

Summary:

Air Hygiene was contracted by Cimarron Energy, Inc. to conduct a performance testing on Emission Combustion Device on Flare Unit, Size 30 (30 ECD). The unit was tested on June 18 through June 20, 2014 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 30 ECD is 1.88MMBtu/hr
- o The inlet gas fuel range for 0% (min. rate) and 100% (max. rate) are 3.12MSCFD, and 15.00MSCFD, respectively
- o Air/Stream injection/assist is not applicable for 30 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 – 12.5SCFH from previous testing
- Tip velocity range – 251ft/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 30 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 30
PREPARED FOR
CIMARRON ENERGY, INC.
AT THE
NORMAN FACILITY
NORMAN, OKLAHOMA
JUNE 18-20, 2014
RE-TEST**



Corporate Headquarters

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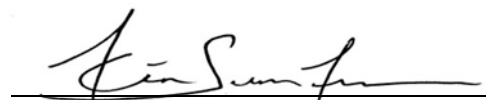
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**Stack Emissions Study
Emission Combustion Device on Flare Unit, Size 30
Cimarron Energy, Inc.
Norman Facility
Norman, Oklahoma
June 18-20, 2014**

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 30 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 June 18-20, 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 30.

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 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 30
- 1.2.6 Emission Points
 - For all gases, one sample point in the exhaust duct from the Emission Combustion Device on Flare Unit, Size 30, 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 30
 - 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 30
- 1.2.7 Emission Parameters Measured
- CO
 - THC
 - Flow
 - Visual Emission
 - H₂O
 - CO₂
 - O₂
- 1.2.8 Dates of Emission Test
- June 18-20, 2014

1.3 KEY PERSONNEL

Cimarron Energy, Inc.:

Air Hygiene:

Air Hygiene:

Air Hygiene:

Tim Charlton

Min Sum Lee

Darin Grimes

Mitch Carson

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 30 located at the Norman Facility on June 18-20, 2014 are summarized in the following table and relate only to the items tested.

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

Parameter	0-30-0 Load, Run - 30 ECD R1	0-30-0 Load, Run - 30 ECD R2	0-30-0 Load, Run - 30 ECD R3	Average
Date (mm/dd/yy)	06/19/14	06/20/14	06/20/14	--
Start Time (hh:mm:ss)	18:33:10	7:39:12	9:05:12	--
End Time (hh:mm:ss)	19:43:10	8:49:12	10:15:12	--
Run Duration (min / run)	71	71	71	71
Bar. Pressure (in. Hg)	29.99	29.97	30.00	29.99
Amb. Temp. (°F)	83	82	87	84
Rel. Humidity (%)	38	70	72	60
Spec. Humidity (lb water / lb air)	0.009106	0.016440	0.019942	0.015162
Wind Speed (mph)	6.0	4.0	3.0	4.3
Wind Direction (--)	SE	SE	SE	--
Inlet Gas Canister Pressure Start (inHg)	-28.65	-19.14	-9.23	--
Inlet Gas Canister Pressure Stop (inHg)	-19.14	-9.23	-1.54	--
Gross Fuel Heating Value (Btu/ft ³)	2,545	2,545	2,545	2,545
Stack Flow (M2) (dscfh)	45,642	43,812	44,676	44,710
Stack Moisture (Method 4)	4.3	4.8	4.6	4.6
Gross Fuel Heating Value (Btu/ft ³)	2,544.8	2,544.8	2,544.8	2,544.80
Average Inlet Fuel Flowrate (SCFH)	202.7	218.1	211.0	210.58
Average Inlet Mass Fuel Flowrate (lb/hr)	23.5	25.3	24.5	24.46
% Excess Air	803.2	448.0	582.0	611.07
CO ₂ (%) - Modified method 3C	2.59	3.67	3.19	3.15
O ₂ (%) - Modified Method 3C	18.50	17.10	17.80	17.80
N ₂ (%) - Modified Method 3C	78.80	79.23	79.01	79.01
Visual Emission (mm:ss)	0:00	0:00	0:00	0.00
CO (ppmvd)	2.44	4.01	2.07	2.84
CO (ppm@3%CO ₂)	2.83	3.28	1.95	2.69
THC (ppmvw)	0.38	0.55	0.29	0.41
THC (ppm@3%CO ₂)	0.44	0.45	0.27	0.39
THC (lb/hr)	0.00	0.00	0.00	0.00
VOC Destruction Efficiency (%)	99.991	99.988	99.993	99.991

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

Parameter	30-70-30 Load, Run - 30 ECD R4	30-70-30 Load, Run - 30 ECD R5	30-70-30 Load, Run - 30 ECD R6	Average
Date (mm/dd/yy)	06/19/14	06/19/14	06/19/14	--
Start Time (hh:mm:ss)	14:10:10	15:35:10	17:00:10	--
End Time (hh:mm:ss)	15:20:10	16:45:10	18:10:10	--
Run Duration (min / run)	70	70	71	71
Bar. Pressure (in. Hg)	29.98	29.95	29.95	29.96
Amb. Temp. (°F)	88	89	83	87
Rel. Humidity (%)	48	40	34	41
Spec. Humidity (lb water / lb air)	0.013596	0.011669	0.008146	0.011137
Wind Speed (mph)	11.0	11.0	7.0	9.7
Wind Direction (--)	SE	SE	SE	--
Inlet Gas Canister Pressure Start (inHg)	-28.65	-18.52	-9.87	-19.01
Inlet Gas Canister Pressure Stop (inHg)	-18.52	-9.87	-1.75	-10.05
Gross Fuel Heating Value (Btu/ft ³)	2,521	2,521	2,521	2,521
Stack Flow (M2) (dscfh)	45,532	44,972	42,903	44,469
Stack Moisture (Method 4)	5.5	5.3	5.2	5.3
Gross Fuel Heating Value (Btu/ft ³)	2,521.1	2,521.1	2,521.1	2,521.10
Average Inlet Fuel Flowrate (SCFH)	356.1	353.8	355.8	355.22
Average Inlet Mass Fuel Flowrate (lb/hr)	41.4	41.1	41.3	41.26
% Excess Air	605.5	556.9	303.0	488.48
CO ₂ (%) - Modified method 3C	3.10	3.26	4.60	3.65
O ₂ (%) - Modified Method 3C	17.90	17.70	15.80	17.13
N ₂ (%) - Modified Method 3C	79.00	79.10	79.60	79.23
Visual Emission (mm:ss)	0:00	0:00	0:00	0:00
CO (ppmvd)	1.21	1.28	1.31	1.27
CO (ppm@3%CO ₂)	1.17	1.18	0.86	1.07
THC (ppmvw)	0.00	0.00	0.16	0.05
THC (ppm@3%CO ₂)	0.00	0.00	0.11	0.04
THC (lb/hr)	0.00	0.00	0.00	0.00
VOC Destruction Efficiency (%)	99.999	99.999	99.998	99.999

TABLE 2.3
30 ECD 70-100-70 LOAD DATA SUMMARY

Parameter	70-100-70 Load, Run - 30 ECD R7	70-100-70 Load, Run - 30 ECD R8	70-100-70 Load, Run - 30 ECD R9	Average
Date (mm/dd/yy)	06/19/14	06/19/14	06/19/14	--
Start Time (hh:mm:ss)	9:25:22	10:50:22	12:20:10	--
End Time (hh:mm:ss)	10:35:22	12:00:22	13:30:10	--
Run Duration (min / run)	71	71	71	71
Bar. Pressure (in. Hg)	29.95	29.96	29.99	29.97
Amb. Temp. (°F)	75	80	81	79
Rel. Humidity (%)	79	68	68	72
Spec. Humidity (lb water / lb air)	0.014705	0.014933	0.015425	0.015021
Wind Speed (mph)	7.0	6.0	11.0	8.0
Wind Direction (--)	NW	NW	SEE	--
Inlet Gas Canister Pressure Start (inHg)	-28.72	-19.00	-10.11	--
Inlet Gas Canister Pressure Stop (inHg)	-19.00	-10.11	-1.93	--
Gross Fuel Heating Value (Btu/ft ³)	2,550	2,550	2,550	2,550
Stack Flow (M2) (dscfh)	42,099	41,626	42,465	42,063
Stack Moisture (Method 4)	5.0	5.6	5.9	5.5
Gross Fuel Heating Value (Btu/ft ³)	2,550.2	2,550.2	2,550.2	2,550.20
Average Inlet Fuel Flowrate (SCFH)	552.4	557.5	548.5	552.82
Average Inlet Mass Fuel Flowrate (lb/hr)	63.9	64.8	58.3	62.30
% Excess Air	449.7	235.7	369.8	351.72
CO ₂ (%) - Modified method 3C	3.70	5.35	4.11	4.39
O ₂ (%) - Modified Method 3C	17.10	14.80	16.50	16.13
N ₂ (%) - Modified Method 3C	79.19	79.85	79.40	79.48
Visual Emission (mm:ss)	0:00	0:00	0:00	0:00
CO (ppmvd)	2.02	1.56	2.10	1.89
CO (ppm@3%CO ₂)	1.64	0.88	1.53	1.35
THC (ppmvw)	0.00	0.00	0.03	0.01
THC (ppm@3%CO ₂)	0.00	0.00	0.02	0.01
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
30 ECD 90-100 LOAD DATA SUMMARY

Parameter	90-100 Load, Run - 30 ECD R10	90-100 Load, Run - 30 ECD R11	90-100 Load, Run - 30 ECD R12	Average
Date (mm/dd/yy)	06/18/14	06/18/14	06/19/14	--
Start Time (hh:mm:ss)	17:40:27	19:05:27	8:00:12	--
End Time (hh:mm:ss)	18:50:27	20:15:27	9:10:12	--
Run Duration (min / run)	70	71	71	70
Bar. Pressure (in. Hg)	29.85	29.83	29.96	29.88
Amb. Temp. (°F)	84	86	84	85
Rel. Humidity (%)	35	45	59	46
Spec. Humidity (lb water / lb air)	0.008697	0.011992	0.014747	0.011812
Wind Speed (mph)	15.0	12.0	4.0	10.3
Wind Direction (--)	SE	SE	NW	--
Inlet Gas Canister Pressure Start (inHg)	-28.10	-18.52	-9.87	--
Inlet Gas Canister Pressure Stop (inHg)	-18.52	-9.87	-1.75	--
Gross Fuel Heating Value (Btu/ft ³)	2,486	2,486	2,486	2,486
Stack Flow (M2) (dscfh)	41,579	41,273	44,684	42,512
Stack Moisture (Method 4)	6.3	6.0	6.1	6.1
Gross Fuel Heating Value (Btu/ft ³)	2,485.6	2,485.6	2,485.6	2,485.60
Average Inlet Fuel Flowrate (SCFH)	589.4	593.4	614.1	598.98
Average Inlet Mass Fuel Flowrate (lb/hr)	68.5	68.5	71.3	69.43
% Excess Air	235.2	241.4	241.6	239.40
CO ₂ (%) - Modified method 3C	5.34	5.26	5.21	5.27
O ₂ (%) - Modified Method 3C	14.80	14.90	14.90	14.87
N ₂ (%) - Modified Method 3C	79.90	79.83	79.80	79.84
Visual Emission (mm:ss)	0:00	0:00	0:00	0:00
CO (ppmvd)	2.63	1.51	1.33	1.82
CO (ppm@3%CO ₂)	1.48	0.86	0.77	1.03
THC (ppmvw)	0.04	0.00	0.00	0.01
THC (ppm@3%CO ₂)	0.02	0.00	0.00	0.01
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 30 (30 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 15 feet above grade level on the exhaust system. The stack had a 29.6 inches inner diameter and was equipped with two, 3 inch ports oriented at 90 degrees. The ports were 4.8 duct diameters downstream from the flare tip and 1.05 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 30 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 June 18-20, 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 30 for CO, THC, CO₂, and O₂.

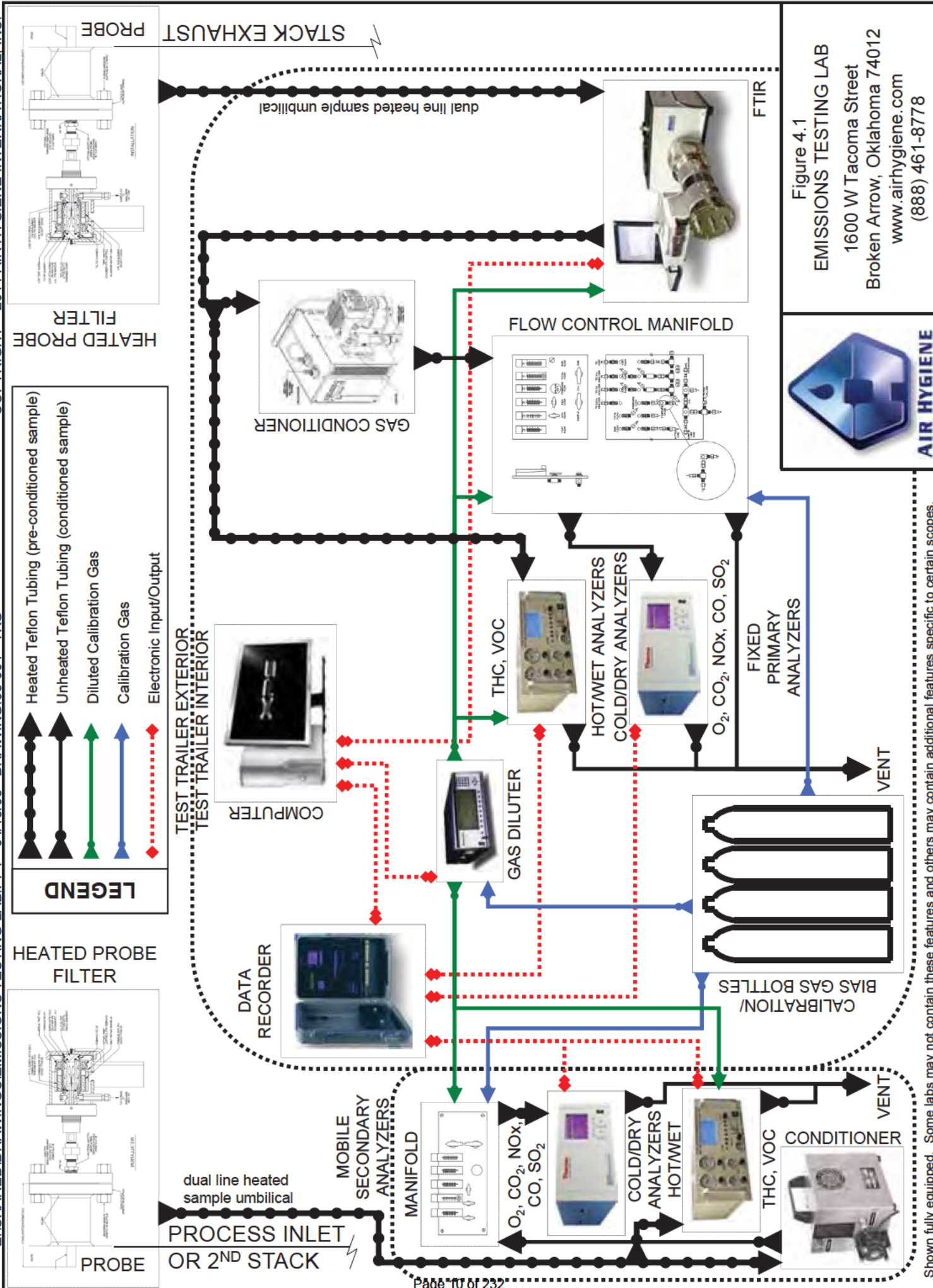
The stack gas analysis for O₂ and CO₂ concentrations was performed in accordance with procedures set forth in EPA Method 3C. The sample were collected in a tedlar bag and analyzed by GC-TCD at an offsite laboratory.

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



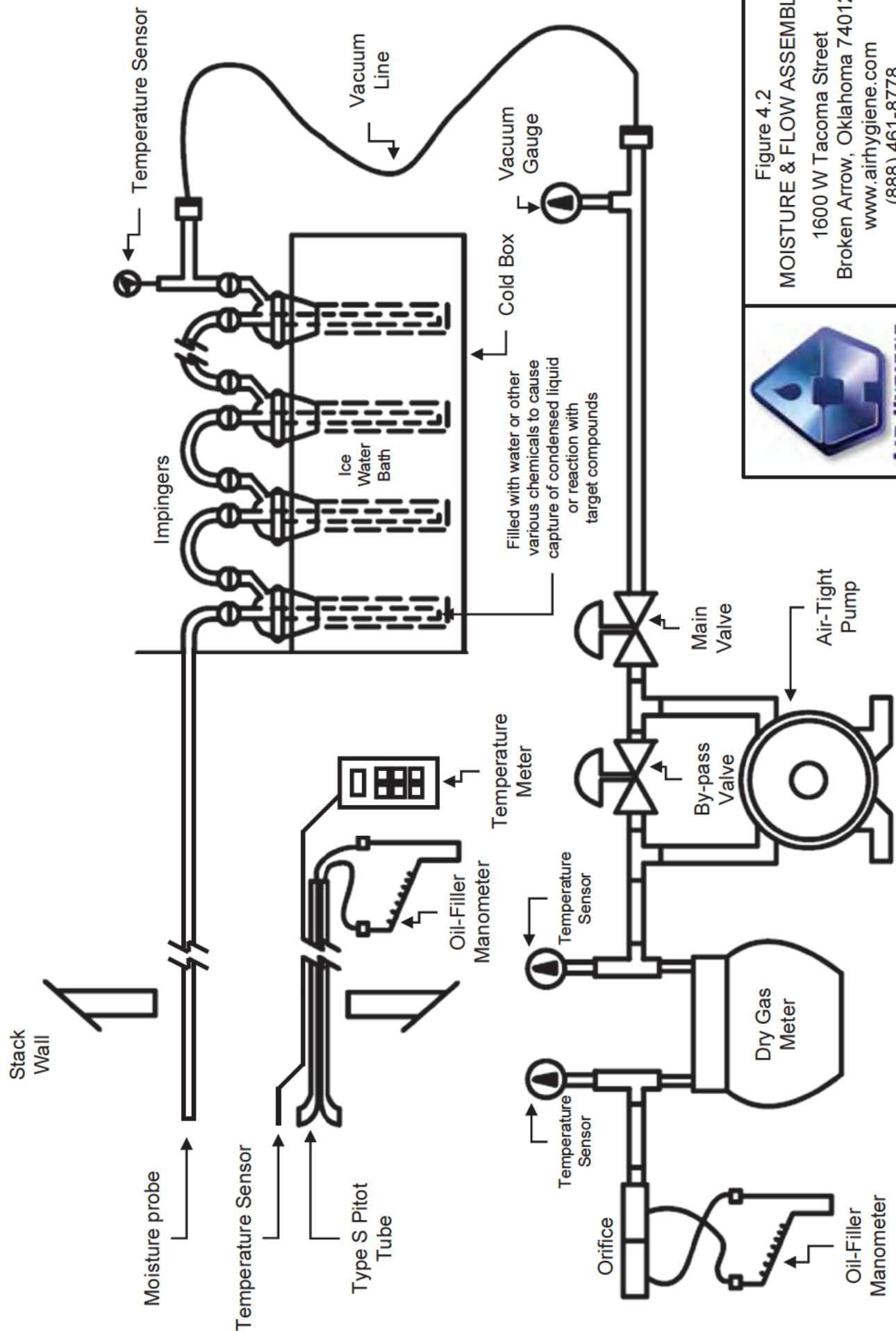


Figure 4.2
MOISTURE & FLOW ASSEMBLY
 1600 W Tacoma Street
 Broken Arrow, Oklahoma 74012
 www.airhygiene.com
 (888) 461-8778

APPENDIX A

TEST RESULTS AND CALCULATIONS

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

Unit	Load	Test Type	Run	Date	Start	Stop	Time Sync
30 ECD	0-30-0	CO, THC & Fuel Sample	30 ECD R1	06/19/14	18:33:10	19:43:10	CST
30 ECD	0-30-0	CO, THC & Fuel Sample	30 ECD R2	06/20/14	7:39:12	8:49:12	CST
30 ECD	0-30-0	CO, THC & Fuel Sample	30 ECD R3	06/20/14	9:05:12	10:15:12	CST
30 ECD	30-70-30	CO, THC & Fuel Sample	30 ECD R4	06/19/14	8:34:00	15:20:10	CST
30 ECD	30-70-30	CO, THC & Fuel Sample	30 ECD R5	06/19/14	15:35:10	16:45:10	CST
30 ECD	30-70-30	CO, THC & Fuel Sample	30 ECD R6	06/19/14	17:00:10	18:10:10	CST
30 ECD	70-100-70	CO, THC & Fuel Sample	30 ECD R7	06/19/14	9:25:22	10:35:22	CST
30 ECD	70-100-70	CO, THC & Fuel Sample	30 ECD R8	06/19/14	10:50:22	12:00:22	CST
30 ECD	70-100-70	CO, THC & Fuel Sample	30 ECD R9	06/19/14	12:20:10	13:30:10	CST
30 ECD	90-100	CO, THC & Fuel Sample	30 ECD R10	06/18/14	17:40:27	18:50:27	CST
30 ECD	90-100	CO, THC & Fuel Sample	30 ECD R11	06/18/14	19:05:27	20:15:27	CST
30 ECD	90-100	CO, THC & Fuel Sample	30 ECD R12	06/19/14	8:00:12	9:10:12	CST
30 ECD	0-30-0	Fixed Gas & Moisture	0-30-0%-1	06/19/14	18:33:00	19:43:00	CST
30 ECD	0-30-0	Fixed Gas & Moisture	0-30-0%-2	06/20/14	7:39:00	8:49:00	CST
30 ECD	0-30-0	Fixed Gas & Moisture	0-30-0%-3	06/20/14	9:05:00	10:15:00	CST
30 ECD	30-70-30	Fixed Gas & Moisture	30-70-30%-4	06/19/14	14:10:00	15:20:00	CST
30 ECD	30-70-30	Fixed Gas & Moisture	30-70-30%-5	06/19/14	15:35:00	16:45:00	CST
30 ECD	30-70-30	Fixed Gas & Moisture	30-70-30%-6	06/19/14	17:00:00	18:10:00	CST
30 ECD	70-100-70	Fixed Gas & Moisture	70-100-70%-7	06/19/14	9:25:00	10:35:00	CST
30 ECD	70-100-70	Fixed Gas & Moisture	70-100-70%-8	06/19/14	10:50:00	12:00:00	CST
30 ECD	70-100-70	Fixed Gas & Moisture	70-100-70%-9	06/19/14	12:20:00	13:30:00	CST
30 ECD	90-100	Fixed Gas & Moisture	90-100%-10	06/18/14	17:40:00	18:50:00	CST
30 ECD	90-100	Fixed Gas & Moisture	90-100%-11	06/18/14	19:05:00	20:15:00	CST
30 ECD	90-100	Fixed Gas & Moisture	90-100%-12	06/19/14	8:00:00	9:10:00	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.

$$RH_{sp} (lb/lb) = \left[\left(\frac{gr}{lb} \right) \times \frac{lb}{7000 gr} \right] \quad RH_{sp} = \frac{63.74 \text{ gr}}{lb} \times \frac{1 lb}{7000 gr} = 0.009106 \frac{lb \text{ H}_2\text{O}}{lb \text{ Air}}$$

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)

$$E_p = \frac{C_{Dir(H)} - C_{Dir(Z)}}{C_{V(H)} - C_{V(Z)}} \times C_{Dir(M)} + C_{Dir(Z)} \quad \text{Eq. of a line } y=mx+b \quad E_p = \frac{8.49 \text{ ppm} - 0.01 \text{ ppm}}{8.48 \text{ ppm} - 0.00 \text{ ppm}} \times 5.01 \text{ ppm} + 0.01 = 5.02 \text{ ppm}$$

$$ACE = \left(\frac{C_{Dir} - C_V}{CS} \right) \times 100 \quad \text{Eq. 7E-1} \quad ACE_{THC} = \frac{5.07 \text{ ppm} - 5.02 \text{ ppm}}{5.01 \text{ ppm}} \times 100 = 1.00 \%$$

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)

$$SB = \left(\frac{C_S - C_{Dir}}{CS} \right) \times 100 \quad \text{Eq. 7E-2} \quad SB = \frac{2.94 \text{ ppm} - 3.02 \text{ ppm}}{10.00 \text{ ppm}} \times 100 = -0.80 \%$$

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)

$$D = |SB_{final} - SB_i| \quad \text{Eq. 7E-4} \quad D = |0.80 \% - -0.80 \%| = 1.60 \%$$

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)

$$SB / D_{Alt} = |C_S - C_{Dir}| \quad \text{Eq. Section 13.2 and 13.3} \quad SB / D_{Alt} = |2.94 \text{ ppm} - 3.02 \text{ ppm}| = 0.08 \text{ ppm}$$

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)

$$C_{Gas} = (C_{Avg} - C_O) \times \left(\frac{C_{MA}}{C_M - C_O} \right) \quad \text{Eq. 7E-5b} \quad C_{Gas} = \left(0.40 \text{ ppm} - 0.03 \text{ ppm} \right) \times \left(\frac{3.04 \text{ ppm}}{3.02 \text{ ppm} - 0.03 \text{ ppm}} \right) = 0.38 \text{ ppm}$$

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

$$C_{adj} = 0.40 \text{ ppm} \times \left(\frac{3.00 \%}{5.90 \%} \right) = 0.20 \text{ ppm@3\%CO}_2$$

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)

$$E_{lb/hr} = \frac{C_{Gaz}}{10^6} \times \frac{Q_S \times MW}{G} \quad E_{lb/hr} = \frac{0.40 \text{ ppm}}{10^6 \text{ ppm/part}} \times \frac{43,812 \text{ SCFH} \times 44.00 \text{ lb/lb-mol}}{385.23 \text{ SCF/lb-mol}} = \frac{0.002 \text{ lb}}{\text{hr}}$$

VOC Destruction Efficiency

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

$$DE\% = \frac{23.539 - 0.002 \text{ lb/hr}}{23.539 \text{ lb/hr}} \times 100 = 99.991 \%$$

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.)

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

$$D(in.) = 35.63 \text{ in.} - 6.00 \text{ in.} = 29.63 \text{ in.}$$

Stack Diameters Downstream

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

$$B_D(dia.) = \frac{121.00 \text{ in.}}{29.63 \text{ in.}} = 4.08 \text{ diameters}$$

Area of Stack (ft²)

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

$$A_s(ft^2) = 3.14 \times \left(\frac{29.63 \text{ in.}}{2 \times 12 \text{ in./ft}} \right)^2 = 4.79 \text{ ft}^2$$

Stack Diameters Upstream

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

$$A_D(dia.) = \frac{31.00 \text{ in.}}{29.63 \text{ in.}} = 1.05 \text{ diameters}$$

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

Carbon Monoxide Concentration (%)

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

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

Nitrogen Concentration (%)

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

$$\%N_2(\%) = 100 - 2.59 \text{ \%} - 18.50 \text{ \%} - 0.00 / 10,000 \% = 78.91 \%$$

Stack Dry Molecular Weight (lb/lb-mole)

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

$$M_d(lb/lb-mol) = \left(\frac{44 \text{ lb/lb-mol}}{100} \times 2.59 \text{ \%} \right) +$$

$$\left(\frac{32 \text{ lb/lb-mol}}{100} \times 18.50 \text{ \%} \right) + \left(\frac{28 \text{ lb/lb-mol}}{100} \times \left[\frac{0.00}{10,000} + 78.80 \right] \right) = \frac{29.12 \text{ lb}}{\text{lb-mol}}$$

Stack Wet Molecular Weight (lb/lb-mole)

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

$$M_s(lb/lb-mol) = \left\{ \frac{29.12 \text{ lb}}{\text{lb-mol}} \times \left(1 - \frac{4.33 \text{ \%}}{100} \right) \right\} + \left\{ \frac{18 \text{ lb}}{\text{lb-mol}} \times \frac{4.33 \text{ \%}}{100} \right\} = \frac{28.64 \text{ lb}}{\text{lb-mol}}$$

Average Excess Air (%)

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

$$(\%EA)_{AVG} = \frac{100 \times \{ 18.50 \text{ \%} - (0.5 \times 0.000 \text{ \%}) \}}{(0.264 \times 78.80 \text{ \%}) - \{ 18.50 \text{ \%} - (0.5 \times 0.000 \text{ \%}) \}} = 803.23 \%$$

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)

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

$$P_s (\text{in. Hg}) = 29.99 \text{ in. Hg} + \frac{0.00 \text{ in. H}_2\text{O}}{13.6 \text{ in. H}_2\text{O/in. Hg}} = 29.99 \text{ in. Hg}$$

Average Stack Gas Velocity (ft/sec)

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

$$v_{sl} (\text{ft/sec}) =$$

$$\left(\frac{85.49 \text{ ft (lb/lb-mol)(in. Hg)}}{\text{sec (}^\circ\text{R)(in. H}_2\text{O)}} \right)^{1/2} \times 0.82 \times 0.07 \text{ in. H}_2\text{O}^{1/2} \times \sqrt{\frac{576.42 + 460^\circ\text{R}}{29.99 \text{ in. Hg} \times 28.64 \text{ lb/lb-mol}}} = \frac{5.4 \text{ ft}}{\text{sec}}$$

Average Stack Dry Standard Flow Rate (dscfh)

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

$$Q_{sd} (\text{dscf/hr}) = \frac{3600 \text{ sec}}{\text{hr}} \times \left(1 - \frac{4.33 \%}{100} \right) \times \frac{5.42 \text{ ft}}{\text{sec}} \times 4.79 \text{ ft}^2 \times \frac{68.00 + 460^\circ\text{R}}{576.42 + 460^\circ\text{R}} \times \frac{29.99 \text{ in. Hg}}{29.92 \text{ in. Hg}} = \frac{45,641.79 \text{ dscf}}{\text{hr}}$$

Average Stack Wet Flow Rate (acfm)

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

$$Q_{aw} (\text{acf/min}) = \frac{60 \text{ sec}}{\text{min}} \times \frac{5.42 \text{ ft}}{\text{sec}} \times 4.79 \text{ ft}^2 = \frac{1,557.19 \text{ acf}}{\text{min}}$$

Average Stack Wet Standard Flow Rate (ascfh)

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

$$Q_{sw} (\text{ascf/hr}) = \frac{60 \text{ min}}{\text{hr}} \times \frac{1,557.19 \text{ acf}}{\text{min}} \times \frac{68.00 + 460^\circ\text{R}}{576.42 + 460^\circ\text{R}} \times \frac{29.99 \text{ in. Hg}}{29.92 \text{ in. Hg}} = \frac{47,709.90 \text{ ascf}}{\text{hr}}$$

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)

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

$$V_{wsg(std)} = 45.80 \text{ g} \times 0.04715 \text{ ft}^3/\text{g} = 2.160 \text{ scf}$$

Standard Meter Volume (dscf)

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

$$V_{m(std)} = \frac{17.65 \text{ }^{\circ}\text{R}}{\text{in. Hg}} \times 1.01 \times 48.03 \text{ dcf} \times \left(29.99 \text{ in. Hg} + \frac{1.90 \text{ in. H}_2\text{O}}{13.6 \text{ in. H}_2\text{O} / \text{in. Hg}} \right) = 47.66 \text{ dscf}$$

$$81.21 \text{ }^{\circ}\text{F} + 460 \text{ }^{\circ}\text{R}$$

Calculated Moisture Content (%)

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

$$B_{ws(calc)} = 100 \times \frac{2.16 \text{ dscf}}{2.16 \text{ dscf} + 47.66 \text{ dscf}} = 4.33 \%$$

Saturated Moisture Content (%)

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

$$B_{ws(svp)} = 100 \times \frac{10^{\left(6.691 - \frac{3144}{576.42 \text{ }^{\circ}\text{F} + 390.86} \right)}}{29.99 \text{ in. Hg} + \frac{0.00 \text{ in. H}_2\text{O}}{13.6 \text{ in. H}_2\text{O} / \text{in. Hg}}} \leq 100 = 100.00 \%$$

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_o = 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 = $1.0236 = \text{conv. at } 14.696 \text{ psia and } 68 \text{ deg F (ref. Civil Eng. Ref. Manual, 7th Ed.)}$
 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
- $P_b = P_{\text{bar}}$ = 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}
- $Q_{\text{s(std)}}$ = 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:	June 16, 2014
Project Number:	cei-14-norman.ok-comp#1
Manufacturer & Equipment:	30 ECD
Test Load:	Multiple
Tester(s) / Test Unit(s):	MSL/DG/CG/MC/208

		RUN											
	UNITS	30 ECD R1	30 ECD R2	30 ECD R3	30 ECD R4	30 ECD R5	30 ECD R6	30 ECD R7	30 ECD R8	30 ECD R9	30 ECD R10	30 ECD R11	30 ECD R12
Start Time	hh:mm:ss	18:33:10	07:39:12	09:05:12	14:10:10	15:35:10	17:00:10	09:25:22	10:50:22	12:20:10	17:40:27	19:05:27	08:00:12
End Time	hh:mm:ss	19:43:10	08:49:12	10:15:12	15:20:10	16:45:10	18:10:10	10:35:22	12:00:22	13:30:10	18:50:27	20:15:27	09:10:12
Bar. Pressure	in. Hg	29.99	29.97	30.00	29.98	29.95	29.95	29.95	29.96	29.99	29.85	29.83	29.96
Amb. Temp.	F	83	82	87	88	89	83	75	80	81	84	86	84
Rel. Humidity	%	38	70	72	48	40	34	79	68	68	35	45	59
Spec. Humidity	lb water / lb air	0.009106	0.016440	0.019942	0.013596	0.011669	0.008146	0.014705	0.014933	0.015425	0.008697	0.011992	0.014747
Date	mm/dd/yy	06/19/14	06/20/14	06/20/14	06/19/14	06/19/14	06/19/14	06/19/14	06/19/14	06/19/14	06/18/14	06/18/14	06/19/14
Unit Number		1	1	1	1	1	1	1	1	1	1	1	1
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/lb3	2,545	2,545	2,545	2,521	2,521	2,521	2,550	2,550	2,550	2,486	2,486	2,486
Stack Flow (M2)	dscfh	45,642	43,812	44,676	45,532	44,972	42,903	42,099	41,626	42,465	41,579	41,273	44,684
Stack Moisture	Method 4	4.33	4.80	4.55	5.46	5.29	5.20	4.99	5.64	5.85	6.29	5.99	6.09
Wind Speed	mph	6	4	3	11	11	7	7	6	11	15	12	4
Wind Direction	--	SE	SE	SE	SE	SE	SE	NW	NW	SEE	SE	SE	NW
CO ₂ - Method 3C	%	2.59	3.67	3.19	3.10	3.26	4.60	3.70	5.35	4.11	5.34	5.26	5.21
O ₂ - Method 3C	%	18.50	17.10	17.80	17.90	17.70	15.80	17.10	14.80	16.50	14.80	14.90	14.90
N ₂ -Method 3C	%	78.80	79.23	79.01	79.00	79.10	79.60	79.19	79.85	79.40	79.90	79.83	79.80
Excess Air	%	803.23	448.03	581.96	605.55	556.87	303.01	449.67	235.65	369.82	235.16	241.43	241.60

METHOD 1 - SAMPLE AND VELOCITY TRAVERSES FOR CIRCULAR SOURCES

Plant Name	Norman Facility	Date	06/18/14
Sampling Location	30 ECD	Stack Type	Circular
Operator	DG	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})	35.63	in
Distance to Near Wall of Stack	(L_{nw})	6.00	in
Diameter of Stack	(D)	29.63	in
Area of Stack	(A_s)	4.79	ft ²

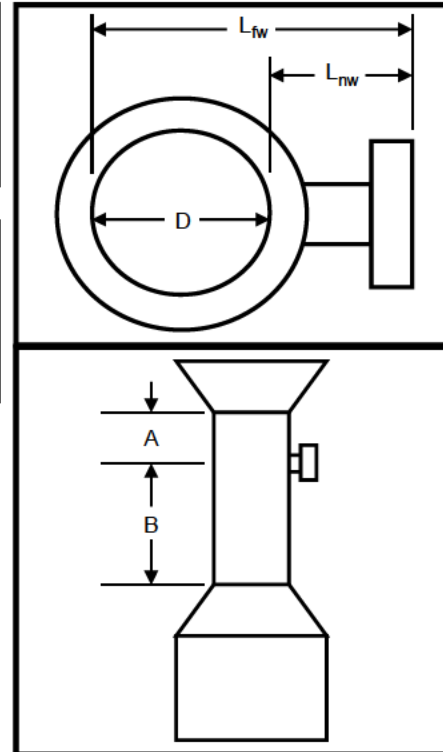
Distance from Port to Disturbances			
Distance Upstream	(A)	31.00	in
Diameters Upstream	(A_D)	1.05	diameters
Distance Downstream	(B)	137.00	in
Diameters Downstream	(B_D)	4.62	diameters

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	5/8	6 5/8
2	0.067	2	8
3	0.118	3 4/8	9 4/8
4	0.177	5 2/8	11 2/8
5	0.250	7 3/8	13 3/8
6	0.356	10 4/8	16 4/8
7	0.644	19 1/8	25 1/8
8	0.750	22 2/8	28 2/8
9	0.823	24 3/8	30 3/8
10	0.882	26 1/8	32 1/8
11	0.933	27 5/8	33 5/8
12	0.979	29	35

METHOD 1 - ISOKINETIC TRAVERSE FOR A CIRCULAR SOURCE

Company	Cimarron Energy	Date	06/18/14
Plant Name	Norman Facility	Project #	cei-14-norman.ok-comp#1
Equipment	30 ECD	# of Ports Available	2
Location	Ports	# of Ports Used	2

Circular Stack or Duct Diameter			
Distance to Far Wall of Stack	(L_{fw})	35.63	in.
Distance to Near Wall of Stack	(L_{nw})	6.00	in.
Diameter of Stack	(D)	29.63	in.
Area of Stack	(A_s)	4.79	ft ²

Distance from Disturbances to Port			
Distance Upstream	(A)	31.00	in.
Diameters Upstream	(A_D)	1.05	diameters
Distance Downstream	(B)	137.00	in.
Diameters Downstream	(B_D)	4.62	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 75/8.12	12 RM1 pts
5.00-5.99	1.25-1.49	20	16	●○○○Q 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		24	16	RATA Stratification	
Traverse Pts Required		24	16	Criteria	Points
				○ Part 75/60	12 RM1 pts
				○ 75 abrv (a)	3 points
				○ 75 abrv (b)	6 points

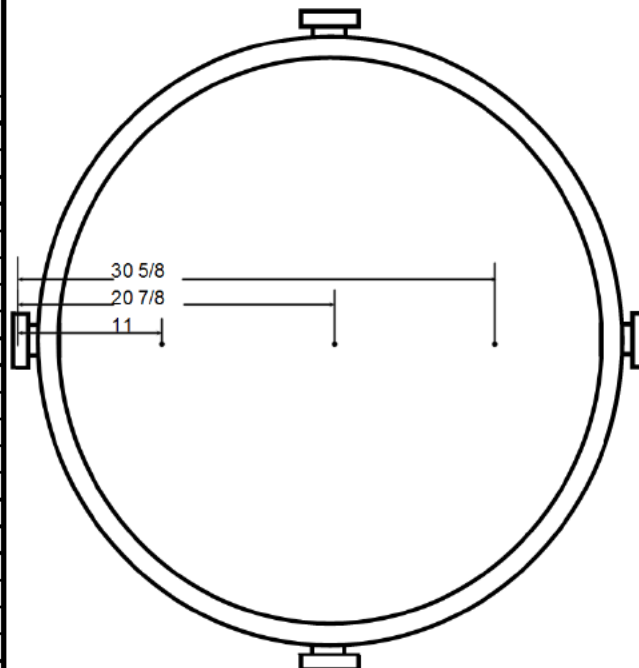
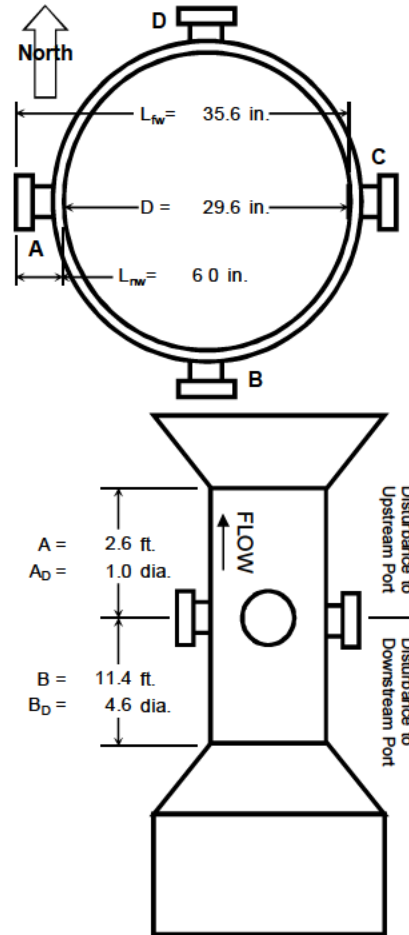
¹ Check Minimum Number of Points for the Upstream and Downstream conditions, then use the largest.

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

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

Gas Sampling

Traverse Point Locations			
Traverse Point Number	Percent of Stack Diameter	Distance from Inside Wall	Distance Including Reference Length
	%	in.	in.
1	16.7%	5	11
2	50.0%	14 7/8	20 7/8
3	83.3%	24 5/8	30 5/8
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
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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	Norman Facility
Sampling Location	30 ECD
Fuel Type	Gas, Propene

Test Information			
Project #		cei-14-norman.ok-comp#1	
Operator		DG	
Date for Preliminary Run	(mm/dd/yy)	06/18/14	
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	65	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)	06/19/14	06/20/14	06/20/14	
Load	% or w/DB	0-30-0	0-30-0	0-30-0	
Meter Box Number	from ACS	SAMP-CP-0023	SAMP-CP-0023	SAMP-CP-0023	
Meter Calibration Factor	(Y)	1.010	1.010	1.010	
Orifice Meter Coefficient	(ΔH_{or})	1.877	1.877	1.877	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)	0.819	0.819	0.819	
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-0002	SAMP-BC-0002	SAMP-BC-0002	

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	Norman Facility
Sampling Location	30 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	18:33	07:39	09:05		hh:mm
Run Stop Time	19:43	08:49	10:15		hh:mm
Test Date	06/19/14	06/20/14	06/20/14		mm/dd/yy
Meter Calibration Factor	1.010	1.010	1.010		
Pitot Tube Coefficient	0.819	0.819	0.819		
Initial Meter Volume	906.510	963.630	14.990		ft ³
Final Meter Volume	954.540	1011.080	61.170		ft ³
Total Meter Volume	48.030	47.450	46.180	47.220	ft ³
Total Sampling Time	65.00	65.00	65.00	65.00	min
Average Meter Temperature	81.21	76.08	82.83	80.04	°F
Average Stack Temperature	576.42	653.63	610.67	613.57	°F
Barometric Pressure	29.99	29.97	30.00	29.99	in Hg
Stack Static Pressure	0.00	0.00	0.00	0.00	in H ₂ O
Absolute Stack Pressure	29.99	29.97	30.00	29.99	in Hg
Average Orifice Pressure Drop	1.90	1.90	1.90	1.90	in H ₂ O
Absolute Meter Pressure	30.13	30.11	30.14	30.12	in Hg
Avg Square Root Pitot Pressure	0.07	0.07	0.07	0.07	√(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	34.80	40.60	34.50	36.63	g
Silica Gel Weight Gain	11.00	10.20	11.70	10.97	g
Total Water Volume Collected	45.88	50.89	46.28	47.69	ml
Standard Water Vapor Volume	2.16	2.40	2.18	2.24	scf
Standard Meter Volume	47.7	47.5	45.7	47.0	dscf
Calculated Stack Moisture	4.33	4.80	4.55	4.56	%
Saturated Stack Moisture	100.00	100.00	100.00	100.00	%
Reported Stack Moisture Content	4.33	4.80	4.55	4.56	%
Method 3C Gas Analysis Data	0-30-0%-1	0-30-0%-2	0-30-0%-3	Average	Units
Carbon Dioxide Content	2.6	3.7	3.2	3.2	%
Oxygen Content	18.5	17.1	17.8	17.8	%
Nitrogen Content	78.8	79.2	79.0	79.0	%
Stack Dry Molecular Weight	29.12	29.27	29.22	29.21	lb/lb-mole
Stack Wet Molecular Weight	28.64	28.73	28.71	28.69	lb/lb-mole
Percent Excess Air	803.2	448.0	582.0	611.1	%
Volumetric Flow Rate Data	0-30-0%-1	0-30-0%-2	0-30-0%-3	Average	Units
Average Stack Gas Velocity	5.42	5.62	5.49	5.51	ft/sec
Stack Cross-Sectional Area	4.79	4.79	4.79	4.79	ft ²
Actual Stack Flow Rate	1,557	1,615	1,578	1,583	acfm
Wet Standard Stack Flow Rate	48	46	47	47	wkscfh
Dry Standard Stack Flow Rate	45,642	43,812	44,676	44,710	dscfh

METHOD 3C - DETERMINATION OF DRY MOLECULAR WEIGHT BY ANALYZER

Plant Name	Norman Facility	Preliminary Date	06/18/14		
Sampling Location	30 ECD	Operator	DG		
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	06/19/14	Run Start Time	18:33	Run Stop Time	19:43
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		%	
01:10	2.6	18.5	0.0	78.8	29.12	0.927	803.2	N/A

Gas Analysis Data								
Run Number	0-30-0%-2		Date	06/20/14	Run Start Time	07:39	Run Stop Time	08:49
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		%	
01:10	3.7	17.1	0.0	79.2	29.27	1.035	448.0	N/A

Gas Analysis Data								
Run Number	0-30-0%-3		Date	06/20/14	Run Start Time	09:05	Run Stop Time	10:15
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		%	
01:10	3.2	17.8	0.0	79.0	29.22	0.972	582.0	N/A

METHOD 4 - DETERMINATION OF MOISTURE CONTENT IN STACK GASES

Plant Name	Norman Facility	Preliminary Date	06/18/14
Sampling Location	30 ECD	Operator	DG
Project #	cei-14-norman.ok-comp#1	Ports Used	2

Moisture Content Data								
Run Number	0-30-0%-1		Date	06/19/14	Start Time	18:33	Stop Time	19:43
Meter Box Number	SAMP-CP-0023				Meter Cal Factor	(Y)	1.010	
Total Meter Volume	(V _m)	48.030	dcf		Barometric Pressure	(P _b)	29.99	in Hg
Average Stack Temp	(t _s) _{avg}	576	°F		Stack Static Pressure	(P _{static})	0.00	in H ₂ O
Average Meter Temp	(t _m) _{avg}	81	°F		Avg Orifice Pressure	(ΔH) _{avg}	1.90	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)	785.70	757.50	586.10	940.20			
Initial Value	(V _i),(W _i)	760.00	751.20	583.30	929.20			
Net Value	(V _n),(W _n)	25.7	6.3	2.8	11.0			
Results								
Total Weight	(W _f)	45.80	g	Water Vol Weighed	(V _{wsg(std)})	2.159	scf	
Std Meter Volume	(V _{m(std)})	47.658	dscf	Sat. Moisture Content	(B _{ws(svp)})	100.00	%	
Calc Moisture Content	(B _{ws(calc)})	4.33	%	Final Moisture Content	(B _{ws})	4.33	%	

Moisture Content Data								
Run Number	0-30-0%-2		Date	06/20/14	Start Time	07:39	Stop Time	08:49
Meter Box Number	SAMP-CP-0023				Meter Cal Factor	(Y)	1.010	
Total Meter Volume	(V _m)	47.450	dcf		Barometric Pressure	(P _b)	29.97	in Hg
Average Stack Temp	(t _s) _{avg}	654	°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}	1.90	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)	734.50	710.60	567.90	942.90			
Initial Value	(V _i),(W _i)	704.70	703.20	564.50	932.70			
Net Value	(V _n),(W _n)	29.8	7.4	3.4	10.2			
Results								
Total Weight	(W _f)	50.80	g	Water Vol Weighed	(V _{wsg(std)})	2.395	scf	
Std Meter Volume	(V _{m(std)})	47.501	dscf	Sat. Moisture Content	(B _{ws(svp)})	100.00	%	
Calc Moisture Content	(B _{ws(calc)})	4.80	%	Final Moisture Content	(B _{ws})	4.80	%	

Moisture Content Data								
Run Number	0-30-0%-3		Date	06/20/14	Start Time	09:05	Stop Time	10:15
Meter Box Number	SAMP-CP-0023				Meter Cal Factor	(Y)	1.010	
Total Meter Volume	(V _m)	46.180	dcf		Barometric Pressure	(P _b)	30.00	in Hg
Average Stack Temp	(t _s) _{avg}	611	°F		Stack Static Pressure	(P _{static})	0.00	in H ₂ O
Average Meter Temp	(t _m) _{avg}	83	°F		Avg Orifice Pressure	(ΔH) _{avg}	1.90	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)	760.50	716.50	570.50	954.60			
Initial Value	(V _i),(W _i)	734.50	710.60	567.90	942.90			
Net Value	(V _n),(W _n)	26.0	5.9	2.6	11.7			
Results								
Total Weight	(W _f)	46.20	g	Water Vol Weighed	(V _{wsg(std)})	2.178	scf	
Std Meter Volume	(V _{m(std)})	45.700	dscf	Sat. Moisture Content	(B _{ws(svp)})	100.00	%	
Calc Moisture Content	(B _{ws(calc)})	4.55	%	Final Moisture Content	(B _{ws})	4.55	%	

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

Plant Name	Norman Facility
Sampling Location	30 ECD
Project #	cel-14-norman.ok-comp#1

Date	06/19/14
Operator	DG
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 (+)	0.2	in H ₂ O for	30.0
		Pre (-)	0.2	in H ₂ O for	30.0
		Post (+)	0.2	in H ₂ O for	30.0
		Post (-)	0.2	in H ₂ O for	30.0

Nozzle Measurements				
Pre				PASS
Post				PASS

Run Time			
Start	18:33	End	19:43

Weights	Imp 1	Imp 2	Imp 3	Imp 4	Imp 5	Imp 6	Imp 7	Imp 8
Pre	760.0	751.2	583.3	929.2				
Post	785.7	757.5	586.1	940.2				

Sampling Equipment		
Meter Box Number	SAMP-CP-0023	
Meter Cal Factor	(Y)	1.010
Low Flow Meter	SAMP-MN-0001	
Average Nozzle Diameter	(D _{na})	in
Suggested Nozzle Diameter	(D _n)	0.4644 in
Probe Number	SAMP-SP-0001	in
Probe Length	60	in
Liner Material	inconel	
Sample Case / Oven Number		
Impinger Case Number	SAMP-BC-0002	

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Coefficient	(C _p)	0.819	
Average Stack Temp	(t _s)	576.4	F
Average Meter Temp	(t _m)	81.2	
Orifice Meter Coefficient	(ΔH@)	1.877	in H ₂ O
Square Root ΔP	(ΔP ^{1/2} _{avg})	0.07	in H ₂ O
Stack Moisture Content	(B _{ws})	4.33	%
Stack Dry Molecular Weight	(M _d)	29.12	lb/lb-mole
Estimated Orifice Flow Rate	(Q _m)	0.75	acfm
ΔP to ΔH Isokinetic Factor	(K)		

Pressures			
Barometric Pressure	(P _b)	29.99	in Hg
Stack Static Pressure	(P _{static})	0.00	in H ₂ O
Absolute Stack Pressure	(P _a)	29.99	in Hg
Absolute Meter Pressure	(P _m)	30.13	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) _i	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	906.510	0.005	1.877	1.90	556	250		58			81	81	0.0	0.07	5.38	1.975		47.408
A-2	2.7	00:02:43	908.500	0.005	1.877	1.90	554	250		50			81	81	0.0	0.07	5.38	3.990		47.885
A-3	5.4	00:05:25	910.530	0.005	1.877	1.90	625	250		48			81	81	0.0	0.07	5.56	5.976		47.805
A-4	8.1	00:08:07	912.530	0.005	1.877	1.90	707	250		48			81	81	0.0	0.07	5.77	7.782		46.694
A-5	10.8	00:10:50	914.350	0.005	1.877	1.90	733	250		49			81	81	0.0	0.07	5.83	9.728		46.694
A-6	13.5	00:13:33	916.310	0.005	1.877	1.90	738	250		49			81	81	0.0	0.07	5.85	11.664		46.654
A-7	16.3	00:16:15	918.260	0.005	1.877	1.90	741	250		50			81	81	0.0	0.07	5.85	14.006		48.021
A-8	19.0	00:18:58	920.620	0.005	1.877	1.90	626	250		50			81	81	0.0	0.07	5.57	15.843		47.528
A-9	21.7	00:21:40	922.470	0.005	1.877	1.90	583	250		50			81	81	0.0	0.07	5.46	17.947		47.858
A-10	24.4	00:24:22	924.590	0.005	1.877	1.90	562	250		50			81	81	0.0	0.07	5.40	19.605		47.051
A-11	27.1	00:27:05	926.260	0.005	1.877	1.90	530	250		50			81	81	0.0	0.07	5.32	21.530		46.975
A-12	29.8	00:29:47	928.200	0.005	1.877	1.90	439	250		51			81	81	0.0	0.07	5.06	23.446		46.892
B-1	32.5	00:32:30	930.130	0.005	1.877	1.90	266	250		51			81	81	0.0	0.07	4.55	25.620		47.298
B-2	35.2	00:35:12	932.320	0.005	1.877	1.90	548	250		51			81	81	0.0	0.07	5.36	27.556		47.238
B-3	37.9	00:37:55	934.270	0.005	1.877	1.90	691	250		51			81	81	0.0	0.07	5.73	29.779		47.647
B-4	40.6	00:40:37	936.510	0.005	1.877	1.90	745	250		51			81	81	0.0	0.07	5.86	31.665		47.498
B-5	43.3	00:43:20	938.410	0.005	1.877	1.90	756	250		52			81	81	0.0	0.07	5.89	33.650		47.507
B-6	46.0	00:46:03	940.410	0.005	1.877	1.90	762	250		53			81	81	0.0	0.07	5.91	35.417		47.223
B-7	48.8	00:48:45	942.190	0.005	1.877	1.90	739	250		53			81	81	0.0	0.07	5.85	37.442		47.296
B-8	51.5	00:51:28	944.230	0.005	1.877	1.90	495	250		53			82	82	0.0	0.07	5.22	39.483		47.380
B-9	54.2	00:54:10	946.290	0.005	1.877	1.90	421	250		54			82	82	0.0	0.07	5.01	41.495		47.423
B-10	56.9	00:56:53	948.320	0.005	1.877	1.90	431	250		54			82	82	0.0	0.07	5.04	43.585		47.548
B-11	59.6	00:59:35	950.430	0.005	1.877	1.90	382	250		55			82	82	0.0	0.07	4.90	45.577		47.558
B-12	62.3	01:02:18	952.440	0.005	1.877	1.90	204	250		55			82	82	0.0	0.07	4.35	47.658		47.658
Last Pt	65.0	01:05:00	954.540																	
Final Val	65.0	01:05:00	954.540												Max Vac	0.0	Final Values	47.658		
Average Values				0.01		1.90	576	250		52			81	81		0.07	5.42			
													81							

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

Plant Name		Norman Facility				Date		06/20/14		Ideal Nozzle Diameter and IsoKinetic Factor Setup					
Sampling Location		30 ECD				Operator		DG							
Project #		cei-14-norman.ok-comp#1				Run Number		0-30-0%-2							

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 (+)	0.2	in H ₂ O for	30.0	sec
	Pre (-)	0.2	in H ₂ O for	30.0	sec
	Post (+)	0.2	in H ₂ O for	30.0	sec
	Post (-)	0.2	in H ₂ O for	30.0	sec

Nozzle Measurements			
Pre			PASS
Post			PASS

Run Time			
Start	07:39	End	08:49

Weights	Imp 1	Imp 2	Imp 3	Imp 4	Imp 5	Imp 6	Imp 7	Imp 8
Pre	704.7	703.2	564.5	932.7				
Post	734.5	710.6	567.9	942.9				

Sampling Equipment			
Meter Box Number	SAMP-CP-0023		
Meter Cal Factor	(Y)	1.010	
Low Flow Meter			
Average Nozzle Diameter	(D _{na})		in
Suggested Nozzle Diameter	(D _n)	0.4700	in
Probe Number	SAMP-SP-0001		in
Probe Length	60	in	
Liner Material	Inconel		
Sample Case / Oven Number			
Impinger Case Number	SAMP-BC-0002		

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)	30.11	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 _{mi})	Meter Outlet Temp (t _{mo})	Pump Vacuum	Square Root ΔP (Δp ^{1/2})	Local Stack Velocity (v _{sl})	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	963.630	0.005	1.877	1.90	580	250		65			70	70	0.0	0.07	5.44	1.762		42.285
A-2	2.7	00:02:43	965.370	0.005	1.877	1.90	571	250		45			71	71	0.0	0.07	5.42	3.793		45.520
A-3	5.4	00:05:25	967.380	0.005	1.877	1.90	654	250		44			71	71	0.0	0.07	5.63	5.744		45.951
A-4	8.1	00:08:07	969.310	0.005	1.877	1.90	712	250		43			71	71	0.0	0.07	5.78	7.583		45.500
A-5	10.8	00:10:50	971.130	0.005	1.877	1.90	757	250		43			72	72	0.0	0.07	5.89	9.621		46.181
A-6	13.5	00:13:33	973.150	0.005	1.877	1.90	773	250		42			72	72	0.0	0.07	5.92	11.548		46.191
A-7	16.3	00:16:15	975.060	0.005	1.877	1.90	780	250		43			73	73	0.0	0.07	5.94	13.521		46.358
A-8	19.0	00:18:58	977.020	0.005	1.877	1.90	746	250		43			74	74	0.0	0.07	5.86	15.511		46.533
A-9	21.7	00:21:40	979.000	0.005	1.877	1.90	588	250		43			75	75	0.0	0.07	5.46	17.497		46.659
A-10	24.4	00:24:22	980.980	0.005	1.877	1.90	485	250		44			76	76	0.0	0.07	5.19	19.520		46.847
A-11	27.1	00:27:05	983.000	0.005	1.877	1.90	469	250		44			76	76	0.0	0.07	5.14	21.532		46.979
A-12	29.8	00:29:47	985.010	0.005	1.877	1.90	445	250		45			77	77	0.0	0.07	5.08	23.671		47.342
B-1	32.5	00:32:30	987.150	0.005	1.877	1.90	540	250		45			77	77	0.0	0.07	5.34	25.540		47.150
B-2	35.2	00:35:12	989.020	0.005	1.877	1.90	613	250		46			78	78	0.0	0.07	5.53	27.595		47.305
B-3	37.9	00:37:55	991.080	0.005	1.877	1.90	719	250		45			78	78	0.0	0.07	5.79	29.560		47.295
B-4	40.6	00:40:37	993.050	0.005	1.877	1.90	781	250		45			78	78	0.0	0.07	5.94	31.545		47.317
B-5	43.3	00:43:20	995.040	0.005	1.877	1.90	796	250		45			78	78	0.0	0.07	5.98	33.590		47.421
B-6	46.0	00:46:03	997.090	0.005	1.877	1.90	801	250		45			79	79	0.0	0.07	5.99	35.432		47.242
B-7	48.8	00:48:45	998.940	0.005	1.877	1.90	819	250		45			79	79	0.0	0.07	6.03	37.542		47.422
B-8	51.5	00:51:28	1001.060	0.005	1.877	1.90	684	250		46			80	80	0.0	0.07	5.71	39.391		47.269
B-9	54.2	00:54:10	1002.920	0.005	1.877	1.90	631	250		46			80	80	0.0	0.07	5.57	41.369		47.278
B-10	56.9	00:56:53	1004.910	0.005	1.877	1.90	613	250		46			80	80	0.0	0.07	5.53	43.356		47.298
B-11	59.6	00:59:35	1006.910	0.005	1.877	1.90	567	250		46			80	80	0.0	0.07	5.41	45.384		47.357
B-12	62.3	01:02:18	1008.950	0.005	1.877	1.90	563	250		47			81	81	0.0	0.07	5.40	47.496		47.496
Last Pt	65.0	01:05:00	1011.080																	
Final Val	65.0	01:05:00	1011.080												Max Vac	0.0	Final Values	47.496		
Average Values						0.01		1.90	654	250		45		76	76		0.07	5.62		
										76										

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

Plant Name	Norman Facility
Sampling Location	30 ECD
Project #	cel-14-norman.ok-comp#1

Date	06/20/14
Operator	DG
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 (+)	0.2	in H ₂ O for	30.0
		Pre (-)	0.2	in H ₂ O for	30.0
		Post (+)	0.2	in H ₂ O for	30.0
		Post (-)	0.2	in H ₂ O for	30.0

Nozzle Measurements				
Pre				PASS
Post				PASS

Run Time			
Start	09:05	End	10:15

Weights	Imp 1	Imp 2	Imp 3	Imp 4	Imp 5	Imp 6	Imp 7	Imp 8
Pre	734.5	710.6	567.9	942.9				
Post	760.5	716.5	570.5	954.6				

Sampling Equipment		
Meter Box Number	SAMP-CP-0023	
Meter Cal Factor	(Y)	1.010
Low Flow Meter	SAMP-MN-0001	
Average Nozzle Diameter	(D _{na})	in
Suggested Nozzle Diameter	(D _n)	0.4617 in
Probe Number	SAMP-SP-0001	in
Probe Length	60	in
Liner Material	inconel	
Sample Case / Oven Number		
Impinger Case Number	SAMP-BC-0002	

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Coefficient	(C _p)	0.819	
Average Stack Temp	(t _s)	610.7	F
Average Meter Temp	(t _m)	82.8	
Orifice Meter Coefficient	(ΔH@)	1.877	in H ₂ O
Square Root ΔP	(ΔP ^{1/2} _{avg})	0.07	in H ₂ O
Stack Moisture Content	(B _{ws})	4.55	%
Stack Dry Molecular Weight	(M _d)	29.22	lb/lb-mole
Estimated Orifice Flow Rate	(Q _m)	0.73	acfm
ΔP to ΔH Isokinetic Factor	(K)		

Pressures			
Barometric Pressure	(P _b)	30.00	in Hg
Stack Static Pressure	(P _{static})	0.00	in H ₂ O
Absolute Stack Pressure	(P _a)	30.00	in Hg
Absolute Meter Pressure	(P _m)	30.14	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) _i	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	14.990	0.005	1.877	1.90	538	250		61			80	80	0.0	0.07	5.33	0.925		22.204
A-2	2.7	00:02:43	15.920	0.005	1.877	1.90	552	250		54			81	81	0.0	0.07	5.37	2.871		34.457
A-3	5.4	00:05:25	17.880	0.005	1.877	1.90	638	250		51			81	81	0.0	0.07	5.59	4.500		35.999
A-4	8.1	00:08:07	19.520	0.005	1.877	1.90	759	250		50			81	81	0.0	0.07	5.89	6.079		36.472
A-5	10.8	00:10:50	21.110	0.005	1.877	1.90	768	250		50			81	81	0.0	0.07	5.91	8.551		41.046
A-6	13.5	00:13:33	23.600	0.005	1.877	1.90	783	250		51			82	82	0.0	0.07	5.95	10.454		41.817
A-7	16.3	00:16:15	25.520	0.005	1.877	1.90	811	250		52			82	82	0.0	0.07	6.01	12.585		43.149
A-8	19.0	00:18:58	27.670	0.005	1.877	1.90	794	250		54			82	82	0.0	0.07	5.97	14.359		43.078
A-9	21.7	00:21:40	29.460	0.005	1.877	1.90	676	250		55			83	83	0.0	0.07	5.69	16.278		43.409
A-10	24.4	00:24:22	31.400	0.005	1.877	1.90	720	250		56			83	83	0.0	0.07	5.79	18.376		44.102
A-11	27.1	00:27:05	33.520	0.005	1.877	1.90	547	250		56			83	83	0.0	0.07	5.35	20.256		44.194
A-12	29.8	00:29:47	35.420	0.005	1.877	1.90	265	250		57			83	83	0.0	0.07	4.54	22.264		44.528
B-1	32.5	00:32:30	37.450	0.005	1.877	1.90	223	250		58			83	83	0.0	0.07	4.41	24.215		44.704
B-2	35.2	00:35:12	39.422	0.005	1.877	1.90	572	250		59			83	83	0.0	0.07	5.42	25.927		44.447
B-3	37.9	00:37:55	41.153	0.005	1.877	1.90	757	250		58			83	83	0.0	0.07	5.88	28.467		45.547
B-4	40.6	00:40:37	43.720	0.005	1.877	1.90	789	250		58			83	83	0.0	0.07	5.96	30.069		45.104
B-5	43.3	00:43:20	45.340	0.005	1.877	1.90	797	250		58			83	83	0.0	0.07	5.98	31.969		45.133
B-6	46.0	00:46:03	47.260	0.005	1.877	1.90	807	250		59			84	84	0.0	0.07	6.00	33.835		45.114
B-7	48.8	00:48:45	49.150	0.005	1.877	1.90	757	250		58			84	84	0.0	0.07	5.88	35.761		45.172
B-8	51.5	00:51:28	51.100	0.005	1.877	1.90	598	250		60			84	84	0.0	0.07	5.49	37.736		45.283
B-9	54.2	00:54:10	53.100	0.005	1.877	1.90	623	250		60			84	84	0.0	0.07	5.55	39.721		45.395
B-10	56.9	00:56:53	55.110	0.005	1.877	1.90	458	250		61			85	85	0.0	0.07	5.11	41.712		45.504
B-11	59.6	00:59:35	57.130	0.005	1.877	1.90	255	250		62			85	85	0.0	0.07	4.51	43.654		45.552
B-12	62.3	01:02:18	59.100	0.005	1.877	1.90	169	250		62			85	85	0.0	0.07	4.23	45.694		45.694
Last Pt	65.0	01:05:00	61.170																	
Final Val	65.0	01:05:00	61.170												Max Vac	0.0	Final Values	45.694		
Average Values				0.01		1.90	611	250		57			83	83		0.07	5.49			
													83							

CIMARRON ENERGY, INC.

June 19, 2014

30 ECD

Norman Facility

Unit Data

Meas. Stack Moisture	4.3	%
Stack Exhaust Flow (M2)	43,812	SCFH

Weather Data

Barometric Pressure	29.99	in. Hg
Relative Humidity	38	%
Ambient Temperature	83	°F
Specific Humidity	0.009106	lb H ₂ O / lb air

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

	Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmvd)	THC (ppmwv)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
A1	06/19/14 18:33:10	22800	18.07	3.92	0.59	1.99	2.52	91.30	107.00
	06/19/14 18:33:40	22830	18.11	3.60	0.66	1.88	2.52	91.30	107.00
	06/19/14 18:34:10	22860	18.17	3.42	0.73	1.85	2.30	91.20	150.00
	06/19/14 18:34:40	22890	18.32	3.50	0.66	1.79	2.30	91.20	150.00
	06/19/14 18:35:10	22920	18.30	3.50	0.81	1.74	2.19	91.20	150.00
	06/19/14 18:35:40	22950	18.34	3.67	0.66	1.76	2.19	91.20	150.00
	06/19/14 18:36:10	22980	18.23	3.19	0.66	1.80	2.35	91.10	150.00
	06/19/14 18:36:40	23010	18.25	3.23	0.65	1.81	2.35	91.10	150.00
	06/19/14 18:37:10	23040	18.17	3.33	0.62	1.84	2.38	91.00	150.00
	06/19/14 18:37:40	23070	18.22	3.35	0.64	1.82	2.38	91.00	150.00
	06/19/14 18:38:10	23100	18.06	3.25	0.52	1.98	2.93	90.90	140.00
	06/19/14 18:38:40	23130	18.26	3.05	0.65	1.74	2.93	90.90	140.00
	06/19/14 18:39:10	23160	17.39	3.03	0.40	2.38	5.48	90.80	227.00
	06/19/14 18:39:40	23190	17.25	2.21	0.37	2.60	5.48	90.80	227.00
	06/19/14 18:40:10	23220	17.20	2.10	0.37	2.53	5.79	90.60	238.00
	06/19/14 18:40:40	23250	17.04	2.24	0.33	2.70	5.79	90.60	238.00
	06/19/14 18:41:10	23280	17.13	2.03	0.37	2.69	5.81	90.50	239.00
	06/19/14 18:41:40	23310	16.87	2.28	0.31	2.79	5.81	90.50	239.00
	06/19/14 18:42:10	23340	17.43	2.24	0.33	2.46	5.70	90.30	217.00
	06/19/14 18:42:40	23370	17.17	1.99	0.34	2.59	5.70	90.30	217.00
	06/19/14 18:43:10	23400	16.97	2.31	0.33	2.80	5.87	90.10	228.00
	06/19/14 18:43:40	23430	16.90	2.06	0.34	2.73	5.87	90.10	228.00
	06/19/14 18:44:10	23460	17.20	2.33	0.34	2.61	5.76	90.00	239.00
	06/19/14 18:44:40	23490	16.61	2.29	0.30	3.00	5.76	90.00	239.00
	06/19/14 18:45:10	23520	16.86	2.25	0.35	2.85	5.65	89.90	239.00
	06/19/14 18:45:40	23550	17.01	2.14	0.35	2.72	5.65	89.90	239.00
	06/19/14 18:46:10	23580	16.64	2.22	0.32	2.97	5.95	89.80	250.00
	06/19/14 18:46:40	23610	16.34	2.18	0.23	3.11	5.95	89.80	250.00
	06/19/14 18:47:10	23640	16.36	2.35	0.25	3.20	5.56	89.70	228.00
	06/19/14 18:47:40	23670	16.46	2.29	0.27	3.10	5.56	89.70	228.00
	06/19/14 18:48:10	23700	16.62	2.16	0.26	2.98	5.84	89.60	217.00
	06/19/14 18:48:40	23730	16.86	2.11	0.31	2.89	5.84	89.60	217.00
	06/19/14 18:49:10	23760	17.68	2.32	0.54	2.40	1.74	89.60	129.00
	06/19/14 18:49:40	23790	18.07	3.31	0.56	1.91	1.74	89.60	129.00
	06/19/14 18:50:10	23820	17.99	4.12	0.67	2.01	2.02	89.60	140.00
	06/19/14 18:50:40	23850	18.05	4.03	0.67	1.95	2.02	89.60	140.00
	06/19/14 18:51:10	23880	18.31	4.03	0.73	1.81	2.19	89.60	140.00
	06/19/14 18:51:40	23910	18.39	3.98	0.68	1.66	2.19	89.60	140.00
	06/19/14 18:52:10	23940	18.04	3.98	0.65	1.96	2.33	89.60	140.00
	06/19/14 18:52:40	23970	18.06	3.88	0.56	1.99	2.33	89.60	140.00
	06/19/14 18:53:10	24000	18.05	3.59	0.53	1.93	3.02	89.60	151.00
	06/19/14 18:53:40	24030	17.90	3.91	0.52	2.09	3.02	89.60	151.00
	06/19/14 18:54:10	24060	17.13	3.39	0.38	2.53	5.26	89.50	217.00
	06/19/14 18:54:40	24090	17.11	2.34	0.33	2.64	5.26	89.50	217.00
	06/19/14 18:55:10	24120	17.07	2.21	0.37	2.73	5.56	89.40	228.00
	06/19/14 18:55:40	24150	16.95	2.10	0.36	2.72	5.56	89.40	228.00
A2	06/19/14 18:56:10	24180	16.86	2.09	0.35	2.82	5.70	89.30	239.00
	06/19/14 18:56:40	24210	16.91	2.36	0.33	2.82	5.70	89.30	239.00
	06/19/14 18:57:10	24240	17.08	2.28	0.35	2.68	5.84	89.20	239.00
	06/19/14 18:57:40	24270	17.08	2.08	0.35	2.67	5.84	89.20	239.00
	06/19/14 18:58:10	24300	17.01	2.05	0.31	2.68	5.73	89.20	239.00
	06/19/14 18:58:40	24330	17.17	2.15	0.41	2.68	5.73	89.20	239.00
	06/19/14 18:59:10	24360	17.50	2.00	0.38	2.35	5.87	89.20	239.00
	06/19/14 18:59:40	24390	16.76	1.98	0.27	2.84	5.87	89.20	239.00
	06/19/14 19:00:10	24420	17.03	2.15	0.31	2.73	5.76	89.20	228.00
	06/19/14 19:00:40	24450	17.09	2.25	0.35	2.66	5.76	89.20	228.00
	06/19/14 19:01:10	24480	16.53	2.29	0.28	3.03	5.79	89.10	239.00
	06/19/14 19:01:40	24510	16.40	2.37	0.27	3.12	5.79	89.10	239.00
	06/19/14 19:02:10	24540	16.75	2.23	0.26	2.91	5.92	89.10	239.00
	06/19/14 19:02:40	24570	16.28	2.17	0.19	3.19	5.92	89.10	239.00

CIMARRON ENERGY, INC.

June 19, 2014

30 ECD

Norman Facility

Unit Data

Meas. Stack Moisture	4.3	%
Stack Exhaust Flow (M2)	43,812	SCFH

Weather Data

Barometric Pressure	29.99	in. Hg
Relative Humidity	38	%
Ambient Temperature	83	°F
Specific Humidity	0.009106	lb H ₂ O / lb air

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

	Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmvd)	THC (ppmwv)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
	06/19/14 19:03:10	24600	16.71	2.41	0.28	2.97	5.67	89.10	250.00
	06/19/14 19:03:40	24630	16.56	2.49	0.23	3.03	5.67	89.10	250.00
	06/19/14 19:04:10	24660	16.52	2.23	0.24	3.05	5.95	89.00	250.00
	06/19/14 19:04:40	24690	16.42	2.18	0.26	3.09	5.95	89.00	250.00
	06/19/14 19:05:10	24720	16.73	2.23	0.31	2.96	5.70	89.00	228.00
	06/19/14 19:05:40	24750	16.72	2.30	0.31	2.93	5.70	89.00	228.00
	06/19/14 19:06:10	24780	16.62	2.17	0.30	2.93	5.70	89.00	228.00
	06/19/14 19:06:40	24810	16.81	2.38	0.31	2.94	5.70	89.00	228.00
	06/19/14 19:07:10	24840	16.64	2.33	0.26	2.90	5.98	88.90	239.00
	06/19/14 19:07:40	24870	16.43	2.26	0.20	3.11	5.98	88.90	239.00
	06/19/14 19:08:10	24900	16.47	2.22	0.17	3.09	4.26	88.80	184.00
	06/19/14 19:08:40	24930	17.38	2.37	0.51	2.64	4.26	88.80	184.00
	06/19/14 19:09:10	24960	17.85	2.67	0.47	2.09	2.68	88.80	151.00
	06/19/14 19:09:40	24990	18.09	2.61	0.56	1.98	2.68	88.80	151.00
	06/19/14 19:10:10	25020	18.21	2.47	0.59	1.83	2.71	88.80	151.00
	06/19/14 19:10:40	25050	18.08	2.56	0.61	1.93	2.71	88.80	151.00
	06/19/14 19:11:10	25080	18.05	2.87	0.64	2.00	2.82	88.80	151.00
	06/19/14 19:11:40	25110	18.12	2.77	0.60	1.92	2.82	88.80	151.00
	06/19/14 19:12:10	25140	17.66	2.57	0.42	2.11	5.34	88.80	217.00
	06/19/14 19:12:40	25170	17.08	2.17	0.29	2.69	5.34	88.80	217.00
	06/19/14 19:13:10	25200	16.79	2.12	0.28	2.85	5.76	88.70	239.00
	06/19/14 19:13:40	25230	16.75	2.29	0.29	2.92	5.76	88.70	239.00
	06/19/14 19:14:10	25260	17.15	2.18	0.32	2.65	5.51	88.70	217.00
	06/19/14 19:14:40	25290	17.06	1.99	0.33	2.73	5.51	88.70	217.00
	06/19/14 19:15:10	25320	17.11	2.05	0.34	2.61	5.51	88.70	228.00
	06/19/14 19:15:40	25350	17.01	2.30	0.32	2.69	5.51	88.70	228.00
	06/19/14 19:16:10	25380	17.15	2.34	0.34	2.69	5.65	88.70	228.00
	06/19/14 19:16:40	25410	16.98	2.19	0.31	2.71	5.65	88.70	228.00
	06/19/14 19:17:10	25440	16.84	2.30	0.29	2.83	5.40	88.70	217.00
	06/19/14 19:17:40	25470	17.03	2.51	0.32	2.75	5.40	88.70	217.00
	06/19/14 19:18:10	25500	16.88	2.20	0.30	2.82	5.67	88.70	228.00
	06/19/14 19:18:40	25530	16.96	2.19	0.29	2.74	5.67	88.70	228.00
A3	06/19/14 19:19:10	25560	17.04	2.16	0.31	2.70	5.54	88.70	239.00
	06/19/14 19:19:40	25590	16.81	2.28	0.27	2.86	5.54	88.70	239.00
	06/19/14 19:20:10	25620	16.98	2.25	0.29	2.75	5.67	88.70	239.00
	06/19/14 19:20:40	25650	16.73	2.19	0.32	2.90	5.67	88.70	239.00
	06/19/14 19:21:10	25680	16.86	2.30	0.31	2.80	5.67	88.80	228.00
	06/19/14 19:21:40	25710	17.00	2.21	0.30	2.73	5.67	88.80	228.00
	06/19/14 19:22:10	25740	16.83	2.09	0.33	2.82	5.29	88.80	228.00
	06/19/14 19:22:40	25770	16.90	2.25	0.29	2.84	5.29	88.80	228.00
	06/19/14 19:23:10	25800	16.86	2.13	0.31	2.83	5.70	88.80	239.00
	06/19/14 19:23:40	25830	17.27	2.11	0.39	2.57	5.70	88.80	239.00
	06/19/14 19:24:10	25860	17.27	2.01	0.39	2.56	4.90	88.80	217.00
	06/19/14 19:24:40	25890	17.18	2.05	0.31	2.55	4.90	88.80	217.00
	06/19/14 19:25:10	25920	17.62	2.22	0.58	2.42	2.13	88.70	140.00
	06/19/14 19:25:40	25950	18.01	2.97	0.67	2.01	2.13	88.70	140.00
	06/19/14 19:26:10	25980	18.08	3.29	0.63	1.95	2.27	88.80	129.00
	06/19/14 19:26:40	26010	18.17	3.24	0.62	1.90	2.27	88.80	129.00
	06/19/14 19:27:10	26040	18.02	3.09	0.61	1.94	2.41	88.80	140.00
	06/19/14 19:27:40	26070	17.84	3.09	0.64	2.12	2.41	88.80	140.00
	06/19/14 19:28:10	26100	17.97	3.05	0.59	2.03	2.41	88.80	140.00
	06/19/14 19:28:40	26130	17.89	3.09	0.61	2.10	2.41	88.80	140.00
	06/19/14 19:29:10	26160	18.03	3.27	0.65	1.99	3.07	88.80	173.00
	06/19/14 19:29:40	26190	17.85	3.11	0.56	2.08	3.07	88.80	173.00
	06/19/14 19:30:10	26220	17.24	2.67	0.41	2.51	5.87	88.70	239.00
	06/19/14 19:30:40	26250	16.90	2.28	0.33	2.75	5.87	88.70	239.00
	06/19/14 19:31:10	26280	16.64	2.34	0.32	2.96	5.87	88.60	229.00
	06/19/14 19:31:40	26310	16.58	2.37	0.32	2.99	5.87	88.60	229.00
	06/19/14 19:32:10	26340	16.87	2.31	0.35	2.84	5.76	88.50	218.00
	06/19/14 19:32:40	26370	16.76	2.26	0.32	2.90	5.76	88.50	218.00

Norman Facility

Meas. Stack Moisture	4.3	%
Stack Exhaust Flow (M2)	43,812	SCFH

Weather Data		
Barometric Pressure	29.99	in. Hg
Relative Humidity	38	%
Ambient Temperature	83	° F
Specific Humidity	0.009106	lb H ₂ O / lb air

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmvd)	THC (ppmwv)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
06/19/14 19:33:10	26400	16.78	2.29	0.30	2.89	5.65	88.40	228.00
06/19/14 19:33:40	26430	16.85	2.39	0.36	2.88	5.65	88.40	228.00
06/19/14 19:34:10	26460	16.90	2.16	0.36	2.77	5.40	88.30	239.00
06/19/14 19:34:40	26490	16.80	2.14	0.28	2.83	5.40	88.30	239.00
06/19/14 19:35:10	26520	16.89	2.04	0.29	2.82	5.92	88.20	218.00
06/19/14 19:35:40	26550	16.57	2.17	0.28	3.00	5.92	88.20	218.00
06/19/14 19:36:10	26580	16.66	2.26	0.27	2.94	5.54	88.10	229.00
06/19/14 19:36:40	26610	16.52	2.13	0.27	3.02	5.54	88.10	229.00
06/19/14 19:37:10	26640	16.55	2.18	0.25	3.06	5.67	88.00	229.00
06/19/14 19:37:40	26670	16.65	2.21	0.25	2.95	5.67	88.00	229.00
06/19/14 19:38:10	26700	16.63	2.14	0.23	3.00	5.43	87.80	218.00
06/19/14 19:38:40	26730	16.72	2.23	0.32	2.93	5.43	87.80	218.00
06/19/14 19:39:10	26760	16.81	2.37	0.28	2.84	3.99	87.80	174.00
06/19/14 19:39:40	26790	16.59	2.25	0.21	2.99	3.99	87.80	174.00
06/19/14 19:40:10	26820	16.40	2.18	0.20	3.13	2.66	87.70	162.00
06/19/14 19:40:40	26850	16.85	2.17	0.44	2.91	2.66	87.70	162.00
06/19/14 19:41:10	26880	17.67	2.65	0.61	2.27	2.55	87.60	162.00
06/19/14 19:41:40	26910	17.74	2.54	0.63	2.22	2.55	87.60	162.00
06/19/14 19:42:10	26940	17.76	2.60	0.51	2.19	3.10	87.50	173.00
06/19/14 19:42:40	26970	17.83	2.34	0.45	2.10	3.10	87.50	173.00
06/19/14 19:43:10	27000	17.89	2.25	0.49	2.07	2.96	87.40	152.00
RAW AVERAGE		17.23	2.53	0.40	2.56	4.61	89.16	202.67

		O ₂	CO	THC	CO ₂	Press. Trans	Temp. Trans.	F-Flow Trans.
Serial Number:		INST-22-0005	INST-CO-0034	INST-VC-0006	INST-22-0005			
		(%)	(ppmvd)	(ppmvw)	(%)	(in. H ₂ O)	(°F)	(SCFH)
Bias	Initial Zero	0.04	0.01	0.02	0.01			
	Final Zero	0.02	0.10	0.03	0.01			
	Avg. Zero	0.03	0.06	0.03	0.01			
	Initial UpScale	12.10	5.25	2.94	9.25			
	Final UpScale	12.11	5.23	3.10	9.24			
	Avg. UpScale	12.11	5.24	3.02	9.25			
		12.25	5.12	3.04	9.33			

EMISSIONS DATA	O ₂	CO	THC	CO ₂
Corrected Raw Average (ppm/% dry basis)	17.45	2.44	0.40	2.57
Corrected Raw Average (ppm/% wet basis)	16.69	2.34	0.38	2.46
Emission Rate (lb/hr)	N/A	0.01	0.00	N/A

CIMARRON ENERGY, INC.

June 20, 2014

30 ECD

Norman Facility

Unit Data

Meas. Stack Moisture	4.8	%
Stack Exhaust Flow (M2)	44,676	SCFH

Weather Data

Barometric Pressure	29.97	in. Hg
Relative Humidity	70	%
Ambient Temperature	82	°F
Specific Humidity	0.016440	lb H ₂ O / lb air

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

	Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmvd)	THC (ppmwv)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
A1	06/20/14 07:39:12	3270	18.15	3.46	0.62	1.86	2.55	74.70	133.00
	06/20/14 07:39:42	3300	17.91	3.47	0.58	2.00	2.55	74.70	133.00
	06/20/14 07:40:12	3330	17.96	3.85	0.58	1.95	2.63	74.80	133.00
	06/20/14 07:40:42	3360	17.70	3.91	0.46	2.18	2.63	74.80	133.00
	06/20/14 07:41:12	3390	17.73	3.75	0.46	2.15	2.71	74.90	133.00
	06/20/14 07:41:42	3420	17.93	3.78	0.52	2.00	2.71	74.90	133.00
	06/20/14 07:42:12	3450	17.82	4.03	0.45	2.10	2.66	75.10	133.00
	06/20/14 07:42:42	3480	17.98	4.53	0.45	1.98	2.66	75.10	133.00
	06/20/14 07:43:12	3510	18.10	4.24	0.54	1.90	2.74	75.20	133.00
	06/20/14 07:43:42	3540	17.56	4.16	0.45	2.21	2.74	75.20	133.00
	06/20/14 07:44:12	3570	17.48	5.06	0.39	2.32	6.45	75.40	223.00
	06/20/14 07:44:42	3600	16.35	4.00	0.29	3.05	6.45	75.40	223.00
	06/20/14 07:45:12	3630	15.98	2.02	0.21	3.31	6.31	75.50	234.00
	06/20/14 07:45:42	3660	15.77	2.02	0.18	3.50	6.31	75.50	234.00
	06/20/14 07:46:12	3690	15.93	2.14	0.25	3.45	6.14	75.80	245.00
	06/20/14 07:46:42	3720	16.17	2.10	0.24	3.20	6.14	75.80	245.00
	06/20/14 07:47:12	3750	15.94	2.22	0.21	3.44	6.23	76.00	245.00
	06/20/14 07:47:42	3780	15.98	2.42	0.25	3.34	6.23	76.00	245.00
	06/20/14 07:48:12	3810	16.11	2.37	0.22	3.28	6.20	76.20	245.00
	06/20/14 07:48:42	3840	16.35	2.16	0.23	3.16	6.20	76.20	245.00
	06/20/14 07:49:12	3870	16.05	1.96	0.20	3.27	6.17	76.40	223.00
	06/20/14 07:49:42	3900	16.02	2.25	0.20	3.34	6.17	76.40	223.00
	06/20/14 07:50:12	3930	16.05	2.28	0.25	3.28	6.39	76.60	223.00
	06/20/14 07:50:42	3960	16.06	2.28	0.22	3.34	6.39	76.60	223.00
	06/20/14 07:51:12	3990	16.19	1.99	0.25	3.18	5.95	76.90	233.00
	06/20/14 07:51:42	4020	16.90	2.04	0.34	2.82	5.95	76.90	233.00
	06/20/14 07:52:12	4050	16.10	1.89	0.18	3.19	6.42	77.20	245.00
	06/20/14 07:52:42	4080	15.94	2.19	0.18	3.40	6.42	77.20	245.00
	06/20/14 07:53:12	4110	15.96	2.39	0.23	3.38	6.23	77.50	233.00
	06/20/14 07:53:42	4140	15.96	2.40	0.16	3.36	6.23	77.50	233.00
	06/20/14 07:54:12	4170	15.71	2.06	0.12	3.57	6.03	77.90	233.00
	06/20/14 07:54:42	4200	15.97	2.05	0.15	3.43	6.03	77.90	233.00
	06/20/14 07:55:12	4230	16.07	1.76	0.18	3.27	6.37	78.20	233.00
	06/20/14 07:55:42	4260	15.88	1.88	0.16	3.40	6.37	78.20	233.00
	06/20/14 07:56:12	4290	16.05	2.29	0.14	3.33	3.93	78.60	166.00
	06/20/14 07:56:42	4320	16.68	2.66	0.53	3.03	3.93	78.60	166.00
	06/20/14 07:57:12	4350	17.41	12.04	0.72	2.44	2.96	78.90	165.00
	06/20/14 07:57:42	4380	16.88	25.99	0.44	2.62	2.96	78.90	165.00
	06/20/14 07:58:12	4410	16.80	11.59	0.48	2.82	4.59	79.20	187.00
	06/20/14 07:58:42	4440	16.56	7.28	0.26	2.97	4.59	79.20	187.00
	06/20/14 07:59:12	4470	17.17	8.41	0.41	2.61	3.88	79.50	176.00
	06/20/14 07:59:42	4500	17.09	12.62	0.36	2.57	3.88	79.50	176.00
	06/20/14 08:00:12	4530	16.97	9.52	0.40	2.73	3.82	79.70	176.00
	06/20/14 08:00:42	4560	17.19	10.47	0.56	2.52	3.82	79.70	176.00
	06/20/14 08:01:12	4590	17.12	11.11	0.44	2.54	5.09	80.00	198.00
	06/20/14 08:01:42	4620	16.21	8.32	0.20	3.11	5.09	80.00	198.00
A2	06/20/14 08:02:12	4650	16.57	3.46	0.29	3.03	6.48	80.30	232.00
	06/20/14 08:02:42	4680	15.95	3.07	0.19	3.29	6.48	80.30	232.00
	06/20/14 08:03:12	4710	15.95	2.44	0.17	3.36	6.84	80.60	243.00
	06/20/14 08:03:42	4740	15.96	2.68	0.17	3.43	6.84	80.60	243.00
	06/20/14 08:04:12	4770	16.27	2.35	0.19	3.20	6.39	80.80	232.00
	06/20/14 08:04:42	4800	16.17	1.98	0.13	3.14	6.39	80.80	232.00
	06/20/14 08:05:12	4830	15.78	1.99	0.11	3.50	6.48	81.10	232.00
	06/20/14 08:05:42	4860	15.87	2.12	0.15	3.48	6.48	81.10	232.00
	06/20/14 08:06:12	4890	16.09	2.29	0.17	3.25	6.56	81.20	221.00
	06/20/14 08:06:42	4920	15.78	2.38	0.14	3.49	6.56	81.20	221.00
	06/20/14 08:07:12	4950	15.73	2.57	0.11	3.56	6.39	81.50	232.00
	06/20/14 08:07:42	4980	15.69	2.11	0.08	3.58	6.39	81.50	232.00
	06/20/14 08:08:12	5010	15.72	1.93	0.11	3.56	7.14	81.70	243.00
	06/20/14 08:08:42	5040	15.55	1.88	0.11	3.71	7.14	81.70	243.00

CIMARRON ENERGY, INC.

June 20, 2014

30 ECD

Norman Facility

Unit Data

Meas. Stack Moisture	4.8	%
Stack Exhaust Flow (M2)	44,676	SCFH

Weather Data

Barometric Pressure	29.97	in. Hg
Relative Humidity	70	%
Ambient Temperature	82	°F
Specific Humidity	0.016440	lb H ₂ O / lb air

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

	Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmvd)	THC (ppmwv)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
	06/20/14 08:09:12	5070	15.65	1.97	0.15	3.61	6.98	81.80	243.00
	06/20/14 08:09:42	5100	15.74	2.43	0.16	3.57	6.98	81.80	243.00
	06/20/14 08:10:12	5130	15.63	2.56	0.11	3.60	7.09	82.00	243.00
	06/20/14 08:10:42	5160	15.45	2.37	0.16	3.76	7.09	82.00	243.00
	06/20/14 08:11:12	5190	15.65	2.47	0.30	3.63	6.64	82.10	243.00
	06/20/14 08:11:42	5220	15.73	2.55	0.28	3.55	6.64	82.10	243.00
	06/20/14 08:12:12	5250	15.49	2.36	0.26	3.71	6.75	82.10	232.00
	06/20/14 08:12:42	5280	15.57	2.48	0.29	3.70	6.75	82.10	232.00
	06/20/14 08:13:12	5310	15.66	2.40	0.27	3.64	5.29	82.20	220.00
	06/20/14 08:13:42	5340	16.24	2.44	0.62	3.29	5.29	82.20	220.00
	06/20/14 08:14:12	5370	16.55	4.50	0.51	2.98	3.82	82.30	175.00
	06/20/14 08:14:42	5400	16.72	4.70	0.48	2.88	3.82	82.30	175.00
	06/20/14 08:15:12	5430	16.73	5.14	0.58	2.85	4.71	82.30	197.00
	06/20/14 08:15:42	5460	16.43	4.39	0.52	3.03	4.71	82.30	197.00
	06/20/14 08:16:12	5490	16.47	3.38	0.46	3.03	4.43	82.40	197.00
	06/20/14 08:16:42	5520	16.53	3.19	0.46	2.99	4.43	82.40	197.00
	06/20/14 08:17:12	5550	16.60	3.40	0.57	2.94	5.45	82.50	198.00
	06/20/14 08:17:42	5580	16.01	3.32	0.47	3.28	5.45	82.50	198.00
	06/20/14 08:18:12	5610	15.61	2.65	0.46	3.58	7.14	82.60	243.00
	06/20/14 08:18:42	5640	15.57	2.55	0.57	3.68	7.14	82.60	243.00
	06/20/14 08:19:12	5670	15.52	2.18	0.59	3.68	7.50	82.70	243.00
	06/20/14 08:19:42	5700	15.58	2.07	0.55	3.70	7.50	82.70	243.00
	06/20/14 08:20:12	5730	15.58	2.07	0.55	3.66	7.06	82.90	253.00
	06/20/14 08:20:42	5760	15.70	2.02	0.53	3.55	7.06	82.90	253.00
	06/20/14 08:21:12	5790	15.59	1.94	0.48	3.65	7.17	83.10	253.00
	06/20/14 08:21:42	5820	15.67	1.93	0.60	3.62	7.17	83.10	253.00
	06/20/14 08:22:12	5850	15.68	2.14	0.58	3.57	7.25	83.30	264.00
	06/20/14 08:22:42	5880	15.61	2.01	0.66	3.63	7.25	83.30	264.00
	06/20/14 08:23:12	5910	15.75	1.98	0.59	3.56	6.95	83.50	242.00
	06/20/14 08:23:42	5940	15.72	1.97	0.99	3.57	6.95	83.50	242.00
	06/20/14 08:24:12	5970	15.59	2.06	0.50	3.60	7.17	83.70	264.00
	06/20/14 08:24:42	6000	15.43	2.09	0.46	3.79	7.17	83.70	264.00
A3	06/20/14 08:25:12	6030	15.69	2.17	0.49	3.60	6.86	83.90	242.00
	06/20/14 08:25:42	6060	15.64	2.23	0.47	3.61	6.86	83.90	242.00
	06/20/14 08:26:12	6090	15.62	2.02	0.57	3.62	7.20	84.20	242.00
	06/20/14 08:26:42	6120	15.55	2.04	0.54	3.71	7.20	84.20	242.00
	06/20/14 08:27:12	6150	15.57	2.08	0.53	3.67	6.75	84.40	231.00
	06/20/14 08:27:42	6180	15.69	2.08	0.53	3.58	6.75	84.40	231.00
	06/20/14 08:28:12	6210	15.44	2.17	0.45	3.75	6.98	84.60	242.00
	06/20/14 08:28:42	6240	15.52	2.17	0.49	3.73	6.98	84.60	242.00
	06/20/14 08:29:12	6270	15.58	2.30	0.49	3.66	7.06	84.80	242.00
	06/20/14 08:29:42	6300	15.43	2.24	0.50	3.76	7.06	84.80	242.00
	06/20/14 08:30:12	6330	15.59	2.47	0.47	3.71	6.23	85.00	241.00
	06/20/14 08:30:42	6360	15.69	2.25	0.52	3.60	6.23	85.00	241.00
	06/20/14 08:31:12	6390	16.35	2.49	0.68	3.17	4.21	85.20	185.00
	06/20/14 08:31:42	6420	16.65	2.71	0.75	2.94	4.21	85.20	185.00
	06/20/14 08:32:12	6450	16.84	2.87	0.86	2.78	3.52	85.40	174.00
	06/20/14 08:32:42	6480	16.91	3.09	0.84	2.74	3.52	85.40	174.00
	06/20/14 08:33:12	6510	16.77	3.27	0.95	2.79	3.60	85.50	174.00
	06/20/14 08:33:42	6540	16.80	3.43	0.99	2.83	3.60	85.50	174.00
	06/20/14 08:34:12	6570	16.86	3.64	1.10	2.78	3.57	85.70	174.00
	06/20/14 08:34:42	6600	16.92	3.94	1.19	2.73	3.57	85.70	174.00
	06/20/14 08:35:12	6630	16.80	4.06	1.15	2.81	5.12	85.80	207.00
	06/20/14 08:35:42	6660	16.29	4.06	1.03	3.05	5.12	85.80	207.00
	06/20/14 08:36:12	6690	15.88	4.23	1.05	3.45	6.42	86.00	252.00
	06/20/14 08:36:42	6720	15.85	4.64	1.04	3.43	6.42	86.00	252.00
	06/20/14 08:37:12	6750	15.64	4.59	1.12	3.63	6.64	86.10	241.00
	06/20/14 08:37:42	6780	15.76	4.61	1.22	3.52	6.64	86.10	241.00
	06/20/14 08:38:12	6810	15.82	5.06	1.31	3.52	6.73	86.20	252.00
	06/20/14 08:38:42	6840	15.67	5.46	1.38	3.56	6.73	86.20	252.00

Norman Facility

Meas. Stack Moisture	4.8	%
Stack Exhaust Flow (M2)	44,676	SCFH

Barometric Pressure	29.97	in. Hg
Relative Humidity	70	%
Ambient Temperature	82	°F
Specific Humidity	0.016440	lb H ₂ O / lb air

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
06/20/14 08:39:12	6870	15.59	5.78	1.54	3.66	6.59	86.40	241.00
06/20/14 08:39:42	6900	15.69	6.24	1.69	3.60	6.59	86.40	241.00
06/20/14 08:40:12	6930	15.78	6.67	1.79	3.54	6.50	86.60	241.00
06/20/14 08:40:42	6960	15.75	6.86	1.77	3.53	6.50	86.60	241.00
06/20/14 08:41:12	6990	15.69	7.37	1.84	3.60	6.75	86.70	241.00
06/20/14 08:41:42	7020	15.72	7.92	1.93	3.56	6.75	86.70	241.00
06/20/14 08:42:12	7050	15.71	8.06	2.04	3.57	6.31	86.80	240.00
06/20/14 08:42:42	7080	15.63	8.60	2.22	3.64	6.31	86.80	240.00
06/20/14 08:43:12	7110	15.83	9.46	2.40	3.50	6.95	86.90	241.00
06/20/14 08:43:42	7140	15.79	9.80	2.38	3.51	6.95	86.90	241.00
06/20/14 08:44:12	7170	15.91	9.73	2.26	3.42	7.83	87.10	252.00
06/20/14 08:44:42	7200	15.59	9.18	2.03	3.64	7.83	87.10	252.00
06/20/14 08:45:12	7230	15.78	8.59	1.94	3.53	7.00	87.20	263.00
06/20/14 08:45:42	7260	15.71	8.00	1.73	3.59	7.00	87.20	263.00
06/20/14 08:46:12	7290	15.62	7.21	1.57	3.62	4.07	87.30	195.00
06/20/14 08:46:42	7320	15.75	6.75	1.49	3.57	4.07	87.30	195.00
06/20/14 08:47:12	7350	16.56	6.49	1.51	3.06	3.90	87.40	184.00
06/20/14 08:47:42	7380	16.83	5.94	1.55	2.81	3.90	87.40	184.00
06/20/14 08:48:12	7410	16.91	5.65	1.46	2.76	4.12	87.50	195.00
06/20/14 08:48:42	7440	16.99	5.12	1.48	2.67	4.12	87.50	195.00
06/20/14 08:49:12	7470	16.90	4.85	1.27	2.74	3.82	87.60	184.00

218.11

	O ₂	CO	THC	CO ₂	Press. Trans	Temp. Trans.	F-Flow Trans.
Serial Number:	INST-22-0005	INST-CO-0034	INST-VC-0006	INST-22-0005	0	0	0
	(in. H ₂ O)	(°F)	(SCFH)				
Initial Zero	0.05	0.01	0.08	0.07			
Final Zero	0.03	-0.02	0.08	0.03			
Avg. Zero	0.04	-0.01	0.08	0.05			
Initial UpScale	12.11	5.27	3.11	9.17			
Final UpScale	12.06	5.22	3.14	9.16			
Avg. UpScale	12.09	5.25	3.13	9.17			
	12.25	5.12	3.04	9.33			

EMISSIONS DATA	O ₂	CO	THC	CO ₂
Corrected Raw Average (ppm/% dry basis)	16.43	4.01	0.58	3.25
Corrected Raw Average (ppm/% wet basis)	15.64	3.82	0.55	3.09
Emission Rate (lb/hr)	N/A	0.01	0.00	N/A

CIMARRON ENERGY, INC.

June 20, 2014

30 ECD

Norman Facility

Unit Data

Meas. Stack Moisture	4.6	%
Stack Exhaust Flow (M2)	45,532	SCFH

Weather Data

Barometric Pressure	30.00	in. Hg
Relative Humidity	72	%
Ambient Temperature	87	°F
Specific Humidity	0.019942	lb H ₂ O / lb air

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

	Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmvd)	THC (ppmwv)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
A1	06/20/14 09:05:12	8430	17.36	6.58	0.81	2.40	2.38	90.20	140.00
	06/20/14 09:05:42	8460	17.32	7.02	0.83	2.46	2.38	90.20	140.00
	06/20/14 09:06:12	8490	17.46	6.87	0.75	2.36	2.49	90.40	129.00
	06/20/14 09:06:42	8520	17.58	6.91	0.80	2.28	2.49	90.40	129.00
	06/20/14 09:07:12	8550	17.57	6.81	0.83	2.27	2.57	90.60	151.00
	06/20/14 09:07:42	8580	17.31	7.53	0.68	2.44	2.57	90.60	151.00
	06/20/14 09:08:12	8610	17.28	7.31	0.81	2.48	2.68	90.80	151.00
	06/20/14 09:08:42	8640	17.35	7.26	0.71	2.46	2.68	90.80	151.00
	06/20/14 09:09:12	8670	17.29	7.07	0.89	2.47	2.68	91.10	140.00
	06/20/14 09:09:42	8700	17.26	7.63	0.91	2.51	2.68	91.10	140.00
	06/20/14 09:10:12	8730	17.27	6.41	0.71	2.49	4.93	91.20	195.00
	06/20/14 09:10:42	8760	16.51	4.53	0.45	2.90	4.93	91.20	195.00
	06/20/14 09:11:12	8790	16.47	1.71	0.43	3.09	7.03	91.60	261.00
	06/20/14 09:11:42	8820	15.60	1.40	0.32	3.57	7.03	91.60	261.00
	06/20/14 09:12:12	8850	15.44	1.54	0.33	3.80	6.48	91.90	249.00
	06/20/14 09:12:42	8880	15.93	1.54	0.39	3.48	6.48	91.90	249.00
	06/20/14 09:13:12	8910	15.79	1.73	0.36	3.52	6.75	92.20	260.00
	06/20/14 09:13:42	8940	15.72	1.65	0.33	3.54	6.75	92.20	260.00
	06/20/14 09:14:12	8970	15.61	1.57	0.30	3.65	6.48	92.40	238.00
	06/20/14 09:14:42	9000	15.76	1.70	0.29	3.55	6.48	92.40	238.00
	06/20/14 09:15:12	9030	15.46	1.40	0.29	3.76	6.86	92.70	238.00
	06/20/14 09:15:42	9060	15.44	1.28	0.32	3.80	6.86	92.70	238.00
	06/20/14 09:16:12	9090	15.54	1.54	0.27	3.72	6.73	92.90	249.00
	06/20/14 09:16:42	9120	15.53	1.50	0.27	3.70	6.73	92.90	249.00
	06/20/14 09:17:12	9150	15.46	1.79	0.32	3.78	6.56	93.10	249.00
	06/20/14 09:17:42	9180	15.51	2.56	0.27	3.73	6.56	93.10	249.00
	06/20/14 09:18:12	9210	15.67	2.03	0.29	3.61	6.56	93.30	238.00
	06/20/14 09:18:42	9240	15.58	1.89	0.26	3.67	6.56	93.30	238.00
	06/20/14 09:19:12	9270	15.54	1.40	0.31	3.71	6.26	93.50	238.00
	06/20/14 09:19:42	9300	15.68	2.60	0.26	3.63	6.26	93.50	238.00
	06/20/14 09:20:12	9330	15.62	1.41	0.26	3.61	6.50	93.60	259.00
	06/20/14 09:20:42	9360	15.58	1.16	0.28	3.69	6.50	93.60	259.00
	06/20/14 09:21:12	9390	15.59	1.55	0.32	3.67	5.15	93.80	215.00
	06/20/14 09:21:42	9420	16.08	1.58	0.36	3.38	5.15	93.80	215.00
	06/20/14 09:22:12	9450	16.58	1.47	0.52	3.02	2.88	93.90	161.00
	06/20/14 09:22:42	9480	17.29	2.04	0.63	2.51	2.88	93.90	161.00
	06/20/14 09:23:12	9510	17.50	2.44	0.57	2.35	2.96	94.00	150.00
	06/20/14 09:23:42	9540	17.30	2.53	0.59	2.45	2.96	94.00	150.00
	06/20/14 09:24:12	9570	17.15	2.66	0.60	2.57	2.93	94.00	161.00
	06/20/14 09:24:42	9600	17.09	2.55	0.54	2.61	2.93	94.00	161.00
	06/20/14 09:25:12	9630	17.19	2.52	0.56	2.57	2.49	94.10	150.00
	06/20/14 09:25:42	9660	17.30	2.61	0.56	2.48	2.49	94.10	150.00
	06/20/14 09:26:12	9690	17.24	2.70	0.60	2.52	4.84	94.20	183.00
	06/20/14 09:26:42	9720	16.24	2.16	0.33	3.04	4.84	94.20	183.00
	06/20/14 09:27:12	9750	15.86	1.50	0.32	3.46	5.87	94.40	226.00
	06/20/14 09:27:42	9780	15.80	1.49	0.27	3.50	5.87	94.40	226.00
A2	06/20/14 09:28:12	9810	15.77	1.19	0.26	3.50	6.26	94.60	237.00
	06/20/14 09:28:42	9840	15.69	1.20	0.28	3.61	6.26	94.60	237.00
	06/20/14 09:29:12	9870	16.07	1.40	0.35	3.34	5.95	94.80	237.00
	06/20/14 09:29:42	9900	15.81	1.43	0.30	3.47	5.95	94.80	237.00
	06/20/14 09:30:12	9930	15.68	1.47	0.29	3.60	6.03	95.10	226.00
	06/20/14 09:30:42	9960	15.84	1.40	0.31	3.50	6.03	95.10	226.00
	06/20/14 09:31:12	9990	15.92	1.46	0.33	3.43	6.37	95.40	248.00
	06/20/14 09:31:42	10020	15.63	1.43	0.29	3.62	6.37	95.40	248.00
	06/20/14 09:32:12	10050	15.88	1.54	0.31	3.49	6.06	95.70	236.00
	06/20/14 09:32:42	10080	15.85	1.30	0.28	3.48	6.06	95.70	236.00
	06/20/14 09:33:12	10110	15.71	1.27	0.24	3.54	6.56	95.90	237.00
	06/20/14 09:33:42	10140	15.69	1.26	0.28	3.61	6.56	95.90	237.00
	06/20/14 09:34:12	10170	15.86	1.76	0.31	3.50	6.50	96.20	237.00
	06/20/14 09:34:42	10200	15.82	1.39	0.26	3.45	6.50	96.20	237.00

CIMARRON ENERGY, INC.

June 20, 2014

30 ECD

Norman Facility

Unit Data

Meas. Stack Moisture	4.6	%
Stack Exhaust Flow (M2)	45,532	SCFH

Weather Data

Barometric Pressure	30.00	in. Hg
Relative Humidity	72	%
Ambient Temperature	87	°F
Specific Humidity	0.019942	lb H ₂ O / lb air

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

	Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmvd)	THC (ppmwv)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
	06/20/14 09:35:12	10230	15.51	1.04	0.19	3.75	6.59	96.40	247.00
	06/20/14 09:35:42	10260	15.94	1.28	0.26	3.46	6.59	96.40	247.00
	06/20/14 09:36:12	10290	15.95	1.41	0.29	3.42	6.64	96.70	247.00
	06/20/14 09:36:42	10320	15.71	1.38	0.23	3.51	6.64	96.70	247.00
	06/20/14 09:37:12	10350	15.66	1.51	0.29	3.64	6.34	97.00	236.00
	06/20/14 09:37:42	10380	15.79	1.61	0.28	3.53	6.34	97.00	236.00
	06/20/14 09:38:12	10410	15.75	1.38	0.27	3.54	6.39	97.30	236.00
	06/20/14 09:38:42	10440	15.61	1.41	0.23	3.67	6.39	97.30	236.00
	06/20/14 09:39:12	10470	15.90	1.23	0.27	3.47	5.01	97.50	214.00
	06/20/14 09:39:42	10500	16.08	1.38	0.38	3.36	5.01	97.50	214.00
	06/20/14 09:40:12	10530	17.28	2.11	0.56	2.58	2.19	97.70	149.00
	06/20/14 09:40:42	10560	17.67	2.76	0.60	2.26	2.19	97.70	149.00
	06/20/14 09:41:12	10590	17.54	2.76	0.56	2.29	2.41	97.70	127.00
	06/20/14 09:41:42	10620	17.41	2.97	0.56	2.36	2.41	97.70	127.00
	06/20/14 09:42:12	10650	17.21	2.96	0.49	2.50	3.02	97.80	149.00
	06/20/14 09:42:42	10680	17.09	2.39	0.43	2.62	3.02	97.80	149.00
	06/20/14 09:43:12	10710	17.16	2.17	0.48	2.58	2.85	97.90	159.00
	06/20/14 09:43:42	10740	17.18	2.22	0.49	2.57	2.85	97.90	159.00
	06/20/14 09:44:12	10770	16.42	2.13	0.29	2.95	6.39	98.00	236.00
	06/20/14 09:44:42	10800	15.61	1.30	0.23	3.63	6.39	98.00	236.00
	06/20/14 09:45:12	10830	15.67	1.21	0.21	3.64	6.23	98.30	235.00
	06/20/14 09:45:42	10860	15.71	1.27	0.19	3.60	6.23	98.30	235.00
	06/20/14 09:46:12	10890	15.54	1.23	0.19	3.70	6.59	98.60	246.00
	06/20/14 09:46:42	10920	15.67	1.42	0.22	3.65	6.59	98.60	246.00
	06/20/14 09:47:12	10950	15.71	1.25	0.24	3.60	6.53	98.90	246.00
	06/20/14 09:47:42	10980	15.67	1.35	0.24	3.63	6.53	98.90	246.00
	06/20/14 09:48:12	11010	15.51	1.45	0.23	3.73	6.37	99.10	235.00
	06/20/14 09:48:42	11040	15.70	1.47	0.25	3.61	6.37	99.10	235.00
	06/20/14 09:49:12	11070	15.75	1.28	0.24	3.56	6.31	99.30	246.00
	06/20/14 09:49:42	11100	15.55	1.22	0.22	3.68	6.31	99.30	246.00
	06/20/14 09:50:12	11130	15.66	1.20	0.23	3.66	6.14	99.50	246.00
	06/20/14 09:50:42	11160	15.93	1.20	0.25	3.40	6.14	99.50	246.00
A3	06/20/14 09:51:12	11190	15.55	1.26	0.22	3.69	6.50	99.80	246.00
	06/20/14 09:51:42	11220	15.55	1.31	0.21	3.72	6.50	99.80	246.00
	06/20/14 09:52:12	11250	15.65	1.31	0.22	3.65	6.34	99.90	246.00
	06/20/14 09:52:42	11280	15.66	1.37	0.22	3.61	6.34	99.90	246.00
	06/20/14 09:53:12	11310	15.45	1.28	0.19	3.77	6.42	100.10	235.00
	06/20/14 09:53:42	11340	15.64	1.24	0.23	3.68	6.42	100.10	235.00
	06/20/14 09:54:12	11370	15.70	1.27	0.25	3.59	6.39	100.20	245.00
	06/20/14 09:54:42	11400	15.60	1.33	0.22	3.66	6.39	100.20	245.00
	06/20/14 09:55:12	11430	15.62	1.38	0.23	3.68	6.23	100.30	245.00
	06/20/14 09:55:42	11460	15.94	1.19	0.26	3.42	6.23	100.30	245.00
	06/20/14 09:56:12	11490	15.73	1.19	0.25	3.57	4.87	100.30	202.00
	06/20/14 09:56:42	11520	16.36	1.27	0.40	3.25	4.87	100.30	202.00
	06/20/14 09:57:12	11550	16.94	1.63	0.42	2.75	3.27	100.30	169.00
	06/20/14 09:57:42	11580	17.14	1.78	0.46	2.63	3.27	100.30	169.00
	06/20/14 09:58:12	11610	17.01	1.94	0.52	2.64	2.85	100.20	148.00
	06/20/14 09:58:42	11640	17.42	2.23	0.68	2.48	2.85	100.20	148.00
	06/20/14 09:59:12	11670	17.63	3.14	0.62	2.24	2.30	100.10	127.00
	06/20/14 09:59:42	11700	17.59	3.28	0.56	2.27	2.30	100.10	127.00
	06/20/14 10:00:12	11730	17.70	3.30	0.59	2.18	2.27	100.10	127.00
	06/20/14 10:00:42	11760	17.52	3.02	0.56	2.29	2.27	100.10	127.00
	06/20/14 10:01:12	11790	17.33	2.73	0.55	2.45	4.79	100.00	202.00
	06/20/14 10:01:42	11820	16.16	2.27	0.31	3.11	4.79	100.00	202.00
	06/20/14 10:02:12	11850	15.79	1.29	0.27	3.53	6.64	100.00	246.00
	06/20/14 10:02:42	11880	15.71	1.18	0.24	3.57	6.64	100.00	246.00
	06/20/14 10:03:12	11910	15.80	1.31	0.28	3.55	6.23	100.00	235.00
	06/20/14 10:03:42	11940	15.97	1.23	0.28	3.42	6.23	100.00	235.00
	06/20/14 10:04:12	11970	15.92	1.06	0.28	3.38	6.37	100.00	246.00
	06/20/14 10:04:42	12000	15.74	1.11	0.28	3.59	6.37	100.00	246.00

CIMARRON ENERGY, INC.

June 20, 2014

30 ECD

Norman Facility

Unit Data

Meas. Stack Moisture	4.6	%
Stack Exhaust Flow (M2)	45,532	SCFH

Weather Data

Barometric Pressure	30.00	in. Hg
Relative Humidity	72	%
Ambient Temperature	87	°F
Specific Humidity	0.019942	lb H ₂ O / lb air

0-30-0 Load, Run - 30 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
06/20/14 10:05:12	12030	15.76	1.34	0.25	3.55	6.34	100.00	256.00
06/20/14 10:05:42	12060	15.81	1.31	0.22	3.53	6.34	100.00	256.00
06/20/14 10:06:12	12090	15.82	1.24	0.28	3.50	6.48	99.90	246.00
06/20/14 10:06:42	12120	15.87	1.24	0.30	3.49	6.48	99.90	246.00
06/20/14 10:07:12	12150	15.80	1.23	0.28	3.50	6.06	99.90	235.00
06/20/14 10:07:42	12180	15.73	1.35	0.29	3.57	6.06	99.90	235.00
06/20/14 10:08:12	12210	15.67	1.39	0.27	3.63	6.59	99.80	246.00
06/20/14 10:08:42	12240	15.77	1.39	0.29	3.56	6.59	99.80	246.00
06/20/14 10:09:12	12270	15.84	1.20	0.28	3.49	6.31	99.90	246.00
06/20/14 10:09:42	12300	15.69	1.19	0.23	3.59	6.31	99.90	246.00
06/20/14 10:10:12	12330	15.71	1.16	0.29	3.61	6.42	99.90	246.00
06/20/14 10:10:42	12360	15.83	1.39	0.31	3.52	6.42	99.90	246.00
06/20/14 10:11:12	12390	15.70	1.32	0.29	3.59	4.15	99.90	191.00
06/20/14 10:11:42	12420	15.62	1.13	0.28	3.66	4.15	99.90	191.00
06/20/14 10:12:12	12450	15.72	1.24	0.27	3.59	2.93	99.90	159.00
06/20/14 10:12:42	12480	16.02	1.40	0.47	3.47	2.93	99.90	159.00
06/20/14 10:13:12	12510	17.12	2.10	0.53	2.62	2.93	99.90	148.00
06/20/14 10:13:42	12540	17.19	2.01	0.58	2.60	2.93	99.90	148.00
06/20/14 10:14:12	12570	17.19	2.05	0.53	2.57	3.04	99.90	159.00
06/20/14 10:14:42	12600	17.10	2.17	0.50	2.61	3.04	99.90	159.00
06/20/14 10:15:12	12630	17.13	2.11	0.50	2.59	2.77	99.90	159.00

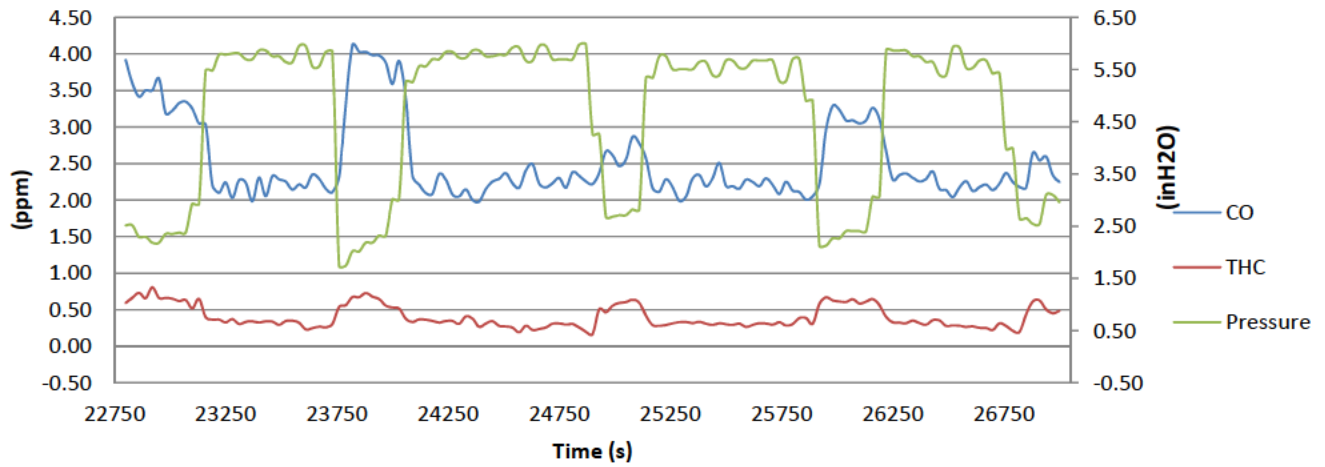
RAW AVERAGE **16.22** **2.10** **0.38** **3.23** **5.18** **96.67** **210.97**

Bias	Serial Number:	CO ₂ (%)	CO (ppmvd)	THC (ppmvw)	CO ₂ (%)	Press. Trans 0 (in. H ₂ O)	Temp. Trans. 0 (°F)	F-Flow Trans. 0 (SCFH)
	INST-22-0005	INST-22-0005	INST-CO-0034	INST-VC-0006	INST-22-0005			
	Initial Zero	0.03	-0.02	0.08	0.03			
	Final Zero	0.04	0.10	0.06	0.10			
	Avg. Zero	0.04	0.04	0.07	0.07			
	Initial UpScale	12.06	5.22	3.14	9.16			
	Final UpScale	12.10	5.04	3.06	9.18			
	Avg. UpScale	12.08	5.13	3.10	9.17			

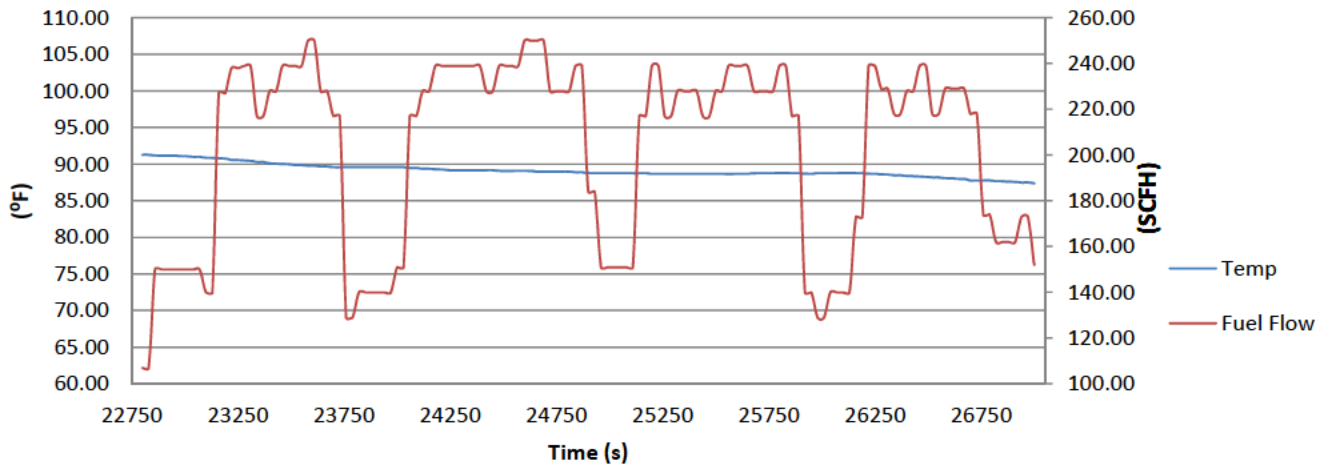
Upscale Cal Gas **12.25** **5.12** **3.04** **9.33**

EMISSIONS DATA	O ₂	CO	THC	CO ₂
Corrected Raw Average (ppm/% dry basis)	16.46	2.07	0.31	3.25
Corrected Raw Average (ppm/% wet basis)	15.71	1.98	0.29	3.09
Emission Rate (lb/hr)	N/A	0.01	0.00	N/A

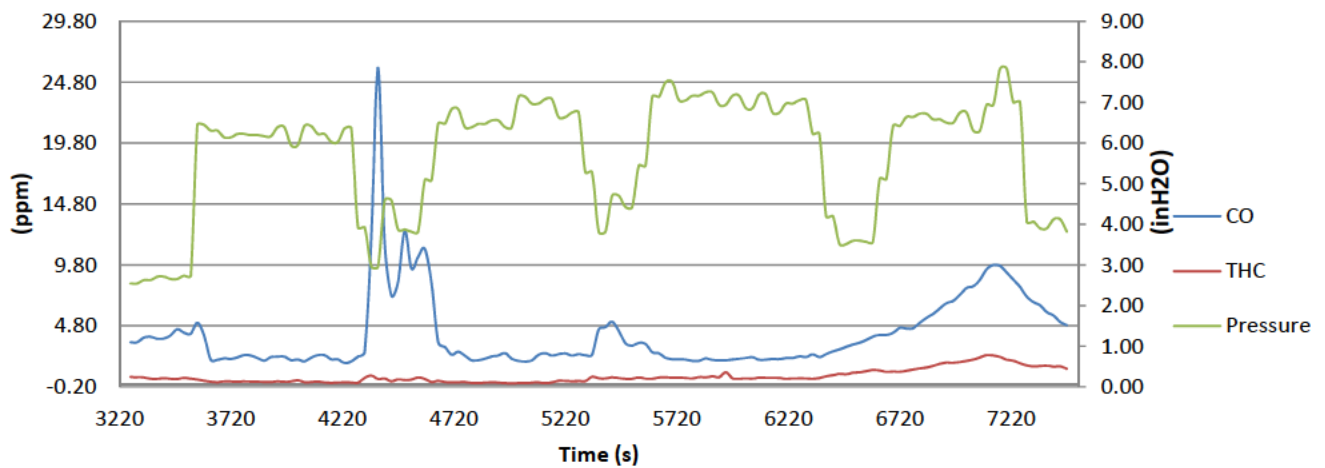
30 ECD R1



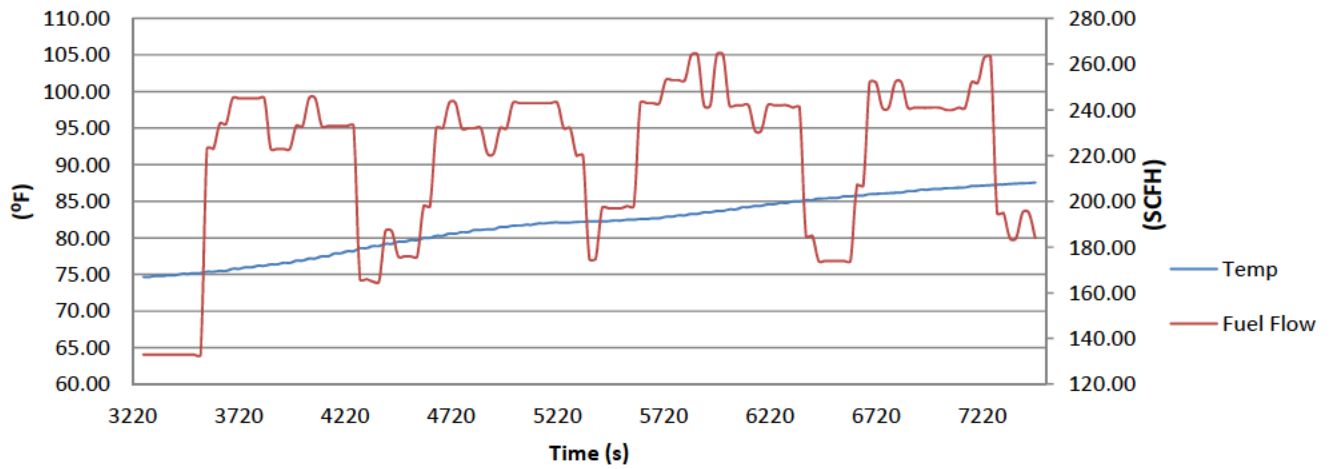
30 ECD R1



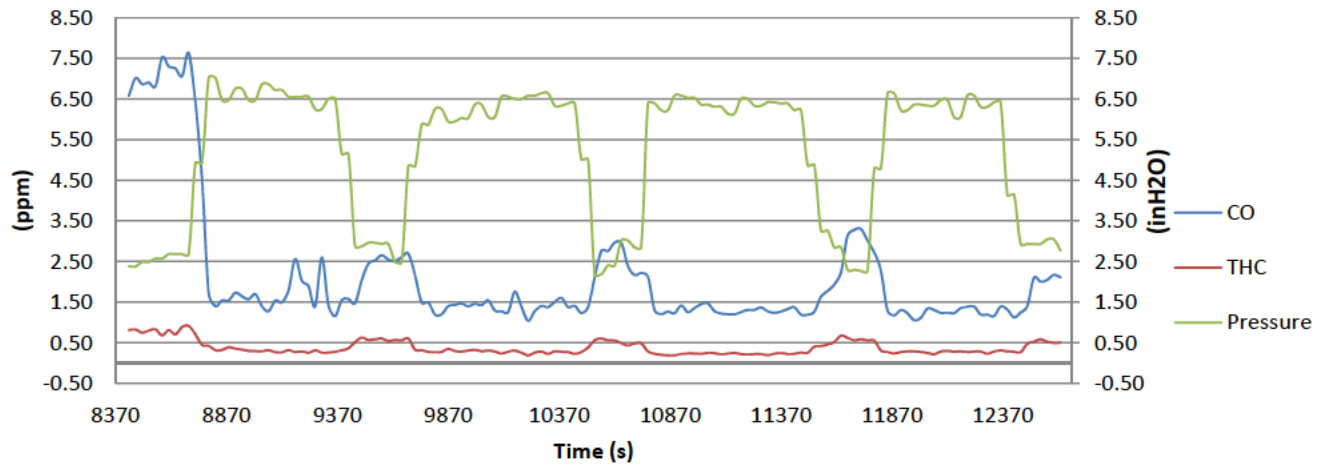
30 ECD R2



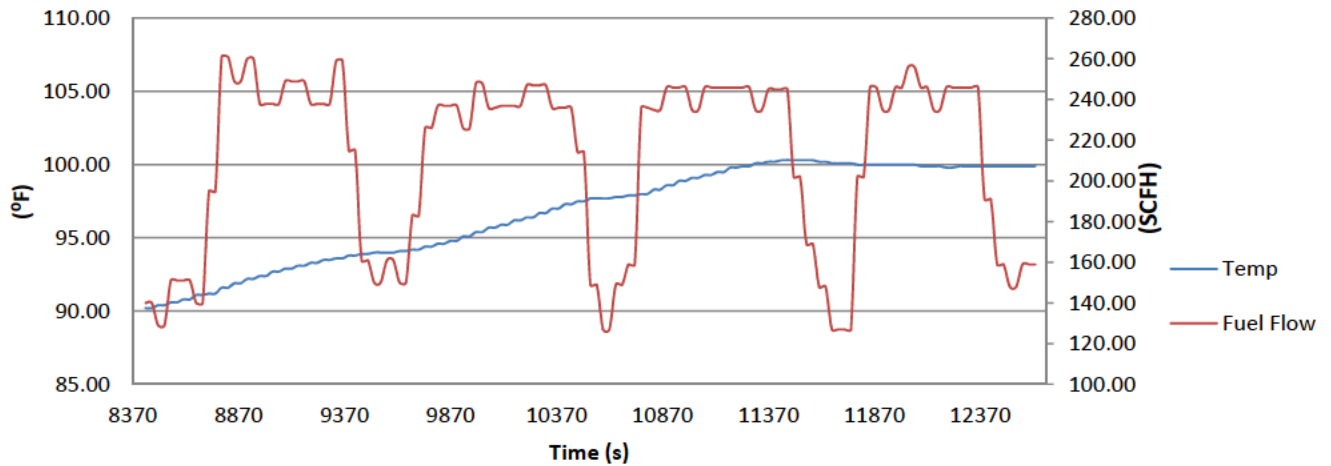
30 ECD R2



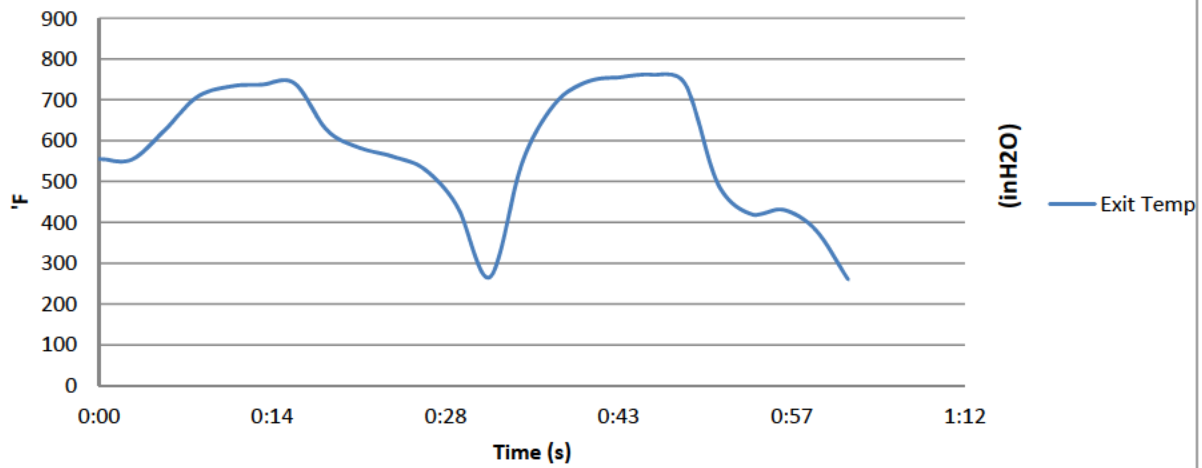
30 ECD R3



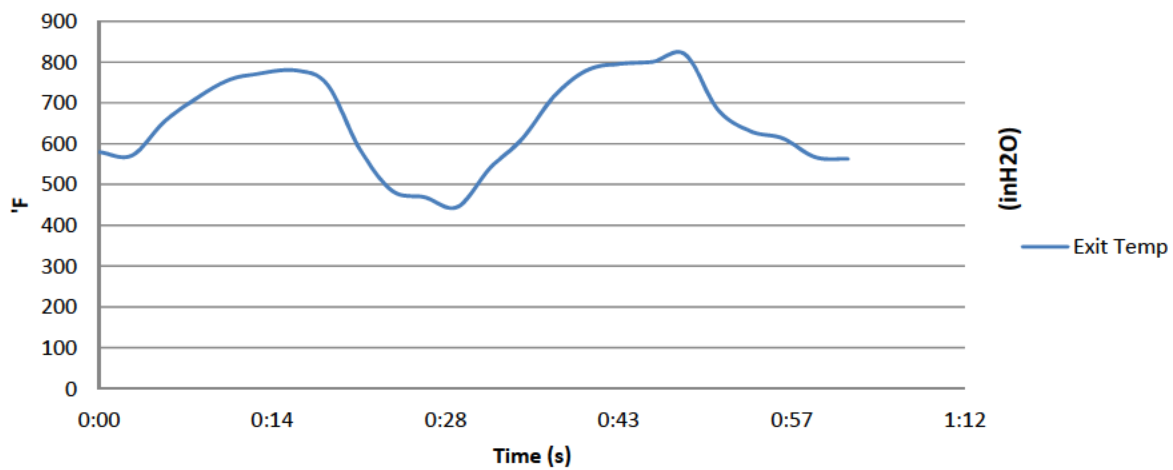
30 ECD R3



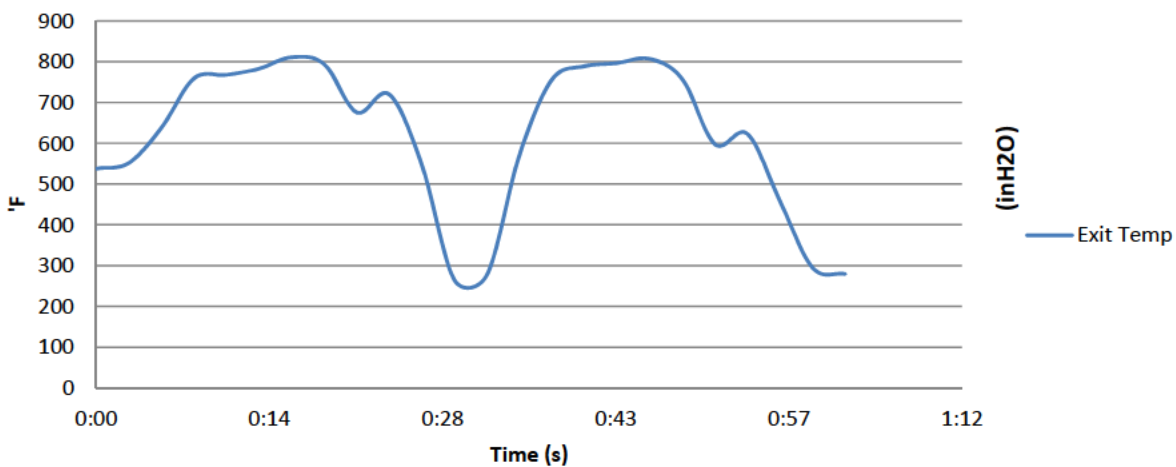
30 ECD R1



30 ECD R2



30 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	Norman Facility
Sampling Location	30 ECD
Fuel Type	Gas, Propene

Test Information			
Project #		cei-14-norman.ok-comp#1	
Operator		DG	
Date for Preliminary Run	(mm/dd/yy)	06/18/14	
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	65	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)	06/19/14	06/19/14	06/19/14	
Load	% or w/DB	30-70-30	30-70-30	30-70-30	
Meter Box Number	from ACS	SAMP-CP-0023	SAMP-CP-0023	SAMP-CP-0023	
Meter Calibration Factor	(Y)	1.010	1.010	1.010	
Orifice Meter Coefficient	(ΔH_{or})	1.877	1.877	1.877	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)	0.819	0.819	0.819	
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-0002	SAMP-BC-0002	SAMP-BC-0002	

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	Norman Facility
Sampling Location	30 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	14:10	15:35	17:00		hh:mm
Run Stop Time	15:20	16:45	18:10		hh:mm
Test Date	06/19/14	06/19/14	06/19/14		mm/dd/yy
Meter Calibration Factor	1.010	1.010	1.010		
Pitot Tube Coefficient	0.819	0.819	0.819		
Stack Test Data	30-70-30%-4	30-70-30%-5	30-70-30%-6	Average	Units
Initial Meter Volume	748.740	798.800	849.610		ft ³
Final Meter Volume	794.570	846.510	896.990		ft ³
Total Meter Volume	45.830	47.710	47.380	46.973	ft ³
Total Sampling Time	65.00	65.00	65.00	65.00	min
Average Meter Temperature	82.33	84.21	84.63	83.72	°F
Average Stack Temperature	706.92	737.42	774.67	739.67	°F
Barometric Pressure	29.98	29.95	29.99	29.97	in Hg
Stack Static Pressure	0.00	0.00	0.00	0.00	in H ₂ O
Absolute Stack Pressure	29.98	29.95	29.99	29.97	in Hg
Average Orifice Pressure Drop	1.90	1.90	1.90	1.90	in H ₂ O
Absolute Meter Pressure	30.12	30.09	30.13	30.11	in Hg
Avg Square Root Pitot Pressure	0.08	0.08	0.07	0.07	√(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	46.40	45.00	44.30	45.23	g
Silica Gel Weight Gain	9.20	10.70	10.00	9.97	g
Total Water Volume Collected	55.70	55.80	54.40	55.30	ml
Standard Water Vapor Volume	2.62	2.63	2.56	2.60	scf
Standard Meter Volume	45.4	47.0	46.7	46.4	dscf
Calculated Stack Moisture	5.46	5.29	5.20	5.32	%
Saturated Stack Moisture	100.00	100.00	100.00	100.00	%
Reported Stack Moisture Content	5.46	5.29	5.20	5.32	%
Gas Analysis Data	30-70-30%-4	30-70-30%-5	30-70-30%-6	Average	Units
Carbon Dioxide Content	3.1	3.3	4.6	3.7	%
Oxygen Content	17.9	17.7	15.8	17.1	%
Nitrogen Content	79.0	79.1	79.6	79.2	%
Stack Dry Molecular Weight	29.21	29.25	29.37	29.28	lb/lb-mole
Stack Wet Molecular Weight	28.60	28.65	28.78	28.68	lb/lb-mole
Percent Excess Air	605.5	556.2	303.0	488.2	%
Volumetric Flow Rate Data	30-70-30%-4	30-70-30%-5	30-70-30%-6	Average	Units
Average Stack Gas Velocity	6.16	6.24	6.13	6.18	ft/sec
Stack Cross-Sectional Area	4.79	4.79	4.79	4.79	ft ²
Actual Stack Flow Rate	1,771	1,793	1,760	1,774	acfm
Wet Standard Stack Flow Rate	48	47	45	47	wkscfh
Dry Standard Stack Flow Rate	45,532	44,972	42,903	44,469	dscfh

METHOD 3C - DETERMINATION OF DRY MOLECULAR WEIGHT BY ANALYZER

Plant Name	Norman Facility	Preliminary Date	06/18/14		
Sampling Location	30 ECD	Operator	DG		
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	06/19/14	Run Start Time	14:10	Run Stop Time	15:20
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		%	
01:10	3.1	17.9	0.0	79.0	29.21	0.968	605.5	N/A

Gas Analysis Data								
Run Number	30-70-30%-5		Date	06/19/14	Run Start Time	15:35	Run Stop Time	16:45
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		%	
01:10	3.3	17.7	0.0	79.1	29.25	0.982	556.2	N/A

Gas Analysis Data								
Run Number	30-70-30%-6		Date	06/19/14	Run Start Time	17:00	Run Stop Time	18:10
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		%	
01:10	4.6	15.8	0.0	79.6	29.37	1.109	303.0	N/A

METHOD 4 - DETERMINATION OF MOISTURE CONTENT IN STACK GASES

Plant Name	Norman Facility	Preliminary Date	06/18/14
Sampling Location	30 ECD	Operator	DG
Project #	cei-14-norman.ok-comp#1	Ports Used	2

Moisture Content Data								
Run Number	30-70-30%-4	Date	06/19/14	Start Time	14:10	Stop Time	15:20	
Meter Box Number	SAMP-CP-0023			Meter Cal Factor	(Y)	1.010		
Total Meter Volume	(V _m)	45.830	dcf	Barometric Pressure	(P _b)	29.98	in Hg	
Average Stack Temp	(t _s) _{avg}	707	°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}	1.90	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)	797.60	736.00	578.50	946.60			
Initial Value	(V _i),(W _i)	764.80	726.90	574.00	937.40			
Net Value	(V _n),(W _n)	32.8	9.1	4.5	9.2			
Results								
Total Weight	(W _f)	55.60	g	Water Vol Weighed	(V _{wsg(std)})	2.622	scf	
Std Meter Volume	(V _{m(std)})	45.366	dscf	Sat. Moisture Content	(B _{ws(svp)})	100.00	%	
Calc Moisture Content	(B _{ws(calc)})	5.46	%	Final Moisture Content	(B _{ws})	5.46	%	

Moisture Content Data								
Run Number	30-70-30%-5	Date	06/19/14	Start Time	15:35	Stop Time	16:45	
Meter Box Number	SAMP-CP-0023			Meter Cal Factor	(Y)	1.010		
Total Meter Volume	(V _m)	47.710	dcf	Barometric Pressure	(P _b)	29.95	in Hg	
Average Stack Temp	(t _s) _{avg}	737	°F	Stack Static Pressure	(P _{static})	0.00	in H ₂ O	
Average Meter Temp	(t _m) _{avg}	84	°F	Avg Orifice Pressure	(ΔH) _{avg}	1.90	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)	833.30	743.00	580.80	919.20			
Initial Value	(V _i),(W _i)	797.60	736.00	578.50	908.50			
Net Value	(V _n),(W _n)	35.7	7.0	2.3	10.7			
Results								
Total Weight	(W _f)	55.70	g	Water Vol Weighed	(V _{wsg(std)})	2.626	scf	
Std Meter Volume	(V _{m(std)})	47.017	dscf	Sat. Moisture Content	(B _{ws(svp)})	100.00	%	
Calc Moisture Content	(B _{ws(calc)})	5.29	%	Final Moisture Content	(B _{ws})	5.29	%	

Moisture Content Data								
Run Number	30-70-30%-6	Date	06/19/14	Start Time	17:00	Stop Time	18:10	
Meter Box Number	SAMP-CP-0023			Meter Cal Factor	(Y)	1.010		
Total Meter Volume	(V _m)	47.380	dcf	Barometric Pressure	(P _b)	29.99	in Hg	
Average Stack Temp	(t _s) _{avg}	775	°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}	1.90	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)	760.00	751.20	583.30	929.20			
Initial Value	(V _i),(W _i)	726.40	743.00	580.80	919.20			
Net Value	(V _n),(W _n)	33.6	8.2	2.5	10.0			
Results								
Total Weight	(W _f)	54.30	g	Water Vol Weighed	(V _{wsg(std)})	2.560	scf	
Std Meter Volume	(V _{m(std)})	46.718	dscf	Sat. Moisture Content	(B _{ws(svp)})	100.00	%	
Calc Moisture Content	(B _{ws(calc)})	5.20	%	Final Moisture Content	(B _{ws})	5.20	%	

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

Plant Name		Norman Facility			
Sampling Location		30 ECD			
Project #		cel-14-norman.ok-comp#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
Pitot	Pre (+)	0.20	in H ₂ O for	30.0	sec
< 3.0	Pre (-)	0.20	in H ₂ O for	30.0	sec
	Post (+)	0.20	in H ₂ O for	30.0	sec
	Post (-)	0.25	in H ₂ O for	30.0	sec

Nozzle Measurements					
Pre					PASS
Post					PASS

Run Time	
Start	14:10 End 15:20

Weights	Imp 1	Imp 2	Imp 3	Imp 4	Imp 5	Imp 6	Imp 7	Imp 8
Pre	764.8	726.9	574.0	937.4				
Post	797.6	736.0	578.5	946.6				

Date		06/19/14	
Operator		DG	
Run Number		30-70-30%-4	

Sampling Equipment			
Meter Box Number		SAMP-CP-0023	
Meter Cal Factor		(Y)	1.010
Nozzle Number			
Average Nozzle Diameter		(D _{no})	in
Suggested Nozzle Diameter		(D _n)	0.4697 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-0002	

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Coefficient		(C _p)	0.819
Average Stack Temp		(t _s)	706.9 F
Average Meter Temp		(t _m)	82.3
Orifice Meter Coefficient		(ΔH@)	1.877 in H ₂ O
Square Root ΔP		(ΔP ^{1/2} _{avg})	0.08 in H ₂ O
Stack Moisture Content		(B _{wa})	5.46 %
Stack Dry Molecular Weight		(M _d)	29.21 lb/lb-mole
Estimated Orifice Flow Rate		(Q _m)	0.75 acfm
ΔP to ΔH Isokinetic Factor		(K)	

Pressures			
Barometric Pressure		(P _b)	29.98 in Hg
Stack Static Pressure		(P _{static})	0.00 in H ₂ O
Absolute Stack Pressure		(P _a)	29.98 in Hg
Absolute Meter Pressure		(P _m)	30.12 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	748.740	0.005	1.877	1.90	580	250		51			81	81	0.0	0.07	5.45	1.895		45.487
A-2	2.7	00:02:43	750.650	0.005	1.877	1.90	646	250		49			81	81	0.0	0.07	5.62	3.880		46.559
A-3	5.4	00:05:25	752.650	0.005	1.877	1.90	679	250		46			81	81	0.0	0.07	5.71	5.825		46.599
A-4	8.1	00:08:07	754.610	0.005	1.877	1.90	825	250		47			81	81	0.0	0.07	6.06	7.581		45.487
A-5	10.8	00:10:50	756.380	0.005	1.877	1.90	907	250		47			81	81	0.0	0.07	6.25	9.437		45.297
A-6	13.5	00:13:33	758.250	0.010	1.877	1.90	962	250		49			82	82	0.0	0.10	9.02	11.685		46.741
A-7	16.3	00:16:15	760.520	0.005	1.877	1.90	971	250		49			82	82	0.0	0.07	6.40	13.171		45.158
A-8	19.0	00:18:58	762.020	0.010	1.877	1.90	676	250		50			82	82	0.0	0.10	8.06	15.251		45.753
A-9	21.7	00:21:40	764.120	0.005	1.877	1.90	461	250		50			82	82	0.0	0.07	5.13	17.212		45.899
A-10	24.4	00:24:22	766.100	0.005	1.877	1.90	445	250		51			82	82	0.0	0.07	5.09	19.015		45.636
A-11	27.1	00:27:05	767.920	0.005	1.877	1.90	330	250		51			82	82	0.0	0.07	4.75	20.926		45.658
A-12	29.8	00:29:47	769.850	0.005	1.877	1.90	260	250		51			83	83	0.0	0.07	4.54	22.755		45.511
B-1	32.5	00:32:30	771.700	0.005	1.877	1.90	259	250		51			83	83	0.0	0.07	4.53	24.881		45.934
B-2	35.2	00:35:12	773.850	0.005	1.877	1.90	630	250		52			83	83	0.0	0.07	5.58	26.690		45.755
B-3	37.9	00:37:55	775.680	0.005	1.877	1.90	830	250		51			83	83	0.0	0.07	6.07	28.539		45.662
B-4	40.6	00:40:37	777.550	0.005	1.877	1.90	908	250		52			83	83	0.0	0.07	6.25	30.398		45.597
B-5	43.3	00:43:20	779.430	0.005	1.877	1.90	931	250		52			83	83	0.0	0.07	6.31	32.227		45.497
B-6	46.0	00:46:03	781.280	0.005	1.877	1.90	937	250		54			83	83	0.0	0.07	6.32	34.026		45.368
B-7	48.8	00:48:45	783.100	0.005	1.877	1.90	983	250		52			83	83	0.0	0.07	6.42	35.895		45.341
B-8	51.5	00:51:28	784.990	0.010	1.877	1.90	985	250		53			83	83	0.0	0.10	9.09	38.040		45.648
B-9	54.2	00:54:10	787.160	0.005	1.877	1.90	751	250		53			83	83	0.0	0.07	5.88	39.652		45.316
B-10	56.9	00:56:53	788.790	0.010	1.877	1.90	690	250		53			83	83	0.0	0.10	8.11	41.540		45.316
B-11	59.6	00:59:35	790.700	0.005	1.877	1.90	767	250		53			83	83	0.0	0.07	5.92	43.468		45.358
B-12	62.3	01:02:18	792.650	0.005	1.877	1.90	553	250		53			83	83	0.0	0.07	5.38	45.366		45.366
Last Pt	65.0	01:05:00	794.570																	
Final Val	65.0	01:05:00	794.570												Max Vac	0.0	Final Values	45.366		
Average Values				0.01		1.90	707	250		51			82	82		0.08	6.16			
													82							

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

Plant Name		Norman Facility				Date		06/19/14				Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Sampling Location		30 ECD				Operator		DG							
Project #		cei-14-norman.ok-comp#1				Run Number		30-70-30%-5							

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 (+)	0.20	in H ₂ O for	30.0	sec
	Pre (-)	0.25	in H ₂ O for	30.0	sec
	Post (+)	0.20	in H ₂ O for	30.0	sec
	Post (-)	0.20	in H ₂ O for	30.0	sec

Nozzle Measurements					
Pre				PASS	
Post				PASS	

Run Time					
Start	15:35		End	16:45	

Weights	Imp 1	Imp 2	Imp 3	Imp 4	Imp 5	Imp 6	Imp 7	Imp 8
Pre	797.6	736.0	578.5	908.5				
Post	833.3	743.0	580.8	919.2				

Sampling Equipment					
Meter Box Number		SAMP-CP-0023			
Meter Cal Factor		(Y)	1.010		
Nozzle Number					
Average Nozzle Diameter		(D _{no})	in		
Suggested Nozzle Diameter		(D _n)	0.4554 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-0002			

Pressures					
Barometric Pressure		(P _a)	29.95	in Hg	
Stack Static Pressure		(P _{static})	0.00	in H ₂ O	
Absolute Stack Pressure		(P _a)	29.95	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	798.800	0.005	1.877	1.90	636	250		62			83	83	0.0	0.07	5.60	1.719		41.245
A-2	2.7	00:02:43	800.540	0.005	1.877	1.90	673	250		54			83	83	0.0	0.07	5.69	3.812		45.749
A-3	5.4	00:05:25	802.660	0.010	1.877	1.90	788	250		52			83	83	0.0	0.10	8.44	5.689		45.512
A-4	8.1	00:08:07	804.560	0.005	1.877	1.90	934	250		51			84	84	0.0	0.07	6.31	7.542		45.254
A-5	10.8	00:10:50	806.440	0.010	1.877	1.90	945	250		51			84	84	0.0	0.10	8.96	9.396		45.100
A-6	13.5	00:13:33	808.320	0.005	1.877	1.90	962	250		51			84	84	0.0	0.07	6.37	11.476		45.904
A-7	16.3	00:16:15	810.430	0.005	1.877	1.90	881	250		54			84	84	0.0	0.07	6.19	13.142		45.058
A-8	19.0	00:18:58	812.120	0.005	1.877	1.90	741	250		55			84	84	0.0	0.07	5.86	15.232		45.696
A-9	21.7	00:21:40	814.240	0.005	1.877	1.90	756	250		55			84	84	0.0	0.07	5.89	17.529		46.744
A-10	24.4	00:24:22	816.570	0.005	1.877	1.90	795	250		57			84	84	0.0	0.07	5.99	19.481		46.755
A-11	27.1	00:27:05	818.550	0.005	1.877	1.90	672	250		56			85	85	0.0	0.07	5.69	21.443		46.785
A-12	29.8	00:29:47	820.544	0.005	1.877	1.90	590	250		52			85	85	0.0	0.07	5.48	23.358		46.716
B-1	32.5	00:32:30	822.490	0.005	1.877	1.90	560	250		52			85	85	0.0	0.07	5.40	25.444		46.974
B-2	35.2	00:35:12	824.610	0.005	1.877	1.90	618	250		48			85	85	0.0	0.07	5.55	27.373		46.925
B-3	37.9	00:37:55	826.570	0.005	1.877	1.90	891	250		47			85	85	0.0	0.07	6.21	29.203		46.726
B-4	40.6	00:40:37	828.430	0.005	1.877	1.90	966	250		47			85	85	0.0	0.07	6.38	31.201		46.802
B-5	43.3	00:43:20	830.460	0.005	1.877	1.90	973	250		46			85	85	0.0	0.07	6.40	33.218		46.897
B-6	46.0	00:46:03	832.510	0.010	1.877	1.90	990	250		46			85	85	0.0	0.10	9.10	35.295		47.060
B-7	48.8	00:48:45	834.620	0.005	1.877	1.90	953	250		46			84	84	0.0	0.07	6.35	36.941		46.662
B-8	51.5	00:51:28	836.290	0.005	1.877	1.90	716	250		46			84	84	0.0	0.07	5.80	39.021		46.825
B-9	54.2	00:54:10	838.400	0.010	1.877	1.90	569	250		47			84	84	0.0	0.10	7.67	41.407		47.322
B-10	56.9	00:56:53	840.820	0.005	1.877	1.90	533	250		46			84	84	0.0	0.07	5.33	43.113		47.032
B-11	59.6	00:59:35	842.550	0.005	1.877	1.90	284	250		46			84	84	0.0	0.07	4.61	44.729		46.674
B-12	62.3	01:02:18	844.190	0.005	1.877	1.90	272	250		46			84	84	0.0	0.07	4.57	47.016		47.016
Last Pt	65.0	01:05:00	846.510																	
Final Val	65.0	01:05:00	846.510												Max Vac	0.0	Final Values		47.016	
Average Values						0.01		1.90	737	250		51		84	84		0.08	6.24		
84																				

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

Plant Name	Norman Facility
Sampling Location	30 ECD
Project #	cel-14-norman.ok-comp#1

Date	06/19/14
Operator	DG
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 (+)	0.20	in H ₂ O for	30.0
		Pre (-)	0.20	in H ₂ O for	30.0
		Post (+)	0.25	in H ₂ O for	30.0
		Post (-)	0.20	in H ₂ O for	30.0

Nozzle Measurements			
Pre			PASS
Post			PASS

Run Time			
Start	17:00	End	18:10

Weights	Imp 1	Imp 2	Imp 3	Imp 4	Imp 5	Imp 6	Imp 7	Imp 8
Pre	726.4	743.0	580.8	919.2				
Post	760.0	751.2	583.3	929.2				

Sampling Equipment		
Meter Box Number	SAMP-CP-0023	
Meter Cal Factor	(Y)	1.010
Nozzle Number		
Average Nozzle Diameter	(D _{no})	in
Suggested Nozzle Diameter	(D _n)	0.4715 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-0002	

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Coefficient	(C _p)	0.819	
Average Stack Temp	(t _s)	774.7	F
Average Meter Temp	(t _m)	84.6	
Orifice Meter Coefficient	(ΔH@)	1.877	in H ₂ O
Square Root ΔP	(ΔP ^{1/2} _{avg})	0.07	in H ₂ O
Stack Moisture Content	(B _{ws})	5.20	%
Stack Dry Molecular Weight	(M _d)	29.37	lb/lb-mole
Estimated Orifice Flow Rate	(Q _m)	0.72	acfm
ΔP to ΔH Isokinetic Factor	(K)		

Pressures			
Barometric Pressure	(P _b)	29.99	in Hg
Stack Static Pressure	(P _{static})	0.00	in H ₂ O
Absolute Stack Pressure	(P _a)	29.99	in Hg
Absolute Meter Pressure	(P _m)	30.13	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	849.610	0.005	1.877	1.90	708	250		52			84	84	0.0	0.07	5.76	1.570		37.670
A-2	2.7	00:02:43	851.200	0.005	1.877	1.90	762	250		48			84	84	0.0	0.07	5.89	3.741		44.896
A-3	5.4	00:05:25	853.400	0.005	1.877	1.90	871	250		48			84	84	0.0	0.07	6.15	5.716		45.725
A-4	8.1	00:08:07	855.400	0.010	1.877	1.90	960	250		49			84	84	0.0	0.10	8.98	7.493		44.955
A-5	10.8	00:10:50	857.200	0.010	1.877	1.90	987	250		49			85	85	0.0	0.10	9.07	9.384		45.045
A-6	13.5	00:13:33	859.120	0.005	1.877	1.90	988	250		50			85	85	0.0	0.07	6.41	11.257		45.027
A-7	16.3	00:16:15	861.020	0.005	1.877	1.90	977	250		51			85	85	0.0	0.07	6.39	13.178		45.182
A-8	19.0	00:18:58	862.970	0.005	1.877	1.90	788	250		51			85	85	0.0	0.07	5.95	15.060		45.180
A-9	21.7	00:21:40	864.880	0.005	1.877	1.90	605	250		51			85	85	0.0	0.07	5.50	16.940		45.174
A-10	24.4	00:24:22	866.788	0.005	1.877	1.90	553	250		51			85	85	0.0	0.07	5.36	19.011		45.627
A-11	27.1	00:27:05	868.890	0.005	1.877	1.90	550	250		51			85	85	0.0	0.07	5.36	21.012		45.844
A-12	29.8	00:29:47	870.920	0.005	1.877	1.90	435	250		51			85	85	0.0	0.07	5.04	22.884		45.768
B-1	32.5	00:32:30	872.820	0.005	1.877	1.90	525	250		53			85	85	0.0	0.07	5.29	24.973		46.104
B-2	35.2	00:35:12	874.940	0.005	1.877	1.90	664	250		52			85	85	0.0	0.07	5.65	26.884		46.087
B-3	37.9	00:37:55	876.880	0.005	1.877	1.90	837	250		52			85	85	0.0	0.07	6.07	28.747		45.995
B-4	40.6	00:40:37	878.770	0.005	1.877	1.90	909	250		52			85	85	0.0	0.07	6.24	30.599		45.899
B-5	43.3	00:43:20	880.650	0.005	1.877	1.90	930	250		52			85	85	0.0	0.07	6.28	32.461		45.828
B-6	46.0	00:46:03	882.540	0.005	1.877	1.90	938	250		52			85	85	0.0	0.07	6.30	34.383		45.844
B-7	48.8	00:48:45	884.490	0.005	1.877	1.90	959	250		52			85	85	0.0	0.07	6.35	36.846		46.543
B-8	51.5	00:51:28	886.990	0.005	1.877	1.90	1002	250		52			84	84	0.0	0.07	6.44	38.051		45.661
B-9	54.2	00:54:10	888.210	0.005	1.877	1.90	700	250		53			84	84	0.0	0.07	5.74	40.055		45.777
B-10	56.9	00:56:53	890.240	0.005	1.877	1.90	709	250		53			84	84	0.0	0.07	5.76	41.920		45.731
B-11	59.6	00:59:35	892.130	0.005	1.877	1.90	717	250		54			84	84	0.0	0.07	5.78	43.786		45.690
B-12	62.3	01:02:18	894.020	0.005	1.877	1.90	518	250		54			84	84	0.0	0.07	5.27	46.718		46.718
Last Pt	65.0	01:05:00	896.990																	
Final Val	65.0	01:05:00	896.990											Max Vac	0.0		Final Values	46.718		
Average Values				0.01		1.90	775	250		51			85	85		0.07	6.13			
													85							

CIMARRON ENERGY, INC.

June 19, 2014

30 ECD

Norman Facility

Unit Data

Meas. Stack Moisture	5.5	%
Stack Exhaust Flow (M2)	45,532	SCFH

Weather Data

Barometric Pressure	29.98	in. Hg
Relative Humidity	48	%
Ambient Temperature	88	°F
Specific Humidity	0.013596	lb H ₂ O / lb air

30-70-30 Load, Run - 30 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	06/19/14 14:10:10	7020	17.88	2.38	0.53	2.05	5.59	91.80	227.00
	06/19/14 14:10:40	7050	17.18	2.04	0.58	2.60	5.59	91.80	227.00
	06/19/14 14:11:10	7080	17.31	1.91	0.55	2.55	5.07	91.70	227.00
	06/19/14 14:11:40	7110	17.34	1.78	0.54	2.50	5.07	91.70	227.00
	06/19/14 14:12:10	7140	17.38	1.74	0.58	2.50	4.71	91.50	205.00
	06/19/14 14:12:40	7170	17.52	1.82	0.57	2.33	4.71	91.50	205.00
	06/19/14 14:13:10	7200	17.40	1.84	0.56	2.50	4.32	91.40	205.00
	06/19/14 14:13:40	7230	17.52	1.86	0.58	2.39	4.32	91.40	205.00
	06/19/14 14:14:10	7260	17.52	1.87	0.63	2.41	4.21	91.30	194.00
	06/19/14 14:14:40	7290	17.62	1.77	0.55	2.31	4.21	91.30	194.00
	06/19/14 14:15:10	7320	17.45	1.75	0.57	2.42	4.51	91.20	205.00
	06/19/14 14:15:40	7350	17.37	1.85	0.61	2.45	4.51	91.20	205.00
	06/19/14 14:16:10	7380	16.20	1.81	0.37	3.15	14.34	91.10	376.00
	06/19/14 14:16:40	7410	14.93	1.82	0.24	4.19	14.34	91.10	376.00
	06/19/14 14:17:10	7440	15.24	1.75	0.22	4.55	17.66	91.00	435.00
	06/19/14 14:17:40	7470	15.10	1.38	0.24	4.69	17.66	91.00	435.00
	06/19/14 14:18:10	7500	14.98	1.25	0.24	4.76	17.13	90.90	423.00
	06/19/14 14:18:40	7530	14.60	1.19	0.23	4.46	17.13	90.90	423.00
	06/19/14 14:19:10	7560	14.24	1.25	0.22	4.74	17.55	90.80	424.00
	06/19/14 14:19:40	7590	14.08	1.22	0.20	4.81	17.55	90.80	424.00
	06/19/14 14:20:10	7620	14.17	1.06	0.21	4.84	17.16	90.70	412.00
	06/19/14 14:20:40	7650	14.39	1.09	0.18	4.64	17.16	90.70	412.00
	06/19/14 14:21:10	7680	14.27	1.21	0.17	4.70	17.55	90.70	435.00
	06/19/14 14:21:40	7710	14.04	1.15	0.15	4.83	17.55	90.70	435.00
	06/19/14 14:22:10	7740	14.10	1.05	0.12	4.85	17.16	90.80	423.00
	06/19/14 14:22:40	7770	14.33	1.04	0.12	4.71	17.16	90.80	423.00
	06/19/14 14:23:10	7800	14.28	1.31	0.14	4.66	17.94	90.90	435.00
	06/19/14 14:23:40	7830	14.26	1.21	0.15	4.70	17.94	90.90	435.00
	06/19/14 14:24:10	7860	14.18	1.07	0.16	4.80	17.00	91.00	423.00
	06/19/14 14:24:40	7890	14.31	1.08	0.13	4.68	17.00	91.00	423.00
	06/19/14 14:25:10	7920	14.34	1.22	0.14	4.68	17.91	91.10	424.00
	06/19/14 14:25:40	7950	14.22	1.26	0.13	4.70	17.91	91.10	424.00
	06/19/14 14:26:10	7980	14.29	1.11	0.12	4.73	17.24	91.20	434.00
	06/19/14 14:26:40	8010	14.49	1.11	0.12	4.57	17.24	91.20	434.00
	06/19/14 14:27:10	8040	14.23	1.21	0.11	4.71	14.97	91.30	388.00
	06/19/14 14:27:40	8070	14.75	1.07	0.19	4.52	14.97	91.30	388.00
	06/19/14 14:28:10	8100	16.74	1.94	0.51	3.12	5.67	91.40	227.00
	06/19/14 14:28:40	8130	16.91	2.04	0.43	2.79	5.67	91.40	227.00
	06/19/14 14:29:10	8160	17.07	1.84	0.46	2.77	5.79	91.60	249.00
	06/19/14 14:29:40	8190	17.11	1.69	0.50	2.62	5.79	91.60	249.00
	06/19/14 14:30:10	8220	17.13	1.74	0.47	2.68	5.76	91.70	238.00
	06/19/14 14:30:40	8250	17.01	1.71	0.45	2.69	5.76	91.70	238.00
	06/19/14 14:31:10	8280	16.63	1.79	0.40	2.98	6.01	91.80	227.00
	06/19/14 14:31:40	8310	16.78	1.90	0.43	2.91	6.01	91.80	227.00
	06/19/14 14:32:10	8340	17.07	1.77	0.48	2.73	7.72	92.00	261.00
	06/19/14 14:32:40	8370	16.92	1.65	0.38	2.74	7.72	92.00	261.00
A2	06/19/14 14:33:10	8400	16.04	1.77	0.27	3.32	16.05	92.20	399.00
	06/19/14 14:33:40	8430	15.42	2.01	0.17	3.78	16.05	92.20	399.00
	06/19/14 14:34:10	8460	14.69	1.57	0.12	4.40	16.94	92.50	422.00
	06/19/14 14:34:40	8490	14.88	1.37	0.14	4.26	16.94	92.50	422.00
	06/19/14 14:35:10	8520	14.22	1.17	0.09	4.72	16.91	92.70	433.00
	06/19/14 14:35:40	8550	14.34	1.14	0.14	4.66	16.91	92.70	433.00
	06/19/14 14:36:10	8580	14.24	1.03	0.14	4.71	17.83	92.90	444.00
	06/19/14 14:36:40	8610	14.20	1.10	0.08	4.74	17.83	92.90	444.00
	06/19/14 14:37:10	8640	14.03	0.99	0.06	4.87	17.00	93.20	421.00
	06/19/14 14:37:40	8670	14.44	0.96	0.11	4.60	17.00	93.20	421.00
	06/19/14 14:38:10	8700	14.06	0.90	0.11	4.84	17.88	93.50	422.00
	06/19/14 14:38:40	8730	14.03	0.95	0.07	4.88	17.88	93.50	422.00
	06/19/14 14:39:10	8760	15.50	0.97	0.27	4.07	17.05	93.80	432.00
	06/19/14 14:39:40	8790	16.58	0.74	0.32	2.98	17.05	93.80	432.00

CIMARRON ENERGY, INC.

June 19, 2014

30 ECD

Norman Facility

Unit Data

Meas. Stack Moisture	5.5	%
Stack Exhaust Flow (M2)	45,532	SCFH

Weather Data

Barometric Pressure	29.98	in. Hg
Relative Humidity	48	%
Ambient Temperature	88	°F
Specific Humidity	0.013596	lb H ₂ O / lb air

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

	Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmvd)	THC (ppmwv)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
	06/19/14 14:40:10	8820	15.38	0.70	0.22	3.86	17.80	94.10	421.00
	06/19/14 14:40:40	8850	15.08	0.69	0.20	4.04	17.80	94.10	421.00
	06/19/14 14:41:10	8880	14.87	0.67	0.18	4.25	17.11	94.30	431.00
	06/19/14 14:41:40	8910	15.08	0.75	0.25	4.19	17.11	94.30	431.00
	06/19/14 14:42:10	8940	14.95	0.85	0.18	4.17	17.47	94.50	432.00
	06/19/14 14:42:40	8970	15.48	0.82	0.33	3.95	17.47	94.50	432.00
	06/19/14 14:43:10	9000	16.05	0.74	0.34	3.43	17.58	94.70	421.00
	06/19/14 14:43:40	9030	16.53	0.87	0.44	3.10	17.58	94.70	421.00
	06/19/14 14:44:10	9060	16.43	0.70	0.43	3.23	12.73	94.70	351.00
	06/19/14 14:44:40	9090	17.08	0.91	0.44	2.70	12.73	94.70	351.00
	06/19/14 14:45:10	9120	17.22	1.59	0.48	2.59	5.54	94.80	237.00
	06/19/14 14:45:40	9150	17.41	1.70	0.51	2.47	5.54	94.80	237.00
	06/19/14 14:46:10	9180	18.16	1.40	0.65	1.97	5.51	94.90	226.00
	06/19/14 14:46:40	9210	18.42	1.17	0.68	1.72	5.51	94.90	226.00
	06/19/14 14:47:10	9240	18.52	1.06	0.69	1.60	5.65	95.00	215.00
	06/19/14 14:47:40	9270	18.03	1.10	0.51	1.82	5.65	95.00	215.00
	06/19/14 14:48:10	9300	17.11	1.44	0.49	2.70	8.80	95.00	271.00
	06/19/14 14:48:40	9330	16.57	1.48	0.29	2.84	8.80	95.00	271.00
	06/19/14 14:49:10	9360	15.69	1.39	0.14	3.64	15.97	95.10	408.00
	06/19/14 14:49:40	9390	15.31	1.24	0.23	4.02	15.97	95.10	408.00
	06/19/14 14:50:10	9420	15.96	0.98	0.27	3.45	15.83	95.20	396.00
	06/19/14 14:50:40	9450	16.52	0.93	0.34	3.03	15.83	95.20	396.00
	06/19/14 14:51:10	9480	15.40	0.73	0.25	3.88	16.86	95.40	408.00
	06/19/14 14:51:40	9510	16.03	0.90	0.37	3.54	16.86	95.40	408.00
	06/19/14 14:52:10	9540	16.56	0.78	0.39	3.05	16.58	95.60	408.00
	06/19/14 14:52:40	9570	17.00	0.76	0.45	2.78	16.58	95.60	408.00
	06/19/14 14:53:10	9600	17.13	0.72	0.46	2.61	17.08	95.80	419.00
	06/19/14 14:53:40	9630	17.08	0.71	0.43	2.64	17.08	95.80	419.00
	06/19/14 14:54:10	9660	16.32	0.67	0.41	3.24	16.52	95.90	408.00
	06/19/14 14:54:40	9690	17.10	0.63	0.46	2.73	16.52	95.90	408.00
	06/19/14 14:55:10	9720	16.52	0.70	0.32	2.91	16.88	95.90	430.00
	06/19/14 14:55:40	9750	16.13	0.83	0.31	3.29	16.88	95.90	430.00
A3	06/19/14 14:56:10	9780	16.25	0.74	0.34	3.41	16.61	96.00	408.00
	06/19/14 14:56:40	9810	15.64	0.70	0.26	3.64	16.61	96.00	408.00
	06/19/14 14:57:10	9840	15.47	0.84	0.25	3.82	16.86	96.10	408.00
	06/19/14 14:57:40	9870	15.83	0.73	0.32	3.63	16.86	96.10	408.00
	06/19/14 14:58:10	9900	16.14	0.81	0.33	3.24	16.58	96.10	408.00
	06/19/14 14:58:40	9930	15.54	0.81	0.24	3.60	16.58	96.10	408.00
	06/19/14 14:59:10	9960	15.50	0.72	0.29	3.97	16.69	96.20	397.00
	06/19/14 14:59:40	9990	16.50	0.69	0.38	3.20	16.69	96.20	397.00
	06/19/14 15:00:10	10020	17.04	0.85	0.39	2.65	16.80	96.30	408.00
	06/19/14 15:00:40	10050	16.53	0.95	0.37	3.05	16.80	96.30	408.00
	06/19/14 15:01:10	10080	15.91	0.82	0.32	3.49	16.39	96.40	418.00
	06/19/14 15:01:40	10110	15.91	0.79	0.32	3.52	16.39	96.40	418.00
	06/19/14 15:02:10	10140	16.74	1.04	0.41	2.88	7.58	96.50	269.00
	06/19/14 15:02:40	10170	16.73	1.57	0.50	2.99	7.58	96.50	269.00
	06/19/14 15:03:10	10200	17.53	1.62	0.58	2.37	5.04	96.50	225.00
	06/19/14 15:03:40	10230	17.68	1.48	0.56	2.27	5.04	96.50	225.00
	06/19/14 15:04:10	10260	17.73	1.47	0.59	2.26	5.40	96.70	214.00
	06/19/14 15:04:40	10290	17.25	1.47	0.52	2.48	5.40	96.70	214.00
	06/19/14 15:05:10	10320	17.27	1.63	0.55	2.59	5.23	96.90	214.00
	06/19/14 15:05:40	10350	17.73	1.40	0.61	2.18	5.23	96.90	214.00
	06/19/14 15:06:10	10380	17.46	1.46	0.48	2.36	10.13	97.10	314.00
	06/19/14 15:06:40	10410	15.95	1.44	0.28	3.31	10.13	97.10	314.00
	06/19/14 15:07:10	10440	14.97	1.57	0.19	4.09	18.77	97.20	442.00
	06/19/14 15:07:40	10470	15.07	1.01	0.28	4.28	18.77	97.20	442.00
	06/19/14 15:08:10	10500	15.93	0.70	0.34	3.55	17.38	97.40	429.00
	06/19/14 15:08:40	10530	16.99	0.64	0.45	2.79	17.38	97.40	429.00
	06/19/14 15:09:10	10560	16.33	0.70	0.33	3.12	17.74	97.60	430.00
	06/19/14 15:09:40	10590	15.87	0.74	0.31	3.40	17.74	97.60	430.00

CIMARRON ENERGY, INC.

June 19, 2014

30 ECD

Norman Facility

Unit Data

Meas. Stack Moisture	5.5	%
Stack Exhaust Flow (M2)	45,532	SCFH

Weather Data

Barometric Pressure	29.98	in. Hg
Relative Humidity	48	%
Ambient Temperature	88	°F
Specific Humidity	0.013596	lb H ₂ O / lb air

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

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmvd)	THC (ppmw)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
06/19/14 15:10:10	10620	15.19	0.72	0.27	4.11	17.33	97.70	429.00
06/19/14 15:10:40	10650	16.01	0.63	0.26	3.37	17.33	97.70	429.00
06/19/14 15:11:10	10680	14.34	0.73	0.12	4.60	17.52	98.00	429.00
06/19/14 15:11:40	10710	14.45	0.98	0.13	4.62	17.52	98.00	429.00
06/19/14 15:12:10	10740	14.63	1.06	0.13	4.43	18.02	98.20	418.00
06/19/14 15:12:40	10770	15.07	1.04	0.19	4.24	18.02	98.20	418.00
06/19/14 15:13:10	10800	14.74	1.01	0.12	4.29	17.47	98.40	440.00
06/19/14 15:13:40	10830	14.55	1.25	0.11	4.52	17.47	98.40	440.00
06/19/14 15:14:10	10860	14.95	1.42	0.20	4.25	18.38	98.40	441.00
06/19/14 15:14:40	10890	15.06	0.94	0.24	4.14	18.38	98.40	441.00
06/19/14 15:15:10	10920	16.44	0.73	0.41	3.31	17.55	98.50	429.00
06/19/14 15:15:40	10950	15.60	0.51	0.30	3.52	17.55	98.50	429.00
06/19/14 15:16:10	10980	14.81	0.65	0.22	4.37	13.78	98.60	382.00
06/19/14 15:16:40	11010	15.42	0.81	0.23	3.87	13.78	98.60	382.00
06/19/14 15:17:10	11040	16.23	0.78	0.40	3.46	5.90	98.70	235.00
06/19/14 15:17:40	11070	17.35	0.89	0.48	2.52	5.90	98.70	235.00
06/19/14 15:18:10	11100	17.56	1.29	0.49	2.27	5.76	98.80	224.00
06/19/14 15:18:40	11130	17.14	1.39	0.50	2.69	5.76	98.80	224.00
06/19/14 15:19:10	11160	16.97	1.56	0.49	2.75	5.59	99.00	224.00
06/19/14 15:19:40	11190	17.09	1.53	0.55	2.65	5.59	99.00	224.00
06/19/14 15:20:10	11220	17.02	1.59	0.54	2.70	5.59	99.10	235.00
RAW AVERAGE		15.96	1.20	0.33	3.50	13.25	94.43	356.09

Bias	Serial Number: INST-22-0005 INST-CO-0034 INST-VC-0006 INST-22-0005				Press. Trans.	Temp. Trans.	F-Flow Trans.
					0	0	0
					(in. H ₂ O)	(°F)	(SCFH)
	Initial Zero	0.02	-0.03	0.07	0.01	0	0
	Final Zero	0.01	0.08	0.05	0.04		
	Avg. Zero	0.02	0.03	0.06	0.03		
	Initial UpScale	12.11	4.97	3.09	9.26		
	Final UpScale	12.10	5.00	3.11	9.25		
	Avg. UpScale	12.11	4.99	3.10	9.26		
Upscale Cal Gas		12.25	5.12	3.04	9.33		

EMISSIONS DATA	O₂	CO	THC	CO₂
Corrected Raw Average (ppm/% dry basis)	16.16	1.21	0.00	3.51
Corrected Raw Average (ppm/% wet basis)	15.28	1.14	0.00	3.31
Emission Rate (lb/hr)	N/A	0.00	0.00	N/A

CIMARRON ENERGY, INC.

June 19, 2014

30 ECD

Norman Facility

Unit Data

Meas. Stack Moisture	5.3	%
Stack Exhaust Flow (M2)	44,972	SCFH

Weather Data

Barometric Pressure	29.95	in. Hg
Relative Humidity	40	%
Ambient Temperature	89	°F
Specific Humidity	0.011669	lb H ₂ O / lb air

30-70-30 Load, Run - 30 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	06/19/14 15:35:10	12120	16.90	1.81	0.44	2.77	5.31	100.20	213.00
	06/19/14 15:35:40	12150	17.45	1.89	0.54	2.53	5.31	100.20	213.00
	06/19/14 15:36:10	12180	17.81	1.72	0.55	2.11	5.45	100.20	234.00
	06/19/14 15:36:40	12210	17.64	1.72	0.56	2.19	5.45	100.20	234.00
	06/19/14 15:37:10	12240	17.33	1.85	0.52	2.62	5.18	100.20	224.00
	06/19/14 15:37:40	12270	18.18	1.63	0.61	1.89	5.18	100.20	224.00
	06/19/14 15:38:10	12300	17.90	1.50	0.58	2.01	5.56	100.20	234.00
	06/19/14 15:38:40	12330	17.20	1.82	0.50	2.56	5.56	100.20	234.00
	06/19/14 15:39:10	12360	17.66	1.76	0.54	2.23	5.45	100.20	213.00
	06/19/14 15:39:40	12390	17.32	1.76	0.50	2.56	5.45	100.20	213.00
	06/19/14 15:40:10	12420	18.08	1.61	0.57	2.00	10.35	100.10	313.00
	06/19/14 15:40:40	12450	16.55	1.47	0.33	2.78	10.35	100.10	313.00
	06/19/14 15:41:10	12480	15.99	1.60	0.31	3.43	17.58	100.00	428.00
	06/19/14 15:41:40	12510	15.79	1.01	0.35	3.70	17.58	100.00	428.00
	06/19/14 15:42:10	12540	15.74	1.02	0.26	3.44	16.91	99.70	416.00
	06/19/14 15:42:40	12570	15.47	1.08	0.26	3.96	16.91	99.70	416.00
	06/19/14 15:43:10	12600	15.42	0.86	0.24	3.81	17.72	99.50	428.00
	06/19/14 15:43:40	12630	16.31	1.05	0.31	3.22	17.72	99.50	428.00
	06/19/14 15:44:10	12660	15.38	0.97	0.19	3.82	16.94	99.30	406.00
	06/19/14 15:44:40	12690	15.53	1.01	0.23	3.88	16.94	99.30	406.00
	06/19/14 15:45:10	12720	16.32	1.02	0.35	3.25	17.60	99.10	428.00
	06/19/14 15:45:40	12750	15.69	1.02	0.23	3.47	17.60	99.10	428.00
	06/19/14 15:46:10	12780	15.36	1.00	0.24	4.03	16.83	99.00	428.00
	06/19/14 15:46:40	12810	16.09	1.12	0.26	3.27	16.83	99.00	428.00
	06/19/14 15:47:10	12840	15.66	1.12	0.32	3.91	17.63	98.90	429.00
	06/19/14 15:47:40	12870	16.85	0.86	0.41	2.83	17.63	98.90	429.00
	06/19/14 15:48:10	12900	16.09	0.88	0.34	3.25	16.55	98.90	406.00
	06/19/14 15:48:40	12930	16.61	0.90	0.40	3.06	16.55	98.90	406.00
	06/19/14 15:49:10	12960	15.24	0.75	0.19	3.75	17.22	98.80	439.00
	06/19/14 15:49:40	12990	14.20	0.98	0.12	4.73	17.22	98.80	439.00
	06/19/14 15:50:10	13020	14.57	1.15	0.12	4.55	17.22	98.90	417.00
	06/19/14 15:50:40	13050	15.55	1.16	0.28	3.93	17.22	98.90	417.00
	06/19/14 15:51:10	13080	16.99	0.77	0.39	2.87	9.47	98.90	313.00
	06/19/14 15:51:40	13110	17.78	1.15	0.46	2.22	9.47	98.90	313.00
	06/19/14 15:52:10	13140	17.51	1.27	0.47	2.37	6.23	99.00	235.00
	06/19/14 15:52:40	13170	17.78	1.51	0.48	2.11	6.23	99.00	235.00
	06/19/14 15:53:10	13200	17.48	1.56	0.45	2.47	5.70	99.10	224.00
	06/19/14 15:53:40	13230	17.86	1.60	0.57	2.21	5.70	99.10	224.00
	06/19/14 15:54:10	13260	17.59	1.48	0.43	2.18	6.06	99.20	246.00
	06/19/14 15:54:40	13290	17.60	1.60	0.52	2.24	6.06	99.20	246.00
	06/19/14 15:55:10	13320	17.63	1.65	0.56	2.41	5.65	99.20	224.00
	06/19/14 15:55:40	13350	17.77	1.49	0.57	2.14	5.65	99.20	224.00
	06/19/14 15:56:10	13380	17.90	1.51	0.54	2.05	10.05	99.30	302.00
	06/19/14 15:56:40	13410	17.01	1.48	0.37	2.66	10.05	99.30	302.00
	06/19/14 15:57:10	13440	16.32	1.42	0.32	3.16	17.38	99.30	428.00
A2	06/19/14 15:57:40	13470	16.11	1.14	0.34	3.19	17.38	99.30	428.00
	06/19/14 15:58:10	13500	16.02	1.16	0.31	3.41	16.97	99.20	417.00
	06/19/14 15:58:40	13530	15.26	1.05	0.19	3.89	16.97	99.20	417.00
	06/19/14 15:59:10	13560	15.63	1.10	0.29	3.86	17.49	99.10	428.00
	06/19/14 15:59:40	13590	15.07	1.07	0.21	4.04	17.49	99.10	428.00
	06/19/14 16:00:10	13620	14.58	0.82	0.19	4.45	16.94	99.00	417.00
	06/19/14 16:00:40	13650	15.01	0.92	0.16	4.12	16.94	99.00	417.00
	06/19/14 16:01:10	13680	14.67	1.12	0.18	4.47	17.33	99.00	428.00
	06/19/14 16:01:40	13710	15.47	0.80	0.34	3.96	17.33	99.00	428.00
	06/19/14 16:02:10	13740	15.82	0.88	0.30	3.40	16.66	99.00	417.00
	06/19/14 16:02:40	13770	15.69	1.06	0.28	3.71	16.66	99.00	417.00
	06/19/14 16:03:10	13800	14.63	1.06	0.14	4.30	17.44	99.00	406.00
	06/19/14 16:03:40	13830	14.39	1.05	0.14	4.65	17.44	99.00	406.00
	06/19/14 16:04:10	13860	14.68	1.08	0.16	4.45	16.36	99.00	416.00
	06/19/14 16:04:40	13890	14.65	1.13	0.19	4.43	16.36	99.00	416.00

CIMARRON ENERGY, INC.

June 19, 2014

30 ECD

Norman Facility

Unit Data

Meas. Stack Moisture	5.3	%
Stack Exhaust Flow (M2)	44,972	SCFH

Weather Data

Barometric Pressure	29.95	in. Hg
Relative Humidity	40	%
Ambient Temperature	89	°F
Specific Humidity	0.011669	lb H ₂ O / lb air

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

	Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmvd)	THC (ppmwv)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
	06/19/14 16:05:10	13920	15.14	1.23	0.19	3.96	17.41	99.00	417.00
	06/19/14 16:05:40	13950	14.32	1.18	0.13	4.69	17.41	99.00	417.00
	06/19/14 16:06:10	13980	14.79	1.10	0.24	4.45	16.61	99.10	417.00
	06/19/14 16:06:40	14010	16.92	0.93	0.43	2.97	16.61	99.10	417.00
	06/19/14 16:07:10	14040	16.33	0.83	0.34	3.13	17.36	99.00	417.00
	06/19/14 16:07:40	14070	16.08	0.83	0.32	3.31	17.36	99.00	417.00
	06/19/14 16:08:10	14100	16.73	0.91	0.37	3.00	16.94	99.10	406.00
	06/19/14 16:08:40	14130	16.24	0.82	0.35	3.22	16.94	99.10	406.00
	06/19/14 16:09:10	14160	16.39	0.70	0.37	3.17	14.01	99.10	371.00
	06/19/14 16:09:40	14190	16.93	0.85	0.37	2.75	14.01	99.10	371.00
	06/19/14 16:10:10	14220	16.68	1.50	0.42	3.03	6.12	99.10	246.00
	06/19/14 16:10:40	14250	17.20	1.96	0.49	2.59	6.12	99.10	246.00
	06/19/14 16:11:10	14280	17.29	1.91	0.46	2.55	5.45	99.20	224.00
	06/19/14 16:11:40	14310	17.13	1.75	0.46	2.64	5.45	99.20	224.00
	06/19/14 16:12:10	14340	17.25	1.73	0.48	2.56	5.84	99.30	235.00
	06/19/14 16:12:40	14370	17.58	1.68	0.50	2.37	5.84	99.30	235.00
	06/19/14 16:13:10	14400	17.73	1.60	0.52	2.24	9.30	99.40	291.00
	06/19/14 16:13:40	14430	16.51	1.60	0.27	2.88	9.30	99.40	291.00
	06/19/14 16:14:10	14460	15.26	1.46	0.19	3.87	16.77	99.30	406.00
	06/19/14 16:14:40	14490	15.20	1.26	0.20	4.07	16.77	99.30	406.00
	06/19/14 16:15:10	14520	15.36	1.21	0.19	3.92	16.39	99.20	416.00
	06/19/14 16:15:40	14550	15.05	1.27	0.21	4.12	16.39	99.20	416.00
	06/19/14 16:16:10	14580	15.07	1.14	0.15	4.01	16.94	98.90	428.00
	06/19/14 16:16:40	14610	15.01	1.16	0.17	4.21	16.94	98.90	428.00
	06/19/14 16:17:10	14640	14.89	1.08	0.18	4.31	16.55	98.70	417.00
	06/19/14 16:17:40	14670	15.45	1.01	0.22	3.79	16.55	98.70	417.00
	06/19/14 16:18:10	14700	15.23	0.91	0.19	4.07	17.00	98.50	417.00
	06/19/14 16:18:40	14730	15.20	1.12	0.21	3.98	17.00	98.50	417.00
	06/19/14 16:19:10	14760	15.40	0.97	0.22	3.94	16.47	98.30	417.00
	06/19/14 16:19:40	14790	15.58	1.15	0.21	3.71	16.47	98.30	417.00
	06/19/14 16:20:10	14820	15.18	1.18	0.18	4.13	16.36	98.00	417.00
A3	06/19/14 16:20:40	14850	14.95	1.14	0.12	4.05	16.36	98.00	417.00
	06/19/14 16:21:10	14880	14.93	1.28	0.13	4.24	16.94	97.80	407.00
	06/19/14 16:21:40	14910	14.94	1.15	0.17	4.22	16.94	97.80	407.00
	06/19/14 16:22:10	14940	15.13	1.00	0.23	4.16	16.30	97.50	406.00
	06/19/14 16:22:40	14970	15.39	0.90	0.19	3.84	16.30	97.50	406.00
	06/19/14 16:23:10	15000	15.42	1.07	0.22	3.90	17.00	97.30	407.00
	06/19/14 16:23:40	15030	15.18	0.98	0.14	3.98	17.00	97.30	407.00
	06/19/14 16:24:10	15060	14.43	0.88	0.09	4.51	16.22	97.20	407.00
	06/19/14 16:24:40	15090	14.54	0.97	0.05	4.57	16.22	97.20	407.00
	06/19/14 16:25:10	15120	14.25	1.29	0.03	4.66	16.91	97.10	418.00
	06/19/14 16:25:40	15150	14.40	1.28	0.02	4.62	16.91	97.10	418.00
	06/19/14 16:26:10	15180	14.25	1.35	0.01	4.70	12.40	97.10	349.00
	06/19/14 16:26:40	15210	15.12	1.55	0.13	4.24	12.40	97.10	349.00
	06/19/14 16:27:10	15240	16.17	2.05	0.27	3.43	5.34	97.10	225.00
	06/19/14 16:27:40	15270	17.12	1.82	0.36	2.66	5.34	97.10	225.00
	06/19/14 16:28:10	15300	16.87	1.87	0.32	2.81	5.73	97.30	225.00
	06/19/14 16:28:40	15330	16.68	2.00	0.32	2.93	5.73	97.30	225.00
	06/19/14 16:29:10	15360	17.15	1.87	0.38	2.67	5.87	97.40	225.00
	06/19/14 16:29:40	15390	17.58	1.82	0.40	2.36	5.87	97.40	225.00
	06/19/14 16:30:10	15420	17.23	1.68	0.37	2.52	5.98	97.60	236.00
	06/19/14 16:30:40	15450	17.05	1.78	0.37	2.70	5.98	97.60	236.00
	06/19/14 16:31:10	15480	16.71	1.72	0.35	2.89	6.78	97.70	247.00
	06/19/14 16:31:40	15510	16.82	1.85	0.32	2.87	6.78	97.70	247.00
	06/19/14 16:32:10	15540	15.64	1.78	0.16	3.54	14.09	97.80	371.00
	06/19/14 16:32:40	15570	15.46	1.93	0.21	3.83	14.09	97.80	371.00
	06/19/14 16:33:10	15600	15.48	1.29	0.22	3.85	16.36	97.80	406.00
	06/19/14 16:33:40	15630	14.48	1.26	0.04	4.40	16.36	97.80	406.00
	06/19/14 16:34:10	15660	14.23	1.34	0.05	4.72	17.02	97.80	407.00
	06/19/14 16:34:40	15690	14.53	1.17	0.07	4.54	17.02	97.80	407.00

Norman Facility

Meas. Stack Moisture	5.3	%
Stack Exhaust Flow (M2)	44,972	SCFH

Weather Data		
Barometric Pressure	29.95	in. Hg
Relative Humidity	40	%
Ambient Temperature	89	°F
Specific Humidity	0.011669	lb H ₂ O / lb air

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
06/19/14 16:35:10	15720	14.88	1.11	0.12	4.33	16.61	97.80	428.00
06/19/14 16:35:40	15750	15.19	1.27	0.18	4.08	16.61	97.80	428.00
06/19/14 16:36:10	15780	14.91	1.13	0.14	4.14	16.44	97.90	406.00
06/19/14 16:36:40	15810	15.15	0.89	0.22	4.21	16.44	97.90	406.00
06/19/14 16:37:10	15840	15.83	1.02	0.23	3.51	16.58	97.90	406.00
06/19/14 16:37:40	15870	15.26	1.24	0.18	3.93	16.58	97.90	406.00
06/19/14 16:38:10	15900	15.40	1.04	0.21	3.99	16.83	97.90	407.00
06/19/14 16:38:40	15930	15.53	0.90	0.18	3.69	16.83	97.90	407.00
06/19/14 16:39:10	15960	14.59	0.95	0.11	4.40	16.41	97.90	406.00
06/19/14 16:39:40	15990	15.57	0.88	0.21	3.88	16.41	97.90	406.00
06/19/14 16:40:10	16020	16.21	0.85	0.26	3.39	16.97	97.90	418.00
06/19/14 16:40:40	16050	15.91	0.92	0.25	3.38	16.97	97.90	418.00
06/19/14 16:41:10	16080	16.04	0.92	0.28	3.47	16.17	97.90	406.00
06/19/14 16:41:40	16110	15.95	1.05	0.24	3.42	16.17	97.90	406.00
06/19/14 16:42:10	16140	15.18	1.05	0.15	3.84	7.89	97.90	269.00
06/19/14 16:42:40	16170	14.93	1.04	0.11	4.24	7.89	97.90	269.00
06/19/14 16:43:10	16200	15.26	1.53	0.16	4.06	5.23	98.00	224.00
06/19/14 16:43:40	16230	16.71	1.76	0.33	3.11	5.23	98.00	224.00
06/19/14 16:44:10	16260	16.97	1.85	0.34	2.74	5.62	98.10	225.00
06/19/14 16:44:40	16290	17.17	1.81	0.42	2.69	5.62	98.10	225.00
06/19/14 16:45:10	16320	17.48	1.71	0.44	2.35	5.34	98.20	225.00

353.79

	O ₂	CO	THC	CO ₂	Press. Trans	Temp. Trans.	F-Flow Trans.
Serial Number:	INST-22-0005	INST-CO-0034	INST-VC-0006	INST-22-0005	0	0	0
	(%)	(ppmvd)	(ppmvw)	(%)	(in. H ₂ O)	(°F)	(SCFH)
Initial Zero	0.01	0.08	0.05	0.04			
Final Zero	0.03	-0.04	0.06	0.02			
Avg. Zero	0.02	0.02	0.06	0.03			
Initial UpScale	12.10	5.00	3.11	9.25			
Final UpScale	12.12	5.06	3.09	9.29			
Avg. UpScale	12.11	5.03	3.10	9.27			

9.33

EMISSIONS DATA	O ₂	CO	THC	CO ₂
Corrected Raw Average (ppm/% dry basis)	16.19	1.28	0.00	3.45
Corrected Raw Average (ppm/% wet basis)	15.33	1.22	0.00	3.27
Emission Rate (lb/hr)	N/A	0.00	0.00	N/A

CIMARRON ENERGY, INC.

June 19, 2014

30 ECD

Norman Facility

Unit Data

Meas. Stack Moisture	5.2	%
Stack Exhaust Flow (M2)	42,903	SCFH

Weather Data

Barometric Pressure	29.95	in. Hg
Relative Humidity	34	%
Ambient Temperature	83	°F
Specific Humidity	0.008146	lb H ₂ O / lb air

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

	Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmvd)	THC (ppmwv)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
A1	06/19/14 17:00:10	17220	17.00	1.82	0.46	2.70	5.43	97.80	235.00
	06/19/14 17:00:40	17250	17.15	1.82	0.43	2.65	5.43	97.80	235.00
	06/19/14 17:01:10	17280	16.80	1.79	0.41	2.85	5.15	97.80	214.00
	06/19/14 17:01:40	17310	17.14	1.83	0.47	2.67	5.15	97.80	214.00
	06/19/14 17:02:10	17340	16.95	1.84	0.46	2.77	5.43	97.80	225.00
	06/19/14 17:02:40	17370	17.40	1.88	0.53	2.47	5.43	97.80	225.00
	06/19/14 17:03:10	17400	17.34	1.76	0.51	2.51	5.56	97.70	225.00
	06/19/14 17:03:40	17430	17.30	1.80	0.50	2.56	5.56	97.70	225.00
	06/19/14 17:04:10	17460	17.58	1.65	0.46	2.35	5.31	97.70	225.00
	06/19/14 17:04:40	17490	16.98	1.67	0.45	2.67	5.31	97.70	225.00
	06/19/14 17:05:10	17520	17.12	1.77	0.42	2.60	11.99	97.70	337.00
	06/19/14 17:05:40	17550	15.32	1.68	0.21	3.80	11.99	97.70	337.00
	06/19/14 17:06:10	17580	14.47	1.92	0.18	4.46	17.08	97.50	407.00
	06/19/14 17:06:40	17610	14.28	1.48	0.13	4.69	17.08	97.50	407.00
	06/19/14 17:07:10	17640	14.22	1.38	0.13	4.70	17.22	97.40	418.00
	06/19/14 17:07:40	17670	14.08	1.10	0.15	4.84	17.22	97.40	418.00
	06/19/14 17:08:10	17700	15.06	1.15	0.22	4.34	17.33	97.20	419.00
	06/19/14 17:08:40	17730	14.55	1.08	0.13	4.33	17.33	97.20	419.00
	06/19/14 17:09:10	17760	14.92	1.04	0.23	4.34	18.02	97.10	430.00
	06/19/14 17:09:40	17790	14.15	0.76	0.14	4.67	18.02	97.10	430.00
	06/19/14 17:10:10	17820	14.07	0.87	0.11	4.84	17.88	97.10	430.00
	06/19/14 17:10:40	17850	14.15	1.12	0.12	4.80	17.88	97.10	430.00
	06/19/14 17:11:10	17880	14.18	1.17	0.15	4.74	17.99	97.00	430.00
	06/19/14 17:11:40	17910	14.21	0.91	0.13	4.80	17.99	97.00	430.00
	06/19/14 17:12:10	17940	14.89	0.88	0.19	4.38	17.99	97.00	441.00
	06/19/14 17:12:40	17970	14.55	0.86	0.13	4.37	17.99	97.00	441.00
	06/19/14 17:13:10	18000	14.91	0.84	0.22	4.34	17.58	96.90	430.00
	06/19/14 17:13:40	18030	14.79	0.95	0.16	4.27	17.58	96.90	430.00
	06/19/14 17:14:10	18060	14.60	1.19	0.11	4.44	18.24	96.90	431.00
	06/19/14 17:14:40	18090	14.07	1.14	0.14	4.80	18.24	96.90	431.00
	06/19/14 17:15:10	18120	14.15	0.92	0.16	4.86	17.58	96.90	419.00
	06/19/14 17:15:40	18150	14.60	0.86	0.18	4.48	17.58	96.90	419.00
	06/19/14 17:16:10	18180	14.27	0.87	0.17	4.66	14.50	96.90	383.00
	06/19/14 17:16:40	18210	16.08	1.23	0.30	3.65	14.50	96.90	383.00
	06/19/14 17:17:10	18240	16.86	1.52	0.44	2.94	5.56	96.90	236.00
	06/19/14 17:17:40	18270	17.49	1.74	0.48	2.42	5.56	96.90	236.00
	06/19/14 17:18:10	18300	17.50	1.66	0.45	2.42	6.23	97.00	236.00
	06/19/14 17:18:40	18330	17.19	1.60	0.42	2.51	6.23	97.00	236.00
	06/19/14 17:19:10	18360	16.61	1.73	0.36	2.96	5.95	97.10	236.00
	06/19/14 17:19:40	18390	16.69	1.86	0.37	2.97	5.95	97.10	236.00
	06/19/14 17:20:10	18420	16.93	1.79	0.43	2.82	6.23	97.10	236.00
	06/19/14 17:20:40	18450	17.19	1.79	0.49	2.68	6.23	97.10	236.00
	06/19/14 17:21:10	18480	17.73	1.67	0.52	2.19	6.09	97.20	247.00
	06/19/14 17:21:40	18510	17.42	1.54	0.49	2.42	6.09	97.20	247.00
	06/19/14 17:22:10	18540	16.78	1.76	0.38	2.81	11.43	97.10	326.00
	06/19/14 17:22:40	18570	16.33	1.64	0.31	3.10	11.43	97.10	326.00
A2	06/19/14 17:23:10	18600	15.56	1.44	0.26	3.71	17.44	96.90	430.00
	06/19/14 17:23:40	18630	15.43	1.05	0.27	3.85	17.44	96.90	430.00
	06/19/14 17:24:10	18660	14.95	0.96	0.24	4.23	16.66	96.60	418.00
	06/19/14 17:24:40	18690	15.30	1.03	0.26	3.99	16.66	96.60	418.00
	06/19/14 17:25:10	18720	16.15	1.04	0.32	3.39	17.36	96.30	419.00
	06/19/14 17:25:40	18750	15.00	0.95	0.19	3.93	17.36	96.30	419.00
	06/19/14 17:26:10	18780	14.46	1.24	0.14	4.61	17.11	96.00	419.00
	06/19/14 17:26:40	18810	14.13	1.35	0.09	4.76	17.11	96.00	419.00
	06/19/14 17:27:10	18840	13.85	1.09	0.11	5.00	16.88	95.80	408.00
	06/19/14 17:27:40	18870	14.01	0.98	0.14	4.89	16.88	95.80	408.00
	06/19/14 17:28:10	18900	14.23	1.08	0.12	4.73	17.19	95.50	409.00
	06/19/14 17:28:40	18930	13.95	1.22	0.10	4.91	17.19	95.50	409.00
	06/19/14 17:29:10	18960	13.95	1.11	0.09	4.93	16.83	95.20	431.00
	06/19/14 17:29:40	18990	14.29	1.08	0.10	4.74	16.83	95.20	431.00

CIMARRON ENERGY, INC.

June 19, 2014

30 ECD

Norman Facility

Unit Data

Meas. Stack Moisture	5.2	%
Stack Exhaust Flow (M2)	42,903	SCFH

Weather Data

Barometric Pressure	29.95	in. Hg
Relative Humidity	34	%
Ambient Temperature	83	°F
Specific Humidity	0.008146	lb H ₂ O / lb air

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

	Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmvd)	THC (ppmwv)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
	06/19/14 17:30:10	19020	14.18	1.07	0.09	4.74	17.27	95.00	420.00
	06/19/14 17:30:40	19050	14.00	1.34	0.10	4.85	17.27	95.00	420.00
	06/19/14 17:31:10	19080	14.18	1.04	0.11	4.83	16.88	94.70	420.00
	06/19/14 17:31:40	19110	14.41	1.14	0.10	4.59	16.88	94.70	420.00
	06/19/14 17:32:10	19140	14.05	1.29	0.10	4.78	17.58	94.50	410.00
	06/19/14 17:32:40	19170	13.97	1.10	0.10	4.95	17.58	94.50	410.00
	06/19/14 17:33:10	19200	13.88	1.16	0.09	4.96	16.55	94.30	398.00
	06/19/14 17:33:40	19230	14.08	1.26	0.05	4.82	16.55	94.30	398.00
	06/19/14 17:34:10	19260	14.41	1.23	0.10	4.74	7.28	94.10	270.00
	06/19/14 17:34:40	19290	15.58	1.80	0.21	3.82	7.28	94.10	270.00
	06/19/14 17:35:10	19320	16.43	2.09	0.29	3.17	5.98	94.10	226.00
	06/19/14 17:35:40	19350	16.60	1.97	0.32	3.01	5.98	94.10	226.00
	06/19/14 17:36:10	19380	16.36	1.92	0.29	3.13	6.14	94.00	237.00
	06/19/14 17:36:40	19410	16.45	2.12	0.30	3.10	6.14	94.00	237.00
	06/19/14 17:37:10	19440	16.58	2.10	0.32	3.03	6.31	94.00	248.00
	06/19/14 17:37:40	19470	16.61	2.00	0.32	2.97	6.31	94.00	248.00
	06/19/14 17:38:10	19500	16.31	2.03	0.24	3.16	10.60	93.90	316.00
	06/19/14 17:38:40	19530	15.28	1.86	0.13	3.85	10.60	93.90	316.00
	06/19/14 17:39:10	19560	14.55	1.88	0.07	4.39	17.94	93.70	433.00
	06/19/14 17:39:40	19590	14.08	1.52	0.06	4.79	17.94	93.70	433.00
	06/19/14 17:40:10	19620	13.84	1.13	0.07	4.99	17.96	93.50	422.00
	06/19/14 17:40:40	19650	13.81	1.06	0.03	4.98	17.96	93.50	422.00
	06/19/14 17:41:10	19680	13.63	0.90	0.03	5.15	18.68	93.20	445.00
	06/19/14 17:41:40	19710	13.74	0.91	0.06	5.07	18.68	93.20	445.00
	06/19/14 17:42:10	19740	13.91	0.93	0.06	4.98	18.30	92.90	423.00
	06/19/14 17:42:40	19770	13.71	0.88	0.07	5.06	18.30	92.90	423.00
	06/19/14 17:43:10	19800	13.75	0.84	0.07	5.06	18.32	92.80	423.00
	06/19/14 17:43:40	19830	13.75	0.88	0.07	5.08	18.32	92.80	423.00
	06/19/14 17:44:10	19860	13.88	0.86	0.05	4.95	18.49	92.60	434.00
	06/19/14 17:44:40	19890	13.62	0.85	0.06	5.12	18.49	92.60	434.00
	06/19/14 17:45:10	19920	13.63	0.71	0.05	5.14	18.38	92.50	434.00
	06/19/14 17:45:40	19950	13.69	0.74	0.02	5.10	18.38	92.50	434.00
A3	06/19/14 17:46:10	19980	13.68	0.78	0.03	5.10	18.66	92.40	435.00
	06/19/14 17:46:40	20010	13.68	0.75	0.03	5.11	18.66	92.40	435.00
	06/19/14 17:47:10	20040	13.73	0.70	0.06	5.07	18.41	92.30	423.00
	06/19/14 17:47:40	20070	13.98	0.78	0.03	4.89	18.41	92.30	423.00
	06/19/14 17:48:10	20100	13.58	0.71	0.03	5.15	19.07	92.20	446.00
	06/19/14 17:48:40	20130	13.68	0.66	0.05	5.11	19.07	92.20	446.00
	06/19/14 17:49:10	20160	13.64	0.76	0.04	5.14	18.16	92.10	412.00
	06/19/14 17:49:40	20190	13.80	0.74	0.03	5.03	18.16	92.10	412.00
	06/19/14 17:50:10	20220	13.61	0.75	0.04	5.14	18.71	92.10	446.00
	06/19/14 17:50:40	20250	13.60	0.71	0.04	5.16	18.71	92.10	446.00
	06/19/14 17:51:10	20280	13.89	0.72	0.02	5.02	12.73	92.00	363.00
	06/19/14 17:51:40	20310	14.83	1.23	0.05	4.38	12.73	92.00	363.00
	06/19/14 17:52:10	20340	16.13	1.92	0.26	3.54	5.29	92.10	216.00
	06/19/14 17:52:40	20370	16.74	2.65	0.37	2.95	5.29	92.10	216.00
	06/19/14 17:53:10	20400	16.92	2.31	0.38	2.81	5.31	92.10	216.00
	06/19/14 17:53:40	20430	16.76	2.03	0.39	2.87	5.31	92.10	216.00
	06/19/14 17:54:10	20460	16.66	2.19	0.38	2.94	5.18	92.20	205.00
	06/19/14 17:54:40	20490	16.85	2.22	0.39	2.89	5.18	92.20	205.00
	06/19/14 17:55:10	20520	16.84	2.26	0.34	2.81	5.34	92.20	216.00
	06/19/14 17:55:40	20550	16.66	2.14	0.30	2.95	5.34	92.20	216.00
	06/19/14 17:56:10	20580	16.44	2.21	0.24	3.03	11.60	92.20	318.00
	06/19/14 17:56:40	20610	15.40	1.87	0.14	3.85	11.60	92.20	318.00
	06/19/14 17:57:10	20640	15.13	1.43	0.17	4.09	17.05	92.10	422.00
	06/19/14 17:57:40	20670	15.06	1.16	0.16	4.01	17.05	92.10	422.00
	06/19/14 17:58:10	20700	15.01	0.93	0.16	4.22	17.47	92.00	423.00
	06/19/14 17:58:40	20730	15.04	0.75	0.15	4.11	17.47	92.00	423.00
	06/19/14 17:59:10	20760	15.05	0.90	0.14	4.10	17.36	91.90	434.00
	06/19/14 17:59:40	20790	14.89	0.93	0.16	4.35	17.36	91.90	434.00

Norman Facility

Meas. Stack Moisture	5.2	%
Stack Exhaust Flow (M2)	42,903	SCFH

Barometric Pressure	29.95	in. Hg
Relative Humidity	34	%
Ambient Temperature	83	° F
Specific Humidity	0.008146	lb H ₂ O / lb air

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
06/19/14 18:00:10	20820	15.57	0.78	0.21	3.75	17.63	91.80	423.00
06/19/14 18:00:40	20850	14.83	0.72	0.16	4.23	17.63	91.80	423.00
06/19/14 18:01:10	20880	15.33	0.70	0.20	3.97	17.94	91.60	434.00
06/19/14 18:01:40	20910	15.19	0.70	0.19	4.03	17.94	91.60	434.00
06/19/14 18:02:10	20940	14.91	0.78	0.14	4.20	17.27	91.60	423.00
06/19/14 18:02:40	20970	14.88	0.70	0.15	4.27	17.27	91.60	423.00
06/19/14 18:03:10	21000	14.83	0.73	0.14	4.28	17.83	91.50	423.00
06/19/14 18:03:40	21030	15.15	0.85	0.14	4.10	17.83	91.50	423.00
06/19/14 18:04:10	21060	15.21	0.70	0.16	4.04	17.30	91.50	412.00
06/19/14 18:04:40	21090	15.21	0.72	0.15	4.01	17.30	91.50	412.00
06/19/14 18:05:10	21120	15.26	0.78	0.14	4.03	17.58	91.50	412.00
06/19/14 18:05:40	21150	15.00	0.81	0.13	4.11	17.58	91.50	412.00
06/19/14 18:06:10	21180	14.97	0.83	0.10	4.22	8.00	91.60	283.00
06/19/14 18:06:40	21210	14.21	0.89	0.03	4.59	8.00	91.60	283.00
06/19/14 18:07:10	21240	14.34	1.00	0.05	4.76	6.03	91.60	238.00
06/19/14 18:07:40	21270	16.15	1.60	0.28	3.49	6.03	91.60	238.00
06/19/14 18:08:10	21300	17.03	2.22	0.42	2.76	6.14	91.70	238.00
06/19/14 18:08:40	21330	16.97	2.16	0.37	2.75	6.14	91.70	238.00
06/19/14 18:09:10	21360	16.86	2.05	0.34	2.79	5.90	91.80	227.00
06/19/14 18:09:40	21390	17.08	2.00	0.44	2.80	5.90	91.80	227.00
06/19/14 18:10:10	21420	17.34	2.12	0.54	2.42	6.01	91.90	173.00

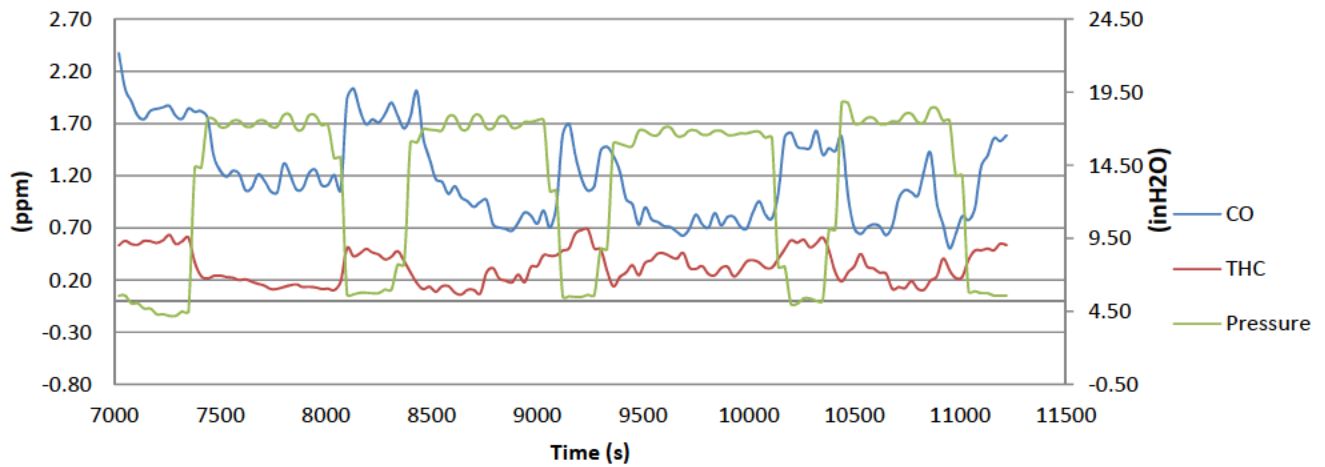
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	O ₂	CO	THC	CO ₂	Press. Trans	Temp. Trans.	F-Flow Trans.
Serial Number:	INST-22-0005	INST-CO-0034	INST-VC-0006	INST-22-0005	0	0	0
	(%)	(ppmvd)	(ppmvw)	(%)	(in. H ₂ O)	(°F)	(SCFH)
Initial Zero	0.03	-0.04	0.06	0.02			
Final Zero	0.04	0.01	0.02	0.01			
Avg. Zero	0.04	-0.02	0.04	0.02			
Initial UpScale	12.12	5.06	3.09	9.29			
Final UpScale	12.10	5.25	2.94	9.25			
Avg. UpScale	12.11	5.16	3.02	9.27			

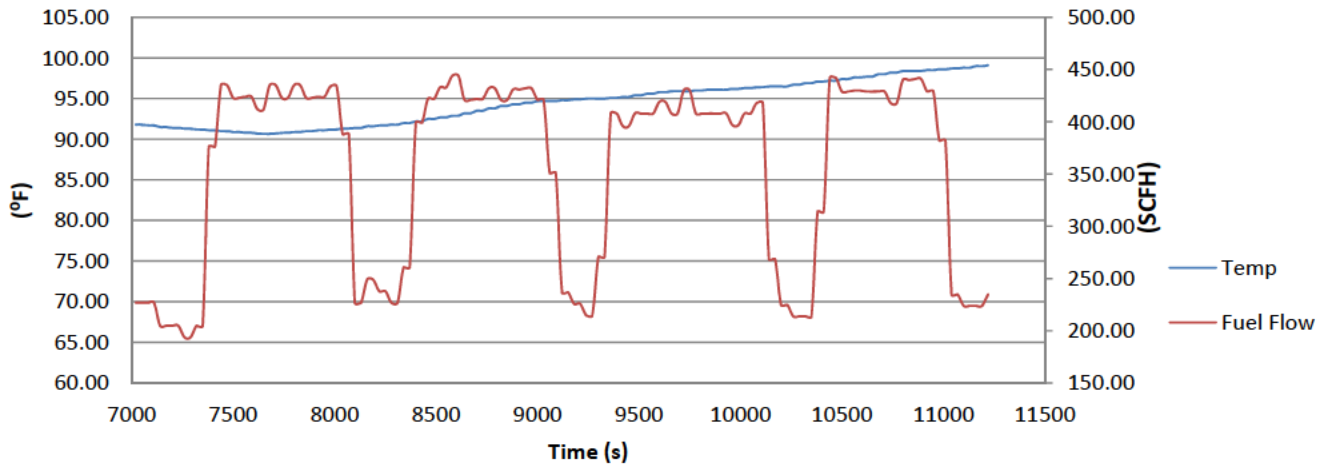
9.33

EMISSIONS DATA	O ₂	CO	THC	CO ₂
Corrected Raw Average (ppm/% dry basis)	15.42	1.31	0.17	4.02
Corrected Raw Average (ppm/% wet basis)	14.61	1.24	0.16	3.81
Emission Rate (lb/hr)	N/A	0.00	0.00	N/A

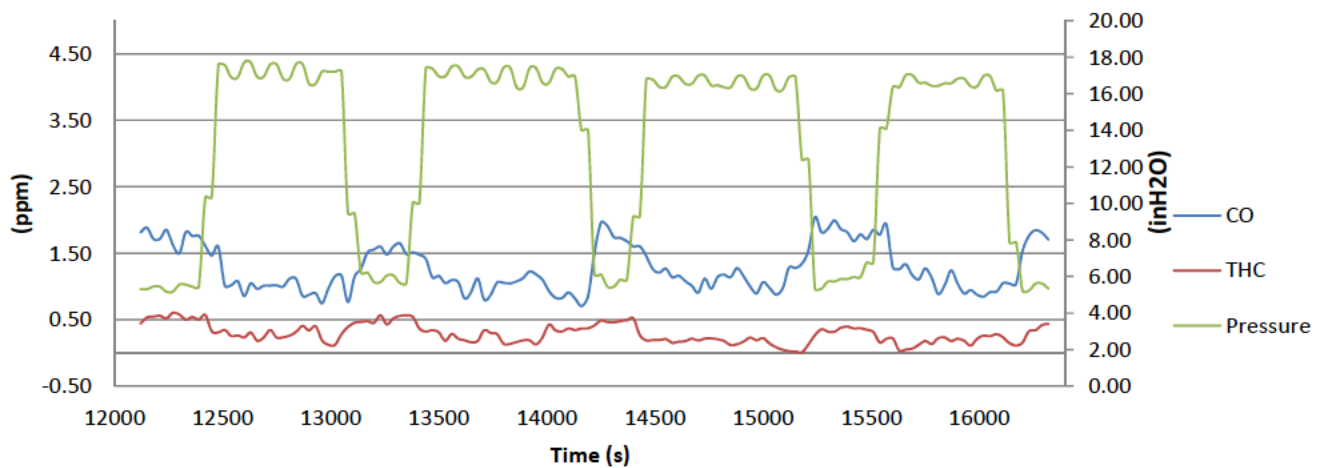
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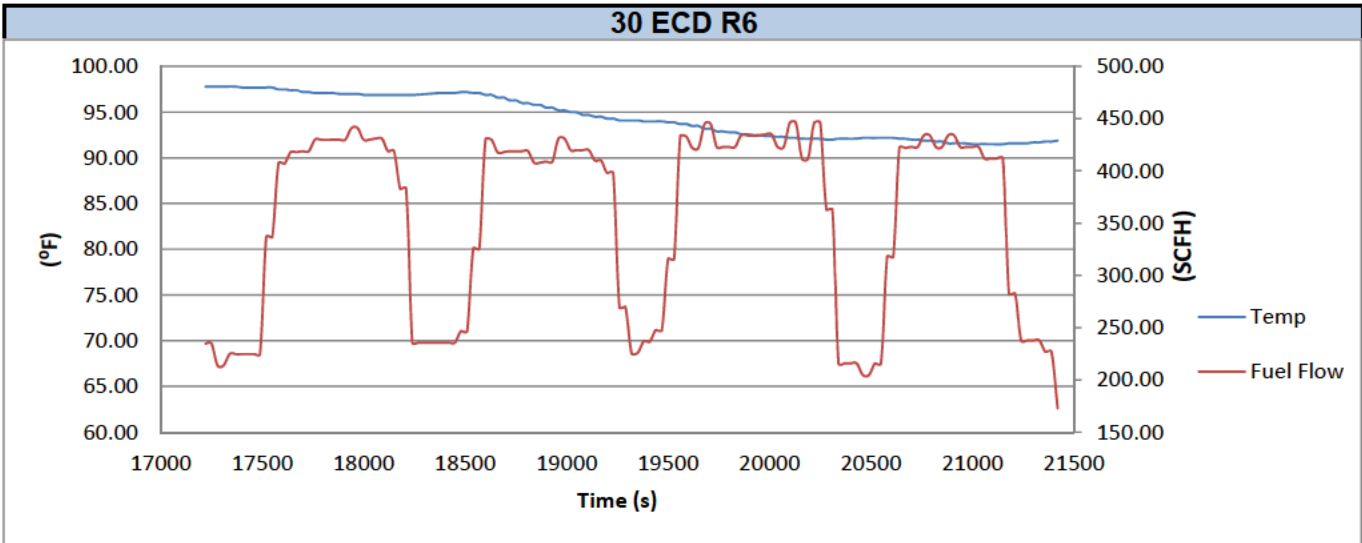
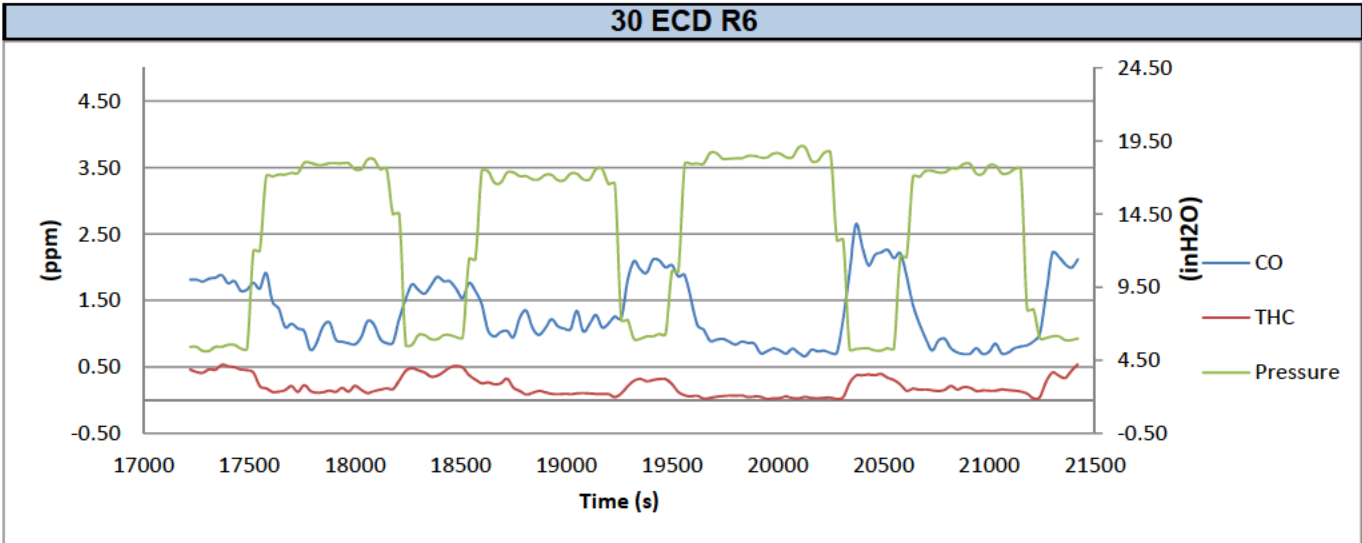
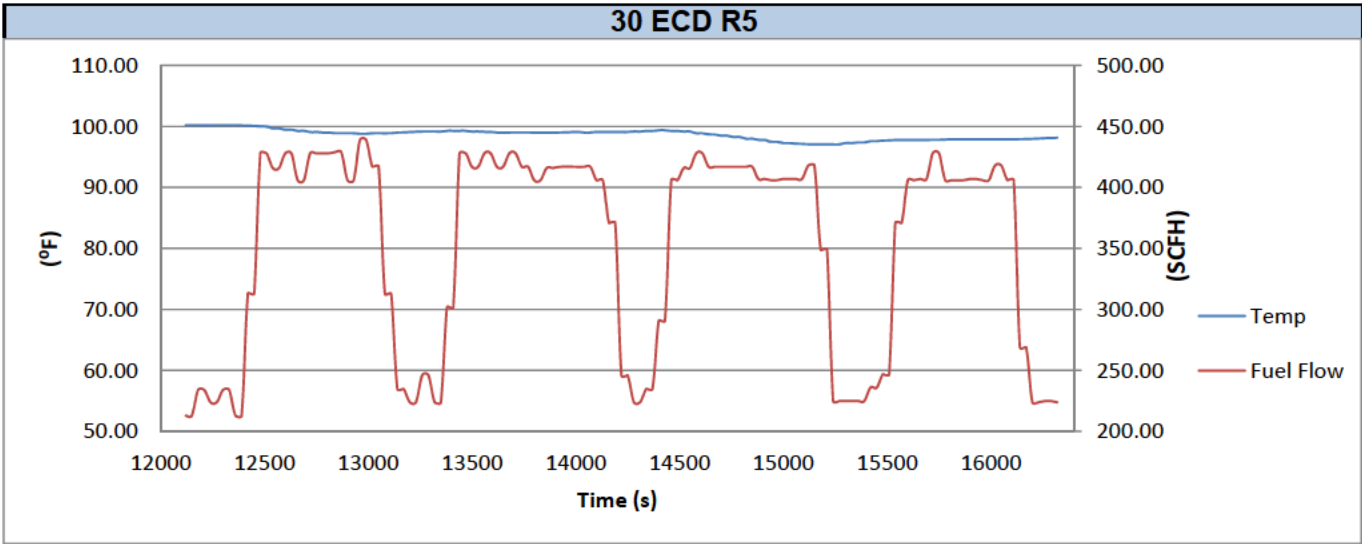


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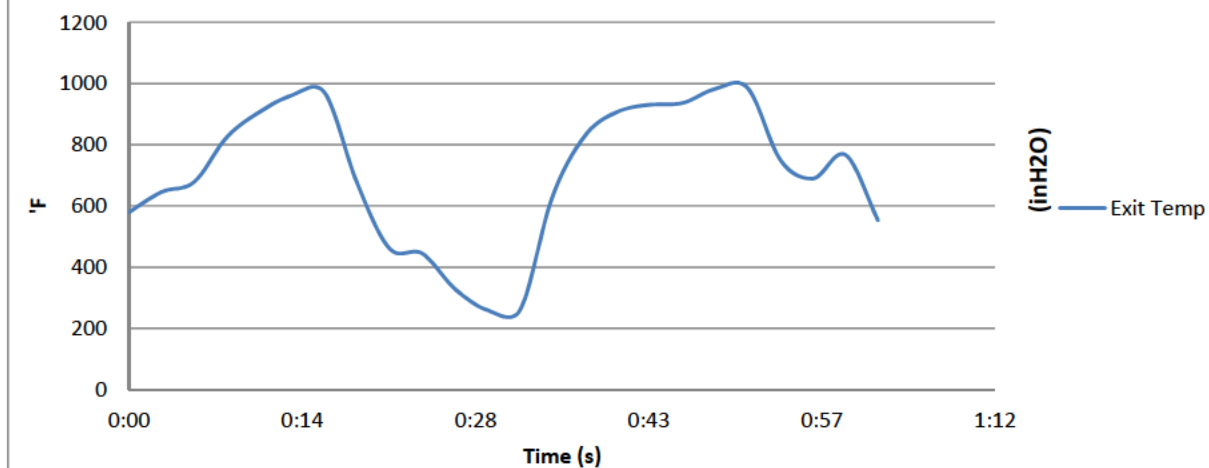


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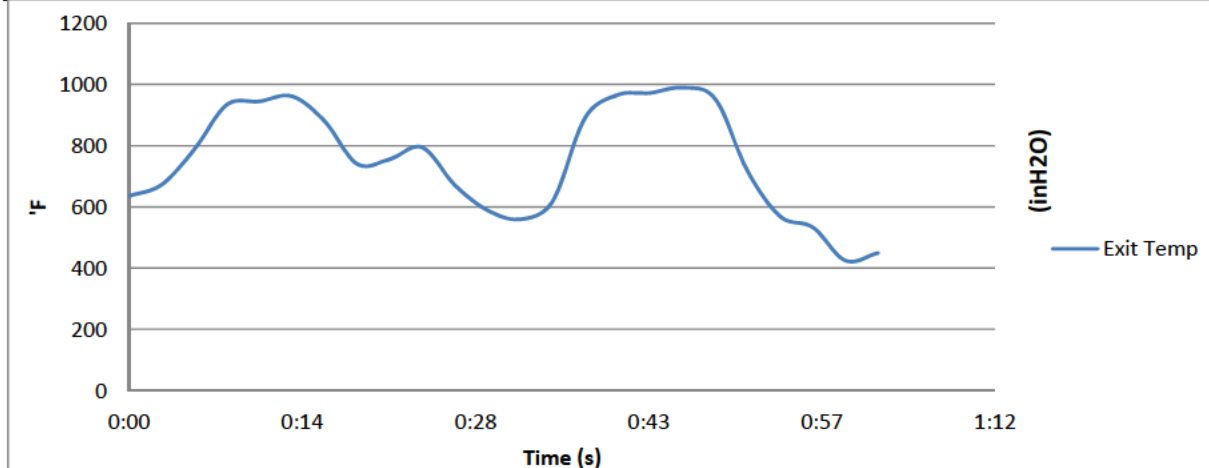




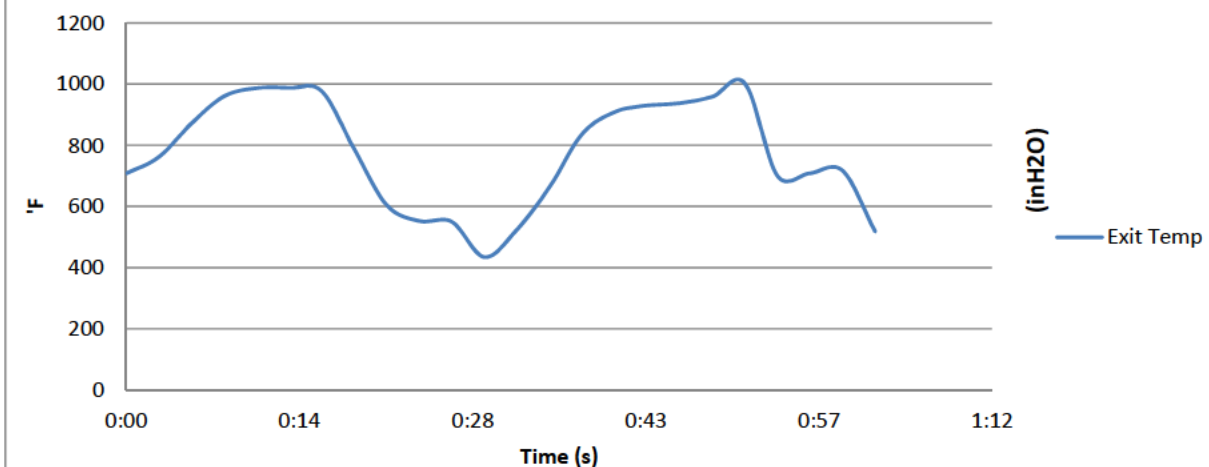
30 ECD R4



30 ECD R5



30 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	Norman Facility
Sampling Location	30 ECD
Fuel Type	Gas, Propene

Test Information			
Project #		cei-14-norman.ok-comp#1	
Operator		DG	
Date for Preliminary Run	(mm/dd/yy)	06/18/14	
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	65	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)	06/19/14	06/19/14	06/19/14	
Load	% or w/DB	70-100-70	70-100-70	70-100-70	
Meter Box Number	from ACS	SAMP-CP-0023	SAMP-CP-0023	SAMP-CP-0023	
Meter Calibration Factor	(Y)	1.010	1.010	1.010	
Orifice Meter Coefficient	(ΔH_{or})	1.877	1.877	1.877	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)	0.819	0.819	0.819	
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-0002	SAMP-BC-0002	SAMP-BC-0002	

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	Norman Facility
Sampling Location	30 ECD
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	09:25	10:50	12:20		hh:mm
Run Stop Time	10:35	12:00	13:30		hh:mm
Test Date	06/19/14	06/19/14	06/19/14		mm/dd/yy
Meter Calibration Factor	1.010	1.010	1.010		
Pitot Tube Coefficient	0.819	0.819	0.819		
Stack Test Data	70-100-70%-7	70-100-70%-8	70-100-70%-9	Average	Units
Initial Meter Volume	600.460	650.690	700.540		ft ³
Final Meter Volume	647.420	696.870	746.640		ft ³
Total Meter Volume	46.960	46.180	46.100	46.413	ft ³
Total Sampling Time	65.00	65.00	65.00	65.00	min
Average Meter Temperature	73.54	73.21	78.00	74.92	°F
Average Stack Temperature	929.67	925.79	877.54	911.00	°F
Barometric Pressure	29.95	29.96	29.99	29.97	in Hg
Stack Static Pressure	0.00	0.00	0.00	0.00	in H ₂ O
Absolute Stack Pressure	29.95	29.96	29.99	29.97	in Hg
Average Orifice Pressure Drop	1.90	1.90	1.90	1.90	in H ₂ O
Absolute Meter Pressure	30.09	30.10	30.13	30.10	in Hg
Avg Square Root Pitot Pressure	0.08	0.08	0.08	0.08	√(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	45.90	45.50	51.80	47.73	g
Silica Gel Weight Gain	6.70	13.40	8.80	9.63	g
Total Water Volume Collected	52.69	59.01	60.71	57.47	ml
Standard Water Vapor Volume	2.48	2.78	2.86	2.70	scf
Standard Meter Volume	47.2	46.5	46.0	46.6	dscf
Calculated Stack Moisture	4.99	5.64	5.85	5.49	%
Saturated Stack Moisture	100.00	100.00	100.00	100.00	%
Reported Stack Moisture Content	4.99	5.64	5.85	5.49	%
Gas Analysis Data	70-100-70%-7	70-100-70%-8	70-100-70%-9	Average	Units
Carbon Dioxide Content	3.7	5.4	4.1	4.4	%
Oxygen Content	17.1	14.8	16.5	16.1	%
Nitrogen Content	79.2	79.9	79.4	79.5	%
Stack Dry Molecular Weight	29.28	29.45	29.32	29.35	lb/lb-mole
Stack Wet Molecular Weight	28.71	28.80	28.66	28.72	lb/lb-mole
Percent Excess Air	449.0	235.7	369.8	351.5	%
Volumetric Flow Rate Data	70-100-70%-7	70-100-70%-8	70-100-70%-9	Average	Units
Average Stack Gas Velocity	6.74	6.71	6.61	6.69	ft/sec
Stack Cross-Sectional Area	4.79	4.79	4.79	4.79	ft ²
Actual Stack Flow Rate	1,936	1,927	1,900	1,921	acfm
Wet Standard Stack Flow Rate	44	44	45	44	wkscfh
Dry Standard Stack Flow Rate	41,970	41,626	42,465	42,020	dscfh

METHOD 3C - DETERMINATION OF DRY MOLECULAR WEIGHT BY ANALYZER

Plant Name	Norman Facility	Preliminary Date	06/18/14		
Sampling Location	30 ECD	Operator	DG		
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	06/19/14	Run Start Time	09:25	Run Stop Time	10:35
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		%	
01:10	3.7	17.1	0.0	79.2	29.28	1.027	449.0	N/A

Gas Analysis Data								
Run Number	70-100-70%-8		Date	06/19/14	Run Start Time	10:50	Run Stop Time	12:00
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		%	
01:10	5.4	14.8	0.0	79.9	29.45	1.140	235.7	N/A

Gas Analysis Data								
Run Number	70-100-70%-9		Date	06/19/14	Run Start Time	12:20	Run Stop Time	13:30
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		%	
01:10	4.1	16.5	0.0	79.4	29.32	1.071	369.8	N/A

METHOD 4 - DETERMINATION OF MOISTURE CONTENT IN STACK GASES

Plant Name	Norman Facility	Preliminary Date	06/18/14
Sampling Location	30 ECD	Operator	DG
Project #	cei-14-norman.ok-comp#1	Ports Used	2

Moisture Content Data								
Run Number	70-100-70%-7	Date	06/19/14	Start Time	09:25	Stop Time	10:35	
Meter Box Number	SAMP-CP-0023			Meter Cal Factor	(Y)	1.010		
Total Meter Volume	(V _m)	46.960	dcf	Barometric Pressure	(P _b)	29.95	in Hg	
Average Stack Temp	(t _s) _{avg}	930	°F	Stack Static Pressure	(P _{static})	0.00	in H ₂ O	
Average Meter Temp	(t _m) _{avg}	74	°F	Avg Orifice Pressure	(ΔH) _{avg}	1.90	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)	788.00	730.40	570.80	901.50			
Initial Value	(V _i),(W _i)	753.30	721.20	568.80	894.80			
Net Value	(V _n),(W _n)	34.7	9.2	2.0	6.7			
Results								
Total Weight	(W _f)	52.60	g	Water Vol Weighed	(V _{wsg(std)})	2.480	scf	
Std Meter Volume	(V _{m(std)})	47.203	dscf	Sat. Moisture Content	(B _{ws(svp)})	100.00	%	
Calc Moisture Content	(B _{ws(calc)})	4.99	%	Final Moisture Content	(B _{ws})	4.99	%	

Moisture Content Data								
Run Number	70-100-70%-8	Date	06/19/14	Start Time	10:50	Stop Time	12:00	
Meter Box Number	SAMP-CP-0023			Meter Cal Factor	(Y)	1.010		
Total Meter Volume	(V _m)	46.180	dcf	Barometric Pressure	(P _b)	29.96	in Hg	
Average Stack Temp	(t _s) _{avg}	926	°F	Stack Static Pressure	(P _{static})	0.00	in H ₂ O	
Average Meter Temp	(t _m) _{avg}	73	°F	Avg Orifice Pressure	(ΔH) _{avg}	1.90	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)	720.80	720.00	573.10	928.60			
Initial Value	(V _i),(W _i)	686.80	710.80	570.80	915.20			
Net Value	(V _n),(W _n)	34.0	9.2	2.3	13.4			
Results								
Total Weight	(W _f)	58.90	g	Water Vol Weighed	(V _{wsg(std)})	2.777	scf	
Std Meter Volume	(V _{m(std)})	46.464	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	70-100-70%-9	Date	06/19/14	Start Time	12:20	Stop Time	13:30	
Meter Box Number	SAMP-CP-0023			Meter Cal Factor	(Y)	1.010		
Total Meter Volume	(V _m)	46.100	dcf	Barometric Pressure	(P _b)	29.99	in Hg	
Average Stack Temp	(t _s) _{avg}	878	°F	Stack Static Pressure	(P _{static})	0.00	in H ₂ O	
Average Meter Temp	(t _m) _{avg}	78	°F	Avg Orifice Pressure	(ΔH) _{avg}	1.90	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)	764.80	726.90	574.00	937.40			
Initial Value	(V _i),(W _i)	720.80	720.00	573.10	928.60			
Net Value	(V _n),(W _n)	44.0	6.9	0.9	8.8			
Results								
Total Weight	(W _f)	60.60	g	Water Vol Weighed	(V _{wsg(std)})	2.857	scf	
Std Meter Volume	(V _{m(std)})	46.016	dscf	Sat. Moisture Content	(B _{ws(svp)})	100.00	%	
Calc Moisture Content	(B _{ws(calc)})	5.85	%	Final Moisture Content	(B _{ws})	5.85	%	

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

Plant Name	Norman Facility
Sampling Location	30 ECD
Project #	cel-14-norman.ok-comp#1

Date	06/19/14
Operator	DG
Run Number	70-100-70%-7

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Coefficient	(C _p)	0.819	
Average Stack Temp	(t _s)	929.7	F
Average Meter Temp	(t _m)	73.5	
Orifice Meter Coefficient	(ΔH@)	1.877	in H ₂ O
Square Root ΔP	(ΔP ^{1/2} _{avg})	0.08	in H ₂ O
Stack Moisture Content	(B _{ws})	4.99	%
Stack Dry Molecular Weight	(M _d)	29.28	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
< 3.0	Pitot	Pre (+)	0.25	in H ₂ O for	30.0
		Pre (-)	0.25	in H ₂ O for	30.0
		Post (+)	0.20	in H ₂ O for	30.0
		Post (-)	0.15	in H ₂ O for	30.0

Sampling Equipment		
Meter Box Number	SAMP-CP-0023	
Meter Cal Factor	(Y)	1.010
Nozzle Number		
Average Nozzle Diameter	(D _{no})	
Suggested Nozzle Diameter	(D _n)	0.4951
Probe Number	SAMP-SP-0001	
Probe Length	60	
Liner Material	inconel	
Sample Case / Oven Number	SAMP-BC-0012	
Impinger Case Number	SAMP-BC-0002	

Nozzle Measurements			
Pre			PASS
Post			PASS

Run Time		
Start	09:25	End 10:35

Weights	Imp 1	Imp 2	Imp 3	Imp 4	Imp 5	Imp 6	Imp 7	Imp 8
Pre	753.3	721.2	568.8	894.8				
Post	788.0	730.4	570.8	901.5				

Pressures			
Barometric Pressure	(P _b)	29.95	in Hg
Stack Static Pressure	(P _{static})	0.00	in H ₂ O
Absolute Stack Pressure	(P _a)	29.95	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	600.460	0.005	1.877	1.90	893	250		57			74	74	0.0	0.07	6.21	1.898		45.556
A-2	2.7	00:02:43	602.350	0.005	1.877	1.90	912	250		57			74	74	0.0	0.07	6.25	3.806		45.676
A-3	5.4	00:05:25	604.250	0.005	1.877	1.90	905	250		57			74	74	0.0	0.07	6.24	5.664		45.315
A-4	8.1	00:08:07	606.100	0.005	1.877	1.90	899	250		56			74	74	0.0	0.07	6.22	7.683		46.098
A-5	10.8	00:10:50	608.110	0.010	1.877	1.90	1002	250		57			74	74	0.0	0.10	9.13	9.591		46.038
A-6	13.5	00:13:33	610.010	0.005	1.877	1.90	1056	250		59			74	74	0.0	0.07	6.57	12.233		48.930
A-7	16.3	00:16:15	612.640	0.010	1.877	1.90	1078	250		60			74	74	0.0	0.10	9.36	13.699		46.968
A-8	19.0	00:18:58	614.100	0.005	1.877	1.90	1034	250		62			74	74	0.0	0.07	6.53	15.396		46.188
A-9	21.7	00:21:40	615.790	0.005	1.877	1.90	953	250		60			74	74	0.0	0.07	6.35	17.334		46.225
A-10	24.4	00:24:22	617.720	0.005	1.877	1.90	915	250		58			74	74	0.0	0.07	6.26	19.283		46.279
A-11	27.1	00:27:05	619.660	0.005	1.877	1.90	875	250		56			74	74	0.0	0.07	6.17	21.221		46.301
A-12	29.8	00:29:47	621.590	0.005	1.877	1.90	930	250		54			74	74	0.0	0.07	6.29	23.230		46.460
B-1	32.5	00:32:30	623.590	0.005	1.877	1.90	885	250		52			74	74	0.0	0.07	6.19	25.188		46.501
B-2	35.2	00:35:12	625.540	0.005	1.877	1.90	877	250		50			73	73	0.0	0.07	6.17	27.251		46.716
B-3	37.9	00:37:55	627.590	0.005	1.877	1.90	982	250		49			73	73	0.0	0.07	6.41	29.183		46.693
B-4	40.6	00:40:37	629.510	0.005	1.877	1.90	990	250		49			73	73	0.0	0.07	6.43	31.004		46.506
B-5	43.3	00:43:20	631.320	0.005	1.877	1.90	1016	250		48			73	73	0.0	0.07	6.49	32.976		46.555
B-6	46.0	00:46:03	633.280	0.005	1.877	1.90	1021	250		48			73	73	0.0	0.07	6.50	34.918		46.558
B-7	48.8	00:48:45	635.210	0.010	1.877	1.90	1026	250		48			73	73	0.0	0.10	9.20	36.931		46.649
B-8	51.5	00:51:28	637.210	0.010	1.877	1.90	1069	250		49			73	73	0.0	0.10	9.34	38.913		46.695
B-9	54.2	00:54:10	639.180	0.005	1.877	1.90	918	250		49			73	73	0.0	0.07	6.27	41.076		46.944
B-10	56.9	00:56:53	641.330	0.005	1.877	1.90	751	250		49			73	73	0.0	0.07	5.88	43.139		47.061
B-11	59.6	00:59:35	643.380	0.005	1.877	1.90	715	250		49			73	73	0.0	0.07	5.79	45.151		47.114
B-12	62.3	01:02:18	645.380	0.005	1.877	1.90	610	250		49			73	73	0.0	0.07	5.52	47.204		47.204
Last Pt	65.0	01:05:00	647.420																	
Final Val	65.0	01:05:00	647.420												Max Vac	0.0	Final Values	47.204		
Average Values				0.01		1.90	930	250		53			74	74		0.08	6.74			
													74							

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

Plant Name	Norman Facility
Sampling Location	30 ECD
Project #	cel-14-norman.ok-comp#1

Date	06/19/14
Operator	DG
Run Number	70-100-70%-8

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	30.0
		Pre (-)	0.20	in H ₂ O for	30.0
		Post (+)	0.20	in H ₂ O for	30.0
		Post (-)	0.20	in H ₂ O for	30.0

Nozzle Measurements				
Pre				PASS
Post				PASS

Run Time			
Start	10:50	End	12:00

Weights	Imp 1	Imp 2	Imp 3	Imp 4	Imp 5	Imp 6	Imp 7	Imp 8
Pre	686.8	710.8	570.8	915.2				
Post	720.8	720.0	573.1	928.6				

Sampling Equipment		
Meter Box Number	SAMP-CP-0023	
Meter Cal Factor	(Y)	1.010
Nozzle Number		
Average Nozzle Diameter	(D _{no})	in
Suggested Nozzle Diameter	(D _n)	0.4874 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-0002	

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Coefficient	(C _p)	0.819	
Average Stack Temp	(t _s)	925.8	F
Average Meter Temp	(t _m)	73.2	
Orifice Meter Coefficient	(ΔH@)	1.877	in H ₂ O
Square Root ΔP	(ΔP ^{1/2} _{avg})	0.08	in H ₂ O
Stack Moisture Content	(B _{wt})	5.64	%
Stack Dry Molecular Weight	(M _d)	29.45	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)	30.10	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	650.690	0.005	1.877	1.90	859	250		61			72	72	0.0	0.07	6.12	1.956		46.952
A-2	2.7	00:02:43	652.630	0.005	1.877	1.90	910	250		55			73	73	0.0	0.07	6.24	3.496		41.956
A-3	5.4	00:05:25	654.160	0.010	1.877	1.90	968	250		51			73	73	0.0	0.10	9.01	5.721		45.766
A-4	8.1	00:08:07	656.370	0.005	1.877	1.90	1012	250		51			73	73	0.0	0.07	6.47	7.583		45.497
A-5	10.8	00:10:50	658.220	0.005	1.877	1.90	1093	250		50			73	73	0.0	0.07	6.64	9.445		45.336
A-6	13.5	00:13:33	660.070	0.010	1.877	1.90	1106	250		51			73	73	0.0	0.10	9.43	11.307		45.228
A-7	16.3	00:16:15	661.920	0.005	1.877	1.90	1112	250		51			73	73	0.0	0.07	6.68	13.219		45.324
A-8	19.0	00:18:58	663.820	0.005	1.877	1.90	1103	250		52			73	73	0.0	0.07	6.66	15.152		45.456
A-9	21.7	00:21:40	665.740	0.005	1.877	1.90	767	250		52			73	73	0.0	0.07	5.90	17.145		45.720
A-10	24.4	00:24:22	667.720	0.005	1.877	1.90	631	250		52			73	73	0.0	0.07	5.57	19.108		45.858
A-11	27.1	00:27:05	669.670	0.005	1.877	1.90	605	250		53			73	73	0.0	0.07	5.50	21.070		45.972
A-12	29.8	00:29:47	671.620	0.005	1.877	1.90	545	250		53			73	73	0.0	0.07	5.34	22.983		45.966
B-1	32.5	00:32:30	673.520	0.005	1.877	1.90	683	250		56			73	73	0.0	0.07	5.70	24.996		46.146
B-2	35.2	00:35:12	675.520	0.005	1.877	1.90	920	250		55			73	73	0.0	0.07	6.26	27.009		46.301
B-3	37.9	00:37:55	677.520	0.005	1.877	1.90	1035	250		55			73	73	0.0	0.07	6.52	28.881		46.210
B-4	40.6	00:40:37	679.380	0.005	1.877	1.90	1083	250		55			73	73	0.0	0.07	6.62	30.784		46.175
B-5	43.3	00:43:20	681.270	0.005	1.877	1.90	1083	250		55			73	73	0.0	0.07	6.62	32.625		46.059
B-6	46.0	00:46:03	683.100	0.005	1.877	1.90	1097	250		56			73	73	0.0	0.07	6.65	34.508		46.010
B-7	48.8	00:48:45	684.970	0.010	1.877	1.90	1110	250		57			74	74	0.0	0.10	9.44	36.467		46.063
B-8	51.5	00:51:28	686.920	0.005	1.877	1.90	1083	250		57			74	74	0.0	0.07	6.62	38.446		46.135
B-9	54.2	00:54:10	688.890	0.010	1.877	1.90	970	250		58			74	74	0.0	0.10	9.01	40.485		46.269
B-10	56.9	00:56:53	690.920	0.005	1.877	1.90	871	250		59			74	74	0.0	0.07	6.15	42.394		46.248
B-11	59.6	00:59:35	692.820	0.005	1.877	1.90	946	250		60			74	74	0.0	0.07	6.32	44.444		46.376
B-12	62.3	01:02:18	694.860	0.005	1.877	1.90	627	250		61			74	74	0.0	0.07	5.56	46.463		46.463
Last Pt	65.0	01:05:00	696.870																	
Final Val	65.0	01:05:00	696.870											Max Vac	0.0		Final Values	46.463		
Average Values				0.01		1.90	926	250		55			73	73		0.08	6.71			
													73							

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

Plant Name		Norman Facility				Date		06/19/14				Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Sampling Location		30 ECD				Operator		DG							
Project #		cel-14-norman.ok-comp#1				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
Pitot	Pre (+)	0.25	in H ₂ O for	30.0	sec
	Pre (-)	0.25	in H ₂ O for	30.0	sec
	Post (+)	0.15	in H ₂ O for	30.0	sec
	Post (-)	0.20	in H ₂ O for	30.0	sec

Nozzle Measurements					
Pre				PASS	
Post				PASS	

Run Time			
Start	12:20	End	13:30

Weights	Imp 1	Imp 2	Imp 3	Imp 4	Imp 5	Imp 6	Imp 7	Imp 8
Pre	720.8	720.0	573.1	928.6				
Post	764.8	726.9	574.0	937.4				

Meter Box Number		SAMP-CP-0023	
Meter Cal Factor		(Y)	1.010
Nozzle Number			
Average Nozzle Diameter		(D _{na})	in
Suggested Nozzle Diameter		(D _n)	0.4767 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-0002	

Pressures			
Barometric Pressure		(P _b)	29.99 in Hg
Stack Static Pressure		(P _{static})	0.00 in H ₂ O
Absolute Stack Pressure		(P _a)	29.99 in Hg
Absolute Meter Pressure		(P _m)	30.13 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 _{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	700.540	0.005	1.877	1.90	882	250		61			75	75	0.0	0.07	6.19	2.168		52.036
A-2	2.7	00:02:43	702.700	0.005	1.877	1.90	924	250		47			75	75	0.0	0.07	6.28	3.854		46.254
A-3	5.4	00:05:25	704.380	0.010	1.877	1.90	909	250		45			75	75	0.0	0.10	8.84	5.782		46.254
A-4	8.1	00:08:07	706.300	0.005	1.877	1.90	908	250		45			75	75	0.0	0.07	6.25	7.659		45.953
A-5	10.8	00:10:50	708.170	0.005	1.877	1.90	972	250		44			75	75	0.0	0.07	6.39	9.516		45.676
A-6	13.5	00:13:33	710.020	0.010	1.877	1.90	1063	250		44			76	76	0.0	0.10	9.32	11.800		47.200
A-7	16.3	00:16:15	712.300	0.005	1.877	1.90	1097	250		44			76	76	0.0	0.07	6.66	13.483		46.228
A-8	19.0	00:18:58	713.980	0.005	1.877	1.90	950	250		44			77	77	0.0	0.07	6.34	15.413		46.240
A-9	21.7	00:21:40	715.910	0.005	1.877	1.90	912	250		44			78	78	0.0	0.07	6.26	17.070		45.521
A-10	24.4	00:24:22	717.570	0.005	1.877	1.90	903	250		44			78	78	0.0	0.07	6.23	19.017		45.640
A-11	27.1	00:27:05	719.520	0.005	1.877	1.90	744	250		44			78	78	0.0	0.07	5.86	21.033		45.890
A-12	29.8	00:29:47	721.540	0.005	1.877	1.90	566	250		44			78	78	0.0	0.07	5.41	23.169		46.338
B-1	32.5	00:32:30	723.680	0.005	1.877	1.90	641	250		45			78	78	0.0	0.07	5.60	24.976		46.109
B-2	35.2	00:35:12	725.490	0.005	1.877	1.90	612	250		45			79	79	0.0	0.07	5.53	26.988		46.266
B-3	37.9	00:37:55	727.510	0.005	1.877	1.90	814	250		46			79	79	0.0	0.07	6.03	28.702		45.923
B-4	40.6	00:40:37	729.230	0.005	1.877	1.90	925	250		45			79	79	0.0	0.07	6.28	30.575		45.863
B-5	43.3	00:43:20	731.110	0.005	1.877	1.90	1043	250		44			79	79	0.0	0.07	6.55	32.448		45.809
B-6	46.0	00:46:03	732.990	0.005	1.877	1.90	1062	250		44			79	79	0.0	0.07	6.59	34.301		45.735
B-7	48.8	00:48:45	734.850	0.010	1.877	1.90	1094	250		44			80	80	0.0	0.10	9.41	36.251		45.790
B-8	51.5	00:51:28	736.810	0.010	1.877	1.90	1089	250		45			80	80	0.0	0.10	9.40	38.041		45.649
B-9	54.2	00:54:10	738.610	0.005	1.877	1.90	949	250		45			80	80	0.0	0.07	6.34	40.010		45.725
B-10	56.9	00:56:53	740.590	0.005	1.877	1.90	811	250		45			81	81	0.0	0.07	6.02	42.045		45.867
B-11	59.6	00:59:35	742.640	0.005	1.877	1.90	639	250		45			81	81	0.0	0.07	5.60	44.030		45.944
B-12	62.3	01:02:18	744.640	0.005	1.877	1.90	552	250		45			81	81	0.0	0.07	5.37	46.015		46.015
Last Pt	65.0	01:05:00	746.640																	
Final Val	65.0	01:05:00	746.640											Max Vac	0.0		Final Values	46.015		
Average Values						0.01		1.90	878	250		45		78	78		0.08	6.61		
78																				

CIMARRON ENERGY, INC.

June 19, 2014

30 ECD

Norman Facility

Unit Data

Meas. Stack Moisture	5.0	%
Stack Exhaust Flow (M2)	42,099	SCFH

Weather Data

Barometric Pressure	29.95	in. Hg
Relative Humidity	79	%
Ambient Temperature	75	°F
Specific Humidity	0.014705	lb H ₂ O / lb air

70-100-70 Load, Run - 30 ECD R7

	Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmvd)	THC (ppmwv)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
A1	06/19/14 09:25:22	10380	15.35	1.61	0.12	3.91	18.93	68.50	442.00
	06/19/14 09:25:52	10410	15.94	1.68	0.17	3.57	18.93	68.50	442.00
	06/19/14 09:26:22	10440	15.82	1.71	0.15	3.54	18.93	68.50	465.00
	06/19/14 09:26:52	10470	15.88	1.74	0.20	3.59	18.93	68.50	465.00
	06/19/14 09:27:22	10500	15.90	1.63	0.16	3.42	19.24	68.40	466.00
	06/19/14 09:27:52	10530	15.83	1.67	0.18	3.57	19.24	68.40	466.00
	06/19/14 09:28:22	10560	16.08	1.63	0.19	3.39	18.74	68.30	442.00
	06/19/14 09:28:52	10590	15.70	1.70	0.15	3.58	18.74	68.30	442.00
	06/19/14 09:29:22	10620	15.26	1.64	0.13	4.00	19.02	68.30	454.00
	06/19/14 09:29:52	10650	15.65	1.51	0.17	3.75	19.02	68.30	454.00
	06/19/14 09:30:22	10680	15.56	1.37	0.16	3.71	19.15	68.20	442.00
	06/19/14 09:30:52	10710	15.56	1.53	0.24	3.83	19.15	68.20	442.00
	06/19/14 09:31:22	10740	15.47	1.58	0.18	3.74	24.80	68.20	507.00
	06/19/14 09:31:52	10770	14.64	1.45	0.08	4.39	24.80	68.20	507.00
	06/19/14 09:32:22	10800	14.49	1.61	0.10	4.55	33.96	68.10	626.00
	06/19/14 09:32:52	10830	13.80	1.06	0.07	4.94	33.96	68.10	626.00
	06/19/14 09:33:22	10860	13.64	0.96	0.05	5.09	36.07	68.10	617.00
	06/19/14 09:33:52	10890	13.67	0.90	0.07	5.16	36.07	68.10	617.00
	06/19/14 09:34:22	10920	13.96	1.03	0.07	4.91	35.46	68.00	617.00
	06/19/14 09:34:52	10950	13.58	1.06	0.04	5.17	35.46	68.00	617.00
	06/19/14 09:35:22	10980	13.59	1.06	0.02	5.14	36.23	68.00	618.00
	06/19/14 09:35:52	11010	13.72	0.94	0.03	5.10	36.23	68.00	618.00
	06/19/14 09:36:22	11040	13.58	0.93	0.05	5.21	35.60	67.90	629.00
	06/19/14 09:36:52	11070	13.65	0.86	0.03	5.07	35.60	67.90	629.00
	06/19/14 09:37:22	11100	13.97	0.97	0.06	4.94	35.73	67.80	629.00
	06/19/14 09:37:52	11130	13.98	1.11	0.09	4.92	35.73	67.80	629.00
	06/19/14 09:38:22	11160	13.76	1.11	0.09	5.02	36.01	67.80	630.00
	06/19/14 09:38:52	11190	14.10	1.12	0.08	4.88	36.01	67.80	630.00
	06/19/14 09:39:22	11220	14.76	1.89	0.15	4.39	35.38	67.70	617.00
	06/19/14 09:39:52	11250	14.84	1.27	0.14	4.30	35.38	67.70	617.00
	06/19/14 09:40:22	11280	14.63	1.20	0.15	4.41	36.29	67.70	618.00
	06/19/14 09:40:52	11310	14.99	1.34	0.15	4.17	36.29	67.70	618.00
	06/19/14 09:41:22	11340	14.29	1.25	0.10	4.67	33.96	67.70	603.00
	06/19/14 09:41:52	11370	14.41	1.17	0.09	4.62	33.96	67.70	603.00
	06/19/14 09:42:22	11400	14.82	1.53	0.15	4.34	24.94	67.70	520.00
	06/19/14 09:42:52	11430	14.96	1.37	0.11	4.25	24.94	67.70	520.00
	06/19/14 09:43:22	11460	15.90	1.62	0.22	3.65	18.79	67.60	454.00
	06/19/14 09:43:52	11490	16.14	1.69	0.28	3.30	18.79	67.60	454.00
	06/19/14 09:44:22	11520	15.81	1.64	0.23	3.52	19.74	67.60	455.00
	06/19/14 09:44:52	11550	15.77	1.60	0.18	3.60	19.74	67.60	455.00
	06/19/14 09:45:22	11580	15.65	1.53	0.16	3.66	18.93	67.60	454.00
	06/19/14 09:45:52	11610	15.90	1.68	0.21	3.48	18.93	67.60	454.00
	06/19/14 09:46:22	11640	15.28	1.64	0.15	3.92	19.10	67.60	454.00
	06/19/14 09:46:52	11670	15.11	1.76	0.12	4.05	19.10	67.60	454.00
	06/19/14 09:47:22	11700	15.49	2.02	0.18	3.85	18.57	67.60	431.00
	06/19/14 09:47:52	11730	15.22	1.95	0.18	4.00	18.57	67.60	431.00
A2	06/19/14 09:48:22	11760	15.55	2.16	0.20	3.76	18.96	67.60	454.00
	06/19/14 09:48:52	11790	15.24	2.03	0.13	4.00	18.96	67.60	454.00
	06/19/14 09:49:22	11820	15.22	2.30	0.13	4.01	22.64	67.70	482.00
	06/19/14 09:49:52	11850	14.74	2.05	0.16	4.37	22.64	67.70	482.00
	06/19/14 09:50:22	11880	14.37	2.95	0.09	4.49	32.33	67.60	589.00
	06/19/14 09:50:52	11910	13.89	2.62	0.06	4.94	32.33	67.60	589.00
	06/19/14 09:51:22	11940	13.83	2.09	0.09	5.04	36.12	67.60	630.00
	06/19/14 09:51:52	11970	13.74	1.74	0.03	5.06	36.12	67.60	630.00
	06/19/14 09:52:22	12000	13.72	1.81	0.02	5.10	35.87	67.60	618.00
	06/19/14 09:52:52	12030	13.85	1.80	0.03	5.03	35.87	67.60	618.00
	06/19/14 09:53:22	12060	13.92	2.20	0.02	4.94	35.60	67.50	617.00
	06/19/14 09:53:52	12090	13.79	1.90	0.04	5.04	35.60	67.50	617.00
	06/19/14 09:54:22	12120	13.92	2.08	0.03	4.98	36.51	67.50	619.00
	06/19/14 09:54:52	12150	13.88	2.22	0.07	4.97	36.51	67.50	619.00

CIMARRON ENERGY, INC.

June 19, 2014

30 ECD

Norman Facility

Unit Data

Meas. Stack Moisture	5.0	%
Stack Exhaust Flow (M2)	42,099	SCFH

Weather Data

Barometric Pressure	29.95	in. Hg
Relative Humidity	79	%
Ambient Temperature	75	°F
Specific Humidity	0.014705	lb H ₂ O / lb air

70-100-70 Load, Run - 30 ECD R7

	Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmvd)	THC (ppmwv)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
	06/19/14 09:55:22	12180	13.81	1.83	0.06	5.02	35.07	67.50	617.00
	06/19/14 09:55:52	12210	13.87	1.93	0.04	5.02	35.07	67.50	617.00
	06/19/14 09:56:22	12240	13.77	1.99	0.04	5.02	35.96	67.40	618.00
	06/19/14 09:56:52	12270	13.75	1.62	0.01	5.09	35.96	67.40	618.00
	06/19/14 09:57:22	12300	13.68	1.74	0.02	5.10	35.76	67.50	618.00
	06/19/14 09:57:52	12330	13.72	1.54	0.02	5.12	35.76	67.50	618.00
	06/19/14 09:58:22	12360	13.69	1.70	0.01	5.11	35.35	67.40	629.00
	06/19/14 09:58:52	12390	13.84	1.66	0.01	5.02	35.35	67.40	629.00
	06/19/14 09:59:22	12420	13.80	1.87	0.02	5.05	31.97	67.50	577.00
	06/19/14 09:59:52	12450	14.24	2.25	0.05	4.76	31.97	67.50	577.00
	06/19/14 10:00:22	12480	14.74	3.43	0.11	4.42	20.07	67.40	467.00
	06/19/14 10:00:52	12510	15.24	3.33	0.11	4.07	20.07	67.40	467.00
	06/19/14 10:01:22	12540	15.08	2.59	0.10	4.14	19.43	67.40	455.00
	06/19/14 10:01:52	12570	15.59	2.35	0.13	3.79	19.43	67.40	455.00
	06/19/14 10:02:22	12600	15.48	1.96	0.13	3.82	19.15	67.50	466.00
	06/19/14 10:02:52	12630	15.33	2.00	0.13	3.93	19.15	67.50	466.00
	06/19/14 10:03:22	12660	15.63	2.07	0.10	3.73	21.37	67.50	480.00
	06/19/14 10:03:52	12690	15.16	2.36	0.05	3.99	21.37	67.50	480.00
	06/19/14 10:04:22	12720	14.88	2.75	0.04	4.23	26.49	67.50	534.00
	06/19/14 10:04:52	12750	14.19	2.69	0.04	4.72	26.49	67.50	534.00
	06/19/14 10:05:22	12780	13.80	3.98	0.05	5.01	35.51	67.50	617.00
	06/19/14 10:05:52	12810	13.73	2.59	0.03	5.09	35.51	67.50	617.00
	06/19/14 10:06:22	12840	13.69	1.53	0.03	5.11	35.76	67.50	630.00
	06/19/14 10:06:52	12870	13.67	1.61	0.01	5.12	35.76	67.50	630.00
	06/19/14 10:07:22	12900	13.58	1.60	0.01	5.17	35.24	67.50	605.00
	06/19/14 10:07:52	12930	13.67	1.49	0.00	5.13	35.24	67.50	605.00
	06/19/14 10:08:22	12960	13.75	1.83	-0.01	5.07	34.99	67.50	605.00
	06/19/14 10:08:52	12990	13.50	1.65	-0.01	5.21	34.99	67.50	605.00
	06/19/14 10:09:22	13020	13.75	1.46	-0.02	5.12	35.65	67.50	618.00
	06/19/14 10:09:52	13050	13.50	1.43	0.01	5.24	35.65	67.50	618.00
	06/19/14 10:10:22	13080	13.85	1.50	0.01	5.01	34.99	67.50	617.00
	06/19/14 10:10:52	13110	13.81	1.72	0.00	5.02	34.99	67.50	617.00
A3	06/19/14 10:11:22	13140	13.63	1.86	0.01	5.11	35.90	67.50	606.00
	06/19/14 10:11:52	13170	13.68	1.65	0.00	5.14	35.90	67.50	606.00
	06/19/14 10:12:22	13200	13.48	1.45	0.00	5.26	34.60	67.50	604.00
	06/19/14 10:12:52	13230	13.79	1.66	-0.02	5.06	34.60	67.50	604.00
	06/19/14 10:13:22	13260	13.58	1.70	-0.03	5.19	36.01	67.60	618.00
	06/19/14 10:13:52	13290	13.71	1.51	0.01	5.09	36.01	67.60	618.00
	06/19/14 10:14:22	13320	13.62	1.74	0.02	5.17	35.10	67.60	617.00
	06/19/14 10:14:52	13350	13.75	1.78	0.03	5.08	35.10	67.60	617.00
	06/19/14 10:15:22	13380	13.82	1.83	0.02	5.02	34.05	67.60	603.00
	06/19/14 10:15:52	13410	13.90	1.70	0.03	5.01	34.05	67.60	603.00
	06/19/14 10:16:22	13440	14.31	2.42	0.04	4.71	24.75	67.70	520.00
	06/19/14 10:16:52	13470	14.70	3.47	0.06	4.44	24.75	67.70	520.00
	06/19/14 10:17:22	13500	14.94	2.80	0.07	4.28	19.38	67.70	466.00
	06/19/14 10:17:52	13530	15.09	2.27	0.11	4.16	19.38	67.70	466.00
	06/19/14 10:18:22	13560	15.16	1.97	0.09	4.04	19.10	67.80	454.00
	06/19/14 10:18:52	13590	15.08	1.78	0.08	4.16	19.10	67.80	454.00
	06/19/14 10:19:22	13620	15.17	1.99	0.09	4.04	18.57	67.90	430.00
	06/19/14 10:19:52	13650	14.91	2.22	0.05	4.23	18.57	67.90	430.00
	06/19/14 10:20:22	13680	15.04	1.98	0.07	4.15	18.96	67.90	466.00
	06/19/14 10:20:52	13710	14.80	1.96	0.06	4.33	18.96	67.90	466.00
	06/19/14 10:21:22	13740	14.94	2.22	0.08	4.24	20.65	68.00	456.00
	06/19/14 10:21:52	13770	14.73	2.30	0.12	4.37	20.65	68.00	456.00
	06/19/14 10:22:22	13800	14.36	2.66	0.08	4.56	28.48	68.10	547.00
	06/19/14 10:22:52	13830	13.80	2.77	0.02	5.00	28.48	68.10	547.00
	06/19/14 10:23:22	13860	13.52	2.98	0.02	5.20	36.04	68.20	617.00
	06/19/14 10:23:52	13890	13.66	2.52	0.02	5.15	36.04	68.20	617.00
	06/19/14 10:24:22	13920	13.60	2.88	0.02	5.16	35.65	68.20	605.00
	06/19/14 10:24:52	13950	13.57	2.93	0.02	5.16	35.65	68.20	605.00

CIMARRON ENERGY, INC.

June 19, 2014

30 ECD

Norman Facility

Unit Data

Meas. Stack Moisture	5.0	%
Stack Exhaust Flow (M2)	42,099	SCFH

Weather Data

Barometric Pressure	29.95	in. Hg
Relative Humidity	79	%
Ambient Temperature	75	°F
Specific Humidity	0.014705	lb H ₂ O / lb air

70-100-70 Load, Run - 30 ECD R7

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmvd)	THC (ppmww)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
06/19/14 10:25:22	13980	13.48	2.52	0.02	5.26	36.18	68.20	630.00
06/19/14 10:25:52	14010	13.64	2.87	0.04	5.14	36.18	68.20	630.00
06/19/14 10:26:22	14040	13.56	2.57	0.03	5.19	36.15	68.20	629.00
06/19/14 10:26:52	14070	13.73	2.22	0.04	5.10	36.15	68.20	629.00
06/19/14 10:27:22	14100	13.52	2.25	0.03	5.23	35.62	68.20	617.00
06/19/14 10:27:52	14130	13.66	2.05	0.03	5.12	35.62	68.20	617.00
06/19/14 10:28:22	14160	13.74	2.31	0.04	5.10	35.87	68.30	629.00
06/19/14 10:28:52	14190	13.60	2.18	0.01	5.17	35.87	68.30	629.00
06/19/14 10:29:22	14220	13.70	2.05	0.02	5.08	35.35	68.30	616.00
06/19/14 10:29:52	14250	13.72	2.07	0.06	5.08	35.35	68.30	616.00
06/19/14 10:30:22	14280	13.65	2.59	0.05	5.13	35.85	68.40	629.00
06/19/14 10:30:52	14310	13.78	2.15	0.04	5.06	35.85	68.40	629.00
06/19/14 10:31:22	14340	13.78	2.20	0.06	5.07	35.98	68.40	629.00
06/19/14 10:31:52	14370	13.72	2.13	0.05	5.06	35.98	68.40	629.00
06/19/14 10:32:22	14400	13.71	2.26	0.06	5.12	28.51	68.40	547.00
06/19/14 10:32:52	14430	13.70	2.99	0.06	5.08	28.51	68.40	547.00
06/19/14 10:33:22	14460	13.97	3.07	0.06	4.95	19.21	68.50	442.00
06/19/14 10:33:52	14490	13.90	2.85	0.03	5.02	19.21	68.50	442.00
06/19/14 10:34:22	14520	14.47	3.27	0.06	4.60	16.69	68.60	405.00
06/19/14 10:34:52	14550	14.92	3.38	0.25	4.29	16.69	68.60	405.00
06/19/14 10:35:22	14580	15.28	5.64	0.25	4.01	17.47	68.70	417.00
RAW AVERAGE		14.39	1.97	0.08	4.61	29.02	67.84	552.38

Bias	Serial Number:	O ₂ (%)	CO (ppmvd)	THC (ppmww)	CO ₂ (%)	Press. Trans 0 (in. H ₂ O)	Temp. Trans. 0 (°F)	F-Flow Trans. 0 (SCFH)
	INST-22-0005	INST-22-0005	INST-CO-0034	INST-VC-0006	INST-22-0005			
	Initial Zero	0.02	-0.02	0.01	0.05			
	Final Zero	0.04	0.03	0.02	0.01			
	Avg. Zero	0.03	0.01	0.02	0.03			
	Initial UpScale	12.11	4.97	2.99	9.26			
	Final UpScale	12.12	5.02	3.06	9.25			
	Avg. UpScale	12.12	5.00	3.03	9.26			
	Upscale Cal Gas	12.25	5.12	3.04	9.33			

EMISSIONS DATA	O₂	CO	THC	CO₂
Corrected Raw Average (ppm/% dry basis)	14.56	2.02	0.00	4.63
Corrected Raw Average (ppm/% wet basis)	13.83	1.92	0.00	4.40
Emission Rate (lb/hr)	N/A	0.01	0.00	N/A

CIMARRON ENERGY, INC.
30 ECD
Norman Facility

Unit Data

Meas. Stack Moisture	5.6	%
Stack Exhaust Flow (M2)	41,626	SCFH

Weather Data

Barometric Pressure	29.96	in. Hg
Relative Humidity	68	%
Ambient Temperature	80	°F
Specific Humidity	0.014933	lb H ₂ O / lb air

70-100-70 Load, Run - 30 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	06/19/14 10:50:22	15480	15.06	1.99	0.10	4.12	17.38	69.60	416.00
	06/19/14 10:50:52	15510	15.04	2.84	0.13	4.18	17.38	69.60	416.00
	06/19/14 10:51:22	15540	15.11	3.17	0.13	4.09	17.11	69.60	428.00
	06/19/14 10:51:52	15570	14.97	2.80	0.08	4.22	17.11	69.60	428.00
	06/19/14 10:52:22	15600	14.94	2.12	0.11	4.24	17.36	69.70	428.00
	06/19/14 10:52:52	15630	15.10	2.43	0.12	4.16	17.36	69.70	428.00
	06/19/14 10:53:22	15660	15.10	2.46	0.09	4.09	17.36	69.70	428.00
	06/19/14 10:53:52	15690	14.98	2.25	0.14	4.19	17.36	69.70	428.00
	06/19/14 10:54:22	15720	14.94	2.45	0.13	4.23	17.47	69.70	428.00
	06/19/14 10:54:52	15750	15.05	2.15	0.12	4.16	17.47	69.70	428.00
	06/19/14 10:55:22	15780	14.99	1.47	0.12	4.20	20.34	69.70	478.00
	06/19/14 10:55:52	15810	14.33	1.43	0.07	4.60	20.34	69.70	478.00
	06/19/14 10:56:22	15840	14.34	1.56	0.06	4.63	26.88	69.80	532.00
	06/19/14 10:56:52	15870	13.84	1.72	0.07	5.05	26.88	69.80	532.00
	06/19/14 10:57:22	15900	14.04	2.04	0.07	4.81	34.32	69.80	601.00
	06/19/14 10:57:52	15930	13.37	1.94	0.05	5.31	34.32	69.80	601.00
	06/19/14 10:58:22	15960	13.34	1.12	0.03	5.37	36.79	69.80	628.00
	06/19/14 10:58:52	15990	13.34	1.09	0.05	5.35	36.79	69.80	628.00
	06/19/14 10:59:22	16020	13.40	1.32	0.08	5.34	36.90	69.80	629.00
	06/19/14 10:59:52	16050	13.46	1.33	0.02	5.29	36.90	69.80	629.00
	06/19/14 11:00:22	16080	13.40	1.42	-0.01	5.30	37.40	69.90	629.00
	06/19/14 11:00:52	16110	13.37	1.40	0.04	5.33	37.40	69.90	629.00
	06/19/14 11:01:22	16140	13.34	1.27	0.06	5.34	37.78	69.90	630.00
	06/19/14 11:01:52	16170	13.21	1.10	0.01	5.46	37.78	69.90	630.00
	06/19/14 11:02:22	16200	13.37	0.95	0.03	5.38	36.45	69.90	616.00
	06/19/14 11:02:52	16230	13.41	1.36	0.03	5.29	36.45	69.90	616.00
	06/19/14 11:03:22	16260	13.37	1.59	0.03	5.32	36.95	69.90	629.00
	06/19/14 11:03:52	16290	13.35	1.42	0.07	5.37	36.95	69.90	629.00
	06/19/14 11:04:22	16320	13.32	1.47	0.06	5.36	37.87	70.00	642.00
	06/19/14 11:04:52	16350	13.44	1.42	0.00	5.32	37.87	70.00	642.00
	06/19/14 11:05:22	16380	13.56	1.90	0.03	5.19	37.06	70.00	641.00
	06/19/14 11:05:52	16410	13.48	1.78	0.03	5.25	37.06	70.00	641.00
	06/19/14 11:06:22	16440	13.62	1.73	0.06	5.20	34.16	70.00	601.00
	06/19/14 11:06:52	16470	13.79	2.53	0.04	5.00	34.16	70.00	601.00
	06/19/14 11:07:22	16500	13.93	1.86	0.05	5.02	25.77	70.10	518.00
	06/19/14 11:07:52	16530	14.24	2.58	0.06	4.75	25.77	70.10	518.00
	06/19/14 11:08:22	16560	14.68	2.08	0.05	4.48	17.99	70.10	451.00
	06/19/14 11:08:52	16590	14.99	2.30	0.10	4.20	17.99	70.10	451.00
	06/19/14 11:09:22	16620	15.07	2.27	0.14	4.14	17.85	70.20	439.00
	06/19/14 11:09:52	16650	15.02	2.13	0.09	4.16	17.85	70.20	439.00
	06/19/14 11:10:22	16680	14.79	2.01	0.09	4.33	18.88	70.30	452.00
	06/19/14 11:10:52	16710	14.84	1.79	0.06	4.30	18.88	70.30	452.00
	06/19/14 11:11:22	16740	14.79	2.17	0.07	4.28	19.29	70.30	441.00
	06/19/14 11:11:52	16770	14.53	2.51	0.05	4.52	19.29	70.30	441.00
	06/19/14 11:12:22	16800	13.88	2.29	0.02	4.95	32.00	70.40	585.00
	06/19/14 11:12:52	16830	13.86	1.78	0.02	4.96	32.00	70.40	585.00
A2	06/19/14 11:13:22	16860	13.56	1.20	0.02	5.17	34.49	70.50	600.00
	06/19/14 11:13:52	16890	13.47	1.14	0.01	5.28	34.49	70.50	600.00
	06/19/14 11:14:22	16920	13.61	1.01	0.02	5.16	34.99	70.50	601.00
	06/19/14 11:14:52	16950	13.58	1.05	0.02	5.18	34.99	70.50	601.00
	06/19/14 11:15:22	16980	13.49	1.00	0.04	5.25	35.13	70.50	613.00
	06/19/14 11:15:52	17010	13.45	1.14	0.04	5.24	35.13	70.50	613.00
	06/19/14 11:16:22	17040	13.58	1.01	0.03	5.20	34.99	70.50	589.00
	06/19/14 11:16:52	17070	13.45	0.92	0.02	5.27	34.99	70.50	589.00
	06/19/14 11:17:22	17100	13.60	0.82	0.01	5.21	35.38	70.50	614.00
	06/19/14 11:17:52	17130	13.51	1.02	0.05	5.22	35.38	70.50	614.00
	06/19/14 11:18:22	17160	13.44	0.89	0.06	5.27	35.76	70.60	602.00
	06/19/14 11:18:52	17190	13.47	0.83	0.05	5.25	35.76	70.60	602.00
	06/19/14 11:19:22	17220	13.42	0.78	0.04	5.31	35.87	70.60	614.00
	06/19/14 11:19:52	17250	13.56	0.90	0.02	5.20	35.87	70.60	614.00
	06/19/14 11:20:22	17280	13.34	1.14	0.01	5.32	36.26	70.70	615.00

CIMARRON ENERGY, INC.
30 ECD
Norman Facility

Unit Data

Meas. Stack Moisture	5.6	%
Stack Exhaust Flow (M2)	41,626	SCFH

Weather Data

Barometric Pressure	29.96	in. Hg
Relative Humidity	68	%
Ambient Temperature	80	°F
Specific Humidity	0.014933	lb H ₂ O / lb air

70-100-70 Load, Run - 30 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
	06/19/14 11:20:52	17310	13.37	0.85	0.05	5.37	36.26	70.70	615.00
	06/19/14 11:21:22	17340	13.48	0.91	0.05	5.26	35.73	70.70	614.00
	06/19/14 11:21:52	17370	13.62	1.14	0.03	5.18	35.73	70.70	614.00
	06/19/14 11:22:22	17400	13.69	1.24	0.02	5.12	34.93	70.80	601.00
	06/19/14 11:22:52	17430	13.65	1.27	-0.01	5.15	34.93	70.80	601.00
	06/19/14 11:23:22	17460	13.77	1.45	0.01	5.09	34.38	71.00	600.00
	06/19/14 11:23:52	17490	13.72	1.32	0.01	5.05	34.38	71.00	600.00
	06/19/14 11:24:22	17520	13.79	0.99	0.01	5.08	34.35	71.10	600.00
	06/19/14 11:24:52	17550	13.72	1.43	0.03	5.09	34.35	71.10	600.00
	06/19/14 11:25:22	17580	14.00	1.44	0.03	4.92	28.70	71.30	544.00
	06/19/14 11:25:52	17610	13.93	1.71	0.02	4.99	28.70	71.30	544.00
	06/19/14 11:26:22	17640	14.47	2.11	0.03	4.59	20.82	71.40	465.00
	06/19/14 11:26:52	17670	14.78	2.10	0.03	4.38	20.82	71.40	465.00
	06/19/14 11:27:22	17700	14.75	2.50	0.00	4.38	18.93	71.60	439.00
	06/19/14 11:27:52	17730	14.76	1.94	0.01	4.36	18.93	71.60	439.00
	06/19/14 11:28:22	17760	14.73	1.68	0.00	4.39	21.40	71.80	477.00
	06/19/14 11:28:52	17790	14.36	1.75	0.02	4.60	21.40	71.80	477.00
	06/19/14 11:29:22	17820	13.98	2.58	0.02	4.87	29.89	72.00	569.00
	06/19/14 11:29:52	17850	13.84	2.32	0.01	5.01	29.89	72.00	569.00
	06/19/14 11:30:22	17880	13.68	2.50	0.00	5.11	34.57	72.20	611.00
	06/19/14 11:30:52	17910	13.58	1.67	0.02	5.18	34.57	72.20	611.00
	06/19/14 11:31:22	17940	13.61	1.44	0.00	5.18	36.12	72.40	624.00
	06/19/14 11:31:52	17970	13.50	1.43	0.01	5.26	36.12	72.40	624.00
	06/19/14 11:32:22	18000	13.52	1.89	0.01	5.23	36.21	72.60	612.00
	06/19/14 11:32:52	18030	13.52	1.37	0.01	5.25	36.21	72.60	612.00
	06/19/14 11:33:22	18060	13.53	1.06	0.02	5.22	35.38	72.80	623.00
	06/19/14 11:33:52	18090	13.52	0.91	-0.01	5.26	35.38	72.80	623.00
	06/19/14 11:34:22	18120	13.59	1.17	0.00	5.17	35.60	72.90	599.00
	06/19/14 11:34:52	18150	13.57	1.10	0.01	5.21	35.60	72.90	599.00
	06/19/14 11:35:22	18180	13.52	0.97	0.01	5.24	36.37	73.10	612.00
	06/19/14 11:35:52	18210	13.52	1.06	0.02	5.23	36.37	73.10	612.00
A3	06/19/14 11:36:22	18240	13.58	1.13	0.01	5.20	36.98	73.30	625.00
	06/19/14 11:36:52	18270	13.55	1.21	0.01	5.22	36.98	73.30	625.00
	06/19/14 11:37:22	18300	13.53	1.31	0.02	5.21	36.43	73.50	624.00
	06/19/14 11:37:52	18330	13.52	1.45	-0.01	5.25	36.43	73.50	624.00
	06/19/14 11:38:22	18360	13.49	1.25	0.00	5.27	35.46	73.70	610.00
	06/19/14 11:38:52	18390	13.55	1.37	0.01	5.23	35.46	73.70	610.00
	06/19/14 11:39:22	18420	13.81	1.08	0.02	5.04	35.29	73.80	598.00
	06/19/14 11:39:52	18450	13.70	1.24	0.02	5.11	35.29	73.80	598.00
	06/19/14 11:40:22	18480	13.60	1.33	0.01	5.18	35.79	74.00	622.00
	06/19/14 11:40:52	18510	13.57	1.34	-0.01	5.20	35.79	74.00	622.00
	06/19/14 11:41:22	18540	13.84	1.21	0.01	5.08	34.68	74.20	609.00
	06/19/14 11:41:52	18570	14.16	1.46	0.07	4.81	34.68	74.20	609.00
	06/19/14 11:42:22	18600	14.86	1.55	0.11	4.39	22.31	74.40	487.00
	06/19/14 11:42:52	18630	15.78	1.68	0.19	3.71	22.31	74.40	487.00
	06/19/14 11:43:22	18660	15.99	1.76	0.17	3.44	19.27	74.60	449.00
	06/19/14 11:43:52	18690	15.92	1.80	0.21	3.52	19.27	74.60	449.00
	06/19/14 11:44:22	18720	15.99	1.64	0.18	3.42	19.60	74.70	449.00
	06/19/14 11:44:52	18750	15.55	2.04	0.17	3.75	19.60	74.70	449.00
	06/19/14 11:45:22	18780	15.77	2.17	0.21	3.65	19.04	74.90	425.00
	06/19/14 11:45:52	18810	15.84	2.42	0.17	3.54	19.04	74.90	425.00
	06/19/14 11:46:22	18840	15.59	2.06	0.18	3.78	20.59	75.10	461.00
	06/19/14 11:46:52	18870	15.06	1.87	0.12	4.03	20.59	75.10	461.00
	06/19/14 11:47:22	18900	14.39	2.21	0.07	4.52	32.27	75.30	580.00
	06/19/14 11:47:52	18930	13.79	1.44	-0.01	5.04	32.27	75.30	580.00
	06/19/14 11:48:22	18960	13.65	1.06	0.02	5.13	36.57	75.50	621.00
	06/19/14 11:48:52	18990	13.92	1.00	0.04	4.98	36.57	75.50	621.00
	06/19/14 11:49:22	19020	13.75	1.12	0.03	5.15	37.17	75.70	622.00
	06/19/14 11:49:52	19050	13.83	0.98	0.07	4.98	37.17	75.70	622.00
	06/19/14 11:50:22	19080	13.63	0.88	0.04	5.12	36.62	75.90	621.00
	06/19/14 11:50:52	19110	13.63	0.95	0.03	5.17	36.62	75.90	621.00

CIMARRON ENERGY, INC.
30 ECD
Norman Facility

Unit Data

Meas. Stack Moisture	5.6	%
Stack Exhaust Flow (M2)	41,626	SCFH

Weather Data

Barometric Pressure	29.96	in. Hg
Relative Humidity	68	%
Ambient Temperature	80	°F
Specific Humidity	0.014933	lb H ₂ O / lb air

70-100-70 Load, Run - 30 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
06/19/14 11:51:22	19140	13.74	0.92	0.05	5.12	35.51	76.30	607.00
06/19/14 11:51:52	19170	14.10	0.88	0.10	4.87	35.51	76.30	607.00
06/19/14 11:52:22	19200	13.81	0.84	0.09	5.04	35.35	76.50	607.00
06/19/14 11:52:52	19230	13.83	1.11	0.03	5.00	35.35	76.50	607.00
06/19/14 11:53:22	19260	13.81	1.21	0.05	5.06	35.98	76.70	607.00
06/19/14 11:53:52	19290	14.38	1.25	0.08	4.66	35.98	76.70	607.00
06/19/14 11:54:22	19320	13.74	1.02	0.04	5.05	36.73	77.00	620.00
06/19/14 11:54:52	19350	13.65	0.91	0.03	5.15	36.73	77.00	620.00
06/19/14 11:55:22	19380	13.54	1.07	0.03	5.20	36.68	77.20	620.00
06/19/14 11:55:52	19410	13.75	1.07	0.08	5.09	36.68	77.20	620.00
06/19/14 11:56:22	19440	13.61	0.85	0.05	5.20	34.30	77.50	604.00
06/19/14 11:56:52	19470	13.54	1.03	0.03	5.23	34.30	77.50	604.00
06/19/14 11:57:22	19500	13.66	0.97	0.04	5.14	20.82	77.80	459.00
06/19/14 11:57:52	19530	14.05	1.31	0.01	4.95	20.82	77.80	459.00
06/19/14 11:58:22	19560	15.52	2.09	0.14	4.00	19.07	78.00	434.00
06/19/14 11:58:52	19590	15.38	2.22	0.19	3.88	19.07	78.00	434.00
06/19/14 11:59:22	19620	15.71	2.33	0.14	3.63	17.83	78.30	421.00
06/19/14 11:59:52	19650	15.24	2.54	0.11	4.04	17.83	78.30	421.00
RAW AVERAGE		14.07	1.55	0.05	4.85	30.17	72.39	557.54

Bias	Serial Number:	O ₂ (%)	CO (ppmvd)	THC (ppmvw)	CO ₂ (%)	Press. Trans. 0 (in. H ₂ O)	Temp. Trans. 0 (°F)	F-Flow Trans. 0 (SCFH)
	INST-22-0005	INST-22-0005	INST-CO-0034	INST-VC-0006	INST-22-0005			
	Initial Zero	0.04	0.03	0.02	0.01			
	Final Zero	0.03	0.06	0.02	0.02			
	Avg. Zero	0.04	0.05	0.02	0.02			
	Initial UpScale	12.12	5.02	3.06	9.25			
	Final UpScale	12.13	4.95	3.05	9.28			
	Avg. UpScale	12.13	4.99	3.06	9.27			
Upscale Cal Gas		12.25	5.12	3.04	9.33			

EMISSIONS DATA	O₂	CO	THC	CO₂
Corrected Raw Average (ppm/% dry basis)	14.22	1.56	0.00	4.87
Corrected Raw Average (ppm/% wet basis)	13.42	1.47	0.00	4.60
Emission Rate (lb/hr)	N/A	0.00	0.00	N/A

CIMARRON ENERGY, INC.

June 19, 2014

30 ECD

Norman Facility

Unit Data

Meas. Stack Moisture	5.9	%
Stack Exhaust Flow (M2)	42,465	SCFH

Weather Data

Barometric Pressure	29.99	in. Hg
Relative Humidity	68	%
Ambient Temperature	81	°F
Specific Humidity	0.015425	lb H ₂ O / lb air

70-100-70 Load, Run - 30 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	06/19/14 12:20:10	420	15.71	1.89	0.15	3.53	18.99	84.40	441.00
	06/19/14 12:20:40	450	15.36	1.77	0.19	4.01	18.99	84.40	441.00
	06/19/14 12:21:10	480	15.29	1.83	0.15	3.86	19.98	84.80	453.00
	06/19/14 12:21:40	510	15.59	1.85	0.17	3.79	19.98	84.80	453.00
	06/19/14 12:22:10	540	15.66	1.97	0.18	3.79	19.13	85.20	451.00
	06/19/14 12:22:40	570	15.53	1.96	0.13	3.67	19.13	85.20	451.00
	06/19/14 12:23:10	600	15.67	2.01	0.18	3.84	19.57	85.60	452.00
	06/19/14 12:23:40	630	15.30	1.86	0.12	3.89	19.57	85.60	452.00
	06/19/14 12:24:10	660	15.17	2.06	0.12	4.07	18.99	86.00	439.00
	06/19/14 12:24:40	690	15.11	1.99	0.11	4.15	18.99	86.00	439.00
	06/19/14 12:25:10	720	15.57	1.92	0.15	3.88	20.90	86.30	464.00
	06/19/14 12:25:40	750	15.12	2.18	0.10	4.04	20.90	86.30	464.00
	06/19/14 12:26:10	780	14.73	3.40	0.13	4.46	34.43	86.90	618.00
	06/19/14 12:26:40	810	14.93	3.39	0.15	4.18	34.43	86.90	618.00
	06/19/14 12:27:10	840	13.91	3.79	0.08	4.90	36.62	87.50	620.00
	06/19/14 12:27:40	870	13.57	2.87	0.07	5.15	36.62	87.50	620.00
	06/19/14 12:28:10	900	13.92	2.71	0.07	5.06	35.24	88.00	606.00
	06/19/14 12:28:40	930	14.56	4.28	0.15	4.54	35.24	88.00	606.00
	06/19/14 12:29:10	960	14.19	4.36	0.05	4.76	35.15	88.40	605.00
	06/19/14 12:29:40	990	13.95	5.51	0.07	4.89	35.15	88.40	605.00
	06/19/14 12:30:10	1020	14.27	5.37	0.13	4.90	35.10	88.70	605.00
	06/19/14 12:30:40	1050	14.31	5.11	0.08	4.57	35.10	88.70	605.00
	06/19/14 12:31:10	1080	14.13	5.33	0.10	4.83	35.82	89.00	617.00
	06/19/14 12:31:40	1110	14.26	6.23	0.11	4.67	35.82	89.00	617.00
	06/19/14 12:32:10	1140	13.56	3.16	0.04	5.18	35.76	89.20	617.00
	06/19/14 12:32:40	1170	13.81	2.21	0.06	5.13	35.76	89.20	617.00
	06/19/14 12:33:10	1200	14.07	1.26	0.06	4.91	35.46	89.30	616.00
	06/19/14 12:33:40	1230	14.51	2.03	0.11	4.50	35.46	89.30	616.00
	06/19/14 12:34:10	1260	14.10	1.72	0.09	4.85	34.60	89.40	615.00
	06/19/14 12:34:40	1290	14.58	1.85	0.11	4.52	34.60	89.40	615.00
	06/19/14 12:35:10	1320	13.77	1.91	0.05	4.99	34.16	89.40	580.00
	06/19/14 12:35:40	1350	14.03	1.84	0.09	4.87	34.16	89.40	580.00
	06/19/14 12:36:10	1380	14.16	2.03	0.12	4.93	32.94	89.40	578.00
	06/19/14 12:36:40	1410	13.76	2.08	0.05	4.97	32.94	89.40	578.00
	06/19/14 12:37:10	1440	13.85	1.12	0.05	5.05	21.01	89.40	462.00
	06/19/14 12:37:40	1470	15.30	1.40	0.11	4.12	21.01	89.40	462.00
	06/19/14 12:38:10	1500	15.30	1.62	0.09	3.93	18.19	89.40	447.00
	06/19/14 12:38:40	1530	15.76	1.38	0.22	3.72	18.19	89.40	447.00
	06/19/14 12:39:10	1560	15.38	1.51	0.16	3.84	18.55	89.50	436.00
	06/19/14 12:39:40	1590	16.24	1.69	0.19	3.36	18.55	89.50	436.00
	06/19/14 12:40:10	1620	15.69	1.76	0.15	3.61	17.74	89.50	424.00
	06/19/14 12:40:40	1650	15.47	1.84	0.15	3.88	17.74	89.50	424.00
	06/19/14 12:41:10	1680	15.54	1.94	0.12	3.74	18.24	89.50	436.00
	06/19/14 12:41:40	1710	15.24	1.65	0.11	4.07	18.24	89.50	436.00
	06/19/14 12:42:10	1740	14.50	1.69	0.06	4.38	30.39	89.70	563.00
	06/19/14 12:42:40	1770	14.00	1.97	0.03	4.86	30.39	89.70	563.00
A2	06/19/14 12:43:10	1800	13.51	1.28	0.05	5.27	35.51	89.70	604.00
	06/19/14 12:43:40	1830	13.66	0.92	0.04	5.11	35.51	89.70	604.00
	06/19/14 12:44:10	1860	14.05	1.00	0.12	4.99	35.10	89.80	615.00
	06/19/14 12:44:40	1890	14.14	1.45	0.08	4.74	35.10	89.80	615.00
	06/19/14 12:45:10	1920	13.59	1.92	0.03	5.14	33.60	89.90	590.00
	06/19/14 12:45:40	1950	13.51	1.68	0.05	5.23	33.60	89.90	590.00
	06/19/14 12:46:10	1980	13.53	2.18	0.03	5.23	34.10	89.90	602.00
	06/19/14 12:46:40	2010	13.15	1.67	0.03	5.48	34.10	89.90	602.00
	06/19/14 12:47:10	2040	13.32	1.29	0.03	5.41	34.99	90.10	603.00
	06/19/14 12:47:40	2070	13.43	1.64	0.00	5.25	34.99	90.10	603.00
	06/19/14 12:48:10	2100	13.09	1.40	0.00	5.59	36.04	90.20	616.00
	06/19/14 12:48:40	2130	13.24	0.93	0.04	5.48	36.04	90.20	616.00
	06/19/14 12:49:10	2160	13.44	1.30	0.06	5.32	35.46	90.30	615.00
	06/19/14 12:49:40	2190	13.95	3.07	0.05	4.98	35.46	90.30	615.00

CIMARRON ENERGY, INC.

June 19, 2014

30 ECD

Norman Facility

Unit Data

Meas. Stack Moisture	5.9	%
Stack Exhaust Flow (M2)	42,465	SCFH

Weather Data

Barometric Pressure	29.99	in. Hg
Relative Humidity	68	%
Ambient Temperature	81	°F
Specific Humidity	0.015425	lb H ₂ O / lb air

70-100-70 Load, Run - 30 ECD R9

	Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmvd)	THC (ppmwv)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
	06/19/14 12:50:10	2220	13.85	3.75	0.08	5.00	34.90	90.40	603.00
	06/19/14 12:50:40	2250	13.78	3.45	0.04	5.06	34.90	90.40	603.00
	06/19/14 12:51:10	2280	13.65	2.38	0.03	5.11	34.35	90.50	590.00
	06/19/14 12:51:40	2310	13.59	1.95	0.08	5.28	34.35	90.50	590.00
	06/19/14 12:52:10	2340	13.84	3.85	0.04	4.94	33.91	90.50	601.00
	06/19/14 12:52:40	2370	13.56	2.25	0.02	5.21	33.91	90.50	601.00
	06/19/14 12:53:10	2400	13.66	1.56	0.01	5.15	34.41	90.60	590.00
	06/19/14 12:53:40	2430	13.71	2.26	0.04	5.08	34.41	90.60	590.00
	06/19/14 12:54:10	2460	13.55	2.41	0.05	5.20	32.00	90.60	576.00
	06/19/14 12:54:40	2490	13.72	2.10	0.04	5.19	32.00	90.60	576.00
	06/19/14 12:55:10	2520	14.31	3.14	0.05	4.75	19.65	90.60	459.00
	06/19/14 12:55:40	2550	15.02	4.26	0.18	4.25	19.65	90.60	459.00
	06/19/14 12:56:10	2580	15.28	5.29	0.14	3.97	19.38	90.60	458.00
	06/19/14 12:56:40	2610	15.22	3.62	0.12	4.02	19.38	90.60	458.00
	06/19/14 12:57:10	2640	14.93	3.00	0.11	4.21	20.40	90.60	460.00
	06/19/14 12:57:40	2670	14.79	2.43	0.13	4.36	20.40	90.60	460.00
	06/19/14 12:58:10	2700	14.85	1.65	0.11	4.31	23.33	90.70	497.00
	06/19/14 12:58:40	2730	14.45	1.56	0.05	4.51	23.33	90.70	497.00
	06/19/14 12:59:10	2760	14.47	2.33	0.10	4.60	31.28	90.90	563.00
	06/19/14 12:59:40	2790	13.72	4.24	0.04	4.99	31.28	90.90	563.00
	06/19/14 13:00:10	2820	13.62	2.15	0.03	5.18	34.05	91.00	590.00
	06/19/14 13:00:40	2850	13.45	2.27	0.06	5.27	34.05	91.00	590.00
	06/19/14 13:01:10	2880	13.57	1.63	0.05	5.20	34.54	91.10	602.00
	06/19/14 13:01:40	2910	13.46	1.86	0.07	5.27	34.54	91.10	602.00
	06/19/14 13:02:10	2940	13.22	1.53	0.06	5.42	34.24	91.20	602.00
	06/19/14 13:02:40	2970	13.31	1.26	0.05	5.39	34.24	91.20	602.00
	06/19/14 13:03:10	3000	13.39	1.38	0.06	5.36	34.63	91.30	602.00
	06/19/14 13:03:40	3030	13.31	1.12	0.06	5.38	34.63	91.30	602.00
	06/19/14 13:04:10	3060	13.28	0.93	0.08	5.41	34.35	91.50	590.00
	06/19/14 13:04:40	3090	13.31	1.01	0.05	5.38	34.35	91.50	590.00
	06/19/14 13:05:10	3120	13.07	0.96	0.03	5.57	34.30	91.70	590.00
	06/19/14 13:05:40	3150	13.11	0.88	0.03	5.52	34.30	91.70	590.00
A3	06/19/14 13:06:10	3180	13.35	0.84	0.04	5.41	35.07	91.90	602.00
	06/19/14 13:06:40	3210	13.58	1.49	0.05	5.20	35.07	91.90	602.00
	06/19/14 13:07:10	3240	13.70	2.02	0.05	5.13	34.77	92.10	601.00
	06/19/14 13:07:40	3270	13.50	1.86	0.07	5.23	34.77	92.10	601.00
	06/19/14 13:08:10	3300	13.57	1.51	0.05	5.22	34.21	92.20	600.00
	06/19/14 13:08:40	3330	13.50	1.17	0.06	5.23	34.21	92.20	600.00
	06/19/14 13:09:10	3360	13.74	1.22	0.07	5.14	33.91	92.30	588.00
	06/19/14 13:09:40	3390	13.62	1.58	0.07	5.10	33.91	92.30	588.00
	06/19/14 13:10:10	3420	13.68	1.32	0.05	5.15	33.22	92.40	576.00
	06/19/14 13:10:40	3450	13.72	1.92	0.04	5.07	33.22	92.40	576.00
	06/19/14 13:11:10	3480	13.51	1.45	0.04	5.28	28.68	92.40	547.00
	06/19/14 13:11:40	3510	14.00	1.72	0.11	4.99	28.68	92.40	547.00
	06/19/14 13:12:10	3540	14.77	2.27	0.13	4.41	18.05	92.40	434.00
	06/19/14 13:12:40	3570	14.97	2.25	0.11	4.26	18.05	92.40	434.00
	06/19/14 13:13:10	3600	15.29	1.99	0.08	3.93	19.07	92.50	435.00
	06/19/14 13:13:40	3630	14.97	1.63	0.10	4.21	19.07	92.50	435.00
	06/19/14 13:14:10	3660	15.02	1.58	0.11	4.21	19.46	92.50	446.00
	06/19/14 13:14:40	3690	15.13	1.62	0.10	4.06	19.46	92.50	446.00
	06/19/14 13:15:10	3720	15.20	1.58	0.12	4.07	18.91	92.50	446.00
	06/19/14 13:15:40	3750	15.22	1.65	0.13	4.04	18.91	92.50	446.00
	06/19/14 13:16:10	3780	15.38	1.81	0.14	3.90	19.18	92.60	446.00
	06/19/14 13:16:40	3810	15.24	1.86	0.15	4.05	19.18	92.60	446.00
	06/19/14 13:17:10	3840	15.08	2.42	0.15	4.09	26.71	92.60	534.00
	06/19/14 13:17:40	3870	14.52	3.88	0.13	4.43	26.71	92.60	534.00
	06/19/14 13:18:10	3900	13.51	2.84	0.10	5.21	34.68	92.60	612.00
	06/19/14 13:18:40	3930	13.69	1.72	0.09	5.10	34.68	92.60	612.00
	06/19/14 13:19:10	3960	13.33	1.96	0.07	5.33	36.26	92.60	614.00
	06/19/14 13:19:40	3990	13.29	1.22	0.05	5.38	36.26	92.60	614.00

CIMARRON ENERGY, INC.

June 19, 2014

30 ECD

Norman Facility

Unit Data

Meas. Stack Moisture	5.9	%
Stack Exhaust Flow (M2)	42,465	SCFH

Weather Data

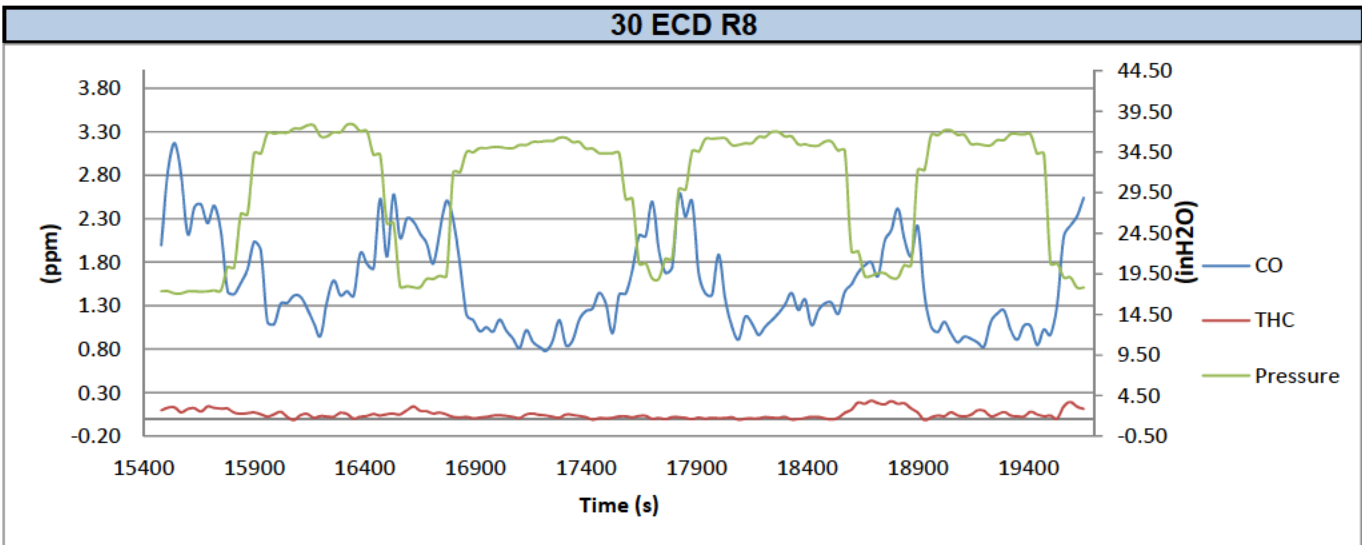
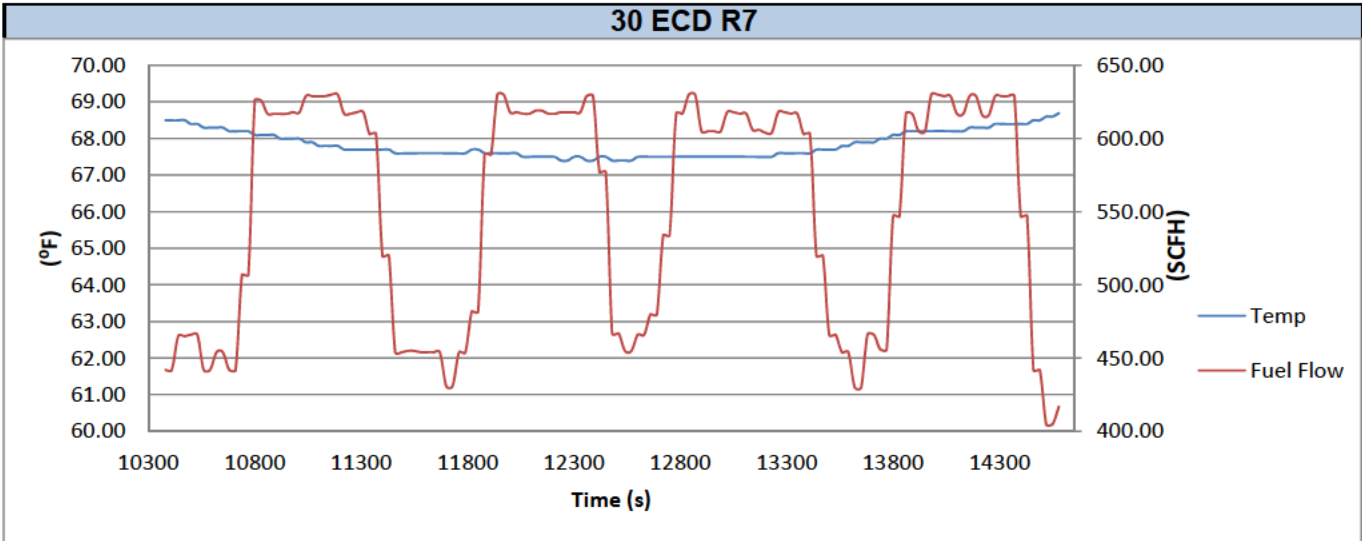
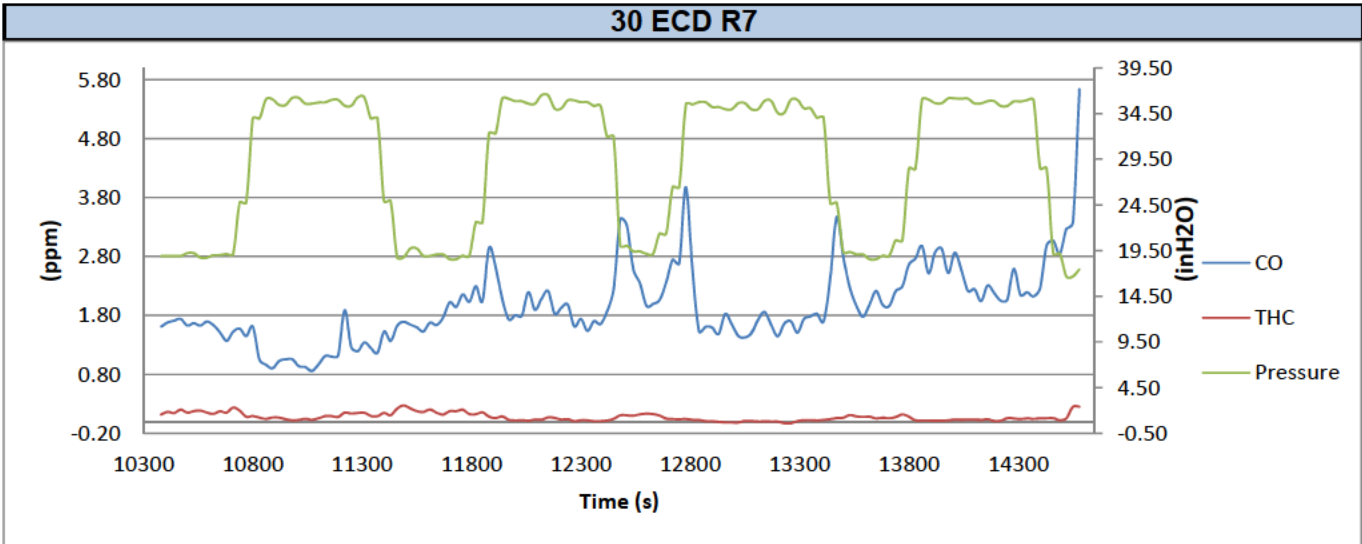
Barometric Pressure	29.99	in. Hg
Relative Humidity	68	%
Ambient Temperature	81	°F
Specific Humidity	0.015425	lb H ₂ O / lb air

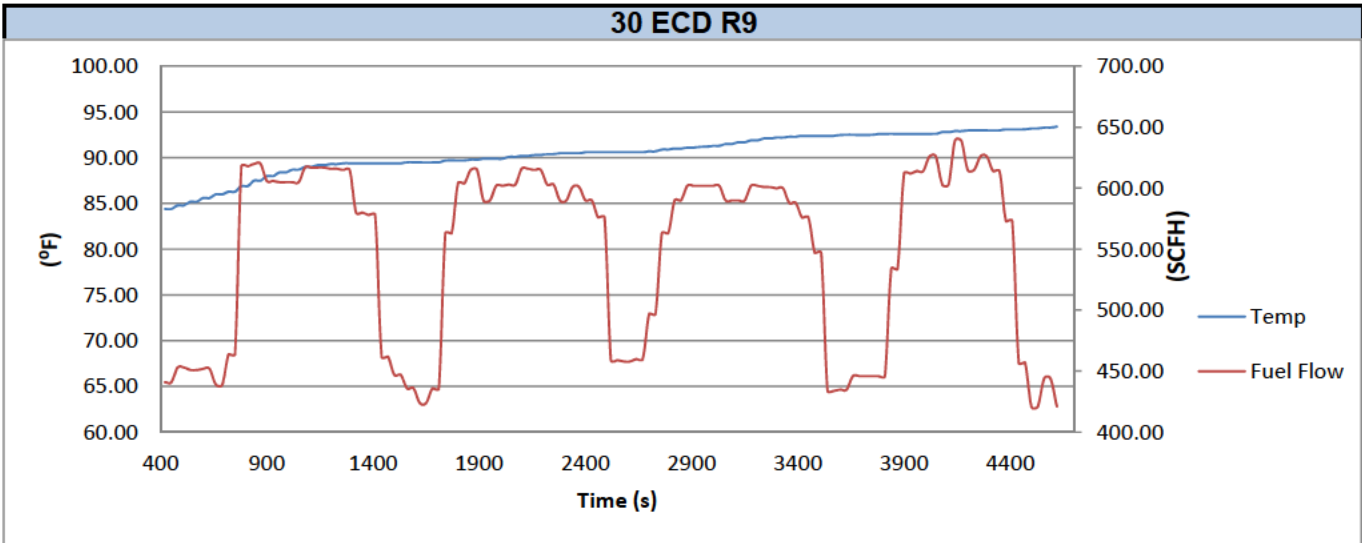
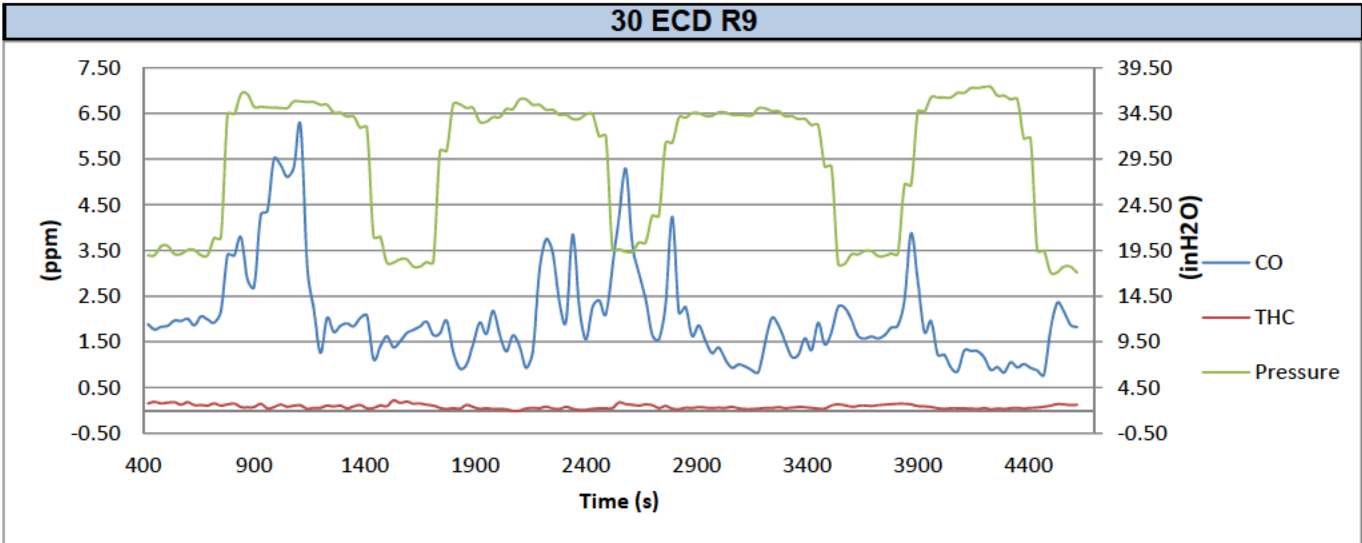
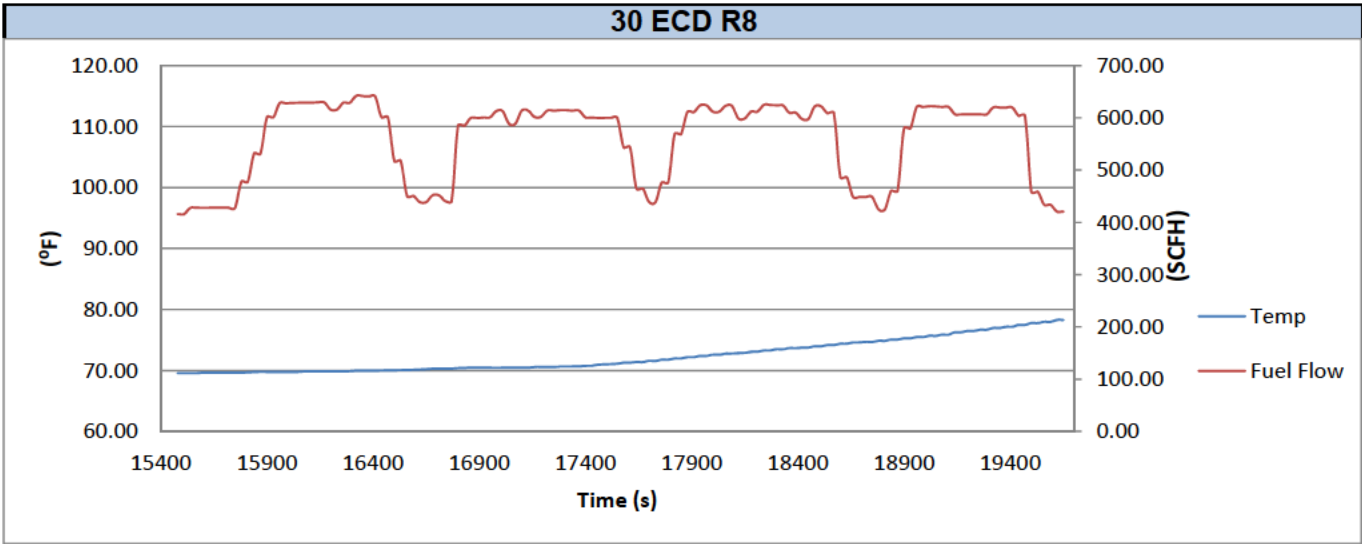
70-100-70 Load, Run - 30 ECD R9

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
06/19/14 13:20:10	4020	13.33	1.22	0.04	5.38	36.26	92.60	626.00
06/19/14 13:20:40	4050	13.16	0.94	0.05	5.47	36.26	92.60	626.00
06/19/14 13:21:10	4080	13.46	0.86	0.05	5.34	36.76	92.80	603.00
06/19/14 13:21:40	4110	13.37	1.31	0.04	5.32	36.76	92.80	603.00
06/19/14 13:22:10	4140	13.40	1.30	0.04	5.33	37.28	92.90	639.00
06/19/14 13:22:40	4170	13.39	1.30	0.03	5.30	37.28	92.90	639.00
06/19/14 13:23:10	4200	13.15	1.16	0.05	5.52	37.40	93.00	615.00
06/19/14 13:23:40	4230	13.27	0.89	0.02	5.42	37.40	93.00	615.00
06/19/14 13:24:10	4260	13.14	0.95	0.04	5.54	36.45	93.00	626.00
06/19/14 13:24:40	4290	13.19	0.83	0.03	5.46	36.45	93.00	626.00
06/19/14 13:25:10	4320	13.37	1.06	0.05	5.33	36.04	93.00	614.00
06/19/14 13:25:40	4350	13.27	0.94	0.06	5.41	36.04	93.00	614.00
06/19/14 13:26:10	4380	13.30	1.01	0.04	5.38	31.75	93.10	573.00
06/19/14 13:26:40	4410	13.30	0.93	0.06	5.39	31.75	93.10	573.00
06/19/14 13:27:10	4440	13.24	0.88	0.06	5.44	19.51	93.10	457.00
06/19/14 13:27:40	4470	13.45	0.78	0.08	5.38	19.51	93.10	457.00
06/19/14 13:28:10	4500	14.39	1.76	0.10	4.68	17.11	93.20	421.00
06/19/14 13:28:40	4530	14.99	2.35	0.14	4.24	17.11	93.20	421.00
06/19/14 13:29:10	4560	15.12	2.17	0.13	4.17	17.74	93.30	444.00
06/19/14 13:29:40	4590	15.34	1.88	0.12	3.93	17.74	93.30	444.00
06/19/14 13:30:10	4620	15.27	1.83	0.12	3.98	17.08	93.40	421.00
RAW AVERAGE		14.17	2.04	0.08	4.78	29.34	90.48	548.55

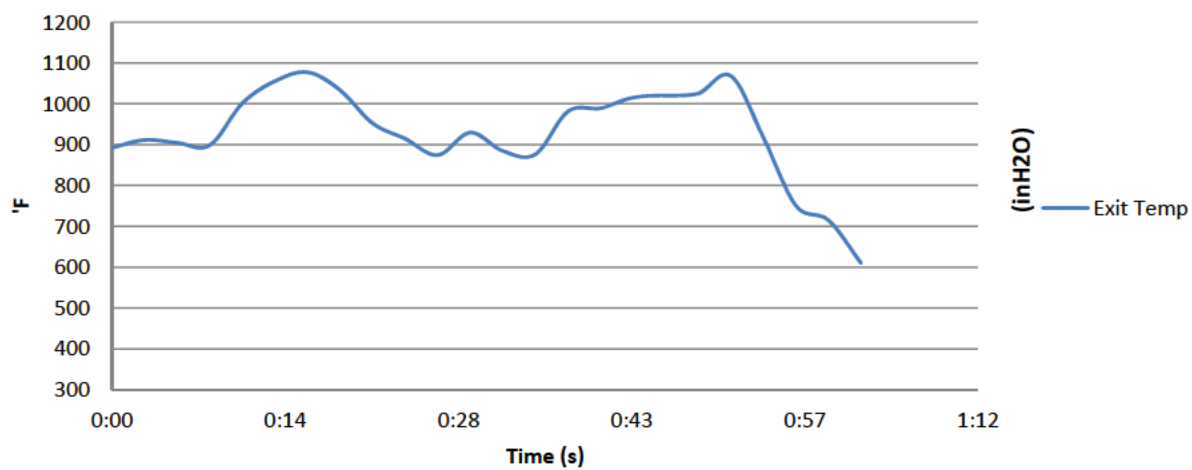
Bias	Serial Number:	O ₂ (%)	CO (ppmv)	THC (ppmv)	CO ₂ (%)	Press. Trans 0 (in. H ₂ O)	Temp. Trans. 0 (°F)	F-Flow Trans. 0 (SCFH)
	INST-22-0005	INST-22-0005	INST-CO-0034	INST-VC-0006	INST-22-0005			
	Initial Zero	0.03	0.06	0.02	0.02			
	Final Zero	0.02	-0.03	0.07	0.01			
	Avg. Zero	0.03	0.02	0.05	0.02			
	Initial UpScale	12.13	4.95	3.05	9.28			
	Final UpScale	12.11	4.97	3.09	9.26			
	Avg. UpScale	12.12	4.96	3.07	9.27			
	Upscale Cal Gas	12.25	5.12	3.04	9.33			

EMISSIONS DATA	O ₂	CO	THC	CO ₂
Corrected Raw Average (ppm/% dry basis)	14.33	2.10	0.04	4.80
Corrected Raw Average (ppm/% wet basis)	13.49	1.98	0.03	4.52
Emission Rate (lb/hr)	N/A	0.01	0.00	N/A

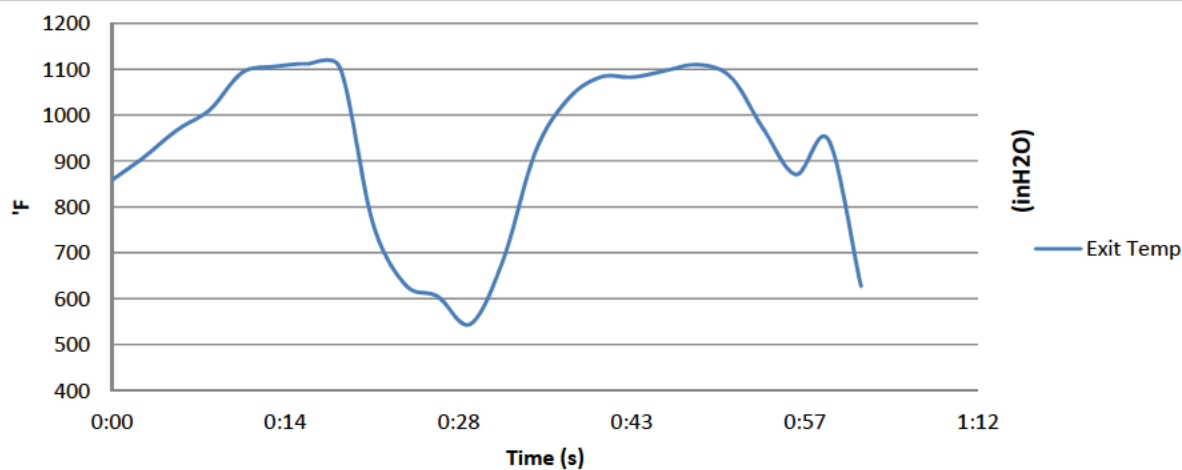




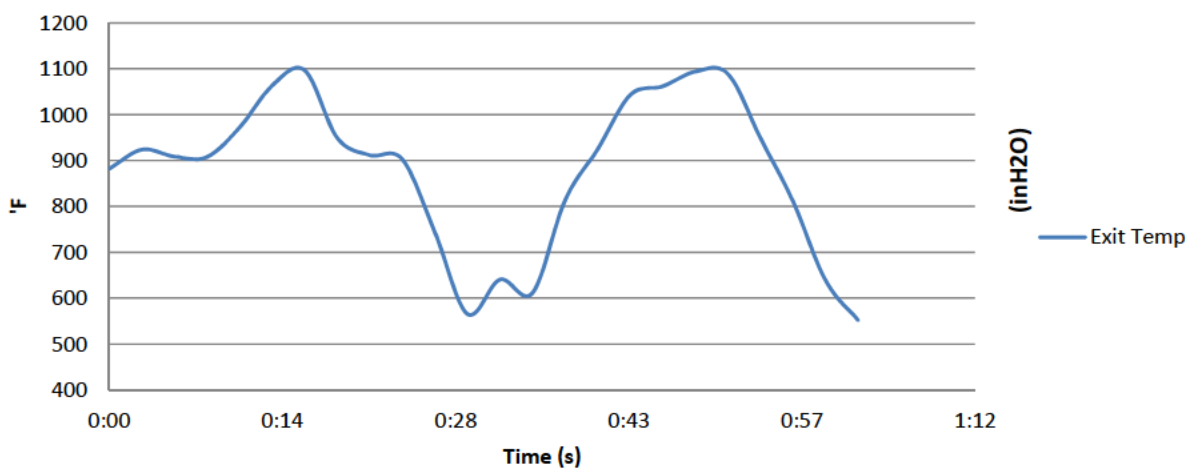
30 ECD R7



30 ECD R8



30 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	Norman Facility
Sampling Location	30 ECD
Fuel Type	Gas, Propene

Test Information			
Project #		cei-14-norman.ok-comp#1	
Operator		DG	
Date for Preliminary Run	(mm/dd/yy)	06/18/14	
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	65	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)	06/18/14	06/18/14	06/19/14	
Load	% or w/DB	90-100	90-100	90-100	
Meter Box Number	from ACS	SAMP-CP-0023	SAMP-CP-0023	SAMP-CP-0023	
Meter Calibration Factor	(Y)	1.010	1.010	1.010	
Orifice Meter Coefficient	(ΔH_{or})	1.877	1.877	1.877	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)	0.819	0.819	0.819	
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-0002	SAMP-BC-0002	SAMP-BC-0002	

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	Norman Facility
Sampling Location	30 ECD
Project #	cei-14-norman.ok-comp#1

Historical Data	90-100%-10	90-100%-11	90-100%-12	Average	Units
Run Start Time	17:40	19:05	08:00		hh:mm
Run Stop Time	18:50	20:15	09:10		hh:mm
Test Date	06/18/14	06/18/14	06/19/14		mm/dd/yy
Meter Calibration Factor	1.010	1.010	1.010		
Pitot Tube Coefficient	0.819	0.819	0.819		
Stack Test Data	90-100%-10	90-100%-11	90-100%-12	Average	Units
Initial Meter Volume	447.790	496.570	547.960		ft ³
Final Meter Volume	493.910	543.270	594.140		ft ³
Total Meter Volume	46.120	46.700	46.180	46.333	ft ³
Total Sampling Time	65.00	65.00	65.00	65.00	min
Average Meter Temperature	85.38	85.00	72.50	80.96	°F
Average Stack Temperature	954.21	983.67	994.25	977.38	°F
Barometric Pressure	29.85	29.83	29.96	29.88	in Hg
Stack Static Pressure	0.00	0.00	0.00	0.00	in H ₂ O
Absolute Stack Pressure	29.85	29.83	29.96	29.88	in Hg
Average Orifice Pressure Drop	1.90	1.90	1.90	1.90	in H ₂ O
Absolute Meter Pressure	29.99	29.97	30.10	30.02	in Hg
Avg Square Root Pitot Pressure	0.08	0.08	0.08	0.08	√(in H ₂ O)
Moisture Content Data	90-100%-10	90-100%-11	90-100%-12	Average	Units
Impinger Water Weight Gain	55.30	52.40	51.40	53.03	g
Silica Gel Weight Gain	9.10	9.50	12.60	10.40	g
Total Water Volume Collected	64.52	62.01	64.12	63.55	ml
Standard Water Vapor Volume	3.04	2.92	3.02	2.99	scf
Standard Meter Volume	45.2	45.8	46.5	45.8	dscf
Calculated Stack Moisture	6.29	5.99	6.09	6.13	%
Saturated Stack Moisture	100.00	100.00	100.00	100.00	%
Reported Stack Moisture Content	6.29	5.99	6.09	6.13	%
Gas Analysis Data	90-100%-10	90-100%-11	90-100%-12	Average	Units
Carbon Dioxide Content	5.3	5.3	5.2	5.3	%
Oxygen Content	14.8	14.9	14.9	14.9	%
Nitrogen Content	79.9	79.8	79.8	79.8	%
Stack Dry Molecular Weight	29.46	29.44	29.40	29.43	lb/lb-mole
Stack Wet Molecular Weight	28.74	28.75	28.71	28.73	lb/lb-mole
Percent Excess Air	235.2	241.2	241.6	239.3	%
Volumetric Flow Rate Data	90-100%-10	90-100%-11	90-100%-12	Average	Units
Average Stack Gas Velocity	6.91	6.99	7.59	7.17	ft/sec
Stack Cross-Sectional Area	4.79	4.79	4.79	4.79	ft ²
Actual Stack Flow Rate	1,985	2,007	2,181	2,058	acfm
Wet Standard Stack Flow Rate	44	44	48	45	wkscfh
Dry Standard Stack Flow Rate	41,579	41,273	44,684	42,512	dscfh

METHOD 3C - DETERMINATION OF DRY MOLECULAR WEIGHT BY ANALYZER

Plant Name	Norman Facility	Preliminary Date	06/18/14		
Sampling Location	30 ECD	Operator	DG		
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	06/18/14	Run Start Time	17:40	Run Stop Time	18:50
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		%	
01:10	5.3	14.8	0.0	79.9	29.46	1.142	235.2	N/A

Gas Analysis Data								
Run Number	90-100%-11		Date	06/18/14	Run Start Time	19:05	Run Stop Time	20:15
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		%	
01:10	5.3	14.9	0.0	79.8	29.44	1.141	241.2	N/A

Gas Analysis Data								
Run Number	90-100%-12		Date	06/19/14	Run Start Time	08:00	Run Stop Time	09:10
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		%	
01:10	5.2	14.9	0.0	79.8	29.40	1.152	241.6	N/A

METHOD 4 - DETERMINATION OF MOISTURE CONTENT IN STACK GASES

Plant Name	Norman Facility	Preliminary Date	06/18/14
Sampling Location	30 ECD	Operator	DG
Project #	cei-14-norman.ok-comp#1	Ports Used	2

Moisture Content Data								
Run Number	90-100%-10		Date	06/18/14	Start Time	17:40	Stop Time	18:50
Meter Box Number	SAMP-CP-0023				Meter Cal Factor	(Y)	1.010	
Total Meter Volume	(V _m)	46.120	dcf		Barometric Pressure	(P _b)	29.85	in Hg
Average Stack Temp	(t _s) _{avg}	954	°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}	1.90	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)	774.30	753.20	578.60	928.80			
Initial Value	(V _i),(W _i)	729.50	744.70	576.60	919.70			
Net Value	(V _n),(W _n)	44.8	8.5	2.0	9.1			
Results								
Total Weight	(W _f)	64.40	g	Water Vol Weighed	(V _{wsg(std)})	3.036	scf	
Std Meter Volume	(V _{m(std)})	45.202	dscf	Sat. Moisture Content	(B _{ws(svp)})	100.00	%	
Calc Moisture Content	(B _{ws(calc)})	6.29	%	Final Moisture Content	(B _{ws})	6.29	%	

Moisture Content Data								
Run Number	90-100%-11		Date	06/18/14	Start Time	19:05	Stop Time	20:15
Meter Box Number	SAMP-CP-0023				Meter Cal Factor	(Y)	1.010	
Total Meter Volume	(V _m)	46.700	dcf		Barometric Pressure	(P _b)	29.83	in Hg
Average Stack Temp	(t _s) _{avg}	984	°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}	1.90	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)	814.90	762.80	580.80	938.30			
Initial Value	(V _i),(W _i)	774.30	753.20	578.60	928.80			
Net Value	(V _n),(W _n)	40.6	9.6	2.2	9.5			
Results								
Total Weight	(W _f)	61.90	g	Water Vol Weighed	(V _{wsg(std)})	2.919	scf	
Std Meter Volume	(V _{m(std)})	45.772	dscf	Sat. Moisture Content	(B _{ws(svp)})	100.00	%	
Calc Moisture Content	(B _{ws(calc)})	5.99	%	Final Moisture Content	(B _{ws})	5.99	%	

Moisture Content Data								
Run Number	90-100%-12		Date	06/19/14	Start Time	08:00	Stop Time	09:10
Meter Box Number	SAMP-CP-0023				Meter Cal Factor	(Y)	1.010	
Total Meter Volume	(V _m)	46.180	dcf		Barometric Pressure	(P _b)	29.96	in Hg
Average Stack Temp	(t _s) _{avg}	994	°F		Stack Static Pressure	(P _{static})	0.00	in H ₂ O
Average Meter Temp	(t _m) _{avg}	73	°F		Avg Orifice Pressure	(ΔH) _{avg}	1.90	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)	753.30	721.20	568.80	894.80			
Initial Value	(V _i),(W _i)	713.20	712.80	565.90	882.20			
Net Value	(V _n),(W _n)	40.1	8.4	2.9	12.6			
Results								
Total Weight	(W _f)	64.00	g	Water Vol Weighed	(V _{wsg(std)})	3.018	scf	
Std Meter Volume	(V _{m(std)})	46.525	dscf	Sat. Moisture Content	(B _{ws(svp)})	100.00	%	
Calc Moisture Content	(B _{ws(calc)})	6.09	%	Final Moisture Content	(B _{ws})	6.09	%	

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

Plant Name		Norman Facility				Date		06/18/14				Ideal Nozzle Diameter and IsoKinetic Factor Setup								
Sampling Location		30 ECD				Operator		DG												
Project #		cei-14-norman.ok-comp#1				Run Number		90-100%-10												
Leak Checks										Sampling Equipment										
Train	Pre	0.000	ft³/min@	15.0	in Hg	Meter Box Number		SAMP-CP-0023				Pitot Coefficient (Cp)				0.819		F		
PASS	Post	0.000	ft³/min@	15.0	in Hg	Meter Cal Factor (Y)		1.010								Average Stack Temp (ts)				954.2
< 3.0	Pitot	Pre (+)	0.25	in H2O for	30.0	sec	Nozzle Number						Average Meter Temp (tm)		85.4					
		Pre (-)	0.20	in H2O for	30.0	sec	Average Nozzle Diameter (Dna)						Orifice Meter Coefficient (ΔH@)		1.877		in H2O			
		Post (+)	0.20	in H2O for	30.0	sec	Suggested Nozzle Diameter (Dn)		0.4895				Square Root ΔP (ΔP1/2avg)		0.08		in H2O			
		Post (-)	0.25	in H2O for	30.0	sec	Probe Number		SAMP-SP-0001				Stack Moisture Content (Bwa)		6.29		%			
						Probe Length		60				Stack Dry Molecular Weight (Ma)		29.46		lb/lb-mole				
						Liner Material		Inconel				Estimated Orifice Flow Rate (Qm)		0.75		acfm				
						Sample Case / Oven Number		SAMP-BC-0012				ΔP to ΔH Isokinetic Factor (K)								
						Impinger Case Number		SAMP-BC-0002												
Nozzle Measurements										Pressures										
Pre					PASS	Barometric Pressure (Pa)		29.85				in Hg								
Post					PASS	Stack Static Pressure (Pstatic)		0.00				in H2O								
						Absolute Stack Pressure (Pa)		29.85				in Hg								
						Absolute Meter Pressure (Pm)		29.99				in Hg								
Run Time										Wash Volumes										
Start	17:40		End	18:50		Weights	Imp 1	Imp 2	Imp 3	Imp 4	Imp 5	Imp 6	Imp 7	Imp 8						ml
						Pre	729.5	744.7	576.6	919.7										
						Post	774.3	753.2	578.6	928.8										ml
Traverse Point #	Sampling Time (Θ)	Timer Time	Dry Gas Meter Reading (Vm)	Velocity Head (Δp)	Desired Orifice ΔH (ΔHd)	Actual Orifice ΔH (ΔHa)	Stack Temp (ts)	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 (tm)	Meter Outlet Temp (tmo)	Pump Vacuum	Square Root ΔP (Δp1/2)	Local Stack Velocity (Vsh)	Cumul. Meter Volume (Vm)std	Cumul. Percent IsoKinetic (I)	Est-Run Meter Volume (Vm)std
	min	hh:mm:ss	ft³	in H2O	in H2O	in H2O	F	F	F	F	F	F	F	F	in Hg	√(in H2O)	ft/sec	dscf	%	dscf
A-1	0.0	00:00:00	447.790	0.005	1.877	1.90	884	250		64			84	84	0.0	0.07	6.20	1.906		45.749
A-2	2.7	00:02:43	449.730	0.005	1.877	1.90	925	250		46			84	84	0.0	0.07	6.29	3.891		46.692
A-3	5.4	00:05:25	451.750	0.005	1.877	1.90	970	250		43			84	84	0.0	0.07	6.39	5.719		45.749
A-4	8.1	00:08:07	453.610	0.005	1.877	1.90	999	250		43			84	84	0.0	0.07	6.46	7.595		45.572
A-5	10.8	00:10:50	455.520	0.010	1.877	1.90	1045	250		43			84	84	0.0	0.10	9.27	9.462		45.419
A-6	13.5	00:13:33	457.420	0.005	1.877	1.90	1101	250		43			84	84	0.0	0.07	6.68	11.309		45.238
A-7	16.3	00:16:15	459.300	0.010	1.877	1.90	1113	250		44			85	85	0.0	0.10	9.48	13.232		45.366
A-8	19.0	00:18:58	461.260	0.005	1.877	1.90	797	250		44			85	85	0.0	0.07	5.99	15.164		45.492
A-9	21.7	00:21:40	463.230	0.005	1.877	1.90	771	250		44			85	85	0.0	0.07	5.93	17.067		45.511
A-10	24.4	00:24:22	465.170	0.005	1.877	1.90	845	250		45			86	86	0.0	0.07	6.11	19.162		45.988
A-11	27.1	00:27:05	467.310	0.010	1.877	1.90	802	250		45			86	86	0.0	0.10	8.49	20.885		45.566
A-12	29.8	00:29:47	469.070	0.005	1.877	1.90	659	250		45			86	86	0.0	0.07	5.65	22.706		45.411
B-1	32.5	00:32:30	470.930	0.005	1.877	1.90	695	250		51			86	86	0.0	0.07	5.74	24.752		45.695
B-2	35.2	00:35:12	473.020	0.005	1.877	1.90	1008	250		45			86	86	0.0	0.07	6.48	26.563		45.536
B-3	37.9	00:37:55	474.870	0.005	1.877	1.90	1084	250		45			86	86	0.0	0.07	6.64	28.403		45.445
B-4	40.6	00:40:37	476.750	0.005	1.877	1.90	1089	250		45			86	86	0.0	0.07	6.65	30.332		45.498
B-5	43.3	00:43:20	478.720	0.005	1.877	1.90	1113	250		46			86	86	0.0	0.07	6.70	32.358		45.682
B-6	46.0	00:46:03	480.790	0.005	1.877	1.90	1113	250		47			86	86	0.0	0.07	6.70	33.954		45.272
B-7	48.8	00:48:45	482.420	0.010	1.877	1.90	1133	250		48			86	86	0.0	0.10	9.54	35.804		45.226
B-8	51.5	00:51:28	484.310	0.010	1.877	1.90	1104	250		48			86	86	0.0	0.10	9.45	37.586		45.103
B-9	54.2	00:54:10	486.130	0.005	1.877	1.90	1049	250		48			86	86	0.0	0.07	6.57	39.505		45.148
B-10	56.9	00:56:53	488.090	0.005	1.877	1.90	930	250		48			86	86	0.0	0.07	6.30	41.375		45.136
B-11	59.6	00:59:35	490.000	0.005	1.877	1.90	896	250		48			86	86	0.0	0.07	6.22	43.274		45.155
B-12	62.3	01:02:18	491.940	0.005	1.877	1.90	776	250		48			86	86	0.0	0.07	5.94	45.202		45.202
Last Pt	65.0	01:05:00	493.910																	
Final Val	65.0	01:05:00	493.910												Max Vac	0.0	Final Values	45.202		
Average Values						0.01		1.90	954	250		47		85	85		0.08	6.91		
													85							

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

Plant Name	Norman Facility
Sampling Location	30 ECD
Project #	cel-14-norman.ok-comp#1

Date	06/18/14
Operator	DG
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 (+)	0.20	in H ₂ O for	30.0 sec
		Pre (-)	0.15	in H ₂ O for	30.0 sec
		Post (+)	0.25	in H ₂ O for	30.0 sec
		Post (-)	0.20	in H ₂ O for	30.0 sec

Nozzle Measurements				
Pre				PASS
Post				PASS

Run Time			
Start	19:05	End	20:15

Weights	Imp 1	Imp 2	Imp 3	Imp 4	Imp 5	Imp 6	Imp 7	Imp 8
Pre	774.3	753.2	578.6	928.8				
Post	814.9	762.8	580.8	938.3				

Sampling Equipment		
Meter Box Number	SAMP-CP-0023	
Meter Cal Factor	(Y)	1.010
Nozzle Number		
Average Nozzle Diameter	(D _{no})	in
Suggested Nozzle Diameter	(D _n)	0.4740 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-0002	

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Coefficient	(C _p)	0.819	
Average Stack Temp	(t _s)	983.7	F
Average Meter Temp	(t _m)	85.0	
Orifice Meter Coefficient	(ΔH@)	1.877	in H ₂ O
Square Root ΔP	(ΔP ^{1/2} _{avg})	0.08	in H ₂ O
Stack Moisture Content	(B _{ws})	5.99	%
Stack Dry Molecular Weight	(M _d)	29.44	lb/lb-mole
Estimated Orifice Flow Rate	(Q _m)	0.70	acfm
ΔP to ΔH Isokinetic Factor	(K)		

Pressures			
Barometric Pressure	(P _b)	29.83	in Hg
Stack Static Pressure	(P _{static})	0.00	in H ₂ O
Absolute Stack Pressure	(P _a)	29.83	in Hg
Absolute Meter Pressure	(P _m)	29.97	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	496.570	0.005	1.877	1.90	973	250		64			85	85	0.0	0.07	6.40	1.901		45.634
A-2	2.7	00:02:43	498.510	0.005	1.877	1.90	1017	250		50			85	85	0.0	0.07	6.50	3.862		46.340
A-3	5.4	00:05:25	500.510	0.005	1.877	1.90	1042	250		49			85	85	0.0	0.07	6.55	5.685		45.478
A-4	8.1	00:08:07	502.370	0.005	1.877	1.90	1047	250		48			85	85	0.0	0.07	6.56	7.351		44.105
A-5	10.8	00:10:50	504.070	0.005	1.877	1.90	1062	250		48			85	85	0.0	0.07	6.60	9.184		44.082
A-6	13.5	00:13:33	505.940	0.010	1.877	1.90	1120	250		49			85	85	0.0	0.10	9.50	10.997		43.988
A-7	16.3	00:16:15	507.790	0.005	1.877	1.90	1162	250		50			85	85	0.0	0.07	6.81	12.830		43.988
A-8	19.0	00:18:58	509.660	0.010	1.877	1.90	1039	250		50			85	85	0.0	0.10	9.26	14.721		44.164
A-9	21.7	00:21:40	511.590	0.010	1.877	1.90	1040	250		50			85	85	0.0	0.10	9.26	16.740		44.641
A-10	24.4	00:24:22	513.650	0.005	1.877	1.90	916	250		51			85	85	0.0	0.07	6.27	18.632		44.717
A-11	27.1	00:27:05	515.580	0.005	1.877	1.90	812	250		51			85	85	0.0	0.07	6.03	20.563		44.865
A-12	29.8	00:29:47	517.550	0.005	1.877	1.90	690	250		51			85	85	0.0	0.07	5.73	22.396		44.792
B-1	32.5	00:32:30	519.420	0.005	1.877	1.90	780	250		55			85	85	0.0	0.07	5.95	24.464		45.164
B-2	35.2	00:35:12	521.530	0.005	1.877	1.90	1030	250		52			85	85	0.0	0.07	6.53	26.385		45.231
B-3	37.9	00:37:55	523.490	0.005	1.877	1.90	1082	250		52			85	85	0.0	0.07	6.64	28.335		45.336
B-4	40.6	00:40:37	525.480	0.010	1.877	1.90	1099	250		52			85	85	0.0	0.10	9.44	30.178		45.267
B-5	43.3	00:43:20	527.360	0.010	1.877	1.90	1125	250		52			85	85	0.0	0.10	9.52	32.148		45.385
B-6	46.0	00:46:03	529.370	0.005	1.877	1.90	1053	250		54			85	85	0.0	0.07	6.58	33.853		45.138
B-7	48.8	00:48:45	531.110	0.005	1.877	1.90	1028	250		53			85	85	0.0	0.07	6.52	35.872		45.313
B-8	51.5	00:51:28	533.170	0.005	1.877	1.90	1108	250		53			85	85	0.0	0.07	6.69	37.784		45.340
B-9	54.2	00:54:10	535.120	0.005	1.877	1.90	1088	250		54			85	85	0.0	0.07	6.65	39.489		45.130
B-10	56.9	00:56:53	536.860	0.005	1.877	1.90	1001	250		54			85	85	0.0	0.07	6.46	41.714		45.506
B-11	59.6	00:59:35	539.130	0.005	1.877	1.90	650	250		54			85	85	0.0	0.07	5.63	43.762		45.665
B-12	62.3	01:02:18	541.220	0.005	1.877	1.90	644	250		54			85	85	0.0	0.07	5.62	45.772		45.772
Last Pt	65.0	01:05:00	543.270																	
Final Val	65.0	01:05:00	543.270											Max Vac	0.0		Final Values	45.772		
Average Values				0.01		1.90	984	250		52			85	85		0.08	6.99			
													85							

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

Plant Name	Norman Facility
Sampling Location	30 ECD
Project #	cel-14-norman.ok-comp#1

Date	06/19/14
Operator	DG
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 (+)	0.15	in H ₂ O for	30.0
		Pre (-)	0.25	in H ₂ O for	30.0
		Post (+)	0.20	in H ₂ O for	30.0
		Post (-)	0.20	in H ₂ O for	30.0

Nozzle Measurements				
Pre				PASS
Post				PASS

Run Time			
Start	08:00	End	09:10

Weights	Imp 1	Imp 2	Imp 3	Imp 4	Imp 5	Imp 6	Imp 7	Imp 8
Pre	713.2	712.8	565.9	882.2				
Post	753.3	721.2	568.8	894.8				

Sampling Equipment		
Meter Box Number	SAMP-CP-0023	
Meter Cal Factor	(Y)	1.010
Nozzle Number		
Average Nozzle Diameter	(D _{no})	in
Suggested Nozzle Diameter	(D _n)	0.4737 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-0002	

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Coefficient	(C _p)	0.819	
Average Stack Temp	(t _s)	994.3	F
Average Meter Temp	(t _m)	72.5	
Orifice Meter Coefficient	(ΔH@)	1.877	in H ₂ O
Square Root ΔP	(ΔP ^{1/2} _{avg})	0.08	in H ₂ O
Stack Moisture Content	(B _{ws})	6.09	%
Stack Dry Molecular Weight	(M _d)	29.40	lb/lb-mole
Estimated Orifice Flow Rate	(Q _m)	0.70	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)	30.10	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	547.960	0.005	1.877	1.90	928	250		62			70	70	0.0	0.07	6.29	1.883		45.186
A-2	2.7	00:02:43	549.820	0.005	1.877	1.90	993	250		49			70	70	0.0	0.07	6.43	3.857		46.279
A-3	5.4	00:05:25	551.770	0.005	1.877	1.90	1009	250		47			70	70	0.0	0.07	6.47	5.830		46.644
A-4	8.1	00:08:07	553.720	0.005	1.877	1.90	1076	250		47			70	70	0.0	0.07	6.62	7.845		47.069
A-5	10.8	00:10:50	555.710	0.005	1.877	1.90	1100	250		47			71	71	0.0	0.07	6.67	9.613		46.142
A-6	13.5	00:13:33	557.460	0.005	1.877	1.90	1123	250		48			71	71	0.0	0.07	6.72	11.603		46.413
A-7	16.3	00:16:15	559.430	0.010	1.877	1.90	1116	250		49			72	72	0.0	0.10	9.48	13.529		46.386
A-8	19.0	00:18:58	561.340	0.010	1.877	1.90	1117	250		50			72	72	0.0	0.10	9.48	15.314		45.943
A-9	21.7	00:21:40	563.110	0.015	1.877	1.90	1018	250		50			72	72	0.0	0.12	11.24	17.260		46.028
A-10	24.4	00:24:22	565.040	0.015	1.877	1.90	766	250		50			72	72	0.0	0.12	10.24	19.257		46.217
A-11	27.1	00:27:05	567.020	0.010	1.877	1.90	650	250		51			73	73	0.0	0.10	7.95	21.240		46.342
A-12	29.8	00:29:47	568.990	0.005	1.877	1.90	592	250		51			73	73	0.0	0.07	5.48	23.273		46.546
B-1	32.5	00:32:30	571.010	0.005	1.877	1.90	755	250		55			73	73	0.0	0.07	5.88	25.226		46.571
B-2	35.2	00:35:12	572.950	0.005	1.877	1.90	990	250		52			73	73	0.0	0.07	6.43	27.169		46.575
B-3	37.9	00:37:55	574.880	0.005	1.877	1.90	1036	250		52			73	73	0.0	0.07	6.53	29.071		46.513
B-4	40.6	00:40:37	576.770	0.005	1.877	1.90	1044	250		52			73	73	0.0	0.07	6.55	31.003		46.505
B-5	43.3	00:43:20	578.690	0.005	1.877	1.90	1070	250		52			74	74	0.0	0.07	6.60	33.003		46.592
B-6	46.0	00:46:03	580.680	0.005	1.877	1.90	1088	250		53			74	74	0.0	0.07	6.64	34.831		46.442
B-7	48.8	00:48:45	582.500	0.010	1.877	1.90	1107	250		53			74	74	0.0	0.10	9.45	36.750		46.421
B-8	51.5	00:51:28	584.410	0.010	1.877	1.90	1121	250		54			74	74	0.0	0.10	9.49	39.071		46.885
B-9	54.2	00:54:10	586.720	0.010	1.877	1.90	1104	250		54			74	74	0.0	0.10	9.44	40.618		46.420
B-10	56.9	00:56:53	588.260	0.010	1.877	1.90	1057	250		55			74	74	0.0	0.10	9.30	42.577		46.448
B-11	59.6	00:59:35	590.210	0.005	1.877	1.90	1006	250		55			74	74	0.0	0.07	6.46	44.556		46.493
B-12	62.3	01:02:18	592.180	0.005	1.877	1.90	996	250		55			74	74	0.0	0.07	6.44	46.525		46.525
Last Pt	65.0	01:05:00	594.140																	
Final Val	65.0	01:05:00	594.140												Max Vac	0.0	Final Values	46.525		
Average Values				0.01		1.90	994	250		52			73	73		0.08	7.59			
													73							

CIMARRON ENERGY, INC.
30 ECD
Norman Facility

Unit Data

Meas. Stack Moisture	6.3	%
Stack Exhaust Flow (M2)	41,579	SCFH

Weather Data

Barometric Pressure	29.85	in. Hg
Relative Humidity	35	%
Ambient Temperature	84	°F
Specific Humidity	0.008697	lb H ₂ O / lb air

90-100 Load, Run - 30 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	06/18/14 17:40:27	2040	14.38	6.03	0.15	4.57	26.99	98.30	529.00
	06/18/14 17:40:57	2070	14.82	7.15	0.28	4.38	26.99	98.30	529.00
	06/18/14 17:41:27	2100	14.71	9.31	0.12	4.36	25.77	98.40	527.00
	06/18/14 17:41:57	2130	14.73	5.96	0.25	4.39	25.77	98.40	527.00
	06/18/14 17:42:27	2160	14.73	9.21	0.23	4.34	27.24	98.40	540.00
	06/18/14 17:42:57	2190	14.69	8.42	0.18	4.40	27.24	98.40	540.00
	06/18/14 17:43:27	2220	14.26	6.70	0.10	4.67	27.62	98.50	541.00
	06/18/14 17:43:57	2250	14.09	3.89	0.12	4.79	27.62	98.50	541.00
	06/18/14 17:44:27	2280	14.20	4.45	0.43	4.86	28.95	98.50	554.00
	06/18/14 17:44:57	2310	14.42	9.21	0.12	4.43	28.95	98.50	554.00
	06/18/14 17:45:27	2340	14.08	5.02	0.08	4.80	27.21	98.50	540.00
	06/18/14 17:45:57	2370	14.81	3.93	0.17	4.66	27.21	98.50	540.00
	06/18/14 17:46:27	2400	15.77	7.85	0.26	4.32	28.01	98.50	496.00
	06/18/14 17:46:57	2430	15.33	7.39	0.14	4.66	28.01	98.50	496.00
	06/18/14 17:47:27	2460	15.79	5.50	0.24	4.41	27.21	98.50	540.00
	06/18/14 17:47:57	2490	15.15	6.22	0.08	4.72	27.21	98.50	540.00
	06/18/14 17:48:27	2520	15.04	2.86	0.13	4.90	27.71	98.60	541.00
	06/18/14 17:48:57	2550	15.06	4.02	0.08	4.80	27.71	98.60	541.00
	06/18/14 17:49:27	2580	14.15	2.28	0.05	5.10	28.37	98.60	553.00
	06/18/14 17:49:57	2610	13.55	1.73	0.02	5.12	28.37	98.60	553.00
	06/18/14 17:50:27	2640	13.04	1.10	0.03	5.50	28.23	98.60	553.00
	06/18/14 17:50:57	2670	13.43	0.98	0.06	5.29	28.23	98.60	553.00
	06/18/14 17:51:27	2700	12.89	0.84	0.07	5.63	27.96	98.60	507.00
	06/18/14 17:51:57	2730	12.94	0.56	0.04	5.57	27.96	98.60	507.00
	06/18/14 17:52:27	2760	13.62	0.92	0.08	5.31	29.95	98.60	554.00
	06/18/14 17:52:57	2790	13.70	3.49	0.03	4.95	29.95	98.60	554.00
	06/18/14 17:53:27	2820	12.82	1.71	0.04	5.67	35.02	98.60	606.00
	06/18/14 17:53:57	2850	12.19	0.67	0.07	6.04	35.02	98.60	606.00
	06/18/14 17:54:27	2880	12.82	0.33	0.06	5.80	34.46	98.60	594.00
	06/18/14 17:54:57	2910	13.09	0.73	0.08	5.54	34.46	98.60	594.00
	06/18/14 17:55:27	2940	13.89	3.34	0.16	4.96	35.54	98.60	607.00
	06/18/14 17:55:57	2970	12.71	4.52	0.04	5.69	35.54	98.60	607.00
	06/18/14 17:56:27	3000	13.03	0.99	0.06	5.59	34.71	98.60	594.00
	06/18/14 17:56:57	3030	13.47	1.88	0.06	5.33	34.71	98.60	594.00
	06/18/14 17:57:27	3060	13.62	3.62	0.03	5.03	34.02	98.60	605.00
	06/18/14 17:57:57	3090	13.29	2.17	0.05	5.36	34.02	98.60	605.00
	06/18/14 17:58:27	3120	13.01	1.72	0.04	5.52	34.96	98.60	606.00
	06/18/14 17:58:57	3150	12.75	0.94	0.03	5.77	34.96	98.60	606.00
	06/18/14 17:59:27	3180	13.21	1.09	0.02	5.47	34.41	98.60	594.00
	06/18/14 17:59:57	3210	13.75	2.59	0.07	5.04	34.41	98.60	594.00
	06/18/14 18:00:27	3240	13.61	3.12	0.04	5.15	35.35	98.50	607.00
	06/18/14 18:00:57	3270	13.50	2.46	0.06	5.17	35.35	98.50	607.00
	06/18/14 18:01:27	3300	13.64	2.65	0.05	5.12	34.27	98.50	594.00
	06/18/14 18:01:57	3330	13.50	2.89	0.05	5.18	34.27	98.50	594.00
	06/18/14 18:02:27	3360	13.45	2.18	0.05	5.32	35.35	98.40	607.00
	06/18/14 18:02:57	3390	13.65	2.43	0.04	5.13	35.35	98.40	607.00
A2	06/18/14 18:03:27	3420	13.65	4.07	0.04	5.07	34.16	98.30	594.00
	06/18/14 18:03:57	3450	13.66	2.72	0.07	5.08	34.16	98.30	594.00
	06/18/14 18:04:27	3480	13.16	1.83	0.04	5.43	34.57	98.20	606.00
	06/18/14 18:04:57	3510	13.54	1.79	0.08	5.16	34.57	98.20	606.00
	06/18/14 18:05:27	3540	13.55	2.21	0.08	5.19	34.30	98.10	594.00
	06/18/14 18:05:57	3570	13.69	2.09	0.09	5.14	34.30	98.10	594.00
	06/18/14 18:06:27	3600	13.60	3.02	0.09	5.05	34.85	98.00	595.00
	06/18/14 18:06:57	3630	13.37	1.92	0.04	5.33	34.85	98.00	595.00
	06/18/14 18:07:27	3660	13.36	1.57	0.05	5.35	34.71	98.00	606.00
	06/18/14 18:07:57	3690	13.85	2.86	0.07	5.01	34.71	98.00	606.00
	06/18/14 18:08:27	3720	13.55	4.24	0.04	5.12	34.46	98.00	583.00
	06/18/14 18:08:57	3750	13.31	2.19	0.08	5.33	34.46	98.00	583.00
	06/18/14 18:09:27	3780	13.99	3.61	0.13	4.97	35.26	98.00	619.00
	06/18/14 18:09:57	3810	13.61	5.14	0.09	5.05	35.26	98.00	619.00
	06/18/14 18:10:27	3840	13.60	2.21	0.08	5.15	34.32	97.90	595.00

CIMARRON ENERGY, INC.
30 ECD
Norman Facility

Unit Data

Meas. Stack Moisture	6.3	%
Stack Exhaust Flow (M2)	41,579	SCFH

Weather Data

Barometric Pressure	29.85	in. Hg
Relative Humidity	35	%
Ambient Temperature	84	°F
Specific Humidity	0.008697	lb H ₂ O / lb air

90-100 Load, Run - 30 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
	06/18/14 18:10:57	3870	13.34	1.87	0.09	5.29	34.32	97.90	595.00
	06/18/14 18:11:27	3900	13.21	1.42	0.07	5.41	35.26	97.80	619.00
	06/18/14 18:11:57	3930	13.20	1.24	0.11	5.42	35.26	97.80	619.00
	06/18/14 18:12:27	3960	13.57	1.54	0.11	5.27	34.21	97.90	606.00
	06/18/14 18:12:57	3990	13.56	3.14	0.06	5.12	34.21	97.90	606.00
	06/18/14 18:13:27	4020	13.98	3.43	0.08	4.93	35.40	97.90	607.00
	06/18/14 18:13:57	4050	13.86	4.03	0.08	4.94	35.40	97.90	607.00
	06/18/14 18:14:27	4080	13.94	4.00	0.05	4.93	34.32	97.80	595.00
	06/18/14 18:14:57	4110	13.84	3.98	0.07	4.94	34.32	97.80	595.00
	06/18/14 18:15:27	4140	13.54	2.67	0.07	5.19	35.13	97.80	619.00
	06/18/14 18:15:57	4170	13.49	2.44	0.05	5.19	35.13	97.80	619.00
	06/18/14 18:16:27	4200	13.38	2.01	0.05	5.24	34.74	97.80	595.00
	06/18/14 18:16:57	4230	13.48	2.34	0.03	5.25	34.74	97.80	595.00
	06/18/14 18:17:27	4260	13.33	2.00	0.04	5.36	34.74	97.70	595.00
	06/18/14 18:17:57	4290	13.53	2.09	0.05	5.19	34.74	97.70	595.00
	06/18/14 18:18:27	4320	13.41	2.34	0.02	5.26	35.15	97.70	596.00
	06/18/14 18:18:57	4350	13.32	1.91	0.03	5.30	35.15	97.70	596.00
	06/18/14 18:19:27	4380	13.19	1.40	0.04	5.47	34.74	97.70	595.00
	06/18/14 18:19:57	4410	13.29	1.35	0.08	5.34	34.74	97.70	595.00
	06/18/14 18:20:27	4440	13.13	1.30	0.05	5.45	35.02	97.60	607.00
	06/18/14 18:20:57	4470	12.95	0.96	0.06	5.60	35.02	97.60	607.00
	06/18/14 18:21:27	4500	13.09	0.80	0.05	5.69	34.35	97.60	618.00
	06/18/14 18:21:57	4530	14.07	0.67	0.03	5.60	34.35	97.60	618.00
	06/18/14 18:22:27	4560	14.06	1.15	0.04	5.58	35.29	97.60	619.00
	06/18/14 18:22:57	4590	14.50	1.13	0.03	5.31	35.29	97.60	619.00
	06/18/14 18:23:27	4620	14.69	2.17	0.07	5.19	34.21	97.50	606.00
	06/18/14 18:23:57	4650	14.33	1.97	0.06	5.38	34.21	97.50	606.00
	06/18/14 18:24:27	4680	14.72	1.62	0.09	5.22	35.29	97.50	608.00
	06/18/14 18:24:57	4710	14.79	2.80	0.04	5.10	35.29	97.50	608.00
	06/18/14 18:25:27	4740	14.71	2.67	0.03	5.04	33.69	97.50	594.00
	06/18/14 18:25:57	4770	13.58	2.42	0.01	5.14	33.69	97.50	594.00
A3	06/18/14 18:26:27	4800	13.38	1.80	0.01	5.29	34.77	97.50	596.00
	06/18/14 18:26:57	4830	13.27	1.72	0.04	5.40	34.77	97.50	596.00
	06/18/14 18:27:27	4860	13.72	2.35	0.05	5.11	34.52	97.40	595.00
	06/18/14 18:27:57	4890	13.51	2.68	0.04	5.16	34.52	97.40	595.00
	06/18/14 18:28:27	4920	13.35	1.82	0.05	5.34	35.32	97.30	608.00
	06/18/14 18:28:57	4950	13.37	1.79	0.04	5.30	35.32	97.30	608.00
	06/18/14 18:29:27	4980	13.49	1.62	0.05	5.21	34.27	97.30	595.00
	06/18/14 18:29:57	5010	13.67	1.72	0.05	5.16	34.27	97.30	595.00
	06/18/14 18:30:27	5040	13.48	2.30	0.04	5.17	34.93	97.20	608.00
	06/18/14 18:30:57	5070	13.60	1.78	0.03	5.16	34.93	97.20	608.00
	06/18/14 18:31:27	5100	13.53	1.87	0.05	5.21	34.13	97.20	595.00
	06/18/14 18:31:57	5130	13.56	1.86	0.02	5.21	34.13	97.20	595.00
	06/18/14 18:32:27	5160	13.40	2.00	0.02	5.23	34.41	97.10	595.00
	06/18/14 18:32:57	5190	13.26	1.38	0.01	5.39	34.41	97.10	595.00
	06/18/14 18:33:27	5220	13.63	1.57	0.00	5.20	34.30	97.10	595.00
	06/18/14 18:33:57	5250	13.60	2.05	0.04	5.12	34.30	97.10	595.00
	06/18/14 18:34:27	5280	13.57	2.11	0.06	5.14	34.82	97.10	596.00
	06/18/14 18:34:57	5310	13.30	1.53	0.06	5.34	34.82	97.10	596.00
	06/18/14 18:35:27	5340	13.45	1.46	0.06	5.29	34.57	97.00	607.00
	06/18/14 18:35:57	5370	13.17	1.54	0.05	5.36	34.57	97.00	607.00
	06/18/14 18:36:27	5400	13.25	1.13	0.03	5.42	35.49	97.10	597.00
	06/18/14 18:36:57	5430	13.27	1.17	0.04	5.43	35.49	97.10	597.00
	06/18/14 18:37:27	5460	13.53	2.09	0.03	5.22	34.30	97.10	595.00
	06/18/14 18:37:57	5490	13.42	1.95	0.03	5.23	34.30	97.10	595.00
	06/18/14 18:38:27	5520	13.55	1.59	0.03	5.22	34.82	97.10	608.00
	06/18/14 18:38:57	5550	13.74	2.06	0.03	5.07	34.82	97.10	608.00
	06/18/14 18:39:27	5580	13.45	2.61	0.05	5.20	34.16	97.10	595.00
	06/18/14 18:39:57	5610	13.43	1.90	0.05	5.27	34.16	97.10	595.00
	06/18/14 18:40:27	5640	13.18	1.55	0.05	5.40	34.82	97.00	596.00
	06/18/14 18:40:57	5670	13.19	1.22	0.03	5.47	34.82	97.00	596.00

CIMARRON ENERGY, INC.
30 ECD
Norman Facility

Unit Data

Meas. Stack Moisture	6.3	%
Stack Exhaust Flow (M2)	41,579	SCFH

Weather Data

Barometric Pressure	29.85	in. Hg
Relative Humidity	35	%
Ambient Temperature	84	°F
Specific Humidity	0.008697	lb H ₂ O / lb air

90-100 Load, Run - 30 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
06/18/14 18:41:27	5700	13.71	1.67	0.04	5.11	34.71	97.00	619.00
06/18/14 18:41:57	5730	13.66	1.86	0.02	5.15	34.71	97.00	619.00
06/18/14 18:42:27	5760	13.19	1.49	0.03	5.36	34.71	97.00	596.00
06/18/14 18:42:57	5790	13.37	1.01	0.05	5.41	34.71	97.00	596.00
06/18/14 18:43:27	5820	13.83	2.49	0.05	4.97	34.18	97.00	607.00
06/18/14 18:43:57	5850	13.46	2.05	0.02	5.24	34.18	97.00	607.00
06/18/14 18:44:27	5880	13.59	1.48	0.03	5.15	34.99	97.00	596.00
06/18/14 18:44:57	5910	13.55	2.16	0.04	5.18	34.99	97.00	596.00
06/18/14 18:45:27	5940	13.20	1.66	0.03	5.39	34.57	97.00	596.00
06/18/14 18:45:57	5970	13.76	1.63	0.03	5.11	34.57	97.00	596.00
06/18/14 18:46:27	6000	13.49	2.48	0.02	5.21	34.85	96.90	596.00
06/18/14 18:46:57	6030	13.34	1.88	0.02	5.30	34.85	96.90	596.00
06/18/14 18:47:27	6060	13.31	1.35	0.04	5.34	34.05	96.90	584.00
06/18/14 18:47:57	6090	13.58	1.78	0.06	5.19	34.05	96.90	584.00
06/18/14 18:48:27	6120	13.31	1.74	0.05	5.30	34.99	96.90	608.00
06/18/14 18:48:57	6150	13.23	1.38	0.05	5.42	34.99	96.90	608.00
06/18/14 18:49:27	6180	13.30	1.41	0.02	5.32	34.46	96.90	607.00
06/18/14 18:49:57	6210	13.66	1.63	0.02	5.22	34.46	96.90	607.00
06/18/14 18:50:27	6240	13.63	2.44	0.04	5.08	34.99	96.80	608.00
RAW AVERAGE		13.66	2.56	0.07	5.18	33.42	97.80	589.42

Bias	Serial Number:	INST-22-0005	INST-CO-0034	INST-VC-0006	INST-22-0005	Press. Trans	Temp. Trans.	F-Flow Trans.
					0	0	0	
		(%)	(ppmvd)	(ppmvw)	(%)	(in. H ₂ O)	(°F)	(SCFH)
	Initial Zero	0.01	0.01	0.02	0.03			
	Final Zero	0.02	0.05	0.02	0.03			
	Avg. Zero	0.02	0.03	0.02	0.03			
	Initial UpScale	12.14	4.97	3.08	9.17			
	Final UpScale	12.13	4.96	2.97	9.18			
	Avg. UpScale	12.14	4.97	3.03	9.18			
	Upscale Cal Gas	12.25	5.12	3.04	9.33			

EMISSIONS DATA	O ₂	CO	THC	CO ₂
Corrected Raw Average (ppm/% dry basis)	13.79	2.63	0.05	5.26
Corrected Raw Average (ppm/% wet basis)	12.93	2.46	0.04	4.92
Emission Rate (lb/hr)	N/A	0.01	0.00	N/A

CIMARRON ENERGY, INC.
30 ECD
Norman Facility

Unit Data

Meas. Stack Moisture	6.0	%
Stack Exhaust Flow (M2)	41,273	SCFH

Weather Data

Barometric Pressure	29.83	in. Hg
Relative Humidity	45	%
Ambient Temperature	86	° F
Specific Humidity	0.011992	lb H ₂ O / lb air

90-100 Load, Run - 30 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	06/18/14 19:05:27	7140	13.83	2.20	0.03	5.03	29.48	95.60	545.00
	06/18/14 19:05:57	7170	13.86	2.56	0.02	4.95	29.48	95.60	545.00
	06/18/14 19:06:27	7200	13.65	2.32	0.03	5.12	30.28	95.60	557.00
	06/18/14 19:06:57	7230	14.06	2.54	0.06	4.89	30.28	95.60	557.00
	06/18/14 19:07:27	7260	14.45	4.41	0.10	4.56	29.09	95.50	545.00
	06/18/14 19:07:57	7290	13.81	4.35	0.01	5.00	29.09	95.50	545.00
	06/18/14 19:08:27	7320	13.64	2.52	0.01	5.09	29.89	95.30	557.00
	06/18/14 19:08:57	7350	13.75	2.24	0.03	5.06	29.89	95.30	557.00
	06/18/14 19:09:27	7380	13.98	2.48	0.04	4.94	29.53	95.20	546.00
	06/18/14 19:09:57	7410	13.82	3.29	0.02	4.95	29.53	95.20	546.00
	06/18/14 19:10:27	7440	13.96	2.60	0.02	4.94	29.95	95.00	558.00
	06/18/14 19:10:57	7470	13.80	2.83	0.05	4.98	29.95	95.00	558.00
	06/18/14 19:11:27	7500	13.61	1.89	0.04	5.14	29.70	94.80	546.00
	06/18/14 19:11:57	7530	13.60	1.76	0.02	5.15	29.70	94.80	546.00
	06/18/14 19:12:27	7560	13.62	2.20	0.04	5.15	29.73	94.70	569.00
	06/18/14 19:12:57	7590	13.79	2.19	0.06	5.01	29.73	94.70	569.00
	06/18/14 19:13:27	7620	13.78	2.50	0.05	5.03	30.14	94.50	558.00
	06/18/14 19:13:57	7650	13.83	2.70	0.07	5.01	30.14	94.50	558.00
	06/18/14 19:14:27	7680	13.83	2.45	0.06	4.99	29.37	94.40	546.00
	06/18/14 19:14:57	7710	13.68	2.49	0.03	5.07	29.37	94.40	546.00
	06/18/14 19:15:27	7740	13.61	2.19	0.01	5.14	30.34	94.20	559.00
	06/18/14 19:15:57	7770	13.33	1.72	0.02	5.31	30.34	94.20	559.00
	06/18/14 19:16:27	7800	13.23	1.20	0.03	5.41	32.36	94.10	573.00
	06/18/14 19:16:57	7830	13.45	1.62	0.08	5.28	32.36	94.10	573.00
	06/18/14 19:17:27	7860	13.53	1.65	0.06	5.25	35.57	93.90	612.00
	06/18/14 19:17:57	7890	13.17	1.87	0.04	5.40	35.57	93.90	612.00
	06/18/14 19:18:27	7920	13.02	1.09	0.03	5.57	35.32	93.80	600.00
	06/18/14 19:18:57	7950	13.06	1.07	0.02	5.53	35.32	93.80	600.00
	06/18/14 19:19:27	7980	13.14	1.03	0.04	5.51	34.54	93.60	611.00
	06/18/14 19:19:57	8010	13.19	1.42	0.04	5.41	34.54	93.60	611.00
	06/18/14 19:20:27	8040	13.38	1.28	0.03	5.34	35.24	93.50	601.00
	06/18/14 19:20:57	8070	13.23	1.36	0.03	5.41	35.24	93.50	601.00
	06/18/14 19:21:27	8100	13.35	1.38	0.03	5.32	34.18	93.40	599.00
	06/18/14 19:21:57	8130	13.39	1.51	0.00	5.32	34.18	93.40	599.00
	06/18/14 19:22:27	8160	13.55	1.91	0.00	5.18	35.54	93.40	601.00
	06/18/14 19:22:57	8190	13.26	1.72	0.02	5.40	35.54	93.40	601.00
	06/18/14 19:23:27	8220	13.20	1.28	0.02	5.46	33.94	93.30	599.00
	06/18/14 19:23:57	8250	13.36	1.64	0.04	5.29	33.94	93.30	599.00
	06/18/14 19:24:27	8280	13.27	1.45	0.03	5.39	35.43	93.30	613.00
	06/18/14 19:24:57	8310	13.28	1.52	0.02	5.42	35.43	93.30	613.00
	06/18/14 19:25:27	8340	13.22	1.39	0.03	5.39	34.49	93.30	600.00
	06/18/14 19:25:57	8370	13.31	1.16	0.02	5.37	34.49	93.30	600.00
	06/18/14 19:26:27	8400	13.12	1.26	0.02	5.49	35.43	93.30	601.00
	06/18/14 19:26:57	8430	13.32	1.11	0.01	5.37	35.43	93.30	601.00
	06/18/14 19:27:27	8460	13.41	1.23	0.02	5.30	34.24	93.30	599.00
	06/18/14 19:27:57	8490	13.36	1.43	0.04	5.31	34.24	93.30	599.00
A2	06/18/14 19:28:27	8520	13.50	1.52	0.01	5.21	35.46	93.20	601.00
	06/18/14 19:28:57	8550	13.31	1.77	0.04	5.39	35.46	93.20	601.00
	06/18/14 19:29:27	8580	13.47	1.65	0.04	5.26	34.27	93.20	599.00
	06/18/14 19:29:57	8610	13.60	1.89	0.01	5.14	34.27	93.20	599.00
	06/18/14 19:30:27	8640	13.32	1.48	0.03	5.35	35.32	93.20	601.00
	06/18/14 19:30:57	8670	13.68	1.74	0.02	5.11	35.32	93.20	601.00
	06/18/14 19:31:27	8700	13.65	2.40	0.03	5.13	34.02	93.30	611.00
	06/18/14 19:31:57	8730	13.54	2.22	0.07	5.13	34.02	93.30	611.00
	06/18/14 19:32:27	8760	13.26	1.31	0.04	5.43	35.21	93.20	612.00
	06/18/14 19:32:57	8790	13.33	1.26	0.02	5.38	35.21	93.20	612.00
	06/18/14 19:33:27	8820	13.55	1.65	0.01	5.14	34.30	93.20	611.00
	06/18/14 19:33:57	8850	13.26	1.36	0.05	5.42	34.30	93.20	611.00
	06/18/14 19:34:27	8880	13.23	1.20	0.05	5.40	35.24	93.20	612.00
	06/18/14 19:34:57	8910	13.33	1.45	0.04	5.38	35.24	93.20	612.00
	06/18/14 19:35:27	8940	13.61	1.68	0.06	5.16	34.32	93.20	600.00

CIMARRON ENERGY, INC.
30 ECD
Norman Facility

Unit Data

Meas. Stack Moisture	6.0	%
Stack Exhaust Flow (M2)	41,273	SCFH

Weather Data

Barometric Pressure	29.83	in. Hg
Relative Humidity	45	%
Ambient Temperature	86	°F
Specific Humidity	0.011992	lb H ₂ O / lb air

90-100 Load, Run - 30 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
	06/18/14 19:35:57	8970	13.37	1.52	0.02	5.30	34.32	93.20	600.00
	06/18/14 19:36:27	9000	13.44	1.53	0.02	5.29	35.26	93.20	612.00
	06/18/14 19:36:57	9030	13.32	1.75	0.01	5.29	35.26	93.20	612.00
	06/18/14 19:37:27	9060	13.48	1.59	0.05	5.27	34.46	93.10	600.00
	06/18/14 19:37:57	9090	13.27	1.55	0.06	5.40	34.46	93.10	600.00
	06/18/14 19:38:27	9120	13.33	1.38	0.05	5.34	35.40	93.10	601.00
	06/18/14 19:38:57	9150	13.32	1.65	0.05	5.36	35.40	93.10	601.00
	06/18/14 19:39:27	9180	13.21	1.40	0.05	5.42	34.21	93.00	588.00
	06/18/14 19:39:57	9210	13.12	1.00	0.04	5.52	34.21	93.00	588.00
	06/18/14 19:40:27	9240	13.09	1.02	0.04	5.52	35.43	93.00	613.00
	06/18/14 19:40:57	9270	13.36	1.50	0.04	5.34	35.43	93.00	613.00
	06/18/14 19:41:27	9300	13.14	1.87	0.04	5.49	33.96	93.00	599.00
	06/18/14 19:41:57	9330	13.22	1.68	0.03	5.42	33.96	93.00	599.00
	06/18/14 19:42:27	9360	13.19	1.32	0.02	5.49	35.46	92.90	601.00
	06/18/14 19:42:57	9390	13.30	1.74	0.02	5.31	35.46	92.90	601.00
	06/18/14 19:43:27	9420	13.02	1.50	0.02	5.61	34.38	92.90	600.00
	06/18/14 19:43:57	9450	12.83	1.09	0.02	5.68	34.38	92.90	600.00
	06/18/14 19:44:27	9480	13.06	0.91	0.02	5.59	35.07	92.90	601.00
	06/18/14 19:44:57	9510	12.99	1.07	0.04	5.59	35.07	92.90	601.00
	06/18/14 19:45:27	9540	13.02	0.81	0.03	5.60	34.13	92.80	600.00
	06/18/14 19:45:57	9570	13.05	1.09	0.00	5.51	34.13	92.80	600.00
	06/18/14 19:46:27	9600	12.75	0.93	0.00	5.76	35.35	92.80	613.00
	06/18/14 19:46:57	9630	13.04	0.82	0.04	5.58	35.35	92.80	613.00
	06/18/14 19:47:27	9660	13.01	0.95	0.02	5.57	35.35	92.70	601.00
	06/18/14 19:47:57	9690	12.88	0.91	0.02	5.67	35.35	92.70	601.00
	06/18/14 19:48:27	9720	12.81	0.80	0.03	5.76	34.85	92.60	601.00
	06/18/14 19:48:57	9750	13.24	0.94	0.02	5.44	34.85	92.60	601.00
	06/18/14 19:49:27	9780	13.18	1.42	0.04	5.46	34.18	92.60	611.00
	06/18/14 19:49:57	9810	13.13	1.61	0.01	5.47	34.18	92.60	611.00
	06/18/14 19:50:27	9840	12.98	1.29	-0.01	5.62	34.85	92.50	589.00
	06/18/14 19:50:57	9870	13.04	1.13	0.02	5.59	34.85	92.50	589.00
A3	06/18/14 19:51:27	9900	13.02	1.27	0.03	5.56	35.26	92.40	602.00
	06/18/14 19:51:57	9930	12.71	0.98	0.03	5.81	35.26	92.40	602.00
	06/18/14 19:52:27	9960	12.99	0.88	0.03	5.60	33.41	92.30	588.00
	06/18/14 19:52:57	9990	13.02	1.06	0.01	5.60	33.41	92.30	588.00
	06/18/14 19:53:27	10020	13.22	1.05	0.02	5.51	35.02	92.20	601.00
	06/18/14 19:53:57	10050	13.91	1.54	0.02	4.98	35.02	92.20	601.00
	06/18/14 19:54:27	10080	14.07	1.46	0.02	4.88	34.35	92.20	601.00
	06/18/14 19:54:57	10110	14.16	1.69	0.03	4.77	34.35	92.20	601.00
	06/18/14 19:55:27	10140	14.13	1.84	0.05	4.81	34.77	92.10	590.00
	06/18/14 19:55:57	10170	14.07	1.99	0.04	4.77	34.77	92.10	590.00
	06/18/14 19:56:27	10200	13.11	1.67	0.04	5.46	34.52	91.90	589.00
	06/18/14 19:56:57	10230	13.15	1.12	0.03	5.46	34.52	91.90	589.00
	06/18/14 19:57:27	10260	12.87	1.10	0.02	5.65	34.93	91.80	602.00
	06/18/14 19:57:57	10290	12.90	1.06	0.03	5.67	34.93	91.80	602.00
	06/18/14 19:58:27	10320	13.11	0.91	0.03	5.56	33.88	91.70	600.00
	06/18/14 19:58:57	10350	13.51	1.54	0.00	5.28	33.88	91.70	600.00
	06/18/14 19:59:27	10380	13.71	1.80	0.00	5.06	35.07	91.60	602.00
	06/18/14 19:59:57	10410	13.53	1.56	0.02	5.19	35.07	91.60	602.00
	06/18/14 20:00:27	10440	13.62	1.42	0.03	5.16	33.88	91.50	589.00
	06/18/14 20:00:57	10470	13.57	1.45	0.04	5.18	33.88	91.50	589.00
	06/18/14 20:01:27	10500	13.57	1.36	0.03	5.15	34.96	91.40	614.00
	06/18/14 20:01:57	10530	13.47	1.29	0.04	5.27	34.96	91.40	614.00
	06/18/14 20:02:27	10560	13.73	1.53	0.02	5.10	33.52	91.30	600.00
	06/18/14 20:02:57	10590	13.86	2.10	0.03	4.95	33.52	91.30	600.00
	06/18/14 20:03:27	10620	13.45	1.57	0.04	5.26	34.85	91.20	602.00
	06/18/14 20:03:57	10650	13.62	1.46	-0.01	5.16	34.85	91.20	602.00
	06/18/14 20:04:27	10680	13.49	1.98	0.02	5.15	34.21	91.10	590.00
	06/18/14 20:04:57	10710	13.48	1.28	0.00	5.32	34.21	91.10	590.00
	06/18/14 20:05:27	10740	13.70	0.75	-0.01	5.12	34.60	91.00	602.00
	06/18/14 20:05:57	10770	13.67	0.89	0.03	5.08	34.60	91.00	602.00

CIMARRON ENERGY, INC.
30 ECD
Norman Facility

Unit Data

Meas. Stack Moisture	6.0	%
Stack Exhaust Flow (M2)	41,273	SCFH

Weather Data

Barometric Pressure	29.83	in. Hg
Relative Humidity	45	%
Ambient Temperature	86	°F
Specific Humidity	0.011992	lb H ₂ O / lb air

90-100 Load, Run - 30 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
06/18/14 20:06:27	10800	13.62	0.79	0.02	5.14	34.63	90.80	602.00
06/18/14 20:06:57	10830	13.53	0.65	0.02	5.19	34.63	90.80	602.00
06/18/14 20:07:27	10860	13.34	0.55	0.01	5.36	34.90	90.70	603.00
06/18/14 20:07:57	10890	13.74	0.71	-0.02	5.09	34.90	90.70	603.00
06/18/14 20:08:27	10920	13.51	0.70	-0.02	5.21	34.38	90.60	602.00
06/18/14 20:08:57	10950	13.39	0.63	-0.01	5.29	34.38	90.60	602.00
06/18/14 20:09:27	10980	13.77	0.87	-0.01	5.06	34.27	90.50	591.00
06/18/14 20:09:57	11010	13.80	0.81	0.00	5.04	34.27	90.50	591.00
06/18/14 20:10:27	11040	13.72	0.90	0.00	5.05	34.16	90.40	614.00
06/18/14 20:10:57	11070	13.63	0.73	0.00	5.14	34.16	90.40	614.00
06/18/14 20:11:27	11100	13.67	0.62	-0.01	5.13	34.96	90.30	603.00
06/18/14 20:11:57	11130	13.71	0.80	-0.03	5.08	34.96	90.30	603.00
06/18/14 20:12:27	11160	13.48	0.78	-0.03	5.23	33.91	90.30	590.00
06/18/14 20:12:57	11190	13.73	0.78	-0.01	5.10	33.91	90.30	590.00
06/18/14 20:13:27	11220	13.74	0.86	-0.01	5.05	34.30	90.20	591.00
06/18/14 20:13:57	11250	13.84	0.78	-0.03	5.01	34.30	90.20	591.00
06/18/14 20:14:27	11280	13.69	0.83	-0.03	5.11	34.32	90.10	591.00
06/18/14 20:14:57	11310	13.58	0.77	0.00	5.13	34.32	90.10	591.00
06/18/14 20:15:27	11340	13.56	0.66	0.00	5.20	34.71	90.00	603.00
RAW AVERAGE		13.44	1.49	0.02	5.28	33.88	92.77	593.37

Bias	Serial Number:	O ₂	CO	THC	CO ₂	Press. Trans	Temp. Trans.	F-Flow Trans.
		INST-22-0005	INST-CO-0034	INST-VC-0006	INST-22-0005	0	0	0
		(%)	(ppmvd)	(ppmvw)	(%)	(in. H ₂ O)	(°F)	(SCFH)
	Initial Zero	0.02	0.05	0.02	0.03			
	Final Zero	0.01	0.02	0.03	0.05			
	Avg. Zero	0.02	0.04	0.03	0.04			
	Initial UpScale	12.13	4.96	2.97	9.18			
	Final UpScale	12.14	5.01	3.08	9.15			
	Avg. UpScale	12.14	4.99	3.03	9.17			
		12.25	5.12	3.04	9.33			

EMISSIONS DATA	O ₂	CO	THC	CO ₂
Corrected Raw Average (ppm/% dry basis)	13.56	1.51	0.00	5.35
Corrected Raw Average (ppm/% wet basis)	12.75	1.41	0.00	5.03
Emission Rate (lb/hr)	N/A	0.00	0.00	N/A

CIMARRON ENERGY, INC.

June 19, 2014

30 ECD

Norman Facility

Unit Data

Meas. Stack Moisture	6.1	%
Stack Exhaust Flow (M2)	44,684	SCFH

Weather Data

Barometric Pressure	29.96	in. Hg
Relative Humidity	59	%
Ambient Temperature	84	°F
Specific Humidity	0.014747	lb H ₂ O / lb air

90-100 Load, Run - 30 ECD R12

	Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmvd)	THC (ppmwv)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
A1	06/19/14 08:00:22	5280	13.84	1.05	0.04	5.00	26.41	70.00	532.00
	06/19/14 08:00:52	5310	13.84	1.00	0.02	5.04	26.41	70.00	532.00
	06/19/14 08:01:22	5340	13.82	1.01	0.04	5.01	26.41	70.00	520.00
	06/19/14 08:01:52	5370	13.78	0.93	0.04	5.06	26.41	70.00	520.00
	06/19/14 08:02:22	5400	13.69	0.92	0.05	5.11	27.57	69.90	545.00
	06/19/14 08:02:52	5430	13.76	0.85	0.06	5.09	27.57	69.90	545.00
	06/19/14 08:03:22	5460	13.84	0.87	0.05	5.03	27.07	69.90	533.00
	06/19/14 08:03:52	5490	13.80	0.96	0.04	5.04	27.07	69.90	533.00
	06/19/14 08:04:22	5520	13.70	0.98	0.05	5.10	27.74	69.80	533.00
	06/19/14 08:04:52	5550	13.82	0.96	0.12	5.05	27.74	69.80	533.00
	06/19/14 08:05:22	5580	13.89	1.04	0.09	4.97	26.93	69.90	533.00
	06/19/14 08:05:52	5610	13.85	0.97	0.09	5.01	26.93	69.90	533.00
	06/19/14 08:06:22	5640	13.81	0.93	0.08	5.04	27.71	69.80	545.00
	06/19/14 08:06:52	5670	13.76	0.86	0.08	5.07	27.71	69.80	545.00
	06/19/14 08:07:22	5700	13.86	0.83	0.07	5.02	27.07	69.80	545.00
	06/19/14 08:07:52	5730	13.84	0.95	0.07	5.01	27.07	69.80	545.00
	06/19/14 08:08:22	5760	13.74	0.88	0.08	5.07	27.71	69.80	545.00
	06/19/14 08:08:52	5790	13.68	0.84	0.07	5.11	27.71	69.80	545.00
	06/19/14 08:09:22	5820	13.79	0.85	0.05	5.07	26.90	69.80	521.00
	06/19/14 08:09:52	5850	13.81	0.96	0.06	5.01	26.90	69.80	521.00
	06/19/14 08:10:22	5880	13.64	0.86	0.06	5.14	27.82	69.80	557.00
	06/19/14 08:10:52	5910	13.61	0.78	0.08	5.16	27.82	69.80	557.00
	06/19/14 08:11:22	5940	13.79	0.81	0.06	5.06	26.63	69.80	532.00
	06/19/14 08:11:52	5970	13.72	0.87	0.02	5.08	26.63	69.80	532.00
	06/19/14 08:12:22	6000	13.47	0.74	0.01	5.21	31.20	69.80	574.00
	06/19/14 08:12:52	6030	12.97	0.52	0.03	5.62	31.20	69.80	574.00
	06/19/14 08:13:22	6060	12.98	0.39	0.03	5.65	34.46	69.90	614.00
	06/19/14 08:13:52	6090	13.29	0.80	0.01	5.42	34.46	69.90	614.00
	06/19/14 08:14:22	6120	13.78	1.18	0.01	5.11	34.74	69.80	602.00
	06/19/14 08:14:52	6150	13.65	1.13	0.03	5.12	34.74	69.80	602.00
	06/19/14 08:15:22	6180	13.58	0.99	0.01	5.21	35.51	69.80	603.00
	06/19/14 08:15:52	6210	13.61	1.00	0.04	5.18	35.51	69.80	603.00
	06/19/14 08:16:22	6240	13.58	1.07	0.05	5.19	37.87	69.80	631.00
	06/19/14 08:16:52	6270	13.80	1.10	0.01	5.09	37.87	69.80	631.00
	06/19/14 08:17:22	6300	13.78	1.17	0.02	5.06	37.31	69.90	630.00
	06/19/14 08:17:52	6330	13.62	1.19	0.06	5.14	37.31	69.90	630.00
	06/19/14 08:18:22	6360	13.87	1.14	0.06	5.04	36.76	69.80	617.00
	06/19/14 08:18:52	6390	13.83	1.42	0.06	5.00	36.76	69.80	617.00
	06/19/14 08:19:22	6420	13.67	1.30	0.06	5.14	36.51	69.80	629.00
	06/19/14 08:19:52	6450	13.84	1.38	0.01	5.02	36.51	69.80	629.00
	06/19/14 08:20:22	6480	13.84	1.70	0.01	5.03	37.81	69.80	619.00
	06/19/14 08:20:52	6510	13.78	1.46	0.03	5.05	37.81	69.80	619.00
	06/19/14 08:21:22	6540	13.78	1.17	0.04	5.09	38.06	69.80	643.00
	06/19/14 08:21:52	6570	13.88	1.36	0.05	4.98	38.06	69.80	643.00
	06/19/14 08:22:22	6600	13.77	1.42	0.06	5.06	37.53	69.80	630.00
	06/19/14 08:22:52	6630	13.84	1.30	0.07	5.03	37.53	69.80	630.00
A2	06/19/14 08:23:22	6660	13.77	1.28	0.06	5.05	36.98	69.90	605.00
	06/19/14 08:23:52	6690	13.79	1.27	0.05	5.08	36.98	69.90	605.00
	06/19/14 08:24:22	6720	13.80	1.30	0.06	5.03	36.32	69.90	603.00
	06/19/14 08:24:52	6750	13.83	1.31	0.05	5.02	36.32	69.90	603.00
	06/19/14 08:25:22	6780	13.73	1.37	0.05	5.09	39.31	70.00	656.00
	06/19/14 08:25:52	6810	13.70	1.36	0.05	5.14	39.31	70.00	656.00
	06/19/14 08:26:22	6840	13.77	1.36	0.03	5.06	39.06	70.00	631.00
	06/19/14 08:26:52	6870	13.68	1.44	0.03	5.10	39.06	70.00	631.00
	06/19/14 08:27:22	6900	13.79	1.25	0.03	5.08	37.59	70.10	629.00
	06/19/14 08:27:52	6930	13.85	1.51	0.04	5.00	37.59	70.10	629.00
	06/19/14 08:28:22	6960	13.95	1.67	0.01	4.95	37.56	70.10	629.00
	06/19/14 08:28:52	6990	14.00	1.61	0.03	4.91	37.56	70.10	629.00
	06/19/14 08:29:22	7020	13.94	1.79	0.06	4.93	37.81	70.10	629.00
	06/19/14 08:29:52	7050	13.80	1.52	0.05	5.03	37.81	70.10	629.00

CIMARRON ENERGY, INC.

June 19, 2014

30 ECD

Norman Facility

Unit Data

Meas. Stack Moisture	6.1	%
Stack Exhaust Flow (M2)	44,684	SCFH

Weather Data

Barometric Pressure	29.96	in. Hg
Relative Humidity	59	%
Ambient Temperature	84	°F
Specific Humidity	0.014747	lb H ₂ O / lb air

90-100 Load, Run - 30 ECD R12

	Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmvd)	THC (ppmwv)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
	06/19/14 08:30:22	7080	13.92	1.44	0.03	4.98	38.45	70.20	630.00
	06/19/14 08:30:52	7110	13.82	1.54	0.04	5.01	38.45	70.20	630.00
	06/19/14 08:31:22	7140	13.73	1.41	0.04	5.07	39.50	70.30	644.00
	06/19/14 08:31:52	7170	13.76	1.27	0.02	5.09	39.50	70.30	644.00
	06/19/14 08:32:22	7200	13.90	1.69	0.02	4.96	38.31	70.30	642.00
	06/19/14 08:32:52	7230	13.77	1.50	0.05	5.05	38.31	70.30	642.00
	06/19/14 08:33:22	7260	13.89	1.46	0.06	4.99	37.78	70.40	629.00
	06/19/14 08:33:52	7290	13.96	1.83	0.03	4.95	37.78	70.40	629.00
	06/19/14 08:34:22	7320	13.88	1.73	0.03	4.98	37.37	70.40	628.00
	06/19/14 08:34:52	7350	13.78	1.35	0.03	5.06	37.37	70.40	628.00
	06/19/14 08:35:22	7380	13.88	1.34	0.03	5.00	37.59	70.40	629.00
	06/19/14 08:35:52	7410	13.81	1.46	0.03	5.03	37.59	70.40	629.00
	06/19/14 08:36:22	7440	13.76	1.41	0.03	5.06	38.89	70.50	631.00
	06/19/14 08:36:52	7470	13.75	1.31	0.02	5.08	38.89	70.50	631.00
	06/19/14 08:37:22	7500	13.83	1.56	0.02	5.03	38.50	70.60	642.00
	06/19/14 08:37:52	7530	13.74	1.52	0.03	5.07	38.50	70.60	642.00
	06/19/14 08:38:22	7560	13.77	1.37	0.04	5.09	38.23	70.60	629.00
	06/19/14 08:38:52	7590	13.84	1.52	0.03	5.02	38.23	70.60	629.00
	06/19/14 08:39:22	7620	13.81	1.60	0.02	5.04	37.53	70.70	628.00
	06/19/14 08:39:52	7650	13.85	1.47	0.02	5.02	37.53	70.70	628.00
	06/19/14 08:40:22	7680	13.82	1.59	0.03	5.01	37.28	70.70	640.00
	06/19/14 08:40:52	7710	13.73	1.50	0.05	5.08	37.28	70.70	640.00
	06/19/14 08:41:22	7740	13.78	1.38	0.02	5.07	38.59	70.70	642.00
	06/19/14 08:41:52	7770	13.59	1.35	0.02	5.16	38.59	70.70	642.00
	06/19/14 08:42:22	7800	13.86	1.40	0.03	5.02	38.97	70.70	643.00
	06/19/14 08:42:52	7830	13.71	1.73	0.05	5.08	38.97	70.70	643.00
	06/19/14 08:43:22	7860	13.62	1.45	0.05	5.16	38.45	70.70	630.00
	06/19/14 08:43:52	7890	13.69	1.37	0.00	5.14	38.45	70.70	630.00
	06/19/14 08:44:22	7920	13.74	1.62	-0.01	5.07	38.17	70.70	629.00
	06/19/14 08:44:52	7950	13.78	1.65	0.00	5.07	38.17	70.70	629.00
	06/19/14 08:45:22	7980	13.86	1.64	0.00	4.99	37.01	70.60	616.00
	06/19/14 08:45:52	8010	13.82	1.65	0.02	5.04	37.01	70.60	616.00
A3	06/19/14 08:46:22	8040	13.76	1.54	0.04	5.04	37.53	70.50	629.00
	06/19/14 08:46:52	8070	13.82	1.63	0.03	5.02	37.53	70.50	629.00
	06/19/14 08:47:22	8100	13.71	1.50	0.02	5.09	38.72	70.50	630.00
	06/19/14 08:47:52	8130	13.60	1.45	0.07	5.15	38.72	70.50	630.00
	06/19/14 08:48:22	8160	13.38	1.35	0.07	5.29	38.61	70.40	642.00
	06/19/14 08:48:52	8190	13.31	1.40	0.02	5.38	38.61	70.40	642.00
	06/19/14 08:49:22	8220	13.10	1.00	0.01	5.52	37.84	70.40	641.00
	06/19/14 08:49:52	8250	13.48	1.06	0.05	5.27	37.84	70.40	641.00
	06/19/14 08:50:22	8280	13.39	1.44	0.04	5.29	37.34	70.30	641.00
	06/19/14 08:50:52	8310	13.33	1.15	0.05	5.37	37.34	70.30	641.00
	06/19/14 08:51:22	8340	13.44	1.36	0.04	5.28	37.37	70.20	629.00
	06/19/14 08:51:52	8370	13.23	1.14	0.02	5.44	37.37	70.20	629.00
	06/19/14 08:52:22	8400	13.42	1.26	0.03	5.29	38.42	70.00	643.00
	06/19/14 08:52:52	8430	13.34	1.33	0.03	5.36	38.42	70.00	643.00
	06/19/14 08:53:22	8460	13.49	1.25	0.05	5.22	38.72	70.00	643.00
	06/19/14 08:53:52	8490	13.49	1.15	0.03	5.26	38.72	70.00	643.00
	06/19/14 08:54:22	8520	13.44	1.44	0.04	5.26	38.23	69.90	642.00
	06/19/14 08:54:52	8550	13.49	1.46	0.01	5.26	38.23	69.90	642.00
	06/19/14 08:55:22	8580	13.45	1.24	0.00	5.28	37.70	69.90	630.00
	06/19/14 08:55:52	8610	13.40	1.16	0.01	5.34	37.70	69.90	630.00
	06/19/14 08:56:22	8640	13.74	1.45	0.01	5.07	37.34	69.80	629.00
	06/19/14 08:56:52	8670	13.67	1.53	0.05	5.10	37.34	69.80	629.00
	06/19/14 08:57:22	8700	13.69	1.33	0.04	5.11	37.23	69.70	629.00
	06/19/14 08:57:52	8730	13.61	1.43	0.04	5.16	37.23	69.70	629.00
	06/19/14 08:58:22	8760	13.67	1.41	0.07	5.14	38.59	69.60	643.00
	06/19/14 08:58:52	8790	13.46	1.31	0.04	5.27	38.59	69.60	643.00
	06/19/14 08:59:22	8820	13.63	1.52	0.05	5.17	38.72	69.50	631.00
	06/19/14 08:59:52	8850	13.63	1.60	0.04	5.17	38.72	69.50	631.00

CIMARRON ENERGY, INC.

June 19, 2014

30 ECD

Norman Facility

Unit Data

Meas. Stack Moisture	6.1	%
Stack Exhaust Flow (M2)	44,684	SCFH

Weather Data

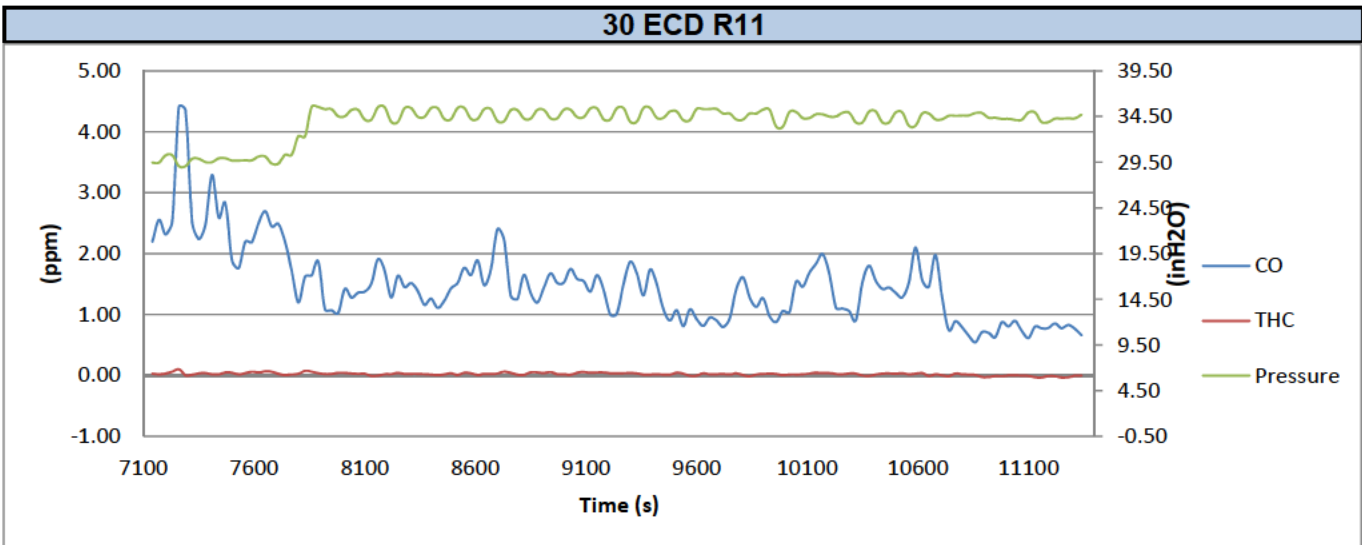
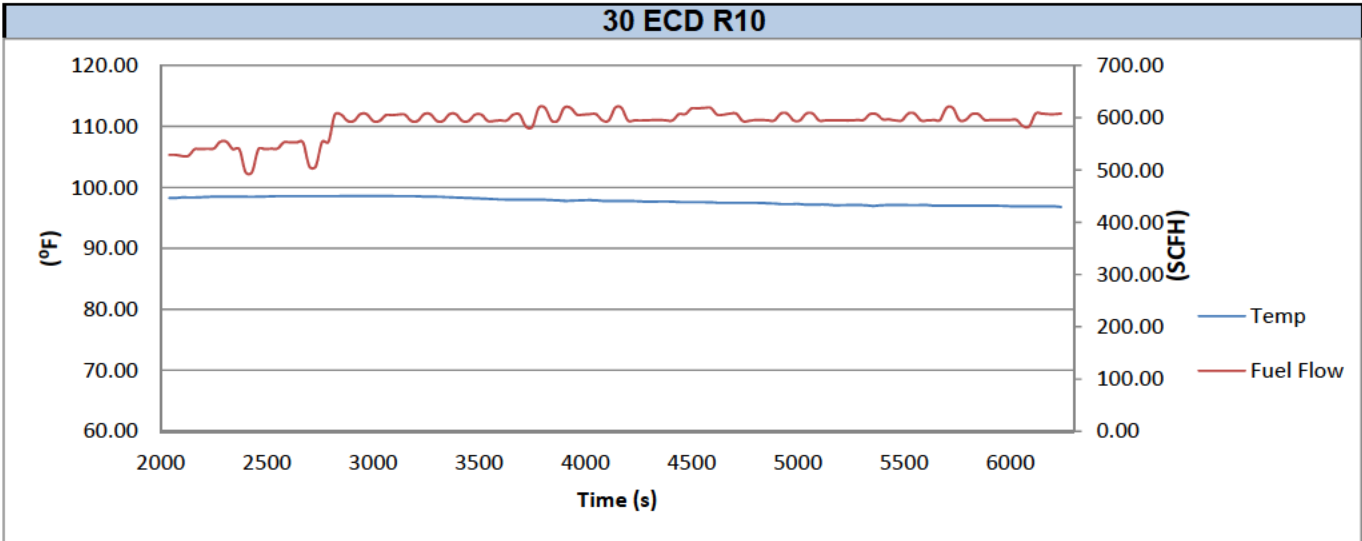
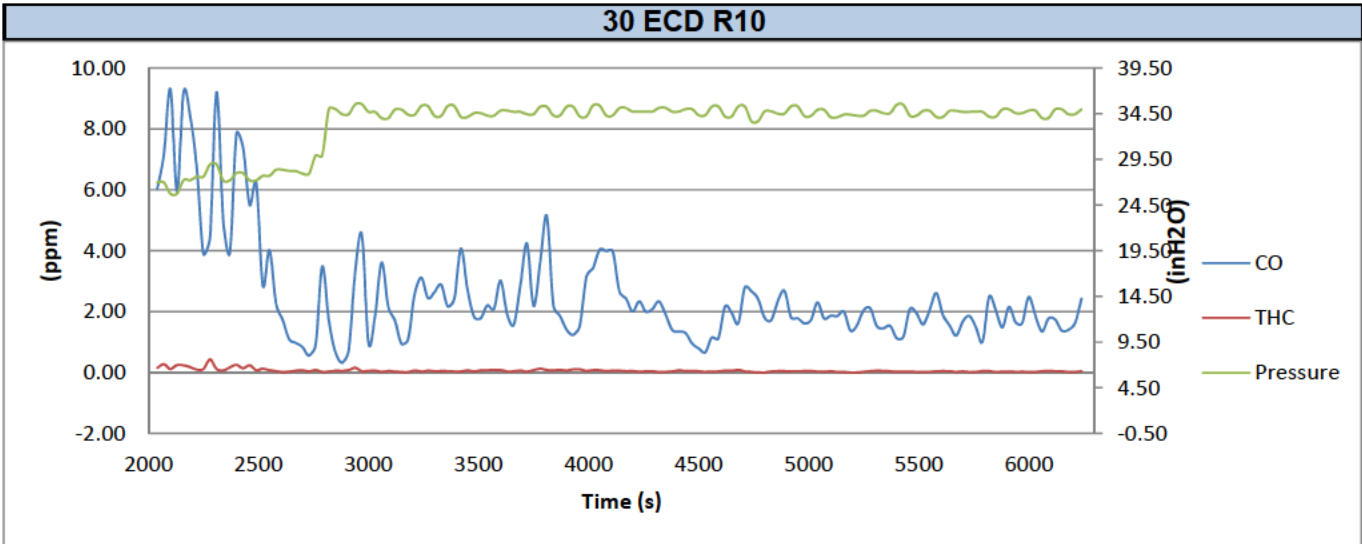
Barometric Pressure	29.96	in. Hg
Relative Humidity	59	%
Ambient Temperature	84	°F
Specific Humidity	0.014747	lb H ₂ O / lb air

90-100 Load, Run - 30 ECD R12

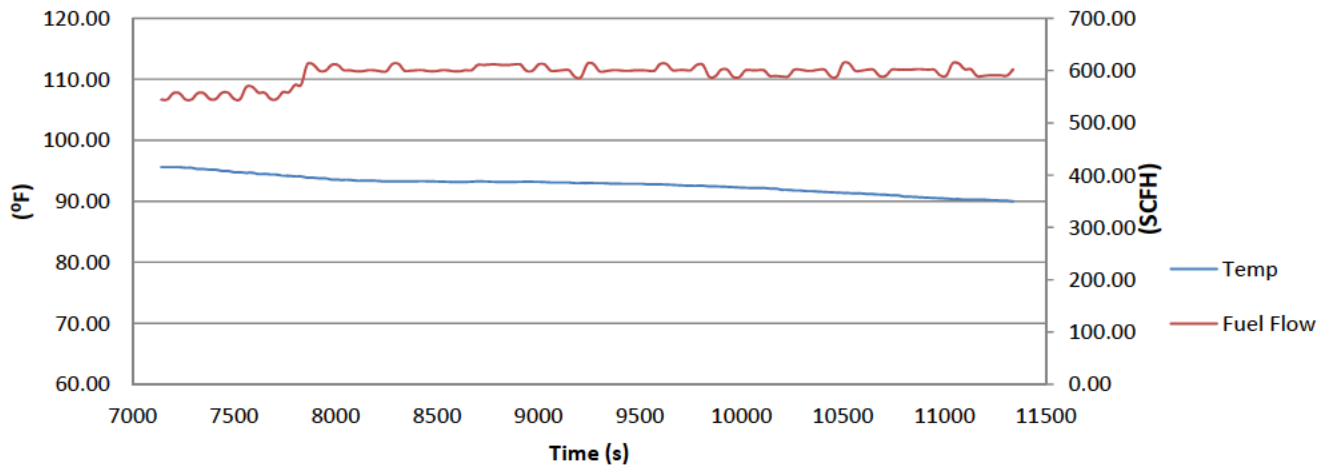
Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmvd)	THC (ppmvw)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
06/19/14 09:00:22	8880	13.67	1.76	0.04	5.10	38.09	69.50	631.00
06/19/14 09:00:52	8910	13.51	1.61	0.02	5.23	38.09	69.50	631.00
06/19/14 09:01:22	8940	13.73	1.64	0.03	5.08	36.95	69.30	617.00
06/19/14 09:01:52	8970	13.43	1.40	0.02	5.30	36.95	69.30	617.00
06/19/14 09:02:22	9000	13.59	1.37	0.04	5.18	38.56	69.20	644.00
06/19/14 09:02:52	9030	13.49	1.51	0.03	5.24	38.56	69.20	644.00
06/19/14 09:03:22	9060	13.60	1.41	0.04	5.19	38.86	69.20	644.00
06/19/14 09:03:52	9090	13.52	1.59	0.02	5.18	38.86	69.20	644.00
06/19/14 09:04:22	9120	13.24	1.29	0.01	5.43	38.34	69.20	631.00
06/19/14 09:04:52	9150	13.37	1.22	0.13	5.35	38.34	69.20	631.00
06/19/14 09:05:22	9180	13.43	1.58	0.17	5.27	37.98	69.10	631.00
06/19/14 09:05:52	9210	13.36	1.29	0.19	5.36	37.98	69.10	631.00
06/19/14 09:06:22	9240	13.56	1.49	0.14	5.20	36.95	69.10	617.00
06/19/14 09:06:52	9270	13.62	1.73	0.13	5.17	36.95	69.10	617.00
06/19/14 09:07:22	9300	13.59	1.79	0.16	5.15	38.00	69.10	643.00
06/19/14 09:07:52	9330	13.56	1.94	0.17	5.19	38.00	69.10	643.00
06/19/14 09:08:22	9360	13.69	1.88	0.17	5.15	38.67	69.10	644.00
06/19/14 09:08:52	9390	13.58	1.90	0.15	5.18	38.67	69.10	644.00
06/19/14 09:09:22	9420	13.26	1.54	0.20	5.42	38.03	69.10	631.00
06/19/14 09:09:52	9450	13.63	1.58	0.19	5.18	38.03	69.10	631.00
06/19/14 09:10:22	9480	13.54	2.16	0.19	5.20	37.26	69.10	630.00
RAW AVERAGE		13.67	1.32	0.05	5.13	35.89	69.96	614.14

Bias	Serial Number:	O ₂ (%)	CO (ppmvd)	THC (ppmvw)	CO ₂ (%)	Press. Trans 0 (in. H ₂ O)	Temp. Trans. 0 (°F)	F-Flow Trans. 0 (SCFH)
	INST-22-0005	INST-22-0005	INST-CO-0034	INST-VC-0006	INST-22-0005			
	Initial Zero	0.07	0.06	0.08	0.03			
	Final Zero	0.02	-0.02	0.01	0.05			
	Avg. Zero	0.05	0.02	0.05	0.04			
	Initial UpScale	12.13	5.11	3.00	9.24			
	Final UpScale	12.11	4.97	2.99	9.26			
	Avg. UpScale	12.12	5.04	3.00	9.25			
	Upscale Cal Gas	12.25	5.12	3.04	9.33			

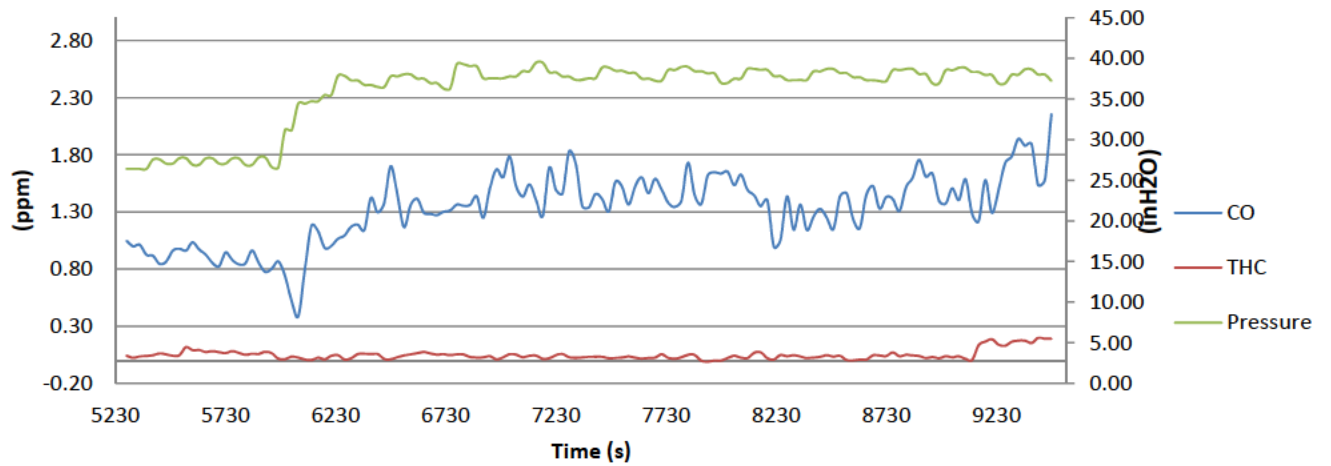
EMISSIONS DATA	O ₂	CO	THC	CO ₂
Corrected Raw Average (ppm/% dry basis)	13.83	1.33	0.00	5.15
Corrected Raw Average (ppm/% wet basis)	12.98	1.25	0.00	4.84
Emission Rate (lb/hr)	N/A	0.00	0.00	N/A



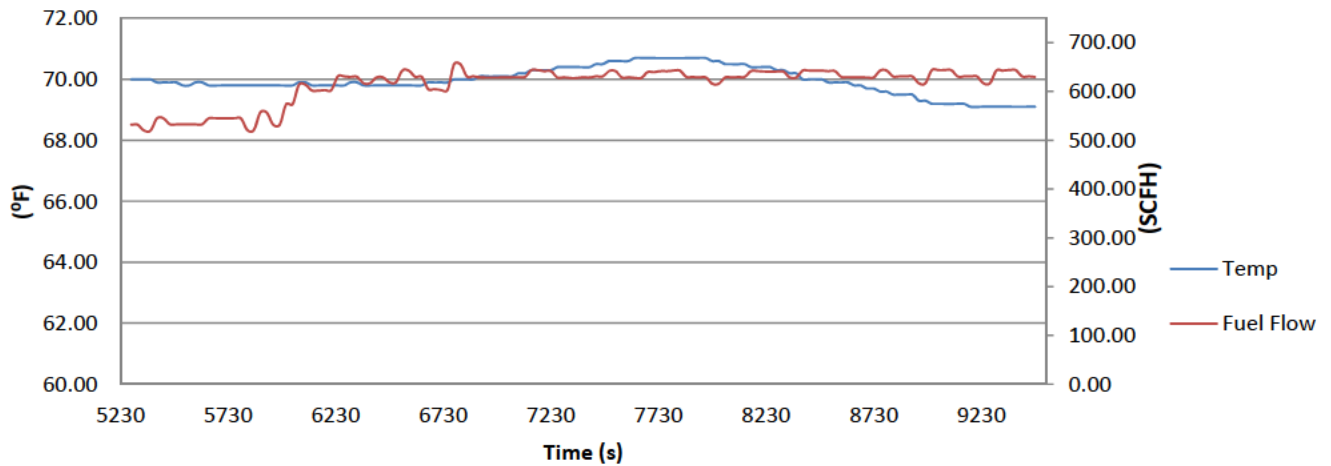
30 ECD R11

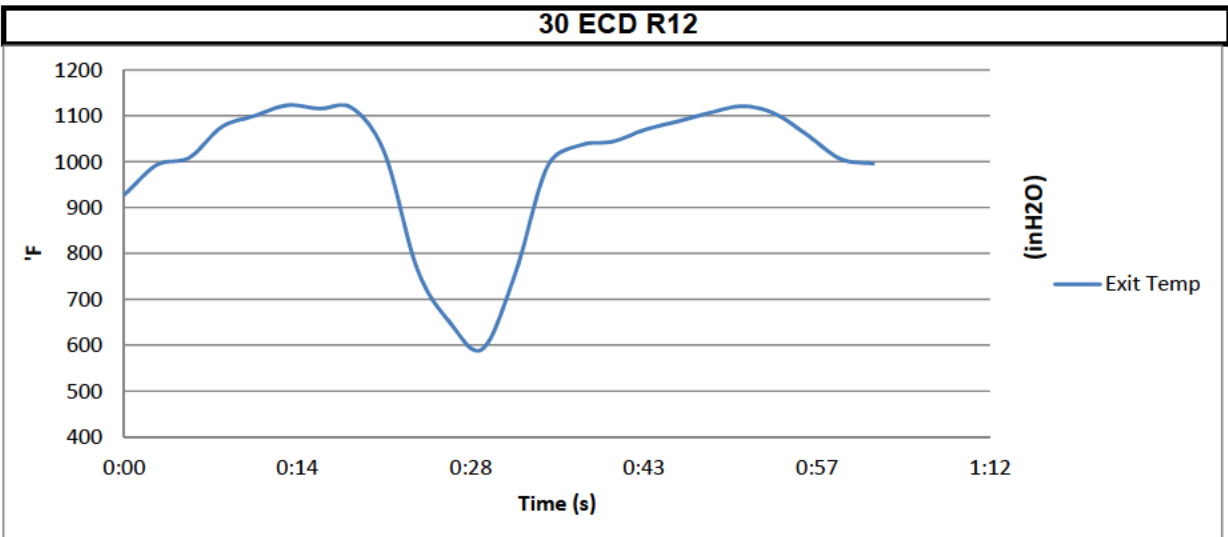
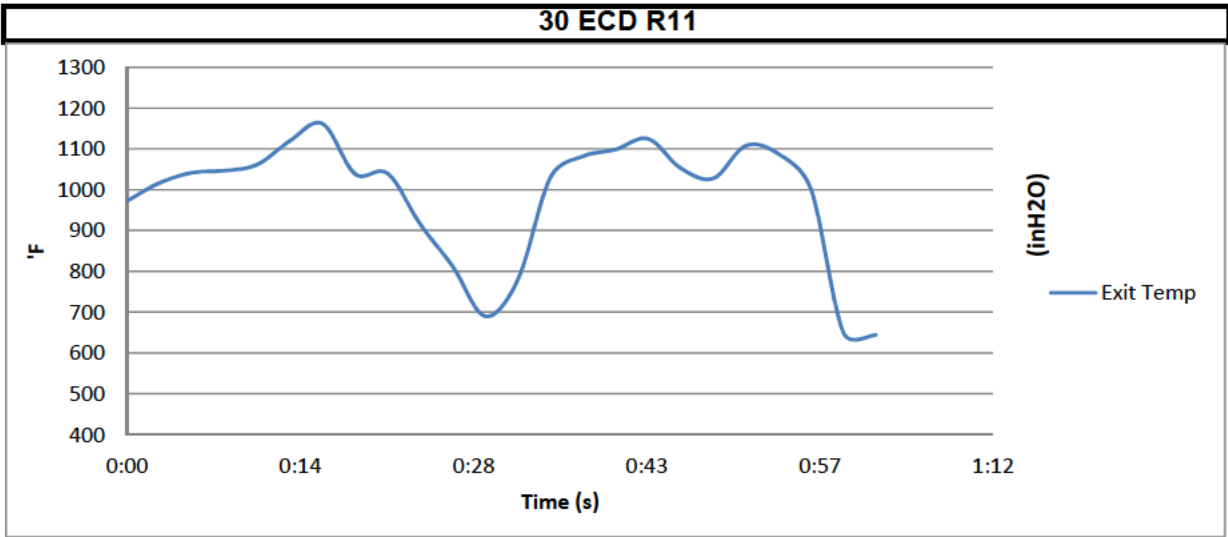
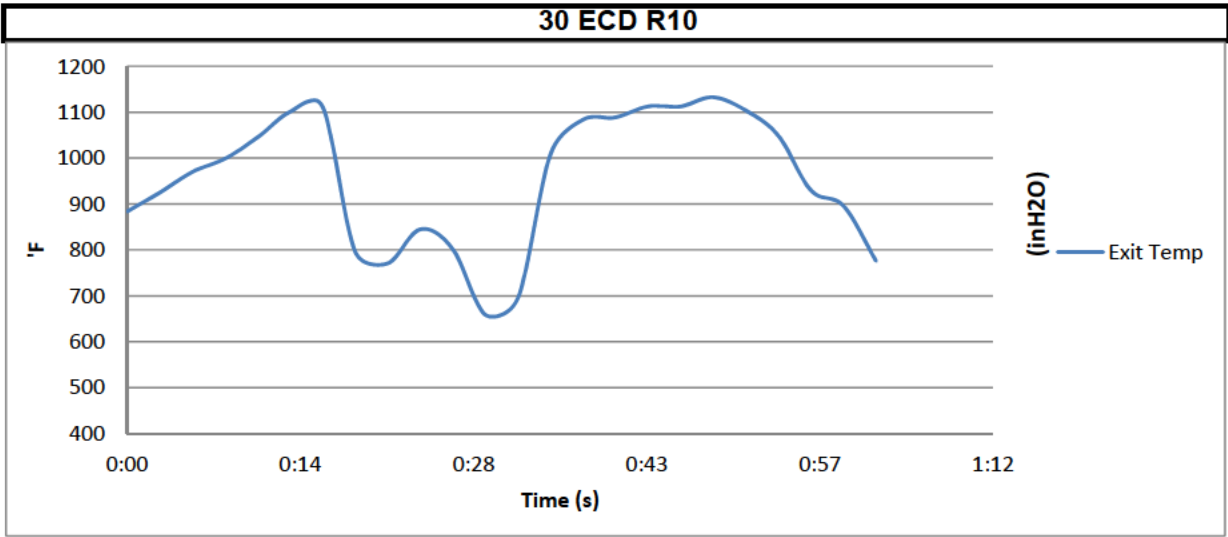


30 ECD R12



30 ECD R12





EMISSION DATA RECORDS

Visual Emission Data Record



Run 1



Run 2

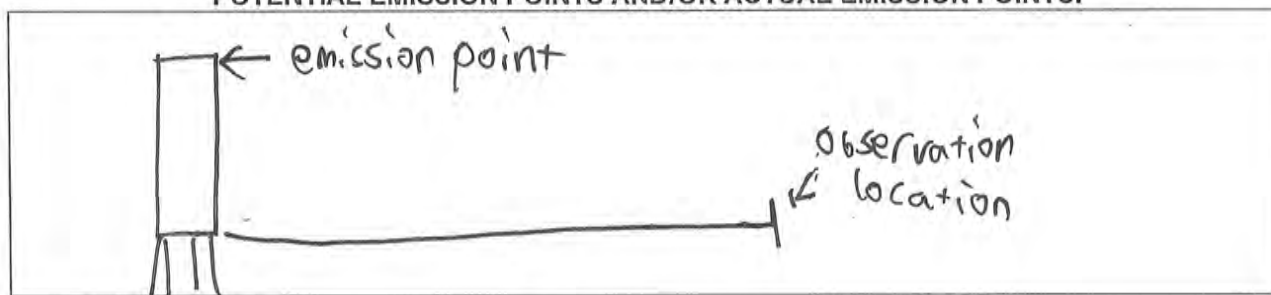
METHOD 22
FUGITIVE OR SMOKE EMISSION
INSPECTION FORM



AIR HYGIENE

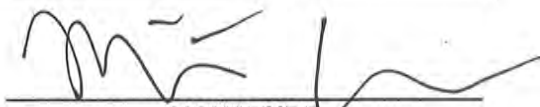
COMPANY: Cimaron Energy Inc. LOCATION: Norman Plant COMPANY REP: Tim Chalton	OBSERVER: Mitch Carson AFFILIATION: Air Hygiene Inc. DATE: 6/20/14
SKY CONDITIONS: Mostly sunny; blue/white PRECIPITATION: none	WIND DIRECTION: SE WIND SPEED: 4.0 mph
INDUSTRY: Natural Gas & Oil Industry	PROCESS UNIT: 30 ECD

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
7:39:12	20:00	00:00	NW of Stack
7:59	5:00	break	↓
8:04	20:00	00:00	
8:24	5:00	break	
8:29	20:00	00:50	
8:49			
Photo: 8:28			


SIGNATURE

Run 2



Run 3

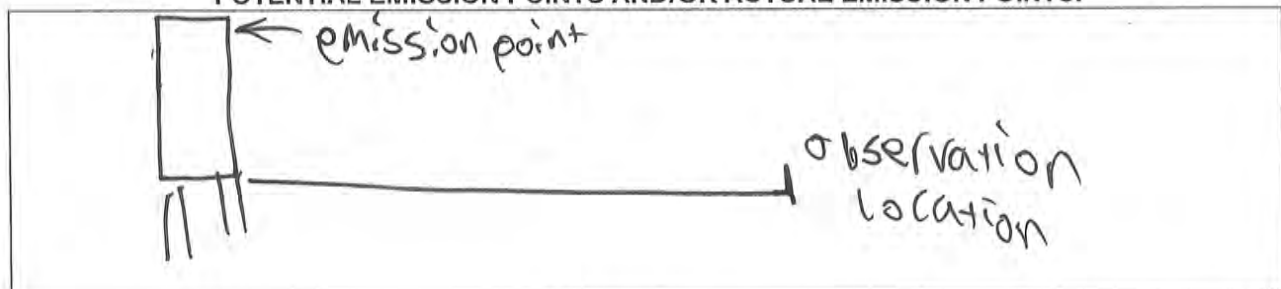
METHOD 22
FUGITIVE OR SMOKE EMISSION
INSPECTION FORM



AIR HYGIENE

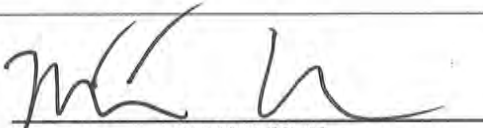
COMPANY: Cimaron Energy Inc. LOCATION: Norman Plant COMPANY REP: Tim Chalton	OBSERVER: Mitch Carlson AFFILIATION: Air Hygiene Inc. DATE: 6/20/14
SKY CONDITIONS: mostly sunny; blue/white PRECIPITATION: none	WIND DIRECTION: SE WIND SPEED: 2-8 mph
INDUSTRY: Natural Gas & Oil Industry	PROCESS UNIT: 30 ECD

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
9:05	20:00	00:00	NW of stack
9:25	5:00	break	↓
9:30	20:00	00:00	
9:50	5:00	break	
9:55	20:00	00:00	
10:15			
10:15			
photo:			
9:25			


SIGNATURE

Run 3



R4

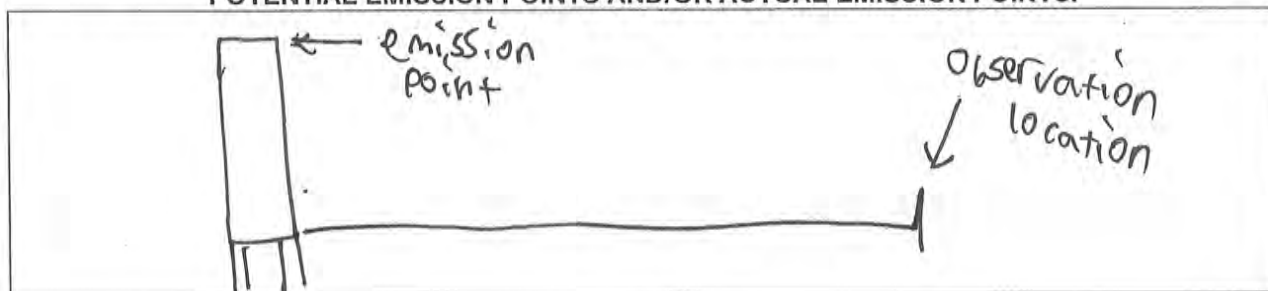
METHOD 22
FUGITIVE OR SMOKE EMISSION
INSPECTION FORM



AIR HYGIENE

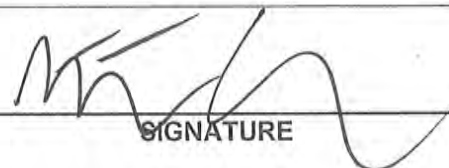
COMPANY: Cimaron Energy Inc. LOCATION: Norman Plant COMPANY REP: Tim Chalton	OBSERVER: Mitch Carson AFFILIATION: Air Hygiene Inc. DATE: 6/19/14
SKY CONDITIONS: mostly cloudy; gray/blue PRECIPITATION: none	WIND DIRECTION: SE WIND SPEED: 10-15 mph
INDUSTRY: Natural Gas & Oil Industry	PROCESS UNIT: 30 ECD

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
14:10	20:00	00:00	NW of stack
14:30	5:00	break	↓
14:35	20:00	00:00	
14:55	5:00	break	
15:00	20:00	00:00	
15:10			
Photo:			
14:32			


SIGNATURE

Run 4



Run 5

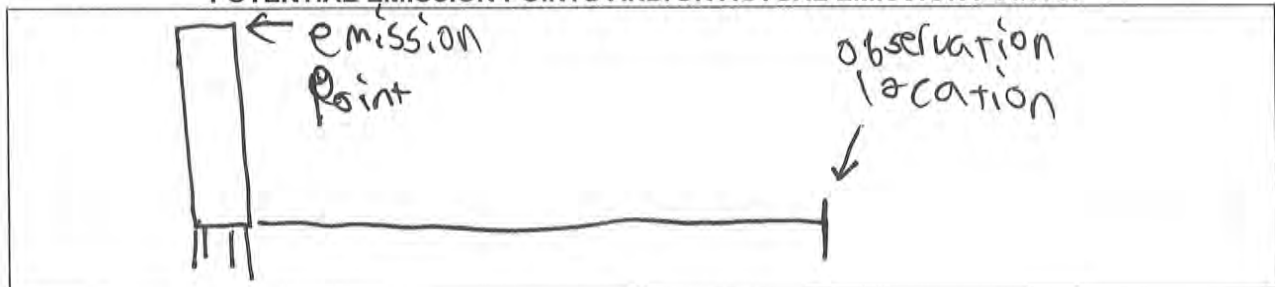
METHOD 22
FUGITIVE OR SMOKE EMISSION
INSPECTION FORM



AIR HYGIENE

COMPANY: Cimaron Energy Inc. LOCATION: Norman Plant COMPANY REP: Tim Chalton	OBSERVER: Mitch Carson AFFILIATION: Air Hygiene Inc. DATE: 6/19/14
SKY CONDITIONS: fair weather / blue PRECIPITATION: none	WIND DIRECTION: SE WIND SPEED: 10.8 mph
INDUSTRY: Natural Gas & Oil Industry	PROCESS UNIT: 30 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
15:35	20:00	00:00	NW of stack
15:55	5:00	break	↓
16:00	20:00	00:00	
16:20	5:00	break	
16:25	20:00	00:00	
16:45			
photo:			
15:56			


SIGNATURE

Run 5



Run 6

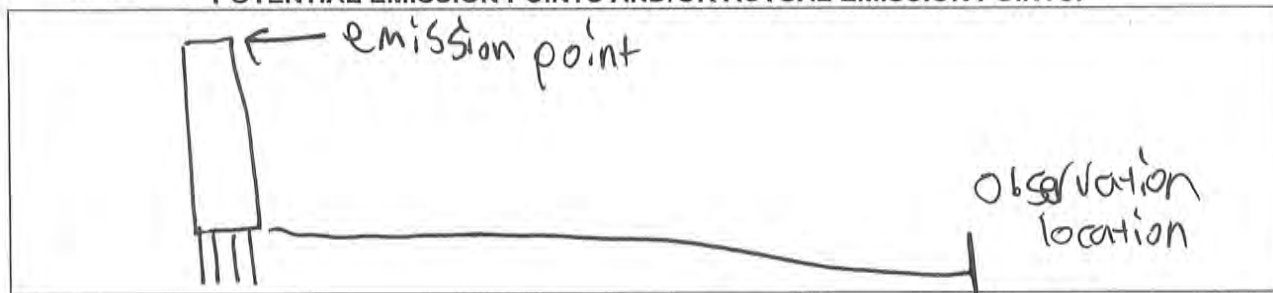
METHOD 22
FUGITIVE OR SMOKE EMISSION
INSPECTION FORM



AIR HYGIENE

COMPANY: Cimaron Energy Inc. LOCATION: Norman Plant COMPANY REP: Tim Chalton	OBSERVER: Mitch Carson / Min Sum Lee AFFILIATION: Air Hygiene Inc. DATE: 6/19/14
SKY CONDITIONS: fair Weather: blue/white PRECIPITATION: none	WIND DIRECTION: SE WIND SPEED: 6.5 mph
INDUSTRY: Natural Gas & Oil Industry	PROCESS UNIT: 30 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
17:00			
17:20	20:00	00:00	NW of stack
17:25	5:00	break	
17:45	20:00	00:00	
17:50	5:00	break	
18:10	20:00	00:00	
photo: 17:21			

Min Sum Lee
SIGNATURE

Run 6



METHOD 22 FUGITIVE OR SMOKE EMISSION INSPECTION FORM



AIR HYGIENE

COMPANY: Cimaron Energy Inc. LOCATION: Norman Plant COMPANY REP: Tim Chalton	OBSERVER: Mitch Carson AFFILIATION: Air Hygiene Inc. DATE: 6/16/14
SKY CONDITIONS: cloudy gray background PRECIPITATION: raining	WIND DIRECTION: NW WIND SPEED: 7 mph
INDUSTRY: Natural Gas & Oil Industry	PROCESS UNIT: 30 ECD

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

OBSERVATIONS

[illegible]


SIGNATURE

Run 7



METHOD 22 FUGITIVE OR SMOKE EMISSION INSPECTION FORM



AIR HYGIENE

COMPANY: Cimaron Energy Inc. LOCATION: Norman Plant COMPANY REP: Tim Chalton	OBSERVER: Mitch Carson AFFILIATION: Air Hygiene Inc. DATE:
SKY CONDITIONS: Cloudy/gray background PRECIPITATION: light rain	WIND DIRECTION: NW WIND SPEED: 5-5
INDUSTRY: Natural Gas & Oil Industry	PROCESS UNIT: 30 ECD

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

OBSERVATIONS

[illegible]


SIGNATURE

Run 8



METHOD 22 FUGITIVE OR SMOKE EMISSION INSPECTION FORM



AIR HYGIENE

COMPANY: Cimaron Energy Inc. LOCATION: Norman Plant COMPANY REP: Tim Chalton	OBSERVER: Min Sun Lee / Mitch Co AFFILIATION: Air Hygiene Inc. DATE: 6/19/04
SKY CONDITIONS: cloudy grey & blue PRECIPITATION: None	WIND DIRECTION: SEE WIND SPEED: 11
INDUSTRY: Natural Gas & Oil Industry	PROCESS UNIT: 30 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
12:20	20:00	00:00	NW of stack
12:40	5:00	break	↓
12:45	20:00	00:00	
13:05	5:00	break	
13:10	20:00	00:00	
13:30			
Photo:			
12:48			



SIGNATURE

Run 9



R10

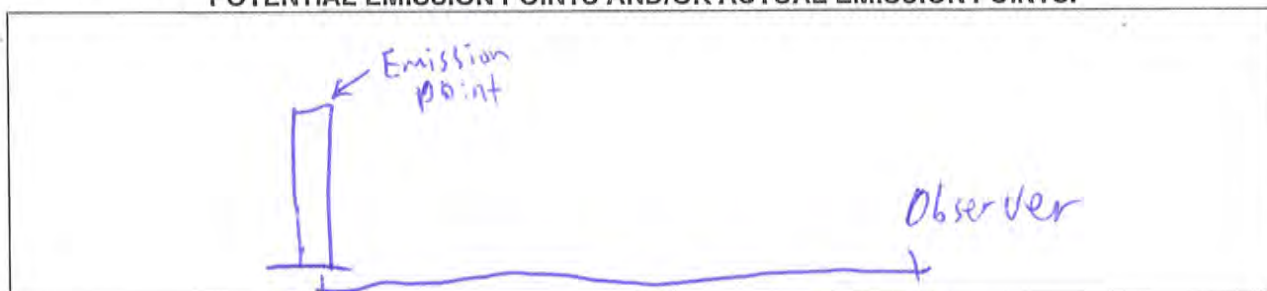
METHOD 22
FUGITIVE OR SMOKE EMISSION
INSPECTION FORM



AIR HYGIENE

COMPANY: Cimaron Energy Inc.	OBSERVER: Min Sum Lee / Mitch Carlson
LOCATION: Norman Plant	AFFILIATION: Air Hygiene Inc.
COMPANY REP: Tim Chalton	DATE: 6/18/14
SKY CONDITIONS: clear / partly cloudy	WIND DIRECTION: SE
PRECIPITATION: none	WIND SPEED: 15-20 mph
INDUSTRY: Natural Gas & Oil Industry	PROCESS UNIT: 30 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
17:40:	20:00	00:00	NW of stack
18:00	05:00	Break	
18:05	20:00	00:00	
18:25	05:00	Break	
18:30	20:00	0:00	
18:50			
18:50			
msl 8/18/14			
Photo: 18:20			

[Signature]
SIGNATURE

Run 10



R11

METHOD 22
FUGITIVE OR SMOKE EMISSION
INSPECTION FORM



AIR HYGIENE

COMPANY: Cimaron Energy Inc. LOCATION: Norman Plant COMPANY REP: Tim Chalton	OBSERVER: Min Sun Lee / Metah CNS AFFILIATION: Air Hygiene Inc. DATE: 6/18/14
SKY CONDITIONS: clear / cloudy PRECIPITATION: none	WIND DIRECTION: SE WIND SPEED: 10-12 mph
INDUSTRY: Natural Gas & Oil Industry	PROCESS UNIT: 30 ELD

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
19:05	20:00	00:00	NW of stack (MSL)
19:25	05:00	break	
19:30	20:00	00:00	
19:50	5:00	break	
19:55	20:00	00:00	
20:15			

pk @ 19:35

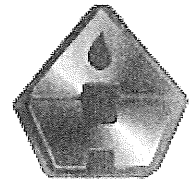
SIGNATURE

Run 11



Run 12

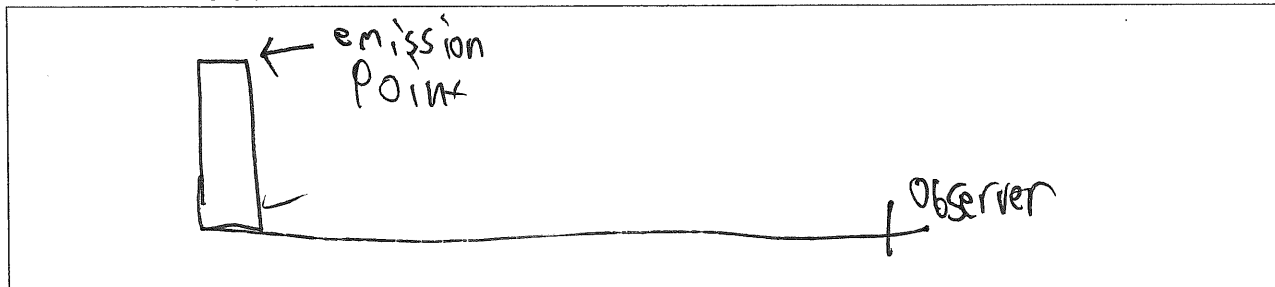
METHOD 22
FUGITIVE OR SMOKE EMISSION
INSPECTION FORM



AIR HYGIENE

COMPANY: Cimaron Energy Inc. LOCATION: Norman Plant COMPANY REP: Tim Chalton	OBSERVER: Mitch Carlson AFFILIATION: Air Hygiene Inc. DATE: 6/19/14
SKY CONDITIONS: cloudy/gray background PRECIPITATION: rain	WIND DIRECTION: NW WIND SPEED: 4 mph
INDUSTRY: Natural Gas & Oil Industry	PROCESS UNIT: 30 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
8:00			
8:20	20:00	00:00	NW of stack
8:25	25:00	break	
8:45	20:00	00:00	
8:50	5:00	break	
8:50	20:06	00:00	
9:10			
Photo 8:35			

SIGNATURE

Run 12



APPENDIX C

CALIBRATION GAS CERTIFICATIONS



Air Liquide America
Specialty Gases LLC



Shipped 8832 DICE ROAD
From: SANTA FE SPRINGS CA 90670-2516
Phone: 800-323-2212 Fax: 562-464-5262
C E R T I F I C A T E O F A N A L Y S I S

ALA-CYL-TULSA OK (LOC 84231)

DOCUMENT#: 53436505 -002
PO#: MT'S ON 53379330
ITEM #: 7501-30AL
DATE: 07Jan2014

1319 NORTH PEORIA
TRANSFER ACCOUNT
TULSA OK 74106
US

CYLINDER #: ALM001736
FILL PRESSURE: 02000 PSIG

PURE MATERIAL: NITROGEN

CAS# 7727-37-9

GRADE: ACID RAIN CEM 0

PURITY: 99.9995%

<u>IMPURITY</u>	<u>MAXIMUM CONCENTRATIONS</u>	<u>ACTUAL CONCENTRATIONS</u>
SOX	0.1 PPM	<0.1 PPM
NOX	0.1 PPM	<0.1 PPM
CO	0.5 PPM	<0.1 PPM
CO2	1 PPM	<0.1 PPM
THC	0.1 PPM	<0.1 PPM
H2O	2 PPM	0.6 PPM
O2	0.5 PPM	0.3 PPM

LOT # : SBO0084338

THIS CERTIFICATION DOES NOT EXPIRE PER EPA 600/R-12/531.

ANALYST: _____

JMU



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

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

P.O. No.: 11050810
Document #: 41897192-001
Folio #: AH034

Customer

AIR HYGIENE

MIKE SCOTT
5634 S. 122ND EAST AVE.
TULSA OK 74146
US

ANALYTICAL INFORMATION Gas Type : CO,BALN

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

Cylinder Number: ALM066600
Cylinder Pressure***: 2000 PSIG

Certification Date: 03Jun2011

Exp. Date: 04Jun2019
Batch No: TRO0034087

COMPONENT	CERTIFIED CONCENTRATION (Moles)	ACCURACY**	TRACEABILITY
CARBON MONOXIDE	11.0 PPM	+/- 1%	Direct NIST and VSL
NITROGEN	BALANCE		

*** 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 2635	05May2016	KAL003163	25.21 PPM	CARBON MONOXIDE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#
SIEMENS I/ULTRAMAT 6E/N1-VN-0545

DATE LAST CALIBRATED
27May2011

ANALYTICAL PRINCIPLE
NDIR

ANALYZER READINGS

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

First Triad Analysis

CARBON MONOXIDE

Date: 27May2011 Response Unit: PPM
Z1=0.00000 R1=25.30000 T1=10.60000
R2=25.30000 Z2=0.00000 T2=10.60000
Z3=0.00000 T3=10.60000 R3=25.30000
Avg. Concentration: 10.94 PPM

Second Triad Analysis

Date: 03Jun2011 Response Unit: PPM
Z1=0.00000 R1=25.20000 T1=10.64000
R2=25.10000 Z2=0.00000 T2=10.64000
Z3=0.00000 T3=10.64000 R3=24.10000
Avg. Concentration: 11.05 PPM

Calibration Curve

Concentration = A + Bx + Cx² + Dx³ + Ex⁴
r = 0.999995
Constants: A = 0.01276296
B = 1.102531222 C = 0.0000169313
D = 0 E = 0

Special Notes:

AH034 CO RANGE 10-12PPM

The expiration date has been extended without re-assay per EPA 600/R23-23/542.

APPROVED BY:



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

Document # : 51213840-002

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

P.O. No.:
Folio #: AH070

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: CC309916
Cylinder Pressure: 1950 PSIG

Certification Date: 05Jul2013

Exp. Date: 06Jul2016
Batch No: TRO086403

COMPONENT	CERTIFIED CONCENTRATION (Moles)		ACCURACY ABSOLUTE / RELATIVE		
NITRIC OXIDE	5.07	PPM	.06	PPM	/ 1.2 %
CARBON MONOXIDE	5.12	PPM	.04	PPM	/ .8 %
NITROGEN - OXYGEN FREE		BALANCE			
TOTAL OXIDES OF NITROGEN	5.08	PPM	Reference Value Only		

TRACEABILITY

REFERENCE STANDARD

COMPONENT	CONCENTRATION		UNCERTAINTY		CYLINDER	TYPE/SRM SAMPLE	EXP. DATE
NITRIC OXIDE	20.34	PPM	0.250	PPM	KAL004232	NTRM 2629/	31May2016
CARBON MONOXIDE	9.855	PPM	0.050	PPM	KAL003992	NTRM 1677/	14Mar2018

ANALYTICAL METHOD

1st Analysis: 27Jun2013

COMPONENT	INSTRUMENT	ANALYTICAL/PRINCIPLE	CALIBRATED	CONCENTRATION
NITRIC OXIDE	CAI/600/X11041	CHEMI	14Jun2013	5.080 PPM

1st Analysis: 28Jun2013

COMPONENT	INSTRUMENT	ANALYTICAL/PRINCIPLE	CALIBRATED	CONCENTRATION
CARBON MONOXIDE	SIEMENS I/ULTRAMAT 6E/N1-VN-0545	NDIR	27Jun2013	5.120 PPM

2nd Analysis: 05Jul2013

COMPONENT	INSTRUMENT	ANALYTICAL/PRINCIPLE	CALIBRATED	CONCENTRATION
NITRIC OXIDE	CAI/600/X11041	CHEMI	14Jun2013	5.070 PPM

Special Notes: AH070 LIST ITEM AH070 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: A22013

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

P.O. No.:
Document #: 52235725-002
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: ALM038933 Certification Date: 30Sep2013 Exp. Date: 01Oct2021
Cylinder Pressure: 2000 PSIG Batch No: TRO0093577

COMPONENT	CERTIFIED CONCENTRATION (Moles)		ACCURACY (ABSOLUTE / RELATIVE)			
OXYGEN	21.1	%	0.08	%	/	0.4 %
CARBON DIOXIDE	18.5	%	0.2	%	/	0.8 %
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: 30Sep2013

COMPONENT	INSTRUMENT	ANALYTICAL/PRINCIPLE	CALIBRATED	CONCENTRATION
OXYGEN	CAI/110P/V03018	PARAMAGNETIC	30Sep2013	21.10 %
CARBON DIOXIDE	PIR/2000/609015	NDIR	09Sep2013	18.50 %

Special Notes:

AH095 LIST ITEM AH095 ON CERTS AND TAGS

APPROVED BY:

JEFF CROTEAU



HiQ® Certificate / Certificat HiQ®

LINDE CANADA LIMITED

530 Watson St. East
Whitby, ON, Canada L1N 5R9

CERTIFICATE OF ANALYSIS

PGVP ID # L12013

Purchase order # 110585036

Lot # 1263942

Procedure: G1

Gas Type Code: OC2

Cylinder Number: EB 0049211

Cylinder pressure: 2000 psig

Certification date

July 19, 2013

Expiration Date

July 20, 2021

ANALYTICAL RESULTS

Component	Requested Concentration ± blending tolerance	Date of Assay	Mean Concentration	Certified Concentration Uncertainty expressed at 95% confidence
Oxygen	12 % ± 5%	July 19, 2013	12.25 %	12.25 ± 0.01 %
Carbon Dioxide	9 % ± 5%	July 19, 2013	9.33 %	9.33 ± 0.02 %

BALANCE GAS: Nitrogen

REFERENCE STANDARDS

Component	Type	Reference Number	Serial Number	Concentration	Expiration Date
Oxygen	NIST	071001	CC 237234	24.12 ± 0.12 %	March 27, 2017
Carbon Dioxide	GMIS	1187915	SX 21992	10 ± 0.02 %	August 20, 2013

CERTIFICATION INSTRUMENTS

Component	Make/Model	Measurement Principle	Serial Number	Last Calibration
Oxygen	Servomex 04100 C1	Paramagnetic Sensor	392350	July 15, 2013
Carbon Dioxide	SICK MCS 100E	Infrared Photometer	04310670	June 27, 2013

THIS STANDARD IS NIST TRACEABLE. IT WAS CERTIFIED ACCORDING TO THE 2012 EPA PROTOCOL PROCEDURE

DO NOT USE THIS CYLINDER WHEN THE PRESSURE FALLS BELOW 100 PSIG

Analyst: Keith Cybulski Signature 

Date 7/25/13

Notes:



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: A22014

AIR LIQUIDE AMERICA SPECIALTY GASES LLC P.O. No.: MAX
1290 COMBERMERE STREET Document # : 54740879-001
TROY, MI 48083

Customer

AIR HYGIENE
MAX CORBIN
1600 W TACOMA
BROKEN ARROW OK 74012
US

ANALYTICAL INFORMATION Gas Type : PPN,BALA

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: ALM010279 Certification Date: 21Apr2014 Exp. Date: 22Apr2022
Cylinder Pressure: 1950 PSIG Batch No: TRO0107817

COMPONENT	CERTIFIED CONCENTRATION (Moles)	ACCURACY (ABSOLUTE / RELATIVE)
PROPANE	5.01 PPM	0.03 PPM / 0.7 %
AIR	BALANCE	

TRACEABILITY

REFERENCE STANDARD

COMPONENT	CONCENTRATION	UNCERTAINTY	CYLINDER	TYPE/SRM SAMPLE	EXP. DATE
PROPANE	9.6000 PPM	0.0600 PPM	K012629	9 PPM C3H	24Feb2016

ANALYTICAL METHOD

1st Analysis: 21Apr2014

COMPONENT	INSTRUMENT	ANALYTICAL/PRINCIPLE	CALIBRATED	CONCENTRATION
PROPANE	HORIBA/FIA-220/G05000JAS	FLAME IONIZATION	17Apr2014	5.010 PPM

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 #: 48529652-004

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
Cylinder Pressure***: 2000 PSIG

Certification Date: 19Nov2012

Exp. Date: 20Nov2020
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#
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=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

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: June 18-20, 2014
Company: Cimarron Energy, Inc.
Location: Norman, Oklahoma
Techs: MSL/TP/CG

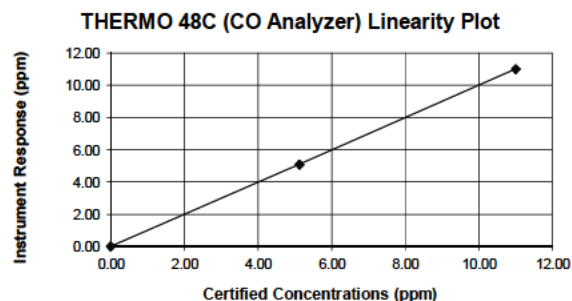
Sample System Leak Check

Date	Sample System	Leak Rate (l/min)
June 18-20, 2014	1	0

Calibration Date: June 16, 2014
Client: CIMARRON ENERGY, INC.

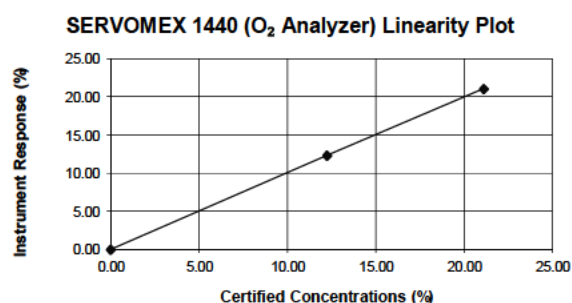
CO Span (ppm) = 11.00

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	0.02	0.18	0.02	YES (%)
5.12	5.10	-0.18	0.02	YES (%)
11.00	11.01	0.09	0.01	YES (%)
Linearity = 1.001				



O₂ Span (%) = 21.10

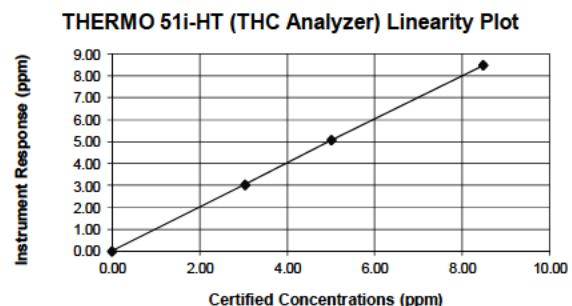
SERVOMEX 1440 (O ₂ Analyzer)				
Certified Concentration (%)	Instrument Response (%)	Calibration Error (%)	Absolute Conc. (%)	Pass or Fail ($\pm 2\%$, $\leq 0.5\%$)
0.00	0.01	0.05	0.01	YES (%)
12.25	12.33	0.38	0.08	YES (%)
21.10	21.06	-0.19	0.04	YES (%)
Linearity = 1.002				



THC Range (ppm) = 10

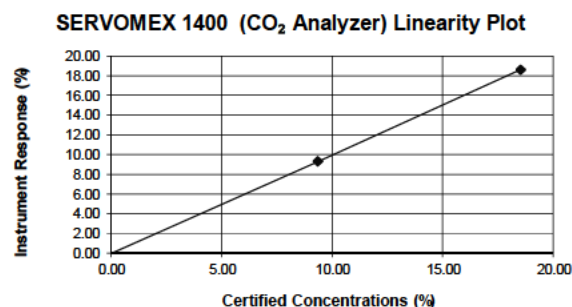
THERMO 51i-HT (THC Analyzer)				
Certified Concentration (ppm)	Instrument Response (ppm)	Calibration Error (%)	Estimated Point (ppm)	Pass or Fail ($\pm 2.5\%$) ¹
0.00	0.01	0.10	N/A	YES
3.04	3.05	0.00	3.05	YES
5.01	5.07	1.00	5.02	YES
8.48	8.49	0.10	N/A	YES
Linearity = 1.002				

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



CO₂ Span (%) = 18.50

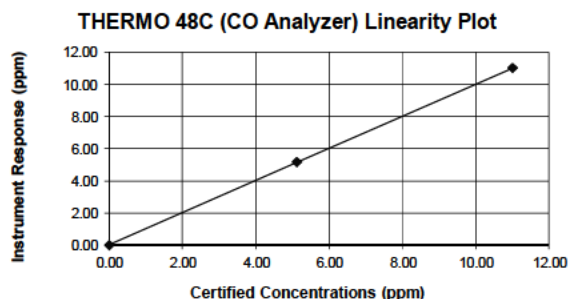
SERVOMEX 1400 (CO ₂ Analyzer)				
Certified Concentration (%)	Instrument Response (%)	Calibration Error (%)	Absolute Conc. (%)	Pass or Fail ($\pm 2\%$, $\leq 0.5\%$)
0.00	-0.05	-0.27	0.05	YES (%)
9.33	9.26	-0.38	0.07	YES (%)
18.50	18.57	0.38	0.07	YES (%)
Linearity = 0.994				



Calibration Date: June 19, 2014
Client: CIMARRON ENERGY, INC.

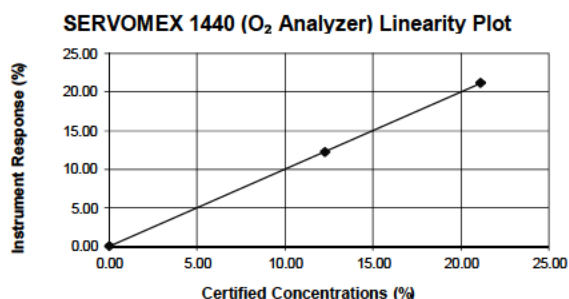
CO Span (ppm) = 11.00

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	0.02	0.18	0.02	YES (%)
5.12	5.17	0.45	0.05	YES (%)
11.00	11.02	0.18	0.02	YES (%)
Linearity = 1.000				



O₂ Span (%) = 21.10

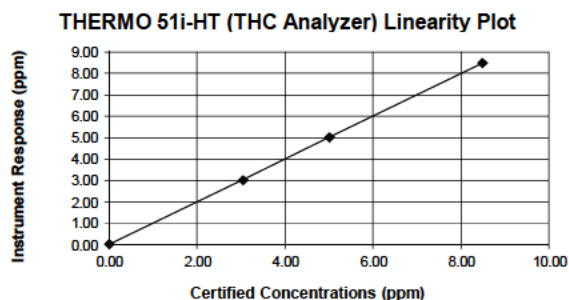
SERVOMEX 1440 (O ₂ Analyzer)				
Certified Concentration (%)	Instrument Response (%)	Calibration Error (%)	Absolute Conc. (%)	Pass or Fail ($\pm 2\%$, $\leq 0.5\%$)
0.00	0.04	0.19	0.04	YES (%)
12.25	12.28	0.14	0.03	YES (%)
21.10	21.14	0.19	0.04	YES (%)
Linearity = 1.000				



THC Range (ppm) = 10

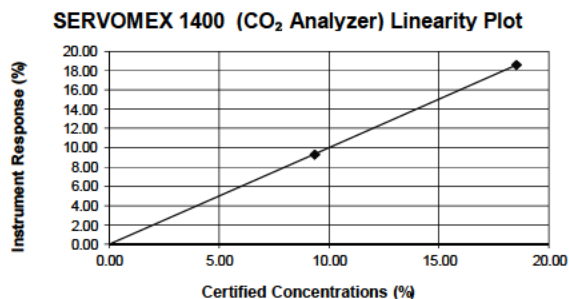
THERMO 51i-HT (THC Analyzer)				
Certified Concentration (ppm)	Instrument Response (ppm)	Calibration Error (%)	Estimated Point (ppm)	Pass or Fail ($\pm 2.5\%$) ¹
0.00	0.03	0.30	N/A	YES
3.04	3.02	-1.17	3.06	YES
5.01	5.03	0.27	5.02	YES
8.48	8.47	-0.10	N/A	YES
Linearity = 0.999				

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



CO₂ Span (%) = 18.50

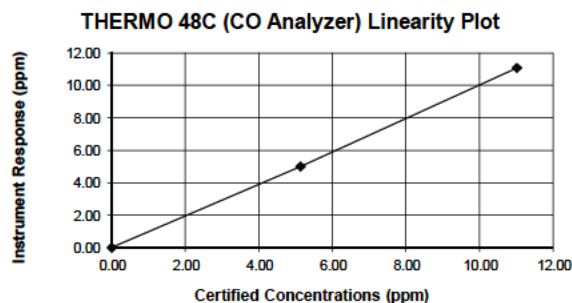
SERVOMEX 1400 (CO ₂ Analyzer)				
Certified Concentration (%)	Instrument Response (%)	Calibration Error (%)	Absolute Conc. (%)	Pass or Fail ($\pm 2\%$, $\leq 0.5\%$)
0.00	-0.02	-0.11	0.02	YES (%)
9.33	9.31	-0.11	0.02	YES (%)
18.50	18.57	0.38	0.07	YES (%)
Linearity = 0.995				



Calibration Date: June 20, 2014
Client: CIMARRON ENERGY, INC.

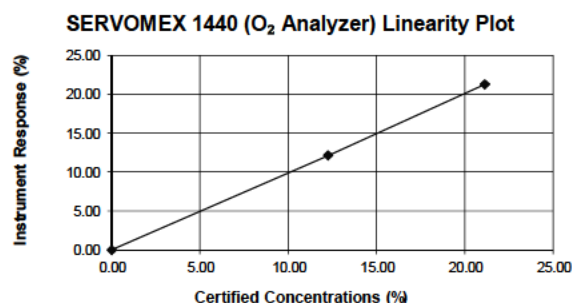
CO Span (ppm) = 11.00

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	0.01	0.09	0.01	YES (%)
5.12	5.01	-1.00	0.11	YES (%)
11.00	11.08	0.73	0.08	YES (%)
Linearity = 0.993				



O2 Span (%) = 21.10

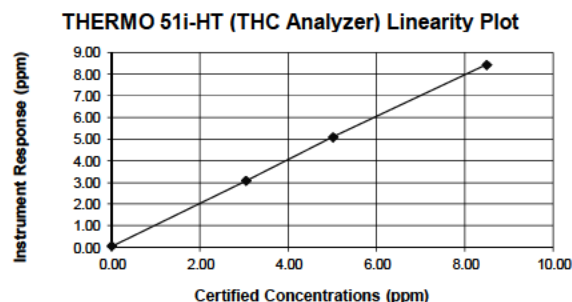
SERVOMEX 1440 (O ₂ Analyzer)				
Certified Concentration (%)	Instrument Response (%)	Calibration Error (%)	Absolute Conc. (%)	Pass or Fail ($\pm 2\%$, $\leq 0.5\%$)
0.00	0.02	0.09	0.02	YES (%)
12.25	12.15	-0.47	0.10	YES (%)
21.10	21.27	0.81	0.17	YES (%)
Linearity = 0.994				



THC Range (ppm) = 10

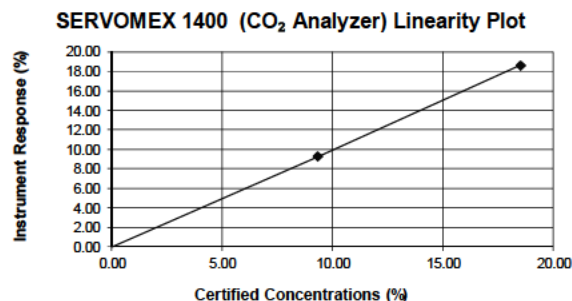
THERMO 51i-HT (THC Analyzer)				
Certified Concentration (ppm)	Instrument Response (ppm)	Calibration Error (%)	Estimated Point (ppm)	Pass or Fail ($\pm 2.5\%$) ¹
0.00	0.05	0.50	N/A	YES
3.04	3.07	0.52	3.05	YES
5.01	5.09	1.78	5.00	YES
8.48	8.43	-0.50	N/A	YES
Linearity = 1.017				

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



CO2 Span (%) = 18.50

SERVOMEX 1400 (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 (%)
9.33	9.24	-0.49	0.09	YES (%)
18.50	18.61	0.59	0.11	YES (%)
Linearity = 0.994				



DRIFT AND BIAS CHECK				
0-30-0 Load, Run - 30 ECD R1	O ₂	CO	THC	CO ₂
Raw Average	17.23	2.53	0.40	2.56
Corrected Average	17.45	2.44	0.40	2.57
Initial Zero	0.04	0.01	0.02	0.01
Final Zero	0.02	0.10	0.03	0.01
Avg. Zero	0.03	0.06	0.03	0.01
Initial UpScale	12.10	5.25	2.94	9.25
Final UpScale	12.11	5.23	3.10	9.24
Avg. UpScale	12.11	5.24	3.02	9.25
Sys Resp (Zero)	0.04	0.02	0.03	-0.02
Sys Resp (Upscale)	12.28	5.17	3.02	9.31
Upscale Cal Gas	12.25	5.12	3.04	9.33
Initial Zero Bias	0.00%	-0.09%	-0.10%	0.16%
Final Zero Bias	-0.09%	0.73%	0.00%	0.16%
Zero Drift	0.09%	0.82%	0.10%	0.00%
Initial Upscale Bias	-0.85%	0.73%	-0.80%	-0.32%
Final Upscale Bias	-0.81%	0.55%	0.80%	-0.38%
Upscale Drift	0.05%	0.18%	1.60%	0.05%
Alternative Specification Abs Diff	Initial Zero	0.00	0.01	0.03
	Final Zero	0.02	0.08	0.03
	Initial Upscale	0.18	0.08	0.06
	Final Upscale	0.17	0.06	0.07
Calibration Span	21.10	11.00	10.00	18.50
3% of Cal. Span (drift)	0.63	0.33	0.30	0.56
5% of Cal. Span (bias)	1.06	0.55	0.50	0.93

DRIFT AND BIAS CHECK				
0-30-0 Load, Run - 30 ECD R2	O ₂	CO	THC	CO ₂
Raw Average	16.19	4.11	0.66	3.23
Corrected Average	16.43	4.01	0.58	3.25
Initial Zero	0.05	0.01	0.08	0.07
Final Zero	0.03	-0.02	0.08	0.03
Avg. Zero	0.04	-0.01	0.08	0.05
Initial UpScale	12.11	5.27	3.11	9.17
Final UpScale	12.06	5.22	3.14	9.16
Avg. UpScale	12.09	5.25	3.13	9.17
Sys Resp (Zero)	0.02	0.01	0.05	-0.01
Sys Resp (Upscale)	12.15	5.01	3.07	9.24
Upscale Cal Gas	12.25	5.12	3.04	9.33
Initial Zero Bias	0.14%	0.00%	0.30%	0.43%
Final Zero Bias	0.05%	-0.27%	0.30%	0.22%
Zero Drift	0.09%	0.27%	0.00%	0.22%
Initial Upscale Bias	-0.19%	2.36%	0.40%	-0.38%
Final Upscale Bias	-0.43%	1.91%	0.70%	-0.43%
Upscale Drift	0.24%	0.45%	0.30%	0.05%
Alternative Specification Abs Diff	Initial Zero	0.03	0.00	0.08
	Final Zero	0.01	0.03	0.04
	Initial Upscale	0.04	0.26	0.07
	Final Upscale	0.09	0.21	0.08
Calibration Span	21.10	11.00	10.00	18.50
3% of Cal. Span (drift)	0.63	0.33	0.30	0.56
5% of Cal. Span (bias)	1.06	0.55	0.50	0.93

DRIFT AND BIAS CHECK				
0-30-0 Load, Run - 30 ECD R3	O ₂	CO	THC	CO ₂
Raw Average	16.22	2.10	0.38	3.23
Corrected Average	16.46	2.07	0.31	3.25
Initial Zero	0.03	-0.02	0.08	0.03
Final Zero	0.04	0.10	0.06	0.10
Avg. Zero	0.04	0.04	0.07	0.07
Initial UpScale	12.06	5.22	3.14	9.16
Final UpScale	12.10	5.04	3.06	9.18
Avg. UpScale	12.08	5.13	3.10	9.17
Sys Resp (Zero)	0.02	0.01	0.05	-0.01
Sys Resp (Upscale)	12.15	5.01	3.07	9.24
Upscale Cal Gas	12.25	5.12	3.04	9.33
Initial Zero Bias	0.05%	-0.27%	0.30%	0.22%
Final Zero Bias	0.09%	0.82%	0.10%	0.59%
Zero Drift	0.05%	1.09%	0.20%	0.38%
Initial Upscale Bias	-0.43%	1.91%	0.70%	-0.43%
Final Upscale Bias	-0.24%	0.27%	-0.10%	-0.32%
Upscale Drift	0.19%	1.64%	0.80%	0.11%
Alternative Specification Abs Diff	Initial Zero	0.01	0.03	0.04
	Final Zero	0.02	0.09	0.11
	Initial Upscale	0.09	0.21	0.08
	Final Upscale	0.05	0.03	0.06
Calibration Span	21.10	11.00	10.00	18.50
3% of Cal. Span (drift)	0.63	0.33	0.30	0.56
5% of Cal. Span (bias)	1.06	0.55	0.50	0.93

DRIFT AND BIAS CHECK				
30-70-30 Load, Run - 30 ECD R4	O ₂	CO	THC	CO ₂
Raw Average	15.96	1.20	0.33	3.50
Corrected Average	16.16	1.21	0.00	3.51
Initial Zero	0.02	-0.03	0.07	0.01
Final Zero	0.01	0.08	0.05	0.04
Avg. Zero	0.02	0.03	0.06	0.03
Initial UpScale	12.11	4.97	3.09	9.26
Final UpScale	12.10	5.00	3.11	9.25
Avg. UpScale	12.11	4.99	3.10	9.26
Sys Resp (Zero)	0.01	0.02	0.01	-0.05
Sys Resp (Upscale)	12.33	5.10	3.05	9.26
Upscale Cal Gas	12.25	5.12	3.04	9.33
Initial Zero Bias	0.05%	-0.45%	0.60%	0.32%
Final Zero Bias	0.00%	0.55%	0.40%	0.49%
Zero Drift	0.05%	1.00%	0.20%	0.16%
Initial Upscale Bias	-1.04%	-1.18%	0.40%	0.00%
Final Upscale Bias	-1.09%	-0.91%	0.60%	-0.05%
Upscale Drift	0.05%	0.27%	0.20%	0.05%
Alternative Specification Abs Diff	Initial Zero	0.01	0.05	0.06
	Final Zero	0.00	0.06	0.09
	Initial Upscale	0.22	0.13	0.00
	Final Upscale	0.23	0.10	0.01
Calibration Span	21.10	11.00	10.00	18.50
3% of Cal. Span (drift)	0.63	0.33	0.30	0.56
5% of Cal. Span (bias)	1.06	0.55	0.50	0.93

DRIFT AND BIAS CHECK				
30-70-30 Load, Run - 30 ECD R5	O ₂	CO	THC	CO ₂
Raw Average	16.00	1.28	0.29	3.45
Corrected Average	16.19	1.28	0.00	3.45
Initial Zero	0.01	0.08	0.05	0.04
Final Zero	0.03	-0.04	0.06	0.02
Avg. Zero	0.02	0.02	0.06	0.03
Initial UpScale	12.10	5.00	3.11	9.25
Final UpScale	12.12	5.06	3.09	9.29
Avg. UpScale	12.11	5.03	3.10	9.27
Sys Resp (Zero)	0.04	0.02	0.03	-0.02
Sys Resp (Upscale)	12.28	5.17	3.02	9.31
Upscale Cal Gas	12.25	5.12	3.04	9.33
Initial Zero Bias	-0.14%	0.55%	0.20%	0.32%
Final Zero Bias	-0.05%	-0.55%	0.30%	0.22%
Zero Drift	0.09%	1.09%	0.10%	0.11%
Initial Upscale Bias	-0.85%	-1.55%	0.90%	-0.32%
Final Upscale Bias	-0.76%	-1.00%	0.70%	-0.11%
Upscale Drift	0.09%	0.55%	0.20%	0.22%
Alternative Specification Abs Diff	Initial Zero	0.03	0.06	0.06
	Final Zero	0.01	0.06	0.04
	Initial Upscale	0.18	0.17	0.06
	Final Upscale	0.16	0.11	0.02
Calibration Span	21.10	11.00	10.00	18.50
3% of Cal. Span (drift)	0.63	0.33	0.30	0.56
5% of Cal. Span (bias)	1.06	0.55	0.50	0.93

DRIFT AND BIAS CHECK				
30-70-30 Load, Run - 30 ECD R6	O ₂	CO	THC	CO ₂
Raw Average	15.23	1.31	0.21	4.00
Corrected Average	15.42	1.31	0.17	4.02
Initial Zero	0.03	-0.04	0.06	0.02
Final Zero	0.04	0.01	0.02	0.01
Avg. Zero	0.04	-0.02	0.04	0.02
Initial UpScale	12.12	5.06	3.09	9.29
Final UpScale	12.10	5.25	2.94	9.25
Avg. UpScale	12.11	5.16	3.02	9.27
Sys Resp (Zero)	0.04	0.02	0.03	-0.02
Sys Resp (Upscale)	12.28	5.17	3.02	9.31
Upscale Cal Gas	12.25	5.12	3.04	9.33
Initial Zero Bias	-0.05%	-0.55%	0.30%	0.22%
Final Zero Bias	0.00%	-0.09%	-0.10%	0.16%
Zero Drift	0.05%	0.45%	0.40%	0.05%
Initial Upscale Bias	-0.76%	-1.00%	0.70%	-0.11%
Final Upscale Bias	-0.85%	0.73%	-0.80%	-0.32%
Upscale Drift	0.09%	1.73%	1.50%	0.22%
Alternative Specification Abs Diff	Initial Zero	0.01	0.06	0.04
	Final Zero	0.00	0.01	0.03
	Initial Upscale	0.16	0.11	0.02
	Final Upscale	0.18	0.08	0.06
Calibration Span	21.10	11.00	10.00	18.50
3% of Cal. Span (drift)	0.63	0.33	0.30	0.56
5% of Cal. Span (bias)	1.06	0.55	0.50	0.93

DRIFT AND BIAS CHECK				
70-100-70 Load, Run - 30 ECD R7	O ₂	CO	THC	CO ₂
Raw Average	14.39	1.97	0.08	4.61
Corrected Average	14.56	2.02	0.00	4.63
Initial Zero	0.02	-0.02	0.01	0.05
Final Zero	0.04	0.03	0.02	0.01
Avg. Zero	0.03	0.01	0.02	0.03
Initial UpScale	12.11	4.97	2.99	9.26
Final UpScale	12.12	5.02	3.06	9.25
Avg. UpScale	12.12	5.00	3.03	9.26
Sys Resp (Zero)	0.04	0.02	0.03	-0.02
Sys Resp (Upscale)	12.28	5.17	3.02	9.31
Upscale Cal Gas	12.25	5.12	3.04	9.33
Initial Zero Bias	-0.09%	-0.36%	-0.20%	0.38%
Final Zero Bias	0.00%	0.09%	-0.10%	0.16%
Zero Drift	0.09%	0.45%	0.10%	0.22%
Initial Upscale Bias	-0.81%	-1.82%	-0.30%	-0.27%
Final Upscale Bias	-0.76%	-1.36%	0.40%	-0.32%
Upscale Drift	0.05%	0.45%	0.70%	0.05%
Alternative Specification Abs Diff	Initial Zero	0.02	0.04	0.07
	Final Zero	0.00	0.01	0.03
	Initial Upscale	0.17	0.20	0.05
	Final Upscale	0.16	0.15	0.06
Calibration Span	21.10	11.00	10.00	18.50
3% of Cal. Span (drift)	0.63	0.33	0.30	0.56
5% of Cal. Span (bias)	1.06	0.55	0.50	0.93

DRIFT AND BIAS CHECK				
70-100-70 Load, Run - 30 ECD R8	O ₂	CO	THC	CO ₂
Raw Average	14.07	1.55	0.05	4.85
Corrected Average	14.22	1.56	0.00	4.87
Initial Zero	0.04	0.03	0.02	0.01
Final Zero	0.03	0.06	0.02	0.02
Avg. Zero	0.04	0.05	0.02	0.02
Initial UpScale	12.12	5.02	3.06	9.25
Final UpScale	12.13	4.95	3.05	9.28
Avg. UpScale	12.13	4.99	3.06	9.27
Sys Resp (Zero)	0.04	0.02	0.03	-0.02
Sys Resp (Upscale)	12.28	5.17	3.02	9.31
Upscale Cal Gas	12.25	5.12	3.04	9.33
Initial Zero Bias	0.00%	0.09%	-0.10%	0.16%
Final Zero Bias	-0.05%	0.36%	-0.10%	0.22%
Zero Drift	0.05%	0.27%	0.00%	0.05%
Initial Upscale Bias	-0.76%	-1.36%	0.40%	-0.32%
Final Upscale Bias	-0.71%	-2.00%	0.30%	-0.16%
Upscale Drift	0.05%	0.64%	0.10%	0.16%
Alternative Specification Abs Diff	Initial Zero	0.00	0.01	0.03
	Final Zero	0.01	0.04	0.04
	Initial Upscale	0.16	0.15	0.06
	Final Upscale	0.15	0.22	0.03
Calibration Span	21.10	11.00	10.00	18.50
3% of Cal. Span (drift)	0.63	0.33	0.30	0.56
5% of Cal. Span (bias)	1.06	0.55	0.50	0.93

DRIFT AND BIAS CHECK				
70-100 Load, Run - 30 ECD R9	O ₂	CO	THC	CO ₂
Raw Average	14.17	2.04	0.08	4.78
Corrected Average	14.33	2.10	0.04	4.80
Initial Zero	0.03	0.06	0.02	0.02
Final Zero	0.02	-0.03	0.07	0.01
Avg. Zero	0.03	0.02	0.05	0.02
Initial UpScale	12.13	4.95	3.05	9.28
Final UpScale	12.11	4.97	3.09	9.26
Avg. UpScale	12.12	4.96	3.07	9.27
Sys Resp (Zero)	0.04	0.02	0.03	-0.02
Sys Resp (Upscale)	12.28	5.17	3.02	9.31
Upscale Cal Gas	12.25	5.12	3.04	9.33
Initial Zero Bias	-0.05%	0.36%	-0.10%	0.22%
Final Zero Bias	-0.09%	-0.45%	0.40%	0.16%
Zero Drift	0.05%	0.82%	0.50%	0.05%
Initial Upscale Bias	-0.71%	-2.00%	0.30%	-0.16%
Final Upscale Bias	-0.81%	-1.82%	0.70%	-0.27%
Upscale Drift	0.09%	0.18%	0.40%	0.11%
Alternative Specification Abs Diff	Initial Zero	0.01	0.04	0.04
	Final Zero	0.02	0.05	0.03
	Initial Upscale	0.15	0.22	0.03
	Final Upscale	0.17	0.20	0.05
Calibration Span	21.10	11.00	10.00	18.50
3% of Cal. Span (drift)	0.63	0.33	0.30	0.56
5% of Cal. Span (bias)	1.06	0.55	0.50	0.93

DRIFT AND BIAS CHECK				
90-100 Load, Run - 30 ECD R10	O ₂	CO	THC	CO ₂
Raw Average	13.66	2.56	0.07	5.18
Corrected Average	13.79	2.63	0.05	5.26
Initial Zero	0.01	0.01	0.02	0.03
Final Zero	0.02	0.05	0.02	0.03
Avg. Zero	0.02	0.03	0.02	0.03
Initial UpScale	12.14	4.97	3.08	9.17
Final UpScale	12.13	4.96	2.97	9.18
Avg. UpScale	12.14	4.97	3.03	9.18
Sys Resp (Zero)	0.01	0.02	0.01	-0.05
Sys Resp (Upscale)	12.33	5.10	3.05	9.26
Upscale Cal Gas	12.25	5.12	3.04	9.33
Initial Zero Bias	0.00%	-0.09%	0.10%	0.43%
Final Zero Bias	0.05%	0.27%	0.10%	0.43%
Zero Drift	0.05%	0.36%	0.00%	0.00%
Initial Upscale Bias	-0.90%	-1.18%	0.30%	-0.49%
Final Upscale Bias	-0.95%	-1.27%	-0.80%	-0.43%
Upscale Drift	0.05%	0.09%	1.10%	0.05%
Alternative Specification Abs Diff	Initial Zero	0.00	0.01	0.08
	Final Zero	0.01	0.03	0.08
	Initial Upscale	0.19	0.13	0.09
	Final Upscale	0.20	0.14	0.08
Calibration Span	21.10	11.00	10.00	18.50
3% of Cal. Span (drift)	0.63	0.33	0.30	0.56
5% of Cal. Span (bias)	1.06	0.55	0.50	0.93

DRIFT AND BIAS CHECK				
90-100 Load, Run - 30 ECD R11	O ₂	CO	THC	CO ₂
Raw Average	13.44	1.49	0.02	5.28
Corrected Average	13.56	1.51	0.00	5.35
Initial Zero	0.02	0.05	0.02	0.03
Final Zero	0.01	0.02	0.03	0.05
Avg. Zero	0.02	0.04	0.03	0.04
Initial UpScale	12.13	4.96	2.97	9.18
Final UpScale	12.14	5.01	3.08	9.15
Avg. UpScale	12.14	4.99	3.03	9.17
Sys Resp (Zero)	0.01	0.02	0.01	-0.05
Sys Resp (Upscale)	12.33	5.10	3.05	9.26
Upscale Cal Gas	12.25	5.12	3.04	9.33
Initial Zero Bias	0.05%	0.27%	0.10%	0.43%
Final Zero Bias	0.00%	0.00%	0.20%	0.54%
Zero Drift	0.05%	0.27%	0.10%	0.11%
Initial Upscale Bias	-0.95%	-1.27%	-0.80%	-0.43%
Final Upscale Bias	-0.90%	-0.82%	0.30%	-0.59%
Upscale Drift	0.05%	0.45%	1.10%	0.16%
Alternative Specification Abs Diff	Initial Zero	0.01	0.03	0.08
	Final Zero	0.00	0.00	0.10
	Initial Upscale	0.20	0.14	0.08
	Final Upscale	0.19	0.09	0.11
Calibration Span	21.10	11.00	10.00	18.50
3% of Cal. Span (drift)	0.63	0.33	0.30	0.56
5% of Cal. Span (bias)	1.06	0.55	0.50	0.93

DRIFT AND BIAS CHECK				
90-100 Load, Run - 30 ECD R12	O ₂	CO	THC	CO ₂
Raw Average	13.67	1.32	0.05	5.13
Corrected Average	13.83	1.33	0.00	5.15
Initial Zero	0.07	0.06	0.08	0.03
Final Zero	0.02	-0.02	0.01	0.05
Avg. Zero	0.05	0.02	0.05	0.04
Initial UpScale	12.13	5.11	3.00	9.24
Final UpScale	12.11	4.97	2.99	9.26
Avg. UpScale	12.12	5.04	3.00	9.25
Sys Resp (Zero)	0.04	0.02	0.03	-0.02
Sys Resp (Upscale)	12.28	5.17	3.02	9.31
Upscale Cal Gas	12.25	5.12	3.04	9.33
Initial Zero Bias	0.14%	0.36%	0.50%	0.27%
Final Zero Bias	-0.09%	-0.36%	-0.20%	0.38%
Zero Drift	0.24%	0.73%	0.70%	0.11%
Initial Upscale Bias	-0.71%	-0.55%	-0.20%	-0.38%
Final Upscale Bias	-0.81%	-1.82%	-0.30%	-0.27%
Upscale Drift	0.09%	1.27%	0.10%	0.11%
Alternative Specification Abs Diff	Initial Zero	0.03	0.04	0.05
	Final Zero	0.02	0.04	0.07
	Initial Upscale	0.15	0.06	0.07
	Final Upscale	0.17	0.20	0.05
Calibration Span	21.10	11.00	10.00	18.50
3% of Cal. Span (drift)	0.63	0.33	0.30	0.56
5% of Cal. Span (bias)	1.06	0.55	0.50	0.93

METERING SYSTEM DRY GAS METER CALIBRATION SHEET

EPA Reference Method

Metering System Post-Test Calibration

Air Hygiene Asset ID: samp-cp-0023

Filename: Y:\Shared\QAQC\Calibrations\PM-Equipment\IM-5 Consoles\Calibration Sheet v4.1\Current[SAMP-CP-0023 Calibration 8-24-13.xls]7-1-14 (3 point)

Make: apex
Model #: 522
Serial #: 1308034

Date: 07/01/14
Barometric Pressure: 29.36 (in. Hg)
Theoretical Critical Vacuum: 13.85 (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)
2.10	10.00	716.430	724.310	7.880	73.0	73.0
2.10	10.00	724.310	732.180	7.870	73.0	73.0
2.10	10.00	732.180	740.070	7.890	73.0	73.0

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)
73.0	73.0	63	0.6099	15.0	74.1	74.1	74.1
73.0	73.0	63	0.6099	15.0	74.1	74.3	74.2
73.0	73.0	63	0.6099	15.0	74.3	74.3	74.3

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)
7.697	217.98	7.748	219.4	7.990
7.687	217.71	7.748	219.4	7.991
7.707	218.26	7.747	219.4	7.992

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)
0.000	1.007	1.913	48.58	0.000
0.001	1.008	1.913	48.59	0.000
-0.001	1.005	1.913	48.60	0.000
AVERAGE:	1.007	1.913	48.59	PASSED

LAST 5-PT:	1.010	1.877	PASSED	5-PT Date:
% DIFF:	0.3%	1.9%		08/24/13

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, (ft³*(deg R)^{0.5}/((in.Hg)*(min))).

SIGNATURE: Craig McCarty

DATE: 07/01/14 07/01/14

METERING SYSTEM THERMOCOUPLE CALIBRATION SHEET

EPA Reference Method

Metering System Post-Test Calibration

Air Hygiene Asset ID: samp-cp-0023

Filename: Y:\Shared\QAQC\Calibrations\PM-Equipment\W-5 Consoles\Calibration Sheet v4.1\Current\{SAMP-CP-0023 Calibration 8-24-13.xls}7-1-14 (3 point)

Make: apex
Model #: 522
Serial #: 1308034

Date: 07/01/14
Barometric Pressure: 29.36 (in. Hg)
Temperature (ASTM cal): 74.10 (°F)

Thermocouple	100 (°F)		600 (°F)		1200 (°F)	
	Reading	% Error	Reading	% Error	Reading	% Error
Stack	100.00	0.00	601.00	0.17	1203.00	0.25
Probe	98.00	1.00	599.00	0.17	1201.00	0.08
Filter	100.00	0.00	601.00	0.17	1203.00	0.25
Dryer	100.00	0.00	600.00	0.00	1200.00	0.00
Aux.	100.00	0.00	601.00	0.17	1203.00	0.25

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	74.10 (°F)	
	Reading	(±°F)
DGM In	73.0	1.10
DGM Out	73.0	1.10

Note: Calibrated against ASTM Reference Thermometer.

SIGNATURE: _____

Craig M. Carthy

DATE: 07/01/14 07/01/14

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-0001

Gooseneck: samp-ad-0033

Filename: Y:\Shared\QAQC\Calibrations\PM-Equipment\IM-5 Consoles\Calibration Sheet v4.1\Current\{SAMP-CP-0023 Calibration 8-24-13.xls}7-1-14 (3 point)

Barometric Pressure: 29.36

Thermo-couples	Temps		Signature		Date	
		(°F)				
Stack	Ref	74.10	<i>Craig McCarty</i>		<i>07/01/14</i>	07/01/14
	Read	74.00				
	±°F	0.10				
Filter	Ref	74.10	<i>Craig McCarty</i>		<i>07/01/14</i>	07/01/14
	Read	73.00				
	±°F	1.10				
Exit	Ref	74.10	<i>Craig McCarty</i>		<i>07/01/14</i>	07/01/14
	Read	74.00				
	±°F	0.10				

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 Pre-Test Calibration

Air Hygiene Asset ID: samp-cp-0023

Filename: Y:\Shared\QAQC\Calibrations\PM-Equipment\IM-5 Consoles\Calibration Sheet v4.1\Current[SAMP-CP-0023 Calibration 8-24-13.xls]Original (5 point)

Make: apex
Model #: 522
Serial #: 1308034

Date: 08/24/13
Barometric Pressure: 29.61 (in. Hg)
Theoretical Critical Vacuum: 13.97 (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)
0.32	17.00	85.200	90.280	5.080	73.0	73.0
0.64	12.00	90.280	95.460	5.180	73.0	73.0
1.10	10.00	95.460	101.320	5.860	74.0	74.0
2.10	10.00	101.320	109.270	7.950	74.0	74.0
3.50	10.00	109.270	119.700	10.430	75.0	75.0

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)
73.0	73.0	40	0.2346	16.0	74.1	74.8	74.5
73.0	73.0	48	0.3355	16.0	74.8	75.3	75.1
74.0	74.0	55	0.4522	16.0	75.2	75.3	75.3
75.0	75.0	63	0.6118	15.0	75.3	75.5	75.4
76.0	76.0	73	0.8022	14.0	75.5	75.7	75.6

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)
4.982	141.10	5.108	144.7	5.227
5.084	143.99	5.154	146.0	5.279
5.747	162.77	5.787	163.9	5.931
7.809	221.16	7.829	221.7	8.025
10.262	290.61	10.264	290.7	10.525

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)
0.016	1.025	1.954	49.64	0.078
0.004	1.014	1.913	48.60	0.037
-0.003	1.007	1.808	45.91	-0.069
-0.007	1.003	1.884	47.85	0.007
-0.010	1.000	1.824	46.32	-0.053
AVERAGE:	1.010	1.877	47.67	PASSED

Notes:

For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is +/- 0.02. For Orifice Calibration Factor $\Delta H @$, 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: 08/24/13 08/24/13

METERING SYSTEM THERMOCOUPLE CALIBRATION SHEET

EPA Reference Method

Metering System Pre-Test Calibration

Air Hygiene Asset ID: samp-cp-0023

Filename: Y:\Shared\QAQC\Calibrations\PM-Equipment\M-5 Consoles\Calibration Sheet v4.1\Current\{SAMP-CP-0023 Calibration 8-24-13.xls}Original (5 point)

Make: apex

Date: 08/24/13

Model #: 522

Barometric Pressure: 29.61 (in. Hg)

Serial #: 1308034

Temperature (ASTM cal): 75.90 (°F)

Thermocouple	100 (°F)		600 (°F)		1200 (°F)	
	Reading	% Error	Reading	% Error	Reading	% Error
Stack	100.00	0.00	601.00	0.17	1203.00	0.25
Probe	100.00	0.00	600.00	0.00	1200.00	0.00
Filter	100.00	0.00	601.00	0.17	1203.00	0.25
Dryer	100.00	0.00	600.00	0.00	1203.00	0.25
Aux.	100.00	0.00	601.00	0.17	1203.00	0.25

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	75.90 (°F)	
	Reading	(±°F)
DGM In	77.0	1.10
DGM Out	77.0	1.10

Note: Calibrated against ASTM Reference Thermometer.

SIGNATURE: _____

Craig M. Carthy

DATE: 08/24/13 08/24/13

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-0001

Hotbox: samp-bh-0012

Gooseneck: samp-ad-0037

Filename: Y:\Shared\QAQC\Calibrations\PM-Equipment\TM-5 Consoles\Calibration Sheet v4.1\Current\{SAMP-CP-0023 Calibration 8-24-13.xls}Original (5 point)

Barometric Pressure:

29.61

Thermo-couples	Temps		Signature		Date	
		(°F)				
Stack	Ref	75.90	<i>Craig McCarty</i>		<i>08/24/13</i>	08/24/13
	Read	76.00				
	±°F	0.10				
Filter	Ref	75.90	<i>Craig McCarty</i>		<i>08/24/13</i>	08/24/13
	Read	76.00				
	±°F	0.10				
Exit	Ref	75.90	<i>Craig McCarty</i>		<i>08/24/13</i>	08/24/13
	Read	75.00				
	±°F	0.90				

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.

S-TYPE PITOT TUBE CALIBRATION SHEET

Reference USEPA Reference Method 2 (40CFR60, App. A, Meth. 2)

PITOT SERIAL# <u>4174</u>	CALIBRATION DATE: <u>11-Jan-13</u>
PITOT TYPE: <u>S-Type</u>	BAROMETRIC PRESSURE: <u>29.88</u> in Hg
STD. PITOT TYPE: <u>Ellipsoidal</u>	STATIC PRESSURE: <u>1.4</u> in H ₂ O
Cp(std): <u>0.990</u>	BLOCKAGE %: <u>N/A</u>
PROBE SERIAL# <u>NICK</u>	CORRECTION FACTOR: <u>1.00</u>

SIDE "A" CALIBRATION				
RUN NO.	Δ Pstd in H ₂ O	Δ Ps in H ₂ O	Cp(s)	DEVIATION Cp(s) - avg.Cp(s)
1	0.560	0.820	0.818	0.000
2	0.560	0.820	0.818	0.000
3	0.560	0.820	0.818	0.000
"A" AVERAGE			0.818	0.0000 (must be ≤ 0.01)

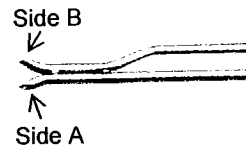
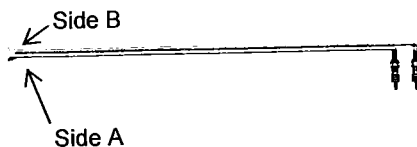
SIDE "B" CALIBRATION				
RUN NO.	Δ Pstd in H ₂ O	Δ Ps in H ₂ O	Cp(s)	DEVIATION Cp(s) - avg.Cp(s)
1	0.560	0.815	0.821	0.000
2	0.560	0.815	0.821	0.000
3	0.560	0.815	0.821	0.000
"B" AVERAGE			0.821	0.0000 (must be ≤ 0.01)

ACCEPTANCE CRITERIA

AVERAGE -0.0025 AVG. Cp (A) - AVG. Cp (B) must be ≤ 0.01

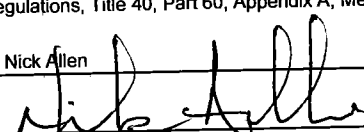
If the Average and both Deviation Averages "A" & "B" are ≤ 0.01, then the OVERALL AVERAGE below may be used.
* If NOT, use the "A" Average OR "B" Average.

OVERALL AVERAGE 0.8194



I certify that the above pitot tube was tested in accordance with the US EPA Method 2 standards.
See the Code of Federal Regulations, Title 40, Part 60, Appendix A, Method 2, Item 4.

Print Name: Nick Allen

Signature: 

Date 1.11.13

WEATHER STATION CALIBRATION SHEET
Temperature, Barometric Pressure, and Relative Humidity Periodic Calibration
Air Hygiene Asset ID: samp-we-0021

Filename: \\SERVER2\public\Shared\QAQC\Calibrations\Weather Stations\2013\[Weather Station Calibration_samp-we-0021.xlsm]100913

Make: Kestrel

NIST ID 21470653

Model #: 4000

NIST S/N 21470653

Serial #: 686543

Cal Due 10/9/2014

ASTM Temp (deg F)	Thermo. (deg F)	± deg F	ASTM Barometer (in. Hg)	Barometric (in. Hg)	± in. Hg
68.00	68.50	0.50	29.44	29.28	0.16

Sean Barnes

10/09/13

(signature)

(date)

ASTM Temp (deg F)	Thermo. (deg F)	± deg F	ASTM Barometer (in. Hg)	Barometric (in. Hg)	± in. Hg
68.00	68.40	0.40	29.44	29.27	0.17

Sean Barnes

10/09/13

(signature)

(date)

ASTM Temp (deg F)	Thermo. (deg F)	± deg F	ASTM Barometer (in. Hg)	Barometric (in. Hg)	± in. Hg
68.00	68.50	0.50	29.44	29.28	0.16

Sean Barnes

10/09/13

(signature)

(date)

ASTM Temp (deg F)	Thermo. (deg F)	± deg F	ASTM Barometer (in. Hg)	Barometric (in. Hg)	± in. Hg
68.00	68.60	0.60	29.44	29.28	0.16

Sean Barnes

10/09/13

(signature)

(date)

Note: Calibrated against NIST Traceable Barometer and Thermometer (SAMP-WE-0100).

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 ±2F.

Standard of Calibration for Barometers

40 CFR Part 60, Appendix A, Method 5, Section:

6.0 Equipment and Supplies, 6.1 Sample Collection, 6.1.2 Barometer. Mercury, aneroid, or other barometer capable of measuring atmospheric pressure to within 2.5 mm Hg (0.1 in.).

10.0 Calibration and Standardization, 10.6 Barometer. Calibrate against a mercury barometer.



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 Date

5/8/2014

Truck/Trailer No.:

66/601

Property	Result	Specification
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# CT41661

SOURCE 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



2655 Park Center Dr., Suite A
Simi Valley, CA 93065
T: +1 805 526 7161
F: +1 805 526 7270
www.alsglobal.com

LABORATORY REPORT

July 9, 2014

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

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

Dear Min:

Enclosed are the results of the samples submitted to our laboratory on June 25, 2014. For your reference, these analyses have been assigned our service request number P1402561.

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
T: +1 805 526 7161
F: +1 805 526 7270
www.alsglobal.com

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

Service Request No: P1402561

CASE NARRATIVE

The samples were received intact under chain of custody on June 25, 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.



2655 Park Center Dr., Suite A
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www.alsglobal.com

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

Service Request No: P1402561

CASE NARRATIVE

Hydrogen Sulfide Analysis

The samples were also analyzed for hydrogen sulfide per ASTM D 5504-12 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.



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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.pjlab.com/search-accredited-labs	L11-203
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	494864
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: Cimarron Flare / cei-14-norman.ok-comp#1

Service Request: P1402561

Date Received: 6/25/2014
 Time Received: 09:50

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-90-100%-can-30ECD	P1402561-001	Air	6/19/2014	08:15	SSC00169	-0.04	3.66	X	X	X
cei-70-100-70%-can-30ECD	P1402561-002	Air	6/19/2014	13:40	SSC00137	-1.47	3.66	X	X	X
cei-30-70-30%-can-30ECD	P1402561-003	Air	6/19/2014	18:20	SSC00151	-1.54	3.52	X	X	X
cei-0-30-0%-can-30ECD	P1402561-004	Air	6/20/2014	10:30	SSC00188	-0.97	3.65	X	X	X

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ALS Environmental Sample Acceptance Check Form

Client: Air Hygiene, Incorporated

Work order: P1402561

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

Sample(s) received on: 6/25/14

Date opened: 6/25/14

by: KKELPE

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
P1402561-001.01	6.0 L Silonite Can					
P1402561-002.01	6.0 L Silonite Can					
P1402561-003.01	6.0 L Silonite Can					
P1402561-004.01	6.0 L Silonite Can					

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

Chain of Custody is missing TAT

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

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

ALS Project ID: P1402561

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: 6/19 - 6/20/14
Date Received: 6/25/14
Date Analyzed: 6/30/14

Client Sample ID	ALS Sample ID	Canister Dilution Factor	Injection Volume ml(s)	Result ppmV	MRL ppmV	Data Qualifier
cei-90-100%-can-30ECD	P1402561-001	1.25	0.050	ND	15	
cei-70-100-70%-can-30ECD	P1402561-002	1.39	0.050	ND	17	
cei-30-70-30%-can-30ECD	P1402561-003	1.38	0.050	ND	17	
cei-0-30-0%-can-30ECD	P1402561-004	1.34	0.050	ND	16	
Method Blank	P140630-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: Cimarron Flare / cei-14-norman.ok-comp#1

ALS Project ID: P1402561

ALS Sample ID: P140630-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: 6/30/14

Volume(s) Analyzed: NA ml(s)

Compound	Spike Amount ppmV	Result ppmV	% Recovery	ALS	Data Qualifier
				Acceptance Limits	
Benzene	137	152	111	50-150	

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: Air Hygiene, Incorporated
Client Sample ID: cei-90-100%-can-30ECD
Client Project ID: Cimarron Flare / cei-14-norman.ok-comp#1

ALS Project ID: P1402561
 ALS Sample ID: P1402561-001

Test Code: ASTM D3588-98
 Analyst: Mike Conejo/Nalini Lall
 Sample Type: 6.0 L Silonite Canister
 Test Notes:
 Container ID: SSC00169

Date Collected: 6/19/14
 Date Received: 6/25/14

Initial Pressure (psig): -0.04 Final Pressure (psig): 3.66

Components	Result Volume %	Canister Dilution Factor: 1.25	
		Result Weight %	Data Qualifier
Hydrogen	< 0.01	< 0.01	
Oxygen + Argon	0.59	0.43	
Nitrogen	2.25	1.44	
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	97.15	98.11	
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	27.13	80.18
Hydrogen	72.34	17.94
Oxygen + Argon	0.11	0.43
Nitrogen	0.42	1.44
Sulfur	< 0.10	< 0.10

Specific Gravity (Air = 1)		1.5075
Specific Volume	ft3/lb	8.69
Gross Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/ft3	2,485.6
Net Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/ft3	2,286.8
Gross Heating Value (Water Saturated at 0.25636 psia)	BTU/ft3	2,401.8
Net Heating Value (Water Saturated at 0.25636 psia)	BTU/ft3	2,209.7
Gross Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/lb	21,603.7
Net Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/lb	19,876.2
Compressibility Factor "Z" (60 F, 14.696 psia)		0.9834

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: Air Hygiene, Incorporated
Client Sample ID: cei-70-100-70%-can-30ECD
Client Project ID: Cimarron Flare / cei-14-norman.ok-comp#1

ALS Project ID: P1402561
ALS Sample ID: P1402561-002

Test Code: ASTM D3588-98
Analyst: Mike Conejo/Nalini Lall
Sample Type: 6.0 L Silonite Canister
Test Notes:
Container ID: SSC00137

Date Collected: 6/19/14
Date Received: 6/25/14

Initial Pressure (psig): -1.47 Final Pressure (psig): 3.66

Components	Result Volume %	Canister Dilution Factor: 1.39	
		Result Weight %	Data Qualifier
Hydrogen	< 0.01	< 0.01	
Oxygen + Argon	0.07	0.05	
Nitrogen	0.32	0.20	
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	99.60	99.74	
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	81.51
Hydrogen	72.68	18.24
Oxygen + Argon	< 0.10	< 0.10
Nitrogen	< 0.10	0.20
Sulfur	< 0.10	< 0.10

Specific Gravity (Air = 1)		1.5204
Specific Volume	ft3/lb	8.62
Gross Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/ft3	2,550.2
Net Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/ft3	2,346.3
Gross Heating Value (Water Saturated at 0.25636 psia)	BTU/ft3	2,462.5
Net Heating Value (Water Saturated at 0.25636 psia)	BTU/ft3	2,265.5
Gross Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/lb	21,977.4
Net Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/lb	20,220.0
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-30ECD
Client Project ID: Cimarron Flare / cei-14-norman.ok-comp#1

ALS Project ID: P1402561
ALS Sample ID: P1402561-003

Test Code: ASTM D3588-98
Analyst: Mike Conejo/Nalini Lall
Sample Type: 6.0 L Silonite Canister
Test Notes:
Container ID: SSC00151

Date Collected: 6/19/14
Date Received: 6/25/14

Initial Pressure (psig): -1.54 Final Pressure (psig): 3.52

Components	Result Volume %	Canister Dilution Factor: 1.38	
		Result Weight %	Data Qualifier
Hydrogen	< 0.01	< 0.01	
Oxygen + Argon	0.26	0.19	
Nitrogen	1.23	0.78	
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	98.50	99.01	
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	27.20	80.92
Hydrogen	72.53	18.11
Oxygen + Argon	< 0.10	0.19
Nitrogen	0.23	0.78
Sulfur	< 0.10	< 0.10

Specific Gravity (Air = 1)		1.5145
Specific Volume	ft3/lb	8.65
Gross Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/ft3	2,521.1
Net Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/ft3	2,319.5
Gross Heating Value (Water Saturated at 0.25636 psia)	BTU/ft3	2,435.2
Net Heating Value (Water Saturated at 0.25636 psia)	BTU/ft3	2,240.5
Gross Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/lb	21,810.4
Net Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/lb	20,066.3
Compressibility Factor "Z" (60 F, 14.696 psia)		0.9831

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: Air Hygiene, Incorporated
Client Sample ID: cei-0-30-0%-can-30ECD
Client Project ID: Cimarron Flare / cei-14-norman.ok-comp#1

ALS Project ID: P1402561
ALS Sample ID: P1402561-004

Test Code: ASTM D3588-98
Analyst: Mike Conejo/Nalini Lall
Sample Type: 6.0 L Silonite Canister
Test Notes:
Container ID: SSC00188

Date Collected: 6/20/14
Date Received: 6/25/14

Initial Pressure (psig): -0.97 Final Pressure (psig): 3.65

Components	Result Volume %	Canister Dilution Factor: 1.34	
		Result Weight %	Data Qualifier
Hydrogen	< 0.01	< 0.01	
Oxygen + Argon	0.09	0.07	
Nitrogen	0.50	0.32	
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	99.40	99.60	
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	81.40
Hydrogen	72.65	18.22
Oxygen + Argon	< 0.10	< 0.10
Nitrogen	< 0.10	0.32
Sulfur	< 0.10	< 0.10

Specific Gravity (Air = 1)		1.5193
Specific Volume	ft3/lb	8.62
Gross Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/ft3	2,544.8
Net Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/ft3	2,341.3
Gross Heating Value (Water Saturated at 0.25636 psia)	BTU/ft3	2,457.5
Net Heating Value (Water Saturated at 0.25636 psia)	BTU/ft3	2,261.0
Gross Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/lb	21,946.6
Net Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/lb	20,191.7
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-90-100%-can-30ECD
Client Project ID: Cimarron Flare / cei-14-norman.ok-comp#1

ALS Project ID: P1402561
 ALS Sample ID: P1402561-001

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: SSC00169

Date Collected: 6/19/14
Date Received: 6/25/14
Date Analyzed: 6/30/14
Volume(s) Analyzed: 0.050 ml(s)

Initial Pressure (psig): -0.04 **Final Pressure (psig):** 3.66

Canister Dilution Factor: 1.25

Compound	Result ppmV	MRL ppmV	Data Qualifier
Methane	ND	13	
C ₂ as Ethane	30	13	
C ₃ as Propane	970,000	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-70-100-70%-can-30ECD
Client Project ID: Cimarron Flare / cei-14-norman.ok-comp#1

ALS Project ID: P1402561
 ALS Sample ID: P1402561-002

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: SSC00137

Date Collected: 6/19/14
Date Received: 6/25/14
Date Analyzed: 6/30/14
Volume(s) Analyzed: 0.050 ml(s)

Initial Pressure (psig): -1.47 **Final Pressure (psig):** 3.66

Canister Dilution Factor: 1.39

Compound	Result ppmV	MRL ppmV	Data Qualifier
Methane	ND	14	
C ₂ as Ethane	23	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-30-70-30%-can-30ECD
Client Project ID: Cimarron Flare / cei-14-norman.ok-comp#1

ALS Project ID: P1402561
 ALS Sample ID: P1402561-003

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: SSC00151

Date Collected: 6/19/14
Date Received: 6/25/14
Date Analyzed: 6/30/14
Volume(s) Analyzed: 0.050 ml(s)

Initial Pressure (psig): -1.54 **Final Pressure (psig):** 3.52

Canister Dilution Factor: 1.38

Compound	Result ppmV	MRL ppmV	Data Qualifier
Methane	ND	14	
C ₂ as Ethane	28	14	
C ₃ as Propane	980,000	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-0-30-0%-can-30ECD
Client Project ID: Cimarron Flare / cei-14-norman.ok-comp#1

ALS Project ID: P1402561
 ALS Sample ID: P1402561-004

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: SSC00188

Date Collected: 6/20/14
Date Received: 6/25/14
Date Analyzed: 6/30/14
Volume(s) Analyzed: 0.050 ml(s)

Initial Pressure (psig): -0.97 **Final Pressure (psig):** 3.65

Canister Dilution Factor: 1.34

Compound	Result ppmV	MRL ppmV	Data Qualifier
Methane	ND	13	
C ₂ as Ethane	27	13	
C ₃ as Propane	990,000	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	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: Cimarron Flare / cei-14-norman.ok-comp#1

ALS Project ID: P1402561
ALS Sample ID: P140630-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: 6/30/14
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: Cimarron Flare / cei-14-norman.ok-comp#1

ALS Project ID: P1402561
ALS Sample ID: P140630-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: 6/30/14
Volume(s) Analyzed: NA ml(s)

Compound	Spike Amount ppmV	Result ppmV	% Recovery	ALS	Data Qualifier
				Acceptance Limits	
Methane	1,010	1,000	99	83-120	
Ethane	1,020	998	98	85-122	
Propane	1,040	1,010	97	84-121	
n-Butane	1,010	945	94	79-114	
n-Pentane	1,000	959	96	80-121	
n-Hexane	1,010	952	94	73-121	

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: Air Hygiene, Incorporated
Client Sample ID: cei-90-100%-can-30ECD
Client Project ID: Cimarron Flare / cei-14-norman.ok-comp#1

ALS Project ID: P1402561
 ALS Sample ID: P1402561-001

Test Code: ASTM D1945-03
 Instrument ID: HP5890 II/GC1/TCD
 Analyst: Nalini Lall
 Sample Type: 6.0 L Silonite Canister
 Test Notes:
 Container ID: SSC00169

Date Collected: 6/19/14
 Date Received: 6/25/14
 Date Analyzed: 6/30/14
 Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -0.04 Final Pressure (psig): 3.66

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	0.588	0.13	
7727-37-9	Nitrogen	2.25	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-70-100-70%-can-30ECD
Client Project ID: Cimarron Flare / cei-14-norman.ok-comp#1

ALS Project ID: P1402561
 ALS Sample ID: P1402561-002

Test Code: ASTM D1945-03
 Instrument ID: HP5890 II/GC1/TCD
 Analyst: Nalini Lall
 Sample Type: 6.0 L Silonite Canister
 Test Notes:
 Container ID: SSC00137

Date Collected: 6/19/14
 Date Received: 6/25/14
 Date Analyzed: 6/30/14
 Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -1.47 Final Pressure (psig): 3.66

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	0.319	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-30-70-30%-can-30ECD
Client Project ID: Cimarron Flare / cei-14-norman.ok-comp#1

ALS Project ID: P1402561
 ALS Sample ID: P1402561-003

Test Code: ASTM D1945-03
Instrument ID: HP5890 II/GC1/TCD
Analyst: Nalini Lall
Sample Type: 6.0 L Silonite Canister
Test Notes:
Container ID: SSC00151

Date Collected: 6/19/14
Date Received: 6/25/14
Date Analyzed: 6/30/14
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -1.54 **Final Pressure (psig):** 3.52

Canister Dilution Factor: 1.38

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	0.265	0.14	
7727-37-9	Nitrogen	1.23	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-0-30-0%-can-30ECD
Client Project ID: Cimarron Flare / cei-14-norman.ok-comp#1

ALS Project ID: P1402561
 ALS Sample ID: P1402561-004

Test Code: ASTM D1945-03
Instrument ID: HP5890 II/GC1/TCD
Analyst: Nalini Lall
Sample Type: 6.0 L Silonite Canister
Test Notes:
Container ID: SSC00188

Date Collected: 6/20/14
Date Received: 6/25/14
Date Analyzed: 6/30/14
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -0.97 **Final Pressure (psig):** 3.65

Canister Dilution Factor: 1.34

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	0.498	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: Method Blank
Client Project ID: Cimarron Flare / cei-14-norman.ok-comp#1

ALS Project ID: P1402561
ALS Sample ID: P140630-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: 6/30/14
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: Cimarron Flare / cei-14-norman.ok-comp#1

ALS Project ID: P1402561
 ALS Sample ID: P140630-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: 6/30/14
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	37,900	95	84-110	
7782-44-7	Oxygen +					
7440-37-1	Argon	50,000	51,900	104	88-114	
7727-37-9	Nitrogen	50,000	53,900	108	88-114	
630-08-0	Carbon Monoxide	50,000	51,100	102	88-113	
124-38-9	Carbon Dioxide	50,000	50,600	101	84-109	

APPENDIX F

METHOD 3C RESULTS



2655 Park Center Dr., Suite A
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F: +1 805 526 7270
www.alsglobal.com

LABORATORY REPORT

July 3, 2014

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

RE: cei-13-norman.ok-comp#1

Dear Min:

Your report number P1402494 has been amended for the samples submitted to our laboratory on June 21, 2014. The results for R2-0-30-0%-30 ECD-backup have been corrected. The revised page has been indicated by the "Revised Page" footer located at the bottom right of the page.

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
T: +1 805 526 7161
F: +1 805 526 7270
www.alsglobal.com

Client: Air Hygiene, Incorporated
Project: cei-13-norman.ok-comp#1

Service Request No: P1402494

CASE NARRATIVE

The samples were received intact under chain of custody on June 21, 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.

The primary sample for R2-0-30-0%-30-ECD went flat before the analysis could be performed; therefore the back-up sample was analyzed and reported.

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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 Simi Valley, CA 93065
 T: +1 805 526 7161
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www.alsglobal.com

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	L11-203
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	494864
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-13-norman.ok-comp#1

Service Request: P1402494

Date Received: 6/21/2014
Time Received: 10:05

3C Modified - Fxd Gases Bag 2X

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	
R1-0-30-0%-30 ECD	P1402494-001	Air	6/19/2014	00:00	X
R2-0-30-0%-30 ECD-Backup	P1402494-004	Air	6/20/2014	00:00	X
R3-0-30-0%-30 ECD	P1402494-005	Air	6/20/2014	00:00	X
R10-90-100%-24 ECD	P1402494-007	Air	6/20/2014	00:00	X
R11-90-100%-24 ECD	P1402494-009	Air	6/20/2014	00:00	X
R12-90-100%-24 ECD	P1402494-011	Air	6/20/2014	00:00	X

P14024/94

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-13-norman.ok-comp#1		Laboratory Analysis Requested:		Method 3C	
Person Taking Samples:		DG/CG					
Sample Number	Location	Date	Volume	Analysis Method			
				O ₂	CO ₂	N ₂	Methane
R1-0-30-0%-30 ECD	Cimarron Norman Facility	6/19/2014	10	X	X	X	X
R1-0-30-0%-30 ECD-Backup	Cimarron Norman Facility	6/19/2014	5	X	X	X	X
R2-0-30-0%-30 ECD	Cimarron Norman Facility	6/20/2014	10	X	X	X	X
R2-0-30-0%-30 ECD-Backup	Cimarron Norman Facility	6/20/2014	5	X	X	X	X
R3-0-30-0%-30 ECD	Cimarron Norman Facility	6/20/2014	10	X	X	X	X
R3-0-30-0%-30 ECD-Backup	Cimarron Norman Facility	6/20/2014	5	X	X	X	X
Relinquished by: (Signature)		11:50 AM 6/20/14		Received by: (Signature)		6/24/14	
		Date: Time				Date: Time	
Relinquished by: (Signature)		Date: Time		Received by: (Signature)		Date: Time	

1 2 3 4 5 6

2ndmob-061614-coc

ALS Environmental Sample Acceptance Check Form

Client: Air Hygiene, Incorporated

Work order: P1402494

Project: cei-13-norman.ok-comp#1

Sample(s) received on: 6/21/14

Date opened: 6/21/14

by: SANDERSON

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
P1402494-001.01	10 L Tedlar Bag					
P1402494-002.01	5.0 L Tedlar Bag					
P1402494-003.01	10 L Tedlar Bag					
P1402494-004.01	5.0 L Tedlar Bag					
P1402494-005.01	10 L Tedlar Bag					
P1402494-006.01	5.0 L Tedlar Bag					
P1402494-007.01	10 L Tedlar Bag					
P1402494-008.01	5.0 L Tedlar Bag					

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

Sample -011: COC notes ID as R12-100%-24-ECD but the container label notes R12-90-100%-24 ECD

The container label was followed for login purposes.

ALS Environmental Sample Acceptance Check Form

Client: Air Hygiene, Incorporated

Work order: P1402494

Project: cei-13-norman.ok-comp#1

Sample(s) received on: 6/21/14

Date opened: 6/21/14

by: SANDERSON

[illegible]

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: Air Hygiene, Incorporated
Client Sample ID: R1-0-30-0%-30 ECD
Client Project ID: cei-13-norman.ok-comp#1

ALS Project ID: P1402494
 ALS Sample ID: P1402494-001

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: 6/19/14
Date Received: 6/21/14
Date Analyzed: 6/23/14
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	18.5	0.10	
7727-37-9	Nitrogen	78.8	0.10	
74-82-8	Methane	ND	0.10	
124-38-9	Carbon Dioxide	2.59	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: R2-0-30-0%-30 ECD-Backup
Client Project ID: cei-13-norman.ok-comp#1

ALS Project ID: P1402494
ALS Sample ID: P1402494-004

Test Code: EPA Method 3C Modified
Instrument ID: HP5890 II/GC1/TCD
Analyst: Nalini Lall
Sample Type: 5.0 L Tedlar Bag
Test Notes:

Date Collected: 6/20/14
Date Received: 6/21/14
Date Analyzed: 6/23/14
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	17.1	0.10	
7727-37-9	Nitrogen	79.2	0.10	
74-82-8	Methane	ND	0.10	
124-38-9	Carbon Dioxide	3.67	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%-30 ECD
Client Project ID: cei-13-norman.ok-comp#1

ALS Project ID: P1402494
ALS Sample ID: P1402494-005

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: 6/20/14
Date Received: 6/21/14
Date Analyzed: 6/23/14
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	17.8	0.10	
7727-37-9	Nitrogen	79.0	0.10	
74-82-8	Methane	ND	0.10	
124-38-9	Carbon Dioxide	3.19	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-13-norman.ok-comp#1

ALS Project ID: P1402494
ALS Sample ID: P140623-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: 6/23/14
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

June 30, 2014

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

RE: cei-13-norman.ok-comp#1

Dear Min:

Enclosed are the results of the samples submitted to our laboratory on June 20, 2014. For your reference, these analyses have been assigned our service request number P1402483.

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-13-norman.ok-comp#1

Service Request No: P1402483

CASE NARRATIVE

The samples were received intact under chain of custody on June 20, 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	L11-203
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	494864
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-13-norman.ok-comp#1

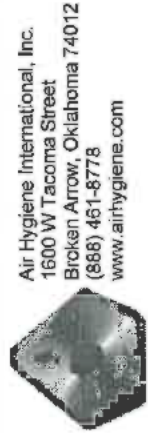
Service Request: P1402483

Date Received: 6/20/2014
Time Received: 09:30

3C Modified - Fxd Gases Bag 2X

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	
R4-30-70-30%-30 ECD	P1402483-001	Air	6/19/2014	00:00	X
R5-30-70-30%-30 ECD	P1402483-003	Air	6/19/2014	00:00	X
R6-30-70-30%-30 ECD	P1402483-005	Air	6/19/2014	00:00	X
R7-70-100-70%-30 ECD	P1402483-007	Air	6/19/2014	00:00	X
R8-70-100-70%-30 ECD	P1402483-009	Air	6/19/2014	00:00	X
R9-70-100-70%-30 ECD	P1402483-011	Air	6/19/2014	00:00	X
R10-90-100%-30 ECD	P1402483-013	Air	6/19/2014	00:00	X
R11-90-100%-30 ECD	P1402483-015	Air	6/18/2014	00:00	X
R12-90-100%-30 ECD	P1402483-017	Air	6/18/2014	00:00	X

PH-2014-83



SAMPLE DESCRIPTION AND CHAIN OF CUSTODY RECORD

Project Number: cel-13-norman.ok-comp#1		Laboratory Analysis Requested: Method 3C					
Person Taking Samples: DG/CG							
Sample Number	Location	Date	Volume	Analysis Method			
				O ₂	CO ₂	N ₂	Methane
R4-30-70-30%-30 ECD	Cimarron Norman Facility	6/19/2014	10	X	X	X	X
R4-30-70-30%-30 ECD-Backup	Cimarron Norman Facility	6/19/2014	5	X	X	X	X
R5-30-70-30%-30 ECD	Cimarron Norman Facility	6/19/2014	10	X	X	X	X
R5-30-70-30%-30 ECD-Backup	Cimarron Norman Facility	6/19/2014	5	X	X	X	X
R6-30-70-30%-30 ECD	Cimarron Norman Facility	6/19/2014	10	X	X	X	X
R6-30-70-30%-30 ECD-Backup	Cimarron Norman Facility	6/19/2014	5	X	X	X	X
R7-70-100-70%-30 ECD	Cimarron Norman Facility	6/19/2014	10	X	X	X	X
R7-70-100-70%-30 ECD-Backup	Cimarron Norman Facility	6/19/2014	5	X	X	X	X
R8-70-100-70%-30 ECD	Cimarron Norman Facility	6/19/2014	10	X	X	X	X
R8-70-100-70%-30 ECD-Backup	Cimarron Norman Facility	6/19/2014	5	X	X	X	X
R9-70-100-70%-30 ECD	Cimarron Norman Facility	6/19/2014	10	X	X	X	X
R9-70-100-70%-30 ECD-Backup	Cimarron Norman Facility	6/19/2014	5	X	X	X	X
R10-90-100%-30 ECD	Cimarron Norman Facility	6/18/2014	10	X	X	X	X
R10-90-100%-30 ECD-Backup	Cimarron Norman Facility	6/18/2014	5	X	X	X	X
R11-90-100%-30 ECD	Cimarron Norman Facility	6/18/2014	10	X	X	X	X
R11-90-100%-30 ECD-Backup	Cimarron Norman Facility	6/18/2014	5	X	X	X	X
R12-90-100%-30 ECD	Cimarron Norman Facility	6/19/2014	10	X	X	X	X
R12-90-100%-30 ECD-Backup	Cimarron Norman Facility	6/19/2014	5	X	X	X	X

Relinquished by: (Signature) [Signature] Date: 6/19/14 Time: 18:15

Relinquished by: (Signature) [Signature] Date: 6/20/14 Time: 09:30

Received by: (Signature) [Signature] Date: 6/20/14 Time: 09:30

Received by: (Signature) [Signature] Date: 6/20/14 Time: 09:30

ndmob-061614-coc

ALS Environmental Sample Acceptance Check Form

Client: Air Hygiene, Incorporated

Work order: P1402483

Project: cei-13-norman.ok-comp#1

Sample(s) received on: 6/20/14

Date opened: 6/20/14

by: KKELPE

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
P1402483-001.01	10 L Tedlar Bag					
P1402483-002.01	5.0 L Tedlar Bag					
P1402483-003.01	10 L Tedlar Bag					
P1402483-004.01	5.0 L Tedlar Bag					
P1402483-005.01	10 L Tedlar Bag					
P1402483-006.01	5.0 L Tedlar Bag					
P1402483-007.01	10 L Tedlar Bag					
P1402483-008.01	5.0 L Tedlar Bag					

Explain any discrepancies: (include lab sample ID numbers): NO tat

Chain of Custody is missing time collected

ALS Environmental Sample Acceptance Check Form

Client: Air Hygiene, Incorporated

Work order: P1402483

Project: cei-13-norman.ok-comp#1

Sample(s) received on: 6/20/14

Date opened: 6/20/14

by: KKELPE

[illegible]

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%-30 ECD
Client Project ID: cei-13-norman.ok-comp#1

ALS Project ID: P1402483
ALS Sample ID: P1402483-001

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: 6/19/14
Date Received: 6/20/14
Date Analyzed: 6/21/14
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	17.9	0.10	
7727-37-9	Nitrogen	79.0	0.10	
74-82-8	Methane	ND	0.10	
124-38-9	Carbon Dioxide	3.10	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%-30 ECD
Client Project ID: cei-13-norman.ok-comp#1

ALS Project ID: P1402483
ALS Sample ID: P1402483-003

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: 6/19/14
Date Received: 6/20/14
Date Analyzed: 6/21/14
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	17.7	0.10	
7727-37-9	Nitrogen	79.1	0.10	
74-82-8	Methane	ND	0.10	
124-38-9	Carbon Dioxide	3.26	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%-30 ECD
Client Project ID: cei-13-norman.ok-comp#1

ALS Project ID: P1402483
ALS Sample ID: P1402483-005

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: 6/19/14
Date Received: 6/20/14
Date Analyzed: 6/21/14
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	15.8	0.10	
7727-37-9	Nitrogen	79.6	0.10	
74-82-8	Methane	ND	0.10	
124-38-9	Carbon Dioxide	4.60	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: R7-70-100-70%-30 ECD
Client Project ID: cei-13-norman.ok-comp#1

ALS Project ID: P1402483
ALS Sample ID: P1402483-007

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: 6/19/14
Date Received: 6/20/14
Date Analyzed: 6/21/14
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	17.1	0.10	
7727-37-9	Nitrogen	79.2	0.10	
74-82-8	Methane	ND	0.10	
124-38-9	Carbon Dioxide	3.70	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%-30 ECD
Client Project ID: cei-13-norman.ok-comp#1

ALS Project ID: P1402483
ALS Sample ID: P1402483-009

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: 6/19/14
Date Received: 6/20/14
Date Analyzed: 6/21/14
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	14.8	0.10	
7727-37-9	Nitrogen	79.8	0.10	
74-82-8	Methane	ND	0.10	
124-38-9	Carbon Dioxide	5.35	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%-30 ECD
Client Project ID: cei-13-norman.ok-comp#1

ALS Project ID: P1402483
ALS Sample ID: P1402483-011

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: 6/19/14
Date Received: 6/20/14
Date Analyzed: 6/21/14
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	16.5	0.10	
7727-37-9	Nitrogen	79.4	0.10	
74-82-8	Methane	ND	0.10	
124-38-9	Carbon Dioxide	4.14	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: R10-90-100%-30 ECD
Client Project ID: cei-13-norman.ok-comp#1

ALS Project ID: P1402483
ALS Sample ID: P1402483-013

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: 6/19/14
Date Received: 6/20/14
Date Analyzed: 6/21/14
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	15.5	0.10	
7727-37-9	Nitrogen	79.7	0.10	
74-82-8	Methane	ND	0.10	
124-38-9	Carbon Dioxide	4.84	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: R11-90-100%-30 ECD
Client Project ID: cei-13-norman.ok-comp#1

ALS Project ID: P1402483
ALS Sample ID: P1402483-015

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: 6/18/14
Date Received: 6/20/14
Date Analyzed: 6/21/14
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	14.6	0.10	
7727-37-9	Nitrogen	79.9	0.10	
74-82-8	Methane	ND	0.10	
124-38-9	Carbon Dioxide	5.47	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%-30 ECD
Client Project ID: cei-13-norman.ok-comp#1

ALS Project ID: P1402483
ALS Sample ID: P1402483-017

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: 6/18/14
Date Received: 6/20/14
Date Analyzed: 6/21/14
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	14.8	0.10	
7727-37-9	Nitrogen	79.9	0.10	
74-82-8	Methane	ND	0.10	
124-38-9	Carbon Dioxide	5.33	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-13-norman.ok-comp#1

ALS Project ID: P1402483
ALS Sample ID: P140621-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: 6/21/14
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

RATA - FIELD DATA SHEET

AIR HYGIENE



Company:	Cameron Energy		
Location:	Norman Facility		
Date:	6/18/14		
Unit Make and Model:	30 ECD		
Unit Number:	1		
Serial Number:	1		
Data Recorded By:			
Tested With AHI Unit(s):	Truck(s):	Trailers(s):	
	132	208	
LDEQ Warmup/Cal Req:	On (Day/Time):	5:30 AM	Cal (Day/Time):
			2:00 PM

CYLINDER SERIAL NUMBERS	O ₂				THC				CO				CO ₂			
	Low															
	Mid															
	High															

RUN INFORMATION	Run #1		Run #2		Run #3		Run #4		Run #5		Run #6		Run #7		Run #8		Run #9		Run #10		Run #11		Run #12	
	Load (%)																							
Time Start (hh:mm:ss)																								
Time Stop (hh:mm:ss)																								
Barometric Pressure (in. Hg)																								
Ambient Temperature (°F)																								
Relative Humidity (%)																								

90-100%
17:40:23 19:05:23
18:50:23 20:15:23
29.85 29.83
8.64 8.6
7.5 4.5

CALIBRATION	O ₂		CO		THC		CO ₂	
	Conc.	Actual	Conc.	Actual	Conc.	Actual	Conc.	Actual
Zero Gas	0	0.01	0	0.02	0	0.01	0	-0.05
Low Gas	12.30	12.33	5.12	5.10	3.04	3.05	4.33	9.26
Mid Gas	21.10	21.06	11.0	11.01	5.07	5.07	17.50	18.57
High Gas			25.9		8.48	8.49		

REPORT INFORMATION		
INSTRUMENT	SERIAL #	
O ₂		
NOX		
CO		
THC		
CO ₂		
SO ₂		

BIAS	O ₂		CO		THC		CO ₂	
	Zero	Mid	Zero	Mid	Zero	Mid	Zero	Mid
Initial Run #1	0.01	12.14	0.01	4.94	0.07	3.08	0.02	9.17
Run #1 / Run #2	0.02	12.13	0.05	4.96	0.02	2.97	0.03	9.18
Run #2 / Run #3	0.01	12.14	0.02	5.01	0.05	3.08	0.05	9.15
Run #3 / Run #4								
Run #4 / Run #5								
Run #5 / Run #6								
Run #6 / Run #7								
Run #7 / Run #8								
Run #8 / Run #9								
Run #9 / Run #10								
Run #10 / Run #11								
Run #11 / Run #12								
Run #12 Final								

Bias Gas Actual Conc.

RATA - FIELD DATA SHEET

AIR HYGIENE



Company:	Cameron Energy		
Location:	Norman Facility		
Date:	6/19/14		
Unit Make and Model:	BoFlex		
Unit Number:	1		
Serial Number:	7462		
Data Recorded By:	Paul		
Trailer(s):	205		
Tested With AHI Unit(s):	Truck(s):	132	
Cal (Day/Time):	5:30 AM	3:00 PM	

CYLINDER SERIAL NUMBERS	O ₂			
	THC			
	CO			
	CO ₂			
	Low	Mid	High	

RUN INFORMATION	Run #1	Run #2	Run #3	Run #4	Run #5	Run #6	Run #7	Run #8	Run #9	Run #10	Run #11	Run #12
Load (%)	0	30-0%	"	30-70	30%	40-100	70%	70%	71			90-100%
Time Start (hh:mm:ss)	18:33:10			14:10:10	15:35:10	17:00:10	9:25:22	10:50:22	12:20:10			8:00:12
Time Stop (hh:mm:ss)	19:43:10			15:20:10	16:45:10	18:10:10	10:35:22	12:00:22	13:30:10			9:10:12
Barometric Pressure (in. Hg)	29.99			29.98	29.95	29.95	29.95	29.96	29.99			29.96
Ambient Temperature (°F)	83			88	89	83	75	80	81			84
Relative Humidity (%)	38			48	40	34	79	68	68			59

CALIBRATION	O ₂		CO		THC		CO ₂	
	Conc.	Actual	Conc.	Actual	Conc.	Actual	Conc.	Actual
Zero Gas	0	0.04	0	0.02	0	0.03	0	-0.02
Low Gas			5.12	5.17	3.04	3.02	9.33	9.31
Mid Gas	12.3	12.28	11.0	11.02	5.04	5.03	17.50	18.57
High Gas	21.1	21.14	25.9	-	8.48	8.47		

REPORT INFORMATION		
INSTRUMENT	SERIAL #	
O ₂		
NOX		
CO		
THC		
CO ₂		
SO ₂		

BIAS	O ₂		CO		THC		CO ₂	
	Zero	Mid	Zero	Mid	Zero	Mid	Zero	Mid
Initial Run #1	0.02	12.13	0.06	5.11	0.08	3.00	0.03	9.24
Run #1 / Run #2	0.02	12.11	-0.02	4.97	0.01	2.99	0.05	9.26
Run #2 / Run #3	0.04	12.12	0.03	5.02	0.02	3.06	0.01	9.25
Run #3 / Run #4	0.03	12.13	0.06	4.95	0.02	3.05	0.01	9.28
Run #4 / Run #5	0.02	12.11	-0.03	4.97	0.07	3.09	0.01	9.26
Run #5 / Run #6	0.01	12.10	0.08	5.00	0.05	3.11	0.04	9.25
Run #6 / Run #7	0.03	12.12	-0.04	5.06	0.06	3.09	0.02	9.29
Run #7 / Run #8	0.04	12.10	0.01	5.25	0.02	2.94	0.01	9.25
Run #8 / Run #9	0.02	12.11	0.10	5.23	0.03	3.10	0.01	9.24
Run #9 / Run #10								
Run #10 / Run #11								
Run #11 / Run #12								
Run #12 Final								

Bias Gas Actual Conc.

RATA - FIELD DATA SHEET



Company:	Cinabron Energy		
Location:	Norman Facility		
Date:	6/20/14		
Unit Make and Model:	306CD		
Serial Number:	11		
Data Recorded By:	MSL		
Truck(s):	132	Trailer(s):	208
Tested With AHI Unit(s):	5:30AM Cal (Day/Time): 7:00PM		
LDEQ Warmup/Cal Req:	On (Day/Time):		

CYLINDER SERIAL NUMBERS	O ₂				THC				CO				CO ₂			
	Low															
	Mid															
	High															

RUN INFORMATION	Run #1		Run #2		Run #3		Run #4		Run #5		Run #6		Run #7		Run #8		Run #9		Run #10		Run #11		Run #12	
	Load (%)																							
Time Start (hh:mm:ss)	10-30-09		10-34-12		9:05:12																			
Time Stop (hh:mm:ss)	8:48:12		10:15:12																					
Barometric Pressure (in. Hg)	29.97		30.00																					
Ambient Temperature (°F)	82		82																					
Relative Humidity (%)	40		79																					

CALIBRATION	O ₂		CO		THC		CO ₂	
	Conc.	Actual	Conc.	Actual	Conc.	Actual	Conc.	Actual
Zero Gas	0	0.00	0	0.01	0	0.05	0	-0.01
Low Gas			5.12	5.01	3.04	3.07	9.33	9.24
Mid Gas	12.3	12.15	11.0	11.08	5.04	5.09	18.50	18.61
High Gas	21.1	21.27	25.9		8.47	8.43		

REPORT INFORMATION		
INSTRUMENT	SERIAL #	
O ₂		
NOX		
CO		
THC		
CO ₂		
SO ₂		

BIAS	O ₂		CO		THC		CO ₂	
	Zero	Mid	Zero	Mid	Zero	Mid	Zero	Mid
Initial Run #1	0.05	12.11	0.01	5.27	0.05	3.11	0.04	9.17
Run #1 / Run #2	0.03	12.06	-0.02	5.22	0.08	3.14	0.03	9.16
Run #2 / Run #3	0.04	12.10	0.10	5.04	0.06	3.06	0.10	9.18
Run #3 / Run #4								
Run #4 / Run #5								
Run #5 / Run #6								
Run #6 / Run #7								
Run #7 / Run #8								
Run #8 / Run #9								
Run #9 / Run #10								
Run #10 / Run #11								
Run #11 / Run #12								
Run #12 Final								

Bias Gas Actual Conc.

AIR HYGIENE

MOISTURE (EPA METHOD 4) DATA SHEET



Site Info.

Plant Name.
 Sampling Location.
 Unit #
 Date.

Norman Plant
Test Pkts
30 ECD
6-18-19

Console Info.

Console.
 Meter Calibration Factor
 Orifice Meter Coefficient

Samp-CP-0023
1.010
1.877

Run <u>1</u> Load <u>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)	<u>728.5</u>	<u>744.7</u>	<u>576.6</u>	<u>919.7</u>			
Final Value	(Vf),(Wf)	<u>774.3</u>	<u>753.2</u>	<u>578.6</u>	<u>928.8</u>			

Run <u>2</u> Load <u>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)	<u>774.3</u>	<u>753.2</u>	<u>578.6</u>	<u>928.8</u>			
Final Value	(Vf),(Wf)	<u>814.9</u>	<u>762.8</u>	<u>580.8</u>	<u>938.3</u>			

Run <u>3</u> Load <u>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)	<u>774.3</u>	<u>753.2</u>	<u>578.6</u>	<u>928.8</u>			
Final Value	(Vf),(Wf)	<u>814.9</u>	<u>762.8</u>	<u>580.8</u>	<u>938.3</u>			

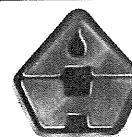
Run <u>1</u> Load		Box #						
		Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7
		(g)	(g)	(g)	(g)			
Contents		H ₂ O	H ₂ O	-	Sil Gel			
Initial Value	(Vi),(Wi)	<u>753.3</u>	<u>721.2</u>	<u>568.8</u>	<u>894.8</u>			
Final Value	(Vf),(Wf)	<u>788.0</u>	<u>730.4</u>	<u>570.8</u>	<u>901.5</u>			

Run <u>2</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)	<u>686.8</u>	<u>710.8</u>	<u>570.8</u>	<u>915.2</u>			
Final Value	(Vf),(Wf)	<u>720.8</u>	<u>720.0</u>	<u>573.1</u>	<u>928.6</u>			

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)	<u>720.8</u>	<u>720.0</u>	<u>573.1</u>	<u>928.6</u>			
Final Value	(Vf),(Wf)	<u>764.8</u>	<u>726.9</u>	<u>574.0</u>	<u>937.4</u>			

AIR HYGIENE

MOISTURE (EPA METHOD 4) DATA SHEET



Site Info.

Plant Name. Norman Plant
 Sampling Location. Test Room
 Unit # 30ECD
 Date. 6-19-19

Console Info.

Console.
 Meter Calibration Factor
 Orifice Meter Coefficient

Run <u>4</u> Load <u>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)	764.8	726.9	574.0	937.9			
Final Value	(Vf),(Wf)	797.6	736.0	578.5	946.6			

Run <u>5</u> Load <u>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)	797.6	736.0	578.5	908.5			
Final Value	(Vf),(Wf)	833.3	743.0	580.8	919.2			

Run <u>6</u> Load <u>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)	726.4	743.0	580.8	919.2			
Final Value	(Vf),(Wf)	760.0	751.2	583.3	929.2			

Run <u>1</u> Load <u>0-30-0</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)	760.0	751.2	583.3	929.2			
Final Value	(Vf),(Wf)	785.7	752.5	586.1	940.2			

Run <u>2</u> Load <u>0-30-0</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)	704.7	703.2	564.5	932.7			
Final Value	(Vf),(Wf)	734.5	710.6	562.9	942.9			

Run <u>3</u> Load <u>0-30-0</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)	734.5	710.6	567.9	942.9			
Final Value	(Vf),(Wf)	760.5	714.5	570.5	954.6			

8/18/14 30 ECU
90-100%
-28.10
-18.25
-8.93
-0.82

8/19/14
70-100-70% 30 ECU
-28.72
-19.00
-10.11
-1.93

30-70-30%
-28.65
-18.52
-9.87
-1.75

0-30-0%
-28.65
-19.14
-9.23
~~exp~~
-1.54

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end of report