

Summary:

Air Hygiene was contracted by Cimarron Energy, Inc. to conduct a performance testing on Emission Combustion Device on Flare Unit, Size 24 (24 ECD). The unit was tested on June 20 through June 24, 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 24 ECD is 1.15MMBtu/hr
- o The inlet gas fuel range for 0% (min. rate) and 100% (max. rate) are 2.0MSCFD, and 9.2MSCFD, respectively
- o Air/Stream injection/assist is not applicable for 24 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 – 212ft/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 24 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 24
PREPARED FOR
CIMARRON ENERGY, INC.
AT THE
NORMAN FACILITY
NORMAN, OKLAHOMA
JUNE 20-24, 2014
RE-TEST**



Corporate Headquarters

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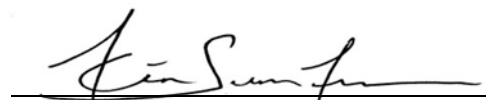
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**Stack Emissions Study
Emission Combustion Device on Flare Unit, Size 24
Cimarron Energy, Inc.
Norman Facility
Norman, Oklahoma
June 20-24, 2014**

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 24 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 20-24, 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 24.

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 24
- 1.2.6 Emission Points
 - For all gases, one sample point in the exhaust duct from the Emission Combustion Device on Flare Unit, Size 24, 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 24
 - 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 24
- 1.2.7 Emission Parameters Measured
- CO
 - THC
 - Flow
 - Visual Emission
 - H₂O
 - CO₂
 - O₂
- 1.2.8 Dates of Emission Test
- June 20-24, 2014

1.3 KEY PERSONNEL

Cimarron Energy, Inc.:

Air Hygiene:

Air Hygiene:

Air Hygiene:

Tim Charlton

Min Sum Lee

Mitch Carson

Darin Grindes

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 24 located at the Norman Facility on June 20-24, 2014 are summarized in the following table and relate only to the items tested.

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

Parameter	0-30-0 Load, Run - 24 ECD R1	0-30-0 Load, Run - 24 ECD R2	0-30-0 Load, Run - 24 ECD R3	Average
Date (mm/dd/yy)	06/24/14	06/24/14	06/24/14	--
Start Time (hh:mm:ss)	12:49:05	14:27:05	15:53:05	--
End Time (hh:mm:ss)	13:59:05	15:37:05	17:03:05	--
Run Duration (min / run)	70	70	70	70
Bar. Pressure (in. Hg)	30.06	29.92	30.02	30.00
Amb. Temp. (°F)	77	86	84	82
Rel. Humidity (%)	80	58	62	67
Spec. Humidity (lb water / lb air)	0.015887	0.015494	0.015483	0.015622
Wind Speed (mph)	20.0	1.0	2.0	7.7
Wind Direction (--)	WNW	WNW	S	--
Inlet Gas Canister Pressure Start (inHg)	-28.72	-20.11	-12.33	--
Inlet Gas Canister Pressure Stop (inHg)	-20.11	-12.33	-2.64	--
Gross Fuel Heating Value (Btu/ft ³)	2,545	2,545	2,545	2,545
Stack Flow (M2) (dscfh)	29,463	29,715	29,825	29,668
Stack Moisture (Method 4)	4.4	4.2	4.0	4.2
Gross Fuel Heating Value (Btu/ft ³)	2,544.5	2,544.5	2,544.5	2,544.50
Average Inlet Fuel Flowrate (SCFH)	125.7	111.5	111.4	116.19
Average Inlet Mass Fuel Flowrate (lb/hr)	14.6	12.9	12.9	13.49
% Excess Air	757.3	723.4	678.5	719.75
CO ₂ (%) - Modified method 3C	2.72	2.79	2.68	2.73
O ₂ (%) - Modified Method 3C	18.40	18.30	18.20	18.30
N ₂ (%) - Modified Method 3C	78.90	78.90	79.10	78.97
Visual Emission (mm:ss)	0:00	0:00	0:00	0.00
CO (ppmvd)	7.14	7.15	8.23	7.51
CO (ppm@3%CO ₂)	7.87	7.69	9.22	8.26
THC (ppmvw)	1.80	2.16	2.32	2.09
THC (ppm@3%CO ₂)	1.98	2.33	2.59	2.30
THC (lb/hr)	0.01	0.01	0.01	0.01
VOC Destruction Efficiency (%)	99.956	99.941	99.943	99.946

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

Parameter	30-70-30 Load, Run - 24 ECD R4	30-70-30 Load, Run - 24 ECD R5	30-70-30 Load, Run - 24 ECD R6	Average
Date (mm/dd/yy)	06/23/14	06/23/14	06/23/14	--
Start Time (hh:mm:ss)	14:55:19	16:20:19	17:51:19	--
End Time (hh:mm:ss)	16:05:19	17:30:19	19:01:19	--
Run Duration (min / run)	70	71	70	71
Bar. Pressure (in. Hg)	29.95	29.94	29.94	29.94
Amb. Temp. (°F)	83	82	81	82
Rel. Humidity (%)	59	54	57	57
Spec. Humidity (lb water / lb air)	0.014273	0.012619	0.012900	0.013264
Wind Speed (mph)	4.0	5.0	0.0	3.0
Wind Direction (--)	NE	NW	NO WIND	--
Inlet Gas Canister Pressure Start (inHg)	-28.60	-19.71	-11.33	-19.88
Inlet Gas Canister Pressure Stop (inHg)	-19.71	-11.33	-2.34	-11.13
Gross Fuel Heating Value (Btu/ft ³)	2,545	2,545	2,545	2,545
Stack Flow (M2) (dscfh)	27,012	27,255	26,993	27,087
Stack Moisture (Method 4)	6.5	4.4	4.6	5.2
Gross Fuel Heating Value (Btu/ft ³)	2,544.5	2,544.5	2,544.5	2,544.50
Average Inlet Fuel Flowrate (SCFH)	204.9	206.8	208.9	206.83
Average Inlet Mass Fuel Flowrate (lb/hr)	23.8	24.0	24.3	24.02
% Excess Air	279.7	394.3	463.4	379.16
CO ₂ (%) - Modified method 3C	4.79	3.97	3.59	4.12
O ₂ (%) - Modified Method 3C	15.50	16.70	17.20	16.47
N ₂ (%) - Modified Method 3C	79.70	79.30	79.21	79.40
Visual Emission (mm:ss)	0:00	0:00	0:00	0:00
CO (ppmvd)	3.52	3.09	3.27	3.30
CO (ppm@3%CO ₂)	2.20	2.34	2.74	2.43
THC (ppmvw)	0.52	0.00	0.35	0.29
THC (ppm@3%CO ₂)	0.33	0.00	0.30	0.21
THC (lb/hr)	0.00	0.00	0.00	0.00
VOC Destruction Efficiency (%)	99.993	99.999	99.995	99.996

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

Parameter	70-100-70 Load, Run - 24 ECD R7	70-100-70 Load, Run - 24 ECD R8	70-100-70 Load, Run - 24 ECD R9	Average
Date (mm/dd/yy)	06/23/14	06/23/14	06/23/14	--
Start Time (hh:mm:ss)	10:18:19	11:45:19	13:15:19	--
End Time (hh:mm:ss)	11:28:19	12:55:19	14:25:19	--
Run Duration (min / run)	71	71	70	71
Bar. Pressure (in. Hg)	29.81	29.88	29.88	29.86
Amb. Temp. (°F)	84	82	81	82
Rel. Humidity (%)	58	55	60	58
Spec. Humidity (lb water / lb air)	0.014565	0.012884	0.013621	0.013690
Wind Speed (mph)	8.5	7.3	6.7	7.5
Wind Direction (--)	NW	NW	NE	--
Inlet Gas Canister Pressure Start (inHg)	-28.60	-18.55	-10.13	--
Inlet Gas Canister Pressure Stop (inHg)	-18.55	-10.13	-1.08	--
Gross Fuel Heating Value (Btu/ft ³)	2,521	2,521	2,521	2,521
Stack Flow (M2) (dscfh)	25,720	25,684	25,408	25,604
Stack Moisture (Method 4)	5.8	5.4	5.4	5.5
Gross Fuel Heating Value (Btu/ft ³)	2,521.1	2,521.1	2,521.1	2,521.10
Average Inlet Fuel Flowrate (SCFH)	309.2	307.6	305.3	307.37
Average Inlet Mass Fuel Flowrate (lb/hr)	35.7	35.7	32.4	34.64
% Excess Air	265.3	286.7	253.1	268.36
CO ₂ (%) - Modified method 3C	4.94	4.69	5.09	4.91
O ₂ (%) - Modified Method 3C	15.30	15.60	15.10	15.33
N ₂ (%) - Modified Method 3C	79.80	79.70	79.80	79.77
Visual Emission (mm:ss)	0:00	0:00	0:00	0:00
CO (ppmvd)	4.94	4.01	4.01	4.32
CO (ppm@3%CO ₂)	3.00	2.57	2.36	2.64
THC (ppmvw)	0.11	0.22	0.36	0.23
THC (ppm@3%CO ₂)	0.07	0.14	0.21	0.14
THC (lb/hr)	0.00	0.00	0.00	0.00
VOC Destruction Efficiency (%)	99.999	99.998	99.997	99.998

TABLE 2.4
24 ECD 90-100 LOAD DATA SUMMARY

Parameter	90-100 Load, Run - 24 ECD R10	90-100 Load, Run - 24 ECD R11	90-100 Load, Run - 24 ECD R12	Average
Date (mm/dd/yy)	06/20/14	06/20/14	06/20/14	--
Start Time (hh:mm:ss)	12:18:07	13:50:07	15:15:07	--
End Time (hh:mm:ss)	13:28:07	15:00:07	16:25:05	--
Run Duration (min / run)	70	70	70	70
Bar. Pressure (in. Hg)	29.98	29.98	29.99	29.98
Amb. Temp. (°F)	87	84	88	86
Rel. Humidity (%)	58	55	49	54
Spec. Humidity (lb water / lb air)	0.015975	0.013715	0.013881	0.014524
Wind Speed (mph)	4.0	8.5	6.5	6.3
Wind Direction (--)	SSE	SE	SE	--
Inlet Gas Canister Pressure Start (inHg)	-28.72	-20.11	-12.33	--
Inlet Gas Canister Pressure Stop (inHg)	-20.11	-12.33	-2.64	--
Gross Fuel Heating Value (Btu/ft ³)	2,526	2,526	2,526	2,526
Stack Flow (M2) (dscfh)	25,224	24,368	24,482	24,691
Stack Moisture (Method 4)	3.8	5.9	5.8	5.2
Gross Fuel Heating Value (Btu/ft ³)	2,526.3	2,526.3	2,526.3	2,526.30
Average Inlet Fuel Flowrate (SCFH)	359.2	354.4	351.4	355.00
Average Inlet Mass Fuel Flowrate (lb/hr)	41.7	40.9	40.8	41.15
% Excess Air	235.6	240.6	241.6	239.24
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	79.86	79.90	79.80	79.85
Visual Emission (mm:ss)	0:00	0:00	0:00	0:00
CO (ppmvd)	7.92	7.32	6.64	7.29
CO (ppm@3%CO ₂)	4.45	4.17	3.82	4.15
THC (ppmvw)	0.53	0.09	0.09	0.23
THC (ppm@3%CO ₂)	0.30	0.05	0.05	0.13
THC (lb/hr)	0.00	0.00	0.00	0.00
VOC Destruction Efficiency (%)	99.996	99.999	99.999	99.998

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 24 (24 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 12.6 feet above grade level on the exhaust system. The stack had a 46 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 1.02 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 24 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 20-24, 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 24 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

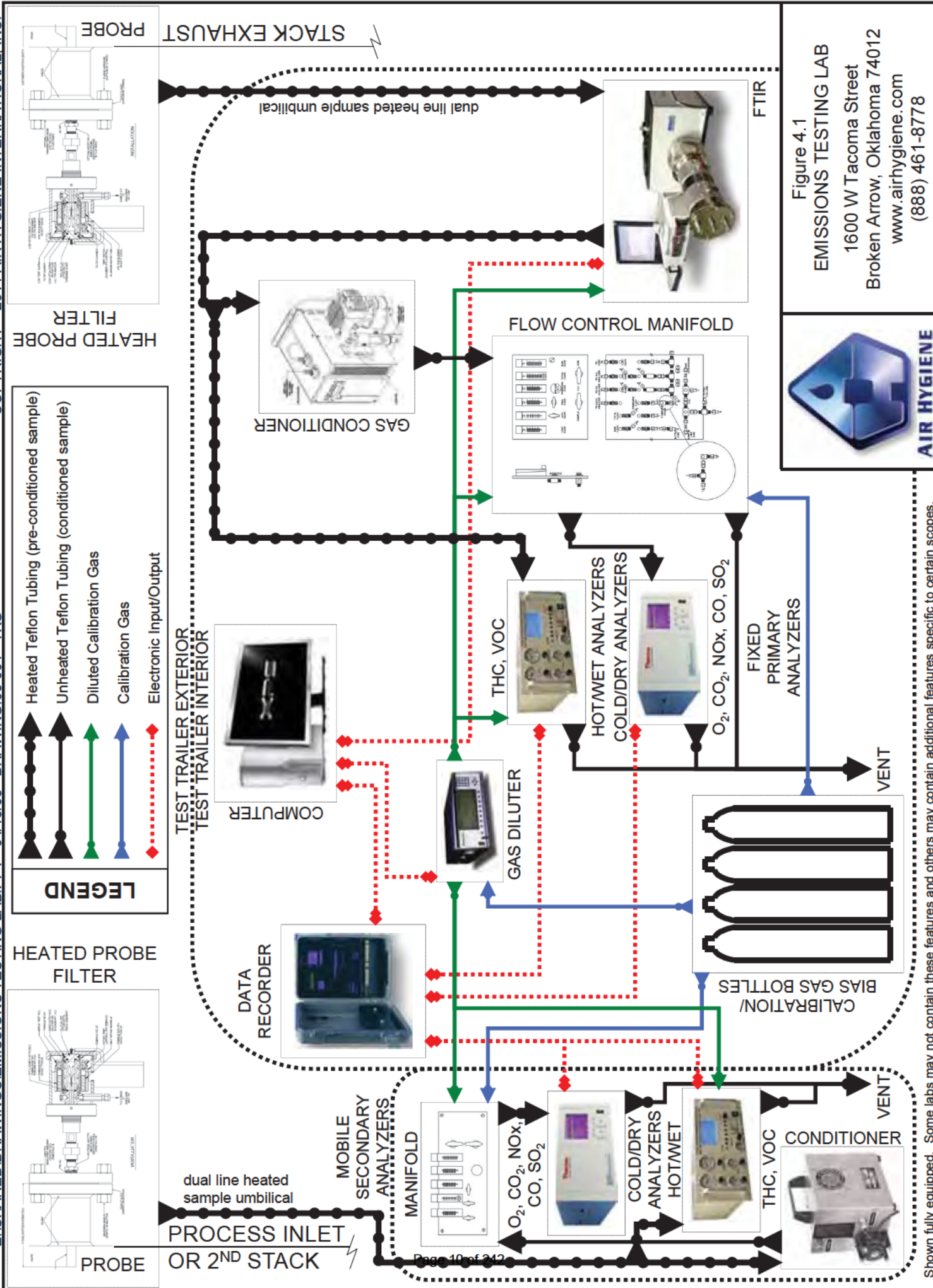


Figure 4.1
EMISSIONS TESTING LAB
1600 W Tacoma Street
Broken Arrow, Oklahoma 74012
www.airhygiene.com
(888) 461-8778

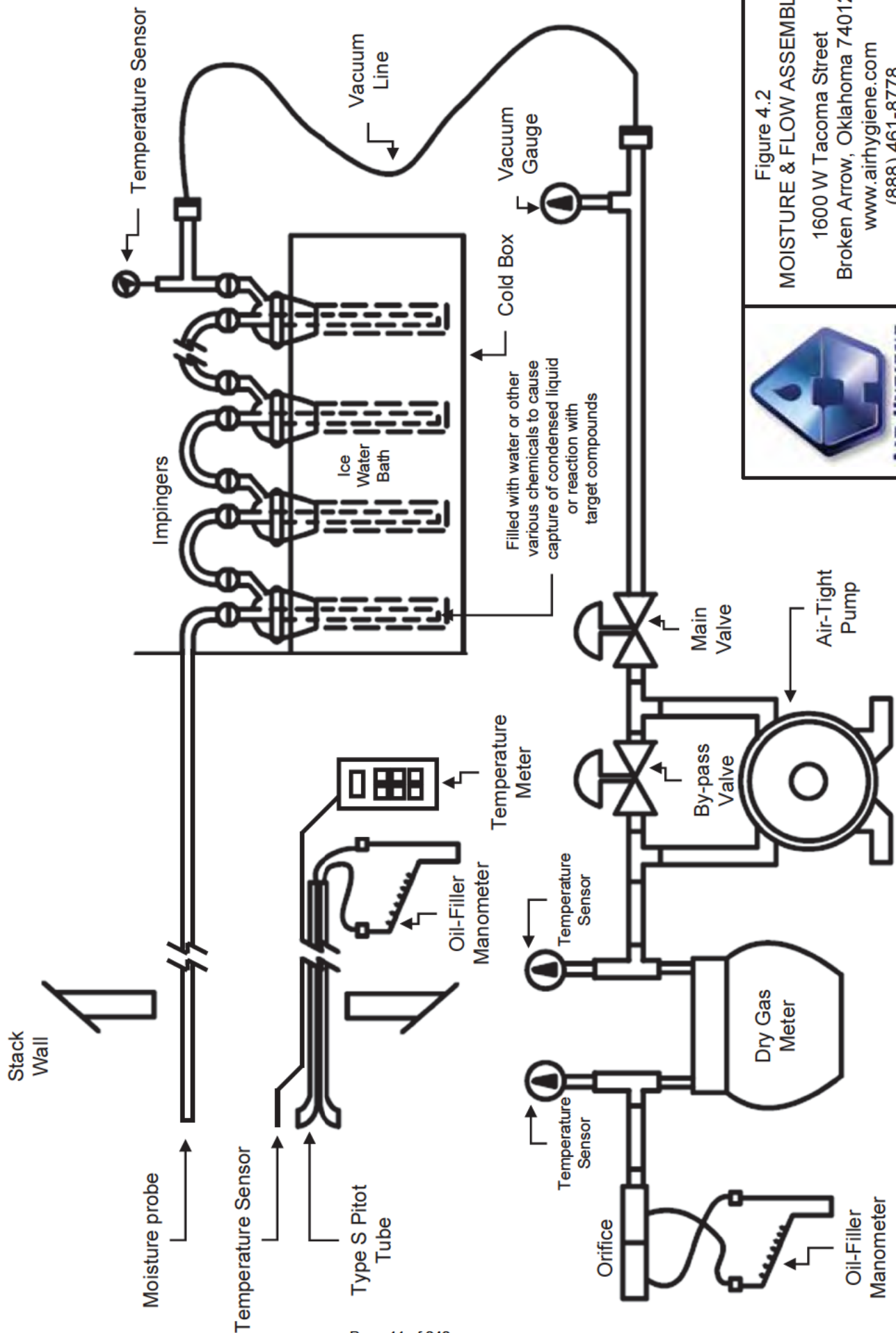


Figure 4.2
MOISTURE & FLOW ASSEMBLY
 1600 W Tacoma Street
 Broken Arrow, Oklahoma 74012
 www.airhygiene.com
 (888) 461-8778

APPENDIX A

TEST RESULTS AND CALCULATIONS

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

Unit	Load	Test Type	Run	Date	Start	Stop	Time Sync
24 ECD	0-30-0	CO, THC & Fuel Sample	24 ECD R1	06/24/14	12:49:05	13:59:05	CST
24 ECD	0-30-0	CO, THC & Fuel Sample	24 ECD R2	06/24/14	14:27:05	15:37:05	CST
24 ECD	0-30-0	CO, THC & Fuel Sample	24 ECD R3	06/24/14	15:53:05	17:03:05	CST
24 ECD	30-70-30	CO, THC & Fuel Sample	24 ECD R4	06/23/14	14:55:19	16:05:19	CST
24 ECD	30-70-30	CO, THC & Fuel Sample	24 ECD R5	06/23/14	16:20:19	17:30:19	CST
24 ECD	30-70-30	CO, THC & Fuel Sample	24 ECD R6	06/23/14	17:51:19	19:01:19	CST
24 ECD	70-100-70	CO, THC & Fuel Sample	24 ECD R7	06/23/14	10:18:19	11:28:19	CST
24 ECD	70-100-70	CO, THC & Fuel Sample	24 ECD R8	06/23/14	11:45:19	12:55:19	CST
24 ECD	70-100-70	CO, THC & Fuel Sample	24 ECD R9	06/23/14	13:15:19	14:25:19	CST
24 ECD	90-100	CO, THC & Fuel Sample	24 ECD R10	06/20/14	12:18:07	13:28:07	CST
24 ECD	90-100	CO, THC & Fuel Sample	24 ECD R11	06/20/14	13:50:07	15:00:07	CST
24 ECD	90-100	CO, THC & Fuel Sample	24 ECD R12	06/20/14	15:15:07	16:25:05	CST
24 ECD	0-30-0	Fixed Gas & Moisture	0-30-0%-1	06/24/14	12:49:00	13:59:00	CST
24 ECD	0-30-0	Fixed Gas & Moisture	0-30-0%-2	06/24/14	14:27:00	15:37:00	CST
24 ECD	0-30-0	Fixed Gas & Moisture	0-30-0%-3	06/24/14	15:53:00	17:03:00	CST
24 ECD	30-70-30	Fixed Gas & Moisture	30-70-30%-4	06/23/14	14:55:00	16:05:00	CST
24 ECD	30-70-30	Fixed Gas & Moisture	30-70-30%-5	06/23/14	16:20:00	17:30:00	CST
24 ECD	30-70-30	Fixed Gas & Moisture	30-70-30%-6	06/23/14	17:51:00	19:01:00	CST
24 ECD	70-100-70	Fixed Gas & Moisture	70-100-70%-7	06/23/14	10:18:00	11:28:00	CST
24 ECD	70-100-70	Fixed Gas & Moisture	70-100-70%-8	06/23/14	11:45:00	12:55:00	CST
24 ECD	70-100-70	Fixed Gas & Moisture	70-100-70%-9	06/23/14	13:15:00	14:25:00	CST
24 ECD	90-100	Fixed Gas & Moisture	90-100%-10	06/20/14	12:18:00	13:28:00	CST
24 ECD	90-100	Fixed Gas & Moisture	90-100%-11	06/20/14	13:50:00	14:00:00	CST
24 ECD	90-100	Fixed Gas & Moisture	90-100%-12	06/20/14	15:15:00	16:25:00	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.

$$RH_{sp} (lb/lb) = \left[\left(\frac{gr}{lb} \right) \times \frac{lb}{7000 gr} \right] \quad RH_{sp} = \frac{111.21 \text{ gr}}{lb} \times \frac{1 lb}{7000 gr} = 0.015887 \frac{lb \text{ H}_2\text{O}}{lb \text{ Air}}$$

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)

$$E_p = \frac{C_{Dir(H)} - C_{Dir(Z)}}{C_{V(H)} - C_{V(Z)}} \times C_{Dir(M)} + C_{Dir(Z)} \quad \text{Eq. of a line } y=mx+b \quad E_p = \frac{8.43 \text{ ppm} - 0.05 \text{ ppm}}{8.48 \text{ ppm} - 0.00 \text{ ppm}} \times 5.01 \text{ ppm} + 0.05 = 5.00 \text{ ppm}$$

$$ACE = \left(\frac{C_{Dir} - C_V}{CS} \right) \times 100 \quad \text{Eq. 7E-1} \quad ACE_{THC} = \frac{5.09 \text{ ppm} - 5.00 \text{ ppm}}{5.01 \text{ ppm}} \times 100 = 1.78 \%$$

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)

$$SB = \left(\frac{C_S - C_{Dir}}{CS} \right) \times 100 \quad \text{Eq. 7E-2} \quad SB = \frac{2.95 \text{ ppm} - 3.16 \text{ ppm}}{10.00 \text{ ppm}} \times 100 = -2.10 \%$$

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)

$$D = |SB_{final} - SB_i| \quad \text{Eq. 7E-4} \quad D = |-0.80 \% - -2.10 \%| = 1.30 \%$$

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)

$$SB / D_{Alt} = |C_S - C_{Dir}| \quad \text{Eq. Section 13.2 and 13.3} \quad SB / D_{Alt} = |2.95 \text{ ppm} - 3.16 \text{ ppm}| = 0.21 \text{ ppm}$$

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)

$$C_{Gas} = (C_{Avg} - C_O) \times \left(\frac{C_{MA}}{C_M - C_O} \right) \quad \text{Eq. 7E-5b} \quad C_{Gas} = \left(1.79 \text{ ppm} - 0.03 \text{ ppm} \right) \times \left(\frac{3.04 \text{ ppm}}{3.02 \text{ ppm} - 0.03 \text{ ppm}} \right) = 1.80 \text{ ppm}$$

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

$$C_{adj} = 1.88 \text{ ppm} \times \left(\frac{3.00 \%}{5.90 \%} \right) = 0.96 \text{ ppm@3\%CO}_2$$

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)

$$E_{lb/hr} = \frac{C_{Gaz}}{10^6} \times \frac{Q_S \times MW}{G} \quad E_{lb/hr} = \frac{1.88 \text{ ppm}}{10^6 \text{ ppm/part}} \times \frac{29,715 \text{ SCFH} \times 44.00 \text{ lb/lb-mol}}{385.23 \text{ SCF/lb-mol}} = \frac{0.006 \text{ lb}}{\text{hr}}$$

VOC Destruction Efficiency

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

$$DE\% = \frac{14.595 - 0.006 \text{ lb/hr}}{14.595 \text{ lb/hr}} \times 100 = 99.956 \%$$

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

EXAMPLE CALCULATIONS (Reference Method 1 - Circular Stack)

Diameter of Stack (in.)

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

$$D(\text{in.}) = 29.63 \text{ in.} - 6.00 \text{ in.} = 23.63 \text{ in.}$$

Stack Diameters Downstream

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

$$B_D(\text{dia.}) = \frac{113.50 \text{ in.}}{23.63 \text{ in.}} = 4.80 \text{ diameters}$$

Area of Stack (ft²)

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

$$A_s(\text{ft}^2) = 3.14 \times \left(\frac{23.63 \text{ in.}}{2 \times 12 \text{ in./ft}} \right)^2 = 3.04 \text{ ft}^2$$

Stack Diameters Upstream

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

$$A_D(\text{dia.}) = \frac{24.00 \text{ in.}}{23.63 \text{ in.}} = 1.02 \text{ diameters}$$

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

Carbon Monoxide Concentration (%)

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

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

Nitrogen Concentration (%)

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

$$\%N_2(\%) = 100 - 2.72 \text{ \%} - 18.40 \text{ \%} - 0.00 / 10,000 \% = 78.88 \%$$

Stack Dry Molecular Weight (lb/lb-mole)

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

$$M_d(\text{lb/lb-mol}) = \left(\frac{44 \text{ lb/lb-mol}}{100} \times 2.72 \text{ \%} \right) +$$

$$\left(\frac{32 \text{ lb/lb-mol}}{100} \times 18.40 \text{ \%} \right) + \left(\frac{28 \text{ lb/lb-mol}}{100} \times \left[\frac{0.00}{10,000} + 78.90 \right] \right) = \frac{29.18 \text{ lb}}{\text{lb-mol}}$$

Stack Wet Molecular Weight (lb/lb-mole)

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

$$M_s(\text{lb/lb-mol}) = \left\{ \frac{29.18 \text{ lb}}{\text{lb-mol}} \times \left(1 - \frac{4.43 \text{ \%}}{100} \right) \right\} + \left\{ \frac{18 \text{ lb}}{\text{lb-mol}} \times \frac{4.43 \text{ \%}}{100} \right\} = \frac{28.68 \text{ lb}}{\text{lb-mol}}$$

Average Excess Air (%)

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

$$(\%EA)_{AVG} = \frac{100 \times \{ 18.40 \text{ \%} - (0.5 \times 0.000 \text{ \%}) \}}{(0.264 \times 78.90 \text{ \%}) - \{ 18.40 \text{ \%} - (0.5 \times 0.000 \text{ \%}) \}} = 757.33 \%$$

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)

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

$$P_s (\text{in. Hg}) = 30.06 \text{ in. Hg} + \frac{0.00 \text{ in. H}_2\text{O}}{13.6 \text{ in. H}_2\text{O/in. Hg}} = 30.06 \text{ in. Hg}$$

Average Stack Gas Velocity (ft/sec)

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

$$v_{sl} (\text{ft/sec}) = \left(\frac{85.49 \text{ ft (lb/lb-mol)(in. Hg)}}{\text{sec (}^\circ\text{R)(in. H}_2\text{O)}} \right)^{1/2} \times 0.82 \times 0.07 \text{ in. H}_2\text{O}^{1/2} \times \sqrt{\frac{543.38 + 460^\circ\text{R}}{30.06 \text{ in. Hg} \times 28.68 \text{ lb/lb-mol}}} = \frac{5.3 \text{ ft}}{\text{sec}}$$

Average Stack Dry Standard Flow Rate (dscfh)

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

$$Q_{sd} (\text{dscf/hr}) = \frac{3600 \text{ sec}}{\text{hr}} \times \left(1 - \frac{4.43 \%}{100}\right) \times \frac{5.32 \text{ ft}}{\text{sec}} \times 3.04 \text{ ft}^2 \times \frac{68.00 + 460^\circ\text{R}}{543.38 + 460^\circ\text{R}} \times \frac{30.06 \text{ in. Hg}}{29.92 \text{ in. Hg}} = \frac{29,463.44 \text{ dscf}}{\text{hr}}$$

Average Stack Wet Flow Rate (acfm)

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

$$Q_{aw} (\text{acf/min}) = \frac{60 \text{ sec}}{\text{min}} \times \frac{5.32 \text{ ft}}{\text{sec}} \times 3.04 \text{ ft}^2 = \frac{971.88 \text{ acf}}{\text{min}}$$

Average Stack Wet Standard Flow Rate (ascfh)

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

$$Q_{sw} (\text{ascf/hr}) = \frac{60 \text{ min}}{\text{hr}} \times \frac{971.88 \text{ acf}}{\text{min}} \times \frac{68.00 + 460^\circ\text{R}}{543.38 + 460^\circ\text{R}} \times \frac{30.06 \text{ in. Hg}}{29.92 \text{ in. Hg}} = \frac{30,829.32 \text{ ascf}}{\text{hr}}$$

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

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

Water Volume Weighed (scf)

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

$$V_{wsg(std)} = 48.10 \text{ g} \times 0.04715 \text{ ft}^3/\text{g} = 2.270 \text{ scf}$$

Standard Meter Volume (dscf)

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

$$V_{m(std)} = \frac{17.65 \text{ }^\circ\text{R}}{\text{in. Hg}} \times 1.01 \times 48.85 \text{ dcf} \times \left(30.06 \text{ in. Hg} + \frac{1.85 \text{ in. H}_2\text{O}}{13.6 \text{ in. H}_2\text{O} / \text{in. Hg}} \right) = 48.92 \text{ dscf}$$

$$77.42 \text{ }^\circ\text{F} + 460 \text{ }^\circ\text{R}$$

Calculated Moisture Content (%)

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

$$B_{ws(calc)} = 100 \times \frac{2.27 \text{ dscf}}{2.27 \text{ dscf} + 48.92 \text{ dscf}} = 4.43 \%$$

Saturated Moisture Content (%)

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

$$B_{ws(svp)} = 100 \times \frac{10^{\left(6.691 - \frac{3144}{543.38 \text{ }^\circ\text{F} + 390.86} \right)}}{30.06 \text{ in. Hg} + \frac{0.00 \text{ in. H}_2\text{O}}{13.6 \text{ in. H}_2\text{O} / \text{in. Hg}}} \leq 100 = 100.00 \%$$

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}
- $Q_{s(\text{std})}$ = 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)

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

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 20, 2014
Project Number:	cei-14-norman.ok-comp#1
Manufacturer & Equipment:	24 ECD
Test Load:	Multiple
Tester(s) / Test Unit(s):	MSL/DG/CG/MC/208

		RUN											
	UNITS	24 ECD R1	24 ECD R2	24 ECD R3	24 ECD R4	24 ECD R5	24 ECD R6	24 ECD R7	24 ECD R8	24 ECD R9	24 ECD R10	24 ECD R11	24 ECD R12
Start Time	hh:mm:ss	12:49:05	14:27:05	15:53:05	14:55:19	16:20:19	17:51:19	10:18:19	11:45:19	13:15:19	12:18:07	13:50:07	15:15 07
End Time	hh:mm:ss	13:59:05	15:37:05	17:03:05	16:05:19	17:30:19	19:01:19	11:28:19	12:55:19	14:25:19	13:28:07	15:00:07	16:25 05
Bar. Pressure	in. Hg	30.06	29.92	30.02	29.95	29.94	29.94	29.81	29.88	29.88	29.98	29.98	29.99
Amb. Temp.	F	77	86	84	83	82	81	84	82	81	87	84	88
Rel. Humidity	%	80	58	62	59	54	57	58	55	60	58	55	49
Spec. Humidity	lb water / lb air	0.015887	0.015494	0.015483	0.014273	0.012619	0.012900	0.014565	0.012884	0.013621	0.015975	0.013715	0.013881
Date	mm/dd/yy	06/24/14	06/24/14	06/24/14	06/23/14	06/23/14	06/23/14	06/23/14	06/23/14	06/23/14	06/20/14	06/20/14	06/20/14
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	2,545	2,545	2,545	2,521	2,521	2,521	2,526	2,526	2,526
Stack Flow (M2)	dscfh	29,463	29,715	29,825	27,012	27,255	26,993	25,720	25,684	25,408	25,224	24,368	24,482
Stack Moisture	Method 4	4.43	4.17	3.98	6.48	4.41	4.56	5.79	5.37	5.44	3.79	5.92	5.77
Wind Speed	mph	20	1	2	4	5	0	8.5	7.3	6.7	4	8.5	7
Wind Direction	--	WNW	WNW	S	NE	NW	NO WIND	NW	NW	NE	SSE	SE	SE
CO ₂ - Method 3C	%	2.72	2.79	2.68	4.79	3.97	3.59	4.94	4.69	5.09	5.34	5.26	5.21
O ₂ - Method 3C	%	18.40	18.30	18.20	15.50	16.70	17.20	15.30	15.60	15.10	14.80	14.90	14.90
N ₂ -Method 3C	%	78.90	78.90	79.10	79.70	79.30	79.21	79.80	79.70	79.80	79.86	79.90	79.80
Excess Air	%	757.33	723.43	678.50	279.74	394.31	463.43	265.29	286.72	253.05	235.55	240.57	241.60

METHOD 1 - SAMPLE AND VELOCITY TRAVERSES FOR CIRCULAR SOURCES

Plant Name	Norman Facility	Date	06/20/14
Sampling Location	24 ECD	Stack Type	Circular
Operator	TRS	Ports Available	2
Project #	cei-14-norman.ok-comp#1	Ports Used	2
Stack Size	Small (<24 inch diameter)	Port ID (inches)	3.00

Circular Stack or Duct Diameter			
Distance to Far Wall of Stack	(L_{fw})	29.63	in
Distance to Near Wall of Stack	(L_{nw})	6.00	in
Diameter of Stack	(D)	23.63	in
Area of Stack	(A_s)	3.04	ft ²

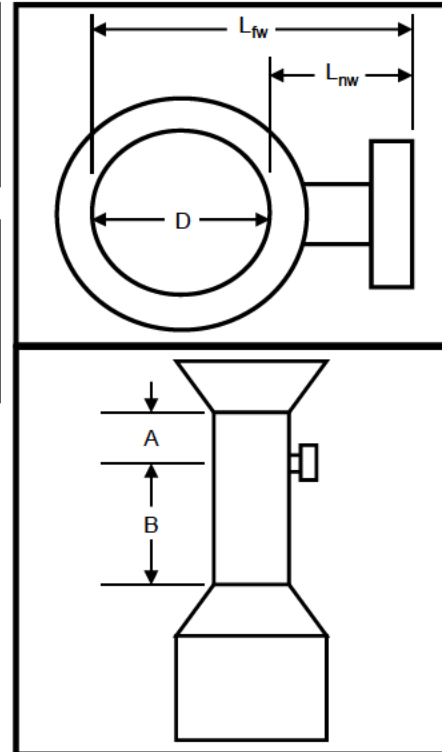
Distance from Port to Disturbances			
Distance Upstream	(A)	24.00	in
Diameters Upstream	(A_D)	1.02	diameters
Distance Downstream	(B)	113.50	in
Diameters Downstream	(B_D)	4.80	diameters

Number of Traverse Points Required			
Diameters to Flow Disturbance		Minimum Number of ¹ Traverse Points	
Down Stream	Up Stream	Particulate Points	Velocity Points
2.00-4.99	0.50-1.24	24	16
5.00-5.99	1.25-1.49	20	16
6.00-6.99	1.50-1.74	16	12
7.00-7.99	1.75-1.99	12	12
≥ 8.00	≥ 2.00	8 or 12 ²	8 or 12 ²
Upstream Spec		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	4/8	6 4/8
2	0.067	1 5/8	7 5/8
3	0.118	2 6/8	8 6/8
4	0.177	4 1/8	10 1/8
5	0.250	5 7/8	11 7/8
6	0.356	8 3/8	14 3/8
7	0.644	15 2/8	21 2/8
8	0.750	17 6/8	23 6/8
9	0.823	19 4/8	25 4/8
10	0.882	20 7/8	26 7/8
11	0.933	22	28
12	0.979	23 1/8	29 1/8

METHOD 1 - ISOKINETIC TRAVERSE FOR A CIRCULAR SOURCE

Company	Cimarron Energy	Date	06/20/14
Plant Name	Norman Facility	Project #	cei-14-norman.ok-comp#1
Equipment	24 ECD	# of Ports Available	2
Location	Ports	# of Ports Used	2

Circular Stack or Duct Diameter			
Distance to Far Wall of Stack	(L_{fw})	29.63	in.
Distance to Near Wall of Stack	(L_{nw})	6.00	in.
Diameter of Stack	(D)	23.63	in.
Area of Stack	(A_s)	3.04	ft ²

Distance from Disturbances to Port			
Distance Upstream	(A)	24.00	in.
Diameters Upstream	(A_D)	1.02	diameters
Distance Downstream	(B)	113.50	in.
Diameters Downstream	(B_D)	4.80	diameters

Number of Traverse Points Required					
Diameters to		Minimum Number of ¹		Minimum Number of	
Flow Disturbance		Traverse Points		Traverse Points	
Down (B_D)	Up (A_D)	Particulate	Velocity	Comp Stratification	
Stream	Stream	Points	Points	Criteria	Points
2.00-4.99	0.50-1.24	24	16	○ RM 7E 8.1.2	12 RM1 pts
5.00-5.99	1.25-1.49	20	16	● 0000 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

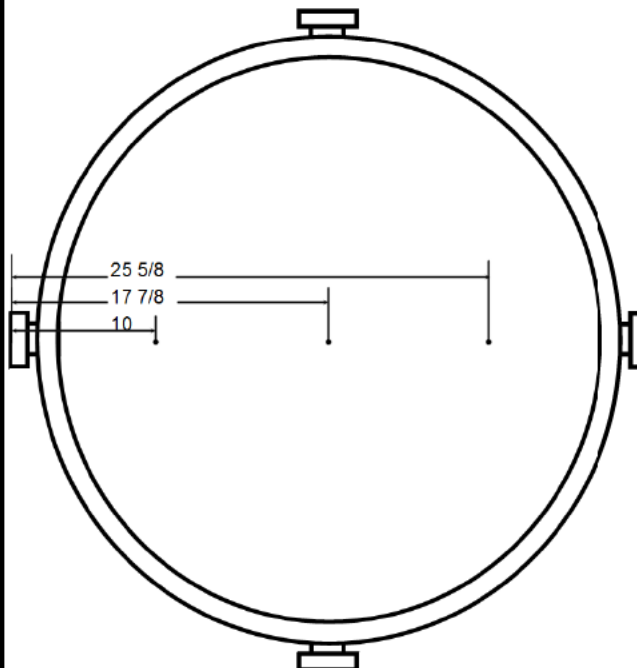
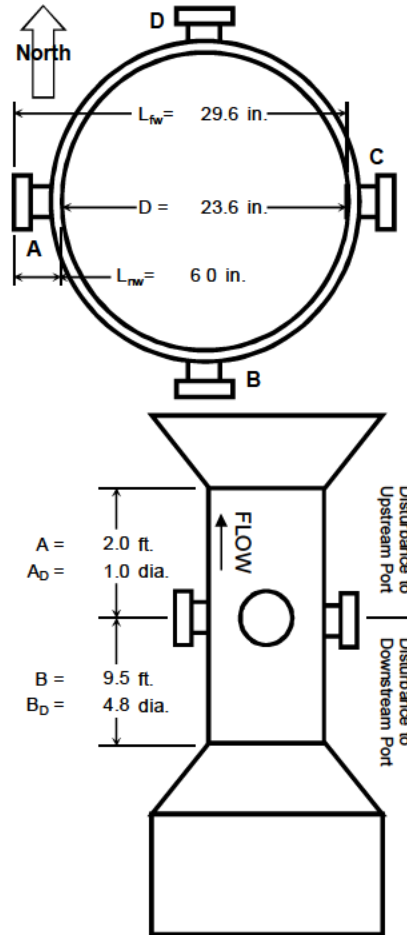
¹ Check Minimum Number of Points for the Upstream and Downstream conditions, then use the largest.

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%	4	10
2	50.0%	11 7/8	17 7/8
3	83.3%	19 5/8	25 5/8
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			



EMISSION DATA RECORDS

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

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

Source Information	
Plant Name	Norman Facility
Sampling Location	24 ECD
Fuel Type	Gas, Propene

Test Information			
Project #		cei-14-norman.ok-comp#1	
Operator		TRS	
Date for Preliminary Run	(mm/dd/yy)	06/20/14	
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)	06/24/14	06/24/14	06/24/14	
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	24 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	12:49	14:27	15:53		hh:mm
Run Stop Time	13:59	15:37	17:03		hh:mm
Test Date	06/24/14	06/24/14	06/24/14		mm/dd/yy
Meter Calibration Factor	1.010	1.010	1.010		
Pitot Tube Coefficient	0.819	0.819	0.819		
Initial Meter Volume	548.350	598.100	647.100		ft ³
Final Meter Volume	597.200	646.650	695.750		ft ³
Total Meter Volume	48.850	48.550	48.650	48.683	ft ³
Total Sampling Time	65.00	65.00	65.00	65.00	min
Average Meter Temperature	77.42	74.96	77.75	76.71	°F
Average Stack Temperature	543.38	527.88	527.33	532.86	°F
Barometric Pressure	30.06	29.92	30.02	30.00	in Hg
Stack Static Pressure	0.00	0.00	0.00	0.00	in H ₂ O
Absolute Stack Pressure	30.06	29.92	30.02	30.00	in Hg
Average Orifice Pressure Drop	1.85	1.86	1.85	1.85	in H ₂ O
Absolute Meter Pressure	30.20	30.06	30.16	30.14	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	33.00	35.30	32.60	33.63	g
Silica Gel Weight Gain	15.10	9.60	10.10	11.60	g
Total Water Volume Collected	48.19	44.98	42.78	45.31	ml
Standard Water Vapor Volume	2.27	2.12	2.01	2.13	scf
Standard Meter Volume	48.9	48.6	48.6	48.7	dscf
Calculated Stack Moisture	4.43	4.17	3.98	4.19	%
Saturated Stack Moisture	100.00	100.00	100.00	100.00	%
Reported Stack Moisture Content	4.43	4.17	3.98	4.19	%
Method 3C Gas Analysis Data	0-30-0%-1	0-30-0%-2	0-30-0%-3	Average	Units
Carbon Dioxide Content	2.7	2.8	2.7	2.7	%
Oxygen Content	18.4	18.3	18.2	18.3	%
Nitrogen Content	78.9	78.9	79.1	79.0	%
Stack Dry Molecular Weight	29.18	29.18	29.15	29.17	lb/lb-mole
Stack Wet Molecular Weight	28.68	28.71	28.71	28.70	lb/lb-mole
Percent Excess Air	757.3	723.4	678.5	719.8	%
Volumetric Flow Rate Data	0-30-0%-1	0-30-0%-2	0-30-0%-3	Average	Units
Average Stack Gas Velocity	5.32	5.29	5.28	5.30	ft/sec
Stack Cross-Sectional Area	3.04	3.04	3.04	3.04	ft ²
Actual Stack Flow Rate	972	967	965	968	acfm
Wet Standard Stack Flow Rate	31	31	31	31	wkscfh
Dry Standard Stack Flow Rate	29,463	29,715	29,825	29,668	dscfh

METHOD 3C - DETERMINATION OF DRY MOLECULAR WEIGHT BY ANALYZER

Plant Name	Norman Facility	Preliminary Date	06/20/14		
Sampling Location	24 ECD	Operator	TRS		
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	06/24/14	Run Start Time	12:49	Run Stop Time	13:59
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	2.7	18.4	0.0	78.9	29.18	0.919	757.3	N/A

Gas Analysis Data								
Run Number	0-30-0%-2		Date	06/24/14	Run Start Time	14:27	Run Stop Time	15:37
Sample Analysis Time	CO₂ Conc.	O₂ Conc.	Methane Conc.	N₂ Conc.	Dry Molecular Weight	Calculated Fuel Factor	Excess Air	Fuel Factor in Range
	(%CO ₂)	(%O ₂)	(ppmCO)	(%N ₂)	(M _d)	(F _o) _{avg}	(%EA) _{avg}	
hh:mm	%	%	ppm	%	lb/lb-mole		%	
01:10	2.8	18.3	0.0	78.9	29.18	0.932	723.4	N/A

Gas Analysis Data								
Run Number	0-30-0%-3		Date	06/24/14	Run Start Time	15:53	Run Stop Time	17:03
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	2.7	18.2	0.0	79.1	29.15	1.007	678.5	N/A

METHOD 4 - DETERMINATION OF MOISTURE CONTENT IN STACK GASES

Plant Name	Norman Facility	Preliminary Date	06/20/14
Sampling Location	24 ECD	Operator	TRS
Project #	cei-14-norman.ok-comp#1	Ports Used	2

Moisture Content Data								
Run Number	0-30-0%-1		Date	06/24/14	Start Time	12:49	Stop Time	13:59
Meter Box Number	SAMP-CP-0023				Meter Cal Factor	(Y)	1.010	
Total Meter Volume	(V _m)	48.850	dcf		Barometric Pressure	(P _b)	30.06	in Hg
Average Stack Temp	(t _s) _{avg}	543	°F		Stack Static Pressure	(P _{static})	0.00	in H ₂ O
Average Meter Temp	(t _m) _{avg}	77	°F		Avg Orifice Pressure	(ΔH) _{avg}	1.85	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)	757.80	722.40	568.10	925.80			
Initial Value	(V _i),(W _i)	736.40	712.50	566.40	910.70			
Net Value	(V _n),(W _n)	21.4	9.9	1.7	15.1			
Results								
Total Weight	(W _f)	48.10	g	Water Vol Weighed	(V _{wsg(std)})	2.268	scf	
Std Meter Volume	(V _{m(std)})	48.921	dscf	Sat. Moisture Content	(B _{ws(svp)})	100.00	%	
Calc Moisture Content	(B _{ws(calc)})	4.43	%	Final Moisture Content	(B _{ws})	4.43	%	

Moisture Content Data								
Run Number	0-30-0%-2		Date	06/24/14	Start Time	14:27	Stop Time	15:37
Meter Box Number	SAMP-CP-0023				Meter Cal Factor	(Y)	1.010	
Total Meter Volume	(V _m)	48.550	dcf		Barometric Pressure	(P _b)	29.92	in Hg
Average Stack Temp	(t _s) _{avg}	528	°F		Stack Static Pressure	(P _{static})	0.00	in H ₂ O
Average Meter Temp	(t _m) _{avg}	75	°F		Avg Orifice Pressure	(ΔH) _{avg}	1.86	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)	688.00	659.30	736.30	998.70			
Initial Value	(V _i),(W _i)	757.80	722.40	568.10	989.10			
Net Value	(V _n),(W _n)	-69.8	-63.1	168.2	9.6			
Results								
Total Weight	(W _f)	44.90	g	Water Vol Weighed	(V _{wsg(std)})	2.117	scf	
Std Meter Volume	(V _{m(std)})	48.619	dscf	Sat. Moisture Content	(B _{ws(svp)})	100.00	%	
Calc Moisture Content	(B _{ws(calc)})	4.17	%	Final Moisture Content	(B _{ws})	4.17	%	

Moisture Content Data								
Run Number	0-30-0%-3		Date	06/24/14	Start Time	15:53	Stop Time	17:03
Meter Box Number	SAMP-CP-0023				Meter Cal Factor	(Y)	1.010	
Total Meter Volume	(V _m)	48.650	dcf		Barometric Pressure	(P _b)	30.02	in Hg
Average Stack Temp	(t _s) _{avg}	527	°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}	1.85	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)	708.00	669.20	739.00	1008.80			
Initial Value	(V _i),(W _i)	688.00	659.30	736.30	998.70			
Net Value	(V _n),(W _n)	20.0	9.9	2.7	10.1			
Results								
Total Weight	(W _f)	42.70	g	Water Vol Weighed	(V _{wsg(std)})	2.013	scf	
Std Meter Volume	(V _{m(std)})	48.626	dscf	Sat. Moisture Content	(B _{ws(svp)})	100.00	%	
Calc Moisture Content	(B _{ws(calc)})	3.98	%	Final Moisture Content	(B _{ws})	3.98	%	

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

Plant Name		Norman Facility				Date		06/24/14		Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Sampling Location		24 ECD				Operator		TRS		Pitot Coefficient		(C _p)	0.819
Project #		cel-14-norman.ok-comp#1				Run Number		0-30-09%-2		Average Stack Temp		(t _s)	527.9
										Average Meter Temp		(t _m)	75.0
										Orifice Meter Coefficient		(ΔH@)	1.877
										Square Root ΔP		(ΔP ^{1/2} _{avg})	0.07
										Stack Moisture Content		(B _{ws})	4.17
										Stack Dry Molecular Weight		(M _d)	29.18
										Estimated Orifice Flow Rate		(Q _m)	0.75
										ΔP to ΔH Isokinetic Factor		(K)	
										Pressures			
										Barometric Pressure		(P _b)	29.92
										Stack Static Pressure		(P _{static})	0.00
										Absolute Stack Pressure		(P _a)	29.92
										Absolute Meter Pressure		(P _m)	30.06
										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	ft³	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	598.100	0.005	1.877	1.90	586	250		44			74	74	0.0	0.07	5.46	2.057		49.363
A-2	2.7	00:02:43	600.150	0.005	1.877	1.90	622	250		44			74	74	0.0	0.07	5.56	4.164		49.965
A-3	5.4	00:05:25	602.250	0.005	1.877	1.90	660	250		43			74	74	0.0	0.07	5.65	6.221		49.764
A-4	8.1	00:08:07	604.300	0.005	1.877	1.90	688	250		42			74	74	0.0	0.07	5.72	8.227		49.363
A-5	10.8	00:10:50	606.300	0.005	1.877	1.80	700	250		42			74	74	0.0	0.07	5.75	10.283		49.361
A-6	13.5	00:13:33	608.350	0.005	1.877	1.90	665	250		43			74	74	0.0	0.07	5.67	12.290		49.160
A-7	16.3	00:16:15	610.350	0.005	1.877	1.80	532	250		43			74	74	0.0	0.07	5.32	14.246		48.844
A-8	19.0	00:18:58	612.300	0.005	1.877	1.90	484	250		43			74	74	0.0	0.07	5.19	16.253		48.758
A-9	21.7	00:21:40	614.300	0.005	1.877	1.90	442	250		44			74	74	0.0	0.07	5.07	18.310		48.825
A-10	24.4	00:24:22	616.350	0.005	1.877	1.80	356	250		44			74	74	0.0	0.07	4.83	20.366		48.878
A-11	27.1	00:27:05	618.400	0.005	1.877	1.90	320	250		45			75	75	0.0	0.07	4.72	22.319		48.695
A-12	29.8	00:29:47	620.350	0.005	1.877	1.80	260	251		45			75	75	0.0	0.07	4.53	24.371		48.742
B-1	32.5	00:32:30	622.400	0.005	1.877	1.80	595	251		45			75	75	0.0	0.07	5.49	26.424		48.782
B-2	35.2	00:35:12	624.450	0.005	1.877	1.90	600	250		44			75	75	0.0	0.07	5.50	28.476		48.817
B-3	37.9	00:37:55	626.500	0.005	1.877	1.90	615	251		44			75	75	0.0	0.07	5.54	30.479		48.767
B-4	40.6	00:40:37	628.500	0.005	1.877	1.80	635	250		44			76	76	0.0	0.07	5.59	32.428		48.642
B-5	43.3	00:43:20	630.450	0.005	1.877	1.80	644	250		45			76	76	0.0	0.07	5.61	34.477		48.673
B-6	46.0	00:46:03	632.500	0.005	1.877	1.90	655	250		45			76	76	0.0	0.07	5.64	36.526		48.701
B-7	48.8	00:48:45	634.550	0.005	1.877	1.90	660	250		45			76	76	0.0	0.07	5.65	38.575		48.726
B-8	51.5	00:51:28	636.600	0.005	1.877	1.90	590	250		45			76	76	0.0	0.07	5.47	40.524		48.629
B-9	54.2	00:54:10	638.550	0.005	1.877	1.80	438	250		46			76	76	0.0	0.07	5.06	42.573		48.654
B-10	56.9	00:56:53	640.600	0.005	1.877	1.90	411	250		46			76	76	0.0	0.07	4.99	44.572		48.624
B-11	59.6	00:59:35	642.600	0.005	1.877	1.80	266	250		46			76	76	0.0	0.07	4.55	46.620		48.647
B-12	62.3	01:02:18	644.650	0.005	1.877	1.90	245	249		46			76	76	0.0	0.07	4.49	48.620		48.620
Last Pt	65.0	01:05:00	646.650																	
Final Val	65.0	01:05:00	646.650												Max Vac	0.0	Final Values	48.620		
Average Values				0.01		1.86	528	250		44			75	75		0.07	5.29			
													75							

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

Plant Name	Norman Facility
Sampling Location	24 ECD
Project #	cel-14-norman.ok-comp#1

Date	06/24/14
Operator	TRS
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	15.0
		Pre (-)	0.2	in H ₂ O for	15.0
		Post (+)	0.3	in H ₂ O for	15.0
		Post (-)	0.2	in H ₂ O for	15.0

Nozzle Measurements				
Pre				PASS
Post				PASS

Run Time			
Start	15:53	End	17:03

Weights	Imp 1	Imp 2	Imp 3	Imp 4	Imp 5	Imp 6	Imp 7	Imp 8
Pre	688.0	659.3	736.3	998.7				
Post	708.0	669.2	739.0	1008.8				

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Coefficient	(C _p)	0.819	
Average Stack Temp	(t _s)	527.3	F
Average Meter Temp	(t _m)	77.8	
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})	3.98	%
Stack Dry Molecular Weight	(M _d)	29.15	lb/lb-mole
Estimated Orifice Flow Rate	(Q _m)	0.75	acfm
ΔP to ΔH Isokinetic Factor	(K)		

Pressures			
Barometric Pressure	(P _b)	30.02	in Hg
Stack Static Pressure	(P _{static})	0.00	in H ₂ O
Absolute Stack Pressure	(P _a)	30.02	in Hg
Absolute Meter Pressure	(P _m)	30.16	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	647.100	0.005	1.877	1.90	585	250		43			76	76	0.0	0.07	5.45	2.106		50.546
A-2	2.7	00:02:43	649.200	0.005	1.877	1.90	588	250		43			76	76	0.0	0.07	5.46	4.162		49.944
A-3	5.4	00:05:25	651.250	0.005	1.877	1.90	646	251		44			76	76	0.0	0.07	5.61	6.218		49.744
A-4	8.1	00:08:07	653.300	0.005	1.877	1.80	654	250		44			76	76	0.0	0.07	5.63	8.273		49.640
A-5	10.8	00:10:50	655.350	0.005	1.877	1.80	680	250		44			76	76	0.0	0.07	5.69	10.279		49.338
A-6	13.5	00:13:33	657.350	0.005	1.877	1.80	644	250		45			77	77	0.0	0.07	5.60	12.330		49.321
A-7	16.3	00:16:15	659.400	0.005	1.877	1.90	632	250		45			77	77	0.0	0.07	5.57	14.332		49.140
A-8	19.0	00:18:58	661.400	0.005	1.877	1.90	585	250		46			77	77	0.0	0.07	5.45	16.284		48.853
A-9	21.7	00:21:40	663.350	0.005	1.877	1.80	512	250		46			78	78	0.0	0.07	5.26	18.382		49.019
A-10	24.4	00:24:22	665.450	0.005	1.877	1.90	364	250		46			78	78	0.0	0.07	4.84	20.430		49.033
A-11	27.1	00:27:05	667.500	0.005	1.877	1.90	233	250		47			78	78	0.0	0.07	4.44	22.479		49.044
A-12	29.8	00:29:47	669.550	0.005	1.877	1.80	195	250		47			78	78	0.0	0.07	4.32	24.427		48.853
B-1	32.5	00:32:30	671.500	0.005	1.877	1.80	515	250		49			78	78	0.0	0.07	5.27	26.424		48.784
B-2	35.2	00:35:12	673.500	0.005	1.877	1.80	575	250		48			78	78	0.0	0.07	5.43	28.472		48.810
B-3	37.9	00:37:55	675.550	0.005	1.877	1.90	622	250		48			78	78	0.0	0.07	5.55	30.421		48.673
B-4	40.6	00:40:37	677.500	0.005	1.877	1.80	661	250		48			78	78	0.0	0.07	5.65	32.418		48.628
B-5	43.3	00:43:20	679.500	0.005	1.877	1.80	670	250		48			78	78	0.0	0.07	5.67	34.416		48.588
B-6	46.0	00:46:03	681.500	0.005	1.877	1.80	655	250		49			78	78	0.0	0.07	5.63	36.414		48.552
B-7	48.8	00:48:45	683.500	0.005	1.877	1.90	640	250		49			79	79	0.0	0.07	5.59	38.459		48.579
B-8	51.5	00:51:28	685.550	0.005	1.877	1.90	532	250		49			79	79	0.0	0.07	5.31	40.503		48.604
B-9	54.2	00:54:10	687.600	0.005	1.877	1.80	504	250		49			79	79	0.0	0.07	5.24	42.547		48.625
B-10	56.9	00:56:53	689.650	0.005	1.877	1.90	446	250		49			79	79	0.0	0.07	5.08	44.542		48.591
B-11	59.6	00:59:35	691.650	0.005	1.877	1.90	291	250		50			79	79	0.0	0.07	4.62	46.586		48.612
B-12	62.3	01:02:18	693.700	0.005	1.877	1.80	227	250		51			80	80	0.0	0.07	4.42	48.626		48.626
Last Pt	65.0	01:05:00	695.750																	
Final Val	65.0	01:05:00	695.750											Max Vac	0.0		Final Values	48.626		
Average Values				0.01		1.85	527	250		47			78	78		0.07	5.28			
													78							

CIMARRON ENERGY, INC.

June 24, 2014

24 ECD

Norman Facility

Unit Data

Meas. Stack Moisture	4.4	%
Stack Exhaust Flow (M2)	29,715	SCFH

Weather Data

Barometric Pressure	30.06	in. Hg
Relative Humidity	80	%
Ambient Temperature	77	°F
Specific Humidity	0.015887	lb H ₂ O / lb air

0-30-0 Load, Run - 24 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	06/24/14 12:49:05	18570	17.28	7.23	2.33	2.54	3.32	106.90	115.00
	06/24/14 12:49:35	18600	17.13	7.32	2.36	2.66	3.32	106.90	115.00
	06/24/14 12:50:05	18630	17.03	6.96	2.10	2.71	3.10	106.80	105.00
	06/24/14 12:50:35	18660	17.09	7.01	2.09	2.70	3.10	106.80	105.00
	06/24/14 12:51:05	18690	17.11	6.68	1.64	2.68	3.35	106.80	115.00
	06/24/14 12:51:35	18720	17.22	6.15	1.71	2.62	3.35	106.80	115.00
	06/24/14 12:52:05	18750	17.13	5.89	1.81	2.65	3.35	106.80	126.00
	06/24/14 12:52:35	18780	17.04	6.31	1.83	2.73	3.35	106.80	126.00
	06/24/14 12:53:05	18810	17.12	6.20	1.62	2.68	3.35	106.80	126.00
	06/24/14 12:53:35	18840	17.23	5.71	1.65	2.60	3.35	106.80	126.00
	06/24/14 12:54:05	18870	17.20	5.81	1.62	2.61	4.29	106.80	136.00
	06/24/14 12:54:35	18900	16.75	6.03	1.25	2.91	4.29	106.80	136.00
	06/24/14 12:55:05	18930	16.82	6.02	1.31	2.84	4.68	106.90	147.00
	06/24/14 12:55:35	18960	16.70	6.04	1.14	2.96	4.68	106.90	147.00
	06/24/14 12:56:05	18990	16.82	6.00	1.54	2.88	4.93	106.90	137.00
	06/24/14 12:56:35	19020	16.77	6.25	1.41	2.88	4.93	106.90	137.00
	06/24/14 12:57:05	19050	16.68	6.59	1.11	2.98	4.40	107.00	126.00
	06/24/14 12:57:35	19080	16.76	5.82	1.23	2.91	4.40	107.00	126.00
	06/24/14 12:58:05	19110	16.74	6.04	1.55	2.95	4.79	107.00	137.00
	06/24/14 12:58:35	19140	16.79	6.37	1.23	2.88	4.79	107.00	137.00
	06/24/14 12:59:05	19170	16.57	5.98	1.03	3.02	4.37	107.10	136.00
	06/24/14 12:59:35	19200	16.75	5.91	1.21	2.93	4.37	107.10	136.00
	06/24/14 13:00:05	19230	16.74	6.00	1.37	2.92	4.62	107.20	136.00
	06/24/14 13:00:35	19260	16.92	5.95	1.47	2.81	4.62	107.20	136.00
	06/24/14 13:01:05	19290	16.68	6.18	2.11	2.93	4.62	107.30	147.00
	06/24/14 13:01:35	19320	16.59	8.73	1.80	3.03	4.62	107.30	147.00
	06/24/14 13:02:05	19350	16.63	9.46	1.70	3.02	4.57	107.50	136.00
	06/24/14 13:02:35	19380	16.79	7.68	1.88	2.91	4.57	107.50	136.00
	06/24/14 13:03:05	19410	16.70	7.56	1.47	2.93	4.54	107.60	147.00
	06/24/14 13:03:35	19440	16.59	6.61	1.93	3.03	4.54	107.60	147.00
	06/24/14 13:04:05	19470	16.72	8.83	1.30	2.96	4.37	107.80	147.00
	06/24/14 13:04:35	19500	16.69	6.53	1.33	2.95	4.37	107.80	147.00
	06/24/14 13:05:05	19530	16.73	6.12	1.88	2.95	2.74	108.00	125.00
	06/24/14 13:05:35	19560	17.00	8.27	2.07	2.83	2.74	108.00	125.00
	06/24/14 13:06:05	19590	17.35	7.28	2.59	2.50	2.96	108.10	104.00
	06/24/14 13:06:35	19620	17.27	6.23	1.62	2.57	2.96	108.10	104.00
	06/24/14 13:07:05	19650	17.33	5.16	1.56	2.54	3.04	108.30	104.00
	06/24/14 13:07:35	19680	17.33	4.98	1.50	2.54	3.04	108.30	104.00
	06/24/14 13:08:05	19710	17.29	5.02	1.84	2.55	3.02	108.50	125.00
	06/24/14 13:08:35	19740	17.35	5.91	1.90	2.53	3.02	108.50	125.00
	06/24/14 13:09:05	19770	17.39	5.56	2.15	2.48	2.96	108.70	104.00
	06/24/14 13:09:35	19800	17.49	5.86	1.56	2.44	2.96	108.70	104.00
	06/24/14 13:10:05	19830	17.40	5.14	2.52	2.45	4.26	108.90	125.00
	06/24/14 13:10:35	19860	17.33	7.03	2.46	2.52	4.26	108.90	125.00
	06/24/14 13:11:05	19890	16.78	7.03	1.85	2.80	4.62	109.20	136.00
	06/24/14 13:11:35	19920	16.40	10.88	2.13	3.16	4.62	109.20	136.00
A2	06/24/14 13:12:05	19950	16.66	12.57	3.28	3.00	5.12	109.30	147.00
	06/24/14 13:12:35	19980	16.65	11.60	2.12	2.97	5.12	109.30	147.00
	06/24/14 13:13:05	20010	16.47	10.19	1.53	3.09	4.54	109.60	136.00
	06/24/14 13:13:35	20040	16.66	8.09	1.30	2.99	4.54	109.60	136.00
	06/24/14 13:14:05	20070	16.70	6.24	1.17	2.96	4.51	109.80	125.00
	06/24/14 13:14:35	20100	16.67	5.54	1.06	2.97	4.51	109.80	125.00
	06/24/14 13:15:05	20130	16.74	5.91	1.73	2.98	3.82	110.00	125.00
	06/24/14 13:15:35	20160	17.01	7.69	2.26	2.78	3.82	110.00	125.00
	06/24/14 13:16:05	20190	17.00	6.87	1.67	2.77	4.04	110.20	125.00
	06/24/14 13:16:35	20220	17.00	5.73	1.76	2.76	4.04	110.20	125.00
	06/24/14 13:17:05	20250	16.87	6.69	1.91	2.85	4.12	110.40	135.00
	06/24/14 13:17:35	20280	16.78	7.25	2.12	2.92	4.12	110.40	135.00
	06/24/14 13:18:05	20310	16.91	8.19	1.89	2.83	3.96	110.60	125.00
	06/24/14 13:18:35	20340	17.03	7.08	2.12	2.78	3.96	110.60	125.00

CIMARRON ENERGY, INC.

June 24, 2014

24 ECD

Norman Facility

Unit Data

Meas. Stack Moisture	4.4	%
Stack Exhaust Flow (M2)	29,715	SCFH

Weather Data

Barometric Pressure	30.06	in. Hg
Relative Humidity	80	%
Ambient Temperature	77	°F
Specific Humidity	0.015887	lb H ₂ O / lb air

0-30-0 Load, Run - 24 ECD R1

	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
	06/24/14 13:19:05	20370	17.01	7.14	1.92	2.71	4.18	110.80	135.00
	06/24/14 13:19:35	20400	16.81	7.47	1.84	2.90	4.18	110.80	135.00
	06/24/14 13:20:05	20430	16.85	7.47	1.41	2.88	4.01	111.00	125.00
	06/24/14 13:20:35	20460	16.89	5.96	1.40	2.83	4.01	111.00	125.00
	06/24/14 13:21:05	20490	16.96	5.50	1.50	2.81	4.24	111.20	125.00
	06/24/14 13:21:35	20520	16.90	5.58	1.44	2.81	4.24	111.20	125.00
	06/24/14 13:22:05	20550	16.74	6.16	1.83	2.92	3.82	111.30	125.00
	06/24/14 13:22:35	20580	16.91	7.65	2.33	2.84	3.82	111.30	125.00
	06/24/14 13:23:05	20610	16.99	7.59	1.40	2.76	3.38	111.40	114.00
	06/24/14 13:23:35	20640	16.98	5.29	1.37	2.76	3.38	111.40	114.00
	06/24/14 13:24:05	20670	17.27	5.36	1.79	2.62	2.68	111.30	104.00
	06/24/14 13:24:35	20700	17.38	5.79	2.62	2.49	2.68	111.30	104.00
	06/24/14 13:25:05	20730	17.45	5.69	1.76	2.45	2.55	111.20	104.00
	06/24/14 13:25:35	20760	17.42	5.55	2.02	2.46	2.55	111.20	104.00
	06/24/14 13:26:05	20790	17.41	6.62	3.11	2.48	2.68	111.20	114.00
	06/24/14 13:26:35	20820	17.35	7.60	1.96	2.50	2.68	111.20	114.00
	06/24/14 13:27:05	20850	17.29	6.24	3.02	2.56	4.84	111.10	125.00
	06/24/14 13:27:35	20880	16.74	8.13	1.60	2.85	4.84	111.10	125.00
	06/24/14 13:28:05	20910	16.55	7.72	1.59	3.06	4.73	110.90	136.00
	06/24/14 13:28:35	20940	16.52	8.98	2.66	3.05	4.73	110.90	136.00
	06/24/14 13:29:05	20970	16.47	11.99	2.04	3.12	4.21	110.80	135.00
	06/24/14 13:29:35	21000	16.64	9.96	1.64	3.02	4.21	110.80	135.00
	06/24/14 13:30:05	21030	16.79	7.17	3.75	2.91	4.24	110.60	135.00
	06/24/14 13:30:35	21060	16.76	12.85	2.35	2.91	4.24	110.60	135.00
	06/24/14 13:31:05	21090	16.65	9.74	2.29	3.00	4.12	110.40	146.00
	06/24/14 13:31:35	21120	16.58	9.69	1.68	3.04	4.12	110.40	146.00
	06/24/14 13:32:05	21150	16.69	8.22	1.79	2.96	3.88	110.20	146.00
	06/24/14 13:32:35	21180	16.73	8.84	2.46	2.94	3.88	110.20	146.00
	06/24/14 13:33:05	21210	16.67	9.80	2.38	2.98	3.90	110.10	135.00
	06/24/14 13:33:35	21240	16.59	10.00	1.69	3.04	3.90	110.10	135.00
	06/24/14 13:34:05	21270	16.94	7.42	1.64	2.84	3.24	110.00	104.00
	06/24/14 13:34:35	21300	17.01	6.25	1.98	2.77	3.24	110.00	104.00
A3	06/24/14 13:35:05	21330	16.99	6.78	2.27	2.76	3.96	109.90	136.00
	06/24/14 13:35:35	21360	16.87	8.41	2.29	2.85	3.96	109.90	136.00
	06/24/14 13:36:05	21390	16.77	8.64	2.28	2.91	3.43	109.80	125.00
	06/24/14 13:36:35	21420	16.89	8.54	1.60	2.86	3.43	109.80	125.00
	06/24/14 13:37:05	21450	17.02	6.14	1.49	2.74	3.71	109.70	125.00
	06/24/14 13:37:35	21480	16.95	5.83	1.53	2.76	3.71	109.70	125.00
	06/24/14 13:38:05	21510	16.89	6.14	1.36	2.82	3.74	109.70	125.00
	06/24/14 13:38:35	21540	16.77	6.16	1.51	2.90	3.74	109.70	125.00
	06/24/14 13:39:05	21570	16.89	6.76	2.08	2.84	3.74	109.70	125.00
	06/24/14 13:39:35	21600	16.90	7.32	2.44	2.82	3.74	109.70	125.00
	06/24/14 13:40:05	21630	16.79	8.82	2.11	2.88	2.38	109.70	104.00
	06/24/14 13:40:35	21660	17.24	7.94	2.43	2.65	2.38	109.70	104.00
	06/24/14 13:41:05	21690	17.34	7.50	2.63	2.55	3.07	109.70	104.00
	06/24/14 13:41:35	21720	17.28	7.42	2.49	2.53	3.07	109.70	104.00
	06/24/14 13:42:05	21750	17.48	6.79	1.84	2.45	2.80	109.80	104.00
	06/24/14 13:42:35	21780	17.33	5.81	1.69	2.53	2.80	109.80	104.00
	06/24/14 13:43:05	21810	17.34	5.44	2.53	2.51	2.52	109.80	94.00
	06/24/14 13:43:35	21840	17.40	6.94	1.99	2.48	2.52	109.80	94.00
	06/24/14 13:44:05	21870	17.35	5.86	1.36	2.50	2.38	109.90	93.00
	06/24/14 13:44:35	21900	17.46	5.26	1.44	2.46	2.38	109.90	93.00
	06/24/14 13:45:05	21930	17.44	5.17	1.26	2.43	3.71	109.90	125.00
	06/24/14 13:45:35	21960	17.32	5.39	1.26	2.53	3.71	109.90	125.00
	06/24/14 13:46:05	21990	16.72	5.61	1.81	2.86	4.37	110.00	146.00
	06/24/14 13:46:35	22020	16.70	8.66	1.61	2.95	4.37	110.00	146.00
	06/24/14 13:47:05	22050	16.76	7.44	1.52	2.93	4.51	110.00	146.00
	06/24/14 13:47:35	22080	16.75	6.53	1.19	2.91	4.51	110.00	146.00
	06/24/14 13:48:05	22110	16.57	6.54	1.36	3.04	3.96	110.10	136.00
	06/24/14 13:48:35	22140	16.67	6.86	1.44	3.00	3.96	110.10	136.00

CIMARRON ENERGY, INC.

June 24, 2014

24 ECD

Norman Facility

Unit Data

Meas. Stack Moisture	4.4	%
Stack Exhaust Flow (M2)	29,715	SCFH

Weather Data

Barometric Pressure	30.06	in. Hg
Relative Humidity	80	%
Ambient Temperature	77	°F
Specific Humidity	0.015887	lb H ₂ O / lb air

0-30-0 Load, Run - 24 ECD R1

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmvd)	THC (ppmvw)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
06/24/14 13:49:05	22170	16.78	6.55	1.21	2.91	4.51	110.00	136.00
06/24/14 13:49:35	22200	16.88	5.68	1.26	2.84	4.51	110.00	136.00
06/24/14 13:50:05	22230	16.77	5.76	1.75	2.90	4.12	109.90	136.00
06/24/14 13:50:35	22260	16.68	7.61	1.33	2.97	4.12	109.90	136.00
06/24/14 13:51:05	22290	16.73	6.49	1.41	2.96	4.26	109.80	125.00
06/24/14 13:51:35	22320	16.80	6.46	1.60	2.89	4.26	109.80	125.00
06/24/14 13:52:05	22350	16.75	6.88	1.45	2.91	3.85	109.80	125.00
06/24/14 13:52:35	22380	16.60	6.58	1.20	3.02	3.85	109.80	125.00
06/24/14 13:53:05	22410	16.76	6.44	1.46	2.92	4.26	109.80	136.00
06/24/14 13:53:35	22440	16.83	6.36	1.47	2.86	4.26	109.80	136.00
06/24/14 13:54:05	22470	16.89	6.09	1.38	2.83	4.01	109.70	136.00
06/24/14 13:54:35	22500	16.66	5.85	1.05	2.95	4.01	109.70	136.00
06/24/14 13:55:05	22530	16.58	6.08	1.16	3.04	3.07	109.70	114.00
06/24/14 13:55:35	22560	16.73	6.46	1.78	2.94	3.07	109.70	114.00
06/24/14 13:56:05	22590	16.80	7.87	2.46	2.90	2.82	109.70	125.00
06/24/14 13:56:35	22620	16.96	8.72	1.81	2.81	2.82	109.70	125.00
06/24/14 13:57:05	22650	17.12	6.75	2.08	2.67	3.07	109.70	114.00
06/24/14 13:57:35	22680	17.34	6.20	1.58	2.53	3.07	109.70	114.00
06/24/14 13:58:05	22710	17.23	5.71	2.17	2.59	2.96	109.70	104.00
06/24/14 13:58:35	22740	17.27	6.58	1.92	2.56	2.96	109.70	104.00
06/24/14 13:59:05	22770	17.23	6.09	1.76	2.59	2.68	109.70	104.00
RAW AVERAGE		16.93	6.99	1.79	2.80	3.80	109.31	125.66

Bias	Serial Number:	O ₂ (%)	CO (ppmvd)	THC (ppmvw)	CO ₂ (%)	Press. Trans (in. H ₂ O)	Temp. Trans. (°F)	F-Flow Trans. (SCFH)
	INST-22-0005	INST-22-0005	INST-CO-0034	INST-VC-0006	INST-22-0005			
	Initial Zero	0.05	-0.04	0.08	0.06			
	Final Zero	0.03	0.01	-0.02	0.08			
	Avg. Zero	0.04	-0.02	0.03	0.07			
	Initial UpScale	12.11	10.75	2.95	9.23			
	Final UpScale	12.07	10.81	3.08	9.21			
	Avg. UpScale	12.09	10.78	3.02	9.22			
	Upscale Cal Gas	12.25	11.00	3.04	9.33			

EMISSIONS DATA	O ₂	CO	THC	CO ₂
Corrected Raw Average (ppm/% dry basis)	17.17	7.14	1.88	2.78
Corrected Raw Average (ppm/% wet basis)	16.41	6.82	1.80	2.66
Emission Rate (lb/hr)	N/A	0.02	0.01	N/A

CIMARRON ENERGY, INC.

June 24, 2014

24 ECD

Norman Facility

Unit Data

Meas. Stack Moisture	4.2	%
Stack Exhaust Flow (M2)	29,825	SCFH

Weather Data

Barometric Pressure	29.92	in. Hg
Relative Humidity	58	%
Ambient Temperature	86	°F
Specific Humidity	0.015494	lb H ₂ O / lb air

0-30-0 Load, Run - 24 ECD R2

	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
A1	06/24/14 14:27:05	24450	17.42	5.48	1.85	2.46	2.55	107.50	94.00
	06/24/14 14:27:35	24480	17.41	6.05	2.74	2.45	2.55	107.50	94.00
	06/24/14 14:28:05	24510	17.34	7.46	2.72	2.51	2.27	107.50	104.00
	06/24/14 14:28:35	24540	17.40	7.22	2.53	2.47	2.27	107.50	104.00
	06/24/14 14:29:05	24570	17.37	7.00	2.76	2.49	2.13	107.50	104.00
	06/24/14 14:29:35	24600	17.56	7.38	2.16	2.38	2.13	107.50	104.00
	06/24/14 14:30:05	24630	17.52	6.30	2.12	2.37	2.55	107.50	94.00
	06/24/14 14:30:35	24660	17.49	6.17	1.82	2.40	2.55	107.50	94.00
	06/24/14 14:31:05	24690	17.40	5.66	1.69	2.46	2.27	107.60	104.00
	06/24/14 14:31:35	24720	17.50	5.70	1.86	2.40	2.27	107.60	104.00
	06/24/14 14:32:05	24750	17.55	5.70	1.75	2.37	3.99	107.60	147.00
	06/24/14 14:32:35	24780	17.22	5.55	1.31	2.51	3.99	107.60	147.00
	06/24/14 14:33:05	24810	16.58	5.96	1.17	3.01	3.32	107.60	126.00
	06/24/14 14:33:35	24840	16.67	6.50	1.65	3.01	3.32	107.60	126.00
	06/24/14 14:34:05	24870	17.03	7.29	3.06	2.74	3.60	107.60	126.00
	06/24/14 14:34:35	24900	17.03	8.83	2.82	2.75	3.60	107.60	126.00
	06/24/14 14:35:05	24930	17.07	7.67	2.18	2.70	4.12	107.70	126.00
	06/24/14 14:35:35	24960	16.83	6.65	1.65	2.80	4.12	107.70	126.00
	06/24/14 14:36:05	24990	16.69	7.31	1.86	2.96	3.99	107.70	126.00
	06/24/14 14:36:35	25020	16.73	7.79	2.02	2.90	3.99	107.70	126.00
	06/24/14 14:37:05	25050	16.84	8.45	2.20	2.89	4.12	107.80	136.00
	06/24/14 14:37:35	25080	16.85	7.78	2.21	2.83	4.12	107.80	136.00
	06/24/14 14:38:05	25110	16.69	8.84	2.73	2.95	4.10	107.80	115.00
	06/24/14 14:38:35	25140	16.70	10.23	2.53	2.94	4.10	107.80	115.00
	06/24/14 14:39:05	25170	16.76	9.84	2.42	2.91	3.96	107.90	126.00
	06/24/14 14:39:35	25200	16.90	8.99	2.36	2.83	3.96	107.90	126.00
	06/24/14 14:40:05	25230	16.86	8.00	1.73	2.81	3.16	107.90	105.00
	06/24/14 14:40:35	25260	16.81	6.83	1.65	2.89	3.16	107.90	105.00
	06/24/14 14:41:05	25290	17.21	6.17	1.51	2.62	2.91	107.90	115.00
	06/24/14 14:41:35	25320	17.33	5.43	1.60	2.55	2.91	107.90	115.00
	06/24/14 14:42:05	25350	17.31	5.25	1.53	2.50	3.04	107.80	115.00
	06/24/14 14:42:35	25380	17.18	5.39	1.57	2.61	3.04	107.80	115.00
	06/24/14 14:43:05	25410	17.07	5.62	1.67	2.70	2.66	107.70	94.00
	06/24/14 14:43:35	25440	17.12	6.06	2.76	2.67	2.66	107.70	94.00
	06/24/14 14:44:05	25470	17.27	7.64	2.49	2.60	1.88	107.50	83.00
	06/24/14 14:44:35	25500	17.61	6.98	2.39	2.34	1.88	107.50	83.00
	06/24/14 14:45:05	25530	17.60	6.43	2.67	2.32	2.19	107.40	115.00
	06/24/14 14:45:35	25560	17.54	7.04	2.21	2.36	2.19	107.40	115.00
	06/24/14 14:46:05	25590	17.55	6.78	2.60	2.38	2.08	107.10	104.00
	06/24/14 14:46:35	25620	17.61	6.47	2.04	2.33	2.08	107.10	104.00
	06/24/14 14:47:05	25650	17.63	5.89	1.78	2.31	1.97	107.00	94.00
	06/24/14 14:47:35	25680	17.64	5.82	2.68	2.28	1.97	107.00	94.00
	06/24/14 14:48:05	25710	17.62	6.68	2.20	2.31	3.07	106.90	126.00
	06/24/14 14:48:35	25740	17.41	6.14	1.90	2.42	3.07	106.90	126.00
	06/24/14 14:49:05	25770	17.16	6.22	2.41	2.64	2.96	106.70	105.00
	06/24/14 14:49:35	25800	17.18	7.40	2.73	2.62	2.96	106.70	105.00
A2	06/24/14 14:50:05	25830	17.21	7.23	2.38	2.63	3.38	106.50	115.00
	06/24/14 14:50:35	25860	17.20	6.43	2.01	2.60	3.38	106.50	115.00
	06/24/14 14:51:05	25890	17.03	6.11	2.22	2.73	3.02	106.40	115.00
	06/24/14 14:51:35	25920	17.14	6.72	1.99	2.67	3.02	106.40	115.00
	06/24/14 14:52:05	25950	17.14	6.08	1.87	2.64	3.04	106.20	115.00
	06/24/14 14:52:35	25980	17.20	6.08	2.52	2.61	3.04	106.20	115.00
	06/24/14 14:53:05	26010	17.16	6.45	2.00	2.62	3.21	106.10	115.00
	06/24/14 14:53:35	26040	17.04	6.27	1.96	2.71	3.21	106.10	115.00
	06/24/14 14:54:05	26070	17.10	6.32	2.12	2.68	2.82	105.90	126.00
	06/24/14 14:54:35	26100	17.15	6.47	2.63	2.64	2.82	105.90	126.00
	06/24/14 14:55:05	26130	17.16	7.90	3.57	2.65	3.10	105.90	126.00
	06/24/14 14:55:35	26160	17.10	8.60	2.58	2.67	3.10	105.90	126.00
	06/24/14 14:56:05	26190	17.05	6.93	1.78	2.70	3.10	105.80	126.00
	06/24/14 14:56:35	26220	17.07	6.91	2.89	2.71	3.10	105.80	126.00

CIMARRON ENERGY, INC.

June 24, 2014

24 ECD

Norman Facility

Unit Data

Meas. Stack Moisture	4.2	%
Stack Exhaust Flow (M2)	29,825	SCFH

Weather Data

Barometric Pressure	29.92	in. Hg
Relative Humidity	58	%
Ambient Temperature	86	°F
Specific Humidity	0.015494	lb H ₂ O / lb air

0-30-0 Load, Run - 24 ECD R2

	Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmvd)	THC (ppmvw)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
	06/24/14 14:57:05	26250	17.14	7.20	2.19	2.66	3.13	105.80	115.00
	06/24/14 14:57:35	26280	17.20	6.74	2.15	2.62	3.13	105.80	115.00
	06/24/14 14:58:05	26310	17.16	6.13	1.78	2.63	3.27	105.70	115.00
	06/24/14 14:58:35	26340	17.02	6.07	1.83	2.73	3.27	105.70	115.00
	06/24/14 14:59:05	26370	17.15	6.12	2.10	2.64	2.99	105.70	115.00
	06/24/14 14:59:35	26400	17.15	6.49	2.18	2.64	2.99	105.70	115.00
	06/24/14 15:00:05	26430	17.11	6.46	2.33	2.66	3.40	105.70	105.00
	06/24/14 15:00:35	26460	17.03	7.55	2.92	2.73	3.40	105.70	105.00
	06/24/14 15:01:05	26490	17.05	9.10	2.49	2.71	2.88	105.70	83.00
	06/24/14 15:01:35	26520	17.14	7.21	2.17	2.67	2.88	105.70	83.00
	06/24/14 15:02:05	26550	17.30	6.37	2.57	2.57	2.33	105.80	84.00
	06/24/14 15:02:35	26580	17.46	6.81	2.21	2.44	2.33	105.80	84.00
	06/24/14 15:03:05	26610	17.48	6.46	2.91	2.40	2.85	105.80	115.00
	06/24/14 15:03:35	26640	17.30	6.90	3.22	2.52	2.85	105.80	115.00
	06/24/14 15:04:05	26670	17.36	8.25	2.86	2.51	2.44	105.90	105.00
	06/24/14 15:04:35	26700	17.42	7.08	2.52	2.47	2.44	105.90	105.00
	06/24/14 15:05:05	26730	17.46	6.55	1.82	2.42	3.35	105.90	126.00
	06/24/14 15:05:35	26760	17.12	5.79	1.96	2.57	3.35	105.90	126.00
	06/24/14 15:06:05	26790	17.16	7.02	2.09	2.66	2.82	106.00	105.00
	06/24/14 15:06:35	26820	17.27	6.76	2.53	2.56	2.82	106.00	105.00
	06/24/14 15:07:05	26850	17.37	7.06	3.03	2.49	2.66	106.00	105.00
	06/24/14 15:07:35	26880	17.33	7.64	2.27	2.51	2.66	106.00	105.00
	06/24/14 15:08:05	26910	17.18	7.24	2.60	2.61	3.07	106.00	126.00
	06/24/14 15:08:35	26940	17.21	7.90	2.71	2.60	3.07	106.00	126.00
	06/24/14 15:09:05	26970	17.14	7.28	1.90	2.65	2.80	105.90	105.00
	06/24/14 15:09:35	27000	17.23	6.60	2.16	2.59	2.80	105.90	105.00
	06/24/14 15:10:05	27030	17.26	6.79	2.28	2.56	2.68	105.90	115.00
	06/24/14 15:10:35	27060	17.19	7.03	3.01	2.60	2.68	105.90	115.00
	06/24/14 15:11:05	27090	17.25	7.90	2.05	2.57	2.82	105.80	105.00
	06/24/14 15:11:35	27120	17.15	6.34	1.87	2.64	2.82	105.80	105.00
	06/24/14 15:12:05	27150	17.24	6.42	2.62	2.59	2.57	105.70	105.00
	06/24/14 15:12:35	27180	17.24	7.44	3.06	2.57	2.57	105.70	105.00
A3	06/24/14 15:13:05	27210	17.30	7.94	2.81	2.53	2.74	105.50	126.00
	06/24/14 15:13:35	27240	17.30	7.31	3.23	2.53	2.74	105.50	126.00
	06/24/14 15:14:05	27270	17.16	8.19	3.76	2.62	2.63	105.40	105.00
	06/24/14 15:14:35	27300	17.12	9.29	2.98	2.66	2.63	105.40	105.00
	06/24/14 15:15:05	27330	17.16	8.55	3.99	2.63	2.66	105.20	105.00
	06/24/14 15:15:35	27360	17.37	9.78	4.84	2.50	2.66	105.20	105.00
	06/24/14 15:16:05	27390	17.26	10.00	2.71	2.54	2.82	105.00	126.00
	06/24/14 15:16:35	27420	17.21	7.41	2.11	2.60	2.82	105.00	126.00
	06/24/14 15:17:05	27450	17.11	6.43	2.25	2.68	2.44	104.90	105.00
	06/24/14 15:17:35	27480	17.56	7.45	2.17	2.35	2.44	104.90	105.00
	06/24/14 15:18:05	27510	17.41	8.48	2.54	2.47	2.21	104.70	105.00
	06/24/14 15:18:35	27540	17.56	7.92	2.36	2.35	2.21	104.70	105.00
	06/24/14 15:19:05	27570	17.42	7.01	2.01	2.43	2.49	104.60	105.00
	06/24/14 15:19:35	27600	17.31	6.47	1.82	2.50	2.49	104.60	105.00
	06/24/14 15:20:05	27630	17.39	6.30	2.25	2.48	2.27	104.50	84.00
	06/24/14 15:20:35	27660	17.47	6.75	2.50	2.41	2.27	104.50	84.00
	06/24/14 15:21:05	27690	17.48	7.10	2.31	2.42	2.41	104.50	105.00
	06/24/14 15:21:35	27720	17.53	6.58	1.81	2.36	2.41	104.50	105.00
	06/24/14 15:22:05	27750	17.42	6.36	2.19	2.44	2.44	104.30	95.00
	06/24/14 15:22:35	27780	17.50	6.09	1.62	2.41	2.44	104.30	95.00
	06/24/14 15:23:05	27810	17.39	6.10	2.13	2.43	3.52	104.40	116.00
	06/24/14 15:23:35	27840	17.04	6.90	1.91	2.71	3.52	104.40	116.00
	06/24/14 15:24:05	27870	16.92	6.62	1.69	2.73	3.40	104.30	126.00
	06/24/14 15:24:35	27900	16.89	6.61	1.82	2.81	3.40	104.30	126.00
	06/24/14 15:25:05	27930	16.93	6.57	1.67	2.80	3.40	104.30	105.00
	06/24/14 15:25:35	27960	17.08	6.59	2.34	2.69	3.40	104.30	105.00
	06/24/14 15:26:05	27990	17.16	6.63	1.68	2.64	3.43	104.30	126.00
	06/24/14 15:26:35	28020	17.19	5.69	1.70	2.60	3.43	104.30	126.00

CIMARRON ENERGY, INC.

June 24, 2014

24 ECD

Norman Facility

Unit Data

Meas. Stack Moisture	4.2	%
Stack Exhaust Flow (M2)	29,825	SCFH

Weather Data

Barometric Pressure	29.92	in. Hg
Relative Humidity	58	%
Ambient Temperature	86	°F
Specific Humidity	0.015494	lb H ₂ O / lb air

0-30-0 Load, Run - 24 ECD R2

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmvd)	THC (ppmvw)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
06/24/14 15:27:05	28050	16.98	5.81	1.52	2.73	3.54	104.30	116.00
06/24/14 15:27:35	28080	16.91	6.41	2.17	2.80	3.54	104.30	116.00
06/24/14 15:28:05	28110	17.03	8.91	6.51	2.75	3.54	104.40	116.00
06/24/14 15:28:35	28140	17.24	13.20	1.63	2.59	3.54	104.40	116.00
06/24/14 15:29:05	28170	17.14	6.16	1.55	2.63	3.13	104.40	116.00
06/24/14 15:29:35	28200	17.04	5.63	1.57	2.69	3.13	104.40	116.00
06/24/14 15:30:05	28230	17.00	5.93	1.56	2.74	3.40	104.50	126.00
06/24/14 15:30:35	28260	17.04	6.58	3.95	2.72	3.40	104.50	126.00
06/24/14 15:31:05	28290	17.10	8.59	1.64	2.66	3.52	104.60	116.00
06/24/14 15:31:35	28320	17.07	5.97	2.18	2.68	3.52	104.60	116.00
06/24/14 15:32:05	28350	16.96	6.35	1.48	2.75	3.21	104.70	116.00
06/24/14 15:32:35	28380	16.94	5.95	1.67	2.80	3.21	104.70	116.00
06/24/14 15:33:05	28410	17.00	6.18	2.51	2.73	2.10	104.80	105.00
06/24/14 15:33:35	28440	17.13	7.65	2.55	2.66	2.10	104.80	105.00
06/24/14 15:34:05	28470	17.12	7.35	1.97	2.66	3.02	104.90	105.00
06/24/14 15:34:35	28500	17.16	6.85	2.23	2.66	3.02	104.90	105.00
06/24/14 15:35:05	28530	17.41	8.03	3.00	2.46	2.74	105.00	105.00
06/24/14 15:35:35	28560	17.39	8.01	2.39	2.40	2.74	105.00	105.00
06/24/14 15:36:05	28590	17.35	8.00	3.61	2.53	2.19	105.10	105.00
06/24/14 15:36:35	28620	17.35	8.73	2.12	2.48	2.19	105.10	105.00
06/24/14 15:37:05	28650	17.53	7.10	2.32	2.39	2.05	105.20	94.00

RAW AVERAGE **17.20** **7.02** **2.30** **2.60** **2.93** **106.02** **111.46**

	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 (in. H ₂ O)	0 (°F)	0 (SCFH)
Bias	Initial Zero	0.03	0.01	-0.02	0.08			
	Final Zero	0.04	-0.08	0.01	0.09			
	Avg. Zero	0.04	-0.04	-0.01	0.09			
	Initial UpScale	12.07	10.81	3.08	9.21			
	Final UpScale	12.08	10.82	3.12	9.20			
	Avg. UpScale	12.08	10.82	3.10	9.21			

Upscale Cal Gas **12.25** **11.00** **3.04** **9.33**

EMISSIONS DATA	O ₂	CO	THC	CO ₂
Corrected Raw Average (ppm/% dry basis)	17.47	7.15	2.26	2.57
Corrected Raw Average (ppm/% wet basis)	16.74	6.85	2.16	2.46
Emission Rate (lb/hr)	N/A	0.02	0.01	N/A

CIMARRON ENERGY, INC.

June 24, 2014

24 ECD

Norman Facility

Unit Data

Meas. Stack Moisture	4.0	%
Stack Exhaust Flow (M2)	27,012	SCFH

Weather Data

Barometric Pressure	30.02	in. Hg
Relative Humidity	62	%
Ambient Temperature	84	°F
Specific Humidity	0.015483	lb H ₂ O / lb air

0-30-0 Load, Run - 24 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	06/24/14 15:53:05	29610	17.83	8.52	2.69	2.13	1.72	103.90	84.00
	06/24/14 15:53:35	29640	17.87	8.91	3.34	2.09	1.72	103.90	84.00
	06/24/14 15:54:05	29670	17.67	8.61	3.12	2.25	1.72	103.80	84.00
	06/24/14 15:54:35	29700	17.67	8.17	2.40	2.25	1.72	103.80	84.00
	06/24/14 15:55:05	29730	17.72	7.91	3.34	2.22	2.02	103.70	105.00
	06/24/14 15:55:35	29760	17.57	7.93	1.78	2.32	2.02	103.70	105.00
	06/24/14 15:56:05	29790	17.56	6.15	1.88	2.31	3.24	103.70	105.00
	06/24/14 15:56:35	29820	17.50	6.04	1.90	2.37	3.24	103.70	105.00
	06/24/14 15:57:05	29850	17.07	5.26	1.92	2.34	3.76	103.60	127.00
	06/24/14 15:57:35	29880	17.11	5.02	1.27	2.53	3.76	103.60	127.00
	06/24/14 15:58:05	29910	16.97	6.48	1.89	2.75	3.65	103.60	116.00
	06/24/14 15:58:35	29940	16.96	6.92	2.43	2.75	3.65	103.60	116.00
	06/24/14 15:59:05	29970	16.88	7.44	1.98	2.78	3.52	103.50	127.00
	06/24/14 15:59:35	30000	16.81	7.33	2.03	2.87	3.52	103.50	127.00
	06/24/14 16:00:05	30030	16.97	6.91	1.74	2.75	3.40	103.40	116.00
	06/24/14 16:00:35	30060	17.02	6.66	2.45	2.73	3.40	103.40	116.00
	06/24/14 16:01:05	30090	17.08	6.85	1.66	2.67	3.65	103.40	116.00
	06/24/14 16:01:35	30120	17.01	6.04	1.84	2.72	3.65	103.40	116.00
	06/24/14 16:02:05	30150	16.99	6.27	1.75	2.74	3.40	103.30	127.00
	06/24/14 16:02:35	30180	17.02	6.01	1.69	2.72	3.40	103.30	127.00
	06/24/14 16:03:05	30210	17.11	6.14	2.11	2.67	3.54	103.20	127.00
	06/24/14 16:03:35	30240	17.12	6.54	1.88	2.64	3.54	103.20	127.00
	06/24/14 16:04:05	30270	17.00	6.32	1.84	2.73	3.29	103.20	127.00
	06/24/14 16:04:35	30300	16.96	6.77	3.14	2.75	3.29	103.20	127.00
	06/24/14 16:05:05	30330	17.08	8.25	1.71	2.68	3.43	103.20	127.00
	06/24/14 16:05:35	30360	17.09	5.92	1.96	2.66	3.43	103.20	127.00
	06/24/14 16:06:05	30390	17.04	6.78	2.77	2.68	3.46	103.10	127.00
	06/24/14 16:06:35	30420	16.89	7.80	2.11	2.77	3.46	103.10	127.00
	06/24/14 16:07:05	30450	16.90	8.22	3.37	2.81	3.18	103.10	127.00
	06/24/14 16:07:35	30480	17.06	8.55	2.21	2.69	3.18	103.10	127.00
	06/24/14 16:08:05	30510	17.04	7.55	3.11	2.68	3.46	103.10	127.00
	06/24/14 16:08:35	30540	17.01	8.03	2.13	2.72	3.46	103.10	127.00
	06/24/14 16:09:05	30570	16.88	6.80	2.59	2.78	2.10	103.00	105.00
	06/24/14 16:09:35	30600	17.40	8.26	2.45	2.50	2.10	103.00	105.00
	06/24/14 16:10:05	30630	17.52	9.16	3.45	2.36	1.99	103.00	84.00
	06/24/14 16:10:35	30660	17.55	10.47	2.33	2.31	1.99	103.00	84.00
	06/24/14 16:11:05	30690	17.56	10.21	2.52	2.32	2.13	103.00	105.00
	06/24/14 16:11:35	30720	17.50	9.93	3.31	2.36	2.13	103.00	105.00
	06/24/14 16:12:05	30750	17.56	10.63	3.53	2.33	1.88	103.00	95.00
	06/24/14 16:12:35	30780	17.56	11.14	3.50	2.35	1.88	103.00	95.00
	06/24/14 16:13:05	30810	17.66	10.50	2.35	2.23	3.21	102.90	127.00
	06/24/14 16:13:35	30840	17.23	9.32	2.32	2.50	3.21	102.90	127.00
	06/24/14 16:14:05	30870	17.23	8.36	2.97	2.57	2.68	102.90	105.00
	06/24/14 16:14:35	30900	17.13	9.09	2.94	2.61	2.68	102.90	105.00
	06/24/14 16:15:05	30930	17.24	8.76	2.83	2.57	3.24	102.90	116.00
	06/24/14 16:15:35	30960	17.16	8.01	2.46	2.60	3.24	102.90	116.00
A2	06/24/14 16:16:05	30990	17.17	7.69	1.83	2.55	2.96	102.90	105.00
	06/24/14 16:16:35	31020	16.93	7.34	1.94	2.82	2.96	102.90	105.00
	06/24/14 16:17:05	31050	17.19	6.50	2.18	2.58	2.82	102.80	105.00
	06/24/14 16:17:35	31080	17.25	6.68	2.44	2.53	2.82	102.80	105.00
	06/24/14 16:18:05	31110	17.22	7.09	2.35	2.58	2.99	102.80	116.00
	06/24/14 16:18:35	31140	17.16	7.19	3.19	2.60	2.99	102.80	116.00
	06/24/14 16:19:05	31170	17.16	8.26	2.58	2.61	3.40	102.80	116.00
	06/24/14 16:19:35	31200	17.09	7.80	3.20	2.65	3.40	102.80	116.00
	06/24/14 16:20:05	31230	17.11	8.96	3.86	2.63	3.13	102.70	116.00
	06/24/14 16:20:35	31260	17.03	10.44	4.02	2.71	3.13	102.70	116.00
	06/24/14 16:21:05	31290	17.23	8.87	2.31	2.56	3.93	102.70	127.00
	06/24/14 16:21:35	31320	16.94	7.81	2.84	2.72	3.93	102.70	127.00
	06/24/14 16:22:05	31350	16.78	8.74	2.75	2.85	4.62	102.60	138.00
	06/24/14 16:22:35	31380	16.57	9.88	2.34	2.97	4.62	102.60	138.00

CIMARRON ENERGY, INC.

June 24, 2014

24 ECD

Norman Facility

Unit Data

Meas. Stack Moisture	4.0	%
Stack Exhaust Flow (M2)	27,012	SCFH

Weather Data

Barometric Pressure	30.02	in. Hg
Relative Humidity	62	%
Ambient Temperature	84	°F
Specific Humidity	0.015483	lb H ₂ O / lb air

0-30-0 Load, Run - 24 ECD R3

	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
	06/24/14 16:23:05	31410	16.63	9.88	2.25	2.97	3.29	102.50	127.00
	06/24/14 16:23:35	31440	16.89	8.47	2.11	2.81	3.29	102.50	127.00
	06/24/14 16:24:05	31470	17.20	7.42	2.67	2.61	2.77	102.50	105.00
	06/24/14 16:24:35	31500	17.20	7.61	2.71	2.58	2.77	102.50	105.00
	06/24/14 16:25:05	31530	17.28	7.18	2.39	2.51	2.52	102.50	116.00
	06/24/14 16:25:35	31560	17.27	6.99	3.12	2.52	2.52	102.50	116.00
	06/24/14 16:26:05	31590	17.23	8.11	3.97	2.55	3.21	102.40	127.00
	06/24/14 16:26:35	31620	17.17	8.86	2.26	2.59	3.21	102.40	127.00
	06/24/14 16:27:05	31650	16.99	7.10	2.94	2.68	2.80	102.40	105.00
	06/24/14 16:27:35	31680	16.95	8.55	3.14	2.75	2.80	102.40	105.00
	06/24/14 16:28:05	31710	17.03	8.86	5.00	2.70	3.07	102.40	116.00
	06/24/14 16:28:35	31740	17.40	11.36	3.42	2.45	3.07	102.40	116.00
	06/24/14 16:29:05	31770	17.14	8.44	3.31	2.60	2.96	102.30	84.00
	06/24/14 16:29:35	31800	17.03	9.06	2.95	2.68	2.96	102.30	84.00
	06/24/14 16:30:05	31830	17.09	8.12	1.87	2.66	3.10	102.30	116.00
	06/24/14 16:30:35	31860	17.07	6.60	2.38	2.63	3.10	102.30	116.00
	06/24/14 16:31:05	31890	16.87	7.58	2.72	2.85	3.10	102.30	106.00
	06/24/14 16:31:35	31920	17.15	8.15	3.71	2.58	3.10	102.30	106.00
	06/24/14 16:32:05	31950	17.00	8.13	3.62	2.70	2.96	102.20	116.00
	06/24/14 16:32:35	31980	16.99	9.43	2.93	2.72	2.96	102.20	116.00
	06/24/14 16:33:05	32010	17.11	8.31	2.65	2.65	3.10	102.20	106.00
	06/24/14 16:33:35	32040	17.13	7.55	2.99	2.65	3.10	102.20	106.00
	06/24/14 16:34:05	32070	17.01	8.03	2.78	2.69	2.96	102.20	106.00
	06/24/14 16:34:35	32100	16.92	8.22	2.68	2.75	2.96	102.20	106.00
	06/24/14 16:35:05	32130	16.83	8.15	2.31	2.83	2.68	102.20	116.00
	06/24/14 16:35:35	32160	16.81	8.63	2.48	2.85	2.68	102.20	116.00
	06/24/14 16:36:05	32190	16.79	9.26	2.40	2.84	3.10	102.20	106.00
	06/24/14 16:36:35	32220	16.74	7.99	1.57	2.86	3.10	102.20	106.00
	06/24/14 16:37:05	32250	16.68	6.50	2.21	2.93	3.10	102.20	106.00
	06/24/14 16:37:35	32280	16.78	8.00	1.75	2.87	3.10	102.20	106.00
	06/24/14 16:38:05	32310	16.84	6.71	2.04	2.82	3.21	102.20	116.00
	06/24/14 16:38:35	32340	16.85	7.96	1.95	2.81	3.21	102.20	116.00
A3	06/24/14 16:39:05	32370	16.78	7.99	2.53	2.83	3.21	102.20	116.00
	06/24/14 16:39:35	32400	16.62	9.47	2.20	2.95	3.21	102.20	116.00
	06/24/14 16:40:05	32430	16.72	8.98	1.93	2.92	2.93	102.20	106.00
	06/24/14 16:40:35	32460	16.79	7.71	1.66	2.85	2.93	102.20	106.00
	06/24/14 16:41:05	32490	16.81	7.14	2.34	2.83	3.04	102.20	116.00
	06/24/14 16:41:35	32520	16.71	8.86	2.17	2.89	3.04	102.20	116.00
	06/24/14 16:42:05	32550	16.76	9.01	2.05	2.88	2.80	102.30	116.00
	06/24/14 16:42:35	32580	16.67	7.86	1.89	2.91	2.80	102.30	116.00
	06/24/14 16:43:05	32610	16.68	7.74	1.80	2.93	2.93	102.20	106.00
	06/24/14 16:43:35	32640	16.74	7.30	2.31	2.88	2.93	102.20	106.00
	06/24/14 16:44:05	32670	16.79	8.18	1.76	2.84	2.38	102.20	104.00
	06/24/14 16:44:35	32700	17.05	10.13	2.41	2.74	2.38	102.20	104.00
	06/24/14 16:45:05	32730	16.67	23.60	2.13	2.84	3.18	102.20	106.00
	06/24/14 16:45:35	32760	16.77	13.06	2.72	2.90	3.18	102.20	106.00
	06/24/14 16:46:05	32790	16.58	13.50	2.06	2.92	3.07	102.20	106.00
	06/24/14 16:46:35	32820	16.47	11.63	2.41	3.12	3.07	102.20	106.00
	06/24/14 16:47:05	32850	16.55	12.56	2.35	2.98	3.88	102.10	102.00
	06/24/14 16:47:35	32880	16.52	12.43	2.19	3.03	3.88	102.10	102.00
	06/24/14 16:48:05	32910	16.19	12.03	1.95	3.17	4.82	102.00	94.00
	06/24/14 16:48:35	32940	15.91	13.17	1.36	3.48	4.82	102.00	94.00
	06/24/14 16:49:05	32970	15.87	13.46	1.36	3.46	4.04	102.00	84.00
	06/24/14 16:49:35	33000	16.04	13.25	1.51	3.40	4.04	102.00	84.00
	06/24/14 16:50:05	33030	16.46	11.18	2.64	3.12	2.71	101.90	106.00
	06/24/14 16:50:35	33060	16.84	9.00	1.92	2.85	2.71	101.90	106.00
	06/24/14 16:51:05	33090	17.21	5.79	1.84	2.57	3.27	101.80	116.00
	06/24/14 16:51:35	33120	17.01	5.43	2.44	2.67	3.27	101.80	116.00
	06/24/14 16:52:05	33150	16.96	7.03	3.46	2.73	3.02	101.80	106.00
	06/24/14 16:52:35	33180	16.97	7.40	3.18	2.73	3.02	101.80	106.00

CIMARRON ENERGY, INC.

June 24, 2014

24 ECD

Norman Facility

Unit Data

Meas. Stack Moisture	4.0	%
Stack Exhaust Flow (M2)	27,012	SCFH

Weather Data

Barometric Pressure	30.02	in. Hg
Relative Humidity	62	%
Ambient Temperature	84	°F
Specific Humidity	0.015483	lb H ₂ O / lb air

0-30-0 Load, Run - 24 ECD R3

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
06/24/14 16:53:05	33210	17.04	7.28	2.52	2.68	2.88	101.70	116.00
06/24/14 16:53:35	33240	17.07	6.37	2.29	2.65	2.88	101.70	116.00
06/24/14 16:54:05	33270	17.04	5.53	1.71	2.66	2.63	101.60	116.00
06/24/14 16:54:35	33300	16.87	5.69	2.72	2.79	2.63	101.60	116.00
06/24/14 16:55:05	33330	16.92	6.74	1.95	2.75	2.93	101.50	106.00
06/24/14 16:55:35	33360	17.01	5.88	1.99	2.70	2.93	101.50	106.00
06/24/14 16:56:05	33390	17.08	5.65	1.72	2.66	2.80	101.50	106.00
06/24/14 16:56:35	33420	16.98	5.19	1.75	2.70	2.80	101.50	106.00
06/24/14 16:57:05	33450	16.88	5.96	2.81	2.78	3.10	101.40	106.00
06/24/14 16:57:35	33480	16.92	6.87	1.83	2.75	3.10	101.40	106.00
06/24/14 16:58:05	33510	16.96	5.45	1.79	2.74	3.10	101.30	127.00
06/24/14 16:58:35	33540	17.01	5.36	1.84	2.68	3.10	101.30	127.00
06/24/14 16:59:05	33570	16.99	5.25	1.72	2.71	2.85	101.30	106.00
06/24/14 16:59:35	33600	16.89	5.64	3.20	2.78	2.85	101.30	106.00
06/24/14 17:00:05	33630	16.91	7.67	2.31	2.77	2.33	101.20	106.00
06/24/14 17:00:35	33660	16.93	6.34	2.05	2.75	2.33	101.20	106.00
06/24/14 17:01:05	33690	16.96	5.93	3.07	2.73	3.16	101.10	116.00
06/24/14 17:01:35	33720	17.02	7.36	2.39	2.67	3.16	101.10	116.00
06/24/14 17:02:05	33750	16.96	6.48	3.02	2.77	2.21	101.00	106.00
06/24/14 17:02:35	33780	17.33	11.46	3.14	2.40	2.21	101.00	106.00
06/24/14 17:03:05	33810	16.78	12.16	4.09	2.87	3.57	100.90	117.00

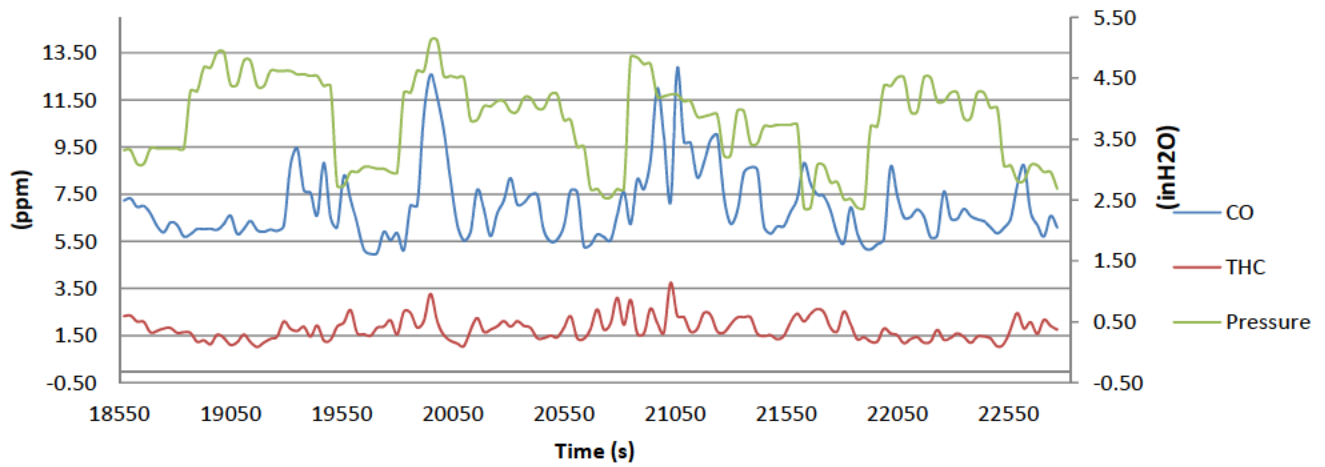
RAW AVERAGE **17.01** **8.20** **2.46** **2.70** **3.04** **102.48** **111.44**

Bias	Serial Number:	CO 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	0.04	-0.08	0.01	0.09			
	Final Zero	0.02	0.10	0.01	0.07			
	Avg. Zero	0.03	0.01	0.01	0.08			
	Initial UpScale	12.08	10.82	3.12	9.20			
	Final UpScale	12.03	11.09	3.07	9.12			
	Avg. UpScale	12.06	10.96	3.10	9.16			

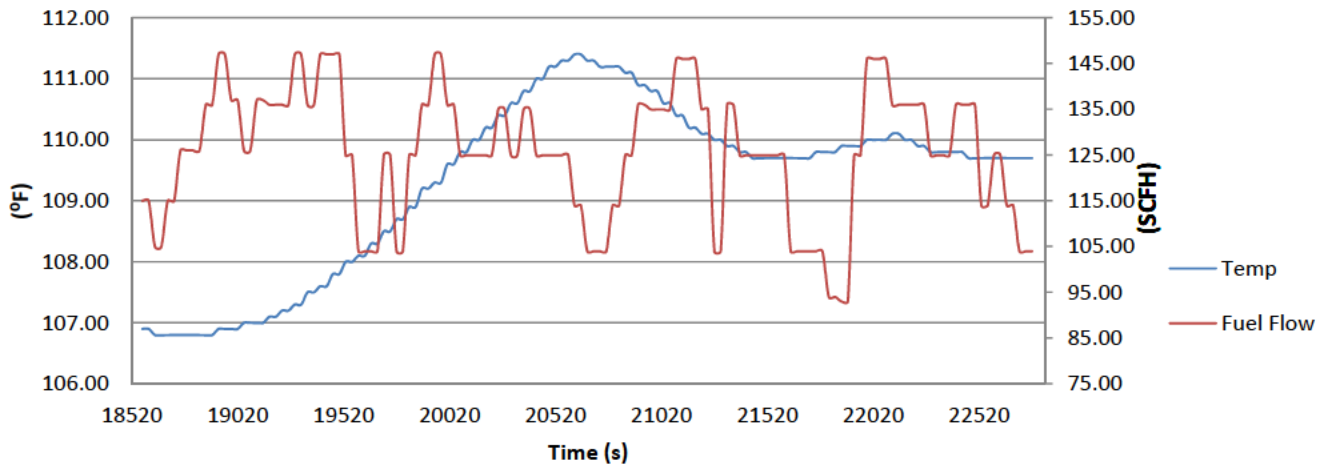
Upscale Cal Gas **12.25** **11.00** **3.04** **9.33**

EMISSIONS DATA	O ₂	CO	THC	CO ₂
Corrected Raw Average (ppm/% dry basis)	17.30	8.23	2.41	2.69
Corrected Raw Average (ppm/% wet basis)	16.61	7.91	2.32	2.58
Emission Rate (lb/hr)	N/A	0.02	0.01	N/A

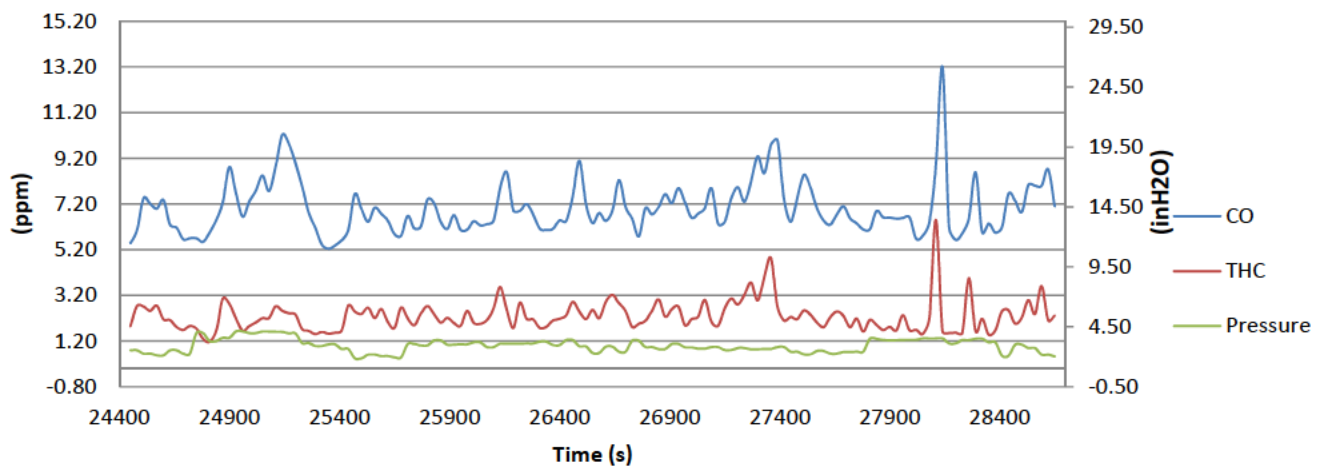
24 ECD R1



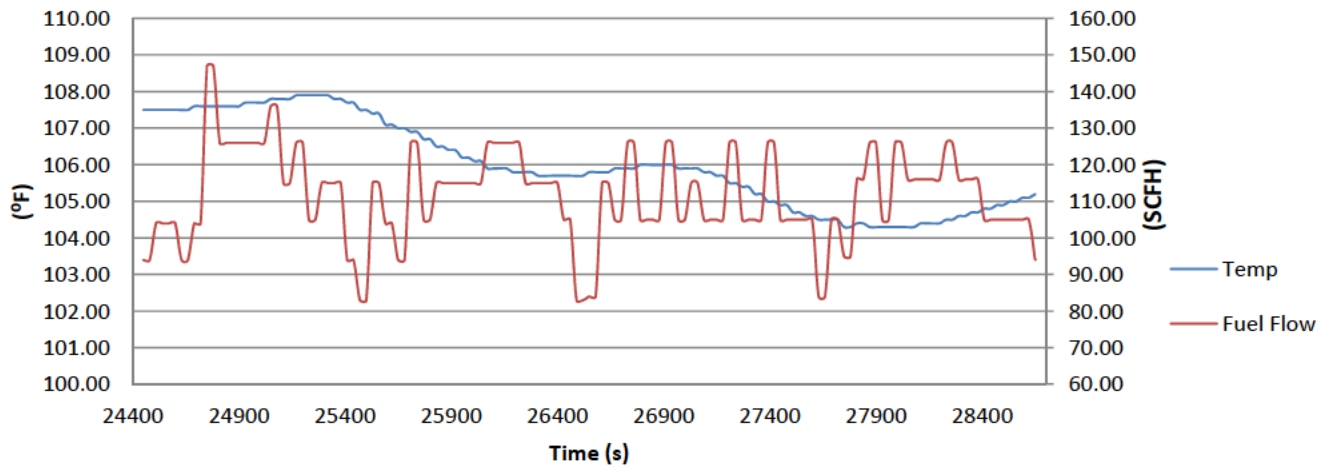
24 ECD R1



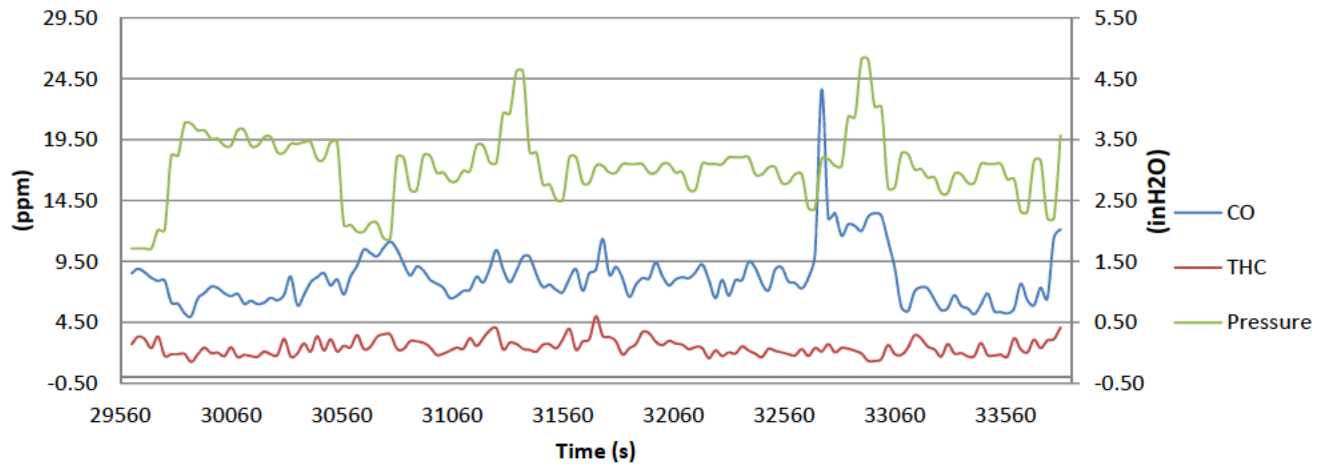
24 ECD R2



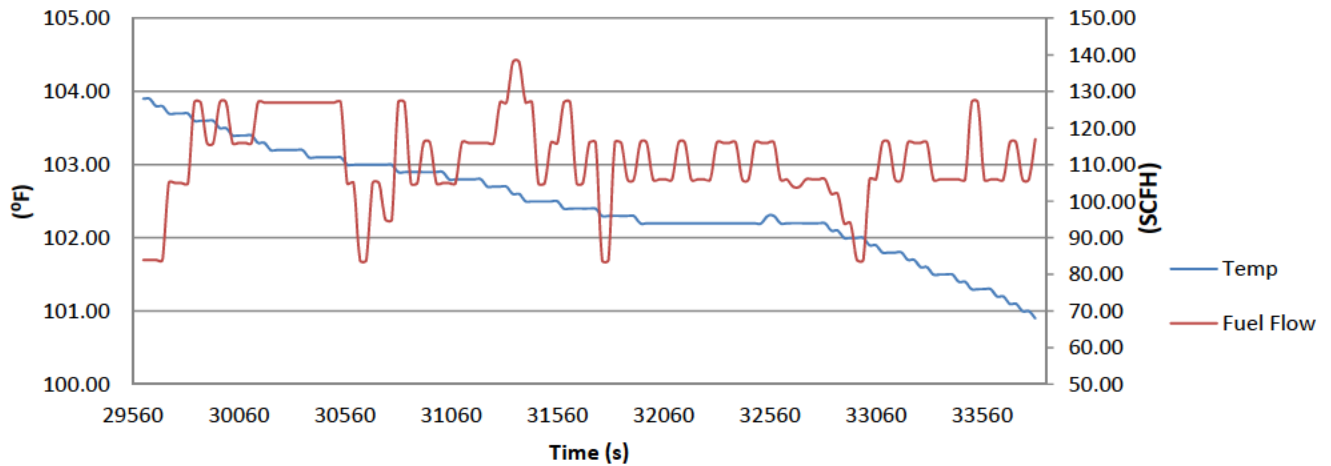
24 ECD R2



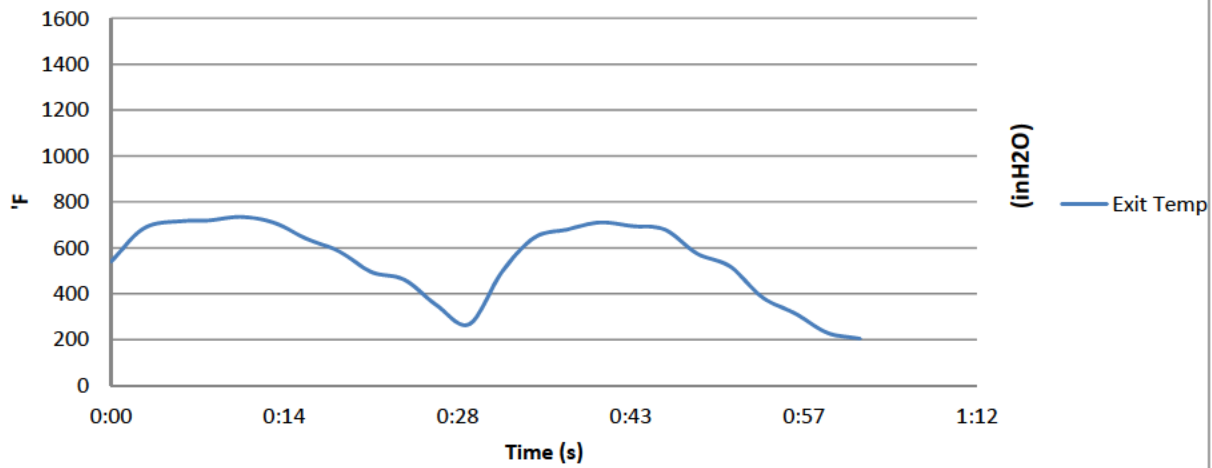
24 ECD R3



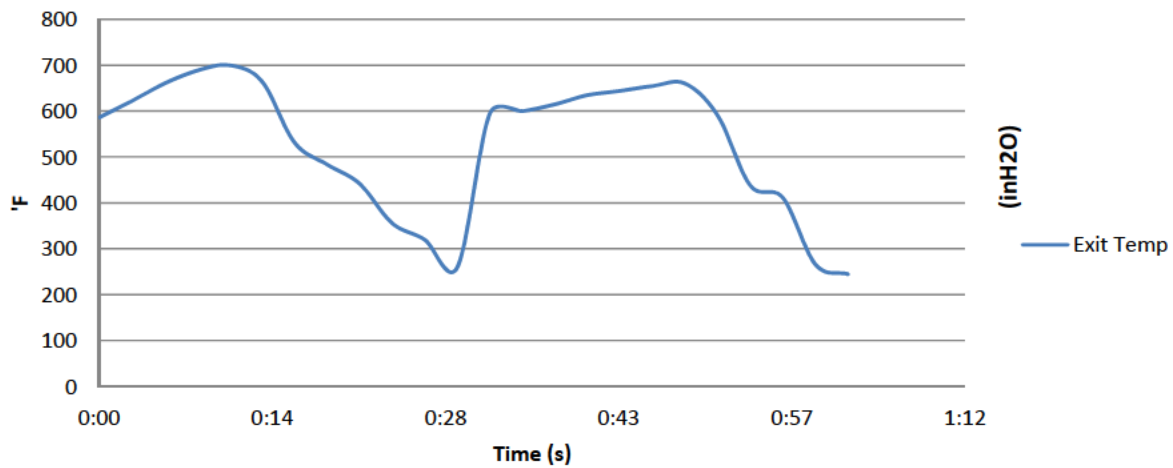
24 ECD R3



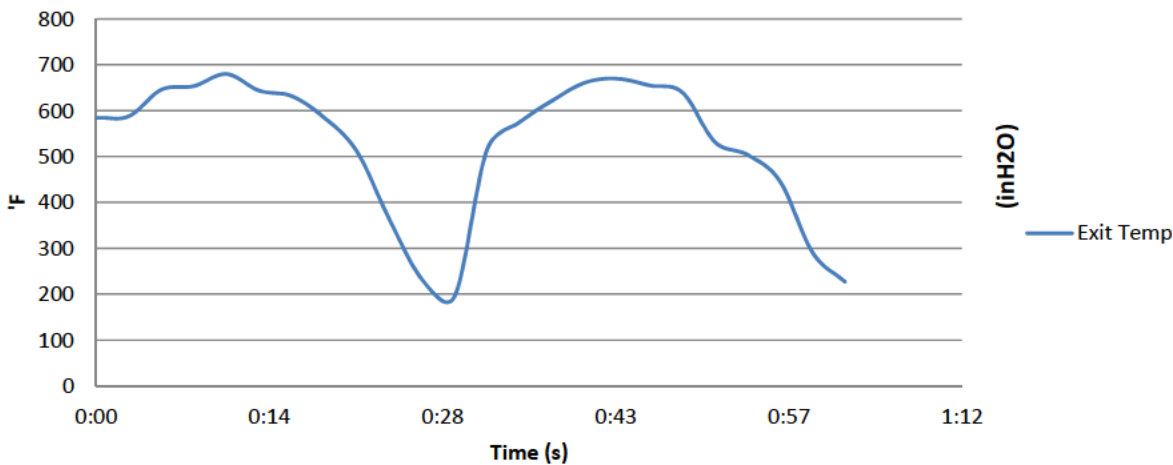
24 ECD R1



24 ECD R2



24 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	24 ECD
Fuel Type	Gas, Propene

Test Information			
Project #		cei-14-norman.ok-comp#1	
Operator		TRS	
Date for Preliminary Run	(mm/dd/yy)	06/20/14	
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)	06/23/14	06/23/14	06/23/14	
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	($\Delta H_{@}$)	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	24 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	14:55	16:20	17:51		hh:mm
Run Stop Time	16:05	17:30	19:01		hh:mm
Test Date	06/23/14	06/23/14	06/23/14		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	359.900	412.400	461.500		ft ³
Final Meter Volume	408.300	461.100	510.000		ft ³
Total Meter Volume	48.400	48.700	48.500	48.533	ft ³
Total Sampling Time	65.00	65.00	65.00	65.00	min
Average Meter Temperature	79.21	77.96	75.92	77.69	°F
Average Stack Temperature	682.67	704.46	724.21	703.78	°F
Barometric Pressure	29.95	29.94	29.94	29.94	in Hg
Stack Static Pressure	0.00	0.00	0.00	0.00	in H ₂ O
Absolute Stack Pressure	29.95	29.94	29.94	29.94	in Hg
Average Orifice Pressure Drop	1.85	1.85	1.83	1.85	in H ₂ O
Absolute Meter Pressure	30.09	30.08	30.08	30.08	in Hg
Avg Square Root Pitot Pressure	0.07	0.07	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	54.00	37.00	36.80	42.60	g
Silica Gel Weight Gain	16.70	10.50	12.40	13.20	g
Total Water Volume Collected	70.83	47.59	49.29	55.90	ml
Standard Water Vapor Volume	3.33	2.24	2.32	2.63	scf
Standard Meter Volume	48.1	48.5	48.5	48.4	dscf
Calculated Stack Moisture	6.48	4.41	4.56	5.15	%
Saturated Stack Moisture	100.00	100.00	100.00	100.00	%
Reported Stack Moisture Content	6.48	4.41	4.56	5.15	%
Gas Analysis Data	30-70-30%-4	30-70-30%-5	30-70-30%-6	Average	Units
Carbon Dioxide Content	4.8	4.0	3.6	4.1	%
Oxygen Content	15.5	16.7	17.2	16.5	%
Nitrogen Content	79.7	79.3	79.2	79.4	%
Stack Dry Molecular Weight	29.38	29.29	29.26	29.31	lb/lb-mole
Stack Wet Molecular Weight	28.65	28.80	28.75	28.73	lb/lb-mole
Percent Excess Air	279.7	394.3	463.4	379.2	%
Volumetric Flow Rate Data	30-70-30%-4	30-70-30%-5	30-70-30%-6	Average	Units
Average Stack Gas Velocity	5.70	5.73	5.78	5.74	ft/sec
Stack Cross-Sectional Area	3.05	3.05	3.05	3.05	ft ²
Actual Stack Flow Rate	1,041	1,047	1,057	1,048	acfm
Wet Standard Stack Flow Rate	29	29	28	29	wkscfh
Dry Standard Stack Flow Rate	27,012	27,255	26,993	27,087	dscfh

METHOD 3C - DETERMINATION OF DRY MOLECULAR WEIGHT BY ANALYZER

Plant Name	Norman Facility	Preliminary Date	06/20/14		
Sampling Location	24 ECD	Operator	TRS		
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	06/23/14	Run Start Time	14:55	Run Stop Time	16:05
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	4.8	15.5	0.0	79.7	29.38	1.127	279.7	N/A

Gas Analysis Data								
Run Number	30-70-30%-5		Date	06/23/14	Run Start Time	16:20	Run Stop Time	17:30
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	4.0	16.7	0.0	79.3	29.29	1.058	394.3	N/A

Gas Analysis Data								
Run Number	30-70-30%-6		Date	06/23/14	Run Start Time	17:51	Run Stop Time	19:01
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	3.6	17.2	0.0	79.2	29.26	1.031	463.4	N/A

METHOD 4 - DETERMINATION OF MOISTURE CONTENT IN STACK GASES

Plant Name	Norman Facility	Preliminary Date	06/20/14
Sampling Location	24 ECD	Operator	TRS
Project #	cei-14-norman.ok-comp#1	Ports Used	2

Moisture Content Data								
Run Number	30-70-30%-4		Date	06/23/14	Start Time	14:55	Stop Time	16:05
Meter Box Number	SAMP-CP-0023				Meter Cal Factor	(Y)	1.010	
Total Meter Volume	(V _m)	48.400	dcf		Barometric Pressure	(P _b)	29.95	in Hg
Average Stack Temp	(t _s) _{avg}	683	°F		Stack Static Pressure	(P _{static})	0.00	in H ₂ O
Average Meter Temp	(t _m) _{avg}	79	°F		Avg Orifice Pressure	(ΔH) _{avg}	1.85	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)	715.50	749.30	576.00	1045.70			
Initial Value	(V _i),(W _i)	688.00	730.80	568.00	1029.00			
Net Value	(V _n),(W _n)	27.5	18.5	8.0	16.7			
Results								
Total Weight	(W _f)	70.70	g	Water Vol Weighed	(V _{wsg(std)})	3.334	scf	
Std Meter Volume	(V _{m(std)})	48.134	dscf	Sat. Moisture Content	(B _{ws(svp)})	100.00	%	
Calc Moisture Content	(B _{ws(calc)})	6.48	%	Final Moisture Content	(B _{ws})	6.48	%	

Moisture Content Data								
Run Number	30-70-30%-5		Date	06/23/14	Start Time	16:20	Stop Time	17:30
Meter Box Number	SAMP-CP-0023				Meter Cal Factor	(Y)	1.010	
Total Meter Volume	(V _m)	48.700	dcf		Barometric Pressure	(P _b)	29.94	in Hg
Average Stack Temp	(t _s) _{avg}	704	°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}	1.85	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)	705.80	686.70	567.30	914.70			
Initial Value	(V _i),(W _i)	683.10	674.90	564.80	904.20			
Net Value	(V _n),(W _n)	22.7	11.8	2.5	10.5			
Results								
Total Weight	(W _f)	47.50	g	Water Vol Weighed	(V _{wsg(std)})	2.240	scf	
Std Meter Volume	(V _{m(std)})	48.528	dscf	Sat. Moisture Content	(B _{ws(svp)})	100.00	%	
Calc Moisture Content	(B _{ws(calc)})	4.41	%	Final Moisture Content	(B _{ws})	4.41	%	

Moisture Content Data								
Run Number	30-70-30%-6		Date	06/23/14	Start Time	17:51	Stop Time	19:01
Meter Box Number	SAMP-CP-0023				Meter Cal Factor	(Y)	1.010	
Total Meter Volume	(V _m)	48.500	dcf		Barometric Pressure	(P _b)	29.94	in Hg
Average Stack Temp	(t _s) _{avg}	724	°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}	1.83	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)	721.60	704.00	571.00	927.10			
Initial Value	(V _i),(W _i)	705.80	686.70	567.30	914.70			
Net Value	(V _n),(W _n)	15.8	17.3	3.7	12.4			
Results								
Total Weight	(W _f)	49.20	g	Water Vol Weighed	(V _{wsg(std)})	2.320	scf	
Std Meter Volume	(V _{m(std)})	48.511	dscf	Sat. Moisture Content	(B _{ws(svp)})	100.00	%	
Calc Moisture Content	(B _{ws(calc)})	4.56	%	Final Moisture Content	(B _{ws})	4.56	%	

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

Plant Name	Norman Facility
Sampling Location	24 ECD
Project #	cel-14-norman.ok-comp#1

Date	06/23/14
Operator	TRS
Run Number	30-70-30%-4

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Coefficient	(C _p)	0.819	
Average Stack Temp	(t _s)	682.7	F
Average Meter Temp	(t _m)	79.2	
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})	6.48	%
Stack Dry Molecular Weight	(M _d)	29.38	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 (+)	0.20	in H ₂ O for	15.0
		Pre (-)	0.20	in H ₂ O for	15.0
		Post (+)	0.20	in H ₂ O for	15.0
		Post (-)	0.20	in H ₂ O for	15.0

Sampling Equipment		
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)	0.4766 in
Probe Number	SAMP-SP-0001	
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)	29.95	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

Run Time			
Start	14:55	End	16:05

Weights	Imp 1	Imp 2	Imp 3	Imp 4	Imp 5	Imp 6	Imp 7	Imp 8
Pre	688.0	730.8	568.0	1029.0				
Post	715.5	749.3	576.0	1045.7				

Wash Volumes					ml
					ml

Traverse Point #	Sampling Time (Θ)	Timer Time	Dry Gas Meter Reading (V _m)	Velocity Head (Δp)	Desired Orifice ΔH (ΔH _d)	Actual Orifice ΔH (ΔH _a)	Stack Temp (t _s)	Snorkel Temp (248±25°F)	Filter Temp (248±25°F)	Impinger Exit Temp (568°F)	Cond. Temp (≤-°F)	CPM Filter Temp (-±-°F)	Meter Inlet Temp (t _{mi})	Meter Outlet Temp (t _{mo})	Pump Vacuum	Square Root ΔP (Δp ^{1/2})	Local Stack Velocity (v _{s,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	359.900	0.005	1.877	1.90	640	250		54			77	77	0.0	0.07	5.61	2.047		49.136
A-2	2.7	00:02:43	361.950	0.005	1.877	1.80	685	250		50			77	77	0.0	0.07	5.72	3.944		47.333
A-3	5.4	00:05:25	363.850	0.005	1.877	1.80	765	250		50			77	77	0.0	0.07	5.92	5.841		46.732
A-4	8.1	00:08:07	365.750	0.005	1.877	1.80	856	250		46			77	77	0.0	0.07	6.13	7.788		46.731
A-5	10.8	00:10:50	367.700	0.005	1.877	1.80	945	250		46			77	77	0.0	0.07	6.34	9.835		47.210
A-6	13.5	00:13:33	369.750	0.005	1.877	1.90	880	250		47			77	77	0.0	0.07	6.19	11.883		47.531
A-7	16.3	00:16:15	371.800	0.005	1.877	1.90	715	250		46			78	78	0.0	0.07	5.79	13.876		47.576
A-8	19.0	00:18:58	373.800	0.005	1.877	1.80	625	250		46			78	78	0.0	0.07	5.57	15.870		47.609
A-9	21.7	00:21:40	375.800	0.005	1.877	1.80	535	250		47			78	78	0.0	0.07	5.33	17.913		47.767
A-10	24.4	00:24:22	377.850	0.005	1.877	1.90	445	250		47			79	79	0.0	0.07	5.08	19.952		47.886
A-11	27.1	00:27:05	379.900	0.005	1.877	1.90	430	250		48			79	79	0.0	0.07	5.04	21.992		47.983
A-12	29.8	00:29:47	381.950	0.005	1.877	1.90	390	250		48			79	79	0.0	0.07	4.93	23.982		47.964
B-1	32.5	00:32:30	383.950	0.005	1.877	1.80	650	250		51			79	79	0.0	0.07	5.63	26.021		48.039
B-2	35.2	00:35:12	386.000	0.005	1.877	1.90	710	250		49			80	80	0.0	0.07	5.78	28.057		48.098
B-3	37.9	00:37:55	388.050	0.005	1.877	1.90	824	250		49			80	80	0.0	0.07	6.06	30.093		48.149
B-4	40.6	00:40:37	390.100	0.005	1.877	1.90	920	250		49			80	80	0.0	0.07	6.28	32.080		48.119
B-5	43.3	00:43:20	392.100	0.005	1.877	1.80	900	250		49			80	80	0.0	0.07	6.23	34.115		48.163
B-6	46.0	00:46:03	394.150	0.005	1.877	1.90	933	250		49			81	81	0.0	0.07	6.31	36.147		48.196
B-7	48.8	00:48:45	396.200	0.005	1.877	1.90	815	250		49			81	81	0.0	0.07	6.04	38.130		48.164
B-8	51.5	00:51:28	398.200	0.005	1.877	1.80	750	250		49			81	81	0.0	0.07	5.88	40.112		48.135
B-9	54.2	00:54:10	400.200	0.005	1.877	1.80	620	250		49			81	81	0.0	0.07	5.55	42.094		48.108
B-10	56.9	00:56:53	402.200	0.005	1.877	1.80	550	250		50			81	81	0.0	0.07	5.37	44.126		48.137
B-11	59.6	00:59:35	404.250	0.005	1.877	1.90	421	250		50			82	82	0.0	0.07	5.02	46.154		48.161
B-12	62.3	01:02:18	406.300	0.005	1.877	1.90	380	250		50			82	82	0.0	0.07	4.90	48.133		48.133
Last Pt	65.0	01:05:00	408.300																	
Final Val	65.0	01:05:00	408.300												Max Vac	0.0	Final Values	48.133		
Average Values				0.01		1.85	683	250		49			79	79		0.07	5.70			
													79							

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

Plant Name	Norman Facility
Sampling Location	24 ECD
Project #	cel-14-norman.ok-comp#1

Date	06/23/14
Operator	TRS
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
< 3.0	Pitot	Pre (+)	0.20	in H ₂ O for	15.0
		Pre (-)	0.20	in H ₂ O for	15.0
		Post (+)	0.20	in H ₂ O for	15.0
		Post (-)	0.20	in H ₂ O for	15.0

Nozzle Measurements				
Pre				PASS
Post				PASS

Run Time			
Start	16:20	End	17:30

Weights	Imp 1	Imp 2	Imp 3	Imp 4	Imp 5	Imp 6	Imp 7	Imp 8
Pre	683.1	674.9	564.8	904.2				
Post	705.8	686.7	567.3	914.7				

Sampling Equipment			
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)	0.4769	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)	704.5	F
Average Meter Temp	(t _m)	78.0	
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})	4.41	%
Stack Dry Molecular Weight	(M _d)	29.29	lb/lb-mole
Estimated Orifice Flow Rate	(Q _m)	0.74	acfm
ΔP to ΔH Isokinetic Factor	(K)		

Pressures			
Barometric Pressure	(P _b)	29.94	in Hg
Stack Static Pressure	(P _{static})	0.00	in H ₂ O
Absolute Stack Pressure	(P _a)	29.94	in Hg
Absolute Meter Pressure	(P _m)	30.08	in Hg

Wash Volumes					ml
					ml

Traverse Point #	Sampling Time (Θ)	Timer Time	Dry Gas Meter Reading (V _m)	Velocity Head (Δp)	Desired Orifice ΔH (ΔH _d)	Actual Orifice ΔH (ΔH _a)	Stack Temp (t _s)	Snorkel Temp (248±25°F)	Filter Temp (248±25°F)	Impinger Exit Temp (568°F)	Cond. Temp (≤-°F)	CPM Filter Temp (-±-°F)	Meter Inlet Temp (t _{mi})	Meter Outlet Temp (t _{mo})	Pump Vacuum	Square Root ΔP (ΔP ^{1/2})	Local Stack Velocity (v _{s,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	412.400	0.005	1.877	1.80	635	250		56			80	80	0.0	0.07	5.58	2.035		48.835
A-2	2.7	00:02:43	414.450	0.005	1.877	1.80	730	250		52			79	79	0.0	0.07	5.82	4.024		48.284
A-3	5.4	00:05:25	416.450	0.005	1.877	1.80	740	250		48			78	78	0.0	0.07	5.84	6.066		48.528
A-4	8.1	00:08:07	418.500	0.005	1.877	1.90	915	250		48			78	78	0.0	0.07	6.25	8.109		48.653
A-5	10.8	00:10:50	420.550	0.005	1.877	1.80	955	250		47			77	77	0.0	0.07	6.34	10.105		48.505
A-6	13.5	00:13:33	422.550	0.005	1.877	1.80	970	250		47			77	77	0.0	0.07	6.38	12.151		48.605
A-7	16.3	00:16:15	424.600	0.005	1.877	1.90	850	250		48			78	78	0.0	0.07	6.10	14.144		48.495
A-8	19.0	00:18:58	426.600	0.005	1.877	1.90	810	250		48			78	78	0.0	0.07	6.01	16.088		48.263
A-9	21.7	00:21:40	428.550	0.005	1.877	1.80	590	250		48			78	78	0.0	0.07	5.46	18.130		48.346
A-10	24.4	00:24:22	430.600	0.005	1.877	1.90	445	250		48			78	78	0.0	0.07	5.07	20.173		48.415
A-11	27.1	00:27:05	432.650	0.005	1.877	1.90	456	250		48			78	78	0.0	0.07	5.10	22.216		48.470
A-12	29.8	00:29:47	434.700	0.005	1.877	1.90	389	250		49			79	79	0.0	0.07	4.91	24.255		48.509
B-1	32.5	00:32:30	436.750	0.005	1.877	1.90	645	250		51			78	78	0.0	0.07	5.60	26.298		48.549
B-2	35.2	00:35:12	438.800	0.005	1.877	1.90	715	250		50			78	78	0.0	0.07	5.78	28.291		48.498
B-3	37.9	00:37:55	440.800	0.005	1.877	1.80	803	250		50			77	77	0.0	0.07	5.99	30.337		48.539
B-4	40.6	00:40:37	442.850	0.005	1.877	1.90	922	250		50			77	77	0.0	0.07	6.27	32.383		48.575
B-5	43.3	00:43:20	444.900	0.005	1.877	1.80	948	250		50			77	77	0.0	0.07	6.33	34.380		48.536
B-6	46.0	00:46:03	446.900	0.005	1.877	1.80	966	251		50			77	77	0.0	0.07	6.37	36.426		48.568
B-7	48.8	00:48:45	448.950	0.005	1.877	1.90	820	250		51			78	78	0.0	0.07	6.03	38.469		48.592
B-8	51.5	00:51:28	451.000	0.005	1.877	1.80	750	250		51			78	78	0.0	0.07	5.87	40.461		48.554
B-9	54.2	00:54:10	453.000	0.005	1.877	1.80	613	250		51			78	78	0.0	0.07	5.52	42.504		48.576
B-10	56.9	00:56:53	455.050	0.005	1.877	1.90	540	251		51			78	78	0.0	0.07	5.33	44.546		48.596
B-11	59.6	00:59:35	457.100	0.005	1.877	1.90	380	250		51			78	78	0.0	0.07	4.89	46.540		48.563
B-12	62.3	01:02:18	459.100	0.005	1.877	1.80	320	250		52			79	79	0.0	0.07	4.71	48.528		48.528
Last Pt	65.0	01:05:00	461.100																	
Final Val	65.0	01:05:00	461.100											Max Vac	0.0		Final Values	48.528		
Average Values				0.01		1.85	704	250		50			78	78		0.07	5.73			
													78							

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

Plant Name	Norman Facility
Sampling Location	24 ECD
Project #	cel-14-norman.ok-comp#1

Date	06/23/14
Operator	TRS
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	15.0
		Pre (-)	0.20	in H ₂ O for	15.0
		Post (+)	0.20	in H ₂ O for	15.0
		Post (-)	0.20	in H ₂ O for	15.0

Nozzle Measurements				
Pre				PASS
Post				PASS

Run Time			
Start	17:51	End	19:01

Weights	Imp 1	Imp 2	Imp 3	Imp 4	Imp 5	Imp 6	Imp 7	Imp 8
Pre	705.8	686.7	567.3	914.7				
Post	721.6	704.0	571.0	927.1				

Sampling Equipment		
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)	0.4816 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)	724.2	F
Average Meter Temp	(t _m)	75.9	
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})	4.56	%
Stack Dry Molecular Weight	(M _d)	29.26	lb/lb-mole
Estimated Orifice Flow Rate	(Q _m)	0.75	acfm
ΔP to ΔH Isokinetic Factor	(K)		

Pressures			
Barometric Pressure	(P _b)	29.94	in Hg
Stack Static Pressure	(P _{static})	0.00	in H ₂ O
Absolute Stack Pressure	(P _a)	29.94	in Hg
Absolute Meter Pressure	(P _m)	30.08	in Hg

Wash Volumes					ml
					ml

Traverse Point #	Sampling Time (Θ)	Timer Time	Dry Gas Meter Reading (V _m)	Velocity Head (Δp)	Desired Orifice ΔH (ΔH _d)	Actual Orifice ΔH (ΔH _a)	Stack Temp (t _s)	Snorkel Temp (248±25°F)	Filter Temp (248±25°F)	Impinger Exit Temp (568°F)	Cond. Temp (≤-°F)	CPM Filter Temp (-±-°F)	Meter Inlet Temp (t _{mi})	Meter Outlet Temp (t _{mo})	Pump Vacuum	Square Root ΔP (Δp ^{1/2})	Local Stack Velocity (v _{s,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	461.500	0.005	1.877	1.80	640	250		55			76	76	0.0	0.07	5.60	2.050		49.200
A-2	2.7	00:02:43	463.550	0.005	1.877	1.90	790	250		54			76	76	0.0	0.07	5.97	4.050		48.605
A-3	5.4	00:05:25	465.550	0.005	1.877	1.90	855	250		54			76	76	0.0	0.07	6.12	6.101		48.808
A-4	8.1	00:08:07	467.600	0.005	1.877	1.90	940	251		55			76	76	0.0	0.07	6.31	8.101		48.608
A-5	10.8	00:10:50	469.600	0.005	1.877	1.90	955	250		56			76	76	0.0	0.07	6.35	10.152		48.729
A-6	13.5	00:13:33	471.650	0.005	1.877	1.80	950	250		57			76	76	0.0	0.07	6.34	12.202		48.808
A-7	16.3	00:16:15	473.700	0.005	1.877	1.80	840	250		58			76	76	0.0	0.07	6.08	14.202		48.692
A-8	19.0	00:18:58	475.700	0.005	1.877	1.80	760	250		58			76	76	0.0	0.07	5.89	16.252		48.756
A-9	21.7	00:21:40	477.750	0.005	1.877	1.80	645	250		57			76	76	0.0	0.07	5.61	18.252		48.672
A-10	24.4	00:24:22	479.750	0.005	1.877	1.80	520	250		56			76	76	0.0	0.07	5.28	20.302		48.724
A-11	27.1	00:27:05	481.800	0.005	1.877	1.80	485	251		56			76	76	0.0	0.07	5.19	22.352		48.768
A-12	29.8	00:29:47	483.850	0.005	1.877	1.80	505	250		55			76	76	0.0	0.07	5.24	24.302		48.604
B-1	32.5	00:32:30	485.800	0.005	1.877	1.80	635	250		57			75	75	0.0	0.07	5.58	26.305		48.564
B-2	35.2	00:35:12	487.800	0.005	1.877	1.80	840	250		55			75	75	0.0	0.07	6.08	28.359		48.616
B-3	37.9	00:37:55	489.850	0.005	1.877	1.80	925	250		53			75	75	0.0	0.07	6.28	30.313		48.501
B-4	40.6	00:40:37	491.800	0.005	1.877	1.90	965	250		53			75	75	0.0	0.07	6.37	32.367		48.551
B-5	43.3	00:43:20	493.850	0.005	1.877	1.80	984	250		52			75	75	0.0	0.07	6.41	34.421		48.594
B-6	46.0	00:46:03	495.900	0.005	1.877	1.80	968	250		52			76	76	0.0	0.07	6.38	36.421		48.561
B-7	48.8	00:48:45	497.900	0.005	1.877	1.90	945	250		53			76	76	0.0	0.07	6.33	38.472		48.596
B-8	51.5	00:51:28	499.950	0.005	1.877	1.80	664	250		53			77	77	0.0	0.07	5.66	40.418		48.501
B-9	54.2	00:54:10	501.900	0.005	1.877	1.90	480	249		53			77	77	0.0	0.07	5.17	42.465		48.531
B-10	56.9	00:56:53	503.950	0.005	1.877	1.80	405	250		54			76	76	0.0	0.07	4.96	44.465		48.507
B-11	59.6	00:59:35	505.950	0.005	1.877	1.90	365	250		55			76	76	0.0	0.07	4.85	46.465		48.485
B-12	62.3	01:02:18	507.950	0.005	1.877	1.80	320	250		55			77	77	0.0	0.07	4.71	48.511		48.511
Last Pt	65.0	01:05:00	510.000																	
Final Val	65.0	01:05:00	510.000											Max Vac	0.0		Final Values	48.511		
Average Values				0.01		1.83	724	250		55			76	76		0.07	5.78			
													76							

CIMARRON ENERGY, INC.

June 23, 2014

24 ECD

Norman Facility

Unit Data

Meas. Stack Moisture	6.5	%
Stack Exhaust Flow (M2)	27,012	SCFH

Weather Data

Barometric Pressure	29.95	in. Hg
Relative Humidity	59	%
Ambient Temperature	83	°F
Specific Humidity	0.014273	lb H ₂ O / lb air

30-70-30 Load, Run - 24 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	06/23/14 14:55:19	20940	16.68	3.68	1.06	2.93	3.88	99.50	117.00
	06/23/14 14:55:49	20970	16.93	3.57	1.10	2.76	3.88	99.50	117.00
	06/23/14 14:56:19	21000	16.81	3.43	1.09	2.79	3.46	99.50	127.00
	06/23/14 14:56:49	21030	16.95	3.67	1.10	2.74	3.46	99.50	127.00
	06/23/14 14:57:19	21060	16.66	3.53	1.04	2.85	3.71	99.50	127.00
	06/23/14 14:57:49	21090	16.59	3.85	1.05	2.97	3.71	99.50	127.00
	06/23/14 14:58:19	21120	16.80	3.79	1.11	2.82	3.29	99.60	117.00
	06/23/14 14:58:49	21150	16.80	3.73	1.13	2.84	3.29	99.60	117.00
	06/23/14 14:59:19	21180	16.85	3.80	1.12	2.75	3.57	99.50	127.00
	06/23/14 14:59:49	21210	16.74	3.75	1.09	2.84	3.57	99.50	127.00
	06/23/14 15:00:19	21240	16.57	3.85	0.98	2.96	7.97	99.50	182.00
	06/23/14 15:00:49	21270	15.33	3.97	1.70	3.78	7.97	99.50	182.00
	06/23/14 15:01:19	21300	15.45	9.37	0.75	3.73	13.98	99.50	250.00
	06/23/14 15:01:49	21330	14.42	6.93	0.46	4.52	13.98	99.50	250.00
	06/23/14 15:02:19	21360	14.34	5.68	0.46	4.61	13.04	99.40	250.00
	06/23/14 15:02:49	21390	14.32	5.49	0.44	4.63	13.04	99.40	250.00
	06/23/14 15:03:19	21420	14.17	5.29	0.44	4.73	12.93	99.40	228.00
	06/23/14 15:03:49	21450	14.35	5.00	0.44	4.61	12.93	99.40	228.00
	06/23/14 15:04:19	21480	14.42	3.87	0.44	4.60	13.45	99.40	261.00
	06/23/14 15:04:49	21510	14.38	3.81	0.44	4.58	13.45	99.40	261.00
	06/23/14 15:05:19	21540	14.46	3.48	0.45	4.56	13.06	99.40	250.00
	06/23/14 15:05:49	21570	14.66	3.87	0.50	4.39	13.06	99.40	250.00
	06/23/14 15:06:19	21600	14.35	3.69	0.44	4.58	13.87	99.40	250.00
	06/23/14 15:06:49	21630	14.21	2.84	0.45	4.73	13.87	99.40	250.00
	06/23/14 15:07:19	21660	14.46	3.90	0.44	4.55	13.34	99.50	250.00
	06/23/14 15:07:49	21690	14.11	3.04	0.43	4.76	13.34	99.50	250.00
	06/23/14 15:08:19	21720	14.25	3.27	0.43	4.68	13.45	99.60	250.00
	06/23/14 15:08:49	21750	14.43	3.34	0.45	4.58	13.45	99.60	250.00
	06/23/14 15:09:19	21780	14.66	3.02	0.46	4.42	13.98	99.70	261.00
	06/23/14 15:09:49	21810	14.45	3.40	0.39	4.53	13.98	99.70	261.00
	06/23/14 15:10:19	21840	14.34	3.84	0.42	4.63	13.29	99.80	250.00
	06/23/14 15:10:49	21870	14.47	3.40	0.39	4.53	13.29	99.80	250.00
	06/23/14 15:11:19	21900	14.35	2.94	0.39	4.60	7.94	100.00	182.00
	06/23/14 15:11:49	21930	15.01	3.37	0.61	4.28	7.94	100.00	182.00
	06/23/14 15:12:19	21960	16.13	4.82	0.80	3.41	4.59	100.00	138.00
	06/23/14 15:12:49	21990	16.70	3.74	0.96	2.88	4.59	100.00	138.00
	06/23/14 15:13:19	22020	16.91	3.24	1.03	2.78	3.38	100.10	117.00
	06/23/14 15:13:49	22050	17.06	3.19	1.00	2.64	3.38	100.10	117.00
	06/23/14 15:14:19	22080	16.93	3.07	0.99	2.72	3.76	100.10	106.00
	06/23/14 15:14:49	22110	17.06	3.17	1.03	2.66	3.76	100.10	106.00
	06/23/14 15:15:19	22140	17.12	3.14	1.02	2.60	3.21	100.20	106.00
	06/23/14 15:15:49	22170	17.07	3.17	0.97	2.63	3.21	100.20	106.00
	06/23/14 15:16:19	22200	17.07	3.17	0.99	2.64	6.12	100.20	149.00
	06/23/14 15:16:49	22230	16.78	3.17	0.87	2.75	6.12	100.20	149.00
	06/23/14 15:17:19	22260	15.20	3.07	0.52	3.88	12.48	100.30	239.00
	06/23/14 15:17:49	22290	15.04	3.54	0.50	4.03	12.48	100.30	239.00
A2	06/23/14 15:18:19	22320	14.25	2.94	0.45	4.67	14.34	100.50	250.00
	06/23/14 15:18:49	22350	14.40	2.38	0.43	4.56	14.34	100.50	250.00
	06/23/14 15:19:19	22380	14.31	2.70	0.43	4.64	14.84	100.60	261.00
	06/23/14 15:19:49	22410	14.25	2.80	0.43	4.66	14.84	100.60	261.00
	06/23/14 15:20:19	22440	14.18	2.47	0.45	4.75	14.28	100.80	250.00
	06/23/14 15:20:49	22470	14.41	2.69	0.46	4.57	14.28	100.80	250.00
	06/23/14 15:21:19	22500	14.30	2.83	0.44	4.63	14.78	100.90	261.00
	06/23/14 15:21:49	22530	13.94	2.81	0.41	4.83	14.78	100.90	261.00
	06/23/14 15:22:19	22560	14.14	2.60	0.43	4.83	14.48	101.10	250.00
	06/23/14 15:22:49	22590	14.01	2.90	0.42	4.80	14.48	101.10	250.00
	06/23/14 15:23:19	22620	13.90	2.80	0.43	4.94	14.59	101.20	250.00
	06/23/14 15:23:49	22650	13.98	2.72	0.40	4.91	14.59	101.20	250.00
	06/23/14 15:24:19	22680	13.99	2.61	0.40	4.87	14.84	101.30	250.00
	06/23/14 15:24:49	22710	14.19	3.12	0.44	4.74	14.84	101.30	250.00

CIMARRON ENERGY, INC.

June 23, 2014

24 ECD

Norman Facility

Unit Data

Meas. Stack Moisture	6.5	%
Stack Exhaust Flow (M2)	27,012	SCFH

Weather Data

Barometric Pressure	29.95	in. Hg
Relative Humidity	59	%
Ambient Temperature	83	°F
Specific Humidity	0.014273	lb H ₂ O / lb air

30-70-30 Load, Run - 24 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
	06/23/14 15:25:19	22740	13.99	3.01	0.43	4.92	14.01	101.50	260.00
	06/23/14 15:25:49	22770	14.20	3.14	0.42	4.67	14.01	101.50	260.00
	06/23/14 15:26:19	22800	14.21	4.16	0.43	4.77	14.92	101.60	261.00
	06/23/14 15:26:49	22830	15.02	3.59	0.42	4.85	14.92	101.60	261.00
	06/23/14 15:27:19	22860	15.15	2.65	0.41	4.89	14.50	101.80	250.00
	06/23/14 15:27:49	22890	14.77	2.36	0.40	4.74	14.50	101.80	250.00
	06/23/14 15:28:19	22920	14.04	2.47	0.38	4.80	14.73	102.00	250.00
	06/23/14 15:28:49	22950	14.21	3.10	0.42	4.74	14.73	102.00	250.00
	06/23/14 15:29:19	22980	14.13	3.19	0.41	4.79	9.36	102.30	194.00
	06/23/14 15:29:49	23010	14.82	3.94	0.55	4.41	9.36	102.30	194.00
	06/23/14 15:30:19	23040	16.75	4.18	1.02	3.02	3.74	102.40	116.00
	06/23/14 15:30:49	23070	17.28	3.62	0.99	2.51	3.74	102.40	116.00
	06/23/14 15:31:19	23100	17.31	3.32	1.18	2.48	2.77	102.60	105.00
	06/23/14 15:31:49	23130	17.31	3.54	1.04	2.45	2.77	102.60	105.00
	06/23/14 15:32:19	23160	17.47	3.49	1.08	2.37	2.99	102.70	116.00
	06/23/14 15:32:49	23190	17.37	3.34	1.04	2.40	2.99	102.70	116.00
	06/23/14 15:33:19	23220	17.40	3.23	1.04	2.42	7.11	102.90	160.00
	06/23/14 15:33:49	23250	16.21	3.28	0.68	3.06	7.11	102.90	160.00
	06/23/14 15:34:19	23280	15.18	3.51	0.51	3.91	11.07	103.20	204.00
	06/23/14 15:34:49	23310	14.91	3.31	0.52	4.19	11.07	103.20	204.00
	06/23/14 15:35:19	23340	14.68	3.12	0.47	4.35	12.62	103.40	237.00
	06/23/14 15:35:49	23370	14.76	3.27	0.46	4.35	12.62	103.40	237.00
	06/23/14 15:36:19	23400	14.50	3.16	0.44	4.44	12.84	103.60	226.00
	06/23/14 15:36:49	23430	14.18	3.50	0.45	4.75	12.84	103.60	226.00
	06/23/14 15:37:19	23460	14.53	4.61	0.45	4.50	12.54	103.80	237.00
	06/23/14 15:37:49	23490	14.63	3.74	0.43	4.40	12.54	103.80	237.00
	06/23/14 15:38:19	23520	14.69	3.12	0.44	4.36	12.51	103.80	237.00
	06/23/14 15:38:49	23550	14.74	3.01	0.45	4.37	12.51	103.80	237.00
	06/23/14 15:39:19	23580	14.55	3.76	0.43	4.44	12.79	103.70	226.00
	06/23/14 15:39:49	23610	14.40	4.75	0.41	4.54	12.79	103.70	226.00
	06/23/14 15:40:19	23640	14.48	4.48	0.45	4.56	11.99	103.70	237.00
	06/23/14 15:40:49	23670	14.27	3.86	0.41	4.66	11.99	103.70	237.00
A3	06/23/14 15:41:19	23700	14.58	3.54	0.44	4.45	12.93	103.50	237.00
	06/23/14 15:41:49	23730	14.43	3.92	0.45	4.56	12.93	103.50	237.00
	06/23/14 15:42:19	23760	14.75	3.83	0.50	4.32	12.54	103.30	226.00
	06/23/14 15:42:49	23790	14.64	4.35	0.46	4.42	12.54	103.30	226.00
	06/23/14 15:43:19	23820	14.49	3.82	0.44	4.48	12.57	103.00	248.00
	06/23/14 15:43:49	23850	14.54	3.98	0.47	4.52	12.57	103.00	248.00
	06/23/14 15:44:19	23880	14.79	4.47	0.48	4.30	12.59	102.70	237.00
	06/23/14 15:44:49	23910	14.48	4.00	0.43	4.51	12.59	102.70	237.00
	06/23/14 15:45:19	23940	14.58	4.06	0.48	4.45	11.96	102.50	226.00
	06/23/14 15:45:49	23970	14.73	3.91	0.48	4.35	11.96	102.50	226.00
	06/23/14 15:46:19	24000	14.75	4.09	0.46	4.32	9.60	102.30	204.00
	06/23/14 15:46:49	24030	14.96	3.63	0.58	4.28	9.60	102.30	204.00
	06/23/14 15:47:19	24060	15.86	4.06	0.71	3.53	4.57	102.10	138.00
	06/23/14 15:47:49	24090	16.58	3.57	0.92	3.06	4.57	102.10	138.00
	06/23/14 15:48:19	24120	16.80	3.01	0.92	2.79	4.04	102.10	127.00
	06/23/14 15:48:49	24150	16.67	2.94	0.90	2.90	4.04	102.10	127.00
	06/23/14 15:49:19	24180	16.84	3.00	0.97	2.83	3.40	102.00	116.00
	06/23/14 15:49:49	24210	16.92	2.97	0.98	2.73	3.40	102.00	116.00
	06/23/14 15:50:19	24240	17.02	2.99	1.02	2.71	3.79	102.10	116.00
	06/23/14 15:50:49	24270	17.05	2.87	0.95	2.62	3.79	102.10	116.00
	06/23/14 15:51:19	24300	16.13	2.96	0.66	3.15	11.54	102.20	226.00
	06/23/14 15:51:49	24330	15.31	3.67	0.53	3.81	11.54	102.20	226.00
	06/23/14 15:52:19	24360	14.32	3.39	0.43	4.61	14.17	102.30	260.00
	06/23/14 15:52:49	24390	14.35	2.82	0.43	4.60	14.17	102.30	260.00
	06/23/14 15:53:19	24420	14.46	2.56	0.46	4.53	13.51	102.40	260.00
	06/23/14 15:53:49	24450	14.44	2.56	0.45	4.55	13.51	102.40	260.00
	06/23/14 15:54:19	24480	14.39	2.90	0.44	4.58	14.01	102.40	249.00
	06/23/14 15:54:49	24510	14.37	2.85	0.44	4.61	14.01	102.40	249.00

Norman Facility

Meas. Stack Moisture	6.5	%
Stack Exhaust Flow (M2)	27,012	SCFH

Barometric Pressure	29.95	in. Hg
Relative Humidity	59	%
Ambient Temperature	83	° F
Specific Humidity	0.014273	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
06/23/14 15:55:19	24540	14.48	2.94	0.47	4.53	13.73	102.40	249.00
06/23/14 15:55:49	24570	14.27	3.31	0.45	4.65	13.73	102.40	249.00
06/23/14 15:56:19	24600	14.21	3.56	0.44	4.70	13.95	102.50	249.00
06/23/14 15:56:49	24630	14.46	2.95	0.45	4.59	13.95	102.50	249.00
06/23/14 15:57:19	24660	14.58	3.13	0.44	4.42	13.40	102.60	249.00
06/23/14 15:57:49	24690	14.47	2.89	0.46	4.53	13.40	102.60	249.00
06/23/14 15:58:19	24720	14.38	2.58	0.46	4.57	14.03	102.80	249.00
06/23/14 15:58:49	24750	14.49	2.99	0.45	4.52	14.03	102.80	249.00
06/23/14 15:59:19	24780	14.48	2.70	0.45	4.52	13.45	102.80	249.00
06/23/14 15:59:49	24810	14.40	2.42	0.42	4.58	13.45	102.80	249.00
06/23/14 16:00:19	24840	14.59	2.54	0.44	4.43	13.98	102.80	249.00
06/23/14 16:00:49	24870	14.44	2.91	0.44	4.53	13.98	102.80	249.00
06/23/14 16:01:19	24900	14.13	2.81	0.43	4.75	10.60	102.80	226.00
06/23/14 16:01:49	24930	14.43	2.58	0.43	4.59	10.60	102.80	226.00
06/23/14 16:02:19	24960	14.50	2.79	0.45	4.48	3.13	102.70	116.00
06/23/14 16:02:49	24990	15.06	2.76	0.56	4.23	3.13	102.70	116.00
06/23/14 16:03:19	25020	15.80	3.64	0.75	3.61	4.29	102.80	137.00
06/23/14 16:03:49	25050	16.72	3.53	0.97	2.93	4.29	102.80	137.00
06/23/14 16:04:19	25080	16.75	3.03	0.86	2.82	3.35	102.70	127.00
06/23/14 16:04:49	25110	16.71	2.90	0.96	2.87	3.35	102.70	127.00
06/23/14 16:05:19	25140	16.74	2.90	0.97	2.85	3.07	102.80	105.00

204.89

	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	
	(in. H ₂ O)	(°F)	(SCFH)				
Initial Zero	0.03	0.05	0.04	0.04	0	0	0
Final Zero	0.04	-0.11	0.05	0.03			
Avg. Zero	0.04	-0.03	0.05	0.04			
Initial UpScale	11.99	10.79	3.19	9.32			
Final UpScale	11.98	10.87	3.15	9.31			
Avg. UpScale	11.99	10.83	3.17	9.32			

9.33

EMISSIONS DATA	O ₂	CO	THC	CO ₂
Corrected Raw Average (ppm/% dry basis)	15.54	3.52	0.56	4.00
Corrected Raw Average (ppm/% wet basis)	14.53	3.29	0.52	3.73
Emission Rate (lb/hr)	N/A	0.01	0.00	N/A

CIMARRON ENERGY, INC.

June 23, 2014

24 ECD

Norman Facility

Unit Data

Meas. Stack Moisture	4.4	%
Stack Exhaust Flow (M2)	27,255	SCFH

Weather Data

Barometric Pressure	29.94	in. Hg
Relative Humidity	54	%
Ambient Temperature	82	°F
Specific Humidity	0.012619	lb H ₂ O / lb air

30-70-30 Load, Run - 24 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	06/23/14 16:20:19	26040	17.11	3.21	1.07	2.60	3.49	101.90	106.00
	06/23/14 16:20:49	26070	16.99	3.13	0.99	2.66	3.49	101.90	106.00
	06/23/14 16:21:19	26100	16.99	3.08	0.96	2.69	3.10	101.80	116.00
	06/23/14 16:21:49	26130	17.05	3.13	1.00	2.65	3.10	101.80	116.00
	06/23/14 16:22:19	26160	17.10	3.17	1.04	2.60	3.21	101.80	116.00
	06/23/14 16:22:49	26190	17.15	3.22	1.05	2.57	3.21	101.80	116.00
	06/23/14 16:23:19	26220	17.08	3.11	1.04	2.62	3.35	101.80	127.00
	06/23/14 16:23:49	26250	17.04	3.11	1.02	2.65	3.35	101.80	127.00
	06/23/14 16:24:19	26280	17.06	3.11	1.05	2.64	2.96	101.80	127.00
	06/23/14 16:24:49	26310	17.12	3.21	1.08	2.61	2.96	101.80	127.00
	06/23/14 16:25:19	26340	17.09	3.19	1.03	2.58	7.36	101.90	181.00
	06/23/14 16:25:49	26370	15.64	3.41	0.61	3.45	7.36	101.90	181.00
	06/23/14 16:26:19	26400	15.19	3.87	0.54	3.99	14.03	101.80	239.00
	06/23/14 16:26:49	26430	14.21	2.87	0.45	4.65	14.03	101.80	239.00
	06/23/14 16:27:19	26460	14.31	2.47	0.45	4.61	13.23	101.60	238.00
	06/23/14 16:27:49	26490	14.49	2.51	0.44	4.55	13.23	101.60	238.00
	06/23/14 16:28:19	26520	14.48	2.72	0.45	4.50	13.92	101.50	249.00
	06/23/14 16:28:49	26550	14.24	2.37	0.41	4.66	13.92	101.50	249.00
	06/23/14 16:29:19	26580	14.27	2.35	0.42	4.69	13.12	101.30	249.00
	06/23/14 16:29:49	26610	14.51	2.09	0.43	4.50	13.12	101.30	249.00
	06/23/14 16:30:19	26640	14.50	1.98	0.45	4.50	13.67	101.10	260.00
	06/23/14 16:30:49	26670	14.38	2.04	0.42	4.59	13.67	101.10	260.00
	06/23/14 16:31:19	26700	14.58	2.06	0.42	4.48	13.42	101.00	249.00
	06/23/14 16:31:49	26730	14.53	2.38	0.44	4.47	13.42	101.00	249.00
	06/23/14 16:32:19	26760	14.50	2.09	0.42	4.50	13.56	100.80	260.00
	06/23/14 16:32:49	26790	14.53	2.33	0.43	4.50	13.56	100.80	260.00
	06/23/14 16:33:19	26820	14.49	2.44	0.43	4.50	13.73	100.70	261.00
	06/23/14 16:33:49	26850	14.49	2.33	0.39	4.50	13.73	100.70	261.00
	06/23/14 16:34:19	26880	14.42	1.94	0.38	4.56	12.93	100.60	228.00
	06/23/14 16:34:49	26910	14.56	1.96	0.39	4.46	12.93	100.60	228.00
	06/23/14 16:35:19	26940	14.61	2.10	0.38	4.40	13.90	100.50	261.00
	06/23/14 16:35:49	26970	14.43	2.20	0.41	4.55	13.90	100.50	261.00
	06/23/14 16:36:19	27000	14.53	2.55	0.41	4.47	11.24	100.40	216.00
	06/23/14 16:36:49	27030	14.85	2.27	0.43	4.35	11.24	100.40	216.00
	06/23/14 16:37:19	27060	15.33	2.74	0.46	3.86	5.90	100.30	150.00
	06/23/14 16:37:49	27090	15.75	3.39	0.70	3.68	5.90	100.30	150.00
	06/23/14 16:38:19	27120	16.98	3.67	0.92	2.80	3.24	100.30	127.00
	06/23/14 16:38:49	27150	17.16	3.16	0.92	2.53	3.24	100.30	127.00
	06/23/14 16:39:19	27180	16.98	3.02	0.95	2.68	3.93	100.30	127.00
	06/23/14 16:39:49	27210	16.86	3.05	0.90	2.76	3.93	100.30	127.00
	06/23/14 16:40:19	27240	16.88	3.08	0.93	2.78	3.40	100.30	127.00
	06/23/14 16:40:49	27270	16.99	3.13	0.94	2.69	3.40	100.30	127.00
	06/23/14 16:41:19	27300	16.97	3.06	0.88	2.68	7.56	100.30	182.00
	06/23/14 16:41:49	27330	15.65	3.20	0.49	3.48	7.56	100.30	182.00
	06/23/14 16:42:19	27360	14.95	3.75	0.40	4.08	14.26	100.30	250.00
A2	06/23/14 16:42:49	27390	14.23	3.15	0.36	4.69	14.26	100.30	250.00
	06/23/14 16:43:19	27420	14.12	2.68	0.33	4.73	14.12	100.20	239.00
	06/23/14 16:43:49	27450	13.95	2.68	0.35	4.90	14.12	100.20	239.00
	06/23/14 16:44:19	27480	14.09	2.90	0.35	4.81	14.26	100.20	261.00
	06/23/14 16:44:49	27510	14.41	4.31	0.35	4.61	14.26	100.20	261.00
	06/23/14 16:45:19	27540	14.36	3.62	0.34	4.61	13.48	100.10	261.00
	06/23/14 16:45:49	27570	14.39	2.51	0.35	4.58	13.48	100.10	261.00
	06/23/14 16:46:19	27600	14.63	2.99	0.35	4.41	14.56	100.00	251.00
	06/23/14 16:46:49	27630	14.47	3.09	0.31	4.50	14.56	100.00	251.00
	06/23/14 16:47:19	27660	14.52	2.84	0.35	4.53	13.37	99.90	250.00
	06/23/14 16:47:49	27690	14.53	2.67	0.34	4.44	13.37	99.90	250.00
	06/23/14 16:48:19	27720	14.39	2.37	0.32	4.58	14.06	99.90	261.00
	06/23/14 16:48:49	27750	14.22	2.35	0.36	4.67	14.06	99.90	261.00
	06/23/14 16:49:19	27780	14.49	2.21	0.37	4.55	13.95	99.70	250.00
	06/23/14 16:49:49	27810	14.53	2.78	0.35	4.47	13.95	99.70	250.00

CIMARRON ENERGY, INC.

June 23, 2014

24 ECD

Norman Facility

Unit Data

Meas. Stack Moisture	4.4	%
Stack Exhaust Flow (M2)	27,255	SCFH

Weather Data

Barometric Pressure	29.94	in. Hg
Relative Humidity	54	%
Ambient Temperature	82	°F
Specific Humidity	0.012619	lb H ₂ O / lb air

30-70-30 Load, Run - 24 ECD R5

	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
	06/23/14 16:50:19	27840	14.34	3.07	0.35	4.63	13.84	99.60	250.00
	06/23/14 16:50:49	27870	14.52	2.73	0.35	4.51	13.84	99.60	250.00
	06/23/14 16:51:19	27900	14.51	2.94	0.36	4.52	14.12	99.50	250.00
	06/23/14 16:51:49	27930	14.44	2.83	0.32	4.53	14.12	99.50	250.00
	06/23/14 16:52:19	27960	14.45	2.96	0.32	4.59	13.31	99.40	228.00
	06/23/14 16:52:49	27990	14.51	2.92	0.32	4.49	13.31	99.40	228.00
	06/23/14 16:53:19	28020	14.51	2.48	0.32	4.50	14.26	99.40	251.00
	06/23/14 16:53:49	28050	14.41	2.32	0.31	4.58	14.26	99.40	251.00
	06/23/14 16:54:19	28080	14.57	2.49	0.32	4.49	10.13	99.40	216.00
	06/23/14 16:54:49	28110	15.26	2.76	0.43	4.07	10.13	99.40	216.00
	06/23/14 16:55:19	28140	15.70	3.52	0.49	3.65	3.71	99.40	117.00
	06/23/14 16:55:49	28170	16.76	3.51	0.82	2.94	3.71	99.40	117.00
	06/23/14 16:56:19	28200	17.00	3.17	0.85	2.70	4.51	99.50	128.00
	06/23/14 16:56:49	28230	16.57	3.13	0.78	2.98	4.51	99.50	128.00
	06/23/14 16:57:19	28260	16.68	3.23	0.83	2.92	3.71	99.60	138.00
	06/23/14 16:57:49	28290	16.81	3.20	0.85	2.86	3.71	99.60	138.00
	06/23/14 16:58:19	28320	17.00	3.16	0.77	2.64	7.83	99.70	193.00
	06/23/14 16:58:49	28350	15.60	3.31	0.46	3.54	7.83	99.70	193.00
	06/23/14 16:59:19	28380	14.88	3.82	0.33	4.14	13.59	99.80	239.00
	06/23/14 16:59:49	28410	14.24	3.10	0.30	4.69	13.59	99.80	239.00
	06/23/14 17:00:19	28440	14.51	3.21	0.32	4.49	13.31	99.80	250.00
	06/23/14 17:00:49	28470	14.54	3.35	0.38	4.49	13.31	99.80	250.00
	06/23/14 17:01:19	28500	14.32	4.01	0.34	4.62	13.45	99.80	239.00
	06/23/14 17:01:49	28530	14.44	3.30	0.35	4.60	13.45	99.80	239.00
	06/23/14 17:02:19	28560	14.57	3.37	0.33	4.46	13.98	99.70	239.00
	06/23/14 17:02:49	28590	14.50	3.28	0.36	4.49	13.98	99.70	239.00
	06/23/14 17:03:19	28620	14.38	2.87	0.34	4.61	12.90	99.70	250.00
	06/23/14 17:03:49	28650	14.56	3.06	0.32	4.51	12.90	99.70	250.00
	06/23/14 17:04:19	28680	14.66	3.48	0.31	4.38	13.73	99.60	239.00
	06/23/14 17:04:49	28710	14.43	3.04	0.33	4.53	13.73	99.60	239.00
	06/23/14 17:05:19	28740	14.52	3.33	0.33	4.50	13.59	99.60	250.00
A3	06/23/14 17:05:49	28770	14.31	3.76	0.33	4.64	13.59	99.60	250.00
	06/23/14 17:06:19	28800	14.31	3.36	0.32	4.65	13.45	99.50	239.00
	06/23/14 17:06:49	28830	14.47	3.72	0.35	4.57	13.45	99.50	239.00
	06/23/14 17:07:19	28860	14.45	4.23	0.36	4.53	13.73	99.50	261.00
	06/23/14 17:07:49	28890	14.27	3.92	0.32	4.66	13.73	99.50	261.00
	06/23/14 17:08:19	28920	14.17	3.87	0.32	4.76	13.09	99.40	250.00
	06/23/14 17:08:49	28950	14.38	4.72	0.36	4.61	13.09	99.40	250.00
	06/23/14 17:09:19	28980	14.28	4.09	0.34	4.65	13.51	99.30	239.00
	06/23/14 17:09:49	29010	14.25	4.25	0.31	4.72	13.51	99.30	239.00
	06/23/14 17:10:19	29040	14.53	3.32	0.31	4.51	13.54	99.20	239.00
	06/23/14 17:10:49	29070	14.62	4.18	0.34	4.43	13.54	99.20	239.00
	06/23/14 17:11:19	29100	14.47	4.66	0.33	4.54	8.61	99.10	183.00
	06/23/14 17:11:49	29130	15.16	4.52	0.46	4.13	8.61	99.10	183.00
	06/23/14 17:12:19	29160	15.78	4.47	0.66	3.67	3.43	99.10	127.00
	06/23/14 17:12:49	29190	16.58	3.76	0.76	2.99	3.43	99.10	127.00
	06/23/14 17:13:19	29220	16.67	3.47	0.79	2.95	3.74	99.10	128.00
	06/23/14 17:13:49	29250	16.75	3.31	0.84	2.86	3.74	99.10	128.00
	06/23/14 17:14:19	29280	16.92	3.31	0.86	2.77	3.35	99.10	106.00
	06/23/14 17:14:49	29310	16.99	3.20	0.86	2.70	3.35	99.10	106.00
	06/23/14 17:15:19	29340	17.00	3.18	0.86	2.70	3.49	99.10	117.00
	06/23/14 17:15:49	29370	16.90	3.27	0.87	2.75	3.49	99.10	117.00
	06/23/14 17:16:19	29400	16.76	3.18	0.81	2.85	7.92	99.10	183.00
	06/23/14 17:16:49	29430	15.60	3.40	0.45	3.52	7.92	99.10	183.00
	06/23/14 17:17:19	29460	15.03	3.84	0.37	4.07	13.15	99.00	239.00
	06/23/14 17:17:49	29490	14.72	3.27	0.33	4.39	13.15	99.00	239.00
	06/23/14 17:18:19	29520	14.56	3.02	0.33	4.46	12.90	98.90	250.00
	06/23/14 17:18:49	29550	14.58	2.82	0.28	4.42	12.90	98.90	250.00
	06/23/14 17:19:19	29580	14.37	2.56	0.28	4.63	13.45	98.80	229.00
	06/23/14 17:19:49	29610	14.52	2.38	0.32	4.54	13.45	98.80	229.00

Norman Facility

Meas. Stack Moisture	4.4	%
Stack Exhaust Flow (M2)	27,255	SCFH

Barometric Pressure	29.94	in. Hg
Relative Humidity	54	%
Ambient Temperature	82	°F
Specific Humidity	0.012619	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
06/23/14 17:20:19	29640	14.59	2.49	0.30	4.44	13.31	98.70	250.00
06/23/14 17:20:49	29670	14.46	2.89	0.31	4.54	13.31	98.70	250.00
06/23/14 17:21:19	29700	14.40	2.81	0.33	4.61	13.45	98.50	251.00
06/23/14 17:21:49	29730	14.55	2.76	0.32	4.49	13.45	98.50	251.00
06/23/14 17:22:19	29760	14.53	2.87	0.31	4.52	13.20	98.30	240.00
06/23/14 17:22:49	29790	14.34	2.61	0.32	4.60	13.20	98.30	240.00
06/23/14 17:23:19	29820	14.41	2.61	0.30	4.64	13.48	98.20	251.00
06/23/14 17:23:49	29850	14.60	2.63	0.30	4.45	13.48	98.20	251.00
06/23/14 17:24:19	29880	14.45	2.76	0.29	4.53	13.51	98.00	229.00
06/23/14 17:24:49	29910	14.46	2.78	0.32	4.59	13.51	98.00	229.00
06/23/14 17:25:19	29940	14.67	2.75	0.32	4.39	12.84	97.80	250.00
06/23/14 17:25:49	29970	14.44	2.46	0.30	4.53	12.84	97.80	250.00
06/23/14 17:26:19	30000	14.27	2.26	0.31	4.71	8.61	97.70	194.00
06/23/14 17:26:49	30030	14.56	2.51	0.32	4.49	8.61	97.70	194.00
06/23/14 17:27:19	30060	14.47	2.67	0.33	4.57	3.16	97.60	117.00
06/23/14 17:27:49	30090	15.36	3.12	0.41	3.96	3.16	97.60	117.00
06/23/14 17:28:19	30120	15.92	3.86	0.64	3.59	3.85	97.50	128.00
06/23/14 17:28:49	30150	16.93	3.50	0.80	2.79	3.85	97.50	128.00
06/23/14 17:29:19	30180	16.86	3.13	0.82	2.80	3.21	97.40	117.00
06/23/14 17:29:49	30210	16.77	3.29	0.79	2.85	3.21	97.40	117.00
06/23/14 17:30:19	30240	16.67	3.28	0.81	2.95	3.35	97.40	128.00

206.77

	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	0.04	-0.11	0.05	0.03			
Final Zero	0.02	-0.02	0.03	0.07			
Avg. Zero	0.03	-0.07	0.04	0.05			
Initial UpScale	11.98	10.87	3.15	9.31			
Final UpScale	12.00	11.18	3.00	9.34			
Avg. UpScale	11.99	11.03	3.08	9.33			

9.33

EMISSIONS DATA	O ₂	CO	THC	CO ₂
Corrected Raw Average (ppm/% dry basis)	15.53	3.09	0.00	3.98
Corrected Raw Average (ppm/% wet basis)	14.84	2.96	0.00	3.80
Emission Rate (lb/hr)	N/A	0.01	0.00	N/A

CIMARRON ENERGY, INC.

June 23, 2014

24 ECD

Norman Facility

Unit Data

Meas. Stack Moisture	4.6	%
Stack Exhaust Flow (M2)	26,993	SCFH

Weather Data

Barometric Pressure	29.94	in. Hg
Relative Humidity	57	%
Ambient Temperature	81	°F
Specific Humidity	0.012900	lb H ₂ O / lb air

30-70-30 Load, Run - 24 ECD R6

	Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmvd)	THC (ppmvw)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
A1	06/23/14 17:51:19	31500	16.91	3.47	0.65	2.76	3.60	94.30	118.00
	06/23/14 17:51:49	31530	16.73	3.34	0.57	2.82	3.60	94.30	118.00
	06/23/14 17:52:19	31560	16.73	3.58	0.64	2.89	3.35	94.10	107.00
	06/23/14 17:52:49	31590	16.83	3.59	0.67	2.83	3.35	94.10	107.00
	06/23/14 17:53:19	31620	16.88	3.60	0.68	2.80	3.52	94.00	102.00
	06/23/14 17:53:49	31650	16.88	3.47	0.62	2.77	3.52	94.00	102.00
	06/23/14 17:54:19	31680	16.74	3.55	0.68	2.86	3.68	93.90	129.00
	06/23/14 17:54:49	31710	16.77	3.83	0.66	2.88	3.68	93.90	129.00
	06/23/14 17:55:19	31740	16.82	3.69	0.66	2.84	3.46	93.70	107.00
	06/23/14 17:55:49	31770	16.92	3.68	0.87	2.77	3.46	93.70	107.00
	06/23/14 17:56:19	31800	16.90	3.63	0.79	2.77	6.81	93.60	173.00
	06/23/14 17:56:49	31830	16.03	3.61	0.41	3.20	6.81	93.60	173.00
	06/23/14 17:57:19	31860	15.04	4.66	0.32	4.07	13.20	93.40	253.00
	06/23/14 17:57:49	31890	14.60	6.76	0.21	4.43	13.20	93.40	253.00
	06/23/14 17:58:19	31920	14.35	6.09	0.17	4.63	13.62	93.20	242.00
	06/23/14 17:58:49	31950	14.34	3.84	0.16	4.65	13.62	93.20	242.00
	06/23/14 17:59:19	31980	14.38	3.57	0.16	4.61	14.03	92.90	242.00
	06/23/14 17:59:49	32010	14.23	4.04	0.14	4.70	14.03	92.90	242.00
	06/23/14 18:00:19	32040	14.23	4.95	0.12	4.74	13.81	92.70	242.00
	06/23/14 18:00:49	32070	14.42	3.89	0.14	4.59	13.81	92.70	242.00
	06/23/14 18:01:19	32100	14.27	3.81	0.12	4.66	13.84	92.50	253.00
	06/23/14 18:01:49	32130	14.16	3.41	0.12	4.76	13.84	92.50	253.00
	06/23/14 18:02:19	32160	14.32	3.57	0.12	4.68	14.01	92.30	265.00
	06/23/14 18:02:49	32190	14.35	4.41	0.13	4.63	14.01	92.30	265.00
	06/23/14 18:03:19	32220	14.21	4.52	0.11	4.72	13.62	92.10	242.00
	06/23/14 18:03:49	32250	14.35	3.65	0.12	4.66	13.62	92.10	242.00
	06/23/14 18:04:19	32280	14.36	3.48	0.14	4.60	14.06	92.00	265.00
	06/23/14 18:04:49	32310	14.26	3.63	0.11	4.71	14.06	92.00	265.00
	06/23/14 18:05:19	32340	14.36	3.40	0.13	4.65	13.67	91.80	243.00
	06/23/14 18:05:49	32370	14.38	3.39	0.17	4.62	13.67	91.80	243.00
	06/23/14 18:06:19	32400	14.34	4.03	0.15	4.63	13.59	91.60	254.00
	06/23/14 18:06:49	32430	14.42	4.37	0.14	4.61	13.59	91.60	254.00
	06/23/14 18:07:19	32460	14.54	3.97	0.14	4.51	11.35	91.40	231.00
	06/23/14 18:07:49	32490	14.58	4.00	0.21	4.51	11.35	91.40	231.00
	06/23/14 18:08:19	32520	15.45	4.44	0.35	3.91	5.54	91.30	152.00
	06/23/14 18:08:49	32550	15.94	4.67	0.47	3.54	5.54	91.30	152.00
	06/23/14 18:09:19	32580	16.67	3.90	0.70	3.00	3.71	91.30	129.00
	06/23/14 18:09:49	32610	16.75	3.57	0.68	2.87	3.71	91.30	129.00
	06/23/14 18:10:19	32640	16.70	3.51	0.68	2.91	4.12	91.30	129.00
	06/23/14 18:10:49	32670	16.67	3.48	0.63	2.94	4.12	91.30	129.00
	06/23/14 18:11:19	32700	16.78	3.35	0.64	2.86	3.90	91.20	129.00
	06/23/14 18:11:49	32730	16.83	3.30	0.68	2.84	3.90	91.20	129.00
	06/23/14 18:12:19	32760	16.87	3.33	0.68	2.81	7.64	91.20	163.00
	06/23/14 18:12:49	32790	15.87	3.36	0.32	3.33	7.64	91.20	163.00
	06/23/14 18:13:19	32820	15.08	3.69	0.18	4.10	13.51	91.10	243.00
	06/23/14 18:13:49	32850	14.45	2.97	0.12	4.52	13.51	91.10	243.00
A2	06/23/14 18:14:19	32880	14.41	2.47	0.13	4.58	13.65	91.00	254.00
	06/23/14 18:14:49	32910	14.29	2.11	0.13	4.67	13.65	91.00	254.00
	06/23/14 18:15:19	32940	14.28	2.09	0.12	4.68	14.34	91.00	265.00
	06/23/14 18:15:49	32970	14.16	2.16	0.13	4.77	14.34	91.00	265.00
	06/23/14 18:16:19	33000	14.19	1.99	0.21	4.76	13.67	90.90	265.00
	06/23/14 18:16:49	33030	14.18	2.35	0.29	4.77	13.67	90.90	265.00
	06/23/14 18:17:19	33060	14.30	2.18	0.30	4.68	14.23	90.90	243.00
	06/23/14 18:17:49	33090	14.26	1.92	0.29	4.71	14.23	90.90	243.00
	06/23/14 18:18:19	33120	14.34	2.09	0.28	4.66	14.12	90.80	254.00
	06/23/14 18:18:49	33150	14.40	2.56	0.24	4.62	14.12	90.80	254.00
	06/23/14 18:19:19	33180	14.25	2.39	0.27	4.71	14.01	90.80	243.00
	06/23/14 18:19:49	33210	14.39	2.17	0.29	4.66	14.01	90.80	243.00
	06/23/14 18:20:19	33240	14.33	2.14	0.28	4.66	14.14	90.70	243.00
	06/23/14 18:20:49	33270	14.27	2.09	0.25	4.70	14.14	90.70	243.00

CIMARRON ENERGY, INC.

June 23, 2014

24 ECD

Norman Facility

Unit Data

Meas. Stack Moisture	4.6	%
Stack Exhaust Flow (M2)	26,993	SCFH

Weather Data

Barometric Pressure	29.94	in. Hg
Relative Humidity	57	%
Ambient Temperature	81	°F
Specific Humidity	0.012900	lb H ₂ O / lb air

30-70-30 Load, Run - 24 ECD R6

	Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmvd)	THC (ppmvw)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
	06/23/14 18:21:19	33300	14.21	2.13	0.26	4.78	13.51	90.60	243.00
	06/23/14 18:21:49	33330	14.37	2.49	0.28	4.64	13.51	90.60	243.00
	06/23/14 18:22:19	33360	14.33	2.83	0.27	4.65	14.03	90.40	254.00
	06/23/14 18:22:49	33390	14.26	2.09	0.29	4.72	14.03	90.40	254.00
	06/23/14 18:23:19	33420	14.39	2.18	0.29	4.64	14.20	90.30	266.00
	06/23/14 18:23:49	33450	14.37	2.19	0.24	4.62	14.20	90.30	266.00
	06/23/14 18:24:19	33480	14.23	1.93	0.24	4.71	13.81	90.30	243.00
	06/23/14 18:24:49	33510	14.42	1.91	0.25	4.62	13.81	90.30	243.00
	06/23/14 18:25:19	33540	14.39	2.07	0.25	4.62	10.66	90.20	220.00
	06/23/14 18:25:49	33570	14.93	2.22	0.36	4.34	10.66	90.20	220.00
	06/23/14 18:26:19	33600	15.65	3.42	0.54	3.77	4.43	90.10	141.00
	06/23/14 18:26:49	33630	16.56	3.96	0.82	3.06	4.43	90.10	141.00
	06/23/14 18:27:19	33660	16.90	3.57	0.88	2.81	3.90	90.00	119.00
	06/23/14 18:27:49	33690	16.76	3.43	0.86	2.86	3.90	90.00	119.00
	06/23/14 18:28:19	33720	16.62	3.56	0.85	2.97	3.54	90.00	130.00
	06/23/14 18:28:49	33750	16.90	3.63	0.93	2.81	3.54	90.00	130.00
	06/23/14 18:29:19	33780	17.04	3.45	0.88	2.71	7.94	90.00	175.00
	06/23/14 18:29:49	33810	15.75	3.55	0.48	3.41	7.94	90.00	175.00
	06/23/14 18:30:19	33840	15.23	4.25	0.38	3.94	13.54	89.80	243.00
	06/23/14 18:30:49	33870	14.57	4.01	0.30	4.47	13.54	89.80	243.00
	06/23/14 18:31:19	33900	14.47	3.85	0.27	4.51	14.86	89.70	266.00
	06/23/14 18:31:49	33930	14.27	3.40	0.29	4.71	14.86	89.70	266.00
	06/23/14 18:32:19	33960	14.27	3.52	0.29	4.73	14.09	89.60	244.00
	06/23/14 18:32:49	33990	14.37	3.33	0.27	4.63	14.09	89.60	244.00
	06/23/14 18:33:19	34020	14.33	3.49	0.27	4.64	14.50	89.40	266.00
	06/23/14 18:33:49	34050	14.17	3.26	0.27	4.76	14.50	89.40	266.00
	06/23/14 18:34:19	34080	14.30	3.22	0.29	4.68	14.26	89.40	255.00
	06/23/14 18:34:49	34110	14.23	4.29	0.24	4.73	14.26	89.40	255.00
	06/23/14 18:35:19	34140	14.20	3.81	0.21	4.74	14.26	89.30	244.00
	06/23/14 18:35:49	34170	14.27	3.25	0.26	4.72	14.26	89.30	244.00
	06/23/14 18:36:19	34200	14.34	3.49	0.26	4.64	14.39	89.30	266.00
	06/23/14 18:36:49	34230	14.17	3.45	0.22	4.74	14.39	89.30	266.00
A3	06/23/14 18:37:19	34260	14.22	2.88	0.23	4.76	13.73	89.40	255.00
	06/23/14 18:37:49	34290	14.30	3.20	0.26	4.68	13.73	89.40	255.00
	06/23/14 18:38:19	34320	14.31	3.45	0.24	4.65	14.53	89.40	255.00
	06/23/14 18:38:49	34350	14.30	3.29	0.23	4.69	14.53	89.40	255.00
	06/23/14 18:39:19	34380	14.39	3.24	0.22	4.62	14.28	89.40	244.00
	06/23/14 18:39:49	34410	14.42	3.34	0.23	4.61	14.28	89.40	244.00
	06/23/14 18:40:19	34440	14.34	3.44	0.21	4.66	14.03	89.30	255.00
	06/23/14 18:40:49	34470	14.41	3.24	0.23	4.63	14.03	89.30	255.00
	06/23/14 18:41:19	34500	14.45	3.26	0.22	4.59	14.70	89.30	255.00
	06/23/14 18:41:49	34530	14.24	3.31	0.22	4.73	14.70	89.30	255.00
	06/23/14 18:42:19	34560	14.38	3.27	0.23	4.66	11.51	89.30	242.00
	06/23/14 18:42:49	34590	14.53	3.37	0.22	4.53	11.51	89.30	242.00
	06/23/14 18:43:19	34620	15.49	3.78	0.42	3.93	5.43	89.30	152.00
	06/23/14 18:43:49	34650	16.13	4.41	0.66	3.35	5.43	89.30	152.00
	06/23/14 18:44:19	34680	16.70	3.98	0.78	2.99	3.82	89.30	130.00
	06/23/14 18:44:49	34710	16.69	3.55	0.78	2.93	3.82	89.30	130.00
	06/23/14 18:45:19	34740	16.97	3.45	0.85	2.75	3.82	89.30	108.00
	06/23/14 18:45:49	34770	16.96	3.39	0.80	2.74	3.82	89.30	108.00
	06/23/14 18:46:19	34800	16.89	3.37	0.83	2.79	3.71	89.30	130.00
	06/23/14 18:46:49	34830	16.92	3.32	0.88	2.77	3.71	89.30	130.00
	06/23/14 18:47:19	34860	16.92	3.40	0.91	2.78	3.43	89.40	119.00
	06/23/14 18:47:49	34890	17.01	3.50	0.88	2.72	3.43	89.40	119.00
	06/23/14 18:48:19	34920	16.61	3.46	0.65	2.87	9.66	89.40	208.00
	06/23/14 18:48:49	34950	15.43	3.85	0.39	3.82	9.66	89.40	208.00
	06/23/14 18:49:19	34980	14.96	3.89	0.29	4.09	14.45	89.40	244.00
	06/23/14 18:49:49	35010	14.34	3.01	0.25	4.62	14.45	89.40	244.00
	06/23/14 18:50:19	35040	14.37	2.76	0.24	4.64	14.03	89.30	244.00
	06/23/14 18:50:49	35070	14.42	2.83	0.22	4.60	14.03	89.30	244.00

CIMARRON ENERGY, INC.

June 23, 2014

24 ECD

Norman Facility

Unit Data

Meas. Stack Moisture	4.6	%
Stack Exhaust Flow (M2)	26,993	SCFH

Weather Data

Barometric Pressure	29.94	in. Hg
Relative Humidity	57	%
Ambient Temperature	81	°F
Specific Humidity	0.012900	lb H ₂ O / lb air

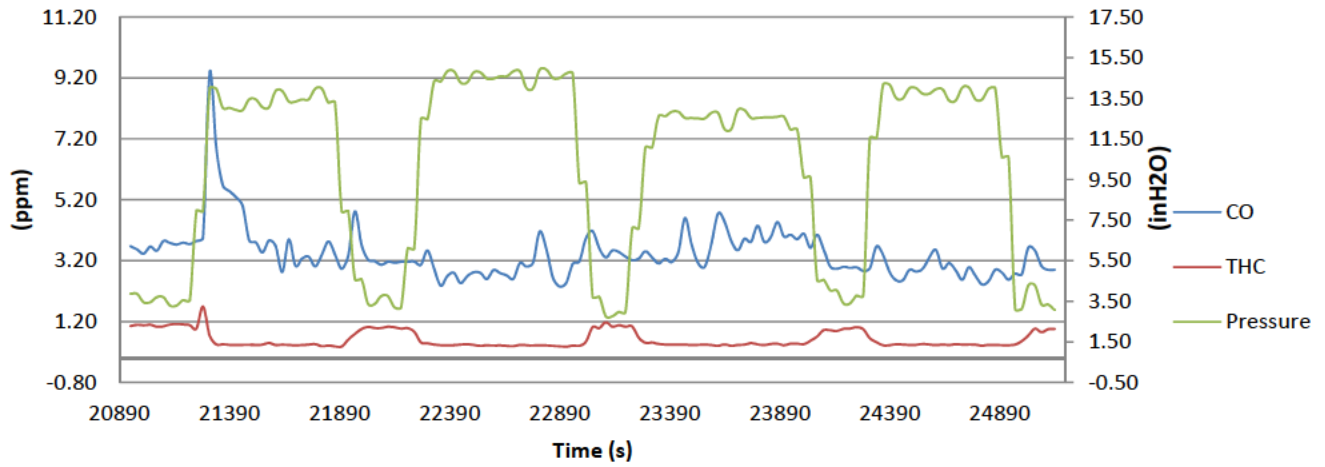
30-70-30 Load, Run - 24 ECD R6

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmvd)	THC (ppmvw)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
06/23/14 18:51:19	35100	14.41	2.90	0.22	4.58	14.45	89.30	244.00
06/23/14 18:51:49	35130	14.35	2.75	0.22	4.67	14.45	89.30	244.00
06/23/14 18:52:19	35160	14.50	2.84	0.25	4.55	14.20	89.20	266.00
06/23/14 18:52:49	35190	14.50	2.85	0.25	4.54	14.20	89.20	266.00
06/23/14 18:53:19	35220	14.38	2.70	0.19	4.61	14.34	89.10	255.00
06/23/14 18:53:49	35250	14.47	2.66	0.20	4.57	14.34	89.10	255.00
06/23/14 18:54:19	35280	14.49	2.73	0.20	4.55	13.81	89.00	244.00
06/23/14 18:54:49	35310	14.46	2.95	0.21	4.55	13.81	89.00	244.00
06/23/14 18:55:19	35340	14.40	2.79	0.20	4.63	14.48	88.90	255.00
06/23/14 18:55:49	35370	14.57	2.87	0.20	4.49	14.48	88.90	255.00
06/23/14 18:56:19	35400	14.54	3.19	0.20	4.49	14.37	88.90	244.00
06/23/14 18:56:49	35430	14.39	2.97	0.17	4.61	14.37	88.90	244.00
06/23/14 18:57:19	35460	14.56	2.95	0.18	4.51	9.99	88.80	198.00
06/23/14 18:57:49	35490	14.54	3.06	0.16	4.51	9.99	88.80	198.00
06/23/14 18:58:19	35520	14.36	2.95	0.17	4.62	3.49	88.80	130.00
06/23/14 18:58:49	35550	14.99	3.01	0.33	4.32	3.49	88.80	130.00
06/23/14 18:59:19	35580	15.92	3.98	0.48	3.48	3.13	88.90	108.00
06/23/14 18:59:49	35610	16.73	4.06	0.75	3.02	3.13	88.90	108.00
06/23/14 19:00:19	35640	16.94	3.50	0.78	2.75	3.52	89.00	119.00
06/23/14 19:00:49	35670	17.12	3.41	0.78	2.64	3.52	89.00	119.00
06/23/14 19:01:19	35700	17.03	3.34	0.80	2.70	3.79	89.10	130.00
RAW AVERAGE		15.13	3.33	0.37	4.07	10.56	90.59	208.85

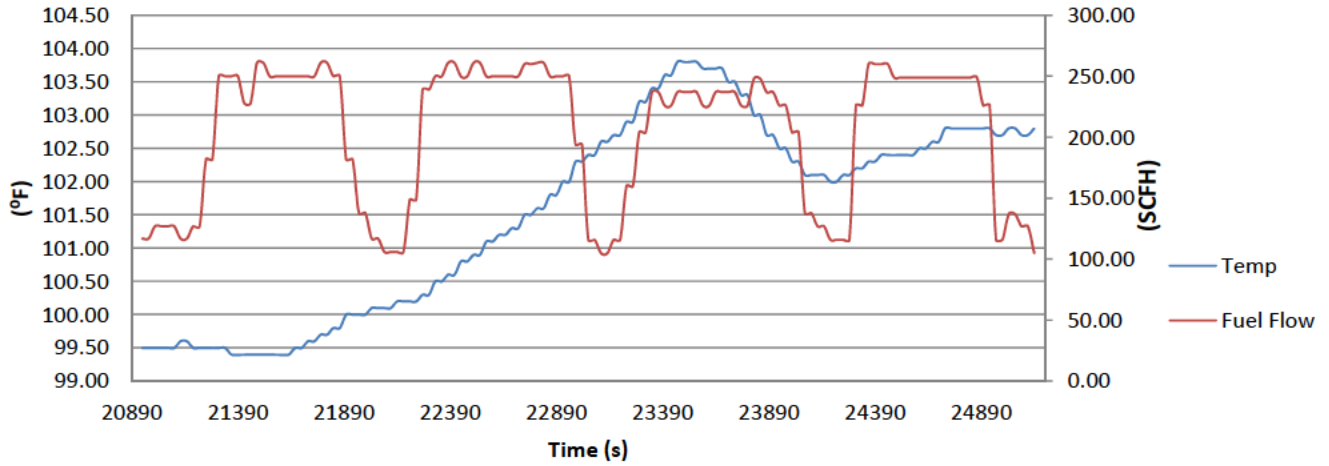
Bias	Serial Number:	O ₂ (%)	CO (ppmvd)	THC (ppmvw)	CO ₂ (%)	Press. Trans 0 (in. H ₂ O)	Temp. Trans. 0 (°F)	F-Flow Trans. 0 (SCFH)
	INST-22-0005	INST-22-0005	INST-CO-0034	INST-VC-0006	INST-22-0005			
	Initial Zero	0.02	-0.02	0.03	0.07			
	Final Zero	0.04	0.07	-0.02	0.09			
	Avg. Zero	0.03	0.03	0.01	0.08			
	Initial UpScale	12.00	11.18	3.00	9.34			
	Final UpScale	12.02	11.08	3.08	9.35			
	Avg. UpScale	12.01	11.13	3.04	9.35			
	Upscale Cal Gas	12.25	11.00	3.04	9.33			

EMISSIONS DATA	O₂	CO	THC	CO₂
Corrected Raw Average (ppm/% dry basis)	15.44	3.27	0.37	4.02
Corrected Raw Average (ppm/% wet basis)	14.74	3.12	0.35	3.83
Emission Rate (lb/hr)	N/A	0.01	0.00	N/A

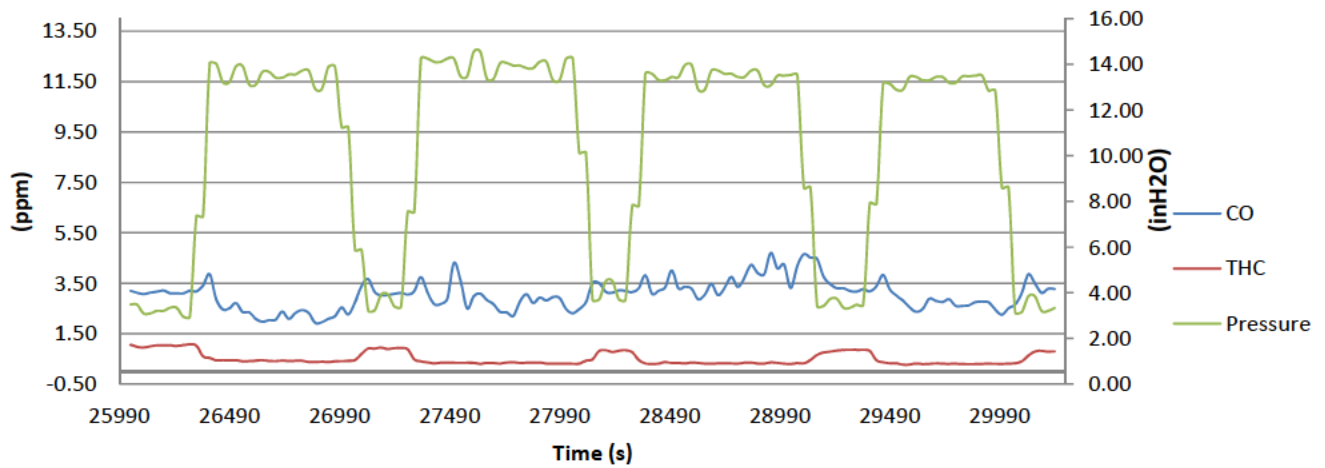
24 ECD R4



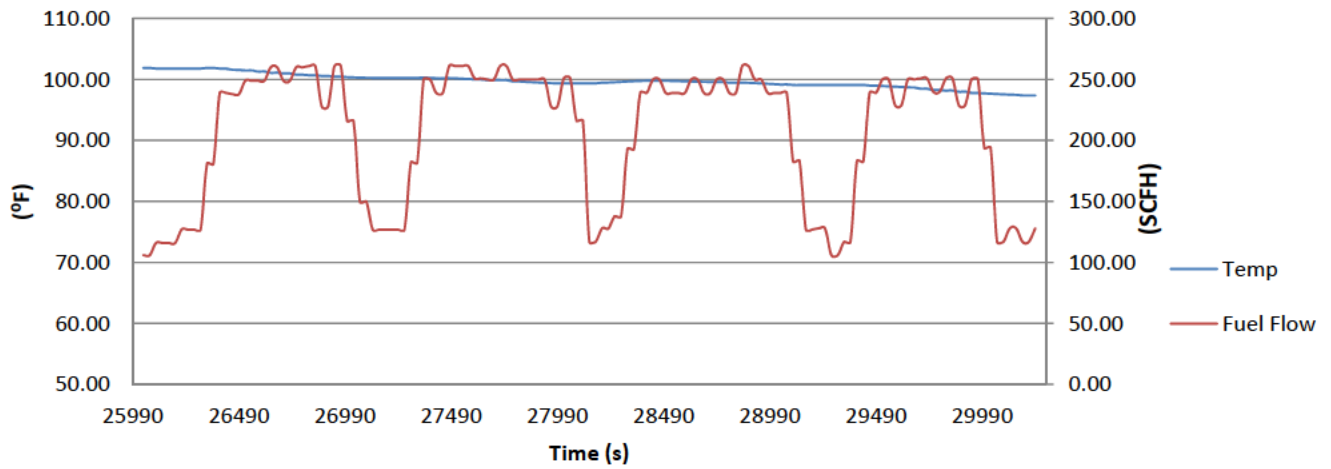
24 ECD R4



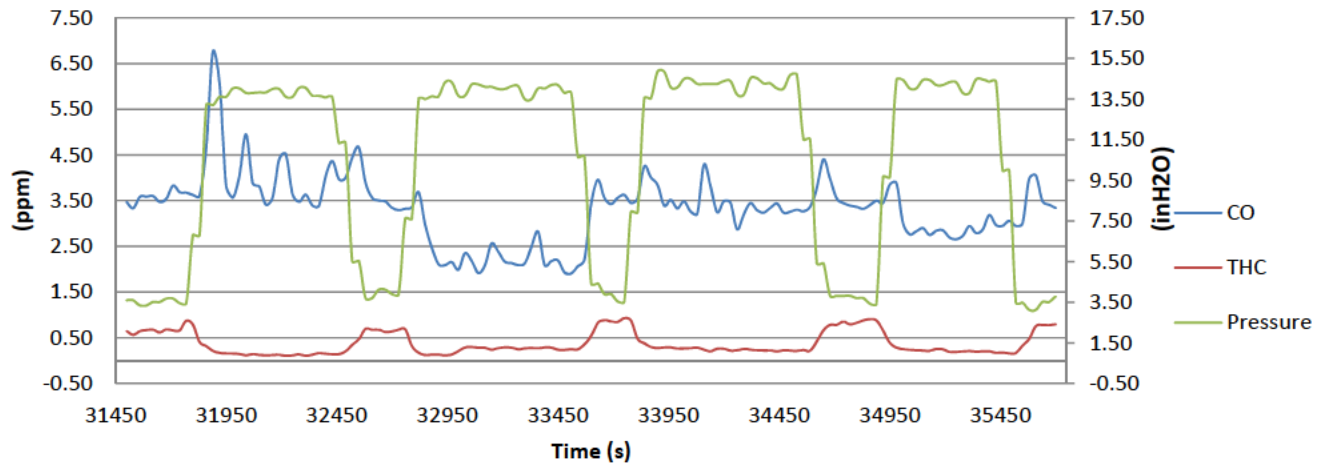
24 ECD R5



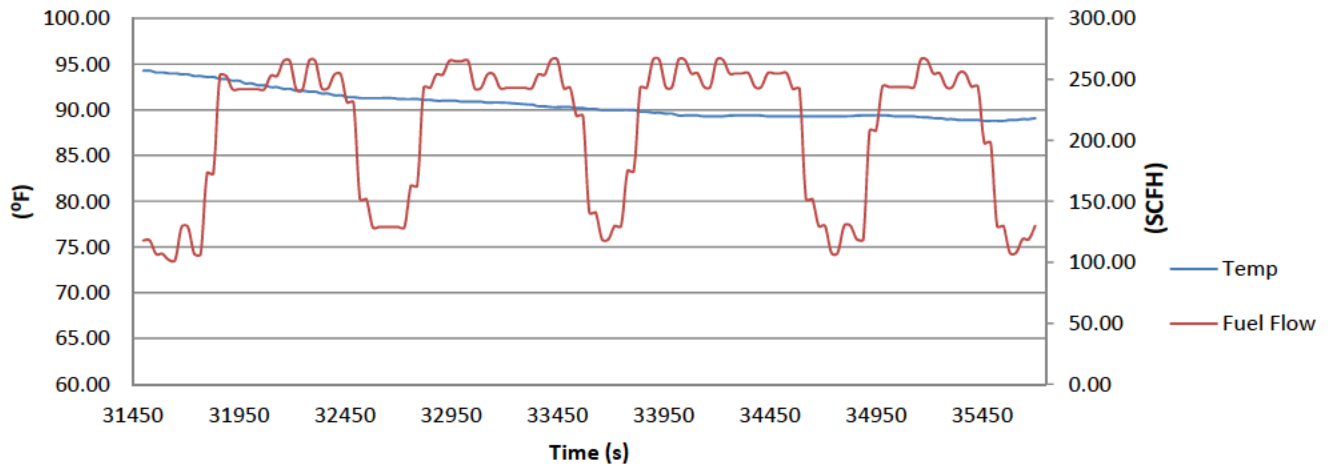
24 ECD R5

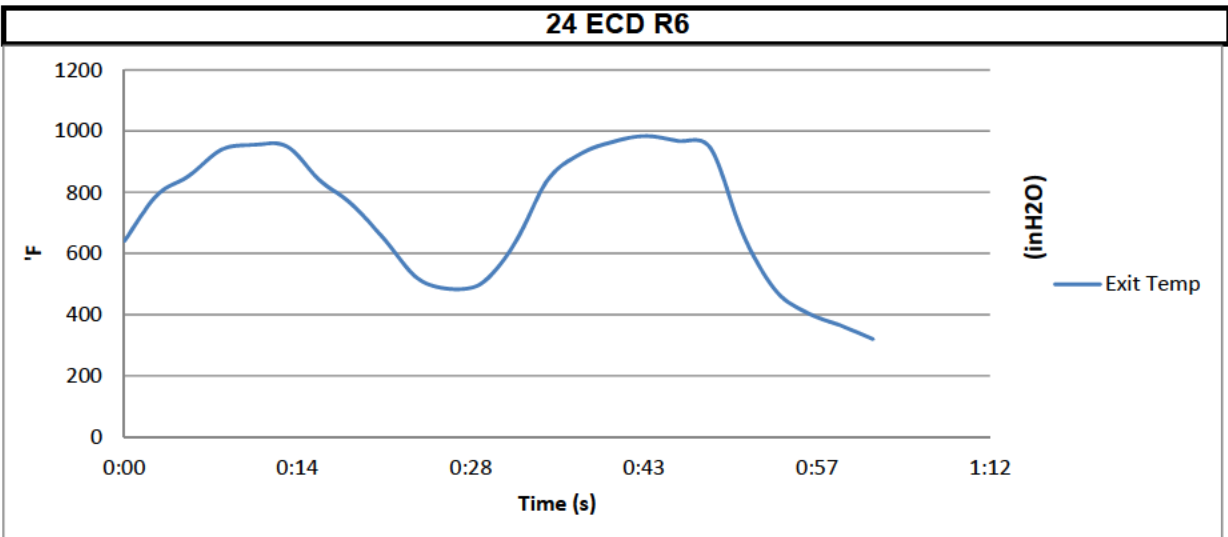
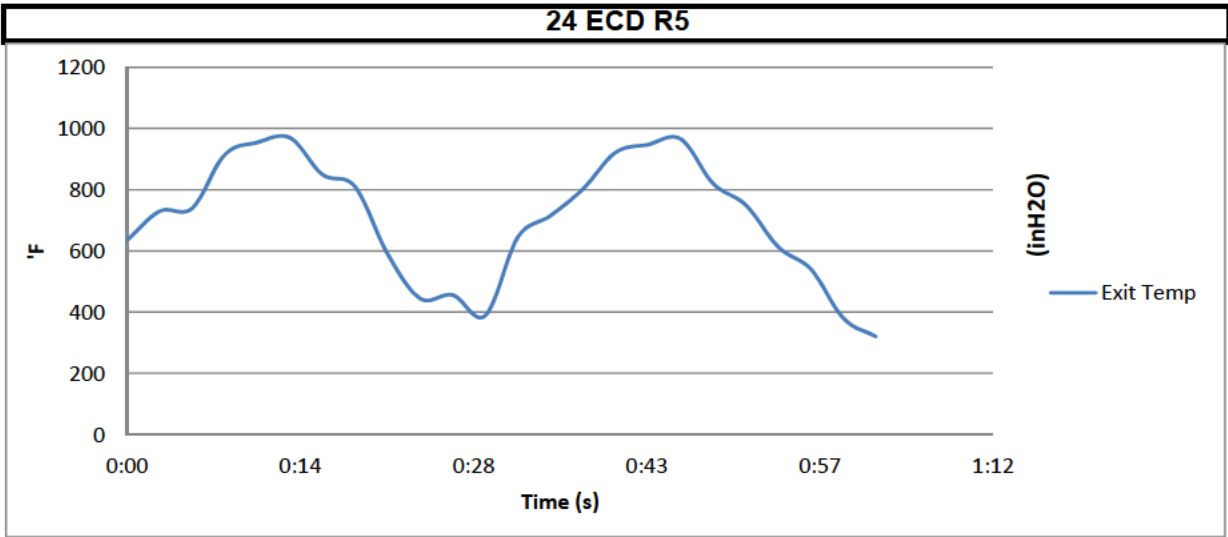
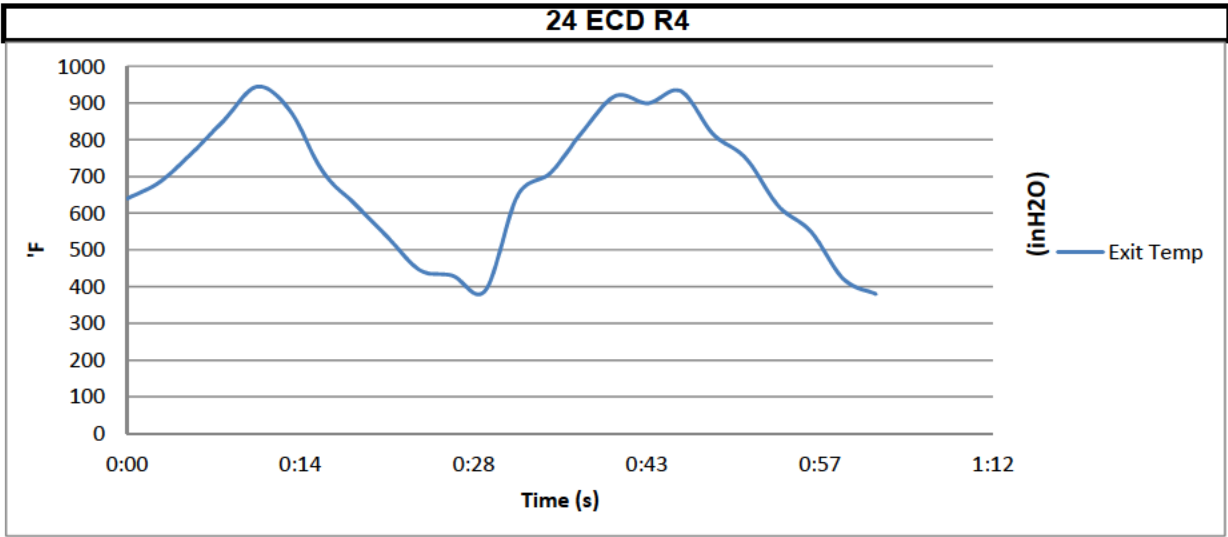


24 ECD R6



24 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	24 ECD
Fuel Type	Gas, Propene

Test Information			
Project #		cei-14-norman.ok-comp#1	
Operator		TRS	
Date for Preliminary Run	(mm/dd/yy)	06/20/14	
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)	06/23/14	06/23/14	06/23/14	
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	24 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	10:18	11:45	13:15		hh:mm
Run Stop Time	11:28	12:55	14:25		hh:mm
Test Date	06/23/14	06/23/14	06/23/14		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	213.200	262.400	311.100		ft ³
Final Meter Volume	262.200	310.700	359.650		ft ³
Total Meter Volume	49.000	48.300	48.550	48.617	ft ³
Total Sampling Time	65.00	65.00	65.00	65.00	min
Average Meter Temperature	72.17	77.50	78.50	76.06	°F
Average Stack Temperature	812.67	827.54	853.58	831.26	°F
Barometric Pressure	29.86	29.88	29.88	29.87	in Hg
Stack Static Pressure	0.00	0.00	0.00	0.00	in H ₂ O
Absolute Stack Pressure	29.86	29.88	29.88	29.87	in Hg
Average Orifice Pressure Drop	1.81	1.84	1.83	1.83	in H ₂ O
Absolute Meter Pressure	30.00	30.02	30.02	30.01	in Hg
Avg Square Root Pitot Pressure	0.07	0.07	0.07	0.07	√(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	49.40	47.60	50.00	49.00	g
Silica Gel Weight Gain	14.80	10.30	8.90	11.33	g
Total Water Volume Collected	64.32	58.00	59.01	60.44	ml
Standard Water Vapor Volume	3.03	2.73	2.78	2.84	scf
Standard Meter Volume	49.2	48.1	48.2	48.5	dscf
Calculated Stack Moisture	5.79	5.37	5.44	5.54	%
Saturated Stack Moisture	100.00	100.00	100.00	100.00	%
Reported Stack Moisture Content	5.79	5.37	5.44	5.54	%
Gas Analysis Data	70-100-70%-7	70-100-70%-8	70-100-70%-9	Average	Units
Carbon Dioxide Content	4.9	4.7	5.1	4.9	%
Oxygen Content	15.3	15.6	15.1	15.3	%
Nitrogen Content	79.8	79.7	79.8	79.8	%
Stack Dry Molecular Weight	29.41	29.37	29.42	29.40	lb/lb-mole
Stack Wet Molecular Weight	28.75	28.76	28.79	28.77	lb/lb-mole
Percent Excess Air	265.3	286.7	253.1	268.4	%
Volumetric Flow Rate Data	70-100-70%-7	70-100-70%-8	70-100-70%-9	Average	Units
Average Stack Gas Velocity	6.01	6.05	6.11	6.05	ft/sec
Stack Cross-Sectional Area	3.05	3.05	3.05	3.05	ft ²
Actual Stack Flow Rate	1,099	1,105	1,116	1,106	acfm
Wet Standard Stack Flow Rate	27	27	27	27	wkscfh
Dry Standard Stack Flow Rate	25,720	25,684	25,408	25,604	dscfh

METHOD 3C - DETERMINATION OF DRY MOLECULAR WEIGHT BY ANALYZER

Plant Name	Norman Facility	Preliminary Date	06/20/14		
Sampling Location	24 ECD	Operator	TRS		
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	06/23/14	Run Start Time	10:18	Run Stop Time	11:28
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	4.9	15.3	0.0	79.8	29.41	1.134	265.3	N/A

Gas Analysis Data								
Run Number	70-100-70%-8		Date	06/23/14	Run Start Time	11:45	Run Stop Time	12:55
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	4.7	15.6	0.0	79.7	29.37	1.130	286.7	N/A

Gas Analysis Data								
Run Number	70-100-70%-9		Date	06/23/14	Run Start Time	13:15	Run Stop Time	14:25
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	5.1	15.1	0.0	79.8	29.42	1.139	253.1	N/A

METHOD 4 - DETERMINATION OF MOISTURE CONTENT IN STACK GASES

Plant Name	Norman Facility	Preliminary Date	06/20/14
Sampling Location	24 ECD	Operator	TRS
Project #	cei-14-norman.ok-comp#1	Ports Used	2

Moisture Content Data								
Run Number	70-100-70%-7	Date	06/23/14	Start Time	10:18	Stop Time	11:28	
Meter Box Number	SAMP-CP-0023			Meter Cal Factor	(Y)	1.010		
Total Meter Volume	(V _m)	49.000	dcf	Barometric Pressure	(P _b)	29.86	in Hg	
Average Stack Temp	(t _s) _{avg}	813	°F	Stack Static Pressure	(P _{static})	0.00	in H ₂ O	
Average Meter Temp	(t _m) _{avg}	72	°F	Avg Orifice Pressure	(ΔH) _{avg}	1.81	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)	764.90	687.50	569.00	935.30			
Initial Value	(V _i),(W _i)	736.80	671.00	564.20	920.50			
Net Value	(V _n),(W _n)	28.1	16.5	4.8	14.8			
Results								
Total Weight	(W _f)	64.20	g	Water Vol Weighed	(V _{wsg(std)})	3.027	scf	
Std Meter Volume	(V _{m(std)})	49.223	dscf	Sat. Moisture Content	(B _{ws(svp)})	100.00	%	
Calc Moisture Content	(B _{ws(calc)})	5.79	%	Final Moisture Content	(B _{ws})	5.79	%	

Moisture Content Data								
Run Number	70-100-70%-8	Date	06/23/14	Start Time	11:45	Stop Time	12:55	
Meter Box Number	SAMP-CP-0023			Meter Cal Factor	(Y)	1.010		
Total Meter Volume	(V _m)	48.300	dcf	Barometric Pressure	(P _b)	29.88	in Hg	
Average Stack Temp	(t _s) _{avg}	828	°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}	1.84	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)	718.80	778.30	571.90	945.60			
Initial Value	(V _i),(W _i)	687.50	764.90	569.00	935.30			
Net Value	(V _n),(W _n)	31.3	13.4	2.9	10.3			
Results								
Total Weight	(W _f)	57.90	g	Water Vol Weighed	(V _{wsg(std)})	2.730	scf	
Std Meter Volume	(V _{m(std)})	48.073	dscf	Sat. Moisture Content	(B _{ws(svp)})	100.00	%	
Calc Moisture Content	(B _{ws(calc)})	5.37	%	Final Moisture Content	(B _{ws})	5.37	%	

Moisture Content Data								
Run Number	70-100-70%-9	Date	06/23/14	Start Time	13:15	Stop Time	14:25	
Meter Box Number	SAMP-CP-0023			Meter Cal Factor	(Y)	1.010		
Total Meter Volume	(V _m)	48.550	dcf	Barometric Pressure	(P _b)	29.88	in Hg	
Average Stack Temp	(t _s) _{avg}	854	°F	Stack Static Pressure	(P _{static})	0.00	in H ₂ O	
Average Meter Temp	(t _m) _{avg}	79	°F	Avg Orifice Pressure	(ΔH) _{avg}	1.83	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)	815.10	730.80	568.00	1029.00			
Initial Value	(V _i),(W _i)	778.30	718.80	566.80	1020.10			
Net Value	(V _n),(W _n)	36.8	12.0	1.2	8.9			
Results								
Total Weight	(W _f)	58.90	g	Water Vol Weighed	(V _{wsg(std)})	2.777	scf	
Std Meter Volume	(V _{m(std)})	48.231	dscf	Sat. Moisture Content	(B _{ws(svp)})	100.00	%	
Calc Moisture Content	(B _{ws(calc)})	5.44	%	Final Moisture Content	(B _{ws})	5.44	%	

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

Plant Name	Norman Facility
Sampling Location	24 ECD
Project #	cel-14-norman.ok-comp#1

Date	06/23/14
Operator	TRS
Run Number	70-100-70%-7

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

Nozzle Measurements				
Pre				PASS
Post				PASS

Run Time			
Start	10:18	End	11:28

Weights	Imp 1	Imp 2	Imp 3	Imp 4	Imp 5	Imp 6	Imp 7	Imp 8
Pre	736.8	671.0	564.2	920.5				
Post	764.9	687.5	569.0	935.3				

Sampling Equipment		
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)	0.4929 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)	812.7	F
Average Meter Temp	(t _m)	72.2	
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})	5.79	%
Stack Dry Molecular Weight	(M _d)	29.41	lb/lb-mole
Estimated Orifice Flow Rate	(Q _m)	0.75	acfm
ΔP to ΔH Isokinetic Factor	(K)		

Pressures			
Barometric Pressure	(P _b)	29.86	in Hg
Stack Static Pressure	(P _{static})	0.00	in H ₂ O
Absolute Stack Pressure	(P _a)	29.86	in Hg
Absolute Meter Pressure	(P _m)	30.00	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	213.200	0.005	1.877	1.90	899	249		53			67	67	0.0	0.07	6.23	2.841		68.182
A-2	2.7	00:02:43	216.000	0.005	1.877	1.90	911	250		47			67	67	0.0	0.07	6.26	4.809		57.711
A-3	5.4	00:05:25	217.940	0.005	1.877	1.80	993	250		46			68	68	0.0	0.07	6.44	6.895		55.159
A-4	8.1	00:08:07	220.000	0.005	1.877	1.80	1013	250		47			69	69	0.0	0.07	6.48	9.017		54.102
A-5	10.8	00:10:50	222.100	0.005	1.877	1.80	1023	251		48			69	69	0.0	0.07	6.51	11.139		53.468
A-6	13.5	00:13:33	224.200	0.005	1.877	1.80	1000	250		50			69	69	0.0	0.07	6.46	13.261		53.045
A-7	16.3	00:16:15	226.300	0.005	1.877	1.80	870	250		51			70	70	0.0	0.07	6.16	15.208		52.141
A-8	19.0	00:18:58	228.230	0.005	1.877	1.80	880	250		51			70	70	0.0	0.07	6.19	17.195		51.585
A-9	21.7	00:21:40	230.200	0.005	1.877	1.80	540	250		53			71	71	0.0	0.07	5.34	19.208		51.222
A-10	24.4	00:24:22	232.200	0.005	1.877	1.80	445	250		53			71	71	0.0	0.07	5.08	21.373		51.295
A-11	27.1	00:27:05	234.350	0.005	1.877	1.80	555	250		54			72	72	0.0	0.07	5.38	23.433		51.126
A-12	29.8	00:29:47	236.400	0.005	1.877	1.80	570	251		56			73	73	0.0	0.07	5.42	25.489		50.977
B-1	32.5	00:32:30	238.450	0.005	1.877	1.80	885	250		57			73	73	0.0	0.07	6.20	27.444		50.667
B-2	35.2	00:35:12	240.400	0.005	1.877	1.80	870	251		56			73	73	0.0	0.07	6.16	29.400		50.400
B-3	37.9	00:37:55	242.350	0.005	1.877	1.80	925	250		56			74	74	0.0	0.07	6.29	31.352		50.164
B-4	40.6	00:40:37	244.300	0.005	1.877	1.80	940	251		56			74	74	0.0	0.07	6.32	33.404		50.107
B-5	43.3	00:43:20	246.350	0.005	1.877	1.80	895	250		56			74	74	0.0	0.07	6.22	35.357		49.915
B-6	46.0	00:46:03	248.300	0.005	1.877	1.80	875	250		57			74	74	0.0	0.07	6.17	37.309		49.745
B-7	48.8	00:48:45	250.250	0.005	1.877	1.80	860	250		57			75	75	0.0	0.07	6.14	39.257		49.588
B-8	51.5	00:51:28	252.200	0.005	1.877	1.80	865	250		58			75	75	0.0	0.07	6.15	41.355		49.626
B-9	54.2	00:54:10	254.300	0.005	1.877	1.90	715	251		59			76	76	0.0	0.07	5.79	43.301		49.486
B-10	56.9	00:56:53	256.250	0.005	1.877	1.80	610	250		60			76	76	0.0	0.07	5.53	45.295		49.413
B-11	59.6	00:59:35	258.250	0.005	1.877	1.80	640	250		60			76	76	0.0	0.07	5.60	47.240		49.294
B-12	62.3	01:02:18	260.200	0.005	1.877	1.80	725	250		60			76	76	0.0	0.07	5.82	49.235		49.235
Last Pt	65.0	01:05:00	262.200																	
Final Val	65.0	01:05:00	262.200											Max Vac	0.0		Final Values	49.235		
Average Values				0.005		1.81	813	250		54			72	72		0.07	6.01			
													72							

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

Plant Name		Norman Facility			
Sampling Location		24 ECD			
Project #		cei-14-norman.ok-comp#1			

Leak Checks					
Train	Pre	0.000	ft³/min@	15.0	in Hg
PASS	Post	0.000	ft³/min@	15.0	in Hg
Pitot	Pre (+)	0.20	in H₂O for	15.0	sec
< 3.0	Pre (-)	0.25	in H₂O for	15.0	sec
	Post (+)	0.20	in H₂O for	15.0	sec
	Post (-)	0.20	in H₂O for	15.0	sec

Nozzle Measurements					
Pre					PASS
Post					PASS

Run Time			
Start	11:45	End	12:55

Weights	Imp 1	Imp 2	Imp 3	Imp 4	Imp 5	Imp 6	Imp 7	Imp 8
Pre	687.5	764.9	569.0	935.3				
Post	718.8	778.3	571.9	945.6				

Date		06/23/14	
Operator		TRS	
Run Number		70-100-70%-8	

Sampling Equipment			
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)	0.4944 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)	827.5 F
Average Meter Temp		(t _m)	77.5
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})	5.37 %
Stack Dry Molecular Weight		(M _d)	29.37 lb/lb-mole
Estimated Orifice Flow Rate		(Q _m)	0.76 acfm
ΔP to ΔH Isokinetic Factor		(K)	

Pressures			
Barometric Pressure		(P _b)	29.88 in Hg
Stack Static Pressure		(P _{static})	0.00 in H ₂ O
Absolute Stack Pressure		(P _a)	29.88 in Hg
Absolute Meter Pressure		(P _m)	30.02 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 _{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	262.400	0.005	1.877	1.90	857	250		55			75	75	0.0	0.07	6.13	2.050		49.205
A-2	2.7	00:02:43	264.450	0.005	1.877	1.80	925	250		52			75	75	0.0	0.07	6.29	3.950		47.399
A-3	5.4	00:05:25	266.350	0.005	1.877	1.80	940	250		50			75	75	0.0	0.07	6.32	5.850		46.798
A-4	8.1	00:08:07	268.250	0.005	1.877	1.80	977	251		49			75	75	0.0	0.07	6.40	7.799		46.797
A-5	10.8	00:10:50	270.200	0.005	1.877	1.80	970	250		48			75	75	0.0	0.07	6.39	9.799		47.036
A-6	13.5	00:13:33	272.200	0.005	1.877	1.80	935	250		49			76	76	0.0	0.07	6.31	11.745		46.981
A-7	16.3	00:16:15	274.150	0.005	1.877	1.80	885	250		49			76	76	0.0	0.07	6.19	13.841		47.455
A-8	19.0	00:18:58	276.250	0.005	1.877	1.80	902	250		50			77	77	0.0	0.07	6.23	15.784		47.351
A-9	21.7	00:21:40	278.200	0.005	1.877	1.80	625	250		50			77	77	0.0	0.07	5.56	17.776		47.402
A-10	24.4	00:24:22	280.200	0.005	1.877	1.90	590	250		51			77	77	0.0	0.07	5.47	19.818		47.564
A-11	27.1	00:27:05	282.250	0.005	1.877	1.90	615	250		51			78	78	0.0	0.07	5.54	21.857		47.688
A-12	29.8	00:29:47	284.300	0.005	1.877	1.80	600	250		52			78	78	0.0	0.07	5.50	23.846		47.691
B-1	32.5	00:32:30	286.300	0.005	1.877	1.90	870	250		55			78	78	0.0	0.07	6.16	25.885		47.787
B-2	35.2	00:35:12	288.350	0.005	1.877	1.80	951	250		52			78	78	0.0	0.07	6.34	27.873		47.782
B-3	37.9	00:37:55	290.350	0.005	1.877	1.80	968	250		51			78	78	0.0	0.07	6.38	29.862		47.779
B-4	40.6	00:40:37	292.350	0.005	1.877	1.80	984	250		51			79	79	0.0	0.07	6.42	31.847		47.770
B-5	43.3	00:43:20	294.350	0.005	1.877	1.80	952	250		51			79	79	0.0	0.07	6.35	33.881		47.832
B-6	46.0	00:46:03	296.400	0.005	1.877	1.90	969	250		52			79	79	0.0	0.07	6.38	35.866		47.822
B-7	48.8	00:48:45	298.400	0.005	1.877	1.80	973	250		53			79	79	0.0	0.07	6.39	37.901		47.875
B-8	51.5	00:51:28	300.450	0.005	1.877	1.90	988	250		53			79	79	0.0	0.07	6.43	39.936		47.923
B-9	54.2	00:54:10	302.500	0.005	1.877	1.90	860	250		54			80	80	0.0	0.07	6.14	41.967		47.962
B-10	56.9	00:56:53	304.550	0.005	1.877	1.90	540	250		54			79	79	0.0	0.07	5.34	43.903		47.894
B-11	59.6	00:59:35	306.500	0.005	1.877	1.80	460	250		54			79	79	0.0	0.07	5.12	45.987		47.986
B-12	62.3	01:02:18	308.600	0.005	1.877	1.90	525	250		55			79	79	0.0	0.07	5.30	48.072		48.072
Last Pt	65.0	01:05:00	310.700																	
Final Val	65.0	01:05:00	310.700											Max Vac	0.0		Final Values	48.072		
Average Values				0.01		1.84	828	250		52			78	78		0.07	6.05			
														78						

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

Plant Name	Norman Facility
Sampling Location	24 ECD
Project #	cel-14-norman.ok-comp#1

Date	06/23/14
Operator	TRS
Run Number	70-100-70%-9

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

Nozzle Measurements				
Pre				PASS
Post				PASS

Run Time			
Start	13:15	End	14:25

Weights	Imp 1	Imp 2	Imp 3	Imp 4	Imp 5	Imp 6	Imp 7	Imp 8
Pre	778.3	718.8	566.8	1020.1				
Post	815.1	730.8	568.0	1029.0				

Sampling Equipment		
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)	0.4907 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)	853.6	F
Average Meter Temp	(t _m)	78.5	
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})	5.44	%
Stack Dry Molecular Weight	(M _d)	29.42	lb/lb-mole
Estimated Orifice Flow Rate	(Q _m)	0.74	acfm
ΔP to ΔH Isokinetic Factor	(K)		

Pressures			
Barometric Pressure	(P _b)	29.88	in Hg
Stack Static Pressure	(P _{static})	0.00	in H ₂ O
Absolute Stack Pressure	(P _a)	29.88	in Hg
Absolute Meter Pressure	(P _m)	30.02	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 _{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	311.100	0.005	1.877	1.80	845	250		67			77	77	0.0	0.07	6.10	2.042		49.010
A-2	2.7	00:02:43	313.150	0.005	1.877	1.80	965	250		63			77	77	0.0	0.07	6.37	4.034		48.412
A-3	5.4	00:05:25	315.150	0.005	1.877	1.80	952	251		57			77	77	0.0	0.07	6.34	6.027		48.213
A-4	8.1	00:08:07	317.150	0.005	1.877	1.80	973	250		52			77	77	0.0	0.07	6.39	7.969		47.815
A-5	10.8	00:10:50	319.100	0.005	1.877	1.80	962	250		50			77	77	0.0	0.07	6.36	9.961		47.815
A-6	13.5	00:13:33	321.100	0.005	1.877	1.80	968	250		49			78	78	0.0	0.07	6.38	12.000		47.999
A-7	16.3	00:16:15	323.150	0.005	1.877	1.90	978	250		49			78	78	0.0	0.07	6.40	13.989		47.961
A-8	19.0	00:18:58	325.150	0.005	1.877	1.80	966	250		49			78	78	0.0	0.07	6.37	16.027		48.081
A-9	21.7	00:21:40	327.200	0.005	1.877	1.90	815	250		49			78	78	0.0	0.07	6.03	18.016		48.043
A-10	24.4	00:24:22	329.200	0.005	1.877	1.80	587	250		49			78	78	0.0	0.07	5.46	20.054		48.130
A-11	27.1	00:27:05	331.250	0.005	1.877	1.90	560	250		49			79	79	0.0	0.07	5.39	22.089		48.195
A-12	29.8	00:29:47	333.300	0.005	1.877	1.90	535	250		49			79	79	0.0	0.07	5.32	24.075		48.149
B-1	32.5	00:32:30	335.300	0.005	1.877	1.80	865	250		52			78	78	0.0	0.07	6.14	26.063		48.117
B-2	35.2	00:35:12	337.300	0.005	1.877	1.80	978	250		51			79	79	0.0	0.07	6.40	28.098		48.168
B-3	37.9	00:37:55	339.350	0.005	1.877	1.90	985	250		51			79	79	0.0	0.07	6.42	30.133		48.213
B-4	40.6	00:40:37	341.400	0.005	1.877	1.90	981	250		49			79	79	0.0	0.07	6.41	32.118		48.177
B-5	43.3	00:43:20	343.400	0.005	1.877	1.80	946	250		49			79	79	0.0	0.07	6.33	34.153		48.216
B-6	46.0	00:46:03	345.450	0.005	1.877	1.90	954	250		48			79	79	0.0	0.07	6.35	36.188		48.250
B-7	48.8	00:48:45	347.500	0.005	1.877	1.80	1001	250		50			79	79	0.0	0.07	6.45	38.222		48.281
B-8	51.5	00:51:28	349.550	0.005	1.877	1.80	960	250		50			79	79	0.0	0.07	6.36	40.257		48.308
B-9	54.2	00:54:10	351.600	0.005	1.877	1.80	815	250		50			80	80	0.0	0.07	6.03	42.287		48.329
B-10	56.9	00:56:53	353.650	0.005	1.877	1.80	660	250		51			80	80	0.0	0.07	5.65	44.269		48.293
B-11	59.6	00:59:35	355.650	0.005	1.877	1.80	645	250		51			80	80	0.0	0.07	5.61	46.299		48.312
B-12	62.3	01:02:18	357.700	0.005	1.877	1.80	590	250		51			80	80	0.0	0.07	5.47	48.231		48.231
Last Pt	65.0	01:05:00	359.650																	
Final Val	65.0	01:05:00	359.650												Max Vac	0.0	Final Values	48.231		
Average Values				0.01		1.83	854	250		51			79	79		0.07	6.11			
													79							

CIMARRON ENERGY, INC.

June 23, 2014

24 ECD

Norman Facility

Unit Data

Meas. Stack Moisture	5.8	%
Stack Exhaust Flow (M2)	25,720	SCFH

Weather Data

Barometric Pressure	29.81	in. Hg
Relative Humidity	58	%
Ambient Temperature	84	° F
Specific Humidity	0.014565	lb H ₂ O / lb air

70-100-70 Load, Run - 24 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
A1	06/23/14 10:18:19	4320	13.73	3.20	0.23	5.06	15.00	88.60	266.00
	06/23/14 10:18:49	4350	14.09	5.56	0.27	4.77	15.00	88.60	266.00
	06/23/14 10:19:19	4380	13.93	6.20	0.28	4.90	15.72	88.90	256.00
	06/23/14 10:19:49	4410	13.80	6.13	0.28	4.98	15.72	88.90	256.00
	06/23/14 10:20:19	4440	14.22	6.06	0.26	4.66	15.94	89.20	267.00
	06/23/14 10:20:49	4470	13.62	4.58	0.23	5.07	15.94	89.20	267.00
	06/23/14 10:21:19	4500	13.60	2.84	0.24	5.14	15.36	89.50	255.00
	06/23/14 10:21:49	4530	13.92	2.89	0.21	4.92	15.36	89.50	255.00
	06/23/14 10:22:19	4560	13.71	3.04	0.20	4.92	15.83	89.80	266.00
	06/23/14 10:22:49	4590	13.90	2.53	0.26	5.00	15.83	89.80	266.00
	06/23/14 10:23:19	4620	13.98	2.87	0.29	4.82	14.97	90.10	255.00
	06/23/14 10:23:49	4650	13.84	2.75	0.21	4.89	14.97	90.10	255.00
	06/23/14 10:24:19	4680	13.67	2.46	0.19	5.06	17.58	90.30	278.00
	06/23/14 10:24:49	4710	13.13	2.28	0.22	5.40	17.58	90.30	278.00
	06/23/14 10:25:19	4740	12.95	1.89	0.23	5.64	24.77	90.60	340.00
	06/23/14 10:25:49	4770	13.38	4.04	0.21	5.18	24.77	90.60	340.00
	06/23/14 10:26:19	4800	12.64	4.10	0.19	5.73	30.56	90.90	355.00
	06/23/14 10:26:49	4830	12.64	2.88	0.22	5.83	30.56	90.90	355.00
	06/23/14 10:27:19	4860	12.66	2.75	0.22	5.88	30.92	91.30	378.00
	06/23/14 10:27:49	4890	13.43	5.44	0.29	5.18	30.92	91.30	378.00
	06/23/14 10:28:19	4920	13.20	7.18	0.27	5.47	29.95	91.50	389.00
	06/23/14 10:28:49	4950	13.82	8.14	0.29	5.01	29.95	91.50	389.00
	06/23/14 10:29:19	4980	13.30	9.22	0.26	5.24	30.56	91.80	378.00
	06/23/14 10:29:49	5010	13.63	7.58	0.23	5.07	30.56	91.80	378.00
	06/23/14 10:30:19	5040	13.81	8.23	0.32	5.08	30.12	92.00	366.00
	06/23/14 10:30:49	5070	13.70	9.38	0.29	5.00	30.12	92.00	366.00
	06/23/14 10:31:19	5100	13.80	9.49	0.33	4.98	26.52	92.30	340.00
	06/23/14 10:31:49	5130	13.86	10.07	0.32	4.97	26.52	92.30	340.00
	06/23/14 10:32:19	5160	14.15	9.13	0.36	4.62	18.27	92.40	278.00
	06/23/14 10:32:49	5190	13.76	5.43	0.21	5.09	18.27	92.40	278.00
	06/23/14 10:33:19	5220	13.99	4.12	0.21	4.76	16.50	92.50	266.00
	06/23/14 10:33:49	5250	13.88	4.36	0.27	5.06	16.50	92.50	266.00
	06/23/14 10:34:19	5280	14.55	3.69	0.26	4.87	16.33	92.70	265.00
	06/23/14 10:34:49	5310	14.20	3.55	0.21	4.73	16.33	92.70	265.00
	06/23/14 10:35:19	5340	13.98	2.96	0.23	4.81	16.80	92.80	288.00
	06/23/14 10:35:49	5370	14.14	3.25	0.23	4.76	16.80	92.80	288.00
	06/23/14 10:36:19	5400	14.03	3.71	0.24	4.80	16.36	92.90	265.00
	06/23/14 10:36:49	5430	14.08	3.66	0.22	4.81	16.36	92.90	265.00
	06/23/14 10:37:19	5460	14.09	3.17	0.19	4.74	16.30	93.10	276.00
	06/23/14 10:37:49	5490	13.79	2.79	0.17	4.95	16.30	93.10	276.00
	06/23/14 10:38:19	5520	14.23	2.98	0.19	4.72	15.75	93.20	265.00
	06/23/14 10:38:49	5550	14.02	3.89	0.16	4.76	15.75	93.20	265.00
	06/23/14 10:39:19	5580	14.19	3.46	0.18	4.73	15.69	93.30	265.00
	06/23/14 10:39:49	5610	14.34	3.86	0.21	4.61	15.69	93.30	265.00
	06/23/14 10:40:19	5640	14.33	3.58	0.19	4.59	17.91	93.50	288.00
	06/23/14 10:40:49	5670	13.69	3.55	0.22	4.98	17.91	93.50	288.00
A2	06/23/14 10:41:19	5700	14.04	3.95	0.24	4.77	28.98	93.60	352.00
	06/23/14 10:41:49	5730	13.16	4.63	0.19	5.40	28.98	93.60	352.00
	06/23/14 10:42:19	5760	12.66	3.73	0.18	5.76	30.28	93.80	376.00
	06/23/14 10:42:49	5790	12.90	3.45	0.21	5.67	30.28	93.80	376.00
	06/23/14 10:43:19	5820	13.44	8.85	0.21	5.26	30.89	94.10	388.00
	06/23/14 10:43:49	5850	13.13	11.15	0.19	5.36	30.89	94.10	388.00
	06/23/14 10:44:19	5880	13.47	8.18	0.29	5.33	29.92	94.20	387.00
	06/23/14 10:44:49	5910	13.56	11.68	0.29	5.09	29.92	94.20	387.00
	06/23/14 10:45:19	5940	13.54	9.32	0.28	5.19	30.95	94.30	388.00
	06/23/14 10:45:49	5970	13.76	7.13	0.29	5.04	30.95	94.30	388.00
	06/23/14 10:46:19	6000	13.81	10.89	0.34	4.96	30.23	94.50	364.00
	06/23/14 10:46:49	6030	14.12	11.19	0.32	4.80	30.23	94.50	364.00
	06/23/14 10:47:19	6060	13.77	10.55	0.30	4.91	31.11	94.60	365.00
	06/23/14 10:47:49	6090	13.70	9.94	0.31	5.12	31.11	94.60	365.00

CIMARRON ENERGY, INC.

June 23, 2014

24 ECD

Norman Facility

Unit Data

Meas. Stack Moisture	5.8	%
Stack Exhaust Flow (M2)	25,720	SCFH

Weather Data

Barometric Pressure	29.81	in. Hg
Relative Humidity	58	%
Ambient Temperature	84	°F
Specific Humidity	0.014565	lb H ₂ O / lb air

70-100-70 Load, Run - 24 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
	06/23/14 10:48:19	6120	13.71	10.90	0.25	4.96	29.09	94.80	363.00
	06/23/14 10:48:49	6150	13.88	8.52	0.33	4.88	29.09	94.80	363.00
	06/23/14 10:49:19	6180	13.35	6.44	0.25	5.32	21.09	94.90	312.00
	06/23/14 10:49:49	6210	13.60	3.90	0.23	5.22	21.09	94.90	312.00
	06/23/14 10:50:19	6240	13.99	3.74	0.20	4.82	16.44	94.90	264.00
	06/23/14 10:50:49	6270	13.97	4.86	0.19	4.89	16.44	94.90	264.00
	06/23/14 10:51:19	6300	14.24	5.90	0.19	4.65	16.28	95.00	264.00
	06/23/14 10:51:49	6330	14.47	5.66	0.19	4.54	16.28	95.00	264.00
	06/23/14 10:52:19	6360	14.61	5.16	0.23	4.41	15.58	95.10	264.00
	06/23/14 10:52:49	6390	14.29	5.31	0.21	4.59	15.58	95.10	264.00
	06/23/14 10:53:19	6420	14.14	6.31	0.20	4.75	15.67	95.20	264.00
	06/23/14 10:53:49	6450	13.72	5.95	0.19	4.96	15.67	95.20	264.00
	06/23/14 10:54:19	6480	14.08	5.13	0.30	4.87	15.64	95.40	253.00
	06/23/14 10:54:49	6510	14.50	5.40	0.26	4.46	15.64	95.40	253.00
	06/23/14 10:55:19	6540	14.40	4.80	0.25	4.53	15.33	95.60	252.00
	06/23/14 10:55:49	6570	14.25	3.12	0.24	4.65	15.33	95.60	252.00
	06/23/14 10:56:19	6600	14.47	2.93	0.25	4.53	15.45	95.70	274.00
	06/23/14 10:56:49	6630	14.29	3.85	0.24	4.61	15.45	95.70	274.00
	06/23/14 10:57:19	6660	14.24	3.42	0.22	4.67	16.72	95.80	275.00
	06/23/14 10:57:49	6690	14.38	3.28	0.22	4.52	16.72	95.80	275.00
	06/23/14 10:58:19	6720	13.93	2.91	0.26	4.84	23.33	96.00	324.00
	06/23/14 10:58:49	6750	14.04	2.46	0.32	4.85	23.33	96.00	324.00
	06/23/14 10:59:19	6780	14.18	4.58	0.36	4.70	30.86	96.20	375.00
	06/23/14 10:59:49	6810	13.56	10.11	0.32	5.12	30.86	96.20	375.00
	06/23/14 11:00:19	6840	13.90	8.37	0.32	4.89	30.17	96.50	374.00
	06/23/14 11:00:49	6870	13.87	6.46	0.29	4.99	30.17	96.50	374.00
	06/23/14 11:01:19	6900	13.61	6.35	0.26	5.01	30.12	96.70	374.00
	06/23/14 11:01:49	6930	13.64	5.58	0.26	5.10	30.12	96.70	374.00
	06/23/14 11:02:19	6960	13.68	5.93	0.23	5.09	30.36	96.90	363.00
	06/23/14 11:02:49	6990	13.86	4.99	0.22	4.92	30.36	96.90	363.00
	06/23/14 11:03:19	7020	13.60	4.70	0.23	5.10	29.92	97.10	374.00
	06/23/14 11:03:49	7050	13.75	7.63	0.19	5.07	29.92	97.10	374.00
A3	06/23/14 11:04:19	7080	13.83	6.19	0.15	4.96	29.62	97.20	373.00
	06/23/14 11:04:49	7110	13.79	5.06	0.20	4.94	29.62	97.20	373.00
	06/23/14 11:05:19	7140	13.58	7.80	0.15	5.11	28.79	97.40	372.00
	06/23/14 11:05:49	7170	13.54	5.26	0.19	5.16	28.79	97.40	372.00
	06/23/14 11:06:19	7200	13.63	4.89	0.19	5.04	20.90	97.50	310.00
	06/23/14 11:06:49	7230	14.13	3.22	0.15	4.91	20.90	97.50	310.00
	06/23/14 11:07:19	7260	15.11	3.77	0.31	4.12	15.94	97.60	252.00
	06/23/14 11:07:49	7290	14.13	5.17	0.14	4.59	15.94	97.60	252.00
	06/23/14 11:08:19	7320	14.18	3.73	0.12	4.69	15.92	97.70	263.00
	06/23/14 11:08:49	7350	13.84	3.19	0.12	4.96	15.92	97.70	263.00
	06/23/14 11:09:19	7380	13.98	3.76	0.12	4.87	14.84	97.80	251.00
	06/23/14 11:09:49	7410	14.32	3.55	0.12	4.63	14.84	97.80	251.00
	06/23/14 11:10:19	7440	14.38	3.68	0.12	4.59	14.92	97.80	251.00
	06/23/14 11:10:49	7470	14.45	3.33	0.12	4.50	14.92	97.80	251.00
	06/23/14 11:11:19	7500	14.35	3.67	0.13	4.62	15.03	97.90	262.00
	06/23/14 11:11:49	7530	14.55	3.41	0.11	4.45	15.03	97.90	262.00
	06/23/14 11:12:19	7560	14.26	2.95	0.11	4.63	15.14	98.00	251.00
	06/23/14 11:12:49	7590	14.26	3.26	0.13	4.63	15.14	98.00	251.00
	06/23/14 11:13:19	7620	14.23	3.25	0.13	4.68	14.73	98.00	251.00
	06/23/14 11:13:49	7650	14.52	3.19	0.15	4.50	14.73	98.00	251.00
	06/23/14 11:14:19	7680	14.60	3.64	0.17	4.38	16.03	98.10	274.00
	06/23/14 11:14:49	7710	14.38	3.97	0.15	4.53	16.03	98.10	274.00
	06/23/14 11:15:19	7740	14.89	3.45	0.23	4.28	26.63	98.30	348.00
	06/23/14 11:15:49	7770	14.13	4.34	0.18	4.61	26.63	98.30	348.00
	06/23/14 11:16:19	7800	13.66	6.63	0.16	5.08	29.65	98.50	361.00
	06/23/14 11:16:49	7830	13.48	6.64	0.12	5.23	29.65	98.50	361.00
	06/23/14 11:17:19	7860	13.73	5.86	0.17	5.04	29.09	98.70	361.00
	06/23/14 11:17:49	7890	13.91	8.16	0.17	4.90	29.09	98.70	361.00

CIMARRON ENERGY, INC.

June 23, 2014

24 ECD

Norman Facility

Unit Data

Meas. Stack Moisture	5.8	%
Stack Exhaust Flow (M2)	25,720	SCFH

Weather Data

Barometric Pressure	29.81	in. Hg
Relative Humidity	58	%
Ambient Temperature	84	°F
Specific Humidity	0.014565	lb H ₂ O / lb air

70-100-70 Load, Run - 24 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
06/23/14 11:18:19	7920	13.67	7.23	0.15	5.05	29.34	98.90	383.00
06/23/14 11:18:49	7950	13.50	8.15	0.13	5.16	29.34	98.90	383.00
06/23/14 11:19:19	7980	13.52	4.30	0.17	5.19	29.29	99.20	360.00
06/23/14 11:19:49	8010	13.40	5.86	0.10	5.19	29.29	99.20	360.00
06/23/14 11:20:19	8040	13.42	3.88	0.12	5.29	29.40	99.30	372.00
06/23/14 11:20:49	8070	13.61	4.34	0.12	5.14	29.40	99.30	372.00
06/23/14 11:21:19	8100	13.40	3.11	0.12	5.24	26.99	99.40	348.00
06/23/14 11:21:49	8130	13.67	3.26	0.12	5.09	26.99	99.40	348.00
06/23/14 11:22:19	8160	14.01	5.85	0.13	4.84	20.70	99.50	298.00
06/23/14 11:22:49	8190	13.39	4.61	0.12	5.26	20.70	99.50	298.00
06/23/14 11:23:19	8220	13.34	3.72	0.14	5.29	16.28	99.60	273.00
06/23/14 11:23:49	8250	14.12	2.52	0.14	4.85	16.28	99.60	273.00
06/23/14 11:24:19	8280	13.95	2.88	0.11	4.84	15.33	99.60	262.00
06/23/14 11:24:49	8310	13.85	2.65	0.12	4.97	15.33	99.60	262.00
06/23/14 11:25:19	8340	14.15	2.91	0.13	4.75	15.17	99.70	262.00
06/23/14 11:25:49	8370	14.31	3.52	0.15	4.61	15.17	99.70	262.00
06/23/14 11:26:19	8400	14.33	3.53	0.15	4.62	15.69	99.80	251.00
06/23/14 11:26:49	8430	14.00	4.01	0.11	4.81	15.69	99.80	251.00
06/23/14 11:27:19	8460	14.19	3.72	0.10	4.73	15.25	99.90	251.00
06/23/14 11:27:49	8490	14.21	3.32	0.12	4.68	15.25	99.90	251.00
06/23/14 11:28:19	8520	13.87	3.55	0.12	4.91	15.11	100.10	251.00
RAW AVERAGE		13.88	5.08	0.21	4.93	21.79	95.17	309.21

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	0.17	0.13	0.04			
	Final Zero	0.03	-0.03	0.05	0.06			
	Avg. Zero	0.03	0.07	0.09	0.05			
	Initial UpScale	12.02	11.40	3.14	9.27			
	Final UpScale	12.00	11.05	3.00	9.29			
	Avg. UpScale	12.01	11.23	3.07	9.28			
Upscale Cal Gas		12.25	11.00	3.04	9.33			

EMISSIONS DATA	O₂	CO	THC	CO₂
Corrected Raw Average (ppm/% dry basis)	14.16	4.94	0.12	4.93
Corrected Raw Average (ppm/% wet basis)	13.34	4.65	0.11	4.64
Emission Rate (lb/hr)	N/A	0.01	0.00	N/A

CIMARRON ENERGY, INC.
24 ECD
Norman Facility

Unit Data

Meas. Stack Moisture	5.4	%
Stack Exhaust Flow (M2)	25,684	SCFH

Weather Data

Barometric Pressure	29.88	in. Hg
Relative Humidity	55	%
Ambient Temperature	82	°F
Specific Humidity	0.012884	lb H ₂ O / lb air

70-100-70 Load, Run - 24 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	06/23/14 11:45:19	9540	13.85	2.40	-0.06	4.94	15.25	101.00	261.00
	06/23/14 11:45:49	9570	14.20	2.40	0.00	4.74	15.25	101.00	261.00
	06/23/14 11:46:19	9600	14.17	2.75	0.00	4.70	15.89	101.10	262.00
	06/23/14 11:46:49	9630	14.24	3.44	-0.01	4.68	15.89	101.10	262.00
	06/23/14 11:47:19	9660	14.45	2.85	-0.02	4.54	14.92	101.20	261.00
	06/23/14 11:47:49	9690	14.40	2.30	0.02	4.51	14.92	101.20	261.00
	06/23/14 11:48:19	9720	14.08	2.46	0.02	4.78	15.97	101.20	262.00
	06/23/14 11:48:49	9750	13.93	2.86	0.00	4.88	15.97	101.20	262.00
	06/23/14 11:49:19	9780	14.19	4.09	0.00	4.73	15.14	101.30	250.00
	06/23/14 11:49:49	9810	14.16	4.46	-0.02	4.76	15.14	101.30	250.00
	06/23/14 11:50:19	9840	14.25	3.15	-0.02	4.66	18.57	101.40	296.00
	06/23/14 11:50:49	9870	13.91	2.36	0.02	4.88	18.57	101.40	296.00
	06/23/14 11:51:19	9900	14.10	2.24	0.02	4.74	27.76	101.50	370.00
	06/23/14 11:51:49	9930	13.86	2.92	0.02	4.94	27.76	101.50	370.00
	06/23/14 11:52:19	9960	13.33	5.82	0.02	5.25	30.95	101.60	383.00
	06/23/14 11:52:49	9990	13.18	5.69	-0.01	5.45	30.95	101.60	383.00
	06/23/14 11:53:19	10020	13.36	3.93	-0.01	5.29	30.50	101.80	372.00
	06/23/14 11:53:49	10050	13.43	3.94	-0.03	5.29	30.50	101.80	372.00
	06/23/14 11:54:19	10080	13.31	5.22	-0.03	5.25	30.89	102.00	361.00
	06/23/14 11:54:49	10110	13.03	3.54	0.02	5.51	30.89	102.00	361.00
	06/23/14 11:55:19	10140	13.12	2.17	0.02	5.53	30.61	102.00	372.00
	06/23/14 11:55:49	10170	13.43	3.55	-0.01	5.24	30.61	102.00	372.00
	06/23/14 11:56:19	10200	13.58	4.16	-0.01	5.20	30.70	102.10	360.00
	06/23/14 11:56:49	10230	13.35	4.16	0.00	5.28	30.70	102.10	360.00
	06/23/14 11:57:19	10260	13.52	4.34	0.00	5.17	30.56	102.20	383.00
	06/23/14 11:57:49	10290	13.41	5.28	-0.01	5.25	30.56	102.20	383.00
	06/23/14 11:58:19	10320	13.41	4.19	0.02	5.27	26.66	102.30	357.00
	06/23/14 11:58:49	10350	13.56	4.21	0.28	5.20	26.66	102.30	357.00
	06/23/14 11:59:19	10380	14.02	4.47	0.26	4.80	20.10	102.30	297.00
	06/23/14 11:59:49	10410	13.99	2.95	0.29	4.92	20.10	102.30	297.00
	06/23/14 12:00:19	10440	14.07	2.57	0.30	4.78	15.14	102.30	261.00
	06/23/14 12:00:49	10470	14.15	2.75	0.33	4.74	15.14	102.30	261.00
	06/23/14 12:01:19	10500	14.17	2.84	0.32	4.75	14.73	102.30	249.00
	06/23/14 12:01:49	10530	14.36	2.67	0.30	4.61	14.73	102.30	249.00
	06/23/14 12:02:19	10560	14.46	2.78	0.35	4.46	15.36	102.20	261.00
	06/23/14 12:02:49	10590	14.07	3.03	0.34	4.81	15.36	102.20	261.00
	06/23/14 12:03:19	10620	14.24	2.64	0.34	4.68	14.42	102.30	249.00
	06/23/14 12:03:49	10650	14.40	3.27	0.38	4.60	14.42	102.30	249.00
	06/23/14 12:04:19	10680	14.23	3.47	0.38	4.66	15.61	102.30	261.00
	06/23/14 12:04:49	10710	13.79	3.52	0.33	4.93	15.61	102.30	261.00
	06/23/14 12:05:19	10740	14.06	4.04	0.33	4.85	15.06	102.30	260.00
	06/23/14 12:05:49	10770	14.24	4.24	0.32	4.66	15.06	102.30	260.00
	06/23/14 12:06:19	10800	14.09	3.56	0.30	4.81	14.89	102.40	239.00
	06/23/14 12:06:49	10830	14.39	2.74	0.29	4.57	14.89	102.40	239.00
	06/23/14 12:07:19	10860	14.50	3.06	0.31	4.48	18.21	102.50	284.00
	06/23/14 12:07:49	10890	13.82	2.08	0.36	4.95	18.21	102.50	284.00
A2	06/23/14 12:08:19	10920	13.76	2.13	0.35	4.98	26.46	102.50	346.00
	06/23/14 12:08:49	10950	13.96	3.17	0.33	4.86	26.46	102.50	346.00
	06/23/14 12:09:19	10980	13.40	3.85	0.34	5.23	30.20	102.70	382.00
	06/23/14 12:09:49	11010	13.51	5.33	0.40	5.23	30.20	102.70	382.00
	06/23/14 12:10:19	11040	13.42	5.83	0.41	5.22	28.98	102.70	359.00
	06/23/14 12:10:49	11070	13.64	6.17	0.38	5.03	28.98	102.70	359.00
	06/23/14 12:11:19	11100	13.72	6.66	0.42	5.13	29.76	102.70	370.00
	06/23/14 12:11:49	11130	13.16	6.63	0.35	5.37	29.76	102.70	370.00
	06/23/14 12:12:19	11160	13.65	5.78	0.41	5.22	29.34	102.70	359.00
	06/23/14 12:12:49	11190	13.86	6.51	0.41	4.90	29.34	102.70	359.00
	06/23/14 12:13:19	11220	14.00	8.53	0.42	4.86	29.20	102.80	370.00
	06/23/14 12:13:49	11250	13.50	7.87	0.38	5.11	29.20	102.80	370.00
	06/23/14 12:14:19	11280	13.57	5.51	0.43	5.19	29.34	102.90	370.00
	06/23/14 12:14:49	11310	13.81	6.97	0.42	5.00	29.34	102.90	370.00
	06/23/14 12:15:19	11340	14.01	8.07	0.40	4.82	29.20	103.00	359.00

CIMARRON ENERGY, INC.
24 ECD
Norman Facility

Unit Data

Meas. Stack Moisture	5.4	%
Stack Exhaust Flow (M2)	25,684	SCFH

Weather Data

Barometric Pressure	29.88	in. Hg
Relative Humidity	55	%
Ambient Temperature	82	° F
Specific Humidity	0.012884	lb H ₂ O / lb air

70-100-70 Load, Run - 24 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
	06/23/14 12:15:49	11370	13.66	7.44	0.41	5.01	29.20	103.00	359.00
	06/23/14 12:16:19	11400	13.93	9.04	0.48	4.96	25.30	103.00	344.00
	06/23/14 12:16:49	11430	14.05	9.14	0.38	4.76	25.30	103.00	344.00
	06/23/14 12:17:19	11460	14.13	5.31	0.37	4.86	17.72	103.00	273.00
	06/23/14 12:17:49	11490	14.13	3.41	0.32	4.69	17.72	103.00	273.00
	06/23/14 12:18:19	11520	13.99	3.03	0.31	4.83	15.58	103.00	261.00
	06/23/14 12:18:49	11550	13.97	3.34	0.32	4.83	15.58	103.00	261.00
	06/23/14 12:19:19	11580	14.27	3.39	0.34	4.74	14.64	103.00	249.00
	06/23/14 12:19:49	11610	14.54	4.28	0.33	4.48	14.64	103.00	249.00
	06/23/14 12:20:19	11640	14.29	4.00	0.31	4.57	15.31	103.10	260.00
	06/23/14 12:20:49	11670	13.83	3.97	0.30	4.91	15.31	103.10	260.00
	06/23/14 12:21:19	11700	13.85	3.58	0.29	4.98	14.37	103.00	260.00
	06/23/14 12:21:49	11730	14.30	2.94	0.32	4.69	14.37	103.00	260.00
	06/23/14 12:22:19	11760	14.20	2.50	0.32	4.65	15.17	103.10	249.00
	06/23/14 12:22:49	11790	14.36	2.71	0.31	4.59	15.17	103.10	249.00
	06/23/14 12:23:19	11820	14.25	3.27	0.34	4.71	14.75	103.10	260.00
	06/23/14 12:23:49	11850	14.02	3.29	0.33	4.75	14.75	103.10	260.00
	06/23/14 12:24:19	11880	14.16	3.43	0.33	4.76	19.40	103.10	296.00
	06/23/14 12:24:49	11910	13.54	3.00	0.33	5.13	19.40	103.10	296.00
	06/23/14 12:25:19	11940	13.18	3.05	0.31	5.29	28.51	103.10	347.00
	06/23/14 12:25:49	11970	13.25	2.71	0.33	5.44	28.51	103.10	347.00
	06/23/14 12:26:19	12000	13.27	3.00	0.29	5.40	30.23	103.00	371.00
	06/23/14 12:26:49	12030	13.52	2.92	0.29	5.16	30.23	103.00	371.00
	06/23/14 12:27:19	12060	13.16	2.76	0.29	5.45	29.04	102.80	370.00
	06/23/14 12:27:49	12090	13.23	2.93	0.32	5.38	29.04	102.80	370.00
	06/23/14 12:28:19	12120	13.31	2.36	0.28	5.31	29.59	102.50	359.00
	06/23/14 12:28:49	12150	13.31	2.46	0.29	5.30	29.59	102.50	359.00
	06/23/14 12:29:19	12180	13.18	2.45	0.27	5.45	28.95	102.20	370.00
	06/23/14 12:29:49	12210	13.30	3.14	0.30	5.39	28.95	102.20	370.00
	06/23/14 12:30:19	12240	13.09	3.57	0.29	5.46	29.23	102.00	359.00
	06/23/14 12:30:49	12270	12.98	2.31	0.29	5.53	29.23	102.00	359.00
A3	06/23/14 12:31:19	12300	12.98	2.52	0.30	5.64	28.87	101.80	359.00
	06/23/14 12:31:49	12330	13.71	4.58	0.34	5.09	28.87	101.80	359.00
	06/23/14 12:32:19	12360	13.91	7.43	0.51	4.92	26.07	101.70	346.00
	06/23/14 12:32:49	12390	14.57	12.30	0.60	4.51	26.07	101.70	346.00
	06/23/14 12:33:19	12420	13.95	7.95	0.33	4.84	17.52	101.60	284.00
	06/23/14 12:33:49	12450	14.34	3.08	0.32	4.65	17.52	101.60	284.00
	06/23/14 12:34:19	12480	14.98	2.82	0.36	4.17	14.59	101.60	250.00
	06/23/14 12:34:49	12510	14.07	2.86	0.29	4.75	14.59	101.60	250.00
	06/23/14 12:35:19	12540	14.48	3.06	0.31	4.49	13.81	101.50	249.00
	06/23/14 12:35:49	12570	13.84	3.15	0.27	4.94	13.81	101.50	249.00
	06/23/14 12:36:19	12600	14.19	4.43	0.28	4.78	14.75	101.40	250.00
	06/23/14 12:36:49	12630	14.20	5.04	0.30	4.66	14.75	101.40	250.00
	06/23/14 12:37:19	12660	14.15	3.42	0.32	4.75	14.23	101.30	250.00
	06/23/14 12:37:49	12690	14.32	4.21	0.31	4.63	14.23	101.30	250.00
	06/23/14 12:38:19	12720	14.32	4.43	0.30	4.59	14.78	101.20	239.00
	06/23/14 12:38:49	12750	14.18	3.84	0.33	4.76	14.78	101.20	239.00
	06/23/14 12:39:19	12780	14.32	4.38	0.32	4.61	14.28	101.00	261.00
	06/23/14 12:39:49	12810	14.26	5.10	0.34	4.67	14.28	101.00	261.00
	06/23/14 12:40:19	12840	14.16	4.73	0.37	4.75	14.03	100.80	239.00
	06/23/14 12:40:49	12870	14.17	5.84	0.31	4.69	14.03	100.80	239.00
	06/23/14 12:41:19	12900	14.07	4.62	0.31	4.80	18.91	100.50	297.00
	06/23/14 12:41:49	12930	13.88	3.89	0.32	4.97	18.91	100.50	297.00
	06/23/14 12:42:19	12960	13.41	2.57	0.30	5.10	27.74	100.30	348.00
	06/23/14 12:42:49	12990	13.64	1.84	0.33	5.18	27.74	100.30	348.00
	06/23/14 12:43:19	13020	13.34	2.76	0.30	5.29	28.32	100.00	360.00
	06/23/14 12:43:49	13050	13.93	3.54	0.34	4.92	28.32	100.00	360.00
	06/23/14 12:44:19	13080	13.54	4.39	0.36	5.13	29.42	99.80	372.00
	06/23/14 12:44:49	13110	13.20	3.70	0.34	5.34	29.42	99.80	372.00
	06/23/14 12:45:19	13140	12.63	3.21	0.32	5.86	29.06	99.50	361.00
	06/23/14 12:45:49	13170	12.92	3.46	0.34	5.60	29.06	99.50	361.00

CIMARRON ENERGY, INC.
24 ECD
Norman Facility

Unit Data

Meas. Stack Moisture	5.4	%
Stack Exhaust Flow (M2)	25,684	SCFH

Weather Data

Barometric Pressure	29.88	in. Hg
Relative Humidity	55	%
Ambient Temperature	82	°F
Specific Humidity	0.012884	lb H ₂ O / lb air

70-100-70 Load, Run - 24 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
06/23/14 12:46:19	13200	13.48	4.73	0.37	5.30	29.26	99.10	372.00
06/23/14 12:46:49	13230	13.28	5.36	0.34	5.28	29.26	99.10	372.00
06/23/14 12:47:19	13260	13.10	4.40	0.33	5.50	29.15	99.10	361.00
06/23/14 12:47:49	13290	13.06	3.64	0.32	5.54	29.15	99.10	361.00
06/23/14 12:48:19	13320	12.92	3.96	0.32	5.58	25.30	99.10	347.00
06/23/14 12:48:49	13350	13.04	3.78	0.36	5.58	25.30	99.10	347.00
06/23/14 12:49:19	13380	13.68	4.04	0.37	5.10	16.50	99.20	274.00
06/23/14 12:49:49	13410	13.64	4.07	0.35	5.02	16.50	99.20	274.00
06/23/14 12:50:19	13440	13.26	2.31	0.33	5.47	15.03	99.20	262.00
06/23/14 12:50:49	13470	13.67	2.20	0.33	5.04	15.03	99.20	262.00
06/23/14 12:51:19	13500	13.60	2.85	0.30	5.21	14.64	99.40	251.00
06/23/14 12:51:49	13530	14.17	3.44	0.29	4.76	14.64	99.40	251.00
06/23/14 12:52:19	13560	14.37	4.03	0.31	4.62	14.75	99.50	262.00
06/23/14 12:52:49	13590	14.32	3.01	0.32	4.58	14.75	99.50	262.00
06/23/14 12:53:19	13620	14.42	3.18	0.33	4.59	14.06	99.60	250.00
06/23/14 12:53:49	13650	14.06	3.18	0.34	4.79	14.06	99.60	250.00
06/23/14 12:54:19	13680	14.40	2.92	0.36	4.59	15.14	99.80	262.00
06/23/14 12:54:49	13710	14.45	2.43	0.33	4.55	15.14	99.80	262.00
RAW AVERAGE		13.83	3.95	0.27	4.96	21.64	101.65	307.59

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	0.03	-0.03	0.05	0.06			
	Final Zero	-0.01	-0.08	0.02	0.05			
	Avg. Zero	0.01	-0.06	0.04	0.06			
	Initial UpScale	12.00	11.05	3.00	9.29			
	Final UpScale	11.98	10.79	3.15	9.35			
	Avg. UpScale	11.99	10.92	3.08	9.32			
Upscale Cal Gas		12.25	11.00	3.04	9.33			

EMISSIONS DATA	O ₂	CO	THC	CO ₂
Corrected Raw Average (ppm/% dry basis)	14.13	4.01	0.24	4.94
Corrected Raw Average (ppm/% wet basis)	13.37	3.80	0.22	4.67
Emission Rate (lb/hr)	N/A	0.01	0.00	N/A

CIMARRON ENERGY, INC.

June 23, 2014

24 ECD

Norman Facility

Unit Data

Meas. Stack Moisture	5.4	%
Stack Exhaust Flow (M2)	25,408	SCFH

Weather Data

Barometric Pressure	29.88	in. Hg
Relative Humidity	60	%
Ambient Temperature	81	°F
Specific Humidity	0.013621	lb H ₂ O / lb air

70-100-70 Load, Run - 24 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
A1	06/23/14 13:15:19	14940	13.98	4.97	0.00	4.88	14.28	98.90	240.00
	06/23/14 13:15:49	14970	14.04	5.69	0.06	4.83	14.28	98.90	240.00
	06/23/14 13:16:19	15000	14.41	5.87	0.11	4.56	14.84	98.90	262.00
	06/23/14 13:16:49	15030	13.96	5.44	0.04	4.86	14.84	98.90	262.00
	06/23/14 13:17:19	15060	13.98	5.29	0.06	4.88	14.20	98.80	262.00
	06/23/14 13:17:49	15090	14.52	5.43	0.02	4.53	14.20	98.80	262.00
	06/23/14 13:18:19	15120	14.02	4.77	-0.01	4.78	14.48	98.90	251.00
	06/23/14 13:18:49	15150	13.91	4.64	0.03	4.96	14.48	98.90	251.00
	06/23/14 13:19:19	15180	13.92	5.77	0.04	4.91	15.03	99.00	262.00
	06/23/14 13:19:49	15210	14.24	6.09	0.03	4.73	15.03	99.00	262.00
	06/23/14 13:20:19	15240	14.19	5.07	0.03	4.71	21.29	99.00	321.00
	06/23/14 13:20:49	15270	13.78	3.86	0.05	4.95	21.29	99.00	321.00
	06/23/14 13:21:19	15300	12.73	3.13	0.10	5.64	27.29	99.00	348.00
	06/23/14 13:21:49	15330	13.72	2.99	0.49	5.20	27.29	99.00	348.00
	06/23/14 13:22:19	15360	13.25	5.96	0.46	5.37	30.25	98.80	362.00
	06/23/14 13:22:49	15390	13.24	6.78	0.49	5.38	30.25	98.80	362.00
	06/23/14 13:23:19	15420	13.60	7.71	0.52	5.21	29.48	98.60	362.00
	06/23/14 13:23:49	15450	13.77	9.08	0.56	5.02	29.48	98.60	362.00
	06/23/14 13:24:19	15480	13.96	9.12	0.54	4.90	29.51	98.30	362.00
	06/23/14 13:24:49	15510	13.58	7.89	0.49	5.12	29.51	98.30	362.00
	06/23/14 13:25:19	15540	13.86	7.18	0.54	5.02	29.15	98.00	362.00
	06/23/14 13:25:49	15570	13.91	9.18	0.61	4.90	29.15	98.00	362.00
	06/23/14 13:26:19	15600	13.92	10.68	0.60	4.90	29.34	97.80	373.00
	06/23/14 13:26:49	15630	13.85	9.75	0.56	4.98	29.34	97.80	373.00
	06/23/14 13:27:19	15660	14.01	7.78	0.52	4.87	29.23	97.50	362.00
	06/23/14 13:27:49	15690	13.33	5.67	0.46	5.28	29.23	97.50	362.00
	06/23/14 13:28:19	15720	13.01	3.99	0.44	5.53	21.95	97.30	323.00
	06/23/14 13:28:49	15750	13.56	1.78	0.43	5.21	21.95	97.30	323.00
	06/23/14 13:29:19	15780	13.78	1.77	1.36	5.24	15.47	97.10	263.00
	06/23/14 13:29:49	15810	14.94	8.35	0.58	4.07	15.47	97.10	263.00
	06/23/14 13:30:19	15840	14.14	5.76	0.46	4.69	15.64	97.00	263.00
	06/23/14 13:30:49	15870	14.22	3.67	0.46	4.74	15.64	97.00	263.00
	06/23/14 13:31:19	15900	13.84	3.15	0.42	4.93	14.84	97.00	252.00
	06/23/14 13:31:49	15930	13.69	2.35	0.44	5.05	14.84	97.00	252.00
	06/23/14 13:32:19	15960	13.82	1.83	0.44	5.00	15.25	96.90	252.00
	06/23/14 13:32:49	15990	13.63	1.66	0.43	5.16	15.25	96.90	252.00
	06/23/14 13:33:19	16020	13.84	1.75	0.44	4.96	14.73	96.80	263.00
	06/23/14 13:33:49	16050	13.70	2.04	0.41	5.04	14.73	96.80	263.00
	06/23/14 13:34:19	16080	13.64	1.92	0.40	5.15	13.95	96.70	241.00
	06/23/14 13:34:49	16110	14.11	1.93	0.44	4.84	13.95	96.70	241.00
	06/23/14 13:35:19	16140	14.37	2.59	0.45	4.58	14.78	96.50	252.00
	06/23/14 13:35:49	16170	14.19	2.33	0.46	4.72	14.78	96.50	252.00
	06/23/14 13:36:19	16200	14.06	1.86	0.45	4.81	14.14	96.40	241.00
	06/23/14 13:36:49	16230	13.90	2.07	0.45	4.92	14.14	96.40	241.00
	06/23/14 13:37:19	16260	14.04	2.49	0.44	4.78	20.82	96.10	312.00
	06/23/14 13:37:49	16290	13.05	2.08	0.42	5.52	20.82	96.10	312.00
A2	06/23/14 13:38:19	16320	12.33	1.98	0.42	5.87	28.70	95.90	363.00
	06/23/14 13:38:49	16350	12.68	1.45	0.42	5.92	28.70	95.90	363.00
	06/23/14 13:39:19	16380	13.03	3.28	0.43	5.57	30.34	95.70	376.00
	06/23/14 13:39:49	16410	13.00	4.11	0.44	5.59	30.34	95.70	376.00
	06/23/14 13:40:19	16440	13.11	3.23	0.47	5.52	30.89	95.50	376.00
	06/23/14 13:40:49	16470	13.74	8.12	0.50	5.11	30.89	95.50	376.00
	06/23/14 13:41:19	16500	13.76	9.14	0.45	5.00	30.92	95.50	376.00
	06/23/14 13:41:49	16530	13.69	7.62	0.49	5.09	30.92	95.50	376.00
	06/23/14 13:42:19	16560	13.45	9.81	0.45	5.20	31.31	95.50	377.00
	06/23/14 13:42:49	16590	13.12	6.80	0.42	5.49	31.31	95.50	377.00
	06/23/14 13:43:19	16620	13.10	3.30	0.43	5.54	30.64	95.70	376.00
	06/23/14 13:43:49	16650	13.43	4.29	0.46	5.23	30.64	95.70	376.00
	06/23/14 13:44:19	16680	13.39	4.68	0.47	5.29	31.14	95.90	387.00
	06/23/14 13:44:49	16710	13.53	4.67	0.46	5.24	31.14	95.90	387.00

CIMARRON ENERGY, INC.

June 23, 2014

24 ECD

Norman Facility

Unit Data

Meas. Stack Moisture	5.4	%
Stack Exhaust Flow (M2)	25,408	SCFH

Weather Data

Barometric Pressure	29.88	in. Hg
Relative Humidity	60	%
Ambient Temperature	81	°F
Specific Humidity	0.013621	lb H ₂ O / lb air

70-100-70 Load, Run - 24 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
	06/23/14 13:45:19	16740	13.41	4.93	0.47	5.23	28.59	96.00	363.00
	06/23/14 13:45:49	16770	13.70	4.98	0.49	5.13	28.59	96.00	363.00
	06/23/14 13:46:19	16800	13.03	5.67	0.43	5.45	18.32	96.10	288.00
	06/23/14 13:46:49	16830	13.31	1.66	0.43	5.37	18.32	96.10	288.00
	06/23/14 13:47:19	16860	14.20	2.01	0.42	4.80	14.34	96.10	252.00
	06/23/14 13:47:49	16890	14.24	2.71	0.41	4.71	14.34	96.10	252.00
	06/23/14 13:48:19	16920	14.11	2.47	0.40	4.77	15.25	96.10	263.00
	06/23/14 13:48:49	16950	13.66	2.29	0.38	5.04	15.25	96.10	263.00
	06/23/14 13:49:19	16980	13.72	1.64	0.41	5.07	15.50	96.20	253.00
	06/23/14 13:49:49	17010	13.93	1.62	0.41	4.93	15.50	96.20	253.00
	06/23/14 13:50:19	17040	13.70	1.72	0.43	5.09	14.73	96.10	252.00
	06/23/14 13:50:49	17070	13.73	2.20	0.42	5.02	14.73	96.10	252.00
	06/23/14 13:51:19	17100	13.66	2.04	0.43	5.06	14.73	96.00	252.00
	06/23/14 13:51:49	17130	13.70	2.02	0.41	5.10	14.73	96.00	252.00
	06/23/14 13:52:19	17160	14.03	2.21	0.41	4.90	15.03	95.80	253.00
	06/23/14 13:52:49	17190	14.13	1.98	0.43	4.74	15.03	95.80	253.00
	06/23/14 13:53:19	17220	13.60	2.05	0.45	5.11	14.37	95.80	252.00
	06/23/14 13:53:49	17250	13.77	1.96	0.44	5.05	14.37	95.80	252.00
	06/23/14 13:54:19	17280	13.58	1.99	0.43	5.10	19.98	95.70	311.00
	06/23/14 13:54:49	17310	13.23	1.94	0.48	5.35	19.98	95.70	311.00
	06/23/14 13:55:19	17340	13.87	1.89	0.52	5.06	29.31	95.60	363.00
	06/23/14 13:55:49	17370	13.30	3.34	0.47	5.25	29.31	95.60	363.00
	06/23/14 13:56:19	17400	13.36	2.77	0.47	5.36	30.53	95.60	376.00
	06/23/14 13:56:49	17430	13.30	3.51	0.47	5.27	30.53	95.60	376.00
	06/23/14 13:57:19	17460	13.02	2.28	0.47	5.56	29.73	95.40	375.00
	06/23/14 13:57:49	17490	12.96	2.13	0.45	5.60	29.73	95.40	375.00
	06/23/14 13:58:19	17520	13.88	4.12	0.52	5.05	29.89	95.30	364.00
	06/23/14 13:58:49	17550	14.04	6.54	0.54	4.84	29.89	95.30	364.00
	06/23/14 13:59:19	17580	14.05	8.27	0.52	4.80	30.28	95.30	376.00
	06/23/14 13:59:49	17610	13.88	8.24	0.49	4.97	30.28	95.30	376.00
	06/23/14 14:00:19	17640	13.53	5.75	0.45	5.19	29.76	95.20	375.00
	06/23/14 14:00:49	17670	14.01	4.99	0.54	4.89	29.76	95.20	375.00
A3	06/23/14 14:01:19	17700	13.75	7.97	0.48	4.94	30.03	95.10	364.00
	06/23/14 14:01:49	17730	13.82	5.93	0.52	5.07	30.03	95.10	364.00
	06/23/14 14:02:19	17760	13.23	5.24	0.45	5.33	25.52	95.00	349.00
	06/23/14 14:02:49	17790	13.76	4.67	0.49	5.00	25.52	95.00	349.00
	06/23/14 14:03:19	17820	13.83	4.11	0.43	5.03	18.52	94.90	288.00
	06/23/14 14:03:49	17850	13.20	1.61	0.45	5.43	18.52	94.90	288.00
	06/23/14 14:04:19	17880	14.01	1.45	0.46	4.92	15.33	94.90	253.00
	06/23/14 14:04:49	17910	14.12	2.05	0.45	4.75	15.33	94.90	253.00
	06/23/14 14:05:19	17940	14.06	2.13	0.43	4.83	13.90	94.80	252.00
	06/23/14 14:05:49	17970	14.31	2.08	0.43	4.65	13.90	94.80	252.00
	06/23/14 14:06:19	18000	14.42	2.22	0.44	4.58	14.31	94.80	253.00
	06/23/14 14:06:49	18030	14.15	2.33	0.46	4.71	14.31	94.80	253.00
	06/23/14 14:07:19	18060	14.09	2.36	0.44	4.81	13.78	94.90	241.00
	06/23/14 14:07:49	18090	13.89	2.91	0.42	4.90	13.78	94.90	241.00
	06/23/14 14:08:19	18120	14.00	2.71	0.44	4.89	14.59	94.90	264.00
	06/23/14 14:08:49	18150	14.12	2.55	0.41	4.77	14.59	94.90	264.00
	06/23/14 14:09:19	18180	14.35	2.72	0.42	4.63	13.76	95.10	252.00
	06/23/14 14:09:49	18210	14.31	2.51	0.45	4.65	13.76	95.10	252.00
	06/23/14 14:10:19	18240	14.53	2.31	0.45	4.47	14.42	95.40	241.00
	06/23/14 14:10:49	18270	14.42	2.51	0.43	4.57	14.42	95.40	241.00
	06/23/14 14:11:19	18300	14.57	2.88	0.42	4.44	18.24	95.60	288.00
	06/23/14 14:11:49	18330	13.61	2.51	0.43	5.05	18.24	95.60	288.00
	06/23/14 14:12:19	18360	13.80	1.86	0.43	5.01	24.72	96.00	337.00
	06/23/14 14:12:49	18390	13.62	2.04	0.45	5.12	24.72	96.00	337.00
	06/23/14 14:13:19	18420	14.11	4.84	0.51	4.80	29.48	96.30	363.00
	06/23/14 14:13:49	18450	13.90	5.96	0.48	4.92	29.48	96.30	363.00
	06/23/14 14:14:19	18480	14.07	7.36	0.50	4.81	29.01	96.70	362.00
	06/23/14 14:14:49	18510	13.94	7.23	0.48	4.89	29.01	96.70	362.00

Norman Facility

Meas. Stack Moisture	5.4	%
Stack Exhaust Flow (M2)	25,408	SCFH

Barometric Pressure	29.88	in. Hg
Relative Humidity	60	%
Ambient Temperature	81	°F
Specific Humidity	0.013621	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
06/23/14 14:15:19	18540	13.36	5.33	0.43	5.24	29.92	97.00	374.00
06/23/14 14:15:49	18570	12.85	2.69	0.43	5.64	29.92	97.00	374.00
06/23/14 14:16:19	18600	13.20	3.05	0.42	5.44	29.81	97.70	362.00
06/23/14 14:16:49	18630	13.31	3.41	0.43	5.38	29.81	97.70	362.00
06/23/14 14:17:19	18660	12.86	2.95	0.42	5.61	27.62	98.00	349.00
06/23/14 14:17:49	18690	12.53	2.36	0.41	5.87	27.62	98.00	349.00
06/23/14 14:18:19	18720	12.60	1.39	0.43	5.96	23.58	98.40	323.00
06/23/14 14:18:49	18750	13.19	2.36	0.43	5.51	23.58	98.40	323.00
06/23/14 14:19:19	18780	13.69	2.80	0.42	5.03	14.48	98.60	251.00
06/23/14 14:19:49	18810	13.44	2.03	0.42	5.28	14.48	98.60	251.00
06/23/14 14:20:19	18840	13.44	1.30	0.41	5.32	14.03	98.90	240.00
06/23/14 14:20:49	18870	14.50	2.08	0.43	4.56	14.03	98.90	240.00
06/23/14 14:21:19	18900	14.60	3.11	0.45	4.40	14.64	99.20	251.00
06/23/14 14:21:49	18930	14.37	3.07	0.43	4.59	14.64	99.20	251.00
06/23/14 14:22:19	18960	14.28	3.46	0.44	4.67	14.20	99.40	250.00
06/23/14 14:22:49	18990	14.08	3.26	0.43	4.77	14.20	99.40	250.00
06/23/14 14:23:19	19020	14.26	3.06	0.43	4.72	14.42	99.70	250.00
06/23/14 14:23:49	19050	14.32	2.77	0.39	4.61	14.42	99.70	250.00
06/23/14 14:24:19	19080	14.15	2.54	0.40	4.73	14.50	99.90	250.00
06/23/14 14:24:49	19110	14.15	2.57	0.45	4.74	14.50	99.90	250.00
06/23/14 14:25:19	19140	14.34	2.95	0.46	4.68	13.92	100.10	256.00

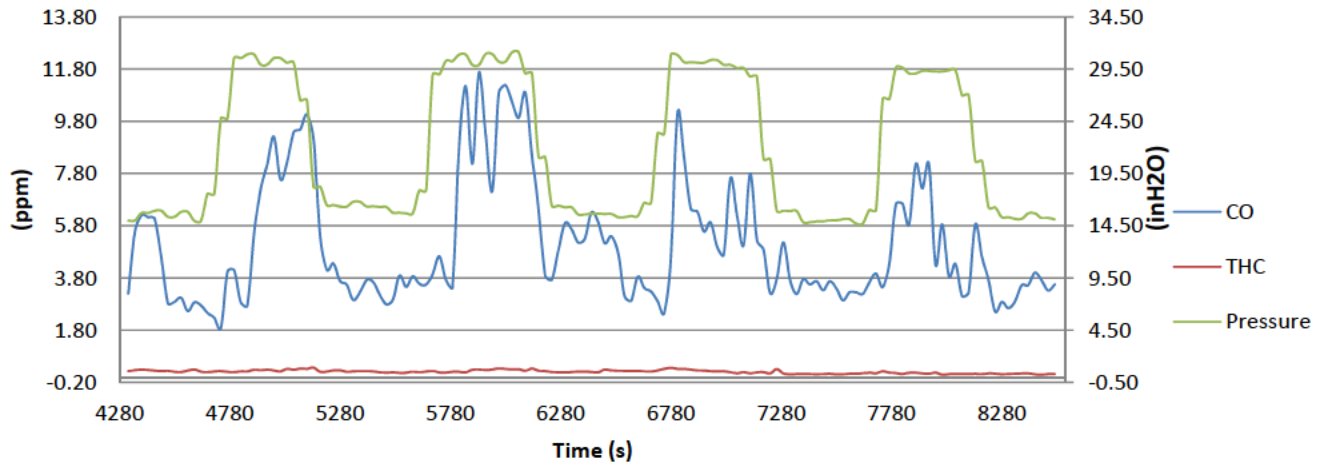
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	O ₂	CO	THC	CO ₂	Press. Trans	Temp. Trans.	F-Flow Trans.
Serial Number:	INST-22-0005	INST-CO-0034	INST-VC-0006	INST-22-0005	0	0	0
	(%)	(ppmvd)	(ppmvw)	(%)	(in. H ₂ O)	(°F)	(SCFH)
Initial Zero	-0.01	-0.08	0.02	0.05			
Final Zero	0.03	0.05	0.04	0.04			
Avg. Zero	0.01	-0.02	0.03	0.05			
Initial UpScale	11.98	10.79	3.15	9.35			
Final UpScale	11.99	10.79	3.19	9.32			
Avg. UpScale	11.99	10.79	3.17	9.34			

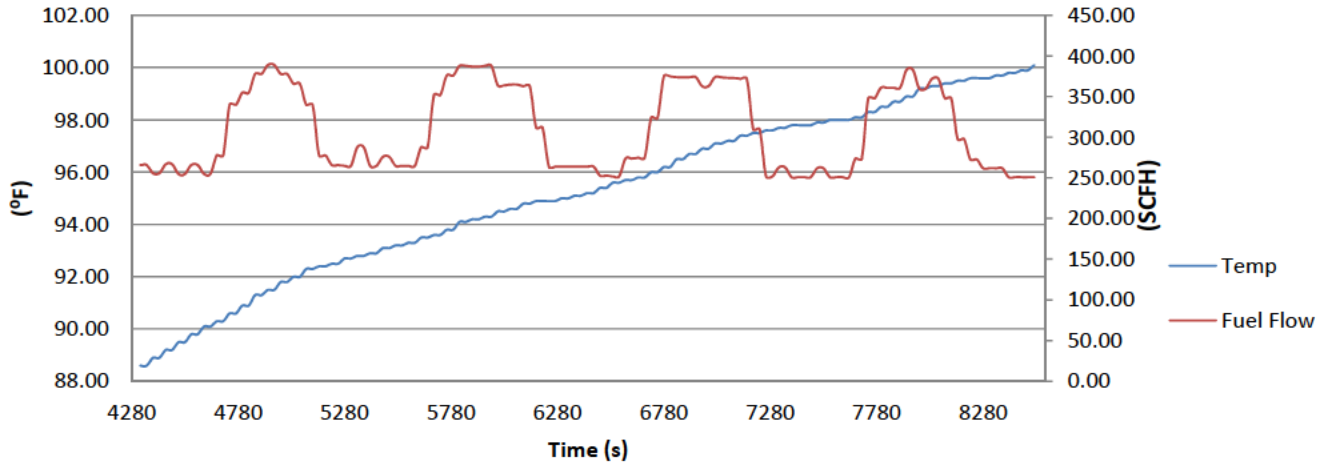
9.33

EMISSIONS DATA	O ₂	CO	THC	CO ₂
Corrected Raw Average (ppm/% dry basis)	14.06	4.01	0.38	5.01
Corrected Raw Average (ppm/% wet basis)	13.30	3.79	0.36	4.73
Emission Rate (lb/hr)	N/A	0.01	0.00	N/A

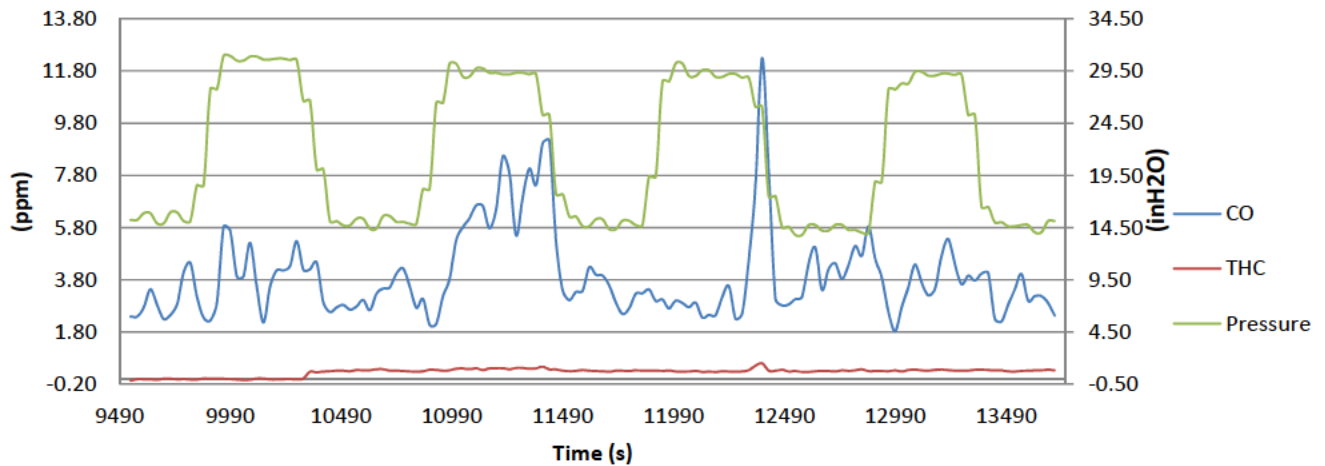
24 ECD R7

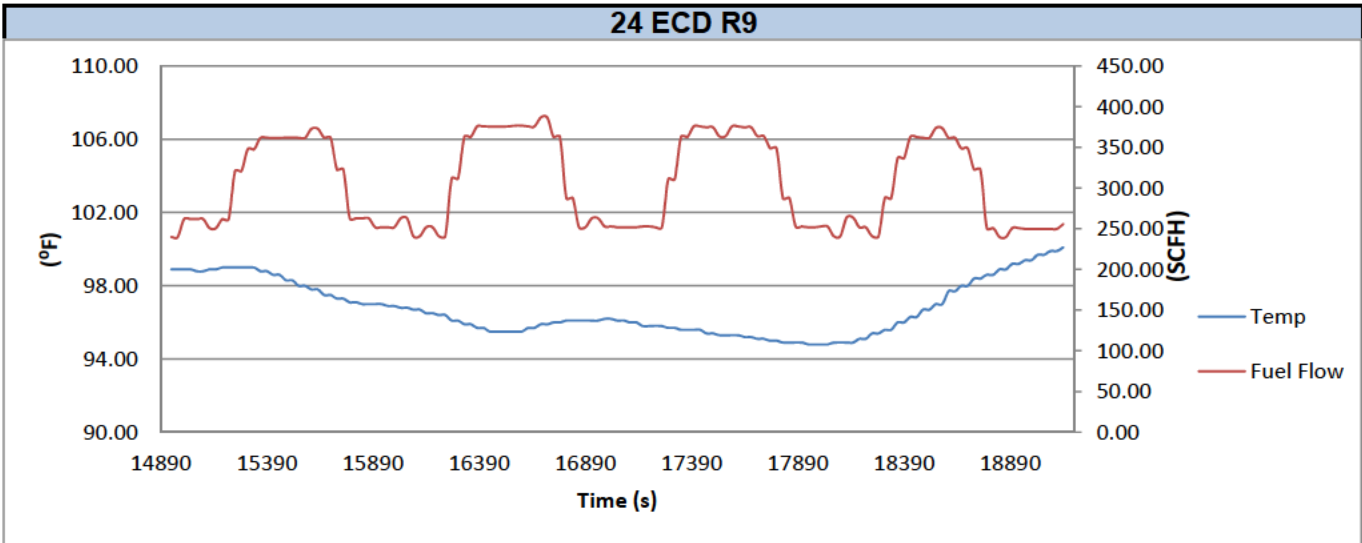
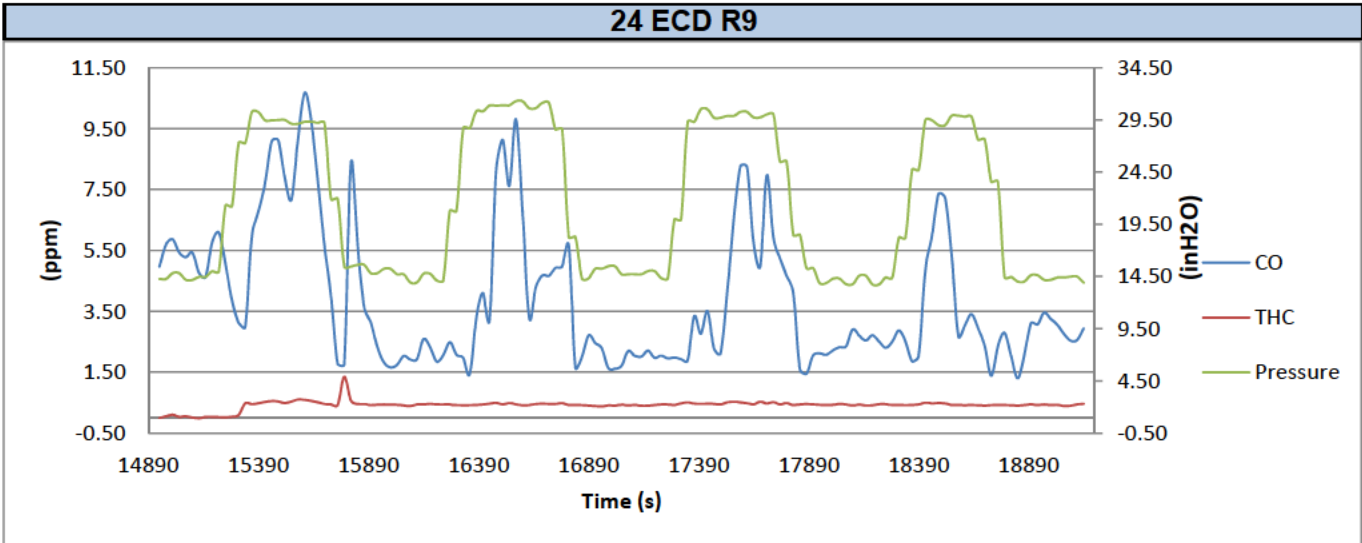
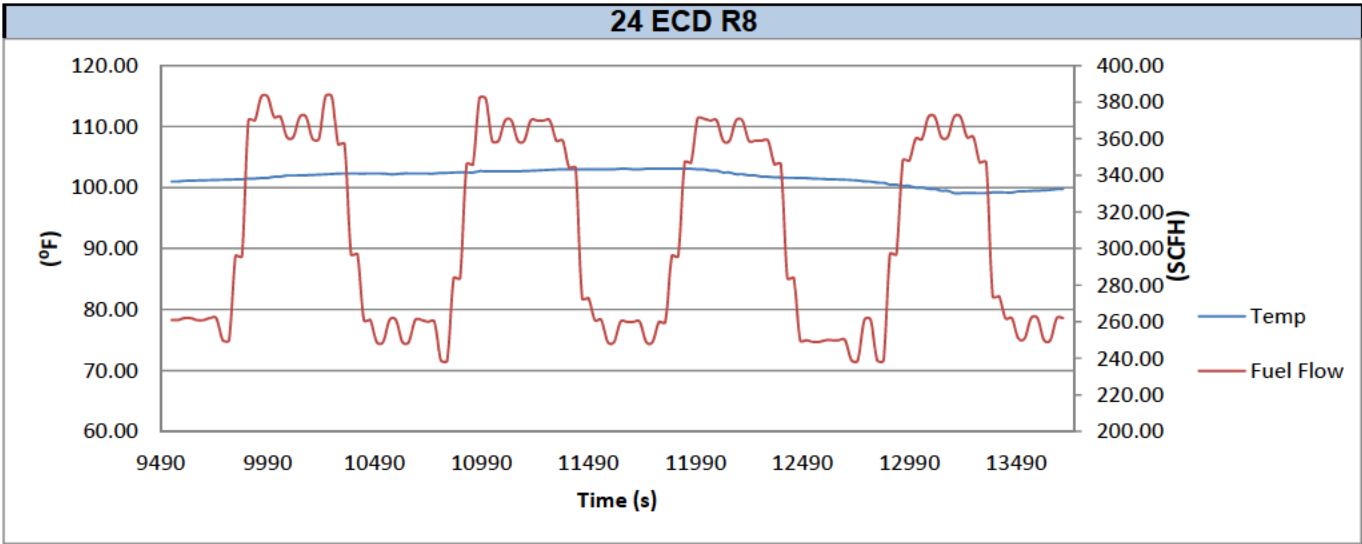


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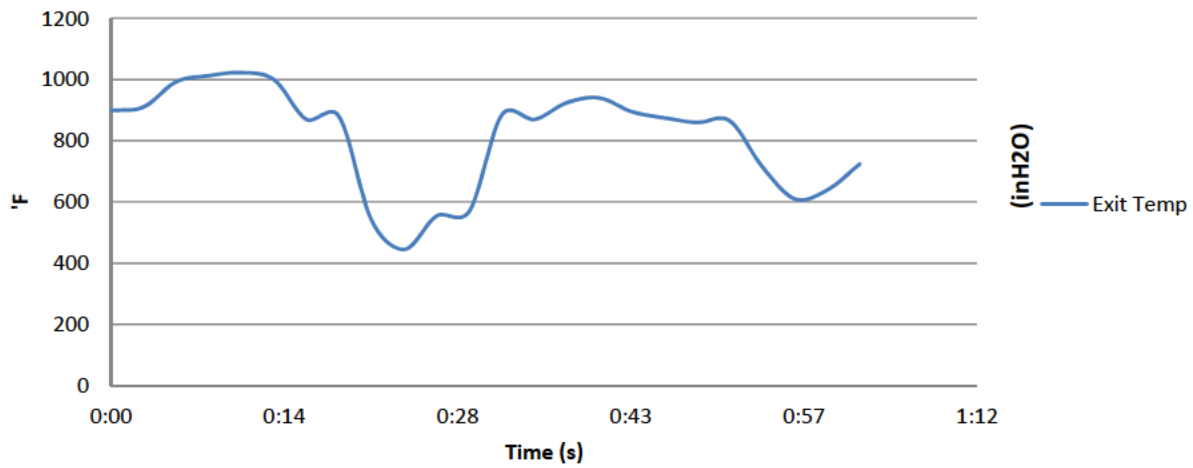


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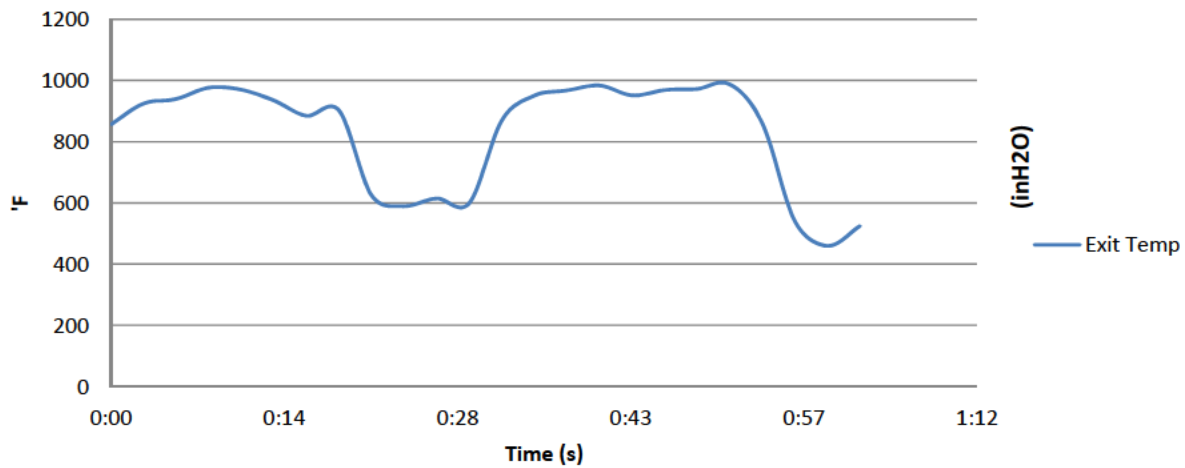




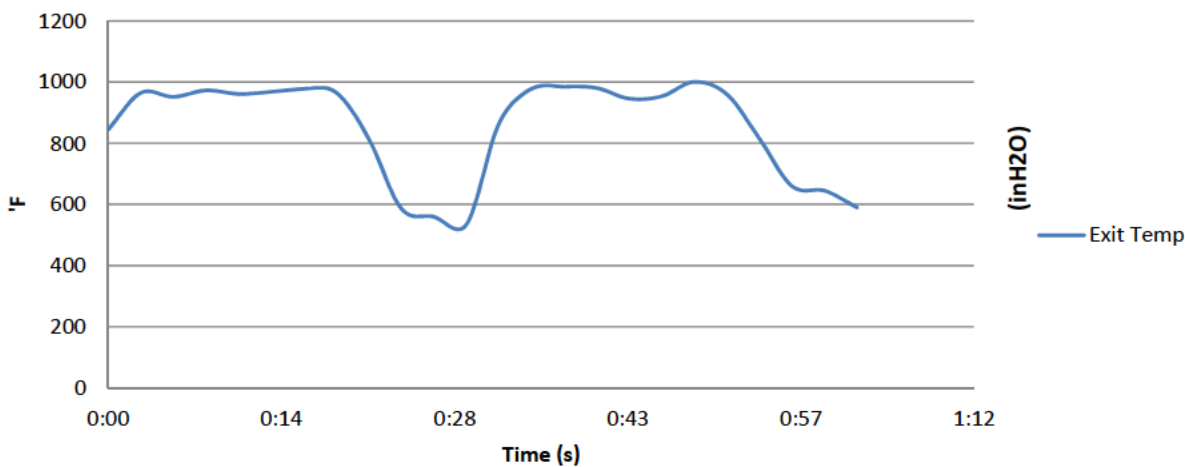
24 ECD R7



24 ECD R8



24 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	24 ECD
Fuel Type	Gas, Propene

Test Information			
Project #		cei-14-norman.ok-comp#1	
Operator		DG	
Date for Preliminary Run	(mm/dd/yy)	06/20/14	
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)	06/20/14	06/20/14	06/20/14	
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	24 ECD
Project #	cei-14-norman.ok-comp#1

Historical Data	90-100%-10	90-100%-11	90-100%-12	Average	Units
Run Start Time	12:18	13:50	15:15		hh:mm
Run Stop Time	13:28	14:00	16:25		hh:mm
Test Date	06/20/14	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		
Stack Test Data	90-100%-10	90-100%-11	90-100%-12	Average	Units
Initial Meter Volume	64.540	111.230	161.710		ft ³
Final Meter Volume	100.300	157.620	208.270		ft ³
Total Meter Volume	35.760	46.390	46.560	42.903	ft ³
Total Sampling Time	65.00	65.00	65.00	65.00	min
Average Meter Temperature	79.50	79.54	80.42	79.82	°F
Average Stack Temperature	915.00	959.63	955.71	943.44	°F
Barometric Pressure	29.98	29.98	29.99	29.98	in Hg
Stack Static Pressure	0.00	0.00	0.00	0.00	in H ₂ O
Absolute Stack Pressure	29.98	29.98	29.99	29.98	in Hg
Average Orifice Pressure Drop	1.90	1.90	1.90	1.90	in H ₂ O
Absolute Meter Pressure	30.12	30.12	30.13	30.12	in Hg
Avg Square Root Pitot Pressure	0.07	0.07	0.07	0.07	√(in H ₂ O)
Moisture Content Data	90-100%-10	90-100%-11	90-100%-12	Average	Units
Impinger Water Weight Gain	20.60	52.00	50.00	40.87	g
Silica Gel Weight Gain	8.80	9.60	10.10	9.50	g
Total Water Volume Collected	29.45	61.71	60.21	50.46	ml
Standard Water Vapor Volume	1.39	2.90	2.83	2.37	scf
Standard Meter Volume	35.6	46.2	46.3	42.7	dscf
Calculated Stack Moisture	3.75	5.92	5.77	5.15	%
Saturated Stack Moisture	100.00	100.00	100.00	100.00	%
Reported Stack Moisture Content	3.75	5.92	5.77	5.15	%
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	79.9	79.8	79.9	%
Stack Dry Molecular Weight	29.45	29.45	29.40	29.44	lb/lb-mole
Stack Wet Molecular Weight	29.02	28.78	28.75	28.85	lb/lb-mole
Percent Excess Air	235.6	240.6	241.6	239.2	%
Volumetric Flow Rate Data	90-100%-10	90-100%-11	90-100%-12	Average	Units
Average Stack Gas Velocity	6.21	6.34	6.34	6.30	ft/sec
Stack Cross-Sectional Area	3.05	3.05	3.05	3.05	ft ²
Actual Stack Flow Rate	1,135	1,158	1,158	1,151	acfm
Wet Standard Stack Flow Rate	26	26	26	26	wkscfh
Dry Standard Stack Flow Rate	25,224	24,368	24,482	24,691	dscfh

METHOD 3C - DETERMINATION OF DRY MOLECULAR WEIGHT BY ANALYZER

Plant Name	Norman Facility	Preliminary Date	06/20/14		
Sampling Location	24 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	06/20/14	Run Start Time	12:18	Run Stop Time	13:28
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	29.45	1.142	235.6	N/A

Gas Analysis Data								
Run Number	90-100%-11		Date	06/20/14	Run Start Time	13:50	Run Stop Time	14:00
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		%	
00:10	5.3	14.9	0.0	79.9	29.45	1.141	240.6	N/A

Gas Analysis Data								
Run Number	90-100%-12		Date	06/20/14	Run Start Time	15:15	Run Stop Time	16:25
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	06/20/14
Sampling Location	24 ECD	Operator	DG
Project #	cei-14-norman.ok-comp#1	Ports Used	2

Moisture Content Data								
Run Number	90-100%-10		Date	06/20/14	Start Time	12:18	Stop Time	13:28
Meter Box Number	SAMP-CP-0023				Meter Cal Factor	(Y)	1.010	
Total Meter Volume	(V _m)	35.760	dcf		Barometric Pressure	(P _b)	29.98	in Hg
Average Stack Temp	(t _s) _{avg}	915	°F		Stack Static Pressure	(P _{static})	0.00	in H ₂ O
Average Meter Temp	(t _m) _{avg}	80	°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)	778.00	718.80	571.30	963.40			
Initial Value	(V _i),(W _i)	760.50	716.50	570.50	954.60			
Net Value	(V _n),(W _n)	17.5	2.3	0.8	8.8			
Results								
Total Weight	(W _f)	29.40	g	Water Vol Weighed	(V _{wsg(std)})	1.386	scf	
Std Meter Volume	(V _{m(std)})	35.584	dscf	Sat. Moisture Content	(B _{ws(svp)})	100.00	%	
Calc Moisture Content	(B _{ws(calc)})	3.75	%	Final Moisture Content	(B _{ws})	3.75	%	

Moisture Content Data								
Run Number	90-100%-11		Date	06/20/14	Start Time	13:50	Stop Time	14:00
Meter Box Number	SAMP-CP-0023				Meter Cal Factor	(Y)	1.010	
Total Meter Volume	(V _m)	46.390	dcf		Barometric Pressure	(P _b)	29.98	in Hg
Average Stack Temp	(t _s) _{avg}	960	°F		Stack Static Pressure	(P _{static})	0.00	in H ₂ O
Average Meter Temp	(t _m) _{avg}	80	°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)	820.30	726.50	573.30	899.70			
Initial Value	(V _i),(W _i)	778.00	718.80	571.30	890.10			
Net Value	(V _n),(W _n)	42.3	7.7	2.0	9.6			
Results								
Total Weight	(W _f)	61.60	g	Water Vol Weighed	(V _{wsg(std)})	2.904	scf	
Std Meter Volume	(V _{m(std)})	46.158	dscf	Sat. Moisture Content	(B _{ws(svp)})	100.00	%	
Calc Moisture Content	(B _{ws(calc)})	5.92	%	Final Moisture Content	(B _{ws})	5.92	%	

Moisture Content Data								
Run Number	90-100%-12		Date	06/20/14	Start Time	15:15	Stop Time	16:25
Meter Box Number	SAMP-CP-0023				Meter Cal Factor	(Y)	1.010	
Total Meter Volume	(V _m)	46.560	dcf		Barometric Pressure	(P _b)	29.99	in Hg
Average Stack Temp	(t _s) _{avg}	956	°F		Stack Static Pressure	(P _{static})	0.00	in H ₂ O
Average Meter Temp	(t _m) _{avg}	80	°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)	856.70	737.30	576.10	909.80			
Initial Value	(V _i),(W _i)	820.30	726.50	573.30	899.70			
Net Value	(V _n),(W _n)	36.4	10.8	2.8	10.1			
Results								
Total Weight	(W _f)	60.10	g	Water Vol Weighed	(V _{wsg(std)})	2.834	scf	
Std Meter Volume	(V _{m(std)})	46.267	dscf	Sat. Moisture Content	(B _{ws(svp)})	100.00	%	
Calc Moisture Content	(B _{ws(calc)})	5.77	%	Final Moisture Content	(B _{ws})	5.77	%	

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

Plant Name	Norman Facility
Sampling Location	24 ECD
Project #	cel-14-norman.ok-comp#1

Date	06/20/14
Operator	DG
Run Number	90-100%-10

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 (-)	0.25	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	12:18	End	13:28

Weights	Imp 1	Imp 2	Imp 3	Imp 4	Imp 5	Imp 6	Imp 7	Imp 8
Pre	760.5	716.5	570.5	954.6				
Post	778.0	718.8	571.3	963.4				

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)	0.5007 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)	915.0	F
Average Meter Temp	(t _m)	79.5	
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 _{wt})	3.75	%
Stack Dry Molecular Weight	(M _d)	29.45	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	64.540	0.005	1.877	1.90	982	250		68			77	77	0.0	0.07	6.37	1.560		37.429
A-2	2.7	00:02:43	66.100	0.005	1.877	1.90	1028	250		69			77	77	0.0	0.07	6.48	3.059		36.709
A-3	5.4	00:05:25	67.600	0.005	1.877	1.90	1047	250		68			78	78	0.0	0.07	6.52	4.596		36.766
A-4	8.1	00:08:07	69.140	0.005	1.877	1.90	1064	250		67			78	78	0.0	0.07	6.55	5.983		35.897
A-5	10.8	00:10:50	70.530	0.005	1.877	1.90	1061	250		68			79	79	0.0	0.07	6.55	7.447		35.745
A-6	13.5	00:13:33	72.000	0.005	1.877	1.90	1091	250		68			79	79	0.0	0.07	6.61	8.921		35.684
A-7	16.3	00:16:15	73.480	0.005	1.877	1.90	1077	250		68			79	79	0.0	0.07	6.58	10.305		35.333
A-8	19.0	00:18:58	74.870	0.005	1.877	1.90	943	250		66			80	80	0.0	0.07	6.29	11.787		35.360
A-9	21.7	00:21:40	76.360	0.005	1.877	1.90	786	250		65			80	80	0.0	0.07	5.93	13.248		35.328
A-10	24.4	00:24:22	77.830	0.005	1.877	1.90	741	250		64			80	80	0.0	0.07	5.82	14.769		35.446
A-11	27.1	00:27:05	79.360	0.005	1.877	1.90	546	250		63			80	80	0.0	0.07	5.32	16.380		35.737
A-12	29.8	00:29:47	80.980	0.005	1.877	1.90	582	250		62			81	81	0.0	0.07	5.42	17.898		35.796
B-1	32.5	00:32:30	82.510	0.005	1.877	1.90	873	250		66			80	80	0.0	0.07	6.13	19.528		36.052
B-2	35.2	00:35:12	84.150	0.005	1.877	1.90	974	250		61			80	80	0.0	0.07	6.36	20.870		35.778
B-3	37.9	00:37:55	85.500	0.005	1.877	1.90	988	250		59			80	80	0.0	0.07	6.39	22.421		35.874
B-4	40.6	00:40:37	87.060	0.005	1.877	1.90	991	250		59			80	80	0.0	0.07	6.39	23.883		35.824
B-5	43.3	00:43:20	88.530	0.005	1.877	1.90	1020	250		58			80	80	0.0	0.07	6.46	25.344		35.780
B-6	46.0	00:46:03	90.000	0.005	1.877	1.90	1025	250		58			80	80	0.0	0.07	6.47	26.905		35.873
B-7	48.8	00:48:45	91.570	0.005	1.877	1.90	1049	250		58			80	80	0.0	0.07	6.52	28.297		35.743
B-8	51.5	00:51:28	92.970	0.005	1.877	1.90	1042	250		59			80	80	0.0	0.07	6.51	29.659		35.590
B-9	54.2	00:54:10	94.340	0.005	1.877	1.90	943	250		59			80	80	0.0	0.07	6.29	31.200		35.657
B-10	56.9	00:56:53	95.890	0.005	1.877	1.90	808	250		59			80	80	0.0	0.07	5.98	32.661		35.630
B-11	59.6	00:59:35	97.360	0.005	1.877	1.90	674	250		59			80	80	0.0	0.07	5.65	34.182		35.668
B-12	62.3	01:02:18	98.890	0.005	1.877	1.90	625	250		59			80	80	0.0	0.07	5.53	35.584		35.584
Last Pt	65.0	01:05:00	100.300							60										
Final Val	65.0	01:05:00	100.300												Max Vac	0.0	Final Values	35.584		
Average Values				0.01		1.90	915	250		63			80	80		0.07	6.21			
													80							

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

Plant Name	Norman Facility
Sampling Location	24 ECD
Project #	cel-14-norman.ok-comp#1

Date	06/20/14
Operator	DG
Run Number	90-100%-11

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Coefficient	(C _p)	0.819	
Average Stack Temp	(t _s)	959.6	F
Average Meter Temp	(t _m)	79.5	
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})	5.92	%
Stack Dry Molecular Weight	(M _d)	29.45	lb/lb-mole
Estimated Orifice Flow Rate	(Q _m)	0.55	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 (+)	0.20	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 (-)	0.25	in H ₂ O for	30.0 sec

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)	0.4303 in
Probe Number	SAMP-SP-0001	
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)	29.98	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

Run Time			
Start	13:50	End	14:00

Weights	Imp 1	Imp 2	Imp 3	Imp 4	Imp 5	Imp 6	Imp 7	Imp 8
Pre	778.0	718.8	571.3	890.1				
Post	820.3	726.5	573.3	899.7				

Wash Volumes					ml
					ml

Traverse Point #	Sampling Time (Θ)	Timer Time	Dry Gas Meter Reading (V _m)	Velocity Head (Δp)	Desired Orifice ΔH (ΔH _d)	Actual Orifice ΔH (ΔH _a)	Stack Temp (t _s)	Snorkel Temp (248±25°F)	Filter Temp (248±25°F)	Impinger Exit Temp (568°F)	Cond. Temp (≤-°F)	CPM Filter Temp (-±-°F)	Meter Inlet Temp (t _{mi})	Meter Outlet Temp (t _{mo})	Pump Vacuum	Square Root ΔP (Δp ^{1/2})	Local Stack Velocity (v _s)	Cumul. Meter Volume (V _m) _{std}	Cumul. Percent IsoKinetic (I)	Est-Run Meter Volume (V _m) _{std}
	min	hh:mm:ss	ft ³	in H ₂ O	in H ₂ O	in H ₂ O	F	F	F	F	F	F	F	F	in Hg	√(in H ₂ O)	ft/sec	dscf	%	dscf
A-1	0.0	00:00:00	111.230	0.005	1.877	1.90	962	250		60			80	80	0.0	0.07	6.36	1.949		46.765
A-2	2.7	00:02:43	113.190	0.005	1.877	1.90	1018	250		51			80	80	0.0	0.07	6.48	3.768		45.214
A-3	5.4	00:05:25	115.020	0.005	1.877	1.90	1028	250		49			80	80	0.0	0.07	6.50	5.647		45.174
A-4	8.1	00:08:07	116.910	0.005	1.877	1.90	1057	250		47			80	80	0.0	0.07	6.57	7.516		45.095
A-5	10.8	00:10:50	118.790	0.005	1.877	1.90	1070	250		46			80	80	0.0	0.07	6.59	9.405		45.142
A-6	13.5	00:13:33	120.690	0.005	1.877	1.90	1085	250		46			80	80	0.0	0.07	6.63	11.244		44.975
A-7	16.3	00:16:15	122.540	0.005	1.877	1.90	1082	250		46			80	80	0.0	0.07	6.62	13.123		44.992
A-8	19.0	00:18:58	124.430	0.005	1.877	1.90	1067	250		46			80	80	0.0	0.07	6.59	15.260		45.780
A-9	21.7	00:21:40	126.580	0.005	1.877	1.90	1042	250		45			80	80	0.0	0.07	6.53	16.940		45.174
A-10	24.4	00:24:22	128.270	0.005	1.877	1.90	798	250		45			80	80	0.0	0.07	5.98	18.879		45.309
A-11	27.1	00:27:05	130.220	0.005	1.877	1.90	698	250		45			80	80	0.0	0.07	5.74	21.076		45.984
A-12	29.8	00:29:47	132.430	0.005	1.877	1.90	561	250		46			80	80	0.0	0.07	5.39	22.696		45.393
B-1	32.5	00:32:30	134.060	0.005	1.877	1.90	902	250		47			80	80	0.0	0.07	6.22	25.142		46.416
B-2	35.2	00:35:12	136.520	0.005	1.877	1.90	1062	250		48			79	79	0.0	0.07	6.58	26.616		45.628
B-3	37.9	00:37:55	138.000	0.005	1.877	1.90	1090	250		46			79	79	0.0	0.07	6.64	28.867		46.187
B-4	40.6	00:40:37	140.260	0.005	1.877	1.90	1098	250		46			79	79	0.0	0.07	6.65	30.909		46.363
B-5	43.3	00:43:20	142.310	0.005	1.877	1.90	1099	250		46			79	79	0.0	0.07	6.66	33.229		46.912
B-6	46.0	00:46:03	144.640	0.005	1.877	1.90	1101	250		46			79	79	0.0	0.07	6.66	34.873		46.497
B-7	48.8	00:48:45	146.290	0.005	1.877	1.90	1084	250		46			79	79	0.0	0.07	6.62	36.954		46.679
B-8	51.5	00:51:28	148.380	0.005	1.877	1.90	1081	250		45			79	79	0.0	0.07	6.62	38.090		45.708
B-9	54.2	00:54:10	149.520	0.005	1.877	1.90	860	250		46			79	79	0.0	0.07	6.12	40.132		45.865
B-10	56.9	00:56:53	151.570	0.005	1.877	1.90	890	250		46			79	79	0.0	0.07	6.19	42.114		45.942
B-11	59.6	00:59:35	153.560	0.005	1.877	1.90	676	250		46			79	79	0.0	0.07	5.68	44.165		46.086
B-12	62.3	01:02:18	155.620	0.005	1.877	1.90	620	250		47			79	79	0.0	0.07	5.54	46.157		46.157
Last Pt	65.0	01:05:00	157.620																	
Final Val	65.0	01:05:00	157.620												Max Vac	0.0	Final Values	46.157		
Average Values				0.01		1.90	960	250		47			80	80		0.07	6.34			
													80							

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		24 ECD				Operator		DG												
Project #		cel-14-norman.ok-comp#1				Run Number		90-100%-12												
Leak Checks										Sampling Equipment										
Train	Pre	0.000	ft ³ /min@	15.0	in Hg	Meter Box Number		SAMP-CP-0023												
PASS	Post	0.000	ft ³ /min@	15.0	in Hg	Meter Cal Factor		(Y)	1.010											
Pitot	Pre (+)	0.25	in H ₂ O for	30.0	sec	Nozzle Number														
< 3.0	Pre (-)	0.25	in H ₂ O for	30.0	sec	Average Nozzle Diameter		(D _{no})			in									
	Post (+)	0.20	in H ₂ O for	30.0	sec	Suggested Nozzle Diameter		(D _n)	0.4893		in									
	Post (-)	0.20	in H ₂ O for	30.0	sec	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												
Run Time										Pressures										
Start	15:15	End	16:25	Weights						Imp 1	Imp 2	Imp 3	Imp 4	Imp 5	Imp 6	Imp 7	Imp 8			
				Pre						820.3	726.5	573.3	899.7							
				Post						856.7	737.3	576.1	909.8							
				Barometric Pressure		(P _b)		29.99		in Hg										
				Stack Static Pressure		(P _{static})		0.00		in H ₂ O										
				Absolute Stack Pressure		(P _s)		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	161.710	0.005	1.877	1.90	1014	250		52			78	78	0.0	0.07	6.47	1.747		41.923
A-2	2.7	00:02:43	163.460	0.005	1.877	1.90	1025	250		50			79	79	0.0	0.07	6.50	3.560		42.721
A-3	5.4	00:05:25	165.280	0.005	1.877	1.90	1035	250		49			79	79	0.0	0.07	6.52	5.762		46.096
A-4	8.1	00:08:07	167.490	0.005	1.877	1.90	1023	250		48			79	79	0.0	0.07	6.49	7.685		46.109
A-5	10.8	00:10:50	169.420	0.005	1.877	1.90	1025	250		48			79	79	0.0	0.07	6.50	9.508		45.639
A-6	13.5	00:13:33	171.250	0.005	1.877	1.90	1017	250		47			80	80	0.0	0.07	6.48	11.895		47.580
A-7	16.3	00:16:15	173.650	0.005	1.877	1.90	1040	250		51			80	80	0.0	0.07	6.53	13.416		45.999
A-8	19.0	00:18:58	175.180	0.005	1.877	1.90	1047	250		51			80	80	0.0	0.07	6.55	15.326		45.978
A-9	21.7	00:21:40	177.100	0.005	1.877	1.90	983	250		52			81	81	0.0	0.07	6.41	17.559		46.825
A-10	24.4	00:24:22	179.350	0.005	1.877	1.90	900	250		52			81	81	0.0	0.07	6.22	19.564		46.955
A-11	27.1	00:27:05	181.370	0.005	1.877	1.90	847	250		53			81	81	0.0	0.07	6.10	21.202		46.259
A-12	29.8	00:29:47	183.020	0.005	1.877	1.90	733	250		53			81	81	0.0	0.07	5.82	23.029		46.057
B-1	32.5	00:32:30	184.860	0.005	1.877	1.90	665	250	53	53			81	81	0.0	0.07	5.66	25.312		46.729
B-2	35.2	00:35:12	187.160	0.005	1.877	1.90	691	250		47			81	81	0.0	0.07	5.72	27.019		46.319
B-3	37.9	00:37:55	188.880	0.005	1.877	1.90	955	250		54			81	81	0.0	0.07	6.34	28.905		46.248
B-4	40.6	00:40:37	190.780	0.005	1.877	1.90	989	250		54			81	81	0.0	0.07	6.42	30.841		46.261
B-5	43.3	00:43:20	192.730	0.005	1.877	1.90	1004	250		54			81	81	0.0	0.07	6.45	32.767		46.259
B-6	46.0	00:46:03	194.670	0.005	1.877	1.90	1024	250		54			81	81	0.0	0.07	6.50	34.583		46.111
B-7	48.8	00:48:45	196.500	0.005	1.877	1.90	1043	250		54			81	81	0.0	0.07	6.54	36.459		46.054
B-8	51.5	00:51:28	198.390	0.005	1.877	1.90	1039	250		55			81	81	0.0	0.07	6.53	38.415		46.098
B-9	54.2	00:54:10	200.360	0.005	1.877	1.90	1031	250		55			81	81	0.0	0.07	6.51	40.330		46.092
B-10	56.9	00:56:53	202.290	0.005	1.877	1.90	996	250		55			81	81	0.0	0.07	6.43	42.445		46.303
B-11	59.6	00:59:35	204.420	0.005	1.877	1.90	904	250		55			81	81	0.0	0.07	6.23	44.390		46.320
B-12	62.3	01:02:18	206.380	0.005	1.877	1.90	907	250		55			81	81	0.0	0.07	6.23	46.266		46.266
Last Pt	65.0	01:05:00	208.270																	
Final Val	65.0	01:05:00	208.270												Max Vac	0.0	Final Values		46.266	
Average Values				0.01		1.90	956	250		52			80	80		0.07	6.34			
													80							

CIMARRON ENERGY, INC.
24 ECD
Norman Facility

Unit Data

Meas. Stack Moisture	3.8	%
Stack Exhaust Flow (M2)	25,224	SCFH

Weather Data

Barometric Pressure	29.98	in. Hg
Relative Humidity	58	%
Ambient Temperature	87	°F
Specific Humidity	0.015975	lb H ₂ O / lb air

90-100 Load, Run - 24 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	06/20/14 12:18:07	6570	13.42	6.46	0.54	5.22	23.31	110.10	328.00
	06/20/14 12:18:37	6600	13.38	8.02	0.58	5.28	23.31	110.10	328.00
	06/20/14 12:19:07	6630	13.51	10.11	0.63	5.20	22.45	110.20	316.00
	06/20/14 12:19:37	6660	13.48	10.84	0.62	5.18	22.45	110.20	316.00
	06/20/14 12:20:07	6690	13.32	10.29	0.60	5.31	22.42	110.20	316.00
	06/20/14 12:20:37	6720	13.30	7.63	0.63	5.37	22.42	110.20	316.00
	06/20/14 12:21:07	6750	13.42	7.51	0.59	5.24	22.92	110.40	316.00
	06/20/14 12:21:37	6780	13.63	7.52	0.60	5.08	22.92	110.40	316.00
	06/20/14 12:22:07	6810	13.39	6.36	0.61	5.25	22.37	110.40	316.00
	06/20/14 12:22:37	6840	13.53	5.72	0.66	5.23	22.37	110.40	316.00
	06/20/14 12:23:07	6870	13.50	6.42	0.72	5.16	23.14	110.50	316.00
	06/20/14 12:23:37	6900	13.35	5.81	0.72	5.32	23.14	110.50	316.00
	06/20/14 12:24:07	6930	13.43	5.96	0.76	5.24	22.73	110.60	316.00
	06/20/14 12:24:37	6960	13.47	6.18	0.82	5.19	22.73	110.60	316.00
	06/20/14 12:25:07	6990	13.41	6.49	0.88	5.28	22.42	110.70	327.00
	06/20/14 12:25:37	7020	13.47	7.11	0.76	5.17	22.42	110.70	327.00
	06/20/14 12:26:07	7050	13.48	6.38	0.80	5.23	22.92	110.80	327.00
	06/20/14 12:26:37	7080	13.40	6.63	0.88	5.23	22.92	110.80	327.00
	06/20/14 12:27:07	7110	13.21	6.42	0.90	5.40	22.37	110.80	316.00
	06/20/14 12:27:37	7140	13.52	6.46	0.78	5.20	22.37	110.80	316.00
	06/20/14 12:28:07	7170	13.54	6.69	0.69	5.13	23.14	110.90	327.00
	06/20/14 12:28:37	7200	13.21	6.07	0.61	5.36	23.14	110.90	327.00
	06/20/14 12:29:07	7230	13.52	5.07	0.65	5.21	23.14	110.80	316.00
	06/20/14 12:29:37	7260	13.82	6.98	0.65	4.99	23.14	110.80	316.00
	06/20/14 12:30:07	7290	13.59	6.99	0.60	5.08	28.21	110.80	364.00
	06/20/14 12:30:37	7320	13.43	5.89	0.66	5.21	28.21	110.80	364.00
	06/20/14 12:31:07	7350	13.09	6.48	0.66	5.47	29.67	110.80	376.00
	06/20/14 12:31:37	7380	12.98	6.16	0.64	5.54	29.67	110.80	376.00
	06/20/14 12:32:07	7410	13.09	5.52	0.57	5.53	29.01	110.80	376.00
	06/20/14 12:32:37	7440	13.25	5.24	0.54	5.36	29.01	110.80	376.00
	06/20/14 12:33:07	7470	13.05	4.90	0.55	5.48	29.53	110.80	365.00
	06/20/14 12:33:37	7500	13.14	4.74	0.55	5.47	29.53	110.80	365.00
	06/20/14 12:34:07	7530	13.33	5.25	0.62	5.31	29.12	110.80	376.00
	06/20/14 12:34:37	7560	13.29	5.61	0.66	5.34	29.12	110.80	376.00
	06/20/14 12:35:07	7590	13.21	5.47	0.64	5.40	29.53	110.70	365.00
	06/20/14 12:35:37	7620	13.15	5.59	0.68	5.42	29.53	110.70	365.00
	06/20/14 12:36:07	7650	13.15	6.16	0.65	5.46	29.65	110.70	354.00
	06/20/14 12:36:37	7680	13.25	6.23	0.68	5.39	29.65	110.70	354.00
	06/20/14 12:37:07	7710	13.36	6.94	0.74	5.25	28.84	110.70	376.00
	06/20/14 12:37:37	7740	13.26	6.23	0.84	5.37	28.84	110.70	376.00
	06/20/14 12:38:07	7770	13.55	7.27	0.85	5.15	29.65	110.70	365.00
	06/20/14 12:38:37	7800	13.01	7.86	0.99	5.48	29.65	110.70	365.00
	06/20/14 12:39:07	7830	12.90	6.42	1.02	5.62	29.37	110.70	376.00
	06/20/14 12:39:37	7860	13.24	6.78	0.95	5.42	29.37	110.70	376.00
	06/20/14 12:40:07	7890	13.09	8.42	0.99	5.44	29.62	110.70	354.00
	06/20/14 12:40:37	7920	12.52	7.93	0.90	5.84	29.62	110.70	354.00
A2	06/20/14 12:41:07	7950	12.65	6.69	0.88	5.83	29.62	110.80	376.00
	06/20/14 12:41:37	7980	13.33	9.90	0.81	5.36	29.62	110.80	376.00
	06/20/14 12:42:07	8010	13.29	9.47	0.72	5.36	29.34	110.80	376.00
	06/20/14 12:42:37	8040	13.43	9.10	0.70	5.24	29.34	110.80	376.00
	06/20/14 12:43:07	8070	13.37	8.86	0.64	5.29	29.45	110.90	376.00
	06/20/14 12:43:37	8100	13.31	7.36	0.63	5.31	29.45	110.90	376.00
	06/20/14 12:44:07	8130	13.63	7.18	0.63	5.12	29.17	110.90	365.00
	06/20/14 12:44:37	8160	13.48	7.65	0.62	5.15	29.17	110.90	365.00
	06/20/14 12:45:07	8190	13.31	7.00	0.63	5.33	29.84	111.10	365.00
	06/20/14 12:45:37	8220	13.45	6.67	0.64	5.24	29.84	111.10	365.00
	06/20/14 12:46:07	8250	13.23	7.05	0.64	5.35	29.56	111.20	365.00
	06/20/14 12:46:37	8280	13.53	7.28	0.60	5.20	29.56	111.20	365.00
	06/20/14 12:47:07	8310	13.50	7.62	0.68	5.18	29.40	111.30	365.00
	06/20/14 12:47:37	8340	13.43	8.65	0.66	5.22	29.40	111.30	365.00
	06/20/14 12:48:07	8370	13.33	10.00	0.62	5.30	29.12	111.40	364.00

CIMARRON ENERGY, INC.
24 ECD
Norman Facility

Unit Data

Meas. Stack Moisture	3.8	%
Stack Exhaust Flow (M2)	25,224	SCFH

Weather Data

Barometric Pressure	29.98	in. Hg
Relative Humidity	58	%
Ambient Temperature	87	° F
Specific Humidity	0.015975	lb H ₂ O / lb air

90-100 Load, Run - 24 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
	06/20/14 12:48:37	8400	13.54	8.16	0.58	5.18	29.12	111.40	364.00
	06/20/14 12:49:07	8430	13.64	10.43	0.61	5.09	28.70	111.40	375.00
	06/20/14 12:49:37	8460	13.63	8.41	0.57	5.08	28.70	111.40	375.00
	06/20/14 12:50:07	8490	13.46	7.23	0.51	5.19	29.62	111.50	354.00
	06/20/14 12:50:37	8520	13.19	6.64	0.47	5.40	29.62	111.50	354.00
	06/20/14 12:51:07	8550	13.42	6.40	0.55	5.28	29.20	111.60	364.00
	06/20/14 12:51:37	8580	13.47	13.00	0.54	5.22	29.20	111.60	364.00
	06/20/14 12:52:07	8610	13.44	10.70	0.49	5.19	29.73	111.70	365.00
	06/20/14 12:52:37	8640	13.36	7.38	0.52	5.32	29.73	111.70	365.00
	06/20/14 12:53:07	8670	13.56	7.55	0.56	5.15	29.59	111.70	354.00
	06/20/14 12:53:37	8700	13.55	8.06	0.68	5.12	29.59	111.70	354.00
	06/20/14 12:54:07	8730	13.46	8.62	0.71	5.25	28.90	111.80	375.00
	06/20/14 12:54:37	8760	13.50	10.86	0.74	5.16	28.90	111.80	375.00
	06/20/14 12:55:07	8790	13.39	9.43	0.72	5.27	29.40	111.90	375.00
	06/20/14 12:55:37	8820	13.48	7.63	0.76	5.18	29.40	111.90	375.00
	06/20/14 12:56:07	8850	13.45	8.81	0.74	5.25	29.01	112.00	375.00
	06/20/14 12:56:37	8880	13.56	9.33	0.78	5.13	29.01	112.00	375.00
	06/20/14 12:57:07	8910	13.46	9.49	0.74	5.18	29.65	112.00	365.00
	06/20/14 12:57:37	8940	13.26	9.60	0.77	5.39	29.65	112.00	365.00
	06/20/14 12:58:07	8970	13.32	8.87	0.79	5.25	29.23	112.00	364.00
	06/20/14 12:58:37	9000	13.56	8.85	0.78	5.19	29.23	112.00	364.00
	06/20/14 12:59:07	9030	13.30	8.46	0.74	5.28	29.62	112.10	375.00
	06/20/14 12:59:37	9060	13.37	8.55	0.71	5.28	29.62	112.10	375.00
	06/20/14 13:00:07	9090	13.48	8.08	0.75	5.20	29.62	112.10	364.00
	06/20/14 13:00:37	9120	13.38	8.95	0.76	5.25	29.62	112.10	364.00
	06/20/14 13:01:07	9150	13.49	8.40	0.71	5.20	29.59	112.20	364.00
	06/20/14 13:01:37	9180	13.48	8.49	0.75	5.18	29.59	112.20	364.00
	06/20/14 13:02:07	9210	13.66	9.73	0.69	5.06	29.20	112.20	375.00
	06/20/14 13:02:37	9240	13.24	10.60	0.61	5.36	29.20	112.20	375.00
	06/20/14 13:03:07	9270	13.55	17.86	0.66	5.15	29.06	112.30	353.00
	06/20/14 13:03:37	9300	13.31	18.60	0.49	5.27	29.06	112.30	353.00
A3	06/20/14 13:04:07	9330	12.99	9.99	0.56	5.60	29.70	112.40	375.00
	06/20/14 13:04:37	9360	13.41	17.26	0.50	5.24	29.70	112.40	375.00
	06/20/14 13:05:07	9390	13.80	12.95	0.48	4.99	29.29	112.50	375.00
	06/20/14 13:05:37	9420	13.64	17.24	0.54	5.05	29.29	112.50	375.00
	06/20/14 13:06:07	9450	12.80	16.28	0.43	5.62	29.40	112.70	353.00
	06/20/14 13:06:37	9480	12.75	8.49	0.41	5.69	29.40	112.70	353.00
	06/20/14 13:07:07	9510	13.10	7.59	0.37	5.52	29.37	112.80	364.00
	06/20/14 13:07:37	9540	13.47	11.99	0.42	5.26	29.37	112.80	364.00
	06/20/14 13:08:07	9570	13.44	15.72	0.34	5.20	28.95	112.90	363.00
	06/20/14 13:08:37	9600	13.55	9.32	0.32	5.13	28.95	112.90	363.00
	06/20/14 13:09:07	9630	13.67	10.89	0.35	5.07	29.76	113.00	375.00
	06/20/14 13:09:37	9660	13.50	10.21	0.31	5.17	29.76	113.00	375.00
	06/20/14 13:10:07	9690	13.61	6.34	0.32	5.12	29.34	113.00	364.00
	06/20/14 13:10:37	9720	13.51	7.49	0.28	5.16	29.34	113.00	364.00
	06/20/14 13:11:07	9750	13.34	6.19	0.28	5.25	29.59	113.00	364.00
	06/20/14 13:11:37	9780	13.37	5.06	0.30	5.31	29.59	113.00	364.00
	06/20/14 13:12:07	9810	13.41	5.51	0.31	5.20	29.45	112.90	364.00
	06/20/14 13:12:37	9840	13.43	5.40	0.30	5.23	29.45	112.90	364.00
	06/20/14 13:13:07	9870	13.27	5.19	0.26	5.38	28.93	112.80	374.00
	06/20/14 13:13:37	9900	13.39	5.13	0.28	5.26	28.93	112.80	374.00
	06/20/14 13:14:07	9930	13.34	5.31	0.27	5.26	29.73	112.60	364.00
	06/20/14 13:14:37	9960	13.19	4.68	0.28	5.40	29.73	112.60	364.00
	06/20/14 13:15:07	9990	13.45	5.07	0.28	5.23	29.34	112.50	375.00
	06/20/14 13:15:37	10020	13.39	6.03	0.29	5.25	29.34	112.50	375.00
	06/20/14 13:16:07	10050	13.35	5.77	0.37	5.32	29.48	112.40	364.00
	06/20/14 13:16:37	10080	13.29	14.47	0.33	5.32	29.48	112.40	364.00
	06/20/14 13:17:07	10110	13.31	7.47	0.29	5.36	29.76	112.30	375.00
	06/20/14 13:17:37	10140	13.53	6.02	0.28	5.15	29.76	112.30	375.00
	06/20/14 13:18:07	10170	13.37	6.20	0.32	5.24	29.37	112.20	364.00
	06/20/14 13:18:37	10200	13.56	5.84	0.33	5.16	29.37	112.20	364.00

CIMARRON ENERGY, INC.
24 ECD
Norman Facility

Unit Data

Meas. Stack Moisture	3.8	%
Stack Exhaust Flow (M2)	25,224	SCFH

Weather Data

Barometric Pressure	29.98	in. Hg
Relative Humidity	58	%
Ambient Temperature	87	°F
Specific Humidity	0.015975	lb H ₂ O / lb air

90-100 Load, Run - 24 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
06/20/14 13:19:07	10230	13.38	6.27	0.37	5.27	29.09	112.10	375.00
06/20/14 13:19:37	10260	13.44	5.83	0.37	5.21	29.09	112.10	375.00
06/20/14 13:20:07	10290	13.52	6.54	0.32	5.18	29.89	112.10	365.00
06/20/14 13:20:37	10320	13.37	8.56	0.35	5.29	29.89	112.10	365.00
06/20/14 13:21:07	10350	13.38	6.40	0.41	5.25	29.48	112.20	375.00
06/20/14 13:21:37	10380	13.48	6.98	0.40	5.22	29.48	112.20	375.00
06/20/14 13:22:07	10410	13.34	6.68	0.42	5.29	29.20	112.20	364.00
06/20/14 13:22:37	10440	13.48	6.91	0.44	5.18	29.20	112.20	364.00
06/20/14 13:23:07	10470	13.25	8.02	0.40	5.35	28.93	112.20	364.00
06/20/14 13:23:37	10500	13.40	7.01	0.43	5.28	28.93	112.20	364.00
06/20/14 13:24:07	10530	13.77	20.41	0.54	5.01	28.93	112.20	353.00
06/20/14 13:24:37	10560	13.60	12.01	0.47	5.09	28.93	112.20	353.00
06/20/14 13:25:07	10590	12.72	12.83	0.44	5.70	29.73	112.40	364.00
06/20/14 13:25:37	10620	13.16	6.26	0.43	5.42	29.73	112.40	364.00
06/20/14 13:26:07	10650	13.32	4.79	0.50	5.33	29.56	112.50	364.00
06/20/14 13:26:37	10680	13.07	4.90	0.47	5.47	29.56	112.50	364.00
06/20/14 13:27:07	10710	13.33	5.17	0.46	5.34	29.40	112.60	375.00
06/20/14 13:27:37	10740	13.26	5.41	0.44	5.37	29.40	112.60	375.00
06/20/14 13:28:07	10770	13.25	4.71	0.40	5.37	29.40	112.70	364.00
RAW AVERAGE		13.37	8.00	0.58	5.28	28.25	111.61	359.25

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	0.04	0.10	0.06	0.10			
	Final Zero	0.02	-0.04	0.03	0.02			
	Avg. Zero	0.03	0.03	0.05	0.06			
	Initial UpScale	12.10	11.08	3.06	9.18			
	Final UpScale	12.07	11.11	2.95	9.20			
	Avg. UpScale	12.09	11.10	3.01	9.19			
		12.25	11.00	3.04	9.33			

EMISSIONS DATA	O ₂	CO	THC	CO ₂
Corrected Raw Average (ppm/% dry basis)	13.55	7.92	0.55	5.33
Corrected Raw Average (ppm/% wet basis)	13.04	7.62	0.53	5.13
Emission Rate (lb/hr)	N/A	0.01	0.00	N/A

CIMARRON ENERGY, INC.
24 ECD
Norman Facility

Unit Data

Meas. Stack Moisture	5.9	%
Stack Exhaust Flow (M2)	24,368	SCFH

Weather Data

Barometric Pressure	29.98	in. Hg
Relative Humidity	55	%
Ambient Temperature	84	°F
Specific Humidity	0.013715	lb H ₂ O / lb air

90-100 Load, Run - 24 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	06/20/14 13:50:07	12090	13.31	3.34	0.13	5.32	21.84	114.60	313.00
	06/20/14 13:50:37	12120	13.40	3.09	0.12	5.24	21.84	114.60	313.00
	06/20/14 13:51:07	12150	13.53	2.84	0.11	5.15	22.67	114.70	314.00
	06/20/14 13:51:37	12180	13.31	3.16	0.14	5.27	22.67	114.70	314.00
	06/20/14 13:52:07	12210	13.31	5.68	0.15	5.29	21.62	114.70	324.00
	06/20/14 13:52:37	12240	13.36	5.20	0.18	5.35	21.62	114.70	324.00
	06/20/14 13:53:07	12270	13.54	6.58	0.15	5.07	22.37	114.80	324.00
	06/20/14 13:53:37	12300	13.49	3.47	0.15	5.21	22.37	114.80	324.00
	06/20/14 13:54:07	12330	13.54	3.57	0.16	5.13	22.37	114.80	313.00
	06/20/14 13:54:37	12360	13.65	4.05	0.13	5.07	22.37	114.80	313.00
	06/20/14 13:55:07	12390	13.58	4.28	0.11	5.15	22.14	114.80	313.00
	06/20/14 13:55:37	12420	13.56	5.27	0.11	5.07	22.14	114.80	313.00
	06/20/14 13:56:07	12450	13.35	4.40	0.13	5.30	22.48	114.80	314.00
	06/20/14 13:56:37	12480	13.26	5.44	0.11	5.34	22.48	114.80	314.00
	06/20/14 13:57:07	12510	13.27	4.35	0.11	5.33	22.28	114.80	303.00
	06/20/14 13:57:37	12540	13.43	5.36	0.10	5.23	22.28	114.80	303.00
	06/20/14 13:58:07	12570	13.15	4.36	0.13	5.37	22.20	114.90	313.00
	06/20/14 13:58:37	12600	13.17	4.63	0.13	5.42	22.20	114.90	313.00
	06/20/14 13:59:07	12630	13.37	7.01	0.11	5.28	22.61	114.80	324.00
	06/20/14 13:59:37	12660	13.39	8.29	0.10	5.25	22.61	114.80	324.00
	06/20/14 14:00:07	12690	13.31	5.50	0.13	5.30	21.78	114.90	302.00
	06/20/14 14:00:37	12720	13.49	6.33	0.15	5.18	21.78	114.90	302.00
	06/20/14 14:01:07	12750	13.39	6.08	0.16	5.22	26.88	114.80	360.00
	06/20/14 14:01:37	12780	12.46	5.16	0.19	5.82	26.88	114.80	360.00
	06/20/14 14:02:07	12810	12.92	4.54	0.15	5.64	30.12	114.90	374.00
	06/20/14 14:02:37	12840	13.15	6.33	0.14	5.49	30.12	114.90	374.00
	06/20/14 14:03:07	12870	13.28	5.30	0.15	5.31	29.04	114.90	362.00
	06/20/14 14:03:37	12900	13.16	3.77	0.14	5.34	29.04	114.90	362.00
	06/20/14 14:04:07	12930	12.97	2.79	0.13	5.57	29.15	114.90	373.00
	06/20/14 14:04:37	12960	13.07	2.66	0.13	5.51	29.15	114.90	373.00
	06/20/14 14:05:07	12990	13.37	3.38	0.15	5.29	28.98	114.90	351.00
	06/20/14 14:05:37	13020	13.64	6.94	0.15	5.07	28.98	114.90	351.00
	06/20/14 14:06:07	13050	13.39	9.21	0.15	5.21	29.51	114.90	363.00
	06/20/14 14:06:37	13080	13.30	7.50	0.14	5.32	29.51	114.90	363.00
	06/20/14 14:07:07	13110	13.48	5.70	0.15	5.18	29.23	114.90	362.00
	06/20/14 14:07:37	13140	13.29	5.45	0.14	5.30	29.23	114.90	362.00
	06/20/14 14:08:07	13170	13.27	4.62	0.11	5.35	28.98	115.00	351.00
	06/20/14 14:08:37	13200	13.29	4.17	0.14	5.32	28.98	115.00	351.00
	06/20/14 14:09:07	13230	13.40	10.05	0.15	5.20	29.09	115.10	362.00
	06/20/14 14:09:37	13260	13.23	11.33	0.17	5.39	29.09	115.10	362.00
	06/20/14 14:10:07	13290	13.55	13.74	0.17	5.13	28.68	115.10	351.00
	06/20/14 14:10:37	13320	13.53	14.50	0.17	5.15	28.68	115.10	351.00
	06/20/14 14:11:07	13350	13.51	10.08	0.13	5.16	29.59	115.20	351.00
	06/20/14 14:11:37	13380	13.37	6.89	0.15	5.24	29.59	115.20	351.00
	06/20/14 14:12:07	13410	13.52	7.10	0.11	5.17	28.90	115.30	362.00
	06/20/14 14:12:37	13440	13.77	7.56	0.14	4.98	28.90	115.30	362.00
A2	06/20/14 14:13:07	13470	13.57	10.65	0.19	5.12	29.15	115.30	351.00
	06/20/14 14:13:37	13500	13.52	16.42	0.19	5.14	29.15	115.30	351.00
	06/20/14 14:14:07	13530	13.71	16.00	0.28	5.03	29.40	115.20	362.00
	06/20/14 14:14:37	13560	13.43	15.23	0.17	5.21	29.40	115.20	362.00
	06/20/14 14:15:07	13590	13.41	6.71	0.12	5.25	28.84	115.30	362.00
	06/20/14 14:15:37	13620	13.53	9.26	0.12	5.16	28.84	115.30	362.00
	06/20/14 14:16:07	13650	13.40	8.17	0.09	5.19	29.65	115.30	373.00
	06/20/14 14:16:37	13680	13.13	4.03	0.10	5.44	29.65	115.30	373.00
	06/20/14 14:17:07	13710	13.07	2.90	0.13	5.47	29.20	115.40	351.00
	06/20/14 14:17:37	13740	13.30	3.09	0.14	5.33	29.20	115.40	351.00
	06/20/14 14:18:07	13770	13.28	3.74	0.15	5.32	28.95	115.40	351.00
	06/20/14 14:18:37	13800	13.27	4.07	0.19	5.34	28.95	115.40	351.00
	06/20/14 14:19:07	13830	13.45	5.78	0.20	5.19	29.56	115.40	373.00
	06/20/14 14:19:37	13860	13.22	5.45	0.21	5.34	29.56	115.40	373.00
	06/20/14 14:20:07	13890	13.04	3.71	0.19	5.51	29.23	115.40	373.00

CIMARRON ENERGY, INC.
24 ECD
Norman Facility

Unit Data

Meas. Stack Moisture	5.9	%
Stack Exhaust Flow (M2)	24,368	SCFH

Weather Data

Barometric Pressure	29.98	in. Hg
Relative Humidity	55	%
Ambient Temperature	84	°F
Specific Humidity	0.013715	lb H ₂ O / lb air

90-100 Load, Run - 24 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
	06/20/14 14:20:37	13920	13.25	4.87	0.18	5.36	29.23	115.40	373.00
	06/20/14 14:21:07	13950	13.07	4.36	0.16	5.45	29.40	115.50	362.00
	06/20/14 14:21:37	13980	13.24	4.29	0.15	5.34	29.40	115.50	362.00
	06/20/14 14:22:07	14010	13.18	4.78	0.14	5.40	29.09	115.60	373.00
	06/20/14 14:22:37	14040	13.27	4.81	0.14	5.32	29.09	115.60	373.00
	06/20/14 14:23:07	14070	13.42	7.60	0.15	5.24	29.06	115.70	351.00
	06/20/14 14:23:37	14100	13.39	7.75	0.14	5.23	29.06	115.70	351.00
	06/20/14 14:24:07	14130	13.42	10.11	0.14	5.22	28.87	115.80	361.00
	06/20/14 14:24:37	14160	13.12	9.97	0.16	5.43	28.87	115.80	361.00
	06/20/14 14:25:07	14190	13.44	7.47	0.19	5.22	28.73	115.90	350.00
	06/20/14 14:25:37	14220	13.39	6.08	0.17	5.22	28.73	115.90	350.00
	06/20/14 14:26:07	14250	13.52	4.44	0.17	5.16	29.15	116.00	372.00
	06/20/14 14:26:37	14280	13.50	4.50	0.18	5.18	29.15	116.00	372.00
	06/20/14 14:27:07	14310	13.38	4.43	0.16	5.20	29.12	116.10	351.00
	06/20/14 14:27:37	14340	13.21	4.15	0.16	5.36	29.12	116.10	351.00
	06/20/14 14:28:07	14370	13.23	4.05	0.18	5.38	28.73	116.20	350.00
	06/20/14 14:28:37	14400	13.24	4.03	0.17	5.34	28.73	116.20	350.00
	06/20/14 14:29:07	14430	13.54	4.12	0.12	5.16	29.06	116.30	361.00
	06/20/14 14:29:37	14460	13.33	4.84	0.13	5.30	29.06	116.30	361.00
	06/20/14 14:30:07	14490	13.19	6.61	0.16	5.36	28.54	116.30	361.00
	06/20/14 14:30:37	14520	13.28	4.91	0.16	5.34	28.54	116.30	361.00
	06/20/14 14:31:07	14550	12.97	6.00	0.14	5.46	29.29	116.30	351.00
	06/20/14 14:31:37	14580	13.00	5.30	0.14	5.60	29.29	116.30	351.00
	06/20/14 14:32:07	14610	13.36	9.28	0.11	5.27	28.73	116.30	372.00
	06/20/14 14:32:37	14640	13.22	11.50	0.15	5.33	28.73	116.30	372.00
	06/20/14 14:33:07	14670	13.15	9.60	0.12	5.44	28.95	116.20	355.00
	06/20/14 14:33:37	14700	13.12	6.22	0.10	5.39	28.95	116.20	355.00
	06/20/14 14:34:07	14730	13.18	4.52	0.13	5.44	28.93	116.20	361.00
	06/20/14 14:34:37	14760	13.25	5.43	0.13	5.32	28.93	116.20	361.00
	06/20/14 14:35:07	14790	13.28	7.93	0.15	5.34	28.84	116.10	350.00
	06/20/14 14:35:37	14820	13.16	9.42	0.17	5.40	28.84	116.10	350.00
A3	06/20/14 14:36:07	14850	13.24	12.49	0.13	5.34	29.48	116.10	362.00
	06/20/14 14:36:37	14880	13.19	10.20	0.09	5.38	29.48	116.10	362.00
	06/20/14 14:37:07	14910	12.98	7.97	0.12	5.53	28.70	116.00	372.00
	06/20/14 14:37:37	14940	13.19	7.43	0.14	5.39	28.70	116.00	372.00
	06/20/14 14:38:07	14970	13.01	7.20	0.14	5.53	28.70	116.00	350.00
	06/20/14 14:38:37	15000	13.24	8.99	0.14	5.38	28.70	116.00	350.00
	06/20/14 14:39:07	15030	13.30	8.79	0.12	5.30	28.87	115.90	351.00
	06/20/14 14:39:37	15060	13.22	6.33	0.13	5.34	28.87	115.90	351.00
	06/20/14 14:40:07	15090	13.23	5.94	0.10	5.37	28.59	115.80	372.00
	06/20/14 14:40:37	15120	13.28	4.48	0.12	5.34	28.59	115.80	372.00
	06/20/14 14:41:07	15150	13.35	11.32	0.17	5.23	29.01	115.80	373.00
	06/20/14 14:41:37	15180	13.04	11.69	0.16	5.50	29.01	115.80	373.00
	06/20/14 14:42:07	15210	13.02	9.70	0.10	5.50	28.76	115.70	351.00
	06/20/14 14:42:37	15240	13.05	8.44	0.08	5.49	28.76	115.70	351.00
	06/20/14 14:43:07	15270	13.00	8.91	0.08	5.53	28.90	115.70	351.00
	06/20/14 14:43:37	15300	13.37	8.90	0.22	5.37	28.90	115.70	351.00
	06/20/14 14:44:07	15330	13.43	14.60	0.16	5.15	29.04	115.50	373.00
	06/20/14 14:44:37	15360	13.57	15.12	0.14	5.12	29.04	115.50	373.00
	06/20/14 14:45:07	15390	13.48	14.09	0.14	5.16	28.93	115.40	362.00
	06/20/14 14:45:37	15420	13.60	8.38	0.12	5.13	28.93	115.40	362.00
	06/20/14 14:46:07	15450	13.51	8.65	0.08	5.14	29.51	115.20	362.00
	06/20/14 14:46:37	15480	13.41	10.56	0.05	5.18	29.51	115.20	362.00
	06/20/14 14:47:07	15510	13.42	12.49	0.08	5.26	28.84	115.10	362.00
	06/20/14 14:47:37	15540	13.44	12.33	0.11	5.20	28.84	115.10	362.00
	06/20/14 14:48:07	15570	13.33	15.23	0.05	5.27	28.73	115.10	362.00
	06/20/14 14:48:37	15600	13.46	11.20	0.09	5.22	28.73	115.10	362.00
	06/20/14 14:49:07	15630	12.89	8.71	0.13	5.49	29.01	115.00	351.00
	06/20/14 14:49:37	15660	13.29	7.00	0.10	5.43	29.01	115.00	351.00
	06/20/14 14:50:07	15690	13.49	6.65	0.09	5.15	28.59	115.00	362.00
	06/20/14 14:50:37	15720	13.38	4.68	0.09	5.23	28.59	115.00	362.00

CIMARRON ENERGY, INC.
24 ECD
Norman Facility

Unit Data

Meas. Stack Moisture	5.9	%
Stack Exhaust Flow (M2)	24,368	SCFH

Weather Data

Barometric Pressure	29.98	in. Hg
Relative Humidity	55	%
Ambient Temperature	84	°F
Specific Humidity	0.013715	lb H ₂ O / lb air

90-100 Load, Run - 24 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
06/20/14 14:51:07	15750	13.33	4.71	0.03	5.29	28.90	115.00	362.00
06/20/14 14:51:37	15780	13.26	5.08	0.06	5.34	28.90	115.00	362.00
06/20/14 14:52:07	15810	13.17	10.15	0.07	5.42	28.76	115.00	373.00
06/20/14 14:52:37	15840	13.55	10.87	0.07	5.10	28.76	115.00	373.00
06/20/14 14:53:07	15870	13.24	9.45	0.05	5.35	29.15	115.00	373.00
06/20/14 14:53:37	15900	13.18	7.97	0.06	5.40	29.15	115.00	373.00
06/20/14 14:54:07	15930	13.37	10.19	0.04	5.22	29.04	115.00	373.00
06/20/14 14:54:37	15960	13.19	11.70	0.04	5.39	29.04	115.00	373.00
06/20/14 14:55:07	15990	13.17	9.33	0.02	5.40	28.76	114.90	362.00
06/20/14 14:55:37	16020	13.39	8.45	0.02	5.30	28.76	114.90	362.00
06/20/14 14:56:07	16050	13.24	9.30	0.04	5.30	28.79	114.80	373.00
06/20/14 14:56:37	16080	13.28	7.03	0.04	5.35	28.79	114.80	373.00
06/20/14 14:57:07	16110	13.36	6.42	0.06	5.29	28.79	114.80	373.00
06/20/14 14:57:37	16140	13.51	8.98	0.06	5.16	28.79	114.80	373.00
06/20/14 14:58:07	16170	13.33	9.92	0.04	5.27	29.06	114.70	384.00
06/20/14 14:58:37	16200	13.40	5.98	0.05	5.22	29.06	114.70	384.00
06/20/14 14:59:07	16230	13.53	5.29	0.07	5.12	28.65	114.70	362.00
06/20/14 14:59:37	16260	13.34	8.96	0.06	5.30	28.65	114.70	362.00
06/20/14 15:00:07	16290	13.41	8.17	0.05	5.24	29.06	114.60	351.00
RAW AVERAGE		13.31	7.28	0.13	5.30	27.93	115.32	354.36

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	-0.04	0.03	0.02			
	Final Zero	0.04	-0.07	0.04	0.05			
	Avg. Zero	0.03	-0.06	0.04	0.04			
Upscale Cal Gas	Initial UpScale	12.07	11.11	2.95	9.20			
	Final UpScale	12.05	10.82	2.97	9.14			
	Avg. UpScale	12.06	10.97	2.96	9.17			

EMISSIONS DATA	O ₂	CO	THC	CO ₂
Corrected Raw Average (ppm/% dry basis)	13.53	7.32	0.10	5.38
Corrected Raw Average (ppm/% wet basis)	12.72	6.89	0.09	5.05
Emission Rate (lb/hr)	N/A	0.01	0.00	N/A

CIMARRON ENERGY, INC.

June 20, 2014

24 ECD

Norman Facility

Unit Data

Meas. Stack Moisture	5.8	%
Stack Exhaust Flow (M2)	24,482	SCFH

Weather Data

Barometric Pressure	29.99	in. Hg
Relative Humidity	49	%
Ambient Temperature	88	°F
Specific Humidity	0.013881	lb H ₂ O / lb air

90-100 Load, Run - 24 ECD R12

	Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	CO (ppmvd)	THC (ppmvw)	CO ₂ (%)	Fuel Pressure in. H ₂ O	Fuel Temp. °F	Fuel Flow SCFH
A1	06/20/14 15:15:07	17190	14.07	4.20	0.08	4.75	22.92	114.30	325.00
	06/20/14 15:15:37	17220	14.18	4.05	0.09	4.71	22.92	114.30	325.00
	06/20/14 15:16:07	17250	13.92	3.65	0.13	4.86	22.78	114.20	314.00
	06/20/14 15:16:37	17280	13.93	4.64	0.10	4.88	22.78	114.20	314.00
	06/20/14 15:17:07	17310	14.02	5.34	0.09	4.77	23.47	114.20	325.00
	06/20/14 15:17:37	17340	13.62	4.39	0.06	5.04	23.47	114.20	325.00
	06/20/14 15:18:07	17370	13.66	3.05	0.10	5.07	22.95	114.10	325.00
	06/20/14 15:18:37	17400	13.85	3.36	0.11	4.97	22.95	114.10	325.00
	06/20/14 15:19:07	17430	13.55	3.27	0.06	5.06	23.64	114.10	326.00
	06/20/14 15:19:37	17460	13.53	2.59	0.06	5.15	23.64	114.10	326.00
	06/20/14 15:20:07	17490	13.67	2.73	0.03	5.07	23.22	114.10	325.00
	06/20/14 15:20:37	17520	13.68	3.46	0.04	5.01	23.22	114.10	325.00
	06/20/14 15:21:07	17550	13.52	3.28	0.07	5.18	22.97	114.00	314.00
	06/20/14 15:21:37	17580	13.65	3.30	0.09	5.05	22.97	114.00	314.00
	06/20/14 15:22:07	17610	13.45	3.78	0.07	5.20	23.67	114.00	336.00
	06/20/14 15:22:37	17640	13.49	5.18	0.05	5.15	23.67	114.00	336.00
	06/20/14 15:23:07	17670	13.46	5.24	0.11	5.21	22.84	114.00	314.00
	06/20/14 15:23:37	17700	13.71	5.03	0.10	5.00	22.84	114.00	314.00
	06/20/14 15:24:07	17730	13.73	4.54	0.09	5.02	23.11	114.00	325.00
	06/20/14 15:24:37	17760	13.75	4.73	0.11	4.98	23.11	114.00	325.00
	06/20/14 15:25:07	17790	13.66	5.43	0.12	5.04	23.67	114.00	326.00
	06/20/14 15:25:37	17820	13.55	5.60	0.09	5.17	23.67	114.00	326.00
	06/20/14 15:26:07	17850	13.37	4.70	0.15	5.27	23.11	114.00	325.00
	06/20/14 15:26:37	17880	13.65	6.18	0.14	5.08	23.11	114.00	325.00
	06/20/14 15:27:07	17910	13.45	5.82	0.16	5.14	29.73	113.80	363.00
	06/20/14 15:27:37	17940	12.52	3.11	0.15	5.81	29.73	113.80	363.00
	06/20/14 15:28:07	17970	12.88	3.43	0.09	5.66	28.40	113.50	362.00
	06/20/14 15:28:37	18000	13.01	5.02	0.10	5.52	28.40	113.50	362.00
	06/20/14 15:29:07	18030	13.20	3.97	0.17	5.48	28.57	113.20	352.00
	06/20/14 15:29:37	18060	13.62	7.99	0.19	5.09	28.57	113.20	352.00
	06/20/14 15:30:07	18090	13.82	12.62	0.21	4.94	29.01	112.90	363.00
	06/20/14 15:30:37	18120	13.48	9.65	0.21	5.14	29.01	112.90	363.00
	06/20/14 15:31:07	18150	13.67	9.95	0.19	5.06	28.48	112.70	363.00
	06/20/14 15:31:37	18180	13.96	10.07	0.21	4.88	28.48	112.70	363.00
	06/20/14 15:32:07	18210	14.12	13.44	0.44	4.81	28.10	112.50	363.00
	06/20/14 15:32:37	18240	13.97	14.68	0.16	4.73	28.10	112.50	363.00
	06/20/14 15:33:07	18270	13.67	7.69	0.14	5.07	28.54	112.40	352.00
	06/20/14 15:33:37	18300	13.42	3.43	0.13	5.22	28.54	112.40	352.00
	06/20/14 15:34:07	18330	13.43	1.98	0.12	5.20	28.15	112.30	352.00
	06/20/14 15:34:37	18360	13.37	1.92	0.13	5.26	28.15	112.30	352.00
	06/20/14 15:35:07	18390	13.21	1.50	0.12	5.31	28.84	112.20	353.00
	06/20/14 15:35:37	18420	13.16	2.64	0.12	5.41	28.84	112.20	353.00
	06/20/14 15:36:07	18450	13.20	3.16	0.08	5.45	28.32	112.10	352.00
	06/20/14 15:36:37	18480	13.29	2.45	0.08	5.30	28.32	112.10	352.00
	06/20/14 15:37:07	18510	13.04	3.30	0.12	5.44	28.46	112.10	363.00
	06/20/14 15:37:37	18540	13.09	2.97	0.14	5.50	28.46	112.10	363.00
A2	06/20/14 15:38:07	18570	13.17	3.26	0.17	5.41	28.32	112.10	363.00
	06/20/14 15:38:37	18600	13.01	3.42	0.15	5.49	28.32	112.10	363.00
	06/20/14 15:39:07	18630	13.32	4.06	0.12	5.35	28.59	112.10	364.00
	06/20/14 15:39:37	18660	13.38	3.48	0.14	5.27	28.59	112.10	364.00
	06/20/14 15:40:07	18690	13.78	6.78	0.22	5.02	28.59	112.00	353.00
	06/20/14 15:40:37	18720	13.66	10.53	0.15	4.99	28.59	112.00	353.00
	06/20/14 15:41:07	18750	13.69	5.22	0.20	5.11	28.46	112.00	363.00
	06/20/14 15:41:37	18780	13.83	10.36	0.19	4.89	28.46	112.00	363.00
	06/20/14 15:42:07	18810	13.84	10.05	0.16	4.96	27.93	112.00	352.00
	06/20/14 15:42:37	18840	13.82	8.78	0.19	4.97	27.93	112.00	352.00
	06/20/14 15:43:07	18870	14.02	10.42	0.21	4.80	29.01	111.90	375.00
	06/20/14 15:43:37	18900	13.62	9.67	0.18	5.04	29.01	111.90	375.00
	06/20/14 15:44:07	18930	13.48	6.97	0.17	5.16	28.59	111.90	353.00
	06/20/14 15:44:37	18960	13.73	3.87	0.19	5.06	28.59	111.90	353.00

CIMARRON ENERGY, INC.

June 20, 2014

24 ECD

Norman Facility

Unit Data

Meas. Stack Moisture	5.8	%
Stack Exhaust Flow (M2)	24,482	SCFH

Weather Data

Barometric Pressure	29.99	in. Hg
Relative Humidity	49	%
Ambient Temperature	88	°F
Specific Humidity	0.013881	lb H ₂ O / lb air

90-100 Load, Run - 24 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
	06/20/14 15:45:07	18990	13.65	7.22	0.14	5.05	28.18	111.80	352.00
	06/20/14 15:45:37	19020	13.66	4.44	0.12	5.01	28.18	111.80	352.00
	06/20/14 15:46:07	19050	13.54	3.26	0.12	5.17	28.59	111.80	353.00
	06/20/14 15:46:37	19080	13.53	3.35	0.14	5.10	28.59	111.80	353.00
	06/20/14 15:47:07	19110	13.55	3.20	0.12	5.16	28.48	111.70	353.00
	06/20/14 15:47:37	19140	13.54	2.61	0.15	5.13	28.48	111.70	353.00
	06/20/14 15:48:07	19170	13.62	4.39	0.12	5.06	29.15	111.70	353.00
	06/20/14 15:48:37	19200	13.92	6.36	0.19	4.93	29.15	111.70	353.00
	06/20/14 15:49:07	19230	13.56	8.71	0.16	5.08	28.59	111.60	364.00
	06/20/14 15:49:37	19260	13.64	7.51	0.19	5.03	28.59	111.60	364.00
	06/20/14 15:50:07	19290	13.69	6.09	0.18	5.11	28.21	111.50	353.00
	06/20/14 15:50:37	19320	13.53	8.50	0.16	5.09	28.21	111.50	353.00
	06/20/14 15:51:07	19350	13.67	6.84	0.21	5.06	28.73	111.30	353.00
	06/20/14 15:51:37	19380	13.80	6.82	0.22	4.99	28.73	111.30	353.00
	06/20/14 15:52:07	19410	13.85	10.36	0.29	4.92	28.23	111.10	353.00
	06/20/14 15:52:37	19440	13.91	14.29	0.25	4.86	28.23	111.10	353.00
	06/20/14 15:53:07	19470	13.60	12.29	0.20	5.05	28.65	110.90	364.00
	06/20/14 15:53:37	19500	13.56	8.88	0.15	5.13	28.65	110.90	364.00
	06/20/14 15:54:07	19530	13.74	5.53	0.16	5.00	28.43	110.50	353.00
	06/20/14 15:54:37	19560	13.87	7.89	0.29	4.85	28.43	110.50	353.00
	06/20/14 15:55:07	19590	13.64	10.19	0.17	5.15	28.07	110.20	353.00
	06/20/14 15:55:37	19620	13.39	8.95	0.12	5.18	28.07	110.20	353.00
	06/20/14 15:56:07	19650	13.64	7.55	0.15	5.06	29.04	109.80	354.00
	06/20/14 15:56:37	19680	13.56	7.22	0.16	5.12	29.04	109.80	354.00
	06/20/14 15:57:07	19710	13.56	6.78	0.13	5.11	28.54	109.40	354.00
	06/20/14 15:57:37	19740	13.84	6.33	0.19	4.92	28.54	109.40	354.00
	06/20/14 15:58:07	19770	13.61	9.46	0.14	5.02	28.32	109.10	365.00
	06/20/14 15:58:37	19800	13.61	7.61	0.12	5.09	28.32	109.10	365.00
	06/20/14 15:59:07	19830	13.65	5.53	0.11	5.06	28.62	108.90	354.00
	06/20/14 15:59:37	19860	13.46	6.64	0.14	5.11	28.62	108.90	354.00
	06/20/14 16:00:07	19890	13.54	8.20	0.13	5.13	28.37	108.80	365.00
	06/20/14 16:00:37	19920	13.64	8.03	0.16	5.12	28.37	108.80	365.00
A3	06/20/14 16:01:07	19950	13.75	9.69	0.14	4.93	28.81	108.60	355.00
	06/20/14 16:01:37	19980	13.72	8.90	0.17	5.05	28.81	108.60	355.00
	06/20/14 16:02:07	20010	13.66	10.57	0.20	5.05	28.57	108.50	344.00
	06/20/14 16:02:37	20040	13.88	12.45	0.18	4.85	28.57	108.50	344.00
	06/20/14 16:03:07	20070	13.40	11.13	0.10	5.17	28.04	108.40	354.00
	06/20/14 16:03:37	20100	13.75	7.92	0.14	5.04	28.04	108.40	354.00
	06/20/14 16:04:07	20130	13.83	10.85	0.14	4.90	28.87	108.20	355.00
	06/20/14 16:04:37	20160	13.72	7.53	0.09	4.97	28.87	108.20	355.00
	06/20/14 16:05:07	20190	13.60	4.98	0.10	5.05	28.48	108.00	366.00
	06/20/14 16:05:37	20220	13.47	4.66	0.11	5.17	28.48	108.00	366.00
	06/20/14 16:06:07	20250	13.48	7.40	0.12	5.20	28.37	107.90	355.00
	06/20/14 16:06:37	20280	13.89	11.11	0.18	4.92	28.37	107.90	355.00
	06/20/14 16:07:07	20310	14.11	14.01	0.15	4.75	28.54	107.80	355.00
	06/20/14 16:07:37	20340	13.75	11.76	0.12	4.90	28.54	107.80	355.00
	06/20/14 16:08:07	20370	13.29	6.48	0.10	5.29	28.29	107.80	355.00
	06/20/14 16:08:37	20400	13.69	5.10	0.15	5.06	28.29	107.80	355.00
	06/20/14 16:09:07	20430	13.51	6.92	0.15	5.12	28.84	107.70	355.00
	06/20/14 16:09:37	20460	13.71	8.32	0.16	5.01	28.84	107.70	355.00
	06/20/14 16:10:07	20490	13.66	9.24	0.12	5.02	28.46	107.70	355.00
	06/20/14 16:10:37	20520	13.60	5.57	0.10	5.08	28.46	107.70	355.00
	06/20/14 16:11:07	20550	13.60	3.12	0.11	5.08	28.32	107.70	355.00
	06/20/14 16:11:37	20580	13.43	2.77	0.12	5.16	28.32	107.70	355.00
	06/20/14 16:12:07	20610	13.59	2.57	0.11	5.12	28.98	107.60	356.00
	06/20/14 16:12:37	20640	13.66	6.45	0.08	5.01	28.98	107.60	356.00
	06/20/14 16:13:07	20670	13.55	6.34	0.11	5.13	28.46	107.60	355.00
	06/20/14 16:13:37	20700	14.01	9.31	0.22	4.83	28.46	107.60	355.00
	06/20/14 16:14:07	20730	13.81	13.96	0.15	4.84	28.59	107.60	355.00
	06/20/14 16:14:37	20760	13.79	10.98	0.13	5.01	28.59	107.60	355.00

CIMARRON ENERGY, INC.

June 20, 2014

24 ECD

Norman Facility

Unit Data

Meas. Stack Moisture	5.8	%
Stack Exhaust Flow (M2)	24,482	SCFH

Weather Data

Barometric Pressure	29.99	in. Hg
Relative Humidity	49	%
Ambient Temperature	88	°F
Specific Humidity	0.013881	lb H ₂ O / lb air

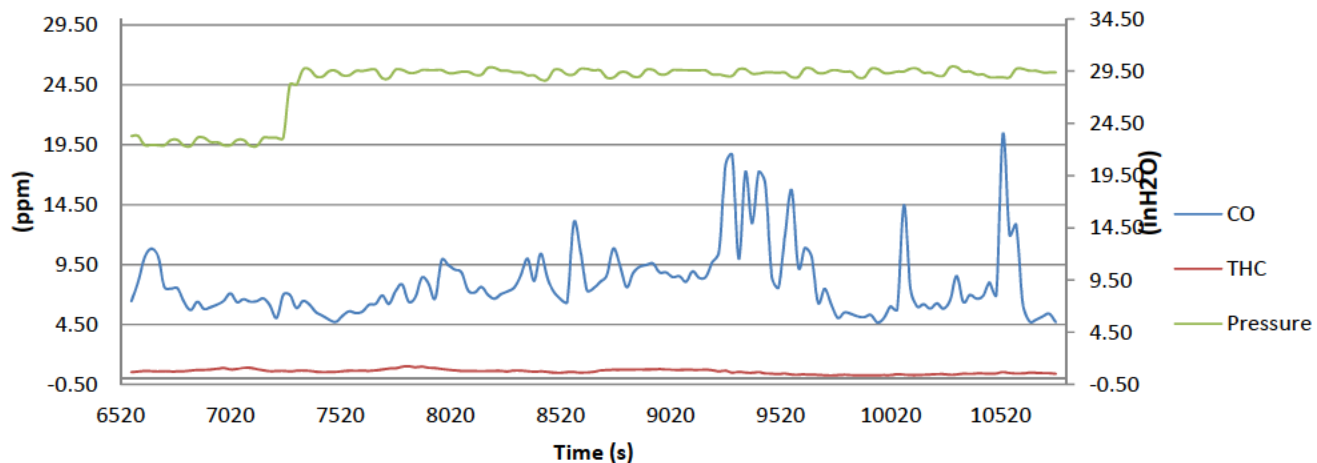
90-100 Load, Run - 24 ECD R12

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
06/20/14 16:15:07	20790	13.93	10.49	0.15	4.89	28.46	107.60	366.00
06/20/14 16:15:37	20820	13.59	11.46	0.04	4.99	28.46	107.60	366.00
06/20/14 16:16:07	20850	13.19	4.39	0.05	5.35	28.90	107.50	356.00
06/20/14 16:16:37	20880	13.45	5.12	0.08	5.24	28.90	107.50	356.00
06/20/14 16:17:07	20910	13.32	7.36	0.06	5.22	28.48	107.40	366.00
06/20/14 16:17:37	20940	13.40	4.33	0.07	5.26	28.48	107.40	366.00
06/20/14 16:18:07	20970	13.46	3.55	0.06	5.19	28.37	107.40	355.00
06/20/14 16:18:37	21000	13.31	3.53	0.03	5.27	28.37	107.40	355.00
06/20/14 16:19:07	21030	13.39	4.15	0.03	5.26	28.90	107.30	367.00
06/20/14 16:19:37	21060	13.65	6.87	0.06	5.05	28.90	107.30	367.00
06/20/14 16:20:07	21090	13.59	7.79	0.05	5.05	28.79	107.30	356.00
06/20/14 16:20:37	21120	13.31	4.87	0.03	5.26	28.79	107.30	356.00
06/20/14 16:21:07	21150	13.35	4.87	0.02	5.22	28.37	107.30	366.00
06/20/14 16:21:37	21180	13.36	3.82	0.02	5.26	28.37	107.30	366.00
06/20/14 16:22:07	21210	13.61	4.04	0.09	5.11	28.51	107.20	355.00
06/20/14 16:22:37	21240	13.34	6.69	0.03	5.21	28.51	107.20	355.00
06/20/14 16:23:07	21270	13.54	7.00	0.03	5.21	28.12	107.20	344.00
06/20/14 16:23:37	21300	13.69	7.65	-0.04	4.94	28.12	107.20	344.00
06/20/14 16:24:07	21330	13.50	6.71	-0.03	5.15	29.23	107.10	356.00
06/20/14 16:24:37	21360	13.42	4.03	-0.03	5.20	29.23	107.10	356.00
06/20/14 16:25:07	21390	13.53	7.21	0.00	5.08	28.43	107.00	356.00
RAW AVERAGE		13.59	6.50	0.13	5.10	27.64	110.65	351.38

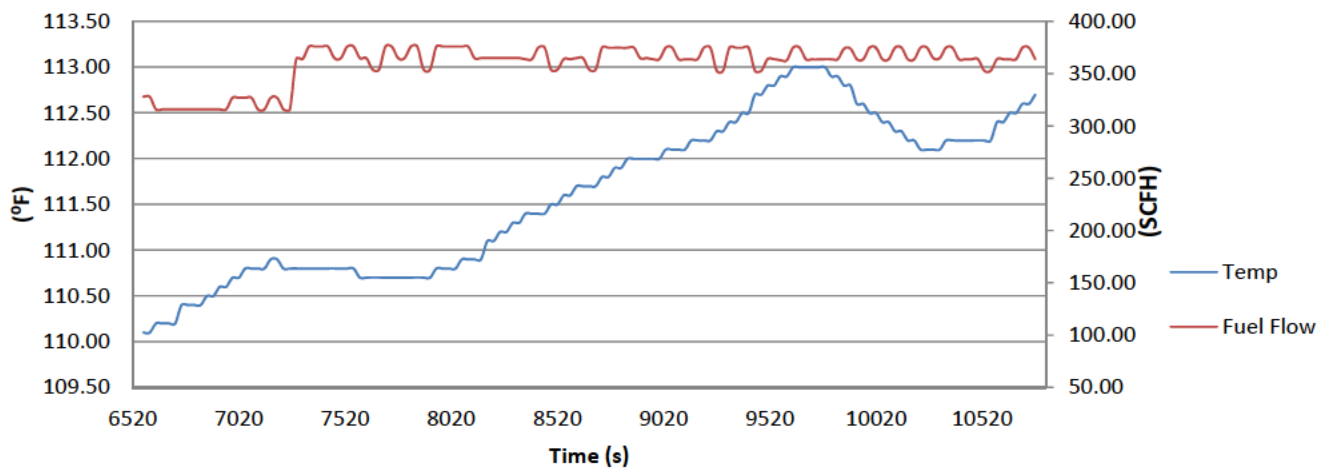
Bias	Serial Number:	O ₂ (%)	CO (ppmvd)	THC (ppmvw)	CO ₂ (%)	Press. Trans 0 (in. H ₂ O)	Temp. Trans. 0 (°F)	F-Flow Trans. 0 (SCFH)
	INST-22-0005	INST-22-0005	INST-CO-0034	INST-VC-0006	INST-22-0005			
	Initial Zero	0.04	-0.07	0.04	0.05			
	Final Zero	0.09	-0.13	0.03	0.02			
	Avg. Zero	0.07	-0.10	0.04	0.04			
	Initial UpScale	12.05	10.82	2.97	9.14			
	Final UpScale	12.10	10.86	3.10	9.13			
	Avg. UpScale	12.08	10.84	3.04	9.14			
	Upscale Cal Gas	12.25	11.00	3.04	9.33			

EMISSIONS DATA	O₂	CO	THC	CO₂
Corrected Raw Average (ppm/% dry basis)	13.79	6.64	0.09	5.19
Corrected Raw Average (ppm/% wet basis)	12.99	6.26	0.09	4.89
Emission Rate (lb/hr)	N/A	0.01	0.00	N/A

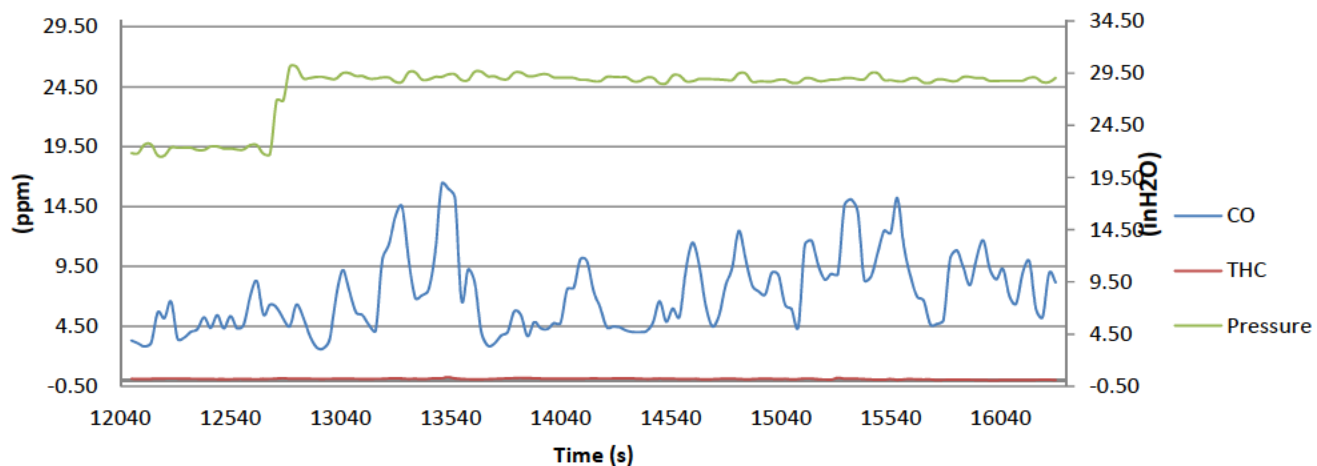
24 ECD R10

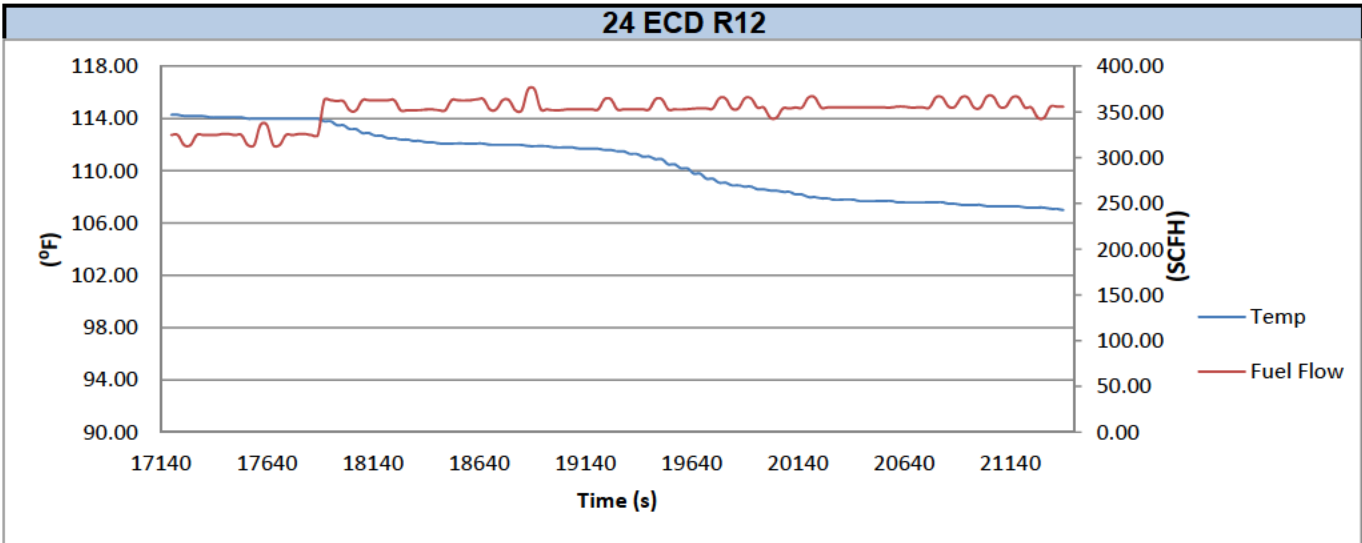
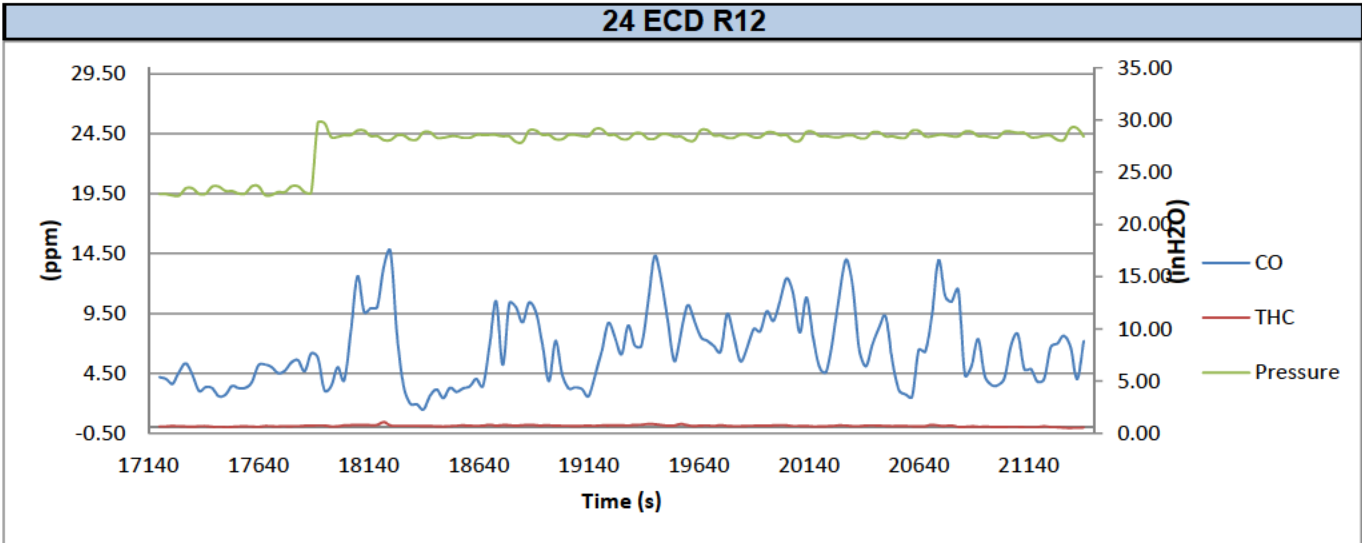
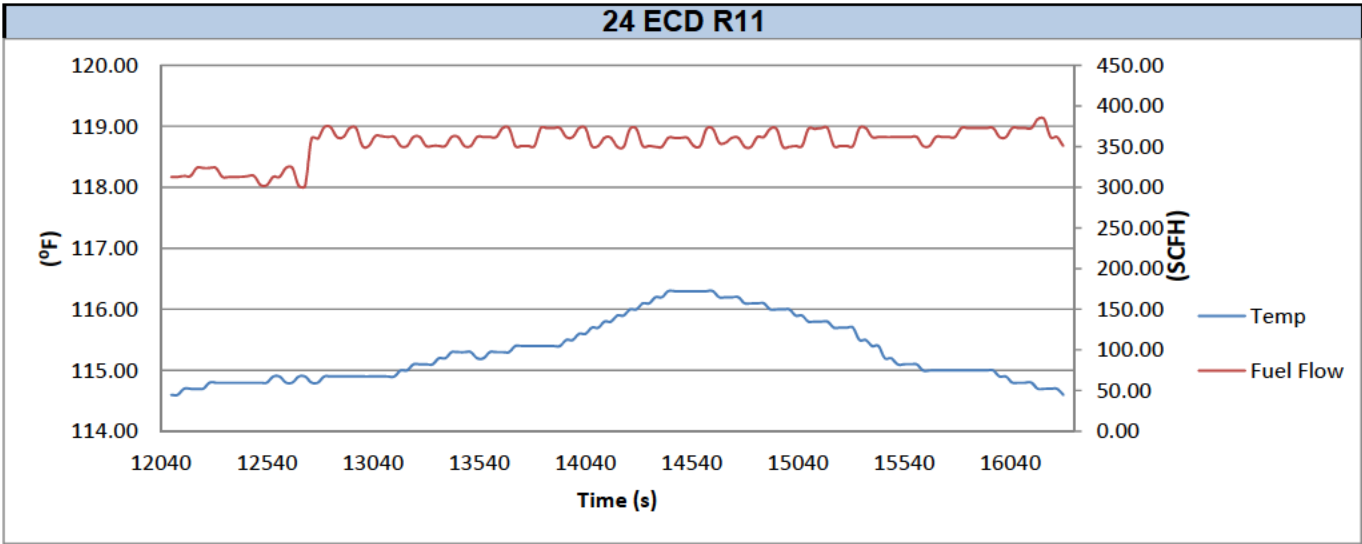


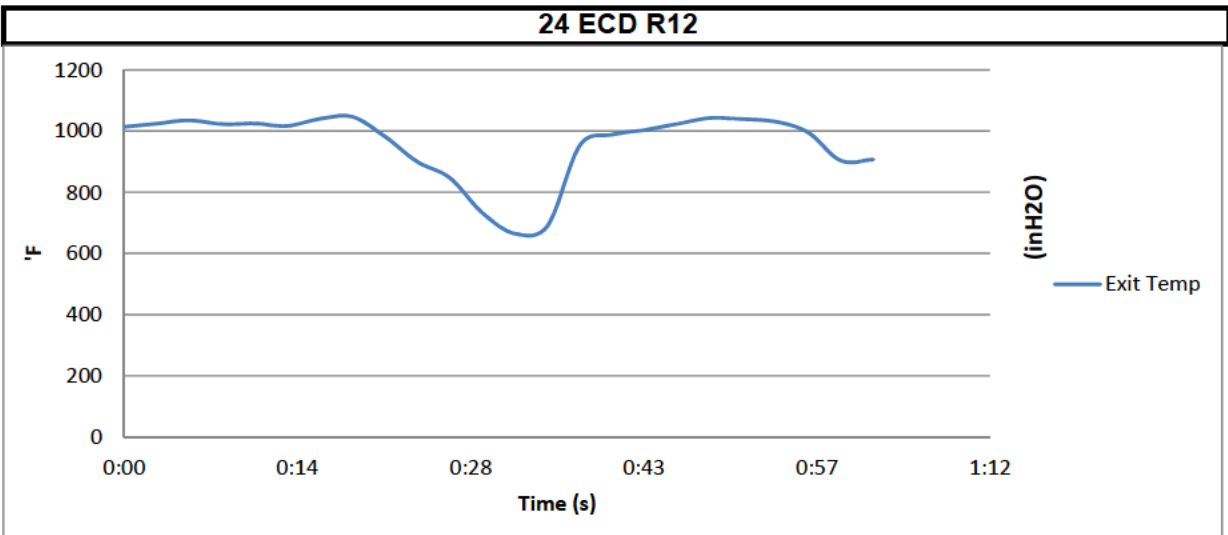
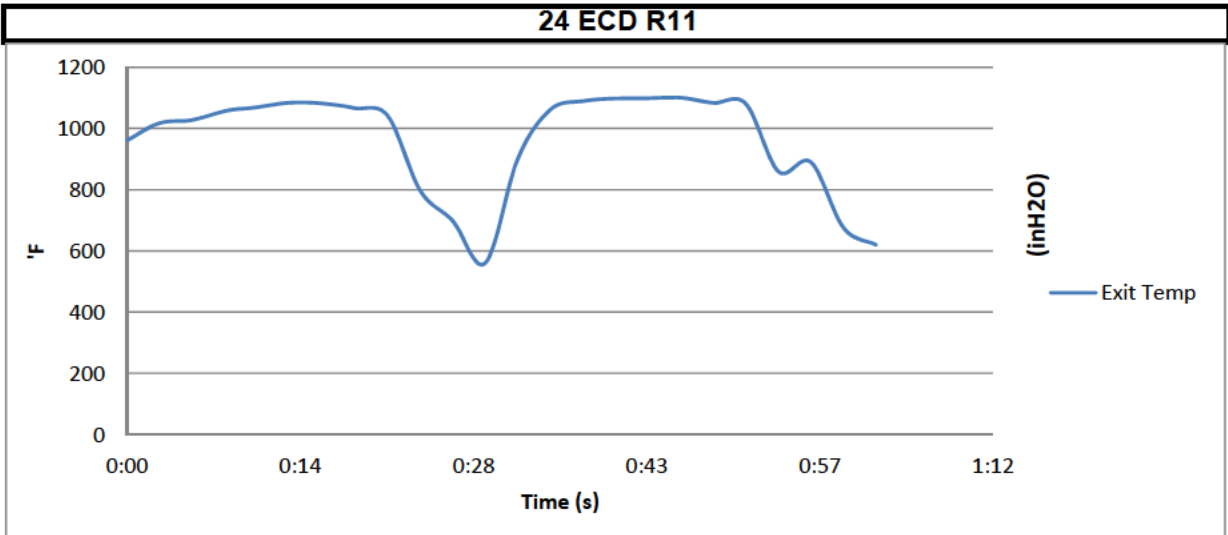
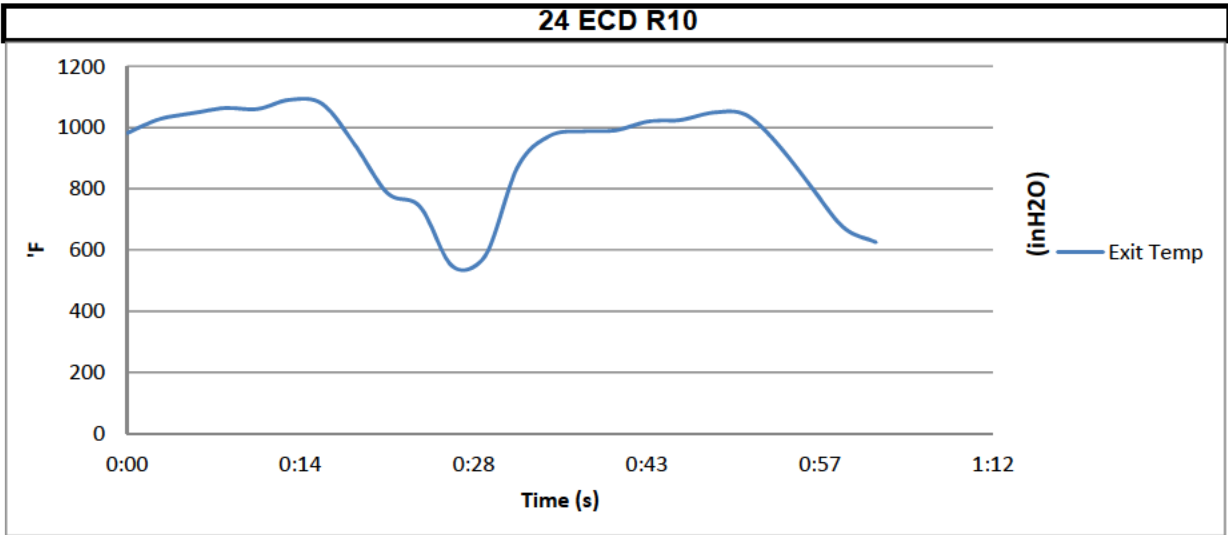
24 ECD R10



24 ECD R11







EMISSION DATA RECORDS

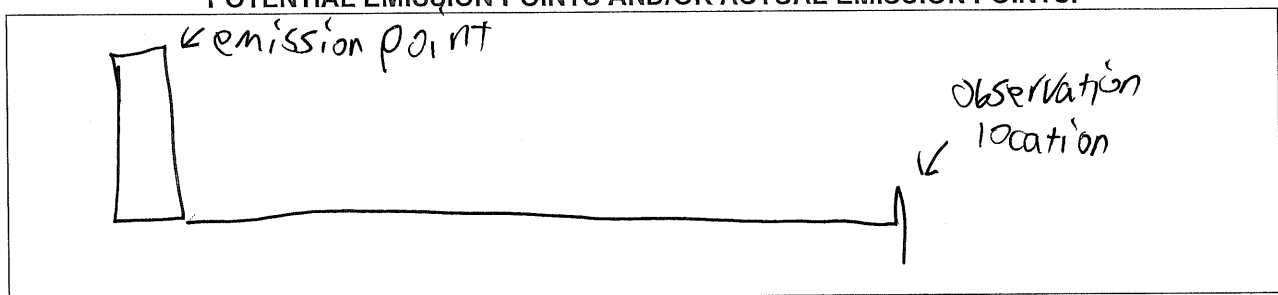
Visual Emission Data Record

Run /
METHOD 22
FUGITIVE OR SMOKE EMISSION
INSPECTION FORM



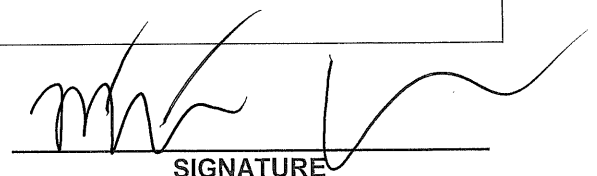
COMPANY: Cimaron Energy Inc. LOCATION: Norman Plant COMPANY REP: Tim Chalton	OBSERVER: mitch carson AFFILIATION: Air Hygiene Inc. DATE: 6/24/14
SKY CONDITIONS: partly cloudy: blue/white PRECIPITATION: none	WIND DIRECTION: WNW WIND SPEED: 2.0 mph
INDUSTRY: Natural Gas & Oil Industry	PROCESS UNIT: 2A ECD

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
12:40	20:00	00:00	NW of stack
13:09	5:00	break	↓
13:14	20:00	00:20	
13:34	5:00	break	
13:39	20:00	00:00	
13:59			
Photo: 13:10			


SIGNATURE

Run 1

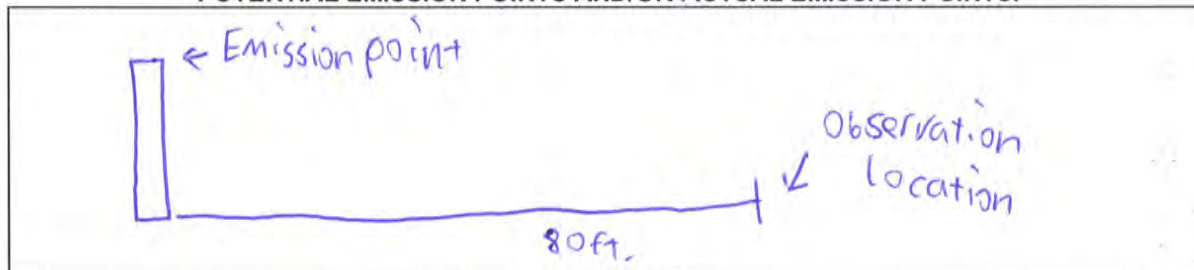


Run 2
METHOD 22
FUGITIVE OR SMOKE EMISSION
INSPECTION FORM



COMPANY: Cimmeron Energy Inc. LOCATION: Norman Plant COMPANY REP: Tim Chalton	OBSERVER: Mitch Carson AFFILIATION: Air Hygiene Inc. DATE: 6/24/14
SKY CONDITIONS: partly cloudy; blue/white PRECIPITATION: none	WIND DIRECTION: WNW WIND SPEED: 1mph
INDUSTRY: Natural Gas & Oil Industry	PROCESS UNIT: 24 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
14:27	20:00	0:00	NW of stack
14:47	5:00	break	↓
14:52	20:00	0:00	
15:12	5:00	break	
15:17	20:00	0:00	
15:37			
Photo			
14:59			

SIGNATURE

Run 2



Run 3

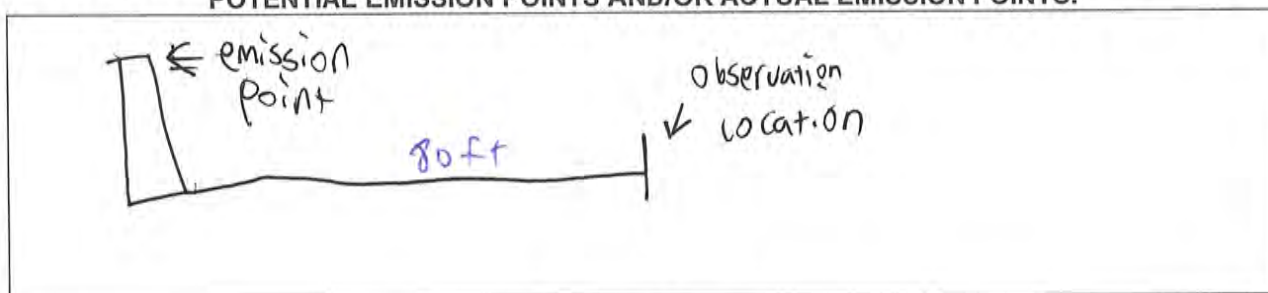
METHOD 22
FUGITIVE OR SMOKE EMISSION
INSPECTION FORM



AIR HYGIENE

COMPANY: Cimaron Energy Inc. LOCATION: Norman Plant COMPANY REP: Tim Chalton	OBSERVER: Mitch Carson / Min Sum Lee AFFILIATION: Air Hygiene Inc. DATE: 6/24/14
SKY CONDITIONS: partly cloudy: white/blue PRECIPITATION: None	WIND DIRECTION: S WIND SPEED: 2 mph
INDUSTRY: Natural Gas & Oil Industry	PROCESS UNIT: 24 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
15:53	20:00	00:00	NW of stack
16:13	5:00	break	
16:16	20:00	00:00	
16:38	5:00	break	
16:43	20:00	00:00	
17:03			

Photo @ 16:35

Min Sum Lee

SIGNATURE

Run 3



Run 4

METHOD 22
FUGITIVE OR SMOKE EMISSION
INSPECTION FORM

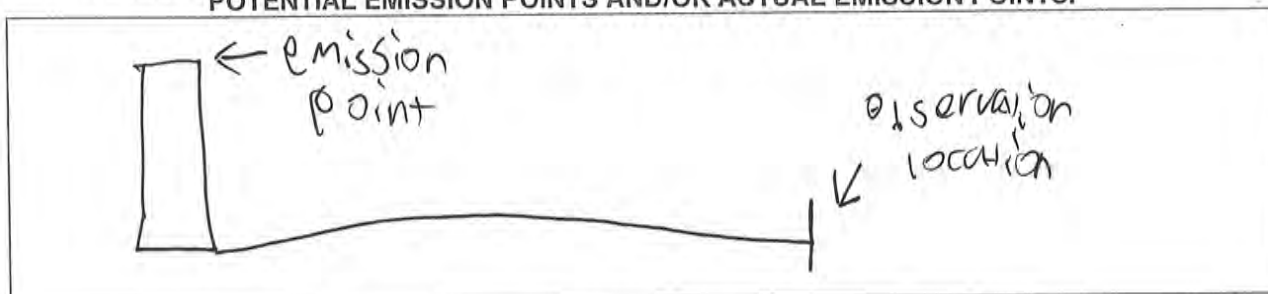
Run 4



AIR HYGIENE

COMPANY: Cimaron Energy Inc.	OBSERVER: Mitch Carlson
LOCATION: Norman Plant	AFFILIATION: Air Hygiene Inc.
COMPANY REP: Tim Chalton	DATE: 6/23/14
SKY CONDITIONS: Mostly clear; gray/blue	WIND DIRECTION: NE
PRECIPITATION: None	WIND SPEED: ~4.0 mph
INDUSTRY: Natural Gas & Oil Industry	PROCESS UNIT: 24 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
14:55	~20:00	00:00	NW of stack
15:15	5:20	break	↓
15:20	20:00	00:06	
15:40	5:00	break	
15:45	20:00	20:00	
16:05			
Photo:			
15:40			

SIGNATURE

Run 4



Run 5

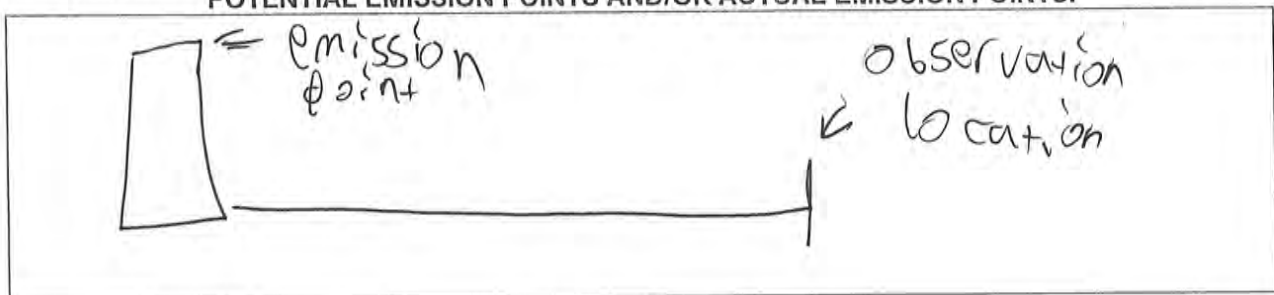
METHOD 22
FUGITIVE OR SMOKE EMISSION
INSPECTION FORM



AIR HYGIENE

COMPANY: Cimaron Energy Inc. LOCATION: Norman Plant COMPANY REP: Tim Chalton	OBSERVER: Mitch Carson / Min Sun Lee AFFILIATION: Air Hygiene Inc. DATE: 6/23/16 6/23/16
SKY CONDITIONS: Mostly cloudy: blue/gray PRECIPITATION: None	WIND DIRECTION: NW WIND SPEED: ~5.0 mph
INDUSTRY: Natural Gas & Oil Industry	PROCESS UNIT: 24 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
16:20	20:00	00:00	NW of Stack
16:40	5:00	break	
16:45	20:00	00:00	
17:05	5:00	break	
17:10	20:00	00:00	
17:30			
photo:			
16:44			

SIGNATURE

Run 5

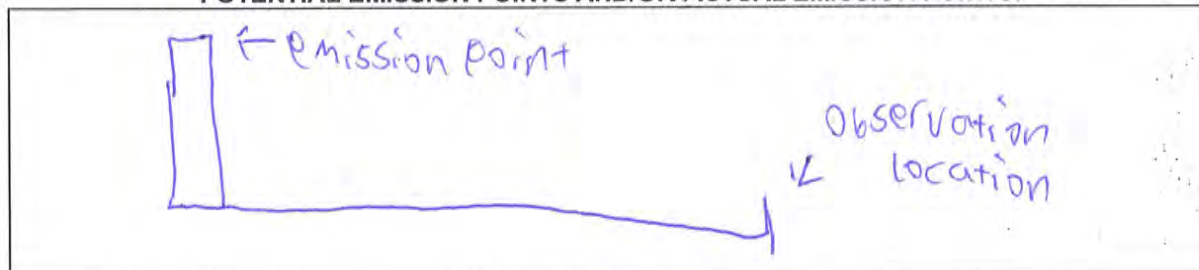


Run 6
METHOD 22
FUGITIVE OR SMOKE EMISSION
INSPECTION FORM



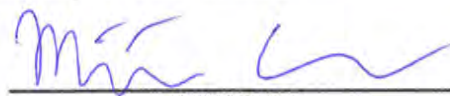
COMPANY: Cimarron Energy Inc. LOCATION: Norman Plant COMPANY REP: Tim Chalton	OBSERVER: Mitch Carson AFFILIATION: Air Hygiene Inc. DATE: 6/23/14
SKY CONDITIONS: partly cloudy: blue/gray PRECIPITATION: none	WIND DIRECTION: WIND SPEED: No Wind
INDUSTRY: Natural Gas & Oil Industry	PROCESS UNIT: 24 ECD

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
≈ 17:51	≈ 20:00	00:00	NW of stack
18:11	≈ 5:00	break	↓
18:16	≈ 20:00	00:00	
≈ 18:36	≈ 5:00	break	
18:41	20:00	00:00	
19:01			
Photo:			
18:21			


 SIGNATURE

Run 6



Run 7

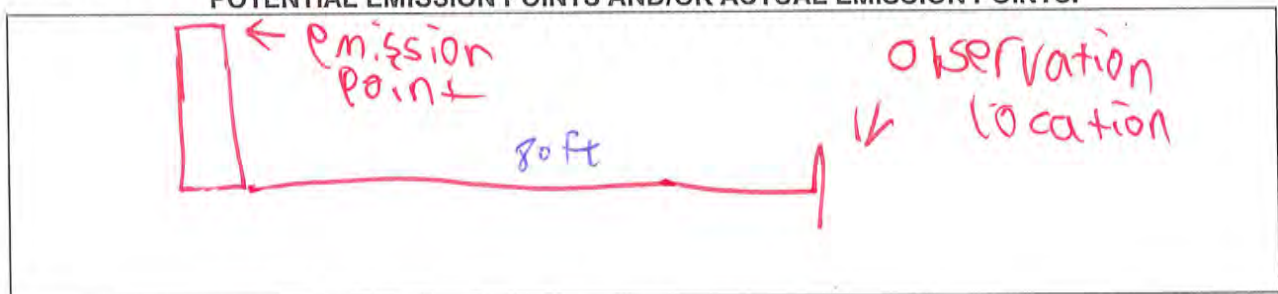




Run 8
METHOD 22
FUGITIVE OR SMOKE EMISSION
INSPECTION FORM

COMPANY: Cimaron Energy Inc. LOCATION: Norman Plant COMPANY REP: Tim Chalton	OBSERVER: Mitch Carson AFFILIATION: Air Hygiene Inc. DATE: 6/23/14
SKY CONDITIONS: Fair weather: blue PRECIPITATION: none	WIND DIRECTION: NW WIND SPEED: 7.3 mph
INDUSTRY: Natural Gas & Oil Industry	PROCESS UNIT: 24 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
11:45	20:00	00:00	NW of stack
12:05	5:00	break	↓
12:10	20:00	00:00	
~12:30	5:00	break	
~12:35	~20:00	00:00	
~12:55			
Photo:			
12:05			

Min ~

SIGNATURE

Run 8



Ruri 9

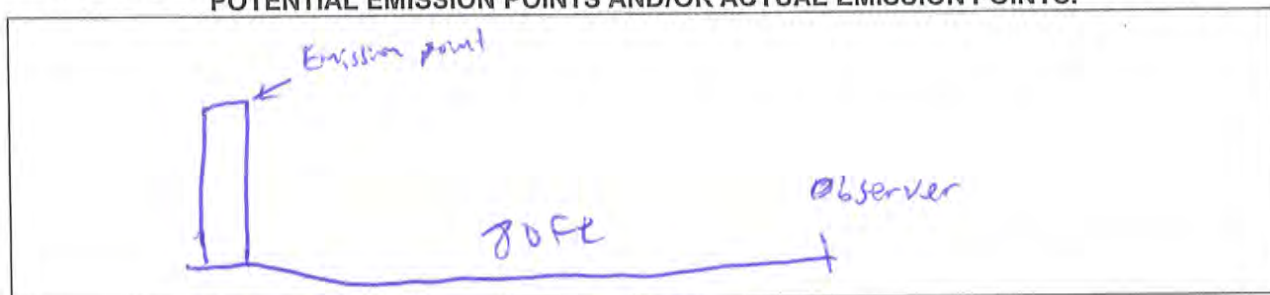
METHOD 22
FUGITIVE OR SMOKE EMISSION
INSPECTION FORM



AIR HYGIENE

COMPANY: Cimaron Energy Inc. LOCATION: Norman Plant COMPANY REP: Tim Chalton	OBSERVER: Mitch Carson / Min Sun Lee AFFILIATION: Air Hygiene Inc. DATE: 6/23/14
SKY CONDITIONS: fair weather: blue/white PRECIPITATION: none	WIND DIRECTION: NVE WIND SPEED: 6.7 mph
INDUSTRY: Natural Gas & Oil Industry	PROCESS UNIT: 24 ECD

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



OBSERVATIONS

CLOCK TIME	OBSERVATION PERIOD DURATION (MIN:SEC)	ACCUMULATION EMISSION TIME (MIN:SEC)	OBSERVATION LOCATION
13:15	20:00	00:00 (min)	NW of stack
13:35	05:00	Break	
13:40	20:00	00:00	
14:00	5:00	Break	
14:05	20:00	00:00	
14:25			
Photo:			
14:21			

[Signature]
SIGNATURE

Run 9



R10

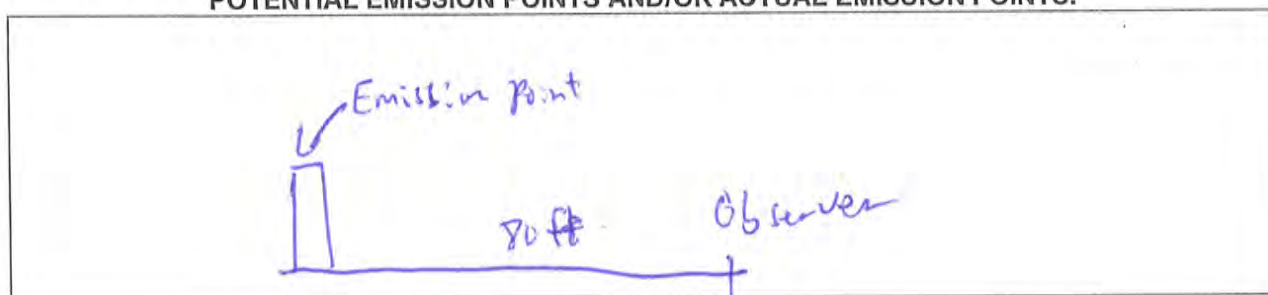
METHOD 22
FUGITIVE OR SMOKE EMISSION
INSPECTION FORM



AIR HYGIENE

COMPANY: Cimaron Energy Inc. LOCATION: Norman Plant COMPANY REP: Tim Chalton	OBSERVER: Min Sun Lee AFFILIATION: Air Hygiene Inc. DATE: 6/20/14
SKY CONDITIONS: partly cloudy/white background PRECIPITATION: None	WIND DIRECTION: SSE WIND SPEED: 4.
INDUSTRY: Natural Gas & Oil Industry	PROCESS UNIT: 24 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
12:18	20:00	00:00	SW
12:38	5:00	Break	NNW
12:43	20:00	00:00	
13:03	5:00	Break	
13:08	20:00	0:00	
13:28			

SIGNATURE

Run 10

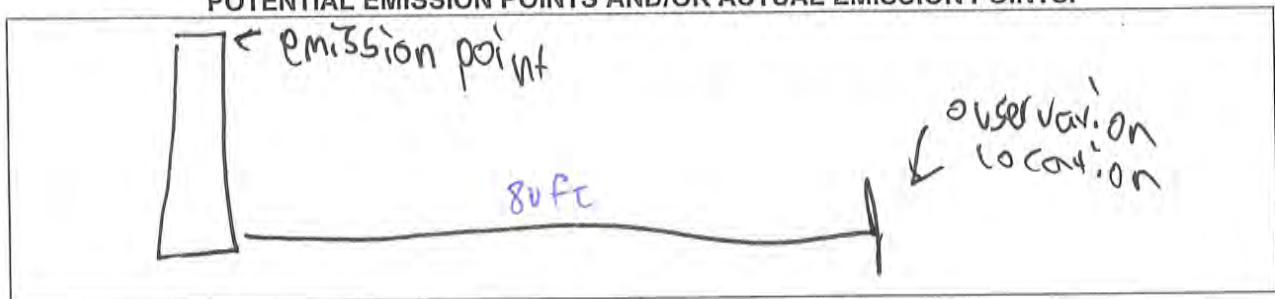


METHOD 22 *Run 11*
FUGITIVE OR SMOKE EMISSION
INSPECTION FORM



COMPANY: Cimaron Energy Inc. LOCATION: Norman Plant COMPANY REP: Tim Chalton	OBSERVER: <i>Mitch Carson</i> AFFILIATION: Air Hygiene Inc. DATE: <i>6/20/14</i>
SKY CONDITIONS: <i>fair weather: blue/white</i> PRECIPITATION: <i>no</i>	WIND DIRECTION: <i>SE</i> WIND SPEED: <i>8.5 mph</i>
INDUSTRY: Natural Gas & Oil Industry	PROCESS UNIT: <i>24 ECD</i>

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
<i>13:50</i>			
<i>14:10</i>	<i>20:00</i>	<i>00:00</i>	<i>NW of Stack</i>
<i>14:15</i>	<i>5:00</i>	<i>break</i>	
<i>14:35</i>	<i>20:00</i>	<i>00:00</i>	
<i>14:40</i>	<i>5:00</i>	<i>break</i>	
<i>15:00</i>	<i>20:00</i>	<i>00:00</i>	
<i>Photo:</i>			
<i>14:42</i>			

Mitch Carson
SIGNATURE

Run 11

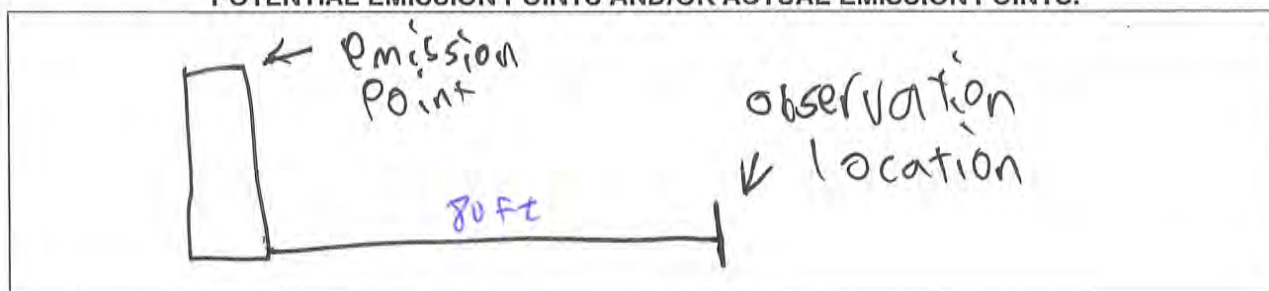


Run 12
METHOD 22
FUGITIVE OR SMOKE EMISSION
INSPECTION FORM



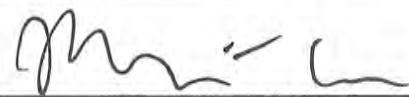
COMPANY: Cimaron Energy Inc. LOCATION: Norman Plant COMPANY REP: Tim Chalton	OBSERVER: Mitch Carlson AFFILIATION: Air Hygiene Inc. DATE: 6/20/14
SKY CONDITIONS: fair weather: blue/white PRECIPITATION: no np	WIND DIRECTION: SE WIND SPEED: 6-5 mph
INDUSTRY: Natural Gas & Oil Industry	PROCESS UNIT: 24 ECD

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
15:15	20:00	00:00	NW of stack
15:35	5:00	break	
15:40	20:00	00:00	
16:00	5:00	break	
16:05	20:00	00:00	
16:25			
Photo			
16:40			


 SIGNATURE

Run 12



APPENDIX C

CALIBRATION GAS CERTIFICATIONS



AIR LIQUIDE

Air Liquide America
Specialty Gases LLC



Intertek

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

1319 NORTH PEORIA
TRANSFER ACCOUNT
TULSA OK 74106
US

PO#: MT'S ON 53379330

ITEM #: 7501-30AL

DATE: 07Jan2014

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

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

LOT # : SBO0084338



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

CARBON MONOXIDE
NITROGEN

CERTIFIED CONCENTRATION (Moles)

11.0 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 2635

EXPIRATION DATE

05May2016

CYLINDER NUMBER

KAL003163

CONCENTRATION

25.21 PPM

COMPONENT

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

Dual-Analyzed Calibration Standard

11426 FAIRMONT PKWY, LA PORTE, TX 77571

Phone: 800-248-1427

Fax: 281-474-8419

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

Assay Laboratory - PGVP Vendor ID: A32012

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

P.O. No.:
Document #: 45457634-002
Folio #: AH077

Customer
AIR HYGIENE

MIKE SCOTT
1600 WEST TACOMA ST
BROKEN ARROW OK 74012
US

ANALYTICAL INFORMATION Gas Type : CO,NO,BALN

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

Cylinder Number: ALM044426 Certification Date: 26Mar2012 Exp. Date: 28Mar2020
Cylinder Pressure***: 2000 PSIG Batch No: LAP0061069

COMPONENT	CERTIFIED CONCENTRATION (Moles)		ACCURACY**	TRACEABILITY
CARBON MONOXIDE	25.9	PPM	+/- 1%	Direct NIST and VSL
NITRIC OXIDE	24.7	PPM	+/- 1%	Direct NIST and VSL
NITROGEN - OXYGEN FREE		BALANCE		
TOTAL OXIDES OF NITROGEN	24.7	PPM		Reference Value Only

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

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

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 2635	05May2016	KAL003201	25.21 PPM	CARBON MONOXIDE
NTRM 1683	15Aug2012	KAL004271	51.08 PPM	NITRIC OXIDE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
FTIR//MG-09-149	02Mar2012	FTIR
FTIR//MG-09-149	08Mar2012	FTIR

ANALYZER READINGS

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

First Triad Analysis

CARBON MONOXIDE

Date: 19Mar2012 Response Unit: PPM
Z1 = -0.00042 R1 = 25.19425 T1 = 25.90939
R2 = 25.21510 Z2 = 0.00845 T2 = 25.95239
Z3 = 0.01995 T3 = 25.97762 R3 = 25.26226
Avg. Concentration: 25.93 PPM

Second Triad Analysis

Date: 26Mar2012 Response Unit: PPM
Z1 = -0.02688 R1 = 25.35750 T1 = 25.96312
R2 = 25.36664 Z2 = -0.02516 T2 = 25.97086
Z3 = 0.00203 T3 = 25.99690 R3 = 25.37952
Avg. Concentration: 25.81 PPM

Calibration Curve

Concentration = A + Bx + Cx2 + Dx3 + Ex4
r = 9.99998E-1
Constants: A = 0.00000E+0
B = 9.02311E-1 C = 6.31000E-4
D = 1.00000E-6 E = 0.00000E+0

NITRIC OXIDE

Date: 19Mar2012 Response Unit: PPM
Z1 = -0.01772 R1 = 50.82095 T1 = 24.52914
R2 = 50.83754 Z2 = 0.00825 T2 = 24.56882
Z3 = 0.02251 T3 = 24.59501 R3 = 50.87560
Avg. Concentration: 24.67 PPM

Date: 26Mar2012 Response Unit: PPM
Z1 = 0.00398 R1 = 51.02810 T1 = 24.70002
R2 = 51.14354 Z2 = 0.02038 T2 = 24.72838
Z3 = 0.02173 T3 = 24.75324 R3 = 51.17688
Avg. Concentration: 24.70 PPM

Concentration = A + Bx + Cx2 + Dx3 + Ex4
r = 9.99983E-1
Constants: A = 0.00000E+0
B = 9.47513E-1 C = 1.88000E-4
D = 0.00000E+0 E = 0.00000E+0

Special Notes: THE EXPIRATION DATE HAS BEEN CORRECTED PER EPA 600/R-12/531, AS MODIFIED ON 09/14/2012.

APPROVED BY:

DEW POINT 40F CGA 660. ITEM# AH077

RON STITT



Air Liquide America
Specialty Gases LLC



RATA CLASS

Guaranteed +/- 1% Accuracy

1290 COMBERMERE STREET, TROY, MI 48083

Phone: 248-589-2950

Fax: 248-589-2134

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory - PGVP Vendor ID: A22013

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

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

Certification Date: 19Nov2012

Exp. Date: 20Nov2020

Cylinder Pressure***: 2000 PSIG

Batch No: TRO0070134

COMPONENT
PROPANE
AIR

CERTIFIED CONCENTRATION (Moles)
3.04 PPM
BALANCE

ACCURACY**
+/- 1%

TRACEABILITY
Direct NIST and VSL

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

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

REFERENCE STANDARD

TYPE/SRM NO.
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=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 20-24, 2014
Company: Cimarron Energy, Inc.
Location: Norman, Oklahoma
Techs: MSL/TP/MM

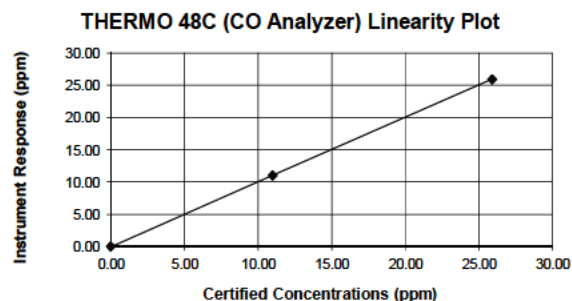
Sample System Leak Check

Date	Sample System	Leak Rate (l/min)
June 20-24, 2014	1	0

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

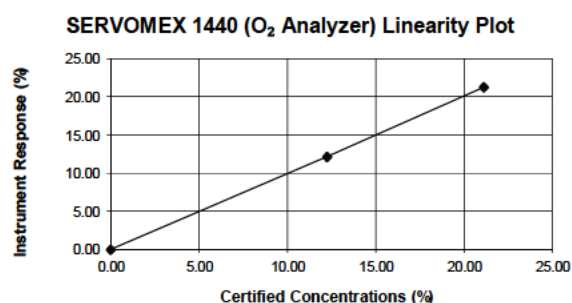
CO Span (ppm) = 25.90

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	0.04	0.01	YES (%)
11.00	11.08	0.31	0.08	YES (%)
25.90	25.93	0.12	0.03	YES (%)
Linearity = 0.999				



O₂ Span (%) = 21.10

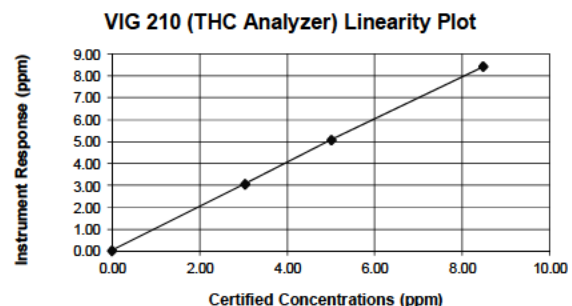
SERVOMEX 1440 (O ₂ Analyzer)				
Certified Concentration (%)	Instrument Response (%)	Calibration Error (%)	Absolute Conc. (%)	Pass or Fail ($\pm 2\%$, $\leq 0.5\%$)
0.00	0.02	0.09	0.02	YES (%)
12.25	12.15	-0.47	0.10	YES (%)
21.10	21.27	0.81	0.17	YES (%)
Linearity = 0.994				



THC Range (ppm) = 10

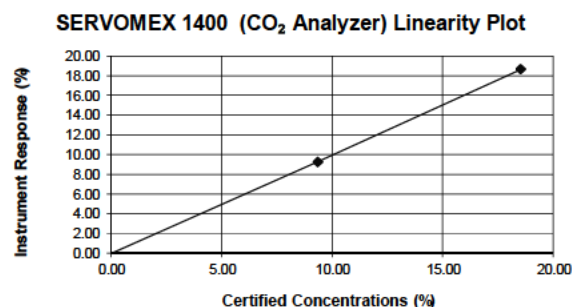
VIG 210 (THC Analyzer)				
Certified Concentration (ppm)	Instrument Response (ppm)	Calibration Error (%)	Estimated Point (ppm)	Pass or Fail ($\pm 2, 5\%$) ¹
0.00	0.05	0.50	N/A	YES
3.04	3.07	0.52	3.05	YES
5.01	5.09	1.78	5.00	YES
8.48	8.43	-0.50	N/A	YES
Linearity = 1.017				

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



CO₂ Span (%) = 18.50

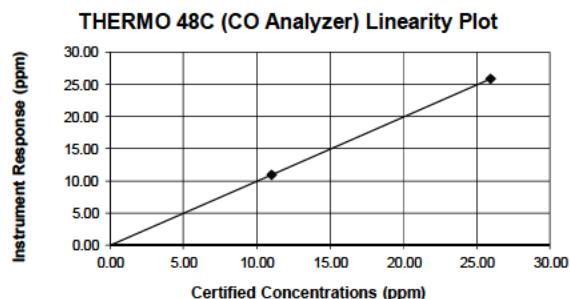
SERVOMEX 1400 (CO ₂ Analyzer)				
Certified Concentration (%)	Instrument Response (%)	Calibration Error (%)	Absolute Conc. (%)	Pass or Fail ($\pm 2\%$, $\leq 0.5\%$)
0.00	-0.01	-0.05	0.01	YES (%)
9.33	9.24	-0.49	0.09	YES (%)
18.50	18.61	0.59	0.11	YES (%)
Linearity = 0.994				



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

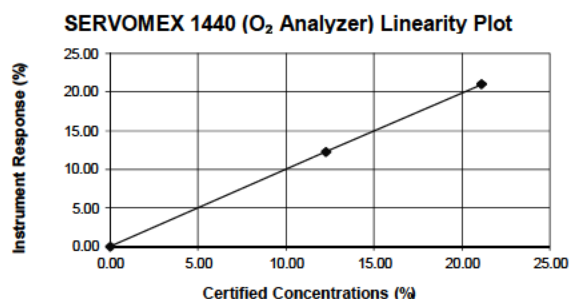
CO Span (ppm) = 25.90

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	-0.03	-0.12	0.03	YES (%)
11.00	10.96	-0.15	0.04	YES (%)
25.90	25.88	-0.08	0.02	YES (%)
Linearity = 1.000				



O2 Span (%) = 21.10

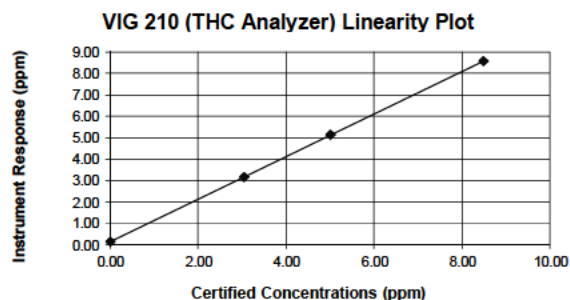
SERVOMEX 1440 (O ₂ Analyzer)				
Certified Concentration (%)	Instrument Response (%)	Calibration Error (%)	Absolute Conc. (%)	Pass or Fail ($\pm 2\%$, $\leq 0.5\%$)
0.00	0.01	0.05	0.01	YES (%)
12.25	12.25	0.00	0.00	YES (%)
21.10	21.00	-0.47	0.10	YES (%)
Linearity = 1.005				



THC Range (ppm) = 10

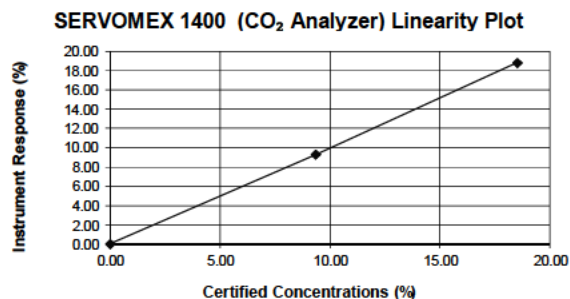
VIG 210 (THC Analyzer)				
Certified Concentration (ppm)	Instrument Response (ppm)	Calibration Error (%)	Estimated Point (ppm)	Pass or Fail ($\pm 2.5\%$) ¹
0.00	0.15	1.50	N/A	YES
3.04	3.16	-0.16	3.16	YES
5.01	5.13	0.23	5.12	YES
8.48	8.56	0.80	N/A	YES
Linearity = 1.008				

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



CO₂ Span (%) = 18.50

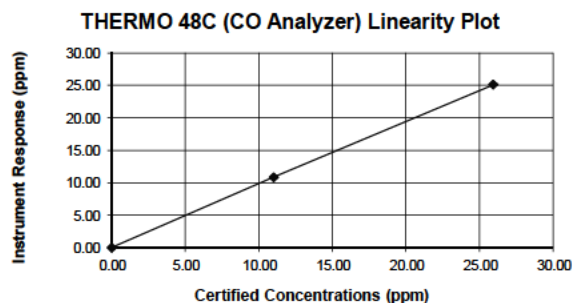
SERVOMEX 1400 (CO ₂ Analyzer)				
Certified Concentration (%)	Instrument Response (%)	Calibration Error (%)	Absolute Conc. (%)	Pass or Fail ($\pm 2\%$, $\leq 0.5\%$)
0.00	0.02	0.11	0.02	YES (%)
9.33	9.28	-0.27	0.05	YES (%)
18.50	18.80	1.62	0.30	YES (%)
Linearity = 0.985				



Calibration Date: June 24, 2014
Client: CIMARRON ENERGY, INC.

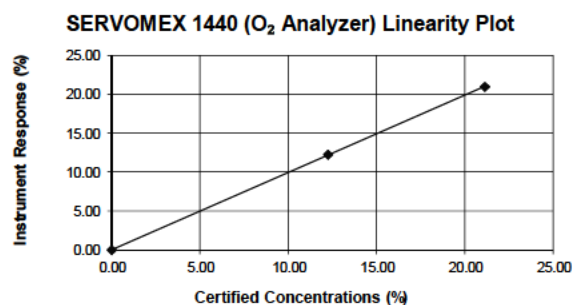
CO Span (ppm) = 25.90

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	0.08	0.02	YES (%)
11.00	10.89	-0.42	0.11	YES (%)
25.90	25.10	-3.09	0.80	NO
Linearity = 1.033				



O2 Span (%) = 21.10

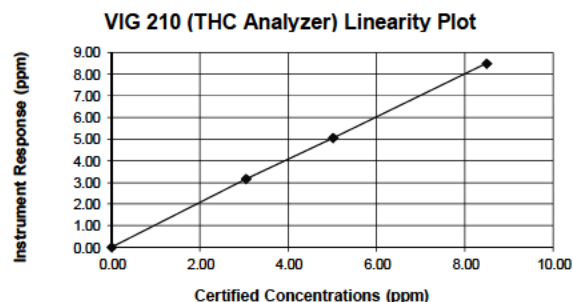
SERVOMEX 1440 (O ₂ Analyzer)				
Certified Concentration (%)	Instrument Response (%)	Calibration Error (%)	Absolute Conc. (%)	Pass or Fail ($\pm 2\%$, $\leq 0.5\%$)
0.00	0.01	0.05	0.01	YES (%)
12.25	12.23	-0.09	0.02	YES (%)
21.10	20.98	-0.57	0.12	YES (%)
Linearity = 1.006				



THC Range (ppm) = 10

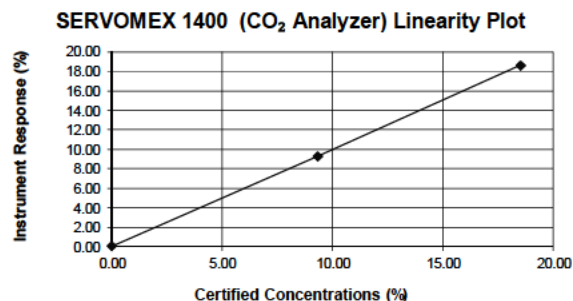
VIG 210 (THC Analyzer)				
Certified Concentration (ppm)	Instrument Response (ppm)	Calibration Error (%)	Estimated Point (ppm)	Pass or Fail ($\pm 2.5\%$) ¹
0.00	0.01	0.10	N/A	YES
3.04	3.16	3.62	3.05	YES
5.01	5.05	0.60	5.02	YES
8.48	8.49	0.10	N/A	YES
Linearity = 1.019				

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	9.29	-0.22	0.04	YES (%)
18.50	18.60	0.54	0.10	YES (%)
Linearity = 0.997				



DRIFT AND BIAS CHECK				
0-30-0 Load, Run - 24 ECD R1	O ₂	CO	THC	CO ₂
Raw Average	16.93	6.99	1.79	2.80
Corrected Average	17.17	7.14	1.88	2.78
Initial Zero	0.05	-0.04	0.08	0.06
Final Zero	0.03	0.01	-0.02	0.08
Avg. Zero	0.04	-0.02	0.03	0.07
Initial UpScale	12.11	10.75	2.95	9.23
Final UpScale	12.07	10.81	3.08	9.21
Avg. UpScale	12.09	10.78	3.02	9.22
Sys Resp (Zero)	0.01	0.02	0.01	0.05
Sys Resp (Upscale)	12.23	10.89	3.16	9.29
Upscale Cal Gas	12.25	11.00	3.04	9.33
Initial Zero Bias	0.19%	-0.23%	0.70%	0.05%
Final Zero Bias	0.09%	-0.04%	-0.30%	0.16%
Zero Drift	0.09%	0.19%	1.00%	0.11%
Initial Upscale Bias	-0.57%	-0.54%	-2.10%	-0.32%
Final Upscale Bias	-0.76%	-0.31%	-0.80%	-0.43%
Upscale Drift	0.19%	0.23%	1.30%	0.11%
Alternative Specification Abs Diff	Initial Zero	0.04	0.06	0.01
	Final Zero	0.02	0.01	0.03
	Initial Upscale	0.12	0.14	0.06
	Final Upscale	0.16	0.08	0.08
Calibration Span	21.10	25.90	10.00	18.50
3% of Cal. Span (drift)	0.63	0.78	0.30	0.56
5% of Cal. Span (bias)	1.06	1.30	0.50	0.93

DRIFT AND BIAS CHECK				
0-30-0 Load, Run - 24 ECD R2	O ₂	CO	THC	CO ₂
Raw Average	17.20	7.02	2.30	2.60
Corrected Average	17.47	7.15	2.26	2.57
Initial Zero	0.03	0.01	-0.02	0.08
Final Zero	0.04	-0.08	0.01	0.09
Avg. Zero	0.04	-0.04	-0.01	0.09
Initial UpScale	12.07	10.81	3.08	9.21
Final UpScale	12.08	10.82	3.12	9.20
Avg. UpScale	12.08	10.82	3.10	9.21
Sys Resp (Zero)	0.01	0.02	0.01	0.05
Sys Resp (Upscale)	12.23	10.89	3.16	9.29
Upscale Cal Gas	12.25	11.00	3.04	9.33
Initial Zero Bias	0.09%	-0.04%	-0.30%	0.16%
Final Zero Bias	0.14%	-0.39%	0.00%	0.22%
Zero Drift	0.05%	0.35%	0.30%	0.05%
Initial Upscale Bias	-0.76%	-0.31%	-0.80%	-0.43%
Final Upscale Bias	-0.71%	-0.27%	-0.40%	-0.49%
Upscale Drift	0.05%	0.04%	0.40%	0.05%
Alternative Specification Abs Diff	Initial Zero	0.02	0.01	0.03
	Final Zero	0.03	0.10	0.04
	Initial Upscale	0.16	0.08	0.08
	Final Upscale	0.15	0.07	0.09
Calibration Span	21.10	25.90	10.00	18.50
3% of Cal. Span (drift)	0.63	0.78	0.30	0.56
5% of Cal. Span (bias)	1.06	1.30	0.50	0.93

DRIFT AND BIAS CHECK				
0-30-0 Load, Run - 24 ECD R3	O ₂	CO	THC	CO ₂
Raw Average	17.01	8.20	2.46	2.70
Corrected Average	17.30	8.23	2.41	2.69
Initial Zero	0.04	-0.08	0.01	0.09
Final Zero	0.02	0.10	0.01	0.07
Avg. Zero	0.03	0.01	0.01	0.08
Initial UpScale	12.08	10.82	3.12	9.20
Final UpScale	12.03	11.09	3.07	9.12
Avg. UpScale	12.06	10.96	3.10	9.16
Sys Resp (Zero)	0.01	0.02	0.01	0.05
Sys Resp (Upscale)	12.23	10.89	3.16	9.29
Upscale Cal Gas	12.25	11.00	3.04	9.33
Initial Zero Bias	0.14%	-0.39%	0.00%	0.22%
Final Zero Bias	0.05%	0.31%	0.00%	0.11%
Zero Drift	0.09%	0.69%	0.00%	0.11%
Initial Upscale Bias	-0.71%	-0.27%	-0.40%	-0.49%
Final Upscale Bias	-0.95%	0.77%	-0.90%	-0.92%
Upscale Drift	0.24%	1.04%	0.50%	0.43%
Alternative Specification Abs Diff	Initial Zero	0.03	0.10	0.04
	Final Zero	0.01	0.08	0.02
	Initial Upscale	0.15	0.07	0.09
	Final Upscale	0.20	0.20	0.17
Calibration Span	21.10	25.90	10.00	18.50
3% of Cal. Span (drift)	0.63	0.78	0.30	0.56
5% of Cal. Span (bias)	1.06	1.30	0.50	0.93

DRIFT AND BIAS CHECK				
30-70-30 Load, Run - 24 ECD R4	O ₂	CO	THC	CO ₂
Raw Average	15.20	3.44	0.62	4.01
Corrected Average	15.54	3.52	0.56	4.00
Initial Zero	0.03	0.05	0.04	0.04
Final Zero	0.04	-0.11	0.05	0.03
Avg. Zero	0.04	-0.03	0.05	0.04
Initial UpScale	11.99	10.79	3.19	9.32
Final UpScale	11.98	10.87	3.15	9.31
Avg. UpScale	11.99	10.83	3.17	9.32
Sys Resp (Zero)	0.01	-0.03	0.15	0.02
Sys Resp (Upscale)	12.25	10.96	3.16	9.28
Upscale Cal Gas	12.25	11.00	3.04	9.33
Initial Zero Bias	0.09%	0.31%	-1.10%	0.11%
Final Zero Bias	0.14%	-0.31%	-1.00%	0.05%
Zero Drift	0.05%	0.62%	0.10%	0.05%
Initial Upscale Bias	-1.23%	-0.66%	0.30%	0.22%
Final Upscale Bias	-1.28%	-0.35%	-0.10%	0.16%
Upscale Drift	0.05%	0.31%	0.40%	0.05%
Alternative Specification Abs Diff	Initial Zero	0.02	0.08	0.02
	Final Zero	0.03	0.08	0.01
	Initial Upscale	0.26	0.17	0.04
	Final Upscale	0.27	0.09	0.03
Calibration Span	21.10	25.90	10.00	18.50
3% of Cal. Span (drift)	0.63	0.78	0.30	0.56
5% of Cal. Span (bias)	1.06	1.30	0.50	0.93

DRIFT AND BIAS CHECK				
30-70-30 Load, Run - 24 ECD R5	O ₂	CO	THC	CO ₂
Raw Average	15.19	3.05	0.51	4.01
Corrected Average	15.53	3.09	0.00	3.98
Initial Zero	0.04	-0.11	0.05	0.03
Final Zero	0.02	-0.02	0.03	0.07
Avg. Zero	0.03	-0.07	0.04	0.05
Initial UpScale	11.98	10.87	3.15	9.31
Final UpScale	12.00	11.18	3.00	9.34
Avg. UpScale	11.99	11.03	3.08	9.33
Sys Resp (Zero)	0.01	-0.03	0.15	0.02
Sys Resp (Upscale)	12.25	10.96	3.16	9.28
Upscale Cal Gas	12.25	11.00	3.04	9.33
Initial Zero Bias	0.14%	-0.31%	-1.00%	0.05%
Final Zero Bias	0.05%	0.04%	-1.20%	0.27%
Zero Drift	0.09%	0.35%	0.20%	0.22%
Initial Upscale Bias	-1.28%	-0.35%	-0.10%	0.16%
Final Upscale Bias	-1.18%	0.85%	-1.60%	0.32%
Upscale Drift	0.09%	1.20%	1.50%	0.16%
Alternative Specification Abs Diff	Initial Zero	0.03	0.08	0.01
	Final Zero	0.01	0.01	0.05
	Initial Upscale	0.27	0.09	0.03
	Final Upscale	0.25	0.22	0.06
Calibration Span	21.10	25.90	10.00	18.50
3% of Cal. Span (drift)	0.63	0.78	0.30	0.56
5% of Cal. Span (bias)	1.06	1.30	0.50	0.93

DRIFT AND BIAS CHECK				
30-70-30 Load, Run - 24 ECD R6	O ₂	CO	THC	CO ₂
Raw Average	15.13	3.33	0.37	4.07
Corrected Average	15.44	3.27	0.37	4.02
Initial Zero	0.02	-0.02	0.03	0.07
Final Zero	0.04	0.07	-0.02	0.09
Avg. Zero	0.03	0.03	0.01	0.08
Initial UpScale	12.00	11.18	3.00	9.34
Final UpScale	12.02	11.08	3.08	9.35
Avg. UpScale	12.01	11.13	3.04	9.35
Sys Resp (Zero)	0.01	-0.03	0.15	0.02
Sys Resp (Upscale)	12.25	10.96	3.16	9.28
Upscale Cal Gas	12.25	11.00	3.04	9.33
Initial Zero Bias	0.05%	0.04%	-1.20%	0.27%
Final Zero Bias	0.14%	0.39%	-1.70%	0.38%
Zero Drift	0.09%	0.35%	0.50%	0.11%
Initial Upscale Bias	-1.18%	0.85%	-1.60%	0.32%
Final Upscale Bias	-1.09%	0.46%	-0.80%	0.38%
Upscale Drift	0.09%	0.39%	0.80%	0.05%
Alternative Specification Abs Diff	Initial Zero	0.01	0.01	0.05
	Final Zero	0.03	0.10	0.07
	Initial Upscale	0.25	0.22	0.06
	Final Upscale	0.23	0.12	0.07
Calibration Span	21.10	25.90	10.00	18.50
3% of Cal. Span (drift)	0.63	0.78	0.30	0.56
5% of Cal. Span (bias)	1.06	1.30	0.50	0.93

DRIFT AND BIAS CHECK				
70-100-70 Load, Run - 24 ECD R7	O ₂	CO	THC	CO ₂
Raw Average	13.88	5.08	0.21	4.93
Corrected Average	14.16	4.94	0.12	4.93
Initial Zero	0.02	0.17	0.13	0.04
Final Zero	0.03	-0.03	0.05	0.06
Avg. Zero	0.03	0.07	0.09	0.05
Initial UpScale	12.02	11.40	3.14	9.27
Final UpScale	12.00	11.05	3.00	9.29
Avg. UpScale	12.01	11.23	3.07	9.28
Sys Resp (Zero)	0.01	-0.03	0.15	0.02
Sys Resp (Upscale)	12.25	10.96	3.16	9.28
Upscale Cal Gas	12.25	11.00	3.04	9.33
Initial Zero Bias	0.05%	0.77%	-0.20%	0.11%
Final Zero Bias	0.09%	0.00%	-1.00%	0.22%
Zero Drift	0.05%	0.77%	0.80%	0.11%
Initial Upscale Bias	-1.09%	1.70%	-0.20%	-0.05%
Final Upscale Bias	-1.18%	0.35%	-1.60%	0.05%
Upscale Drift	0.09%	1.35%	1.40%	0.11%
Alternative Specification Abs Diff	Initial Zero	0.01	0.20	0.02
	Final Zero	0.02	0.00	0.04
	Initial Upscale	0.23	0.44	0.01
	Final Upscale	0.25	0.09	0.01
Calibration Span	21.10	25.90	10.00	18.50
3% of Cal. Span (drift)	0.63	0.78	0.30	0.56
5% of Cal. Span (bias)	1.06	1.30	0.50	0.93

DRIFT AND BIAS CHECK				
70-100-70 Load, Run - 24 ECD R8	O ₂	CO	THC	CO ₂
Raw Average	13.83	3.95	0.27	4.96
Corrected Average	14.13	4.01	0.24	4.94
Initial Zero	0.03	-0.03	0.05	0.06
Final Zero	-0.01	-0.08	0.02	0.05
Avg. Zero	0.01	-0.06	0.04	0.06
Initial UpScale	12.00	11.05	3.00	9.29
Final UpScale	11.98	10.79	3.15	9.35
Avg. UpScale	11.99	10.92	3.08	9.32
Sys Resp (Zero)	0.01	-0.03	0.15	0.02
Sys Resp (Upscale)	12.25	10.96	3.16	9.28
Upscale Cal Gas	12.25	11.00	3.04	9.33
Initial Zero Bias	0.09%	0.00%	-1.00%	0.22%
Final Zero Bias	-0.09%	-0.19%	-1.30%	0.16%
Zero Drift	0.19%	0.19%	0.30%	0.05%
Initial Upscale Bias	-1.18%	0.35%	-1.60%	0.05%
Final Upscale Bias	-1.28%	-0.66%	-0.10%	0.38%
Upscale Drift	0.09%	1.00%	1.50%	0.32%
Alternative Specification Abs Diff	Initial Zero	0.02	0.00	0.04
	Final Zero	0.02	0.05	0.03
	Initial Upscale	0.25	0.09	0.01
	Final Upscale	0.27	0.17	0.07
Calibration Span	21.10	25.90	10.00	18.50
3% of Cal. Span (drift)	0.63	0.78	0.30	0.56
5% of Cal. Span (bias)	1.06	1.30	0.50	0.93

DRIFT AND BIAS CHECK				
70-100 Load, Run - 24 ECD R9	O ₂	CO	THC	CO ₂
Raw Average	13.76	3.92	0.42	5.03
Corrected Average	14.06	4.01	0.38	5.01
Initial Zero	-0.01	-0.08	0.02	0.05
Final Zero	0.03	0.05	0.04	0.04
Avg. Zero	0.01	-0.02	0.03	0.05
Initial UpScale	11.98	10.79	3.15	9.35
Final UpScale	11.99	10.79	3.19	9.32
Avg. UpScale	11.99	10.79	3.17	9.34
Sys Resp (Zero)	0.01	-0.03	0.15	0.02
Sys Resp (Upscale)	12.25	10.96	3.16	9.28
Upscale Cal Gas	12.25	11.00	3.04	9.33
Initial Zero Bias	-0.09%	-0.19%	-1.30%	0.16%
Final Zero Bias	0.09%	0.31%	-1.10%	0.11%
Zero Drift	0.19%	0.50%	0.20%	0.05%
Initial Upscale Bias	-1.28%	-0.66%	-0.10%	0.38%
Final Upscale Bias	-1.23%	-0.66%	0.30%	0.22%
Upscale Drift	0.05%	0.00%	0.40%	0.16%
Alternative Specification Abs Diff	Initial Zero	0.02	0.05	0.03
	Final Zero	0.02	0.08	0.02
	Initial Upscale	0.27	0.17	0.07
	Final Upscale	0.26	0.17	0.04
Calibration Span	21.10	25.90	10.00	18.50
3% of Cal. Span (drift)	0.63	0.78	0.30	0.56
5% of Cal. Span (bias)	1.06	1.30	0.50	0.93

DRIFT AND BIAS CHECK				
90-100 Load, Run - 24 ECD R10	O ₂	CO	THC	CO ₂
Raw Average	13.37	8.00	0.58	5.28
Corrected Average	13.55	7.92	0.55	5.33
Initial Zero	0.04	0.10	0.06	0.10
Final Zero	0.02	-0.04	0.03	0.02
Avg. Zero	0.03	0.03	0.05	0.06
Initial UpScale	12.10	11.08	3.06	9.18
Final UpScale	12.07	11.11	2.95	9.20
Avg. UpScale	12.09	11.10	3.01	9.19
Sys Resp (Zero)	0.02	0.01	0.05	-0.01
Sys Resp (Upscale)	12.15	11.08	3.07	9.24
Upscale Cal Gas	12.25	11.00	3.04	9.33
Initial Zero Bias	0.09%	0.35%	0.10%	0.59%
Final Zero Bias	0.00%	-0.19%	-0.20%	0.16%
Zero Drift	0.09%	0.54%	0.30%	0.43%
Initial Upscale Bias	-0.24%	0.00%	-0.10%	-0.32%
Final Upscale Bias	-0.38%	0.12%	-1.20%	-0.22%
Upscale Drift	0.14%	0.12%	1.10%	0.11%
Alternative Specification Abs Diff	Initial Zero	0.02	0.09	0.11
	Final Zero	0.00	0.05	0.03
	Initial Upscale	0.05	0.00	0.06
	Final Upscale	0.08	0.03	0.04
Calibration Span	21.10	25.90	10.00	18.50
3% of Cal. Span (drift)	0.63	0.78	0.30	0.56
5% of Cal. Span (bias)	1.06	1.30	0.50	0.93

DRIFT AND BIAS CHECK				
90-100 Load, Run - 24 ECD R11	O ₂	CO	THC	CO ₂
Raw Average	13.31	7.28	0.13	5.30
Corrected Average	13.53	7.32	0.10	5.38
Initial Zero	0.02	-0.04	0.03	0.02
Final Zero	0.04	-0.07	0.04	0.05
Avg. Zero	0.03	-0.06	0.04	0.04
Initial UpScale	12.07	11.11	2.95	9.20
Final UpScale	12.05	10.82	2.97	9.14
Avg. UpScale	12.06	10.97	2.96	9.17
Sys Resp (Zero)	0.02	0.01	0.05	-0.01
Sys Resp (Upscale)	12.15	11.08	3.07	9.24
Upscale Cal Gas	12.25	11.00	3.04	9.33
Initial Zero Bias	0.00%	-0.19%	-0.20%	0.16%
Final Zero Bias	0.09%	-0.31%	-0.10%	0.32%
Zero Drift	0.09%	0.12%	0.10%	0.16%
Initial Upscale Bias	-0.38%	0.12%	-1.20%	-0.22%
Final Upscale Bias	-0.47%	-1.00%	-1.00%	-0.54%
Upscale Drift	0.09%	1.12%	0.20%	0.32%
Alternative Specification Abs Diff	Initial Zero	0.00	0.05	0.03
	Final Zero	0.02	0.08	0.06
	Initial Upscale	0.08	0.03	0.04
	Final Upscale	0.10	0.26	0.10
Calibration Span	21.10	25.90	10.00	18.50
3% of Cal. Span (drift)	0.63	0.78	0.30	0.56
5% of Cal. Span (bias)	1.06	1.30	0.50	0.93

DRIFT AND BIAS CHECK				
90-100 Load, Run - 24 ECD R12	O ₂	CO	THC	CO ₂
Raw Average	13.59	6.50	0.13	5.10
Corrected Average	13.79	6.64	0.09	5.19
Initial Zero	0.04	-0.07	0.04	0.05
Final Zero	0.09	-0.13	0.03	0.02
Avg. Zero	0.07	-0.10	0.04	0.04
Initial UpScale	12.05	10.82	2.97	9.14
Final UpScale	12.10	10.86	3.10	9.13
Avg. UpScale	12.08	10.84	3.04	9.14
Sys Resp (Zero)	0.02	0.01	0.05	-0.01
Sys Resp (Upscale)	12.15	11.08	3.07	9.24
Upscale Cal Gas	12.25	11.00	3.04	9.33
Initial Zero Bias	0.09%	-0.31%	-0.10%	0.32%
Final Zero Bias	0.33%	-0.54%	-0.20%	0.16%
Zero Drift	0.24%	0.23%	0.10%	0.16%
Initial Upscale Bias	-0.47%	-1.00%	-1.00%	-0.54%
Final Upscale Bias	-0.24%	-0.85%	0.30%	-0.59%
Upscale Drift	0.24%	0.15%	1.30%	0.05%
Alternative Specification Abs Diff	Initial Zero	0.02	0.08	0.06
	Final Zero	0.07	0.14	0.03
	Initial Upscale	0.10	0.26	0.10
	Final Upscale	0.05	0.22	0.11
Calibration Span	21.10	25.90	10.00	18.50
3% of Cal. Span (drift)	0.63	0.78	0.30	0.56
5% of Cal. Span (bias)	1.06	1.30	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 McCarthy

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>	<u>08/24/13</u>	<u>08/24/13</u>
	Read	76.00			
	±°F	0.10			
Filter	Ref	75.90	<i>Craig McCarty</i>	<u>08/24/13</u>	<u>08/24/13</u>
	Read	76.00			
	±°F	0.10			
Exit	Ref	75.90	<i>Craig McCarty</i>	<u>08/24/13</u>	<u>08/24/13</u>
	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)

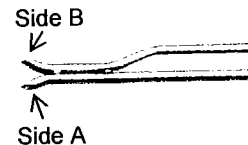
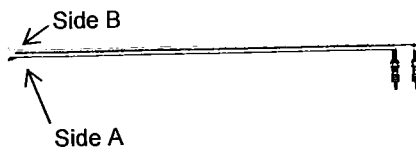
SIDE "B" CALIBRATION				
RUN NO.	Δ Pstd in H ₂ O	Δ Ps in H ₂ O	Cp(s)	DEVIATION Cp(s) - avg.Cp(s)
1	0.560	0.815	0.821	0.000
2	0.560	0.815	0.821	0.000
3	0.560	0.815	0.821	0.000
"B" AVERAGE			0.821	0.0000 (must be ≤ 0.01)

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

Date 1.11.13

Signature: Nick Allen

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 $\pm 2^\circ\text{F}$.

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
Mezu m L

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

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

Certified By

Soter J J

Date

29/03/12



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

Customer Information

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

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

Unit Description

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

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

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

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

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

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

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

NMI accredited laboratory no: CE-085

This meter conforms to purchaser specifications.

Test date 21-May-12 by MARTINEZ, JUAN

DMD Model 5 Prover

Date: 7/14/2014

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

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

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

Monday, July 14, 2014

1 of 1

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

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

REF ID# CT41661SOURCE Tank 5

by/for EGH
Robert D. Freeman
Laboratory Manager

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

revised 09/09/13

APPENDIX E

FUEL ANALYSIS RECORDS

LABORATORY REPORT

July 11, 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 26, 2014. For your reference, these analyses have been assigned our service request number P1402577.

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

For Kelly Horiuchi
Laboratory Director

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

Service Request No: P1402577

CASE NARRATIVE

The samples were received intact under chain of custody on June 26, 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.

C1 through C6 Hydrocarbon Analysis

The samples were analyzed according to ASTM D1945-03 for C1 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 modified EPA Method 3C (single injection) using a gas chromatograph equipped with a thermal conductivity detector (TCD). This method is not included on the laboratory's NELAP or AIHA-LAP scope of accreditation.

Hydrogen Sulfide Analysis

The samples were also analyzed for hydrogen sulfide per modified SCAQMD Method 307-91 and 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.

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

Service Request: P1402577

Date Received: 6/26/2014
 Time Received: 09:40

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-24 ECD	P1402577-001	Air	6/20/2014	16:35	SSC00037	-2.03	3.55	X	X	X
cei-70-100%-70-can-24 ECD	P1402577-002	Air	6/23/2014	14:40	SSC00180	-1.14	3.57	X	X	X
cei-30-70-30%-can-24 ECD	P1402577-003	Air	6/23/2014	19:15	SSC00082	-1.47	4.22	X	X	X
cei-0-30-0%-can-24 ECD	P1402577-004	Air	6/24/2014	17:10	SSC00087	-1.70	3.51	X	X	X



2655 Park Center Drive, Suite A
Simi Valley, California 93065
Phone (805) 526-7161
Fax (805) 526-7270

Page _____ of _____

Air - Chain of Custody Record & Analytical Service Request

ALS

Simi Valley, California 93065
Phone (805) 526-7161
Fax (805) 526-7270

Requested Turnaround Time in Business Days (Surcharges) please circle
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10-Day-Standard

ALS Project No. **PW0517**

Company Name & Address (Reporting Information)

Cimarron Energy
Project Manager **Min Sun Lee**
Phone **918 307 8865**
Email Address for Result Reporting **mlee@air-hygiene.com & lab@air-hygiene.com**
Fax

Project Name

Cimarron Flare

Project Number

CEI-14-norman.ok-comp#1

P.O. # / Billing Information

Email Address for Result Reporting

mlee@air-hygiene.com & lab@air-hygiene.com

Client Sample ID

CEI-90-100%-can-24EED
CEI-70-100-70%-can-24EED
CEI-30-70-30%-can-24EED
CEI-0-30-0%-can-24EED

Sampler (Print & Sign)

[Signature]

Laboratory ID Number	Date Collected	Time Collected	Canister ID (Bar code # - AC, SC, etc.)	Flow Controller ID (Bar code # - FC #)	Canister Start Pressure "Hg	Canister End Pressure "Hg/psig	Sample Volume
6/20/14	16:35	SSC00037	SQA00031	-28.72	-2.64	X	
6/23/14	14:40	SSC00180	SQA0042	-28.60	-1.08	X	
6/23/14	19:15	SSC00082	SQA00141	-28.60	-2.34	X	
6/24/14	17:10	SSC00087	SQA00022	-28.72	-1.71	X	

Report Tier Levels - please select

Tier I - Results (Default in not specified)
Tier II (Results + QC Summaries)
Tier III (Results + QC & Calibration Summaries)
Tier IV (Date Validation Package) 10% Surcharge

Chain of Custody Seal:

INTACT BROKEN ABSENT

Project Requirements (MRLs, QAPP)

(MRLs, QAPP)

Relinquished by: (Signature)

[Signature]

Date:

9/24/14

Received by: (Signature)

[Signature]

Type:

K.V. Lee

Date:

6/24/14

Time:

09:00

Project Requirements (MRLs, QAPP)

(MRLs, QAPP)

Chain of Custody Seal:

INTACT BROKEN ABSENT

Project Requirements (MRLs, QAPP)

(MRLs, QAPP)

Chain of Custody Seal:

INTACT BROKEN ABSENT

Project Requirements (MRLs, QAPP)

(MRLs, QAPP)

Chain of Custody Seal:

INTACT BROKEN ABSENT

Project Requirements (MRLs, QAPP)

(MRLs, QAPP)

Chain of Custody Seal:

INTACT BROKEN ABSENT

Project Requirements (MRLs, QAPP)

(MRLs, QAPP)

Chain of Custody Seal:

INTACT BROKEN ABSENT

Project Requirements (MRLs, QAPP)

(MRLs, QAPP)

Chain of Custody Seal:

INTACT BROKEN ABSENT

Project Requirements (MRLs, QAPP)

(MRLs, QAPP)

Chain of Custody Seal:

INTACT BROKEN ABSENT

Project Requirements (MRLs, QAPP)

(MRLs, QAPP)

Chain of Custody Seal:

INTACT BROKEN ABSENT

Project Requirements (MRLs, QAPP)

(MRLs, QAPP)

Chain of Custody Seal:

INTACT BROKEN ABSENT

Project Requirements (MRLs, QAPP)

(MRLs, QAPP)

Chain of Custody Seal:

INTACT BROKEN ABSENT

Project Requirements (MRLs, QAPP)

ALS Environmental **Sample Acceptance Check Form**

Client: Air Hygiene, Incorporated

Work order: P1402577

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

Sample(s) received on: 6/26/14

Date opened: 6/26/14

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
P1402577-001.01	6.0 L Silonite Can					
P1402577-002.01	6.0 L Silonite Can					
P1402577-003.01	6.0 L Silonite Can					
P1402577-004.01	6.0 L Silonite Can					

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

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: P1402577

Benzene

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

Date(s) Collected: 6/20 - 6/24/14
Date Received: 6/26/14
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-24 ECD	P1402577-001	1.44	0.050	ND	17	
cei-70-100%-70-can-24 ECD	P1402577-002	1.35	0.050	ND	16	
cei-30-70-30%-can-24 ECD	P1402577-003	1.43	0.050	ND	17	
cei-0-30-0%-can-24 ECD	P1402577-004	1.40	0.050	ND	17	
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: P1402577
ALS Sample ID: P140630-LCS

Test Code: ASTM D1945-03
Instrument ID: HP5890 II/GC8/FID
Analyst: Wade Henton/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	
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-24 ECD
Client Project ID: Cimarron Flare / cei-14-norman.ok-comp#1

ALS Project ID: P1402577
ALS Sample ID: P1402577-001

Test Code: ASTM D3588-98
Analyst: Mike Conejo/Nalini Lall
Sample Type: 6.0 L Silonite Canister
Test Notes:
Container ID: SSC00037

Date Collected: 6/20/14
Date Received: 6/26/14

Initial Pressure (psig): -2.03 Final Pressure (psig): 3.55

Components	Result Volume %	Canister Dilution Factor: 1.44	
		Result Weight %	Data Qualifier
Hydrogen	< 0.01	< 0.01	
Oxygen + Argon	0.23	0.17	
Nitrogen	1.06	0.68	
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	98.70	99.14	
C4 as n-Butane	< 0.01	< 0.01	
C5 as n-Pentane	< 0.01	< 0.01	
C6 as n-Hexane	< 0.01	< 0.01	
> C6 as n-Hexane	< 0.01	< 0.01	
TOTALS	99.99	99.99	

Components	Mole %	Weight %
Carbon	27.21	81.02
Hydrogen	72.55	18.13
Oxygen + Argon	< 0.10	0.17
Nitrogen	0.19	0.68
Sulfur	< 0.10	< 0.10

Specific Gravity (Air = 1)		1.5156
Specific Volume	ft3/lb	8.65
Gross Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/ft3	2,526.3
Net Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/ft3	2,324.3
Gross Heating Value (Water Saturated at 0.25636 psia)	BTU/ft3	2,440.0
Net Heating Value (Water Saturated at 0.25636 psia)	BTU/ft3	2,244.9
Gross Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/lb	21,840.5
Net Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/lb	20,094.0
Compressibility Factor "Z" (60 F, 14.696 psia)		0.9830

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: Air Hygiene, Incorporated
Client Sample ID: cei-70-100%-70-can-24 ECD
Client Project ID: Cimarron Flare / cei-14-norman.ok-comp#1

ALS Project ID: P1402577
ALS Sample ID: P1402577-002

Test Code: ASTM D3588-98
Analyst: Mike Conejo/Nalini Lall
Sample Type: 6.0 L Silonite Canister
Test Notes:
Container ID: SSC00180

Date Collected: 6/23/14
Date Received: 6/26/14

Initial Pressure (psig): -1.14 Final Pressure (psig): 3.57

Components	Result Volume %	Canister Dilution Factor: 1.35	
		Result Weight %	Data Qualifier
Hydrogen	< 0.01	< 0.01	
Oxygen + Argon	0.27	0.19	
Nitrogen	1.22	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	0.22	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	2,435.1
Net Heating Value (Water Saturated at 0.25636 psia)	BTU/ft3	2,240.4
Gross Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/lb	21,810.5
Net Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/lb	20,066.4
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-30-70-30%-can-24 ECD
Client Project ID: Cimarron Flare / cei-14-norman.ok-comp#1

ALS Project ID: P1402577
ALS Sample ID: P1402577-003

Test Code: ASTM D3588-98
Analyst: Mike Conejo/Nalini Lall
Sample Type: 6.0 L Silonite Canister
Test Notes:
Container ID: SSC00082

Date Collected: 6/23/14
Date Received: 6/26/14

Initial Pressure (psig): -1.47 Final Pressure (psig): 4.22

Components	Result Volume %	Canister Dilution Factor: 1.43	
		Result Weight %	Data Qualifier
Hydrogen	< 0.01	< 0.01	
Oxygen + Argon	0.08	0.06	
Nitrogen	0.52	0.33	
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	99.39	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	18.21
Oxygen + Argon	< 0.10	< 0.10
Nitrogen	< 0.10	0.33
Sulfur	< 0.10	< 0.10

Specific Gravity (Air = 1)		1.5192
Specific Volume	ft3/lb	8.62
Gross Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/ft3	2,544.5
Net Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/ft3	2,341.0
Gross Heating Value (Water Saturated at 0.25636 psia)	BTU/ft3	2,457.2
Net Heating Value (Water Saturated at 0.25636 psia)	BTU/ft3	2,260.7
Gross Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/lb	21,945.4
Net Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/lb	20,190.5
Compressibility Factor "Z" (60 F, 14.696 psia)		0.9828

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: Air Hygiene, Incorporated
Client Sample ID: cei-0-30-0%-can-24 ECD
Client Project ID: Cimarron Flare / cei-14-norman.ok-comp#1

ALS Project ID: P1402577
ALS Sample ID: P1402577-004

Test Code: ASTM D3588-98
Analyst: Mike Conejo/Nalini Lall
Sample Type: 6.0 L Silonite Canister
Test Notes:
Container ID: SSC00087

Date Collected: 6/24/14
Date Received: 6/26/14

Initial Pressure (psig): -1.70 Final Pressure (psig): 3.51

Components	Result Volume %	Canister Dilution Factor: 1.40	
		Result Weight %	Data Qualifier
Hydrogen	< 0.01	< 0.01	
Oxygen + Argon	0.11	0.08	
Nitrogen	0.49	0.31	
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	99.39	99.59	
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	81.39
Hydrogen	72.65	18.21
Oxygen + Argon	< 0.10	< 0.10
Nitrogen	< 0.10	0.31
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	2,544.5
Net Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/ft3	2,341.1
Gross Heating Value (Water Saturated at 0.25636 psia)	BTU/ft3	2,457.2
Net Heating Value (Water Saturated at 0.25636 psia)	BTU/ft3	2,260.7
Gross Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/lb	21,944.8
Net Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/lb	20,190.0
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-24 ECD
Client Project ID: Cimarron Flare / cei-14-norman.ok-comp#1

ALS Project ID: P1402577
 ALS Sample ID: P1402577-001

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: SSC00037

Date Collected: 6/20/14
Date Received: 6/26/14
Date Analyzed: 6/30/14
Volume(s) Analyzed: 0.050 ml(s)

Initial Pressure (psig): -2.03 **Final Pressure (psig):** 3.55

Canister Dilution Factor: 1.44

Compound	Result ppmV	MRL ppmV	Data Qualifier
Methane	ND	14	
C ₂ as Ethane	27	14	
C ₃ as Propane	990,000	14	
C ₄ as n-Butane	ND	14	
C ₅ as n-Pentane	ND	14	
C ₆ as n-Hexane	ND	14	
C ₆ + as n-Hexane	ND	29	

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-24 ECD
Client Project ID: Cimarron Flare / cei-14-norman.ok-comp#1

ALS Project ID: P1402577
 ALS Sample ID: P1402577-002

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: SSC00180

Date Collected: 6/23/14
 Date Received: 6/26/14
 Date Analyzed: 6/30/14
 Volume(s) Analyzed: 0.050 ml(s)

Initial Pressure (psig): -1.14 Final Pressure (psig): 3.57

Canister Dilution Factor: 1.35

Compound	Result ppmV	MRL ppmV	Data Qualifier
Methane	ND	14	
C ₂ as Ethane	27	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	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: cei-30-70-30%-can-24 ECD
Client Project ID: Cimarron Flare / cei-14-norman.ok-comp#1

ALS Project ID: P1402577
 ALS Sample ID: P1402577-003

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: SSC00082

Date Collected: 6/23/14
Date Received: 6/26/14
Date Analyzed: 6/30/14
Volume(s) Analyzed: 0.050 ml(s)

Initial Pressure (psig): -1.47 **Final Pressure (psig):** 4.22

Canister Dilution Factor: 1.43

Compound	Result ppmV	MRL ppmV	Data Qualifier
Methane	ND	14	
C ₂ as Ethane	27	14	
C ₃ as Propane	990,000	14	
C ₄ as n-Butane	ND	14	
C ₅ as n-Pentane	ND	14	
C ₆ as n-Hexane	ND	14	
C ₆ + as n-Hexane	ND	29	

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-24 ECD
Client Project ID: Cimarron Flare / cei-14-norman.ok-comp#1

ALS Project ID: P1402577
 ALS Sample ID: P1402577-004

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: SSC00087

Date Collected: 6/24/14
Date Received: 6/26/14
Date Analyzed: 6/30/14
Volume(s) Analyzed: 0.050 ml(s)

Initial Pressure (psig): -1.70 **Final Pressure (psig):** 3.51

Canister Dilution Factor: 1.40

Compound	Result ppmV	MRL ppmV	Data Qualifier
Methane	ND	14	
C ₂ as Ethane	27	14	
C ₃ as Propane	990,000	14	
C ₄ as n-Butane	ND	14	
C ₅ as n-Pentane	ND	14	
C ₆ as n-Hexane	ND	14	
C ₆ + as n-Hexane	ND	28	

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

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

ALS Project ID: P1402577
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: P1402577

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 Acceptance Limits	Data Qualifier
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-24 ECD
Client Project ID: Cimarron Flare / cei-14-norman.ok-comp#1

ALS Project ID: P1402577
 ALS Sample ID: P1402577-001

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: SSC00037

Date Collected: 6/20/14
 Date Received: 6/26/14
 Date Analyzed: 7/3/14
 Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -2.03 Final Pressure (psig): 3.55

Canister Dilution Factor: 1.44

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	0.231	0.14	
7727-37-9	Nitrogen	1.06	0.14	
630-08-0	Carbon Monoxide	ND	0.14	
124-38-9	Carbon Dioxide	ND	0.14	

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: Air Hygiene, Incorporated
Client Sample ID: cei-70-100%-70-can-24 ECD
Client Project ID: Cimarron Flare / cei-14-norman.ok-comp#1

ALS Project ID: P1402577
 ALS Sample ID: P1402577-002

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: SSC00180

Date Collected: 6/23/14
 Date Received: 6/26/14
 Date Analyzed: 7/3/14
 Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -1.14 Final Pressure (psig): 3.57

Canister Dilution Factor: 1.35

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	0.267	0.14	
7727-37-9	Nitrogen	1.22	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-24 ECD
Client Project ID: Cimarron Flare / cei-14-norman.ok-comp#1

ALS Project ID: P1402577
 ALS Sample ID: P1402577-003

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: SSC00082

Date Collected: 6/23/14
 Date Received: 6/26/14
 Date Analyzed: 7/3/14
 Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -1.47 Final Pressure (psig): 4.22

Canister Dilution Factor: 1.43

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	0.519	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-24 ECD
Client Project ID: Cimarron Flare / cei-14-norman.ok-comp#1

ALS Project ID: P1402577
 ALS Sample ID: P1402577-004

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: SSC00087

Date Collected: 6/24/14
 Date Received: 6/26/14
 Date Analyzed: 7/3/14
 Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -1.70 Final Pressure (psig): 3.51

Canister Dilution Factor: 1.40

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	0.490	0.14	
630-08-0	Carbon Monoxide	ND	0.14	
124-38-9	Carbon Dioxide	ND	0.14	

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

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

ALS Project ID: P1402577
ALS Sample ID: P140703-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: 7/03/14
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: P1402577

ALS Sample ID: P140703-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: 7/03/14

Volume(s) Analyzed: NA ml(s)

CAS #	Compound	Spike Amount ppmV	Result ppmV	% Recovery	ALS Acceptance Limits	Data Qualifier
1333-74-0	Hydrogen	40,000	36,600	92	84-110	
7782-44-7	Oxygen +					
7440-37-1	Argon	50,000	51,000	102	88-114	
7727-37-9	Nitrogen	50,000	56,000	112	88-114	
630-08-0	Carbon Monoxide	50,000	49,300	99	88-113	
124-38-9	Carbon Dioxide	50,000	48,800	98	84-109	

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: P1402577

Hydrogen Sulfide

Test Code: ASTM D 5504-12
Instrument ID: Agilent 7890A/GC22/SCD
Analyst: Mike Conejo
Sample Type: 6.0 L Silonite Canister(s)
Test Notes:

Date(s) Collected: 6/20 - 6/24/14
Date Received: 6/26/14
Date Analyzed: 6/27/14

Client Sample ID	ALS Sample ID	Canister		Time Analyzed	Result $\mu\text{g}/\text{m}^3$	MRL $\mu\text{g}/\text{m}^3$	Result ppbV	MRL ppbV	Data Qualifier
		Factor	Dilution Injection Volume ml(s)						
cei-90-100%-can-24 ECD	P1402577-001	1.44	1.0	15:28	ND	10	ND	7.2	
cei-70-100%-70-can-24 ECD	P1402577-002	1.35	1.0	15:25	ND	9.4	ND	6.8	
cei-30-70-30%-can-24 ECD	P1402577-003	1.43	1.0	15:34	ND	10	ND	7.2	
cei-0-30-0%-can-24 ECD	P1402577-004	1.40	1.0	15:31	ND	9.8	ND	7.0	
Method Blank	P140627-MB	1.00	1.0	08:39	ND	7.0	ND	5.0	

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: P1402577

ALS Sample ID: P140627-LCS

Test Code: ASTM D 5504-12

Instrument ID: Agilent 7890A/GC22/SCD

Analyst: Mike Conejo

Sample Type: 6.0 L Silonite Canister

Test Notes:

Date Collected: NA

Date Received: NA

Date Analyzed: 6/27/14

Volume(s) Analyzed: NA ml(s)

CAS #	Compound	Spike Amount ppmV	Result ppmV	% Recovery	ALS	Data Qualifier
					Acceptance Limits	
7783-06-4	Hydrogen Sulfide	2,050	2,020	99	66-131	

APPENDIX F

METHOD 3C RESULTS

LABORATORY REPORT

July 1, 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 25, 2014. For your reference, these analyses have been assigned our service request number P1402546.

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: P1402546

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.

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: P1402546

Date Received: 6/25/2014
Time Received: 09:30

3C Modified - Fxd Gases Bag 2X

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	
R6-30-70-30%-24 ECD	P1402546-001	Air	6/23/2014	00:00	X
R1-0-30-0%-24 ECD	P1402546-003	Air	6/24/2014	00:00	X
R2-0-30-0%-24 ECD	P1402546-005	Air	6/24/2014	00:00	X
R3-0-30-0%-24 ECD	P1402546-007	Air	6/24/2014	00:00	X
R3-0-30-0%-24 ECD-Backup	P1402546-008	Air	6/24/2014	00:00	X

P1402546

SAMPLE DESCRIPTION AND CHAIN OF CUSTODY RECORD					 Air Hygiene International, Inc. 1600 W Tacoma Street Broken Arrow, Oklahoma 74012 (888) 461-8778 www.airhygiene.com			
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	
1 R6-30-70-30%-24 ECD	Cimarron Norman Facility	6/23/2014	10	X	X	X	X	
2 R6-30-70-30%-24 ECD-Backup	Cimarron Norman Facility	6/23/2014	5	X	X	X	X	
3 R1-0-30-0%-24 ECD	Cimarron Norman Facility	6/24/2014	10	X	X	X	X	
4 R1-0-30-0%-24 ECD-Backup	Cimarron Norman Facility	6/24/2014	5	X	X	X	X	
5 R2-0-30-0%-24 ECD	Cimarron Norman Facility	6/24/2014	10	X	X	X	X	
6 R2-0-30-0%-24 ECD-Backup	Cimarron Norman Facility	6/24/2014	5	X	X	X	X	
7 R3-0-30-0%-24 ECD	Cimarron Norman Facility	6/24/2014	10	X	X	X	X	
8 R3-0-30-0%-24 ECD-Backup	Cimarron Norman Facility	6/24/2014	5	X	X	X	X	
Relinquished by: (Signature)		Date: 6/24/14	Time: 18:40	Received by: (Signature)		Date: 6/25/14	Time: 0930	
Relinquished by: (Signature)		Date:	Time:	Received by: (Signature)		Date:	Time:	

ALS Environmental Sample Acceptance Check Form

Client: Air Hygiene, Incorporated

Work order: P1402546

Project: cei-13-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
P1402546-001.01	10 L Tedlar Bag					
P1402546-002.01	5.0 L Tedlar Bag					
P1402546-003.01	10 L Tedlar Bag					
P1402546-004.01	5.0 L Tedlar Bag					
P1402546-005.01	10 L Tedlar Bag					
P1402546-006.01	5.0 L Tedlar Bag					
P1402546-007.01	10 L Tedlar Bag					
P1402546-008.01	5.0 L Tedlar Bag					

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: Air Hygiene, Incorporated
Client Sample ID: R6-30-70-30%-24 ECD
Client Project ID: cei-13-norman.ok-comp#1

ALS Project ID: P1402546
ALS Sample ID: P1402546-001

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: 6/23/14
Date Received: 6/25/14
Date Analyzed: 6/26/14
Volume(s) Analyzed: 0.10 ml(s)

CAS #	Compound	Result %, v/v	MRL %, v/v	Data Qualifier
7782-44-7	Oxygen +			
7440-37-1	Argon	17.2	0.10	
7727-37-9	Nitrogen	79.2	0.10	
74-82-8	Methane	ND	0.10	
124-38-9	Carbon Dioxide	3.59	0.10	

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: Air Hygiene, Incorporated
Client Sample ID: R1-0-30-0%-24 ECD
Client Project ID: cei-13-norman.ok-comp#1

ALS Project ID: P1402546
ALS Sample ID: P1402546-003

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: 6/24/14
Date Received: 6/25/14
Date Analyzed: 6/26/14
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	18.4	0.10	
7727-37-9	Nitrogen	78.9	0.10	
74-82-8	Methane	ND	0.10	
124-38-9	Carbon Dioxide	2.72	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%-24 ECD
Client Project ID: cei-13-norman.ok-comp#1

ALS Project ID: P1402546
ALS Sample ID: P1402546-005

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: 6/24/14
Date Received: 6/25/14
Date Analyzed: 6/26/14
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	18.3	0.10	
7727-37-9	Nitrogen	78.9	0.10	
74-82-8	Methane	ND	0.10	
124-38-9	Carbon Dioxide	2.79	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%-24 ECD
Client Project ID: cei-13-norman.ok-comp#1

ALS Project ID: P1402546
ALS Sample ID: P1402546-007

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: 6/24/14
Date Received: 6/25/14
Date Analyzed: 6/26/14
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	18.2	0.10	
7727-37-9	Nitrogen	79.1	0.10	
74-82-8	Methane	ND	0.10	
124-38-9	Carbon Dioxide	2.68	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%-24 ECD-Backup
Client Project ID: cei-13-norman.ok-comp#1

ALS Project ID: P1402546
ALS Sample ID: P1402546-008

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: 6/24/14
Date Received: 6/25/14
Date Analyzed: 6/26/14
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	18.6	0.10	
7727-37-9	Nitrogen	78.8	0.10	
74-82-8	Methane	ND	0.10	
124-38-9	Carbon Dioxide	2.54	0.10	

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

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

ALS Project ID: P1402546
ALS Sample ID: P140626-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: 6/26/14
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.



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

LABORATORY REPORT

July 25, 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 P1402521 has been amended for the samples submitted to our laboratory on June 24, 2014. The oxygen result has been corrected for the sample labeled R7-70-100-70-24-ECD. 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: P1402521

CASE NARRATIVE

The samples were received intact under chain of custody on June 24, 2014 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

Fixed Gases Analysis

The samples were analyzed for fixed gases (oxygen/argon, nitrogen, methane and carbon dioxide) according to modified EPA Method 3C (triplicate injection) using a gas chromatograph equipped with a thermal conductivity detector (TCD). This procedure is described in laboratory SOP VOA-EPA3C. This method is not included on the laboratory's NELAP or AIHA-LAP scope of accreditation.

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

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



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 Simi Valley, CA 93065
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ALS Environmental – Simi Valley
 Certifications, Accreditations, and Registrations

Agency	Web Site	Number
AIHA	http://www.aihaaccreditedlabs.org	101661
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0694
DoD ELAP	http://www.pjlabs.com/search-accredited-labs	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: P1402521

Date Received: 6/24/2014
Time Received: 09:30

3C Modified - Fxd Gases Bag 2X

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	
R7-70-100-70%-24-ECD	P1402521-001	Air	6/23/2014	00:00	X
R8-70-100-70%-24-ECD	P1402521-003	Air	6/23/2014	00:00	X
R9-70-100-70%-24-ECD	P1402521-005	Air	6/23/2014	00:00	X
R4-30-70-30%-24-ECD	P1402521-007	Air	6/23/2014	00:00	X
R5-30-70-30%-24-ECD	P1402521-009	Air	6/23/2014	00:00	X

91402521



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

SAMPLE DESCRIPTION AND CHAIN OF CUSTODY RECORD

Project Number:		cel-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
R7-70-100-70%-24 ECD	Cimarron Norman Facility	6/23/2014	10	X	X	X	X
R7-70-100-70%-24 ECD-Backup	Cimarron Norman Facility	6/23/2014	5	X	X	X	X
R8-70-100-70%-24 ECD	Cimarron Norman Facility	6/23/2014	10	X	X	X	X
R8-70-100-70%-24 ECD-Backup	Cimarron Norman Facility	6/23/2014	5	X	X	X	X
R9-70-100-70%-24 ECD	Cimarron Norman Facility	6/23/2014	10	X	X	X	X
R9-70-100-70%-24 ECD-Backup	Cimarron Norman Facility	6/23/2014	5	X	X	X	X
R4-30-70-30%-24 ECD	Cimarron Norman Facility	6/23/2014	10	X	X	X	X
R4-30-70-30%-24 ECD-Backup	Cimarron Norman Facility	6/23/2014	5	X	X	X	X
R5-30-70-30%-24 ECD	Cimarron Norman Facility	6/23/2014	10	X	X	X	X
R5-30-70-30%-24 ECD-Backup	Cimarron Norman Facility	6/23/2014	5	X	X	X	X

Relinquished by: (Signature) [Signature] Date: 6/23/14 Time: 14:45:

Relinquished by: (Signature) _____ Date: _____ Time: _____

Received by: (Signature) [Signature] Date: 6/24/14 Time: 0930

Received by: (Signature) _____ Date: _____ Time: _____

2ndmob-061614-coc

ALS Environmental Sample Acceptance Check Form

Client: Air Hygiene, Incorporated

Work order: P1402521

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

Sample(s) received on: 6/24/14

Date opened: 6/24/14

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
P1402521-001.01	10 L Tedlar Bag					
P1402521-002.01	5.0 L Tedlar Bag					
P1402521-003.01	10 L Tedlar Bag					
P1402521-004.01	5.0 L Tedlar Bag					
P1402521-005.01	10 L Tedlar Bag					
P1402521-006.01	5.0 L Tedlar Bag					
P1402521-007.01	10 L Tedlar Bag					
P1402521-008.01	5.0 L Tedlar Bag					

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

Chain of Custody is missing TAT _____

ALS Environmental Sample Acceptance Check Form

Client: Air Hygiene, Incorporated

Work order: P1402521

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

Sample(s) received on: 6/24/14

Date opened: 6/24/14

by: KKE LPE

[illegible]

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: Air Hygiene, Incorporated
Client Sample ID: R7-70-100-70%-24-ECD
Client Project ID: cei-13-norman.ok-comp#1

ALS Project ID: P1402521
ALS Sample ID: P1402521-001

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: 6/23/14
Date Received: 6/24/14
Date Analyzed: 6/26/14
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	15.3	0.10	
7727-37-9	Nitrogen	79.8	0.10	
74-82-8	Methane	ND	0.10	
124-38-9	Carbon Dioxide	4.94	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%-24-ECD
Client Project ID: cei-13-norman.ok-comp#1

ALS Project ID: P1402521
ALS Sample ID: P1402521-003

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: 6/23/14
Date Received: 6/24/14
Date Analyzed: 6/26/14
Volume(s) Analyzed: 0.10 ml(s)

CAS #	Compound	Result %, v/v	MRL %, v/v	Data Qualifier
7782-44-7	Oxygen +			
7440-37-1	Argon	15.6	0.10	
7727-37-9	Nitrogen	79.7	0.10	
74-82-8	Methane	ND	0.10	
124-38-9	Carbon Dioxide	4.69	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%-24-ECD
Client Project ID: cei-13-norman.ok-comp#1

ALS Project ID: P1402521
ALS Sample ID: P1402521-005

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: 6/23/14
Date Received: 6/24/14
Date Analyzed: 6/26/14
Volume(s) Analyzed: 0.10 ml(s)

CAS #	Compound	Result %, v/v	MRL %, v/v	Data Qualifier
7782-44-7	Oxygen +			
7440-37-1	Argon	15.1	0.10	
7727-37-9	Nitrogen	79.8	0.10	
74-82-8	Methane	ND	0.10	
124-38-9	Carbon Dioxide	5.09	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: R4-30-70-30%-24-ECD
Client Project ID: cei-13-norman.ok-comp#1

ALS Project ID: P1402521
ALS Sample ID: P1402521-007

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: 6/23/14
Date Received: 6/24/14
Date Analyzed: 6/26/14
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	4.79	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%-24-ECD
Client Project ID: cei-13-norman.ok-comp#1

ALS Project ID: P1402521
ALS Sample ID: P1402521-009

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: 6/23/14
Date Received: 6/24/14
Date Analyzed: 6/26/14
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	16.7	0.10	
7727-37-9	Nitrogen	79.3	0.10	
74-82-8	Methane	ND	0.10	
124-38-9	Carbon Dioxide	3.97	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: P1402521
ALS Sample ID: P140626-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: 6/26/14
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.



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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



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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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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

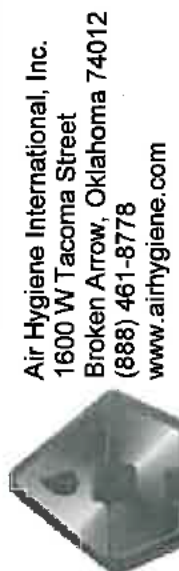
Service Request: P1402494

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

P1402494



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
R10-90-100%-24 ECD	Cimarron Norman Facility	6/20/2014	10
R10-90-100%-24 ECD-Backup	Cimarron Norman Facility	6/20/2014	5
R11-90-100%-24 ECD	Cimarron Norman Facility	6/20/2014	10
R11-90-100%-24 ECD-Backup	Cimarron Norman Facility	6/20/2014	5
R12-100%-24 ECD	Cimarron Norman Facility	6/20/2014	10
R12-90-100%-24 ECD-Backup	Cimarron Norman Facility	6/20/2014	5

Analysis Method			
O ₂	CO ₂	N ₂	Methane
X	X	X	X
X	X	X	X
X	X	X	X
X	X	X	X
X	X	X	X
X	X	X	X

Relinquished by: (Signature) [Signature] Date: 6/20/14 Time: 16:35

Received by: (Signature) [Signature] Date: 6/24/14 Time: 1005

7
8
9
10
11
12

**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: R10-90-100%-24 ECD
Client Project ID: cei-13-norman.ok-comp#1

ALS Project ID: P1402494
ALS Sample ID: P1402494-007

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: 6/20/14
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	14.8	0.10	
7727-37-9	Nitrogen	79.9	0.10	
74-82-8	Methane	ND	0.10	
124-38-9	Carbon Dioxide	5.34	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%-24 ECD
Client Project ID: cei-13-norman.ok-comp#1

ALS Project ID: P1402494
ALS Sample ID: P1402494-009

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: 6/20/14
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	14.9	0.10	
7727-37-9	Nitrogen	79.9	0.10	
74-82-8	Methane	ND	0.10	
124-38-9	Carbon Dioxide	5.26	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: R12-90-100%-24 ECD
Client Project ID: cei-13-norman.ok-comp#1

ALS Project ID: P1402494
ALS Sample ID: P1402494-011

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: 6/20/14
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	14.9	0.10	
7727-37-9	Nitrogen	79.8	0.10	
74-82-8	Methane	ND	0.10	
124-38-9	Carbon Dioxide	5.21	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.

APPENDIX G

Field Data Sheets

RATA - FIELD DATA SHEET

AIR HYGIENE



Company:	Cinnamon Energy
Location:	Nashua Facility
Date:	6/20/14
Unit Make and Model:	24 ECD
Unit Number:	2
Serial Number:	MSL/06
Data Recorded By:	MSL/06
Trucks:	132
Trailer(s):	208
Tested With AHI Units:	
LDEQ Warmup/Cal Req:	On (Day/Time): 5:30 AM Cal (Day/Time): 7:00 AM

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 (%)																								

CALIBRATION	O ₂		CO		THC		CO ₂	
	Conc.	Actual	Conc.	Actual	Conc.	Actual	Conc.	Actual
Zero Gas	0	0.02	0	0.01	0	0.05	0	-0.01
Low Gas	12.3	12.15	5.12	5.01	3.04	3.03	9.33	9.24
Mid Gas	21.1	21.22	11.0	11.08	8.48	8.43	18.58	18.61
High Gas			25.9	25.93				

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	0.04	2.10	0.10	11.08	0.06	3.08	0.10	9.18
Run #1 / Run #2	0.02	12.07	-0.04	11.11	0.03	2.95	0.07	9.20
Run #2 / Run #3	0.04	12.03	-0.07	10.92	0.04	2.97	0.05	9.14
Run #3 / Run #4	0.09	12.10	-0.13	10.86	0.03	3.10	0.02	9.13
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:	Cimerson Energy		
Location:	Hobson Fairway		
Date:	6/23/14		
Unit Make and Model:	24 ECU		
Unit Number:	1		
Serial Number:	1 MSL 18		
Data Recorded By:	Truck(s): 132 Trailer(s): 208		
Tested With AHI Unit(s):	Cal (Day/Time): 4:50		
LDEQ Warrup/Cal Req:	On (Day/Time): 4:50 Cal (Day/Time): 4:45		

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)							14:55:19	16:20:19	17:58:17	10:18:19	11:45:19	13:15:19												
Time Stop (hh:mm:ss)							16:05:19	18:30:19	19:01:19	11:28:19	12:55:19	14:25:19												
Barometric Pressure (in. Hg)							29.95	29.94	29.94	29.81	29.81	29.88												
Ambient Temperature (°F)							83	82	81	84	82	81												
Relative Humidity (%)							59	54	57	58	55	60												

CALIBRATION	O ₂		CO		THC		CO ₂	
	Conc.	Actual	Conc.	Actual	Conc.	Actual	Conc.	Actual
Zero Gas	0	0.01	0	-0.03	0	-0.03	0	0.02
Low Gas	12.3	12.25	11.0	10.96	3.04	3.16	9.33	9.28
Mid Gas	21.1	21.00	25.9	25.88	8.48	8.56	18.50	18.80
High Gas								

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	12.02	0.17	11.40	0.13	3.16	0.04	9.27
Run #1 / Run #2	0.03	12.00	-0.03	11.05	0.05	3.00	0.06	9.29
Run #2 / Run #3	-0.01	11.98	-0.08	10.99	0.02	3.15	0.05	9.35
Run #3 / Run #4	0.03	11.99	0.05	10.99	0.04	3.19	0.04	9.32
Run #4 / Run #5	0.04	11.98	-0.11	10.87	0.05	3.15	0.03	9.34
Run #5 / Run #6	0.02	12.00	-0.02	11.18	0.03	3.00	0.07	9.34
Run #6 / Run #7	0.04	12.02	0.04	11.08	-0.02	3.08	0.09	9.35
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, Oklahoma		
Date:	6/24/14		
Unit Make and Model:	24 Eco		
Unit Number:	1		
Serial Number:	MSL		
Data Recorded By:	Trucks: 132 Trailer(s): 208		
Tested With AHU Unit(s):	Cal (Day/Time): 7:30 AM		
LDEQ Warmup/Cal Req:	On (Day/Time): 6:00 AM		

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	50	0									
Time Start (hh:mm:ss)		12:49:05	14:17:05	15:53:05									
Time Stop (hh:mm:ss)		13:59:05	15:34:05	17:03:05									
Barometric Pressure (in. Hg)		30.06	29.92	30.02									
Ambient Temperature (°F)		77	86	84									
Relative Humidity (%)		80	58	62									

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	19.3	12.23	11.0	10.89	3.04	3.16	9.33	9.29
Mid Gas	21.1	20.98	23.9	25.1	8.48	8.49	18.50	18.60
High Gas								

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	-0.04	10.75	0.08	2.95	0.06	9.23
Run #1 / Run #2	0.03	12.03	0.01	10.81	-0.02	3.08	0.08	9.21
Run #2 / Run #3	0.04	12.08	-0.08	10.82	0.01	3.12	0.09	9.20
Run #3 / Run #4	0.02	12.03	0.10	11.09	0.01	3.03	0.03	9.12
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

Company:	Cimarron Energy		
Location:	Norman Field		
Date:	6/24/14		
Unit Make and Model:	246C10		
Unit Number:	1		
Serial Number:	1481		
Data Recorded By:	PMSL		
Truck(s):	132	Trailer(s):	208
Tested With AHJ Unit(s):		Cal (Day/Time):	7:30
LDEQ Warmup/Cal Req:	On (Day/Time): 6:00	Cal (Day/Time):	7:30

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)	11:55:05											
Time Stop (hh:mm:ss)	12:45:05											
Barometric Pressure (in. Hg)	30.06											
Ambient Temperature (°F)	77											
Relative Humidity (%)	80											

CALIBRATION	O ₂			CO			THC			CO ₂		
	Conc.	Actual	Conc.	Actual	Conc.	Actual	Conc.	Actual	Conc.	Actual	Conc.	Actual
Zero Gas	0	0.01	0	0.02	0	0.01	0	0.05	0	0.05		
Low Gas					3.04	2.96			9.33	9.29		
Mid Gas	12.3	12.23	11.0	10.89	5.04	5.05			18.50	18.60		
High Gas	21.1	20.98	25.9	25.1	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	Zero	Mid	Zero	Mid
Initial Run #1	0.05	12.11	-0.04	10.75	0.08	2.95	0.06	9.23				
Run #1 / Run #2												
Run #2 / Run #3												
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. Normandy Plant
 Sampling Location. Test Pops
 Unit # 24500
 Date. 6-20-14

Console Info.

Console.
 Meter Calibration Factor
 Orifice Meter Coefficient

Run <u>10</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)	734.5	710.6	567.9	942.9			
Final Value	(Vf),(Wf)	778.0	718.8	571.3	963.4			

Run <u>11</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)	778.0	718.8	571.3	890.1			
Final Value	(Vf),(Wf)	820.3	726.5	573.3	899.7			

Run <u>12</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)	820.3	726.5	573.3	899.7			
Final Value	(Vf),(Wf)	856.7	737.3	576.1	909.8			

Run <u>7</u> Load <u>70-100-70</u>		Box #						
		Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7
		(g)	(g)	(g)	(g)			
Contents		H ₂ O	H ₂ O	-	Sil Gel			
Initial Value	(Vi),(Wi)	766.8	671.0	564.2	920.5			
Final Value	(Vf),(Wf)	764.9	687.5	569.0	935.3			

Run <u>8</u> Load <u>70-100-70</u>		Box #						
		Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7
		(g)	(g)	(g)	(g)			
Contents		H ₂ O	H ₂ O	-	Sil Gel			
Initial Value	(Vi),(Wi)	764.9	687.5	569.0	935.3			
Final Value	(Vf),(Wf)	718.8	718.3	571.9	945.6			

Run <u>9</u> Load <u>70-100-70</u>		Box #						
		Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7
		(g)	(g)	(g)	(g)			
Contents		H ₂ O	H ₂ O	-	Sil Gel			
Initial Value	(Vi),(Wi)	778.3	718.8	566.8	1020.1			
Final Value	(Vf),(Wf)	815.1	730.8	568.0	1029.0			

TRF
06-23-14

AIR HYGIENE

MOISTURE (EPA METHOD 4) DATA SHEET



Site Info.

Plant Name. Norman Plant
 Sampling Location. Test Pools
 Unit # 24 ECD
 Date. 06-23-14

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)	688.0	730.8	568.0	1029.0			
Final Value	(Vf),(Wf)	715.5	749.3	576.0	1045.7			

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)	683.1	674.9	564.8	904.2			
Final Value	(Vf),(Wf)	705.8	686.7	567.3	914.7			

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)	705.8	686.7	567.3	914.7			
Final Value	(Vf),(Wf)	721.6	704.0	571.0	927.1			

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)	721.5	703.8	565.4	903.0	736.4	712.5	566.4
Final Value	(Vf),(Wf)					757.8	722.4	568.1

910.7
925.8

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)	757.8	722.4	568.1	989.1			
Final Value	(Vf),(Wf)	688.0	659.3	736.3	998.7			

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)	688.0	659.3	736.3	998.7			
Final Value	(Vf),(Wf)	708.0	669.2	739.0	1008.8			

R10-R12

90-100% 24 ELD

- 28.72

- 20.11

- 12.33

- 2.64

R 7-9

70-100-70%-24 ELD

- 28.60

- 18.55

- 10.13

- 1.08

R4-6 30-70-70%-24 ELD

- 28.60

- 19.71

- 11.33

- 2.34

R1-R3 0-30-0%-24 ELD

- 28.72

- 19.03

- 10.22

- 1.71

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end of report**