
SCE_{final} = Post-run system calibration error, percent of calibration span.
Z = Zero calibration gas, designator.

40CFR60.355(b)(1), (09-20-06), Nomenclature. The terms used in the equations are defined as follows

P_i = reference combustor inlet absolute pressure at 101.3 kilopascals ambient pressure, mm Hg
P_o = observed combustor inlet absolute pressure at test, mm Hg
H_a = observed humidity of ambient air, g H₂O/g air
e = transcendental constant, 2.718
T_a = ambient temperature, K

RM 19, (07-29-06), 12.1 Nomenclature. The terms used in the equations are defined as follows

AdjFactor = Percent oxygen or carbon dioxide adjustment applied to a target pollutant
 B_{wa} = Moisture fraction of ambient air, percent.
 Btu = British thermal unit
 $\%C$ = Concentration of carbon from an ultimate analysis of fuel, weight percent.
 $\%CO_{2d}, \%CO_{2w}$ = Concentration of carbon dioxide on a dry and wet basis, respectively, percent.
 C P / CDP = Combustor inlet pressure / compressor discharge pressure (mm Hg); note, some manufactures reference as PCD.
 E = Pollutant emission rate, ng/J (lb/million Btu).
 E_a = Average pollutant rate for the specified performance test period, ng/J (lb/million Btu).
 E_{ao}, E_{ai} = Average pollutant rate of the control device, outlet and inlet, respectively, for the performance test period, ng/J (lb/million Btu).
 E_{gi} = Pollutant rate from the steam generating unit, ng/J (lb/million Btu).
 E_{go} = Pollutant emission rate from the steam generating unit, ng/J (lb/million Btu).
 E_{ci} = Pollutant rate in combined effluent, ng/J (lb/million Btu).
 E_{co} = Pollutant emission rate in combined effluent, ng/J (lb/million Btu).
 E_d = Average pollutant rate for each sampling period (e.g., 24-hr Method 6B sample or 24-hr fuel sample) or for each fuel lot (e.g., amount of fuel bunkered), ng/J (lb/million Btu).
 E_{di} = Average inlet SO_2 rate for each sampling period d, ng/J (lb/million Btu).
 E_g = Pollutant rate from gas turbine, ng/J (lb/million Btu).
 E_{ga} = Daily geometric average pollutant rate, ng/J (lbs/million Btu) or ppm corrected to 7 percent O_2 .
 E_{go}, E_{gi} = Matched pair hourly arithmetic average pollutant rate, outlet and inlet, respectively, ng/J (lb/million Btu) or ppm corrected to 7 percent O_2 .
 E_h = Hourly average pollutant, ng/J (lb/million Btu).
 E_{hj} = Hourly arithmetic average pollutant rate for hour "j," ng/J (lb/million Btu) or ppm corrected to 7 percent O_2 .
 EXP = Natural logarithmic base (2.718) raised to the value enclosed by brackets.
 Fc = Ratio of the volume of carbon dioxide produced to the gross calorific value of the fuel from Method 19
 F_d, F_w, F_c = Volumes of combustion components per unit of heat content, scm/J (scf/million Btu).
 ft^3 = cubic feet
 G = ideal gas conversion factor
 (385.23 SCF/lb-mol at 68 deg F & 14.696 psia)
 GCM = gross Btu per SCF (constant, compound based)
 GCV = Gross calorific value of the fuel consistent with the ultimate analysis, kJ/kg (Btu/lb).
 GCV_p, GCV_r = Gross calorific value for the product and raw fuel lots, respectively, dry basis, kJ/kg (Btu/lb).
 $\%H$ = Concentration of hydrogen from an ultimate analysis of fuel, weight percent.
 H_b = Heat input rate to the steam generating unit from fuels fired in the steam generating unit, J/hr (million Btu/hr).
 H_g = Heat input rate to gas turbine from all fuels fired in the gas turbine, J/hr (million Btu/hr).
 $\%H_2O$ = Concentration of water from an ultimate analysis of fuel, weight percent.
 H_t = Total numbers of hours in the performance test period (e.g., 720 hours for 30-day performance test period).
 K = volume of combustion component per pound of component (constant)
 K = Conversion factor, 10^{-5} (kJ/J)/(%) [10^6 Btu/million Btu].
 $K_c = (9.57 \text{ scm/kg})/\% [(1.53 \text{ scf/lb})/\%]$.
 $K_{cc} = (2.0 \text{ scm/kg})/\% [(0.321 \text{ scf/lb})/\%]$.
 $K_{hd} = (22.7 \text{ scm/kg})/\% [(3.64 \text{ scf/lb})/\%]$.
 $K_{hw} = (34.74 \text{ scm/kg})/\% [(5.57 \text{ scf/lb})/\%]$.
 $K_n = (0.86 \text{ scm/kg})/\% [(0.14 \text{ scf/lb})/\%]$.
 $K_o = (2.85 \text{ scm/kg})/\% [(0.46 \text{ scf/lb})/\%]$.
 $K_s = (3.54 \text{ scm/kg})/\% [(0.57 \text{ scf/lb})/\%]$.
 $K_{su \text{ fur}} = 2 \times 10^4 \text{ Btu/mt}\% \text{-MMBtu}$
 $K_w = (1.30 \text{ scm/kg})/\% [(0.21 \text{ scf/lb})/\%]$.
 lb = pound
 ln = Natural log of indicated value.
 L_p, L_r = Weight of the product and raw fuel lots, respectively, metric ton (ton).
 $\%N$ = Concentration of nitrogen from an ultimate analysis of fuel, weight percent.
 $M_{\%}$ = mole percent
 mol = mole
 MW = molecular weight (lb/lb-mol)
 $MW_{air} = \text{molecular weight of air } (28.9625 \text{ lb/lb-mole})^{-1}$
 NCM = net Btu per SCF (constant based on compound)
 $\%O$ = Concentration of oxygen from an ultimate analysis of fuel, weight percent.
 $\%O_{2d}, \%O_{2w}$ = Concentration of oxygen on a dry and wet basis, respectively, percent.
 P_B = barometric pressure, in Hg
 P_s = Potential SO_2 emissions, percent.
 $\%S$ = Sulfur content of as-fired fuel lot, dry basis, weight percent.
 S_a = Standard deviation of the hourly average pollutant rates for each performance test period, ng/J (lb/million Btu).
 $\%S_f$ = Concentration of sulfur from an ultimate analysis of fuel, weight percent.
 $S(\text{wt}\%)$ = weight percent of sulfur, per lab analysis by appropriate ASTM standard
 S_i = Standard deviation of the hourly average inlet pollutant rates for each performance test period, ng/J (lb/million Btu).
 S_o = Standard deviation of the hourly average emission rates for each performance test period, ng/J (lb/million Btu).
 $\%S_p, \%S_r$ = Sulfur content of the product and raw fuel lots respectively, dry basis, weight percent.
 SCF = standard cubic feet
 SH = specific humidity, pounds of water per pound of air
 $t_{0.95}$ = Values shown in Table 19-3 for the indicated number of data points n.
 T_{amb} = ambient temperature, °F
 W/D Factor = 1.0236 = conv. at 14.696 psia and 68 deg F (ref. Civil Eng. Ref. Manual, 7th Ed.)
 X_{CO_2} = CO_2 Correction factor, percent.
 X_k = Fraction of total heat input from each type of fuel k.

Nomenclature

- %CO = carbon monoxide concentration (%)
- %CO₂ = carbon dioxide concentration (%)
- %N₂ = nitrogen concentration (%)
- %O₂ = 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
- [(Δp)^{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 mol of substance at 0°C and 1 atm (ref. Civil Engineering Reference Manual, 7th ed. - Michael R. Lindeburg)
- 5.02 × 10⁴ = 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.)
- A_n = Area of nozzle, square feet
- A_s = area of stack (ft²)
- 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, D_p, and calculated using the actual stack gas temperature, dimensionless
- C₁ = -150.3162 (micropoise)
- C₂ = 18.0614 (micropoise/K^{0.5}) = 13.4622 (micropoise/R^{0.5})
- C₃ = 1.19183 × 10⁶ (micropoise/K²) = 3.86153 × 10⁶ (micropoise/R²)
- C₄ = 0.591123 (micropoise)
- C₅ = 91.9723 (micropoise)
- C₆ = 4.91705 × 10⁻⁵ (micropoise/K²) = 1.51761 × 10⁻⁵ (micropoise/R²)
- 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 PM₁₀, 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

Nomenclature

- C_p = Pitot coefficient for the combined cyclone pitot, dimensionless
- 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.)
- $\Delta H@$ = ΔH @ 0.75 scfm (in. H₂O)
- ΔH_{avg} = average orifice pressure (in. H₂O)
- 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. H₂O)
- Δp_1 = velocity head at first current traverse point (in. H₂O)
- $\Delta p'_1$ = velocity head at first preliminary traverse point (in. H₂O)
- Δp_{avg} = average pitot tube differential pressure (in. H₂O)
- Δp_n = velocity head at subsequent current traverse point (in. H₂O)
- Δp_{RM2} = method 2 velocity head (in. H₂O)
- D_s = diameter of stack (in.)
- F_d = fuel f-factor (dscf/MMBtu)
- f_{O_2} = stack gas fraction of O₂, by volume, dry basis
- I = Percent isokinetic sampling, dimensionless
- K_1 = standard volume correction, 17.65°R/in. Hg
- K_4 = isokinetic conversion constant, 0.0945min•in.Hg/sec•°R
- K_5 = water mass to std water vapor, 0.04715 ft³/g
- K_p = 85.49, ((ft/sec)/(pounds/mole •°R))
- 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

Nomenclature

- 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)
- 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. H₂O)
- P_{std} = standard pressure, 29.92 in. Hg
- Θ = total sampling time (min)
- Q_{aw} = average stack wet flow rate (ascf/min)
- Q_l = Sampling rate for cyclone I to achieve specified D_{50}
- Q_m = estimated orifice flow rate, 0.750 acfm, else V_m/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 (°F)
- t_m = average meter temperature (°F)
- T_m = Meter box and orifice gas temperature, °R
- t_n = Sampling time at point n, min
- t_r = Total projected run time, min
- T_s = Absolute stack gas temperature, °R
- T_{std} = standard temperature, 68°F, 528°R

Nomenclature

- T_u = absolute temperature offset, 460°R
- 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)
- 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 D₅₀ values, dimensionless
- γ = Dry gas meter gamma value, dimensionless
- ΔH = Meter box orifice pressure drop, inches W.C.
- $\Delta H@$ = 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.

Nomenclature

- 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

Calculations, Formulas, and Constants

The following information supports the spreadsheets for this testing project.

Given Data:

Ideal Gas Conversion Factor = 385.23 SCF/lb-mol at 68 deg F & 14.696 psia

Fuel Heating Value is based upon Air Hygiene's fuel gas calculation sheet. All calculations are based upon a correction to 68 deg F & 14.696 psia

High Heating Values (HHV) are used for the Fuel Heating Value, F-Factor, and Fuel Flow Data per EPA requirements.

ASTM D 3588

Molecular Weight of NOx (lb/lb-mole) =	46.01
Molecular Weight of CO (lb/lb-mole) =	28.00
Molecular Weight of SO ₂ (lb/lb-mole) =	64.00
Molecular Weight of THC (propane) (lb/lb-mole) =	44.00
Molecular Weight of VOC (methane) (lb/lb-mole) =	16.00
Molecular Weight of NH ₃ (lb/lb-mole) =	17.03
Molecular Weight of HCHO (lb/lb-mole) =	30.03

40CFR60, App. A, RM 19, Table 19-1

Conversion Constant for NOx =	0.0000001194351
Conversion Constant for CO =	0.0000000726839
Conversion Constant for SO ₂ =	0.0000001661345
Conversion Constant for THC =	0.0000001142175
Conversion Constant for VOC (methane) =	0.0000000415336
Conversion Constant for NH ₃ =	0.0000000442074
Conversion Constant for HCHO =	0.0000000779534

NOTE: units are lb/ppm*ft³

Formulas:

1. Corrected Raw Average (C_{Gas}), 40CFR60, App. A, RM 7E, Eq. 7E-5 (08/15/06)

$$C_{Gas} = (C_{Avg} - C_o) \times \left(\frac{C_{MA}}{C_M - C_o} \right)$$

2. Correction to % O₂, 40CFR60, App. A, RM 20, Eq. 20-5 (11/26/02)

$$C_{adj} = C_{Gas(Target)} \times \left(\frac{20.9\% - AdjFactor}{20.9\% - C_{Gas(O_2)}} \right)$$

3. Correction to % O₂ and ISO Conditions

$$C_{ISO} = C_{Adj} \times \sqrt{\frac{P_r}{P_o}} \times e^{(19 \times (H_o - 0.00633))} \times \left(\frac{288}{T_a} \right)^{1.53}$$

4. Method 19 stack exhaust flow (scfh)

$$Q_s = \left(\frac{FFactor \times Q_f \times HHV}{1,000,000} \right) \times \left(\frac{20.9\%}{20.9\% - C_{Gas(O_2)}} \right)$$

5. Emission Rate in lb/hr

$$E_{lb/hr} = \frac{C_{Gas}}{10^6} \times \frac{Q_s \times MW}{G}$$

6. Emission Rate in tons per year

$$E_{ton/yr} = \frac{E_{lb/hr} \times hr_{year}}{2000}$$

7. Emission Concentration in lb/MMBtu (O₂ based)

$$E_{lb/MMBtu} = \frac{C_{Gas} \times F_d Factor \times Conv_c \times 20.9\%}{20.9\% - C_{Gas(O_2)}}$$

8. Emission Concentration in g/hp*hr

$$E_{g/hp \cdot hr} = \frac{E_{lb/hr} \times 453.6}{mw \times 1314.022} \text{ or } \frac{E_{lb/hr} \times 453.6}{hp}$$

APPENDIX B

EMISSION DATA RECORDS

CIMARRON ENERGY, INC.	
Air Permit # :	40 CFR 60 Sub Part OOOO
Plant Name or Location:	Norman Facility
Date:	May 7, 2014
Project Number:	cei-14-norman.ok-comp#1
Manufacturer & Equipment:	48HV ECD
Test Load:	Multiple
Tester(s) / Test Unit(s):	MSL/TP/MM/TS/AR/209

		RUN											
	UNITS	48HV ECD R1	48HV ECD R2	48HV ECD R3	48HV ECD R4	48HV ECD R5	48HV ECD R6	48HV ECD R7	48HV ECD R8	48HV ECD R9	48HV ECD R10	48HV ECD R11	48HV ECD R12
Start Time	hh:mm:ss	13:45 06	15 09 06	16 27 06	13:46:00	15:05:00	16:25:00	10:35:00	11:49:00	13:01:00	15:13:00	12:29:24	13:48 24
End Time	hh:mm:ss	14:45 06	16 09 06	17 27 06	14:46:00	16:05:00	17:25:00	11:35:00	12:49:00	14:01:00	16:13:00	13:29:24	14:48 24
Bar. Pressure	in. Hg	29 80	29 09	29.75	29.84	29.82	29 80	29.97	29.97	29.96	29.92	30 36	30 29
Amb. Temp.	F	85	91	83	77	83	85	71	76	82	84	76	67
Rel. Humidity	%	42	26	24	45	40	25	40	43	32	27	37	34
Spec. Humidity	lb water / lb air	0.010831	0.008270	0.005767	0.008904	0.009648	0 006402	0.006353	0.008205	0.007412	0.006672	0.006939	0.004694
Date	mm/dd/yy	05/07/14	05/07/14	05/07/14	05/08/14	05/08/14	05/08/14	05/09/14	05/09/14	05/09/14	05/09/14	05/14/14	05/14/14
Unit Number		48HV ECD	48HV ECD	48HV ECD	48HV ECD	48HV ECD	48HV ECD	48HV ECD	48HV ECD	48HV ECD	48HV ECD	48HV ECD	48HV ECD
Load Designator	%	0-30-0	0-30-0	0-30-0	30-70-30	30-70-30	30-70-30	70-100-70	70-100-70	70-100-70	90-100	90-100	90-100
Gross Fuel Heating Value	Btu/ft3	2,549	2,549	2,549	2,528	2,528	2,528	2,553	2,553	2,553	2,543	2,543	2,543
Stack Flow (M2)	dscfh	81,239	79,818	87,302	128,077	135,858	129,256	218,382	258,078	246,941	259,605	284,181	252,884
Stack Moisture	Method 4	5.49	5.28	5.25	6 24	5 69	6.29	5.47	5.38	5.17	5.64	5.03	5.26
Wind Speed	mph	20	16	15	15	15	12	4	5	5	7	16	13
Wind Direction	--	SSE	SSE	SSE	S	S	S	NW	NW	NW	NW	N	NW
CO ₂ - Method 3C	%	4 8	3 5	3 6	5.1	4.7	5 2	5.0	5.3	5.4	5.4	5.4	4 5
O ₂ - Method 3C	%	15.6	17.3	17.2	15.1	15.6	15.0	15 2	14 9	14.7	14.7	14.7	15.9
N ₂ -Method 3C	%	79.6	79.2	79.2	79 8	79.6	79.8	79 8	79 8	79 9	79 9	79.9	79.5
Excess Air	%	287 6	480.1	463.4	253.5	288.1	247 6	259.4	241.6	230.2	229.6	230.1	311.5

METHOD 1 - SAMPLE AND VELOCITY TRAVERSES FOR CIRCULAR SOURCES

Plant Name	Norman Facility	Date	05/07/14
Sampling Location	48HV ECD	Stack Type	Circular
Operator	TP/MM	Ports Available	2
Project #	cei-14-norman.ok-comp#1	Ports Used	2
Stack Size	Large (>24 inch diameter)	Port ID (inches)	3.00

Circular Stack or Duct Diameter			
Distance to Far Wall of Stack	(L _{fw})	47.00	in
Distance to Near Wall of Stack	(L _{nw})	8.00	in
Diameter of Stack	(D)	39.00	in
Area of Stack	(A _s)	8.30	ft ²

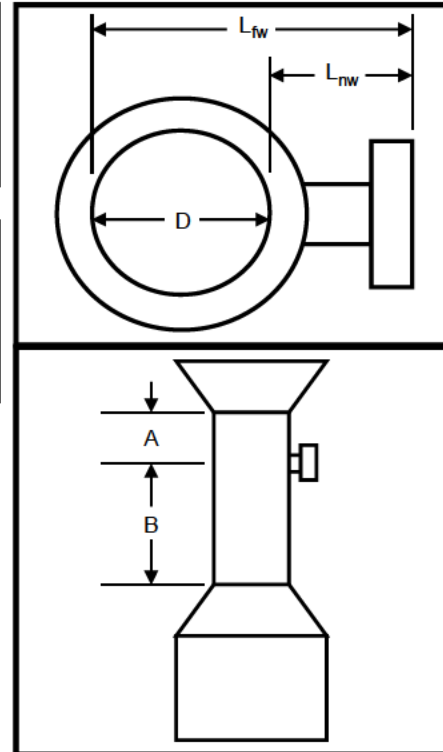
Distance from Port to Disturbances			
Distance Upstream	(A)	41.00	in
Diameters Upstream	(A _D)	1.05	diameters
Distance Downstream	(B)	336.00	in
Diameters Downstream	(B _D)	8.62	diameters

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		24	16
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

Location of Traverse Points in Circular Stacks									
Traverse Point	(Fraction of Stack Dimension from Inside Wall to Traverse Point)								
Number	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



Number of Traverse Points Used			
2	Ports by	12	Across
24	Pts Used	24	Required

- ☒ Method 1 Trav
☐ 12 Point PM Trav
☐ Velocity

Traverse Point Locations			
Traverse Point Number	Fraction of Stack Diameter	Distance from Inside Wall	Distance Including Reference Length
		in	in
1	0.021	7/8	8 7/8
2	0.067	2 5/8	10 5/8
3	0.118	4 5/8	12 5/8
4	0.177	6 7/8	14 7/8
5	0.250	9 6/8	17 6/8
6	0.356	13 7/8	21 7/8
7	0.644	25 1/8	33 1/8
8	0.750	29 2/8	37 2/8
9	0.823	32 1/8	40 1/8
10	0.882	34 3/8	42 3/8
11	0.933	36 3/8	44 3/8
12	0.979	38 1/8	46 1/8

METHOD 1 - ISOKINETIC TRAVERSE FOR A CIRCULAR SOURCE

Company	Cimarron Energy	Date	05/07/14
Plant Name	Norman Facility	Project #	cei-14-norman.ok-comp#1
Equipment	48HV ECD	# of Ports Available	2
Location	Ports	# of Ports Used	2

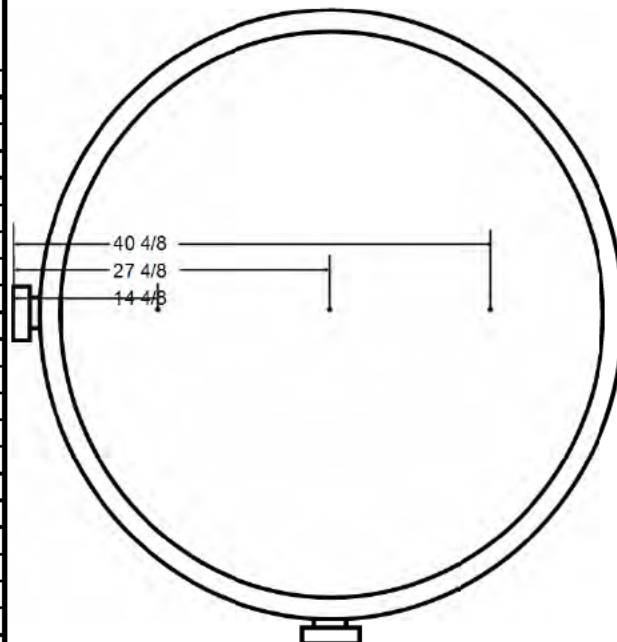
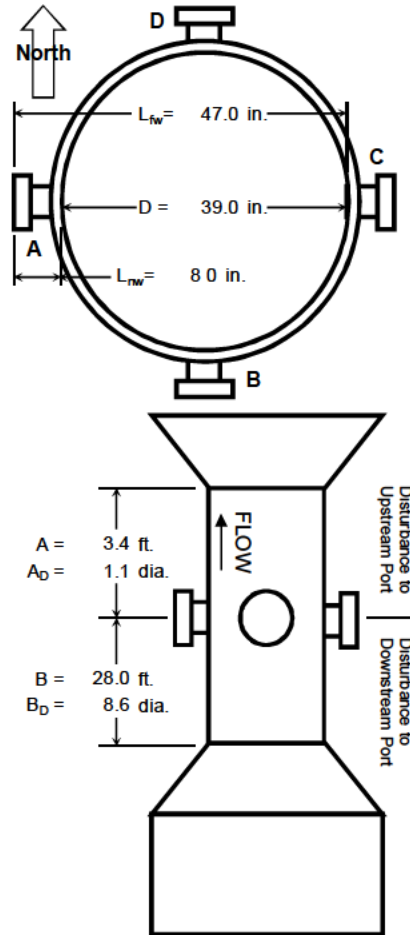
Circular Stack or Duct Diameter			
Distance to Far Wall of Stack	(L_{fw})	47.00	in.
Distance to Near Wall of Stack	(L_{nw})	8.00	in.
Diameter of Stack	(D)	39.00	in.
Area of Stack	(A_s)	8.30	ft ²

Distance from Disturbances to Port			
Distance Upstream	(A)	41.00	in.
Diameters Upstream	(A_D)	1.05	diameters
Distance Downstream	(B)	336.00	in.
Diameters Downstream	(B_D)	8.62	diameters

Number of Traverse Points Required					
Diameters to		Minimum Number of ¹		Minimum Number of	
Flow Disturbance		Traverse Points		Traverse Points	
Down (B _D)	Up (A _D)	Particulate	Velocity	Comp Stratification	
Stream	Stream	Points	Points	Criteria	Points
2.00-4.99	0.50-1.24	24	16	○ RM 7E 8.1.2	12 RM1 pts
5.00-5.99	1.25-1.49	20	16	● ○○○○ Req.	3 points
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	Minimum Number of	
Upstream Spec		24	16	Traverse Points	
Downstream Spec		12	12	RATA Stratification	
Traverse Pts Required		24	16	Criteria	Points
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					
				○ Part75/60	12 RM1 pts
				○ 75 abrv (a)	3 points
				○ 75 abrv (b)	6 points

Number of Traverse Points Used			
2	Ports by	3	Pts / port
1	Pts Used	3	Required

Traverse Point Locations			
Traverse Point Number	Percent of Stack Diameter	Distance from Inside Wall	Distance Including Reference Length
	%	in.	in.
1	16.7%	6 4/8	14 4/8
2	50.0%	19 4/8	27 4/8
3	83.3%	32 4/8	40 4/8
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			



EMISSION DATA RECORDS

0-30-0% Ramp-up, Ramp-down Unit Operations Data

METHOD 4 (MOISTURE) [MULTI POINT, NO VARIATION] SOURCE SAMPLING TITLE PAGE

Source Information	
Plant Name	Cimaron Energy, INC
Sampling Location	48HV ECD
Fuel Type	Gas, Propene

Test Information			
Project #		cei-14-norman.ok-comp#1	
Operator		TP/MM	
Date for Preliminary Run	(mm/dd/yy)	05/07/14	
Standard Temperature		68	°F
Standard Pressure		29.92	in Hg
Required Sample Vol.	RM4, 8.1.1.2	21	scf
Run Duration	≤0.75 cfm	60	minutes
Unit Number		1	
Base Run Number		0-30-0%	
Number of Ports Available		2	
Number of Ports Used		2	
Port Inside Diameter		3.00	in
Stack Shape		Circular	

Test Equipment Information					
Run		1	2	3	
Test Date	(mm/dd/yy)	05/07/14	05/07/14	05/07/14	
Load	% or w/DB	0-30-0	0-30-0	0-30-0	
Meter Box Number	from ACS	SAMP-CP-0012	SAMP-CP-0012	SAMP-CP-0012	
Meter Calibration Factor	(Y)	0.889	0.889	0.889	
Orifice Meter Coefficient	(ΔH_{or})	1.632	1.632	1.632	in H ₂ O
Pitot Identification	from ACS	4-17-14-2	4-17-14-2	4-17-14-2	
Pitot Tube Coefficient	(C _p)	0.840	0.840	0.840	
Probe Number	from ACS	SAMP-SP-0001	SAMP-SP-0001	SAMP-SP-0001	
Probe Length		60.0	60.0	60.0	in
(SS, Glass) Liner Material	from list	inconel	inconel	inconel	
Impinger Case Number	from ACS	SAMP-BC-0017	SAMP-BC-0017	SAMP-BC-0017	

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	Min Sum Lee
Phone Number	(918) 307-8865
Fax Number	(918) 307-9131

METHOD 4 (MOISTURE) [MULTI POINT, NO VARIATION] - RESULTS

Plant Name	Cimaron Energy, INC
Sampling Location	48HV ECD
Project #	cei-14-norman.ok-comp#1

Historical Data	0-30-0%-1	0-30-0%-2	0-30-0%-3	Average	Units
Run Start Time	13:45	15:09	16:27		hh:mm
Run Stop Time	14:49	16:12	17:32		hh:mm
Test Date	05/07/14	05/07/14	05/07/14		mm/dd/yy
Meter Calibration Factor	0.889	0.889	0.889		
Pitot Tube Coefficient	0.840	0.840	0.840		
Initial Meter Volume	711.410	762.190	813.590		ft ³
Final Meter Volume	761.900	813.380	864.020		ft ³
Total Meter Volume	50.490	51.190	50.430	50.703	ft ³
Total Sampling Time	60.00	60.00	60.00	60.00	min
Average Meter Temperature	87.90	84.96	81.85	84.90	°F
Average Stack Temperature	1216.21	1193.96	1268.08	1226.08	°F
Barometric Pressure	29.80	29.09	29.75	29.55	in Hg
Stack Static Pressure	0.00	0.00	0.00	0.00	in H ₂ O
Absolute Stack Pressure	29.80	29.09	29.75	29.55	in Hg
Average Orifice Pressure Drop	1.60	1.60	1.60	1.60	in H ₂ O
Absolute Meter Pressure	29.92	29.21	29.87	29.67	in Hg
Avg Square Root Pitot Pressure	0.09	0.09	0.10	0.09	√(in H ₂ O)
Moisture Content Data	0-30-0%-1	0-30-0%-2	0-30-0%-3	Average	Units
Impinger Water Weight Gain	44.30	39.60	43.20	42.37	g
Silica Gel Weight Gain	9.00	11.30	8.00	9.43	g
Total Water Volume Collected	53.40	50.99	51.29	51.89	ml
Standard Water Vapor Volume	2.51	2.40	2.41	2.44	scf
Standard Meter Volume	43.3	43.0	43.6	43.3	dscf
Calculated Stack Moisture	5.49	5.28	5.25	5.34	%
Saturated Stack Moisture	100.00	100.00	100.00	100.00	%
Reported Stack Moisture Content	5.49	5.28	5.25	5.34	%
Method 3C Gas Analysis Data	0-30-0%-1	0-30-0%-2	0-30-0%-3	Average	Units
Carbon Dioxide Content	4.8	3.5	3.6	4.0	%
Oxygen Content	15.6	17.3	17.2	16.7	%
Nitrogen Content	79.6	79.2	79.2	79.3	%
Stack Dry Molecular Weight	29.39	29.26	29.26	29.30	lb/lb-mole
Stack Wet Molecular Weight	28.76	28.66	28.67	28.70	lb/lb-mole
Percent Excess Air	287.6	480.1	463.4	410.4	%
Volumetric Flow Rate Data	0-30-0%-1	0-30-0%-2	0-30-0%-3	Average	Units
Average Stack Gas Velocity	9.17	9.09	10.15	9.47	ft/sec
Stack Cross-Sectional Area	8.30	8.30	8.30	8.30	ft ²
Actual Stack Flow Rate	4,566	4,525	5,055	4,715	acfm
Wet Standard Stack Flow Rate	86	84	92	87	wkscfh
Dry Standard Stack Flow Rate	81,239	79,818	87,302	82,787	dscfh

METHOD 3C - DETERMINATION OF DRY MOLECULAR WEIGHT BY ANALYZER

Plant Name	Cimaron Energy, INC	Preliminary Date	05/07/14		
Sampling Location	48HV ECD	Operator	TP/MM		
Project #	cei-14-norman.ok-comp#1	# of Ports Used	2		
Fuel Type	Gas, Propene	Min. Fuel Factor	N/A	Max. Fuel Factor	N/A

Gas Analysis Data								
Run Number	0-30-0%-1		Date	05/07/14	Run Start Time	13:45	Run Stop Time	14:49
Sample Analysis Time	CO₂ Conc.	O₂ Conc.	Methane Conc.	N₂ 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		%	
01:04	4.8	15.6	0.0	79.6	29.39	1.113	287.6	N/A

Gas Analysis Data								
Run Number	0-30-0%-2		Date	05/07/14	Run Start Time	15:09	Run Stop Time	16:12
Sample Analysis Time	CO₂ Conc.	O₂ Conc.	Methane Conc.	N₂ 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		%	
01:03	3.5	17.3	0.0	79.2	29.26	1.023	480.1	N/A

Gas Analysis Data								
Run Number	0-30-0%-3		Date	05/07/14	Run Start Time	16:27	Run Stop Time	17:32
Sample Analysis Time	CO₂ Conc.	O₂ Conc.	Methane Conc.	N₂ 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		%	
01:05	3.6	17.2	0.0	79.2	29.26	1.031	463.4	N/A

METHOD 4 - DETERMINATION OF MOISTURE CONTENT IN STACK GASES

Plant Name	Cimaron Energy, INC	Preliminary Date	05/07/14
Sampling Location	48HV ECD	Operator	TP/MM
Project #	cei-14-norman.ok-comp#1	Ports Used	2

Moisture Content Data								
Run Number	0-30-0%-1		Date	05/07/14	Start Time	13:45	Stop Time	14:49
Meter Box Number	SAMP-CP-0012				Meter Cal Factor	(Y)	0.889	
Total Meter Volume	(V _m)	50.490	dcf		Barometric Pressure	(P _b)	29.80	in Hg
Average Stack Temp	(t _s) _{avg}	1216	°F		Stack Static Pressure	(P _{static})	0.00	in H ₂ O
Average Meter Temp	(t _m) _{avg}	88	°F		Avg Orifice Pressure	(ΔH) _{avg}	1.60	in H ₂ O
	Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7	Impinger 8
	(g)	(g)	(g)	(g)				
Contents	H ₂ O	H ₂ O	-	Sil Gel				
Final Value	(V _f),(W _f)	743.70	745.90	597.00	828.00			
Initial Value	(V _i),(W _i)	715.60	731.30	595.40	819.00			
Net Value	(V _n),(W _n)	28.1	14.6	1.6	9.0			
Results								
Total Weight	(W _t)	53.30	g		Water Vol Weighed	(V _{wsg(std)})	2.513	scf
Std Meter Volume	(V _{m(std)})	43.252	dscf		Sat. Moisture Content	(B _{ws(svp)})	100.00	%
Calc Moisture Content	(B _{ws(calc)})	5.49	%		Final Moisture Content	(B _{ws})	5.49	%

Moisture Content Data								
Run Number	0-30-0%-2		Date	05/07/14	Start Time	15:09	Stop Time	16:12
Meter Box Number	SAMP-CP-0012				Meter Cal Factor	(Y)	0.889	
Total Meter Volume	(V _m)	51.190	dcf		Barometric Pressure	(P _b)	29.09	in Hg
Average Stack Temp	(t _s) _{avg}	1194	°F		Stack Static Pressure	(P _{static})	0.00	in H ₂ O
Average Meter Temp	(t _m) _{avg}	85	°F		Avg Orifice Pressure	(ΔH) _{avg}	1.60	in H ₂ O
	Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7	Impinger 8
	(g)	(g)	(g)	(g)				
Contents	H ₂ O	H ₂ O	-	Sil Gel				
Final Value	(V _f),(W _f)	765.40	777.60	578.00	871.50			
Initial Value	(V _i),(W _i)	737.00	767.00	577.40	860.20			
Net Value	(V _n),(W _n)	28.4	10.6	0.6	11.3			
Results								
Total Weight	(W _t)	50.90	g		Water Vol Weighed	(V _{wsg(std)})	2.400	scf
Std Meter Volume	(V _{m(std)})	43.042	dscf		Sat. Moisture Content	(B _{ws(svp)})	100.00	%
Calc Moisture Content	(B _{ws(calc)})	5.28	%		Final Moisture Content	(B _{ws})	5.28	%

Moisture Content Data								
Run Number	0-30-0%-3		Date	05/07/14	Start Time	16:27	Stop Time	17:32
Meter Box Number	SAMP-CP-0012				Meter Cal Factor	(Y)	0.889	
Total Meter Volume	(V _m)	50.430	dcf		Barometric Pressure	(P _b)	29.75	in Hg
Average Stack Temp	(t _s) _{avg}	1268	°F		Stack Static Pressure	(P _{static})	0.00	in H ₂ O
Average Meter Temp	(t _m) _{avg}	82	°F		Avg Orifice Pressure	(ΔH) _{avg}	1.60	in H ₂ O
	Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7	Impinger 8
	(g)	(g)	(g)	(g)				
Contents	H ₂ O	H ₂ O	-	Sil Gel				
Final Value	(V _f),(W _f)	776.30	754.20	599.30	836.00			
Initial Value	(V _i),(W _i)	743.70	745.90	597.00	828.00			
Net Value	(V _n),(W _n)	32.6	8.3	2.3	8.0			
Results								
Total Weight	(W _t)	51.20	g		Water Vol Weighed	(V _{wsg(std)})	2.414	scf
Std Meter Volume	(V _{m(std)})	43.610	dscf		Sat. Moisture Content	(B _{ws(svp)})	100.00	%
Calc Moisture Content	(B _{ws(calc)})	5.25	%		Final Moisture Content	(B _{ws})	5.25	%

METHOD 4 (MOISTURE) [MULTI POINT, NO VARIATION] SOURCE SAMPLING TITLE PAGE ISOKINETIC SAMPLING DATA

Plant Name	Cimaron Energy, INC
Sampling Location	48HV ECD
Project #	cel-14-norman.ok-comp#1

Date	05/07/14
Operator	TP/MM
Run Number	0-30-0%-1

Leak Checks					
Train	Pre	0.000	ft ³ /min@	15.0	in Hg
PASS	Post	0.000	ft ³ /min@	15.0	in Hg
< 3.0	Pitot	Pre (+)	0.15	in H ₂ O for	15.0
		Pre (-)	0.20	in H ₂ O for	15.0
		Post (+)	0.05	in H ₂ O for	15.0
		Post (-)	0.10	in H ₂ O for	15.0

Nozzle Measurements				
Pre				PASS
Post				PASS

Run Time			
Start	13:45	End	14:49

Weights	Imp 1	Imp 2	Imp 3	Imp 4	Imp 5	Imp 6	Imp 7	Imp 8
Pre	715.6	731.3	595.4	819.0				
Post	743.7	745.9	597.0	828.0				

Sampling Equipment		
Meter Box Number	SAMP-CP-0012	
Meter Cal Factor	(Y)	0.889
Low Flow Manometer	SAMP-MN-0001	
Average Nozzle Diameter	(D _{no})	in
Suggested Nozzle Diameter	(D _n)	0.4819 in
Probe Number	SAMP-SP-0001	in
Probe Length	60	in
Liner Material	inconel	
Sample Case / Oven Number		
Impinger Case Number	SAMP-BC-0017	

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Coefficient	(C _p)	0.840	
Average Stack Temp	(t _s)	1216.2	F
Average Meter Temp	(t _m)	87.9	
Orifice Meter Coefficient	(ΔH@)	1.632	in H ₂ O
Square Root ΔP	(ΔP ^{1/2} _{avg})	0.09	in H ₂ O
Stack Moisture Content	(B _{ws})	5.49	%
Stack Dry Molecular Weight	(M _d)	29.39	lb/lb-mole
Estimated Orifice Flow Rate	(Q _m)	0.75	acfm
ΔP to ΔH Isokinetic Factor	(K)		

Pressures			
Barometric Pressure	(P _b)	29.80	in Hg
Stack Static Pressure	(P _{static})	0.00	in H ₂ O
Absolute Stack Pressure	(P _a)	29.80	in Hg
Absolute Meter Pressure	(P _m)	29.92	in Hg

Wash Volumes					ml
					ml

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)	Snorkel Temp (248±25°F)	Filter Temp (248±25°F)	Impinger Exit Temp (568°F)	Cond. Temp (≤-°F)	CPM Filter Temp (-±-°F)	Meter Inlet Temp (t _{mi})	Meter Outlet Temp (t _{mo})	Pump Vacuum	Square Root ΔP (ΔP ^{1/2})	Local Stack Velocity (v _s)	Cumul. Meter Volume (V _m) _{std}	Cumul. Percent IsoKinetic (I)	Est-Run Meter Volume (V _m) _{std}
	min	hh:mm:ss	ft ³	in H ₂ O	in H ₂ O	in H ₂ O	F	F	F	F	F	F	F	F	in Hg	√(in H ₂ O)	ft/sec	dscf	%	dscf
A-1	0.0	00:00:00	711.410	0.005	1.632	1.60	915	272		58			85	85	3.5	0.07	6.43	1.886		45.265
A-2	2.5	00:02:30	713.600	0.010	1.632	1.60	961	271		58			86	85	3.5	0.10	9.25	3.702		44.418
A-3	5.0	00:05:00	715.710	0.010	1.632	1.60	1238	271		60			88	85	3.5	0.10	10.11	5.496		43.972
A-4	7.5	00:07:30	717.800	0.010	1.632	1.60	1400	270		60			89	84	3.5	0.10	10.58	7.296		43.774
A-5	10.0	00:10:00	719.895	0.010	1.632	1.60	1441	270		61			89	85	3.5	0.10	10.69	9.145		43.895
A-6	12.5	00:12:30	722.050	0.010	1.632	1.60	1430	270		61			90	85	3.5	0.10	10.66	10.898		43.592
A-7	15.0	00:15:00	724.095	0.010	1.632	1.60	1195	270		62			91	85	3.5	0.10	9.98	12.667		43.428
A-8	17.5	00:17:30	726.160	0.005	1.632	1.60	1090	270		62			91	85	3.5	0.07	6.83	14.478		43.434
A-9	20.0	00:20:00	728.275	0.010	1.632	1.60	1331	271		63			92	86	3.5	0.10	10.38	16.273		43.396
A-10	22.5	00:22:30	730.375	0.010	1.632	1.60	1412	270		65			92	86	3.5	0.10	10.61	18.047		43.314
A-11	25.0	00:25:00	732.450	0.010	1.632	1.60	1429	270		68			92	87	3.5	0.10	10.66	19.820		43.243
A-12	27.5	00:27:30	734.525	0.005	1.632	1.60	1448	270		68			91	88	3.5	0.07	7.58	21.609		43.218
B-1	30.0	00:30:00	736.620	0.010	1.632	1.60	837	271		68			89	88	3.5	0.10	8.83	23.432		43.259
B-2	32.5	00:32:30	738.750	0.005	1.632	1.60	914	271		65			90	88	3.5	0.07	6.43	25.184		43.173
B-3	35.0	00:35:00	740.800	0.005	1.632	1.60	1064	270		65			90	88	3.5	0.07	6.77	27.108		43.373
B-4	37.5	00:37:30	743.050	0.005	1.632	1.60	1363	270		65			90	88	3.5	0.07	7.41	28.878		43.317
B-5	40.0	00:40:00	745.120	0.005	1.632	1.60	1128	270		65			90	88	3.5	0.07	6.91	30.690		43.327
B-6	42.5	00:42:30	747.240	0.005	1.632	1.60	1019	270		65			89	87	3.5	0.07	6.67	32.497		43.330
B-7	45.0	00:45:00	749.350	0.010	1.632	1.60	1233	270		65			89	87	3.5	0.10	10.09	34.562		43.657
B-8	47.5	00:47:30	751.760	0.015	1.632	1.60	1368	270		65			89	87	3.5	0.12	12.84	36.077		43.293
B-9	50.0	00:50:00	753.530	0.010	1.632	1.60	1396	270		65			89	87	3.5	0.10	10.57	37.850		43.258
B-10	52.5	00:52:30	755.600	0.010	1.632	1.60	1350	270		65			89	86	3.5	0.10	10.44	39.651		43.255
B-11	55.0	00:55:00	757.700	0.010	1.632	1.60	1174	270		65			89	86	3.5	0.10	9.92	41.481		43.284
B-12	57.5	00:57:30	759.835	0.010	1.632	1.60	1053	270		65			88	86	3.5	0.10	9.54	43.253		43.253
Last Pt	60.0	01:00:00	761.900																	
Final Val	60.0	01:00:00	761.900											Max Vac	3.5		Final Values	43.253		
Average Values				0.01		1.60	1216	270		64			89	86		0.09	9.17			
													88							

METHOD 4 (MOISTURE) [MULTI POINT, NO VARIATION] SOURCE SAMPLING TITLE PAGE ISOKINETIC SAMPLING DATA

Plant Name	Cimaron Energy, INC
Sampling Location	48HV ECD
Project #	cel-14-norman.ok-comp#1

Date	05/07/14
Operator	TP/MM
Run Number	0-30-09%-2

Leak Checks					
Train	Pre	0.000	ft ³ /min@	15.0	in Hg
PASS	Post	0.005	ft ³ /min@	15.0	in Hg
< 3.0	Pitot	Pre (+)	0.20	in H ₂ O for	15.0
		Pre (-)	0.17	in H ₂ O for	15.0
		Post (+)	0.24	in H ₂ O for	15.0
		Post (-)	0.22	in H ₂ O for	15.0

Nozzle Measurements				
Pre				PASS
Post				PASS

Run Time			
Start	15:09	End	16:12

Weights	Imp 1	Imp 2	Imp 3	Imp 4	Imp 5	Imp 6	Imp 7	Imp 8
Pre	737.0	767.0	577.4	860.2				
Post	765.4	777.6	578.0	871.5				

Sampling Equipment		
Meter Box Number	SAMP-CP-0012	
Meter Cal Factor	(Y)	0.889
Low Flow Manometer	SAMP-MN-0001	
Average Nozzle Diameter	(D _{no})	in
Suggested Nozzle Diameter	(D _n)	0.4712 in
Probe Number	SAMP-SP-0001	in
Probe Length	60	in
Liner Material	inconel	
Sample Case / Oven Number		
Impinger Case Number	SAMP-BC-0017	

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Coefficient	(C _p)	0.840	
Average Stack Temp	(t _s)	1194.0	F
Average Meter Temp	(t _m)	85.0	
Orifice Meter Coefficient	(ΔH@)	1.632	in H ₂ O
Square Root ΔP	(ΔP ^{1/2} _{avg})	0.09	in H ₂ O
Stack Moisture Content	(B _{ws})	5.28	%
Stack Dry Molecular Weight	(M _d)	29.26	lb/lb-mole
Estimated Orifice Flow Rate	(Q _m)	0.72	acfm
ΔP to ΔH Isokinetic Factor	(K)		

Pressures			
Barometric Pressure	(P _b)	29.09	in Hg
Stack Static Pressure	(P _{static})	0.00	in H ₂ O
Absolute Stack Pressure	(P _a)	29.09	in Hg
Absolute Meter Pressure	(P _m)	29.21	in Hg

Wash Volumes					ml
					ml

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)	Snorkel Temp (248±25°F)	Filter Temp (248±25°F)	Impinger Exit Temp (568°F)	Cond. Temp (≤-°F)	CPM Filter Temp (-±-°F)	Meter Inlet Temp (t _{mi})	Meter Outlet Temp (t _{mo})	Pump Vacuum	Square Root ΔP (ΔP ^{1/2})	Local Stack Velocity (v _s)	Cumul. Meter Volume (V _m) _{std}	Cumul. Percent IsoKinetic (I)	Est-Run Meter Volume (V _m) _{std}
	min	hh:mm:ss	ft ³	in H ₂ O	in H ₂ O	in H ₂ O	F	F	F	F	F	F	F	F	in Hg	√(in H ₂ O)	ft/sec	dscf	%	dscf
A-1	0.0	00:00:00	762.190	0.005	1.632	1.60	887	271		65			81	84	2.5	0.07	6.45	1.993		47.840
A-2	2.5	00:02:30	764.550	0.005	1.632	1.60	930	271		63			82	84	2.5	0.07	6.56	3.917		47.008
A-3	5.0	00:05:00	766.830	0.010	1.632	1.60	1333	269		59			84	83	2.5	0.10	10.53	5.810		46.481
A-4	7.5	00:07:30	769.075	0.015	1.632	1.60	1394	270		58			85	83	2.5	0.12	13.12	7.579		45.474
A-5	10.0	00:10:00	771.175	0.015	1.632	1.60	1396	270		58			85	83	2.5	0.12	13.12	9.470		45.456
A-6	12.5	00:12:30	773.420	0.015	1.632	1.60	1359	270		58			85	82	2.5	0.12	12.99	11.194		44.776
A-7	15.0	00:15:00	775.465	0.010	1.632	1.60	1019	262		59			86	82	2.5	0.10	9.56	12.976		44.487
A-8	17.5	00:17:30	777.580	0.005	1.632	1.60	1008	258		59			86	86	2.5	0.07	6.74	14.826		44.478
A-9	20.0	00:20:00	779.785	0.005	1.632	1.60	1218	258		60			87	83	2.5	0.07	7.20	16.512		44.031
A-10	22.5	00:22:30	781.790	0.005	1.632	1.60	1283	260		61			87	83	2.5	0.07	7.34	18.286		43.886
A-11	25.0	00:25:00	783.900	0.005	1.632	1.60	1050	260		60			87	83	2.5	0.07	6.83	20.123		43.904
A-12	27.5	00:27:30	786.085	0.005	1.632	1.60	1004	260		58			88	83	2.5	0.07	6.73	21.912		43.824
B-1	30.0	00:30:00	788.215	0.005	1.632	1.60	903	260		57			86	84	2.5	0.07	6.49	23.686		43.728
B-2	32.5	00:32:30	790.325	0.010	1.632	1.60	1266	260		56			87	84	2.5	0.10	10.33	25.538		43.780
B-3	35.0	00:35:00	792.530	0.010	1.632	1.60	1413	260		54			87	84	2.5	0.10	10.76	27.151		43.442
B-4	37.5	00:37:30	794.450	0.010	1.632	1.60	1441	260		54			87	84	2.5	0.10	10.84	28.881		43.322
B-5	40.0	00:40:00	796.510	0.010	1.632	1.60	1352	260		54			87	84	2.5	0.10	10.59	30.637		43.252
B-6	42.5	00:42:30	798.600	0.010	1.632	1.60	1129	260		54			87	85	2.5	0.10	9.91	32.399		43.199
B-7	45.0	00:45:00	800.700	0.010	1.632	1.60	1066	260		54			87	85	2.5	0.10	9.72	34.153		43.141
B-8	47.5	00:47:30	802.790	0.010	1.632	1.60	1282	260		54			87	85	2.5	0.10	10.38	35.916		43.099
B-9	50.0	00:50:00	804.890	0.010	1.632	1.60	1320	260		55			87	84	2.5	0.10	10.49	37.680		43.062
B-10	52.5	00:52:30	806.990	0.005	1.632	1.60	1345	260		55			87	85	2.5	0.07	7.47	39.471		43.060
B-11	55.0	00:55:00	809.125	0.005	1.632	1.60	1215	260		55			87	85	2.5	0.07	7.20	41.238		43.031
B-12	57.5	00:57:30	811.230	0.005	1.632	1.60	1042	260		55			86	85	2.5	0.07	6.82	43.044		43.044
Last Pt	60.0	01:00:00	813.380																	
Final Val	60.0	01:00:00	813.380												Max Vac	2.5	Final Values	43.044		
Average Values				0.01		1.60	1194	262		57			86	84		0.09	9.09			
													85							

METHOD 4 (MOISTURE) [MULTI POINT, NO VARIATION] SOURCE SAMPLING TITLE PAGE ISOKINETIC SAMPLING DATA

Plant Name	Cimaron Energy, INC
Sampling Location	48HV ECD
Project #	cel-14-norman.ok-comp#1

Date	05/07/14
Operator	TP/MM
Run Number	0-30-09%-3

Leak Checks					
Train	Pre	0.000	ft ³ /min@	15.0	in Hg
PASS	Post	0.000	ft ³ /min@	15.0	in Hg
< 3.0	Pitot	Pre (+)	0.20	in H ₂ O for	15.0
		Pre (-)	0.18	in H ₂ O for	15.0
		Post (+)	0.16	in H ₂ O for	15.0
		Post (-)	0.20	in H ₂ O for	15.0

Nozzle Measurements				
Pre				PASS
Post				PASS

Run Time			
Start	16:27	End	17:32

Weights	Imp 1	Imp 2	Imp 3	Imp 4	Imp 5	Imp 6	Imp 7	Imp 8
Pre	743.7	745.9	597.0	828.0				
Post	776.3	754.2	599.3	836.0				

Sampling Equipment		
Meter Box Number	SAMP-CP-0012	
Meter Cal Factor	(Y)	0.889
Low Flow Manometer	SAMP-MN-0001	
Average Nozzle Diameter	(D _{no})	in
Suggested Nozzle Diameter	(D _n)	0.4671 in
Probe Number	SAMP-SP-0001	in
Probe Length	60	in
Liner Material	inconel	
Sample Case / Oven Number		
Impinger Case Number	SAMP-BC-0017	

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Coefficient	(C _p)	0.840	
Average Stack Temp	(t _s)	1268.1	F
Average Meter Temp	(t _m)	81.9	
Orifice Meter Coefficient	(ΔH@)	1.632	in H ₂ O
Square Root ΔP	(ΔP ^{1/2} _{avg})	0.10	in H ₂ O
Stack Moisture Content	(B _{ws})	5.25	%
Stack Dry Molecular Weight	(M _d)	29.26	lb/lb-mole
Estimated Orifice Flow Rate	(Q _m)	0.72	acfm
ΔP to ΔH Isokinetic Factor	(K)		

Pressures			
Barometric Pressure	(P _b)	29.75	in Hg
Stack Static Pressure	(P _{static})	0.00	in H ₂ O
Absolute Stack Pressure	(P _a)	29.75	in Hg
Absolute Meter Pressure	(P _m)	29.87	in Hg

Wash Volumes					ml
					ml

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)	Snorkel Temp (248±25°F)	Filter Temp (248±25°F)	Impinger Exit Temp (568°F)	Cond. Temp (≤-°F)	CPM Filter Temp (-±-°F)	Meter Inlet Temp (t _{mi})	Meter Outlet Temp (t _{mo})	Pump Vacuum	Square Root ΔP (ΔP ^{1/2})	Local Stack Velocity (v _s)	Cumul. Meter Volume (V _m) _{std}	Cumul. Percent IsoKinetic (I)	Est-Run Meter Volume (V _m) _{std}
	min	hh:mm:ss	ft ³	in H ₂ O	in H ₂ O	in H ₂ O	F	F	F	F	F	F	F	F	in Hg	√(in H ₂ O)	ft/sec	dscf	%	dscf
A-1	0.0	00:00:00	813.590	0.005	1.632	1.60	924	261		59			79	83	2.5	0.07	6.47	1.828		43.860
A-2	2.5	00:02:30	815.700	0.050	1.632	1.60	1142	260		55			80	82	2.5	0.22	22.01	3.638		43.652
A-3	5.0	00:05:00	817.790	0.010	1.632	1.60	1327	260		56			80	82	2.5	0.10	10.39	5.379		43.029
A-4	7.5	00:07:30	819.800	0.010	1.632	1.60	1391	260		56			81	81	2.5	0.10	10.58	7.132		42.795
A-5	10.0	00:10:00	821.825	0.010	1.632	1.60	1433	260		57			82	81	2.5	0.10	10.70	8.885		42.647
A-6	12.5	00:12:30	823.850	0.010	1.632	1.60	1384	260		57			82	81	3.0	0.10	10.56	10.711		42.842
A-7	15.0	00:15:00	825.960	0.010	1.632	1.60	1168	260		57			82	81	3.0	0.10	9.92	12.549		43.027
A-8	17.5	00:17:30	828.085	0.005	1.632	1.60	1046	260		57			83	81	3.0	0.07	6.75	14.378		43.134
A-9	20.0	00:20:00	830.200	0.005	1.632	1.60	1193	260		57			83	81	3.0	0.07	7.07	16.280		43.413
A-10	22.5	00:22:30	832.400	0.005	1.632	1.60	1356	260		57			83	81	3.0	0.07	7.41	18.026		43.263
A-11	25.0	00:25:00	834.420	0.005	1.632	1.60	1359	260		57			83	81	3.0	0.07	7.42	19.894		43.404
A-12	27.5	00:27:30	836.580	0.005	1.632	1.60	1316	260		57			83	81	3.0	0.07	7.33	21.687		43.375
B-1	30.0	00:30:00	838.655	0.015	1.632	1.60	1280	260		58			81	81	3.0	0.12	12.56	23.519		43.420
B-2	32.5	00:32:30	840.770	0.015	1.632	1.60	1399	260		57			82	81	3.0	0.12	12.98	25.315		43.397
B-3	35.0	00:35:00	842.845	0.015	1.632	1.60	1499	260		58			83	81	3.0	0.12	13.33	27.307		43.692
B-4	37.5	00:37:30	845.150	0.015	1.632	1.60	1498	260		59			83	80	3.0	0.12	13.33	28.934		43.401
B-5	40.0	00:40:00	847.030	0.010	1.632	1.60	1228	260		60			83	80	3.0	0.10	10.10	30.803		43.487
B-6	42.5	00:42:30	849.190	0.010	1.632	1.60	1096	260		60			83	81	3.0	0.10	9.70	32.606		43.475
B-7	45.0	00:45:00	851.275	0.010	1.632	1.60	1285	260		61			84	81	3.0	0.10	10.27	34.424		43.483
B-8	47.5	00:47:30	853.380	0.010	1.632	1.60	1425	260		61			84	81	3.0	0.10	10.68	36.238		43.485
B-9	50.0	00:50:00	855.480	0.010	1.632	1.60	1400	260		62			84	81	3.0	0.10	10.60	38.065		43.502
B-10	52.5	00:52:30	857.595	0.010	1.632	1.60	1315	260		62			84	82	3.0	0.10	10.36	39.881		43.507
B-11	55.0	00:55:00	859.700	0.005	1.632	1.60	1072	260		62			84	82	3.0	0.07	6.81	41.775		43.592
B-12	57.5	00:57:30	861.895	0.005	1.632	1.60	898	260		63			84	82	3.0	0.07	6.41	43.609		43.609
Last Pt	60.0	01:00:00	864.020																	
Final Val	60.0	01:00:00	864.020												Max Vac	3.0	Final Values	43.609		
Average Values				0.01		1.60	1268	260		59			83	81		0.10	10.15			
													82							

CIMARRON ENERGY, INC.

May 7, 2014

48HV ECD

Norman Facility

Unit Data

Meas. Stack Moisture	5.5	%
Stack Exhaust Flow (M2)	81,239	SCFH

Weather Data

Barometric Pressure	29.80	in. Hg
Relative Humidity	42	%
Ambient Temperature	85	°F
Specific Humidity	0.010831	lb H ₂ O / lb air

0-30-0 Load, Run - 48HV ECD R1

	Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmvd)	THC (ppmvw)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
A1	05/07/14 13:45:06	4200	16.85	7.60	1.12	2.73	2.10	98.10	647.00
	05/07/14 13:45:36	4230	16.65	7.28	1.08	2.90	2.10	98.10	647.00
	05/07/14 13:46:06	4260	16.79	7.23	1.17	2.79	2.13	97.90	668.00
	05/07/14 13:46:36	4290	16.80	7.56	1.10	2.77	2.13	97.90	668.00
	05/07/14 13:47:06	4320	16.47	6.86	0.95	3.05	2.16	97.70	637.00
	05/07/14 13:47:36	4350	16.84	6.83	1.17	2.75	2.16	97.70	637.00
	05/07/14 13:48:06	4380	16.73	7.92	1.02	2.82	1.91	97.50	637.00
	05/07/14 13:48:36	4410	15.42	6.34	0.59	3.79	1.91	97.50	637.00
	05/07/14 13:49:06	4440	14.79	2.35	0.53	4.21	3.54	97.30	800.00
	05/07/14 13:49:36	4470	14.22	0.88	0.51	4.63	3.54	97.30	800.00
	05/07/14 13:50:06	4500	13.75	0.28	0.48	4.98	6.50	97.10	1,096.00
	05/07/14 13:50:36	4530	13.85	0.03	0.52	4.90	6.50	97.10	1,096.00
	05/07/14 13:51:06	4560	13.64	-0.29	0.59	5.06	8.25	96.70	1,230.00
	05/07/14 13:51:36	4590	13.72	3.66	0.97	4.99	8.25	96.70	1,230.00
	05/07/14 13:52:06	4620	13.59	21.44	2.07	5.09	8.55	96.40	1,254.00
	05/07/14 13:52:36	4650	13.41	66.88	1.16	5.21	8.55	96.40	1,254.00
	05/07/14 13:53:06	4680	13.37	58.75	0.59	5.25	8.44	96.10	1,221.00
	05/07/14 13:53:36	4710	13.61	15.64	0.63	5.08	8.44	96.10	1,221.00
	05/07/14 13:54:06	4740	13.58	8.79	0.64	5.09	8.61	95.80	1,233.00
	05/07/14 13:54:36	4770	13.55	5.52	0.53	5.11	8.61	95.80	1,233.00
	05/07/14 13:55:06	4800	13.53	0.40	0.51	5.13	8.64	95.60	1,223.00
	05/07/14 13:55:36	4830	13.57	0.49	0.52	5.11	8.64	95.60	1,223.00
	05/07/14 13:56:06	4860	13.49	0.68	0.48	5.16	8.39	95.40	1,212.00
	05/07/14 13:56:36	4890	13.52	-0.34	0.48	5.14	8.39	95.40	1,212.00
	05/07/14 13:57:06	4920	13.66	-0.50	0.50	5.03	8.55	95.20	1,213.00
	05/07/14 13:57:36	4950	13.56	-0.45	0.48	5.11	8.55	95.20	1,213.00
	05/07/14 13:58:06	4980	14.03	-0.65	0.51	4.78	8.44	95.10	1,213.00
	05/07/14 13:58:36	5010	14.20	-0.51	0.48	4.65	8.44	95.10	1,213.00
	05/07/14 13:59:06	5040	14.69	-0.47	0.48	4.31	8.19	94.90	1,180.00
	05/07/14 13:59:36	5070	15.75	0.33	0.52	3.58	8.19	94.90	1,180.00
	05/07/14 14:00:06	5100	16.01	1.42	0.51	3.38	4.35	94.80	869.00
	05/07/14 14:00:36	5130	16.11	2.44	0.49	3.31	4.35	94.80	869.00
	05/07/14 14:01:06	5160	16.20	3.62	0.67	3.25	3.16	94.80	717.00
	05/07/14 14:01:36	5190	16.49	5.27	0.66	3.02	3.16	94.80	717.00
	05/07/14 14:02:06	5220	16.64	6.38	0.68	2.91	2.52	94.70	662.00
	05/07/14 14:02:36	5250	16.68	6.36	0.68	2.87	2.52	94.70	662.00
	05/07/14 14:03:06	5280	16.64	6.42	0.67	2.90	1.99	94.70	629.00
	05/07/14 14:03:36	5310	16.60	5.52	0.73	2.94	1.99	94.70	629.00
	05/07/14 14:04:06	5340	16.76	6.46	0.79	2.81	2.27	94.60	619.00
	05/07/14 14:04:36	5370	16.02	5.85	0.59	3.34	2.27	94.60	619.00
	05/07/14 14:05:06	5400	14.90	2.70	0.54	4.13	3.35	94.60	739.00
A2	05/07/14 14:05:36	5430	14.08	0.89	0.98	4.74	3.35	94.60	739.00
	05/07/14 14:06:06	5460	13.89	2.92	0.86	4.87	7.75	94.70	1,158.00
	05/07/14 14:06:36	5490	13.63	1.62	0.57	5.05	7.75	94.70	1,158.00
	05/07/14 14:07:06	5520	13.64	-0.18	0.57	5.05	8.28	94.80	1,191.00
	05/07/14 14:07:36	5550	14.07	-0.06	0.61	4.76	8.28	94.80	1,191.00
	05/07/14 14:08:06	5580	14.10	0.01	0.51	4.72	9.19	94.90	1,259.00
	05/07/14 14:08:36	5610	14.01	0.24	0.41	4.78	9.19	94.90	1,259.00
	05/07/14 14:09:06	5640	13.81	0.73	0.33	4.92	9.22	95.20	1,258.00
	05/07/14 14:09:36	5670	13.96	0.04	0.27	4.82	9.22	95.20	1,258.00
	05/07/14 14:10:06	5700	13.76	-0.49	0.25	4.97	9.30	95.50	1,269.00
	05/07/14 14:10:36	5730	13.90	-0.70	0.25	4.87	9.30	95.50	1,269.00
	05/07/14 14:11:06	5760	13.76	-0.59	0.23	4.96	9.02	95.80	1,224.00
	05/07/14 14:11:36	5790	13.65	-0.59	0.17	5.04	9.02	95.80	1,224.00

CIMARRON ENERGY, INC.

May 7, 2014

48HV ECD

Norman Facility

Unit Data

Meas. Stack Moisture	5.5	%
Stack Exhaust Flow (M2)	81,239	SCFH

Weather Data

Barometric Pressure	29.80	in. Hg
Relative Humidity	42	%
Ambient Temperature	85	°F
Specific Humidity	0.010831	lb H ₂ O / lb air

0-30-0 Load, Run - 48HV ECD R1

	Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmvd)	THC (ppmvw)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
	05/07/14 14:12:06	5820	13.96	-0.63	0.16	4.82	8.86	96.10	1,244.00
	05/07/14 14:12:36	5850	13.79	-0.57	0.16	4.94	8.86	96.10	1,244.00
	05/07/14 14:13:06	5880	13.50	-0.64	0.18	5.14	8.83	96.40	1,233.00
	05/07/14 14:13:36	5910	13.86	-0.35	0.18	4.90	8.83	96.40	1,233.00
	05/07/14 14:14:06	5940	15.12	-0.35	0.17	4.02	8.41	96.60	1,177.00
	05/07/14 14:14:36	5970	16.10	1.16	0.19	3.32	8.41	96.60	1,177.00
	05/07/14 14:15:06	6000	16.55	3.01	0.21	2.97	3.43	96.80	757.00
	05/07/14 14:15:36	6030	16.60	3.79	0.32	2.93	3.43	96.80	757.00
	05/07/14 14:16:06	6060	16.92	4.95	0.40	2.67	2.88	97.10	649.00
	05/07/14 14:16:36	6090	16.85	5.60	0.37	2.73	2.88	97.10	649.00
	05/07/14 14:17:06	6120	16.84	5.76	0.35	2.73	2.33	97.40	627.00
	05/07/14 14:17:36	6150	16.83	5.91	0.42	2.75	2.33	97.40	627.00
	05/07/14 14:18:06	6180	16.83	6.22	0.47	2.76	2.16	97.60	595.00
	05/07/14 14:18:36	6210	16.82	6.06	0.47	2.77	2.16	97.60	595.00
	05/07/14 14:19:06	6240	17.07	6.81	0.67	2.56	2.27	97.90	594.00
	05/07/14 14:19:36	6270	16.64	7.20	0.28	2.87	2.27	97.90	594.00
	05/07/14 14:20:06	6300	15.49	4.03	0.11	3.73	2.74	98.20	680.00
	05/07/14 14:20:36	6330	14.34	1.46	0.11	4.53	2.74	98.20	680.00
	05/07/14 14:21:06	6360	13.73	-0.15	0.09	4.98	6.45	98.50	1,050.00
	05/07/14 14:21:36	6390	13.71	-0.34	0.07	5.00	6.45	98.50	1,050.00
	05/07/14 14:22:06	6420	13.78	-0.45	0.07	4.96	8.53	98.80	1,216.00
	05/07/14 14:22:36	6450	13.96	-0.47	0.08	4.81	8.53	98.80	1,216.00
	05/07/14 14:23:06	6480	13.77	-0.30	0.06	4.96	8.89	98.90	1,238.00
	05/07/14 14:23:36	6510	13.89	-0.12	0.09	4.86	8.89	98.90	1,238.00
	05/07/14 14:24:06	6540	13.60	-0.25	0.09	5.07	9.00	99.10	1,227.00
	05/07/14 14:24:36	6570	13.78	-0.24	0.06	4.95	9.00	99.10	1,227.00
	05/07/14 14:25:06	6600	13.94	-0.14	0.06	4.84	9.11	99.20	1,249.00
A3	05/07/14 14:25:36	6630	13.73	-0.24	0.06	4.99	9.11	99.20	1,249.00
	05/07/14 14:26:06	6660	13.55	-0.30	0.06	5.12	9.22	99.30	1,249.00
	05/07/14 14:26:36	6690	13.86	-0.28	0.04	4.89	9.22	99.30	1,249.00
	05/07/14 14:27:06	6720	13.92	-0.21	0.04	4.85	9.19	99.40	1,227.00
	05/07/14 14:27:36	6750	14.28	-0.13	0.07	4.60	9.19	99.40	1,227.00
	05/07/14 14:28:06	6780	14.01	-0.13	0.06	4.78	8.91	99.50	1,248.00
	05/07/14 14:28:36	6810	14.07	-0.24	0.05	4.76	8.91	99.50	1,248.00
	05/07/14 14:29:06	6840	15.30	0.12	0.07	3.90	8.08	99.60	1,148.00
	05/07/14 14:29:36	6870	17.19	3.69	0.37	2.52	8.08	99.60	1,148.00
	05/07/14 14:30:06	6900	17.45	9.53	0.56	2.30	2.99	99.80	721.00
	05/07/14 14:30:36	6930	17.30	9.94	0.44	2.39	2.99	99.80	721.00
	05/07/14 14:31:06	6960	17.17	7.61	0.49	2.49	2.05	99.80	571.00
	05/07/14 14:31:36	6990	17.11	7.59	0.50	2.53	2.05	99.80	571.00
	05/07/14 14:32:06	7020	17.16	7.85	0.55	2.50	2.16	99.90	603.00
	05/07/14 14:32:36	7050	16.95	7.54	0.38	2.65	2.16	99.90	603.00
	05/07/14 14:33:06	7080	16.81	6.47	0.35	2.77	2.27	100.00	613.00
	05/07/14 14:33:36	7110	16.85	6.37	0.36	2.74	2.27	100.00	613.00
	05/07/14 14:34:06	7140	16.91	6.49	0.41	2.68	1.99	100.20	592.00
	05/07/14 14:34:36	7170	16.33	6.05	0.13	3.12	1.99	100.20	592.00
	05/07/14 14:35:06	7200	14.88	3.20	0.03	4.15	2.77	100.30	688.00
	05/07/14 14:35:36	7230	13.77	0.64	0.06	4.94	2.77	100.30	688.00
	05/07/14 14:36:06	7260	13.58	-0.11	0.07	5.07	7.56	100.40	1,156.00
	05/07/14 14:36:36	7290	14.04	0.10	0.03	4.78	7.56	100.40	1,156.00
	05/07/14 14:37:06	7320	14.13	0.58	0.03	4.70	9.00	100.60	1,267.00
	05/07/14 14:37:36	7350	14.12	0.80	0.00	4.72	9.00	100.60	1,267.00
	05/07/14 14:38:06	7380	14.09	0.97	0.01	4.73	8.72	100.60	1,223.00
	05/07/14 14:38:36	7410	14.04	0.93	0.03	4.78	8.72	100.60	1,223.00

CIMARRON ENERGY, INC.

May 7, 2014

48HV ECD

Norman Facility

Unit Data

Meas. Stack Moisture	5.5	%
Stack Exhaust Flow (M2)	81,239	SCFH

Weather Data

Barometric Pressure	29.80	in. Hg
Relative Humidity	42	%
Ambient Temperature	85	°F
Specific Humidity	0.010831	lb H ₂ O / lb air

0-30-0 Load, Run - 48HV ECD R1

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmvd)	THC (ppmvw)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
05/07/14 14:39:06	7440	14.60	0.98	0.03	4.38	8.69	100.60	1,212.00
05/07/14 14:39:36	7470	14.41	1.22	0.06	4.51	8.69	100.60	1,212.00
05/07/14 14:40:06	7500	14.19	0.98	0.06	4.68	8.41	100.60	1,211.00
05/07/14 14:40:36	7530	14.47	0.94	0.05	4.46	8.41	100.60	1,211.00
05/07/14 14:41:06	7560	14.18	0.94	0.06	4.66	8.14	100.60	1,179.00
05/07/14 14:41:36	7590	13.78	0.61	0.06	4.97	8.14	100.60	1,179.00
05/07/14 14:42:06	7620	14.14	0.40	0.05	4.71	8.39	100.60	1,190.00
05/07/14 14:42:36	7650	14.26	0.45	0.03	4.63	8.39	100.60	1,190.00
05/07/14 14:43:06	7680	14.13	0.39	0.03	4.71	8.53	100.60	1,201.00
05/07/14 14:43:36	7710	14.34	0.24	0.03	4.57	8.53	100.60	1,201.00
05/07/14 14:44:06	7740	15.33	0.54	0.03	3.89	7.72	100.60	1,146.00
05/07/14 14:44:36	7770	16.55	2.58	0.11	2.99	7.72	100.60	1,146.00
05/07/14 14:45:06	7800	16.64	4.57	0.16	2.92	3.18	100.60	720.00
RAW AVERAGE		14.95	3.75	0.39	4.11	6.20	97.65	998.33

	O ₂ (%)	CO (ppmvd)	THC (ppmvw)	CO ₂ (%)	Press. Trans (in. H ₂ O)	Temp. Trans. (°F)	F-Flow Trans. (SCFH)
Serial Number:	INST-22-010	INST-CO-0008	INST-VC-0007	INST-22-0010	1229943	1229943	1229943
Initial Zero	0.34	0.11	0.04	0.04			
Final Zero	0.03	-0.15	0.04	0.06			
Avg. Zero	0.19	-0.02	0.04	0.05			
Initial UpScale	12.54	8.71	3.16	8.51			
Final UpScale	12.05	8.93	3.01	8.52			
Avg. UpScale	12.30	8.82	3.09	8.52			
Upscale Cal Gas	12.20	9.00	3.04	8.56			

EMISSIONS DATA	O ₂	CO	THC	CO ₂
Corrected Raw Average (ppm/% dry basis)	14.87	3.84	0.37	4.11
Corrected Raw Average (ppm/% wet basis)	14.05	3.63	0.35	3.88
Emission Rate (lb/hr)	N/A	0.02	0.00	N/A

CIMARRON ENERGY, INC.

May 7, 2014

48HV ECD

Norman Facility

Unit Data

Meas. Stack Moisture	5.3	%
Stack Exhaust Flow (M2)	79,818	SCFH

Weather Data

Barometric Pressure	29.09	in. Hg
Relative Humidity	26	%
Ambient Temperature	91	° F
Specific Humidity	0.008270	lb H ₂ O / lb air

0-30-0 Load, Run - 48HV ECD R2

	Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmvd)	THC (ppmvw)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
A1	05/07/14 15:09:06	9240	16.89	8.16	0.57	3.01	2.55	101.00	718.00
	05/07/14 15:09:36	9270	16.88	9.39	0.47	3.02	2.55	101.00	718.00
	05/07/14 15:10:06	9300	16.93	9.03	0.54	2.99	1.88	101.20	643.00
	05/07/14 15:10:36	9330	17.03	8.84	0.56	2.92	1.88	101.20	643.00
	05/07/14 15:11:06	9360	16.99	8.92	0.48	2.97	1.88	101.40	632.00
	05/07/14 15:11:36	9390	17.17	8.92	0.37	3.05	1.88	101.40	632.00
	05/07/14 15:12:06	9420	16.91	8.96	0.33	3.13	2.02	101.50	632.00
	05/07/14 15:12:36	9450	16.99	9.71	0.30	3.08	2.02	101.50	632.00
	05/07/14 15:13:06	9480	15.71	9.53	0.06	3.93	2.16	101.50	633.00
	05/07/14 15:13:36	9510	13.74	6.64	0.26	5.29	2.16	101.50	633.00
	05/07/14 15:14:06	9540	13.61	11.96	2.16	5.44	6.81	101.50	1,141.00
	05/07/14 15:14:36	9570	13.89	29.89	1.65	5.22	6.81	101.50	1,141.00
	05/07/14 15:15:06	9600	13.93	45.20	0.13	5.27	8.41	101.60	1,263.00
	05/07/14 15:15:36	9630	14.15	49.72	0.10	5.27	8.41	101.60	1,263.00
	05/07/14 15:16:06	9660	14.48	48.18	0.08	5.05	8.41	101.60	1,252.00
	05/07/14 15:16:36	9690	14.15	43.44	0.08	5.17	8.41	101.60	1,252.00
	05/07/14 15:17:06	9720	14.26	39.45	0.08	5.10	8.55	101.60	1,242.00
	05/07/14 15:17:36	9750	14.43	33.79	0.07	5.15	8.55	101.60	1,242.00
	05/07/14 15:18:06	9780	14.90	26.37	0.06	4.87	8.28	101.50	1,220.00
	05/07/14 15:18:36	9810	14.51	20.06	0.05	5.10	8.28	101.50	1,220.00
	05/07/14 15:19:06	9840	14.73	14.66	0.05	4.93	8.14	101.40	1,198.00
	05/07/14 15:19:36	9870	14.62	12.48	0.02	4.96	8.14	101.40	1,198.00
	05/07/14 15:20:06	9900	14.68	10.65	0.03	4.91	8.00	101.40	1,177.00
	05/07/14 15:20:36	9930	14.53	8.33	0.03	4.97	8.00	101.40	1,177.00
	05/07/14 15:21:06	9960	14.59	6.64	0.03	4.88	8.14	101.40	1,166.00
	05/07/14 15:21:36	9990	14.34	5.99	0.06	4.90	8.14	101.40	1,166.00
	05/07/14 15:22:06	10020	14.60	5.46	0.05	4.64	8.03	101.40	1,166.00
	05/07/14 15:22:36	10050	15.09	5.91	0.02	4.31	8.03	101.40	1,166.00
	05/07/14 15:23:06	10080	16.32	6.86	0.06	3.46	6.95	101.40	1,099.00
	05/07/14 15:23:36	10110	17.69	10.58	0.27	2.41	6.95	101.40	1,099.00
	05/07/14 15:24:06	10140	17.66	11.55	0.31	2.43	2.13	101.30	622.00
	05/07/14 15:24:36	10170	17.55	9.50	0.31	2.51	2.13	101.30	622.00
	05/07/14 15:25:06	10200	17.34	9.97	0.25	2.69	1.88	101.30	569.00
	05/07/14 15:25:36	10230	17.35	7.86	0.30	2.70	1.88	101.30	569.00
	05/07/14 15:26:06	10260	17.57	7.43	0.42	2.54	1.74	101.30	569.00
	05/07/14 15:26:36	10290	17.50	7.70	0.34	2.59	1.74	101.30	569.00
	05/07/14 15:27:06	10320	17.19	6.89	0.19	2.82	1.74	101.40	569.00
	05/07/14 15:27:36	10350	16.91	6.01	0.19	3.03	1.74	101.40	569.00
	05/07/14 15:28:06	10380	16.91	6.00	0.15	3.00	2.02	101.40	611.00
	05/07/14 15:28:36	10410	15.76	4.91	0.04	3.81	2.02	101.40	611.00
	05/07/14 15:29:06	10440	14.37	1.87	0.05	4.77	3.74	101.40	805.00
A2	05/07/14 15:29:36	10470	14.15	0.18	0.04	4.96	3.74	101.40	805.00
	05/07/14 15:30:06	10500	14.12	0.11	0.05	4.98	8.53	101.40	1,242.00
	05/07/14 15:30:36	10530	13.77	-0.03	0.01	5.22	8.53	101.40	1,242.00
	05/07/14 15:31:06	10560	13.91	0.10	0.02	5.13	8.39	101.50	1,220.00
	05/07/14 15:31:36	10590	14.10	0.14	0.05	5.02	8.39	101.50	1,220.00
	05/07/14 15:32:06	10620	14.05	0.13	0.05	5.06	8.25	101.40	1,199.00
	05/07/14 15:32:36	10650	13.96	0.21	0.05	5.11	8.25	101.40	1,199.00
	05/07/14 15:33:06	10680	13.93	0.30	0.06	5.12	8.22	101.40	1,199.00
	05/07/14 15:33:36	10710	13.76	0.36	0.02	5.24	8.22	101.40	1,199.00
	05/07/14 15:34:06	10740	13.76	0.36	0.03	5.24	8.61	101.50	1,210.00

CIMARRON ENERGY, INC.

May 7, 2014

48HV ECD

Norman Facility

Unit Data

Meas. Stack Moisture	5.3	%
Stack Exhaust Flow (M2)	79,818	SCFH

Weather Data

Barometric Pressure	29.09	in. Hg
Relative Humidity	26	%
Ambient Temperature	91	° F
Specific Humidity	0.008270	lb H ₂ O / lb air

0-30-0 Load, Run - 48HV ECD R2

	Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmvd)	THC (ppmvw)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
	05/07/14 15:34:36	10770	13.95	0.52	0.05	5.11	8.61	101.50	1,210.00
	05/07/14 15:35:06	10800	14.07	0.96	0.05	5.06	8.75	101.50	1,211.00
	05/07/14 15:35:36	10830	14.41	1.43	0.05	4.93	8.75	101.50	1,211.00
	05/07/14 15:36:06	10860	14.26	1.72	0.05	5.09	8.61	101.50	1,199.00
	05/07/14 15:36:36	10890	14.20	1.53	0.02	5.08	8.61	101.50	1,199.00
	05/07/14 15:37:06	10920	14.26	1.40	0.02	4.96	8.30	101.60	1,177.00
	05/07/14 15:37:36	10950	14.92	1.34	0.02	4.45	8.30	101.60	1,177.00
	05/07/14 15:38:06	10980	16.47	2.19	0.02	3.34	7.11	101.60	1,067.00
	05/07/14 15:38:36	11010	16.99	4.69	0.06	2.94	7.11	101.60	1,067.00
	05/07/14 15:39:06	11040	17.07	5.44	0.08	2.88	2.55	101.70	665.00
	05/07/14 15:39:36	11070	17.14	5.46	0.12	2.81	2.55	101.70	665.00
	05/07/14 15:40:06	11100	17.01	5.47	0.09	2.91	2.27	101.80	611.00
	05/07/14 15:40:36	11130	16.89	5.12	0.07	3.01	2.27	101.80	611.00
	05/07/14 15:41:06	11160	16.97	5.06	0.14	2.96	2.38	101.90	633.00
	05/07/14 15:41:36	11190	17.14	5.60	0.17	2.79	2.38	101.90	633.00
	05/07/14 15:42:06	11220	17.16	5.63	0.22	2.80	2.10	101.90	600.00
	05/07/14 15:42:36	11250	17.26	6.26	0.22	2.71	2.10	101.90	600.00
	05/07/14 15:43:06	11280	17.20	6.39	0.24	2.77	1.97	102.00	579.00
	05/07/14 15:43:36	11310	16.62	7.00	0.07	3.19	1.97	102.00	579.00
	05/07/14 15:44:06	11340	14.81	3.16	0.05	4.47	3.29	102.10	729.00
	05/07/14 15:44:36	11370	14.26	0.50	0.05	4.89	3.29	102.10	729.00
	05/07/14 15:45:06	11400	14.40	0.29	0.05	4.77	8.08	102.10	1,186.00
	05/07/14 15:45:36	11430	14.03	0.26	0.04	5.04	8.08	102.10	1,186.00
	05/07/14 15:46:06	11460	14.56	0.49	0.04	4.66	9.02	102.10	1,253.00
	05/07/14 15:46:36	11490	14.22	1.31	0.02	4.90	9.02	102.10	1,253.00
	05/07/14 15:47:06	11520	14.00	1.23	0.03	5.06	9.13	102.00	1,243.00
	05/07/14 15:47:36	11550	13.97	1.03	0.02	5.08	9.13	102.00	1,243.00
	05/07/14 15:48:06	11580	14.04	0.92	0.03	5.04	8.75	101.90	1,231.00
	05/07/14 15:48:36	11610	14.28	1.49	0.02	4.85	8.75	101.90	1,231.00
	05/07/14 15:49:06	11640	14.14	2.39	0.02	4.97	8.64	101.80	1,210.00
A3	05/07/14 15:49:36	11670	13.95	2.70	0.01	5.09	8.64	101.80	1,210.00
	05/07/14 15:50:06	11700	13.91	0.67	0.02	5.13	8.22	101.70	1,198.00
	05/07/14 15:50:36	11730	14.18	-0.19	0.01	4.94	8.22	101.70	1,198.00
	05/07/14 15:51:06	11760	14.05	-0.32	0.02	5.06	8.22	101.70	1,177.00
	05/07/14 15:51:36	11790	14.35	-0.43	0.05	4.88	8.22	101.70	1,177.00
	05/07/14 15:52:06	11820	14.22	-0.27	0.05	4.99	8.36	101.70	1,177.00
	05/07/14 15:52:36	11850	15.39	-0.37	0.02	4.33	8.36	101.70	1,177.00
	05/07/14 15:53:06	11880	17.15	0.76	0.01	3.40	6.89	101.70	1,088.00
	05/07/14 15:53:36	11910	17.59	2.71	0.02	3.02	6.89	101.70	1,088.00
	05/07/14 15:54:06	11940	17.56	3.74	0.09	2.90	2.77	101.80	707.00
	05/07/14 15:54:36	11970	17.47	5.05	0.25	2.72	2.77	101.80	707.00
	05/07/14 15:55:06	12000	17.39	5.92	0.16	2.77	2.49	101.80	643.00
	05/07/14 15:55:36	12030	17.52	5.59	0.31	2.66	2.49	101.80	643.00
	05/07/14 15:56:06	12060	17.37	6.57	0.20	2.77	2.35	101.80	633.00
	05/07/14 15:56:36	12090	17.30	5.30	0.16	2.82	2.35	101.80	633.00
	05/07/14 15:57:06	12120	17.27	5.35	0.14	2.86	2.21	101.80	632.00
	05/07/14 15:57:36	12150	17.14	5.52	0.13	2.97	2.21	101.80	632.00
	05/07/14 15:58:06	12180	17.23	5.05	0.27	2.91	2.10	101.80	611.00
	05/07/14 15:58:36	12210	17.54	5.94	0.22	2.66	2.10	101.80	611.00
	05/07/14 15:59:06	12240	15.74	4.85	0.01	3.97	2.38	101.80	675.00
	05/07/14 15:59:36	12270	14.61	0.75	0.05	4.83	2.38	101.80	675.00

CIMARRON ENERGY, INC.

May 7, 2014

48HV ECD

Norman Facility

Unit Data

Meas. Stack Moisture	5.3	%
Stack Exhaust Flow (M2)	79,818	SCFH

Weather Data

Barometric Pressure	29.09	in. Hg
Relative Humidity	26	%
Ambient Temperature	91	° F
Specific Humidity	0.008270	lb H ₂ O / lb air

0-30-0 Load, Run - 48HV ECD R2

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmvd)	THC (ppmvw)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
05/07/14 16:00:06	12300	14.50	-0.12	0.06	4.87	7.97	101.90	1,208.00
05/07/14 16:00:36	12330	14.51	-0.25	0.04	4.89	7.97	101.90	1,208.00
05/07/14 16:01:06	12360	15.11	-0.11	0.04	4.46	8.77	101.80	1,264.00
05/07/14 16:01:36	12390	15.38	0.17	0.02	4.30	8.77	101.80	1,264.00
05/07/14 16:02:06	12420	15.13	0.09	0.03	4.47	8.36	101.70	1,230.00
05/07/14 16:02:36	12450	15.50	-0.07	0.02	4.26	8.36	101.70	1,230.00
05/07/14 16:03:06	12480	15.33	0.10	0.02	4.32	8.11	101.60	1,198.00
05/07/14 16:03:36	12510	14.70	-0.08	0.05	4.76	8.11	101.60	1,198.00
05/07/14 16:04:06	12540	14.54	-0.25	0.05	4.97	8.39	101.40	1,220.00
05/07/14 16:04:36	12570	14.81	-0.32	0.02	4.90	8.39	101.40	1,220.00
05/07/14 16:05:06	12600	14.74	-0.31	0.02	4.92	8.39	101.30	1,210.00
05/07/14 16:05:36	12630	14.35	-0.38	0.02	4.96	8.39	101.30	1,210.00
05/07/14 16:06:06	12660	14.18	-0.38	0.02	4.95	8.80	101.20	1,211.00
05/07/14 16:06:36	12690	14.28	-0.34	0.04	4.84	8.80	101.20	1,211.00
05/07/14 16:07:06	12720	14.71	-0.26	0.04	4.57	7.75	101.10	1,155.00
05/07/14 16:07:36	12750	15.47	0.11	0.01	4.03	7.75	101.10	1,155.00
05/07/14 16:08:06	12780	16.77	1.36	0.04	3.11	6.84	101.00	1,068.00
05/07/14 16:08:36	12810	17.29	4.24	0.18	2.67	6.84	101.00	1,068.00
05/07/14 16:09:06	12840	17.69	6.37	0.39	2.39	2.30	101.00	655.00
RAW AVERAGE		15.48	6.33	0.14	4.11	5.90	101.58	978.90

	Serial Number:	O ₂	CO	THC	CO ₂	Press. Trans	Temp. Trans.	F-Flow Trans.
		INST-22-010	INST-CO-0008	INST-VC-0007	INST-22-0010	1229943 (in. H ₂ O)	1229943 (°F)	1229943 (SCFH)
Bias	Initial Zero	0.03	-0.15	0.04	0.06			
	Final Zero	0.35	0.03	0.03	0.07			
	Avg. Zero	0.19	-0.06	0.04	0.07			
	Initial UpScale	12.05	8.93	3.01	8.52			
	Final UpScale	12.19	8.84	2.95	8.51			
	Avg. UpScale	12.12	8.89	2.98	8.52			
	Upscale Cal Gas	12.20	9.00	3.04	8.56			

EMISSIONS DATA	O ₂	CO	THC	CO ₂
Corrected Raw Average (ppm/% dry basis)	15.64	6.43	0.11	4.10
Corrected Raw Average (ppm/% wet basis)	14.80	6.09	0.10	3.88
Emission Rate (lb/hr)	N/A	0.04	0.00	N/A

CIMARRON ENERGY, INC.

May 7, 2014

48HV ECD

Norman Facility

Unit Data

Meas. Stack Moisture	5.3	%
Stack Exhaust Flow (M2)	87,302	SCFH

Weather Data

Barometric Pressure	29.75	in. Hg
Relative Humidity	24	%
Ambient Temperature	83	° F
Specific Humidity	0.005767	lb H ₂ O / lb air

0-30-0 Load, Run - 48HV ECD R3

	Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmvd)	THC (ppmvw)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
A1	05/07/14 16:27:06	13920	17.38	9.20	0.83	2.59	1.74	98.30	636.00
	05/07/14 16:27:36	13950	17.16	9.34	0.46	2.75	1.74	98.30	636.00
	05/07/14 16:28:06	13980	17.19	8.89	0.56	2.74	1.66	97.90	625.00
	05/07/14 16:28:36	14010	17.25	8.78	0.74	2.70	1.66	97.90	625.00
	05/07/14 16:29:06	14040	17.30	9.93	0.55	2.65	1.99	97.40	648.00
	05/07/14 16:29:36	14070	17.03	9.21	0.34	2.88	1.99	97.40	648.00
	05/07/14 16:30:06	14100	17.04	8.72	0.27	2.86	1.91	97.00	659.00
	05/07/14 16:30:36	14130	15.71	7.27	0.04	3.81	1.91	97.00	659.00
	05/07/14 16:31:06	14160	14.41	3.86	0.04	4.73	3.71	96.50	823.00
	05/07/14 16:31:36	14190	13.75	3.40	0.04	5.21	3.71	96.50	823.00
	05/07/14 16:32:06	14220	13.99	5.39	0.04	5.05	8.14	96.00	1,253.00
	05/07/14 16:32:36	14250	13.93	7.70	0.03	5.08	8.14	96.00	1,253.00
	05/07/14 16:33:06	14280	13.88	9.47	0.03	5.11	7.81	95.50	1,210.00
	05/07/14 16:33:36	14310	14.38	10.06	0.02	4.79	7.81	95.50	1,210.00
	05/07/14 16:34:06	14340	14.08	10.74	0.02	4.99	8.25	95.00	1,223.00
	05/07/14 16:34:36	14370	14.04	8.96	0.05	5.01	8.25	95.00	1,223.00
	05/07/14 16:35:06	14400	14.11	8.07	0.05	4.96	8.58	94.60	1,258.00
	05/07/14 16:35:36	14430	14.15	7.95	0.05	4.94	8.58	94.60	1,258.00
	05/07/14 16:36:06	14460	14.07	8.68	0.05	4.98	8.75	94.20	1,248.00
	05/07/14 16:36:36	14490	13.90	8.61	0.05	5.11	8.75	94.20	1,248.00
	05/07/14 16:37:06	14520	14.16	6.88	0.04	4.93	8.94	93.80	1,261.00
	05/07/14 16:37:36	14550	13.96	5.79	0.02	5.06	8.94	93.80	1,261.00
	05/07/14 16:38:06	14580	14.06	4.83	0.02	4.99	9.27	93.40	1,263.00
	05/07/14 16:38:36	14610	14.05	4.49	0.02	5.01	9.27	93.40	1,263.00
	05/07/14 16:39:06	14640	14.41	3.78	0.02	4.76	8.50	93.00	1,250.00
	05/07/14 16:39:36	14670	14.58	4.47	0.02	4.62	8.50	93.00	1,250.00
	05/07/14 16:40:06	14700	14.20	4.69	0.02	4.90	8.58	92.70	1,229.00
	05/07/14 16:40:36	14730	15.15	4.12	0.01	4.26	8.58	92.70	1,229.00
	05/07/14 16:41:06	14760	15.89	4.39	0.01	3.72	7.03	92.30	1,085.00
	05/07/14 16:41:36	14790	16.28	4.34	0.02	3.45	7.03	92.30	1,085.00
	05/07/14 16:42:06	14820	16.58	4.67	0.02	3.23	4.29	92.00	873.00
	05/07/14 16:42:36	14850	16.73	4.86	0.01	3.13	4.29	92.00	873.00
	05/07/14 16:43:06	14880	17.01	5.18	0.02	2.90	2.63	91.70	720.00
	05/07/14 16:43:36	14910	17.30	5.95	0.15	2.66	2.63	91.70	720.00
	05/07/14 16:44:06	14940	17.23	7.06	0.15	2.71	2.02	91.50	655.00
	05/07/14 16:44:36	14970	17.42	7.06	0.29	2.56	2.02	91.50	655.00
	05/07/14 16:45:06	15000	17.23	7.10	0.19	2.71	1.94	91.30	623.00
	05/07/14 16:45:36	15030	17.05	6.13	0.13	2.85	1.94	91.30	623.00
	05/07/14 16:46:06	15060	17.08	5.54	0.22	2.83	1.99	91.10	623.00
	05/07/14 16:46:36	15090	16.92	6.02	0.10	2.94	1.99	91.10	623.00
	05/07/14 16:47:06	15120	15.36	3.70	0.05	4.06	2.71	90.90	721.00
A2	05/07/14 16:47:36	15150	14.74	1.14	0.05	4.51	2.71	90.90	721.00
	05/07/14 16:48:06	15180	14.65	0.52	0.05	4.58	7.67	90.60	1,177.00
	05/07/14 16:48:36	15210	14.22	0.46	0.05	4.88	7.67	90.60	1,177.00
	05/07/14 16:49:06	15240	14.27	0.32	0.05	4.83	8.11	90.30	1,255.00
	05/07/14 16:49:36	15270	14.15	0.34	0.04	4.93	8.11	90.30	1,255.00
	05/07/14 16:50:06	15300	14.38	0.40	0.05	4.78	8.83	90.00	1,269.00
	05/07/14 16:50:36	15330	14.55	0.72	0.05	4.64	8.83	90.00	1,269.00
	05/07/14 16:51:06	15360	14.35	0.76	0.05	4.79	8.89	89.70	1,270.00
	05/07/14 16:51:36	15390	14.77	0.82	0.05	4.51	8.89	89.70	1,270.00
	05/07/14 16:52:06	15420	14.52	0.94	0.05	4.67	8.80	89.30	1,259.00

CIMARRON ENERGY, INC.

May 7, 2014

48HV ECD

Norman Facility

Unit Data

Meas. Stack Moisture	5.3	%
Stack Exhaust Flow (M2)	87,302	SCFH

Weather Data

Barometric Pressure	29.75	in. Hg
Relative Humidity	24	%
Ambient Temperature	83	° F
Specific Humidity	0.005767	lb H ₂ O / lb air

0-30-0 Load, Run - 48HV ECD R3

	Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmvd)	THC (ppmvw)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
	05/07/14 16:52:36	15450	14.30	0.78	0.02	4.82	8.80	89.30	1,259.00
	05/07/14 16:53:06	15480	14.55	0.14	0.02	4.65	8.97	89.10	1,261.00
	05/07/14 16:53:36	15510	14.55	-0.09	0.02	4.65	8.97	89.10	1,261.00
	05/07/14 16:54:06	15540	14.39	-0.18	0.01	4.75	9.02	88.80	1,272.00
	05/07/14 16:54:36	15570	14.01	-0.28	0.05	5.03	9.02	88.80	1,272.00
	05/07/14 16:55:06	15600	13.98	-0.30	0.05	5.06	9.05	88.60	1,262.00
	05/07/14 16:55:36	15630	15.22	-0.18	0.02	4.19	9.05	88.60	1,262.00
	05/07/14 16:56:06	15660	16.23	0.83	0.01	3.49	7.39	88.40	1,137.00
	05/07/14 16:56:36	15690	16.86	2.86	0.02	3.03	7.39	88.40	1,137.00
	05/07/14 16:57:06	15720	16.88	3.77	0.03	3.01	2.93	88.10	768.00
	05/07/14 16:57:36	15750	17.12	4.68	0.09	2.80	2.93	88.10	768.00
	05/07/14 16:58:06	15780	17.12	5.45	0.08	2.80	2.44	88.00	681.00
	05/07/14 16:58:36	15810	17.16	4.92	0.23	2.77	2.44	88.00	681.00
	05/07/14 16:59:06	15840	17.28	6.19	0.19	2.67	2.08	87.90	648.00
	05/07/14 16:59:36	15870	16.97	5.78	0.05	2.93	2.08	87.90	648.00
	05/07/14 17:00:06	15900	16.94	5.64	0.09	2.97	2.13	87.70	649.00
	05/07/14 17:00:36	15930	16.99	5.90	0.08	2.91	2.13	87.70	649.00
	05/07/14 17:01:06	15960	16.87	5.29	0.08	3.02	2.33	87.50	595.00
	05/07/14 17:01:36	15990	17.07	5.45	0.18	2.86	2.33	87.50	595.00
	05/07/14 17:02:06	16020	16.83	5.38	0.07	3.02	2.24	87.30	638.00
	05/07/14 17:02:36	16050	15.26	3.53	0.05	4.14	2.24	87.30	638.00
	05/07/14 17:03:06	16080	14.02	0.61	0.05	5.02	5.45	87.20	971.00
	05/07/14 17:03:36	16110	13.92	-0.28	0.05	5.10	5.45	87.20	971.00
	05/07/14 17:04:06	16140	13.85	-0.36	0.04	5.14	8.28	87.00	1,240.00
	05/07/14 17:04:36	16170	13.45	-0.38	0.01	5.42	8.28	87.00	1,240.00
	05/07/14 17:05:06	16200	13.44	-0.21	0.02	5.43	9.36	86.70	1,299.00
	05/07/14 17:05:36	16230	13.97	-0.07	0.04	5.06	9.36	86.70	1,299.00
	05/07/14 17:06:06	16260	13.79	-0.04	0.05	5.19	9.80	86.40	1,312.00
	05/07/14 17:06:36	16290	13.80	-0.11	0.05	5.18	9.80	86.40	1,312.00
	05/07/14 17:07:06	16320	13.57	-0.09	0.04	5.34	9.96	86.10	1,314.00
A3	05/07/14 17:07:36	16350	13.55	-0.07	0.05	5.35	9.96	86.10	1,314.00
	05/07/14 17:08:06	16380	13.69	-0.13	0.05	5.25	10.02	85.90	1,336.00
	05/07/14 17:08:36	16410	13.86	-0.09	0.04	5.13	10.02	85.90	1,336.00
	05/07/14 17:09:06	16440	13.84	-0.08	0.04	5.14	9.91	85.60	1,303.00
	05/07/14 17:09:36	16470	13.44	-0.16	0.04	5.43	9.91	85.60	1,303.00
	05/07/14 17:10:06	16500	13.74	-0.13	0.04	5.23	10.10	85.40	1,315.00
	05/07/14 17:10:36	16530	14.31	-0.12	0.05	4.84	10.10	85.40	1,315.00
	05/07/14 17:11:06	16560	15.51	0.19	0.04	4.01	8.69	85.20	1,213.00
	05/07/14 17:11:36	16590	16.35	1.51	0.05	3.41	8.69	85.20	1,213.00
	05/07/14 17:12:06	16620	17.00	3.65	0.06	2.91	3.04	84.90	740.00
	05/07/14 17:12:36	16650	17.07	4.68	0.11	2.87	3.04	84.90	740.00
	05/07/14 17:13:06	16680	17.13	5.40	0.12	2.80	2.41	84.80	641.00
	05/07/14 17:13:36	16710	17.10	5.41	0.09	2.82	2.41	84.80	641.00
	05/07/14 17:14:06	16740	16.99	5.42	0.09	2.91	2.05	84.70	619.00
	05/07/14 17:14:36	16770	16.95	5.45	0.10	2.96	2.05	84.70	619.00
	05/07/14 17:15:06	16800	16.97	5.13	0.13	2.94	2.35	84.60	619.00
	05/07/14 17:15:36	16830	17.00	5.37	0.12	2.91	2.35	84.60	619.00
	05/07/14 17:16:06	16860	16.76	5.11	0.06	3.08	2.13	84.40	641.00
	05/07/14 17:16:36	16890	15.27	3.28	0.01	4.12	2.13	84.40	641.00
	05/07/14 17:17:06	16920	14.01	0.88	0.01	5.03	5.20	84.30	931.00
	05/07/14 17:17:36	16950	13.96	0.06	0.04	5.06	5.20	84.30	931.00

CIMARRON ENERGY, INC.

May 7, 2014

48HV ECD

Norman Facility

Unit Data

Meas. Stack Moisture	5.3	%
Stack Exhaust Flow (M2)	87,302	SCFH

Weather Data

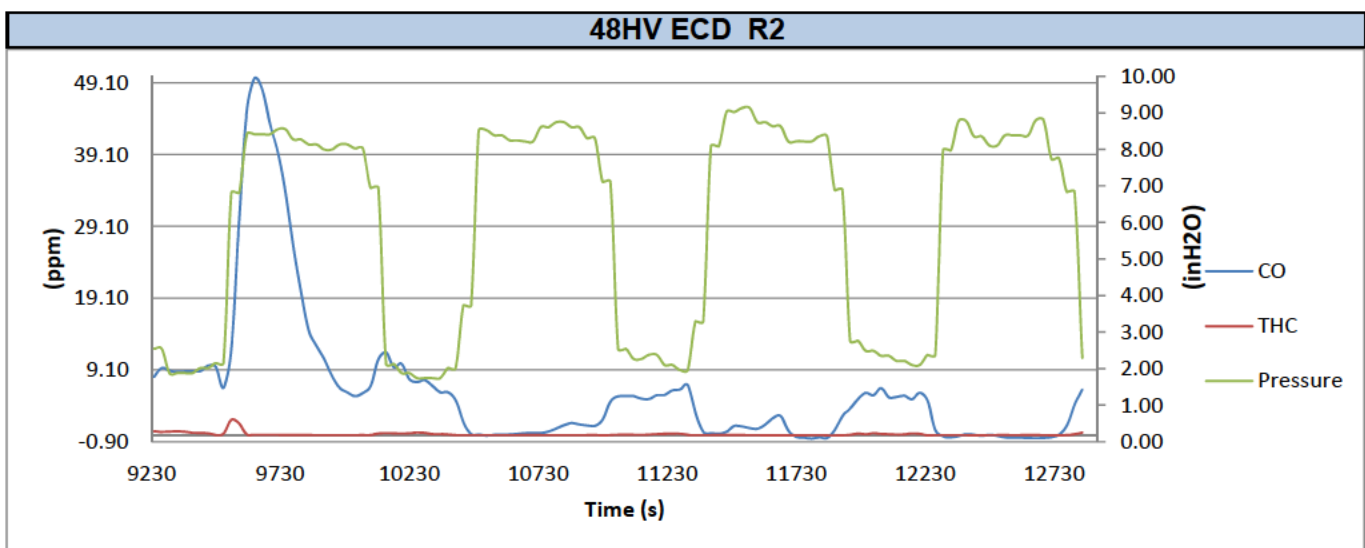
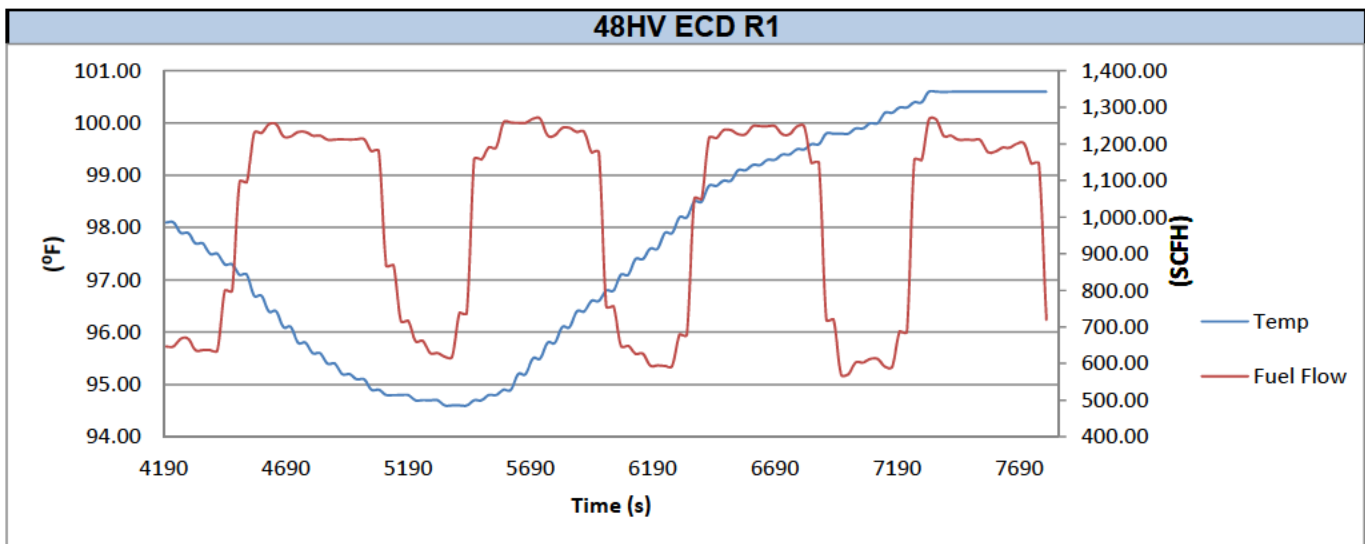
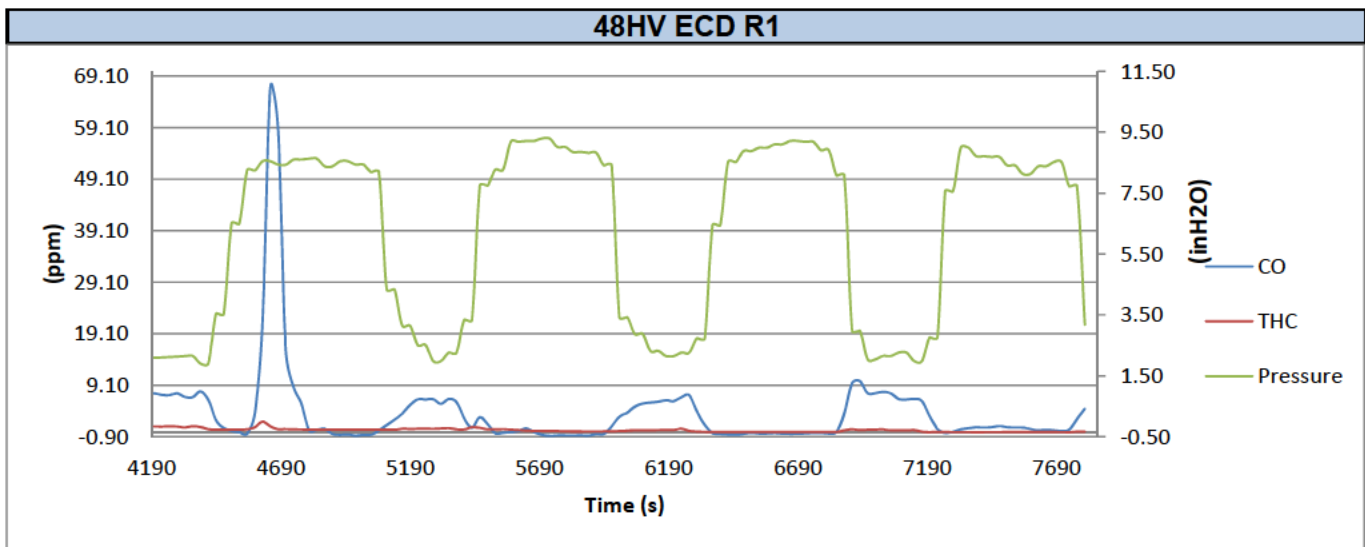
Barometric Pressure	29.75	in. Hg
Relative Humidity	24	%
Ambient Temperature	83	° F
Specific Humidity	0.005767	lb H ₂ O / lb air

0-30-0 Load, Run - 48HV ECD R3

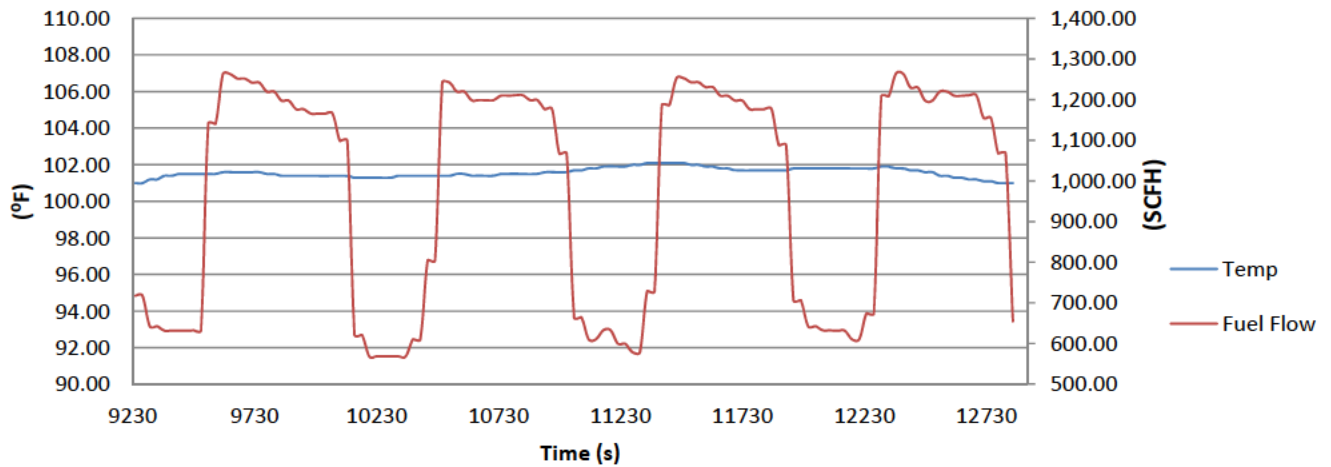
Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmvd)	THC (ppmvw)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
05/07/14 17:18:06	16980	14.10	0.12	0.04	4.96	8.55	84.10	1,247.00
05/07/14 17:18:36	17010	13.68	-0.02	0.01	5.26	8.55	84.10	1,247.00
05/07/14 17:19:06	17040	13.68	-0.08	0.01	5.27	9.11	83.90	1,283.00
05/07/14 17:19:36	17070	13.79	-0.05	0.05	5.19	9.11	83.90	1,283.00
05/07/14 17:20:06	17100	13.77	-0.06	0.05	5.20	8.89	83.70	1,249.00
05/07/14 17:20:36	17130	14.02	-0.04	0.03	5.03	8.89	83.70	1,249.00
05/07/14 17:21:06	17160	13.98	-0.02	0.04	5.05	8.91	83.50	1,250.00
05/07/14 17:21:36	17190	14.21	-0.10	0.02	4.91	8.91	83.50	1,250.00
05/07/14 17:22:06	17220	14.36	0.00	0.02	4.78	9.33	83.30	1,263.00
05/07/14 17:22:36	17250	14.39	-0.02	0.05	4.78	9.33	83.30	1,263.00
05/07/14 17:23:06	17280	14.36	0.03	0.04	4.79	8.83	83.10	1,262.00
05/07/14 17:23:36	17310	14.08	0.00	0.02	5.00	8.83	83.10	1,262.00
05/07/14 17:24:06	17340	14.45	-0.06	0.02	4.73	8.89	83.00	1,218.00
05/07/14 17:24:36	17370	14.36	0.02	0.04	4.80	8.89	83.00	1,218.00
05/07/14 17:25:06	17400	14.86	0.08	0.04	4.45	9.16	82.80	1,252.00
05/07/14 17:25:36	17430	14.98	0.32	0.04	4.36	9.16	82.80	1,252.00
05/07/14 17:26:06	17460	16.20	0.93	0.04	3.52	7.75	82.70	1,138.00
05/07/14 17:26:36	17490	16.86	2.97	0.05	3.03	7.75	82.70	1,138.00
05/07/14 17:27:06	17520	16.90	4.41	0.07	3.00	3.02	82.50	765.00
RAW AVERAGE		15.24	3.35	0.08	4.16	6.30	88.96	1,025.88

Bias	Serial Number:	CO ₂ (%)	CO (ppmvd)	THC (ppmvw)	CO ₂ (%)	Press. Trans (in. H ₂ O)	Temp. Trans. (°F)	F-Flow Trans. (SCFH)
	INST-22-010	INST-CO-0008	INST-VC-0007	INST-22-0010	1229943	1229943	1229943	
	Initial Zero	0.35	0.03	0.03	0.07			
	Final Zero	0.35	0.13	0.05	0.11			
	Avg. Zero	0.35	0.08	0.04	0.09			
	Initial UpScale	12.19	8.84	2.95	8.51			
	Final UpScale	12.21	8.94	3.05	8.43			
	Avg. UpScale	12.20	8.89	3.00	8.47			
Upscale Cal Gas		12.20	9.00	3.04	8.56			

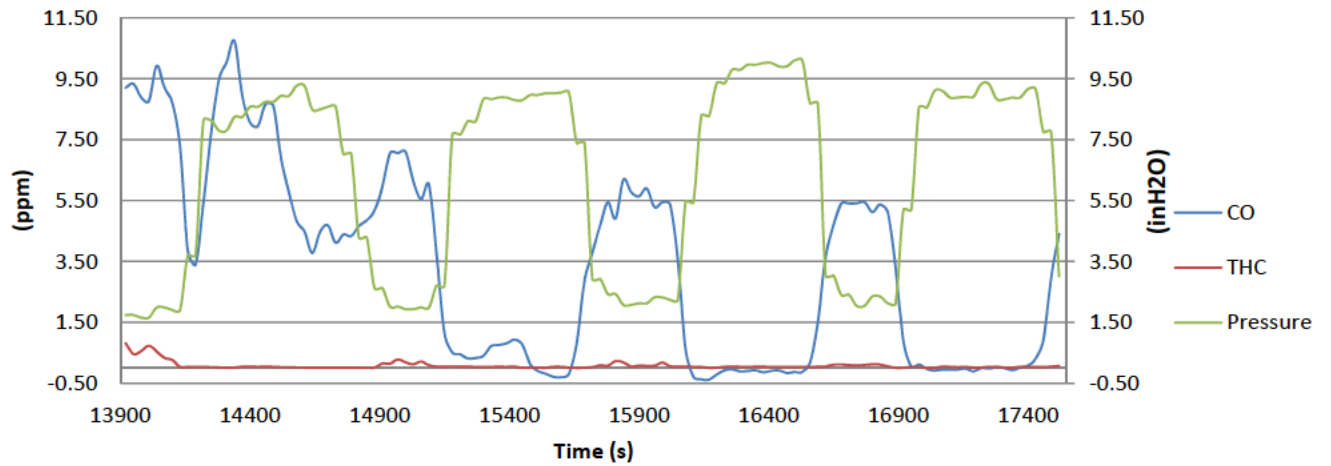
EMISSIONS DATA	O₂	CO	THC	CO₂
Corrected Raw Average (ppm/% dry basis)	15.33	3.34	0.04	4.15
Corrected Raw Average (ppm/% wet basis)	14.50	3.16	0.04	3.93
Emission Rate (lb/hr)	N/A	0.02	0.00	N/A



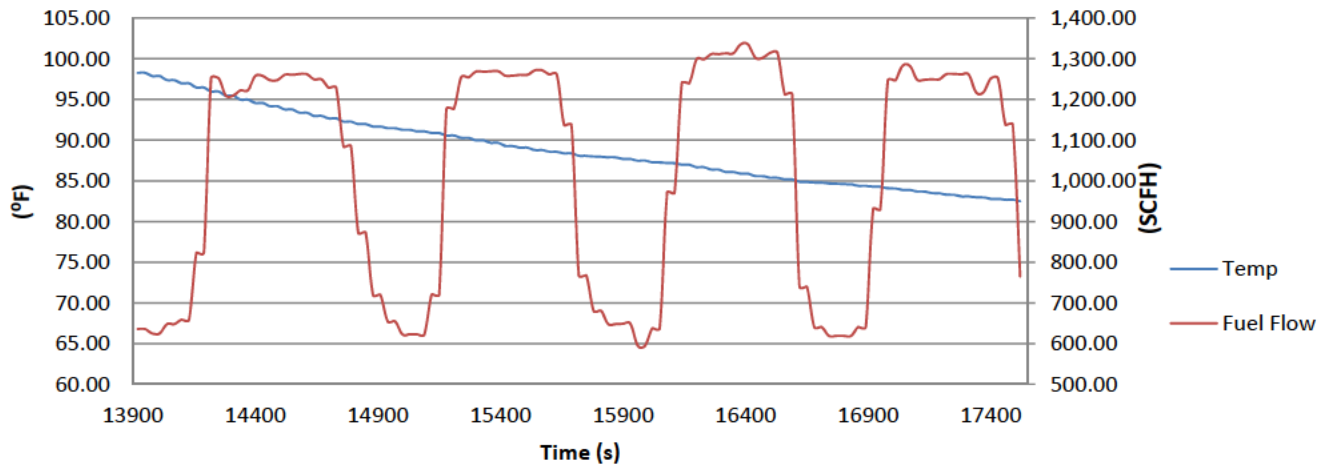
48HV ECD R2



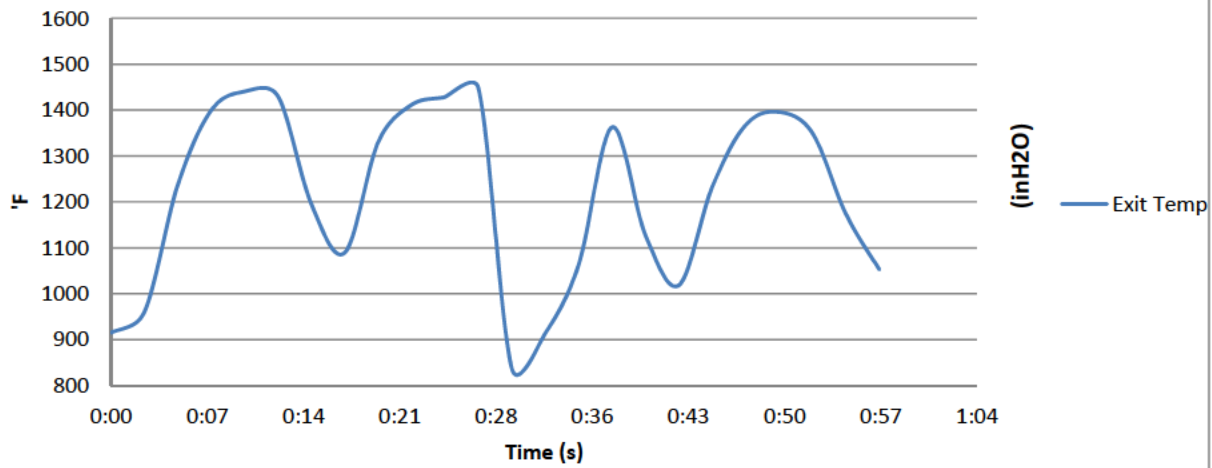
48HV ECD R3



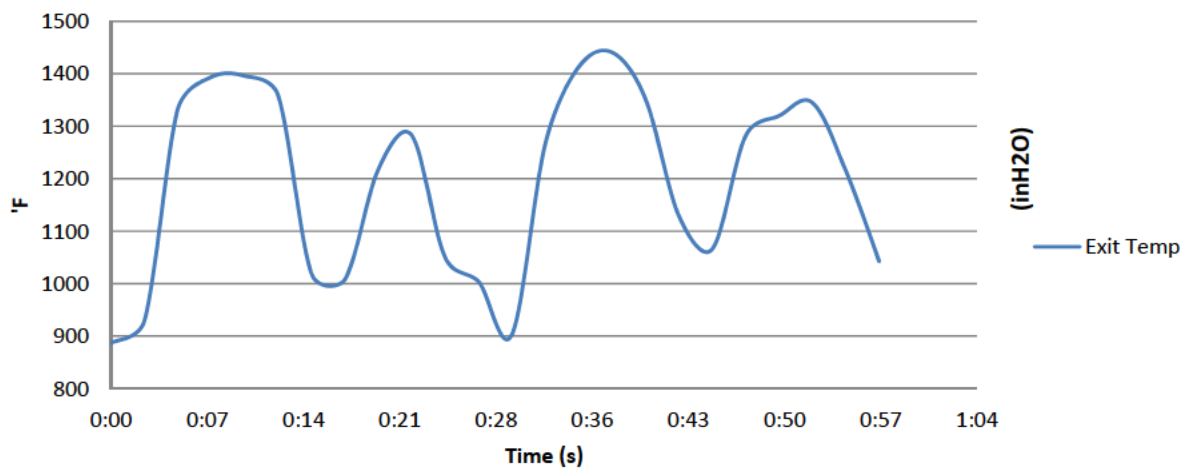
48HV ECD R3



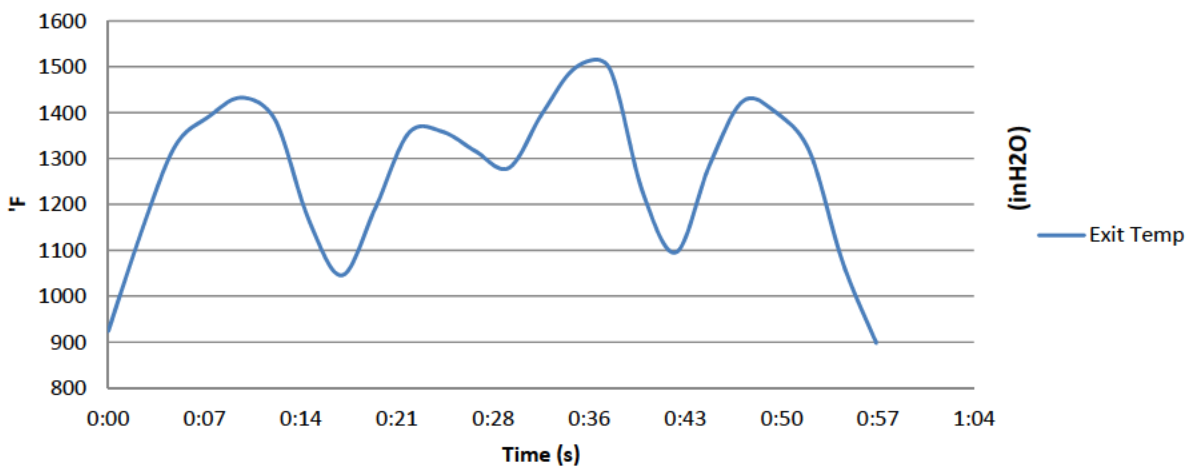
48HV ECD R1



48HV ECD R2



48HV ECD R3



EMISSION DATA RECORDS

30-70-30% Ramp-up, Ramp-down Unit Operations Data

METHOD 4 (MOISTURE) [MULTI POINT, NO VARIATION] SOURCE SAMPLING TITLE PAGE

Source Information	
Plant Name	Cimaron Energy, INC
Sampling Location	48HV ECD
Fuel Type	Gas, Propene

Test Information			
Project #		cei-14-norman.ok-comp#1	
Operator		TP/MM	
Date for Preliminary Run	(mm/dd/yy)	05/07/14	
Standard Temperature		68	°F
Standard Pressure		29.92	in Hg
Required Sample Vol.	RM4, 8.1.1.2	21	scf
Run Duration	≤0.75 cfm	60	minutes
Unit Number		1	
Base Run Number		30-70-30%	
Number of Ports Available		2	
Number of Ports Used		2	
Port Inside Diameter		3.00	in
Stack Shape		Circular	

Test Equipment Information					
Run		4	5	6	
Test Date	(mm/dd/yy)	05/08/14	05/08/14	05/08/14	
Load	% or w/DB	30-70-30	30-70-30	30-70-30	
Meter Box Number	from ACS	SAMP-CP-0012	SAMP-CP-0012	SAMP-CP-0012	
Meter Calibration Factor	(Y)	0.889	0.889	0.889	
Orifice Meter Coefficient	(ΔH_{or})	1.632	1.632	1.632	in H ₂ O
Pitot Identification	from ACS	4-17-14-2	4-17-14-2	4-17-14-2	
Pitot Tube Coefficient	(C _p)	0.840	0.840	0.840	
Probe Number	from ACS	SAMP-FP-0001	SAMP-FP-0001	SAMP-FP-0001	
Probe Length		60.0	60.0	60.0	in
(SS, Glass) Liner Material	from list	inconel	inconel	inconel	
Impinger Case Number	from ACS	SAMP-BC-0003	SAMP-BC-0003	SAMP-BC-0003	

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	Min Sum Lee
Phone Number	(918) 307-8865
Fax Number	(918) 307-9131

METHOD 4 (MOISTURE) [MULTI POINT, NO VARIATION] - RESULTS

Plant Name	Cimaron Energy, INC
Sampling Location	48HV ECD
Project #	cei-14-norman.ok-comp#1

Historical Data	30-70-30%-4	30-70-30%-5	30-70-30%-6	Average	Units
Run Start Time	13:46	15:05	16:25		hh:mm
Run Stop Time	14:50	16:08	17:27		hh:mm
Test Date	05/08/14	05/08/14	05/08/14		mm/dd/yy
Meter Calibration Factor	0.889	0.889	0.889		
Pitot Tube Coefficient	0.840	0.840	0.840		
Stack Test Data	30-70-30%-4	30-70-30%-5	30-70-30%-6	Average	Units
Initial Meter Volume	864.490	915.460	966.165		ft ³
Final Meter Volume	915.315	965.975	1016.835		ft ³
Total Meter Volume	50.825	50.515	50.670	50.670	ft ³
Total Sampling Time	60.00	60.00	60.00	60.00	min
Average Meter Temperature	86.02	87.40	85.13	86.18	°F
Average Stack Temperature	1580.96	1506.17	1536.83	1541.32	°F
Barometric Pressure	29.84	29.82	29.80	29.82	in Hg
Stack Static Pressure	0.00	0.00	0.00	0.00	in H ₂ O
Absolute Stack Pressure	29.84	29.82	29.80	29.82	in Hg
Average Orifice Pressure Drop	1.60	1.60	1.60	1.60	in H ₂ O
Absolute Meter Pressure	29.96	29.94	29.92	29.94	in Hg
Avg Square Root Pitot Pressure	0.16	0.16	0.15	0.16	√(in H ₂ O)
Moisture Content Data	30-70-30%-4	30-70-30%-5	30-70-30%-6	Average	Units
Impinger Water Weight Gain	50.00	49.80	51.60	50.47	g
Silica Gel Weight Gain	11.70	5.70	10.50	9.30	g
Total Water Volume Collected	61.81	55.60	62.21	59.87	ml
Standard Water Vapor Volume	2.91	2.62	2.93	2.82	scf
Standard Meter Volume	43.7	43.3	43.6	43.6	dscf
Calculated Stack Moisture	6.24	5.69	6.29	6.07	%
Saturated Stack Moisture	100.00	100.00	100.00	100.00	%
Reported Stack Moisture Content	6.24	5.69	6.29	6.07	%
Gas Analysis Data	30-70-30%-4	30-70-30%-5	30-70-30%-6	Average	Units
Carbon Dioxide Content	5.1	4.7	5.2	5.0	%
Oxygen Content	15.1	15.6	15.0	15.2	%
Nitrogen Content	79.8	79.6	79.8	79.7	%
Stack Dry Molecular Weight	29.43	29.37	29.44	29.41	lb/lb-mole
Stack Wet Molecular Weight	28.71	28.72	28.72	28.72	lb/lb-mole
Percent Excess Air	253.5	288.1	247.6	263.1	%
Volumetric Flow Rate Data	30-70-30%-4	30-70-30%-5	30-70-30%-6	Average	Units
Average Stack Gas Velocity	17.73	18.02	16.80	17.52	ft/sec
Stack Cross-Sectional Area	8.30	8.30	8.30	8.30	ft ²
Actual Stack Flow Rate	8,824	8,971	8,363	8,719	acfm
Wet Standard Stack Flow Rate	137	144	132	138	wkscfh
Dry Standard Stack Flow Rate	128,077	135,858	123,833	129,256	dscfh

METHOD 3C - DETERMINATION OF DRY MOLECULAR WEIGHT BY ANALYZER

Plant Name	Cimaron Energy, INC	Preliminary Date	05/07/14		
Sampling Location	48HV ECD	Operator	TP/MM		
Project #	cei-14-norman.ok-comp#1	# of Ports Used	2		
Fuel Type	Gas, Propene	Min. Fuel Factor	N/A	Max. Fuel Factor	N/A

Gas Analysis Data								
Run Number	30-70-30%-4		Date	05/08/14	Run Start Time	13:46	Run Stop Time	14:50
Sample Analysis Time	CO₂ Conc.	O₂ Conc.	Methane Conc.	N₂ 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		%	
01:04	5.1	15.1	0.0	79.8	29.43	1.128	253.5	N/A

Gas Analysis Data								
Run Number	30-70-30%-5		Date	05/08/14	Run Start Time	15:05	Run Stop Time	16:08
Sample Analysis Time	CO₂ Conc.	O₂ Conc.	Methane Conc.	N₂ 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		%	
01:03	4.7	15.6	0.0	79.6	29.37	1.118	288.1	N/A

Gas Analysis Data								
Run Number	30-70-30%-6		Date	05/08/14	Run Start Time	16:25	Run Stop Time	17:27
Sample Analysis Time	CO₂ Conc.	O₂ Conc.	Methane Conc.	N₂ 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		%	
01:02	5.2	15.0	0.0	79.8	29.44	1.128	247.6	N/A

METHOD 4 - DETERMINATION OF MOISTURE CONTENT IN STACK GASES

Plant Name	Cimaron Energy, INC	Preliminary Date	05/07/14
Sampling Location	48HV ECD	Operator	TP/MM
Project #	cei-14-norman.ok-comp#1	Ports Used	2

Moisture Content Data								
Run Number	30-70-30%-4		Date	05/08/14	Start Time	13:46	Stop Time	14:50
Meter Box Number	SAMP-CP-0012				Meter Cal Factor	(Y)	0.889	
Total Meter Volume	(V _m)	50.825	dcf		Barometric Pressure	(P _b)	29.84	in Hg
Average Stack Temp	(t _s) _{avg}	1581	°F		Stack Static Pressure	(P _{static})	0.00	in H ₂ O
Average Meter Temp	(t _m) _{avg}	86	°F		Avg Orifice Pressure	(ΔH) _{avg}	1.60	in H ₂ O
	Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7	Impinger 8
	(g)	(g)	(g)	(g)				
Contents	H ₂ O	H ₂ O	-	Sil Gel				
Final Value	(V _f),(W _f)	803.60	787.60	579.80	883.20			
Initial Value	(V _i),(W _i)	765.40	777.60	578.00	871.50			
Net Value	(V _n),(W _n)	38.2	10.0	1.8	11.7			
Results								
Total Weight	(W _t)	61.70	g	Water Vol Weighed	(V _{wsg(std)})	2.909	scf	
Std Meter Volume	(V _{m(std)})	43.747	dscf	Sat. Moisture Content	(B _{ws(svp)})	100.00	%	
Calc Moisture Content	(B _{ws(calc)})	6.24	%	Final Moisture Content	(B _{ws})	6.24	%	

Moisture Content Data								
Run Number	30-70-30%-5		Date	05/08/14	Start Time	15:05	Stop Time	16:08
Meter Box Number	SAMP-CP-0012				Meter Cal Factor	(Y)	0.889	
Total Meter Volume	(V _m)	50.515	dcf		Barometric Pressure	(P _b)	29.82	in Hg
Average Stack Temp	(t _s) _{avg}	1506	°F		Stack Static Pressure	(P _{static})	0.00	in H ₂ O
Average Meter Temp	(t _m) _{avg}	87	°F		Avg Orifice Pressure	(ΔH) _{avg}	1.60	in H ₂ O
	Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7	Impinger 8
	(g)	(g)	(g)	(g)				
Contents	H ₂ O	H ₂ O	-	Sil Gel				
Final Value	(V _f),(W _f)	816.00	762.40	601.20	841.70			
Initial Value	(V _i),(W _i)	776.30	754.20	599.30	836.00			
Net Value	(V _n),(W _n)	39.7	8.2	1.9	5.7			
Results								
Total Weight	(W _t)	55.50	g	Water Vol Weighed	(V _{wsg(std)})	2.617	scf	
Std Meter Volume	(V _{m(std)})	43.342	dscf	Sat. Moisture Content	(B _{ws(svp)})	100.00	%	
Calc Moisture Content	(B _{ws(calc)})	5.69	%	Final Moisture Content	(B _{ws})	5.69	%	

Moisture Content Data								
Run Number	30-70-30%-6		Date	05/08/14	Start Time	16:25	Stop Time	17:27
Meter Box Number	SAMP-CP-0012				Meter Cal Factor	(Y)	0.889	
Total Meter Volume	(V _m)	50.670	dcf		Barometric Pressure	(P _b)	29.80	in Hg
Average Stack Temp	(t _s) _{avg}	1537	°F		Stack Static Pressure	(P _{static})	0.00	in H ₂ O
Average Meter Temp	(t _m) _{avg}	85	°F		Avg Orifice Pressure	(ΔH) _{avg}	1.60	in H ₂ O
	Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7	Impinger 8
	(g)	(g)	(g)	(g)				
Contents	H ₂ O	H ₂ O	-	Sil Gel				
Final Value	(V _f),(W _f)	844.10	797.10	581.40	806.30			
Initial Value	(V _i),(W _i)	803.60	787.60	579.80	795.80			
Net Value	(V _n),(W _n)	40.5	9.5	1.6	10.5			
Results								
Total Weight	(W _t)	62.10	g	Water Vol Weighed	(V _{wsg(std)})	2.928	scf	
Std Meter Volume	(V _{m(std)})	43.627	dscf	Sat. Moisture Content	(B _{ws(svp)})	100.00	%	
Calc Moisture Content	(B _{ws(calc)})	6.29	%	Final Moisture Content	(B _{ws})	6.29	%	

METHOD 4 (MOISTURE) [MULTI POINT, NO VARIATION] SOURCE SAMPLING TITLE PAGE ISOKINETIC SAMPLING DATA

Plant Name	Cimaron Energy, INC
Sampling Location	48HV ECD
Project #	cel-14-norman.ok-comp#1

Date	05/08/14
Operator	TP/MM
Run Number	30-70-30%-4

Leak Checks					
Train	Pre	0.0050	ft ³ /min@	15.0	in Hg
PASS	Post	0.0025	ft ³ /min@	15.0	in Hg
< 3.0	Pitot	Pre (+)	0.15	in H ₂ O for	15.0
		Pre (-)	0.25	in H ₂ O for	15.0
		Post (+)	0.22	in H ₂ O for	15.0
		Post (-)	0.20	in H ₂ O for	15.0

Nozzle Measurements				
Pre				PASS
Post				PASS

Run Time			
Start	13:46	End	14:50

Weights	Imp 1	Imp 2	Imp 3	Imp 4	Imp 5	Imp 6	Imp 7	Imp 8
Pre	765.4	777.6	578.0	871.5				
Post	803.6	787.6	579.8	883.2				

Sampling Equipment		
Meter Box Number	SAMP-CP-0012	
Meter Cal Factor	(Y)	0.889
Low Flow Manometer	SAMP-MN-0001	
Average Nozzle Diameter	(D _{no})	in
Suggested Nozzle Diameter	(D _n)	0.4414 in
Probe Number	SAMP-FP-0001	in
Probe Length	60	in
Liner Material	inconel	
Sample Case / Oven Number	SAMP-BC-0012	
Impinger Case Number	SAMP-BC-0003	

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Coefficient	(C _p)	0.840	
Average Stack Temp	(t _s)	1581.0	F
Average Meter Temp	(t _m)	86.0	
Orifice Meter Coefficient	(ΔH@)	1.632	in H ₂ O
Square Root ΔP	(ΔP ^{1/2} _{avg})	0.16	in H ₂ O
Stack Moisture Content	(B _{ws})	6.24	%
Stack Dry Molecular Weight	(M _d)	29.43	lb/lb-mole
Estimated Orifice Flow Rate	(Q _m)	0.75	acfm
ΔP to ΔH Isokinetic Factor	(K)		

Pressures			
Barometric Pressure	(P _b)	29.84	in Hg
Stack Static Pressure	(P _{static})	0.00	in H ₂ O
Absolute Stack Pressure	(P _a)	29.84	in Hg
Absolute Meter Pressure	(P _m)	29.96	in Hg

Wash Volumes					ml
					ml

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)	Snorkel Temp (248±25°F)	Filter Temp (248±25°F)	Impinger Exit Temp (568°F)	Cond. Temp (≤-°F)	CPM Filter Temp (-±-°F)	Meter Inlet Temp (t _{mi})	Meter Outlet Temp (t _{mo})	Pump Vacuum	Square Root ΔP (ΔP ^{1/2})	Local Stack Velocity (v _s)	Cumul. Meter Volume (V _m) _{std}	Cumul. Percent IsoKinetic (I)	Est-Run Meter Volume (V _m) _{std}
	min	hh:mm:ss	ft ³	in H ₂ O	in H ₂ O	in H ₂ O	F	F	F	F	F	F	F	F	in Hg	√(in H ₂ O)	ft/sec	dscf	%	dscf
A-1	0.0	00:00:00	864.490	0.005	1.632	1.60	1382	261		66			82	77	2.0	0.07	7.45	2.095		50.282
A-2	2.5	00:02:30	866.895	0.015	1.632	1.60	1515	260		58			86	77	2.0	0.12	13.35	3.792		45.503
A-3	5.0	00:05:00	868.850	0.025	1.632	1.60	1710	259		57			86	77	2.0	0.16	18.07	5.675		45.402
A-4	7.5	00:07:30	871.020	0.030	1.632	1.60	1752	260		57			87	78	2.0	0.17	19.98	7.451		44.708
A-5	10.0	00:10:00	873.070	0.030	1.632	1.60	1777	260		59			88	78	2.0	0.17	20.10	9.234		44.324
A-6	12.5	00:12:30	875.130	0.030	1.632	1.60	1783	260		61			88	79	2.0	0.17	20.12	11.007		44.028
A-7	15.0	00:15:00	877.180	0.015	1.632	1.60	1576	260		61			89	79	2.0	0.12	13.56	12.839		44.018
A-8	17.5	00:17:30	879.300	0.015	1.632	1.60	1480	260		60			89	80	2.0	0.12	13.23	14.651		43.953
A-9	20.0	00:20:00	881.400	0.035	1.632	1.60	1621	260		60			89	81	2.5	0.19	20.94	16.471		43.922
A-10	22.5	00:22:30	883.510	0.040	1.632	1.60	1772	260		60			90	82	2.5	0.20	23.18	18.296		43.909
A-11	25.0	00:25:00	885.630	0.035	1.632	1.60	1778	260		60			90	82	2.5	0.19	21.71	20.120		43.899
A-12	27.5	00:27:30	887.750	0.010	1.632	1.60	1652	260		60			90	82	2.5	0.10	11.27	21.967		43.933
B-1	30.0	00:30:00	889.895	0.020	1.632	1.60	1424	260		63			88	84	2.5	0.14	15.06	23.779		43.899
B-2	32.5	00:32:30	892.000	0.035	1.632	1.60	1783	260		59			91	84	2.5	0.19	21.74	25.573		43.839
B-3	35.0	00:35:00	894.090	0.050	1.632	1.60	1711	260		59			91	85	2.5	0.22	25.56	27.352		43.764
B-4	37.5	00:37:30	896.165	0.055	1.632	1.60	1654	260		59			91	85	2.5	0.23	26.45	29.158		43.736
B-5	40.0	00:40:00	898.270	0.035	1.632	1.60	1493	260		59			91	85	2.5	0.19	20.28	30.976		43.731
B-6	42.5	00:42:30	900.390	0.020	1.632	1.60	1460	260		60			91	85	2.5	0.14	15.20	32.785		43.714
B-7	45.0	00:45:00	902.500	0.030	1.632	1.60	1572	260		60			92	85	2.5	0.17	19.15	34.572		43.670
B-8	47.5	00:47:30	904.585	0.040	1.632	1.60	1629	260		61			93	86	2.5	0.20	22.43	36.381		43.657
B-9	50.0	00:50:00	906.700	0.035	1.632	1.60	1569	260		62			93	86	2.5	0.19	20.67	38.203		43.660
B-10	52.5	00:52:30	908.830	0.030	1.632	1.60	1522	260		62			93	86	2.5	0.17	18.92	40.024		43.663
B-11	55.0	00:55:00	910.960	0.010	1.632	1.60	1343	260		63			93	86	2.5	0.10	10.42	41.889		43.710
B-12	57.5	00:57:30	913.140	0.005	1.632	1.60	985	260		63			93	86	2.5	0.07	6.59	43.749		43.749
Last Pt	60.0	01:00:00	915.315																	
Final Val	60.0	01:00:00	915.315												Max Vac	2.5	Final Values	43.749		
Average Values				0.03		1.60	1581	260		60			90	82		0.16	17.73			
													86							

METHOD 4 (MOISTURE) [MULTI POINT, NO VARIATION] SOURCE SAMPLING TITLE PAGE ISOKINETIC SAMPLING DATA

Plant Name	Cimaron Energy, INC
Sampling Location	48HV ECD
Project #	cel-14-norman.ok-comp#1

Date	05/08/14
Operator	TP/MM
Run Number	30-70-30%-5

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Coefficient	(C _p)	0.840	
Average Stack Temp	(t _s)	1506.2	F
Average Meter Temp	(t _m)	87.4	
Orifice Meter Coefficient	(ΔH@)	1.632	in H ₂ O
Square Root ΔP	(ΔP ^{1/2} _{avg})	0.16	in H ₂ O
Stack Moisture Content	(B _{ws})	5.69	%
Stack Dry Molecular Weight	(M _d)	29.37	lb/lb-mole
Estimated Orifice Flow Rate	(Q _m)	0.73	acfm
ΔP to ΔH Isokinetic Factor	(K)		

Leak Checks					
Train INCOMPLETE	Pre	0.000	ft ³ /min@	15.0	in Hg
	Post		ft ³ /min@	15.0	in Hg
< 3.0	Pitot	Pre (+)	0.200	in H ₂ O for	15.0 sec
		Pre (-)	0.185	in H ₂ O for	15.0 sec
		Post (+)	0.210	in H ₂ O for	15.0 sec
		Post (-)	0.200	in H ₂ O for	15.0 sec

Sampling Equipment		
Meter Box Number	SAMP-CP-0012	
Meter Cal Factor	(Y)	0.889
Low Flow Manometer	SAMP-MN-0001	
Average Nozzle Diameter	(D _{no})	in
Suggested Nozzle Diameter	(D _n)	0.4267 in
Probe Number	SAMP-FP-0001	in
Probe Length	60	in
Liner Material	inconel	
Sample Case / Oven Number	SAMP-BC-0012	
Impinger Case Number	SAMP-BC-0003	

Pressures			
Barometric Pressure	(P _b)	29.82	in Hg
Stack Static Pressure	(P _{static})	0.00	in H ₂ O
Absolute Stack Pressure	(P _a)	29.82	in Hg
Absolute Meter Pressure	(P _m)	29.94	in Hg

Run Time			
Start	15:05	End	16:08

Weights	Imp 1	Imp 2	Imp 3	Imp 4	Imp 5	Imp 6	Imp 7	Imp 8
Pre	776.3	754.2	599.3	836.0				
Post	816.0	762.4	601.2	841.7				

Wash Volumes					ml
					ml

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)	Snorkel Temp (248±25°F)	Filter Temp (248±25°F)	Impinger Exit Temp (568°F)	Cond. Temp (≤-°F)	CPM Filter Temp (-±-°F)	Meter Inlet Temp (t _{mi})	Meter Outlet Temp (t _{mo})	Pump Vacuum	Square Root ΔP (ΔP ^{1/2})	Local Stack Velocity (v _s)	Cumul. Meter Volume (V _m) _{std}	Cumul. Percent IsoKinetic (I)	Est-Run Meter Volume (V _m) _{std}
	min	hh:mm:ss	ft ³	in H ₂ O	in H ₂ O	in H ₂ O	F	F	F	F	F	F	F	F	in Hg	√(in H ₂ O)	ft/sec	dscf	%	dscf
A-1	0.0	00:00:00	915.460	0.010	1.632	1.60	1343	261		68			84	85	3.5	0.10	10.42	1.837		44.095
A-2	2.5	00:02:30	917.590	0.015	1.632	1.60	1360	260		63			86	85	3.5	0.12	12.82	3.645		43.744
A-3	5.0	00:05:00	919.690	0.030	1.632	1.60	1500	260		64			87	85	3.5	0.17	18.82	5.460		43.683
A-4	7.5	00:07:30	921.800	0.050	1.632	1.60	1727	260		64			89	85	3.5	0.22	25.66	7.191		43.143
A-5	10.0	00:10:00	923.815	0.055	1.632	1.60	1729	260		63			89	85	3.5	0.23	26.93	9.002		43.211
A-6	12.5	00:12:30	925.925	0.055	1.632	1.60	1736	260		64			90	85	3.5	0.23	26.97	10.731		42.923
A-7	15.0	00:15:00	927.940	0.020	1.632	1.60	1508	260		62			90	86	3.5	0.14	15.40	12.496		42.844
A-8	17.5	00:17:30	930.000	0.015	1.632	1.60	1425	260		60			90	86	3.5	0.12	13.05	14.292		42.876
A-9	20.0	00:20:00	932.095	0.020	1.632	1.60	1434	260		58			90	86	3.5	0.14	15.10	16.096		42.923
A-10	22.5	00:22:30	934.200	0.020	1.632	1.60	1552	260		57			90	86	3.5	0.14	15.57	17.883		42.919
A-11	25.0	00:25:00	936.285	0.020	1.632	1.60	1365	260		55			90	86	3.5	0.14	14.83	19.717		43.019
A-12	27.5	00:27:30	938.425	0.015	1.632	1.60	1058	260		55			90	86	3.5	0.12	11.71	21.551		43.102
B-1	30.0	00:30:00	940.565	0.005	1.632	1.60	1350	260		56			87	86	3.5	0.07	7.38	23.356		43.119
B-2	32.5	00:32:30	942.665	0.025	1.632	1.60	1619	260		54			89	86	3.5	0.16	17.69	25.149		43.112
B-3	35.0	00:35:00	944.755	0.040	1.632	1.60	1537	260		53			89	86	3.5	0.20	21.93	26.946		43.114
B-4	37.5	00:37:30	946.850	0.045	1.632	1.60	1545	260		53			89	86	3.5	0.21	23.31	28.747		43.121
B-5	40.0	00:40:00	948.950	0.040	1.632	1.60	1560	260		53			89	86	3.5	0.20	22.06	30.575		43.164
B-6	42.5	00:42:30	951.080	0.020	1.632	1.60	1460	260		53			89	86	3.5	0.14	15.21	32.436		43.248
B-7	45.0	00:45:00	953.250	0.015	1.632	1.60	1500	260		53			90	86	3.5	0.12	13.31	34.223		43.229
B-8	47.5	00:47:30	955.335	0.040	1.632	1.60	1597	260		53			90	86	3.5	0.20	22.26	36.036		43.243
B-9	50.0	00:50:00	957.450	0.060	1.632	1.60	1593	260		54			90	86	3.5	0.24	27.24	37.857		43.265
B-10	52.5	00:52:30	959.575	0.055	1.632	1.60	1568	260		54			90	86	3.5	0.23	25.92	39.678		43.285
B-11	55.0	00:55:00	961.700	0.020	1.632	1.60	1602	260		54			90	86	3.5	0.14	15.76	41.512		43.317
B-12	57.5	00:57:30	963.840	0.015	1.632	1.60	1480	260		54			90	86	3.5	0.12	13.24	43.342		43.342
Last Pt	60.0	01:00:00	965.975																	
Final Val	60.0	01:00:00	965.975											Max Vac	3.5		Final Values	43.342		
Average Values				0.03		1.60	1506	260		57			89	86		0.16	18.02			
													87							

METHOD 4 (MOISTURE) [MULTI POINT, NO VARIATION] SOURCE SAMPLING TITLE PAGE ISOKINETIC SAMPLING DATA

Plant Name	Cimaron Energy, INC
Sampling Location	48HV ECD
Project #	cel-14-norman.ok-comp#1

Date	05/08/14
Operator	TP/MM
Run Number	30-70-30%-6

Leak Checks					
Train	Pre	0.000	ft ³ /min@	15.0	in Hg
PASS	Post	0.000	ft ³ /min@	15.0	in Hg
< 3.0	Pitot	Pre (+)	0.010	in H ₂ O for	15.0
		Pre (-)	0.021	in H ₂ O for	15.0
		Post (+)	0.015	in H ₂ O for	15.0
		Post (-)	0.018	in H ₂ O for	15.0

Nozzle Measurements				
Pre				PASS
Post				PASS

Run Time			
Start	16:25	End	17:27

Weights	Imp 1	Imp 2	Imp 3	Imp 4	Imp 5	Imp 6	Imp 7	Imp 8
Pre	803.6	787.6	579.8	795.8				
Post	844.1	797.1	581.4	806.3				

Sampling Equipment		
Meter Box Number	SAMP-CP-0012	
Meter Cal Factor	(Y)	0.889
Low Flow Manometer	SAMP-MN-0001	
Average Nozzle Diameter	(D _{no})	in
Suggested Nozzle Diameter	(D _n)	0.4358 in
Probe Number	SAMP-FP-0001	in
Probe Length	60	in
Liner Material	inconel	
Sample Case / Oven Number	SAMP-BC-0012	
Impinger Case Number	SAMP-BC-0003	

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Coefficient	(C _p)	0.840	
Average Stack Temp	(t _s)	1536.8	F
Average Meter Temp	(t _m)	85.1	
Orifice Meter Coefficient	(ΔH@)	1.632	in H ₂ O
Square Root ΔP	(ΔP ^{1/2} _{avg})	0.15	in H ₂ O
Stack Moisture Content	(B _{ws})	6.29	%
Stack Dry Molecular Weight	(M _d)	29.44	lb/lb-mole
Estimated Orifice Flow Rate	(Q _o)	0.72	acfm
ΔP to ΔH Isokinetic Factor	(K)		

Pressures			
Barometric Pressure	(P _b)	29.80	in Hg
Stack Static Pressure	(P _{static})	0.00	in H ₂ O
Absolute Stack Pressure	(P _a)	29.80	in Hg
Absolute Meter Pressure	(P _m)	29.92	in Hg

Wash Volumes					ml
					ml

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)	Snorkel Temp (248±25°F)	Filter Temp (248±25°F)	Impinger Exit Temp (568°F)	Cond. Temp (≤-°F)	CPM Filter Temp (-±-°F)	Meter Inlet Temp (t _{mi})	Meter Outlet Temp (t _{mo})	Pump Vacuum	Square Root ΔP (ΔP ^{1/2})	Local Stack Velocity (v _s)	Cumul. Meter Volume (V _m) _{std}	Cumul. Percent IsoKinetic (I)	Est-Run Meter Volume (V _m) _{std}
	min	hh:mm:ss	ft ³	in H ₂ O	in H ₂ O	in H ₂ O	F	F	F	F	F	F	F	F	in Hg	√(in H ₂ O)	ft/sec	dscf	%	dscf
A-1	0.0	00:00:00	966.165	0.010	1.632	1.60	1407	261		60			84	84	2.5	0.10	10.61	1.833		44.002
A-2	2.5	00:02:30	968.290	0.010	1.632	1.60	1450	260		53			87	84	2.5	0.10	10.73	3.666		43.993
A-3	5.0	00:05:00	970.420	0.010	1.632	1.60	1485	260		52			87	83	2.5	0.10	10.83	5.500		44.004
A-4	7.5	00:07:30	972.550	0.030	1.632	1.60	1637	260		53			87	83	2.5	0.17	19.47	7.309		43.854
A-5	10.0	00:10:00	974.650	0.035	1.632	1.60	1674	260		55			88	83	2.5	0.19	21.22	9.103		43.694
A-6	12.5	00:12:30	976.735	0.020	1.632	1.60	1763	260		55			88	83	2.5	0.14	16.37	10.923		43.691
A-7	15.0	00:15:00	978.850	0.015	1.632	1.60	1572	260		56			88	83	2.5	0.12	13.55	12.764		43.762
A-8	17.5	00:17:30	980.990	0.010	1.632	1.60	1478	260		56			88	83	2.5	0.10	10.81	14.610		43.829
A-9	20.0	00:20:00	983.135	0.015	1.632	1.60	1479	260		56			88	84	2.5	0.12	13.24	16.441		43.842
A-10	22.5	00:22:30	985.265	0.030	1.632	1.60	1661	260		57			88	84	2.5	0.17	19.58	18.276		43.862
A-11	25.0	00:25:00	987.400	0.035	1.632	1.60	1672	260		57			88	84	2.5	0.19	21.21	20.124		43.907
A-12	27.5	00:27:30	989.550	0.035	1.632	1.60	1668	260		57			87	84	2.5	0.19	21.19	21.944		43.888
B-1	30.0	00:30:00	991.665	0.015	1.632	1.60	1345	260		58			85	84	2.5	0.12	12.77	23.763		43.870
B-2	32.5	00:32:30	993.775	0.010	1.632	1.60	1521	260		57			86	84	2.5	0.10	10.93	25.550		43.799
B-3	35.0	00:35:00	995.850	0.050	1.632	1.60	1681	260		57			86	84	2.5	0.22	25.40	27.328		43.725
B-4	37.5	00:37:30	997.915	0.065	1.632	1.60	1672	260		57			87	84	2.5	0.25	28.90	29.096		43.644
B-5	40.0	00:40:00	999.970	0.065	1.632	1.60	1644	260		58			87	84	2.5	0.25	28.71	30.864		43.573
B-6	42.5	00:42:30	1002.025	0.050	1.632	1.60	1645	260		58			87	83	2.5	0.22	25.18	32.651		43.535
B-7	45.0	00:45:00	1004.100	0.020	1.632	1.60	1570	260		59			87	83	2.5	0.14	15.64	34.460		43.528
B-8	47.5	00:47:30	1006.200	0.015	1.632	1.60	1511	260		59			87	83	2.5	0.12	13.35	36.268		43.522
B-9	50.0	00:50:00	1008.300	0.030	1.632	1.60	1598	260		59			87	83	2.5	0.17	19.29	38.077		43.516
B-10	52.5	00:52:30	1010.400	0.020	1.632	1.60	1467	260		59			86	83	2.5	0.14	15.24	39.952		43.584
B-11	55.0	00:55:00	1012.575	0.015	1.632	1.60	1182	260		59			86	82	2.5	0.12	12.18	41.759		43.575
B-12	57.5	00:57:30	1014.670	0.005	1.632	1.60	1102	260		59			86	82	2.5	0.07	6.86	43.627		43.627
Last Pt	60.0	01:00:00	1016.835																	
Final Val	60.0	01:00:00	1016.835												Max Vac	2.5	Final Values	43.627		
Average Values				0.03		1.60	1537	260		57			87	83		0.15	16.80			
													85							

CIMARRON ENERGY, INC.

May 8, 2014

48HV ECD

Norman Facility

Unit Data

Meas. Stack Moisture	6.2	%
Stack Exhaust Flow (M2)	128,077	SCFH

Weather Data

Barometric Pressure	29.84	in. Hg
Relative Humidity	45	%
Ambient Temperature	77	° F
Specific Humidity	0.008904	lb H ₂ O / lb air

30-70-30 Load, Run - 48HV ECD R4

	Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmvd)	THC (ppmvw)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
A1	05/08/14 13:46:00	22950	14.73	9.66	0.03	4.47	10.13	93.00	1,341.00
	05/08/14 13:46:30	22980	14.72	7.21	0.03	4.48	10.13	93.00	1,341.00
	05/08/14 13:47:00	23010	14.82	7.67	0.06	4.43	10.10	93.10	1,319.00
	05/08/14 13:47:30	23040	14.79	12.44	0.06	4.44	10.10	93.10	1,319.00
	05/08/14 13:48:00	23070	14.62	9.22	0.02	4.56	10.35	93.30	1,341.00
	05/08/14 13:48:30	23100	14.74	6.89	0.03	4.48	10.35	93.30	1,341.00
	05/08/14 13:49:00	23130	13.86	7.95	0.02	5.04	10.19	93.40	1,340.00
	05/08/14 13:49:30	23160	13.55	2.74	0.03	5.33	10.19	93.40	1,340.00
	05/08/14 13:50:00	23190	14.38	-0.07	0.04	4.73	8.83	93.40	2,248.00
	05/08/14 13:50:30	23220	13.33	-0.21	0.05	5.44	8.83	93.40	2,248.00
	05/08/14 13:51:00	23250	13.18	-0.67	0.05	5.56	13.06	93.20	2,755.00
	05/08/14 13:51:30	23280	13.28	-0.73	0.05	5.48	13.06	93.20	2,755.00
	05/08/14 13:52:00	23310	13.24	-0.75	0.02	5.54	13.56	92.90	2,825.00
	05/08/14 13:52:30	23340	13.54	-0.63	0.02	5.32	13.56	92.90	2,825.00
	05/08/14 13:53:00	23370	13.25	-0.56	0.05	5.51	13.18	92.40	2,814.00
	05/08/14 13:53:30	23400	13.42	-0.55	0.05	5.40	13.18	92.40	2,814.00
	05/08/14 13:54:00	23430	13.29	-0.54	0.05	5.48	14.09	92.10	2,888.00
	05/08/14 13:54:30	23460	13.36	-0.53	0.05	5.44	14.09	92.10	2,888.00
	05/08/14 13:55:00	23490	13.27	-0.53	0.03	5.49	13.95	91.90	2,866.00
	05/08/14 13:55:30	23520	13.40	-0.50	0.02	5.40	13.95	91.90	2,866.00
	05/08/14 13:56:00	23550	13.16	-0.58	0.03	5.57	13.81	91.80	2,832.00
	05/08/14 13:56:30	23580	13.17	-0.52	0.03	5.57	13.81	91.80	2,832.00
	05/08/14 13:57:00	23610	13.24	-0.55	0.06	5.52	14.20	91.80	2,879.00
	05/08/14 13:57:30	23640	13.28	-0.53	0.05	5.49	14.20	91.80	2,879.00
	05/08/14 13:58:00	23670	13.30	-0.53	0.05	5.48	14.06	91.90	2,856.00
	05/08/14 13:58:30	23700	13.54	-0.55	0.04	5.31	14.06	91.90	2,856.00
	05/08/14 13:59:00	23730	13.58	-0.56	0.02	5.27	13.78	92.00	2,820.00
	05/08/14 13:59:30	23760	12.91	-0.52	0.03	5.71	13.78	92.00	2,820.00
	05/08/14 14:00:00	23790	12.14	-0.55	0.03	6.25	14.31	92.10	2,867.00
	05/08/14 14:00:30	23820	14.27	-0.50	0.02	4.81	14.31	92.10	2,867.00
	05/08/14 14:01:00	23850	14.28	-0.47	0.03	4.81	16.94	92.20	1,842.00
	05/08/14 14:01:30	23880	14.74	-0.28	0.03	4.48	16.94	92.20	1,842.00
	05/08/14 14:02:00	23910	14.80	0.13	0.06	4.43	11.76	92.30	1,392.00
	05/08/14 14:02:30	23940	14.57	0.41	0.06	4.60	11.76	92.30	1,392.00
	05/08/14 14:03:00	23970	14.76	0.52	0.02	4.47	11.90	92.30	1,381.00
	05/08/14 14:03:30	24000	14.74	1.95	0.02	4.47	11.90	92.30	1,381.00
	05/08/14 14:04:00	24030	14.67	2.13	0.02	4.52	10.71	92.20	1,355.00
	05/08/14 14:04:30	24060	14.65	1.88	0.03	4.53	10.71	92.20	1,355.00
	05/08/14 14:05:00	24090	14.10	2.40	0.03	4.90	11.38	92.30	1,390.00
	05/08/14 14:05:30	24120	13.86	0.77	0.03	5.10	11.38	92.30	1,390.00
	05/08/14 14:06:00	24150	14.46	-0.14	0.02	4.66	9.80	92.20	2,312.00
A2	05/08/14 14:06:30	24180	14.17	-0.12	0.02	4.85	9.80	92.20	2,312.00
	05/08/14 14:07:00	24210	13.60	-0.40	0.03	5.26	11.27	92.10	2,595.00
	05/08/14 14:07:30	24240	13.41	-0.55	0.03	5.40	11.27	92.10	2,595.00
	05/08/14 14:08:00	24270	13.38	-0.56	0.03	5.41	13.40	91.80	2,807.00
	05/08/14 14:08:30	24300	13.48	-0.52	0.03	5.34	13.40	91.80	2,807.00
	05/08/14 14:09:00	24330	13.32	-0.56	0.02	5.45	13.54	91.50	2,821.00
	05/08/14 14:09:30	24360	13.17	-0.57	0.02	5.56	13.54	91.50	2,821.00
	05/08/14 14:10:00	24390	13.30	-0.55	0.05	5.47	14.61	91.40	2,929.00
	05/08/14 14:10:30	24420	13.43	-0.52	0.05	5.39	14.61	91.40	2,929.00
	05/08/14 14:11:00	24450	13.34	-0.55	0.03	5.45	14.34	91.40	2,883.00

CIMARRON ENERGY, INC.

May 8, 2014

48HV ECD

Norman Facility

Unit Data

Meas. Stack Moisture	6.2	%
Stack Exhaust Flow (M2)	128,077	SCFH

Weather Data

Barometric Pressure	29.84	in. Hg
Relative Humidity	45	%
Ambient Temperature	77	° F
Specific Humidity	0.008904	lb H ₂ O / lb air

30-70-30 Load, Run - 48HV ECD R4

	Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmvd)	THC (ppmvw)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
	05/08/14 14:11:30	24480	13.34	-0.52	0.03	5.45	14.34	91.40	2,883.00
	05/08/14 14:12:00	24510	13.30	-0.57	0.03	5.48	14.20	91.40	2,804.00
	05/08/14 14:12:30	24540	13.50	-0.57	0.03	5.33	14.20	91.40	2,804.00
	05/08/14 14:13:00	24570	13.32	-0.54	0.05	5.46	14.34	91.60	2,849.00
	05/08/14 14:13:30	24600	13.60	-0.58	0.05	5.27	14.34	91.60	2,849.00
	05/08/14 14:14:00	24630	13.44	-0.55	0.03	5.33	14.20	91.70	2,837.00
	05/08/14 14:14:30	24660	12.59	-0.56	0.03	5.98	14.20	91.70	2,837.00
	05/08/14 14:15:00	24690	13.11	-0.52	0.03	5.56	15.50	91.80	2,378.00
	05/08/14 14:15:30	24720	12.87	-0.57	0.03	5.78	15.50	91.80	2,378.00
	05/08/14 14:16:00	24750	14.47	-0.51	0.04	4.67	16.41	92.10	1,619.00
	05/08/14 14:16:30	24780	14.94	-0.32	0.05	4.34	16.41	92.10	1,619.00
	05/08/14 14:17:00	24810	15.05	0.88	0.03	4.25	11.49	92.40	1,380.00
	05/08/14 14:17:30	24840	14.98	2.33	0.03	4.30	11.49	92.40	1,380.00
	05/08/14 14:18:00	24870	14.78	3.80	0.02	4.44	11.35	92.70	1,379.00
	05/08/14 14:18:30	24900	14.77	3.83	0.02	4.45	11.35	92.70	1,379.00
	05/08/14 14:19:00	24930	14.65	3.32	0.05	4.53	11.07	93.00	1,344.00
	05/08/14 14:19:30	24960	14.76	5.10	0.05	4.45	11.07	93.00	1,344.00
	05/08/14 14:20:00	24990	14.79	4.85	0.02	4.45	11.32	93.30	1,388.00
	05/08/14 14:20:30	25020	14.45	11.24	0.03	4.65	11.32	93.30	1,388.00
	05/08/14 14:21:00	25050	14.20	5.22	0.05	4.83	10.49	93.60	1,700.00
	05/08/14 14:21:30	25080	13.18	1.03	0.05	5.53	10.49	93.60	1,700.00
	05/08/14 14:22:00	25110	12.21	-0.29	0.03	6.18	11.82	93.80	2,625.00
	05/08/14 14:22:30	25140	11.79	-0.58	0.02	6.45	11.82	93.80	2,625.00
	05/08/14 14:23:00	25170	11.91	-0.57	0.03	6.39	14.45	93.80	2,904.00
	05/08/14 14:23:30	25200	12.19	-0.56	0.03	6.20	14.45	93.80	2,904.00
	05/08/14 14:24:00	25230	12.44	-0.58	0.03	6.07	13.90	93.90	2,856.00
	05/08/14 14:24:30	25260	12.74	-0.52	0.02	5.86	13.90	93.90	2,856.00
	05/08/14 14:25:00	25290	12.96	-0.58	0.02	5.70	13.45	94.00	2,809.00
	05/08/14 14:25:30	25320	13.04	-0.54	0.02	5.65	13.45	94.00	2,809.00
	05/08/14 14:26:00	25350	13.15	-0.50	0.03	5.57	13.95	94.20	2,822.00
A3	05/08/14 14:26:30	25380	13.27	-0.32	0.02	5.50	13.95	94.20	2,822.00
	05/08/14 14:27:00	25410	13.34	-0.24	0.05	5.44	13.65	94.40	2,808.00
	05/08/14 14:27:30	25440	13.39	-0.22	0.05	5.40	13.65	94.40	2,808.00
	05/08/14 14:28:00	25470	13.44	-0.15	0.03	5.37	13.37	94.70	2,772.00
	05/08/14 14:28:30	25500	13.19	-0.02	0.03	5.53	13.37	94.70	2,772.00
	05/08/14 14:29:00	25530	12.95	0.31	0.03	5.72	13.45	94.90	2,782.00
	05/08/14 14:29:30	25560	13.76	0.56	0.03	5.16	13.45	94.90	2,782.00
	05/08/14 14:30:00	25590	13.58	2.15	0.05	5.27	14.06	95.30	2,576.00
	05/08/14 14:30:30	25620	14.85	8.93	0.05	4.41	14.06	95.30	2,576.00
	05/08/14 14:31:00	25650	14.91	19.52	0.06	4.36	18.16	95.40	1,782.00
	05/08/14 14:31:30	25680	15.55	26.41	0.06	3.91	18.16	95.40	1,782.00
	05/08/14 14:32:00	25710	15.59	46.04	0.05	3.87	10.66	95.60	1,347.00
	05/08/14 14:32:30	25740	14.92	43.15	0.06	4.32	10.66	95.60	1,347.00
	05/08/14 14:33:00	25770	14.31	10.37	0.02	4.75	10.10	95.80	1,323.00
	05/08/14 14:33:30	25800	14.07	1.21	0.02	4.93	10.10	95.80	1,323.00
	05/08/14 14:34:00	25830	13.96	0.01	0.05	5.02	12.59	95.90	1,473.00
	05/08/14 14:34:30	25860	14.31	0.28	0.05	4.78	12.59	95.90	1,473.00
	05/08/14 14:35:00	25890	14.13	1.43	0.05	4.84	11.24	96.00	1,392.00
	05/08/14 14:35:30	25920	12.14	2.54	0.06	6.24	11.24	96.00	1,392.00
	05/08/14 14:36:00	25950	13.45	0.36	0.02	5.39	9.63	95.90	2,253.00
	05/08/14 14:36:30	25980	12.60	0.07	0.03	5.90	9.63	95.90	2,253.00

CIMARRON ENERGY, INC.

May 8, 2014

48HV ECD

Norman Facility

Unit Data

Meas. Stack Moisture	6.2	%
Stack Exhaust Flow (M2)	128,077	SCFH

Weather Data

Barometric Pressure	29.84	in. Hg
Relative Humidity	45	%
Ambient Temperature	77	° F
Specific Humidity	0.008904	lb H ₂ O / lb air

30-70-30 Load, Run - 48HV ECD R4

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmvd)	THC (ppmvw)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
05/08/14 14:37:00	26010	11.76	-0.44	0.02	6.46	11.76	95.60	2,638.00
05/08/14 14:37:30	26040	12.06	-0.37	0.02	6.29	11.76	95.60	2,638.00
05/08/14 14:38:00	26070	12.45	-0.02	0.03	6.03	13.62	95.30	2,847.00
05/08/14 14:38:30	26100	12.41	0.24	0.03	6.07	13.62	95.30	2,847.00
05/08/14 14:39:00	26130	12.76	0.41	0.06	5.84	13.76	95.20	2,805.00
05/08/14 14:39:30	26160	12.97	0.83	0.06	5.69	13.76	95.20	2,805.00
05/08/14 14:40:00	26190	13.12	0.79	0.03	5.60	14.14	95.20	2,851.00
05/08/14 14:40:30	26220	13.33	1.21	0.03	5.44	14.14	95.20	2,851.00
05/08/14 14:41:00	26250	13.18	1.35	0.03	5.56	13.73	95.20	2,805.00
05/08/14 14:41:30	26280	13.20	1.45	0.03	5.53	13.73	95.20	2,805.00
05/08/14 14:42:00	26310	13.14	1.35	0.03	5.58	14.12	95.10	2,830.00
05/08/14 14:42:30	26340	13.34	1.45	0.02	5.44	14.12	95.10	2,830.00
05/08/14 14:43:00	26370	13.27	1.47	0.06	5.51	14.39	95.00	2,854.00
05/08/14 14:43:30	26400	13.62	2.68	0.06	5.25	14.39	95.00	2,854.00
05/08/14 14:44:00	26430	14.71	6.47	0.03	4.51	14.23	95.10	2,786.00
05/08/14 14:44:30	26460	15.22	30.20	0.03	4.13	14.23	95.10	2,786.00
05/08/14 14:45:00	26490	15.84	48.30	0.03	3.70	15.69	95.10	1,937.00
05/08/14 14:45:30	26520	14.96	35.42	0.04	4.28	15.69	95.10	1,937.00
05/08/14 14:46:00	26550	14.27	11.56	0.02	4.80	15.28	95.10	1,660.00
RAW AVERAGE		13.70	3.26	0.04	5.19	12.98	93.41	2,298.89

Bias	Serial Number:	O ₂	CO	THC	CO ₂	Press. Trans	Temp. Trans.	F-Flow Trans.
		INST-22-010	INST-CO-0008	INST-VC-0007	INST-22-0010	1229943	1229943	1229943
						(in. H ₂ O)	(°F)	(SCFH)
	Initial Zero	0.10	-0.03	0.04	0.07			
	Final Zero	0.32	-0.06	0.04	0.05			
	Avg. Zero	0.21	-0.05	0.04	0.06			
	Initial UpScale	11.87	8.91	3.10	8.44			
	Final UpScale	12.17	8.86	2.95	8.44			
	Avg. UpScale	12.02	8.89	3.03	8.44			
	Upscale Cal Gas	12.20	9.00	3.04	8.56			

EMISSIONS DATA	O ₂	CO	THC	CO ₂
Corrected Raw Average (ppm/% dry basis)	13.93	3.33	0.00	5.24
Corrected Raw Average (ppm/% wet basis)	13.05	3.13	0.00	4.91
Concentration (ppm@ 3%CO ₂)	N/A	1.91	0.00	N/A
Emission Rate (lb/hr)	N/A	0.03	0.00	N/A

CIMARRON ENERGY, INC.

May 8, 2014

48HV ECD

Norman Facility

Unit Data

Meas. Stack Moisture	5.7	%
Stack Exhaust Flow (M2)	135,858	SCFH

Weather Data

Barometric Pressure	29.82	in. Hg
Relative Humidity	40	%
Ambient Temperature	83	° F
Specific Humidity	0.009648	lb H ₂ O / lb air

30-70-30 Load, Run - 48HV ECD R5

	Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmvd)	THC (ppmvw)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
A1	05/08/14 15:05:00	27690	14.87	0.89	0.03	4.36	8.25	94.30	1,202.00
	05/08/14 15:05:30	27720	14.77	0.41	0.03	4.43	8.25	94.30	1,202.00
	05/08/14 15:06:00	27750	14.86	0.30	0.03	4.37	8.53	94.50	1,235.00
	05/08/14 15:06:30	27780	15.00	0.38	0.03	4.27	8.53	94.50	1,235.00
	05/08/14 15:07:00	27810	15.04	0.77	0.02	4.23	8.28	94.60	1,180.00
	05/08/14 15:07:30	27840	15.05	0.78	0.02	4.24	8.28	94.60	1,180.00
	05/08/14 15:08:00	27870	14.77	0.47	0.02	4.42	8.69	94.70	1,224.00
	05/08/14 15:08:30	27900	14.88	0.27	0.02	4.36	8.69	94.70	1,224.00
	05/08/14 15:09:00	27930	15.09	0.55	0.05	4.20	8.55	94.90	1,213.00
	05/08/14 15:09:30	27960	15.00	0.77	0.05	4.26	8.55	94.90	1,213.00
	05/08/14 15:10:00	27990	14.73	0.71	0.03	4.43	8.28	95.00	1,201.00
	05/08/14 15:10:30	28020	13.16	0.82	0.03	5.58	8.28	95.00	1,201.00
	05/08/14 15:11:00	28050	14.36	0.18	0.03	4.72	7.36	95.10	2,062.00
	05/08/14 15:11:30	28080	14.45	0.84	0.03	4.67	7.36	95.10	2,062.00
	05/08/14 15:12:00	28110	13.63	0.61	0.03	5.24	9.88	95.20	2,530.00
	05/08/14 15:12:30	28140	13.51	-0.30	0.04	5.30	9.88	95.20	2,530.00
	05/08/14 15:13:00	28170	13.29	-0.45	0.02	5.47	12.82	95.10	2,799.00
	05/08/14 15:13:30	28200	13.54	-0.44	0.03	5.29	12.82	95.10	2,799.00
	05/08/14 15:14:00	28230	13.36	-0.46	0.05	5.42	12.68	95.10	2,766.00
	05/08/14 15:14:30	28260	13.53	-0.49	0.05	5.31	12.68	95.10	2,766.00
	05/08/14 15:15:00	28290	13.62	-0.52	0.03	5.24	13.20	95.10	2,802.00
	05/08/14 15:15:30	28320	13.55	-0.52	0.03	5.30	13.20	95.10	2,802.00
	05/08/14 15:16:00	28350	13.69	-0.56	0.03	5.19	13.20	95.00	2,781.00
	05/08/14 15:16:30	28380	13.80	-0.50	0.03	5.12	13.20	95.00	2,781.00
	05/08/14 15:17:00	28410	13.76	-0.51	0.03	5.14	12.79	95.00	2,756.00
	05/08/14 15:17:30	28440	13.80	-0.53	0.03	5.11	12.79	95.00	2,756.00
	05/08/14 15:18:00	28470	13.85	-0.54	0.02	5.08	13.06	95.00	2,780.00
	05/08/14 15:18:30	28500	13.87	-0.40	0.02	5.06	13.06	95.00	2,780.00
	05/08/14 15:19:00	28530	13.20	-0.29	0.03	5.50	13.18	95.10	2,769.00
	05/08/14 15:19:30	28560	12.49	-0.42	0.03	5.99	13.18	95.10	2,769.00
	05/08/14 15:20:00	28590	13.73	-0.52	0.03	5.19	15.31	95.10	2,010.00
	05/08/14 15:20:30	28620	14.93	-0.38	0.03	4.32	15.31	95.10	2,010.00
	05/08/14 15:21:00	28650	15.05	-0.26	0.05	4.24	8.50	95.30	1,168.00
	05/08/14 15:21:30	28680	15.03	0.04	0.05	4.25	8.50	95.30	1,168.00
	05/08/14 15:22:00	28710	14.77	0.03	0.06	4.43	9.27	95.50	1,214.00
	05/08/14 15:22:30	28740	14.83	-0.06	0.06	4.39	9.27	95.50	1,214.00
	05/08/14 15:23:00	28770	14.99	0.08	0.05	4.27	9.00	95.80	1,223.00
	05/08/14 15:23:30	28800	14.91	0.28	0.05	4.32	9.00	95.80	1,223.00
	05/08/14 15:24:00	28830	15.08	0.36	0.05	4.20	8.86	96.00	1,201.00
	05/08/14 15:24:30	28860	14.91	0.52	0.05	4.33	8.86	96.00	1,201.00
	05/08/14 15:25:00	28890	14.46	0.48	0.06	4.63	9.11	96.20	1,233.00
A2	05/08/14 15:25:30	28920	14.46	0.35	0.06	4.66	9.11	96.20	1,233.00
	05/08/14 15:26:00	28950	14.51	1.70	0.05	4.58	8.17	96.30	1,975.00
	05/08/14 15:26:30	28980	13.37	1.10	0.05	5.40	8.17	96.30	1,975.00
	05/08/14 15:27:00	29010	13.05	-0.12	0.03	5.61	10.68	96.30	2,541.00
	05/08/14 15:27:30	29040	12.64	-0.44	0.03	5.89	10.68	96.30	2,541.00
	05/08/14 15:28:00	29070	12.69	-0.51	0.02	5.86	12.93	96.10	2,773.00
	05/08/14 15:28:30	29100	12.95	-0.52	0.03	5.70	12.93	96.10	2,773.00
	05/08/14 15:29:00	29130	13.42	0.35	0.03	5.38	13.06	95.90	2,786.00
	05/08/14 15:29:30	29160	13.57	1.12	0.03	5.26	13.06	95.90	2,786.00
	05/08/14 15:30:00	29190	13.67	1.32	0.03	5.20	12.65	95.80	2,707.00

CIMARRON ENERGY, INC.

May 8, 2014

48HV ECD

Norman Facility

Unit Data

Meas. Stack Moisture	5.7	%
Stack Exhaust Flow (M2)	135,858	SCFH

Weather Data

Barometric Pressure	29.82	in. Hg
Relative Humidity	40	%
Ambient Temperature	83	° F
Specific Humidity	0.009648	lb H ₂ O / lb air

30-70-30 Load, Run - 48HV ECD R5

	Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmvd)	THC (ppmvw)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
	05/08/14 15:30:30	29220	13.81	2.28	0.03	5.09	12.65	95.80	2,707.00
	05/08/14 15:31:00	29250	13.43	2.43	0.06	5.37	12.62	95.80	2,718.00
	05/08/14 15:31:30	29280	13.63	2.60	0.06	5.22	12.62	95.80	2,718.00
	05/08/14 15:32:00	29310	13.56	2.36	0.02	5.28	13.42	95.70	2,790.00
	05/08/14 15:32:30	29340	13.70	2.98	0.03	5.18	13.42	95.70	2,790.00
	05/08/14 15:33:00	29370	13.60	2.77	0.02	5.24	13.15	95.50	2,767.00
	05/08/14 15:33:30	29400	13.63	0.86	0.03	5.26	13.15	95.50	2,767.00
	05/08/14 15:34:00	29430	14.61	3.03	0.03	4.53	13.95	95.50	2,355.00
	05/08/14 15:34:30	29460	13.99	3.12	0.03	4.97	13.95	95.50	2,355.00
	05/08/14 15:35:00	29490	14.77	1.10	0.03	4.43	12.35	95.50	1,464.00
	05/08/14 15:35:30	29520	14.68	2.93	0.02	4.50	12.35	95.50	1,464.00
	05/08/14 15:36:00	29550	14.64	3.27	0.02	4.52	9.41	95.70	1,268.00
	05/08/14 15:36:30	29580	14.66	4.05	0.02	4.52	9.41	95.70	1,268.00
	05/08/14 15:37:00	29610	14.63	5.66	0.05	4.52	9.69	95.80	1,279.00
	05/08/14 15:37:30	29640	14.65	4.61	0.05	4.52	9.69	95.80	1,279.00
	05/08/14 15:38:00	29670	14.72	7.43	0.03	4.46	9.58	95.90	1,257.00
	05/08/14 15:38:30	29700	14.64	8.28	0.03	4.52	9.58	95.90	1,257.00
	05/08/14 15:39:00	29730	13.59	4.99	0.03	5.24	9.44	96.00	1,278.00
	05/08/14 15:39:30	29760	14.67	2.29	0.03	4.49	9.44	96.00	1,278.00
	05/08/14 15:40:00	29790	13.80	4.94	0.05	5.07	8.11	96.10	1,921.00
	05/08/14 15:40:30	29820	12.34	1.11	0.05	6.09	8.11	96.10	1,921.00
	05/08/14 15:41:00	29850	12.34	-0.44	0.00	6.08	13.18	95.80	2,809.00
	05/08/14 15:41:30	29880	12.96	-0.49	0.00	5.69	13.18	95.80	2,809.00
	05/08/14 15:42:00	29910	13.81	-0.03	0.05	5.10	12.90	95.30	2,756.00
	05/08/14 15:42:30	29940	13.96	1.72	0.05	4.99	12.90	95.30	2,756.00
	05/08/14 15:43:00	29970	13.95	3.21	0.03	5.00	12.93	94.70	2,769.00
	05/08/14 15:43:30	30000	13.81	3.45	0.03	5.10	12.93	94.70	2,769.00
	05/08/14 15:44:00	30030	14.12	3.97	0.03	4.89	13.20	94.20	2,785.00
	05/08/14 15:44:30	30060	13.81	3.91	0.03	5.09	13.20	94.20	2,785.00
	05/08/14 15:45:00	30090	13.99	3.32	0.03	4.97	12.98	94.00	2,751.00
A3	05/08/14 15:45:30	30120	13.90	2.99	0.03	5.03	12.98	94.00	2,751.00
	05/08/14 15:46:00	30150	13.81	1.71	0.02	5.09	12.87	93.90	2,740.00
	05/08/14 15:46:30	30180	13.71	1.71	0.02	5.16	12.87	93.90	2,740.00
	05/08/14 15:47:00	30210	13.94	1.81	0.02	5.01	12.73	94.00	2,761.00
	05/08/14 15:47:30	30240	13.71	2.08	0.03	5.16	12.73	94.00	2,761.00
	05/08/14 15:48:00	30270	13.72	1.86	0.05	5.16	13.29	94.10	2,786.00
	05/08/14 15:48:30	30300	13.61	1.60	0.04	5.22	13.29	94.10	2,786.00
	05/08/14 15:49:00	30330	14.67	1.74	0.05	4.54	13.67	94.20	2,711.00
	05/08/14 15:49:30	30360	15.26	12.55	0.05	4.08	13.67	94.20	2,711.00
	05/08/14 15:50:00	30390	14.71	12.51	0.03	4.46	14.61	94.40	1,573.00
	05/08/14 15:50:30	30420	14.94	7.62	0.03	4.31	14.61	94.40	1,573.00
	05/08/14 15:51:00	30450	14.74	8.83	0.05	4.43	11.43	94.70	1,418.00
	05/08/14 15:51:30	30480	13.99	4.01	0.05	4.96	11.43	94.70	1,418.00
	05/08/14 15:52:00	30510	13.92	0.01	0.06	5.03	12.23	95.00	1,431.00
	05/08/14 15:52:30	30540	14.04	-0.15	0.05	4.95	12.23	95.00	1,431.00
	05/08/14 15:53:00	30570	13.87	-0.28	0.05	5.05	12.23	95.20	1,430.00
	05/08/14 15:53:30	30600	14.09	-0.10	0.05	4.91	12.23	95.20	1,430.00
	05/08/14 15:54:00	30630	14.07	0.14	0.03	4.93	12.23	95.50	1,451.00
	05/08/14 15:54:30	30660	14.09	0.02	0.03	4.91	12.23	95.50	1,451.00
	05/08/14 15:55:00	30690	14.04	-0.03	0.02	4.94	11.82	95.70	1,406.00
	05/08/14 15:55:30	30720	12.66	-0.15	0.03	5.86	11.82	95.70	1,406.00

CIMARRON ENERGY, INC.

May 8, 2014

48HV ECD

Norman Facility

Unit Data

Meas. Stack Moisture	5.7	%
Stack Exhaust Flow (M2)	135,858	SCFH

Weather Data

Barometric Pressure	29.82	in. Hg
Relative Humidity	40	%
Ambient Temperature	83	° F
Specific Humidity	0.009648	lb H ₂ O / lb air

30-70-30 Load, Run - 48HV ECD R5

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmvd)	THC (ppmvw)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
05/08/14 15:56:00	30750	13.31	-0.34	0.03	5.44	9.55	95.90	1,961.00
05/08/14 15:56:30	30780	12.22	-0.34	0.03	6.17	9.55	95.90	1,961.00
05/08/14 15:57:00	30810	12.69	-0.52	0.02	5.88	13.51	96.00	2,778.00
05/08/14 15:57:30	30840	13.33	-0.36	0.02	5.44	13.51	96.00	2,778.00
05/08/14 15:58:00	30870	13.37	0.54	0.02	5.41	13.51	95.90	2,822.00
05/08/14 15:58:30	30900	13.25	1.54	0.02	5.49	13.51	95.90	2,822.00
05/08/14 15:59:00	30930	13.62	1.82	0.03	5.23	13.62	95.70	2,813.00
05/08/14 15:59:30	30960	13.35	2.03	0.03	5.41	13.62	95.70	2,813.00
05/08/14 16:00:00	30990	13.32	2.09	0.04	5.44	13.90	95.60	2,837.00
05/08/14 16:00:30	31020	13.51	1.94	0.05	5.31	13.90	95.60	2,837.00
05/08/14 16:01:00	31050	13.56	2.24	0.05	5.27	13.34	95.50	2,790.00
05/08/14 16:01:30	31080	13.65	1.90	0.06	5.21	13.34	95.50	2,790.00
05/08/14 16:02:00	31110	13.35	1.99	0.02	5.42	13.34	95.40	2,768.00
05/08/14 16:02:30	31140	13.34	1.93	0.03	5.44	13.34	95.40	2,768.00
05/08/14 16:03:00	31170	13.63	1.66	0.02	5.22	13.87	95.30	2,816.00
05/08/14 16:03:30	31200	13.05	0.96	0.02	5.62	13.87	95.30	2,816.00
05/08/14 16:04:00	31230	12.53	-0.23	0.00	5.98	13.59	95.30	2,771.00
05/08/14 16:04:30	31260	12.57	-0.53	-0.01	5.97	13.59	95.30	2,771.00
05/08/14 16:05:00	31290	14.21	-0.43	0.05	4.84	11.99	95.30	1,836.00
RAW AVERAGE		13.93	1.46	0.03	5.01	11.65	95.28	2,150.07

Bias	Serial Number:	O ₂ (%)	CO (ppmvd)	THC (ppmvw)	CO ₂ (%)	Press. Trans (in. H ₂ O)	Temp. Trans. (°F)	F-Flow Trans. (SCFH)
	INST-22-010	INST-22-010	INST-CO-0008	INST-VC-0007	INST-22-0010	1229943	1229943	1229943
	Initial Zero	0.32	-0.06	0.04	0.05			
	Final Zero	0.33	0.07	0.02	0.10			
	Avg. Zero	0.33	0.01	0.03	0.08			
	Initial UpScale	12.17	8.86	2.95	8.44			
	Final UpScale	12.16	8.84	3.02	8.42			
	Avg. UpScale	12.17	8.85	2.99	8.43			
	Upscale Cal Gas	12.20	9.00	3.04	8.56			

EMISSIONS DATA	O ₂	CO	THC	CO ₂
Corrected Raw Average (ppm/% dry basis)	14.02	1.48	0.01	5.06
Corrected Raw Average (ppm/% wet basis)	13.20	1.40	0.00	4.77
Concentration (ppm@ 3%CO ₂)	N/A	0.88	0.00	N/A
Emission Rate (lb/hr)	N/A	0.01	0.00	N/A

CIMARRON ENERGY, INC.

May 8, 2014

48HV ECD

Norman Facility

Unit Data

Meas. Stack Moisture	6.3	%
Stack Exhaust Flow (M2)	129,256	SCFH

Weather Data

Barometric Pressure	29.80	in. Hg
Relative Humidity	25	%
Ambient Temperature	85	° F
Specific Humidity	0.006402	lb H ₂ O / lb air

30-70-30 Load, Run - 48HV ECD R6

	Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmvd)	THC (ppmvw)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
A1	05/08/14 16:25:00	32490	15.44	4.34	0.02	4.71	10.57	97.20	1,333.00
	05/08/14 16:25:30	32520	15.20	2.94	0.03	4.67	10.57	97.20	1,333.00
	05/08/14 16:26:00	32550	14.74	2.45	0.02	4.74	10.32	97.00	1,343.00
	05/08/14 16:26:30	32580	14.41	1.97	0.03	4.79	10.32	97.00	1,343.00
	05/08/14 16:27:00	32610	14.31	1.49	0.05	4.81	10.71	96.90	1,366.00
	05/08/14 16:27:30	32640	14.25	0.80	0.05	4.85	10.71	96.90	1,366.00
	05/08/14 16:28:00	32670	14.30	0.77	0.03	4.83	11.29	96.90	1,368.00
	05/08/14 16:28:30	32700	14.36	1.34	0.03	4.77	11.29	96.90	1,368.00
	05/08/14 16:29:00	32730	14.40	0.90	-0.01	4.77	10.21	96.80	1,322.00
	05/08/14 16:29:30	32760	14.36	0.63	-0.01	4.79	10.21	96.80	1,322.00
	05/08/14 16:30:00	32790	13.92	0.86	0.04	5.10	10.38	96.80	1,344.00
	05/08/14 16:30:30	32820	14.58	0.32	0.04	4.68	10.38	96.80	1,344.00
	05/08/14 16:31:00	32850	14.34	0.64	0.02	4.82	9.44	96.70	2,261.00
	05/08/14 16:31:30	32880	13.76	0.17	0.02	5.28	9.44	96.70	2,261.00
	05/08/14 16:32:00	32910	14.07	-0.33	0.03	5.10	11.71	96.50	2,622.00
	05/08/14 16:32:30	32940	13.98	-0.34	0.03	5.22	11.71	96.50	2,622.00
	05/08/14 16:33:00	32970	14.29	-0.43	0.02	5.24	12.79	96.20	2,717.00
	05/08/14 16:33:30	33000	14.44	-0.47	0.02	5.13	12.79	96.20	2,717.00
	05/08/14 16:34:00	33030	14.39	-0.45	0.04	5.10	12.65	96.00	2,739.00
	05/08/14 16:34:30	33060	14.08	-0.48	0.04	5.25	12.65	96.00	2,739.00
	05/08/14 16:35:00	33090	14.07	-0.52	0.02	5.33	12.40	95.80	2,695.00
	05/08/14 16:35:30	33120	14.29	-0.53	0.02	5.27	12.40	95.80	2,695.00
	05/08/14 16:36:00	33150	14.20	-0.54	0.03	5.15	12.26	95.60	2,684.00
	05/08/14 16:36:30	33180	14.20	-0.53	0.02	5.23	12.26	95.60	2,684.00
	05/08/14 16:37:00	33210	14.09	-0.49	0.02	5.16	12.68	95.40	2,699.00
	05/08/14 16:37:30	33240	14.49	-0.52	0.02	5.05	12.68	95.40	2,699.00
	05/08/14 16:38:00	33270	14.49	-0.50	0.05	5.20	12.01	95.30	2,673.00
	05/08/14 16:38:30	33300	13.42	-0.55	0.05	5.90	12.01	95.30	2,673.00
	05/08/14 16:39:00	33330	13.13	-0.58	0.04	6.06	12.95	95.30	2,504.00
	05/08/14 16:39:30	33360	15.35	-0.52	0.04	4.79	12.95	95.30	2,504.00
	05/08/14 16:40:00	33390	15.38	-0.46	0.02	4.65	11.76	95.30	1,363.00
	05/08/14 16:40:30	33420	15.31	-0.35	0.02	4.70	11.76	95.30	1,363.00
	05/08/14 16:41:00	33450	15.35	-0.15	0.05	4.57	10.96	95.50	1,316.00
	05/08/14 16:41:30	33480	15.27	0.50	0.05	4.55	10.96	95.50	1,316.00
	05/08/14 16:42:00	33510	15.17	1.15	0.05	4.59	10.30	95.70	1,314.00
	05/08/14 16:42:30	33540	14.93	0.92	0.06	4.72	10.30	95.70	1,314.00
	05/08/14 16:43:00	33570	14.86	0.47	0.05	4.66	10.57	95.80	1,325.00
	05/08/14 16:43:30	33600	14.89	0.85	0.06	4.60	10.57	95.80	1,325.00
	05/08/14 16:44:00	33630	14.99	2.18	0.05	4.54	10.30	95.90	1,302.00
	05/08/14 16:44:30	33660	14.96	3.06	0.05	4.54	10.30	95.90	1,302.00
	05/08/14 16:45:00	33690	14.18	1.88	0.05	5.04	10.57	96.00	1,336.00
A2	05/08/14 16:45:30	33720	15.33	1.60	0.06	4.16	10.57	96.00	1,336.00
	05/08/14 16:46:00	33750	14.71	4.01	0.04	4.50	9.49	96.00	2,058.00
	05/08/14 16:46:30	33780	14.17	1.56	0.05	4.85	9.49	96.00	2,058.00
	05/08/14 16:47:00	33810	13.75	0.08	0.03	5.15	10.85	95.90	2,500.00
	05/08/14 16:47:30	33840	13.46	-0.35	0.03	5.35	10.85	95.90	2,500.00
	05/08/14 16:48:00	33870	13.41	-0.45	0.02	5.40	13.65	95.70	2,791.00
	05/08/14 16:48:30	33900	13.44	-0.47	0.02	5.36	13.65	95.70	2,791.00
	05/08/14 16:49:00	33930	13.34	-0.54	0.02	5.45	14.06	95.50	2,828.00
	05/08/14 16:49:30	33960	13.54	-0.52	0.02	5.30	14.06	95.50	2,828.00
	05/08/14 16:50:00	33990	13.44	-0.55	0.05	5.37	13.26	95.30	2,780.00

CIMARRON ENERGY, INC.

May 8, 2014

48HV ECD

Norman Facility

Unit Data

Meas. Stack Moisture	6.3	%
Stack Exhaust Flow (M2)	129,256	SCFH

Weather Data

Barometric Pressure	29.80	in. Hg
Relative Humidity	25	%
Ambient Temperature	85	° F
Specific Humidity	0.006402	lb H ₂ O / lb air

30-70-30 Load, Run - 48HV ECD R6

	Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmvd)	THC (ppmvw)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
	05/08/14 16:50:30	34020	13.48	-0.48	0.05	5.34	13.26	95.30	2,780.00
	05/08/14 16:51:00	34050	13.47	-0.44	0.02	5.34	13.29	95.10	2,737.00
	05/08/14 16:51:30	34080	13.46	-0.45	0.02	5.37	13.29	95.10	2,737.00
	05/08/14 16:52:00	34110	13.54	-0.49	0.02	5.30	13.70	94.90	2,784.00
	05/08/14 16:52:30	34140	13.89	-0.30	0.02	5.07	13.70	94.90	2,784.00
	05/08/14 16:53:00	34170	13.94	-0.15	0.06	5.04	13.87	94.70	2,775.00
	05/08/14 16:53:30	34200	13.02	0.03	0.05	5.61	13.87	94.70	2,775.00
	05/08/14 16:54:00	34230	10.80	0.11	0.05	7.08	13.48	94.50	2,730.00
	05/08/14 16:54:30	34260	14.36	0.11	0.04	4.80	13.48	94.50	2,730.00
	05/08/14 16:55:00	34290	14.95	-0.11	0.04	4.62	12.84	94.40	1,413.00
	05/08/14 16:55:30	34320	15.06	-0.25	0.04	4.68	12.84	94.40	1,413.00
	05/08/14 16:56:00	34350	14.33	-0.19	0.04	4.89	11.82	94.40	1,376.00
	05/08/14 16:56:30	34380	14.52	-0.05	0.05	4.68	11.82	94.40	1,376.00
	05/08/14 16:57:00	34410	14.28	0.74	0.02	4.80	11.18	94.40	1,352.00
	05/08/14 16:57:30	34440	14.01	0.24	0.02	4.99	11.18	94.40	1,352.00
	05/08/14 16:58:00	34470	14.21	-0.08	0.05	4.86	11.74	94.40	1,398.00
	05/08/14 16:58:30	34500	14.29	0.18	0.06	4.80	11.74	94.40	1,398.00
	05/08/14 16:59:00	34530	14.15	0.39	0.04	4.88	11.35	94.30	1,386.00
	05/08/14 16:59:30	34560	13.99	0.07	0.05	4.99	11.35	94.30	1,386.00
	05/08/14 17:00:00	34590	13.88	0.09	0.01	5.07	12.18	94.20	1,422.00
	05/08/14 17:00:30	34620	14.64	1.03	0.02	4.56	12.18	94.20	1,422.00
	05/08/14 17:01:00	34650	14.38	4.69	0.01	4.69	11.02	94.10	1,832.00
	05/08/14 17:01:30	34680	13.47	1.46	0.01	5.32	11.02	94.10	1,832.00
	05/08/14 17:02:00	34710	12.79	-0.14	0.05	5.80	13.56	93.90	2,559.00
	05/08/14 17:02:30	34740	12.54	-0.52	0.05	5.97	13.56	93.90	2,559.00
	05/08/14 17:03:00	34770	12.98	-0.54	0.01	5.69	16.36	93.60	2,831.00
	05/08/14 17:03:30	34800	13.17	-0.43	0.02	5.56	16.36	93.60	2,831.00
	05/08/14 17:04:00	34830	13.38	-0.22	0.02	5.40	16.39	93.20	2,811.00
	05/08/14 17:04:30	34860	13.32	0.18	0.02	5.45	16.39	93.20	2,811.00
	05/08/14 17:05:00	34890	13.44	0.33	0.05	5.37	16.14	93.00	2,810.00
A3	05/08/14 17:05:30	34920	13.63	0.61	0.05	5.24	16.14	93.00	2,810.00
	05/08/14 17:06:00	34950	13.58	1.16	0.02	5.27	15.89	92.70	2,788.00
	05/08/14 17:06:30	34980	13.44	1.06	0.02	5.37	15.89	92.70	2,788.00
	05/08/14 17:07:00	35010	13.27	0.77	0.05	5.49	16.03	92.40	2,801.00
	05/08/14 17:07:30	35040	13.26	0.43	0.05	5.49	16.03	92.40	2,801.00
	05/08/14 17:08:00	35070	13.29	0.34	0.02	5.47	16.30	92.10	2,838.00
	05/08/14 17:08:30	35100	13.57	1.20	0.02	5.27	16.30	92.10	2,838.00
	05/08/14 17:09:00	35130	13.49	1.08	0.05	5.33	16.47	91.90	2,729.00
	05/08/14 17:09:30	35160	12.92	0.31	0.05	5.71	16.47	91.90	2,729.00
	05/08/14 17:10:00	35190	12.58	-0.46	0.03	5.96	17.02	91.70	2,278.00
	05/08/14 17:10:30	35220	13.71	-0.55	0.02	5.20	17.02	91.70	2,278.00
	05/08/14 17:11:00	35250	14.09	-0.42	0.02	4.92	12.65	91.70	1,430.00
	05/08/14 17:11:30	35280	14.06	-0.26	0.02	4.95	12.65	91.70	1,430.00
	05/08/14 17:12:00	35310	14.05	-0.05	0.05	4.96	11.99	91.70	1,417.00
	05/08/14 17:12:30	35340	14.26	0.02	0.05	4.80	11.99	91.70	1,417.00
	05/08/14 17:13:00	35370	14.21	0.31	0.05	4.83	12.40	91.70	1,440.00
	05/08/14 17:13:30	35400	14.15	-0.01	0.05	4.89	12.40	91.70	1,440.00
	05/08/14 17:14:00	35430	14.16	0.10	0.02	4.88	11.87	91.70	1,405.00
	05/08/14 17:14:30	35460	14.08	0.04	0.03	4.93	11.87	91.70	1,405.00
	05/08/14 17:15:00	35490	13.49	0.10	0.04	5.30	11.49	91.60	1,404.00
	05/08/14 17:15:30	35520	12.73	-0.11	0.05	5.88	11.49	91.60	1,404.00

CIMARRON ENERGY, INC.

May 8, 2014

48HV ECD

Norman Facility

Unit Data

Meas. Stack Moisture	6.3	%
Stack Exhaust Flow (M2)	129,256	SCFH

Weather Data

Barometric Pressure	29.80	in. Hg
Relative Humidity	25	%
Ambient Temperature	85	° F
Specific Humidity	0.006402	lb H ₂ O / lb air

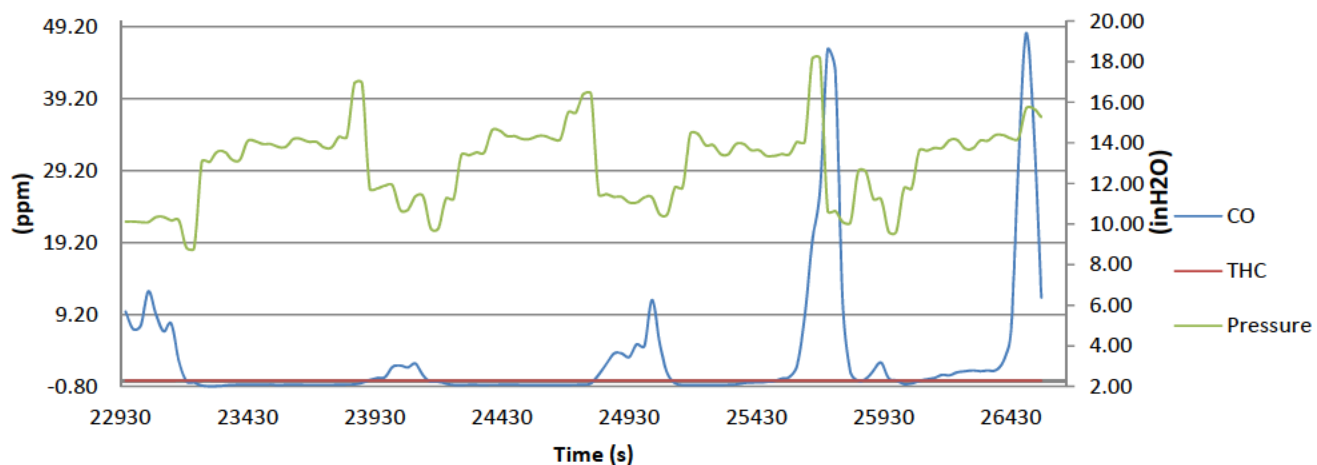
30-70-30 Load, Run - 48HV ECD R6

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmvd)	THC (ppmvw)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
05/08/14 17:16:00	35550	13.88	0.12	0.04	5.06	10.44	91.40	2,157.00
05/08/14 17:16:30	35580	12.44	0.24	0.05	6.02	10.44	91.40	2,157.00
05/08/14 17:17:00	35610	12.45	-0.43	0.05	6.05	13.12	90.90	2,702.00
05/08/14 17:17:30	35640	13.00	-0.08	0.05	5.67	13.12	90.90	2,702.00
05/08/14 17:18:00	35670	12.95	0.60	0.05	5.70	13.42	90.40	2,761.00
05/08/14 17:18:30	35700	13.22	0.72	0.05	5.54	13.42	90.40	2,761.00
05/08/14 17:19:00	35730	13.62	1.78	0.05	5.24	13.70	90.10	2,787.00
05/08/14 17:19:30	35760	13.83	2.47	0.05	5.10	13.70	90.10	2,787.00
05/08/14 17:20:00	35790	13.67	2.79	0.02	5.21	13.87	89.90	2,789.00
05/08/14 17:20:30	35820	13.78	2.41	0.03	5.14	13.87	89.90	2,789.00
05/08/14 17:21:00	35850	13.65	2.18	0.02	5.21	13.37	89.70	2,765.00
05/08/14 17:21:30	35880	13.44	1.58	0.02	5.36	13.37	89.70	2,765.00
05/08/14 17:22:00	35910	12.85	1.15	0.02	5.77	13.92	89.50	2,791.00
05/08/14 17:22:30	35940	12.85	0.89	0.02	5.77	13.92	89.50	2,791.00
05/08/14 17:23:00	35970	13.01	0.84	0.05	5.67	13.56	89.30	2,745.00
05/08/14 17:23:30	36000	12.55	-0.02	0.04	5.96	13.56	89.30	2,745.00
05/08/14 17:24:00	36030	12.07	-0.48	0.02	6.25	14.26	89.30	2,684.00
05/08/14 17:24:30	36060	13.10	-0.50	0.02	5.64	14.26	89.30	2,684.00
05/08/14 17:25:00	36090	14.33	-0.39	0.03	4.76	13.73	89.20	1,574.00
RAW AVERAGE		13.90	0.43	0.03	5.17	12.66	93.96	2,153.67

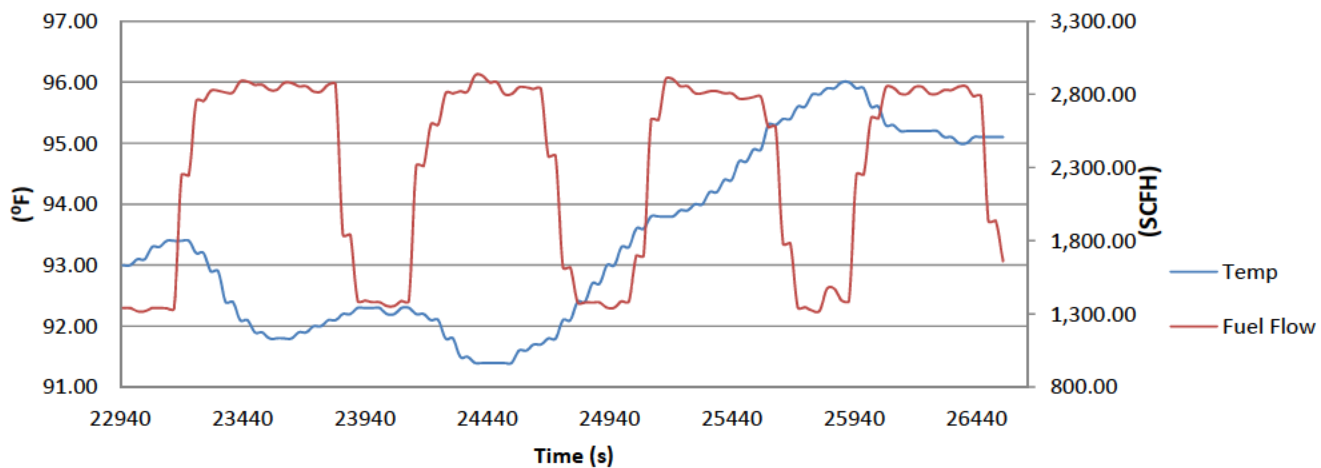
	Serial Number:	O ₂	CO	THC	CO ₂	Press. Trans	Temp. Trans.	F-Flow Trans.
		(%)	(ppmvd)	(ppmvw)	(%)	(in. H ₂ O)	(°F)	(SCFH)
Bias	INST-22-010		INST-CO-0008	INST-VC-0007	INST-22-0010	1229943	1229943	1229943
	Initial Zero	0.33	0.07	0.02	0.10			
	Final Zero	0.35	-0.08	0.04	0.07			
	Avg. Zero	0.34	-0.01	0.03	0.09			
	Initial UpScale	12.16	8.84	3.02	8.42			
	Final UpScale	12.17	8.95	3.00	8.43			
	Avg. UpScale	12.17	8.90	3.01	8.43			
Upscale Cal Gas		12.20	9.00	3.04	8.56			

EMISSIONS DATA	O ₂	CO	THC	CO ₂
Corrected Raw Average (ppm/% dry basis)	13.99	0.44	0.00	5.22
Corrected Raw Average (ppm/% wet basis)	13.09	0.42	0.00	4.88
Emission Rate (lb/hr)	N/A	0.00	0.00	N/A

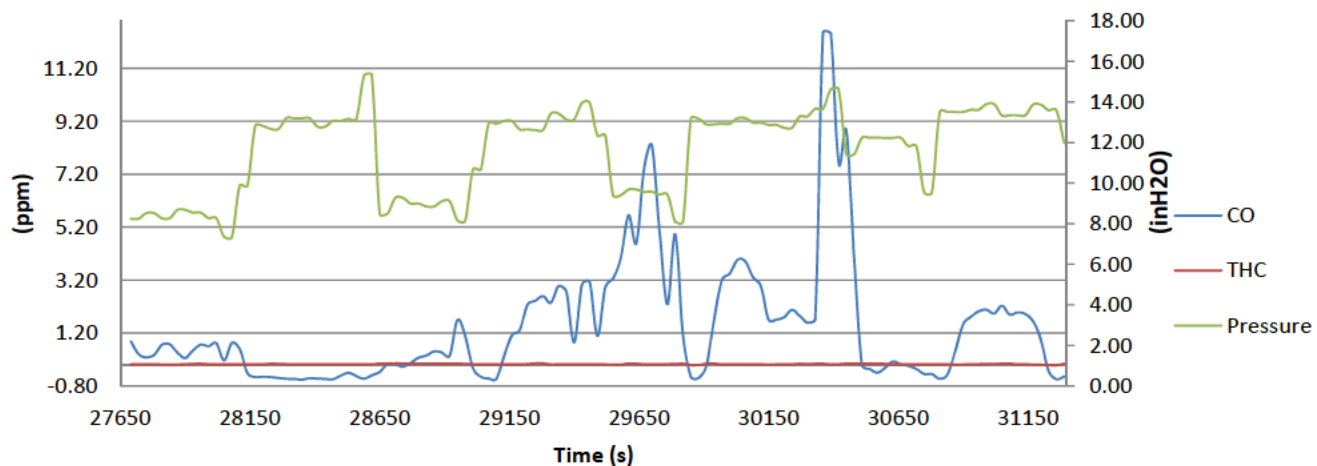
48HV ECD R4



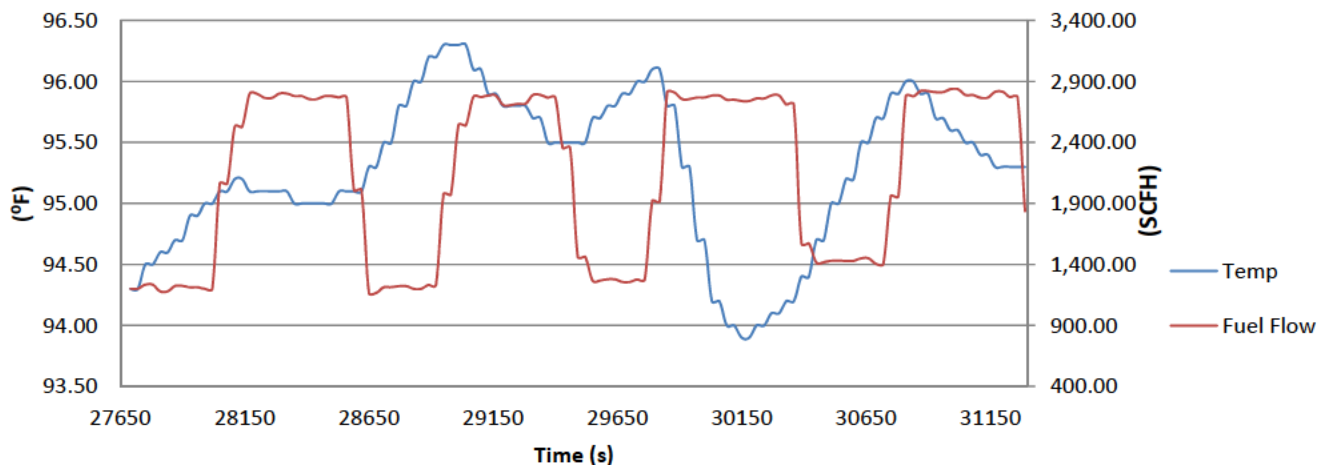
48HV ECD R4



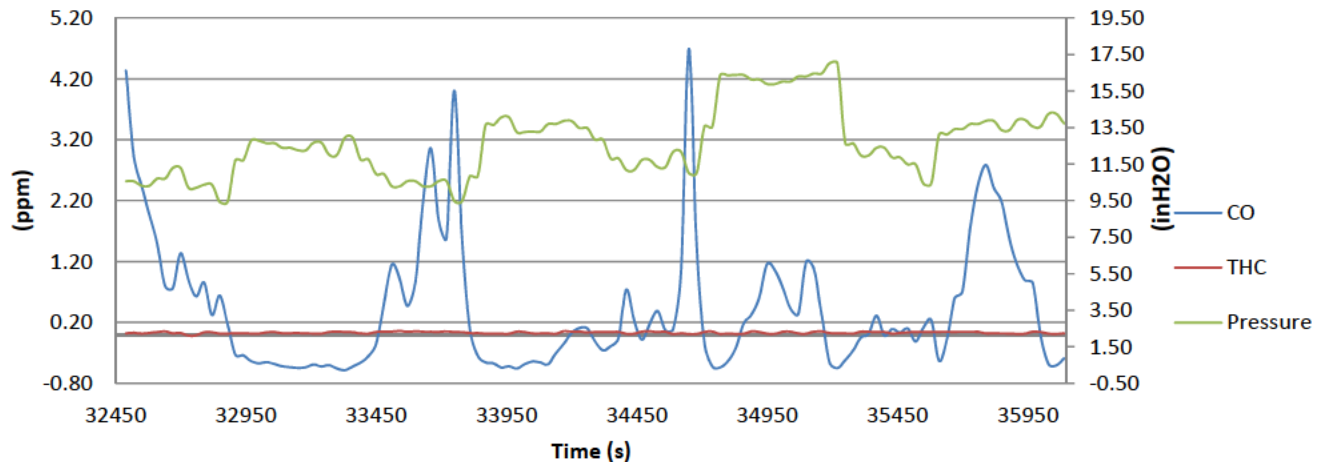
48HV ECD R5



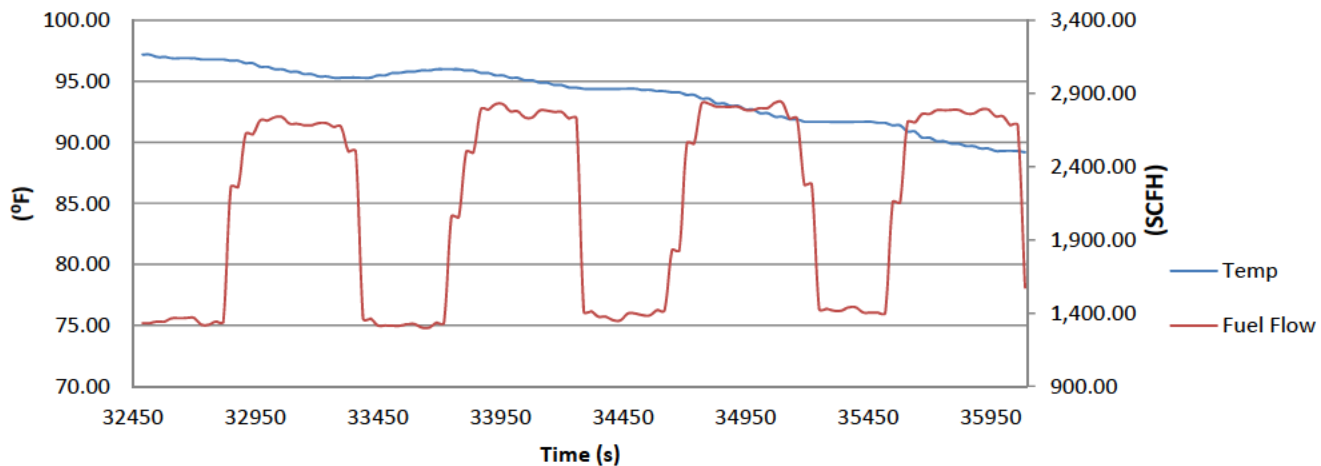
48HV ECD R5



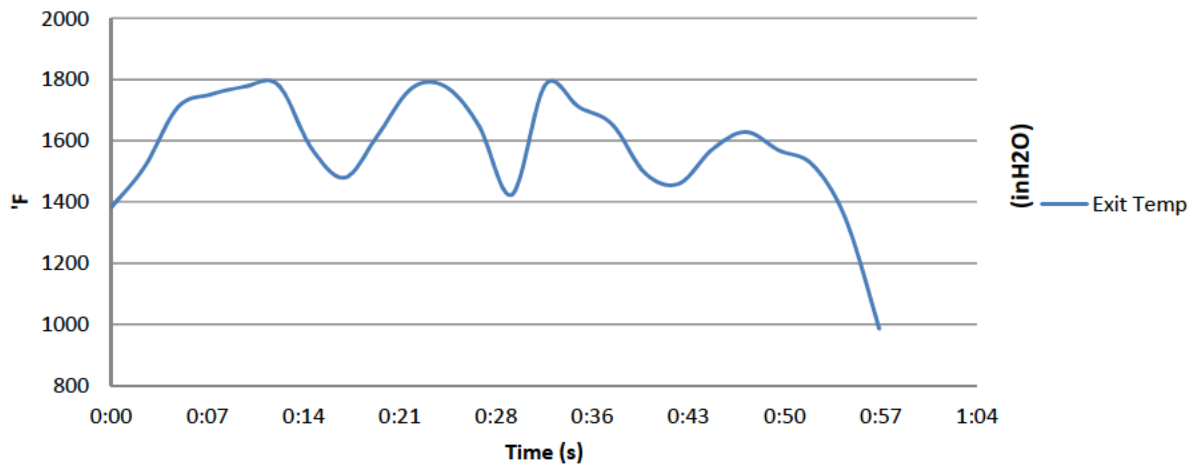
48HV ECD R6



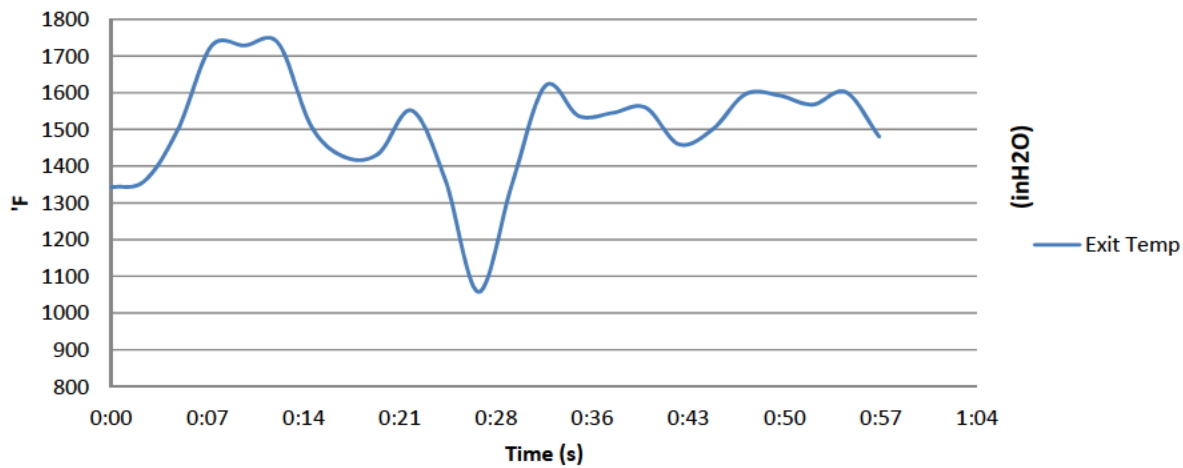
48HV ECD R6



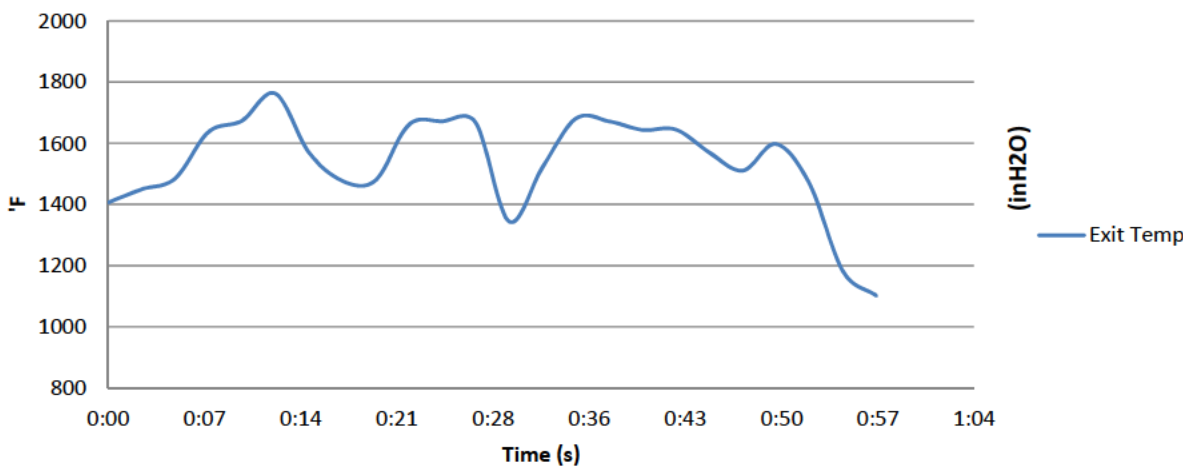
48HV ECD R4



48HV ECD R5



48HV ECD R6



EMISSION DATA RECORDS

70-100-70% Ramp-up, Ramp-down Unit Operations Data

METHOD 4 (MOISTURE) [MULTI POINT, NO VARIATION] SOURCE SAMPLING TITLE PAGE

Source Information	
Plant Name	Cimaron Energy, INC
Sampling Location	Norman Facility
Fuel Type	Gas, Propene

Test Information			
Project #		cei-14-norman.ok-comp#1	
Operator		TP/MM	
Date for Preliminary Run	(mm/dd/yy)	05/07/14	
Standard Temperature		68	°F
Standard Pressure		29.92	in Hg
Required Sample Vol.	RM4, 8.1.1.2	21	scf
Run Duration	≤0.75 cfm	60	minutes
Unit Number		1	
Base Run Number		70-100-70%	
Number of Ports Available		2	
Number of Ports Used		2	
Port Inside Diameter		3.00	in
Stack Shape		Circular	

Test Equipment Information					
Run		7	8	9	
Test Date	(mm/dd/yy)	05/09/14	05/09/14	05/09/14	
Load	% or w/DB	70-100-70	70-100-70	70-100-70	
Meter Box Number	from ACS	SAMP-CP-0012	SAMP-CP-0012	SAMP-CP-0012	
Meter Calibration Factor	(Y)	0.889	0.889	0.889	
Orifice Meter Coefficient	(ΔH_{or})	1.632	1.632	1.632	in H ₂ O
Pitot Identification	from ACS	4-17-14-2	4-17-14-2	4-17-14-2	
Pitot Tube Coefficient	(C _p)	0.840	0.840	0.840	
Probe Number	from ACS	SAMP-SP-0001	samp-hp-0003	samp-hp-0003	
Probe Length		60.0	60.0	60.0	in
(SS, Glass) Liner Material	from list	inconel	inconel	inconel	
Impinger Case Number	from ACS	SAMP-BC-0003	SAMP-BC-0003	SAMP-BC-0003	

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	Min Sum Lee
Phone Number	(918) 307-8865
Fax Number	(918) 307-9131

METHOD 4 (MOISTURE) [MULTI POINT, NO VARIATION] - RESULTS

Plant Name	Cimaron Energy, INC
Sampling Location	Norman Facility
Project #	cei-14-norman.ok-comp#1

Historical Data	70-100-70%-7	70-100-70%-8	70-100-70%-9	Average	Units
Run Start Time	10:35	11:49	13:01		hh:mm
Run Stop Time	11:37	12:52	14:02		hh:mm
Test Date	05/09/14	05/09/14	05/09/14		mm/dd/yy
Meter Calibration Factor	0.889	0.889	0.889		
Pitot Tube Coefficient	0.840	0.840	0.840		
Stack Test Data	70-100-70%-7	70-100-70%-8	70-100-70%-9	Average	Units
Initial Meter Volume	17.085	67.220	118.190		ft ³
Final Meter Volume	66.945	117.800	168.745		ft ³
Total Meter Volume	49.860	50.580	50.555	50.332	ft ³
Total Sampling Time	60.00	60.00	60.00	60.00	min
Average Meter Temperature	76.44	84.92	87.71	83.02	°F
Average Stack Temperature	1526.33	1528.33	1483.54	1512.74	°F
Barometric Pressure	29.97	29.97	29.96	29.97	in Hg
Stack Static Pressure	0.00	0.00	0.00	0.00	in H ₂ O
Absolute Stack Pressure	29.97	29.97	29.96	29.97	in Hg
Average Orifice Pressure Drop	1.60	1.60	1.60	1.60	in H ₂ O
Absolute Meter Pressure	30.09	30.09	30.08	30.09	in Hg
Avg Square Root Pitot Pressure	0.27	0.32	0.29	0.29	√(in H ₂ O)
Moisture Content Data	70-100-70%-7	70-100-70%-8	70-100-70%-9	Average	Units
Impinger Water Weight Gain	42.50	42.70	40.70	41.97	g
Silica Gel Weight Gain	11.30	10.10	9.70	10.37	g
Total Water Volume Collected	53.90	52.90	50.49	52.43	ml
Standard Water Vapor Volume	2.54	2.49	2.38	2.47	scf
Standard Meter Volume	43.9	43.8	43.6	43.7	dscf
Calculated Stack Moisture	5.47	5.38	5.17	5.34	%
Saturated Stack Moisture	100.00	100.00	100.00	100.00	%
Reported Stack Moisture Content	5.47	5.38	5.17	5.34	%
Gas Analysis Data	70-100-70%-7	70-100-70%-8	70-100-70%-9	Average	Units
Carbon Dioxide Content	5.0	5.3	5.4	5.2	%
Oxygen Content	15.2	14.9	14.7	14.9	%
Nitrogen Content	79.8	79.8	79.9	79.8	%
Stack Dry Molecular Weight	29.41	29.42	29.46	29.43	lb/lb-mole
Stack Wet Molecular Weight	28.79	28.81	28.86	28.82	lb/lb-mole
Percent Excess Air	259.4	241.6	230.2	243.7	%
Volumetric Flow Rate Data	70-100-70%-7	70-100-70%-8	70-100-70%-9	Average	Units
Average Stack Gas Velocity	29.05	34.33	32.05	31.81	ft/sec
Stack Cross-Sectional Area	8.30	8.30	8.30	8.30	ft ²
Actual Stack Flow Rate	14,460	17,090	15,955	15,835	acfm
Wet Standard Stack Flow Rate	231	273	260	255	wkscfh
Dry Standard Stack Flow Rate	218,382	258,078	246,941	241,134	dscfh

METHOD 3C - DETERMINATION OF DRY MOLECULAR WEIGHT BY ANALYZER

Plant Name	Cimaron Energy, INC	Preliminary Date	05/07/14		
Sampling Location	Norman Facility	Operator	TP/MM		
Project #	cei-14-norman.ok-comp#1	# of Ports Used	2		
Fuel Type	Gas, Propene	Min. Fuel Factor	N/A	Max. Fuel Factor	N/A

Gas Analysis Data								
Run Number	70-100-70%-7		Date	05/09/14	Run Start Time	10:35	Run Stop Time	11:37
Sample Analysis Time	CO₂ Conc.	O₂ Conc.	Methane Conc.	N₂ 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		%	
01:02	5.0	15.2	0.0	79.8	29.41	1.133	259.4	N/A

Gas Analysis Data								
Run Number	70-100-70%-8		Date	05/09/14	Run Start Time	11:49	Run Stop Time	12:52
Sample Analysis Time	CO₂ Conc.	O₂ Conc.	Methane Conc.	N₂ 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		%	
01:03	5.3	14.9	0.0	79.8	29.42	1.143	241.6	N/A

Gas Analysis Data								
Run Number	70-100-70%-9		Date	05/09/14	Run Start Time	13:01	Run Stop Time	14:02
Sample Analysis Time	CO₂ Conc.	O₂ Conc.	Methane Conc.	N₂ 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		%	
01:01	5.4	14.7	0.0	79.9	29.46	1.142	230.2	N/A

METHOD 4 - DETERMINATION OF MOISTURE CONTENT IN STACK GASES

Plant Name	Cimaron Energy, INC	Preliminary Date	05/07/14
Sampling Location	Norman Facility	Operator	TP/MM
Project #	cei-14-norman.ok-comp#1	Ports Used	2

Moisture Content Data								
Run Number	70-100-70%-7	Date	05/09/14	Start Time	10:35	Stop Time	11:37	
Meter Box Number	SAMP-CP-0012			Meter Cal Factor	(Y)	0.889		
Total Meter Volume	(V _m)	49.860	dcf	Barometric Pressure	(P _b)	29.97	in Hg	
Average Stack Temp	(t _s) _{avg}	1526	°F	Stack Static Pressure	(P _{static})	0.00	in H ₂ O	
Average Meter Temp	(t _m) _{avg}	76	°F	Avg Orifice Pressure	(ΔH) _{avg}	1.60	in H ₂ O	
	Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7	Impinger 8
	(g)	(g)	(g)	(g)				
Contents	H ₂ O	H ₂ O	-	Sil Gel				
Final Value	(V _f),(W _f)	848.20	770.60	603.30	870.50			
Initial Value	(V _i),(W _i)	816.00	762.40	601.20	859.20			
Net Value	(V _n),(W _n)	32.2	8.2	2.1	11.3			
Results								
Total Weight	(W _t)	53.80	g	Water Vol Weighed	(V _{wsg(std)})	2.537	scf	
Std Meter Volume	(V _{m(std)})	43.873	dscf	Sat. Moisture Content	(B _{ws(svp)})	100.00	%	
Calc Moisture Content	(B _{ws(calc)})	5.47	%	Final Moisture Content	(B _{ws})	5.47	%	

Moisture Content Data								
Run Number	70-100-70%-8	Date	05/09/14	Start Time	11:49	Stop Time	12:52	
Meter Box Number	SAMP-CP-0012			Meter Cal Factor	(Y)	0.889		
Total Meter Volume	(V _m)	50.580	dcf	Barometric Pressure	(P _b)	29.97	in Hg	
Average Stack Temp	(t _s) _{avg}	1528	°F	Stack Static Pressure	(P _{static})	0.00	in H ₂ O	
Average Meter Temp	(t _m) _{avg}	85	°F	Avg Orifice Pressure	(ΔH) _{avg}	1.60	in H ₂ O	
	Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7	Impinger 8
	(g)	(g)	(g)	(g)				
Contents	H ₂ O	H ₂ O	-	Sil Gel				
Final Value	(V _f),(W _f)	876.00	805.90	583.40	816.40			
Initial Value	(V _i),(W _i)	844.10	797.10	581.40	806.30			
Net Value	(V _n),(W _n)	31.9	8.8	2.0	10.1			
Results								
Total Weight	(W _t)	52.80	g	Water Vol Weighed	(V _{wsg(std)})	2.490	scf	
Std Meter Volume	(V _{m(std)})	43.814	dscf	Sat. Moisture Content	(B _{ws(svp)})	100.00	%	
Calc Moisture Content	(B _{ws(calc)})	5.38	%	Final Moisture Content	(B _{ws})	5.38	%	

Moisture Content Data								
Run Number	70-100-70%-9	Date	05/09/14	Start Time	13:01	Stop Time	14:02	
Meter Box Number	SAMP-CP-0012			Meter Cal Factor	(Y)	0.889		
Total Meter Volume	(V _m)	50.555	dcf	Barometric Pressure	(P _b)	29.96	in Hg	
Average Stack Temp	(t _s) _{avg}	1484	°F	Stack Static Pressure	(P _{static})	0.00	in H ₂ O	
Average Meter Temp	(t _m) _{avg}	88	°F	Avg Orifice Pressure	(ΔH) _{avg}	1.60	in H ₂ O	
	Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7	Impinger 8
	(g)	(g)	(g)	(g)				
Contents	H ₂ O	H ₂ O	-	Sil Gel				
Final Value	(V _f),(W _f)	878.60	778.30	605.90	880.20			
Initial Value	(V _i),(W _i)	848.20	770.60	603.30	870.50			
Net Value	(V _n),(W _n)	30.4	7.7	2.6	9.7			
Results								
Total Weight	(W _t)	50.40	g	Water Vol Weighed	(V _{wsg(std)})	2.376	scf	
Std Meter Volume	(V _{m(std)})	43.554	dscf	Sat. Moisture Content	(B _{ws(svp)})	100.00	%	
Calc Moisture Content	(B _{ws(calc)})	5.17	%	Final Moisture Content	(B _{ws})	5.17	%	

METHOD 4 (MOISTURE) [MULTI POINT, NO VARIATION] SOURCE SAMPLING TITLE PAGE ISOKINETIC SAMPLING DATA

Plant Name		Cimaron Energy, INC				Date		05/09/14		Ideal Nozzle Diameter and IsoKinetic Factor Setup							
Sampling Location		Norman Facility				Operator		TP/MM		Pitot Coefficient		(C _p)		0.840			
Project #		cei-14-norman.ok-comp#1				Run Number		70-100-70%-7		Average Stack Temp		(t _s)		1526.3		F	
										Average Meter Temp		(t _m)		76.4			
										Orifice Meter Coefficient		(ΔH@)		1.632		in H ₂ O	
										Square Root ΔP		(ΔP ^{1/2} _{avg})		0.27		in H ₂ O	
										Stack Moisture Content		(B _{wa})		5.47		%	
										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)					

Leak Checks					
Train	Pre	0.000	ft ³ /min@	15.0	in Hg
PASS	Post	0.000	ft ³ /min@	15.0	in Hg
Pitot	Pre (+)	0.09	in H ₂ O for	15.0	sec
< 3.0	Pre (-)	0.14	in H ₂ O for	15.0	sec
	Post (+)	0.22	in H ₂ O for	15.0	sec
	Post (-)	0.18	in H ₂ O for	15.0	sec

Nozzle Measurements			
Pre			PASS
Post			PASS

Run Time			
Start	10:35	End	11:37

Weights	Imp 1	Imp 2	Imp 3	Imp 4	Imp 5	Imp 6	Imp 7	Imp 8
Pre	816.0	762.4	601.2	859.2				
Post	848.2	770.6	603.3	870.5				

Meter Box Number		SAMP-CP-0012	
Meter Cal Factor		(Y) 0.889	
Low Flow Manometer		SAMP-MN-0001	
Average Nozzle Diameter		(D _{na})	in
Suggested Nozzle Diameter		(D _n)	0.3895 in
Probe Number		SAMP-SP-0001 in	
Probe Length		60 in	
Liner Material		inconel	
Sample Case / Oven Number		SAMP-BC-0012	
Impinger Case Number		SAMP-BC-0003	

Pressures					
Barometric Pressure		(P _b)		29.97 in Hg	
Stack Static Pressure		(P _{static})		0.00 in H ₂ O	
Absolute Stack Pressure		(P _a)		29.97 in Hg	
Absolute Meter Pressure		(P _m)		30.09 in Hg	

Wash Volumes					ml
					ml

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)	Snorkel Temp (248±25°F)	Filter Temp (248±25°F)	Impinger Exit Temp (≤68°F)	Cond. Temp (≤--°F)	CPM Filter Temp (-±--°F)	Meter Inlet Temp (t _m)	Meter Outlet Temp (t _{mo})	Pump Vacuum	Square Root ΔP (Δp ^{1/2})	Local Stack Velocity (v _s)	Cumul. Meter Volume (V _m) _{std}	Cumul. Percent IsoKinetic (I)	Est-Run Meter Volume (V _m) _{std}	
	min	hh:mm:ss	ft ³	in H ₂ O	in H ₂ O	in H ₂ O	F	F	F	F	F	F	F	F	in Hg	√(in H ₂ O)	ft/sec	dscf	%	dscf	
A-1	0.0	00:00:00	17.085	0.065	1.632	1.60	1426	261		56			68	67	2.5	0.25	27.07	1.825		43.811	
A-2	2.5	00:02:30	19.125	0.080	1.632	1.60	1424	261		52			69	67	2.5	0.28	30.01	3.680		44.166	
A-3	5.0	00:05:00	21.200	0.130	1.632	1.60	1429	259		52			72	67	2.5	0.36	38.31	5.521		44.170	
A-4	7.5	00:07:30	23.265	0.110	1.632	1.60	1502	260		54			73	67	2.5	0.33	35.92	7.392		44.349	
A-5	10.0	00:10:00	25.365	0.110	1.632	1.60	1472	260		57			74	67	2.5	0.33	35.64	9.247		44.384	
A-6	12.5	00:12:30	27.450	0.080	1.632	1.60	1520	260		60			76	68	2.5	0.28	30.77	11.092		44.369	
A-7	15.0	00:15:00	29.530	0.055	1.632	1.60	1457	260		62			78	69	2.5	0.23	25.10	12.924		44.310	
A-8	17.5	00:17:30	31.600	0.050	1.632	1.60	1444	260		63			79	69	2.5	0.22	23.85	14.780		44.340	
A-9	20.0	00:20:00	33.700	0.055	1.632	1.60	1491	260		65			79	70	2.5	0.23	25.32	16.590		44.241	
A-10	22.5	00:22:30	35.750	0.055	1.632	1.60	1563	260		66			80	71	2.5	0.23	25.79	18.424		44.217	
A-11	25.0	00:25:00	37.830	0.055	1.632	1.60	1604	260		65			81	72	2.5	0.23	26.05	20.245		44.171	
A-12	27.5	00:27:30	39.900	0.025	1.632	1.60	1542	260		65			82	73	2.5	0.16	17.30	22.133		44.266	
B-1	30.0	00:30:00	42.050	0.055	1.632	1.60	1207	260		66			80	74	2.5	0.23	23.41	23.913		44.147	
B-2	32.5	00:32:30	44.075	0.100	1.632	1.60	1590	260		63			82	75	2.5	0.32	35.00	25.688		44.037	
B-3	35.0	00:35:00	46.100	0.120	1.632	1.60	1742	260		63			83	75	2.5	0.35	39.74	27.475		43.959	
B-4	37.5	00:37:30	48.140	0.120	1.632	1.60	1765	260		63			83	76	2.5	0.35	39.95	29.242		43.863	
B-5	40.0	00:40:00	50.160	0.115	1.632	1.60	1748	259		63			84	76	2.5	0.34	38.96	31.069		43.862	
B-6	42.5	00:42:30	52.250	0.090	1.632	1.60	1591	260		63			84	77	2.5	0.30	33.22	32.833		43.777	
B-7	45.0	00:45:00	54.270	0.065	1.632	1.60	1509	260		63			85	78	2.5	0.25	27.66	34.646		43.763	
B-8	47.5	00:47:30	56.350	0.070	1.632	1.60	1636	260		64			85	78	2.5	0.26	29.61	36.455		43.746	
B-9	50.0	00:50:00	58.425	0.055	1.632	1.60	1755	260		64			85	78	2.5	0.23	26.98	38.281		43.750	
B-10	52.5	00:52:30	60.520	0.06	1.632	1.60	1677	260		64			85	78	2.5	0.23	26.50	40.125		43.772	
B-11	55.0	00:55:00	62.635	0.04	1.632	1.60	1529	260		64			86	79	2.5	0.20	21.81	41.969		43.794	
B-12	57.5	00:57:30	64.755	0.02	1.632	1.60	1009	260		64			86	79	2.5	0.14	13.25	43.875		43.875	
Last Pt	60.0	01:00:00	66.945																		
Final Val	60.0	01:00:00	66.945												Max Vac	2.5	Final Values	43.875			
Average Values						0.07		1.60	1526	260			62			80	73		0.27	29.05	
														76							

METHOD 4 (MOISTURE) [MULTI POINT, NO VARIATION] SOURCE SAMPLING TITLE PAGE ISOKINETIC SAMPLING DATA

Plant Name	Cimaron Energy, INC
Sampling Location	Norman Facility
Project #	cel-14-norman.ok-comp#1

Date	05/09/14
Operator	TP/MM
Run Number	70-100-70%-8

Leak Checks					
Train	Pre	0.0025	ft ³ /min@	15.0	in Hg
PASS	Post	0.0025	ft ³ /min@	15.0	in Hg
< 3.0	Pitot	Pre (+)	0.17	in H ₂ O for	15.0
		Pre (-)	0.20	in H ₂ O for	15.0
		Post (+)	0.15	in H ₂ O for	15.0
		Post (-)	0.21	in H ₂ O for	15.0

Nozzle Measurements				
Pre				PASS
Post				PASS

Run Time			
Start	11:49	End	12:52

Weights	Imp 1	Imp 2	Imp 3	Imp 4	Imp 5	Imp 6	Imp 7	Imp 8
Pre	844.1	797.1	581.4	806.3				
Post	876.0	805.9	583.4	816.4				

Sampling Equipment		
Meter Box Number	SAMP-CP-0012	
Meter Cal Factor	(Y)	0.889
Low Flow Manometer	SAMP-MN-0001	
Average Nozzle Diameter	(D _{no})	in
Suggested Nozzle Diameter	(D _n)	0.3654 in
Probe Number	samp-hp-0003	in
Probe Length	60	in
Liner Material	inconel	
Sample Case / Oven Number	SAMP-BC-0012	
Impinger Case Number	SAMP-BC-0003	

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Coefficient	(C _p)	0.840	
Average Stack Temp	(t _s)	1528.3	F
Average Meter Temp	(t _m)	84.9	
Orifice Meter Coefficient	(ΔH@)	1.632	in H ₂ O
Square Root ΔP	(ΔP ^{1/2} _{avg})	0.32	in H ₂ O
Stack Moisture Content	(B _{ws})	5.38	%
Stack Dry Molecular Weight	(M _d)	29.42	lb/lb-mole
Estimated Orifice Flow Rate	(Q _m)	0.73	acfm
ΔP to ΔH Isokinetic Factor	(K)		

Pressures			
Barometric Pressure	(P _b)	29.97	in Hg
Stack Static Pressure	(P _{static})	0.00	in H ₂ O
Absolute Stack Pressure	(P _a)	29.97	in Hg
Absolute Meter Pressure	(P _m)	30.09	in Hg

Wash Volumes					ml
					ml

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)	Snorkel Temp (248±25°F)	Filter Temp (248±25°F)	Impinger Exit Temp (568°F)	Cond. Temp (≤-°F)	CPM Filter Temp (-±-°F)	Meter Inlet Temp (t _{mi})	Meter Outlet Temp (t _{mo})	Pump Vacuum	Square Root ΔP (ΔP ^{1/2})	Local Stack Velocity (v _s)	Cumul. Meter Volume (V _m) _{std}	Cumul. Percent IsoKinetic (I)	Est-Run Meter Volume (V _m) _{std}
	min	hh:mm:ss	ft ³	in H ₂ O	in H ₂ O	in H ₂ O	F	F	F	F	F	F	F	F	in Hg	√(in H ₂ O)	ft/sec	dscf	%	dscf
A-1	0.0	00:00:00	67.220	0.060	1.632	1.60	1514	261		59			84	79	2.0	0.24	26.60	2.140		51.360
A-2	2.5	00:02:30	69.675	0.070	1.632	1.60	1513	260		57			85	79	2.0	0.26	28.72	3.982		47.783
A-3	5.0	00:05:00	71.790	0.110	1.632	1.60	1614	260		57			86	79	2.0	0.33	36.91	5.792		46.334
A-4	7.5	00:07:30	73.870	0.130	1.632	1.60	1576	260		59			86	79	2.0	0.36	39.76	7.619		45.713
A-5	10.0	00:10:00	75.970	0.125	1.632	1.60	1618	260		60			86	80	2.0	0.35	39.39	9.449		45.354
A-6	12.5	00:12:30	78.075	0.120	1.632	1.60	1600	260		61			87	80	2.0	0.35	38.43	11.277		45.108
A-7	15.0	00:15:00	80.180	0.075	1.632	1.60	1585	260		61			87	81	2.0	0.27	30.27	13.116		44.971
A-8	17.5	00:17:30	82.300	0.055	1.632	1.60	1456	260		61			87	81	2.0	0.23	25.09	14.939		44.816
A-9	20.0	00:20:00	84.400	0.055	1.632	1.60	1528	260		62			88	81	2.0	0.23	25.56	16.781		44.749
A-10	22.5	00:22:30	86.525	0.065	1.632	1.60	1444	260		62			88	81	2.0	0.25	27.19	18.623		44.695
A-11	25.0	00:25:00	88.650	0.700	1.632	1.60	1345	260		61			88	82	2.0	0.84	86.87	20.468		44.657
A-12	27.5	00:27:30	90.780	0.300	1.632	1.60	1015	260		60			89	82	2.0	0.55	51.41	22.332		44.665
B-1	30.0	00:30:00	92.935	0.055	1.632	1.60	1387	260		61			86	83	2.0	0.23	24.63	24.144		44.574
B-2	32.5	00:32:30	95.025	0.090	1.632	1.60	1688	260		58			89	83	2.0	0.30	33.98	25.921		44.436
B-3	35.0	00:35:00	97.080	0.125	1.632	1.60	1774	260		58			88	83	2.0	0.35	40.84	27.669		44.270
B-4	37.5	00:37:30	99.100	0.135	1.632	1.60	1777	260		59			89	84	2.0	0.37	42.47	29.439		44.159
B-5	40.0	00:40:00	101.150	0.115	1.632	1.60	1723	260		59			89	84	2.0	0.34	38.72	31.227		44.085
B-6	42.5	00:42:30	103.220	0.085	1.632	1.60	1581	260		59			90	84	2.0	0.29	32.19	33.013		44.018
B-7	45.0	00:45:00	105.290	0.035	1.632	1.60	1541	260		59			90	84	2.0	0.19	20.45	34.800		43.957
B-8	47.5	00:47:30	107.360	0.035	1.632	1.60	1602	260		59			90	84	2.0	0.19	20.76	36.595		43.913
B-9	50.0	00:50:00	109.440	0.080	1.632	1.60	1660	260		59			89	84	2.0	0.28	31.83	38.391		43.876
B-10	52.5	00:52:30	111.520	0.100	1.632	1.60	1635	260		60			89	84	2.0	0.32	35.37	40.188		43.841
B-11	55.0	00:55:00	113.600	0.080	1.632	1.60	1405	260		60			89	84	2.0	0.28	29.85	41.993		43.819
B-12	57.5	00:57:30	115.690	0.030	1.632	1.60	1099	260		60			89	83	2.0	0.17	16.71	43.817		43.817
Last Pt	60.0	01:00:00	117.800																	
Final Val	60.0	01:00:00	117.800												Max Vac	2.0	Final Values	43.817		
Average Values				0.12		1.60	1528	260		60			88	82		0.32	34.33			
													85							

METHOD 4 (MOISTURE) [MULTI POINT, NO VARIATION] SOURCE SAMPLING TITLE PAGE ISOKINETIC SAMPLING DATA

Plant Name	Cimaron Energy, INC
Sampling Location	Norman Facility
Project #	cel-14-norman.ok-comp#1

Date	05/09/14
Operator	TP/MM
Run Number	70-100-70%-9

Leak Checks					
Train	Pre	0.000	ft ³ /min@	15.0	in Hg
PASS	Post	0.000	ft ³ /min@	15.0	in Hg
< 3.0	Pitot	Pre (+)	0.14	in H ₂ O for	15.0
		Pre (-)	0.17	in H ₂ O for	15.0
		Post (+)	0.20	in H ₂ O for	15.0
		Post (-)	0.16	in H ₂ O for	15.0

Nozzle Measurements				
Pre				PASS
Post				PASS

Run Time			
Start	13:01	End	14:02

Weights	Imp 1	Imp 2	Imp 3	Imp 4	Imp 5	Imp 6	Imp 7	Imp 8
Pre	848.2	770.6	603.3	870.5				
Post	878.6	778.3	605.9	880.2				

Sampling Equipment		
Meter Box Number	SAMP-CP-0012	
Meter Cal Factor	(Y)	0.889
Low Flow Manometer	SAMP-MN-0001	
Average Nozzle Diameter	(D _{no})	in
Suggested Nozzle Diameter	(D _n)	0.3688 in
Probe Number	samp-hp-0003	in
Probe Length	60	in
Liner Material	inconel	
Sample Case / Oven Number	SAMP-BC-0012	
Impinger Case Number	SAMP-BC-0003	

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Coefficient	(C _p)	0.840	
Average Stack Temp	(t _s)	1483.5	F
Average Meter Temp	(t _m)	87.7	
Orifice Meter Coefficient	(ΔH@)	1.632	in H ₂ O
Square Root ΔP	(ΔP ^{1/2} _{avg})	0.29	in H ₂ O
Stack Moisture Content	(B _{ws})	5.17	%
Stack Dry Molecular Weight	(M _d)	29.46	lb/lb-mole
Estimated Orifice Flow Rate	(Q _m)	0.73	acfm
ΔP to ΔH Isokinetic Factor	(K)		

Pressures			
Barometric Pressure	(P _b)	29.96	in Hg
Stack Static Pressure	(P _{static})	0.00	in H ₂ O
Absolute Stack Pressure	(P _a)	29.96	in Hg
Absolute Meter Pressure	(P _m)	30.08	in Hg

Wash Volumes					ml
					ml

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)	Snorkel Temp (248±25°F)	Filter Temp (248±25°F)	Impinger Exit Temp (568°F)	Cond. Temp (≤-°F)	CPM Filter Temp (-±-°F)	Meter Inlet Temp (t _{mi})	Meter Outlet Temp (t _{mo})	Pump Vacuum	Square Root ΔP (ΔP ^{1/2})	Local Stack Velocity (v _s)	Cumul. Meter Volume (V _m) _{std}	Cumul. Percent IsoKinetic (I)	Est-Run Meter Volume (V _m) _{std}
	min	hh:mm:ss	ft ³	in H ₂ O	in H ₂ O	in H ₂ O	F	F	F	F	F	F	F	F	in Hg	√(in H ₂ O)	ft/sec	dscf	%	dscf
A-1	0.0	00:00:00	118.190	0.065	1.632	1.60	1500	261		63			86	83	3.0	0.25	27.56	1.785		42.845
A-2	2.5	00:02:30	120.250	0.075	1.632	1.60	1497	260		61			88	83	3.0	0.27	29.58	3.589		43.065
A-3	5.0	00:05:00	122.335	0.120	1.632	1.60	1625	260		61			88	83	3.0	0.35	38.63	5.375		43.000
A-4	7.5	00:07:30	124.400	0.140	1.632	1.60	1548	260		62			88	83	3.0	0.37	40.94	7.183		43.097
A-5	10.0	00:10:00	126.490	0.130	1.632	1.60	1577	260		62			89	83	3.0	0.36	39.74	8.998		43.189
A-6	12.5	00:12:30	128.590	0.085	1.632	1.60	1581	260		63			89	83	3.0	0.29	32.16	10.813		43.250
A-7	15.0	00:15:00	130.690	0.060	1.632	1.60	1500	260		63			90	84	3.0	0.24	26.48	12.611		43.239
A-8	17.5	00:17:30	132.775	0.065	1.632	1.60	1486	260		63			90	84	3.0	0.25	27.46	14.444		43.333
A-9	20.0	00:20:00	134.900	0.070	1.632	1.60	1429	260		63			91	84	3.0	0.26	28.08	16.297		43.460
A-10	22.5	00:22:30	137.050	0.050	1.632	1.60	1400	260		63			91	85	3.0	0.22	23.55	18.123		43.495
A-11	25.0	00:25:00	139.170	0.075	1.632	1.60	1295	260		63			90	85	3.0	0.27	28.02	19.984		43.602
A-12	27.5	00:27:30	141.330	0.025	1.632	1.60	889	260		64			90	86	3.0	0.16	14.18	21.844		43.689
B-1	30.0	00:30:00	143.490	0.065	1.632	1.60	1599	260		64			89	86	3.0	0.25	28.25	23.689		43.733
B-2	32.5	00:32:30	145.630	0.105	1.632	1.60	1690	260		63			90	86	3.0	0.32	36.69	25.428		43.591
B-3	35.0	00:35:00	147.650	0.125	1.632	1.60	1746	260		64			91	86	3.0	0.35	40.55	27.192		43.507
B-4	37.5	00:37:30	149.700	0.125	1.632	1.60	1744	260		64			91	86	3.0	0.35	40.53	29.256		43.884
B-5	40.0	00:40:00	152.100	0.100	1.632	1.60	1629	260		65			92	86	3.0	0.32	35.30	30.846		43.548
B-6	42.5	00:42:30	153.950	0.090	1.632	1.60	1540	260		66			92	86	3.0	0.30	32.76	32.574		43.432
B-7	45.0	00:45:00	155.960	0.065	1.632	1.60	1506	259		66			92	86	3.0	0.25	27.61	34.396		43.448
B-8	47.5	00:47:30	158.080	0.080	1.632	1.60	1546	260		66			92	86	3.0	0.28	30.94	36.304		43.565
B-9	50.0	00:50:00	160.300	0.60	1.632	1.60	1590	260		65			91	87	3.0	0.77	85.64	38.066		43.504
B-10	52.5	00:52:30	162.350	0.05	1.632	1.60	1524	260		65			92	87	3.0	0.22	24.32	39.998		43.634
B-11	55.0	00:55:00	164.600	0.03	1.632	1.60	1315	260		66			92	88	3.0	0.17	17.82	41.714		43.528
B-12	57.5	00:57:30	166.600	0.02	1.632	1.60	849	260		66			92	88	3.0	0.14	12.49	43.554		43.554
Last Pt	60.0	01:00:00	168.745																	
Final Val	60.0	01:00:00	168.745												Max Vac	3.0	Final Values	43.554		
Average Values				0.10		1.60	1484	260		64			90	85		0.29	32.05			
													88							

CIMARRON ENERGY, INC.

May 9, 2014

48HV ECD

Norman Facility

Unit Data

Weather Data

Meas. Stack Moisture	5.5	%	Barometric Pressure	29.97	in. Hg
Stack Exhaust Flow (M2)	218,382	SCFH	Relative Humidity	40	%
			Ambient Temperature	71	° F
			Specific Humidity	0.006353	lb H ₂ O / lb air

70-100-70 Load, Run - 48HV ECD R7

	Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmvd)	THC (ppmvw)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
A1	05/09/14 10:35:00	13320	13.94	9.20	0.04	4.87	14.73	81.20	2,997.00
	05/09/14 10:35:30	13350	14.22	9.39	0.05	4.66	14.73	81.20	2,997.00
	05/09/14 10:36:00	13380	14.36	13.41	0.04	4.52	14.42	81.30	2,949.00
	05/09/14 10:36:30	13410	14.14	11.68	0.05	4.70	14.42	81.30	2,949.00
	05/09/14 10:37:00	13440	14.15	10.64	0.05	4.70	14.09	81.50	2,946.00
	05/09/14 10:37:30	13470	14.26	11.49	0.05	4.62	14.09	81.50	2,946.00
	05/09/14 10:38:00	13500	14.27	11.68	0.05	4.60	14.06	81.60	2,956.00
	05/09/14 10:38:30	13530	14.22	13.00	0.04	4.63	14.06	81.60	2,956.00
	05/09/14 10:39:00	13560	14.26	11.08	0.04	4.60	14.42	81.70	2,970.00
	05/09/14 10:39:30	13590	14.28	13.53	0.02	4.59	14.42	81.70	2,970.00
	05/09/14 10:40:00	13620	13.99	13.46	0.02	4.79	14.26	81.80	2,957.00
	05/09/14 10:40:30	13650	13.39	16.96	0.02	5.26	14.26	81.80	2,957.00
	05/09/14 10:41:00	13680	13.98	11.90	0.01	4.87	18.16	81.90	3,369.00
	05/09/14 10:41:30	13710	14.42	26.74	0.03	4.46	18.16	81.90	3,369.00
	05/09/14 10:42:00	13740	13.53	24.84	0.03	5.14	22.37	82.00	3,770.00
	05/09/14 10:42:30	13770	12.39	8.58	0.02	6.00	22.37	82.00	3,770.00
	05/09/14 10:43:00	13800	12.58	1.72	0.02	5.86	24.30	82.00	3,959.00
	05/09/14 10:43:30	13830	13.45	3.25	0.05	5.25	24.30	82.00	3,959.00
	05/09/14 10:44:00	13860	14.29	9.47	0.04	4.62	23.75	81.90	4,172.00
	05/09/14 10:44:30	13890	14.20	14.78	0.02	4.64	23.75	81.90	4,172.00
	05/09/14 10:45:00	13920	13.94	13.45	0.03	4.88	25.16	81.90	4,105.00
	05/09/14 10:45:30	13950	13.85	10.02	0.02	5.22	25.16	81.90	4,105.00
	05/09/14 10:46:00	13980	13.99	8.86	0.01	5.13	26.05	82.00	4,067.00
	05/09/14 10:46:30	14010	13.68	8.11	0.03	5.36	26.05	82.00	4,067.00
	05/09/14 10:47:00	14040	14.33	7.91	0.03	4.91	26.02	82.00	4,031.00
	05/09/14 10:47:30	14070	14.24	10.43	0.02	4.95	26.02	82.00	4,031.00
	05/09/14 10:48:00	14100	13.44	11.58	0.03	5.51	26.10	82.10	3,962.00
	05/09/14 10:48:30	14130	12.82	4.03	0.02	5.88	26.10	82.10	3,962.00
	05/09/14 10:49:00	14160	12.79	1.16	0.02	5.71	24.08	82.20	3,840.00
	05/09/14 10:49:30	14190	13.22	1.16	0.05	5.44	24.08	82.20	3,840.00
	05/09/14 10:50:00	14220	13.17	0.93	0.05	5.74	19.57	82.40	3,434.00
	05/09/14 10:50:30	14250	14.10	1.17	0.05	5.07	19.57	82.40	3,434.00
	05/09/14 10:51:00	14280	14.21	2.95	0.05	4.98	16.08	82.60	3,055.00
	05/09/14 10:51:30	14310	14.35	4.25	0.04	4.88	16.08	82.60	3,055.00
	05/09/14 10:52:00	14340	14.23	4.53	0.04	4.98	15.64	82.90	3,062.00
	05/09/14 10:52:30	14370	14.01	4.10	0.01	5.12	15.64	82.90	3,062.00
	05/09/14 10:53:00	14400	13.99	3.45	0.02	4.99	16.64	83.20	3,158.00
	05/09/14 10:53:30	14430	13.72	5.93	0.03	5.04	16.64	83.20	3,158.00
	05/09/14 10:54:00	14460	13.61	6.50	0.02	5.12	18.99	83.30	3,322.00
	05/09/14 10:54:30	14490	13.83	8.11	0.03	4.96	18.99	83.30	3,322.00
	05/09/14 10:55:00	14520	13.40	8.32	0.02	5.27	21.84	83.40	3,675.00
A2	05/09/14 10:55:30	14550	13.08	6.64	0.05	5.47	21.84	83.40	3,675.00
	05/09/14 10:56:00	14580	13.85	5.39	0.05	4.97	26.19	83.50	4,034.00
	05/09/14 10:56:30	14610	14.73	11.02	0.02	4.27	26.19	83.50	4,034.00
	05/09/14 10:57:00	14640	15.01	15.89	0.02	4.10	26.68	83.40	4,062.00
	05/09/14 10:57:30	14670	14.69	15.32	0.05	4.29	26.68	83.40	4,062.00
	05/09/14 10:58:00	14700	14.00	7.28	0.05	4.81	27.29	83.40	4,114.00
	05/09/14 10:58:30	14730	14.03	2.79	0.05	4.80	27.29	83.40	4,114.00
	05/09/14 10:59:00	14760	14.60	4.90	0.05	4.34	26.07	83.50	4,033.00
	05/09/14 10:59:30	14790	14.26	5.58	0.03	4.60	26.07	83.50	4,033.00
	05/09/14 11:00:00	14820	13.84	2.75	0.03	4.93	26.99	83.60	4,087.00

CIMARRON ENERGY, INC.

May 9, 2014

48HV ECD

Norman Facility

Unit Data

Weather Data

Meas. Stack Moisture	5.5	%	Barometric Pressure	29.97	in. Hg
Stack Exhaust Flow (M2)	218,382	SCFH	Relative Humidity	40	%
			Ambient Temperature	71	° F
			Specific Humidity	0.006353	lb H ₂ O / lb air

70-100-70 Load, Run - 48HV ECD R7

	Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmv)	THC (ppmv)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
	05/09/14 11:00:30	14850	13.81	1.92	0.05	4.96	26.99	83.60	4,087.00
	05/09/14 11:01:00	14880	13.71	1.47	0.05	5.03	27.74	83.60	4,071.00
	05/09/14 11:01:30	14910	13.54	0.92	0.05	5.15	27.74	83.60	4,071.00
	05/09/14 11:02:00	14940	13.47	0.24	0.05	5.20	28.76	83.70	4,184.00
	05/09/14 11:02:30	14970	13.27	0.07	0.02	5.33	28.76	83.70	4,184.00
	05/09/14 11:03:00	15000	13.66	-0.02	0.03	5.06	29.01	83.60	4,199.00
	05/09/14 11:03:30	15030	13.92	0.98	0.02	4.85	29.01	83.60	4,199.00
	05/09/14 11:04:00	15060	13.98	1.44	0.03	4.82	23.42	83.60	3,710.00
	05/09/14 11:04:30	15090	14.16	1.89	0.05	4.67	23.42	83.60	3,710.00
	05/09/14 11:05:00	15120	14.29	2.74	0.05	4.55	20.90	83.60	3,495.00
	05/09/14 11:05:30	15150	14.45	3.04	0.02	4.43	20.90	83.60	3,495.00
	05/09/14 11:06:00	15180	14.55	5.37	0.03	4.36	15.97	83.80	3,048.00
	05/09/14 11:06:30	15210	14.98	10.38	0.04	4.06	15.97	83.80	3,048.00
	05/09/14 11:07:00	15240	14.90	18.70	0.05	4.10	15.45	83.90	3,055.00
	05/09/14 11:07:30	15270	14.80	22.71	0.02	4.15	15.45	83.90	3,055.00
	05/09/14 11:08:00	15300	14.44	18.09	0.03	4.41	16.22	84.10	3,115.00
	05/09/14 11:08:30	15330	14.22	12.91	0.03	4.60	16.22	84.10	3,115.00
	05/09/14 11:09:00	15360	14.37	12.02	0.03	4.49	17.27	84.30	3,235.00
	05/09/14 11:09:30	15390	14.17	13.95	0.03	4.62	17.27	84.30	3,235.00
	05/09/14 11:10:00	15420	13.88	6.91	0.02	4.88	18.43	84.50	3,311.00
	05/09/14 11:10:30	15450	13.90	7.57	0.03	4.85	18.43	84.50	3,311.00
	05/09/14 11:11:00	15480	14.06	6.04	0.03	4.73	23.31	84.60	3,759.00
	05/09/14 11:11:30	15510	13.76	5.81	0.06	4.96	23.31	84.60	3,759.00
	05/09/14 11:12:00	15540	13.57	2.64	0.06	5.10	29.51	84.70	4,172.00
	05/09/14 11:12:30	15570	13.46	1.18	0.03	5.19	29.51	84.70	4,172.00
	05/09/14 11:13:00	15600	13.24	0.60	0.02	5.33	31.47	84.80	4,330.00
	05/09/14 11:13:30	15630	12.90	-0.12	0.03	5.61	31.47	84.80	4,330.00
	05/09/14 11:14:00	15660	12.97	-0.34	0.02	5.54	33.82	84.80	4,505.00
	05/09/14 11:14:30	15690	12.98	-0.35	0.03	5.55	33.82	84.80	4,505.00
	05/09/14 11:15:00	15720	13.16	-0.30	0.02	5.41	32.61	84.80	4,422.00
A3	05/09/14 11:15:30	15750	13.00	-0.31	0.02	5.54	32.61	84.80	4,422.00
	05/09/14 11:16:00	15780	13.00	-0.38	0.02	5.53	33.80	84.70	4,470.00
	05/09/14 11:16:30	15810	12.95	-0.34	0.03	5.56	33.80	84.70	4,470.00
	05/09/14 11:17:00	15840	12.93	-0.41	0.03	5.59	35.35	84.80	4,532.00
	05/09/14 11:17:30	15870	13.13	-0.39	0.05	5.43	35.35	84.80	4,532.00
	05/09/14 11:18:00	15900	13.25	-0.25	0.05	5.34	33.35	84.70	4,454.00
	05/09/14 11:18:30	15930	13.29	-0.10	0.01	5.29	33.35	84.70	4,454.00
	05/09/14 11:19:00	15960	13.24	-0.30	0.02	5.35	29.23	84.70	4,181.00
	05/09/14 11:19:30	15990	13.49	-0.25	0.02	5.18	29.23	84.70	4,181.00
	05/09/14 11:20:00	16020	13.03	-0.11	0.02	5.49	23.53	84.80	3,782.00
	05/09/14 11:20:30	16050	14.13	0.81	0.03	4.71	23.53	84.80	3,782.00
	05/09/14 11:21:00	16080	14.67	5.57	0.03	4.28	17.16	84.90	3,163.00
	05/09/14 11:21:30	16110	14.89	9.98	0.02	4.12	17.16	84.90	3,163.00
	05/09/14 11:22:00	16140	14.77	12.30	0.03	4.19	16.08	85.10	3,075.00
	05/09/14 11:22:30	16170	14.31	9.23	0.02	4.53	16.08	85.10	3,075.00
	05/09/14 11:23:00	16200	14.45	5.79	0.03	4.44	16.47	85.20	3,100.00
	05/09/14 11:23:30	16230	14.45	7.81	0.02	4.43	16.47	85.20	3,100.00
	05/09/14 11:24:00	16260	14.29	8.93	0.02	4.55	16.72	85.30	3,123.00
	05/09/14 11:24:30	16290	14.20	7.02	0.05	4.62	16.72	85.30	3,123.00
	05/09/14 11:25:00	16320	13.90	6.65	0.05	4.85	21.34	85.40	3,590.00
	05/09/14 11:25:30	16350	13.50	4.30	0.03	5.15	21.34	85.40	3,590.00

CIMARRON ENERGY, INC.

May 9, 2014

48HV ECD

Norman Facility

Unit Data

Weather Data

Meas. Stack Moisture	5.5	%	Barometric Pressure	29.97	in. Hg
Stack Exhaust Flow (M2)	218,382	SCFH	Relative Humidity	40	%
			Ambient Temperature	71	° F
			Specific Humidity	0.006353	lb H ₂ O / lb air

70-100-70 Load, Run - 48HV ECD R7

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmvd)	THC (ppmvw)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
05/09/14 11:26:00	16380	13.33	1.27	0.03	5.27	29.53	85.50	4,212.00
05/09/14 11:26:30	16410	13.13	0.19	0.03	5.43	29.53	85.50	4,212.00
05/09/14 11:27:00	16440	12.85	-0.20	0.02	5.63	33.66	85.40	4,439.00
05/09/14 11:27:30	16470	12.77	-0.48	0.03	5.72	33.66	85.40	4,439.00
05/09/14 11:28:00	16500	12.89	-0.43	0.02	5.60	33.63	85.30	4,463.00
05/09/14 11:28:30	16530	12.73	-0.51	0.03	5.73	33.63	85.30	4,463.00
05/09/14 11:29:00	16560	12.80	-0.50	0.02	5.68	34.30	85.20	4,471.00
05/09/14 11:29:30	16590	12.88	-0.50	0.06	5.62	34.30	85.20	4,471.00
05/09/14 11:30:00	16620	13.06	-0.46	0.05	5.49	34.41	85.20	4,472.00
05/09/14 11:30:30	16650	12.96	-0.45	0.00	5.55	34.41	85.20	4,472.00
05/09/14 11:31:00	16680	12.88	-0.51	0.00	5.61	34.54	85.20	4,473.00
05/09/14 11:31:30	16710	13.00	-0.47	0.05	5.54	34.54	85.20	4,473.00
05/09/14 11:32:00	16740	12.98	-0.45	0.05	5.54	34.30	85.30	4,470.00
05/09/14 11:32:30	16770	13.12	-0.47	0.02	5.46	34.30	85.30	4,470.00
05/09/14 11:33:00	16800	13.51	0.07	0.02	5.14	31.36	85.40	4,254.00
05/09/14 11:33:30	16830	13.24	-0.08	0.02	5.35	31.36	85.40	4,254.00
05/09/14 11:34:00	16860	13.41	-0.15	0.02	5.23	26.99	85.50	3,900.00
05/09/14 11:34:30	16890	13.97	0.44	0.03	4.81	26.99	85.50	3,900.00
05/09/14 11:35:00	16920	13.62	0.46	0.03	5.09	20.90	85.50	3,437.00
RAW AVERAGE		13.75	5.64	0.03	5.01	24.03	83.72	3,769.25

Bias	Serial Number:	O ₂ (%)	CO (ppmvd)	THC (ppmvw)	CO ₂ (%)	Press. Trans (in. H ₂ O)	Temp. Trans. (°F)	F-Flow Trans. (SCFH)
	INST-22-010	INST-CO-0008	INST-VC-0007	INST-22-0010	1229943	1229943	1229943	
	Initial Zero	0.37	0.06	0.02	0.01			
	Final Zero	0.36	0.18	0.03	0.09			
	Avg. Zero	0.37	0.12	0.03	0.05			
	Initial UpScale	12.05	9.02	3.02	8.61			
	Final UpScale	11.98	8.91	2.97	8.66			
	Avg. UpScale	12.02	8.97	3.00	8.64			
	Upscale Cal Gas	12.20	9.00	3.04	8.56			

EMISSIONS DATA	O ₂	CO	THC	CO ₂
Corrected Raw Average (ppm/% dry basis)	14.02	5.61	0.01	4.95
Corrected Raw Average (ppm/% wet basis)	13.23	5.30	0.01	4.68
Emission Rate (lb/hr)	N/A	0.09	0.00	N/A

CIMARRON ENERGY, INC.
48HV ECD
Norman Facility

Unit Data

Meas. Stack Moisture	5.4	%
Stack Exhaust Flow (M2)	258,078	SCFH

Weather Data

Barometric Pressure	29.97	in. Hg
Relative Humidity	43	%
Ambient Temperature	76	° F
Specific Humidity	0.008205	lb H ₂ O / lb air

70-100-70 Load, Run - 48HV ECD R8

	Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmvd)	THC (ppmvw)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
A1	05/09/14 11:49:00	17760	14.06	2.36	0.03	4.88	16.66	87.90	3,119.00
	05/09/14 11:49:30	17790	13.96	2.48	0.02	4.95	16.66	87.90	3,119.00
	05/09/14 11:50:00	17820	14.02	2.62	0.03	4.91	16.39	88.00	3,105.00
	05/09/14 11:50:30	17850	14.00	2.49	0.05	4.92	16.39	88.00	3,105.00
	05/09/14 11:51:00	17880	13.93	2.35	0.05	4.97	16.36	88.20	3,138.00
	05/09/14 11:51:30	17910	13.94	2.28	0.03	4.98	16.36	88.20	3,138.00
	05/09/14 11:52:00	17940	14.01	2.58	0.03	4.93	16.08	88.30	3,124.00
	05/09/14 11:52:30	17970	14.11	2.52	0.05	4.86	16.08	88.30	3,124.00
	05/09/14 11:53:00	18000	13.96	3.81	0.05	4.95	17.80	88.30	3,226.00
	05/09/14 11:53:30	18030	13.64	3.96	0.03	5.18	17.80	88.30	3,226.00
	05/09/14 11:54:00	18060	13.48	3.87	0.03	5.29	19.35	88.40	3,395.00
	05/09/14 11:54:30	18090	12.56	1.97	0.02	5.94	19.35	88.40	3,395.00
	05/09/14 11:55:00	18120	11.95	-0.10	0.03	6.38	25.94	88.40	3,950.00
	05/09/14 11:55:30	18150	12.91	0.03	0.03	5.73	25.94	88.40	3,950.00
	05/09/14 11:56:00	18180	13.28	1.04	0.02	5.47	27.38	88.40	4,043.00
	05/09/14 11:56:30	18210	13.33	1.90	0.03	5.41	27.38	88.40	4,043.00
	05/09/14 11:57:00	18240	13.44	2.26	0.03	5.33	27.46	88.40	4,067.00
	05/09/14 11:57:30	18270	13.46	2.79	0.02	5.31	27.46	88.40	4,067.00
	05/09/14 11:58:00	18300	13.40	2.77	0.02	5.35	27.54	88.30	4,068.00
	05/09/14 11:58:30	18330	13.10	2.48	0.03	5.58	27.54	88.30	4,068.00
	05/09/14 11:59:00	18360	12.61	1.46	0.03	5.91	29.48	88.20	4,213.00
	05/09/14 11:59:30	18390	12.51	-0.13	0.06	6.04	29.48	88.20	4,213.00
	05/09/14 12:00:00	18420	13.96	0.73	0.05	4.97	29.04	88.10	4,164.00
	05/09/14 12:00:30	18450	13.86	2.67	0.02	5.01	29.04	88.10	4,164.00
	05/09/14 12:01:00	18480	13.60	2.26	0.02	5.22	30.59	88.00	4,261.00
	05/09/14 12:01:30	18510	13.04	1.51	0.06	5.62	30.59	88.00	4,261.00
	05/09/14 12:02:00	18540	13.23	0.66	0.06	5.48	32.14	87.90	4,392.00
	05/09/14 12:02:30	18570	13.07	0.93	0.03	5.58	32.14	87.90	4,392.00
	05/09/14 12:03:00	18600	12.24	0.05	0.03	6.18	30.25	87.90	4,236.00
	05/09/14 12:03:30	18630	12.56	-0.51	0.02	5.98	30.25	87.90	4,236.00
	05/09/14 12:04:00	18660	12.80	-0.44	0.03	5.81	26.21	88.00	3,887.00
	05/09/14 12:04:30	18690	13.14	-0.25	0.03	5.55	26.21	88.00	3,887.00
	05/09/14 12:05:00	18720	13.73	0.09	0.03	5.14	20.34	88.20	3,382.00
	05/09/14 12:05:30	18750	13.88	0.81	0.02	5.01	20.34	88.20	3,382.00
	05/09/14 12:06:00	18780	13.78	1.59	0.03	5.09	16.72	88.30	3,084.00
	05/09/14 12:06:30	18810	13.96	2.13	0.05	4.97	16.72	88.30	3,084.00
	05/09/14 12:07:00	18840	14.01	3.23	0.06	4.91	16.55	88.60	3,048.00
	05/09/14 12:07:30	18870	13.93	3.45	0.02	4.97	16.55	88.60	3,048.00
	05/09/14 12:08:00	18900	13.72	3.93	0.02	5.14	17.55	88.70	3,155.00
	05/09/14 12:08:30	18930	13.91	4.93	0.05	4.99	17.55	88.70	3,155.00
	05/09/14 12:09:00	18960	13.25	5.10	0.05	5.44	20.82	88.80	3,450.00
A2	05/09/14 12:09:30	18990	12.53	1.32	0.05	5.99	20.82	88.80	3,450.00
	05/09/14 12:10:00	19020	12.66	-0.07	0.05	5.90	29.65	88.80	4,199.00
	05/09/14 12:10:30	19050	13.07	0.27	0.06	5.61	29.65	88.80	4,199.00
	05/09/14 12:11:00	19080	13.43	2.04	0.06	5.34	30.14	88.80	4,227.00
	05/09/14 12:11:30	19110	13.47	3.52	0.06	5.30	30.14	88.80	4,227.00
	05/09/14 12:12:00	19140	13.32	4.07	0.06	5.42	30.34	88.90	4,239.00
	05/09/14 12:12:30	19170	13.53	3.99	0.03	5.25	30.34	88.90	4,239.00
	05/09/14 12:13:00	19200	13.34	2.73	0.03	5.41	29.65	89.00	4,220.00
	05/09/14 12:13:30	19230	13.80	3.17	0.06	5.07	29.65	89.00	4,220.00
	05/09/14 12:14:00	19260	13.28	4.20	0.05	5.43	29.45	89.20	4,218.00
	05/09/14 12:14:30	19290	12.89	3.63	0.03	5.72	29.45	89.20	4,218.00

CIMARRON ENERGY, INC.
48HV ECD
Norman Facility

Unit Data

Meas. Stack Moisture	5.4	%
Stack Exhaust Flow (M2)	258,078	SCFH

Weather Data

Barometric Pressure	29.97	in. Hg
Relative Humidity	43	%
Ambient Temperature	76	° F
Specific Humidity	0.008205	lb H ₂ O / lb air

70-100-70 Load, Run - 48HV ECD R8

	Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmvd)	THC (ppmvw)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
	05/09/14 12:15:00	19320	12.78	3.03	0.02	5.82	31.67	89.20	4,377.00
	05/09/14 12:15:30	19350	12.63	3.16	0.03	5.92	31.67	89.20	4,377.00
	05/09/14 12:16:00	19380	12.80	2.74	0.03	5.79	31.61	89.20	4,400.00
	05/09/14 12:16:30	19410	13.23	3.86	0.03	5.47	31.61	89.20	4,400.00
	05/09/14 12:17:00	19440	13.10	2.51	0.02	5.58	25.47	89.30	3,906.00
	05/09/14 12:17:30	19470	13.25	0.74	0.02	5.48	25.47	89.30	3,906.00
	05/09/14 12:18:00	19500	13.53	0.95	0.02	5.28	21.98	89.50	3,635.00
	05/09/14 12:18:30	19530	13.88	1.63	0.05	5.03	21.98	89.50	3,635.00
	05/09/14 12:19:00	19560	14.16	2.59	0.06	4.79	17.69	89.70	3,184.00
	05/09/14 12:19:30	19590	13.93	2.67	0.03	4.99	17.69	89.70	3,184.00
	05/09/14 12:20:00	19620	14.04	3.45	0.03	4.90	15.78	90.00	3,034.00
	05/09/14 12:20:30	19650	14.16	4.41	0.03	4.81	15.78	90.00	3,034.00
	05/09/14 12:21:00	19680	14.06	5.70	0.03	4.86	16.03	90.20	3,035.00
	05/09/14 12:21:30	19710	14.55	6.62	0.03	4.53	16.03	90.20	3,035.00
	05/09/14 12:22:00	19740	14.67	9.72	0.03	4.41	16.25	90.30	3,069.00
	05/09/14 12:22:30	19770	14.62	10.54	0.05	4.44	16.25	90.30	3,069.00
	05/09/14 12:23:00	19800	14.19	6.52	0.05	4.78	19.13	90.40	3,336.00
	05/09/14 12:23:30	19830	14.04	3.80	0.02	4.89	19.13	90.40	3,336.00
	05/09/14 12:24:00	19860	14.15	3.51	0.02	4.79	24.83	90.60	3,799.00
	05/09/14 12:24:30	19890	13.93	2.25	0.02	4.98	24.83	90.60	3,799.00
	05/09/14 12:25:00	19920	13.85	1.25	0.02	5.03	29.56	90.60	4,173.00
	05/09/14 12:25:30	19950	13.68	0.58	0.06	5.16	29.56	90.60	4,173.00
	05/09/14 12:26:00	19980	13.46	-0.04	0.05	5.31	31.25	90.60	4,293.00
	05/09/14 12:26:30	20010	13.37	-0.32	0.02	5.37	31.25	90.60	4,293.00
	05/09/14 12:27:00	20040	13.40	-0.42	0.03	5.35	33.22	90.60	4,416.00
	05/09/14 12:27:30	20070	13.39	-0.50	0.03	5.36	33.22	90.60	4,416.00
	05/09/14 12:28:00	20100	13.39	-0.50	0.02	5.36	33.96	90.40	4,437.00
	05/09/14 12:28:30	20130	13.36	-0.53	0.03	5.38	33.96	90.40	4,437.00
	05/09/14 12:29:00	20160	13.47	-0.59	0.03	5.31	33.94	90.30	4,414.00
A3	05/09/14 12:29:30	20190	13.41	-0.50	0.06	5.35	33.94	90.30	4,414.00
	05/09/14 12:30:00	20220	13.28	-0.58	0.05	5.44	33.38	90.30	4,386.00
	05/09/14 12:30:30	20250	13.37	-0.55	0.03	5.38	33.38	90.30	4,386.00
	05/09/14 12:31:00	20280	13.38	-0.56	0.02	5.37	33.77	90.30	4,425.00
	05/09/14 12:31:30	20310	13.57	-0.48	0.03	5.23	33.77	90.30	4,425.00
	05/09/14 12:32:00	20340	13.62	-0.39	0.03	5.19	30.01	90.30	4,191.00
	05/09/14 12:32:30	20370	13.31	-0.42	0.03	5.42	30.01	90.30	4,191.00
	05/09/14 12:33:00	20400	13.42	-0.56	0.03	5.35	27.07	90.30	3,924.00
	05/09/14 12:33:30	20430	13.68	-0.48	0.02	5.16	27.07	90.30	3,924.00
	05/09/14 12:34:00	20460	14.20	-0.08	0.03	4.78	23.20	90.40	3,629.00
	05/09/14 12:34:30	20490	14.41	0.79	0.02	4.60	23.20	90.40	3,629.00
	05/09/14 12:35:00	20520	14.41	1.33	0.02	4.61	18.66	90.70	3,230.00
	05/09/14 12:35:30	20550	14.66	2.60	0.05	4.44	18.66	90.70	3,230.00
	05/09/14 12:36:00	20580	14.65	4.51	0.05	4.42	17.16	91.00	3,117.00
	05/09/14 12:36:30	20610	14.45	4.25	0.05	4.57	17.16	91.00	3,117.00
	05/09/14 12:37:00	20640	14.54	4.48	0.05	4.50	17.27	91.10	3,106.00
	05/09/14 12:37:30	20670	14.50	4.64	0.03	4.54	17.27	91.10	3,106.00
	05/09/14 12:38:00	20700	14.34	3.66	0.03	4.66	19.65	91.30	3,368.00
	05/09/14 12:38:30	20730	14.28	3.97	0.02	4.69	19.65	91.30	3,368.00
	05/09/14 12:39:00	20760	14.12	2.93	0.02	4.83	24.30	91.40	3,778.00
	05/09/14 12:39:30	20790	14.11	2.74	0.06	4.84	24.30	91.40	3,778.00
	05/09/14 12:40:00	20820	14.05	2.24	0.06	4.88	30.67	91.30	4,236.00
	05/09/14 12:40:30	20850	13.89	1.01	0.03	5.00	30.67	91.30	4,236.00

CIMARRON ENERGY, INC.
48HV ECD
Norman Facility

Unit Data

Meas. Stack Moisture	5.4	%
Stack Exhaust Flow (M2)	258,078	SCFH

Weather Data

Barometric Pressure	29.97	in. Hg
Relative Humidity	43	%
Ambient Temperature	76	° F
Specific Humidity	0.008205	lb H ₂ O / lb air

70-100-70 Load, Run - 48HV ECD R8

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmvd)	THC (ppmvw)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
05/09/14 12:41:00	20880	13.73	0.22	0.03	5.12	32.39	91.30	4,310.00
05/09/14 12:41:30	20910	13.74	-0.11	0.03	5.11	32.39	91.30	4,310.00
05/09/14 12:42:00	20940	13.85	-0.14	0.02	5.03	33.44	91.20	4,414.00
05/09/14 12:42:30	20970	13.92	-0.09	0.06	4.98	33.44	91.20	4,414.00
05/09/14 12:43:00	21000	13.54	-0.04	0.05	5.24	33.96	91.10	4,432.00
05/09/14 12:43:30	21030	13.54	0.74	0.03	5.25	33.96	91.10	4,432.00
05/09/14 12:44:00	21060	13.40	0.92	0.02	5.36	33.96	91.00	4,444.00
05/09/14 12:44:30	21090	13.35	0.74	0.03	5.39	33.96	91.00	4,444.00
05/09/14 12:45:00	21120	13.10	0.47	0.02	5.57	33.96	91.00	4,444.00
05/09/14 12:45:30	21150	13.00	0.09	0.06	5.66	33.96	91.00	4,444.00
05/09/14 12:46:00	21180	12.98	0.10	0.06	5.67	34.10	91.00	4,445.00
05/09/14 12:46:30	21210	12.98	0.05	0.03	5.67	34.10	91.00	4,445.00
05/09/14 12:47:00	21240	13.28	0.50	0.03	5.44	31.44	91.10	4,258.00
05/09/14 12:47:30	21270	13.39	1.60	0.03	5.36	31.44	91.10	4,258.00
05/09/14 12:48:00	21300	13.47	1.42	0.03	5.31	28.90	91.20	4,048.00
05/09/14 12:48:30	21330	14.09	1.56	0.02	4.85	28.90	91.20	4,048.00

RAW AVERAGE

13.60

1.94

0.03

5.21

25.80

89.62

3,852.40

	O ₂	CO	THC	CO ₂	Press. Trans	Temp. Trans.	F-Flow Trans.
Serial Number:	INST-22-010	INST-CO-0008	INST-VC-0007	INST-22-0010	1229943	1229943	1229943
	(%)	(ppmvd)	(ppmvw)	(%)	(in. H ₂ O)	(°F)	(SCFH)
Bias	Initial Zero	0.36	0.18	0.03	0.09		
	Final Zero	0.33	-0.19	0.02	0.01		
	Avg. Zero	0.35	-0.01	0.03	0.05		
	Initial UpScale	11.98	8.91	2.97	8.66		
	Final UpScale	11.97	8.71	2.90	8.64		
	Avg. UpScale	11.98	8.81	2.94	8.65		

Upscale Cal Gas

12.20

9.00

3.04

8.56

EMISSIONS DATA	O ₂	CO	THC	CO ₂
Corrected Raw Average (ppm/% dry basis)	13.90	1.99	0.01	5.14
Corrected Raw Average (ppm/% wet basis)	13.13	1.88	0.01	4.86
Emission Rate (lb/hr)	N/A	0.04	0.00	N/A

CIMARRON ENERGY, INC.

May 9, 2014

48HV ECD

Norman Facility

Unit Data

Meas. Stack Moisture	5.2	%
Stack Exhaust Flow (M2)	246,941	SCFH

Weather Data

Barometric Pressure	29.96	in. Hg
Relative Humidity	32	%
Ambient Temperature	82	° F
Specific Humidity	0.007412	lb H ₂ O / lb air

70-100-70 Load, Run - 48HV ECD R9

	Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmvd)	THC (ppmvw)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
A1	05/09/14 13:01:00	22080	13.97	3.61	0.03	4.91	16.30	92.40	3,069.00
	05/09/14 13:01:30	22110	13.71	2.69	0.02	5.12	16.30	92.40	3,069.00
	05/09/14 13:02:00	22140	13.72	2.54	0.03	5.11	16.86	92.50	3,117.00
	05/09/14 13:02:30	22170	13.73	2.37	0.03	5.11	16.86	92.50	3,117.00
	05/09/14 13:03:00	22200	13.66	2.56	0.03	5.16	16.58	92.40	3,082.00
	05/09/14 13:03:30	22230	13.94	2.68	0.03	4.96	16.58	92.40	3,082.00
	05/09/14 13:04:00	22260	14.05	3.58	0.03	4.88	16.58	92.50	3,093.00
	05/09/14 13:04:30	22290	13.58	3.87	0.03	5.19	16.58	92.50	3,093.00
	05/09/14 13:05:00	22320	12.58	1.74	0.03	5.93	19.76	92.50	3,384.00
	05/09/14 13:05:30	22350	12.32	0.35	-0.01	6.11	19.76	92.50	3,384.00
	05/09/14 13:06:00	22380	12.16	-0.17	0.00	6.24	24.94	92.50	3,832.00
	05/09/14 13:06:30	22410	11.96	0.03	-0.01	6.35	24.94	92.50	3,832.00
	05/09/14 13:07:00	22440	12.25	-0.07	-0.01	6.19	30.23	92.50	4,200.00
	05/09/14 13:07:30	22470	12.93	0.78	0.02	5.72	30.23	92.50	4,200.00
	05/09/14 13:08:00	22500	14.16	2.08	0.02	4.78	30.75	92.40	4,240.00
	05/09/14 13:08:30	22530	13.88	2.17	0.02	5.05	30.75	92.40	4,240.00
	05/09/14 13:09:00	22560	14.16	3.32	0.02	4.83	29.40	92.40	4,147.00
	05/09/14 13:09:30	22590	13.87	5.34	0.03	5.06	29.40	92.40	4,147.00
	05/09/14 13:10:00	22620	13.78	5.63	0.02	5.12	29.12	92.30	4,191.00
	05/09/14 13:10:30	22650	13.39	3.44	0.05	5.38	29.12	92.30	4,191.00
	05/09/14 13:11:00	22680	12.14	1.38	0.05	6.29	30.97	92.20	4,278.00
	05/09/14 13:11:30	22710	12.93	0.49	0.03	5.77	30.97	92.20	4,278.00
	05/09/14 13:12:00	22740	13.13	0.76	0.03	5.60	30.97	92.10	4,290.00
	05/09/14 13:12:30	22770	12.97	0.83	0.04	5.71	30.97	92.10	4,290.00
	05/09/14 13:13:00	22800	13.49	0.75	0.03	5.35	30.03	92.00	4,179.00
	05/09/14 13:13:30	22830	12.64	0.84	0.05	5.96	30.03	92.00	4,179.00
	05/09/14 13:14:00	22860	12.64	-0.20	0.06	5.97	24.58	91.90	3,720.00
	05/09/14 13:14:30	22890	12.98	-0.10	0.05	5.74	24.58	91.90	3,720.00
	05/09/14 13:15:00	22920	13.81	0.50	0.06	5.13	19.93	91.90	3,345.00
	05/09/14 13:15:30	22950	13.84	1.39	0.04	5.10	19.93	91.90	3,345.00
	05/09/14 13:16:00	22980	13.83	1.76	0.05	5.11	17.38	92.10	3,101.00
	05/09/14 13:16:30	23010	13.91	1.97	0.02	5.06	17.38	92.10	3,101.00
	05/09/14 13:17:00	23040	13.95	2.48	0.03	5.01	16.86	92.30	3,085.00
	05/09/14 13:17:30	23070	13.81	2.59	0.02	5.05	16.86	92.30	3,085.00
	05/09/14 13:18:00	23100	13.27	2.34	0.02	5.43	18.30	92.60	3,172.00
	05/09/14 13:18:30	23130	13.40	1.12	0.03	5.37	18.30	92.60	3,172.00
	05/09/14 13:19:00	23160	13.27	3.04	0.02	5.44	22.14	92.90	3,580.00
	05/09/14 13:19:30	23190	13.04	2.34	0.05	5.61	22.14	92.90	3,580.00
	05/09/14 13:20:00	23220	12.34	1.26	0.06	6.10	25.44	93.20	3,888.00
	05/09/14 13:20:30	23250	12.33	0.10	0.02	6.12	25.44	93.20	3,888.00
	05/09/14 13:21:00	23280	12.23	1.40	0.03	6.19	29.40	93.30	4,128.00
A2	05/09/14 13:21:30	23310	12.24	2.48	0.03	6.16	29.40	93.30	4,128.00
	05/09/14 13:22:00	23340	12.16	3.19	0.03	6.27	29.09	93.40	4,148.00
	05/09/14 13:22:30	23370	13.14	5.75	0.06	5.55	29.09	93.40	4,148.00
	05/09/14 13:23:00	23400	13.88	9.49	0.05	5.00	25.22	93.40	3,885.00
	05/09/14 13:23:30	23430	13.15	10.02	0.03	5.51	25.22	93.40	3,885.00
	05/09/14 13:24:00	23460	12.84	6.14	0.02	5.76	26.13	93.40	3,972.00
	05/09/14 13:24:30	23490	12.94	5.60	0.06	5.71	26.13	93.40	3,972.00
	05/09/14 13:25:00	23520	13.55	7.49	0.06	5.23	26.10	93.40	3,949.00
	05/09/14 13:25:30	23550	14.50	10.31	0.03	4.58	26.10	93.40	3,949.00
	05/09/14 13:26:00	23580	15.06	19.64	0.03	4.12	25.55	93.40	3,944.00

CIMARRON ENERGY, INC.

May 9, 2014

48HV ECD

Norman Facility

Unit Data

Meas. Stack Moisture	5.2	%
Stack Exhaust Flow (M2)	246,941	SCFH

Weather Data

Barometric Pressure	29.96	in. Hg
Relative Humidity	32	%
Ambient Temperature	82	° F
Specific Humidity	0.007412	lb H ₂ O / lb air

70-100-70 Load, Run - 48HV ECD R9

	Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmvd)	THC (ppmvw)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
	05/09/14 13:26:30	23610	14.78	19.96	0.03	4.30	25.55	93.40	3,944.00
	05/09/14 13:27:00	23640	15.06	17.98	0.03	4.13	25.02	93.40	3,996.00
	05/09/14 13:27:30	23670	15.01	19.56	0.03	4.16	25.02	93.40	3,996.00
	05/09/14 13:28:00	23700	14.91	15.77	0.04	4.24	20.34	93.30	3,417.00
	05/09/14 13:28:30	23730	15.01	15.84	0.03	4.16	20.34	93.30	3,417.00
	05/09/14 13:29:00	23760	15.02	15.15	0.03	4.15	16.61	93.40	3,099.00
	05/09/14 13:29:30	23790	14.98	14.27	0.03	4.17	16.61	93.40	3,099.00
	05/09/14 13:30:00	23820	14.85	16.72	0.03	4.26	17.55	93.50	3,084.00
	05/09/14 13:30:30	23850	14.79	19.11	0.05	4.30	17.55	93.50	3,084.00
	05/09/14 13:31:00	23880	14.87	20.82	0.06	4.25	17.00	93.60	3,134.00
	05/09/14 13:31:30	23910	14.73	18.37	0.03	4.35	17.00	93.60	3,134.00
	05/09/14 13:32:00	23940	14.62	15.12	0.03	4.43	17.13	93.60	3,091.00
	05/09/14 13:32:30	23970	14.45	13.56	0.02	4.57	17.13	93.60	3,091.00
	05/09/14 13:33:00	24000	13.94	8.81	0.03	4.94	20.46	93.80	3,382.00
	05/09/14 13:33:30	24030	13.67	3.31	0.05	5.15	20.46	93.80	3,382.00
	05/09/14 13:34:00	24060	13.70	1.51	0.05	5.13	25.49	93.90	3,794.00
	05/09/14 13:34:30	24090	14.21	5.37	0.06	4.75	25.49	93.90	3,794.00
	05/09/14 13:35:00	24120	14.31	17.99	0.06	4.67	28.40	93.80	4,047.00
	05/09/14 13:35:30	24150	13.91	14.88	0.03	4.96	28.40	93.80	4,047.00
	05/09/14 13:36:00	24180	13.62	8.39	0.03	5.18	32.14	93.70	4,312.00
	05/09/14 13:36:30	24210	13.31	2.08	0.03	5.40	32.14	93.70	4,312.00
	05/09/14 13:37:00	24240	13.36	-0.01	0.03	5.37	32.94	93.60	4,343.00
	05/09/14 13:37:30	24270	13.40	0.09	0.03	5.34	32.94	93.60	4,343.00
	05/09/14 13:38:00	24300	13.40	0.08	0.03	5.34	33.19	93.60	4,335.00
	05/09/14 13:38:30	24330	13.45	0.08	0.06	5.31	33.19	93.60	4,335.00
	05/09/14 13:39:00	24360	13.40	0.25	0.06	5.34	33.19	93.60	4,323.00
	05/09/14 13:39:30	24390	13.31	0.07	0.03	5.40	33.19	93.60	4,323.00
	05/09/14 13:40:00	24420	13.42	0.02	0.03	5.33	33.08	93.50	4,311.00
	05/09/14 13:40:30	24450	13.32	0.10	0.06	5.39	33.08	93.50	4,311.00
	05/09/14 13:41:00	24480	13.29	-0.07	0.06	5.42	33.33	93.50	4,325.00
A3	05/09/14 13:41:30	24510	13.38	0.06	0.02	5.36	33.33	93.50	4,325.00
	05/09/14 13:42:00	24540	14.00	1.28	0.02	4.92	30.81	93.60	4,117.00
	05/09/14 13:42:30	24570	14.13	2.60	0.05	4.81	30.81	93.60	4,117.00
	05/09/14 13:43:00	24600	14.01	3.00	0.05	4.89	24.80	93.80	3,709.00
	05/09/14 13:43:30	24630	14.20	3.68	0.02	4.77	24.80	93.80	3,709.00
	05/09/14 13:44:00	24660	14.37	3.93	0.02	4.61	22.37	94.10	3,496.00
	05/09/14 13:44:30	24690	14.34	2.91	-0.01	4.66	22.37	94.10	3,496.00
	05/09/14 13:45:00	24720	14.69	4.52	-0.01	4.38	19.15	94.30	3,236.00
	05/09/14 13:45:30	24750	14.85	7.15	0.05	4.25	19.15	94.30	3,236.00
	05/09/14 13:46:00	24780	14.96	9.65	0.05	4.19	17.41	94.40	3,088.00
	05/09/14 13:46:30	24810	14.95	13.68	0.03	4.19	17.41	94.40	3,088.00
	05/09/14 13:47:00	24840	14.82	14.53	0.03	4.28	17.27	94.40	3,098.00
	05/09/14 13:47:30	24870	14.69	13.97	0.02	4.37	17.27	94.40	3,098.00
	05/09/14 13:48:00	24900	14.66	12.00	0.03	4.40	17.41	94.50	3,121.00
	05/09/14 13:48:30	24930	14.17	11.41	0.06	4.79	17.41	94.50	3,121.00
	05/09/14 13:49:00	24960	14.13	16.60	0.07	4.80	21.15	94.60	3,427.00
	05/09/14 13:49:30	24990	14.17	12.83	0.03	4.78	21.15	94.60	3,427.00
	05/09/14 13:50:00	25020	14.69	24.10	0.03	4.37	25.94	94.70	3,792.00
	05/09/14 13:50:30	25050	14.30	28.39	0.03	4.67	25.94	94.70	3,792.00
	05/09/14 13:51:00	25080	13.82	11.80	0.02	5.05	29.40	94.70	4,118.00
	05/09/14 13:51:30	25110	13.93	3.36	0.05	4.95	29.40	94.70	4,118.00

CIMARRON ENERGY, INC.

May 9, 2014

48HV ECD

Norman Facility

Unit Data

Meas. Stack Moisture	5.2	%
Stack Exhaust Flow (M2)	246,941	SCFH

Weather Data

Barometric Pressure	29.96	in. Hg
Relative Humidity	32	%
Ambient Temperature	82	° F
Specific Humidity	0.007412	lb H ₂ O / lb air

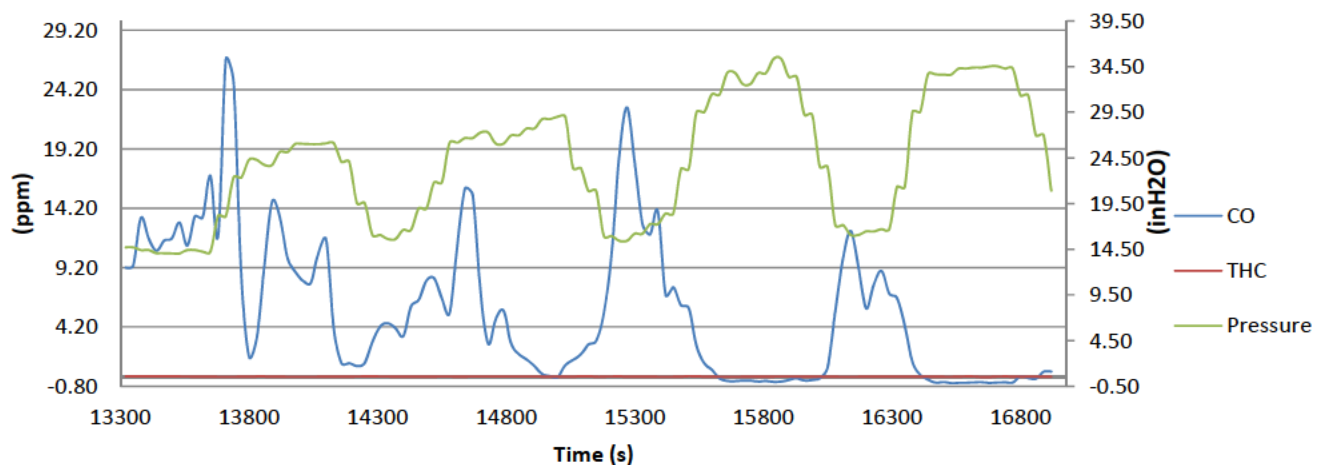
70-100-70 Load, Run - 48HV ECD R9

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmvd)	THC (ppmvw)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
05/09/14 13:52:00	25140	13.79	2.67	0.05	5.06	29.53	94.50	4,087.00
05/09/14 13:52:30	25170	13.50	1.77	0.05	5.26	29.53	94.50	4,087.00
05/09/14 13:53:00	25200	13.54	0.83	0.04	5.24	31.53	94.40	4,232.00
05/09/14 13:53:30	25230	13.50	0.87	0.02	5.27	31.53	94.40	4,232.00
05/09/14 13:54:00	25260	13.53	0.97	0.02	5.26	31.28	94.20	4,185.00
05/09/14 13:54:30	25290	13.47	0.71	0.06	5.29	31.28	94.20	4,185.00
05/09/14 13:55:00	25320	13.49	0.73	0.05	5.28	31.42	94.20	4,187.00
05/09/14 13:55:30	25350	13.54	0.81	0.06	5.24	31.42	94.20	4,187.00
05/09/14 13:56:00	25380	13.56	0.85	0.06	5.23	31.44	94.20	4,187.00
05/09/14 13:56:30	25410	13.77	1.24	0.03	5.08	31.44	94.20	4,187.00
05/09/14 13:57:00	25440	13.99	2.22	0.02	4.92	29.42	94.20	4,054.00
05/09/14 13:57:30	25470	13.87	2.69	0.05	4.99	29.42	94.20	4,054.00
05/09/14 13:58:00	25500	14.07	1.67	0.05	4.85	25.69	94.30	3,748.00
05/09/14 13:58:30	25530	14.09	2.04	0.03	4.84	25.69	94.30	3,748.00
05/09/14 13:59:00	25560	14.08	1.94	0.03	4.84	23.17	94.40	3,546.00
05/09/14 13:59:30	25590	14.62	2.49	0.10	4.56	23.17	94.40	3,546.00
05/09/14 14:00:00	25620	13.93	4.44	0.00	5.86	17.41	94.70	3,065.00
05/09/14 14:00:30	25650	14.07	9.83	0.02	5.34	17.41	94.70	3,065.00
05/09/14 14:01:00	25680	13.26	4.43	0.03	6.83	16.30	95.00	2,989.00
RAW AVERAGE		13.75	5.67	0.03	5.11	24.78	93.41	3,735.53

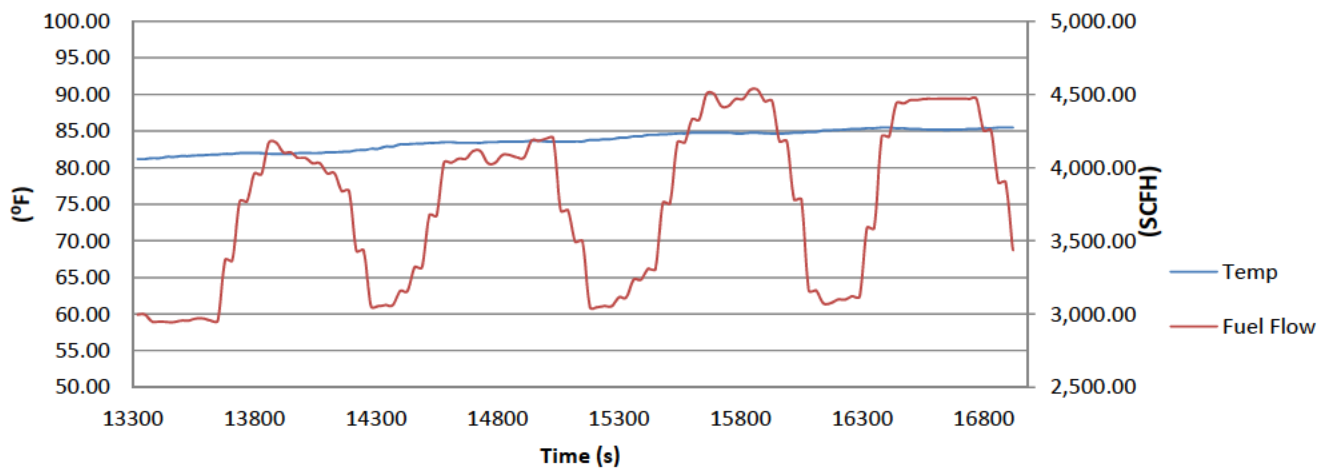
Bias	Serial Number:	O ₂ (%)	CO (ppmvd)	THC (ppmvw)	CO ₂ (%)	Press. Trans (in. H ₂ O)	Temp. Trans. (°F)	F-Flow Trans. (SCFH)
	INST-22-010	INST-22-010	INST-CO-0008	INST-VC-0007	INST-22-0010	1229943	1229943	1229943
	Initial Zero	0.33	-0.19	0.02	0.01			
	Final Zero	0.35	0.12	0.06	0.07			
	Avg. Zero	0.34	-0.04	0.04	0.04			
	Initial UpScale	11.97	8.71	2.90	8.64			
	Final UpScale	11.95	8.64	2.92	8.65			
	Avg. UpScale	11.96	8.68	2.91	8.65			
	Upscale Cal Gas	12.20	9.00	3.04	8.56			

EMISSIONS DATA	O ₂	CO	THC	CO ₂
Corrected Raw Average (ppm/% dry basis)	14.08	5.89	-0.01	5.05
Corrected Raw Average (ppm/% wet basis)	13.34	5.59	-0.01	4.78
Emission Rate (lb/hr)	N/A	0.11	0.00	N/A

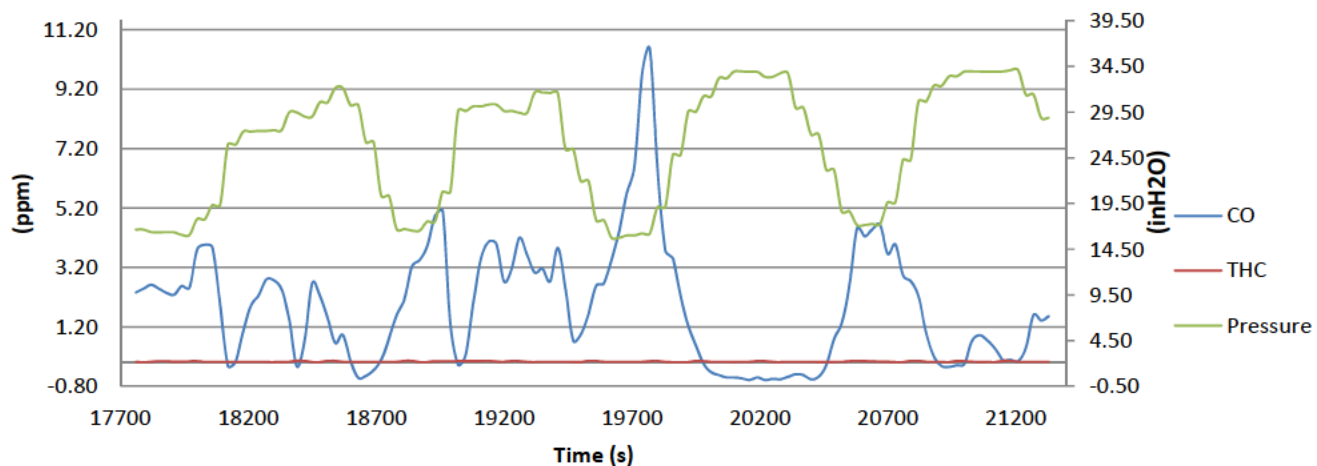
48HV ECD R7



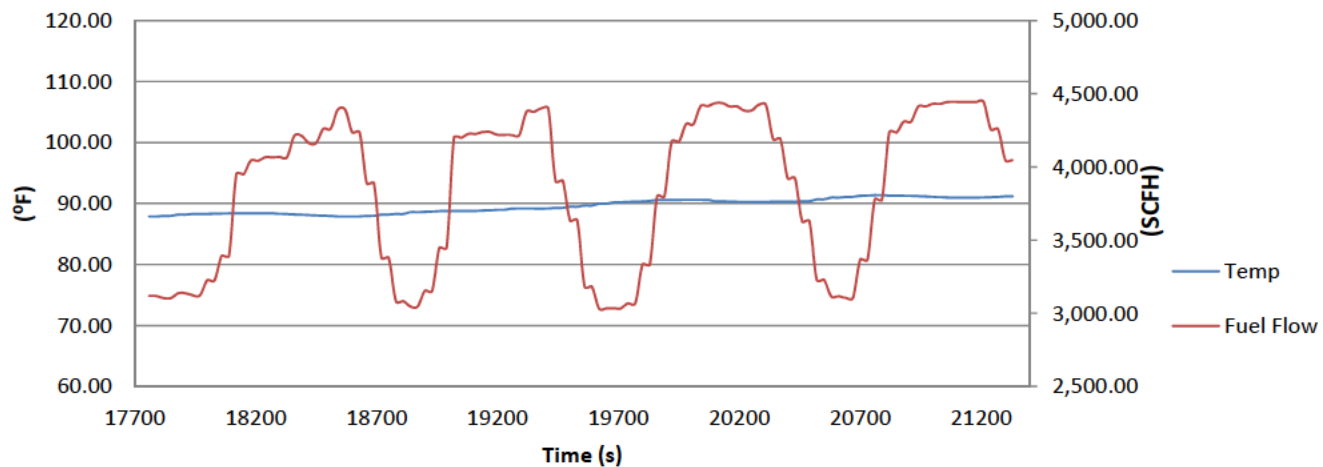
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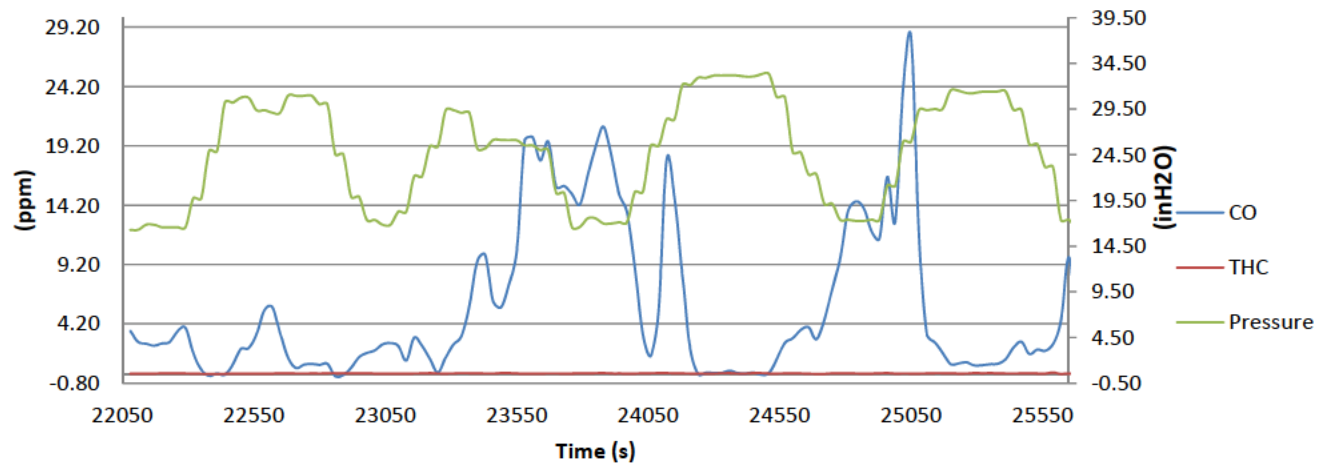
48HV ECD R8



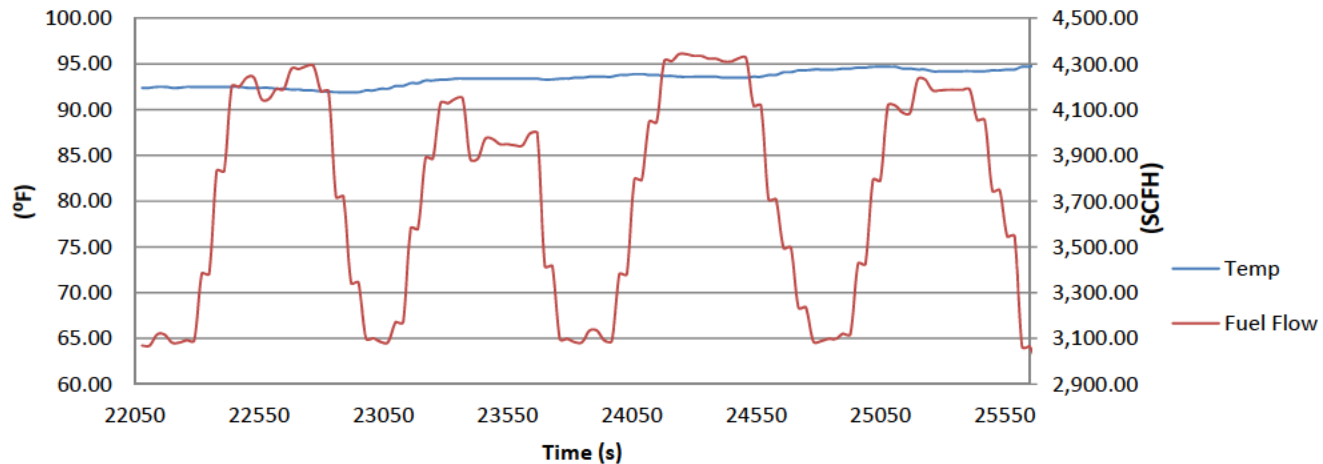
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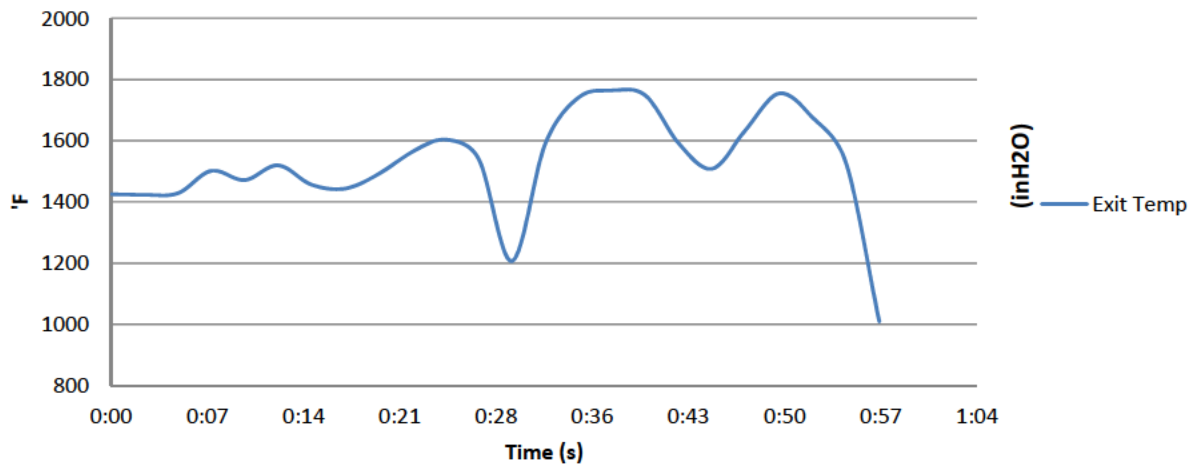
48HV ECD R9



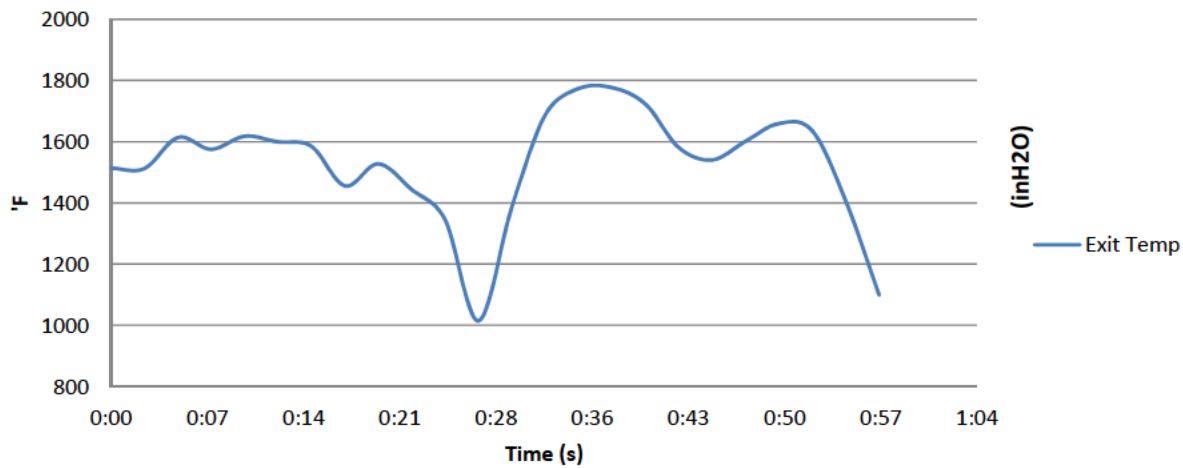
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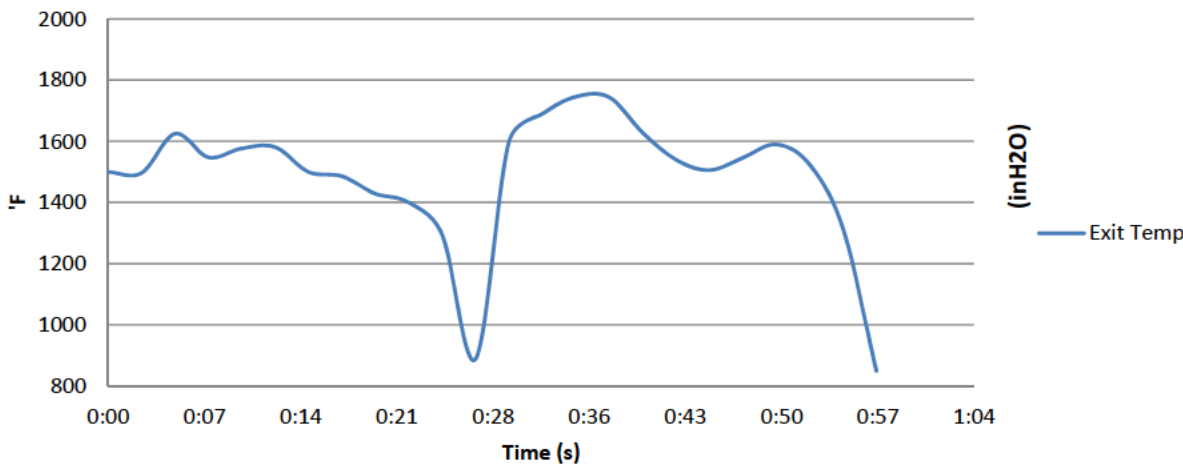
48HV ECD R7



48HV ECD R8



48HV ECD R9



EMISSION DATA RECORDS

90-100% Fixed Rate Unit Operations Data

METHOD 4 (MOISTURE) [MULTI POINT, NO VARIATION] SOURCE SAMPLING TITLE PAGE

Source Information	
Plant Name	Cimaron Energy, INC
Sampling Location	Norman Facility
Fuel Type	Gas, Propene

Test Information			
Project #		cei-14-norman.ok-comp#1	
Operator		TP/MM	
Date for Preliminary Run	(mm/dd/yy)	05/07/14	
Standard Temperature		68	°F
Standard Pressure		29.92	in Hg
Required Sample Vol.	RM4, 8.1.1.2	21	scf
Run Duration	≤0.75 cfm	60	minutes
Unit Number		1	
Base Run Number		90-100%	
Number of Ports Available		2	
Number of Ports Used		2	
Port Inside Diameter		3.00	in
Stack Shape		Circular	

Test Equipment Information					
Run		10	11	12	
Test Date	(mm/dd/yy)	05/09/14	05/14/14	05/14/14	
Load	% or w/DB	30-70-30	30-70-30	30-70-30	
Meter Box Number	from ACS	SAMP-CP-0012	SAMP-CP-0012	SAMP-CP-0012	
Meter Calibration Factor	(Y)	0.889	0.889	0.889	
Orifice Meter Coefficient	(ΔH_{or})	1.632	1.632	1.632	in H ₂ O
Pitot Identification	from ACS	4-17-14-2	4-17-14-2	4-17-14-2	
Pitot Tube Coefficient	(C _p)	0.840	0.840	0.840	
Probe Number	from ACS	SAMP-FP-0001	SAMP-FP-0001	SAMP-FP-0001	
Probe Length		60.0	60.0	60.0	in
(SS, Glass) Liner Material	from list	inconel	inconel	inconel	
Impinger Case Number	from ACS	SAMP-BC-0017	SAMP-BC-0017	SAMP-BC-0017	

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	Min Sum Lee
Phone Number	(918) 307-8865
Fax Number	(918) 307-9131

METHOD 4 (MOISTURE) [MULTI POINT, NO VARIATION] - RESULTS

Plant Name	Cimaron Energy, INC
Sampling Location	Norman Facility
Project #	cei-14-norman.ok-comp#1

Historical Data	90-100%-10	90-100%-11	90-100%-12	Average	Units
Run Start Time	15:13	12:29	13:48		hh:mm
Run Stop Time	16:15	13:35	14:52		hh:mm
Test Date	05/09/14	05/14/14	05/14/14		mm/dd/yy
Meter Calibration Factor	0.889	0.889	0.889		
Pitot Tube Coefficient	0.840	0.840	0.840		
Stack Test Data	90-100%-10	90-100%-11	90-100%-12	Average	Units
Initial Meter Volume	169.000	820.710	870.700		ft ³
Final Meter Volume	219.660	870.525	920.770		ft ³
Total Meter Volume	50.660	49.815	50.070	50.182	ft ³
Total Sampling Time	60.00	60.00	60.00	60.00	min
Average Meter Temperature	86.38	74.69	70.58	77.22	°F
Average Stack Temperature	1533.63	1634.46	1764.92	1644.33	°F
Barometric Pressure	29.92	30.30	30.29	30.17	in Hg
Stack Static Pressure	0.00	0.00	0.00	0.00	in H ₂ O
Absolute Stack Pressure	29.92	30.30	30.29	30.17	in Hg
Average Orifice Pressure Drop	1.60	1.60	1.60	1.60	in H ₂ O
Absolute Meter Pressure	30.04	30.42	30.41	30.29	in Hg
Avg Square Root Pitot Pressure	0.30	0.34	0.31	0.32	√(in H ₂ O)
Moisture Content Data	90-100%-10	90-100%-11	90-100%-12	Average	Units
Impinger Water Weight Gain	44.20	38.00	37.40	39.87	g
Silica Gel Weight Gain	11.20	11.90	15.60	12.90	g
Total Water Volume Collected	55.50	49.99	53.10	52.86	ml
Standard Water Vapor Volume	2.61	2.35	2.50	2.49	scf
Standard Meter Volume	43.7	44.5	45.0	44.4	dscf
Calculated Stack Moisture	5.64	5.03	5.26	5.31	%
Saturated Stack Moisture	100.00	100.00	100.00	100.00	%
Reported Stack Moisture Content	5.64	5.03	5.26	5.31	%
Gas Analysis Data	90-100%-10	90-100%-11	90-100%-12	Average	Units
Carbon Dioxide Content	5.4	5.4	4.5	5.1	%
Oxygen Content	14.7	14.7	15.9	15.1	%
Nitrogen Content	79.9	79.9	79.6	79.8	%
Stack Dry Molecular Weight	29.45	29.46	29.36	29.42	lb/lb-mole
Stack Wet Molecular Weight	28.80	28.88	28.76	28.82	lb/lb-mole
Percent Excess Air	229.6	230.1	311.5	257.1	%
Volumetric Flow Rate Data	90-100%-10	90-100%-11	90-100%-12	Average	Units
Average Stack Gas Velocity	33.07	37.31	35.37	35.25	ft/sec
Stack Cross-Sectional Area	8.73	8.73	8.73	8.73	ft ²
Actual Stack Flow Rate	17,314	19,534	18,517	18,455	acfm
Wet Standard Stack Flow Rate	275	299	267	280	wkscfh
Dry Standard Stack Flow Rate	259,605	284,181	252,884	265,557	dscfh

METHOD 3C - DETERMINATION OF DRY MOLECULAR WEIGHT BY ANALYZER

Plant Name	Cimaron Energy, INC	Preliminary Date	05/07/14		
Sampling Location	Norman Facility	Operator	TP/MM		
Project #	cei-14-norman.ok-comp#1	# of Ports Used	2		
Fuel Type	Gas, Propene	Min. Fuel Factor	N/A	Max. Fuel Factor	N/A

Gas Analysis Data								
Run Number	90-100%-10		Date	05/09/14	Run Start Time	15:13	Run Stop Time	16:15
Sample Analysis Time	CO₂ Conc.	O₂ Conc.	Methane Conc.	N₂ 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		%	
01:02	5.4	14.7	0.0	79.9	29.45	1.155	229.6	N/A

Gas Analysis Data								
Run Number	90-100%-11		Date	05/14/14	Run Start Time	12:29	Run Stop Time	13:35
Sample Analysis Time	CO₂ Conc.	O₂ Conc.	Methane Conc.	N₂ 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		%	
01:06	5.4	14.7	0.0	79.9	29.46	1.144	230.1	N/A

Gas Analysis Data								
Run Number	90-100%-12		Date	05/14/14	Run Start Time	13:48	Run Stop Time	14:52
Sample Analysis Time	CO₂ Conc.	O₂ Conc.	Methane Conc.	N₂ 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		%	
01:04	4.5	15.9	0.0	79.6	29.36	1.101	311.5	N/A

METHOD 4 - DETERMINATION OF MOISTURE CONTENT IN STACK GASES

Plant Name	Cimaron Energy, INC	Preliminary Date	05/07/14
Sampling Location	Norman Facility	Operator	TP/MM
Project #	cei-14-norman.ok-comp#1	Ports Used	2

Moisture Content Data								
Run Number	90-100%-10		Date	05/09/14	Start Time	15:13	Stop Time	16:15
Meter Box Number	SAMP-CP-0012				Meter Cal Factor	(Y)	0.889	
Total Meter Volume	(V _m)	50.660	dcf		Barometric Pressure	(P _b)	29.92	in Hg
Average Stack Temp	(t _s) _{avg}	1534	°F		Stack Static Pressure	(P _{static})	0.00	in H ₂ O
Average Meter Temp	(t _m) _{avg}	86	°F		Avg Orifice Pressure	(ΔH) _{avg}	1.60	in H ₂ O
	Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7	Impinger 8
	(g)	(g)	(g)	(g)				
Contents	H ₂ O	H ₂ O	-	Sil Gel				
Final Value	(V _f),(W _f)	908.40	816.30	584.80	853.50			
Initial Value	(V _i),(W _i)	876.00	805.90	583.40	842.30			
Net Value	(V _n),(W _n)	32.4	10.4	1.4	11.2			
Results								
Total Weight	(W _t)	55.40	g		Water Vol Weighed	(V _{wsg(std)})	2.612	scf
Std Meter Volume	(V _{m(std)})	43.693	dscf		Sat. Moisture Content	(B _{ws(svp)})	100.00	%
Calc Moisture Content	(B _{ws(calc)})	5.64	%		Final Moisture Content	(B _{ws})	5.64	%

Moisture Content Data								
Run Number	90-100%-11		Date	05/14/14	Start Time	12:29	Stop Time	13:35
Meter Box Number	SAMP-CP-0012				Meter Cal Factor	(Y)	0.889	
Total Meter Volume	(V _m)	49.815	dcf		Barometric Pressure	(P _b)	30.30	in Hg
Average Stack Temp	(t _s) _{avg}	1634	°F		Stack Static Pressure	(P _{static})	0.00	in H ₂ O
Average Meter Temp	(t _m) _{avg}	75	°F		Avg Orifice Pressure	(ΔH) _{avg}	1.60	in H ₂ O
	Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7	Impinger 8
	(g)	(g)	(g)	(g)				
Contents	H ₂ O	H ₂ O	-	Sil Gel				
Final Value	(V _f),(W _f)	740.00	718.90	619.80	880.40			
Initial Value	(V _i),(W _i)	712.30	710.40	618.00	868.50			
Net Value	(V _n),(W _n)	27.7	8.5	1.8	11.9			
Results								
Total Weight	(W _t)	49.90	g		Water Vol Weighed	(V _{wsg(std)})	2.353	scf
Std Meter Volume	(V _{m(std)})	44.459	dscf		Sat. Moisture Content	(B _{ws(svp)})	100.00	%
Calc Moisture Content	(B _{ws(calc)})	5.03	%		Final Moisture Content	(B _{ws})	5.03	%

Moisture Content Data								
Run Number	90-100%-12		Date	05/14/14	Start Time	13:48	Stop Time	14:52
Meter Box Number	SAMP-CP-0012				Meter Cal Factor	(Y)	0.889	
Total Meter Volume	(V _m)	50.070	dcf		Barometric Pressure	(P _b)	30.29	in Hg
Average Stack Temp	(t _s) _{avg}	1765	°F		Stack Static Pressure	(P _{static})	0.00	in H ₂ O
Average Meter Temp	(t _m) _{avg}	71	°F		Avg Orifice Pressure	(ΔH) _{avg}	1.60	in H ₂ O
	Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7	Impinger 8
	(g)	(g)	(g)	(g)				
Contents	H ₂ O	H ₂ O	-	Sil Gel				
Final Value	(V _f),(W _f)	724.00	747.40	595.80	835.80			
Initial Value	(V _i),(W _i)	697.50	737.80	594.50	820.20			
Net Value	(V _n),(W _n)	26.5	9.6	1.3	15.6			
Results								
Total Weight	(W _t)	53.00	g		Water Vol Weighed	(V _{wsg(std)})	2.499	scf
Std Meter Volume	(V _{m(std)})	45.017	dscf		Sat. Moisture Content	(B _{ws(svp)})	100.00	%
Calc Moisture Content	(B _{ws(calc)})	5.26	%		Final Moisture Content	(B _{ws})	5.26	%

METHOD 4 (MOISTURE) [MULTI POINT, NO VARIATION] SOURCE SAMPLING TITLE PAGE ISOKINETIC SAMPLING DATA

Plant Name		Cimaron Energy, INC				Date		05/09/14		Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Sampling Location		Norman Facility				Operator		TP/MM		Pitot Coefficient (C _p) 0.840			
Project #		cel-14-norman.ok-comp#1				Run Number		90-100%-10		Average Stack Temp (t _s) 1533.6 F			
Leak Checks						Sampling Equipment							
Train	Pre	0.0025	ft ³ /min@	15.0	in Hg	Meter Box Number	SAMP-CP-0012						
PASS	Post	0.0025	ft ³ /min@	15.0	in Hg	Meter Cal Factor (Y)	0.889						
Pitot	Pre (+)	0.230	in H ₂ O for	15.0	sec	Low Flow Manometer	SAMP-MN-0001						
< 3.0	Pre (-)	0.200	in H ₂ O for	15.0	sec	Average Nozzle Diameter (D _{no})			in				
	Post (+)	0.145	in H ₂ O for	15.0	sec	Suggested Nozzle Diameter (D _n)	0.3740		in				
	Post (-)	0.160	in H ₂ O for	15.0	sec	Probe Number	SAMP-FP-0001		in				
						Probe Length	60		in				
						Liner Material	inconel						
						Sample Case / Oven Number	SAMP-BC-0012						
						Impinger Case Number	SAMP-BC-0017						
Run Time						Pressures							
Start	15:13		End	16:15							Barometric Pressure (P _b) 29.92 in Hg		
												Stack Static Pressure (P _{static}) 0.00 in H ₂ O	
												Absolute Stack Pressure (P _s) 29.92 in Hg	
												Absolute Meter Pressure (P _m) 30.04 in Hg	
												Wash Volumes	

METHOD 4 (MOISTURE) [MULTI POINT, NO VARIATION] SOURCE SAMPLING TITLE PAGE ISOKINETIC SAMPLING DATA

Plant Name	Cimaron Energy, INC
Sampling Location	Norman Facility
Project #	cel-14-norman.ok-comp#1

Date	05/14/14
Operator	TP/MM
Run Number	90-100%-11

Leak Checks					
Train	Pre	0.000	ft ³ /min@	15.0	in Hg
PASS	Post	0.000	ft ³ /min@	15.0	in Hg
< 3.0	Pitot	Pre (+)	0.14	in H ₂ O for	15.0
		Pre (-)	0.17	in H ₂ O for	15.0
		Post (+)	0.20	in H ₂ O for	15.0
		Post (-)	0.12	in H ₂ O for	15.0

Nozzle Measurements				
Pre				PASS
Post				PASS

Run Time			
Start	12:29	End	13:35

Weights	Imp 1	Imp 2	Imp 3	Imp 4	Imp 5	Imp 6	Imp 7	Imp 8
Pre	712.3	710.4	618.0	868.5				
Post	740.0	718.9	619.8	880.4				

Sampling Equipment		
Meter Box Number	SAMP-CP-0012	
Meter Cal Factor	(Y)	0.889
Low Flow Manometer	SAMP-MN-0001	
Average Nozzle Diameter	(D _{no})	in
Suggested Nozzle Diameter	(D _n)	0.3689 in
Probe Number	SAMP-FP-0001	in
Probe Length	60	in
Liner Material	inconel	
Sample Case / Oven Number	SAMP-BC-0012	
Impinger Case Number	SAMP-BC-0017	

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Coefficient	(C _p)	0.840	
Average Stack Temp	(t _s)	1634.5	F
Average Meter Temp	(t _m)	74.7	
Orifice Meter Coefficient	(ΔH@)	1.632	in H ₂ O
Square Root ΔP	(ΔP ^{1/2} _{avg})	0.34	in H ₂ O
Stack Moisture Content	(B _{ws})	5.03	%
Stack Dry Molecular Weight	(M _d)	29.46	lb/lb-mole
Estimated Orifice Flow Rate	(Q _m)	0.73	acfm
ΔP to ΔH Isokinetic Factor	(K)		

Pressures			
Barometric Pressure	(P _b)	30.30	in Hg
Stack Static Pressure	(P _{static})	0.00	in H ₂ O
Absolute Stack Pressure	(P _a)	30.30	in Hg
Absolute Meter Pressure	(P _m)	30.42	in Hg

Wash Volumes					ml
					ml

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)	Snorkel Temp (248±25°F)	Filter Temp (248±25°F)	Impinger Exit Temp (568°F)	Cond. Temp (≤-°F)	CPM Filter Temp (-±-°F)	Meter Inlet Temp (t _{mi})	Meter Outlet Temp (t _{mo})	Pump Vacuum	Square Root ΔP (ΔP ^{1/2})	Local Stack Velocity (v _s)	Cumul. Meter Volume (V _m) _{std}	Cumul. Percent IsoKinetic (I)	Est-Run Meter Volume (V _m) _{std}
	min	hh:mm:ss	ft ³	in H ₂ O	in H ₂ O	in H ₂ O	F	F	F	F	F	F	F	F	in Hg	√(in H ₂ O)	ft/sec	dscf	%	dscf
A-1	0.0	00:00:00	820.710	0.090	1.632	1.60	1616	262		57			70	70	4.0	0.30	33.18	1.819		43.650
A-2	2.5	00:02:30	822.730	0.090	1.632	1.60	1613	260		52			71	70	4.0	0.30	33.16	3.658		43.900
A-3	5.0	00:05:00	824.775	0.095	1.632	1.60	1560	259		52			72	70	4.0	0.31	33.63	5.478		43.825
A-4	7.5	00:07:30	826.800	0.120	1.632	1.60	1538	260		54			73	70	4.0	0.35	37.59	7.359		44.155
A-5	10.0	00:10:00	828.895	0.160	1.632	1.60	1558	260		56			75	70	4.0	0.40	43.62	9.138		43.862
A-6	12.5	00:12:30	830.880	0.155	1.632	1.60	1585	260		57			75	70	4.0	0.39	43.22	10.971		43.882
A-7	15.0	00:15:00	832.925	0.125	1.632	1.60	1641	260		58			77	71	4.0	0.35	39.34	12.811		43.925
A-8	17.5	00:17:30	834.985	0.110	1.632	1.60	1568	260		58			78	71	4.0	0.33	36.26	14.655		43.965
A-9	20.0	00:20:00	837.050	0.090	1.632	1.60	1529	260		59			78	72	4.0	0.30	32.48	16.528		44.075
A-10	22.5	00:22:30	839.150	0.080	1.632	1.60	1451	259		59			78	72	4.0	0.28	30.02	18.468		44.324
A-11	25.0	00:25:00	841.325	0.060	1.632	1.60	1453	259		60			78	73	4.0	0.24	26.01	20.326		44.348
A-12	27.5	00:27:30	843.410	0.055	1.632	1.60	1453	260		60			78	73	4.0	0.23	24.90	22.260		44.520
B-1	30.0	00:30:00	845.580	0.125	1.632	1.60	1672	260		62			76	74	4.0	0.35	39.63	24.088		44.471
B-2	32.5	00:32:30	847.630	0.110	1.632	1.60	1737	260		58			79	75	4.0	0.33	37.74	25.870		44.349
B-3	35.0	00:35:00	849.635	0.125	1.632	1.60	1743	260		58			79	75	4.0	0.35	40.28	27.683		44.293
B-4	37.5	00:37:30	851.675	0.150	1.632	1.60	1752	260		59			79	75	4.0	0.39	44.22	29.567		44.350
B-5	40.0	00:40:00	853.795	0.155	1.632	1.60	1783	260		59			79	75	4.0	0.39	45.26	31.380		44.301
B-6	42.5	00:42:30	855.835	0.140	1.632	1.60	1717	260		60			78	75	4.0	0.37	42.38	33.159		44.212
B-7	45.0	00:45:00	857.835	0.115	1.632	1.60	1732	260		60			77	75	4.0	0.34	38.54	35.011		44.224
B-8	47.5	00:47:30	859.915	0.130	1.632	1.60	1713	260		60			77	75	4.0	0.36	40.80	36.889		44.267
B-9	50.0	00:50:00	862.025	0.125	1.632	1.60	1714	260		60			77	75	4.0	0.35	40.02	38.803		44.346
B-10	52.5	00:52:30	864.175	0.110	1.632	1.60	1709	260		60			77	75	4.0	0.33	37.50	40.695		44.395
B-11	55.0	00:55:00	866.300	0.115	1.632	1.60	1704	260		61			77	75	4.0	0.34	38.30	42.596		44.448
B-12	57.5	00:57:30	868.435	0.110	1.632	1.60	1686	260		61			77	74	4.0	0.33	37.30	44.458		44.458
Last Pt	60.0	01:00:00	870.525																	
Final Val	60.0	01:00:00	870.525												Max Vac	4.0	Final Values	44.458		
Average Values				0.11		1.60	1634	260		58			76	73		0.34	37.31			
													75							

METHOD 4 (MOISTURE) [MULTI POINT, NO VARIATION] SOURCE SAMPLING TITLE PAGE ISOKINETIC SAMPLING DATA

Plant Name	Cimaron Energy, INC
Sampling Location	Norman Facility
Project #	cel-14-norman.ok-comp#1

Date	05/14/14
Operator	TP/MM
Run Number	90-100%-12

Leak Checks					
Train	Pre	0.000	ft ³ /min@	15.0	in Hg
PASS	Post	0.000	ft ³ /min@	15.0	in Hg
< 3.0	Pitot	Pre (+)	0.165	in H ₂ O for	15.0
		Pre (-)	0.180	in H ₂ O for	15.0
		Post (+)	0.135	in H ₂ O for	15.0
		Post (-)	0.200	in H ₂ O for	15.0

Nozzle Measurements				
Pre				PASS
Post				PASS

Run Time			
Start	13:48	End	14:52

Weights	Imp 1	Imp 2	Imp 3	Imp 4	Imp 5	Imp 6	Imp 7	Imp 8
Pre	697.5	737.8	594.5	820.2				
Post	724.0	747.4	595.8	835.8				

Sampling Equipment		
Meter Box Number	SAMP-CP-0012	
Meter Cal Factor	(Y)	0.889
Low Flow Manometer	SAMP-MN-0001	
Average Nozzle Diameter	(D _{no})	in
Suggested Nozzle Diameter	(D _n)	0.3870 in
Probe Number	SAMP-FP-0001	in
Probe Length	60	in
Liner Material	inconel	
Sample Case / Oven Number	SAMP-BC-0012	
Impinger Case Number	SAMP-BC-0017	

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Coefficient	(C _p)	0.840	
Average Stack Temp	(t _s)	1764.9	F
Average Meter Temp	(t _m)	70.6	
Orifice Meter Coefficient	(ΔH@)	1.632	in H ₂ O
Square Root ΔP	(ΔP ^{1/2} _{avg})	0.31	in H ₂ O
Stack Moisture Content	(B _{ws})	5.26	%
Stack Dry Molecular Weight	(M _d)	29.36	lb/lb-mole
Estimated Orifice Flow Rate	(Q _m)	0.74	acfm
ΔP to ΔH Isokinetic Factor	(K)		

Pressures			
Barometric Pressure	(P _b)	30.29	in Hg
Stack Static Pressure	(P _{static})	0.00	in H ₂ O
Absolute Stack Pressure	(P _a)	30.29	in Hg
Absolute Meter Pressure	(P _m)	30.41	in Hg

Wash Volumes					ml
					ml

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)	Snorkel Temp (248±25°F)	Filter Temp (248±25°F)	Impinger Exit Temp (568°F)	Cond. Temp (≤-°F)	CPM Filter Temp (-±-°F)	Meter Inlet Temp (t _{mi})	Meter Outlet Temp (t _{mo})	Pump Vacuum	Square Root ΔP (ΔP ^{1/2})	Local Stack Velocity (v _s)	Cumul. Meter Volume (V _m) _{std}	Cumul. Percent IsoKinetic (I)	Est-Run Meter Volume (V _m) _{std}
	min	hh:mm:ss	ft ³	in H ₂ O	in H ₂ O	in H ₂ O	F	F	F	F	F	F	F	F	in Hg	√(in H ₂ O)	ft/sec	dscf	%	dscf
A-1	0.0	00:00:00	870.700	0.050	1.632	1.60	1747	261		57			73	73	3.0	0.22	25.56	1.942		46.612
A-2	2.5	00:02:30	872.870	0.050	1.632	1.60	1739	260		55			73	72	3.0	0.22	25.51	3.864		46.365
A-3	5.0	00:05:00	875.015	0.050	1.632	1.60	1760	259		55			72	71	3.0	0.22	25.63	5.654		45.235
A-4	7.5	00:07:30	877.010	0.115	1.632	1.60	1752	260		57			72	71	3.0	0.34	38.80	7.530		45.181
A-5	10.0	00:10:00	879.100	0.130	1.632	1.60	1740	260		59			72	70	3.0	0.36	41.14	9.349		44.877
A-6	12.5	00:12:30	881.125	0.135	1.632	1.60	1795	260		61			73	70	3.0	0.37	42.45	11.212		44.847
A-7	15.0	00:15:00	883.200	0.110	1.632	1.60	1799	260		63			73	69	3.0	0.33	38.35	13.089		44.878
A-8	17.5	00:17:30	885.290	0.115	1.632	1.60	1787	260		64			73	69	3.0	0.34	39.11	14.994		44.982
A-9	20.0	00:20:00	887.410	0.115	1.632	1.60	1761	260		64			73	70	3.0	0.34	38.88	16.915		45.106
A-10	22.5	00:22:30	889.550	0.110	1.632	1.60	1754	260		64			73	69	3.0	0.33	37.97	18.936		45.447
A-11	25.0	00:25:00	891.800	0.110	1.632	1.60	1753	260		64			73	69	3.0	0.33	37.96	20.719		45.206
A-12	27.5	00:27:30	893.785	0.100	1.632	1.60	1697	260		64			73	69	3.0	0.32	35.73	22.611		45.221
B-1	30.0	00:30:00	895.890	0.105	1.632	1.60	1832	261		60			70	68	3.0	0.32	37.74	24.459		45.155
B-2	32.5	00:32:30	897.940	0.105	1.632	1.60	1861	260		60			71	68	3.0	0.32	37.98	26.270		45.034
B-3	35.0	00:35:00	899.950	0.110	1.632	1.60	1843	260		61			72	68	3.0	0.33	38.72	28.061		44.898
B-4	37.5	00:37:30	901.940	0.120	1.632	1.60	1844	259		62			72	67	3.0	0.35	40.45	29.890		44.835
B-5	40.0	00:40:00	903.970	0.135	1.632	1.60	1838	260		63			71	67	3.0	0.37	42.85	31.658		44.693
B-6	42.5	00:42:30	905.930	0.140	1.632	1.60	1811	260		63			72	67	3.0	0.37	43.38	33.477		44.637
B-7	45.0	00:45:00	907.950	0.100	1.632	1.60	1775	260		64			72	67	3.0	0.32	36.37	35.302		44.592
B-8	47.5	00:47:30	909.975	0.090	1.632	1.60	1772	260		64			73	67	3.0	0.30	34.48	37.152		44.582
B-9	50.0	00:50:00	912.030	0.080	1.632	1.60	1753	260		64			74	67	3.0	0.28	32.37	39.013		44.586
B-10	52.5	00:52:30	914.100	0.060	1.632	1.60	1672	260		65			74	67	3.0	0.24	27.52	40.910		44.629
B-11	55.0	00:55:00	916.210	0.050	1.632	1.60	1645	260		65			73	67	3.0	0.22	24.96	43.044		44.915
B-12	57.5	00:57:30	918.580	0.050	1.632	1.60	1628	260		65			72	67	3.0	0.22	24.86	45.017		45.017
Last Pt	60.0	01:00:00	920.770																	
Final Val	60.0	01:00:00	920.770												Max Vac	3.0	Final Values	45.017		
Average Values				0.10		1.60	1765	260		62			72	69		0.31	35.37			
													71							

CIMARRON ENERGY, INC.
48HV ECD
Norman Facility

Unit Data

Meas. Stack Moisture	5.6	%
Stack Exhaust Flow (M2)	259,605	SCFH

Weather Data

Barometric Pressure	29.92	in. Hg
Relative Humidity	27	%
Ambient Temperature	84	° F
Specific Humidity	0.006672	lb H ₂ O / lb air

90-100 Load, Run - 48HV ECD R10

	Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmvd)	THC (ppmvw)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
A1	05/09/14 15:13:00	30000	13.42	5.42	0.03	5.29	26.93	100.30	4,031.00
	05/09/14 15:13:30	30030	13.52	6.82	0.03	5.23	26.93	100.30	4,031.00
	05/09/14 15:14:00	30060	13.53	7.02	0.03	5.22	27.21	99.90	4,048.00
	05/09/14 15:14:30	30090	13.39	7.07	0.06	5.31	27.21	99.90	4,048.00
	05/09/14 15:15:00	30120	13.34	7.09	0.06	5.36	27.40	99.60	4,074.00
	05/09/14 15:15:30	30150	13.57	7.72	0.03	5.18	27.40	99.60	4,074.00
	05/09/14 15:16:00	30180	13.44	7.33	0.03	5.28	27.46	99.30	4,077.00
	05/09/14 15:16:30	30210	13.57	7.20	0.00	5.18	27.46	99.30	4,077.00
	05/09/14 15:17:00	30240	13.39	6.74	0.01	5.31	27.24	99.20	4,064.00
	05/09/14 15:17:30	30270	13.03	5.80	0.03	5.57	27.24	99.20	4,064.00
	05/09/14 15:18:00	30300	12.85	5.00	0.03	5.70	27.26	99.20	4,042.00
	05/09/14 15:18:30	30330	13.27	5.37	0.03	5.43	27.26	99.20	4,042.00
	05/09/14 15:19:00	30360	13.44	7.24	0.03	5.27	27.29	99.20	4,065.00
	05/09/14 15:19:30	30390	13.18	8.11	0.06	5.46	27.29	99.20	4,065.00
	05/09/14 15:20:00	30420	13.05	7.13	0.06	5.57	27.60	99.30	4,067.00
	05/09/14 15:20:30	30450	13.50	8.08	0.03	5.25	27.60	99.30	4,067.00
	05/09/14 15:21:00	30480	13.63	8.95	0.03	5.14	27.87	99.30	4,081.00
	05/09/14 15:21:30	30510	13.38	8.79	0.03	5.33	27.87	99.30	4,081.00
	05/09/14 15:22:00	30540	13.60	9.61	0.03	5.15	26.66	99.40	4,024.00
	05/09/14 15:22:30	30570	13.13	9.58	0.03	5.48	26.66	99.40	4,024.00
	05/09/14 15:23:00	30600	12.87	7.69	0.04	5.69	26.93	99.40	4,049.00
	05/09/14 15:23:30	30630	13.27	6.86	0.03	5.42	26.93	99.40	4,049.00
	05/09/14 15:24:00	30660	14.11	9.15	0.03	4.77	26.93	99.50	4,049.00
	05/09/14 15:24:30	30690	13.45	8.22	0.03	5.27	26.93	99.50	4,049.00
	05/09/14 15:25:00	30720	13.07	6.09	0.03	5.55	28.68	99.50	4,132.00
	05/09/14 15:25:30	30750	12.93	4.73	0.00	5.64	28.68	99.50	4,132.00
	05/09/14 15:26:00	30780	12.53	4.49	0.00	5.93	30.14	99.40	4,248.00
	05/09/14 15:26:30	30810	12.33	3.78	0.03	6.07	30.14	99.40	4,248.00
	05/09/14 15:27:00	30840	12.25	1.38	0.03	6.12	30.67	99.40	4,265.00
	05/09/14 15:27:30	30870	12.53	0.28	0.04	5.95	30.67	99.40	4,265.00
	05/09/14 15:28:00	30900	12.60	1.78	0.03	5.88	30.53	99.40	4,264.00
	05/09/14 15:28:30	30930	12.79	3.19	0.00	5.76	30.53	99.40	4,264.00
	05/09/14 15:29:00	30960	12.56	3.93	0.00	5.93	29.31	99.40	4,185.00
	05/09/14 15:29:30	30990	13.35	4.67	0.04	5.36	29.31	99.40	4,185.00
	05/09/14 15:30:00	31020	13.34	6.64	0.03	5.34	27.85	99.30	4,092.00
	05/09/14 15:30:30	31050	12.88	5.06	0.06	5.70	27.85	99.30	4,092.00
	05/09/14 15:31:00	31080	13.90	6.51	0.05	4.98	28.51	99.30	4,143.00
	05/09/14 15:31:30	31110	14.03	10.12	0.06	4.83	28.51	99.30	4,143.00
	05/09/14 15:32:00	31140	13.23	8.95	0.06	5.42	28.51	99.20	4,133.00
	05/09/14 15:32:30	31170	13.01	5.43	0.01	5.60	28.51	99.20	4,133.00
	05/09/14 15:33:00	31200	12.93	5.58	0.01	5.62	28.10	99.20	4,118.00
	05/09/14 15:33:30	31230	12.95	6.21	0.03	5.64	28.10	99.20	4,118.00
A2	05/09/14 15:34:00	31260	12.82	7.85	0.03	5.71	27.98	99.00	4,140.00
	05/09/14 15:34:30	31290	12.89	7.38	0.00	5.69	27.98	99.00	4,140.00
	05/09/14 15:35:00	31320	12.82	6.87	0.00	5.74	27.60	98.90	4,115.00
	05/09/14 15:35:30	31350	13.05	7.43	0.03	5.55	27.60	98.90	4,115.00
	05/09/14 15:36:00	31380	12.93	8.35	0.03	5.64	27.46	98.80	4,092.00
	05/09/14 15:36:30	31410	12.82	7.53	0.03	5.73	27.46	98.80	4,092.00
	05/09/14 15:37:00	31440	13.24	9.01	0.04	5.43	27.21	98.70	4,068.00
	05/09/14 15:37:30	31470	13.56	12.67	0.03	5.17	27.21	98.70	4,068.00
	05/09/14 15:38:00	31500	13.28	14.19	0.03	5.39	27.62	98.70	4,117.00
	05/09/14 15:38:30	31530	13.38	14.01	0.06	5.31	27.62	98.70	4,117.00

CIMARRON ENERGY, INC.
48HV ECD
Norman Facility

Unit Data

Meas. Stack Moisture	5.6	%
Stack Exhaust Flow (M2)	259,605	SCFH

Weather Data

Barometric Pressure	29.92	in. Hg
Relative Humidity	27	%
Ambient Temperature	84	° F
Specific Humidity	0.006672	lb H ₂ O / lb air

90-100 Load, Run - 48HV ECD R10

	Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmvd)	THC (ppmvw)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
	05/09/14 15:39:00	31560	13.05	12.36	0.06	5.56	27.79	98.70	4,130.00
	05/09/14 15:39:30	31590	12.83	10.78	0.03	5.72	27.79	98.70	4,130.00
	05/09/14 15:40:00	31620	12.93	10.23	0.03	5.64	27.13	98.70	4,090.00
	05/09/14 15:40:30	31650	14.04	11.87	0.00	4.85	27.13	98.70	4,090.00
	05/09/14 15:41:00	31680	13.51	13.47	0.01	5.19	27.26	98.70	4,091.00
	05/09/14 15:41:30	31710	13.09	10.26	0.04	5.51	27.26	98.70	4,091.00
	05/09/14 15:42:00	31740	13.01	11.18	0.03	5.61	27.43	98.70	4,115.00
	05/09/14 15:42:30	31770	14.12	13.35	0.00	4.79	27.43	98.70	4,115.00
	05/09/14 15:43:00	31800	14.23	16.29	0.00	4.67	27.15	98.70	4,101.00
	05/09/14 15:43:30	31830	13.31	13.14	0.03	5.38	27.15	98.70	4,101.00
	05/09/14 15:44:00	31860	13.86	11.93	0.03	4.97	26.90	98.60	4,088.00
	05/09/14 15:44:30	31890	13.68	12.84	0.06	5.10	26.90	98.60	4,088.00
	05/09/14 15:45:00	31920	14.29	14.04	0.06	4.68	27.87	98.60	4,109.00
	05/09/14 15:45:30	31950	15.29	20.89	0.06	3.91	27.87	98.60	4,109.00
	05/09/14 15:46:00	31980	15.55	33.62	0.06	3.73	27.49	98.50	4,095.00
	05/09/14 15:46:30	32010	15.39	37.50	0.05	3.83	27.49	98.50	4,095.00
	05/09/14 15:47:00	32040	15.22	31.93	0.05	3.95	30.84	98.50	4,330.00
	05/09/14 15:47:30	32070	14.70	21.22	0.05	4.31	30.84	98.50	4,330.00
	05/09/14 15:48:00	32100	14.22	8.28	0.05	4.69	31.53	98.50	4,326.00
	05/09/14 15:48:30	32130	14.20	4.86	0.03	4.71	31.53	98.50	4,326.00
	05/09/14 15:49:00	32160	14.28	4.42	0.03	4.64	31.80	98.40	4,318.00
	05/09/14 15:49:30	32190	14.04	3.64	0.03	4.81	31.80	98.40	4,318.00
	05/09/14 15:50:00	32220	13.81	2.04	0.02	4.99	32.63	98.30	4,372.00
	05/09/14 15:50:30	32250	13.87	1.30	0.02	4.96	32.63	98.30	4,372.00
	05/09/14 15:51:00	32280	13.78	0.96	0.03	5.03	32.91	98.20	4,387.00
	05/09/14 15:51:30	32310	13.94	0.83	0.00	4.91	32.91	98.20	4,387.00
	05/09/14 15:52:00	32340	13.92	0.94	0.01	4.92	32.52	98.20	4,349.00
	05/09/14 15:52:30	32370	13.96	0.96	0.05	4.89	32.52	98.20	4,349.00
	05/09/14 15:53:00	32400	13.99	1.12	0.05	4.88	32.94	98.20	4,353.00
	05/09/14 15:53:30	32430	14.06	1.04	0.03	4.82	32.94	98.20	4,353.00
A3	05/09/14 15:54:00	32460	13.92	1.05	0.03	4.91	32.94	98.30	4,353.00
	05/09/14 15:54:30	32490	13.79	0.54	0.03	5.01	32.94	98.30	4,353.00
	05/09/14 15:55:00	32520	13.93	0.56	0.03	4.91	32.94	98.30	4,352.00
	05/09/14 15:55:30	32550	13.93	0.80	0.06	4.91	32.94	98.30	4,352.00
	05/09/14 15:56:00	32580	13.95	0.85	0.06	4.90	32.41	98.40	4,301.00
	05/09/14 15:56:30	32610	14.02	1.05	0.05	4.84	32.41	98.40	4,301.00
	05/09/14 15:57:00	32640	14.00	1.28	0.04	4.87	31.61	98.50	4,258.00
	05/09/14 15:57:30	32670	14.02	1.38	0.03	4.85	31.61	98.50	4,258.00
	05/09/14 15:58:00	32700	14.10	1.49	0.04	4.79	31.22	98.50	4,243.00
	05/09/14 15:58:30	32730	14.12	1.76	0.03	4.78	31.22	98.50	4,243.00
	05/09/14 15:59:00	32760	14.05	1.74	0.03	4.83	31.22	98.50	4,221.00
	05/09/14 15:59:30	32790	14.07	1.83	0.03	4.80	31.22	98.50	4,221.00
	05/09/14 16:00:00	32820	14.05	1.80	0.03	4.82	31.22	98.50	4,232.00
	05/09/14 16:00:30	32850	14.14	1.91	0.03	4.76	31.22	98.50	4,232.00
	05/09/14 16:01:00	32880	14.04	1.99	0.02	4.82	31.36	98.50	4,222.00
	05/09/14 16:01:30	32910	13.96	1.39	0.03	4.89	31.36	98.50	4,222.00
	05/09/14 16:02:00	32940	13.99	1.03	0.02	4.87	31.22	98.60	4,220.00
	05/09/14 16:02:30	32970	14.08	1.10	0.05	4.80	31.22	98.60	4,220.00
	05/09/14 16:03:00	33000	14.12	1.43	0.06	4.77	31.64	98.70	4,223.00
	05/09/14 16:03:30	33030	14.15	1.73	0.03	4.75	31.64	98.70	4,223.00
	05/09/14 16:04:00	33060	14.14	1.97	0.03	4.75	31.25	98.80	4,207.00
	05/09/14 16:04:30	33090	14.17	2.18	0.03	4.73	31.25	98.80	4,207.00

CIMARRON ENERGY, INC.
48HV ECD
Norman Facility

Unit Data

Meas. Stack Moisture	5.6	%
Stack Exhaust Flow (M2)	259,605	SCFH

Weather Data

Barometric Pressure	29.92	in. Hg
Relative Humidity	27	%
Ambient Temperature	84	° F
Specific Humidity	0.006672	lb H ₂ O / lb air

90-100 Load, Run - 48HV ECD R10

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmvd)	THC (ppmvw)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
05/09/14 16:05:00	33120	14.16	2.45	0.03	4.74	30.97	98.90	4,215.00
05/09/14 16:05:30	33150	14.14	1.94	0.02	4.76	30.97	98.90	4,215.00
05/09/14 16:06:00	33180	14.16	1.91	0.03	4.73	31.08	99.00	4,205.00
05/09/14 16:06:30	33210	13.93	`	0.06	4.93	31.08	99.00	4,205.00
05/09/14 16:07:00	33240	14.20	4.63	0.06	4.71	31.22	99.00	4,228.00
05/09/14 16:07:30	33270	14.21	6.13	0.02	4.71	31.22	99.00	4,228.00
05/09/14 16:08:00	33300	14.29	7.13	0.02	4.65	31.20	99.10	4,216.00
05/09/14 16:08:30	33330	14.19	7.37	0.02	4.71	31.20	99.10	4,216.00
05/09/14 16:09:00	33360	13.95	6.17	0.03	4.89	30.92	99.20	4,190.00
05/09/14 16:09:30	33390	13.99	5.06	0.05	4.88	30.92	99.20	4,190.00
05/09/14 16:10:00	33420	14.22	6.26	0.05	4.70	31.20	99.20	4,204.00
05/09/14 16:10:30	33450	14.08	6.63	0.03	4.81	31.20	99.20	4,204.00
05/09/14 16:11:00	33480	13.97	6.08	0.03	4.88	31.03	99.20	4,191.00
05/09/14 16:11:30	33510	13.83	4.89	0.03	4.99	31.03	99.20	4,191.00
05/09/14 16:12:00	33540	13.87	4.34	0.03	4.96	31.03	99.20	4,191.00
05/09/14 16:12:30	33570	14.21	5.58	0.03	4.71	31.03	99.20	4,191.00
05/09/14 16:13:00	33600	14.07	7.08	0.03	4.81	31.14	99.30	4,191.00
RAW AVERAGE		13.66	6.78	0.03	5.11	29.49	98.93	4,175.28

Bias	Serial Number:	O ₂ (%)	CO (ppmvd)	THC (ppmvw)	CO ₂ (%)	Press. Trans (in. H ₂ O)	Temp. Trans. (°F)	F-Flow Trans. (SCFH)
	INST-22-010	INST-22-0010	INST-CO-0008	INST-VC-0007	INST-22-0010	1229943	1229943	1229943
	Initial Zero	0.35	0.12	0.06	0.07			
	Final Zero	0.34	0.18	0.02	0.01			
	Avg. Zero	0.35	0.15	0.04	0.04			
	Initial UpScale	11.95	8.64	2.92	8.65			
	Final UpScale	12.10	8.99	2.91	8.58			
	Avg. UpScale	12.03	8.82	2.92	8.62			
Upscale Cal Gas		12.20	9.00	3.04	8.56			

EMISSIONS DATA	O ₂	CO	THC	CO ₂
Corrected Raw Average (ppm/% dry basis)	13.91	6.89	-0.01	5.06
Corrected Raw Average (ppm/% wet basis)	13.11	6.49	-0.01	4.77
Emission Rate (lb/hr)	N/A	0.13	0.00	N/A

CIMARRON ENERGY, INC.
48HV ECD
Norman Facility

Unit Data

Meas. Stack Moisture	5.0	%
Stack Exhaust Flow (M2)	284,181	SCFH

Weather Data

Barometric Pressure	30.36	in. Hg
Relative Humidity	37	%
Ambient Temperature	76	° F
Specific Humidity	0.006939	lb H ₂ O / lb air

90-100 Load, Run - 48HV ECD R11

	Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmvd)	THC (ppmvw)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
A1	05/14/14 12:29:24	8790	13.00	0.92	0.02	5.71	29.53	79.20	4,195.00
	05/14/14 12:29:54	8820	13.29	0.86	0.02	5.52	29.53	79.20	4,195.00
	05/14/14 12:30:24	8850	12.86	1.14	0.03	5.81	30.86	78.90	4,200.00
	05/14/14 12:30:54	8880	13.35	1.43	0.03	5.47	30.86	78.90	4,200.00
	05/14/14 12:31:24	8910	13.58	1.81	0.03	5.31	28.65	78.50	4,216.00
	05/14/14 12:31:54	8940	13.10	1.53	0.02	5.65	28.65	78.50	4,216.00
	05/14/14 12:32:24	8970	12.87	0.96	0.05	5.81	30.92	78.20	4,159.00
	05/14/14 12:32:54	9000	12.98	0.88	0.06	5.77	30.92	78.20	4,159.00
	05/14/14 12:33:24	9030	12.75	0.73	0.03	5.91	30.31	77.70	4,168.00
	05/14/14 12:33:54	9060	13.24	1.30	0.03	5.56	30.31	77.70	4,168.00
	05/14/14 12:34:24	9090	13.08	1.96	0.03	5.66	28.48	77.20	4,143.00
	05/14/14 12:34:54	9120	13.57	2.00	0.03	5.31	28.48	77.20	4,143.00
	05/14/14 12:35:24	9150	13.38	2.71	0.03	5.46	29.87	76.60	4,196.00
	05/14/14 12:35:54	9180	13.57	3.12	0.03	5.30	29.87	76.60	4,196.00
	05/14/14 12:36:24	9210	13.67	4.10	0.03	5.24	30.59	76.10	4,195.00
	05/14/14 12:36:54	9240	13.66	4.24	0.03	5.27	30.59	76.10	4,195.00
	05/14/14 12:37:24	9270	13.88	4.29	0.03	5.08	28.12	75.60	4,187.00
	05/14/14 12:37:54	9300	13.88	4.14	0.03	5.10	28.12	75.60	4,187.00
	05/14/14 12:38:24	9330	13.77	3.43	0.03	5.15	29.23	75.30	4,200.00
	05/14/14 12:38:54	9360	12.99	2.04	0.03	5.74	29.23	75.30	4,200.00
	05/14/14 12:39:24	9390	13.17	1.98	0.06	5.62	30.89	75.20	4,205.00
	05/14/14 12:39:54	9420	13.28	2.86	0.05	5.53	30.89	75.20	4,205.00
	05/14/14 12:40:24	9450	14.58	4.37	0.06	4.58	30.81	75.20	4,180.00
	05/14/14 12:40:54	9480	13.71	4.45	0.06	5.18	30.81	75.20	4,180.00
	05/14/14 12:41:24	9510	12.80	1.89	0.03	5.87	27.68	75.00	4,246.00
	05/14/14 12:41:54	9540	12.55	0.69	0.03	6.02	27.68	75.00	4,246.00
	05/14/14 12:42:24	9570	12.47	0.14	0.06	6.12	34.57	74.80	4,506.00
	05/14/14 12:42:54	9600	13.10	1.09	0.05	5.63	34.57	74.80	4,506.00
	05/14/14 12:43:24	9630	12.54	0.85	0.02	6.05	34.77	74.40	4,535.00
	05/14/14 12:43:54	9660	13.24	0.44	0.02	5.55	34.77	74.40	4,535.00
	05/14/14 12:44:24	9690	11.89	-0.12	0.03	6.45	37.17	74.40	4,548.00
	05/14/14 12:44:54	9720	12.20	-0.76	0.02	6.31	37.17	74.40	4,548.00
	05/14/14 12:45:24	9750	13.73	-0.36	0.00	5.18	34.71	74.30	4,464.00
	05/14/14 12:45:54	9780	13.52	-0.07	-0.01	5.37	34.71	74.30	4,464.00
	05/14/14 12:46:24	9810	13.63	0.45	0.05	5.25	35.40	74.10	4,485.00
	05/14/14 12:46:54	9840	13.02	0.43	0.05	5.71	35.40	74.10	4,485.00
	05/14/14 12:47:24	9870	13.99	1.11	0.03	5.01	34.52	73.70	4,490.00
	05/14/14 12:47:54	9900	13.44	1.48	0.03	5.39	34.52	73.70	4,490.00
	05/14/14 12:48:24	9930	12.86	0.88	0.03	5.83	36.01	73.40	4,520.00
	05/14/14 12:48:54	9960	12.66	0.80	0.03	5.94	36.01	73.40	4,520.00
	05/14/14 12:49:24	9990	13.28	0.38	0.02	5.52	34.60	73.10	4,521.00
	05/14/14 12:49:54	10020	13.61	0.86	0.02	5.32	34.60	73.10	4,521.00
A2	05/14/14 12:50:24	10050	14.50	3.53	0.03	4.64	36.87	72.70	4,523.00
	05/14/14 12:50:54	10080	14.41	4.82	0.03	4.68	36.87	72.70	4,523.00
	05/14/14 12:51:24	10110	14.19	5.43	0.03	4.85	34.82	72.20	4,506.00
	05/14/14 12:51:54	10140	13.62	4.74	0.03	5.26	34.82	72.20	4,506.00
	05/14/14 12:52:24	10170	13.36	1.31	0.03	5.46	35.02	71.80	4,499.00
	05/14/14 12:52:54	10200	13.43	0.79	0.04	5.41	35.02	71.80	4,499.00
	05/14/14 12:53:24	10230	13.94	2.14	0.06	5.05	33.88	71.40	4,480.00
	05/14/14 12:53:54	10260	14.02	5.04	0.06	4.99	33.88	71.40	4,480.00
	05/14/14 12:54:24	10290	13.93	5.84	0.05	5.01	33.96	70.90	4,485.00
	05/14/14 12:54:54	10320	13.43	2.57	0.05	5.41	33.96	70.90	4,485.00

CIMARRON ENERGY, INC.
48HV ECD
Norman Facility

Unit Data

Meas. Stack Moisture	5.0	%
Stack Exhaust Flow (M2)	284,181	SCFH

Weather Data

Barometric Pressure	30.36	in. Hg
Relative Humidity	37	%
Ambient Temperature	76	° F
Specific Humidity	0.006939	lb H ₂ O / lb air

90-100 Load, Run - 48HV ECD R11

	Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmvd)	THC (ppmvw)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
	05/14/14 12:55:24	10350	13.73	2.02	0.02	5.21	34.02	70.40	4,466.00
	05/14/14 12:55:54	10380	14.78	5.35	0.03	4.41	34.02	70.40	4,466.00
	05/14/14 12:56:24	10410	14.22	7.22	0.05	4.80	34.24	70.00	4,471.00
	05/14/14 12:56:54	10440	13.78	5.64	0.05	5.15	34.24	70.00	4,471.00
	05/14/14 12:57:24	10470	14.02	5.46	0.03	4.98	34.57	69.70	4,525.00
	05/14/14 12:57:54	10500	14.04	6.67	0.02	4.97	34.57	69.70	4,525.00
	05/14/14 12:58:24	10530	13.68	5.72	0.03	5.23	33.74	69.50	4,530.00
	05/14/14 12:58:54	10560	13.64	3.34	0.03	5.26	33.74	69.50	4,530.00
	05/14/14 12:59:24	10590	13.62	2.73	0.03	5.26	34.07	69.90	4,507.00
	05/14/14 12:59:54	10620	13.57	2.00	0.03	5.30	34.07	69.90	4,507.00
	05/14/14 13:00:24	10650	14.06	3.21	0.03	4.93	34.10	70.40	4,490.00
	05/14/14 13:00:54	10680	14.02	3.58	0.03	4.98	34.10	70.40	4,490.00
	05/14/14 13:01:24	10710	13.38	2.92	0.03	5.42	33.11	71.10	4,462.00
	05/14/14 13:01:54	10740	13.42	0.79	0.02	5.41	33.11	71.10	4,462.00
	05/14/14 13:02:24	10770	13.54	0.96	0.03	5.33	33.22	71.80	4,446.00
	05/14/14 13:02:54	10800	13.38	1.46	0.03	5.42	33.22	71.80	4,446.00
	05/14/14 13:03:24	10830	13.30	0.84	0.02	5.50	34.82	72.40	4,469.00
	05/14/14 13:03:54	10860	13.61	1.55	0.02	5.28	34.82	72.40	4,469.00
	05/14/14 13:04:24	10890	13.67	3.10	0.03	5.23	34.13	72.90	4,470.00
	05/14/14 13:04:54	10920	13.63	3.03	0.04	5.26	34.13	72.90	4,470.00
	05/14/14 13:05:24	10950	13.70	2.85	0.03	5.22	35.57	73.20	4,470.00
	05/14/14 13:05:54	10980	14.16	3.58	0.03	4.87	35.57	73.20	4,470.00
	05/14/14 13:06:24	11010	14.23	4.09	0.03	4.83	34.38	73.20	4,445.00
	05/14/14 13:06:54	11040	13.94	2.88	0.03	5.02	34.38	73.20	4,445.00
	05/14/14 13:07:24	11070	13.77	1.79	0.05	5.16	33.05	73.20	4,456.00
	05/14/14 13:07:54	11100	13.97	1.73	0.05	5.03	33.05	73.20	4,456.00
	05/14/14 13:08:24	11130	14.17	1.31	0.05	5.08	36.09	73.10	4,464.00
	05/14/14 13:08:54	11160	14.49	0.75	0.06	5.10	36.09	73.10	4,464.00
	05/14/14 13:09:24	11190	13.66	0.57	0.03	5.25	35.68	72.80	4,450.00
	05/14/14 13:09:54	11220	13.80	0.61	0.03	5.15	35.68	72.80	4,450.00
A3	05/14/14 13:10:24	11250	13.81	0.53	0.03	5.13	33.33	72.60	4,417.00
	05/14/14 13:10:54	11280	14.06	0.48	0.03	4.98	33.33	72.60	4,417.00
	05/14/14 13:11:24	11310	13.96	0.61	0.05	5.03	36.09	72.20	4,448.00
	05/14/14 13:11:54	11340	13.92	0.43	0.05	5.05	36.09	72.20	4,448.00
	05/14/14 13:12:24	11370	13.89	0.36	0.02	5.07	34.27	71.80	4,312.00
	05/14/14 13:12:54	11400	14.25	0.54	0.03	4.81	34.27	71.80	4,312.00
	05/14/14 13:13:24	11430	14.31	1.21	0.02	4.76	31.53	71.50	4,405.00
	05/14/14 13:13:54	11460	14.40	1.60	0.02	4.67	31.53	71.50	4,405.00
	05/14/14 13:14:24	11490	13.01	0.72	0.03	5.76	35.10	71.20	4,382.00
	05/14/14 13:14:54	11520	12.84	-0.53	0.03	6.10	35.10	71.20	4,382.00
	05/14/14 13:15:24	11550	13.14	-0.64	0.03	6.32	33.82	70.80	4,420.00
	05/14/14 13:15:54	11580	13.97	-0.17	0.02	5.21	33.82	70.80	4,420.00
	05/14/14 13:16:24	11610	14.10	0.18	0.03	4.96	37.40	70.50	4,434.00
	05/14/14 13:16:54	11640	14.00	0.97	0.03	5.00	37.40	70.50	4,434.00
	05/14/14 13:17:24	11670	14.04	1.04	0.03	5.35	34.16	70.20	4,417.00
	05/14/14 13:17:54	11700	14.14	2.13	0.02	5.02	34.16	70.20	4,417.00
	05/14/14 13:18:24	11730	14.65	2.43	0.02	4.55	36.04	69.90	4,426.00
	05/14/14 13:18:54	11760	14.16	3.78	0.03	5.07	36.04	69.90	4,426.00
	05/14/14 13:19:24	11790	14.06	2.24	0.05	5.00	35.04	69.60	4,418.00
	05/14/14 13:19:54	11820	14.35	2.31	0.05	4.74	35.04	69.60	4,418.00
	05/14/14 13:20:24	11850	14.37	1.23	0.03	4.74	32.99	69.30	4,412.00
	05/14/14 13:20:54	11880	14.41	1.05	0.03	4.70	32.99	69.30	4,412.00

CIMARRON ENERGY, INC.
48HV ECD
Norman Facility

Unit Data

Meas. Stack Moisture	5.0	%
Stack Exhaust Flow (M2)	284,181	SCFH

Weather Data

Barometric Pressure	30.36	in. Hg
Relative Humidity	37	%
Ambient Temperature	76	° F
Specific Humidity	0.006939	lb H ₂ O / lb air

90-100 Load, Run - 48HV ECD R11

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmvd)	THC (ppmvw)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
05/14/14 13:21:24	11910	13.89	1.23	0.03	5.07	35.02	69.10	4,422.00
05/14/14 13:21:54	11940	13.88	0.96	0.03	5.07	35.02	69.10	4,422.00
05/14/14 13:22:24	11970	13.94	0.51	0.03	5.04	34.93	68.90	4,411.00
05/14/14 13:22:54	12000	14.24	0.54	0.03	4.82	34.93	68.90	4,411.00
05/14/14 13:23:24	12030	14.25	0.98	0.05	4.82	33.55	68.70	4,399.00
05/14/14 13:23:54	12060	14.21	1.31	0.05	4.84	33.55	68.70	4,399.00
05/14/14 13:24:24	12090	13.91	1.61	0.02	5.07	34.52	68.70	4,373.00
05/14/14 13:24:54	12120	14.16	1.56	0.02	4.89	34.52	68.70	4,373.00
05/14/14 13:25:24	12150	13.94	1.44	0.05	5.06	33.13	68.70	4,335.00
05/14/14 13:25:54	12180	14.10	1.94	0.05	4.91	33.13	68.70	4,335.00
05/14/14 13:26:24	12210	13.81	1.62	0.03	5.14	33.02	68.80	4,404.00
05/14/14 13:26:54	12240	14.13	1.79	0.02	4.90	33.02	68.80	4,404.00
05/14/14 13:27:24	12270	13.91	1.83	0.06	5.07	34.49	68.90	4,418.00
05/14/14 13:27:54	12300	13.85	0.87	0.06	5.11	34.49	68.90	4,418.00
05/14/14 13:28:24	12330	13.91	0.99	0.03	5.07	36.09	69.00	4,397.00
05/14/14 13:28:54	12360	13.82	1.24	0.02	5.13	36.09	69.00	4,397.00
05/14/14 13:29:24	12390	13.66	0.84	0.05	5.26	34.54	69.00	4,406.00
RAW AVERAGE		13.68	1.94	0.03	5.25	33.53	72.54	4,397.12

Bias	Serial Number:	O ₂ (%)	CO (ppmvd)	THC (ppmvw)	CO ₂ (%)	Press. Trans (in. H ₂ O)	Temp. Trans. (°F)	F-Flow Trans. (SCFH)
	INST-22-010	INST-22-010	INST-CO-0008	INST-VC-0007	INST-22-0010	1229943	1229943	1229943
	Initial Zero	0.23	0.06	0.06	0.05			
	Final Zero	0.24	-0.12	0.02	0.04			
	Avg. Zero	0.24	-0.03	0.04	0.05			
	Initial UpScale	12.06	8.64	3.04	8.69			
	Final UpScale	12.11	8.59	2.99	8.68			
	Avg. UpScale	12.09	8.62	3.02	8.69			
Upscale Cal Gas		12.20	9.00	3.04	8.56			

EMISSIONS DATA	O ₂	CO	THC	CO ₂
Corrected Raw Average (ppm/% dry basis)	13.84	2.05	-0.01	5.16
Corrected Raw Average (ppm/% wet basis)	13.13	1.95	-0.01	4.90
Emission Rate (lb/hr)	N/A	0.04	0.00	N/A

CIMARRON ENERGY, INC.

May 14, 2014

48HV ECD

Norman Facility

Unit Data

Meas. Stack Moisture	5.3	%
Stack Exhaust Flow (M2)	252,884	SCFH

Weather Data

Barometric Pressure	30.29	in. Hg
Relative Humidity	34	%
Ambient Temperature	67	° F
Specific Humidity	0.004694	lb H ₂ O / lb air

90-100 Load, Run - 48HV ECD R12

	Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmvd)	THC (ppmvw)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
A1	05/14/14 13:48:24	13530	14.66	5.07	0.03	4.62	32.52	73.30	4,196.00
	05/14/14 13:48:54	13560	14.67	5.50	0.03	4.62	32.52	73.30	4,196.00
	05/14/14 13:49:24	13590	14.86	5.93	0.06	4.49	28.84	72.90	4,187.00
	05/14/14 13:49:54	13620	14.87	6.02	0.06	4.49	28.84	72.90	4,187.00
	05/14/14 13:50:24	13650	14.82	6.31	0.05	4.50	33.96	72.60	4,216.00
	05/14/14 13:50:54	13680	14.70	5.54	0.05	4.62	33.96	72.60	4,216.00
	05/14/14 13:51:24	13710	14.57	6.05	0.02	4.69	28.73	72.30	4,191.00
	05/14/14 13:51:54	13740	14.87	5.35	0.02	4.48	28.73	72.30	4,191.00
	05/14/14 13:52:24	13770	14.42	5.33	0.02	4.80	31.50	72.00	4,209.00
	05/14/14 13:52:54	13800	14.60	3.62	0.02	4.65	31.50	72.00	4,209.00
	05/14/14 13:53:24	13830	14.62	4.77	0.05	4.63	32.83	71.60	4,201.00
	05/14/14 13:53:54	13860	14.64	4.94	0.05	4.61	32.83	71.60	4,201.00
	05/14/14 13:54:24	13890	14.72	4.14	0.05	4.54	29.73	71.30	4,185.00
	05/14/14 13:54:54	13920	14.68	3.67	0.06	4.57	29.73	71.30	4,185.00
	05/14/14 13:55:24	13950	14.82	4.23	0.05	4.49	33.44	71.30	4,197.00
	05/14/14 13:55:54	13980	15.03	5.81	0.05	4.31	33.44	71.30	4,197.00
	05/14/14 13:56:24	14010	14.97	5.81	0.02	4.39	31.08	71.30	4,162.00
	05/14/14 13:56:54	14040	14.90	6.60	0.03	4.44	31.08	71.30	4,162.00
	05/14/14 13:57:24	14070	14.82	5.91	0.02	4.49	28.62	71.50	4,185.00
	05/14/14 13:57:54	14100	14.59	5.26	0.02	4.67	28.62	71.50	4,185.00
	05/14/14 13:58:24	14130	14.79	4.36	0.02	4.52	31.64	71.60	4,189.00
	05/14/14 13:58:54	14160	14.55	4.58	0.02	4.69	31.64	71.60	4,189.00
	05/14/14 13:59:24	14190	14.34	3.29	0.05	4.87	33.88	71.80	4,197.00
	05/14/14 13:59:54	14220	14.64	3.32	0.05	4.62	33.88	71.80	4,197.00
	05/14/14 14:00:24	14250	14.15	2.24	0.02	4.97	34.93	72.00	4,385.00
	05/14/14 14:00:54	14280	13.82	1.03	0.02	5.23	34.93	72.00	4,385.00
	05/14/14 14:01:24	14310	14.13	0.58	0.03	5.00	33.11	72.40	4,483.00
	05/14/14 14:01:54	14340	14.38	0.83	0.03	4.81	33.11	72.40	4,483.00
	05/14/14 14:02:24	14370	14.37	1.11	0.05	4.82	37.53	72.80	4,525.00
	05/14/14 14:02:54	14400	14.45	1.06	0.05	4.76	37.53	72.80	4,525.00
	05/14/14 14:03:24	14430	14.06	1.19	0.04	5.04	41.19	73.20	4,547.00
	05/14/14 14:03:54	14460	13.56	1.29	0.05	5.42	41.19	73.20	4,547.00
	05/14/14 14:04:24	14490	14.02	0.50	0.05	5.08	41.05	73.60	4,553.00
	05/14/14 14:04:54	14520	14.02	0.36	0.04	5.07	41.05	73.60	4,553.00
	05/14/14 14:05:24	14550	13.98	0.34	0.06	5.10	40.61	74.10	4,521.00
	05/14/14 14:05:54	14580	14.32	0.20	0.05	4.89	40.61	74.10	4,521.00
	05/14/14 14:06:24	14610	14.72	0.35	0.05	4.64	39.00	74.50	4,489.00
	05/14/14 14:06:54	14640	14.94	0.88	0.05	4.48	39.00	74.50	4,489.00
	05/14/14 14:07:24	14670	14.69	0.87	0.02	4.77	36.45	74.90	4,448.00
	05/14/14 14:07:54	14700	14.15	0.59	0.03	5.15	36.45	74.90	4,448.00
	05/14/14 14:08:24	14730	13.81	0.08	0.03	5.61	32.99	75.30	4,434.00
A2	05/14/14 14:08:54	14760	14.16	-0.04	0.02	5.44	32.99	75.30	4,434.00
	05/14/14 14:09:24	14790	14.20	-0.19	0.00	5.58	35.32	75.80	4,477.00
	05/14/14 14:09:54	14820	14.21	-0.30	0.00	5.45	35.32	75.80	4,477.00
	05/14/14 14:10:24	14850	13.46	-0.34	0.05	5.59	41.82	76.10	4,516.00
	05/14/14 14:10:54	14880	13.97	-0.39	0.05	5.42	41.82	76.10	4,516.00
	05/14/14 14:11:24	14910	13.57	-0.35	0.05	5.48	38.36	76.30	4,456.00
	05/14/14 14:11:54	14940	13.58	-0.39	0.05	5.35	38.36	76.30	4,456.00
	05/14/14 14:12:24	14970	13.36	-0.33	0.05	5.46	36.34	76.20	4,472.00
	05/14/14 14:12:54	15000	13.37	-0.36	0.05	5.47	36.34	76.20	4,472.00
	05/14/14 14:13:24	15030	13.58	-0.31	0.03	5.31	40.77	76.30	4,492.00

CIMARRON ENERGY, INC.

May 14, 2014

48HV ECD

Norman Facility

Unit Data

Meas. Stack Moisture	5.3	%
Stack Exhaust Flow (M2)	252,884	SCFH

Weather Data

Barometric Pressure	30.29	in. Hg
Relative Humidity	34	%
Ambient Temperature	67	° F
Specific Humidity	0.004694	lb H ₂ O / lb air

90-100 Load, Run - 48HV ECD R12

	Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmvd)	THC (ppmvw)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
	05/14/14 14:13:54	15060	13.34	-0.34	0.03	5.48	40.77	76.30	4,492.00
	05/14/14 14:14:24	15090	13.54	-0.35	0.02	5.35	34.93	76.50	4,443.00
	05/14/14 14:14:54	15120	13.68	-0.26	0.02	5.24	34.93	76.50	4,443.00
	05/14/14 14:15:24	15150	13.36	-0.31	0.02	5.47	40.03	76.90	4,491.00
	05/14/14 14:15:54	15180	13.42	-0.36	0.02	5.43	40.03	76.90	4,491.00
	05/14/14 14:16:24	15210	13.65	-0.33	0.02	5.26	35.24	77.20	4,429.00
	05/14/14 14:16:54	15240	13.29	-0.31	0.02	5.53	35.24	77.20	4,429.00
	05/14/14 14:17:24	15270	13.41	-0.33	0.06	5.43	39.00	77.50	4,440.00
	05/14/14 14:17:54	15300	13.43	-0.41	0.05	5.43	39.00	77.50	4,440.00
	05/14/14 14:18:24	15330	13.53	-0.35	0.03	5.34	36.59	77.80	4,462.00
	05/14/14 14:18:54	15360	13.52	-0.30	0.03	5.34	36.59	77.80	4,462.00
	05/14/14 14:19:24	15390	13.36	-0.33	0.02	5.47	36.40	77.60	4,390.00
	05/14/14 14:19:54	15420	13.53	-0.34	0.01	5.35	36.40	77.60	4,390.00
	05/14/14 14:20:24	15450	13.66	-0.29	0.03	5.27	38.09	77.00	4,471.00
	05/14/14 14:20:54	15480	13.73	-0.15	0.03	5.21	38.09	77.00	4,471.00
	05/14/14 14:21:24	15510	13.43	-0.19	0.04	5.42	35.57	76.40	4,403.00
	05/14/14 14:21:54	15540	13.45	-0.29	0.05	5.41	35.57	76.40	4,403.00
	05/14/14 14:22:24	15570	13.53	-0.25	0.02	5.34	36.90	75.70	4,458.00
	05/14/14 14:22:54	15600	13.45	-0.26	0.02	5.41	36.90	75.70	4,458.00
	05/14/14 14:23:24	15630	13.58	-0.26	0.05	5.31	39.55	75.10	4,442.00
	05/14/14 14:23:54	15660	13.70	-0.17	0.05	5.23	39.55	75.10	4,442.00
	05/14/14 14:24:24	15690	13.72	-0.08	0.01	5.21	33.13	74.50	4,394.00
	05/14/14 14:24:54	15720	13.56	-0.24	0.02	5.33	33.13	74.50	4,394.00
	05/14/14 14:25:24	15750	13.57	-0.29	0.01	5.32	37.37	74.40	4,473.00
	05/14/14 14:25:54	15780	13.28	-0.37	0.01	5.52	37.37	74.40	4,473.00
	05/14/14 14:26:24	15810	13.43	-0.42	0.02	5.43	40.14	74.60	4,464.00
	05/14/14 14:26:54	15840	13.47	-0.38	0.03	5.39	40.14	74.60	4,464.00
	05/14/14 14:27:24	15870	13.66	-0.36	0.02	5.25	33.33	74.90	4,381.00
	05/14/14 14:27:54	15900	13.66	-0.30	0.03	5.26	33.33	74.90	4,381.00
	05/14/14 14:28:24	15930	13.88	-0.20	0.05	5.10	34.13	74.80	4,414.00
A3	05/14/14 14:28:54	15960	13.93	-0.07	0.05	5.08	34.13	74.80	4,414.00
	05/14/14 14:29:24	15990	13.88	-0.07	0.02	5.14	40.58	74.60	4,456.00
	05/14/14 14:29:54	16020	13.76	-0.10	0.03	5.25	40.58	74.60	4,456.00
	05/14/14 14:30:24	16050	13.71	-0.20	0.04	5.35	35.98	74.30	4,389.00
	05/14/14 14:30:54	16080	14.38	-0.20	0.05	5.23	35.98	74.30	4,389.00
	05/14/14 14:31:24	16110	14.23	-0.22	0.02	5.27	33.38	74.00	4,389.00
	05/14/14 14:31:54	16140	13.82	-0.26	0.02	5.32	33.38	74.00	4,389.00
	05/14/14 14:32:24	16170	13.71	-0.31	0.02	5.33	38.53	74.10	4,439.00
	05/14/14 14:32:54	16200	14.05	-0.23	0.01	5.19	38.53	74.10	4,439.00
	05/14/14 14:33:24	16230	14.55	-0.15	0.04	5.13	40.38	74.40	4,419.00
	05/14/14 14:33:54	16260	13.67	-0.18	0.04	5.31	40.38	74.40	4,419.00
	05/14/14 14:34:24	16290	14.04	-0.18	0.05	5.07	33.16	74.90	4,368.00
	05/14/14 14:34:54	16320	14.29	0.89	0.04	4.81	33.16	74.90	4,368.00
	05/14/14 14:35:24	16350	14.32	1.68	0.05	4.77	39.31	75.30	4,437.00
	05/14/14 14:35:54	16380	14.34	1.75	0.05	4.75	39.31	75.30	4,437.00
	05/14/14 14:36:24	16410	14.31	2.11	0.03	4.77	36.81	75.80	4,385.00
	05/14/14 14:36:54	16440	14.25	2.17	0.02	4.81	36.81	75.80	4,385.00
	05/14/14 14:37:24	16470	14.01	1.44	0.05	5.00	38.09	76.10	4,430.00
	05/14/14 14:37:54	16500	14.11	1.19	0.04	4.92	38.09	76.10	4,430.00
	05/14/14 14:38:24	16530	14.22	1.96	0.05	4.84	37.81	76.50	4,376.00
	05/14/14 14:38:54	16560	13.71	1.57	0.05	5.20	37.81	76.50	4,376.00

CIMARRON ENERGY, INC.

May 14, 2014

48HV ECD

Norman Facility

Unit Data

Meas. Stack Moisture	5.3	%
Stack Exhaust Flow (M2)	252,884	SCFH

Weather Data

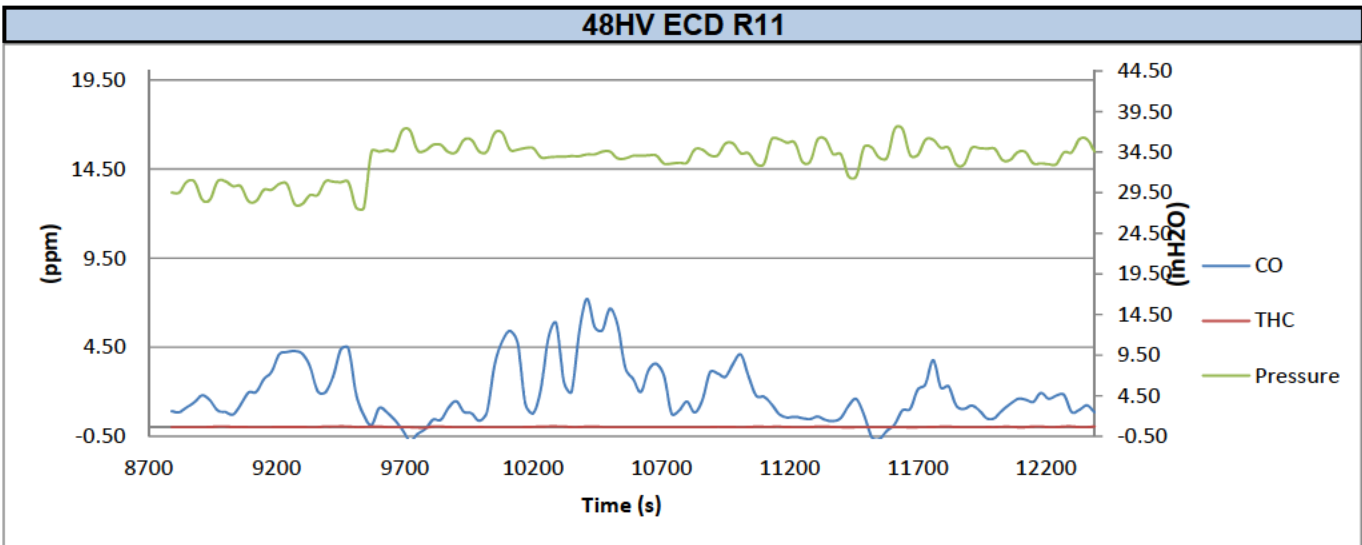
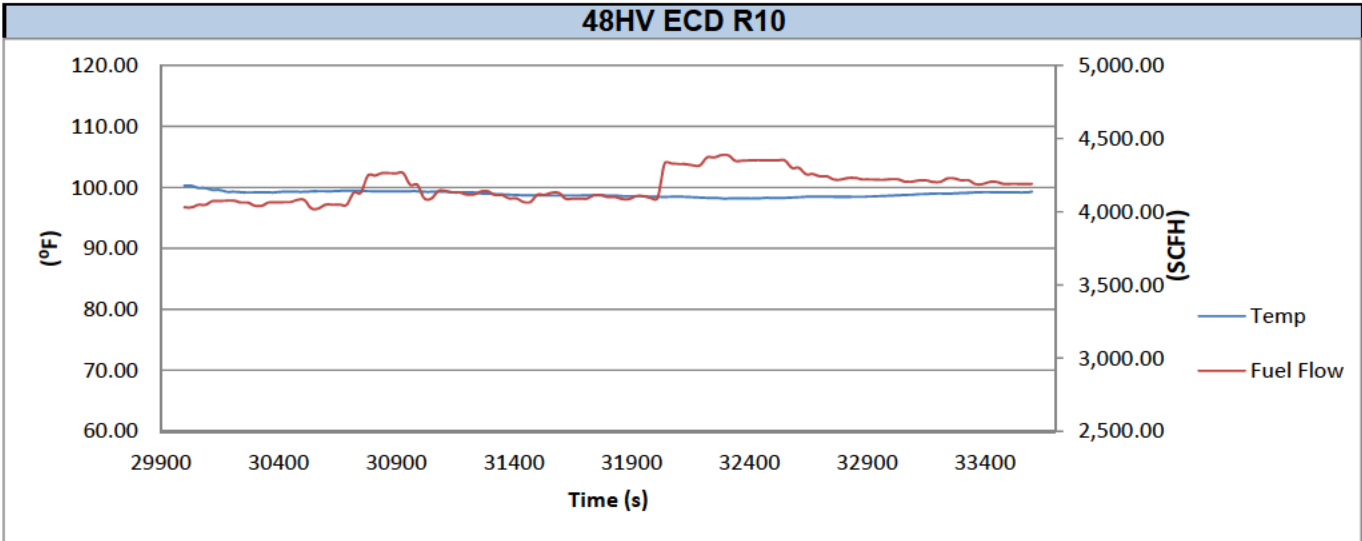
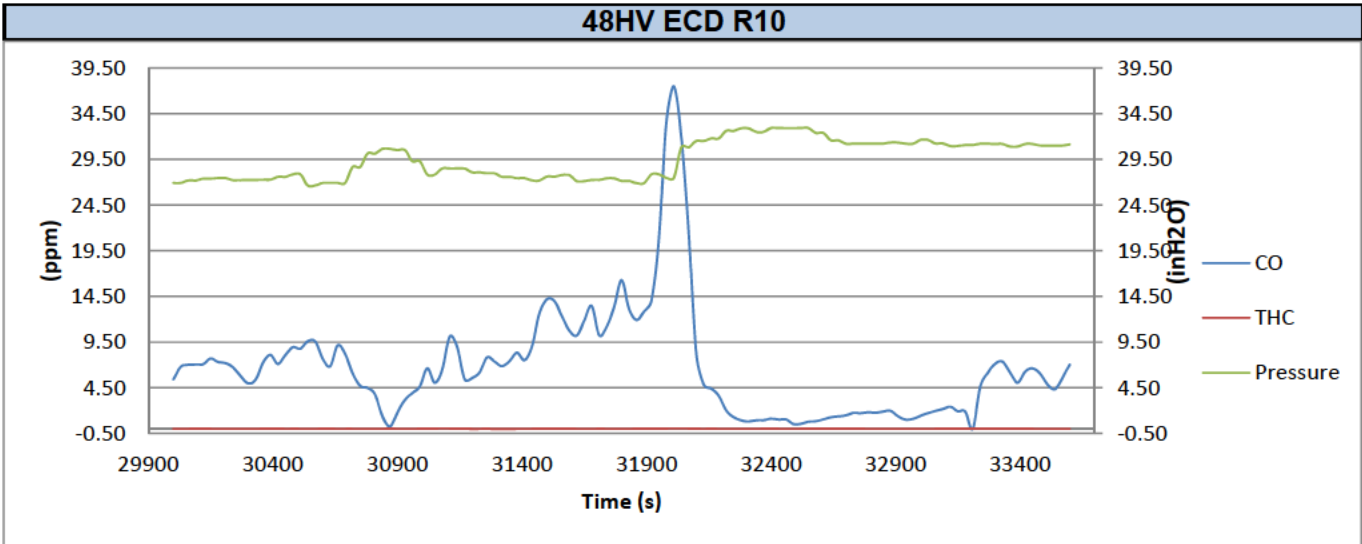
Barometric Pressure	30.29	in. Hg
Relative Humidity	34	%
Ambient Temperature	67	° F
Specific Humidity	0.004694	lb H ₂ O / lb air

90-100 Load, Run - 48HV ECD R12

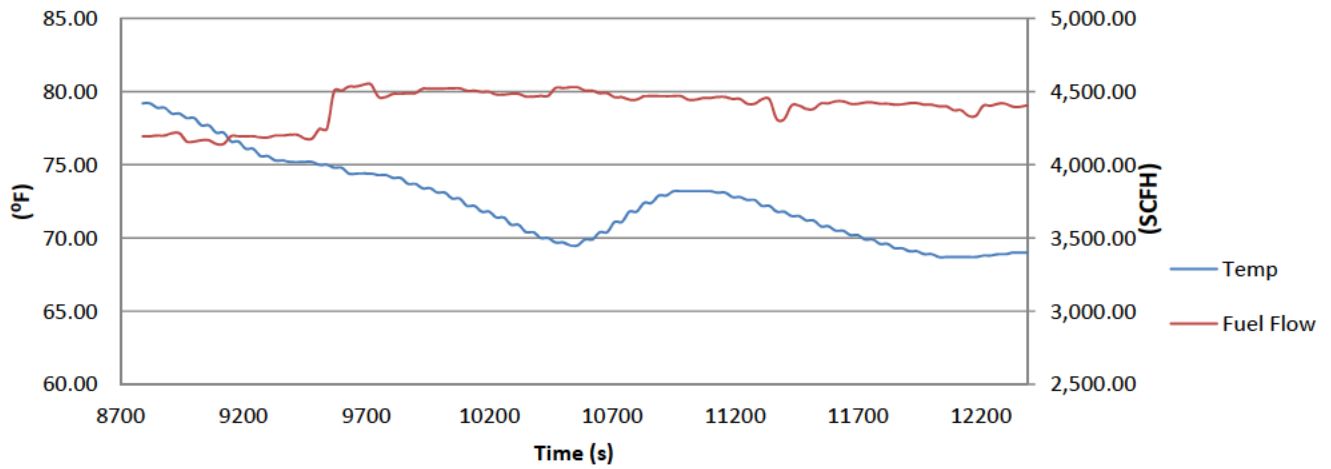
Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmvd)	THC (ppmvw)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
05/14/14 14:39:24	16590	14.04	0.63	0.02	4.98	35.15	77.00	4,395.00
05/14/14 14:39:54	16620	14.28	1.42	0.02	4.79	35.15	77.00	4,395.00
05/14/14 14:40:24	16650	14.36	2.24	0.04	4.72	41.02	77.30	4,390.00
05/14/14 14:40:54	16680	14.11	2.05	0.04	4.92	41.02	77.30	4,390.00
05/14/14 14:41:24	16710	14.14	1.80	0.02	4.90	34.96	77.60	4,363.00
05/14/14 14:41:54	16740	14.00	2.15	0.02	5.00	34.96	77.60	4,363.00
05/14/14 14:42:24	16770	14.19	2.23	0.05	4.85	40.44	78.00	4,391.00
05/14/14 14:42:54	16800	14.22	2.90	0.05	4.84	40.44	78.00	4,391.00
05/14/14 14:43:24	16830	14.01	2.45	0.04	4.99	34.74	78.20	4,368.00
05/14/14 14:43:54	16860	13.99	1.60	0.05	5.04	34.74	78.20	4,368.00
05/14/14 14:44:24	16890	14.14	2.19	0.01	4.92	39.31	78.20	4,378.00
05/14/14 14:44:54	16920	14.20	2.46	0.02	4.89	39.31	78.20	4,378.00
05/14/14 14:45:24	16950	14.20	2.61	0.01	4.88	35.60	77.90	4,368.00
05/14/14 14:45:54	16980	14.23	2.79	0.01	4.86	35.60	77.90	4,368.00
05/14/14 14:46:24	17010	14.50	3.15	0.02	4.67	37.95	77.50	4,358.00
05/14/14 14:46:54	17040	14.06	2.83	0.02	5.05	37.95	77.50	4,358.00
05/14/14 14:47:24	17070	14.31	1.94	0.04	4.91	37.92	77.10	4,385.00
05/14/14 14:47:54	17100	14.09	1.48	0.04	5.02	37.92	77.10	4,385.00
05/14/14 14:48:24	17130	14.07	1.22	0.05	5.01	34.21	76.80	4,327.00
RAW AVERAGE		14.07	1.45	0.03	5.04	36.11	74.96	4,385.38

	Serial Number:	O ₂	CO	THC	CO ₂	Press. Trans	Temp. Trans.	F-Flow Trans.
		(%)	(ppmvd)	(ppmvw)	(%)	(in. H ₂ O)	(°F)	(SCFH)
Bias	Initial Zero	0.24	-0.12	0.02	0.04			
	Final Zero	0.26	0.03	0.01	0.05			
	Avg. Zero	0.25	-0.05	0.02	0.05			
	Initial UpScale	12.11	8.59	2.99	8.68			
	Final UpScale	12.15	9.05	3.01	8.69			
	Avg. UpScale	12.13	8.82	3.00	8.69			
	Upscale Cal Gas	12.20	9.00	3.04	8.56			

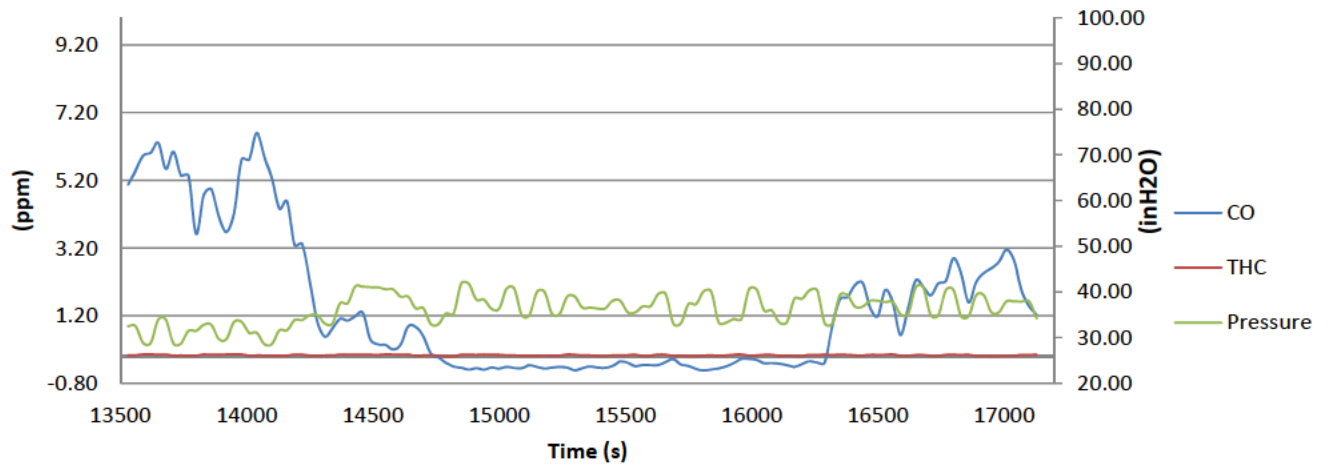
EMISSIONS DATA	O ₂	CO	THC	CO ₂
Corrected Raw Average (ppm/% dry basis)	14.19	1.52	0.02	4.95
Corrected Raw Average (ppm/% wet basis)	13.43	1.44	0.02	4.68
Emission Rate (lb/hr)	N/A	0.03	0.00	N/A



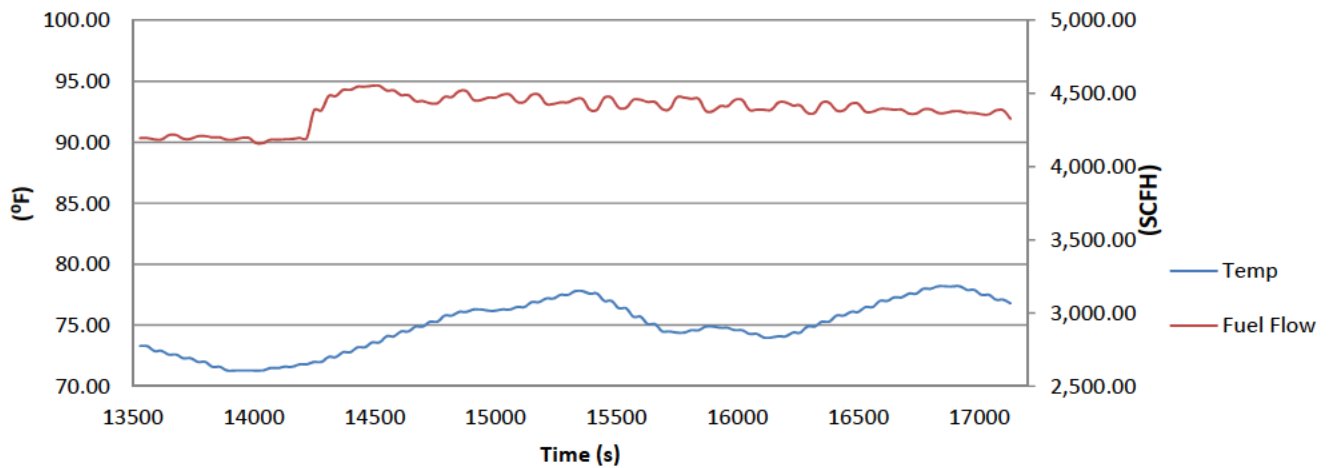
48HV ECD R11



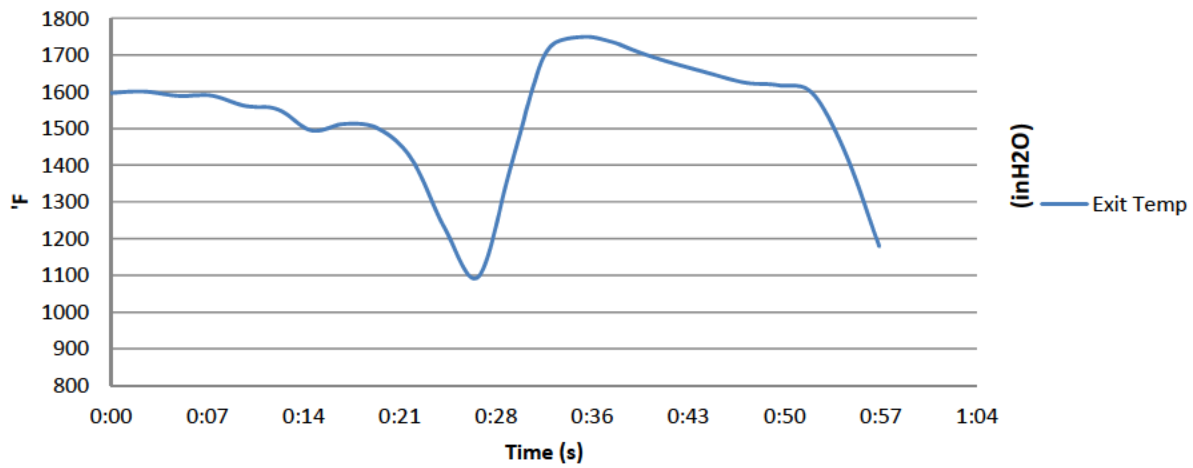
48HV ECD R12



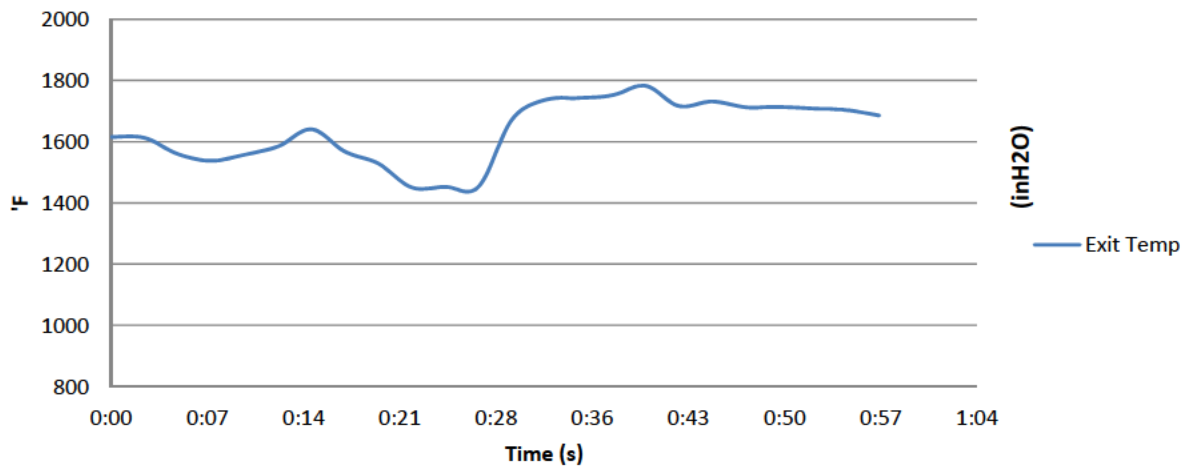
48HV ECD R12



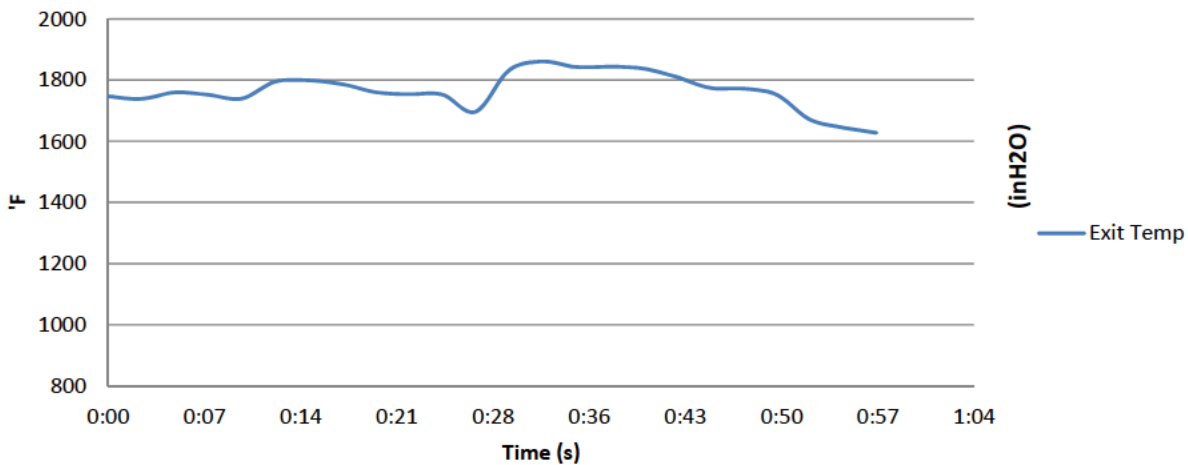
48HV ECD R10



48HV ECD R11



48HV ECD R12



EMISSION DATA RECORDS

Visual Emission Data Record

R1

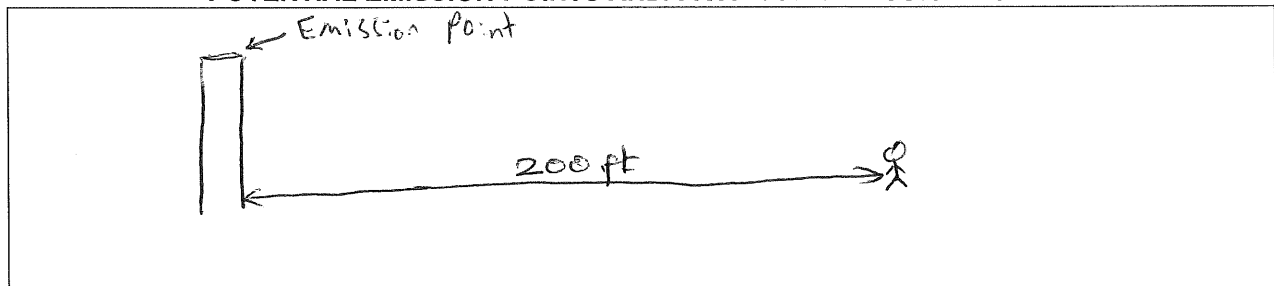
METHOD 22
FUGITIVE OR SMOKE EMISSION
INSPECTION FORM



AIR HYGIENE

COMPANY: Cimaron Energy Inc. LOCATION: Norman Plant COMPANY REP: Tim Chalton	OBSERVER: Ashwin Ravi / Todd Sturgeon AFFILIATION: Air Hygiene Inc. DATE: 5/7/14
SKY CONDITIONS: cloudy PRECIPITATION: none	WIND DIRECTION: SSE WIND SPEED: 20MPH
INDUSTRY: Natural Gas & Oil Industry	PROCESS UNIT: 48HV ECD

SKETCH PROCESS UNIT: INDICATE OBSERVER POSITION RELATIVE TO SOURCE; INDICATE POTENTIAL EMISSION POINTS AND/OR ACTUAL EMISSION POINTS.



OBSERVATIONS

CLOCK TIME	OBSERVATION PERIOD DURATION (MIN:SEC)	ACCUMULATION EMISSION TIME (MIN:SEC)	OBSERVATION LOCATION
13:45	20:00 (AR)	00:00	West of flare
14:05	20:00 (TS)	00:00	↓
14:25	20:00 (AR)	00:00	
14:45			

Pic @ 14:27

SIGNATURE



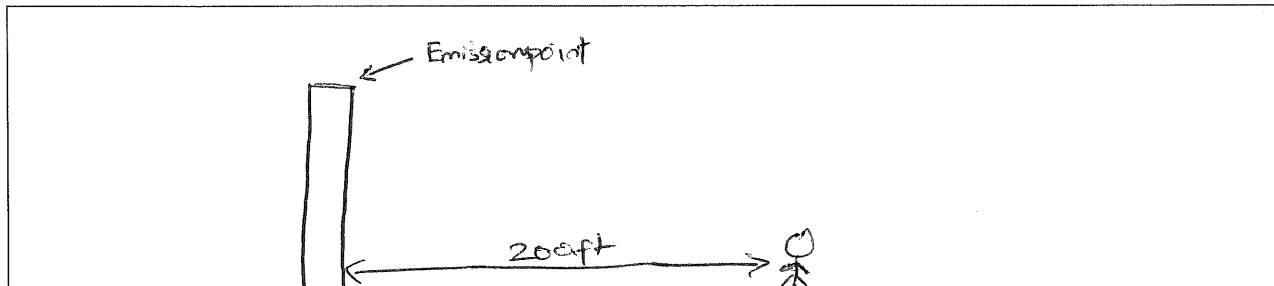
R2

**METHOD 22
FUGITIVE OR SMOKE EMISSION
INSPECTION FORM**

**AIR HYGIENE**

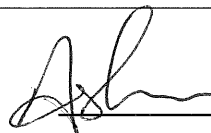
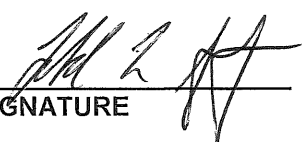
COMPANY: Cimaron Energy Inc. LOCATION: Norman Plant COMPANY REP: Tim Chalton	OBSERVER: Ashwin Ravi / Todd Sturgeon AFFILIATION: Air Hygiene Inc. DATE: 5/7/14.
SKY CONDITIONS: cloudy/clear PRECIPITATION: none	WIND DIRECTION: 16 MPH / SSE WIND SPEED:
INDUSTRY: Natural Gas & Oil Industry	PROCESS UNIT: 48 HVECD

SKETCH PROCESS UNIT: INDICATE OBSERVER POSITION RELATIVE TO SOURCE; INDICATE POTENTIAL EMISSION POINTS AND/OR ACTUAL EMISSION POINTS.

**OBSERVATIONS**

CLOCK TIME	OBSERVATION PERIOD DURATION (MIN:SEC)	ACCUMULATION EMISSION TIME (MIN:SEC)	OBSERVATION LOCATION
15:09	20:00 (AR)	00:00	west of flare
15:29	20:00 (TS)	00:00	↓
15:49	20:00 (AR)	00:00	
16:09			

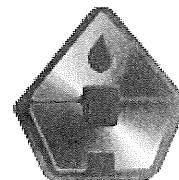
Pic @ 16:00



 SIGNATURE



R3

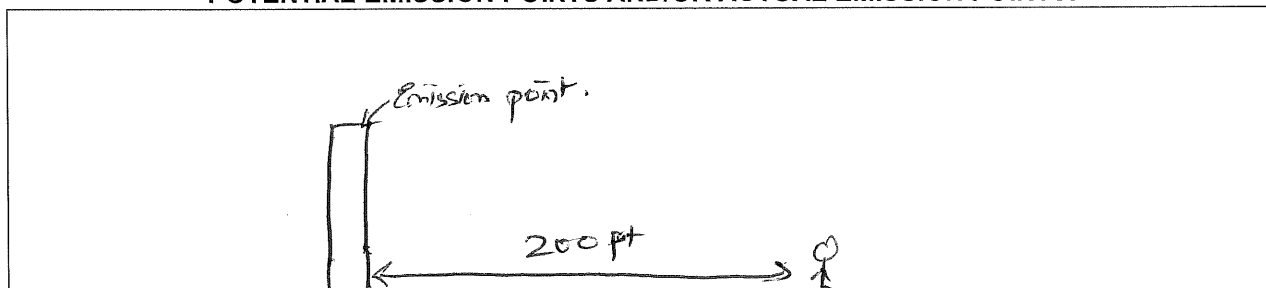
METHOD 22
FUGITIVE OR SMOKE EMISSION
INSPECTION FORM



AIR HYGIENE

COMPANY: Cimaron Energy Inc. LOCATION: Norman Plant COMPANY REP: Tim Chalton	OBSERVER: Ashwin Ravi / Todd Shurgeon AFFILIATION: Air Hygiene Inc. DATE: 5-7-14
SKY CONDITIONS: Cloudy / clear PRECIPITATION: none	WIND DIRECTION: SSE WIND SPEED: 15 MPH
INDUSTRY: Natural Gas & Oil Industry	PROCESS UNIT: 48 HVECD

SKETCH PROCESS UNIT: INDICATE OBSERVER POSITION RELATIVE TO SOURCE; INDICATE POTENTIAL EMISSION POINTS AND/OR ACTUAL EMISSION POINTS.



OBSERVATIONS

CLOCK TIME	OBSERVATION PERIOD DURATION (MIN:SEC)	ACCUMULATION EMISSION TIME (MIN:SEC)	OBSERVATION LOCATION
16:27	20:00 (T.S)	00:00	west of flare
16:47	20:00 (AR)	00:00	↓
16:07	20:00 (T.S)		
17:27			

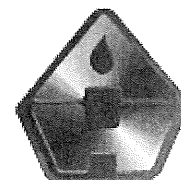
pic @ 17:00

SIGNATURE



R4

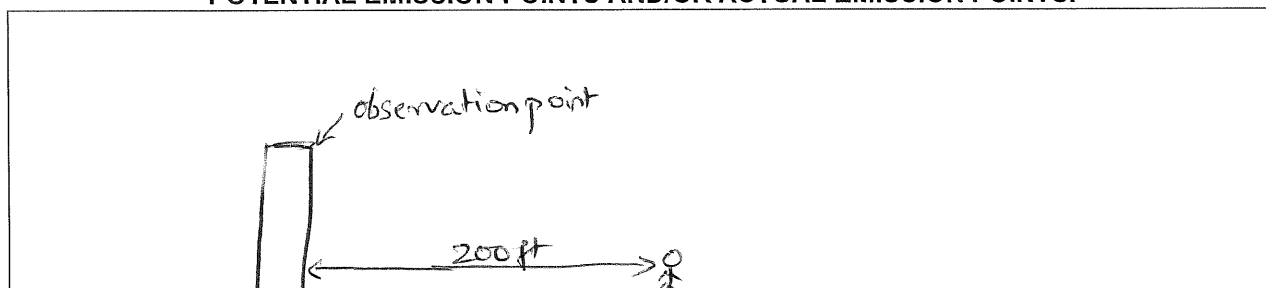
METHOD 22
FUGITIVE OR SMOKE EMISSION
INSPECTION FORM



AIR HYGIENE

COMPANY: Cimaron Energy Inc.	OBSERVER: Ashwin Ravi / Todd Shurgeon
LOCATION: Norman Plant	AFFILIATION: Air Hygiene Inc.
COMPANY REP: Tim Chalton	DATE: 5-8-14
SKY CONDITIONS: Cloudy	WIND DIRECTION: South
PRECIPITATION: none	WIND SPEED: 15 MPH
INDUSTRY: Natural Gas & Oil Industry	PROCESS UNIT: 48HVECD

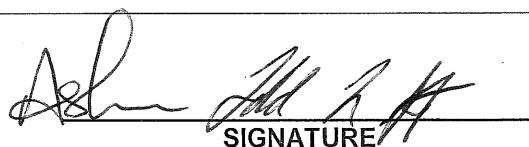
SKETCH PROCESS UNIT: INDICATE OBSERVER POSITION RELATIVE TO SOURCE; INDICATE POTENTIAL EMISSION POINTS AND/OR ACTUAL EMISSION POINTS.



OBSERVATIONS

CLOCK TIME	OBSERVATION PERIOD DURATION (MIN:SEC)	ACCUMULATION EMISSION TIME (MIN:SEC)	OBSERVATION LOCATION
13:46	20:00 (AR)	00:00	West of plane
14:06	20:00 (T.S)	00:00	↓
14:26	20:00 (AR)	00:00	
14:46			

Pic@ 14:25


 SIGNATURE



METHOD 22

FUGITIVE OR SMOKE EMISSION INSPECTION FORM



SKETCH PROCESS UNIT: INDICATE OBSERVER POSITION RELATIVE TO SOURCE; INDICATE POTENTIAL EMISSION POINTS AND/OR ACTUAL EMISSION POINTS.



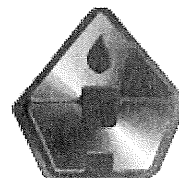
pc @ 15:30

 
SIGNATURE



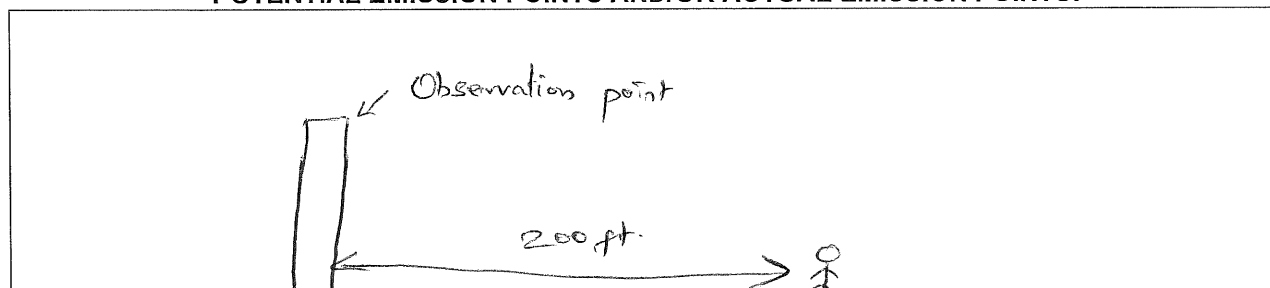
R 6

**METHOD 22
FUGITIVE OR SMOKE EMISSION
INSPECTION FORM**

**AIR HYGIENE**

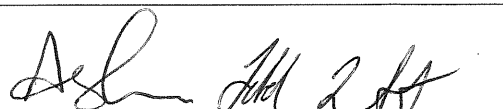
COMPANY: Cimaron Energy Inc. LOCATION: Norman Plant COMPANY REP: Tim Chalton	OBSERVER: Ashwin Ravi / Todd Styer AFFILIATION: Air Hygiene Inc. DATE: 5-8-14
SKY CONDITIONS: Cloudy PRECIPITATION: none	WIND DIRECTION: South WIND SPEED: 12 MPH
INDUSTRY: Natural Gas & Oil Industry	PROCESS UNIT: 48HVECD

SKETCH PROCESS UNIT: INDICATE OBSERVER POSITION RELATIVE TO SOURCE; INDICATE POTENTIAL EMISSION POINTS AND/OR ACTUAL EMISSION POINTS.

**OBSERVATIONS**

CLOCK TIME	OBSERVATION PERIOD DURATION (MIN:SEC)	ACCUMULATION EMISSION TIME (MIN:SEC)	OBSERVATION LOCATION
16:25	20:00 (AR)	00:00	West of flare
16:45	20:00 (TS)	00:00	↓
17:05	20:00 (AR)	00:00	
17:25			

pic @ 17:00


 SIGNATURE



METHOD 22 FUGITIVE OR SMOKE EMISSION INSPECTION FORM



SKETCH PROCESS UNIT: INDICATE OBSERVER POSITION RELATIVE TO SOURCE; INDICATE POTENTIAL EMISSION POINTS AND/OR ACTUAL EMISSION POINTS.

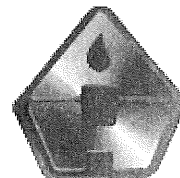



SIGNATURE



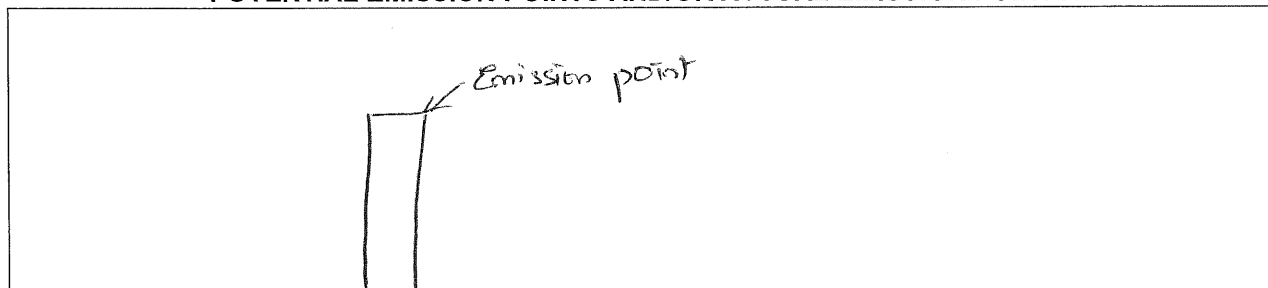
R 8

**METHOD 22
FUGITIVE OR SMOKE EMISSION
INSPECTION FORM**

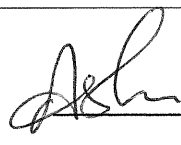
**AIR HYGIENE**

COMPANY: Cimaron Energy Inc.	OBSERVER: Ashwin Ravi / Todd Shyneon
LOCATION: Norman Plant	AFFILIATION: Air Hygiene Inc.
COMPANY REP: Tim Chalton	DATE: 5-9-14
SKY CONDITIONS: cloudy	WIND DIRECTION: NW
PRECIPITATION: none	WIND SPEED: 5
INDUSTRY: Natural Gas & Oil Industry	PROCESS UNIT:

SKETCH PROCESS UNIT: INDICATE OBSERVER POSITION RELATIVE TO SOURCE; INDICATE POTENTIAL EMISSION POINTS AND/OR ACTUAL EMISSION POINTS.

**OBSERVATIONS**

CLOCK TIME	OBSERVATION PERIOD DURATION (MIN:SEC)	ACCUMULATION EMISSION TIME (MIN:SEC)	OBSERVATION LOCATION
11:49	20:00 (TS)	00:00	north of line
12:09	20:00 (AR)	00:00	↓
12:29	20:00 (TS)	00:00	↓
12:49			



 SIGNATURE



**METHOD 22
FUGITIVE OR SMOKE EMISSION
INSPECTION FORM**



AIR HYGIENE

COMPANY: Cimaron Energy Inc. LOCATION: Norman Plant COMPANY REP: Tim Chalton	OBSERVER: Ashwin / Todd AFFILIATION: Air Hygiene Inc. DATE: 5-8-2014
SKY CONDITIONS: clear PRECIPITATION: none	WIND DIRECTION: NW WIND SPEED: 5 MPH
INDUSTRY: Natural Gas & Oil Industry	PROCESS UNIT:

SKETCH PROCESS UNIT: INDICATE OBSERVER POSITION RELATIVE TO SOURCE; INDICATE
POTENTIAL EMISSION POINTS AND/OR ACTUAL EMISSION POINTS.



A hand-drawn diagram of a vertical rectangular column. An arrow points to the top edge of the column, labeled "Emission point".

OBSERVATIONS

[illegible]

 
SIGNATURE



METHOD 22 FUGITIVE OR SMOKE EMISSION INSPECTION FORM



SKETCH PROCESS UNIT: INDICATE OBSERVER POSITION RELATIVE TO SOURCE; INDICATE POTENTIAL EMISSION POINTS AND/OR ACTUAL EMISSION POINTS.



 
SIGNATURE



R11

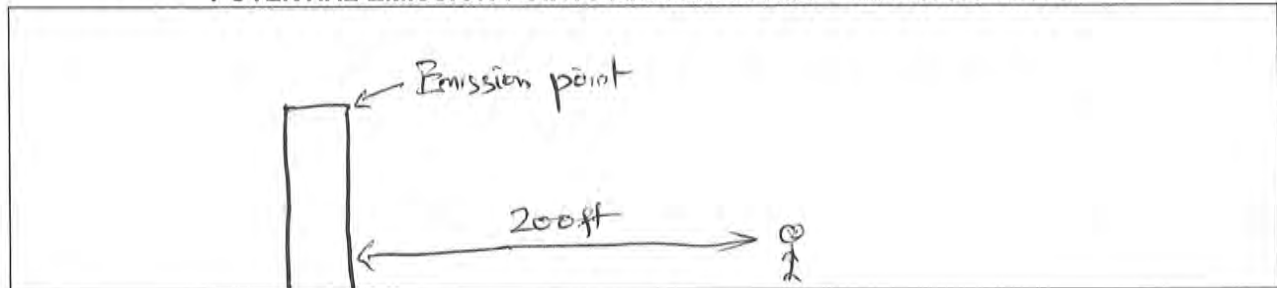
METHOD 22
FUGITIVE OR SMOKE EMISSION
INSPECTION FORM



AIR HYGIENE

COMPANY: Cimaron Energy Inc.	OBSERVER: Ashwin / Todd
LOCATION: Norman Plant	AFFILIATION: Air Hygiene Inc.
COMPANY REP: Tim Chalton	DATE: 5-14-14
SKY CONDITIONS: Cloudy	WIND DIRECTION: N
PRECIPITATION: none	WIND SPEED: 16 MPH
INDUSTRY: Natural Gas & Oil Industry	PROCESS UNIT: 48 BCD

SKETCH PROCESS UNIT: INDICATE OBSERVER POSITION RELATIVE TO SOURCE; INDICATE POTENTIAL EMISSION POINTS AND/OR ACTUAL EMISSION POINTS.



OBSERVATIONS

CLOCK TIME	OBSERVATION PERIOD DURATION (MIN:SEC)	ACCUMULATION EMISSION TIME (MIN:SEC)	OBSERVATION LOCATION
12:29	20:00 (AR)		north of plant
12:49	20:00 (TS)		↓
13:09	20:00 (AR)		
13:29			

pic @ 12:49

Ashwin / Todd
SIGNATURE



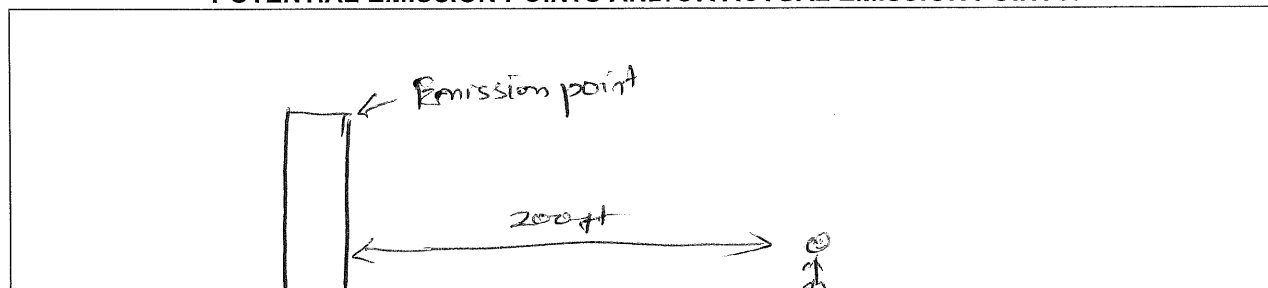
R12

**METHOD 22
FUGITIVE OR SMOKE EMISSION
INSPECTION FORM**

**AIR HYGIENE**

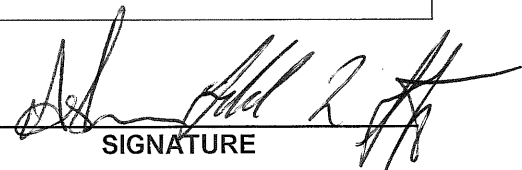
COMPANY: Cimaron Energy Inc.	OBSERVER: Ashwin / Todd
LOCATION: Norman Plant	AFFILIATION: Air Hygiene Inc.
COMPANY REP: Tim Chalton	DATE: 5-14-14
SKY CONDITIONS: Cloudy	WIND DIRECTION: NW
PRECIPITATION: none	WIND SPEED: 13 MPH
INDUSTRY: Natural Gas & Oil Industry	PROCESS UNIT: 48 BCD

SKETCH PROCESS UNIT: INDICATE OBSERVER POSITION RELATIVE TO SOURCE; INDICATE POTENTIAL EMISSION POINTS AND/OR ACTUAL EMISSION POINTS.

**OBSERVATIONS**

CLOCK TIME	OBSERVATION PERIOD DURATION (MIN:SEC)	ACCUMULATION EMISSION TIME (MIN:SEC)	OBSERVATION LOCATION
13:48	20:00 (TS)		north of flares
14:08	20:00 (AR)		↓
14:28	20:00 (TS)		
14:48			

pic @ 14:08


 SIGNATURE



APPENDIX C

CALIBRATION GAS CERTIFICATIONS



Assay Laboratory: Red Ball TGS
609 North Market St.
Shreveport, LA 71107
800-551-8150

CERTIFICATE OF ANALYSIS (Zero Ambient Nitrogen)

Cylinder Number:
Product ID Number:
Cylinder Pressure:
Standard Cubic Feet
CGA

EB0055330
121026
2015 PSI
140
580

Certification Date:
Expiration Date:
MFG Facility:
Lot Number:
Tracking Number:

3/12/2014
3/13/2019
RBTGS - SHREVEPORT
ML1403120954
074328253

Do Not Use This Cylinder Below 150 psig (1.0 Megapascal).

Composing Material: Zero Ambient Nitrogen 152SZ

Component	Specifications	Concentration
Nitrogen		Balance
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
Oxygen as Impurity	1.0 PPM	<1.0 PPM
Sulfur Dioxide as Impurity	0.1 PPM	<0.1 PPM
Total Hydrocarbons as Impurity	0.1 PPM	<0.1 PPM

This material has a recommended shelf life of **five years**

The above mixture is certified in Mole % to be within +/- 2% of the actual number reported relative to each component.

It is recommended that this mixture not be used below **150 PSIG**

This calibration mixture was manufactured by scale; weights traceable to N.I.S.T.

Certificate: #822/266926-02

Fred Holt, CHMM
Quality Control

Red Ball Technical Gas Service
Information and Ordering
800-551-8150
Fax (318-425-6309)



Air Liquide America
Specialty Gases LLC



RATA CLASS

Dual-Analyzed Calibration Standard

11426 FAIRMONT PKWY, LA PORTE, TX 77571

Phone: 800-248-1427

Fax: 281-474-8419

CERTIFICATE OF ACCURACY: Interference Free Multi-Component EPA Protocol Gas

Assay Laboratory - PGVP Vendor ID: A32012

AIR LIQUIDE AMERICA SPECIALTY GASES LLC
11426 FAIRMONT PKWY
LA PORTE, TX 77571

P.O. No.:
Document # : 45457634-001
Folio #: AH073

Customer
AIR HYGIENE

MIKE SCOTT
1600 WEST TACOMA ST
BROKEN ARROW OK 74012
US

ANALYTICAL INFORMATION Gas Type : CO,NO,BALN

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards;
Procedure G-1; September, 1997.

Cylinder Number: CC75555 Certification Date: 27Mar2012 Exp. Date: 29Mar2015
Cylinder Pressure***: 1950 PSIG Batch No: LAP0061243

COMPONENT	CERTIFIED CONCENTRATION (Moles)		ACCURACY**	TRACEABILITY
NITRIC OXIDE	18.4	PPM	+/- 1%	Direct NIST and VSL
CARBON MONOXIDE	17.3	PPM	+/- 1%	
NITROGEN - OXYGEN FREE		BALANCE		
TOTAL OXIDES OF NITROGEN	18.5	PPM		Reference Value Only

*** Do not use when cylinder pressure is below 150 psig.

** Analytical accuracy is based on the requirements of EPA Protocol Procedure G1, September 1997.

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 2629	15Aug2013	KAL003017	19.83 PPM	NITRIC OXIDE
NTRM 2635	01Jun2016	AAL073309	25.54 PPM	CARBON MONOXIDE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
NOX ANALYZER/400-CLD/7M07001	08Mar2012	CHEMI
FTIR/000929060	08Mar2012	FTIR

ANALYZER READINGS

(Z = Zero Gas R = Reference Gas T = Test Gas r = Correlation Coefficient)

First Triad Analysis

NITRIC OXIDE

Date: 21Mar2012 Response Unit: PPM
Z1 = 0.00000 R1 = 19.55000 T1 = 18.10000
R2 = 19.55000 Z2 = 0.00000 T2 = 18.10000
Z3 = 0.00000 T3 = 18.15000 R3 = 19.50000
Avg. Concentration: 18.39 PPM

Second Triad Analysis

Date: 28Mar2012 Response Unit: PPM
Z1 = 0.00000 R1 = 19.75000 T1 = 18.25000
R2 = 19.60000 Z2 = 0.00000 T2 = 18.12000
Z3 = 0.00000 T3 = 18.12000 R3 = 19.55000
Avg. Concentration: 18.34 PPM

Calibration Curve

Concentration = A + Bx + Cx2 + Dx3 + Ex4
r = 0.9999927
Constants: A = 0.043392918
B = 1.016595028 C =
D = E =

CARBON MONOXIDE

Date: 20Mar2012 Response Unit: PPM
Z1 = -0.00994 R1 = 25.52915 T1 = 17.22629
R2 = 25.59899 Z2 = -0.00458 T2 = 17.28559
Z3 = -0.00378 T3 = 17.29797 R3 = 25.61528
Avg. Concentration: 17.24 PPM

Date: 27Mar2012 Response Unit: PPM
Z1 = -0.00936 R1 = 25.54199 T1 = 17.30803
R2 = 25.56195 Z2 = 0.00050 T2 = 17.30976
Z3 = 0.01579 T3 = 17.33766 R3 = 25.57913
Avg. Concentration: 17.30 PPM

Concentration = A + Bx + Cx2 + Dx3 + Ex4
r = 9.99995E-1
Constants: A = -9.34270E+2
B = 1.76177E+0 C = 0.00000E+0
D = 0.00000E+0 E = 0.00000E+0

Special Notes:

AH073 LIST ITEM AH073 ON CERTS ANG TAGS CGA 660; DEW PT. 40 DEG.F.
The expiration date has been extended without re-assay per EPA 600/R23-23/542.

APPROVED BY:

RON STITT



Air Liquide America
Specialty Gases LLC



RATA CLASS

Guaranteed +/- 1% Accuracy

1290 COMBERMERE STREET, TROY, MI 48083

Phone: 248-589-2950

Fax: 248-589-2134

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory - PGVP Vendor ID: A22013

AIR LIQUIDE AMERICA SPECIALTY GASES LLC
1290 COMBERMERE STREET
TROY, MI 48083

Document #: 51330940-001
P.O. No.:
Folio #: AH071

Customer

AIR HYGIENE
MIKE SCOTT
1600 WEST TACOMA ST
BROKEN ARROW OK 74012
US

ANALYTICAL INFORMATION Gas Type : CO,NO,BALN

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure G-1. EPA/600/R-12/531; May 2012. Do not use this standard if pressure is less than 100 psig.

Cylinder Number: AAL8247 Certification Date: 16Jul2013 Exp. Date: 17Jul2016
Cylinder Pressure: 1950 PSIG Batch No: TRO0087292

COMPONENT	CERTIFIED CONCENTRATION (Moles)		ACCURACY (ABSOLUTE / RELATIVE)			
NITRIC OXIDE	9.15	PPM	0.1	PPM	/	1.2 %
CARBON MONOXIDE	9.00	PPM	0.08	PPM	/	0.7 %
NITROGEN - OXYGEN FREE		BALANCE				
TOTAL OXIDES OF NITROGEN	9.16	PPM	Reference Value Only			

TRACEABILITY

REFERENCE STANDARD	CONCENTRATION	UNCERTAINTY	CYLINDER	TYPE/SRM SAMPLE	EXP. DATE
COMPONENT					
NITRIC OXIDE	20.34 PPM	0.250 PPM	KAL004232	NTRM 2629	31May2016
CARBON MONOXIDE	25.54 PPM	0.180 PPM	AAL073274	NTRM 2635	01Jun2016

ANALYTICAL METHOD

COMPONENT	INSTRUMENT	1st Analysis: 09Jul2013		ANALYTICAL/PRINCIPLE	CALIBRATED	CONCENTRATION
NITRIC OXIDE	CAI/600/X11041			CHEMI	12Jul2013	9.150 PPM
CARBON MONOXIDE	MKS/2030/0928621			FOURIER-TRANSFORM IR	03Jul2013	9.000 PPM

COMPONENT	INSTRUMENT	2nd Analysis: 16Jul2013		ANALYTICAL/PRINCIPLE	CALIBRATED	CONCENTRATION
NITRIC OXIDE	CAI/600/X11041			CHEMI	12Jul2013	9.150 PPM

Special Notes:

AH071 LIST ITEM AH071 ON CERTS AND TAGS

APPROVED BY:

HILARY HATCHER



Air Liquide America
Specialty Gases LLC



RATA CLASS

Dual-Analyzed Calibration Standard

1290 COMBERMERE STREET, TROY, MI 48083

Phone: 248-589-2950

Fax: 248-589-2134

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory - PGVP Vendor ID: A22012

P.O. No.: 48529652

Document #: 48529652-003

AIR LIQUIDE AMERICA SPECIALTY GASES LLC
1290 COMBERMERE STREET
TROY, MI 48083

Customer
AIR HYGIENE

MAX CORBIN
1600 W TACOMA
BROKEN ARROW OK 74012
US

ANALYTICAL INFORMATION Gas Type : NONE

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure G-1; September, 1997.

Cylinder Number: ALM030515

Certification Date: 19Nov2012

Exp. Date: 20Nov2020

Cylinder Pressure***: 2000 PSIG

Batch No: TRO0070121

COMPONENT
PROPANE
AIR

CERTIFIED CONCENTRATION (Moles)
5.04 PPM
BALANCE

ACCURACY**
+/- 1%

TRACEABILITY
Direct NIST and VSL

*** Do not use when cylinder pressure is below 150 psig.

** Analytical accuracy is based on the requirements of EPA Protocol Procedure G1, September 1997.

REFERENCE STANDARD

TYPE/SRM NO.
NTRM 1668

EXPIRATION DATE
12Jul2018

CYLINDER NUMBER
ALM038653

CONCENTRATION
98.80 PPM

COMPONENT
PROPANE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#
VARIAN/3400/7506

DATE LAST CALIBRATED
01Nov2012

ANALYTICAL PRINCIPLE
TCD/FID

ANALYZER READINGS

(Z = Zero Gas R = Reference Gas T = Test Gas r = Correlation Coefficient)

First Triad Analysis

Second Triad Analysis

Calibration Curve

PROPANE

Date: 19Nov2012 Response Unit: AREA
Z1=0.00000 R1=2561613. T1=129917.0
R2=2563611. Z2=0.00000 T2=129951.0
Z3=0.00000 T3=130132.0 R3=2564288.
Avg. Concentration: 5.040 PPM

Concentration = A + Bx + Cx² + Dx³ + Ex⁴
r = 0.999998155
Constants: A = -0.0106566
B = 3.80809E-05 C = 0
D = 0 E = 0

APPROVED BY:

ROBERT LESCHIAK



Air Liquide America
Specialty Gases LLC



RATA CLASS

Dual-Analyzed Calibration Standard

1290 COMBERMERE STREET, TROY, MI 48083

Phone: 248-589-2950

Fax: 248-589-2134

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory - PGVP Vendor ID: A22012

P.O. No.: 48529652

Document #: 48529652-004

AIR LIQUIDE AMERICA SPECIALTY GASES LLC
1290 COMBERMERE STREET
TROY, MI 48083

Customer
AIR HYGIENE

MAX CORBIN
1600 W TACOMA
BROKEN ARROW OK 74012
US

ANALYTICAL INFORMATION Gas Type : NONE

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure G-1; September, 1997.

Cylinder Number: ALM066309

Certification Date: 19Nov2012

Exp. Date: 20Nov2020

Cylinder Pressure***: 2000 PSIG

Batch No: TRO0070134

COMPONENT
PROPANE
AIR

CERTIFIED CONCENTRATION (Moles)
3.04 PPM
BALANCE

ACCURACY**
+/- 1%

TRACEABILITY
Direct NIST and VSL

*** Do not use when cylinder pressure is below 150 psig.

** Analytical accuracy is based on the requirements of EPA Protocol Procedure G1, September 1997.

REFERENCE STANDARD

TYPE/SRM NO.

EXPIRATION DATE

CYLINDER NUMBER

CONCENTRATION

COMPONENT

NTRM 1668

12Jul2018

ALM038653

98.80 PPM

PROPANE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#

DATE LAST CALIBRATED

ANALYTICAL PRINCIPLE

VARIAN/3400/7506

01Nov2012

TCD/FID

ANALYZER READINGS

(Z = Zero Gas R = Reference Gas T = Test Gas r = Correlation Coefficient)

First Triad Analysis

Second Triad Analysis

Calibration Curve

PROPANE

Date: 19Nov2012 Response Unit: AREA
Z1=0.00000 R1=2561613. T1=78649.00
R2=2563611. Z2=0.00000 T2=78557.00
Z3=0.00000 T3=78234.00 R3=2564288.
Avg. Concentration: 3.040 PPM

Concentration = A + Bx + Cx² + Dx³ + Ex⁴
r = 0.999998155
Constants: A = -0.0106566
B = 3.80809E-05 C = 0
D = 0 E = 0

APPROVED BY:

ROBERT LESNIAK



Air Liquide America
Specialty Gases LLC



RATA CLASS

Dual-Analyzed Calibration Standard

1290 COMBERMERE STREET, TROY, MI 48083

Phone: 248-589-2950

Fax: 248-589-2134

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory - PGVP Vendor ID: A22012

P.O. No.: 48529652

Document #: 48529652-002

AIR LIQUIDE AMERICA SPECIALTY GASES LLC
1290 COMBERMERE STREET
TROY, MI 48083

Customer
AIR HYGIENE

MAX CORBIN
1600 W TACOMA
BROKEN ARROW OK 74012
US

ANALYTICAL INFORMATION Gas Type : NONE

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure G-1; September, 1997.

Cylinder Number: ALM035126
Cylinder Pressure***: 1950 PSIG

Certification Date: 19Nov2012

Exp. Date: 20Nov2020
Batch No: TRO0069975

COMPONENT
PROPANE
AIR

CERTIFIED CONCENTRATION (Moles)
8.48 PPM
BALANCE

ACCURACY**
+/- 1%

TRACEABILITY
Direct NIST and VSL

*** Do not use when cylinder pressure is below 150 psig.

** Analytical accuracy is based on the requirements of EPA Protocol Procedure G1, September 1997.

REFERENCE STANDARD

TYPE/SRM NO.
NTRM 1668

EXPIRATION DATE
12Jul2018

CYLINDER NUMBER
ALM038653

CONCENTRATION
98.80 PPM

COMPONENT
PROPANE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#
VARIAN/3400/7506

DATE LAST CALIBRATED
01Nov2012

ANALYTICAL PRINCIPLE
TCD/FID

ANALYZER READINGS

(Z = Zero Gas R = Reference Gas T = Test Gas r = Correlation Coefficient)

First Triad Analysis

Second Triad Analysis

Calibration Curve

PROPANE

Date: 19Nov2012 Response Unit: AREA
Z1=0.00000 R1=2561613. T1=218575.0
R2=2563611. Z2=0.00000 T2=218288.0
Z3=0.00000 T3=218534.0 R3=2564288.
Avg. Concentration: 8.480 PPM

Concentration = A + Bx + Cx² + Dx³ + Ex⁴
r = 0.999998155
Constants: A = -0.0106566
B = 3.80809E-05 C = 0
D = 0 E = 0

APPROVED BY:

ROBERT LESMAK



Air Liquide America
Specialty Gases LLC



RATA CLASS

Guaranteed +/- 1% Accuracy

1290 COMBERMERE STREET, TROY, MI 48083

Phone: 248-589-2950

Fax: 248-589-2134

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory - PGVP Vendor ID: A22013

AIR LIQUIDE AMERICA SPECIALTY GASES LLC
1290 COMBERMERE STREET
TROY, MI 48083

P.O. No.:
Document # : 51591960-002
Folio #: AH095

Customer

AIR HYGIENE
MIKE SCOTT
1600 WEST TACOMA ST
BROKEN ARROW OK 74012
US

ANALYTICAL INFORMATION Gas Type : CO₂, O₂, BALN

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure G-1. EPA/600/R-12/531; May 2012. Do not use this standard if pressure is less than 100 psig.

Cylinder Number: CC52566 Certification Date: 08Aug2013 Exp. Date: 09Aug2021
Cylinder Pressure: 2000 PSIG Batch No: TRO0089432

COMPONENT	CERTIFIED CONCENTRATION (Moles)		ACCURACY (ABSOLUTE / RELATIVE)			
OXYGEN	21.1	%	0.1	%	/	0.4 %
CARBON DIOXIDE	18.6	%	0.1	%	/	0.4 %
NITROGEN	BALANCE					

TRACEABILITY

REFERENCE STANDARD

COMPONENT	CONCENTRATION	UNCERTAINTY	CYLINDER	TYPE/SRM SAMPLE	EXP. DATE
OXYGEN	23.2000 %	0.0900 %	K024582	NTRM 2350	04Jan2018
CARBON DIOXIDE	23.0400 %	0.1200 %	K026052	NTRM 2300	17Aug2016

ANALYTICAL METHOD

1st Analysis: 08Aug2013

COMPONENT	INSTRUMENT	ANALYTICAL/PRINCIPLE	CALIBRATED	CONCENTRATION
OXYGEN	CAI/110P/V03018	PARAMAGNETIC	29Jul2013	21.10 %
CARBON DIOXIDE	PIR/2000/609015	NDIR	05Aug2013	18.60 %

Special Notes:

AH095 LIST ITEM AH095 ON CERTS AND TAGS

APPROVED BY:

JEFF CROTEAU



Air Liquide America
Specialty Gases LLC



RATA CLASS

Guaranteed +/- 1% Accuracy

1290 COMBERMERE STREET, TROY, MI 48083

Phone: 248-589-2950

Fax: 248-589-2134

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory - PGVP Vendor ID: A22014

AIR LIQUIDE AMERICA SPECIALTY GASES LLC
1290 COMBERMERE STREET
TROY, MI 48083

P.O. No.:
Document #: 53764325-005
Folio #: AH094

Customer

AIR HYGIENE
MIKE SCOTT
1600 WEST TACOMA ST
BROKEN ARROW OK 74012
US

ANALYTICAL INFORMATION Gas Type : CO₂, O₂, BALN

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure G-1. EPA/600/R-12/531; May 2012. Do not use this standard if pressure is less than 100 psig.

Cylinder Number: CC203132 Certification Date: 07Feb2014 Exp. Date: 08Feb2022
Cylinder Pressure: 2000 PSIG Batch No: TRO0102472

COMPONENT	CERTIFIED CONCENTRATION (Moles)		ACCURACY (ABSOLUTE / RELATIVE)			
OXYGEN	12.2	%	0.05	%	/	0.4 %
CARBON DIOXIDE	8.56	%	0.06	%	/	0.7 %
NITROGEN	BALANCE					

TRACEABILITY

REFERENCE STANDARD

COMPONENT	CONCENTRATION		UNCERTAINTY		CYLINDER	TYPE/SRM SAMPLE	EXP. DATE
OXYGEN	23.2000	%	0.0900	%	K024582	NTRM 2350	04Jan2018
CARBON DIOXIDE	13.9400	%	0.0800	%	K012342	NTRM 1675	05Jan2018

ANALYTICAL METHOD

1st Analysis: 07Feb2014

COMPONENT	INSTRUMENT	ANALYTICAL/PRINCIPLE	CALIBRATED	CONCENTRATION
OXYGEN	CAI/110P/V03018	PARAMAGNETIC	30Jan2014	12.20 %
CARBON DIOXIDE	PIR/2000/609015	NDIR	16Jan2014	8.560 %

Special Notes: AH094 LIST ITEM AH094 ON CERTS AND TAGS

APPROVED BY:

JEFF CROTEAU

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 five major areas:

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

Each of these areas is discussed individually below.

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.

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.

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COMBUSTION TESTING QUALITY ASSURANCE ACTIVITIES

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. NO₂ to NO conversion was checked via direct connect with an EPA Protocol certified concentration of NO₂ in a balance of 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: May 7-14, 2014
Company: Cimarron Energy, Inc.
Location: Norman, Oklahoma
Techs: MSL/TP/MM

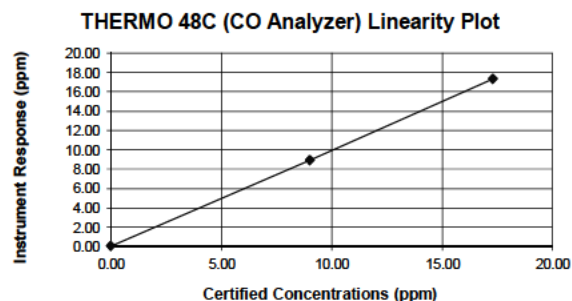
Sample System Leak Check

Date	Sample System	Leak Rate (l/min)
May 7-14, 2014	1	0

Calibration Date: May 7, 2014
Client: CIMARRON ENERGY, INC.

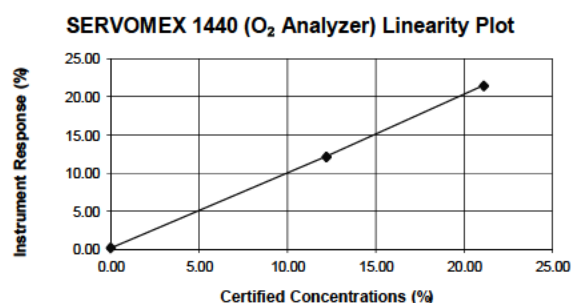
CO Span (ppm) = 17.30

THERMO 48C (CO Analyzer)				
Certified Concentration (ppm)	Instrument Response (ppm)	Calibration Error (%)	Absolute Conc. (ppm)	Pass or Fail ($\pm 2\%$, $\leq 0.5\text{ppm}$)
0.00	0.07	0.40	0.07	YES (%)
9.00	8.94	-0.35	0.06	YES (%)
17.30	17.33	0.17	0.03	YES (%)
Linearity = 1.002				



O₂ Span (%) = 21.10

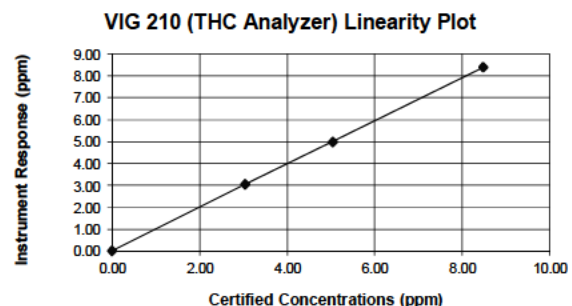
SERVOMEX 1440 (O ₂ Analyzer)				
Certified Concentration (%)	Instrument Response (%)	Calibration Error (%)	Absolute Conc. (%)	Pass or Fail ($\pm 2\%$, $\leq 0.5\%$)
0.00	0.20	0.95	0.20	YES (%)
12.20	12.18	-0.09	0.02	YES (%)
21.10	21.48	1.80	0.38	YES (%)
Linearity = 0.993				



THC Range (ppm) = 10

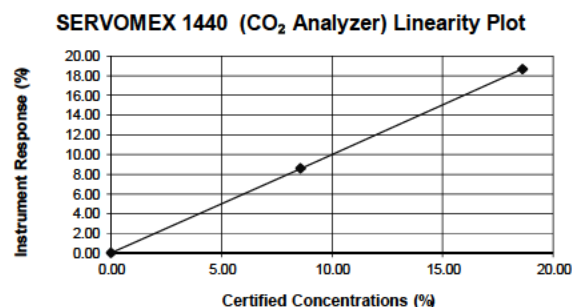
VIG 210 (THC Analyzer)				
Certified Concentration (ppm)	Instrument Response (ppm)	Calibration Error (%)	Estimated Point (ppm)	Pass or Fail ($\pm 2, 5\%$) ¹
0.00	0.03	0.30	N/A	YES
3.04	3.06	0.97	3.03	YES
5.04	5.00	-0.09	5.00	YES
8.48	8.40	-0.80	N/A	YES
Linearity = 1.018				

¹zero/high based on 2% of span, low/mid based on 5% of concentration



CO₂ Span (%) = 18.60

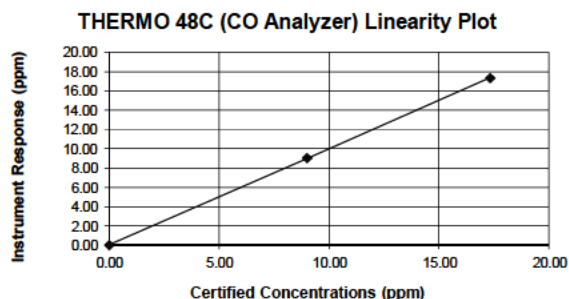
SERVOMEX 1440 (CO ₂ Analyzer)				
Certified Concentration (%)	Instrument Response (%)	Calibration Error (%)	Absolute Conc. (%)	Pass or Fail ($\pm 2\%$, $\leq 0.5\%$)
0.00	0.05	0.27	0.05	YES (%)
8.56	8.55	-0.05	0.01	YES (%)
18.60	18.62	0.11	0.02	YES (%)
Linearity = 1.001				



Calibration Date: May 8, 2014
Client: CIMARRON ENERGY, INC.

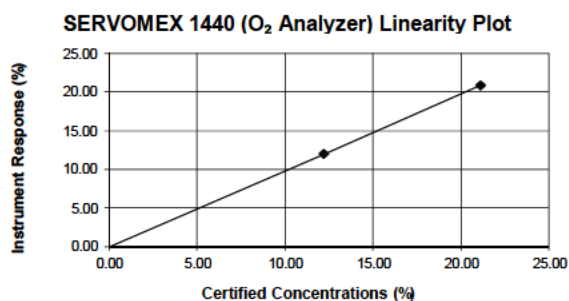
CO Span (ppm) = 17.30

THERMO 48C (CO Analyzer)				
Certified Concentration (ppm)	Instrument Response (ppm)	Calibration Error (%)	Absolute Conc. (ppm)	Pass or Fail ($\pm 2\%$, $\leq 0.5\text{ppm}$)
0.00	0.04	0.23	0.04	YES (%)
9.00	9.02	0.12	0.02	YES (%)
17.30	17.35	0.29	0.05	YES (%)
Linearity = 0.999				



O₂ Span (%) = 21.10

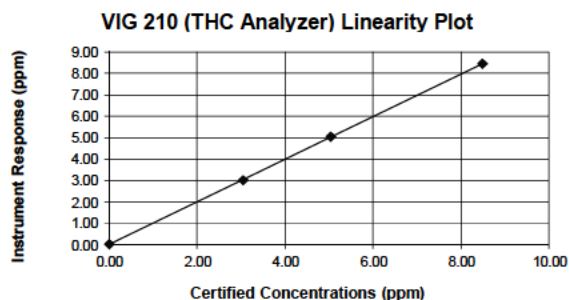
SERVOMEX 1440 (O ₂ Analyzer)				
Certified Concentration (%)	Instrument Response (%)	Calibration Error (%)	Absolute Conc. (%)	Pass or Fail ($\pm 2\%$, $\leq 0.5\%$)
0.00	-0.02	-0.09	0.02	YES (%)
12.20	11.98	-1.04	0.22	YES (%)
21.10	20.88	-1.04	0.22	YES (%)
Linearity = 1.010				



THC Range (ppm) = 10

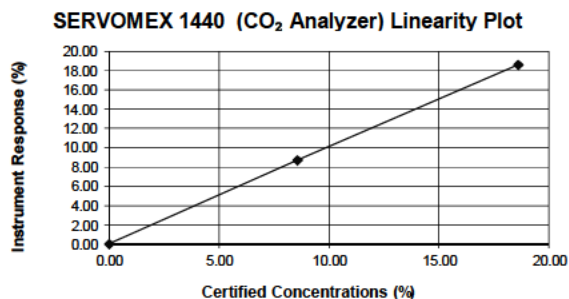
VIG 210 (THC Analyzer)				
Certified Concentration (ppm)	Instrument Response (ppm)	Calibration Error (%)	Estimated Point (ppm)	Pass or Fail ($\pm 2.5\%$) ¹
0.00	0.03	0.30	N/A	YES
3.04	3.02	-0.94	3.05	YES
5.04	5.04	0.11	5.03	YES
8.48	8.45	-0.30	N/A	YES
Linearity = 1.003				

¹zero/high based on 2% of span, low/mid based on 5% of concentration



CO₂ Span (%) = 18.60

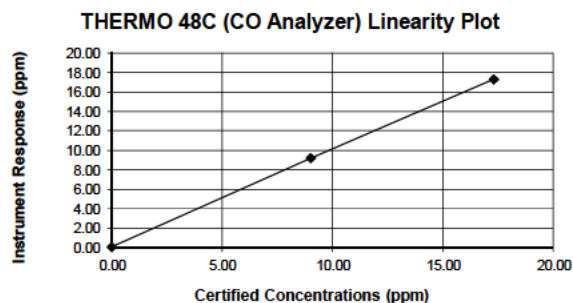
SERVOMEX 1440 (CO ₂ Analyzer)				
Certified Concentration (%)	Instrument Response (%)	Calibration Error (%)	Absolute Conc. (%)	Pass or Fail ($\pm 2\%$, $\leq 0.5\%$)
0.00	0.04	0.22	0.04	YES (%)
8.56	8.70	0.75	0.14	YES (%)
18.60	18.58	-0.11	0.02	YES (%)
Linearity = 1.004				



Calibration Date: May 9, 2014
Client: CIMARRON ENERGY, INC.

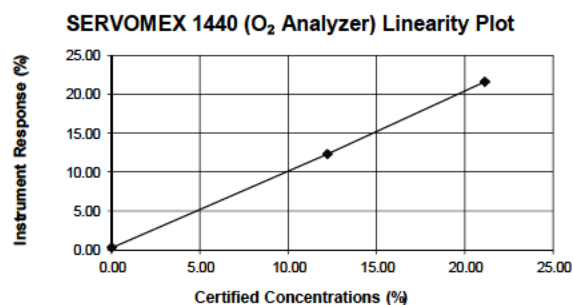
CO Span (ppm) = 17.30

THERMO 48C (CO Analyzer)				
Certified Concentration (ppm)	Instrument Response (ppm)	Calibration Error (%)	Absolute Conc. (ppm)	Pass or Fail ($\pm 2\%$, $\leq 0.5\text{ppm}$)
0.00	0.09	0.52	0.09	YES (%)
9.00	9.18	1.04	0.18	YES (%)
17.30	17.29	-0.06	0.01	YES (%)
Linearity = 1.005				



O2 Span (%) = 21.10

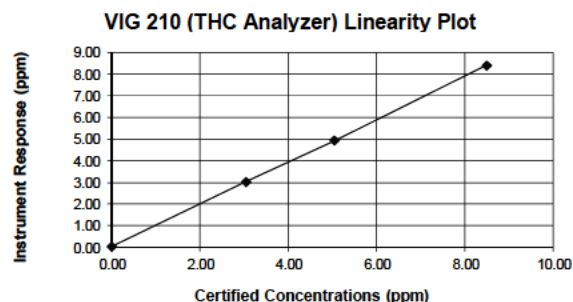
SERVOMEX 1440 (O ₂ Analyzer)				
Certified Concentration (%)	Instrument Response (%)	Calibration Error (%)	Absolute Conc. (%)	Pass or Fail ($\pm 2\%$, $\leq 0.5\%$)
0.00	0.32	1.52	0.32	YES (%)
12.20	12.30	0.47	0.10	YES (%)
21.10	21.60	2.37	0.50	YES (abs)
Linearity = 0.993				



THC Range (ppm) = 10

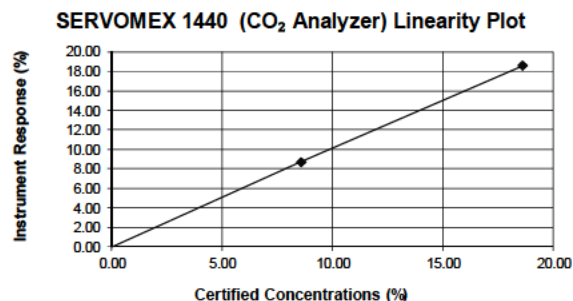
VIG 210 (THC Analyzer)				
Certified Concentration (ppm)	Instrument Response (ppm)	Calibration Error (%)	Estimated Point (ppm)	Pass or Fail ($\pm 2.5\%$) ¹
0.00	0.04	0.40	N/A	YES
3.04	3.02	-0.68	3.04	YES
5.04	4.93	-1.68	5.01	YES
8.48	8.41	-0.70	N/A	YES
Linearity = 1.007				

¹zero/high based on 2% of span, low/mid based on 5% of concentration



CO₂ Span (%) = 18.60

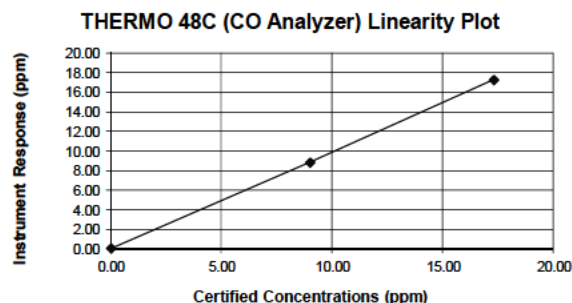
SERVOMEX 1440 (CO ₂ Analyzer)				
Certified Concentration (%)	Instrument Response (%)	Calibration Error (%)	Absolute Conc. (%)	Pass or Fail ($\pm 2\%$, $\leq 0.5\%$)
0.00	-0.02	-0.11	0.02	YES (%)
8.56	8.70	0.75	0.14	YES (%)
18.60	18.59	-0.05	0.01	YES (%)
Linearity = 1.000				



Calibration Date: May 14, 2014
Client: CIMARRON ENERGY, INC.

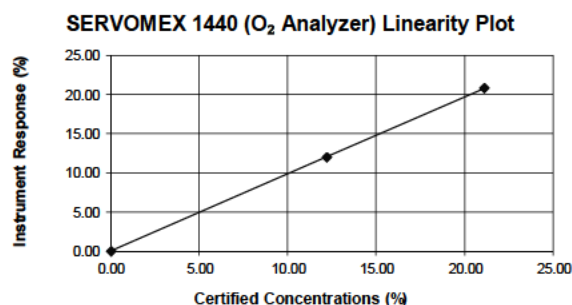
CO Span (ppm) = 17.30

THERMO 48C (CO Analyzer)				
Certified Concentration (ppm)	Instrument Response (ppm)	Calibration Error (%)	Absolute Conc. (ppm)	Pass or Fail ($\pm 2\%$, $\leq 0.5\text{ppm}$)
0.00	0.09	0.52	0.09	YES (%)
9.00	8.85	-0.87	0.15	YES (%)
17.30	17.26	-0.23	0.04	YES (%)
Linearity = 1.008				



O2 Span (%) = 21.10

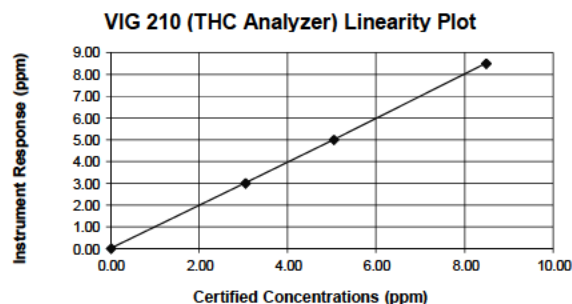
SERVOMEX 1440 (O ₂ Analyzer)				
Certified Concentration (%)	Instrument Response (%)	Calibration Error (%)	Absolute Conc. (%)	Pass or Fail ($\pm 2\%$, $\leq 0.5\%$)
0.00	0.04	0.19	0.04	YES (%)
12.20	12.04	-0.76	0.16	YES (%)
21.10	20.81	-1.37	0.29	YES (%)
Linearity = 1.016				



THC Range (ppm) = 10

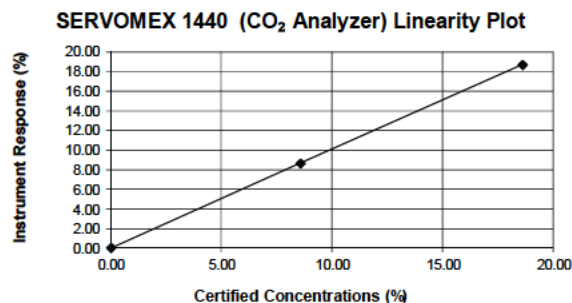
VIG 210 (THC Analyzer)				
Certified Concentration (ppm)	Instrument Response (ppm)	Calibration Error (%)	Estimated Point (ppm)	Pass or Fail ($\pm 2.5\%$) ¹
0.00	0.02	0.20	N/A	YES
3.04	3.02	-1.32	3.06	YES
5.04	5.00	-1.19	5.06	YES
8.48	8.50	0.20	N/A	YES
Linearity = 0.992				

¹-zero/high based on 2% of span, low/mid based on 5% of concentration



CO₂ Span (%) = 18.60

SERVOMEX 1440 (CO ₂ Analyzer)				
Certified Concentration (%)	Instrument Response (%)	Calibration Error (%)	Absolute Conc. (%)	Pass or Fail ($\pm 2\%$, $\leq 0.5\%$)
0.00	0.01	0.05	0.01	YES (%)
8.56	8.66	0.54	0.10	YES (%)
18.60	18.68	0.43	0.08	YES (%)
Linearity = 0.996				



DRIFT AND BIAS CHECK					
0-30-0 Load, Run - 48HV ECD R1	O ₂	CO	THC	CO ₂	
Raw Average	14.95	3.75	0.39	4.11	
Corrected Average	14.87	3.84	0.37	4.11	
Initial Zero	0.34	0.11	0.04	0.04	
Final Zero	0.03	-0.15	0.04	0.06	
Avg. Zero	0.19	-0.02	0.04	0.05	
Initial UpScale	12.54	8.71	3.16	8.51	
Final UpScale	12.05	8.93	3.01	8.52	
Avg. UpScale	12.30	8.82	3.09	8.52	
Sys Resp (Zero)	0.20	0.07	0.03	0.05	
Sys Resp (Upscale)	12.18	8.94	3.06	8.55	
Upscale Cal Gas	12.20	9.00	3.04	8.56	
Initial Zero Bias	0.66%	0.23%	0.10%	-0.05%	
Final Zero Bias	-0.81%	-1.27%	0.10%	0.05%	
Zero Drift	1.47%	1.50%	0.00%	0.11%	
Initial Upscale Bias	1.71%	-1.33%	1.00%	-0.22%	
Final Upscale Bias	-0.62%	-0.06%	-0.50%	-0.16%	
Upscale Drift	2.32%	1.27%	1.50%	0.05%	
Alternative Specification Abs Diff	Initial Zero	0.14	0.04	--	0.01
	Final Zero	0.17	0.22	--	0.01
	Initial Upscale	0.36	0.23	--	0.04
	Final Upscale	0.13	0.01	--	0.03
Calibration Span	21.10	17.30	10.00	18.60	
3% of Cal. Span (drift)	0.63	0.52	0.30	0.56	
5% of Cal. Span (bias)	1.06	0.87	0.50	0.93	

DRIFT AND BIAS CHECK					
0-30-0 Load, Run - 48HV ECD R2	O ₂	CO	THC	CO ₂	
Raw Average	15.48	6.33	0.14	4.11	
Corrected Average	15.64	6.43	0.11	4.10	
Initial Zero	0.03	-0.15	0.04	0.06	
Final Zero	0.35	0.03	0.03	0.07	
Avg. Zero	0.19	-0.06	0.04	0.07	
Initial UpScale	12.05	8.93	3.01	8.52	
Final UpScale	12.19	8.84	2.95	8.51	
Avg. UpScale	12.12	8.89	2.98	8.52	
Sys Resp (Zero)	0.20	0.07	0.03	0.05	
Sys Resp (Upscale)	12.18	8.94	3.06	8.55	
Upscale Cal Gas	12.20	9.00	3.04	8.56	
Initial Zero Bias	-0.81%	-1.27%	0.10%	0.05%	
Final Zero Bias	0.71%	-0.23%	0.00%	0.11%	
Zero Drift	1.52%	1.04%	0.10%	0.05%	
Initial Upscale Bias	-0.62%	-0.06%	-0.50%	-0.16%	
Final Upscale Bias	0.05%	-0.58%	-1.10%	-0.22%	
Upscale Drift	0.66%	0.52%	0.60%	0.05%	
Alternative Specification Abs Diff	Initial Zero	0.17	0.22	--	0.01
	Final Zero	0.15	0.04	--	0.02
	Initial Upscale	0.13	0.01	--	0.03
	Final Upscale	0.01	0.10	--	0.04
Calibration Span	21.10	17.30	10.00	18.60	
3% of Cal. Span (drift)	0.63	0.52	0.30	0.56	
5% of Cal. Span (bias)	1.06	0.87	0.50	0.93	

DRIFT AND BIAS CHECK				
0-30-0 Load, Run - 48HV ECD R3	O ₂	CO	THC	CO ₂
Raw Average	15.24	3.35	0.08	4.16
Corrected Average	15.33	3.34	0.04	4.15
Initial Zero	0.35	0.03	0.03	0.07
Final Zero	0.35	0.13	0.05	0.11
Avg. Zero	0.35	0.08	0.04	0.09
Initial UpScale	12.19	8.84	2.95	8.51
Final UpScale	12.21	8.94	3.05	8.43
Avg. UpScale	12.20	8.89	3.00	8.47
Sys Resp (Zero)	0.20	0.07	0.03	0.05
Sys Resp (Upscale)	12.18	8.94	3.06	8.55
Upscale Cal Gas	12.20	9.00	3.04	8.56
Initial Zero Bias	0.71%	-0.23%	0.00%	0.11%
Final Zero Bias	0.71%	0.35%	0.20%	0.32%
Zero Drift	0.00%	0.58%	0.20%	0.22%
Initial Upscale Bias	0.05%	-0.58%	-1.10%	-0.22%
Final Upscale Bias	0.14%	0.00%	-0.10%	-0.65%
Upscale Drift	0.09%	0.58%	1.00%	0.43%
Alternative Specification Abs Diff	Initial Zero	0.15	0.04	--
	Final Zero	0.15	0.06	--
	Initial Upscale	0.01	0.10	--
	Final Upscale	0.03	0.00	--
Calibration Span	21.10	17.30	10.00	18.60
3% of Cal. Span (drift)	0.63	0.52	0.30	0.56
5% of Cal. Span (bias)	1.06	0.87	0.50	0.93

DRIFT AND BIAS CHECK					
30-70-30 Load, Run - 48HV ECD R4	O ₂	CO	THC	CO ₂	
Raw Average	13.70	3.26	0.04	5.19	
Corrected Average	13.93	3.33	0.00	5.24	
Initial Zero	0.10	-0.03	0.04	0.07	
Final Zero	0.32	-0.06	0.04	0.05	
Avg. Zero	0.21	-0.05	0.04	0.06	
Initial UpScale	11.87	8.91	3.10	8.44	
Final UpScale	12.17	8.86	2.95	8.44	
Avg. UpScale	12.02	8.89	3.03	8.44	
Sys Resp (Zero)	-0.02	0.04	0.03	0.04	
Sys Resp (Upscale)	11.98	9.02	3.02	8.70	
Upscale Cal Gas	12.20	9.00	3.04	8.56	
Initial Zero Bias	0.57%	-0.40%	0.10%	0.16%	
Final Zero Bias	1.61%	-0.58%	0.10%	0.05%	
Zero Drift	1.04%	0.17%	0.00%	0.11%	
Initial Upscale Bias	-0.52%	-0.64%	0.80%	-1.40%	
Final Upscale Bias	0.90%	-0.92%	-0.70%	-1.40%	
Upscale Drift	1.42%	0.29%	1.50%	0.00%	
Alternative Specification Abs Diff	Initial Zero	0.12	0.07	--	0.03
	Final Zero	0.34	0.10	--	0.01
	Initial Upscale	0.11	0.11	--	0.26
	Final Upscale	0.19	0.16	--	0.26
Calibration Span	21.10	17.30	10.00	18.60	
3% of Cal. Span (drift)	0.63	0.52	0.30	0.56	
5% of Cal. Span (bias)	1.06	0.87	0.50	0.93	

DRIFT AND BIAS CHECK				
30-70-30 Load, Run - 48HV ECD R5	O ₂	CO	THC	CO ₂
Raw Average	13.93	1.46	0.03	5.01
Corrected Average	14.02	1.48	0.01	5.06
Initial Zero	0.32	-0.06	0.04	0.05
Final Zero	0.33	0.07	0.02	0.10
Avg. Zero	0.33	0.01	0.03	0.08
Initial UpScale	12.17	8.86	2.95	8.44
Final UpScale	12.16	8.84	3.02	8.42
Avg. UpScale	12.17	8.85	2.99	8.43
Sys Resp (Zero)	-0.02	0.04	0.03	0.04
Sys Resp (Upscale)	11.98	9.02	3.02	8.70
Upscale Cal Gas	12.20	9.00	3.04	8.56
Initial Zero Bias	1.61%	-0.58%	0.10%	0.05%
Final Zero Bias	1.66%	0.17%	-0.10%	0.32%
Zero Drift	0.05%	0.75%	0.20%	0.27%
Initial Upscale Bias	0.90%	-0.92%	-0.70%	-1.40%
Final Upscale Bias	0.85%	-1.04%	0.00%	-1.51%
Upscale Drift	0.05%	0.12%	0.70%	0.11%
Alternative Specification Abs Diff	Initial Zero	0.34	0.10	0.01
	Final Zero	0.35	0.03	0.06
	Initial Upscale	0.19	0.16	0.26
	Final Upscale	0.18	0.18	0.28
Calibration Span	21.10	17.30	10.00	18.60
3% of Cal. Span (drift)	0.63	0.52	0.30	0.56
5% of Cal. Span (bias)	1.06	0.87	0.50	0.93

DRIFT AND BIAS CHECK				
30-70-30 Load, Run - 48HV ECD R6	O ₂	CO	THC	CO ₂
Raw Average	13.90	0.43	0.03	5.17
Corrected Average	13.99	0.44	0.00	5.22
Initial Zero	0.33	0.07	0.02	0.10
Final Zero	0.35	-0.08	0.04	0.07
Avg. Zero	0.34	-0.01	0.03	0.09
Initial UpScale	12.16	8.84	3.02	8.42
Final UpScale	12.17	8.95	3.00	8.43
Avg. UpScale	12.17	8.90	3.01	8.43
Sys Resp (Zero)	-0.02	0.04	0.03	0.04
Sys Resp (Upscale)	11.98	9.02	3.02	8.70
Upscale Cal Gas	12.20	9.00	3.04	8.56
Initial Zero Bias	1.66%	0.17%	-0.10%	0.32%
Final Zero Bias	1.75%	-0.69%	0.10%	0.16%
Zero Drift	0.09%	0.87%	0.20%	0.16%
Initial Upscale Bias	0.85%	-1.04%	0.00%	-1.51%
Final Upscale Bias	0.90%	-0.40%	-0.20%	-1.45%
Upscale Drift	0.05%	0.64%	0.20%	0.05%
Alternative Specification Abs Diff	Initial Zero	0.35	0.03	0.06
	Final Zero	0.37	0.12	0.03
	Initial Upscale	0.18	0.18	0.28
	Final Upscale	0.19	0.07	0.27
Calibration Span	21.10	17.30	10.00	18.60
3% of Cal. Span (drift)	0.63	0.52	0.30	0.56
5% of Cal. Span (bias)	1.06	0.87	0.50	0.93

DRIFT AND BIAS CHECK				
70-100-70 Load, Run - 48HV ECD R7	O ₂	CO	THC	CO ₂
Raw Average	13.75	5.64	0.03	5.01
Corrected Average	14.02	5.61	0.01	4.95
Initial Zero	0.37	0.06	0.02	0.01
Final Zero	0.36	0.18	0.03	0.09
Avg. Zero	0.37	0.12	0.03	0.05
Initial UpScale	12.05	9.02	3.02	8.61
Final UpScale	11.98	8.91	2.97	8.66
Avg. UpScale	12.02	8.97	3.00	8.64
Sys Resp (Zero)	0.32	0.09	0.04	-0.02
Sys Resp (Upscale)	12.30	9.18	3.02	8.70
Upscale Cal Gas	12.20	9.00	3.04	8.56
Initial Zero Bias	0.24%	-0.17%	-0.20%	0.16%
Final Zero Bias	0.19%	0.52%	-0.10%	0.59%
Zero Drift	0.05%	0.69%	0.10%	0.43%
Initial Upscale Bias	-1.18%	-0.92%	0.00%	-0.48%
Final Upscale Bias	-1.52%	-1.56%	-0.50%	-0.22%
Upscale Drift	0.33%	0.64%	0.50%	0.27%
Alternative Specification Abs Diff	Initial Zero	0.05	0.03	0.03
	Final Zero	0.04	0.09	0.11
	Initial Upscale	0.25	0.16	0.09
	Final Upscale	0.32	0.27	0.04
Calibration Span	21.10	17.30	10.00	18.60
3% of Cal. Span (drift)	0.63	0.52	0.30	0.56
5% of Cal. Span (bias)	1.06	0.87	0.50	0.93

DRIFT AND BIAS CHECK				
70-100-70 Load, Run - 48HV ECD R8	O ₂	CO	THC	CO ₂
Raw Average	13.60	1.94	0.03	5.21
Corrected Average	13.90	1.99	0.01	5.14
Initial Zero	0.36	0.18	0.03	0.09
Final Zero	0.33	-0.19	0.02	0.01
Avg. Zero	0.35	-0.01	0.03	0.05
Initial UpScale	11.98	8.91	2.97	8.66
Final UpScale	11.97	8.71	2.90	8.64
Avg. UpScale	11.98	8.81	2.94	8.65
Sys Resp (Zero)	0.32	0.09	0.04	-0.02
Sys Resp (Upscale)	12.30	9.18	3.02	8.70
Upscale Cal Gas	12.20	9.00	3.04	8.56
Initial Zero Bias	0.19%	0.52%	-0.10%	0.59%
Final Zero Bias	0.05%	-1.62%	-0.20%	0.16%
Zero Drift	0.14%	2.14%	0.10%	0.43%
Initial Upscale Bias	-1.52%	-1.56%	-0.50%	-0.22%
Final Upscale Bias	-1.56%	-2.72%	-1.20%	-0.32%
Upscale Drift	0.05%	1.16%	0.70%	0.11%
Alternative Specification Abs Diff	Initial Zero	0.04	0.09	0.11
	Final Zero	0.01	0.28	0.03
	Initial Upscale	0.32	0.27	0.04
	Final Upscale	0.33	0.47	0.06
Calibration Span	21.10	17.30	10.00	18.60
3% of Cal. Span (drift)	0.63	0.52	0.30	0.56
5% of Cal. Span (bias)	1.06	0.87	0.50	0.93

DRIFT AND BIAS CHECK					
70-100-70 Load, Run - 48HV ECD R9	O ₂	CO	THC	CO ₂	
Raw Average	13.75	5.67	0.03	5.11	
Corrected Average	14.08	5.89	-0.01	5.05	
Initial Zero	0.33	-0.19	0.02	0.01	
Final Zero	0.35	0.12	0.06	0.07	
Avg. Zero	0.34	-0.04	0.04	0.04	
Initial UpScale	11.97	8.71	2.90	8.64	
Final UpScale	11.95	8.64	2.92	8.65	
Avg. UpScale	11.96	8.68	2.91	8.65	
Sys Resp (Zero)	0.32	0.09	0.04	-0.02	
Sys Resp (Upscale)	12.30	9.18	3.02	8.70	
Upscale Cal Gas	12.20	9.00	3.04	8.56	
Initial Zero Bias	0.05%	-1.62%	-0.20%	0.16%	
Final Zero Bias	0.14%	0.17%	0.20%	0.48%	
Zero Drift	0.09%	1.79%	0.40%	0.32%	
Initial Upscale Bias	-1.56%	-2.72%	-1.20%	-0.32%	
Final Upscale Bias	-1.66%	-3.12%	-1.00%	-0.27%	
Upscale Drift	0.09%	0.40%	0.20%	0.05%	
Alternative Specification Abs Diff	Initial Zero	0.01	0.28	--	0.03
	Final Zero	0.03	0.03	--	0.09
	Initial Upscale	0.33	0.47	--	0.06
	Final Upscale	0.35	0.54	--	0.05
Calibration Span	21.10	17.30	10.00	18.60	
3% of Cal. Span (drift)	0.63	0.52	0.30	0.56	
5% of Cal. Span (bias)	1.06	0.87	0.50	0.93	

DRIFT AND BIAS CHECK					
90-100 Load, Run - 48HV ECD R10	O ₂	CO	THC	CO ₂	
Raw Average	13.66	6.78	0.03	5.11	
Corrected Average	13.91	6.89	-0.01	5.06	
Initial Zero	0.35	0.12	0.06	0.07	
Final Zero	0.34	0.18	0.02	0.01	
Avg. Zero	0.35	0.15	0.04	0.04	
Initial UpScale	11.95	8.64	2.92	8.65	
Final UpScale	12.10	8.99	2.91	8.58	
Avg. UpScale	12.03	8.82	2.92	8.62	
Sys Resp (Zero)	0.32	0.09	0.04	-0.02	
Sys Resp (Upscale)	12.30	9.18	3.02	8.70	
Upscale Cal Gas	12.20	9.00	3.04	8.56	
Initial Zero Bias	0.14%	0.17%	0.20%	0.48%	
Final Zero Bias	0.09%	0.52%	-0.20%	0.16%	
Zero Drift	0.05%	0.35%	0.40%	0.32%	
Initial Upscale Bias	-1.66%	-3.12%	-1.00%	-0.27%	
Final Upscale Bias	-0.95%	-1.10%	-1.10%	-0.65%	
Upscale Drift	0.71%	2.02%	0.10%	0.38%	
Alternative Specification Abs Diff	Initial Zero	0.03	0.03	--	0.09
	Final Zero	0.02	0.09	--	0.03
	Initial Upscale	0.35	0.54	--	0.05
	Final Upscale	0.20	0.19	--	0.12
Calibration Span	21.10	17.30	10.00	18.60	
3% of Cal. Span (drift)	0.63	0.52	0.30	0.56	
5% of Cal. Span (bias)	1.06	0.87	0.50	0.93	

DRIFT AND BIAS CHECK				
90-100 Load, Run - 48HV ECD R11	O ₂	CO	THC	CO ₂
Raw Average	13.68	1.94	0.03	5.25
Corrected Average	13.84	2.05	-0.01	5.16
Initial Zero	0.23	0.06	0.06	0.05
Final Zero	0.24	-0.12	0.02	0.04
Avg. Zero	0.24	-0.03	0.04	0.05
Initial UpScale	12.06	8.64	3.04	8.69
Final UpScale	12.11	8.59	2.99	8.68
Avg. UpScale	12.09	8.62	3.02	8.69
Sys Resp (Zero)	0.04	0.09	0.02	0.01
Sys Resp (Upscale)	12.04	8.85	3.02	8.66
Upscale Cal Gas	12.20	9.00	3.04	8.56
Initial Zero Bias	0.90%	-0.17%	0.40%	0.22%
Final Zero Bias	0.95%	-1.21%	0.00%	0.16%
Zero Drift	0.05%	1.04%	0.40%	0.05%
Initial Upscale Bias	0.09%	-1.21%	0.20%	0.16%
Final Upscale Bias	0.33%	-1.50%	-0.30%	0.11%
Upscale Drift	0.24%	0.29%	0.50%	0.05%
Alternative Specification Abs Diff	Initial Zero	0.19	0.03	--
	Final Zero	0.20	0.21	--
	Initial Upscale	0.02	0.21	--
	Final Upscale	0.07	0.26	--
Calibration Span	21.10	17.30	10.00	18.60
3% of Cal. Span (drift)	0.63	0.52	0.30	0.56
5% of Cal. Span (bias)	1.06	0.87	0.50	0.93

DRIFT AND BIAS CHECK					
90-100 Load, Run - 48HV ECD R12	O ₂	CO	THC	CO ₂	
Raw Average	14.07	1.45	0.03	5.04	
Corrected Average	14.19	1.52	0.02	4.95	
Initial Zero	0.24	-0.12	0.02	0.04	
Final Zero	0.26	0.03	0.01	0.05	
Avg. Zero	0.25	-0.05	0.02	0.05	
Initial UpScale	12.11	8.59	2.99	8.68	
Final UpScale	12.15	9.05	3.01	8.69	
Avg. UpScale	12.13	8.82	3.00	8.69	
Sys Resp (Zero)	0.04	0.09	0.02	0.01	
Sys Resp (Upscale)	12.04	8.85	3.02	8.66	
Upscale Cal Gas	12.20	9.00	3.04	8.56	
Initial Zero Bias	0.95%	-1.21%	0.00%	0.16%	
Final Zero Bias	1.04%	-0.35%	-0.10%	0.22%	
Zero Drift	0.09%	0.87%	0.10%	0.05%	
Initial Upscale Bias	0.33%	-1.50%	-0.30%	0.11%	
Final Upscale Bias	0.52%	1.16%	-0.10%	0.16%	
Upscale Drift	0.19%	2.66%	0.20%	0.05%	
Alternative Specification Abs Diff	Initial Zero	0.20	0.21	--	0.03
	Final Zero	0.22	0.06	--	0.04
	Initial Upscale	0.07	0.26	--	0.02
	Final Upscale	0.11	0.20	--	0.03
Calibration Span	21.10	17.30	10.00	18.60	
3% of Cal. Span (drift)	0.63	0.52	0.30	0.56	
5% of Cal. Span (bias)	1.06	0.87	0.50	0.93	

METERING SYSTEM DRY GAS METER CALIBRATION SHEET

EPA Reference Method

Metering System Pre-Test Calibration

Air Hygiene Asset ID: samp-cp-0012

Filename: \\SERVER2\public\Shared\QAQC\Calibrations\PM-Equipment\M-5 Consoles\Calibration Sheet v4.1\Current[SAMP-CP-0012 Calibration 1-3-14.xls]Original (5 point)

Make: Thermo Environmental

Date: 01/03/14

Model #: MST-C1

Barometric Pressure: 29.73 (in. Hg)

Serial #: 90699

Theoretical Critical Vacuum: 14.02 (in. Hg)

DRY GAS METER READINGS

ΔH (in. H ₂ O)	Time (min)	Volume			Initial Temperature	
		Initial (ft ³)	Final (ft ³)	Total (ft ³)	Inlet (°F)	Outlet (°F)
0.25	17.00	211.600	217.440	5.840	72.0	67.0
0.53	12.00	217.440	223.350	5.910	74.0	69.0
1.00	10.00	223.350	230.010	6.660	76.0	69.0
1.90	10.00	230.010	239.000	8.990	75.0	70.0
3.30	10.00	239.000	250.780	11.780	78.0	71.0

Final Temperature		Orifice Serial# (number)	K' Orifice Coefficient (see above)	Actual Vacuum (in. Hg)	Ambient Temperature		
Inlet (°F)	Outlet (°F)				Initial (°F)	Final (°F)	Average (°F)
74.0	68.0	40	0.2355	16.0	71.2	71.4	71.3
76.0	69.0	48	0.3369	16.0	71.6	71.9	71.8
78.0	70.0	55	0.4557	16.0	71.9	71.6	71.8
78.0	71.0	63	0.6099	16.0	71.6	71.2	71.4
79.0	71.0	73	0.8065	16.0	71.2	71.2	71.2

RESULTS

DRY GAS METER		ORIFICE		
VOLUME CORRECTED Vm(std) (ft ³)	VOLUME CORRECTED Vm(std) (liters)	VOLUME CORRECTED Vcr(std) (ft ³)	VOLUME CORRECTED Vcr(std) (liters)	VOLUME NOMINAL Vcr (ft ³)
5.780	163.68	5.164	146.2	5.231
5.834	165.21	5.212	147.6	5.285
6.566	185.95	5.875	166.4	5.957
8.879	251.45	7.866	222.8	7.970
11.647	329.85	10.403	294.6	10.537

DRY GAS METER CALIBRATION FACTOR Y		ORIFICE CALIBRATION FACTOR $\Delta H@$		
Variation (number)	Value (number)	Value (in. H ₂ O)	Value (mm H ₂ O)	Variation (in. H ₂ O)
0.001	0.893	1.516	38.50	-0.104
0.001	0.893	1.567	39.81	-0.053
0.003	0.895	1.615	41.01	-0.005
-0.006	0.886	1.708	43.39	0.088
0.001	0.893	1.695	43.04	0.074
AVERAGE:	0.892	1.620	41.15	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 $\Delta H@$, the orifice differential pressure in inches of H₂O 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: 01/03/14 01/03/14

METERING SYSTEM THERMOCOUPLE CALIBRATION SHEET

EPA Reference Method

Metering System Pre-Test Calibration

Air Hygiene Asset ID: samp-cp-0012

Filename: \\SERVER2\public\Shared\QAQC\Calibrations\PM-Equipment\M-5 Consoles\Calibration Sheet v4.1\Current\SAMP-CP-0012 Calibration 1-3-14.xls)Original (5 point)

Make: Thermo Environmental

Date: 01/03/14

Model #: MST-C1

Barometric Pressure: 29.73 (in. Hg)

Serial #: 90699

Temperature (ASTM cal): 71.00 (°F)

Thermocouple	100 (°F)		600 (°F)		1200 (°F)	
	Reading	% Error	Reading	% Error	Reading	% Error
Stack	100.00	0.00	600.00	0.00	1201.00	0.08
Probe	101.00	0.50	601.00	0.17	1202.00	0.17
Filter	99.00	0.50	599.00	0.17	1200.00	0.00
Dryer	99.00	0.50	599.00	0.17	1200.00	0.00
Aux.	99.00	0.50	599.00	0.17	1200.00	0.00

Note: Calibrated against an ALTEK Thermocouple Source Series 22, direct temperature output calibrated to ASTM and IPTS standards as outlined in ALTEK Data Sheet 22.

Thermocouple	71.00 (°F)	
	Reading	(±°F)
DGM In	72.0	1.00
DGM Out	72.0	1.00

Note: Calibrated against ASTM Reference Thermometer.

SIGNATURE: _____

Craig McCarthy

DATE: 01/03/14 01/03/14

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**.

PROBE (STACK), HOTBOX (FILTER), AND GOOSENECK (EXIT) THERMOCOUPLE CALIBRATION SHEET

EPA Reference Method

Metering System Pre-Test Calibration

Air Hygiene Asset ID(s):

Probe: samp-hp-0009

Hotbox: samp-bh-0012

Gooseneck: samp-ad-0039

Filename: \\SERVER2\public\Shared\QAQC\Calibrations\PM-Equipment\M-S Consoles\Calibration Sheet v4.1\Current\{SAMP-CP-0012 Calibration 1-3-14.xls}Original (5 point)

Barometric Pressure:

29.73

Thermo-couples	Temps		Signature	Date	
		(°F)			
Stack	Ref	71.20	<i>Craig McCarty</i>	<u>01/03/14</u>	<u>01/03/14</u>
	Read	72.00			
	±°F	0.80			
Filter	Ref	71.20	<i>Craig McCarty</i>	<u>01/03/14</u>	<u>01/03/14</u>
	Read	72.00			
	±°F	0.80			
Exit	Ref	71.20	<i>Craig McCarty</i>	<u>01/03/14</u>	<u>01/03/14</u>
	Read	72.00			
	±°F	0.80			

Note: Calibrated against ASTM Reference Thermometer.

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**.

METERING SYSTEM DRY GAS METER CALIBRATION SHEET

EPA Reference Method

Metering System Post-Test Calibration

Air Hygiene Asset ID: samp-cp-0012

Filename: \\SERVER2\public\Shared\QAQC\Calibrations\PM-Equipment\W-5 Consoles\Calibration Sheet v4.1\Current[SAMP-CP-0012 Calibration 1-3-14.xls]5-16-14 (3 point)

Make: Thermo Environmental

Date: 05/16/14

Model #: MST-C1

Barometric Pressure: 29.48 (in. Hg)

Serial #: 90699

Theoretical Critical Vacuum: 13.91 (in. Hg)

DRY GAS METER READINGS

ΔH (in. H ₂ O)	Time (min)	Volume			Initial Temperature	
		Initial (ft ³)	Final (ft ³)	Total (ft ³)	Inlet (°F)	Outlet (°F)
1.80	10.00	42.900	51.720	8.820	79.0	74.0
1.80	10.00	51.720	60.550	8.830	79.0	74.0
1.80	10.00	60.550	69.380	8.830	79.0	74.0

Final Temperature		Orifice Serial# (number)	K' Orifice Coefficient (see above)	Actual Vacuum (in. Hg)	Ambient Temperature		
Inlet (°F)	Outlet (°F)				Initial (°F)	Final (°F)	Average (°F)
79.0	74.0	63	0.6099	16.0	70.5	70.5	70.5
79.0	74.0	63	0.6099	16.0	70.5	70.5	70.5
79.0	74.0	63	0.6099	16.0	70.5	70.5	70.5

RESULTS

DRY GAS METER		ORIFICE		
VOLUME CORRECTED Vm(std) (ft ³)	VOLUME CORRECTED Vm(std) (liters)	VOLUME CORRECTED Vcr(std) (ft ³)	VOLUME CORRECTED Vcr(std) (liters)	VOLUME NOMINAL Vcr (ft ³)
8.588	243.20	7.806	221.1	7.963
8.597	243.48	7.806	221.1	7.963
8.597	243.48	7.806	221.1	7.963

DRY GAS METER CALIBRATION FACTOR Y		ORIFICE CALIBRATION FACTOR $\Delta H @$		
Variation (number)	Value (number)	Value (in. H ₂ O)	Value (mm H ₂ O)	Variation (in. H ₂ O)
0.001	0.909	1.619	41.11	0.000
0.000	0.908	1.619	41.11	0.000
0.000	0.908	1.619	41.11	0.000
AVERAGE:	0.908	1.619	41.11	PASSED

LAST 5-PT:	0.892	1.620	PASSED	5-PT Date:
% DIFF:	1.8%	0.1%		01/03/14

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 $\Delta H @$, the orifice differential pressure in inches of H₂O 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: 05/16/14 05/16/14

METERING SYSTEM THERMOCOUPLE CALIBRATION SHEET

EPA Reference Method

Metering System Post-Test Calibration

Air Hygiene Asset ID: samp-cp-0012

Filename: \\SERVER2\public\Shared\QAQC\Calibrations\PM-Equipment\M-5 Consoles\Calibration Sheet v4.1\Current\SAMP-CP-0012 Calibration 1-3-14.xls]5-16-14 (3 point)

Make: Thermo Environmental

Date: 05/16/14

Model #: MST-C1

Barometric Pressure: 29.48 (in. Hg)

Serial #: 90699

Temperature (ASTM cal): 70.50 (°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	101.00	0.50	601.00	0.17	1202.00	0.17
Filter	101.00	0.50	601.00	0.17	1202.00	0.17
Dryer	101.00	0.50	601.00	0.17	1202.00	0.17
Aux.	101.00	0.50	601.00	0.17	1202.00	0.17

Note: Calibrated against an ALTEK Thermocouple Source Series 22, direct temperature output calibrated to ASTM and IPTS standards as outlined in ALTEK Data Sheet 22.

Thermocouple	70.50 (°F)	
	Reading	(±°F)
DGM In	71.0	0.50
DGM Out	71.0	0.50

Note: Calibrated against ASTM Reference Thermometer.

SIGNATURE: _____

Craig McCarthy

DATE: 05/16/14 05/16/14

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**.

PROBE (STACK), HOTBOX (FILTER), AND GOOSENECK (EXIT) THERMOCOUPLE CALIBRATION SHEET

EPA Reference Method

Metering System Post-Test Calibration

Air Hygiene Asset ID(s):

Probe: samp-hp-0033

Hotbox: samp-bh-0012

Gooseneck: samp-ad-0010

Filename: \\SERVER2\public\Shared\QAQC\Calibrations\PM-Equipment\M-S Consoles\Calibration Sheet v4.1\Current[SAMP-CP-0012 Calibration 1-3-14.xls]5-16-14 (3 point)

Barometric Pressure: 29.48

Thermo-couples	Temps		Signature	Date	
		(°F)			
Stack	Ref	70.50	<i>Craig McCarty</i>	<i>05/16/14</i>	05/16/14
	Read	71.00			
	±°F	0.50			
Filter	Ref	70.50	<i>Craig McCarty</i>	<i>05/16/14</i>	05/16/14
	Read	71.00			
	±°F	0.50			
Exit	Ref	70.50	<i>Craig McCarty</i>	<i>05/16/14</i>	05/16/14
	Read	71.00			
	±°F	0.50			

Note: Calibrated against ASTM Reference Thermometer.

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.



Volume Certification

Instrument

Type: IMC/W2
Firmware: 1.94
Serial Number: 03/12/108289 (UK) 1205024036 (US)

Configuration

Meter Type: Series B, Imperial
Meter Size: 3M
Pulse Outputs: Single

Test Conditions

Test Date: 06-02-2012 Time: 07:27:10
Fixture: E-0108
Temperature: 73.3 °F.
Line Pressure: 0.00 psi G PASS
Battery: 5.67 Volts PASS
Flow Rate: 3000 cfh
Test Volume: 100.0 cu.ft. (uncorrected)
Correction Factor: 0.95508

Results:

PASS

VOLUME (CU.FT.)

	<u>Uncorrected</u>	<u>Corrected</u>
Initial:	-0.0125	-0.0122
Final:	99.9938	95.4687
Accumulated:	100.0063	95.4809
Calculated:	100.0000	95.5083
Error:	0.01 %	-0.03 %

	<u>HF (Unc.)</u>	<u>Corrected (Prove)</u>
Comms Pulses:	PASS	PASS

PULSE OUTPUTS

	<u>Uncorrected</u>	<u>Corrected</u>	<u>Fault</u>
Multiplier:	1.0	1.0	-
Expected (± 1):	100	96	-
Received (Ch.A):	100	95	-
Error:	0	-1	-
Min. Width (msec):	124.84	124.84	499.88
Result:	PASS	PASS	PASS

This test performs a check of the configuration, volume input, and pulse outputs of the instrument. The volume input is driven at a precise flow rate for a precise number of revolutions. The test is performed at ambient temperature and pressure.

Operator: JD



DI UK
Unit 1
Yeoman Industrial Park
Test Lane, Nursling
Southampton, Hampshire
England, SO16 9JX
Tel: +44 (0) 23 8087 5600
Fax: +44 (0) 23 8087 5601

Calibration Certificate

Corrector Serial No. 03/12/108289
Transducer Serial No. 666012404
PCB Serial No. 666012404

Transducer: 12bar G
Date: 29/03/2012

Test Equipment

Envio. Chamber: F10004
Druck 1: 515012536

PRT Simulator: RIG_D
Druck 2: 0624/98-02

Calibration Points

Temperatures: 60.00°C, 35.00°C, 10.00°C, -15.00°C, -40.00°C
Pressures: 0.000bar, 3.000bar, 6.000bar, 9.000bar, 12.000bar

Pressure Checks

Applied Pressure	Ambient @60.0°C		Ambient @35.0°C		Ambient @10.0°C		Ambient @-15.0°C		Ambient @-40.0°C	
	PTZ Reading	Deviation %	PTZ Reading	Deviation %	PTZ Reading	Deviation %	PTZ Reading	Deviation %	PTZ Reading	Deviation %
0.000Bar	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3.000Bar	3.000	-0.001	3.000	-0.001	3.000	0.000	3.000	-0.000	3.000	-0.000
6.000Bar	5.999	-0.009	5.999	-0.005	6.000	0.000	6.000	-0.000	6.000	0.000
9.000Bar	8.997	-0.027	8.998	-0.019	8.999	-0.008	8.999	-0.006	9.000	0.001
12.000Bar	11.993	-0.062	11.995	-0.042	11.998	-0.020	11.998	-0.014	12.000	0.002

Errors are shown as %RDG at or above 20% of range, otherwise errors are displayed as %FS

Temperature Checks

Nominal Temperature	Ambient Temperature		Nominal Temperature	Ambient Temperature	
	PTZ Reading °C	Difference °C		PTZ Reading °C	Difference °C
60.0°C	60.1	0.1	0.0°C	0.1	0.1
36.0°C	36.1	0.1	-23.0°C	-22.9	0.1
20.0°C	20.1	0.1	-40.0°C	-39.9	0.1

AR-5
Mezamin L

Note 1: Accuracy limits of the Micro Series Corrector readings are better than 0.7% of reading for 20% to 100% pressure range over the full temperature range of -40.0°C to 60.0°C (-40.0°F to 140.0°F).

Note 2: All pressure Measurements used in the calibration and check procedures have certificates issued in accordance with the conditions of accreditation granted by the National Measurement Accreditation Service. NMAS has assessed the measuring capability of the laboratory issuing the certificate and its traceability to British national standards and to the units of measurement realised at the corresponding laboratory (National Physical Laboratory).

Certified By

Soter J J

Date

29/03/12



Roots Meters & Instruments
16240 Port Northwest Dr., Suite 100
Houston, TX 77041-2645
Phone: 832.590.2303
Fax: 832.590.2494
Toll Free Phone: 800.521.1114
Toll Free Fax: 800.335.5224

Customer Information

Name : KOONS GAS MEASUREMENT (GAS)
PO No. : 1728
Badge No. : NONE

Date Printed : 05 22 2012
Bill of Material 055221-023
Model : 11M175
Serial No. : 1229843
Accessory S/N UC245513
Sales Order No. 193413-8
Spec. Req. No.
Prover Used : 1200 cu. ft.

Unit Description

11M175 SERIES B3 ROOTS METER,
COUNTER WITH INSTRUMENT DRIVE
VERSION

MIN STATIC TEST PRESSURE	MIN LEAK TEST PRESSURE	MAX ALLOWABLE OPER PRESSURE	TC Acc at (deg F)	Accuracy	Proof	% Error
350 psig	219 psig	175 psig				

This meter has been tested and successfully passed a Shell Pressure Test and Leak Test at the above conditions.

P R O V E R T E S T D A T A

Test Point	Flow Rate Dis Vol	% Rated Capacity	Meter Accuracy	ERROR +/- %	Diff Pressure	TC Meter Accuracy	TC Meter Proof %	ERROR +/- %
1	11138.9	101.3	100.28	0.28	1.77			
2	1105.6	10.1	100.14	0.14	0.05			

Above data has been determined from tests performed with air at atmospheric pressure and ambient temperature, using positive displacement bell or piston provers dimensionally traceable to the United States National Institute of Standards and Technology (NIST) and traceable to NMI- Netherlands Measurement Institute for volumetric flow rate.

TC instrument accuracy has been determined from test performed in liquid baths at the temperatures show above using calibrated measurement instruments whose accuracy is traceable to NIST. TC Meter Accuracy (TC Meter Proof) of both meter and instrument in conjunction is calculated using TC accuracy (TC proof) at 60 degree F.

NMI accredited laboratory no: CE-085

This meter conforms to purchaser specifications.

Test date 21-May-12 by MARTINEZ, JUAN

DMD Model 5 Prover

Date: 7/14/2014

Name: CIMARRON
Location: SHOP
Operator's Name or ID: JP
Master Meter Type: 10M(10000cfh/283.2m3)
Master Serial #: 9323385
Meter Output: Press. and Temp. Corrected
Field Meter Type: 11M
Field Meter Serial #: 1229843
Test Setup: 7-14-14
Comments:
IN TEST

Test Completed: Span Test Result: PASS +/- 2.00

	10:25:16	10:27:14
Flow Rate: (acfh)	9990.821	2197.852
Test Volume: (cf)	84.000	19.229
Drive Rate or Pulses/Test:	83.000	19.000
Ambient Pressure: (psia)	14.376	14.376
Master Temperature: (°F)	69.636	69.939
Master Pressure: (inch)	-7.838	-0.500
Master Differential: (inch)	2.610	0.269
Master Volume: (cf)	86.413	19.267
Meter Temperature: (°F)	68.000	68.125
Meter Pressure: (inch)	0.080	0.079
Meter Differential: (inch)	0.355	0.356
Test Duration:	00:00.31	00:00.32
Upper Pass/Fail Limit:	2.000	2.000
Lower Pass/Fail Limit:	2.000	2.000
% Pressure Correction:	-1.987	-0.145
% Temp. Correction:	0.069	0.011
% Uncorrected Proof:	102.403	100.204
% Corrected Proof:	100.436	100.070
% Accuracy:	99.565	99.930
% Error:	-0.435	-0.070
Single Test Result:	Pass	Pass

Monday, July 14, 2014

1 of 1

Sample Date5/8/2014Truck/Trailer No.:66 / 601

<u>Property</u>	<u>Result</u>	<u>Specification</u>
Methane, PPM Wgt.	BDL	Note (1)
Ethane, PPM Wgt.	0	Note (1)
Ethylene, PPM Wgt.	BDL	100 max.
Propane, Wgt. %	0.44	0.5 max.
Propylene, Wgt. %	99.56	99.5 min.
Total Saturated C4's, PPM Mole	BDL	Note (1)
Propadiene, PPM Wgt.	BDL	5 max.
Methyl Acetylene, PPM Wgt.	BDL	7 max.
Acetylene, PPM Wgt.	BDL	3 max.
Total Butadienes, PPM Wgt.	BDL	10 max.
Total Butenes, PPM Wgt.	BDL	100 max.
1-Butyne, PPM Wgt.	BDL	7 max.
2-Butyne, PPM Wgt.	BDL	7 max.
Cyclopropane, PPM Wgt.	BDL	1 max.
3-Methyl 1-Butene, PPM Wgt.	BDL	1 max.
Total > C5, PPM Wgt.	BDL	20 max.
Carbon Monoxide, PPM Wgt.	BDL	0.033 max.
Carbon Dioxide, PPM Wgt.	BDL	2 max.
Carbonyl Sulfide, PPM Wgt.	BDL	0.043 max.
Hydrogen Sulfide, PPM Wgt.	BDL	1 max.
Total Sulfur, PPM Wgt.	BDL	1 max.
Arsine, PPM Wgt.	BDL	0.056 max.
Phosphine, PPM Wgt.	BDL	0.1 max.
Methanol, PPM Wgt.	BDL	4 max.
2-Propanol, PPM Wgt.	BDL	7 max.
Water, PPM Wgt.	<0.1	2 max.
Hydrogen, PPM Wgt.	BDL	1 max.
Oxygen, PPM Wgt.*	BDL	2 max.
Nitrogen, PPM Wgt.	1	Note (1)
Ammonia, PPM Wgt.	BDL	0.2 max.

REF ID# CT41661SOURCE Tank 5

EGH
by/for Robert D. Freeman
Laboratory Manager

Note (1) Total Non-Propane Inerts = 1000 Wt. ppm max

revised 09/09/13

APPENDIX E

FUEL ANALYSIS RECORDS

LABORATORY REPORT

May 29, 2014

Min Lee
Air Hygiene, Incorporated
1600 West Tacoma Street
Broken Arrow, OK 74012

RE: Cimaron Flare Testing / cei-14-norman.ok-comp#1

Dear Min:

Enclosed are the results of the samples submitted to our laboratory on May 19, 2014. For your reference, these analyses have been assigned our service request number P1402004.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

ALS | Environmental

Kelly Horiuchi
Laboratory Director

Client: Air Hygiene, Incorporated
Project: Cimaron Flare Testing / cei-14-norman.ok-comp#1

Service Request No: P1402004

CASE NARRATIVE

The samples were received intact under chain of custody on May 19, 2014 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

Benzene Analysis

The samples were analyzed per ASTM D1945-03 for benzene using a gas chromatograph equipped with a flame ionization detector (FID). This procedure is described in laboratory SOP VOA-TO3C1C6. This method is not included on the laboratory's NELAP or AIHA-LAP scope of accreditation.

BTU and CHONS Analysis

The results for BTU and CHONS were generated according to ASTM D 3588-98. The following analyses were performed and used to calculate the BTU and CHONS results. This method is not included on the laboratory's NELAP, DoD-ELAP, or AIHA-LAP scope of accreditation.

C2 through C6 Hydrocarbon Analysis

The samples were analyzed according to ASTM D1945-03 for C2 through >C6 hydrocarbons using a gas chromatograph equipped with a flame ionization detector (FID). This method is not included on the laboratory's NELAP or AIHA-LAP scope of accreditation.

Fixed Gases Analysis

The samples were also analyzed for fixed gases (hydrogen, oxygen/argon, nitrogen, carbon monoxide, methane and carbon dioxide) according to ASTM D1945-03 (single injection) using a gas chromatograph equipped with a thermal conductivity detector (TCD). This method is not included on the laboratory's NELAP or AIHA-LAP scope of accreditation.

Hydrogen Sulfide Analysis

The samples were also analyzed for hydrogen sulfide per ASTM D 5504-08 using a gas chromatograph equipped with a sulfur chemiluminescence detector (SCD). This method is not included on the laboratory's NELAP, DoD-ELAP, or AIHA-LAP scope of accreditation.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.

Use of ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.

ALS Environmental – Simi Valley

Certifications, Accreditations, and Registrations

Agency	Web Site	Number
AIHA	http://www.aihaaccreditedlabs.org	101661
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0694
DoD ELAP	http://www.pjlabs.com/search-accredited-labs	L14-2
Florida DOH (NELAP)	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E871020
Maine DHHS	http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/labcert.htm	2012039
Minnesota DOH (NELAP)	http://www.health.state.mn.us/accreditation	643428
New Jersey DEP (NELAP)	http://www.nj.gov/dep/oqa/	CA009
New York DOH (NELAP)	http://www.wadsworth.org/labcert/elap/elap.html	11221
Oregon PHD (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	CA200007
Pennsylvania DEP	http://www.depweb.state.pa.us/labs	68-03307 (Registration)
Texas CEQ (NELAP)	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704413-13-4
Utah DOH (NELAP)	http://www.health.utah.gov/lab/labimp/certification/index.html	CA016272013-3
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C946

Analyses were performed according to our laboratory's NELAP and DoD-ELAP approved quality assurance program. A complete listing of specific NELAP and DoD-ELAP certified analytes can be found in the certifications section at www.alsglobal.com, or at the accreditation body's website.

Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact the laboratory for information corresponding to a particular certification.

ALS ENVIRONMENTAL

DETAIL SUMMARY REPORT

Client: Air Hygiene, Incorporated
 Project ID: Cimaron Flare Testing / cei-14-norman.ok-comp#1

Service Request: P1402004

Date Received: 5/19/2014
 Time Received: 09:00

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	Container ID	Pi1 (psig)	Pf1 (psig)	TO-3 Modified - C1C6+ Can	3C Modified - Fxd Gases Can	ASTM D5504-01 - H2S Can
cei-0-30-0%-Can-48HVECD	P1402004-001	Air	5/7/2014	17:29	SSC00203	-0.12	3.55	X	X	X
cei-30-70-30%-Can-48HVECD	P1402004-002	Air	5/8/2014	17:30	SSC00253	-1.43	3.68	X	X	X
cei-70-100-70%-Can-48HVECD	P1402004-003	Air	5/9/2014	14:05	SSC00174	-1.64	3.51	X	X	X
cei-90-100%-Can-48HVECD	P1402004-004	Air	5/14/2014	00:00	SSC00057	-1.33	3.66	X	X	X
cei-90-100%-Can-48ECD	P1402004-005	Air	5/12/2014	16:50	SSC00250	0.10	3.53	X	X	X
cei-70-100-70%-Can-48ECD	P1402004-006	Air	5/13/2014	09:15	SSC00100	-0.71	3.74	X	X	X
cei-30-70-30%-Can-48ECD	P1402004-007	Air	5/13/2014	15:15	SSC00128	-1.19	3.68	X	X	X
cei-0-30-0%-Can-48ECD	P1402004-008	Air	5/14/2014	11:20	SSC00129	-0.16	3.54	X	X	X



Page _____ of _____

Air - Chain of Custody Record & Analytical Service Request

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ALS Environmental **Sample Acceptance Check Form**

Client: Air Hygiene, Incorporated

Work order: P1402004

Project: Cimaron Flare Testing / cei-14-norman.ok-comp#1

Sample(s) received on: 5/19/14

Date opened: 5/19/14

by: MZAMORA

Note: This form is used for all samples received by ALS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

	Yes	No	N/A
1 Were sample containers properly marked with client sample ID?	☒	☐	☐
2 Container(s) supplied by ALS ?	☒	☐	☐
3 Did sample containers arrive in good condition?	☒	☐	☐
4 Were chain-of-custody papers used and filled out?	☒	☐	☐
5 Did sample container labels and/or tags agree with custody papers?	☒	☐	☐
6 Was sample volume received adequate for analysis?	☒	☐	☐
7 Are samples within specified holding times?	☒	☐	☐
8 Was proper temperature (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
9 Was a trip blank received?	☐	☒	☐
10 Were custody seals on outside of cooler/Box?	☐	☒	☐
Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
Were signature and date included?	☐	☐	☒
Were seals intact?	☐	☐	☒
Were custody seals on outside of sample container?	☐	☒	☐
Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
Were signature and date included?	☐	☐	☒
Were seals intact?	☐	☐	☒
11 Do containers have appropriate preservation , according to method/SOP or Client specified information?	☐	☐	☒
Is there a client indication that the submitted samples are pH preserved?	☐	☐	☒
Were VOA vials checked for presence/absence of air bubbles?	☐	☐	☒
Does the client/method/SOP require that the analyst check the sample pH and <u>if necessary</u> alter it?	☐	☐	☒
12 Tubes: Are the tubes capped and intact?	☐	☐	☒
Do they contain moisture?	☐	☐	☒
13 Badges: Are the badges properly capped and intact?	☐	☐	☒
Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1402004-001.01	6.0 L Silonite Can					
P1402004-002.01	6.0 L Silonite Can					
P1402004-003.01	6.0 L Silonite Can					
P1402004-004.01	6.0 L Silonite Can					
P1402004-005.01	6.0 L Silonite Can					
P1402004-006.01	6.0 L Silonite Can					
P1402004-007.01	6.0 L Silonite Can					
P1402004-008.01	6.0 L Silonite Can					

Explain any discrepancies: (include lab sample ID numbers): _____

Chain of Custody is missing sampler's signature _____

No date listed relinquishing sample(s) on Chain of Custody _____

No time listed relinquishing sample(s) on Chain of Custody _____

RSK - MEEPP, HCL (pH<2); RSK - CO₂, (pH 5-8); Sulfur (pH>4)

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: Air Hygiene, Incorporated
Client Project ID: Cimaron Flare Testing / cei-14-norman.ok-comp#1

ALS Project ID: P1402004

Benzene

Test Code: ASTM D1945-03
Instrument ID: HP5890 II/GC8/FID
Analyst: Wade Henton
Sampling Media: 6.0 L Silonite Canister(s)
Test Notes:

Date(s) Collected: 5/7 - 5/14/14
Date Received: 5/19/14
Date Analyzed: 5/21/14

Client Sample ID	ALS Sample ID	Canister Dilution Factor	Injection Volume ml(s)	Result ppmV	MRL ppmV	Data Qualifier
cei-0-30-0%-Can-48HVECD	P1402004-001	1.25	0.050	ND	15	
cei-30-70-30%-Can-48HVECD	P1402004-002	1.39	0.050	ND	17	
cei-70-100-70%-Can-48HVECD	P1402004-003	1.39	0.050	ND	17	
cei-90-100%-Can-48HVECD	P1402004-004	1.37	0.050	ND	16	
cei-90-100%-Can-48ECD	P1402004-005	1.23	0.050	ND	15	
cei-70-100-70%-Can-48ECD	P1402004-006	1.32	0.050	ND	16	
cei-30-70-30%-Can-48ECD	P1402004-007	1.36	0.050	ND	16	
cei-0-30-0%-Can-48ECD	P1402004-008	1.25	0.050	ND	15	
Method Blank	P140521-MB	1.00	1.0	ND	0.60	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Page 1 of 1

Client: Air Hygiene, Incorporated

Client Sample ID: Lab Control Sample

Client Project ID: Cimaron Flare Testing / cei-14-norman.ok-comp#1

ALS Project ID: P1402004

ALS Sample ID: P140521-LCS

Test Code: ASTM D1945-03

Instrument ID: HP5890 II/GC8/FID

Analyst: Wade Henton

Sampling Media: 6.0 L Silonite Canister

Test Notes:

Date Collected: NA

Date Received: NA

Date Analyzed: 5/21/14

Volume(s) Analyzed: NA ml(s)

Compound	Spike Amount ppmV	Result ppmV	% Recovery	ALS	Data Qualifier
				Acceptance Limits	
Benzene	27.5	25.5	93	50-150	

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: Air Hygiene, Incorporated

Client Sample ID: cei-0-30-0%-Can-48HVECD

Client Project ID: Cimaron Flare Testing / cei-14-norman.ok-comp#1

ALS Project ID: P1402004

ALS Sample ID: P1402004-001

Test Code: ASTM D3588-98

Analyst: Mike Conejo/Wade Henton/Nalini Lall

Sample Type: 6.0 L Silonite Canister

Test Notes:

Container ID: SSC00203

Date Collected: 5/7/14

Date Received: 5/19/14

Initial Pressure (psig): -0.12

Final Pressure (psig): 3.55

Canister Dilution Factor: 1.25

Components	Result Volume %	Result Weight %	Data Qualifier
Hydrogen	< 0.01	< 0.01	
Oxygen + Argon	0.09	0.06	
Nitrogen	0.35	0.22	
Carbon Monoxide	< 0.01	< 0.01	
Methane	< 0.01	< 0.01	
Carbon Dioxide	< 0.01	< 0.01	
Hydrogen Sulfide	< 0.01	< 0.01	
C2 as Ethane	< 0.01	< 0.01	
C3 as Propane	99.55	99.71	
C4 as n-Butane	< 0.01	< 0.01	
C5 as n-Pentane	< 0.01	< 0.01	
C6 as n-Hexane	< 0.01	< 0.01	
> C6 as n-Hexane	< 0.01	< 0.01	
TOTALS	99.99	99.99	

Components	Mole %	Weight %
Carbon	27.25	81.48
Hydrogen	72.67	18.23
Oxygen + Argon	< 0.10	< 0.10
Nitrogen	< 0.10	0.22
Sulfur	< 0.10	< 0.10

Specific Gravity (Air = 1)		1.5202
Specific Volume	ft3/lb	8.62
Gross Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/ft3	2,548.9
Net Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/ft3	2,345.1
Gross Heating Value (Water Saturated at 0.25636 psia)	BTU/ft3	2,461.2
Net Heating Value (Water Saturated at 0.25636 psia)	BTU/ft3	2,264.4
Gross Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/lb	21,969.9
Net Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/lb	20,213.1
Compressibility Factor "Z" (60 F, 14.696 psia)		0.9827

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: Air Hygiene, Incorporated
Client Sample ID: cei-30-70-30%-Can-48HVECD
Client Project ID: Cimaron Flare Testing / cei-14-norman.ok-comp#1

ALS Project ID: P1402004
 ALS Sample ID: P1402004-002

Test Code: ASTM D3588-98
 Analyst: Mike Conejo/Wade Henton/Nalini Lall
 Sample Type: 6.0 L Silonite Canister
 Test Notes:
 Container ID: SSC00253

Date Collected: 5/8/14
 Date Received: 5/19/14

Initial Pressure (psig): -1.43 Final Pressure (psig): 3.68

Components	Result Volume %	Canister Dilution Factor: 1.39	
		Result Weight %	Data Qualifier
Hydrogen	< 0.01	< 0.01	
Oxygen + Argon	0.24	0.18	
Nitrogen	1.00	0.64	
Carbon Monoxide	< 0.01	< 0.01	
Methane	< 0.01	< 0.01	
Carbon Dioxide	< 0.01	< 0.01	
Hydrogen Sulfide	< 0.01	< 0.01	
C2 as Ethane	< 0.01	< 0.01	
C3 as Propane	98.75	99.17	
C4 as n-Butane	< 0.01	< 0.01	
C5 as n-Pentane	< 0.01	< 0.01	
C6 as n-Hexane	< 0.01	< 0.01	
> C6 as n-Hexane	< 0.01	< 0.01	
TOTALS	99.99	99.99	

Components	Mole %	Weight %
Carbon	27.21	81.05
Hydrogen	72.56	18.14
Oxygen + Argon	< 0.10	0.18
Nitrogen	0.18	0.64
Sulfur	< 0.10	< 0.10

Specific Gravity (Air = 1)		1.5159
Specific Volume	ft3/lb	8.64
Gross Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/ft3	2,527.7
Net Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/ft3	2,325.6
Gross Heating Value (Water Saturated at 0.25636 psia)	BTU/ft3	2,441.3
Net Heating Value (Water Saturated at 0.25636 psia)	BTU/ft3	2,246.1
Gross Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/lb	21,847.9
Net Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/lb	20,100.8
Compressibility Factor "Z" (60 F, 14.696 psia)		0.9830

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: Air Hygiene, Incorporated
Client Sample ID: cei-70-100-70%-Can-48HVECD
Client Project ID: Cimaron Flare Testing / cei-14-norman.ok-comp#1

ALS Project ID: P1402004
 ALS Sample ID: P1402004-003

Test Code: ASTM D3588-98
 Analyst: Mike Conejo/Wade Henton/Nalini Lall
 Sample Type: 6.0 L Silonite Canister
 Test Notes:
 Container ID: SSC00174

Date Collected: 5/9/14
 Date Received: 5/19/14

Initial Pressure (psig): -1.64 Final Pressure (psig): 3.51

		Canister Dilution Factor: 1.39	
Components	Result Volume %	Result Weight %	Data Qualifier
Hydrogen	< 0.01	< 0.01	
Oxygen + Argon	0.04	0.03	
Nitrogen	0.25	0.16	
Carbon Monoxide	< 0.01	< 0.01	
Methane	< 0.01	< 0.01	
Carbon Dioxide	< 0.01	< 0.01	
Hydrogen Sulfide	< 0.01	< 0.01	
C2 as Ethane	< 0.01	< 0.01	
C3 as Propane	99.70	99.80	
C4 as n-Butane	< 0.01	< 0.01	
C5 as n-Pentane	< 0.01	< 0.01	
C6 as n-Hexane	< 0.01	< 0.01	
> C6 as n-Hexane	< 0.01	< 0.01	
TOTALS	99.99	99.99	
Components	Mole %	Weight %	
Carbon	27.26	81.56	
Hydrogen	72.69	18.25	
Oxygen + Argon	< 0.10	< 0.10	
Nitrogen	< 0.10	0.16	
Sulfur	< 0.10	< 0.10	
Specific Gravity (Air = 1)		1.5209	
Specific Volume	ft3/lb	8.61	
Gross Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/ft3	2,552.8	
Net Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/ft3	2,348.7	
Gross Heating Value (Water Saturated at 0.25636 psia)	BTU/ft3	2,465.0	
Net Heating Value (Water Saturated at 0.25636 psia)	BTU/ft3	2,267.9	
Gross Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/lb	21,992.1	
Net Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/lb	20,233.5	
Compressibility Factor "Z" (60 F, 14.696 psia)		0.9827	

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: Air Hygiene, Incorporated

Client Sample ID: cei-90-100%-Can-48HVECD

Client Project ID: Cimaron Flare Testing / cei-14-norman.ok-comp#1

ALS Project ID: P1402004

ALS Sample ID: P1402004-004

Test Code: ASTM D3588-98

Analyst: Mike Conejo/Wade Henton/Nalini Lall

Sample Type: 6.0 L Silonite Canister

Test Notes:

Container ID: SSC00057

Date Collected: 5/14/14

Date Received: 5/19/14

Initial Pressure (psig): -1.33

Final Pressure (psig): 3.66

Canister Dilution Factor: 1.37

Components	Result Volume %	Result Weight %	Data Qualifier
Hydrogen	< 0.01	< 0.01	
Oxygen + Argon	0.12	0.09	
Nitrogen	0.53	0.34	
Carbon Monoxide	< 0.01	< 0.01	
Methane	< 0.01	< 0.01	
Carbon Dioxide	< 0.01	< 0.01	
Hydrogen Sulfide	< 0.01	< 0.01	
C2 as Ethane	< 0.01	< 0.01	
C3 as Propane	99.34	99.56	
C4 as n-Butane	< 0.01	< 0.01	
C5 as n-Pentane	< 0.01	< 0.01	
C6 as n-Hexane	< 0.01	< 0.01	
> C6 as n-Hexane	< 0.01	< 0.01	
TOTALS	99.99	99.99	

Components	Mole %	Weight %
Carbon	27.24	81.37
Hydrogen	72.64	18.21
Oxygen + Argon	< 0.10	< 0.10
Nitrogen	< 0.10	0.34
Sulfur	< 0.10	< 0.10

Specific Gravity (Air = 1)		1.5190
Specific Volume	ft3/lb	8.63
Gross Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/ft3	2,543.2
Net Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/ft3	2,339.8
Gross Heating Value (Water Saturated at 0.25636 psia)	BTU/ft3	2,456.0
Net Heating Value (Water Saturated at 0.25636 psia)	BTU/ft3	2,259.6
Gross Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/lb	21,937.1
Net Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/lb	20,182.9
Compressibility Factor "Z" (60 F, 14.696 psia)		0.9828

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: Air Hygiene, Incorporated

Client Sample ID: cei-0-30-0%-Can-48HVECD

Client Project ID: Cimaron Flare Testing / cei-14-norman.ok-comp#1

ALS Project ID: P1402004

ALS Sample ID: P1402004-001

Test Code: ASTM D1945-03

Instrument ID: HP5890 II/GC1/TCD

Analyst: Wade Henton

Sample Type: 6.0 L Silonite Canister

Test Notes:

Container ID: SSC00203

Date Collected: 5/7/14

Date Received: 5/19/14

Date Analyzed: 5/20/14

Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -0.12

Final Pressure (psig): 3.55

Canister Dilution Factor: 1.25

CAS #	Compound	Result %, v/v	MRL %, v/v	Data Qualifier
1333-74-0	Hydrogen	ND	0.13	
7782-44-7	Oxygen +			
7440-37-1	Argon	ND	0.13	
7727-37-9	Nitrogen	0.346	0.13	
630-08-0	Carbon Monoxide	ND	0.13	
124-38-9	Carbon Dioxide	ND	0.13	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: Air Hygiene, Incorporated
Client Sample ID: cei-30-70-30%-Can-48HVECD
Client Project ID: Cimaron Flare Testing / cei-14-norman.ok-comp#1

ALS Project ID: P1402004
 ALS Sample ID: P1402004-002

Test Code: ASTM D1945-03
 Instrument ID: HP5890 II/GC1/TCD
 Analyst: Wade Henton
 Sample Type: 6.0 L Silonite Canister
 Test Notes:
 Container ID: SSC00253

Date Collected: 5/8/14
 Date Received: 5/19/14
 Date Analyzed: 5/20/14
 Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -1.43 Final Pressure (psig): 3.68

Canister Dilution Factor: 1.39

CAS #	Compound	Result %, v/v	MRL %, v/v	Data Qualifier
1333-74-0	Hydrogen	ND	0.14	
7782-44-7	Oxygen +			
7440-37-1	Argon	0.243	0.14	
7727-37-9	Nitrogen	0.996	0.14	
630-08-0	Carbon Monoxide	ND	0.14	
124-38-9	Carbon Dioxide	ND	0.14	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: Air Hygiene, Incorporated
Client Sample ID: cei-70-100-70%-Can-48HVECD
Client Project ID: Cimaron Flare Testing / cei-14-norman.ok-comp#1

ALS Project ID: P1402004
 ALS Sample ID: P1402004-003

Test Code: ASTM D1945-03
 Instrument ID: HP5890 II/GC1/TCD
 Analyst: Wade Henton
 Sample Type: 6.0 L Silonite Canister
 Test Notes:
 Container ID: SSC00174

Date Collected: 5/9/14
 Date Received: 5/19/14
 Date Analyzed: 5/20/14
 Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -1.64 Final Pressure (psig): 3.51

Canister Dilution Factor: 1.39

CAS #	Compound	Result %, v/v	MRL %, v/v	Data Qualifier
1333-74-0	Hydrogen	ND	0.14	
7782-44-7	Oxygen +			
7440-37-1	Argon	ND	0.14	
7727-37-9	Nitrogen	0.246	0.14	
630-08-0	Carbon Monoxide	ND	0.14	
124-38-9	Carbon Dioxide	ND	0.14	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: Air Hygiene, Incorporated

Client Sample ID: cei-90-100%-Can-48HVECD

Client Project ID: Cimaron Flare Testing / cei-14-norman.ok-comp#1

ALS Project ID: P1402004

ALS Sample ID: P1402004-004

Test Code: ASTM D1945-03
Instrument ID: HP5890 II/GC1/TCD
Analyst: Wade Henton
Sample Type: 6.0 L Silonite Canister
Test Notes:
Container ID: SSC00057

Date Collected: 5/14/14
Date Received: 5/19/14
Date Analyzed: 5/20/14
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -1.33 Final Pressure (psig): 3.66

Canister Dilution Factor: 1.37

CAS #	Compound	Result %, v/v	MRL %, v/v	Data Qualifier
1333-74-0	Hydrogen	ND	0.14	
7782-44-7	Oxygen +			
7440-37-1	Argon	ND	0.14	
7727-37-9	Nitrogen	0.527	0.14	
630-08-0	Carbon Monoxide	ND	0.14	
124-38-9	Carbon Dioxide	ND	0.14	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: Air Hygiene, Incorporated

Client Sample ID: Method Blank

Client Project ID: Cimaron Flare Testing / cei-14-norman.ok-comp#1

ALS Project ID: P1402004

ALS Sample ID: P140520-MB

Test Code: ASTM D1945-03

Instrument ID: HP5890 II/GC1/TCD

Analyst: Wade Henton

Sample Type: 6.0 L Silonite Canister

Test Notes:

Date Collected: NA

Date Received: NA

Date Analyzed: 5/20/14

Volume(s) Analyzed: 0.10 ml(s)

CAS #	Compound	Result %, v/v	MRL %, v/v	Data Qualifier
1333-74-0	Hydrogen	ND	0.10	
7782-44-7	Oxygen +			
7440-37-1	Argon	ND	0.10	
7727-37-9	Nitrogen	ND	0.10	
630-08-0	Carbon Monoxide	ND	0.10	
124-38-9	Carbon Dioxide	ND	0.10	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: Air Hygiene, Incorporated

Client Sample ID: Method Blank

Client Project ID: Cimaron Flare Testing / cei-14-norman.ok-comp#1

ALS Project ID: P1402004

ALS Sample ID: P140521-MB

Test Code: ASTM D1945-03

Instrument ID: HP5890 II/GC1/TCD

Analyst: Nalini Lall

Sample Type: 6.0 L Silonite Canister

Test Notes:

Date Collected: NA

Date Received: NA

Date Analyzed: 5/21/14

Volume(s) Analyzed: 0.10 ml(s)

CAS #	Compound	Result %, v/v	MRL %, v/v	Data Qualifier
1333-74-0	Hydrogen	ND	0.10	
7782-44-7	Oxygen +			
7440-37-1	Argon	ND	0.10	
7727-37-9	Nitrogen	ND	0.10	
630-08-0	Carbon Monoxide	ND	0.10	
124-38-9	Carbon Dioxide	ND	0.10	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Page 1 of 1

Client: Air Hygiene, Incorporated

Client Sample ID: Lab Control Sample

Client Project ID: Cimaron Flare Testing / cei-14-norman.ok-comp#1

ALS Project ID: P1402004

ALS Sample ID: P140520-LCS

Test Code: ASTM D1945-03

Instrument ID: HP5890 II/GC1/TCD

Analyst: Wade Henton

Sample Type: 6.0 L Silonite Canister

Test Notes:

Date Collected: NA

Date Received: NA

Date Analyzed: 5/20/14

Volume(s) Analyzed: NA ml(s)

CAS #	Compound	Spike Amount ppmV	Result ppmV	% Recovery	ALS Acceptance Limits	Data Qualifier
1333-74-0	Hydrogen	40,000	36,000	90	84-110	
7782-44-7	Oxygen +					
7440-37-1	Argon	50,000	50,100	100	88-114	
7727-37-9	Nitrogen	50,000	52,800	106	88-114	
630-08-0	Carbon Monoxide	50,000	49,100	98	88-113	
124-38-9	Carbon Dioxide	50,000	48,700	97	84-109	

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Page 1 of 1

Client: Air Hygiene, Incorporated

Client Sample ID: Lab Control Sample

Client Project ID: Cimaron Flare Testing / cei-14-norman.ok-comp#1

ALS Project ID: P1402004

ALS Sample ID: P140521-LCS

Test Code: ASTM D1945-03

Instrument ID: HP5890 II/GC1/TCD

Analyst: Nalini Lall

Sample Type: 6.0 L Silonite Canister

Test Notes:

Date Collected: NA

Date Received: NA

Date Analyzed: 5/21/14

Volume(s) Analyzed: NA ml(s)

CAS #	Compound	Spike Amount ppmV	Result ppmV	% Recovery	ALS Acceptance Limits	Data Qualifier
1333-74-0	Hydrogen	40,000	35,900	90	84-110	
7782-44-7	Oxygen +					
7440-37-1	Argon	50,000	51,000	102	88-114	
7727-37-9	Nitrogen	50,000	56,400	113	88-114	
630-08-0	Carbon Monoxide	50,000	49,000	98	88-113	
124-38-9	Carbon Dioxide	50,000	48,700	97	84-109	

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: Air Hygiene, Incorporated
Client Sample ID: cei-0-30-0%-Can-48HVECD
Client Project ID: Cimaron Flare Testing / cei-14-norman.ok-comp#1

ALS Project ID: P1402004
 ALS Sample ID: P1402004-001

Test Code: ASTM D1945-03
Instrument ID: HP5890 II/GC8/FID
Analyst: Nalini Lall
Sampling Media: 6.0 L Silonite Canister
Test Notes:
Container ID: SSC00203

Date Collected: 5/7/14
Date Received: 5/19/14
Date Analyzed: 5/21/14
Volume(s) Analyzed: 0.050 ml(s)

Initial Pressure (psig): -0.12 **Final Pressure (psig):** 3.55

Canister Dilution Factor: 1.25

Compound	Result ppmV	MRL ppmV	Data Qualifier
Methane	ND	13	
C ₂ as Ethane	26	13	
C ₃ as Propane	1,000,000	13	
C ₄ as n-Butane	ND	13	
C ₅ as n-Pentane	ND	13	
C ₆ as n-Hexane	ND	13	
C ₆ + as n-Hexane	ND	25	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: Air Hygiene, Incorporated
Client Sample ID: cei-30-70-30%-Can-48HVECD
Client Project ID: Cimaron Flare Testing / cei-14-norman.ok-comp#1

ALS Project ID: P1402004
 ALS Sample ID: P1402004-002

Test Code: ASTM D1945-03
Instrument ID: HP5890 II/GC8/FID
Analyst: Nalini Lall
Sampling Media: 6.0 L Silonite Canister
Test Notes:
Container ID: SSC00253

Date Collected: 5/8/14
Date Received: 5/19/14
Date Analyzed: 5/21/14
Volume(s) Analyzed: 0.050 ml(s)

Initial Pressure (psig): -1.43 **Final Pressure (psig):** 3.68

Canister Dilution Factor: 1.39

Compound	Result ppmV	MRL ppmV	Data Qualifier
Methane	ND	14	
C ₂ as Ethane	24	14	
C ₃ as Propane	990,000	14	
C ₄ as n-Butane	ND	14	
C ₅ as n-Pentane	ND	14	
C ₆ as n-Hexane	ND	14	
C ₆ + as n-Hexane	ND	28	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: Air Hygiene, Incorporated
Client Sample ID: cei-70-100-70%-Can-48HVECD
Client Project ID: Cimaron Flare Testing / cei-14-norman.ok-comp#1

ALS Project ID: P1402004
 ALS Sample ID: P1402004-003

Test Code: ASTM D1945-03
Instrument ID: HP5890 II/GC8/FID
Analyst: Nalini Lall
Sampling Media: 6.0 L Silonite Canister
Test Notes:
Container ID: SSC00174

Date Collected: 5/9/14
Date Received: 5/19/14
Date Analyzed: 5/21/14
Volume(s) Analyzed: 0.050 ml(s)

Initial Pressure (psig): -1.64 **Final Pressure (psig):** 3.51

Canister Dilution Factor: 1.39

Compound	Result ppmV	MRL ppmV	Data Qualifier
Methane	ND	14	
C ₂ as Ethane	20	14	
C ₃ as Propane	1,000,000	14	
C ₄ as n-Butane	ND	14	
C ₅ as n-Pentane	ND	14	
C ₆ as n-Hexane	ND	14	
C ₆ + as n-Hexane	ND	28	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: Air Hygiene, Incorporated
Client Sample ID: cei-90-100%-Can-48HVECD
Client Project ID: Cimaron Flare Testing / cei-14-norman.ok-comp#1

ALS Project ID: P1402004
 ALS Sample ID: P1402004-004

Test Code: ASTM D1945-03
Instrument ID: HP5890 II/GC8/FID
Analyst: Nalini Lall
Sampling Media: 6.0 L Silonite Canister
Test Notes:
Container ID: SSC00057

Date Collected: 5/14/14
Date Received: 5/19/14
Date Analyzed: 5/21/14
Volume(s) Analyzed: 0.050 ml(s)

Initial Pressure (psig): -1.33 **Final Pressure (psig):** 3.66

Canister Dilution Factor: 1.37

Compound	Result ppmV	MRL ppmV	Data Qualifier
Methane	ND	14	
C ₂ as Ethane	31	14	
C ₃ as Propane	990,000	14	
C ₄ as n-Butane	ND	14	
C ₅ as n-Pentane	ND	14	
C ₆ as n-Hexane	ND	14	
C ₆ + as n-Hexane	ND	27	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: Air Hygiene, Incorporated

Client Sample ID: Method Blank

Client Project ID: Cimaron Flare Testing / cei-14-norman.ok-comp#1

ALS Project ID: P1402004

ALS Sample ID: P140521-MB

Test Code: ASTM D1945-03

Instrument ID: HP5890 II/GC8/FID

Analyst: Nalini Lall

Sampling Media: 6.0 L Silonite Canister

Test Notes:

Date Collected: NA

Date Received: NA

Date Analyzed: 5/21/14

Volume(s) Analyzed: 1.0 ml(s)

Compound	Result ppmV	MRL ppmV	Data Qualifier
Methane	ND	0.50	
C ₂ as Ethane	ND	0.50	
C ₃ as Propane	ND	0.50	
C ₄ as n-Butane	ND	0.50	
C ₅ as n-Pentane	ND	0.50	
C ₆ as n-Hexane	ND	0.50	
C ₆ + as n-Hexane	ND	1.0	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Page 1 of 1

Client: Air Hygiene, Incorporated

Client Sample ID: Lab Control Sample

Client Project ID: Cimaron Flare Testing / cei-14-norman.ok-comp#1

ALS Project ID: P1402004

ALS Sample ID: P140521-LCS

Test Code: ASTM D1945-03

Instrument ID: HP5890 II/GC8/FID

Analyst: Nalini Lall

Sampling Media: 6.0 L Silonite Canister

Test Notes:

Date Collected: NA

Date Received: NA

Date Analyzed: 5/21/14

Volume(s) Analyzed: NA ml(s)

Compound	Spike Amount ppmV	Result ppmV	% Recovery	ALS	Data Qualifier
				Acceptance Limits	
Methane	1,020	1,020	100	83-120	
Ethane	1,010	992	98	85-122	
Propane	1,010	983	97	84-121	
n-Butane	1,010	910	90	79-114	
n-Pentane	1,010	912	90	80-121	
n-Hexane	1,020	834	82	73-121	

APPENDIX F

METHOD 3C RESULTS



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www.alsglobal.com

LABORATORY REPORT

May 20, 2014

Min Lee
Air Hygiene, Incorporated
1600 West Tacoma Street
Broken Arrow, OK 74012

RE: cei-14-norman.ok-comp#1

Dear Min:

Enclosed are the results of the samples submitted to our laboratory on May 8, 2014. For your reference, these analyses have been assigned our service request number P1401866.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

ALS | Environmental

Kelly Horiuchi
Laboratory Director



2655 Park Center Dr., Suite A
Simi Valley, CA 93065
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F: +1 805 526 7270
www.alsglobal.com

Client: Air Hygiene, Incorporated
Project: cei-14-norman.ok-comp#1

Service Request No: P1401866

CASE NARRATIVE

The samples were received intact under chain of custody on May 8, 2014 and were stored in accordance with the analytical method requirements. Four of the bags were labeled with an "R1" prefix. The bags were arbitrarily logged and tagged based on the COC per client instructions. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

Fixed Gases Analysis

The samples were analyzed for fixed gases (oxygen/argon, nitrogen, methane and carbon dioxide) according to EPA Method 3C (triplicate injection) using a gas chromatograph equipped with a thermal conductivity detector (TCD). This procedure is described in laboratory SOP VOA-EPA3C. This method is not included on the laboratory's NELAP or AIHA-LAP scope of accreditation.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.

Use of ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.



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ALS Environmental – Simi Valley
 Certifications, Accreditations, and Registrations

Agency	Web Site	Number
AIHA	http://www.aihaaccreditedlabs.org	101661
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0694
DoD ELAP	http://www.pjlabs.com/search-accredited-labs	L14-2
Florida DOH (NELAP)	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E871020
Maine DHHS	http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/labcert.htm	2012039
Minnesota DOH (NELAP)	http://www.health.state.mn.us/accreditation	643428
New Jersey DEP (NELAP)	http://www.nj.gov/dep/oqa/	CA009
New York DOH (NELAP)	http://www.wadsworth.org/labcert/elap/elap.html	11221
Oregon PHD (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	CA200007
Pennsylvania DEP	http://www.depweb.state.pa.us/labs	68-03307 (Registration)
Texas CEQ (NELAP)	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704413-13-4
Utah DOH (NELAP)	http://www.health.utah.gov/lab/labimp/certification/index.html	CA01627201 3-3
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C946

Analyses were performed according to our laboratory's NELAP and DoD-ELAP approved quality assurance program. A complete listing of specific NELAP and DoD-ELAP certified analytes can be found in the certifications section at www.alsglobal.com, or at the accreditation body's website.

Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact the laboratory for information corresponding to a particular certification.

ALS ENVIRONMENTAL

DETAIL SUMMARY REPORT

Client: Air Hygiene, Incorporated
Project ID: cei-14-norman.ok-comp#1

Service Request: P1401866

Date Received: 5/8/2014
Time Received: 09:30

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	3C Modified - Fxd Gases Bag
R1-0-30-0%-48HV ECD	P1401866-001	Air	5/7/2014	00:00	X
R2-0-30-0%-48HV ECD	P1401866-003	Air	5/7/2014	00:00	X
R3-0-30-0%-48HV ECD	P1401866-005	Air	5/7/2014	00:00	X

P1401866



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

SAMPLE DESCRIPTION AND CHAIN OF CUSTODY RECORD

Project Number:		cei-14-norman.ok-comp#1		Laboratory Analysis Requested:		Method 3C	
Person Taking Samples:		TP/MM					
Sample Number	Location	Date	Volume	Analysis Method			
				O ₂	CO ₂	N ₂	Methane
R1-0-30-0%-48HV ECD	Cimaron Norman Facility	5/7/14	10L	X	X	X	X
R1-0-30-0%-48HV ECD-Backup	Cimaron Norman Facility	5/7/14	5L	X	X	X	X
R2-0-30-0%-48HV ECD	Cimaron Norman Facility	5/7/14	10L	X	X	X	X
R2-0-30-0%-48HV ECD-Backup	Cimaron Norman Facility	5/7/14	5L	X	X	X	X
R3-0-30-0%-48HV ECD	Cimaron Norman Facility	5/7/14	10L	X	X	X	X
R3-0-30-0%-48HV ECD-Backup	Cimaron Norman Facility	5/7/14	5L	X	X	X	X
Relinquished by (Signature)		5/7/14		Received by (Signature)		Date: 0930	
Relinquished by (Signature)		Date:		Received by (Signature)		Date:	

14-norman.ok-comp#1-unit 48HV ECD-COC

ALS Environmental **Sample Acceptance Check Form**

Client: Air Hygiene, Incorporated

Work order: P1401866

Project: cei-14-norman.ok-comp#1

Sample(s) received on: 5/8/14

Date opened: 5/8/14

by: MZAMORA

Note: This form is used for all samples received by ALS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

	Yes	No	N/A
1 Were sample containers properly marked with client sample ID?	☐	☒	☐
2 Container(s) supplied by ALS ?	☐	☒	☐
3 Did sample containers arrive in good condition?	☒	☐	☐
4 Were chain-of-custody papers used and filled out?	☒	☐	☐
5 Did sample container labels and/or tags agree with custody papers?	☐	☒	☐
6 Was sample volume received adequate for analysis?	☒	☐	☐
7 Are samples within specified holding times?	☒	☐	☐
8 Was proper temperature (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
9 Was a trip blank received?	☐	☒	☐
10 Were custody seals on outside of cooler/Box?	☐	☒	☐
Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
Were signature and date included?	☐	☐	☒
Were seals intact?	☐	☐	☒
Were custody seals on outside of sample container?	☐	☒	☐
Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
Were signature and date included?	☐	☐	☒
Were seals intact?	☐	☐	☒
11 Do containers have appropriate preservation , according to method/SOP or Client specified information?	☐	☐	☒
Is there a client indication that the submitted samples are pH preserved?	☐	☐	☒
Were VOA vials checked for presence/absence of air bubbles?	☐	☐	☒
Does the client/method/SOP require that the analyst check the sample pH and <u>if necessary</u> alter it?	☐	☐	☒
12 Tubes: Are the tubes capped and intact?	☐	☐	☒
Do they contain moisture?	☐	☐	☒
13 Badges: Are the badges properly capped and intact?	☐	☐	☒
Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1401866-001.01	10 L Tedlar Bag					
P1401866-002.01	5.0 L Tedlar Bag					
P1401866-003.01	10 L Tedlar Bag					
P1401866-004.01	5.0 L Tedlar Bag					
P1401866-005.01	10 L Tedlar Bag					
P1401866-006.01	5.0 L Tedlar Bag					

Explain any discrepancies: (include lab sample ID numbers): _____

Chain of Custody is missing time collected

No time listed relinquishing sample(s) on Chain of Custody

Four of the samples have a R1 prefix on them, there are no bags with an R2 prefix. Per client label 2 as R2.

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: Air Hygiene, Incorporated
Client Sample ID: R1-0-30-0%-48HV ECD
Client Project ID: cei-14-norman.ok-comp#1

ALS Project ID: P1401866
ALS Sample ID: P1401866-001

Test Code: EPA Method 3C Modified
Instrument ID: HP5890 II/GC1/TCD
Analyst: Nalini Lall
Sample Type: 10 L Tedlar Bag
Test Notes:

Date Collected: 5/7/14
Date Received: 5/8/14
Date Analyzed: 5/9/14
Volume(s) Analyzed: 0.10 ml(s)

CAS #	Compound	Result %, v/v	MRL %, v/v	Data Qualifier
7782-44-7	Oxygen +			
7440-37-1	Argon	15.6	0.10	
7727-37-9	Nitrogen	79.6	0.10	
74-82-8	Methane	ND	0.10	
124-38-9	Carbon Dioxide	4.76	0.10	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: Air Hygiene, Incorporated
Client Sample ID: R2-0-30-0%-48HV ECD
Client Project ID: cei-14-norman.ok-comp#1

ALS Project ID: P1401866
ALS Sample ID: P1401866-003

Test Code: EPA Method 3C Modified
Instrument ID: HP5890 II/GC1/TCD
Analyst: Nalini Lall
Sample Type: 10 L Tedlar Bag
Test Notes:

Date Collected: 5/7/14
Date Received: 5/8/14
Date Analyzed: 5/9/14
Volume(s) Analyzed: 0.10 ml(s)

CAS #	Compound	Result %, v/v	MRL %, v/v	Data Qualifier
7782-44-7	Oxygen +			
7440-37-1	Argon	17.3	0.10	
7727-37-9	Nitrogen	79.2	0.10	
74-82-8	Methane	ND	0.10	
124-38-9	Carbon Dioxide	3.52	0.10	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: Air Hygiene, Incorporated
Client Sample ID: R3-0-30-0%-48HV ECD
Client Project ID: cei-14-norman.ok-comp#1

ALS Project ID: P1401866
ALS Sample ID: P1401866-005

Test Code: EPA Method 3C Modified
Instrument ID: HP5890 II/GC1/TCD
Analyst: Nalini Lall
Sample Type: 10 L Tedlar Bag
Test Notes:

Date Collected: 5/7/14
Date Received: 5/8/14
Date Analyzed: 5/9/14
Volume(s) Analyzed: 0.10 ml(s)

CAS #	Compound	Result %, v/v	MRL %, v/v	Data Qualifier
7782-44-7	Oxygen +			
7440-37-1	Argon	17.2	0.10	
7727-37-9	Nitrogen	79.2	0.10	
74-82-8	Methane	ND	0.10	
124-38-9	Carbon Dioxide	3.59	0.10	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: Air Hygiene, Incorporated
Client Sample ID: Method Blank
Client Project ID: cei-14-norman.ok-comp#1

ALS Project ID: P1401866
ALS Sample ID: P140509-MB

Test Code: EPA Method 3C Modified
Instrument ID: HP5890 II/GC1/TCD
Analyst: Nalini Lall
Sample Type: 10 L Tedlar Bag
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 5/09/14
Volume(s) Analyzed: 0.10 ml(s)

CAS #	Compound	Result %, v/v	MRL %, v/v	Data Qualifier
7782-44-7	Oxygen +			
7440-37-1	Argon	ND	0.10	
7727-37-9	Nitrogen	ND	0.10	
74-82-8	Methane	ND	0.10	
124-38-9	Carbon Dioxide	ND	0.10	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

LABORATORY REPORT

May 20, 2014

Min Lee
Air Hygiene, Incorporated
1600 West Tacoma Street
Broken Arrow, OK 74012

RE: cei-14-norman.ok-comp#1

Dear Min:

Enclosed are the results of the samples submitted to our laboratory on May 9, 2014. For your reference, these analyses have been assigned our service request number P1401888.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

ALS | Environmental

Kelly Horiuchi
Laboratory Director

Client: Air Hygiene, Incorporated
Project: cei-14-norman.ok-comp#1

Service Request No: P1401888

CASE NARRATIVE

The samples were received intact under chain of custody on May 9, 2014 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

Fixed Gases Analysis

The samples were analyzed for fixed gases (oxygen/argon, nitrogen, methane and carbon dioxide) according to EPA Method 3C (triplicate injection) using a gas chromatograph equipped with a thermal conductivity detector (TCD). This procedure is described in laboratory SOP VOA-EPA3C. This method is not included on the laboratory's NELAP or AIHA-LAP scope of accreditation.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.

Use of ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.

ALS Environmental – Simi Valley

Certifications, Accreditations, and Registrations

Agency	Web Site	Number
AIHA	http://www.aihaaccreditedlabs.org	101661
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0694
DoD ELAP	http://www.pjlabs.com/search-accredited-labs	L14-2
Florida DOH (NELAP)	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E871020
Maine DHHS	http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/labcert.htm	2012039
Minnesota DOH (NELAP)	http://www.health.state.mn.us/accreditation	643428
New Jersey DEP (NELAP)	http://www.nj.gov/dep/oqa/	CA009
New York DOH (NELAP)	http://www.wadsworth.org/labcert/elap/elap.html	11221
Oregon PHD (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	CA200007
Pennsylvania DEP	http://www.depweb.state.pa.us/labs	68-03307 (Registration)
Texas CEQ (NELAP)	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704413-13-4
Utah DOH (NELAP)	http://www.health.utah.gov/lab/labimp/certification/index.html	CA016272013-3
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C946

Analyses were performed according to our laboratory's NELAP and DoD-ELAP approved quality assurance program. A complete listing of specific NELAP and DoD-ELAP certified analytes can be found in the certifications section at www.alsglobal.com, or at the accreditation body's website.

Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact the laboratory for information corresponding to a particular certification.

ALS ENVIRONMENTAL

DETAIL SUMMARY REPORT

Client: Air Hygiene, Incorporated
Project ID: cei-14-norman.ok-comp#1

Service Request: P1401888

Date Received: 5/9/2014
Time Received: 09:35

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	3C Modified - Fxd Gases Bag
R4-30-70-30%-48HV ECD	P1401888-001	Air	5/8/2014	00:00	X
R5-30-70-30%-48HV ECD	P1401888-003	Air	5/8/2014	00:00	X
R6-30-70-30%-48HV ECD	P1401888-005	Air	5/8/2014	00:00	X

P1401888

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



SAMPLE DESCRIPTION AND CHAIN OF CUSTODY RECORD

Project Number:		cet-14-norman.ok-comp#1		Laboratory Analysis Requested:		Method 3C	
Person Taking Samples:		TP/MM					
Sample Number	Location	Date	Volume	Analysis Method			
				O ₂	CO ₂	N ₂	Methane
R4-30-70-30%-48HV ECD	Cimaron Norman Facility	5/8/14	10L	X	X	X	X
R4-30-70-30%-48HV ECD-Backup	Cimaron Norman Facility	5/8/14	5L	X	X	X	X
R5-30-70-30%-48HV ECD	Cimaron Norman Facility	5/8/14	10L	X	X	X	X
R5-30-70-30%-48HV ECD-Backup	Cimaron Norman Facility	5/8/14	5L	X	X	X	X
R6-30-70-30%-48HV ECD	Cimaron Norman Facility	5/8/14	10L	X	X	X	X
R6-30-70-30%-48HV ECD-Backup	Cimaron Norman Facility	5/8/14	5L	X	X	X	X
Relinquished by: (Signature)		5/8/14	17:40	Received by: (Signature)		5/8/14	09:11
Relinquished by: (Signature)		Date:	Time:	Received by: (Signature)		Date:	Time:

①
②
③
④
⑤
⑥

14-norman.ok-comp#1-unit 48HV ECD-COC

**ALS Environmental
Sample Acceptance Check Form**

Client: Air Hygiene, Incorporated

Work order: P1401888

Project: cei-14-norman.ok-comp#1

Sample(s) received on: 5/9/14

Date opened: 5/9/14

by: MZAMORA

Note: This form is used for all samples received by ALS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

	Yes	No	N/A
1 Were sample containers properly marked with client sample ID?	☒	☐	☐
2 Container(s) supplied by ALS ?	☐	☒	☐
3 Did sample containers arrive in good condition?	☒	☐	☐
4 Were chain-of-custody papers used and filled out?	☒	☐	☐
5 Did sample container labels and/or tags agree with custody papers?	☒	☐	☐
6 Was sample volume received adequate for analysis?	☒	☐	☐
7 Are samples within specified holding times?	☒	☐	☐
8 Was proper temperature (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
9 Was a trip blank received?	☐	☒	☐
10 Were custody seals on outside of cooler/Box?	☐	☒	☐
Location of seal(s)? _____			
Sealing Lid?	☐	☐	☒
Were signature and date included?	☐	☐	☒
Were seals intact?	☐	☐	☒
Were custody seals on outside of sample container?	☐	☒	☐
Location of seal(s)? _____			
Sealing Lid?	☐	☐	☒
Were signature and date included?	☐	☐	☒
Were seals intact?	☐	☐	☒
11 Do containers have appropriate preservation , according to method/SOP or Client specified information?	☐	☐	☒
Is there a client indication that the submitted samples are pH preserved?	☐	☐	☒
Were VOA vials checked for presence/absence of air bubbles?	☐	☐	☒
Does the client/method/SOP require that the analyst check the sample pH and <u>if necessary</u> alter it?	☐	☐	☒
12 Tubes: Are the tubes capped and intact?	☐	☐	☒
Do they contain moisture?	☐	☐	☒
13 Badges: Are the badges properly capped and intact?	☐	☐	☒
Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1401888-001.01	10 L Tedlar Bag					
P1401888-002.01	5.0 L Tedlar Bag					
P1401888-003.01	10 L Tedlar Bag					
P1401888-004.01	5.0 L Tedlar Bag					
P1401888-005.01	10 L Tedlar Bag					
P1401888-006.01	5.0 L Tedlar Bag					

Explain any discrepancies: (include lab sample ID numbers): _____

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: Air Hygiene, Incorporated
Client Sample ID: R4-30-70-30%-48HV ECD
Client Project ID: cei-14-norman.ok-comp#1

ALS Project ID: P1401888
ALS Sample ID: P1401888-001

Test Code: EPA Method 3C Modified
Instrument ID: HP5890 II/GC1/TCD
Analyst: Nalini Lall
Sample Type: 10 L Tedlar Bag
Test Notes:

Date Collected: 5/8/14
Date Received: 5/9/14
Date Analyzed: 5/10/14
Volume(s) Analyzed: 0.10 ml(s)

CAS #	Compound	Result %, v/v	MRL %, v/v	Data Qualifier
7782-44-7	Oxygen +			
7440-37-1	Argon	15.1	0.10	
7727-37-9	Nitrogen	79.8	0.10	
74-82-8	Methane	ND	0.10	
124-38-9	Carbon Dioxide	5.14	0.10	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: Air Hygiene, Incorporated
Client Sample ID: R5-30-70-30%-48HV ECD
Client Project ID: cei-14-norman.ok-comp#1

ALS Project ID: P1401888
ALS Sample ID: P1401888-003

Test Code: EPA Method 3C Modified
Instrument ID: HP5890 II/GC1/TCD
Analyst: Nalini Lall
Sample Type: 10 L Tedlar Bag
Test Notes:

Date Collected: 5/8/14
Date Received: 5/9/14
Date Analyzed: 5/10/14
Volume(s) Analyzed: 0.10 ml(s)

CAS #	Compound	Result %, v/v	MRL %, v/v	Data Qualifier
7782-44-7	Oxygen +			
7440-37-1	Argon	15.6	0.10	
7727-37-9	Nitrogen	79.6	0.10	
74-82-8	Methane	ND	0.10	
124-38-9	Carbon Dioxide	4.74	0.10	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: Air Hygiene, Incorporated
Client Sample ID: R6-30-70-30%-48HV ECD
Client Project ID: cei-14-norman.ok-comp#1

ALS Project ID: P1401888
ALS Sample ID: P1401888-005

Test Code: EPA Method 3C Modified
Instrument ID: HP5890 II/GC1/TCD
Analyst: Nalini Lall
Sample Type: 10 L Tedlar Bag
Test Notes:

Date Collected: 5/8/14
Date Received: 5/9/14
Date Analyzed: 5/10/14
Volume(s) Analyzed: 0.10 ml(s)

CAS #	Compound	Result %, v/v	MRL %, v/v	Data Qualifier
7782-44-7	Oxygen +			
7440-37-1	Argon	15.0	0.10	
7727-37-9	Nitrogen	79.8	0.10	
74-82-8	Methane	ND	0.10	
124-38-9	Carbon Dioxide	5.23	0.10	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: Air Hygiene, Incorporated
Client Sample ID: Method Blank
Client Project ID: cei-14-norman.ok-comp#1

ALS Project ID: P1401888
ALS Sample ID: P140510-MB

Test Code: EPA Method 3C Modified
Instrument ID: HP5890 II/GC1/TCD
Analyst: Nalini Lall
Sample Type: 10 L Tedlar Bag
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 5/10/14
Volume(s) Analyzed: 0.10 ml(s)

CAS #	Compound	Result %, v/v	MRL %, v/v	Data Qualifier
7782-44-7	Oxygen +			
7440-37-1	Argon	ND	0.10	
7727-37-9	Nitrogen	ND	0.10	
74-82-8	Methane	ND	0.10	
124-38-9	Carbon Dioxide	ND	0.10	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

LABORATORY REPORT

May 20, 2014

Min Lee
Air Hygiene, Incorporated
1600 West Tacoma Street
Broken Arrow, OK 74012

RE: cei-14-norman.ok-comp#1

Dear Min:

Enclosed are the results of the samples submitted to our laboratory on May 10, 2014. For your reference, these analyses have been assigned our service request number P1401903.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

ALS | Environmental

Kelly Horiuchi
Laboratory Director

Client: Air Hygiene, Incorporated
Project: cei-14-norman.ok-comp#1

Service Request No: P1401903

CASE NARRATIVE

The samples were received intact under chain of custody on May 10, 2014 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

Fixed Gases Analysis

The samples were analyzed for fixed gases (oxygen/argon, nitrogen, methane and carbon dioxide) according to modified EPA Method 3C (triplicate injection) using a gas chromatograph equipped with a thermal conductivity detector (TCD). This procedure is described in laboratory SOP VOA-EPA3C. This method is not included on the laboratory's NELAP or AIHA-LAP scope of accreditation.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.

Use of ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.

ALS Environmental – Simi Valley

Certifications, Accreditations, and Registrations

Agency	Web Site	Number
AIHA	http://www.aihaaccreditedlabs.org	101661
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0694
DoD ELAP	http://www.pjlabs.com/search-accredited-labs	L14-2
Florida DOH (NELAP)	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E871020
Maine DHHS	http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/labcert.htm	2012039
Minnesota DOH (NELAP)	http://www.health.state.mn.us/accreditation	643428
New Jersey DEP (NELAP)	http://www.nj.gov/dep/oqa/	CA009
New York DOH (NELAP)	http://www.wadsworth.org/labcert/elap/elap.html	11221
Oregon PHD (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	CA200007
Pennsylvania DEP	http://www.depweb.state.pa.us/labs	68-03307 (Registration)
Texas CEQ (NELAP)	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704413-13-4
Utah DOH (NELAP)	http://www.health.utah.gov/lab/labimp/certification/index.html	CA016272013-3
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C946

Analyses were performed according to our laboratory's NELAP and DoD-ELAP approved quality assurance program. A complete listing of specific NELAP and DoD-ELAP certified analytes can be found in the certifications section at www.alsglobal.com, or at the accreditation body's website.

Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact the laboratory for information corresponding to a particular certification.

ALS ENVIRONMENTAL

DETAIL SUMMARY REPORT

Client: Air Hygiene, Incorporated
Project ID: cei-14-norman.ok-comp#1

Service Request: P1401903

Date Received: 5/10/2014
Time Received: 11:06

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	3C Modified - Fxd Gases Bag
R7-70-100-70%-48HV ECD	P1401903-001	Air	5/9/2014	00:00	X
R8-70-100-70%-48HV ECD	P1401903-003	Air	5/9/2014	00:00	X
R9-70-100-70%-48HV ECD	P1401903-005	Air	5/9/2014	00:00	X
R10-90-100-48HV ECD	P1401903-007	Air	5/9/2014	00:00	X

**ALS Environmental
Sample Acceptance Check Form**

Client: Air Hygiene, Incorporated

Work order: P1401903

Project: cei-14-norman.ok-comp#1

Sample(s) received on: 5/10/14

Date opened: 5/10/14

by: MZAMORA

Note: This form is used for all samples received by ALS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

	Yes	No	N/A
1 Were sample containers properly marked with client sample ID?	☒	☐	☐
2 Container(s) supplied by ALS ?	☐	☒	☐
3 Did sample containers arrive in good condition?	☒	☐	☐
4 Were chain-of-custody papers used and filled out?	☒	☐	☐
5 Did sample container labels and/or tags agree with custody papers?	☒	☐	☐
6 Was sample volume received adequate for analysis?	☒	☐	☐
7 Are samples within specified holding times?	☒	☐	☐
8 Was proper temperature (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
9 Was a trip blank received?	☐	☒	☐
10 Were custody seals on outside of cooler/Box?	☐	☒	☐
Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
Were signature and date included?	☐	☐	☒
Were seals intact?	☐	☐	☒
Were custody seals on outside of sample container?	☐	☒	☐
Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
Were signature and date included?	☐	☐	☒
Were seals intact?	☐	☐	☒
11 Do containers have appropriate preservation , according to method/SOP or Client specified information?	☐	☐	☒
Is there a client indication that the submitted samples are pH preserved?	☐	☐	☒
Were VOA vials checked for presence/absence of air bubbles?	☐	☐	☒
Does the client/method/SOP require that the analyst check the sample pH and <u>if necessary</u> alter it?	☐	☐	☒
12 Tubes: Are the tubes capped and intact?	☐	☐	☒
Do they contain moisture?	☐	☐	☒
13 Badges: Are the badges properly capped and intact?	☐	☐	☒
Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1401903-001.01	10 L Tedlar Bag					
P1401903-002.01	5.0 L Tedlar Bag					
P1401903-003.01	10 L Tedlar Bag					
P1401903-004.01	5.0 L Tedlar Bag					
P1401903-005.01	10 L Tedlar Bag					
P1401903-006.01	5.0 L Tedlar Bag					
P1401903-007.01	10 L Tedlar Bag					
P1401903-008.01	5.0 L Tedlar Bag					

Explain any discrepancies: (include lab sample ID numbers): _____

Chain of Custody is missing time collected _____

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: Air Hygiene, Incorporated
Client Sample ID: R7-70-100-70%-48HV ECD
Client Project ID: cei-14-norman.ok-comp#1

ALS Project ID: P1401903
ALS Sample ID: P1401903-001

Test Code: EPA Method 3C Modified
Instrument ID: HP5890 II/GC1/TCD
Analyst: Nalini Lall
Sample Type: 10 L Tedlar Bag
Test Notes:

Date Collected: 5/9/14
Date Received: 5/10/14
Date Analyzed: 5/11/14
Volume(s) Analyzed: 0.10 ml(s)

CAS #	Compound	Result %, v/v	MRL %, v/v	Data Qualifier
7782-44-7	Oxygen +			
7440-37-1	Argon	15.2	0.10	
7727-37-9	Nitrogen	79.8	0.10	
74-82-8	Methane	ND	0.10	
124-38-9	Carbon Dioxide	5.03	0.10	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: Air Hygiene, Incorporated
Client Sample ID: R8-70-100-70%-48HV ECD
Client Project ID: cei-14-norman.ok-comp#1

ALS Project ID: P1401903
ALS Sample ID: P1401903-003

Test Code: EPA Method 3C Modified
Instrument ID: HP5890 II/GC1/TCD
Analyst: Nalini Lall
Sample Type: 10 L Tedlar Bag
Test Notes:

Date Collected: 5/9/14
Date Received: 5/10/14
Date Analyzed: 5/11/14
Volume(s) Analyzed: 0.10 ml(s)

CAS #	Compound	Result %, v/v	MRL %, v/v	Data Qualifier
7782-44-7	Oxygen +			
7440-37-1	Argon	14.9	0.10	
7727-37-9	Nitrogen	79.8	0.10	
74-82-8	Methane	ND	0.10	
124-38-9	Carbon Dioxide	5.25	0.10	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: Air Hygiene, Incorporated
Client Sample ID: R9-70-100-70%-48HV ECD
Client Project ID: cei-14-norman.ok-comp#1

ALS Project ID: P1401903
ALS Sample ID: P1401903-005

Test Code: EPA Method 3C Modified
Instrument ID: HP5890 II/GC1/TCD
Analyst: Nalini Lall
Sample Type: 10 L Tedlar Bag
Test Notes:

Date Collected: 5/9/14
Date Received: 5/10/14
Date Analyzed: 5/12/14
Volume(s) Analyzed: 0.10 ml(s)

CAS #	Compound	Result %, v/v	MRL %, v/v	Data Qualifier
7782-44-7	Oxygen +			
7440-37-1	Argon	14.7	0.10	
7727-37-9	Nitrogen	79.9	0.10	
74-82-8	Methane	ND	0.10	
124-38-9	Carbon Dioxide	5.43	0.10	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

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Client: Air Hygiene, Incorporated
Client Sample ID: R10-90-100-48HV ECD
Client Project ID: cei-14-norman.ok-comp#1

ALS Project ID: P1401903
ALS Sample ID: P1401903-007

Test Code: EPA Method 3C Modified
Instrument ID: HP5890 II/GC1/TCD
Analyst: Nalini Lall
Sample Type: 10 L Tedlar Bag
Test Notes:

Date Collected: 5/9/14
Date Received: 5/10/14
Date Analyzed: 5/12/14
Volume(s) Analyzed: 0.10 ml(s)

CAS #	Compound	Result %, v/v	MRL %, v/v	Data Qualifier
7782-44-7	Oxygen +			
7440-37-1	Argon	14.7	0.10	
7727-37-9	Nitrogen	79.9	0.10	
74-82-8	Methane	ND	0.10	
124-38-9	Carbon Dioxide	5.37	0.10	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: Air Hygiene, Incorporated
Client Sample ID: Method Blank
Client Project ID: cei-14-norman.ok-comp#1

ALS Project ID: P1401903
ALS Sample ID: P140511-MB

Test Code: EPA Method 3C Modified
Instrument ID: HP5890 II/GC1/TCD
Analyst: Nalini Lall
Sample Type: 10 L Tedlar Bag
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 5/11/14
Volume(s) Analyzed: 0.10 ml(s)

CAS #	Compound	Result %, v/v	MRL %, v/v	Data Qualifier
7782-44-7	Oxygen +			
7440-37-1	Argon	ND	0.10	
7727-37-9	Nitrogen	ND	0.10	
74-82-8	Methane	ND	0.10	
124-38-9	Carbon Dioxide	ND	0.10	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: Air Hygiene, Incorporated
Client Sample ID: Method Blank
Client Project ID: cei-14-norman.ok-comp#1

ALS Project ID: P1401903
ALS Sample ID: P140512-MB

Test Code: EPA Method 3C Modified
Instrument ID: HP5890 II/GC1/TCD
Analyst: Nalini Lall
Sample Type: 10 L Tedlar Bag
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 5/12/14
Volume(s) Analyzed: 0.10 ml(s)

CAS #	Compound	Result %, v/v	MRL %, v/v	Data Qualifier
7782-44-7	Oxygen +			
7440-37-1	Argon	ND	0.10	
7727-37-9	Nitrogen	ND	0.10	
74-82-8	Methane	ND	0.10	
124-38-9	Carbon Dioxide	ND	0.10	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

LABORATORY REPORT

May 22, 2014

Min Lee
Air Hygiene, Incorporated
1600 West Tacoma Street
Broken Arrow, OK 74012

RE: cei-14-norman.ok-comp#1

Dear Min:

Enclosed are the results of the samples submitted to our laboratory on May 15, 2014. For your reference, these analyses have been assigned our service request number P1401957.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

ALS | Environmental

Kelly Horiuchi
Laboratory Director

Client: Air Hygiene, Incorporated
Project: cei-14-norman.ok-comp#1

Service Request No: P1401957

CASE NARRATIVE

The samples were received intact under chain of custody on May 15, 2014 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

Fixed Gases Analysis

The samples were analyzed for fixed gases (oxygen/argon, nitrogen, methane and carbon dioxide) according to modified EPA Method 3C (triplicate injection) using a gas chromatograph equipped with a thermal conductivity detector (TCD). This procedure is described in laboratory SOP VOA-EPA3C. This method is not included on the laboratory's NELAP or AIHA-LAP scope of accreditation.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.

Use of ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.

ALS Environmental – Simi Valley
Certifications, Accreditations, and Registrations

Agency	Web Site	Number
AIHA	http://www.aihaaccreditedlabs.org	101661
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0694
DoD ELAP	http://www.pjlabs.com/search-accredited-labs	L14-2
Florida DOH (NELAP)	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E871020
Maine DHHS	http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/labcert.htm	2012039
Minnesota DOH (NELAP)	http://www.health.state.mn.us/accreditation	643428
New Jersey DEP (NELAP)	http://www.nj.gov/dep/oqa/	CA009
New York DOH (NELAP)	http://www.wadsworth.org/labcert/elap/elap.html	11221
Oregon PHD (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	CA200007
Pennsylvania DEP	http://www.depweb.state.pa.us/labs	68-03307 (Registration)
Texas CEQ (NELAP)	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704413-13-4
Utah DOH (NELAP)	http://www.health.utah.gov/lab/labimp/certification/index.html	CA016272013-3
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C946

Analyses were performed according to our laboratory's NELAP and DoD-ELAP approved quality assurance program. A complete listing of specific NELAP and DoD-ELAP certified analytes can be found in the certifications section at www.alsglobal.com, or at the accreditation body's website.

Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact the laboratory for information corresponding to a particular certification.

ALS ENVIRONMENTAL

DETAIL SUMMARY REPORT

Client: Air Hygiene, Incorporated
Project ID: cei-14-norman.ok-comp#1

Service Request: P1401957

Date Received: 5/15/2014
Time Received: 09:40

3C Modified - Fxd Gases Bag 2X

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	
R2-0-30-0-48 ECD	P1401957-001	Air	5/14/2014	00:00	X
R3-0-30-0-48 ECD	P1401957-003	Air	5/14/2014	00:00	X
R11-90-100-48HV ECD	P1401957-005	Air	5/14/2014	00:00	X
R12-90-100-48HV ECD	P1401957-007	Air	5/14/2014	00:00	X

Q1401957



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

**SAMPLE DESCRIPTION AND
CHAIN OF CUSTODY RECORD**

Project Number: cel-14-norman.ok-comp#1		Laboratory Analysis Requested: Method 3C					
Person Taking Samples:		TPMM					
Sample Number	Location	Date	Volume	Analysis Method			
				O ₂	CO ₂	N ₂	Methane
R2-0-30-0-48 ECD	Cimaron Norman Facility	5/14/14	10L	X	X	X	X
R2-0-30-0-48 ECD-Back Up	Cimaron Norman Facility	5/14/14	5L	X	X	X	X
R3-0-30-0-48 ECD	Cimaron Norman Facility	5/14/14	10	X	X	X	X
R3-0-30-0-48 ECD-Back Up	Cimaron Norman Facility	5/14/14	5	X	X	X	X
R11-90-100-48HV ECD	Cimaron Norman Facility	5/14/14	10	X	X	X	X
R11-90-100-48HV ECD-Back Up	Cimaron Norman Facility	5/14/14	5	X	X	X	X
R12-90-100-48HV ECD	Cimaron Norman Facility	5/14/14	10	X	X	X	X
R12-90-100-48HV ECD-Back Up	Cimaron Norman Facility	5/14/14	5	X	X	X	X
Relinquished by: (Signature) <i>[Signature]</i>		Date: 5/14/14	Time: 14:50	Received by: (Signature) <i>[Signature]</i>		Date: 5/14/14	Time: 0940
Relinquished by: (Signature) _____		Date: _____	Time: _____	Received by: (Signature) _____		Date: _____	Time: _____

① ② ③ ④ ⑤ ⑥ ⑦ ⑧

ALS Environmental **Sample Acceptance Check Form**

Client: Air Hygiene, Incorporated

Work order: P1401957

Project: cei-14-norman.ok-comp#1

Sample(s) received on: 5/15/14

Date opened: 5/15/14

by: MZAMORA

Note: This form is used for all samples received by ALS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

	Yes	No	N/A
1 Were sample containers properly marked with client sample ID?	☒	☐	☐
2 Container(s) supplied by ALS ?	☐	☒	☐
3 Did sample containers arrive in good condition?	☒	☐	☐
4 Were chain-of-custody papers used and filled out?	☒	☐	☐
5 Did sample container labels and/or tags agree with custody papers?	☒	☐	☐
6 Was sample volume received adequate for analysis?	☒	☐	☐
7 Are samples within specified holding times?	☒	☐	☐
8 Was proper temperature (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
9 Was a trip blank received?	☐	☒	☐
10 Were custody seals on outside of cooler/Box?	☐	☒	☐
Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
Were signature and date included?	☐	☐	☒
Were seals intact?	☐	☐	☒
Were custody seals on outside of sample container?	☐	☒	☐
Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
Were signature and date included?	☐	☐	☒
Were seals intact?	☐	☐	☒
11 Do containers have appropriate preservation , according to method/SOP or Client specified information?	☐	☐	☒
Is there a client indication that the submitted samples are pH preserved?	☐	☐	☒
Were VOA vials checked for presence/absence of air bubbles?	☐	☐	☒
Does the client/method/SOP require that the analyst check the sample pH and <u>if necessary</u> alter it?	☐	☐	☒
12 Tubes: Are the tubes capped and intact?	☐	☐	☒
Do they contain moisture?	☐	☐	☒
13 Badges: Are the badges properly capped and intact?	☐	☐	☒
Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1401957-001.01	10 L Tedlar Bag					
P1401957-002.01	5.0 L Tedlar Bag					
P1401957-003.01	10 L Tedlar Bag					
P1401957-004.01	5.0 L Tedlar Bag					
P1401957-005.01	10 L Tedlar Bag					
P1401957-006.01	5.0 L Tedlar Bag					
P1401957-007.01	10 L Tedlar Bag					
P1401957-008.01	5.0 L Tedlar Bag					

Explain any discrepancies: (include lab sample ID numbers): _____

Chain of Custody is missing time collected _____

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: Air Hygiene, Incorporated
Client Sample ID: R11-90-100-48HV ECD
Client Project ID: cei-14-norman.ok-comp#1

ALS Project ID: P1401957
ALS Sample ID: P1401957-005

Test Code: EPA Method 3C Modified
Instrument ID: HP5890 II/GC1/TCD
Analyst: Nalini Lall
Sample Type: 10 L Tedlar Bag
Test Notes:

Date Collected: 5/14/14
Date Received: 5/15/14
Date Analyzed: 5/16/14
Volume(s) Analyzed: 0.10 ml(s)

CAS #	Compound	Result %, v/v	MRL %, v/v	Data Qualifier
7782-44-7	Oxygen +			
7440-37-1	Argon	14.7	0.10	
7727-37-9	Nitrogen	79.9	0.10	
74-82-8	Methane	ND	0.10	
124-38-9	Carbon Dioxide	5.42	0.10	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: Air Hygiene, Incorporated
Client Sample ID: R12-90-100-48HV ECD
Client Project ID: cei-14-norman.ok-comp#1

ALS Project ID: P1401957
ALS Sample ID: P1401957-007

Test Code: EPA Method 3C Modified
Instrument ID: HP5890 II/GC1/TCD
Analyst: Nalini Lall
Sample Type: 10 L Tedlar Bag
Test Notes:

Date Collected: 5/14/14
Date Received: 5/15/14
Date Analyzed: 5/16/14
Volume(s) Analyzed: 0.10 ml(s)

CAS #	Compound	Result %, v/v	MRL %, v/v	Data Qualifier
7782-44-7	Oxygen +			
7440-37-1	Argon	15.9	0.10	
7727-37-9	Nitrogen	79.5	0.10	
74-82-8	Methane	ND	0.10	
124-38-9	Carbon Dioxide	4.54	0.10	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: Air Hygiene, Incorporated
Client Sample ID: Method Blank
Client Project ID: cei-14-norman.ok-comp#1

ALS Project ID: P1401957
ALS Sample ID: P140515-MB

Test Code: EPA Method 3C Modified
Instrument ID: HP5890 II/GC1/TCD
Analyst: Nalini Lall
Sample Type: 10 L Tedlar Bag
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 5/15/14
Volume(s) Analyzed: 0.10 ml(s)

CAS #	Compound	Result %, v/v	MRL %, v/v	Data Qualifier
7782-44-7	Oxygen +			
7440-37-1	Argon	ND	0.10	
7727-37-9	Nitrogen	ND	0.10	
74-82-8	Methane	ND	0.10	
124-38-9	Carbon Dioxide	ND	0.10	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: Air Hygiene, Incorporated
Client Sample ID: Method Blank
Client Project ID: cei-14-norman.ok-comp#1

ALS Project ID: P1401957
ALS Sample ID: P140516-MB

Test Code: EPA Method 3C Modified
Instrument ID: HP5890 II/GC1/TCD
Analyst: Nalini Lall
Sample Type: 10 L Tedlar Bag
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 5/16/14
Volume(s) Analyzed: 0.10 ml(s)

CAS #	Compound	Result %, v/v	MRL %, v/v	Data Qualifier
7782-44-7	Oxygen +			
7440-37-1	Argon	ND	0.10	
7727-37-9	Nitrogen	ND	0.10	
74-82-8	Methane	ND	0.10	
124-38-9	Carbon Dioxide	ND	0.10	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

APPENDIX G

Field Data Sheets



AIR HYGIENE

MULTI LOAD TEST - FIELD DATA SHEET

Company:	Cimarron Energy		
Location:	Norman Facility		
Date:	5/14/14		
Unit Make and Model:	48HV ELD		
Unit Number:			
Serial Number:	MSL		
Data Recorded By:			
Tested With AHI Unit(s):	Truck(s):	Trailer(s):	
LDEQ Warmup/Cal Req:	On (Day/Time):	06:00	Cal (Day/Time): 08:00

CYLINDER SERIAL NUMBERS	O ₂			CO			THC			CO ₂		
	Low											
	Mid											
	High											
	6203137			6259857			ALM08650			6203137		
	6252566			627555			ALM05526			6252566		

RUN INFORMATION	Low Load			Mid Load			Mid-High Load			High Load		
	% #1	% #2	% #3	% #1	% #2	% #3	% #1	% #2	% #3	% #1	% #2	% #3
	Time Start (hh:mm:ss)	Time Stop (hh:mm:ss)	Barometric Pressure (in. Hg)	Time Start (hh:mm:ss)	Time Stop (hh:mm:ss)	Barometric Pressure (in. Hg)	Time Start (hh:mm:ss)	Time Stop (hh:mm:ss)	Barometric Pressure (in. Hg)	Time Start (hh:mm:ss)	Time Stop (hh:mm:ss)	Barometric Pressure (in. Hg)
	13:45:06	16:27:00	16.24:06	14:45:06	16:09:06	17:27:06	29:20	29:09	29:75	85	91	83
	85	42	26	24	20	16	15	15	15	55E	55E	55E
	Wind Speed (mph)	Wind Direction										

CALIBRATION	O ₂			CO			THC			CO ₂		
	Conc.	Actual	Conc.	Actual	Conc.	Actual	Conc.	Actual	Conc.	Zero	Mid	Actual
	0	0.20	0	0.07	0	0.36	0	0.36	0	0.05	0.05	0.05
Zero Gas												
Low Gas												
Mid Gas												
High Gas												

BIAS	O ₂			CO			THC			CO ₂		
	Zero	Mid	Actual	Zero	Mid	Actual	Zero	Mid	Actual	Zero	Mid	Actual
	0.34	12.54	0.11	8.71	0.04	3.16	0.04	3.16	8.51	0.04	8.51	8.51
Initial Low Load Run #1												
Load 1 Run #1 / Load 1 Run #2												
Load 1 Run #2 / Load 1 Run #3												
Load 1 Run #3 / Load 2 Run #1												
Load 2 Run #1 / Load 2 Run #2												
Load 2 Run #2 / Load 2 Run #3												
Load 2 Run #3 / Load 3 Run #1												
Load 3 Run #1 / Load 3 Run #2												
Load 3 Run #2 / Load 3 Run #3												
Load 3 Run #3 / Load 4 Run #1												
Load 4 Run #1 / Load 4 Run #2												
Load 4 Run #2 / Load 4 Run #3												
Load 4 Run #3 Final												

Bias Gas Actual Conc.



AIR HYGIENE

MULTI LOAD TEST - FIELD DATA SHEET

Company:	Amazon Energy		
Location:	Norman Facility		
Date:	5/18/14		
Unit Make and Model:	48HVED		
Unit Number:			
Serial Number:			
Data Recorded By:	MSL		
Truck(s):	140	Trailer(s):	209
LDEQ Warmup/Cal Req:	On (Day/Time): 08:30	Cal (Day/Time):	08:00

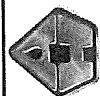
CYLINDER SERIAL NUMBERS		O ₂	CO	THC	CO ₂
Low				ALM06309	
Mid	CC203724	CC59857	CC20382	ALM030515	CC20382
High	CC52566	CC7555	CC2561	ALM035126	CC2561

RUN INFORMATION	Low Load			Mid Load			Mid-High Load			High Load		
	% #1	% #2	% #3	% #1	% #2	% #3	% #1	% #2	% #3	% #1	% #2	% #3
Time Start (hh:mm:ss)				30:40-30:40	15:05:00	16:15:00						
Time Stop (hh:mm:ss)				13:46:00	16:05:00	17:25:00						
Barometric Pressure (in. Hg)				29.84	29.82	29.80						
Ambient Temperature (°F)				77	83	85						
Relative Humidity (%)				45	40	25						
Wind Speed (mph)				15	15	12						
Wind Direction				S	S	S						

CALIBRATION	O ₂		CO		THC		CO ₂	
	Conc.	Actual	Conc.	Actual	Conc.	Actual	Conc.	Actual
Zero Gas	0	-0.02	0	0.04	0	0.03	0	0.04
Low Gas	12.2	11.98	9	9.02	3.04	3.02	8.56	8.70
Mid Gas	21.1	20.88	17.3	17.35	5.04	5.00	18.6	18.58
High Gas					8.48	8.45		

BIAS	O ₂		CO		THC		CO ₂	
	Zero	Mid	Zero	Mid	Zero	Mid	Zero	Mid
Initial Low Load Run #1	0.10	11.84	-0.03	8.91	0.04	3.10	0.07	8.44
Load 1 Run #1 / Load 1 Run #2	0.32	12.17	-0.06	8.86	0.04	2.95	0.05	8.44
Load 1 Run #2 / Load 1 Run #3	0.33	12.16	0.07	8.84	0.02	3.02	0.10	8.42
Load 1 Run #3 / Load 2 Run #1	0.35	12.17	-0.08	8.95	0.04	3.00	0.09	8.43
Load 2 Run #1 / Load 2 Run #2								
Load 2 Run #2 / Load 2 Run #3								
Load 2 Run #3 / Load 3 Run #1								
Load 3 Run #1 / Load 3 Run #2								
Load 3 Run #2 / Load 3 Run #3								
Load 3 Run #3 / Load 4 Run #1								
Load 4 Run #1 / Load 4 Run #2								
Load 4 Run #2 / Load 4 Run #3								
Load 4 Run #3 Final								

Bias Gas Actual Conc.



AIR HYGIENE

MULTI LOAD TEST - FIELD DATA SHEET

Company:	Cimarron Energy		
Location:	Norman Facility		
Date:	5/9/2014		
Unit Make and Model:	-		
Unit Number:	-		
Serial Number:	MSL		
Data Recorded By:	Truck(s): 140 Trailer(s): 209		
Tested With AHI Unit(s):	On (Day/Time): 06:00 Cal (Day/Time): 07:40		
LDEQ Warmup/Cal Req:			

CYLINDER SERIAL NUMBERS	O ₂	CO	THC	CO ₂	
	Low				
	Mid	CC203322	CC59857	ALM010315	CC203132
	High	CC2566	CC4555	ALM03506	CC52566

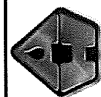
RUN INFORMATION	Low Load			Mid Load			Mid-High Load			High Load		
	% #1	% #2	% #3	% #1	% #2	% #3	% #1	% #2	% #3	% #1	% #2	% #3
Time Start (hh:mm:ss)												
Time Stop (hh:mm:ss)												
Barometric Pressure (in. Hg)												
Ambient Temperature (°F)												
Relative Humidity (%)												
Wind Speed (mph)												
Wind Direction												

CALIBRATION	O ₂		CO		THC		CO ₂	
	Conc.	Actual	Conc.	Actual	Conc.	Actual	Conc.	Actual
Zero Gas	0	0.32	0	0.09	0	0.04	0	0.04
Low Gas					3.04			
Mid Gas	12.2	12.3	9	9.18	5.04	4.93	8.56	8.70
High Gas	21.1	21.06	17.3	17.29	8.48	8.41	18.6	18.59

BIAS	O ₂			CO			THC			CO ₂		
	Zero	Mid	Zero	Mid	Zero	Mid	Zero	Mid	Zero	Mid	Zero	Mid
Initial Low Load Run #1	0.37	17.05	0.06	9.02	0.02	3.02	0.01	8.61				
Load 1 Run #1 / Load 1 Run #2	0.36	11.98	0.18	8.91	0.03	2.93	0.09	8.66				
Load 1 Run #2 / Load 1 Run #3	0.33	11.99	0.19	8.71	0.02	2.90	0.01	8.64				
Load 1 Run #3 / Load 2 Run #1	0.35	11.95	0.12	8.64	0.06	2.92	0.07	8.65				
Load 2 Run #1 / Load 2 Run #2	0.34	12.10	0.18	8.99	0.02	2.91	0.01	8.58				
Load 2 Run #2 / Load 2 Run #3												
Load 2 Run #3 / Load 3 Run #1												
Load 3 Run #1 / Load 3 Run #2												
Load 3 Run #2 / Load 3 Run #3												
Load 3 Run #3 / Load 4 Run #1												
Load 4 Run #1 / Load 4 Run #2												
Load 4 Run #2 / Load 4 Run #3												
Load 4 Run #3 Final												

Bias Gas Actual Conc.

Sample-W 2-0016



AIR HYGIENE

MULTI LOAD TEST - FIELD DATA SHEET

Company:	Ginnard Energy		
Location:	Norman facility		
Date:	5/14/14		
Unit Make and Model:	28HVE6D		
Unit Number:			
Serial Number:	MCL		
Data Recorded By:	Truck(s): 2099		
Tested With AHL Unit(s):	On (Day/Time): 06:00 Cal (Day/Time): 08:00		
LDEQ Warmup/Cal Req:			

CYLINDER SERIAL NUMBERS	O ₂		CO		THC		CO ₂	
	Low	Mid	Low	Mid	Low	Mid	Low	Mid
	CC203137		CC54757		ALM06815		ALM06815	
	CC52886		CC7555		ALM06815		ALM06815	

RUN INFORMATION	Low Load			Mid Load			Mid-High Load			High Load		
	% #1	% #2	% #3	% #1	% #2	% #3	% #1	% #2	% #3	% #1	% #2	% #3
Time Start (hh:mm:ss)												
Time Stop (hh:mm:ss)												
Barometric Pressure (in. Hg)												
Ambient Temperature (°F)												
Relative Humidity (%)												
Wind Speed (mph)												
Wind Direction												

CALIBRATION	O ₂		CO		THC		CO ₂	
	Conc.	Actual	Conc.	Actual	Conc.	Actual	Conc.	Actual
Zero Gas	0	0.04	0	0.09	0	0.02	0	0.01
Low Gas	12.2	12.04	9	8.85	5.04	5.0	8.81	8.66
Mid Gas	21.1	20.81	17.3	17.26	8.48	8.50	18.60	18.68
High Gas								

BIAS	O ₂			CO			THC			CO ₂		
	Zero	Mid	Actual	Zero	Mid	Actual	Zero	Mid	Actual	Zero	Mid	Actual
Initial Low Load Run #1	0.23	12.06		0.06	8.64		0.06	3.04		0.05	8.69	
Load 1 Run #1 / Load 1 Run #2	0.24	12.11		-0.020	8.59		0.07	3.79		0.04	8.68	
Load 1 Run #2 / Load 1 Run #3	0.26	12.15		0.03	9.05		0.01	3.01		0.05	8.69	
Load 1 Run #3 / Load 2 Run #1												
Load 2 Run #1 / Load 2 Run #2												
Load 2 Run #2 / Load 2 Run #3												
Load 2 Run #3 / Load 3 Run #1												
Load 3 Run #1 / Load 3 Run #2												
Load 3 Run #2 / Load 3 Run #3												
Load 3 Run #3 / Load 4 Run #1												
Load 4 Run #1 / Load 4 Run #2												
Load 4 Run #2 / Load 4 Run #3												
Load 4 Run #3 Final												

Bias Gas Actual Conc.

AIR HYGIENE

MOISTURE (EPA METHOD 4) DATA SHEET



Site Info.

Plant Name. Cumaron Energy
 Sampling Location.
 Unit #
 Date. 5-6-13

Console Info.

Console.
 Meter Calibration Factor
 Orifice Meter Coefficient

Samp - CP - 0012
0.889
1.632

Run <u>1</u> Load <u>low 0.6%</u>		Box # <u>Samp - BC - 0017</u>						
		Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7
		(g)	(g)	(g)	(g)			
Contents		H ₂ O	H ₂ O	-	Sil Gel			
Initial Value	(Vi),(Wi)	715.6	731.3	595.4	819			
Final Value	(Vf),(Wf)	743.7	745.9	599.0	828			

Run <u>2</u> Load		Box # <u>Samp - CP - 0033</u>						
		Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7
		(g)	(g)	(g)	(g)			
Contents		H ₂ O	H ₂ O	-	Sil Gel			
Initial Value	(Vi),(Wi)	737.0	767.0	522.4	860.2			
Final Value	(Vf),(Wf)	765.4	777.6	578.0	871.5			

Run <u>3</u> Load		Box #						
		Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7
		(g)	(g)	(g)	(g)			
Contents		H ₂ O	H ₂ O	-	Sil Gel			
Initial Value	(Vi),(Wi)	743.7	745.9	597.0	828.0			
Final Value	(Vf),(Wf)	776.3	754.2	599.3	836.0			

Run <u>4</u> Load <u>Mid 30-70 30%</u>		Box #						
		Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7
		(g)	(g)	(g)	(g)			
Contents		H ₂ O	H ₂ O	-	Sil Gel			
Initial Value	(Vi),(Wi)	765.4	777.6	578.0	871.5			
Final Value	(Vf),(Wf)	803.6	787.6	579.8	883.2			

Run <u>5</u> Load		Box #						
		Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7
		(g)	(g)	(g)	(g)			
Contents		H ₂ O	H ₂ O	-	Sil Gel			
Initial Value	(Vi),(Wi)	776.3	754.2	599.3	836.0			
Final Value	(Vf),(Wf)	754.2	762.4	601.2	841.7			

Run <u>6</u> Load		Box #						
		Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7
		(g)	(g)	(g)	(g)			
Contents		H ₂ O	H ₂ O	-	Sil Gel			
Initial Value	(Vi),(Wi)	803.6	787.6	579.8	795.8			
Final Value	(Vf),(Wf)	844.10	797.10	581.4	806.3			

AIR HYGIENE

MOISTURE (EPA METHOD 4) DATA SHEET



Site Info.

Plant Name..... Cumaran Energy
 Sampling Location.....
 Unit #..... 48H/ECD
 Date..... 5/9/14

Console Info.

Console.....
 Meter Calibration Factor
 Orifice Meter Coefficient

Sample - cp - 0012
.889
1.632

Run <u>7</u> Load <u>Mid/High 70-100-70</u>		Box #						
		Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7
		(g)	(g)	(g)	(g)			
Contents		H ₂ O	H ₂ O	-	Sil Gel			
Initial Value	(Vi),(Wi)	816.0	762.4	601.2	839.2			
Final Value	(Vf),(Wf)	848.2	770.6	603.3	870.5			

Run <u>8</u> Load		Box #						
		Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7
		(g)	(g)	(g)	(g)			
Contents		H ₂ O	H ₂ O	-	Sil Gel			
Initial Value	(Vi),(Wi)	844.1	797.1	581.4	806.3			
Final Value	(Vf),(Wf)	844.1 876.0 ³⁰⁰⁴	797.1 805.9	583.4	816.4			

Run <u>9</u> Load		Box #						
		Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7
		(g)	(g)	(g)	(g)			
Contents		H ₂ O	H ₂ O	-	Sil Gel			
Initial Value	(Vi),(Wi)	848.2	770.6	603.3	870.5			
Final Value	(Vf),(Wf)	878.6	778.3	605.7	880.2			

Run <u>10</u> Load <u>High 90-100%</u>		Box #						
		Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7
		(g)	(g)	(g)	(g)			
Contents		H ₂ O	H ₂ O	-	Sil Gel			
Initial Value	(Vi),(Wi)	876.0	805.9	583.4	842.3			
Final Value	(Vf),(Wf)	908.4	816.3	584.8	853.5			

Run <u>11</u> Load <u>High 90-100</u>		Box #						
		Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7
		(g)	(g)	(g)	(g)			
Contents		H ₂ O	H ₂ O	-	Sil Gel			
Initial Value	(Vi),(Wi)	908.4	816.3	584.8	853.5			
Final Value	(Vf),(Wf)	740.0	718.9	619.8	880.4			
Initial Value		712.3	710.4	618.0	868.5			

Run <u>12</u> Load <u>High 90-100</u>		Box #						
		Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7
		(g)	(g)	(g)	(g)			
Contents		H ₂ O	H ₂ O	-	Sil Gel			
Initial Value	(Vi),(Wi)	723.7	736.4	605.9	809.2			
Final Value	(Vf),(Wf)	724.0	747.4	595.8	835.8			

Initial Value 697.5 737.8 594.5 820.2

5/9/14

Run 7-9

-28.61

-15.03

-7.56

-1.94

Run 10-12

-28.73

-16.83

-8.25

-2.14

5/14/14

5/7/2014

canister Run 1-3 13:45

-28.46

-18.20

-9.50

0.77

canister 30-70-30 R4-6 5/8/14

-28.62

-16.06

-8.46

-1.86

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end of report