San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

HEALTHY AIR LIVING™

July 9, 2014

Mr. Don Litchfield
Forward Inc Landfill
999 S Austin Rd
Manteca, CA 95336

RE: DETERMINATION OF COMPLIANCE EMISSION TESTING

Dear Mr. Litchfield,

District staff have received the test report submitted for the permitted equipment listed below for compliance determination with permitted emission limits. Review of the test result(s) reveal the equipment to be **operating in full compliance** with permitted emission limits.

If the permitted equipment has annual source testing requirements, then the next required test must be conducted within thirty days (+/- 30) of the next test date as shown below. If an ATC has been issued for modifications to the permitted equipment then the testing requirements must follow the ATC.

Permit Number	Unit ID	Test Date	Next Test Date
N-339-17-8	Flare #1	5/6/2014	5/26/2015
N-339-17-8	Flare #2	5/6/2014	5/26/2015

If the equipment is under dormant status, you must contact the District before restarting unit. If you have any questions please call this office at (209) 557-6400.

Sincerely,

Thomas J Busenbark
Supervising Air Quality Inspector

Scott Williams
Air Quality Inspector

Items To Check When Reviewing Source Test Protocols

(Y) / N	Is the source test company CARB certified in the proposed test methods? (Refer to District Policy. This can be found on the District's website by going into Compliance Assistance, Source Testing, Source Test Guidelines.)
(Y) / N	Was the protocol received at least 15 days prior to the scheduled test?
(Y) / N	Is the test scheduled within +/- 30 days of the anniversary date?
Y / (N)	Is/Are the correct ATC/PTO modification number(s) listed on the protocol?
Y / N / (N/A)	If the unit being tested has an ATC, is it for a modification that would change the anniversary date?
(Y) / N	Are the proper test method(s) being proposed in the protocol for each parameter? (Refer to ATC/PTO and/or the District Rule)
(Y) / N	Does the protocol specify at least 3 test runs for each parameter?
(Y) N	Will each test run be a minimum of 30 minutes in duration (for continuous emissions monitoring methods)?
(Y) / N / N/A	Are the correct emission limits listed on the protocol (if listed)?
(Y) / N	Will the reported parameter units be consistent with the permit limits?
Y / (N/A)	Will the proper Alternative Monitoring Scheme (AMS) information be obtained during the test?
(Y) / N	Will the equipment being tested be operated at normal conditions?
(Y) / N	Has the protocol information been entered into PAS (and is the historical test information in PAS accurate)?
(Y) / N	Will the test be conducted during District business hours? If not, did a Supervisor or Manager approve this?

Note: if any of the above items are marked "N" further review and/or a revised protocol may be necessary.

Date Reviewed: 4/23/14

Reviewed By: Dottie Shoffner

Facility ID #: N339-17-8

San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

HEALTHY AIR LIVING™

April 23, 2014

Mr. Guy Worthington
Blue Sky Environmental
624 San Gabriel Ave
Albany, CA 94706

RE: Approval of Test Protocol
Facility: Forward Inc Landfill
Scheduled Test Date(s): 05/06/2014
Permit(s): N-339-17-8

NOTE: Correct Permit to Operate is N-339-17-8.

District staff has completed the review of the test protocol submitted for the testing of Forward Inc Landfill. The staff finds the protocol will meet the District's requirements. Should the test date or test methods change from the approved protocol, then a modified protocol shall be submitted for review no later than seven (7) days prior to the scheduled test date. Submittal of the modified protocol after this date may result in test cancellation by District staff.

Standard conditions include the following:

1) All data must be recorded by a data logger and shall be submitted to the District in hard copy and in electronic form on cd.
2) A colored copy of the original strip chart must be submitted with the report.
3) If at any time during a test run the measured concentration exceeds the span, the test run shall be considered invalid for determining compliance (in some cases, two recorders or a dual-range recorder may be necessary). The emission standard shall not be less than 30% of the monitoring range.
4) Source test is being performed in accordance with the most recent PTO/ATC.
5) All testing must be done during normal District business hours unless otherwise approved.

All source testing must strictly adhere to the SJVAPCD's Source Test Guidelines, as revised on March 8, 2007. This policy may be found on the District's website (www.valleyair.org). If you have any questions, please contact Scott Van Dyken at (209) 557-6400.

Sincerely,

Thomas J Busenbark

EMAILED
4/29/14 08

Thomas J Busenbark
Supervising Air Quality Inspector

Dottie Shoffner

From: Scott Van Dyken
Sent: Monday, May 05, 2014 12:23 PM
To: Dottie Shoffner
Subject: FW: North County Flare Landfill Flare, Protocol revision

Can you add this e-mail to the folder for North County.

Scott Van Dyken
Air Quality Inspector II
San Joaquin Valley Air Pollution Control District
4800 Enterprise Way
Modesto, CA 95356
209-557-6421

From: Scott Van Dyken
Sent: Monday, May 05, 2014 12:23 PM
To: 'Bill Johnston'
Subject: RE: North County Flare Landfill Flare, Protocol revision

Yes, In talking with John Copp, our source test contact in Fresno, that would be fine.

Scott Van Dyken
Air Quality Inspector II
San Joaquin Valley Air Pollution Control District
4800 Enterprise Way
Modesto, CA 95356
209-557-6421

From: Bill Johnston [mailto:bill@airscitech.com]
Sent: Monday, May 05, 2014 11:01 AM
To: Scott Van Dyken
Subject: North County Flare Landfill Flare, Protocol revision

Scott
In reference to the test protocol for the source test at the North County landfill on the landfill flare. AST would like to revised the test protocol.
The revisions include:

1. SOx outlet emissions will not be measured according to EPA Method 6C. SOx emissions will be calculated based on the inlet H2S concentrations collected from the Tedlar bag sample. Analysis for H2S will be analyzed according to ASTM D5504.
2. Instead of taking three samples of the inlet gas, only one sample of the landfill gas is required for analysis.

Please acknowledge your acceptance of these revisions.

Thanks

Bill Johnston
Air Science Technologies, Inc.
247 Rodeo Ave
Rodeo, CA 94572

Direct 510-803-8910 Cell 510-685-0261 Office 510-799-4638
bill@airscitech.com

Forward Landfill
Republic Services Inc
Facility Permit N-339-17-8

Annual Compliance Emissions Test Report #14087
48 & 102 MMBTUH Landfill Gas Flares

Located at:

9999 S. Austin Road,
Manteca, CA 95336

Performed and Reported by:

Blue Sky Environmental, Inc
624 San Gabriel Avenue
Albany, CA 94706

Prepared For:

Don Litchfield
Forward Landfill
9999 S. Austin Road
Manteca CA 95336

For Submittal To:
Michael Hamaguchi
San Joaquin Valley APCD
4230 Kiernan Ave, Ste 130
Modesto, CA 95356

Testing Performed On:
May 6th, 2014

Final Report Submitted On:
June 30th, 2014

P.M. 7/1/14

REVIEW AND CERTIFICATION

Team Leader:

The work performed herein was conducted under my supervision, and I certify that: a) the details and results contained within this report are to the best of my knowledge an authentic and accurate representation of the test program; b) that the sampling and analytical procedures and data presented in the report is authentic and accurate: c) that all testing details and conclusions are accurate and valid, and: d) that the production rate and/or heat input rate during the source test are reported accurately.

If this report is submitted for Compliance purposes it should only be reproduced in its entirety. If there are any questions concerning this report, please contact me at (510) 525 1261.

Jeramie Richardson

Project Manager

TABLE of CONTENTS

SECTION 1. INTRODUCTION

1.1. Summary

Blue Sky Environmental, Inc. was contracted to perform the annual emissions testing on the 48 &102 MMBTU Landfill Gas Flares (A-1 & A-2) at Forward Landfill 9999 S. Austin Road, Manteca, CA 95336. Table 1 summarizes the source test information. Table 2 summarizes the results compared to the emission limits. The flare met all compliance emission criteria.

Table 1. Source Test Information

Test Location:	Forward Landfill, 9999 S. Austin Road, California 95336 Mailing Address PO Box 6336, Stockton, CA 95206
Source Contact:	Don Litchfield (209) 684-4733
Source Tested:	Perennial Energy Enclosed Landfill Gas Flares (A-1) and (A-2)
Source Test Date:	May 6th, 2014
Test Objective:	Determine Compliance with Permit N-339-17-8
Test Performed By:	Blue Sky Environmental, Inc 624 San Gabriel Ave., Albany, CA 94706 Jeramie Richardson (510) 525 1261
Test Parameters:	**Landfill Gas** O_2, N_2, CO_2, BTU, THC, CH_4, NMOC, HHV, F-Factor, Sulfur Species, Volumetric Flow Rate **Flare Emissions** THC, CH_4, NMOC, NOx, CO, O_2, SO_2, Volumetric Flow Rate, Temperature.

Table 2. Compliance Summary

A-1 (48 MMBtu/hr)	Average Test Result	Permit Limit	Compliance Status
NOx, lbs/MMBTU	0.04	0.05	In Compliance
CO, lbs/MMBTU	0.004	0.20	In Compliance
SO_2, lbs/MMBTU	0.012	0.215	In Compliance
NMOC, (ppmvd @ 3% O_2 as CH_4)	8.37	20	In Compliance
NMOC, lbs/MMBTU	0.004	0.113	In Compliance
NMOC, Destruction Efficiency %	>98.9	98	In Compliance
A-2 (102 MMBtu/hr)	**Average Test Result**	**Permit Limit**	**Compliance Status**
NOx, lbs/MMBTU	0.04	0.05	In Compliance
CO, lbs/MMBTU	0.10	0.20	In Compliance
SO_2, lbs/MMBTU	0.012	0.215	In Compliance
NMOC, (ppmvd @ 3% O_2 as CH_4)	8.79	20	In Compliance
NMOC, lbs/MMBTU	0.004	0.113	In Compliance
NMOC, Destruction Efficiency %	>98.9	98	In Compliance

SECTION 2. SOURCE TEST PROGRAM

2.1. Overview

This annual performance test was conducted to demonstrate that the A-1 and A-2 landfill gas flares are operating in accordance with the current SJVAPCD Permit N-339-17-8.

2.2. Pollutants Tested

The following CARB and EPA and ASTM sampling and analytical methods were used:

Test Parameters	Inlet- Test Method	Outlet-Test Method	Measurement Principle
O_2, CO_2	ASTM 1945 x 3	CARB 100 x 3	GC-TCD/Paramagnetic/Infrared
CO		CARB 100 x 3	Non-Dispersive Infrared
NO_x		CARB 100 x 3	Chemiluminescence
SO_2	ASTM 5504 x 3	Calculated x 3	Gas Chromatography/SCD
VOC	EPA M25C x 3	EPA M18 x 3	Gas Chromatography/FID
Flow	CARB M2 x 3	EPA M19 x 3	
Moisture	CARB M4 WBDB x 3	N/A	

2.3. Test Date(s)

Testing was conducted on May 6th, 2014.

2.4. Sampling and Observing Personnel

Jeramie Richardson and Jeff Mesloh representing Blue Sky Environmental, Inc, performed testing.

Nick Posey of SCS and Ruben Ramirez of Republic Services were present to oversee the Flare operation and assist in coordinating testing and the collection of process data during testing.

The SJVAPCD was notified of the test in a plan submitted on April 8th, 2014 and approved on April 23rd, 2014. No representatives from the SJVAPCD were present during testing. A copy of the source test protocol can be found in Appendix I.

2.5. Source/Process Description

The enclosed landfill gas flares consist of a 48 and a 102 million British Thermal Units per hour (MMBtu/hr) units. The A-1 Flare shell is approximately 40 feet high and has an 88-inch inside diameter. The A-2 Flare shell is approximately 40 feet high and has a 132-inch inside diameter.

2.6. Source Operating Conditions

The flare operating temperature records are contained in Appendix-F. There is no condensate injection. Measured fuel flow is greater than recorded fuel rate by the facility yokogawa. The yokogowa clock is real time (PST.)

The 48 MMBtu/hr flare was operated at an average temperature of 1,548°F. The measured (Method 2) average landfill gas flow rate was 1,227 Standard Cubic Feet per Minute (scfm). The landfill gas methane content ranged between 57.9 and 59.0%.

The 102 MMBtu/hr flare was operated an average temperature of 1,550°F. The measured (Method 2) average landfill gas flow rate was 2,880 scfm. The landfill gas methane content ranged between 57.7 and 58.0%.

SECTION 3. SAMPLING AND ANALYSIS PROCEDURES

3.1. Port location

The 48 MMBtu/hr Flare sampling was conducted in the 88-inch diameter ID stack, via ports approximately 35' above grade, accessed by a 40' boom-lift. Two of the four, 4-inch flange ports were available ~4 stack diameters downstream from the burners and ~1 stack diameters upstream from the exit.

The 102 MMBtu/hr Flare sampling was conducted in the 132-inch diameter ID stack, via ports approximately 35' above grade, accessed by a 40' boom-lift. Two of the four, 4-inch flange ports were available ~4 stack diameters downstream from the burners and ~1 stack diameters upstream from the exit.

3.2. Point description/Labeling – ports/stack

Blue Sky Environmental conducted two perpendicular 8 pt traverses and found O_2 stratification greater than 10%, therefore subsequent CEM sampling was conducted with full 8-point traverses of both ports for every run.

3.3. Sample train description

Sampling system diagrams are included in the appendix H. Additional descriptive information is included in the following section.

3.4. Sampling procedure description

On each Flare, three, 32-minute test runs were performed, completely traversing the stack on two diameters during each run. Sixteen points were sampled during every run for 2 minutes each, with a port change after point 8.

Due to the brief spikes in the CO emissions two analyzers with different ranges were used to conduct testing. The applicable minutes from each range were used and then combined using a weighted average based on the minutes collected from each range.

CARB 100 is the protocol for continuous monitoring techniques using instrumental analyzers. Sampling is performed by extractingw exhaust flue gas from the stack via a heated sample line, conditioning the sample to remove moisture and particulates and analyzing it by continuous monitoring gas analyzers in a Continuous Emission Monitoring (CEM) test van. The sampling system consists of a stainless steel sample probe, heated teflon sample line maintained @248°F ±25, a glass-fiber particulate filter, glass moisture-knockout condensers in ice, teflon sample transfer tubing, diaphragm pump and a stainless steel/teflon manifold and flow control/delivery system. A constant sample and calibration gas supply pressure of ~5 PSI is provided to each analyzer to avoid pressure variable response differences. The entire sampling system is leak checked prior to and at the end of the sampling program.

The calibration gases are selected to fall approximately within the following instrument ranges; 40-60% and 80-100% of range and zero. Linearity and system bias checks are performed prior to Run 1. All calibrations during testing are performed externally to incorporate any system bias that may exist. Zero and calibration drift and bias values are determined for each run.

All calibration gases are EPA Protocol #1. The analyzer data recording system consists of a Honeywell DRP3000 strip chart recorder, which can be supported by a Data Acquisition System (DAS). A separate data disk is included containing this electronic record.

System Performance Criteria	
Instrument Linearity	≤2% Full Scale
Instrument Bias	≤5% Full Scale
System Response Time	≤± 2 minutes
NOx Converter Efficiency (EPA 20)	≥ 90%
Instrument Zero/Span Drift	≤± 3% Full Scale

EPA Method 18 is used to determine emissions of volatile organics analyzed by gas chromatograph/mass spectroscopy (GC/MS). Gaseous emissions are drawn through a teflon sample line to a tedlar bag located in a rigid leak proof bag container. Sample is drawn into the bag by evacuating the container to stack gas pressure to allow sample flow without using a pump to avoid contamination. Negative pressure is adjusted to maintain an integrated sample flow for 32 minutes. The bag samples are taken to a laboratory and analyzed within 72 hours.

Concurrent with the exhaust sampling, Blue Sky collected a total of three integrated LFG samples in 5-liter Tedlar Bags for analysis. The samples were collected using Teflon tubing connections, and the tubing and the Tedlar bag were filled and purged prior to sampling. The gas sample was controlled with a rotameter to collect a 32-minute integrated sample. All the LFG samples were analyzed for HHV, F-Factor, Fixed Gases, Sulfur Species (incl. H_2S and TRS) and NMOC.

Sampling & Traverse Points Selection by CARB/EPA Method 1. This method is used to determine the duct or stack area and appropriate traverse points that represent equal areas of the duct for sampling and velocity measurements.

Stack Gas Velocity & Flow Rate by CARB/EPA Method 2. This method is used to determine stack gas velocity using a standard or S-type pitot tube and inclined manometer or Shortridge electronic manometer. Temperature is monitored using a K-type thermocouple and calibrated Omega temperature meter. QA/QC procedures include leak checks before and after each traverse to validate the results. Thermometer calibrations are performed using an Omega Model CL-300 calibrator. Geometric calibrations of S-type pitots are performed every 6 months or following modification according to the guidelines in California Air Resources Board (CARB) QA/QC Volume VI, Table 3.

Stack Gas Molecular Weight by CARB/EPA Method 3. This method is used to determine the molecular weight of the stack gas. Measurements of gas constituents; $\%O_2$ and $\%CO_2$ were collected in an integrated bag sample from the inlet and were analyzed by GC/TCD. The O_2 and CO_2 in the exhaust were measured by CARB 100.

EPA Method 19 (gas) was used to determine stack gas volumetric flow rates using oxygen based F-factors. F-factors are ratios of combustion gas volumes generated from heat input. The heating value of the fuel in Btu per cubic foot is determined from analysis of the fuel gas samples using ASTM D1946/3588 gas chromatography analytical procedures. Total fuel consumption was measured by CARB Method 1, 2, 3 and 4. The total cubic feet per hour of fuel multiplied times the Btu/cf provides million Btu per hour (MMBtu) heat input. The heat input in MMBtu/hr is multiplied by the F-factor (DSCF/MMBtu) and adjusted for the measured oxygen content of the source to determine volumetric flow rate. The flow rates were used to determine emission rates.

3.5. Instrumentation and Analytical procedures

The following continuous emissions analyzers were used:

Instrumentation	Parameter	Principle
TECO 42i	NO_x	Chemiluminescence
TECO 48C	CO	GFC/IR
Servomex 4200	O_2	Paramagnetic
Servomex 4200	CO_2	IR

3.6. Comments: Limitations and Data Qualifications

Due to the landfill gas sample from the final run of the A-2 flare having an unusually high oxygen content the subsequent data was normalized to the average 1.9% Oxygen for calculating the BTU input and the exhaust flow rate.

Blue Sky Environmental has reviewed this report for accuracy, and concluded that the test procedures were followed and accurately described and documented. The review included the following items:

Review of the general text
Review of calculations
Review of CEMS data
Review of supporting documentation

The services described in this report were performed in a manner consistent with the generally accepted professional testing principles and practices. No other warranty, expressed or implied, is made. These services were performed in a manner consistent with our agreement with our client. The report is solely for the use and information of our client unless otherwise noted. Any reliance on this report by a third party is at such party's sole risk.

Opinions contained in this report pertain to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames, and operating parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations, subsequent to this, and do not warranty the accuracy of information supplied by others.

SECTION 4. APPENDICES

A.	Tabulated Results
B.	Calculations
C.	Laboratory Reports
D.	Field Data Sheets & DAS Summary
E.	Strip Charts
F.	Process Information
G.	Calibration Certifications and Quality Assurance Records
H.	Sample Train Configuration and Stack Diagrams
I.	Related Correspondence (Source Test Plan)
J.	Permit

A
Tabulated Results

TABLE #1

Republic Services Forward Landfill
A-1

RUN	Run 1	Run 2	Run 3	AVERAGE	LIMITS
Test Date	5/6/14	5/6/14	5/6/14		
Test Time	1135-1215	1239-1320	1347-1431		
Standard Temp., °F	60	60	60		
Flare Temperature, °F	1,542	1,551	1,551	1,548	>1400
Fuel Flow Rate, DSCFM (Method 2)	1,237	1,224	1,221	1,227	
Fuel Heat Input, MMBTU/Hr	44.4	43.1	43.4	43.6	48
Exhaust Flow Rate, DSCFM (Method 19)	16,666	16,209	16,257	16,377	
Oxygen, O_2, %	12.3	12.3	12.3	12.3	
Carbon Dioxide, CO_2, %	7.2	7.2	7.1	7.2	
NOx, ppm	14.9	14.1	14.4	14.5	
NOx, ppm @ 15% O_2	**10.2**	**9.7**	**9.8**	**9.9**	
NOx, lbs/hr	1.81	1.66	1.71	1.73	
NOx, lbs/MMBTU	**0.04**	**0.04**	**0.04**	**0.04**	**0.05**
CO, ppm	3.3	2.6	1.9	2.6	
CO, ppm @ 15% O_2	**2.3**	**1.8**	**1.3**	**1.8**	
CO, lbs/hr	0.24	0.19	0.13	0.19	
CO, lbs/MMBTU	**0.005**	**0.004**	**0.003**	**0.004**	**0.2**
H_2S in fuel, ppm	**34.4**	**29.0**	**33.1**	**32.2**	**46.9**
Total Reduced Sulfur as H_2S in fuel, ppm	46.5	38.0	45.0	43.2	
SO_2, ppm calculated emission	3.5	2.9	3.4	3.2	
SO_2, lbs/hr	0.58	0.47	0.56	0.54	
SO_2, lbs/MMBTU	**0.013**	**0.011**	**0.013**	**0.012**	**0.215**
NMHC, ppm as CH_4	3.30	5.00	3.80	4.03	
NMHC, lbs/hr as CH_4	0.14	0.21	0.16	0.17	
NMHC, ppm @ 3% O_2 as CH_4	**6.86**	**10.38**	**7.87**	**8.37**	**20**
NMHC, lbs/MMBTU	**0.003**	**0.005**	**0.004**	**0.004**	**0.0113**
INLET NMHC ppm as CH_4	5,043	4,413	5,206	4,887	
INLET NMHC lbs/hr as CH_4	15.8	13.7	16.1	15.2	
NMHC Removal Efficiency	**>99.1%**	**>98.5%**	**>99.0%**	**>98.9%**	**98**
INLET CH_4, ppm	590,000	579,000	585,000	584,667	
INLET CH_4 lbs/hr	1,847	1,793	1,807	1,816	
CH_4 Removal Efficiency	**99.996%**	**99.997%**	**99.997%**	**99.997%**	
INLET THC (TOC) ppm as CH_4	595,043	583,413	590,206	589,554	
INLET THC (TOC) lbs/hr as CH_4	1,863	1,807	1,823	1,831	
THC (TOC) Removal Efficiency	**99.996%**	**99.998%**	**99.997%**	**99.997%**	

WHERE,

ppm = Parts Per Million Concentration
Lbs/hr = Pound Per Hour Emission Rate
Tstd. = Standard Temp. (°R = °F+460)
MW = Molecular Weight
DSCFM = Dry Standard Cubic Feet Per Minute
NOx = Oxides of Nitrogen as NO_2 (MW = 46)
CO = Carbon Monoxide (MW = 28)
TOC = THC = Total Organic Carbon as Methane including CH_4 (MW = 16)
THC = Total Hydrocarbons as Methane (MW = 16)
NMHC = Total Non-Methane Hydrocarbons as Methane (MW = 16)
SO_2 = Sulfur Dioxide as SO_2 (MW = 64.1)

CALCULATIONS,

PPM @ 15% O_2 = ppm * 5.9 / (20.9 - %O_2)
PPM @ 3% O_2 = ppm * 17.9 / (20.9 - %O_2)
Lbs/hr = ppm x 8.223 E-05 x DSCFM x MW / Tstd. °R
Lbs/MMBtu = (Lbs/hr)/(MMBtu/hr)
Lbs/day = Lbs/hr * 24
THC (TOC) Removal Efficiency = (inlet lbs/hr- outlet lbs/hr) / inlet lbs/hr
NMHC Removal Efficiency = (inlet lbs/hr- outlet lbs/hr) / inlet lbs/hr
SO_2 emission ppm = H2S in fuel * Fuel Flow/Stack Gas Flow

TABLE #2

Republic Services Forward Landfill
A-2

RUN	Run 1	Run 2	Run 3	AVERAGE	LIMITS
Test Date	5/6/14	5/6/14	5/6/14		
Test Time	0851-0929	0951-1029	1056-1132		
Standard Temp., °F	60	60	60		
Flare Temperature, °F	1,551	1,550	1,550	1,550	**>1400**
Fuel Flow Rate, DSCFM (Method 2)	2,901	2,872	2,868	2,880	
Fuel Heat Input, MMBTU/Hr	101.7	101.2	100.7	101.2	**102**
Exhaust Flow Rate, DSCFM (Method 19)	40,437	40,080	39,286	39,934	
Oxygen, O_2, %	12.7	12.7	12.6	12.7	
Carbon Dioxide, CO_2, %	6.8	6.9	6.9	6.9	
NOx, ppm	12.8	13.6	14.3	13.6	
NOx, ppm @ 15% O_2	**9.2**	**9.8**	**10.2**	**9.7**	
NOx, lbs/hr	3.75	3.98	4.09	3.94	
NOx, lbs/MMBTU	**0.04**	**0.04**	**0.04**	**0.04**	**0.05**
CO, ppm	69.3	51.7	42.0	54.4	
CO, ppm @ 15% O_2	**50.2**	**37.3**	**29.8**	**39.1**	
CO, lbs/hr	12.41	9.18	7.31	9.63	
CO, lbs/MMBTU	**0.12**	**0.09**	**0.07**	**0.10**	**0.2**
H_2S in fuel, ppm	**32.2**	**32.1**	**30.0**	**31.4**	**46.9**
Total Reduced Sulfur as H_2S in fuel, ppm	43.7	43.5	40.9	42.7	
SO_2, ppm calculated emission	3.1	3.1	3.0	3.1	
SO_2, lbs/hr	1.29	1.27	1.19	1.25	
SO_2, lbs/MMBTU	**0.013**	**0.013**	**0.012**	**0.012**	**0.215**
NMHC, ppm as CH_4	3.30	5.00	3.80	4.03	
NMHC, lbs/hr as CH_4	0.34	0.51	0.38	0.41	
NMHC, ppm @ 3% O_2 as CH_4	**7.25**	**10.93**	**8.18**	**8.79**	**20**
NMHC, lbs/MMBTU	**0.003**	**0.005**	**0.004**	**0.004**	**0.0113**
INLET NMHC ppm as CH_4	4,873	5,272	5,158	5,101	
INLET NMHC lbs/hr as CH_4	35.8	38.3	37.4	37.2	
NMHC Removal Efficiency	**>99.1%**	**>98.7%**	**>99.0%**	**>98.9%**	**98**
INLET CH_4, ppm	577,000	580,000	578,000	578,333	
INLET CH_4 lbs/hr	4,235	4,214	4,195	4,215	
CH_4 Removal Efficiency	**99.995%**	**99.997%**	**99.997%**	**99.997%**	
INLET THC (TOC) ppm as CH_4	581,873	585,272	583,158	583,434	
INLET THC (TOC) lbs/hr as CH_4	4,271	4,252	4,232	4,252	
THC (TOC) Removal Efficiency	**99.995%**	**99.997%**	**99.997%**	**99.997%**	

WHERE,

ppm = Parts Per Million Concentration

Lbs/hr = Pound Per Hour Emission Rate

Tstd. = Standard Temp. (°R = °F+460)

MW = Molecular Weight

DSCFM = Dry Standard Cubic Feet Per Minute

NOx = Oxides of Nitrogen as NO_2 (MW = 46)

CO = Carbon Monoxide (MW = 28)

TOC = THC = Total Organic Carbon as Methane including CH_4 (MW = 16)

THC = Total Hydrocarbons as Methane (MW = 16)

NMHC = Total Non-Methane Hydrocarbons as Methane (MW = 16)

SO_2 = Sulfur Dioxide as SO_2 (MW = 64.1)

CALCULATIONS,

PPM @ 15% O_2 = ppm * 5.9 / (20.9 - %O_2)

PPM @ 3% O_2 = ppm * 17.9 / (20.9 - %O_2)

Lbs/hr = ppm x 8.223 E-05 x DSCFM x MW / Tstd. °R

Lbs/MMBtu = (Lbs/hr)/(MMBtu/hr)

Lbs/day = Lbs/hr * 24

THC (TOC) Removal Efficiency = (inlet lbs/hr- outlet lbs/hr) / inlet lbs/hr

NMHC Removal Efficiency = (inlet lbs/hr- outlet lbs/hr) / inlet lbs/hr

SO_2 emission ppm = H2S in fuel * Fuel Flow/Stack Gas Flow

B
Calculations

BLUE SKY ENVIRONMENTAL, INC

PRELIMINARY CEM SYSTEM QA/QC SUMMARY SHEET

Facility: Republic Services Forward Landfill **Date:** 5/6/14

Location: A-1 **Personnel:** JR, JM

Parameter	O2	CO2	NOx	CO		Comments
Analyzer	4200	4200	42i	48C		
Range	25	15	25	150		
Cal Value (low)	0	0	0	0		EPA 20 & 25A only
Cyl. #						
Cal Value (mid)	14.4	8.11	12.6	85.4		
Cyl. #						
Cal Value (Hi)	20.54	12.45	22.4	124		
Cyl. #						

LINEARITY

low cal (int)	0.0	0.2	0.1	0.3		zero gas
Abs. Difference	0.0	0.2	0.1	0.3		
% Linearity	**0.0**	**1.1**	**0.4**	**0.2**		<2%
mid cal (int)	14.6	8.4	12.4	85.4		set at mid
Abs. Difference	0.2	0.3	-0.2	0.0		
% Linearity	**0.6**	**1.9**	**-0.7**	**0.0**		<2%
high cal (int)	20.5	12.6	22.6	123.8		
Abs. Difference	0.0	0.2	0.2	-0.2		
% Linearity	**0.0**	**1.3**	**1.0**	**-0.1**		<2%

Initial SYSTEM BIAS Check

Zero (int)	0.0	0.2	0.1	0.3		
Zero (ext)	0.4	0.1	0.3	-1.9		
Abs. Difference	0.4	-0.1	0.2	-2.2		
bias, % range	**1.7**	**-0.4**	**0.9**	**-1.5**		EPA 20/6C/7E (±5%)
Cal (int)	14.6	8.4	12.4	85.4		
Cal (ext)	15.0	8.4	12.5	83.0		
Abs. Difference	0.4	0.0	0.0	-2.4		
bias, % range	**1.7**	**0.1**	**0.1**	**-1.6**		EPA 20/6C/7E (±5%)

SYSTEM RESPONSE TIME (secs) - time from ext. zero to ext. cal, or ext. cal to ext. zero (95% response) -

zero to cal.	60	60	60	60	
cal. to zero	60	60	60	60	

If NO_2 % > 5% of NOx then run converter test.

Stack Gas NOx =		**Cal value NO2**	37.5
Stack Gas NO =		**Analyzer NOx Response =**	>34.5
Stack Gas NO_2 =		**Analyzer NO_2 Response =**	>34.5
NO_2 %=		**Analyzer NO Response =**	0.0
		x 100	>92.0

% Efficiency =

System Cal. Bias (Limit ± 5%) = $\frac{100 * \text{External cal - Internal cal}}{\text{Span Range}}$

% Linearity (Limit ± 2%) = $\frac{100 * \text{Cal Gas Value - Internal cal}}{\text{Span Range}}$

BLUE SKY ENVIRONMENTAL, INC

CEM BIAS CORRECTION SUMMARY

Facility:	Republic Services Forward Landfil	Barometric:	
Unit:	A-1	Leak Check:	OK
Condition:	NORMAL	Strat. Check:	OK
Date:	5/6/14	Personnel:	JR, JM

	O_2	CO_2	NOx	CO			
Analyzer	4200	4200	42i	48C			
Range	25	15	25	150			r
EPA Span	20.48	12.45	22.70	124			
Units, ppm or %	%	%	ppm	ppm			
Span Gas Value	**14.40**	**8.11**	**12.60**	**85.4**			**Ccal Primary**
Span Gas Value	20.54	12.45	22.40	124.0			Ccal Secondary
Initial (int. zero)	0.00	0.16	0.11	0			Analyzer Response, Ca
Initial (int. cal) hi	20.54	12.64	22.64	124			Analyzer Response, Ca
Initial (int. cal) mid	14.55	8.40	12.43	85			Analyzer Response, Ca
Initial (int. cal) run	14.55	8.40	12.43	85			Analyzer Response, Ca

Run 1	xzero	0.43	0.10	0.34	-2			zero (initial), Cib
Test Time:	xcal	14.97	8.41	12.46	83			cal (initial), Cib
1135-1215	AVG	12.80	7.52	14.82	1			TEST AVG, Cavg
	xzero	0.50	0.12	0.27	-2			zero (final), Cfb
	xcal	14.88	8.40	12.69	83			cal (final), Cfb
EPA	3	*0%*	*0%*	*0%*	*0%*			zero drift, % of Span
EPA	3	*0%*	*0%*	*1%*	*0%*			cal drift % of Span
CARB	3	*0%*	*0%*	*0%*	*0%*			zero drift, % of range
CARB	3	*0%*	*0%*	*1%*	*0%*			cal drift % of range
EPA	5	*2%*	*0%*	*1%*	*-2%*			% zero bias
EPA	5	*2%*	*0%*	*1%*	*-2%*			% cal bias
CARB	5	*2%*	*0%*	*1%*	*-2%*			% zero bias
CARB	5	*1%*	*0%*	*1%*	*-2%*			% cal bias
		12.29	**7.24**	**14.90**	**3**			**Cgas**

Run 2	xzero	0.50	0.12	0.27	-2			zero (initial), Cib
Test Time:	xcal	14.88	8.40	12.69	83			cal (initial), Cib
1239-1320	AVG	12.72	7.45	14.12	1			TEST AVG, Cavg
	xzero	0.42	0.09	0.15	-2			zero (final), Cfb
	xcal	14.78	8.36	12.57	85			cal (final), Cfb
EPA	3	*0%*	*0%*	*-1%*	*0%*			zero drift, % of Span
EPA	3	*0%*	*0%*	*-1%*	*2%*			cal drift % of Span
CARB	3	*0%*	*0%*	*-1%*	*0%*			zero drift, % of range
CARB	3	*-1%*	*0%*	*0%*	*1%*			cal drift % of range
EPA	5	*2%*	*-1%*	*0%*	*-2%*			% zero bias
EPA	5	*1%*	*0%*	*1%*	*0%*			% cal bias
CARB	5	*2%*	*0%*	*0%*	*-1%*			% zero bias
CARB	5	*1%*	*0%*	*1%*	*0%*			% cal bias
		12.28	**7.20**	**14.11**	**3**			**Cgas**

Run 3	xzero	0.42	0.09	0.15	-2			zero (initial), Cib
Test Time:	xcal	14.78	8.36	12.57	85			cal (initial), Cib
1347-1431	AVG	12.57	7.34	14.40	0			TEST AVG, Cavg
	xzero	0.32	0.09	0.12	-2			zero (final), Cfb
	xcal	14.64	8.32	12.61	85			cal (final), Cfb
EPA	3	*0%*	*0%*	*0%*	*0%*			% zero drift
EPA	3	*-1%*	*0%*	*0%*	*0%*			% cal drift
CARB	3	*0%*	*0%*	*-1%*	*0%*			% zero drift
CARB	3	*-1%*	*-1%*	*1%*	*2%*			% cal drift
EPA	5	*2%*	*-1%*	*0%*	*-2%*			% zero bias
EPA	5	*0%*	*-1%*	*1%*	*0%*			% cal bias
CARB	5	*1%*	*0%*	*0%*	*-1%*			% zero bias
CARB	5	*0%*	*-1%*	*1%*	*0%*			% cal bias
		12.25	**7.13**	**14.43**	**2**			**Cgas**

Pollutant Concentration (Cgas) = (Cavg - Co) x Ccal / (Cbcal - C Co = (Cib + Cfb) / 2 for zero gas
Zero and Calibration Drift = 100 x (Cfb - Cib) / r Cbcal = (Cib + Cfb) / 2 for cal gas
Bias = 100 x (Cfb - Ca) / r Cib (CARB=Pre-first run) (EPA=Pre-run)

STACK GAS FLOW RATE DETERMINATION -- Method 19

Facility: Republic Services Forward Landfill
Unit: A-1
Condition: NORMAL
Date: 5/6/14

		Time:	1135-1215	1239-1320	1347-1431	
		Run:	1	2	3	
# cubic feet/rev			1,237	1,224	1,221	ft^3
# of seconds/rev			60	60	60	seconds
Gas Line Pressure (PSIG)			0.0	0.0	0.0	PSI Gauge
Gas Line Pressure (PSIA)			14.7	14.7	14.7	PSI Absolute
Gross Calorific Value @ 60°F	avg		597.5	586.4	592.4	Btu / ft^3
Stack Oxygen			12.3	12.3	12.3	%
Gas Fd-Factor @ 60°F	avg		9,288.4	9,312.1	9,302.9	DSCF/MMBtu
Gas Temperature (°F)			60	60	60	°F
Standard Temperature (°F) Tstd			60	60	60	°F
Realtime Fuel Rate (CFM)			1237.4	1224.2	1220.5	CFM
Corrected Fuel Rate (SCFM) @ Tstd			1237.4	1224.2	1220.5	SCFM
Fuel Flowrate (SCFH)			74,243	73,450	73,230	SCFH
Million Btu per minute			0.739	0.718	0.723	MMBtu/min
Heat Input (MMBtu/hour)			44.4	43.1	43.4	MMBtu/Hr
Stack Gas Flow Rate @ Tstd			**16,666**	**16,209**	**16,257**	**DSCFM**

WHERE:

Gas Fd-Factor = Fuel conversion factor (ratio of combustion gas volumes to heat inputs)
MMBtu = Million Btu

CALCULATIONS:

SCFM = CFM * (460+Tstd) * (PSIA) / 14.7 / (460+Gas°F))
SCFH = SCFM * 60
MMBtu/min = SCFM * (Btu/ft^3) * (520/(460+Tstd)) / 1,000,000
MMBtu/hr Heat Input = MMBtu/min * 60
DSCFM = Gas Fd-Factor * ((460+Tstd)/520) * MMBtu/min * 20.9/ (20.9 - O_2%)

STACK GAS FLOW RATE DETERMINATION -- PITOT TRAVERSE

Method 2

Facility: Republic Services Forward Landfill
Unit: A-1
Condition: NORMAL
Date: 05/06/14

			Time:	1145	1300	1400	
			Run:	**1**	**2**	**3**	
1. Temperature of Stack (Ts)				73.0	74.0	76.0	°F
2. Std Temperature (Tstd)				60	60	60	°F
3. Square Root of ΔP (√ ΔP)				0.641	0.637	0.636	"H_2O
4. Barometric Pressure (Pb)				29.90	29.90	29.90	"Hg
5. Static Pressure (Pstatic)				-8.78	-8.91	-8.93	"H_2O
6. Stack Pressure (Ps)				29.25	29.24	29.24	"H_2O
7. Stack Gas:							
	Moisture (H_2O)	M.W.= 18		2.8	2.9	3.1	%
	Oxygen (O_2)	M.W.= 32		0.5	0.6	0.5	%
	Carbon Dioxide (CO_2)	M.W.= 44		34.8	34.7	34.7	%
	Carbon Monoxide (CO)	M.W.= 28		0.00	0.00	0.00	%
	Other: methane	M.W.= 16		59.00	57.90	58.50	%
	Nitrogen (N_2)	M.W.= 28		5.70	6.80	6.30	%
8. Mol. Weight of Stack Gas (MWs)				26.27	26.38	26.29	g/g-mol
9. Stack Dimension	Diameter or Width			9.500	9.500	9.500	in
	Length			#N/A	#N/A	#N/A	in
10. Area of Stack (As)				0.49	0.49	0.49	ft^2
11. Pitot Tube Factor (Cp)				0.99	0.99	0.99	
Stack Gas Velocity				**45.18**	**44.84**	**44.97**	ft/s
Actual Flow Rate				**1,334**	**1,324**	**1,328**	ACFM
Standard Flow Rate				**1,237**	**1,224**	**1,221**	DSCFM

WHERE:

Bws = % Moisture / 100
MWs = Molecular Weight of Stack Gas (wet-basis)
MWd = Molecular Weight of Stack Gas (dry-basis)
ΔP = Pitot Differential Pressure

CALCULATIONS:

MWs = MWd * (1-Bws) + 18 (Bws)

MWd = .44(%CO_2) + .32(%O_2) + .28(%CO+%N_2) + (%Other*M.W./100)

Ps = (Pstatic / 13.6) + Pb

As = (Diameter / 24)^2 * P - for Round Stacks; Length * Width / 144 - for Rectangular Stacks

Vs = 85.49 * Cp * √ ΔP * √((Ts + 460) / (Ps x MWs))

ACFM = 60 * Vs * As

DSCFM = 60 (1-Bwo) * Vs * As * (Tstd + 460)/(Ts + 460) * (Ps/29.92)

BLUE SKY ENVIRONMENTAL, INC

Fd-FACTOR CALCULATION

Republic Services Forward Landfill
A-1
Sample ID: **Landfill Gas - LFG-1**
Date: 5/6/2014

	Molecular Weight	Ideal Gas Specific Gravity, G_i	Ideal Gas Total Calorific Value, H_i	Compressibility Summation Factor, $\sqrt{b_i}$	Specific Volume, ft^3/lb	PPM %	Composition Mole Fraction, x_i	Specific Gravity Fraction, $x_i G_i$	Calorific Value Fraction, $x_i H_i$	Compressibility Fraction, $x_i\sqrt{b_i}$	$x_i MW$	Weight Fraction, $\xi_i MW / \Sigma xiMW$	CARBON Weight Fraction	HYDROGEN Weight Fraction	OXYGEN Weight Fraction	NITROGEN Weight Fraction	SULFUR Weight Fraction	CHONS SUM	Specific Volume, ft^3/lb
Helium‡	4.00	0.1382	0.0	-0.0170		0.0	0.0000	0.0000	0.0	0.0000	0.0000	0.0000							
Hydrogen (H_2) ‡	2.02	0.0696	324.9		187.723	0	0.0000	0.0000	0.0	0.0000	0.0000							0.0000	
Nitrogen	28.01	0.9672	0.0	0.0164	13.443	5.6	0.0560	0.0542	0.0	0.0009	1.5686	0.0592				0.0592		0.0592	0.7935
Oxygen	32.00	1.1053	0.0		11.819	0.5	0.0050	0.0055	0.0	0.0000	0.1600	0.0060			0.0060			0.0060	0.0713
Carbon Monoxide	28.01	0.9671	321.3	0.0217	13.506	0.0	0.0000	0.0000	0.0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000
Carbon Dioxide‡	44.01	1.5194	0.0	0.0640	8.548	34.8	0.3480	0.5288	0.0	0.0223	15.3155	0.5778	0.1577	0.0000	0.4201			0.5778	4.9388
Methane	16.04	0.5539	1012.0	0.0436	23.565	59	0.5900	0.3268	597.1	0.0257	9.4636	0.3570	0.2673	0.0897				0.3571	8.4130
Ethane (C2)	30.01	1.0382	1772.9	0.0917	12.455	0	0.0000	0.0000	0.0	0.0000	0.0000	0.0000	0.0000	0.0000				0.0000	0.0000
Propane (C3)	44.09	1.5224	2523.0	0.1342	8.365	41.2	0.0000	0.0000	0.0	0.0000	0.0000	0.0000	0.0000	0.0000				0.0000	0.0000
Isobutane (C4)	58.12	2.0067	3260.1	0.1744	6.321	26.9	0.0000	0.0000	0.0	0.0000	0.0000	0.0000	0.0000	0.0000				0.0000	0.0000
n-Butane	58.12	2.0067	3269.6	0.1825	6.321		0.0000	0.0000	0.0	0.0000	0.0000	0.0000	0.0000	0.0000				0.0000	0.0000
Isopentane (C5)	72.14	2.4910	4009.4	0.2276	5.252	118	0.0000	0.0000	0.0	0.0000	0.0000	0.0000	0.0000	0.0000				0.0000	0.0000
n-Pentane	72.14	2.4910	4018.5	0.2377	5.252		0.0000	0.0000	0.0	0.0000	0.0000	0.0000	0.0000	0.0000				0.0000	0.0000
Hexanes (C6)	86.17	2.9753	4758.0	0.2830	4.398	106	0.0000	0.0000	0.0	0.0000	0.0000	0.0000	0.0000	0.0000				0.0000	0.0000
C6+	86.17	2.9753	4758.0	0.2830	4.398	374	0.0000	0.0000	0.0	0.0000	0.0000	0.0000	0.0000	0.0000				0.0000	0.0000
Total							0.9990	**0.915**	**597.1**	0.0266	26.5076	1.0000	0.4250	0.0897	0.4261	0.0592	0.0000	1.0000	**14.22**
								SG	**Btu/ft³**	$\Sigma x_i\sqrt{b_i}$	$\Sigma xiMW$		**42.50%**	**8.97%**	**42.61%**	**5.92%**	**0.00%**		**ft³/lb**

‡ Omitted from Compressibility Factor Calculation

Calculated Specific Gravity (SG) *(Air = 1.000 @ 760mm Hg, 60°F)* **0.915**

Compressibility Factor (Z) **0.9993**

$Z = 1 - [(\Sigma x_i \sqrt{b_i})^2 + (2x_H \cdot x_H^2)(0.0005)]$

Specific Gravity (corrected) **0.916**

Specific Volume, (SV) ft^3/lb **14.22** ft^3/lb

Gross Calorific Value (GCV) @ 60°F **597.5** **Btu/ft³ Gross**

Gross Calorific Value (GCV) @ 68°F **588.5** **Btu/ft³ Gross**

Gross Calorific Value (GCV) **8,496** **Btu/lb**

*Btu/lb = Btu/ft³ * ft³/lb*

Gas Fd-Factor @ 60°F **9,288** **DSCF/MMBtu**

$DSCF/MMBtu = 10^6 * ((3.64 * \%H_2) + (1.53 * \%C) + (0.57 * \%S) + (0.14 * \%N_2) - (0.46 * \%O_2)) / Btu/lb$

BLUE SKY ENVIRONMENTAL, INC

Fd-FACTOR CALCULATION

Republic Services Forward Landfill
A-1
Sample ID: **Landfill Gas - LFG-2**
Date: 5/6/2014

	Molecular Weight	Ideal Gas Specific Gravity, G_i	Ideal Gas Total Calorific Value, H_i	Compressibility Summation Factor, $\sqrt{b_i}$	Specific Volume, ft^3/lb	PPM %	Composition Mole Fraction, x_i	Specific Gravity Fraction, x_iG_i	Calorific Value Fraction, x_iH_i	Compressibility Fraction, $x_i\sqrt{b_i}$	x_iMW	Weight Fraction, $\xi_iMW / \Sigma xiMW$	CARBON Weight Fraction	HYDROGEN Weight Fraction	OXYGEN Weight Fraction	NITROGEN Weight Fraction	SULFUR Weight Fraction	CHONS SUM	Specific Volume, ft^3/lb
Helium‡	4.00	0.1382	0.0	-0.0170		**0.0**	**0.0000**	0.0000	0.0	0.0000	0.0000	0.0000						0.0000	
Hydrogen (H_2) ‡	2.02	0.0696	324.9		187.723	**0**	**0.0000**	0.0000	0.0	0.0000	0.0000							0.0000	
Nitrogen	28.01	0.9672	0.0	0.0164	13.443	**6.7**	**0.0670**	0.0648	0.0	0.0011	1.8767	0.0705				0.0705		0.0705	0.9475
Oxygen	32.00	1.1053	0.0		11.819	**0.6**	**0.0060**	0.0066	0.0	0.0000	0.1920	0.0072			0.0072			0.0072	0.0852
Carbon Monoxide	28.01	0.9671	321.3	0.0217	13.506	**0.0**	**0.0000**	0.0000	0.0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000
Carbon Dioxide‡	44.01	1.5194	0.0	0.0640	8.548	**34.7**	**0.3470**	0.5272	0.0	0.0222	15.2715	0.5735	0.1565	0.0000	0.4170			0.5735	4.9025
Methane	16.04	0.5539	1012.0	0.0436	23.565	**57.9**	**0.5790**	0.3207	585.9	0.0252	9.2872	0.3488	0.2612	0.0877				0.3488	8.2191
Ethane (C2)	30.01	1.0382	1772.9	0.0917	12.455	**0**	**0.0000**	0.0000	0.0	0.0000	0.0000	0.0000	0.0000	0.0000				0.0000	0.0000
Propane (C3)	44.09	1.5224	2523.0	0.1342	8.365	**34.6**	**0.0000**	0.0000	0.0	0.0000	0.0000	0.0000	0.0000	0.0000				0.0000	0.0000
Isobutane (C4)	58.12	2.0067	3260.1	0.1744	6.321	**23.5**	**0.0000**	0.0000	0.0	0.0000	0.0000	0.0000	0.0000	0.0000				0.0000	0.0000
n-Butane	58.12	2.0067	3269.6	0.1825	6.321		**0.0000**	0.0000	0.0	0.0000	0.0000	0.0000	0.0000	0.0000				0.0000	0.0000
Isopentane (C5)	72.14	2.4910	4009.4	0.2276	5.252	**101**	**0.0000**	0.0000	0.0	0.0000	0.0000	0.0000	0.0000	0.0000				0.0000	0.0000
n-Pentane	72.14	2.4910	4018.5	0.2377	5.252		0.0000	0.0000	0.0	0.0000	0.0000	0.0000	0.0000	0.0000				0.0000	0.0000
Hexanes (C6)	86.17	2.9753	4758.0	0.2830	4.398	**90.5**	**0.0000**	0.0000	0.0	0.0000	0.0000	0.0000	0.0000	0.0000				0.0000	0.0000
C6+	86.17	2.9753	4758.0	0.2830	4.398	**269**	**0.0000**	0.0000	0.0	0.0000	0.0000	0.0000	0.0000	0.0000				0.0000	0.0000
Total							0.9990	**0.919**	**585.9**	0.0263	26.6273	1.0000	0.4177	0.0877	0.4242	0.0705	0.0000	1.0000	**14.15**
								SG	**Btu/ft^3**	$\Sigma x_i\sqrt{b_i}$	$\Sigma xiMW$		**41.76%**	**8.77%**	**42.42%**	**7.05%**	**0.00%**		**ft^3/lb**

‡ Omitted from Compressibility Factor Calculation

Calculated Specific Gravity (SG) *(Air = 1.000 @ 760mm Hg, 60°F)* **0.919**

Compressibility Factor (Z) **0.9993**

$Z = 1 - [(\Sigma x_i \sqrt{b_i})^2 + (2x_H - x_H^2)(0.0005)]$

Specific Gravity (corrected) **0.920**

Specific Volume, (SV) ft^3/lb **14.15** **ft^3/lb**

Gross Calorific Value (GCV) @ 60°F **586.4** **Btu/ft^3 Gross**

Gross Calorific Value (GCV) @ 68°F **577.5** **Btu/ft^3 Gross**

Gross Calorific Value (GCV) **8,299** **Btu/lb**

*Btu/lb = Btu/ft^3 * ft^3/lb*

Gas Fd-Factor @ 60°F **9,312** **DSCF/MMBtu**

$DSCF/MMBtu = 10^6 * ((3.64 * \%H_2) + (1.53 * \%C) + (0.57 * \%S) + (0.14 * \%N_2) - (0.46 * \%O_2)) / Btu/lb$

BLUE SKY ENVIRONMENTAL, INC

Fd-FACTOR CALCULATION

Republic Services Forward Landfill
A-1
Sample ID: **Landfill Gas - LFG-3**
Date: 5/6/2014

	Molecular Weight	Ideal Gas Specific Gravity, G_i	Ideal Gas Total Calorific Value, H_i	Compressibility Summation Factor, $\sqrt{b_i}$	Specific Volume, ft^3/lb	PPM %	Composition Mole Fraction, x_i	Specific Gravity Fraction, x_iG_i	Calorific Value Fraction, x_iH_i	Compressibility Fraction, $x_i\sqrt{b_i}$	x_iMW	Weight Fraction, $\xi_iMW / \Sigma xiMW$	CARBON Weight Fraction	HYDROGEN Weight Fraction	OXYGEN Weight Fraction	NITROGEN Weight Fraction	SULFUR Weight Fraction	CHONS SUM	Specific Volume, ft^3/lb
Helium‡	4.00	0.1382	0.0	-0.0170		0.0	0.0000	0.0000	0.0	0.0000	0.0000	0.0000							
Hydrogen (H_2) ‡	2.02	0.0696	324.9		187.723	0	0.0000	0.0000	0.0	0.0000	0.0000							0.0000	
Nitrogen	28.01	0.9672	0.0	0.0164	13.443	6.2	0.0620	0.0600	0.0	0.0010	1.7366	0.0654				0.0654		0.0654	0.8792
Oxygen	32.00	1.1053	0.0		11.819	0.5	0.0050	0.0055	0.0	0.0000	0.1600	0.0060			0.0060			0.0060	0.0712
Carbon Monoxide	28.01	0.9671	321.3	0.0217	13.506	0.0	0.0000	0.0000	0.0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000
Carbon Dioxide‡	44.01	1.5194	0.0	0.0640	8.548	34.7	0.3470	0.5272	0.0	0.0222	15.2715	0.5752	0.1570	0.0000	0.4182			0.5752	4.9165
Methane	16.04	0.5539	1012.0	0.0436	23.565	58.5	0.5850	0.3240	592.0	0.0255	9.3834	0.3534	0.2646	0.0888				0.3534	8.3280
Ethane (C2)	30.01	1.0382	1772.9	0.0917	12.455	0	0.0000	0.0000	0.0	0.0000	0.0000	0.0000	0.0000	0.0000				0.0000	0.0000
Propane (C3)	44.09	1.5224	2523.0	0.1342	8.365	40.8	0.0000	0.0000	0.0	0.0000	0.0000	0.0000	0.0000	0.0000				0.0000	0.0000
Isobutane (C4)	58.12	2.0067	3260.1	0.1744	6.321	26.4	0.0000	0.0000	0.0	0.0000	0.0000	0.0000	0.0000	0.0000				0.0000	0.0000
n-Butane	58.12	2.0067	3269.6	0.1825	6.321		0.0000	0.0000	0.0	0.0000	0.0000	0.0000	0.0000	0.0000				0.0000	0.0000
Isopentane (C5)	72.14	2.4910	4009.4	0.2276	5.252	114	0.0000	0.0000	0.0	0.0000	0.0000	0.0000	0.0000	0.0000				0.0000	0.0000
n-Pentane	72.14	2.4910	4018.5	0.2377	5.252		0.0000	0.0000	0.0	0.0000	0.0000	0.0000	0.0000	0.0000				0.0000	0.0000
Hexanes (C6)	86.17	2.9753	4758.0	0.2830	4.398	102	0.0000	0.0000	0.0	0.0000	0.0000	0.0000	0.0000	0.0000				0.0000	0.0000
C6+	86.17	2.9753	4758.0	0.2830	4.398	338	0.0000	0.0000	0.0	0.0000	0.0000	0.0000	0.0000	0.0000				0.0000	0.0000
Total							0.9990	**0.917**	**592.0**	0.0265	26.5515	1.0000	0.4216	0.0888	0.4242	0.0654	0.0000	1.0000	**14.19**
								SG	**Btu/ft³**	$\Sigma x_i\sqrt{b_i}$	**ΣxiMW**		**42.16%**	**8.88%**	**42.42%**	**6.54%**	**0.00%**		**ft³/lb**

‡ Omitted from Compressibility Factor Calculation

Calculated Specific Gravity (SG) *(Air = 1.000 @ 760mm Hg, 60°F)* **0.917**

Compressibility Factor (Z) **0.9993**

$Z = 1 - [(\Sigma x_i \sqrt{b_i})^2 + (2x_H \cdot x_H^2)\ (0.0005)]$

Specific Gravity (corrected) **0.917**

Specific Volume, (SV) ft^3/lb **14.19** **ft^3/lb**

Gross Calorific Value (GCV) @ 60°F **592.4** **Btu/ft^3 Gross**

Gross Calorific Value (GCV) @ 68°F **583.5** **Btu/ft^3 Gross**

Gross Calorific Value (GCV) **8,410** **Btu/lb**

$Btu/lb = Btu/ft^3 * ft^3/lb$

Gas Fd-Factor @ 60°F **9,303** **DSCF/MMBtu**

$DSCF/MMBtu = 10^6 * ((3.64*\%H_2)+(1.53*\%C)+(0.57*\%S)+(0.14*\%N_2)-(0.46*\%O_2)) / Btu/lb$

SJVAPCD - Appendix G

Three Run Review Sheet

DRAFT COPY - San Joaquin Valley Air Pollution Control District - Testing Contractor's CARB Method 100 Quality Assurance Worksheet

**** All supporting data for this worksheet must also be clearly indicated and labeled on the emission trace chart ****

**** A copy of a this completed worksheet is required for every unit tested and must be included in the Summary Section of the Source Test Report ****

Company Name:	FORWARD	Permit Number:	N-339-17-8					Test Date:	5/6/2014
Unit Name:	FLARE A-1	Average Fuel Rate MSCFD:	1767			Was multipoint sampling required by the District policy?			Yes
Select Test Type:	Non RATA	Fuel BTU/CF, dry, gross(% wt):	592			Highest point for all pollutants above the Run 1 Cavg.%:			1123.1%
Permitted MMBtu/hr:	48	Fuel Ffactor @ 68:	9301			Lowest point for all pollutants below the Run 1 Cavg %:			238.5%
Testing Company:	Blue Sky	Estimated Qsd DSCFM:	16427			From above does subsequent runs require multipoint?, >10%, M100 4.5:			Yes
Name of Tester:	Jeramie Richardson	Estimated MMBtu/hr, firing percent :	43.60	91%	OK	Is a PM or EPA Method 6 test included in this test report?			No

2.2 Gas Analyzers	O2			NOx			CO			SO2		
Limit equivalent (LE)as uncorrected ppm:				14			83					
Range, Limit equivalent %:	25			25	56%		150	55%			—	
Non RATA; R1 Cavg (0-95%) of r:		51%	OK		59%	OK		1%	OK		—	—
RATA; Run 1 Cavg (10%-95%) of r, M100 1.5.1:		N/A	N/A		N/A	N/A		N/A	N/A		—	—

3 Calibretion Gases														
Was EPA Method 205 gas dilution used?, Then identify gas with division symbol M100 3.2:					No									
If 'Yes' above, select the mid-level cal. gas ppm or %, +/-2%, EPA 205:				÷				÷				÷		÷
High-range: (80-100%) of r, Chcal, M100 3.1.1; select if divider used:	20.540	82.2%	OK		22.400	89.6%	OK		124.000	82.7%	OK		—	—		
High-range cylinder #, M100 3.1.1:	CC300869		OK		CC424021		OK		CC200170		OK			—		
High-range expiration date:	06/11/20		OK		12/02/16		OK		01/22/21		OK			—		
Mid-range: (40-60%) of r, Cmcal, M100 3.1.2; indicate if divider used:	14.400	57.6%	OK		12.600	50.4%	OK		85.400	56.9%	OK		—	—		
Mid-range cylinder #, M100 3.1.2:	CC218936		OK		CC424138		OK		CC196748		OK			—		
Mid-range expiration date:	08/21/21		OK		08/28/16		OK		06/13/14		OK			—		
Zero cylinder #, M100 3.1.3:	CA02155		OK													

SJVAPCD - Appendix G

Three Run Review Sheet

Pollutant	O2			NOx			CO			SO2		
4.2 Calibration of Continuous Analyzers												
NO2 converter efficiency, Eff%, >90%, M100 2.2.5:				94.60		OK		D3, < 1 ppm:	-0.50			
High-range response (+/-2%) of r, Cauh, M100 4.2:	20.54	0.00%	OK	22.64	0.96%	OK	123.80	-0.13%	OK		—	—
Mid-range response (+/-2%) of r, Caum, M100 4.2:	14.55	0.60%	OK	12.43	-0.68%	OK	85.40	0.00%	OK		—	—
Zero gas response (+/- 2%) of r, Caz, M100 4.2:	0.00	0.00%	OK	0.11	0.44%	OK	0.30	0.20%	OK		—	—
4.3 Pre-Test Leak Check												
Time of leak check, M100 4.3:	7:14		OK									
4.4 Pre-Test System Bias Check (Suggest using both mid and high gases if unsure of emission concentration)												
Initial high-gas (+/-5%) Cibu,M100 6.2,Eq100-2:		—	N/A		—	N/A		—	N/A		—	—
Initial mid-gas (+/-5%) Cibu, M100 6.2,Eq100-2:	14.97	-1.68%	OK	12.46	-0.12%	OK	83.00	1.60%	OK		—	—
Initial zero gas (+/-5%) Cibz, M100 8.2,Eq100-2:	0.43	-1.72%	OK	0.34	-0.92%	OK	-1.90	1.47%	OK		—	—
Run 1												
Run 1 start time:	12:09		OK									
Van's voltage, VAC RMS, per policy:	109.00		OK									
5 Sample Collection												
Raw avg, ppm or %, Cavg:	12.80	12.80		14.82	14.82		1.30	1.30			—	
Raw highest, ppm or %, Cmax:	13.52	5.62%		19.24	29.82%		15.90	1123.08%			—	
Raw lowest, ppm or %, Cmin:	11.00	14.06%		12.64	14.71%		-1.80	238.46%			—	
Run1 Cavg as a % of r, M100 4.4:		51.20%			59.28%			0.87%			—	
Select Chcal or Cmcal to become Ccal M100 4.4:	14.400	14.40	OK	12.600	12.60	OK	85.400	85.40	OK		—	—
Cau, M100 6.2:		14.55			12.43			85.40			—	
6.1 Zero and Calibration Drift												
Final upscale (+/-3%),Cfbu,Eq 100-1:	14.88	0.36%	OK	12.69	-0.92%	OK	82.70	0.20%	OK		—	—
Final zero (+/-3%),Cfbu,Eq 100-1:	0.50	-0.28%	OK	0.27	0.28%	OK	-2.10	0.13%	OK		—	—
6.2 Post-Test System Bias Check												
Final upscale (+/-5%),Cfbu,Eq 100-2:		-1.32%	OK		-1.04%	OK		1.80%	OK		—	—
Final zero (+/-5%),Cfbz,Eq 100-2:		-2.00%	OK		-0.64%	OK		1.60%	OK		—	—
7.1 Pollutant Concentration												
Range(0%-95%):		51.20%	OK		59.28%	OK		0.87%	OK		—	—
Avg. of Cibu and Cfbu, Cbcal:		14.93			12.58			82.85			—	
Avg. of Cibz and Cfbz, Co:		0.47			0.31			-2.00			—	
Cgas, ppm or %:		**12.28**			**14.91**			**3.32**			—	
Eq 100-5 Cgas@3%:					30.96			6.89			—	
Cgas@15%:					10.21			2.27			—	

SJVAPCD - Appendix G

Three Run Review Sheet

Pollutant	O2			NOx			CO			SO2		
Run 2												
Run 2 start time:	13:07		OK									
Van's voltage, VAC RMS, per policy:	107.00		OK									
5 Sample Collection												
Raw avg, ppm or %, Cavg:	12.72	12.72		14.12	14.12		0.60	0.60			—	
6.1 Zero and Calibration Drift												
Final upscale (+/-3%),Cfbu,Eq 100-1:	14.78	0.76%	OK	12.57	-0.44%	OK	85.10	-1.40%	OK		—	—
Final zero (+/-3%),Cfbu,Eq 100-1:	0.42	0.04%	OK	0.15	0.76%	OK	-1.90	0.00%	OK		—	—
6.2 Post-Test System Bias Check												
Final upscale (+/-5%),Cfbu,Eq 100-2:		-0.92%	OK		-0.56%	OK		0.20%	OK		—	—
Final zero (+/-5%),Cfbz,Eq 100-2:		-1.68%	OK		-0.16%	OK		1.47%	OK		—	—
7.1 Pollutant Concentration												
Range(0%-95%):		50.88%	OK		56.48%	OK		0.40%	OK		—	—
Avg. of Cibu and Cfbu, Cbcal:		14.83			12.63			83.90			—	
Avg. of Cibz and Cfbz, Co:		0.46			0.21			-2.00			—	
Cgas, ppm or %:		**12.29**			**14.11**			**2.58**			—	
Eq 100-5 Cgas@3%:					29.33			5.36			—	
Cgas@15%:					9.67			1.77			—	

Run 3												
Run 3 start time:	14:08		OK									
Van's voltage, VAC RMS, per policy:	109.00		OK									
5 Sample Collection												
Raw avg, ppm or %, Cavg:	12.57	12.57		14.40	14.40		0.10	0.10			—	
6.1 Zero and Calibration Drift												
Final upscale (+/-3%),Cfbu,Eq 100-1:	14.64	1.32%	OK	12.61	-0.60%	OK	85.30	-1.53%	OK		—	—
Final zero (+/-3%),Cfbu,Eq 100-1:	0.32	0.44%	OK	0.12	0.88%	OK	-1.80	-0.07%	OK		—	—
6.2 Post-Test System Bias Check												
Final upscale (+/-5%),Cfbu,Eq 100-2:		-0.36%	OK		-0.72%	OK		0.07%	OK		—	—
Final zero (+/-5%),Cfbz,Eq 100-2:		-1.28%	OK		-0.04%	OK		1.40%	OK		—	—
7.1 Pollutant Concentration												
Range(0%-95%):		50.28%	OK		57.60%	OK		0.07%	OK		—	—
Avg. of Cibu and Cfbu, Cbcal:		14.71			12.59			85.20			—	
Avg. of Cibz and Cfbz, Co:		0.37			0.14			-1.85			—	
Cgas, ppm or %:		**12.25**			**14.43**			**1.91**			—	
Eq 100-5 Cgas@3%:					29.86			3.95			—	
Cgas@15%:					9.84			1.30			—	

O2% Avg.

- ◉ No Range Changes Occurred. Average From Three Run Review.
- ○ Range Change Occurred After First Run. Average From Run 1 of Three Run Review and Two Run Review.
- ○ Range Change Occurred After Second Run. Average From Runs 1 & 2 From The Three Run Review and One Run Review.

NOx Avg.

- ◉ No Range Changes Occurred. Average From Three Run Review.
- ○ Range Change Occurred After First Run. Average From Run 1 of Three Run Review and
- ○ Range Change Occurred After Second Run. Average From Runs 1 & 2 From The Three Run Review and One Run Review.

CO Avg.

- ◉ No Range Change Occurred. Average From Three Run Review.
- ○ Range Change Occurred After First Run. Average From Run 1 of Three Run Review and Two Run Review.
- ○ Range Change Occurred After Second Run. Average From Runs 1 and 2 From The Three Run Review and One Run Review.

SO2 Avg.

- ◉ No Range Change Occurred. Average From Three Run Review.
- ○ Range Change Occurred After First Run. Average From Run 1 of Three Run Review and Two Run Review.
- ○ Range Change Occurred After Second Run. Average From Runs 1 and 2 From The Three Run Review and One Run Review.

SJVAPCD - Appendix G

Three Run Review Sheet

Pollutant	O2	NOx	CO	SO2
Est. avg. from 3 runs (not to be used for compliance determination)				
Cgas, ppm or %:	12.3	14.5	2.6	—
Eq 100-5 Cgas@3%:		30.1	5.4	—
Cgas@15%:		9.9	1.8	—
Eq 100-4 lbs/hr:		1.71	0.19	—
EPA Eq 19-1 lbs/MMBtu:		0.037	0.004	—
g/Bhp-hr:		0.141	0.015	—

If permit conditions require source to maintain daily, monthly, quarterly or annual fuel, production or sulfur records then enter the data below. Include copies or a printout of these records in the Operating Data section of the test report.

Fuel or production rate nearest to the day of the test.		Units	Fuel sulfur concentration rate nearest to the day of the test.		Units
Fuel or production rate nearest to 3-months prior to the day of test.			Fuel sulfur concentration rate nearest to 3-months prior to the day of the test.		
Fuel or production rate nearest to 6-months prior to the day of test.			Fuel sulfur concentration rate nearest to 6-months prior to the day of the test.		
Fuel or production rate nearest to 9-months prior to the day of test.			Fuel sulfur concentration rate nearest to 9-months prior to the day of the test.		

Tester's comment area, explain each "X" mark and what actions will be taken to prevent reoccurrence.

District Review Code:	1	*

BLUE SKY ENVIRONMENTAL, INC

PRELIMINARY CEM SYSTEM QA/QC SUMMARY SHEET

Facility: Republic Services Forward Landfill **Date:** 5/6/14

Location: A-2 **Personnel:** JR, JM

Parameter	O2	CO2	NOx	CO	CO		Comments
Analyzer	4200	4200	42i	48C	48C		
Range	25	15	25	150	500		
Cal Value (low)	0	0	0	0	0		EPA 20 & 25A only
Cyl. #							
Cal Value (mid)	14.4	8.11	12.6	85.4	228.3		
Cyl. #							
Cal Value (Hi)	20.54	12.45	22.4	124	453		
Cyl. #							

LINEARITY

low cal (int)	0.0	0.2	0.1	0.3	0.2		zero gas
Abs. Difference	0.0	0.2	0.1	0.3	0.2		
% Linearity	**0.0**	**1.1**	**0.4**	**0.2**	**0.0**		<2%
mid cal (int)	14.6	8.4	12.4	85.4	227.2		set at mid
Abs. Difference	0.2	0.3	-0.2	0.0	-1.1		
% Linearity	**0.6**	**1.9**	**-0.7**	**0.0**	**-0.2**		<2%
high cal (int)	20.5	12.6	22.6	123.8	454.8		
Abs. Difference	0.0	0.2	0.2	-0.2	1.8		
% Linearity	**0.0**	**1.3**	**1.0**	**-0.1**	**0.4**		<2%

Initial SYSTEM BIAS Check

Zero (int)	0.0	0.2	0.1	0.3	0.2		
Zero (ext)	0.4	0.1	0.2	-1.0	-0.5		
Abs. Difference	0.4	-0.1	0.1	-1.3	-0.7		
bias, % range	**1.8**	**-0.6**	**0.3**	**-0.9**	**-0.1**		EPA 20/6C/7E (±5%)
Cal (int)	14.6	8.4	12.4	85.4	454.8		
Cal (ext)	14.8	8.5	12.5	85.4	450.1		
Abs. Difference	0.3	0.1	0.1	0.0	-4.7		
bias, % range	**1.1**	**0.9**	**0.4**	**0.0**	**-0.9**		EPA 20/6C/7E (±5%)

SYSTEM RESPONSE TIME (secs) - time from ext. zero to ext. cal, or ext. cal to ext. zero (95% response) -

zero to cal.	60	60	60	60	60	
cal. to zero	60	60	60	60	60	

If NO_2 % > 5% of NOx then run converter test.

Stack Gas NOx =	
Stack Gas NO =	
Stack Gas NO_2 =	
NO_2 %=	

NO_2 CONVERTER TEST

Cal value NO2	37.5
Analyzer NOx Response =	>34.5
Analyzer NO_2 Response =	>34.5
Analyzer NO Response =	0.0
% Efficiency = $\frac{\text{NOx-NO response}}{NO_2 \text{ cal gas value}}$ x 100	>92.0

System Cal. Bias (Limit ± 5%) = $\frac{100 * \text{External cal - Internal cal}}{\text{Span Range}}$

% Linearity (Limit ± 2%) = $\frac{100 * \text{Cal Gas Value - Internal cal}}{\text{Span Range}}$

BLUE SKY ENVIRONMENTAL, INC

CEM BIAS CORRECTION SUMMARY

Facility:	Republic Services Forward Landfill	Barometric:	29.90
Unit:	A-2	Leak Check:	OK
Condition:	NORMAL	Strat. Check:	OK
Date:	5/6/14	Personnel:	JR, JM

	O_2	CO_2	NOx	CO	CO			
Analyzer	4200	4200	42i	48C	48C			
Range	25	15	25	150	500			r
EPA Span	20.48	12.45	22.70	124.0	453.0			
Units, ppm or %	%	%	ppm	ppm	ppm			
Span Gas Value	**14.40**	**8.11**	**12.60**	**85.4**	**453**			**Ccal Primary**
Span Gas Value	20.54	12.45	22.40	124.0	228			Ccal Secondary
Initial (int. zero)	0.00	0.16	0.11	0.30	0			Analyzer Response, Ca
Initial (int. cal) hi	20.54	12.64	22.64	123.8	455			Analyzer Response, Ca
Initial (int. cal) mid	14.55	8.40	12.43	85.4	227			Analyzer Response, Ca
Initial (int. cal) run	14.55	8.40	12.43	85.4	455			Analyzer Response, Ca

Run 1	xzero	0.44	0.07	0.18	-1.0	-1			zero (initial), Cib
Test Time:	xcal	14.83	8.54	12.53	85.4	450			cal (initial), Cib
0851-0929	AVG	13.22	7.14	12.69	14.9	296			TEST AVG, Cavg
	xzero	0.56	0.10	0.27	-1.3	-1			zero (final), Cfb
	xcal	14.90	8.58	12.54	84.0	443			cal (final), Cfb
EPA	3	*1%*	*0%*	*0%*	*0%*	*0%*			zero drift, % of Span
EPA	3	*0%*	*0%*	*0%*	*-1%*	*-2%*			cal drift % of Span
CARB	3	*0%*	*0%*	*0%*	*0%*	*0%*			zero drift, % of range
CARB	3	*0%*	*0%*	*0%*	*-1%*	*-2%*			cal drift % of range
EPA	5	*3%*	*0%*	*1%*	*-1%*	*0%*			% zero bias
EPA	5	*2%*	*1%*	*0%*	*-1%*	*-3%*			% cal bias
CARB	5	*2%*	*0%*	*1%*	*-1%*	*0%*			% zero bias
CARB	5	*1%*	*1%*	*0%*	*-1%*	*-2%*			% cal bias
		12.75	**6.75**	**12.76**	**15.9**	**301**			**Cgas**
			RELAVENT MINUTES		**26**	**6**			
			FINAL CO AVERAGE			**69.3**			

Run 2	xzero	0.56	0.10	0.27	-1.3	-1			zero (initial), Cib
Test Time:	xcal	14.90	8.58	12.54	84.0	443			cal (initial), Cib
0951-1029	AVG	13.19	7.28	13.54	20.2	208.28			TEST AVG, Cavg
	xzero	0.37	0.06	0.33	-1.6	-2			zero (final), Cfb
	xcal	14.85	8.45	12.53	82.8	446			cal (final), Cfb
EPA	3	*-1%*	*0%*	*0%*	*0%*	*0%*			zero drift, % of Span
EPA	3	*0%*	*-1%*	*0%*	*-1%*	*1%*			cal drift % of Span
CARB	3	*0%*	*0%*	*1%*	*0%*	*0%*			zero drift, % of range
CARB	3	*0%*	*-1%*	*0%*	*-2%*	*-1%*			cal drift % of range
EPA	5	*2%*	*-1%*	*1%*	*-2%*	*0%*			% zero bias
EPA	5	*1%*	*0%*	*0%*	*-2%*	*-2%*			% cal bias
CARB	5	*1%*	*-1%*	*1%*	*-1%*	*0%*			% zero bias
CARB	5	*1%*	*0%*	*0%*	*-2%*	*-2%*			% cal bias
		12.71	**6.92**	**13.64**	**21.8**	**213**			**Cgas**
			RELAVENT MINUTES		**27**	**5**			
			FINAL CO AVERAGE			**51.7**			

Run 3	xzero	0.37	0.06	0.33	-1.6	-2			zero (initial), Cib
Test Time:	xcal	14.85	8.45	12.53	82.8	446			cal (initial), Cib
1056-1132	AVG	13.08	7.17	14.16	29.4	197			TEST AVG, Cavg
	xzero	0.43	0.10	0.34	-1.9	-2			zero (final), Cfb
	xcal	14.97	8.41	12.46	83.0	443			cal (final), Cfb
EPA	3	*0%*	*0%*	*0%*	*0%*	*0%*			% zero drift
EPA	3	*1%*	*0%*	*0%*	*0%*	*-1%*			% cal drift
CARB	3	*0%*	*0%*	*1%*	*-1%*	*0%*			% zero drift
CARB	3	*1%*	*-1%*	*0%*	*-2%*	*-2%*			% cal drift
EPA	5	*2%*	*0%*	*1%*	*-2%*	*-1%*			% zero bias
EPA	5	*2%*	*0%*	*0%*	*-2%*	*-3%*			% cal bias
CARB	5	*2%*	*0%*	*1%*	*-1%*	*-1%*			% zero bias
CARB	5	*2%*	*0%*	*0%*	*-2%*	*-2%*			% cal bias
		12.59	**6.88**	**14.33**	**31.4**	**202**			**Cgas**
			RELAVENT MINUTES		**30**	**2**			
			FINAL CO AVERAGE			**42.0**			

Pollutant Concentration (Cgas) = (Cavg - Co) x Ccal / (Cbcal - Co)
Zero and Calibration Drift = 100 x (Cfb - Cib) / r
Bias = 100 x (Cfb - Ca) / r

Co = (Cib + Cfb) / 2 for zero gas
Cbcal = (Cib + Cfb) / 2 for cal gas
Cib (CARB=Pre-first run) (EPA=Pre-run)

STACK GAS FLOW RATE DETERMINATION -- Method 19

Facility: Republic Services Forward Landfill
Unit: A-2
Condition: NORMAL
Date: 5/6/14

		Time:	0851-0929	0951-1029	1056-1132	
		Run:	**1**	**2**	**3**	
# cubic feet/rev			2,901	2,872	2,868	ft^3
# of seconds/rev			60	60	60	seconds
Gas Line Pressure (PSIG)			0.0	0.0	0.0	PSI Gauge
Gas Line Pressure (PSIA)			14.7	14.7	14.7	PSI Absolute
Gross Calorific Value @ 60°F	avg		584.3	587.4	585.3	Btu / ft^3
Stack Oxygen			12.7	12.7	12.6	%
Gas Fd-Factor @ 60°F	avg		9,302.5	9,309.9	9,307.8	DSCF/MMBtu
Gas Temperature (°F)			60	60	60	°F
Standard Temperature (°F) Tstd			60	60	60	°F
Realtime Fuel Rate (CFM)			2901.2	2871.6	2868.4	CFM
Corrected Fuel Rate (SCFM) @ Tstd			2901.2	2871.6	2868.4	SCFM
Fuel Flowrate (SCFH)			174,073	172,298	172,103	SCFH
Million Btu per minute			1.695	1.687	1.679	MMBtu/min
Heat Input (MMBtu/hour)			101.7	101.2	100.7	MMBtu/Hr
Stack Gas Flow Rate @ Tstd			**40,437**	**40,080**	**39,286**	**DSCFM**

WHERE:

Gas Fd-Factor = Fuel conversion factor (ratio of combustion gas volumes to heat inputs)
MMBtu = Million Btu

CALCULATIONS:

SCFM = CFM * (460+Tstd) * (PSIA) / 14.7 / (460+Gas°F))
SCFH = SCFM * 60
MMBtu/min = SCFM * (Btu/ft^3) * (520/(460+Tstd)) / 1,000,000
MMBtu/hr Heat Input = MMBtu/min * 60
DSCFM = Gas Fd-Factor * ((460+Tstd)/520) * MMBtu/min * 20.9/ (20.9 - O_2%)

STACK GAS FLOW RATE DETERMINATION -- PITOT TRAVERSE

Method 2

Facility: Republic Services Forward Landfill
Unit: A-2
Condition: NORMAL
Date: 05/06/14

		Time:	900	1000	1100
		Run:	**1**	**2**	**3**
1. Temperature of Stack (Ts)			62.0	67.0	68.0	°F
2. Std Temperature (Tstd)			60	60	60	°F
3. Square Root of ΔP (√ ΔP)			1.5537	1.5477	1.5508	"H_2O
4. Barometric Pressure (Pb)			29.90	29.90	29.90	"Hg
5. Static Pressure (Pstatic)			-45.41	-45.05	-44.91	"H_2O
6. Stack Pressure (Ps)			26.56	26.59	26.60	"H_2O
7. Stack Gas:						
Moisture (H_2O)	M.W.= 18		2.1	2.5	2.6	%
Oxygen (O_2)	M.W.= 32		0.7	0.6	0.6	%
Carbon Dioxide (CO_2)	M.W.= 44		34.2	34.0	34.4	%
Carbon Monoxide (CO)	M.W.= 28		0.00	0.00	0.00	%
Other: methane	M.W.= 16		57.70	58.00	57.80	%
Nitrogen (N_2)	M.W.= 28		7.40	7.40	7.20	%
8. Mol. Weight of Stack Gas (MWs)			26.40	26.29	26.37	g/g-mol
9. Stack Dimension	Diameter or Width		9.500	9.500	9.500	in
	Length		#N/A	#N/A	#N/A	in
10. Area of Stack (As)			0.49	0.49	0.49	ft^2
11. Pitot Tube Factor (Cp)			0.99	0.99	0.99	
Stack Gas Velocity			**113.47**	**113.74**	**113.88**	ft/s
Actual Flow Rate			**3,351**	**3,359**	**3,363**	ACFM
Standard Flow Rate			**2,901**	**2,872**	**2,868**	DSCFM

WHERE:

Bws = % Moisture / 100
MWs = Molecular Weight of Stack Gas (wet-basis)
MWd = Molecular Weight of Stack Gas (dry-basis)
ΔP = Pitot Differential Pressure

CALCULATIONS:

MWs = MWd * (1-Bws) + 18 (Bws)

MWd = .44(%CO_2) + .32(%O_2) + .28(%CO+%N_2) + (%Other*M.W./100)

Ps = (Pstatic / 13.6) + Pb

As = (Diameter / 24)^2 * P - for Round Stacks; Length * Width / 144 - for Rectangular Stacks

Vs = 85.49 * Cp * √ ΔP * √((Ts + 460) / (Ps x MWs))

ACFM = 60 * Vs * As

DSCFM = 60 (1-Bwo) * Vs * As * (Tstd + 460)/(Ts + 460) * (Ps/29.92)

BLUE SKY ENVIRONMENTAL, INC

Fd-FACTOR CALCULATION

Republic Services Forward Landfill
A-2
Sample ID: **Landfill Gas - LFG-1**
Date: 5/6/2014

	Molecular Weight	Ideal Gas Specific Gravity, G_i	Ideal Gas Total Calorific Value, H_i	Compressibility Summation Factor, $\sqrt{b_i}$	Specific Volume, ft^3/lb	PPM %	Composition Mole Fraction, x_i	Specific Gravity Fraction, x_iG_i	Calorific Value Fraction, x_iH_i	Compressibility Fraction, $x_i\sqrt{b_i}$	x_iMW	Weight Fraction, $\xi_iMW / \Sigma xiMW$	CARBON Weight Fraction	HYDROGEN Weight Fraction	OXYGEN Weight Fraction	NITROGEN Weight Fraction	SULFUR Weight Fraction	CHONS SUM	Specific Volume, ft^3/lb
Helium‡	4.00	0.1382	0.0	-0.0170		**0.0**	**0.0000**	0.0000	0.0	0.0000	0.0000	0.0000							
Hydrogen (H_2) ‡	2.02	0.0696	324.9		187.723	**0**	**0.0000**	0.0000	0.0	0.0000	0.0000							0.0000	
Nitrogen	28.01	0.9672	0.0	0.0164	13.443	**7.4**	**0.0740**	0.0716	0.0	0.0012	2.0727	0.0779				0.0779		0.0779	1.0474
Oxygen	32.00	1.1053	0.0		11.819	**0.7**	**0.0070**	0.0077	0.0	0.0000	0.2240	0.0084			0.0084			0.0084	0.0995
Carbon Monoxide	28.01	0.9671	321.3	0.0217	13.506	**0.0**	**0.0000**	0.0000	0.0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000
Carbon Dioxide‡	44.01	1.5194	0.0	0.0640	8.548	**34.2**	**0.3420**	0.5196	0.0	0.0219	15.0514	0.5658	0.1544	0.0000	0.4114			0.5658	4.8362
Methane	16.04	0.5539	1012.0	0.0436	23.565	**57.7**	**0.5770**	0.3196	583.9	0.0252	9.2551	0.3479	0.2605	0.0875				0.3479	8.1981
Ethane (C2)	30.01	1.0382	1772.9	0.0917	12.455	**0**	**0.0000**	0.0000	0.0	0.0000	0.0000	0.0000	0.0000	0.0000				0.0000	0.0000
Propane (C3)	44.09	1.5224	2523.0	0.1342	8.365	**39**	**0.0000**	0.0000	0.0	0.0000	0.0000	0.0000	0.0000	0.0000				0.0000	0.0000
Isobutane (C4)	58.12	2.0067	3260.1	0.1744	6.321	**24**	**0.0000**	0.0000	0.0	0.0000	0.0000	0.0000	0.0000	0.0000				0.0000	0.0000
n-Butane	58.12	2.0067	3269.6	0.1825	6.321		**0.0000**	0.0000	0.0	0.0000	0.0000	0.0000	0.0000	0.0000				0.0000	0.0000
Isopentane (C5)	72.14	2.4910	4009.4	0.2276	5.252	**92.8**	**0.0000**	0.0000	0.0	0.0000	0.0000	0.0000	0.0000	0.0000				0.0000	0.0000
n-Pentane	72.14	2.4910	4018.5	0.2377	5.252		**0.0000**	0.0000	0.0	0.0000	0.0000	0.0000	0.0000	0.0000				0.0000	0.0000
Hexanes (C6)	86.17	2.9753	4758.0	0.2830	4.398	**84.9**	**0.0000**	0.0000	0.0	0.0000	0.0000	0.0000	0.0000	0.0000				0.0000	0.0000
C6+	86.17	2.9753	4758.0	0.2830	4.398	**304**	**0.0000**	0.0000	0.0	0.0000	0.0000	0.0000	0.0000	0.0000				0.0000	0.0000
Total							1.0000	**0.919**	**583.9**	0.0264	26.6032	1.0000	0.4149	0.0875	0.4198	0.0779	0.0000	1.0000	**14.18**
								SG	**Btu/ft³**	$\Sigma x_i\sqrt{b_i}$	$\Sigma xiMW$		**41.49%**	**8.74%**	**41.98%**	**7.79%**	**0.00%**		**ft³/lb**

‡ Omitted from Compressibility Factor Calculation

Calculated Specific Gravity (SG) *(Air = 1.000 @ 760mm Hg, 60°F)* **0.919**

Compressibility Factor (Z) **0.9993**

$Z = 1 - [(\Sigma x_i \sqrt{b_i})^2 + (2x_H \cdot x_H^2)(0.0005)]$

Specific Gravity (corrected) **0.919**

Specific Volume, (SV) ft^3/lb **14.18** **ft^3/lb**

Gross Calorific Value (GCV) @ 60°F **584.3** **Btu/ft^3 Gross**

Gross Calorific Value (GCV) @ 68°F **575.5** **Btu/ft^3 Gross**

Gross Calorific Value (GCV) **8,287** **Btu/lb**

*Btu/lb = Btu/ft^3 * ft^3 / lb*

Gas Fd-Factor @ 60°F **9,303** **DSCF/MMBtu**

$DSCF/MMBtu = 10^6 * ((3.64 * \%H_2) + (1.53 * \%C) + (0.57 * \%S) + (0.14 * \%N_2) - (0.46 * \%O_2)) / Btu/lb$

Fd-FACTOR CALCULATION

Republic Services Forward Landfill
A-2
Sample ID: **Landfill Gas - LFG-2**
Date: 5/6/2014

	Molecular Weight	Ideal Gas Specific Gravity, G_i	Ideal Gas Total Calorific Value, H_i	Compressibility Summation Factor, $\sqrt{b_i}$	Specific Volume, ft³/lb	PPM / %	Composition Mole Fraction, x_i	Specific Gravity Fraction, x_iG_i	Calorific Value Fraction, x_iH_i	Compressibility Fraction, $x_i\sqrt{b_i}$	x_iMW	Weight Fraction, $\xi_iMW / \sum xiMW$	CARBON Weight Fraction	HYDROGEN Weight Fraction	OXYGEN Weight Fraction	NITROGEN Weight Fraction	SULFUR Weight Fraction	CHONS SUM	Specific Volume, ft³/lb
Helium‡	4.00	0.1382	0.0	-0.0170		0.0	0.0000	0.0000	0.0	0.0000	0.0000	0.0000							
Hydrogen (H_2) ‡	2.02	0.0696	324.9		187.723	0	0.0000	0.0000	0.0	0.0000	0.0000							0.0000	
Nitrogen	28.01	0.9672	0.0	0.0164	13.443	7.3	0.0730	0.0706	0.0	0.0012	2.0447	0.0771				0.0771		0.0771	1.0371
Oxygen	32.00	1.1053	0.0		11.819	0.6	0.0060	0.0066	0.0	0.0000	0.1920	0.0072			0.0072			0.0072	0.0856
Carbon Monoxide	28.01	0.9671	321.3	0.0217	13.306	0.0	0.0000	0.0000	0.0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000
Carbon Dioxide‡	44.01	1.5194	0.0	0.0640	8.548	34	0.3400	0.5166	0.0	0.0218	14.9634	0.5646	0.1541	0.0000	0.4105			0.5646	4.8261
Methane	16.04	0.5539	1012.0	0.0436	23.565	58	0.5800	0.3213	587.0	0.0253	9.3032	0.3510	0.2628	0.0882				0.3511	8.2718
Ethane (C2)	30.01	1.0382	1772.9	0.0917	12.455	0	0.0000	0.0000	0.0	0.0000	0.0000	0.0000	0.0000	0.0000				0.0000	0.0000
Propane (C3)	44.09	1.5224	2523.0	0.1342	8.365	39.2	0.0000	0.0000	0.0	0.0000	0.0000	0.0000	0.0000	0.0000				0.0000	0.0000
Isobutane (C4)	58.12	2.0067	3260.1	0.1744	6.321	26.3	0.0000	0.0000	0.0	0.0000	0.0000	0.0000	0.0000	0.0000				0.0000	0.0000
n-Butane	58.12	2.0067	3269.6	0.1825	6.321		0.0000	0.0000	0.0	0.0000	0.0000	0.0000	0.0000	0.0000				0.0000	0.0000
Isopentane (C5)	72.14	2.4910	4009.4	0.2276	5.252	111	0.0000	0.0000	0.0	0.0000	0.0000	0.0000	0.0000	0.0000				0.0000	0.0000
n-Pentane	72.14	2.4910	4018.5	0.2377	5.252		0.0000	0.0000	0.0	0.0000	0.0000	0.0000	0.0000	0.0000				0.0000	0.0000
Hexanes (C6)	86.17	2.9753	4758.0	0.2830	4.398	99	0.0000	0.0000	0.0	0.0000	0.0000	0.0000	0.0000	0.0000				0.0000	0.0000
C6+	86.17	2.9753	4758.0	0.2830	4.398	322	0.0000	0.0000	0.0	0.0000	0.0000	0.0000	0.0000	0.0000				0.0000	0.0000
Total							0.9990	**0.915**	**587.0**	0.0265	26.5033	1.0000	0.4169	0.0882	0.4178	0.0771	0.0000	1.0000	**14.22**
								SG	**Btu/ft³**	$\sum x_i\sqrt{b_i}$	$\sum xiMW$		**41.69%**	**8.82%**	**41.77%**	**7.71%**	**0.00%**		**ft³/lb**

‡ Omitted from Compressibility Factor Calculation

Calculated Specific Gravity (SG) *(Air = 1.000 @ 760mm Hg, 60°F)* **0.915**

Compressibility Factor (Z) **0.9993**

$Z = 1 - [(\sum x_i \sqrt{b_i})^2 + (2x_H - x_H^2)\,(0.0005)]$

Specific Gravity (corrected) **0.916**

Specific Volume, (SV) ft³/lb **14.22** **ft³/lb**

Gross Calorific Value (GCV) @ 60°F **587.4** **Btu/ft³ Gross**

Gross Calorific Value (GCV) @ 68°F **578.5** **Btu/ft³ Gross**

Gross Calorific Value (GCV) **8,353** **Btu/lb**

*Btu/lb = Btu/ft³ * ft³/lb*

Gas Fd-Factor @ 60°F **9,310** **DSCF/MMBtu**

$DSCF/MMBtu = 10^6 * ((3.64*\%H_2) + (1.53*\%C) + (0.57*\%S) + (0.14*\%N_2) - (0.46*\%O_2)) / Btu/lb$

Fd-FACTOR CALCULATION

Republic Services Forward Landfill
A-2
Sample ID: **Landfill Gas - LFG-3**
Date: 5/6/2014

	Molecular Weight	Ideal Gas Specific Gravity, G_i	Ideal Gas Total Calorific Value, H_i	Compressibility Summation Factor, $\sqrt{b_i}$	Specific Volume, ft^3/lb	PPM %	Composition Mole Fraction, x_i	Specific Gravity Fraction, x_iG_i	Calorific Value Fraction, x_iH_i	Compressibility Fraction, $x_i\sqrt{b_i}$	x_iMW	Weight Fraction, $\xi_iMW / \sum xiMW$	CARBON Weight Fraction	HYDROGEN Weight Fraction	OXYGEN Weight Fraction	NITROGEN Weight Fraction	SULFUR Weight Fraction	CHONS SUM	Specific Volume, ft^3/lb
Helium‡	4.00	0.1382	0.0	-0.0170		0.0	0.0000	0.0000	0.0	0.0000	0.0000	0.0000							
Hydrogen (H_2) ‡	2.02	0.0696	324.9		187.723	0	0.0000	0.0000	0.0	0.0000	0.0000							0.0000	
Nitrogen	28.01	0.9672	0.0	0.0164	13.443	7.2	0.0720	0.0696	0.0	0.0012	2.0167	0.0758				0.0758		0.0758	1.0185
Oxygen	32.00	1.1053	0.0		11.819	0.6	0.0060	0.0066	0.0	0.0000	0.1920	0.0072			0.0072			0.0072	0.0852
Carbon Monoxide	28.01	0.9671	321.3	0.0217	13.506	0.0	0.0000	0.0000	0.0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000
Carbon Dioxide‡	44.01	1.5194	0.0	0.0640	8.548	34.4	0.3440	0.5227	0.0	0.0220	15.1394	0.5687	0.1552	0.0000	0.4135			0.5687	4.8616
Methane	16.04	0.5539	1012.0	0.0436	23.565	57.8	0.5780	0.3202	584.9	0.0252	9.2711	0.3483	0.2608	0.0875				0.3483	8.2074
Ethane (C2)	30.01	1.0382	1772.9	0.0917	12.455	0	0.0000	0.0000	0.0	0.0000	0.0000	0.0000	0.0000	0.0000				0.0000	0.0000
Propane (C3)	44.09	1.5224	2523.0	0.1342	8.365	40.7	0.0000	0.0000	0.0	0.0000	0.0000	0.0000	0.0000	0.0000				0.0000	0.0000
Isobutane (C4)	58.12	2.0067	3260.1	0.1744	6.321	26.9	0.0000	0.0000	0.0	0.0000	0.0000	0.0000	0.0000	0.0000				0.0000	0.0000
n-Butane	58.12	2.0067	3269.6	0.1825	6.321		0.0000	0.0000	0.0	0.0000	0.0000	0.0000	0.0000	0.0000				0.0000	0.0000
Isopentane (C5)	72.14	2.4910	4009.4	0.2276	5.252	115	0.0000	0.0000	0.0	0.0000	0.0000	0.0000	0.0000	0.0000				0.0000	0.0000
n-Pentane	72.14	2.4910	4018.5	0.2377	5.252		0.0000	0.0000	0.0	0.0000	0.0000	0.0000	0.0000	0.0000				0.0000	0.0000
Hexanes (C6)	86.17	2.9753	4758.0	0.2830	4.398	103	0.0000	0.0000	0.0	0.0000	0.0000	0.0000	0.0000	0.0000				0.0000	0.0000
C6+	86.17	2.9753	4758.0	0.2830	4.398	337	0.0000	0.0000	0.0	0.0000	0.0000	0.0000	0.0000	0.0000				0.0000	0.0000
Total							1.0000	**0.919**	**584.9**	0.0264	26.6193	1.0000	0.4160	0.0875	0.4207	0.0758	0.0000	1.0000	**14.17**
								SG	**Btu/ft³**	$\sum x_i\sqrt{b_i}$	**ΣxiMW**		**41.60%**	**8.75%**	**42.07%**	**7.58%**	**0.00%**		**ft³/lb**

‡ Omitted from Compressibility Factor Calculation

Calculated Specific Gravity (SG) *(Air = 1.000 @ 760mm Hg, 60°F)* **0.919**

Compressibility Factor (Z) **0.9993**

$Z = 1 - [(\sum x_i \sqrt{b_i})^2 + (2x_H \cdot x_H^2)\ (0.0005)]$

Specific Gravity (corrected) **0.920**

Specific Volume, (SV) ft^3/lb **14.17** ft^3/lb

Gross Calorific Value (GCV) @ 60°F **585.3** **Btu/ft³ Gross**

Gross Calorific Value (GCV) @ 68°F **576.5** **Btu/ft³ Gross**

Gross Calorific Value (GCV) **8,296** **Btu/lb**

$Btu/lb = Btu/ft^3 * ft^3/lb$

Gas Fd-Factor @ 60°F **9,308** **DSCF/MMBtu**

$DSCF/MMBtu = 10^6 * ((3.64*\%H_2)+(1.53*\%C)+(0.57*\%S)+(0.14*\%N_2)-(0.46*\%O_2)) / Btu/lb$

SJVAPCD - Appendix G

Three Run Review Sheet

DRAFT COPY - San Joaquin Valley Air Pollution Control District - Testing Contractor's CARB Method 100 Quality Assurance Worksheet

**** All supporting data for this worksheet must also be clearly indicated and labeled on the emission trace chart ****

**** A copy of a this completed worksheet is required for every unit tested and must be included in the Summary Section of the Source Test Report ****

Company Name:	FORWARD	Permit Number:	N-339-17-8				Test Date:	5/6/2014
Unit Name:	FLARE A-2	Average Fuel Rate MSCFD:	4148			Was multipoint sampling required by the District policy?		Yes
Select Test Type:	Non RATA	Fuel BTU/CF, dry, gross(% wt):	586			Highest point for all pollutants above the Run 1 Cavg.%:		913.5%
Permitted MMBtu/hr:	102	Fuel Ffactor @ 68:	9307			Lowest point for all pollutants below the Run 1 Cavg %:		88.0%
Testing Company:	Blue Sky	Estimated Qsd DSCFM:	40018			From above does subsequent runs require multipoint?, >10%, M100 4.5:		Yes
Name of Tester:	Jeramie Richardson	Estimated MMBtu/hr, firing percent :	101.22	99%	OK	Is a PM or EPA Method 6 test included in this test report?		No

2.2 Gas Analyzers	O2			NOx			CO			SO2		
Limit equivalent (LE)as uncorrected ppm:				14			83			83		
Range, Limit equivalent %:	25			25	56%		150	55%		500	17%	
Non RATA; R1 Cavg (0-95%) of r:		53%	OK		51%	OK		10%	OK		59%	OK
RATA; Run 1 Cavg (10%-95%) of r, M100 1.5.1:		N/A	N/A		N/A	N/A		N/A	N/A		N/A	N/A

3 Calibration Gases																
Was EPA Method 205 gas dilution used?, Then identify gas with division symbol M100 3.2:					No											
If 'Yes' above, select the mid-level cal. gas ppm or %, +/-2%, EPA 205:				÷				÷				÷				÷
High-range: (80-100%) of r, Chcal, M100 3.1.1; select if divider used:	20.540	82.2%	OK		22.400	89.6%	OK		124.000	82.7%	OK		453.000	90.6%	OK	
High-range cylinder #, M100 3.1.1:	CC300869		OK		CC424021		OK		CC200170		OK		CC198990		OK	
High-range expiration date:	06/11/20		OK		12/02/16		OK		01/22/21		OK		05/19/22		OK	
Mid-range: (40-60%) of r, Cmcal, M100 3.1.2; indicate if divider used:	14.400	57.6%	OK		12.600	50.4%	OK		85.400	56.9%	OK		228.000	45.6%	OK	
Mid-range cylinder #, M100 3.1.2:	CC218936		OK		CC424138		OK		CC196748		OK		CC128199		OK	
Mid-range expiration date:	08/21/21		OK		08/28/16		OK		06/13/14		OK		04/03/14		X	
Zero cylinder #, M100 3.1.3:	CA02155		OK													

SJVAPCD - Appendix G

Three Run Review Sheet

Pollutant	O2			NOx			CO			SO2		
4.2 Calibration of Continuous Analyzers												
NO2 converter efficiency, Eff%, >90%, M100 2.2.5:				94.60		OK		D3, < 1 ppm:	-0.50			
High-range response (+/-2%) of r, Cauh, M100 4.2:	20.54	0.00%	OK	22.40	0.00%	OK	123.80	-0.13%	OK	455.00	0.40%	OK
Mid-range response (+/-2%) of r, Caum, M100 4.2:	14.55	0.60%	OK	12.60	0.00%	OK	85.40	0.00%	OK	227.00	-0.20%	OK
Zero gas response (+/- 2%) of r, Caz, M100 4.2:	0.00	0.00%	OK	0.11	0.44%	OK	0.30	0.20%	OK	0.00	0.00%	OK
4.3 Pre-Test Leak Check												
Time of leak check, M100 4.3:	7:14		OK									
4.4 Pre-Test System Bias Check (Suggest using both mid and high gases if unsure of emission concentration)												
Initial high-gas (+/-5%) Cibu,M100 6.2,Eq100-2:		---	N/A		---	N/A		---	N/A	450.00	1.00%	OK
Initial mid-gas (+/-5%) Cibu, M100 6.2,Eq100-2:	14.83	-1.12%	OK	12.53	0.28%	OK	85.40	0.00%	OK		---	N/A
Initial zero gas (+/-5%) Cibz, M100 6.2,Eq100-2:	0.44	-1.76%	OK	0.18	-0.28%	OK	-1.00	0.87%	OK	0.00	0.00%	OK
Run 1												
Run 1 start time:	8:51		OK									
Van's voltage, VAC RMS, per policy:	109.00		OK									
5 Sample Collection												
Raw avg, ppm or %, Cavg:	13.22	13.22		12.69	12.69		14.80	14.80		296.00	296.00	
Raw highest, ppm or %, Cmax:	16.83	27.31%		17.74	39.60%		150.00	913.51%		363.40	22.77%	
Raw lowest, ppm or %, Cmin:	10.89	17.62%		5.84	53.98%		4.80	67.57%		5.90	98.01%	
Run1 Cavg as a % of r, M100 4.4:		52.88%			50.76%			9.67%			59.20%	
Select Chcal or Cmcal to become Ccal M100 4.4:	14.400	14.40	OK	12.600	12.60	OK	85.400	85.40	OK	453.000	228.00	X
Cau, M100 6.2:		14.55			12.60			85.40			455.00	
6.1 Zero and Calibration Drift												
Final upscale (+/-3%),Cfbu,Eq 100-1:	14.90	-0.28%	OK	12.54	-0.04%	OK	84.00	0.93%	OK	442.00	1.60%	OK
Final zero (+/-3%),Cfbu,Eq 100-1:	0.56	-0.48%	OK	0.27	-0.36%	OK	-1.30	0.20%	OK	-1.00	0.20%	OK
6.2 Post-Test System Bias Check												
Final upscale (+/-5%),Cfbu,Eq 100-2:		-1.40%	OK		0.24%	OK		0.93%	OK		2.60%	OK
Final zero (+/-5%),Cfbz,Eq 100-2:		-2.24%	OK		-0.64%	OK		1.07%	OK		0.20%	OK
7.1 Pollutant Concentration												
Range(0%-95%):		52.88%	OK		50.76%	OK		9.87%	OK		59.20%	OK
Avg. of Cibu and Cfbu, Cbcal:		14.87			12.54			84.70			446.00	
Avg. of Cibz and Cfbz, Co:		0.50			0.23			-1.15			-0.50	
Cgas, ppm or %:		**12.75**			**12.78**			**15.87**			**300.82**	
Eq 100-5 Cgas@3%:					28.03			34.86			660.70	
Cgas@15%:					9.24			11.49			217.77	

SJVAPCD - Appendix G

Three Run Review Sheet

Pollutant	O2			NOx			CO			SO2		
Run 2												
Run 2 start time:	9:51		OK									
Van's voltage, VAC RMS, per policy:	110.00		OK									
5 Sample Collection												
Raw avg, ppm or %, Cavg:	13.19	13.19		13.54	13.54		20.20	20.20		208.00	208.00	
6.1 Zero and Calibration Drift												
Final upscale (+/-3%),Cfbu,Eq 100-1:	14.85	-0.08%	OK	12.53	0.00%	OK	82.80	1.73%	OK	446.00	0.80%	OK
Final zero (+/-3%),Cfbu,Eq 100-1:	0.37	0.28%	OK	0.33	-0.60%	OK	-1.60	0.40%	OK	-2.00	0.40%	OK
6.2 Post-Test System Bias Check												
Final upscale (+/-5%),Cfbu,Eq 100-2:		-1.20%	OK		0.28%	OK		1.73%	OK		1.80%	OK
Final zero (+/-5%),Cfbz,Eq 100-2:		-1.48%	OK		-0.88%	OK		1.27%	OK		0.40%	OK
7.1 Pollutant Concentration												
Range(0%-95%):		52.76%	OK		54.16%	OK		13.47%	OK		41.60%	OK
Avg. of Cibu and Cfbu, Cbcal:		14.88			12.54			83.40			444.00	
Avg. of Cibz and Cfbz, Co:		0.47			0.30			-1.45			-1.50	
Cgas, ppm or %:		**12.72**			**13.63**			**21.79**			**213.03**	
Eq 100-5 Cgas@3%:					29.83			47.68			466.17	
Cgas@15%:					9.83			15.72			153.65	

Run 3												
Run 3 start time:	10:56		OK									
Van's voltage, VAC RMS, per policy:	110.00		OK									
5 Sample Collection												
Raw avg, ppm or %, Cavg:	13.08	13.08		14.18	14.16		29.40	29.40		197.00	197.00	
6.1 Zero and Calibration Drift												
Final upscale (+/-3%),Cfbu,Eq 100-1:	14.97	-0.56%	OK	12.46	0.28%	OK	83.00	1.60%	OK	443.00	1.40%	OK
Final zero (+/-3%),Cfbu,Eq 100-1:	0.43	0.04%	OK	0.34	-0.64%	OK	-1.90	0.60%	OK	-2.00	0.40%	OK
6.2 Post-Test System Bias Check												
Final upscale (+/-5%),Cfbu,Eq 100-2:		-1.68%	OK		0.56%	OK		1.60%	OK		2.40%	OK
Final zero (+/-5%),Cfbz,Eq 100-2:		-1.72%	OK		-0.92%	OK		1.47%	OK		0.40%	OK
7.1 Pollutant Concentration												
Range(0%-95%):		52.32%	OK		56.64%	OK		19.60%	OK		39.40%	OK
Avg. of Cibu and Cfbu, Cbcal:		14.91			12.50			82.90			444.50	
Avg. of Cibz and Cfbz, Co:		0.40			0.34			-1.75			-2.00	
Cgas, ppm or %:		**12.58**			**14.33**			**31.43**			**201.90**	
Eq 100-5 Cgas@3%:					30.83			67.62			434.38	
Cgas@15%:					10.16			22.29			143.17	

O2% Avg.

- ◉ No Range Changes Occurred. Average From Three Run Review.
- ○ Range Change Occurred After First Run. Average From Run 1 of Three Run Review and Two Run Review.
- ○ Range Change Occurred After Second Run. Average From Runs 1 & 2 From The Three Run Review and One Run Review

NOx Avg.

- ◉ No Range Changes Occurred. Average From Three Run Review.
- ○ Range Change Occurred After First Run. Average From Run 1 of Three Run Review and
- ○ Range Change Occurred After Second Run. Average From Runs 1 & 2 From The Three Run Review and One Run Review.

CO Avg.

- ◉ No Range Change Occurred. Average From Three Run Review.
- ○ Range Change Occurred After First Run. Average From Run 1 of Three Run Review and Two Run Review.
- ○ Range Change Occurred After Second Run. Average From Runs 1 and 2 From The Three Run Review and One Run Review.

SO2 Avg.

- ◉ No Range Change Occurred. Average From Three Run Review.
- ○ Range Change Occurred After First Run. Average From Run 1 of Three Run Review and Two Run Review.
- ○ Range Change Occurred After Second Run. Average From Runs 1 and 2 From The Three Run Review and One Run Review

SJVAPCD - Appendix G

Three Run Review Sheet

Pollutant	O2	NOx	CO	SO2
Est. avg. from 3 runs (not to be used for compliance determination)				
Cgas, ppm or %:	12.7	13.6	23.0	238.6
Eq 100-5 Cgas@3%:		29.6	50.1	520.4
Cgas@15%:		9.7	16.5	171.5
Eq 100-4 lbs/hr:		3.90	4.02	95.23
EPA Eq 19-1 lbs/MMBtu:		0.036	0.037	0.879
g/Bhp-hr:		0.138	0.143	3.378

If permit conditions require source to maintain daily, monthly, quarterly or annual fuel, production or sulfur records then enter the data below. Include copies or a printout of these records in the Operating Data section of the test report.

Fuel or production rate nearest to the day of the test.		Units	Fuel sulfur concentration rate nearest to the day of the test.		Units
Fuel or production rate nearest to 3-months prior to the day of test.			Fuel sulfur concentration rate nearest to 3-months prior to the day of the test.		
Fuel or production rate nearest to 6-months prior to the day of test.			Fuel sulfur concentration rate nearest to 6-months prior to the day of the test.		
Fuel or production rate nearest to 9-months prior to the day of test.			Fuel sulfur concentration rate nearest to 9-months prior to the day of the test.		

Tester's comment area, explain each "X" mark and what actions will be taken to prevent reoccurrence.

The SO2 colum was used for the high span of CO gas.

District Review Code:	1	/

C
Laboratory Reports

Atmospheric Analysis & Consulting, Inc.

CLIENT	: Blue Sky Environmental, Inc.
PROJECT NAME	: FORWARD
AAC PROJECT NO.	: 140693
REPORT DATE	: 5/9/2014

On May 7, 2014, Atmospheric Analysis & Consulting, Inc. received six (6) Tedlar Bags for TNMOC analysis by EPA 25C, ASTM D-1945 analysis, and Total Reduced Sulfur analysis by ASTM D-5504. Also received were six (6) Tedlar Bags for C1-C6+ and TNMOC analysis by EPA 18 Modified. Upon receipt, the samples were assigned unique Laboratory ID numbers as follows:

Client ID	Lab No.	Client ID	Lab No.
A1-1-LFG	140693-70787	A2-1-LFG	140693-70793
A1-2-LFG	140693-70788	A2-2-LFG	140693-70794
A1-3-LFG	140693-70789	A2-3-LFG	140693-70795
A1-1-NMOC	140693-70790	A2-1-NMOC	140693-70796
A1-2-NMOC	140693-70791	A2-2-NMOC	140693-70797
A1-3-NMOC	140693-70792	A2-3-NMOC	140693-70798

EPA 25C Analysis - Up to a 1 mL aliquot of sample is injected into the GC/FID/TCA for analysis following EPA 25C as specified in the SOW.

ASTM D-1945 Analysis - Up to a 1 mL aliquot of sample is injected into the GC/FID/TCD for analysis following ASTM D-1945 as specified in the SOW.

ASTM D-5504 Analysis - Up to a 1 mL aliquot of sample is injected into the GC/SCD for analysis following ASTM D-5504 as specified in the SOW.

EPA 18 Modified Analysis - Up to a 1 mL aliquot of sample is injected into the GC/FID for analysis following EPA 18 Modified as specified in the SOW.

No problems were encountered during receiving, preparation, and/or analysis of these samples. The test results included in this report meet all requirements of the NELAC Standards and/or AAC SOP# AACI- EPA 25C, ASTM D-1945, ASTM D-5504, and EPA 18 Modified.

I certify that this data is technically accurate, complete, and in compliance with the terms and conditions of the contract. The Laboratory Director or his designee, as verified by the following signature, has authorized release of the data contained in this hardcopy data package.

If you have any questions or require further explanation of data results, please contact the undersigned.

Marcus Hueppe
Laboratory Director

This report consists of 12 pages.

ACCREDITED IN ACCORDANCE WITH nelac Certificate #E87837

1534 Eastman Ave., Ste. A • Ventura, • CA 93003 www.aaclab.com • (805) 650-1642 • FAX (805) 650-1644

Atmospheric Analysis & Consulting, Inc.

Laboratory Analysis Report

CLIENT : **Blue Sky Environmental, Inc.**
PROJECT NO. : **140693**
MATRIX : **AIR**

SAMPLING DATE : **05/06/2014**
RECEIVING DATE : **05/07/2014**
ANALYSIS DATE : **05/07-09/2014**
REPORT DATE : **05/09/2014**

ASTM D-1945 & EPA 25C

Client ID	A1-1-LFG	A1-2-LFG	A1-3-LFG
AAC ID	140693-70787	140693-70788	140693-70789
Analyte	Result	Result	Result
H_2	< 1.0 %	< 1.0 %	< 1.0 %
O_2	0.5 %	0.6 %	0.5 %
N_2	5.6 %	6.7 %	6.2 %
CO	< 0.1 %	< 0.1 %	< 0.1 %
CO_2	34.8 %	34.7 %	34.7 %
CH_4	59.0 %	57.9 %	58.5 %
C_2	< 2.5 ppmV	< 2.5 ppmV	< 2.5 ppmV
C_3	41.2 ppmV	34.6 ppmV	40.8 ppmV
C_4	26.9 ppmV	23.5 ppmV	26.4 ppmV
C_5	118 ppmV	101 ppmV	114 ppmV
C_6	106 ppmV	90.5 ppmV	102 ppmV
C_6+	374 ppmV	269 ppmV	338 ppmV
TNMOC (as CH_4)	5,043 ppmV	4,413 ppmV	5,206 ppmV

Client ID	A2-1-LFG	A2-2-LFG	A2-3-LFG
AAC ID	140693-70793	140693-70794	140693-70795
Analyte	Result	Result	Result
H_2	< 1.0 %	< 1.0 %	< 1.0 %
O_2	0.7 %	0.6 %	0.6 %
N_2	7.4 %	7.3 %	7.2 %
CO	< 0.1 %	< 0.1 %	< 0.1 %
CO_2	34.2 %	34.0 %	34.4 %
CH_4	57.7 %	58.0 %	57.8 %
C_2	< 2.5 ppmV	< 2.5 ppmV	< 2.5 ppmV
C_3	39.0 ppmV	39.2 ppmV	40.7 ppmV
C_4	24.0 ppmV	26.3 ppmV	26.9 ppmV
C_5	92.8 ppmV	111 ppmV	115 ppmV
C_6	84.9 ppmV	99.0 ppmV	103 ppmV
C_6+	304 ppmV	322 ppmV	337 ppmV
TNMOC (as CH_4)	4,873 ppmV	5,272 ppmV	5,158 ppmV

All Fixed Gases results have been normalized to 100% on a dry weigh basis.
Sample Reporting Limit (SRL) is equal to Reporting Limit x Analysis Dil. Fac

Marcus Hueppe
Laboratory Director

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Atmospheric Analysis & Consulting, Inc.

LABORATORY ANALYSIS REPORT

CLIENT	**: Blue Sky Environmental, Inc.**	**SAMPLING DATE**	**: 05/06/2014**
PROJECT NO.	**: 140693**	**RECEIVING DATE**	**: 05/07/2014**
MATRIX	**: AIR**	**ANALYSIS DATE**	**: 05/07/2014**
UNITS	**: ppmV**	**REPORT DATE**	**: 05/09/2014**

Total Reduced Sulfur Compounds Analysis by ASTM D-5504

Client ID	A1-1-LFG	A1-2-LFG	A1-3-LFG
AAC ID	140693-70787	140693-70788	140693-70789
Analyte	Result	Result	Result
Hydrogen Sulfide	**34.4 ppmv**	**29.0 ppmv**	**33.1 ppmv**
Carbonyl Sulfide	< 0.100 ppmv	< 0.100 ppmv	< 0.100 ppmv
Sulfur Dioxide	< 0.100 ppmv	< 0.100 ppmv	< 0.100 ppmv
Methyl Mercaptan	**2.97 ppmv**	**2.25 ppmv**	**2.85 ppmv**
Ethyl Mercaptan	< 0.100 ppmv	**0.107 ppmv**	**0.110 ppmv**
Dimethyl Sulfide	**8.40 ppmv**	**6.12 ppmv**	**8.19 ppmv**
Carbon Disulfide	< 0.100 ppmv	< 0.100 ppmv	< 0.100 ppmv
Isopropyl Mercaptan	**0.216 ppmv**	**0.176 ppmv**	**0.218 ppmv**
tert-Butyl Mercaptan	**0.220 ppmv**	**0.172 ppmv**	**0.209 ppmv**
n-Propyl Mercaptan	< 0.100 ppmv	< 0.100 ppmv	< 0.100 ppmv
Methylethylsulfide	< 0.100 ppmv	< 0.100 ppmv	< 0.100 ppmv
sec-Butyl Mercaptan	< 0.100 ppmv	< 0.100 ppmv	< 0.100 ppmv
Thiophene	< 0.100 ppmv	< 0.100 ppmv	< 0.100 ppmv
iso-Butyl Mercaptan	**0.281 ppmv**	**0.233 ppmv**	**0.278 ppmv**
Diethyl Sulfide	< 0.100 ppmv	< 0.100 ppmv	< 0.100 ppmv
n-Butyl Mercaptan	< 0.100 ppmv	< 0.100 ppmv	< 0.100 ppmv
Dimethyl Disulfide	< 0.100 ppmv	< 0.100 ppmv	< 0.100 ppmv
2-Methylthiophene	< 0.100 ppmv	< 0.100 ppmv	< 0.100 ppmv
3-Methylthiophene	< 0.100 ppmv	< 0.100 ppmv	< 0.100 ppmv
Tetrahydrothiophene	< 0.100 ppmv	< 0.100 ppmv	< 0.100 ppmv
Bromothiophene	< 0.100 ppmv	< 0.100 ppmv	< 0.100 ppmv
Thiophenol	< 0.100 ppmv	< 0.100 ppmv	< 0.100 ppmv
Diethyl disulfide	< 0.100 ppmv	< 0.100 ppmv	< 0.100 ppmv
Total Unidentified Sulfur	< 0.100 ppmv	< 0.100 ppmv	< 0.100 ppmv
Total Reduced Sulfurs as H_2S	**46.5 ppmv**	**38.0 ppmv**	**45.0 ppmv**

All compound's concentrations expressed in terms of H_2S (TRS does not include COS and SO_2)
Sample Reporting Limit (SRL) is equal to Reporting Limit x Canister Dil. Fac. x Analysis Dil. Fac.

Marcus Hueppe
Laboratory Director

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Atmospheric Analysis & Consulting, Inc.

LABORATORY ANALYSIS REPORT

CLIENT	**: Blue Sky Environmental, Inc.**	**SAMPLING DATE**	**: 05/06/2014**
PROJECT NO.	**: 140693**	**RECEIVING DATE**	**: 05/07/2014**
MATRIX	**: AIR**	**ANALYSIS DATE**	**: 05/07/2014**
UNITS	**: ppmV**	**REPORT DATE**	**: 05/09/2014**

Total Reduced Sulfur Compounds Analysis by ASTM D-5504

Client ID	A2-1-LFG	A2-2-LFG	A2-3-LFG
AAC ID	140693-70793	140693-70794	140693-70795
Analyte	Result	Result	Result
Hydrogen Sulfide	**32.2 ppmv**	**32.1 ppmv**	**30.0 ppmv**
Carbonyl Sulfide	< 0.100 ppmv	< 0.100 ppmv	< 0.100 ppmv
Sulfur Dioxide	< 0.100 ppmv	< 0.100 ppmv	< 0.100 ppmv
Methyl Mercaptan	**2.96 ppmv**	**2.93 ppmv**	**2.67 ppmv**
Ethyl Mercaptan	< 0.100 ppmv	< 0.100 ppmv	< 0.100 ppmv
Dimethyl Sulfide	**7.96 ppmv**	**7.82 ppmv**	**7.66 ppmv**
Carbon Disulfide	< 0.100 ppmv	< 0.100 ppmv	< 0.100 ppmv
Isopropyl Mercaptan	**0.198 ppmv**	**0.174 ppmv**	**0.188 ppmv**
tert-Butyl Mercaptan	< 0.100 ppmv	< 0.100 ppmv	< 0.100 ppmv
n-Propyl Mercaptan	**0.199 ppmv**	**0.232 ppmv**	**0.184 ppmv**
Methylethylsulfide	< 0.100 ppmv	< 0.100 ppmv	< 0.100 ppmv
sec-Butyl Mercaptan	< 0.100 ppmv	< 0.100 ppmv	< 0.100 ppmv
Thiophene	< 0.100 ppmv	< 0.100 ppmv	< 0.100 ppmv
iso-Butyl Mercaptan	**0.244 ppmv**	**0.239 ppmv**	**0.224 ppmv**
Diethyl Sulfide	< 0.100 ppmv	< 0.100 ppmv	< 0.100 ppmv
n-Butyl Mercaptan	< 0.100 ppmv	< 0.100 ppmv	< 0.100 ppmv
Dimethyl Disulfide	< 0.100 ppmv	< 0.100 ppmv	< 0.100 ppmv
2-Methylthiophene	< 0.100 ppmv	< 0.100 ppmv	< 0.100 ppmv
3-Methylthiophene	< 0.100 ppmv	< 0.100 ppmv	< 0.100 ppmv
Tetrahydrothiophene	< 0.100 ppmv	< 0.100 ppmv	< 0.100 ppmv
Bromothiophene	< 0.100 ppmv	< 0.100 ppmv	< 0.100 ppmv
Thiophenol	< 0.100 ppmv	< 0.100 ppmv	< 0.100 ppmv
Diethyl disulfide	< 0.100 ppmv	< 0.100 ppmv	< 0.100 ppmv
Total Unidentified Sulfur	< 0.100 ppmv	< 0.100 ppmv	< 0.100 ppmv
Total Reduced Sulfurs as H_2S	**43.7 ppmv**	**43.5 ppmv**	**40.9 ppmv**

All compound's concentrations expressed in terms of H_2S (TRS does not include COS and SO_2)
Sample Reporting Limit (SRL) is equal to Reporting Limit x Canister Dil. Fac. x Analysis Dil. Fac.

Marcus Hueppe
Laboratory Director

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Atmospheric Analysis & Consulting, Inc.

LABORATORY ANALYSIS REPORT

CLIENT : Blue Sky Environmental, Inc.
PROJECT NO. : 140693
MATRIX : Air
UNITS : ppmV

SAMPLING DATE : 05/06/2014
RECEIVING DATE : 05/07/2014
ANALYSIS DATE : 05/07-09/2014
REPORT DATE : 05/09/2014

C_1 to C_6+ Hydrocarbons by EPA Method 18 Modified

Client ID	A1-1-NMOC		SRL	A1-2-NMOC		SRL	A1-3-NMOC		SRL	Reporting Limit
AAC ID	140693-70790		(RL x DF's)	140693-70791		(RL x DF's)	140693-70792		(RL x DF's)	(RL)
Analyte	Result	Analysis Dil. Fac.		Result	Analysis Dil. Fac.		Result	Analysis Dil. Fac.		
C_1 (as Methane)	<SRL	1	0.5	<SRL	1	0.5	<SRL	1	0.5	0.5
C_2 (as Ethane)	<SRL	1	0.5	<SRL	1	0.5	<SRL	1	0.5	0.5
C_3 (as Propane)	<SRL	1	0.5	<SRL	1	0.5	<SRL	1	0.5	0.5
C_4 (as Butane)	<SRL	1	0.5	<SRL	1	0.5	<SRL	1	0.5	0.5
C_5 (as Pentane)	<SRL	1	0.5	<SRL	1	0.5	<SRL	1	0.5	0.5
C_6 (as Hexane)	<SRL	1	0.5	<SRL	1	0.5	<SRL	1	0.5	0.5
C_6+ (as Hexane)	2.4	1	0.5	1.1	1	0.5	1.2	1	0.5	0.5
TNMOC as Methane	13.8	1	0.5	6.4	1	0.5	6.7	1	0.5	0.5

Client ID	A2-1-NMOC		SRL	A2-2-NMOC		SRL	A2-3-NMOC		SRL	Reporting Limit
AAC ID	140693-70796		(RL x DF's)	140693-70797		(RL x DF's)	140693-70798		(RL x DF's)	(RL)
Analyte	Result	Analysis Dil. Fac.		Result	Analysis Dil. Fac.		Result	Analysis Dil. Fac.		
C_1	14.4	1	0.5	<SRL	1	0.5	<SRL	1	0.5	0.5
C_2	<SRL	1	0.5	<SRL	1	0.5	<SRL	1	0.5	0.5
C_3	<SRL	1	0.5	<SRL	1	0.5	<SRL	1	0.5	0.5
C_4	<SRL	1	0.5	<SRL	1	0.5	<SRL	1	0.5	0.5
C_5	<SRL	1	0.5	<SRL	1	0.5	<SRL	1	0.5	0.5
C_6	<SRL	1	0.5	<SRL	1	0.5	<SRL	1	0.5	0.5
C_6+	1.4	1	0.5	0.6	1	0.5	0.9	1	0.5	0.5
TNMOC as Methane	8.9	1	0.5	3.4	1	0.5	5.1	1	0.5	0.5

Sample Reporting Limit (SRL) is equal to Reporting Limit (RL) x Canister Dilution Factor x Analysis Dilution Factor (if applicable)

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Atmospheric Analysis & Consulting, Inc.

Quality Control/Quality Assurance Report

Date Analyzed : 05/07/2014
Analyst : ZG
Units : %

Instrument ID : TCD#1
Calb Date : 04/13/2012
Reporting Limit : 0.1%

I - Opening Continuing Calibration Verification - ASTM D-1945/1946

AAC ID	Analyte	H_2	O_2	N_2	CO_2	CH_4	CO
CCV	Spike Conc	10.3	10.5	19.6	10.3	9.9	10.3
	Result	10.3	11.2	22.4	9.2	9.2	9.7
	% Rec *	100.6	107.6	114.1	90.2	93.1	93.7

II - Method Blank - ASTM D-1945/1946

AAC ID	Analyte	H_2	O_2	N_2	CO_2	CH_4	CO
MB	Concentration	ND	ND	ND	ND	ND	ND

III - Laboratory Control Spike & Duplicate - ASTM D-1945/1946

AAC ID	Analyte	H_2	O_2	N_2	CO_2	CH_4	CO
Lab Control Standards	Sample Conc	0.0	0.0	0.0	0.0	0.0	0.0
	Spike Conc	10.3	10.5	19.6	10.3	9.9	10.3
	LCS Result	10.9	11.2	22.5	9.1	9.5	9.9
	LCSD Result	10.0	11.4	22.4	9.9	9.8	10.2
	LCS % Rec *	106.6	107.6	114.9	89.0	95.3	96.0
	LCSD % Rec *	97.3	108.9	114.3	96.6	98.4	99.0
	% RPD ***	9.1	1.2	0.5	8.2	3.2	3.1

IV - Sample & Sample Duplicate - ASTM D-1945/1946

AAC ID	Analyte	H_2	O_2	N_2	CO_2	CH_4	CO
140680-70773	Sample	0.0	0.1	1.6	21.6	33.5	0.0
	Sample Dup	0.0	0.1	1.5	20.9	31.9	0.0
	Mean	0.0	0.1	1.6	21.2	32.7	0.0
	% RPD ***	0.0	18.2	8.8	3.1	4.9	0.0

V - Matrix Spike & Duplicate - ASTM D-1945/1946

AAC ID	Analyte	H_2	N_2	CO_2	CH_4	CO
140680-70773	Sample Conc	0.0	0.8	10.6	16.4	0.0
	Spike Conc	10.3	9.2	10.3	9.9	10.3
	MS Result	11.2	12.1	20.5	28.2	11.2
	MSD Result	10.1	11.0	19.9	27.0	10.3
	MS % Rec **	108.8	122.5	96.7	119.3	108.7
	MSD % Rec **	98.1	111.3	90.7	106.8	99.4
	% RPD ***	10.3	9.6	6.5	11.1	8.9

VI - Closing Continuing Calibration Verification - ASTM D-1945/1946

AAC ID	Analyte	H_2	O_2	N_2	CO_2	CH_4	CO
CCV	Spike Conc	10.3	10.5	19.6	10.3	9.9	10.3
	Result	10.2	10.9	22.0	10.2	10.5	11.0
	% Rec *	99.8	104.3	112.1	99.5	106.0	106.0

** Must be 85-115%*
*** Must be 75-125%*
**** Must be < 25%*
ND = Not Detected
<RL = less than Reporting Limit

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Atmospheric Analysis & Consulting, Inc.

Quality Control/Quality Assurance Report

Date Analyzed : 05/07/2014
Analyst : DJ
Units : ppmv

Instrument ID : FID #3
Calb Date : 01/28/14
Reporting Limit : 0.5 ppmv

I - Opening Continuing Calibration Verification - ASTM D-1945/1946

AAC ID	Analyte	Methane	Ethane	Propane	Butane	Pentane	Hexane
CCV	Spike Conc	106.6	101.5	101.6	102.3	103.5	101.2
	Result	102.8	98.3	98.4	99.3	99.9	96.9
	% Rec *	96.4	96.9	96.9	97.0	96.5	95.7

II - Method Blank - ASTM D-1945/1946

AAC ID	Analyte	Methane	Ethane	Propane	Butane	Pentane	Hexane
MB	Concentration	ND	ND	ND	ND	ND	ND

III - Laboratory Control Spike & Duplicate - ASTM D-1945/1946

AAC ID	Analyte	Methane	Ethane	Propane	Butane	Pentane	Hexane
Lab Control Standards	Sample Conc	0.0	0.0	0.0	0.0	0.0	0.0
	Spike Conc	106.6	101.5	101.6	102.3	103.5	101.2
	LCS Result	102.6	98.6	99.2	99.4	100.5	97.6
	LCSD Result	116.3	100.1	100.3	101.3	102.2	99.7
	LCS % Rec *	96.3	97.1	97.6	97.1	97.1	96.4
	LCSD % Rec *	109.1	98.6	98.8	99.0	98.7	98.5
	% RPD ***	12.5	1.5	1.1	1.9	1.6	2.2

IV - Sample & Sample Duplicate - ASTM D-1945/1946

AAC ID	Analyte	Methane	Ethane	Propane	Butane	Pentane	Hexane
140673-70756	Sample	0.0	0.0	0.0	0.0	0.0	0.0
	Sample Dup	0.0	0.0	0.0	0.0	0.0	0.0
	Mean	0.0	0.0	0.0	0.0	0.0	0.0
	% RPD ***	0.0	0.0	0.0	0.0	0.0	0.0

V - Matrix Spike & Duplicate - ASTM D-1945/1946

AAC ID	Analyte	Methane	Ethane	Propane	Butane	Pentane	Hexane
140673-70756	Sample Conc	0.0	0.0	0.0	0.0	0.0	0.0
	Spike Conc	53.3	50.7	50.8	51.2	51.8	50.6
	MS Result	52.3	50.0	50.3	50.3	51.7	52.0
	MSD Result	52.6	49.9	51.0	51.4	52.4	52.3
	MS % Rec **	98.1	98.6	99.1	98.3	99.9	102.7
	MSD % Rec **	98.7	98.2	100.4	100.4	101.2	103.4
	% RPD ***	0.6	0.4	1.3	2.1	1.3	0.6

VI - Closing Continuing Calibration Verification - ASTM D-1945/1946

AAC ID	Analyte	Methane	Ethane	Propane	Butane	Pentane	Hexane
CCV	Spike Conc	106.6	101.5	101.6	102.3	103.5	101.2
	Result	100.4	95.8	96.5	96.6	96.9	93.3
	% Rec *	94.2	94.4	95.0	94.4	93.6	92.2

** Must be 85-115%*

*** Must be 75-125%*

**** Must be < 25%*

ND = Not Detected

<RL = less than Reporting Limit

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Atmospheric Analysis & Consulting, Inc.

Quality Control/Quality Assurance Report

Date Analyzed : 05/08/2014
Analyst : DJ
Units : ppmv

Instrument ID : FID #3
Calb Date : 01/28/14
Reporting Limit : 0.5 ppmv

I - Opening Continuing Calibration Verification - EPA 18

AAC ID	Analyte	Methane	Ethane	Propane	Butane	Pentane	Hexane
CCV	Spike Conc	106.6	101.5	101.6	102.3	103.5	101.2
	Result	101.1	96.3	96.6	97.6	98.1	95.1
	% Rec *	94.8	94.9	95.1	95.3	94.8	94.0

II - Method Blank - EPA 18

AAC ID	Analyte	Methane	Ethane	Propane	Butane	Pentane	Hexane
MB	Concentration	ND	ND	ND	ND	ND	ND

III - Laboratory Control Spike & Duplicate - EPA 18

AAC ID	Analyte	Methane	Ethane	Propane	Butane	Pentane	Hexane
Lab Control Standards	Sample Conc	0.0	0.0	0.0	0.0	0.0	0.0
	Spike Conc	106.6	101.5	101.6	102.3	103.5	101.2
	LCS Result	106.7	101.6	102.3	103.4	104.3	100.8
	LCSD Result	104.8	100.9	101.3	102.1	102.9	99.6
	LCS % Rec *	100.1	100.1	100.7	101.1	100.8	99.6
	LCSD % Rec *	98.3	99.4	99.8	99.7	99.4	98.4
	% RPD ***	1.8	0.7	0.9	1.3	1.3	1.2

IV -Sample & Sample Duplicate - EPA 18

AAC ID	Analyte	Methane	Ethane	Propane	Butane	Pentane	Hexane
140693-70790	Sample	0.0	0.0	0.0	0.0	0.0	0.0
	Sample Dup	0.0	0.0	0.0	0.0	0.0	0.0
	Mean	0.0	0.0	0.0	0.0	0.0	0.0
	% RPD ***	0.0	0.0	0.0	0.0	0.0	0.0

V - Matrix Spike & Duplicate- EPA 18

AAC ID	Analyte	Methane	Ethane	Propane	Butane	Pentane	Hexane
140693-70790	Sample Conc	0.0	0.0	0.0	0.0	0.0	0.0
	Spike Conc	53.3	50.7	50.8	51.2	51.8	50.6
	MS Result	53.6	50.8	51.1	51.1	51.6	50.1
	MSD Result	54.5	50.9	51.5	51.7	52.1	49.5
	MS % Rec **	100.6	100.1	100.6	100.0	99.7	99.0
	MSD % Rec **	102.2	100.4	101.4	101.1	100.6	97.8
	% RPD ***	1.5	0.3	0.8	1.2	0.9	1.3

VI - Closing Continuing Calibration Verification - EPA 18

AAC ID	Analyte	Methane	Ethane	Propane	Butane	Pentane	Hexane
CCV	Spike Conc	106.6	101.5	101.6	102.3	103.5	101.2
	Result	104.4	99.6	100.5	100.9	101.7	98.6
	% Rec *	97.9	98.2	99.0	98.6	98.3	97.4

** Must be 85-115%*
*** Must be 75-125%*
**** Must be < 25%*
ND = Not Detected
<RL = less than Reporting Limit

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Quality Control/Quality Assurance Report
ASTM D-5504

Date Analyzed: 5/7/2014
Analyst: ZG

Instrument ID: SCD#10
Calb. Date: 1/27/2014

Opening Calibration Verification Standard

	Resp. (area)	Result (ppbV)	% Rec *	% RPD ****
Initial	15013	500	100.0	NA
Duplicate	14947	498	99.6	0.4
Triplicate	14890	496	99.2	0.8

Method Blank

Analyte	Result
H2S	ND

Duplicate Analysis **Sample ID** 140695-70803

Analyte	Sample Result	Duplicate Result	Mean	% RPD ***
H2S	56436.0	52782.1	54609.1	6.7

Matrix Spike & Duplicate **Sample ID** 140695-70803

Analyte	Sample Conc.	Spike Added	MS Result	MSD Result	MS % Rec **	MSD % Rec **	% RPD ***
H2S	273.0	250.0	486.9	473.6	93.1	90.5	2.8

Closing Calibration Verification Standard

Analyte	Std. Conc.	Result (ppbV)	% Rec **
H2S	500.0	459.4	91.9

** Must be 95-105%*
*** Must be 90-110%*
**** Must be < 10%*
***** Must be < 5% RPD from Initial result.*

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Quality Control/Quality Assurance Report

Analysis Date : 05/07/2014
Analyst : DJ
Units : ppmv

Instrument ID: FID#4
Calibration Date: 1/8/2013

I - Opening Calibration Verification Standard - Method 25C

Analyte	xRF	DRF	%RPD*
Propane	42505	40620	4.5

II - TNMOC Response Factor - Method 25C

Analyte	xRF	CV RF	CV dp RF	CV tp RF	Average RF	% RPD***
Propane	42505	40620	41179	39891	40563	4.7

III - Method Blank - Method 25C

AAC ID	Analyte	Sample Result
MB	TNMOC	ND

IV - Laboratory Control Spike & Duplicate - Method 25C

AAC ID	Analyte	Spike Added	LCS Result	LCSD Result	LCS % Rec **	LCSD % Rec **	% RPD***
LCS/LCSD	Propane	54.9	55.0	53.3	100.2	97.1	3.2

V - Closing Calibration Verification Standard - Method 25C

Analyte	xCF	dCF	%RPD*
Propane	42505	39816	6.5

xCF - Average Calibration Factor from Initial Calibration Curve
dCF - Daily Calibration Factor
* Must be <15%
** Must be 90-110 %
*** Must be <20%

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Quality Control/Quality Assurance Report

Analysis Date : 05/08/2014 **Instrument ID:** FID#4
Analyst : DJ **Calibration Date:** 1/8/2013
Units : ppmv

I - Opening Calibration Verification Standard - Method 25C

Analyte	xRF	DRF	%RPD*
Propane	42505	40957	3.7

II - TNMOC Response Factor - Method 25C

Analyte	xRF	CV RF	CV dp RF	CV tp RF	Average RF	% RPD***
Propane	42505	40957	41633	40747	41113	3.3

III - Method Blank - Method 25C

AAC ID	Analyte	Sample Result
MB	TNMOC	ND

IV - Laboratory Control Spike & Duplicate - Method 25C

AAC ID	Analyte	Spike Added	LCS Result	LCSD Result	LCS % Rec **	LCSD % Rec **	% RPD***
LCS/LCSD	Propane	54.9	55.6	54.4	101.3	99.2	2.2

V - Closing Calibration Verification Standard - Method 25C

Analyte	xCF	dCF	%RPD*
Propane	42505	40693	4.4

xCF - Average Calibration Factor from Initial Calibration Curve
dCF - Daily Calibration Factor
* Must be <15%
** Must be 90-110 %
*** Must be <20%

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BLUE SKY ENVIRONMENTAL, INC
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ph/fax 805 650 1642, fax -1644
Contact *Marcus Hueppe*

CHAIN OF CUSTODY RECORD

Project Name: FORWARD

Project #: AAC# 140693

SAMPLE Date	SAMPLE Time	Sample ID (Method-Run-Fraction)	Type/Size of container	Analysis Requested: 25C-M NMOC	ASTM 1945	ASTM 3564	EPA18 NMOC			
		A1-1-LFG 70787	1 L	X	X	X				
		A1-2-LFG 70788	1 L	X	X	X				
		A1-3-LFG 70789	1 L	X	X	X				
		A1-1-NMOC 70790	5 L				X			
		A1-2-NMOC 70791	5 L				X			
		A1-3-NMOC 70792	5 L				X			
		A2-1-LFG 70793	1 L	X	X	X				
		A2-2-LFG 70794	1 L	X	X	X				
		A2-3-LFG 70795	1 L	X	X	X				
		A2-1-NMOC 70796	5 L				X			
		A2-2-NMOC 70797	5 L				X			
		A2-3-NMOC 70798	5 L				X			

All samples submitted to laboratories are accepted on a custodial basis only. Ownership of sample remains with the client submitting the sample. Samples should be held for 90+ days. The laboratory reserves the right to return unused sample portions.

COMMENTS:

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
	1800	5-6		3/9/14	0800

D
Field Data Sheets & DAS Summary

FORWARD
A-1 FLARE

		O_2	CO_2	NOx	CO	
DATE	TIME	%	%	PPM	PPM	
5/6/2014	7:14:41 AM	0.00	0.16	0.11	0.3	
5/6/2014	7:20:42 AM	20.54	12.64	22.64	123.8	INTERNAL LINEARITY
5/6/2014	7:31:43 AM	14.55	8.40	12.43	85.4	
5/6/2014	11:40:51 AM	14.97	8.41	0.34	-1.9	
5/6/2014	11:44:52 AM	0.43	0.10	12.46		EXTERNAL BIAS
5/6/2014	11:49:53 AM				83.0	

RUN 1		O_2	CO_2	NOx	CO
DATE	TIME	%	%	PPM	PPM
5/6/2014	12:09:56 PM	11.00	8.88	19.16	15.9
5/6/2014	12:10:57 PM	12.05	8.21	19.24	4.2
5/6/2014	12:11:57 PM	13.00	7.35	15.93	2.2
5/6/2014	12:12:57 PM	13.09	7.19	15.01	3.5
5/6/2014	12:13:57 PM	12.99	7.25	15.33	2.2
5/6/2014	12:14:57 PM	13.22	7.22	14.94	3.0
5/6/2014	12:15:57 PM	13.37	7.07	14.42	2.6
5/6/2014	12:16:58 PM	13.10	7.11	14.33	1.9
5/6/2014	12:17:58 PM	12.57	7.72	15.46	1.3
5/6/2014	12:18:58 PM	12.60	7.64	15.13	1.2
5/6/2014	12:19:58 PM	12.96	7.35	14.15	1.4
5/6/2014	12:20:58 PM	13.00	7.42	14.10	0.9
5/6/2014	12:21:58 PM	13.06	7.20	13.64	0.7
5/6/2014	12:22:59 PM	13.07	7.25	13.65	2.2
5/6/2014	12:23:59 PM	13.52	6.94	13.23	0.6
5/6/2014	12:24:59 PM	13.25	7.17	13.41	-0.6
PORT CHANGE					
5/6/2014	12:35:01 PM	12.74	7.49	15.08	1.4
5/6/2014	12:36:01 PM	12.85	7.54	15.18	1.0
5/6/2014	12:37:01 PM	12.81	7.41	14.98	1.5
5/6/2014	12:38:01 PM	12.52	7.74	15.77	0.7
5/6/2014	12:39:01 PM	12.65	7.72	15.66	0.6
5/6/2014	12:40:02 PM	12.82	7.52	15.14	0.6
5/6/2014	12:41:02 PM	13.19	7.34	14.00	0.0
5/6/2014	12:42:02 PM	13.11	7.18	13.05	-0.5
5/6/2014	12:43:02 PM	13.01	7.48	13.64	-0.9
5/6/2014	12:44:02 PM	13.35	7.06	12.64	1.6
5/6/2014	12:45:02 PM	12.97	7.29	13.32	0.3
5/6/2014	12:46:03 PM	12.53	7.68	14.23	-1.5
5/6/2014	12:47:03 PM	12.17	8.01	15.14	-1.7
5/6/2014	12:48:03 PM	12.12	8.18	15.53	-1.8
5/6/2014	12:49:03 PM	12.31	8.12	15.13	0.1
5/6/2014	12:50:03 PM	12.73	7.85	14.57	1.3
AVERAGE		**12.80**	**7.52**	**14.82**	**1.3**

5/6/2014	12:55:04 PM	14.88	8.40	0.27	-2.1
5/6/2014	1:00:05 PM	0.50	0.12	12.69	
5/6/2014	1:03:06 PM				82.7

RUN 2	O_2	CO_2	NOx	CO
TIME	%	%	PPM	PPM
1:07:06 PM	12.57	7.60	14.77	0.9
1:08:06 PM	12.53	7.53	14.63	0.8
1:09:07 PM	12.33	7.75	15.00	0.2
1:10:07 PM	12.52	7.71	14.88	0.2
1:11:07 PM	12.26	7.72	14.91	0.2
1:12:07 PM	12.19	8.03	15.58	0.2
1:13:07 PM	12.34	7.70	14.92	0.3
1:14:08 PM	12.28	7.87	15.17	0.5
1:15:08 PM	13.06	7.32	13.92	1.2
1:16:08 PM	13.63	6.67	12.21	8.3
1:17:08 PM	13.20	6.94	12.62	3.7
1:18:08 PM	12.61	7.48	13.94	-0.1
1:19:08 PM	12.21	7.96	15.22	-1.1
1:20:09 PM	12.52	7.76	14.82	-1.0
1:21:09 PM	12.39	7.71	14.79	-1.1
1:22:09 PM	12.47	7.78	14.78	-1.3
PORT CHANGE				
1:35:11 PM	12.64	7.44	14.53	-0.4
1:36:11 PM	12.83	7.42	14.35	-0.4
1:37:12 PM	12.83	7.27	14.20	-0.1
1:38:12 PM	12.52	7.52	14.73	-0.4
1:39:12 PM	12.41	7.58	14.81	-0.3
1:40:12 PM	12.88	7.42	14.14	-0.1
1:41:12 PM	13.10	7.07	13.13	1.3
1:42:12 PM	13.40	6.97	12.61	2.2
1:43:13 PM	13.54	6.62	11.71	9.3
1:44:13 PM	12.88	7.19	12.99	0.6
1:45:13 PM	13.18	7.17	13.28	-1.2
1:46:13 PM	13.06	7.03	12.64	-0.8
1:47:13 PM	12.37	7.65	14.03	-0.9
1:48:13 PM	12.37	7.77	14.51	-1.5
1:49:14 PM	12.41	7.69	14.10	-0.4
1:50:14 PM	13.38	7.13	13.79	0.2
AVERAGE	**12.72**	**7.45**	**14.12**	**0.6**

1:55:15 PM	14.78	8.36	0.15	-1.9
1:59:15 PM	0.42	0.09	12.57	
2:03:16 PM				85.1

RUN 3	O_2	CO_2	NOx	CO
TIME	%	%	PPM	PPM
2:08:17 PM	12.62	7.24	14.56	0.1
2:09:17 PM	12.62	7.34	14.83	-0.4
2:10:17 PM	12.43	7.37	15.09	-0.6
2:11:17 PM	12.38	7.51	15.29	-0.6
2:12:18 PM	12.69	7.42	14.79	-0.3
2:13:18 PM	12.97	7.06	14.01	1.3
2:14:18 PM	13.13	6.85	13.46	3.4
2:15:18 PM	12.69	7.12	14.11	0.9
2:16:18 PM	12.46	7.36	14.53	-0.2
2:17:18 PM	12.67	7.33	14.23	-0.2
2:18:19 PM	13.05	7.00	13.29	0.5
2:19:19 PM	12.75	7.11	13.16	5.1
2:20:19 PM	12.10	7.77	14.96	0.3
2:21:19 PM	12.80	7.13	14.10	-1.3
2:22:19 PM	12.16	7.68	14.80	-1.3
2:23:20 PM	12.20	7.71	15.02	-0.9
PORT CHANGE				
2:31:21 PM	12.71	7.16	13.43	-1.2
2:32:21 PM	12.59	7.42	14.96	-0.3
2:33:21 PM	12.86	7.13	14.22	0.7
2:34:21 PM	12.64	7.16	14.51	-0.3
2:35:22 PM	12.30	7.44	15.10	-0.9
2:36:22 PM	12.56	7.44	15.06	-0.4
2:37:22 PM	12.87	7.08	14.08	0.8
2:38:22 PM	12.89	7.05	13.77	0.5
2:39:22 PM	12.70	7.09	13.83	-0.1
2:40:23 PM	12.47	7.52	14.25	-0.8
2:41:23 PM	12.30	7.51	14.37	-1.0
2:42:23 PM	12.22	7.77	15.16	-0.7
2:43:23 PM	12.41	7.44	14.31	0.8
2:44:23 PM	12.36	7.60	14.65	-0.8
2:45:23 PM	12.45	7.34	13.75	0.4
2:46:24 PM	12.23	7.76	15.11	-1.0
AVERAGE	**12.57**	**7.34**	**14.40**	**0.1**

2:54:25 PM	14.64	8.32	0.12	-1.8
2:58:26 PM	0.32	0.09	12.61	
3:02:26 PM				85.3

FORWARD

A-2 FLARE

		O_2	CO_2	NOx	CO-LO	CO-HI	
DATE	TIME	%	%	PPM	PPM	PPM	
5/6/2014	7:14:41 AM	0.00	0.16	0.11	0.3	0	INTERNAL LINEARITY
5/6/2014	7:20:42 AM	20.54	12.64	22.64	123.8		
5/6/2014	7:31:43 AM	14.55	8.40	12.43	85.4		
5/6/2014	8:21:51 AM					455	
5/6/2014	8:27:53 AM					227	
5/6/2014	8:31:53 AM	14.83	8.54	0.18	-1.0	-1	EXTERNAL BIAS
5/6/2014	8:35:54 AM	0.44	0.07	12.53			
5/6/2014	8:40:55 AM				85.4		
5/6/2014	8:45:56 AM					450	

RUN 1		O_2	CO_2	NOx	CO-LO	CO-HI
DATE	TIME	%	%	PPM	PPM	PPM
5/6/2014	8:51:57 AM	13.16	6.96	14.86	17.6	~~21~~
5/6/2014	8:52:57 AM	13.13	6.97	14.78	18.1	~~21~~
5/6/2014	8:53:57 AM	12.88	7.11	15.38	18.4	~~22~~
5/6/2014	8:54:57 AM	12.81	7.28	15.48	19.7	~~23~~
5/6/2014	8:55:57 AM	12.61	7.39	15.70	18.4	~~22~~
5/6/2014	8:56:58 AM	12.53	7.64	15.68	17.3	~~20~~
5/6/2014	8:57:58 AM	12.01	7.93	16.05	17.0	~~20~~
5/6/2014	8:58:58 AM	11.94	8.39	14.97	13.1	~~16~~
5/6/2014	8:59:58 AM	12.54	7.84	13.62	19.1	~~22~~
5/6/2014	9:00:58 AM	13.01	7.44	12.23	47.6	~~53~~
5/6/2014	9:01:58 AM	13.64	6.91	11.07	~~107.6~~	136
5/6/2014	9:02:59 AM	14.04	6.52	9.80	~~150.0~~	306
5/6/2014	9:03:59 AM	14.26	6.34	9.35	~~150.0~~	353
5/6/2014	9:04:59 AM	14.34	6.13	9.02	~~150.0~~	323
5/6/2014	9:05:59 AM	14.43	6.16	8.72	~~150.0~~	363
5/6/2014	9:06:59 AM	14.34	6.12	9.08	~~150.0~~	296
PORT CHANGE						
5/6/2014	9:14:36 AM	16.83	3.54	5.84	17.3	~~20~~
5/6/2014	9:15:36 AM	13.18	7.13	11.90	32.4	~~37~~
5/6/2014	9:16:36 AM	13.11	7.38	12.67	10.8	~~13~~
5/6/2014	9:17:36 AM	13.07	7.20	12.48	6.4	~~8~~
5/6/2014	9:18:36 AM	13.17	7.27	12.47	6.9	~~8~~
5/6/2014	9:19:36 AM	13.31	7.15	11.94	9.5	~~11~~
5/6/2014	9:20:36 AM	13.53	7.04	11.55	12.5	~~15~~
5/6/2014	9:21:36 AM	13.48	6.88	11.40	15.9	~~19~~
5/6/2014	9:22:37 AM	11.46	8.61	14.89	10.6	~~13~~
5/6/2014	9:23:37 AM	10.89	9.36	17.74	6.5	~~8~~
5/6/2014	9:24:37 AM	11.87	8.57	16.29	4.8	~~6~~
5/6/2014	9:25:37 AM	12.39	7.96	14.67	7.1	~~9~~
5/6/2014	9:26:37 AM	13.46	7.17	12.82	5.8	~~7~~
5/6/2014	9:27:37 AM	14.13	6.45	10.79	7.7	~~9~~
5/6/2014	9:28:38 AM	13.67	6.80	11.42	7.2	~~9~~
5/6/2014	9:29:38 AM	13.76	6.88	11.40	18.4	~~22~~
AVERAGE		**13.22**	**7.14**	**12.69**	**14.9**	**296**
		RELAVENT MINUTES			**26**	**6**

5/6/2014	9:33:38 AM	14.90	8.58	0.27	-1.3	-1
5/6/2014	9:37:39 AM	0.56	0.10	12.54		
5/6/2014	9:42:31 AM				84.0	
5/6/2014	9:46:32 AM					443

RUN 2	O_2	CO_2	NOx	CO-LO	CO-HI
TIME	%	%	PPM	PPM	PPM
9:51:32 AM	13.28	6.98	14.36	20.1	~~24~~
9:52:33 AM	12.31	7.82	16.50	15.2	~~18~~
9:53:33 AM	11.99	8.26	18.05	12.5	~~15~~
9:54:33 AM	11.75	8.28	18.20	12.8	~~15~~
9:55:33 AM	12.33	8.01	17.68	12.7	~~15~~
9:56:33 AM	13.21	7.18	15.13	13.7	~~16~~
9:57:33 AM	13.35	7.02	14.20	17.4	~~21~~
9:58:34 AM	13.39	6.98	13.82	20.1	~~24~~
9:59:34 AM	13.01	7.20	13.93	18.1	~~22~~
10:00:34 AM	11.46	8.68	17.58	14.1	~~17~~
10:01:34 AM	11.53	8.83	18.51	8.6	~~10~~
10:02:34 AM	12.70	7.79	15.82	11.3	~~14~~
10:03:34 AM	13.49	7.11	13.68	42.8	~~48~~
10:04:35 AM	14.04	6.59	12.04	35.6	~~40~~
10:05:35 AM	13.97	6.54	11.77	32.5	~~37~~
10:06:35 AM	13.46	7.11	12.93	42.7	~~48~~
PORT CHANGE					
10:14:36 AM	14.05	6.10	10.71	6.6	~~8~~
10:15:37 AM	13.18	7.32	13.46	14.2	~~17~~
10:16:37 AM	13.23	7.17	13.31	8.6	~~10~~
10:17:37 AM	13.08	7.32	13.25	6.3	~~8~~
10:18:37 AM	12.81	7.54	13.29	4.5	~~6~~
10:19:37 AM	12.65	7.86	13.68	4.2	~~5~~
10:20:37 AM	12.86	7.67	13.00	6.0	~~7~~
10:21:38 AM	12.68	7.75	13.36	8.9	~~11~~
10:22:38 AM	12.93	7.70	13.20	9.7	~~12~~
10:23:38 AM	13.42	7.18	11.95	48.4	~~53~~
10:24:38 AM	13.92	6.85	11.02	98.0	~~103~~
10:25:38 AM	14.10	6.64	10.37	~~139.3~~	154
10:26:38 AM	14.30	6.50	9.93	~~150.0~~	225
10:27:39 AM	14.63	6.13	8.96	~~150.0~~	325
10:28:39 AM	14.32	6.37	9.94	~~144.1~~	174
10:29:39 AM	14.50	6.32	9.76	~~149.1~~	164
AVERAGE	**13.19**	**7.28**	**13.54**	**20.2**	**208**
	RELAVENT MINUTES			**27**	**5**

10:36:40 AM	14.85	8.45	0.33	-1.6	-2
10:41:41 AM	0.37	0.06	12.53		
10:45:42 AM				82.8	
10:50:43 AM					446

RUN 3	O_2	CO_2	NOx	CO-LO	CO-HI
TIME	%	%	PPM	PPM	PPM
10:56:44 AM	13.83	6.57	14.23	61.3	~~68~~
10:57:44 AM	13.74	6.22	13.59	22.6	~~27~~
10:58:44 AM	12.47	7.64	16.29	8.6	~~11~~
10:59:44 AM	12.60	7.43	15.70	5.3	~~7~~
11:00:44 AM	12.37	7.60	16.10	5.6	~~7~~
11:01:45 AM	12.54	7.63	15.92	6.0	~~7~~
11:02:45 AM	12.37	7.60	15.82	5.5	~~7~~
11:03:45 AM	12.71	7.54	15.41	7.2	~~9~~
11:04:45 AM	12.63	7.52	15.61	9.1	~~11~~
11:05:45 AM	13.10	7.24	14.55	15.5	~~19~~
11:06:45 AM	13.49	6.96	13.53	65.4	~~72~~
11:07:46 AM	13.54	6.68	12.48	150.0	~~227~~
11:08:46 AM	13.56	6.93	13.28	78.4	~~86~~
11:09:46 AM	14.03	6.51	11.97	92.5	~~102~~
11:10:46 AM	14.10	6.32	11.14	~~150.0~~	180
11:11:46 AM	14.20	6.30	10.81	~~150.0~~	213
PORT CHANGE					
11:17:47 AM	15.86	4.61	8.02	56.5	~~63~~
11:18:48 AM	15.23	4.93	9.39	10.3	~~13~~
11:19:48 AM	12.29	7.72	15.06	1.9	~~2~~
11:20:48 AM	11.85	8.24	17.58	2.3	~~3~~
11:21:48 AM	11.77	8.25	17.76	2.6	~~3~~
11:22:48 AM	11.87	8.22	17.88	3.3	~~4~~
11:23:48 AM	12.76	7.51	15.86	4.8	~~6~~
11:24:49 AM	13.08	7.14	13.91	7.8	~~10~~
11:25:49 AM	13.32	7.13	12.60	8.4	~~10~~
11:26:49 AM	13.02	7.13	12.53	7.5	~~9~~
11:27:49 AM	11.57	8.49	15.86	4.8	~~6~~
11:28:49 AM	11.46	8.73	17.52	5.6	~~7~~
11:29:49 AM	12.49	7.84	15.56	17.6	~~21~~
11:30:50 AM	13.11	7.35	13.93	34.7	~~40~~
11:31:50 AM	13.78	6.70	11.87	64.4	~~71~~
11:32:50 AM	13.89	6.62	11.37	115.0	~~123~~
AVERAGE	**13.08**	**7.17**	**14.16**	**29.4**	**197**
	RELAVENT MINUTES			**30**	**2**

11:40:51 AM	14.97	8.41	0.34	-1.9	-2
11:44:52 AM	0.43	0.10	12.46		
11:49:53 AM				83.0	
11:56:54 AM					~~443~~

BLUE SKY ENVIRONMENTAL, INC

Method 2 - Stack Gas Volumetric Flow Rate Determination

Facility: RS - FORWARD		Location: LFG INLET A-1	
Date: 5-6-14	Personnel: JR	Barometric (P_{bar}), "Hg: 29.9	
Pitot Factor (C_p): 0.99	Pitot #: 18" STD	Stack Dia. (D_s), ": 9.5	De = 2(LW)/(L+W) =
Thermocouple #: ADM	Mag / Incline #: ADM TLOC	Stack Area ft² (A_s): 0.49	
Assumed %O_2: —	Actual %O_2: —	Port Diameter ": 0.5"	
Assumed %CO_2: —	Actual %CO_2: —	Port Depth ": —	
Assumed %CO: —	Actual %CO: —	Downstream to port: 78	
Assumed %H_2O: —	Actual %H_2O: —	Upstream to port: 32	
Pitot Leak Check (15sec @ >3"H_2O) : ✓		Cyclonic Flow Check: ✓	

			RUN # 1	TIME 1145	STATIC -8.78	RUN # 2	TIME 1300	STATIC -8.91	RUN # 3	TIME 1400	STATIC -8.93
Port ID & Point #	Point Location Inches		Stack Temp °F, (ts)	ΔP "H_2O	√ΔP "H_2O	Stack Temp °F, (ts)	ΔP "H_2O	√ΔP "H_2O	Stack Temp °F, (ts)	ΔP "H_2O	√ΔP "H_2O
1	0.5		73	0.4147	0.6440	74	0.3965	0.5846	76	0.3547	0.5972
2	1.4			0.4335	0.6584		0.4249	0.6517		0.4102	0.6405
3	2.8			0.4826	0.6577		0.4408	0.6639		0.4441	0.6664
4	6.7			0.4494	0.6704		0.4391	0.6626		0.4485	0.6697
5	8.1			0.3914	0.6256		0.4142	0.6436		0.4231	0.6505
6	9.0			0.3593	0.5994		0.3838	0.5778		0.3663	0.6052
				0.3187	0.5645		0.3285	0.5731		0.3485	0.5861
				0.3955	0.6289		0.3884	0.6232		0.3779	0.6147
				0.4511	0.6716		0.4411	0.6664		0.4428	0.6658
				0.4384	0.6621		0.4612	0.6791		0.4299	0.6557
				0.4355	0.6599		0.4438	0.6662		0.4214	0.6492
				0.4224	0.6499		0.4169	0.6457		0.4041	0.6357
AVERAGES					0.6910			0.6368			0.6364

Ps = Pb + (Pstatic/13.6)	ft/sec	ft/sec	ft/sec
Vs = 85.49 * Cp * √ΔP * √[(Ts + 460) / (Ps x MWs)]	ACFM	ACFM	ACFM
ACFM = 60 * Vs * As	DSCFM	DSCFM	DSCFM
DSCFM = 60 (1 Bwo) * Vs * As * (Tstd + 460)/(Ts + 460) * (Ps/29.92)			

Comments: (e.g.: cycling, pulsing, diagram or process info.)

BLUE SKY ENVIRONMENTAL, INC

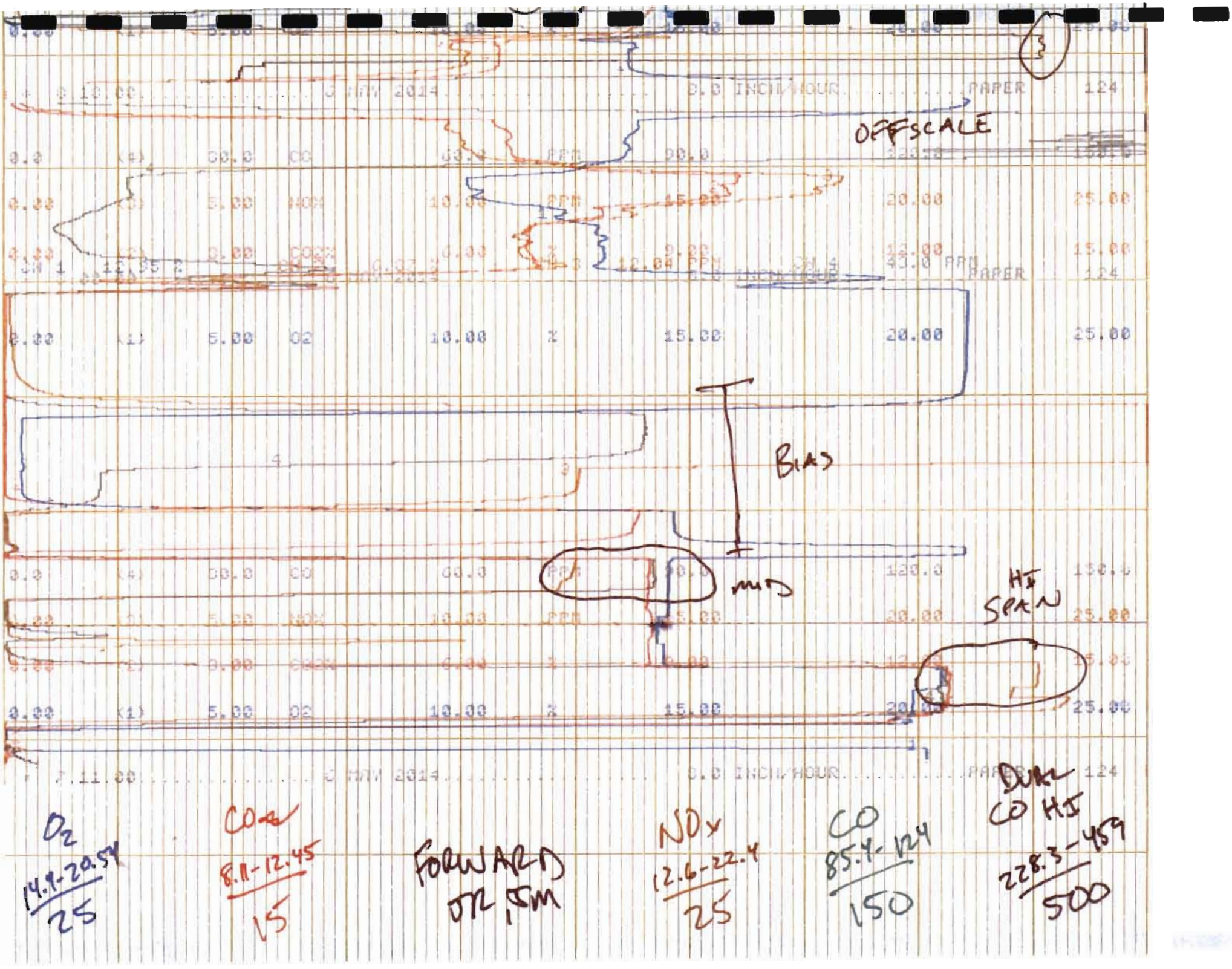
Method 2 - Stack Gas Volumetric Flow Rate Determination

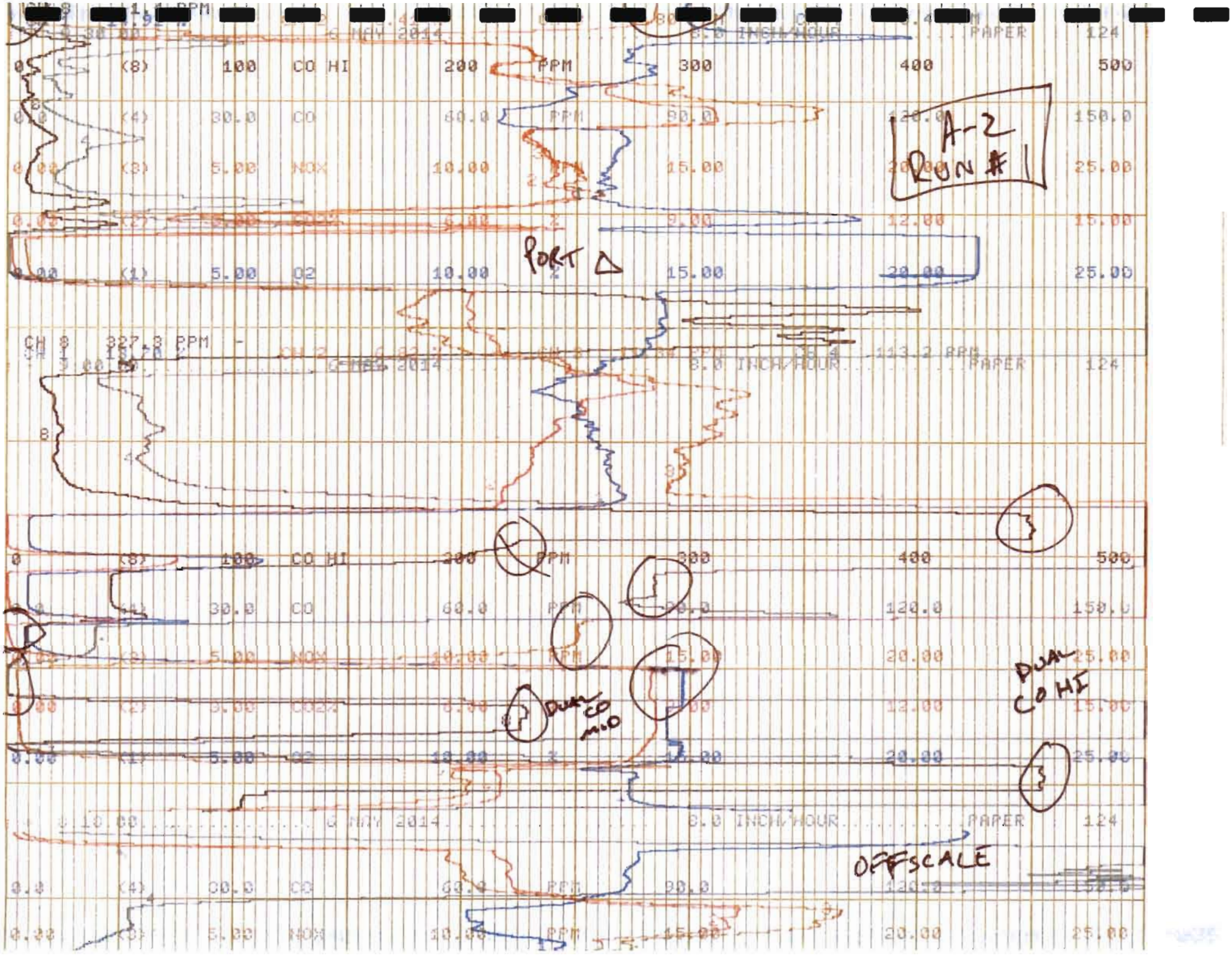
Facility: RS-FORWARD		Location: LFG INLET A-2	
Date: 5-6-14	Personnel: JR	Barometric (P_{bar}), "Hg: 29.9	
Pitot Factor (C_p): 0.99	Pitot #: 18" STD	Stack Dia. (D_s), ": 9.5	Dc = 2(LW)/(L+W) =
Thermocouple #: ADM	Mag / Incline #: ADM 860C	Stack Area ft^2 (A_s): 0.49	
Assumed $\%O_2$: —	Actual $\%O_2$: —	Port Diameter ": 0.5	
Assumed $\%CO_2$: —	Actual $\%CO_2$: —	Port Depth ": —	
Assumed %CO: —	Actual %CO: —	Downstream to port: 78	
Assumed $\%H_2O$: —	Actual $\%H_2O$: —	Upstream to port: >2	
Pitot Leak Check (15sec @ >3"H_2O) : ✓		Cyclonic Flow Check: ✓	

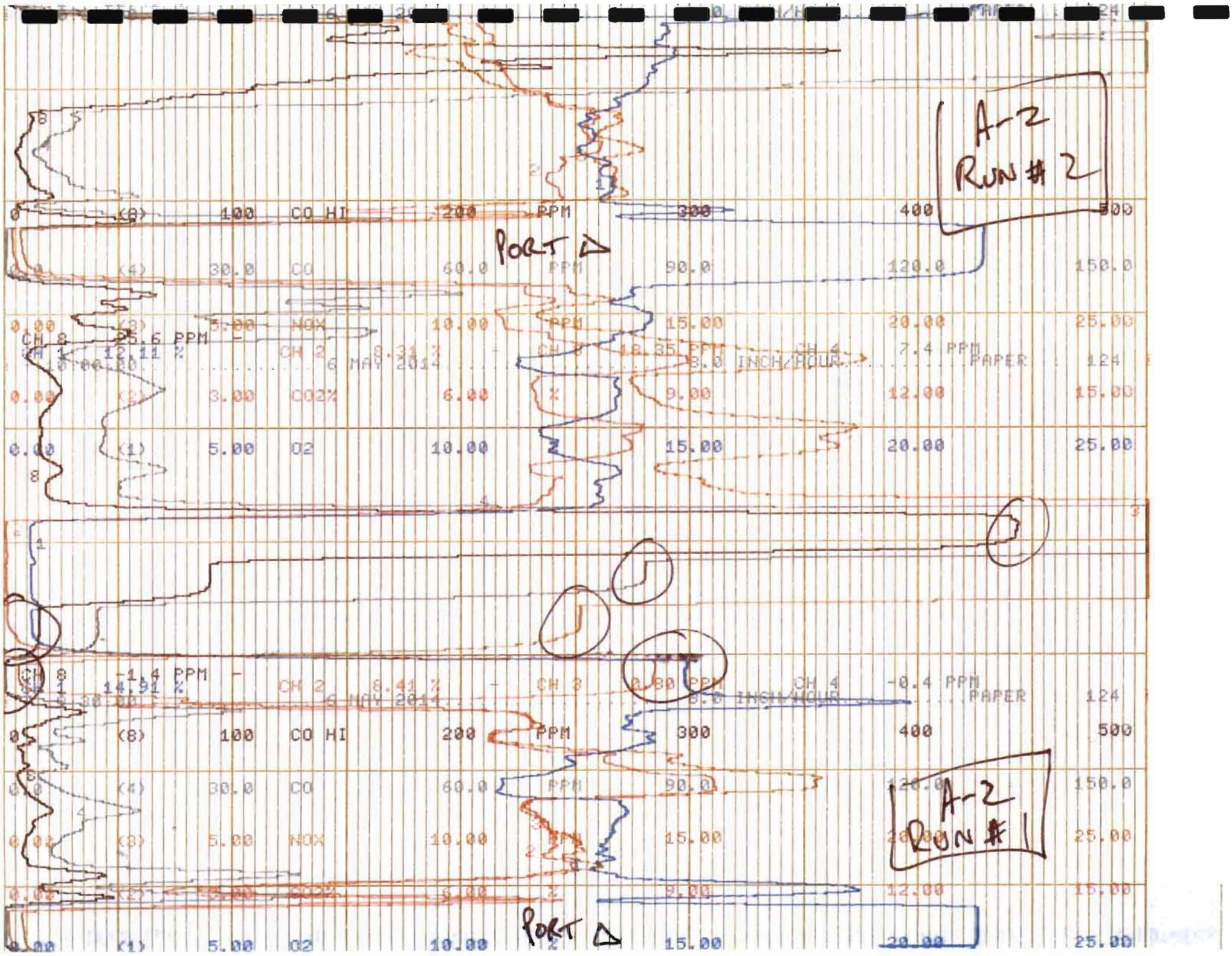
			RUN # 1	TIME 0900	STATIC -45.91	RUN # 2	TIME 1000.	STATIC -45.05	RUN # 3	TIME 1100	STATIC -44.91
Port ID & Point #	Point Location Inches		Stack Temp °F, (ts)	ΔP "H_2O	√ΔP "H_2O	Stack Temp °F, (ts)	ΔP "H_2O	√ΔP "H_2O	Stack Temp °F, (ts)	ΔP "H_2O	√ΔP "H_2O
1	0.5		62	2.242	1.497	67	2.211	1.487	68	2.294	1.515
2	1.4			2.415	1.554		2.339	1.529		2.377	1.542
3	2.8			2.499	1.581		2.513	1.585		2.495	1.580
4	6.7			2.502	1.582		2.559	1.600		2.552	1.597
5	8.1			2.492	1.563		2.432	1.559		2.508	1.584
6	9.0			2.391	1.546		2.373	1.540		2.386	1.545
				2.313	1.521		2.286	1.510		2.274	1.508
				2.379	1.542		2.393	1.547		2.366	1.538
				2.451	1.566		2.442	1.563		2.414	1.554
				2.485	1.576		2.418	1.555		2.485	1.576
				2.552	1.597		2.431	1.559		2.407	1.551
				2.308	1.519		2.364	1.538		2.311	1.520
AVERAGES					1.554			1.548			1.551
$P_s = P_b + (P_{static}/13.6)$			ft/sec			ft/sec			ft/sec		
$V_s = 85.49 * C_p * \sqrt{\Delta P} * \sqrt{((T_s + 460) / (P_s \times MW_s))}$			ACFM			ACFM			ACFM		
$ACFM = 60 * V_s * A_s$			DSCFM			DSCFM			DSCFM		
$DSCFM = 60 (1 - B_{ws}) * V_s * A_s * (T_{std} + 460)/(T_s + 460) * (P_s/29.92)$											

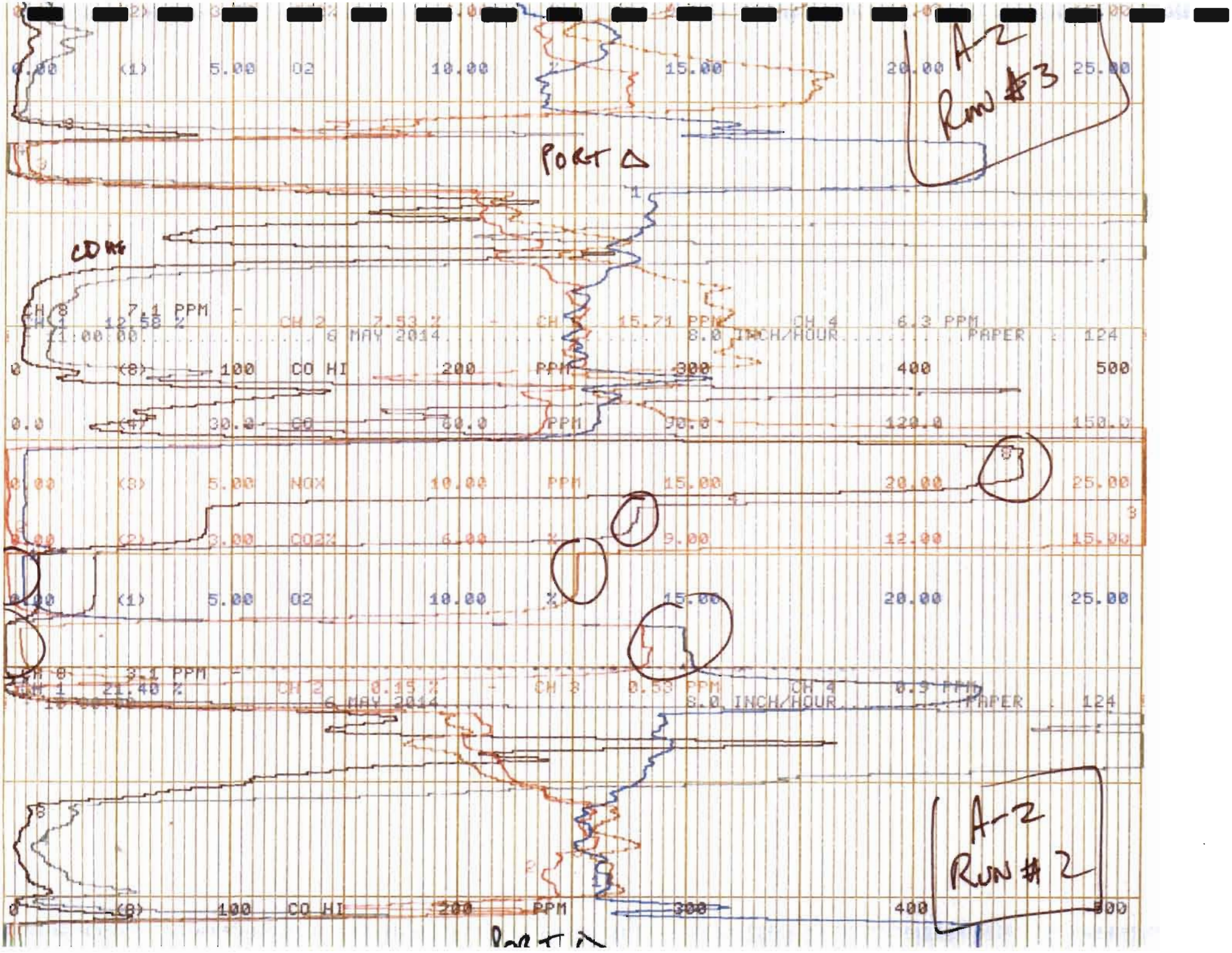
Comments: (e.g.: cycling, pulsing, diagram or process info.)

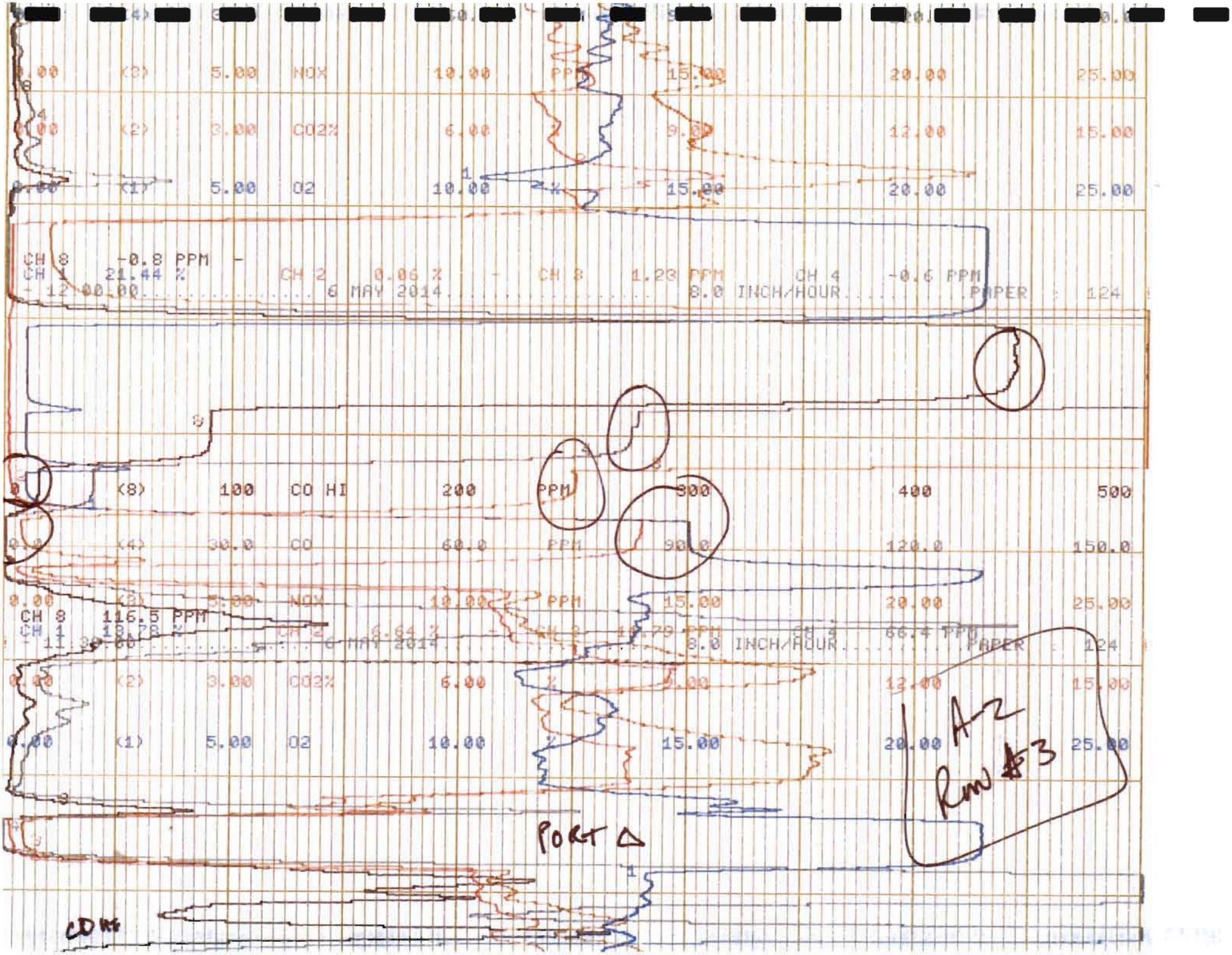
E
Strip Charts

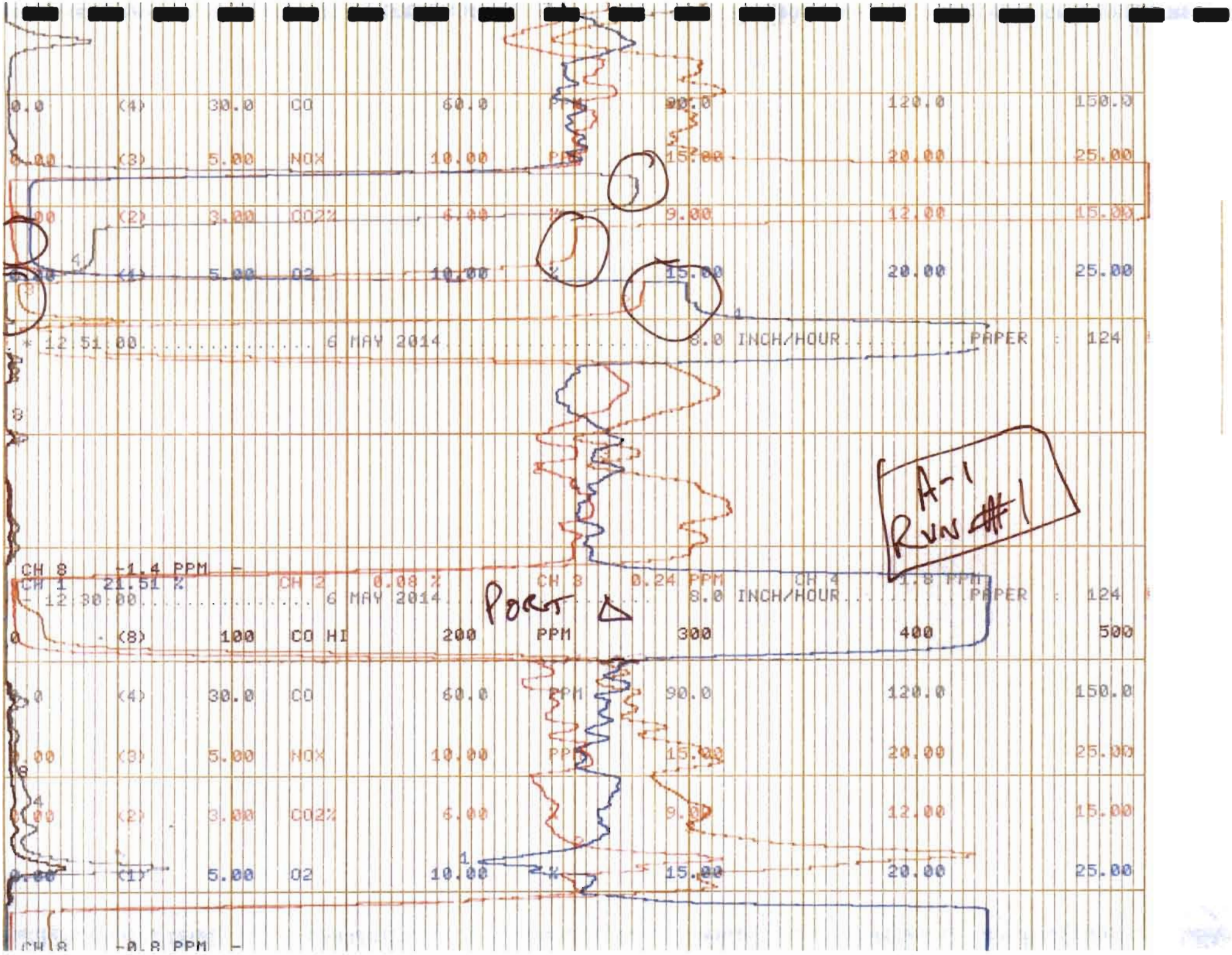

OFFSCALE
BIAS
MID
HI SPAN
O2
14.1-20.5%
25
CO2
8.11-12.45
15
FORWARD
O2 FM
NOx
12.6-22.4
25
CO
85.4-124
150
DUAL CO HI
228.3-459
500

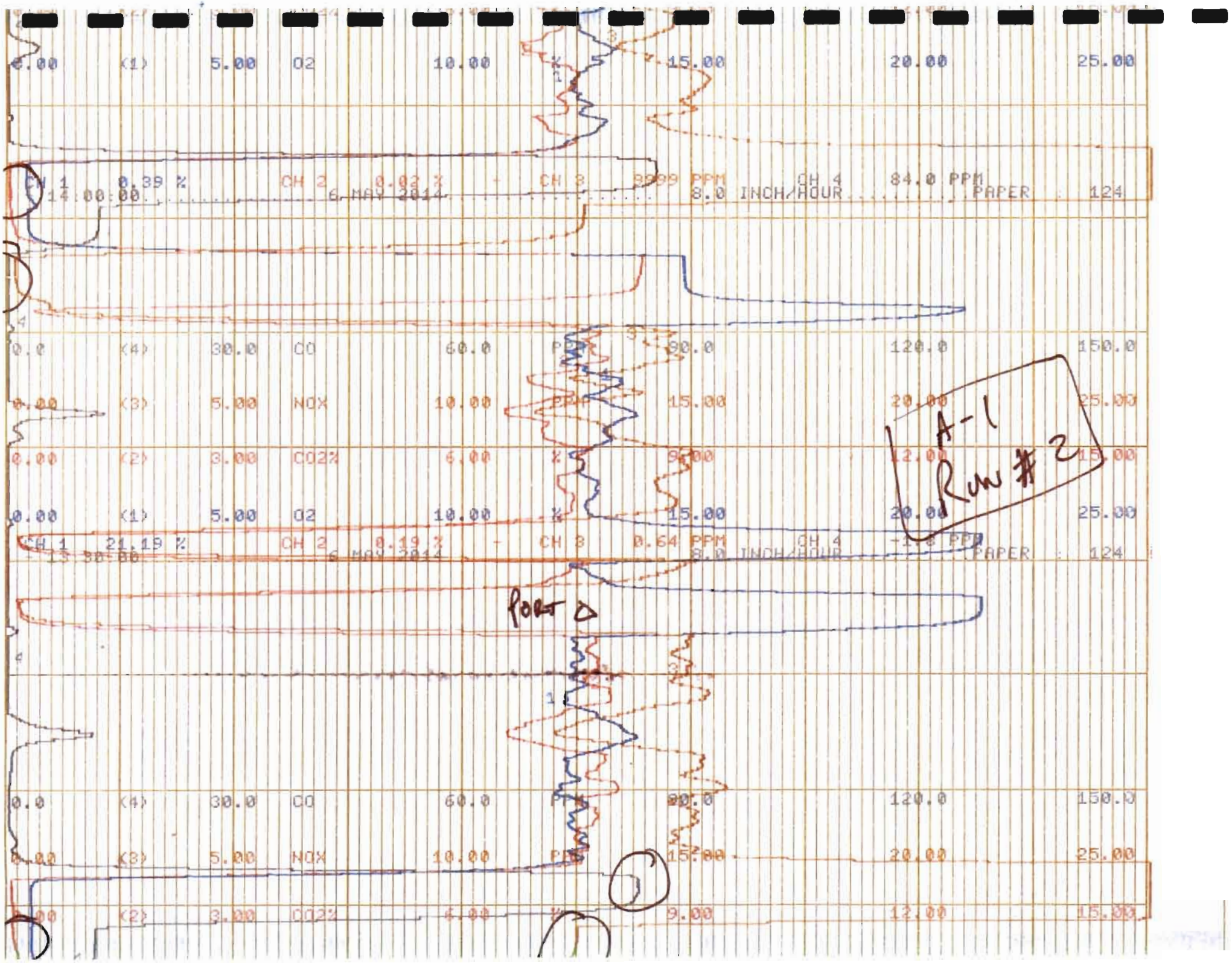

A-2
RUN #1
PORT Δ
DUAL CO MID
DUAL CO HI
OFFSCALE
CO HI
PPM
PAPER
INCH/HOUR

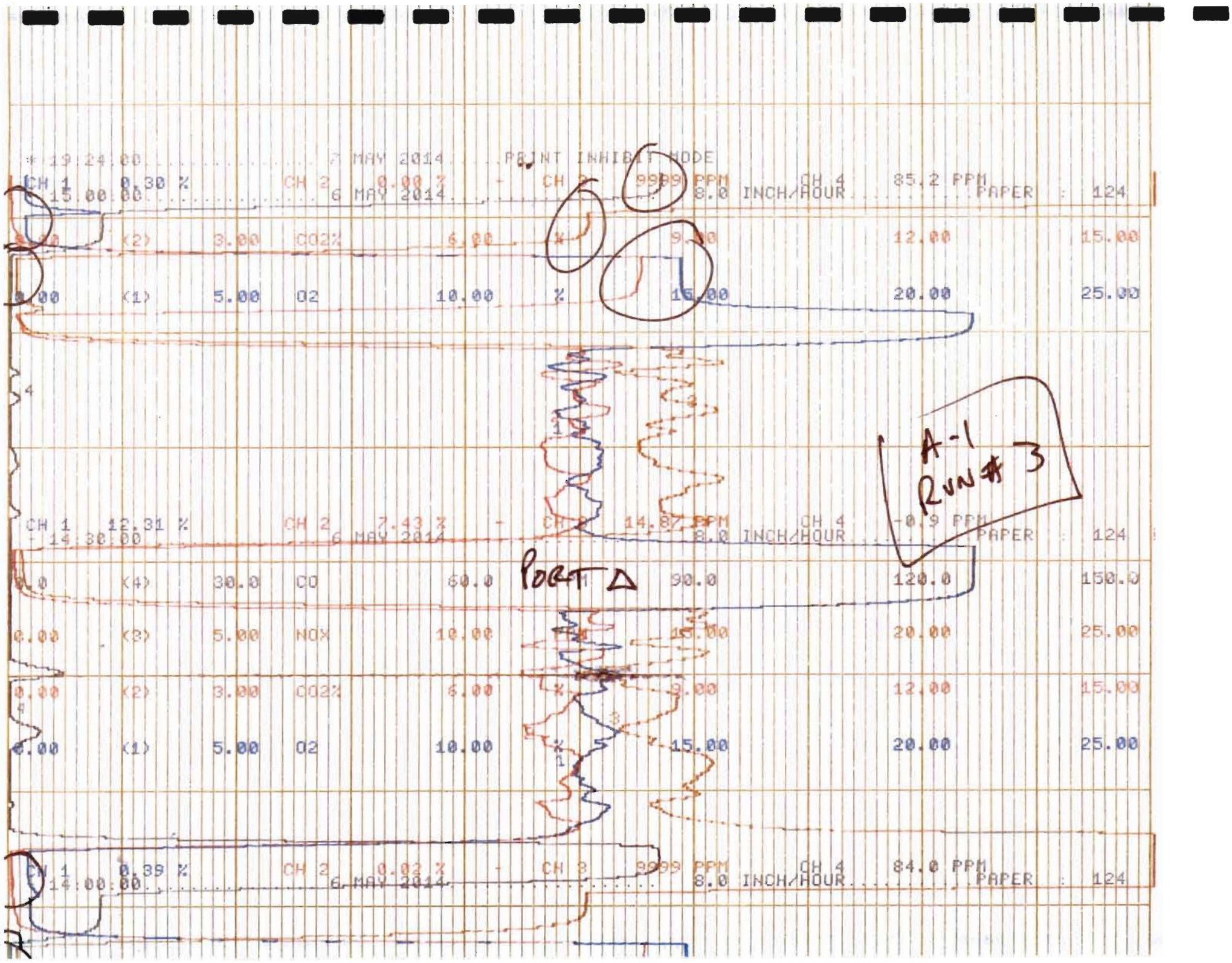

A-2
RUN #2
PORT Δ
(8) 100 CO HI 200 PPM 300 400 500
(4) 30.0 CO 60.0 PPM 90.0 120.0 150.0
(3) 5.00 NOX 10.00 PPM 15.00 20.00 25.00
CH 8 25.6 PPM
CH 1 12.11 %
CH 2 8.31 %
CH 3 18.35 PPM
CH 4 7.4 PPM
6 MAY 2014
3.0 INCH/HOUR
PAPER 124
(2) 3.00 CO2% 6.00 % 9.00 12.00 15.00
(1) 5.00 O2 10.00 15.00 20.00 25.00
CH 8 -1.4 PPM
CH 1 14.91 %
CH 2 8.41 %
CH 3 0.00 PPM
CH 4 -0.4 PPM
6 MAY 2014
3.0 INCH/HOUR
PAPER 124
(8) 100 CO HI 200 PPM 300 400 500
(4) 30.0 CO 60.0 PPM 90.0 120.0 150.0
(3) 5.00 NOX 10.00 PPM 15.00 20.00 25.00
(2) 3.00 CO2% 6.00 % 9.00 12.00 15.00
(1) 5.00 O2 10.00 15.00 20.00 25.00
A-2
RUN #1
PORT Δ


A-2
Run #3
PORT Δ
CO
CH 0 7.1 PPM
CH 1 12.58 %
CH 2 7.53 %
CH 3 15.71 PPM
CH 4 6.3 PPM
11:00:00 6 MAY 2014
8.0 INCH/HOUR
PAPER 124
(8) 100 CO HI 200 PPM 300 400 500
(7) 30.0 60.0 90.0 120.0 150.0
(8) 5.00 NOX 10.00 PPM 15.00 20.00 25.00
(2) 3.00 CO2% 6.00 % 9.00 12.00 15.00
(1) 5.00 O2 10.00 % 15.00 20.00 25.00
CH 0 3.1 PPM
CH 1 21.40 %
CH 2 0.15 %
CH 3 0.58 PPM
CH 4 0.3 PPM
6 MAY 2014
8.0 INCH/HOUR
PAPER 124
(8) 100 CO HI 200 PPM 300 400 500
A-2
Run #2


0.00 (3) 5.00 NOX 10.00 PPM 15.00 20.00 25.00
0.00 (2) 5.00 CO2% 10.00 15.00 20.00 25.00
0.00 (1) 5.00 O2 10.00 % 15.00 20.00 25.00
CH 8 -0.8 PPM
CH 1 21.44 %
CH 2 0.06 %
CH 3 1.23 PPM
CH 4 -0.6 PPM
12:00:00 6 MAY 2014 8.0 INCH/HOUR PAPER 124
0 (8) 100 CO HI 200 PPM 300 400 500
0.0 (4) 30.0 CO 60.0 PPM 90.0 120.0 150.0
0.00 (3) 5.00 NOX 10.00 PPM 15.00 20.00 25.00
CH 8 116.5 PPM
CH 1 18.78 %
CH 2 6.64 %
CH 3 10.79 PPM
CH 4 66.4 PPM
11:30:00 6 MAY 2014 8.0 INCH/HOUR PAPER 124
0.00 (2) 5.00 CO2% 10.00 15.00 20.00
0.00 (1) 5.00 O2 10.00 % 15.00 20.00 25.00
PORT A
A2
Run #3
CO HI


0.0 (4) 30.0 CO 60.0 PPM 90.0 120.0 150.0
0.00 (3) 5.00 NOX 10.00 PPM 15.00 20.00 25.00
0.00 (2) 3.00 CO2% 6.00 % 9.00 12.00 15.00
0.00 (1) 5.00 O2 10.00 % 15.00 20.00 25.00
12:51:00 6 MAY 2014 3.0 INCH/HOUR PAPER : 124
A-1
RUN #1
CH 8 -1.4 PPM
CH 1 21.51 %
CH 2 0.08 %
CH 3 0.24 PPM
CH 4 1.8 PPM
12:30:00 6 MAY 2014 3.0 INCH/HOUR PAPER : 124
PORT Δ
0 (8) 100 CO HI 200 PPM 300 400 500
0.0 (4) 30.0 CO 60.0 PPM 90.0 120.0 150.0
0.00 (3) 5.00 NOX 10.00 PPM 15.00 20.00 25.00
0.00 (2) 3.00 CO2% 6.00 % 9.00 12.00 15.00
0.00 (1) 5.00 O2 10.00 % 15.00 20.00 25.00
CH 8 -0.8 PPM


0.00 (1) 5.00 O2 10.00 % 15.00 20.00 25.00
CH 1 0.39 % CH 2 0.02 % CH 3 9999 PPM CH 4 84.0 PPM
14:00:00 6 MAY 2014 8.0 INCH/HOUR PAPER 124
0.0 (4) 30.0 CO 60.0 PPM 90.0 120.0 150.0
0.00 (3) 5.00 NOX 10.00 PPM 15.00 20.00 25.00
0.00 (2) 3.00 CO2% 6.00 % 9.00 12.00 15.00
0.00 (1) 5.00 O2 10.00 % 15.00 20.00 25.00
CH 1 21.19 % CH 2 0.19 % CH 3 0.64 PPM CH 4 -1.6 PPM
15:30:00 6 MAY 2014 8.0 INCH/HOUR PAPER 124
A-1
Run # 2
PORT D
0.0 (4) 30.0 CO 60.0 PPM 90.0 120.0 150.0
0.00 (3) 5.00 NOX 10.00 PPM 15.00 20.00 25.00
0.00 (2) 3.00 CO2% 6.00 % 9.00 12.00 15.00


* 19:24:00 7 MAY 2014 POINT INHIBIT MODE
CH 1 0.30 % CH 2 0.00 % CH 3 9999 PPM CH 4 85.2 PPM
15:00:00 6 MAY 2014 8.0 INCH/HOUR PAPER : 124
(2) 3.00 CO2% 6.00 % 12.00 15.00
(1) 5.00 O2 10.00 % 15.00 20.00 25.00
CH 1 12.31 % CH 2 7.43 % CH 3 14.87 PPM CH 4 -0.9 PPM
14:30:00 6 MAY 2014 8.0 INCH/HOUR PAPER : 124
(4) 30.0 CO 60.0 90.0 120.0 150.0
(3) 5.00 NOX 10.00 15.00 20.00 25.00
(2) 3.00 CO2% 6.00 % 12.00 15.00
(1) 5.00 O2 10.00 % 15.00 20.00 25.00
CH 1 0.39 % CH 2 0.02 % CH 3 9999 PPM CH 4 84.0 PPM
14:00:00 6 MAY 2014 8.0 INCH/HOUR PAPER : 124
A-1
RUN # 3
PORT A

F
Process Information

Date	Time	CH03 FL150 GAS FLOW SCFM MIN	CH03 FL150 GAS FLOW SCFM MAX	CH04 FL150 FLARE TEMP °F MIN	CH04 FL150 FLARE TEMP °F MAX
START A-1 RUN 1					
2014/05/06	12:09:00	1186	1212	1514	1529
2014/05/06	12:10:00	1188	1208	1186	1577
2014/05/06	12:11:00	1187	1207	1314	1561
2014/05/06	12:12:00	1184	1209	1355	1575
2014/05/06	12:13:00	1186	1206	1531	1607
2014/05/06	12:14:00	1188	1210	1586	1629
2014/05/06	12:15:00	1186	1209	1551	1590
2014/05/06	12:16:00	1189	1209	1537	1551
2014/05/06	12:17:00	1189	1210	1530	1543
2014/05/06	12:18:00	1186	1209	1524	1534
2014/05/06	12:19:00	1180	1209	1522	1533
2014/05/06	12:20:00	1189	1213	1531	1566
2014/05/06	12:21:00	1187	1212	1563	1576
2014/05/06	12:22:00	1186	1213	1559	1577
2014/05/06	12:23:00	1180	1218	1543	1568
2014/05/06	12:24:00	1187	1208	1536	1552
2014/05/06	12:25:00	1190	1212	1533	1541
2014/05/06	12:26:00	1187	1210	1527	1542
2014/05/06	12:27:00	1185	1211	1536	1554
2014/05/06	12:28:00	1189	1211	1543	1552
2014/05/06	12:29:00	1192	1205	1541	1563
2014/05/06	12:30:00	1187	1209	1560	1569
2014/05/06	12:31:00	1182	1212	1544	1562
2014/05/06	12:32:00	1183	1213	1550	1565
2014/05/06	12:33:00	1183	1209	1561	1570
2014/05/06	12:34:00	1181	1213	1539	1567
2014/05/06	12:35:00	1185	1207	1535	1544
2014/05/06	12:36:00	1185	1210	1539	1553
2014/05/06	12:37:00	1186	1210	1541	1552
2014/05/06	12:38:00	1187	1205	1542	1548
2014/05/06	12:39:00	1182	1209	1528	1546
2014/05/06	12:40:00	1186	1209	1526	1550
2014/05/06	12:41:00	1185	1208	1549	1556
2014/05/06	12:42:00	1185	1210	1553	1560
2014/05/06	12:43:00	1185	1208	1555	1566
2014/05/06	12:44:00	1183	1213	1550	1567
2014/05/06	12:45:00	1186	1208	1556	1566
2014/05/06	12:46:00	1190	1214	1537	1564
2014/05/06	12:47:00	1189	1206	1530	1538
2014/05/06	12:48:00	1186	1208	1531	1543
2014/05/06	12:49:00	1189	1207	1538	1553
2014/05/06	12:50:00	1184	1209	1552	1564
Average A-1 Run 1		**1198**		**1542**	

Date	Time	CH03 FL150 GAS FLOW SCFM MIN	CH03 FL150 GAS FLOW SCFM MAX	CH04 FL150 FLARE TEMP °F MIN	CH04 FL150 FLARE TEMP °F MAX
		START A-1 RUN 2			
2014/05/06	13:07:00	1185	1209	1568	1586
2014/05/06	13:08:00	1189	1212	1550	1568
2014/05/06	13:09:00	1190	1209	1541	1553
2014/05/06	13:10:00	1182	1209	1530	1576
2014/05/06	13:11:00	1187	1208	1529	1576
2014/05/06	13:12:00	1189	1211	1543	1552
2014/05/06	13:13:00	1190	1208	1536	1551
2014/05/06	13:14:00	1192	1209	1538	1561
2014/05/06	13:15:00	1187	1211	1558	1566
2014/05/06	13:16:00	1187	1211	1561	1575
2014/05/06	13:17:00	1187	1206	1569	1580
2014/05/06	13:18:00	1191	1212	1531	1569
2014/05/06	13:19:00	1188	1205	1517	1532
2014/05/06	13:20:00	1185	1206	1521	1541
2014/05/06	13:21:00	1187	1208	1539	1565
2014/05/06	13:22:00	1189	1210	1564	1575
2014/05/06	13:23:00	1189	1211	1553	1569
2014/05/06	13:24:00	1191	1208	1553	1563
2014/05/06	13:25:00	1185	1212	1545	1561
2014/05/06	13:26:00	1191	1207	1545	1555
2014/05/06	13:27:00	1187	1210	1545	1557
2014/05/06	13:28:00	1191	1207	1529	1547
2014/05/06	13:29:00	1191	1207	1523	1547
2014/05/06	13:30:00	1192	1209	1546	1553
2014/05/06	13:31:00	1190	1213	1541	1550
2014/05/06	13:32:00	1192	1209	1543	1556
2014/05/06	13:33:00	1191	1210	1550	1569
2014/05/06	13:34:00	1189	1213	1546	1562
2014/05/06	13:35:00	1193	1207	1546	1557
2014/05/06	13:36:00	1189	1206	1529	1546
2014/05/06	13:37:00	1186	1210	1529	1551
2014/05/06	13:38:00	1187	1209	1550	1565
2014/05/06	13:39:00	1186	1207	1551	1564
2014/05/06	13:40:00	1185	1210	1548	1558
2014/05/06	13:41:00	1187	1207	1557	1565
2014/05/06	13:42:00	1189	1208	1560	1568
2014/05/06	13:43:00	1189	1210	1544	1562
2014/05/06	13:44:00	1191	1206	1542	1551
2014/05/06	13:45:00	1193	1206	1525	1547
2014/05/06	13:46:00	1188	1208	1525	1546
2014/05/06	13:47:00	1191	1210	1543	1569
2014/05/06	13:48:00	1180	1209	1548	1567
2014/05/06	13:49:00	1187	1207	1537	1550
2014/05/06	13:50:00	1190	1206	1536	1546
Average A-1 Run 2		**1199**		**1551**	

Date	Time	CH03 FL150 GAS FLOW SCFM MIN	MAX	CH04 FL150 FLARE TEMP °F MIN	MAX
		START A-1 RUN 3			
2014/05/06	14:08:00	1185	1208	1547	1564
2014/05/06	14:09:00	1191	1210	1549	1565
2014/05/06	14:10:00	1190	1209	1532	1551
2014/05/06	14:11:00	1185	1210	1535	1551
2014/05/06	14:12:00	1186	1210	1546	1556
2014/05/06	14:13:00	1188	1209	1552	1562
2014/05/06	14:14:00	1191	1206	1561	1569
2014/05/06	14:15:00	1189	1206	1549	1569
2014/05/06	14:16:00	1188	1209	1537	1555
2014/05/06	14:17:00	1190	1209	1526	1537
2014/05/06	14:18:00	1187	1208	1532	1550
2014/05/06	14:19:00	1185	1209	1550	1566
2014/05/06	14:20:00	1189	1209	1554	1570
2014/05/06	14:21:00	1185	1207	1532	1554
2014/05/06	14:22:00	1191	1206	1527	1538
2014/05/06	14:23:00	1187	1210	1535	1555
2014/05/06	14:24:00	1187	1211	1553	1562
2014/05/06	14:25:00	1190	1205	1552	1561
2014/05/06	14:26:00	1191	1207	1546	1556
2014/05/06	14:27:00	1186	1207	1548	1568
2014/05/06	14:28:00	1185	1206	1547	1569
2014/05/06	14:29:00	1189	1206	1537	1550
2014/05/06	14:30:00	1185	1210	1529	1539
2014/05/06	14:31:00	1188	1209	1530	1554
2014/05/06	14:32:00	1185	1207	1551	1564
2014/05/06	14:33:00	1188	1207	1553	1562
2014/05/06	14:34:00	1191	1206	1553	1597
2014/05/06	14:35:00	1189	1207	1550	1564
2014/05/06	14:36:00	1188	1206	1533	1550
2014/05/06	14:37:00	1190	1211	1536	1548
2014/05/06	14:38:00	1182	1209	1545	1562
2014/05/06	14:39:00	1185	1210	1545	1566
2014/05/06	14:40:00	1187	1207	1535	1547
2014/05/06	14:41:00	1184	1209	1534	1542
2014/05/06	14:42:00	1190	1208	1535	1555
2014/05/06	14:43:00	1188	1210	1553	1569
2014/05/06	14:44:00	1188	1209	1565	1572
2014/05/06	14:45:00	1187	1209	1551	1570
2014/05/06	14:46:00	1186	1209	1541	1553
Average A-1 Run 3		**1198**		**1551**	

Date	Time	CH01 FL100 GAS FLOW SCFM MIN	MAX	CH02 FL100 FLARE TEMP °F MIN	MAX
		START A-2 RUN 1			
2014/05/06	08:51:00	2755	2836	1514	1517
2014/05/06	08:52:00	2767	2832	1515	1523
2014/05/06	08:53:00	2775	2832	1523	1533
2014/05/06	08:54:00	2781	2821	1533	1543
2014/05/06	08:55:00	2784	2822	1542	1546
2014/05/06	08:56:00	2772	2813	1544	1546
2014/05/06	08:57:00	2782	2816	1540	1546
2014/05/06	08:58:00	2782	2820	1536	1540
2014/05/06	08:59:00	2780	2830	1536	1545
2014/05/06	09:00:00	2776	2832	1545	1550
2014/05/06	09:01:00	2772	2816	1549	1556
2014/05/06	09:02:00	2776	2819	1555	1564
2014/05/06	09:03:00	2780	2830	1563	1567
2014/05/06	09:04:00	2771	2821	1564	1565
2014/05/06	09:05:00	2770	2826	1558	1564
2014/05/06	09:06:00	2759	2824	1551	1558
2014/05/06	09:07:00	2776	2832	1542	1551
2014/05/06	09:08:00	2777	2831	1539	1542
2014/05/06	09:09:00	2745	2838	1537	1539
2014/05/06	09:10:00	2750	2837	1539	1546
2014/05/06	09:11:00	2771	2823	1545	1548
2014/05/06	09:12:00	2762	2825	1547	1554
2014/05/06	09:13:00	2753	2825	1552	1556
2014/05/06	09:14:00	2780	2826	1547	1553
2014/05/06	09:15:00	2775	2823	1546	1550
2014/05/06	09:16:00	2776	2817	1550	1553
2014/05/06	09:17:00	2740	2837	1548	1552
2014/05/06	09:18:00	2774	2830	1550	1553
2014/05/06	09:19:00	2773	2828	1552	1558
2014/05/06	09:20:00	2756	2858	1558	1561
2014/05/06	09:21:00	2766	2867	1560	1565
2014/05/06	09:22:00	2765	2859	1564	1567
2014/05/06	09:23:00	2775	2830	1561	1567
2014/05/06	09:24:00	2764	2852	1557	1562
2014/05/06	09:25:00	2753	2852	1558	1563
2014/05/06	09:26:00	2734	2855	1562	1569
2014/05/06	09:27:00	2762	2847	1569	1578
2014/05/06	09:28:00	2746	2847	1573	1578
2014/05/06	09:29:00	2766	2854	1566	1575
Average A-2 Run 1		**2800**		**1551**	

Date	Time	CH01 FL100 GAS FLOW SCFM MIN	MAX	CH02 FL100 FLARE TEMP °F MIN	MAX
		START A-2 RUN 2			
2014/05/06	09:51:00	2757	2864	1568	1579
2014/05/06	09:52:00	2741	2867	1558	1569
2014/05/06	09:53:00	2749	2851	1544	1558
2014/05/06	09:54:00	2736	2863	1532	1544
2014/05/06	09:55:00	2756	2844	1531	1535
2014/05/06	09:56:00	2731	2851	1535	1544
2014/05/06	09:57:00	2751	2837	1544	1556
2014/05/06	09:58:00	2764	2865	1552	1556
2014/05/06	09:59:00	2741	2852	1546	1553
2014/05/06	10:00:00	2759	2836	1537	1546
2014/05/06	10:01:00	2750	2855	1531	1537
2014/05/06	10:02:00	2746	2838	1529	1531
2014/05/06	10:03:00	2762	2840	1529	1534
2014/05/06	10:04:00	2761	2839	1534	1540
2014/05/06	10:05:00	2752	2853	1540	1543
2014/05/06	10:06:00	2761	2852	1531	1541
2014/05/06	10:07:00	2766	2856	1529	1532
2014/05/06	10:08:00	2740	2856	1529	1537
2014/05/06	10:09:00	2752	2858	1537	1558
2014/05/06	10:10:00	2749	2859	1558	1565
2014/05/06	10:11:00	2762	2844	1562	1565
2014/05/06	10:12:00	2752	2842	1557	1563
2014/05/06	10:13:00	2742	2842	1555	1558
2014/05/06	10:14:00	2750	2846	1556	1563
2014/05/06	10:15:00	2757	2850	1563	1575
2014/05/06	10:16:00	2767	2863	1574	1585
2014/05/06	10:17:00	2739	2856	1585	1591
2014/05/06	10:18:00	2729	2846	1573	1589
2014/05/06	10:19:00	2730	2839	1558	1573
2014/05/06	10:20:00	2748	2857	1549	1558
2014/05/06	10:21:00	2758	2862	1543	1549
2014/05/06	10:22:00	2749	2849	1537	1544
2014/05/06	10:23:00	2768	2855	1539	1549
2014/05/06	10:24:00	2744	2859	1546	1548
2014/05/06	10:25:00	2750	2851	1544	1547
2014/05/06	10:26:00	2728	2874	1541	1545
2014/05/06	10:27:00	2738	2859	1539	1544
2014/05/06	10:28:00	2751	2848	1543	1545
2014/05/06	10:29:00	2740	2878	1543	1545
Average A-2 Run 2		**2801**		**1550**	

Date	Time	CH01 FL100 GAS FLOW SCFM MIN	CH01 FL100 GAS FLOW SCFM MAX	CH02 FL100 FLARE TEMP °F MIN	CH02 FL100 FLARE TEMP °F MAX
START A-2 RUN 3					
2014/05/06	10:56:00	2750	2857	1530	1537
2014/05/06	10:57:00	2765	2845	1534	1541
2014/05/06	10:58:00	2735	2864	1521	1537
2014/05/06	10:59:00	2744	2849	1515	1521
2014/05/06	11:00:00	2739	2845	1517	1537
2014/05/06	11:01:00	2720	2845	1537	1548
2014/05/06	11:02:00	2752	2848	1541	1546
2014/05/06	11:03:00	2738	2858	1545	1558
2014/05/06	11:04:00	2735	2853	1556	1567
2014/05/06	11:05:00	2737	2850	1567	1579
2014/05/06	11:06:00	2738	2834	1579	1586
2014/05/06	11:07:00	2756	2852	1584	1586
2014/05/06	11:08:00	2769	2858	1578	1585
2014/05/06	11:09:00	2749	2865	1565	1578
2014/05/06	11:10:00	2732	2846	1550	1565
2014/05/06	11:11:00	2746	2863	1550	1557
2014/05/06	11:12:00	2755	2843	1552	1558
2014/05/06	11:13:00	2748	2864	1548	1552
2014/05/06	11:14:00	2758	2850	1546	1550
2014/05/06	11:15:00	2759	2858	1549	1551
2014/05/06	11:16:00	2754	2851	1546	1552
2014/05/06	11:17:00	2735	2870	1539	1546
2014/05/06	11:18:00	2755	2850	1539	1540
2014/05/06	11:19:00	2786	2824	1540	1551
2014/05/06	11:20:00	2750	2846	1550	1554
2014/05/06	11:21:00	2771	2830	1546	1554
2014/05/06	11:22:00	2770	2810	1546	1549
2014/05/06	11:23:00	2772	2858	1545	1548
2014/05/06	11:24:00	2772	2846	1537	1546
2014/05/06	11:25:00	2773	2831	1536	1537
2014/05/06	11:26:00	2773	2827	1537	1546
2014/05/06	11:27:00	2769	2843	1544	1546
2014/05/06	11:28:00	2767	2823	1540	1544
2014/05/06	11:29:00	2770	2838	1541	1546
2014/05/06	11:30:00	2740	2834	1546	1558
2014/05/06	11:31:00	2740	2850	1558	1565
2014/05/06	11:32:00	2740	2832	1559	1564
Average A-2 Run 3		**2800**		**1550**	

G
Calibration Certifications & QC Records

Praxair
5700 South Alameda Street
Los Angeles, CA 90058
Tel: (323) 585-2154 Fax:(714) 542-6689
PGVPID: F22013

DocNumber: 000057696

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

Customer & Order Information:

PRAXAIR WHSE HAYWARD CA
23133 KIDDER ST
HAYWARD CA 945450

Praxair Order Number: 24624368
Customer P. O. Number: 04534404
Customer Reference Number:

Fill Date: 8/15/2013
Part Number: NI CD8.25O2E-AS
Lot Number: 109322703
Cylinder Style & Outlet: AS CGA 590
Cylinder Pressure & Volume: 2000 psig 140 cu. ft.

Certified Concentration:

Expiration Date:		8/21/2021	NIST Traceable
Cylinder Number:		CC218936	Analytical Uncertainty:
14.4	%	OXYGEN	± 1 %
8.11	%	CARBON DIOXIDE	± 1 %
Balance		NITROGEN	

Certification Information: *Certification Date:* 8/21/2013 *Term:* 96 Months *Expiration Date:* 8/21/2021

This cylinder was certified according to the 2012 EPA Traceability Protocol, Document #EPA-600/R-12/531, using Procedure G1. Do Not Use this Standard if Pressure is less than 100 PSIG.

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

1. Component: OXYGEN

Requested Concentration: 14.5 %
Certified Concentration: 14.4 %
Instrument Used: OXYMAT 5E
Analytical Method: PARAMAGNETIC
Last Multipoint Calibration: 7/24/2013

First Analysis Data: Date: 8/21/2013

Z:	0	R:	19.98	C:	14.4	Conc:	14.407
R:	19.98	Z:	0	C:	14.4	Conc:	14.407
Z:	0	C:	14.4	R:	19.98	Conc:	14.407

UOM: % Mean Test Assay: 14.407 %

Reference Standard Type: GMIS
Ref. Std. Cylinder # : CC92589
Ref. Std. Conc: 19.99%
Ref. Std. Traceable to SRM # . 2659a
SRM Sample # : 71-37-B
SRM Cylinder # : CLM-008734

Second Analysis Data: Date:

Z:	0	R:	0	C:	0	Conc:	0
R:	0	Z:	0	C:	0	Conc:	0
Z:	0	C:	0	R:	0	Conc:	0

UOM: % Mean Test Assay: 0 %

2. Component: CARBON DIOXIDE

Requested Concentration: 8.25 %
Certified Concentration: 8.11 %
Instrument Used: Horiba VIA-510 S/N 2807014
Analytical Method: NDIR
Last Multipoint Calibration: 7/24/2013

First Analysis Data: Date: 8/21/2013

Z:	0	R:	19.71	C:	8.11	Conc:	8.11
R:	19.71	Z:	0	C:	8.11	Conc:	8.11
Z:	0	C:	8.1	R:	19.71	Conc:	8.1

UOM: % Mean Test Assay: 8.107 %

Reference Standard Type: GMIS
Ref. Std. Cylinder # : CC74850
Ref. Std. Conc: 19.71 %
Ref. Std. Traceable to SRM # : vs 1674b
SRM Sample # : 7-F-32
SRM Cylinder # : CAL014645

Second Analysis Data: Date:

Z:	0	R:	0	C:	0	Conc:	0
R:	0	Z:	0	C:	0	Conc:	0
Z:	0	C:	0	R:	0	Conc:	0

UOM: % Mean Test Assay: 0 %

Analyzed by: Ying Yu

Certified by: Henry Kouka

PRAXAIR

Praxair
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PGVP ID: F22012

DocNumber: 000039367

[redacted]

Customer & Order Information:

PRAXAIR WHSE HAYWARD CA
23139 KIDDER ST
HAYWARD CA 945456000

Praxair Order Number: 20447561
Customer PO Number: 03912697
Customer Reference Number:

Fill Date: 06/2012
Part Number: [illegible]
Lot Number: 100215109
Cylinder Style and Outlet: AS CGA 590
Cylinder Pressure and Volume: 2000 psig 160 cu. ft.

Certified Concentration:

Expiration Date: / Cylinder Number:			NIST Traceable Analytical Uncertainty:
12.45	%	CARBON DIOXIDE	±1 %
20.54	%	OXYGEN	±1 %
	Balance	NITROGEN	

Certification Information:

Certification Date : 6/11/2012 Term : 96 Months Expiration Date : 06/11/2020

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

PGVP I.D.# F22012

Analytical Data:

(R=Reference Standard, Z=Zero Gas, C=Gas Candidate)

1. Component: CARBON DIOXIDE

Requested Concentration: 12.5 %
Certified Concentration: 12.45 %
Instrument Used: Siemens Ultramat 6E SN: A12-729
Analytical Method: NDIR
Last Multipoint Calibration: 05/11/2012

First Analyte Data:						Date:	06/10/2012
Z:	0	R:	15.05	C:	12.49	Conc:	12.45
R:	15.05	Z:	0	C:	12.47	Conc:	12.49
Z:	0	C:	12.47	R:	15.09	Conc:	12.44
UOM:	%					Mean Test Assay:	12.45 %

Reference Standard Type: GMIS
Ref. Std. Cylinder #: SA15336
Ref. Std. Conc: 15.05%
Ref. Std. traceable to SRM #: vs 2745
SRM Sample #: 9-5-09
SRM Cylinder #: CAL012759

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

2. Component: OXYGEN

Requested Concentration: 20.5 %
Certified Concentration: 20.54 %
Instrument Used: OXYMAT 6E
Analytical Method: PARAMAGNETIC
Last Multipoint Calibration: 05/11/2012

First Analyte Data:						Date:	06/09/2012
Z:	0	R:	20	C:	20.52	Conc:	20.52
R:	20	Z:	0	C:	20.54	Conc:	20.54
Z:	0	C:	20.54	R:	20	Conc:	20.56
UOM:	%					Mean Test Assay:	20.54 %

Reference Standard Type: GMIS
Ref. Std. Cylinder #: SA19437
Ref. Std. Conc: 20.00%
Ref. Std. traceable to SRM #: 2652a
SRM Sample #: 71-37-5
SRM Cylinder #: CAL-005734

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

Analyzed by: Shameeta Jiffrey
Shameeta Jiffrey

Certified by: Ying Yu
Ying Yu

Praxair
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Los Angeles, CA 90058
Tel: (323) 585-2154 Fax:(714) 542-6689
PGVPID: F22013

DocNumber: 000057721

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

Customer & Order Information:

PRAXAIR WHSE HAYWARD CA
23133 KIDDER ST
HAYWARD CA 945450

Praxair Order Number: 24624640
Customer P. O. Number: 04534438
Customer Reference Number:

Fill Date: 8/17/2013
Part Number: EV NICONOE127AS
Lot Number: 109322807
Cylinder Style & Outlet: AS CGA 660
Cylinder Pressure & Volume: 2000 psig 140 cu ft

Certified Concentration:

Expiration Date:		8/28/2016	NIST Traceable
Cylinder Number:		CC424138	Analytical Uncertainty:
12.6	ppm	CARBON MONOXIDE	± 0.9 %
12.5	ppm	NITRIC OXIDE	± 1 %
Balance		NITROGEN	

NOx = 12.6 ppm **NOx for Reference Only**

Certifcation Information: *Certification Date:* 8/28/2013 *Term:* 36 Months *Expiration Date:* 8/28/2016

This cylinder was certified according to the 2012 EPA Traceability Protocol, Document #EPA-600/R-12/531, using Procedure G1. Do Not Use this Standard if Pressure is less than 100 PSIG.

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

1. Component: CARBON MONOXIDE

Requested Concentration: 12.5 ppm
Certified Concentration: 12.6 ppm
Instrument Used: Horiba VIA-510 S/N 576876015
Analytical Method NDIR
Last Multipoint Calibration: 7/24/2013

First Analysis Data: Date: 8/21/2013

Z:	0	R:	24.7	C:	12.6	Conc:	12.6
R:	24.7	Z:	0	C:	12.6	Conc:	12.6
Z:	0	C:	12.6	R:	24.7	Conc:	12.6

UOM: ppm Mean Test Assay: 12.6 ppm

Reference Standard Type: GMIS
Ref. Std. Cylinder # : CC147286
Ref. Std. Conc: 24.7 ppm
Ref. Std. Traceable to SRM # 2635a
SRM Sample # 58-C-32
SRM Cylinder # CAL011907

Second Analysis Data: Date:

Z:	0	R:	0	C:	0	Conc:	0
R:	0	Z:	0	C:	0	Conc:	0
Z:	0	C:	0	R:	0	Conc:	0

UOM: ppm Mean Test Assay: 0 ppm

2. Component: NITRIC OXIDE

Requested Concentration: 12.5 ppm
Certified Concentration 12.5 ppm
Instrument Used: Thermo Electron 42C S/N 516112467
Analytical Method Chemiluminescence
Last Multipoint Calibration: 8/24/2013

First Analysis Data: Date: 8/21/2013

Z:	0	R:	10.01	C:	12.55	Conc:	12.55
R:	10.01	Z:	0	C:	12.59	Conc:	12.59
Z:	0	C:	12.59	R:	10.01	Conc:	12.59

UOM: ppm Mean Test Assay: 12.577 ppm

Reference Standard Type: GMIS
Ref. Std. Cylinder # : CC330931
Ref. Std. Conc: 10.01 ppm
Ref. Std. Traceable to SRM # : 2629a
SRM Sample # : 50-G-109
SRM Cylinder # FF31631

Second Analysis Data: Date: 8/28/2013

Z:	0	R:	10.01	C:	12.53	Conc:	12.53
R:	10.01	Z:	0	C:	12.52	Conc:	12.52
Z:	0	C:	12.5	R:	10.01	Conc:	12.5

UOM: ppm Mean Test Assay: 12.517 ppm

Analyzed by: Jack Tao

Certified by: Diego Mestanza

PRAXAIR

Praxair
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Tel: (323) 585-2154 Fax:(714) 542-6689
PGVPID: F22013

DocNumber: 000060884

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

Customer & Order Information:

PRAXAIR WHSE HAYWARD CA
23133 KIDDER ST
HAYWARD CA 945450

Praxair Order Number: 25626405
Customer P. O. Number: 04680571
Customer Reference Number:

Fill Date: 11/18/2013
Part Number: EV NICON0E399A$
Lot Number: 109332204
Cylinder Style & Outlet: AS CGA 660
Cylinder Pressure & Volume: 2000 psig 140 cu. ft.

Certified Concentration:

Expiration Date:	12/2/2016	NIST Traceable
Cylinder Number:	CC424021	Analytical Uncertainty:
22.5 ppm	CARBON MONOXIDE	± 0.5 %
22.2 ppm	NITRIC OXIDE	± 1.1 %
Balance	NITROGEN	

NOx = 22.4 ppm — NOx for Reference Only

Certification Information: *Certification Date:* 12/2/2013 *Term:* 36 Months *Expiration Date:* 12/2/2016

This cylinder was certified according to the 2012 EPA Traceability Protocol, Document #EPA-600/R-12/531, using Procedure G1. Do Not Use this Standard if Pressure is less than 100 PSIG.

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

1. Component: CARBON MONOXIDE

Requested Concentration: 22.5 ppm
Certified Concentration: 22.5 ppm
Instrument Used: Horiba VIA-510 S/N 576876015
Analytical Method: NDIR
Last Multipoint Calibration: 10/24/2013

First Analysis Data:						Date: 11/22/2013
Z: 0	R: 100.9	C: 22.4	Conc: 22.4			
R: 100.9	Z: 0	C: 22.5	Conc: 22.5			
Z: 0	C: 22.5	R: 100.9	Conc: 22.6			
UOM: ppm		Mean Test Assay: 22.467 ppm				

Reference Standard Type: GMIS
Ref. Std. Cylinder # : CC306914
Ref. Std. Conc: 100.9 ppm
Ref. Std. Traceable to SRM # : 1679c
SRM Sample # : 3-I-45
SRM Cylinder # : FF28593

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

2. Component: NITRIC OXIDE

Requested Concentration: 22.5 ppm
Certified Concentration: 22.2 ppm
Instrument Used: Thermo Electron 42C S/N 516112467
Analytical Method: Chemiluminescence
Last Multipoint Calibration: 11/24/2013

First Analysis Data:						Date: 11/22/2013
Z: 0	R: 19.9	C: 22.3	Conc: 22.3			
R: 19.9	Z: 0	C: 22.2	Conc: 22.2			
Z: 0	C: 22.2	R: 19.9	Conc: 22.2			
UOM: ppm		Mean Test Assay: 22.233 ppm				

Reference Standard Type: GMIS
Ref. Std. Cylinder # : CC382481
Ref. Std. Conc: 19.9 ppm
Ref. Std. Traceable to SRM # : 2629a
SRM Sample # : 50-G-109
SRM Cylinder # : FF31631

Second Analysis Data:						Date: 12/2/2013
Z: 0	R: 19.9	C: 22.2	Conc: 22.2			
R: 19.9	Z: 0	C: 22.1	Conc: 22.1			
Z: 0	C: 22.1	R: 19.9	Conc: 22.1			
UOM: ppm		Mean Test Assay: 22.133 ppm				

Analyzed by: Diego Mestanza

Certified by:

Praxair
5700 South Alameda Street
Los Angeles, CA 90058
Telephone: (323) 585-2154
Facsimile: (714) 542-6689

DocNumber: 000039446

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

Customer & Order Information:

PRAXAIR WHSE HAYWARD CA
23133 KIDDER ST
HAYWARD CA 945450

Praxair Order Number: 20447561
Customer P. O. Number: 03912637
Customer Reference Number:

Fill Date: 5/29/2012
Part Number: NI CD5MN4E-AS
Lot Number: 109215002
Cylinder Style & Outlet: AS CGA 660
Cylinder Pressure & Volume: 2000 psig 140 cu. ft.

Certified Concentration:

Expiration Date:		6/13/2014	NIST Traceable
Cylinder Number:		CC196748	Analytical Uncertainty:
85.4	ppm	CARBON MONOXIDE	± 1 %
83.6	ppm	NITRIC OXIDE	± 1 %
Balance		NITROGEN	

NOx = 84.4 ppm

NOx for Reference Only

Certification Information: Certification Date: 6/13/2012 Term: 24 Months Expiration Date: 6/13/2014

This cylinder was certified according to the 1997 EPA Traceability Protocol, Document #EPA-600/R-97/121, using Procedure G1
Do Not Use this Standard if Pressure is less than 150 PSIG
PGVP I.D.# F22012

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

1. Component: CARBON MONOXIDE

Requested Concentration: 85 ppm
Certified Concentration: 85.4 ppm
Instrument Used: Horiba VIA-510, S/N 577172043
Analytical Method: NDIR
Last Multipoint Calibration: 3/11/2012

First Analysis Data: Date: 6/5/2012

Z:	0	R:	100.6	C:	85.5	Conc:	85.5
R:	100.6	Z:	0	C:	85.5	Conc:	85.5
Z:	0	C:	85.3	R:	100.6	Conc:	85.3

UOM: ppm Mean Test Assay: 85.4 ppm

Reference Standard Type: GMIS
Ref. Std. Cylinder #: CC248877
Ref. Std. Conc: 100.6 ppm
Ref. Std. Traceable to SRM #: vs. 1679c
SRM Sample #: 3-I-45
SRM Cylinder #: FF28593

Second Analysis Data: Date: 6/12/2012

Z:	0	R:	100.6	C:	85.5	Conc:	85.5
R:	100.6	Z:	0	C:	85.4	Conc:	85.4
Z:	0	C:	85.4	R:	100.6	Conc:	85.4

UOM: ppm Mean Test Assay: 85.4 ppm

2. Component: NITRIC OXIDE

Requested Concentration: 85 ppm
Certified Concentration: 83.6 ppm
Instrument Used: Thermo Electron 42I S/N 072602432C
Analytical Method: Chemiluminescence
Last Multipoint Calibration: 5/16/2012

First Analysis Data: Date: 6/5/2012

Z:	0	R:	97.6	C:	83.7	Conc:	83.7
R:	97.6	Z:	0	C:	83.5	Conc:	83.5
Z:	0	C:	83.9	R:	97.6	Conc:	83.9

UOM: ppm Mean Test Assay: 83.7 ppm

Reference Standard Type: GMIS
Ref. Std. Cylinder #: CC102122
Ref. Std. Conc: 97.6 ppm
Ref. Std. Traceable to SRM #: vs. 1684b
SRM Sample #: 44-S81
SRM Cylinder #: CAL016464

Second Analysis Data: Date: 6/12/2012

Z:	0	R:	97.6	C:	83.6	Conc:	83.6
R:	97.6	Z:	0	C:	83.7	Conc:	83.7
Z:	0	C:	83.6	R:	97.6	Conc:	83.6

UOM: ppm Mean Test Assay: 83.6 ppm

Analyzed by: Nelson Ma
Nelson Ma

Certified by:
Rolonda Kaywood

PRAXAIR

Praxair
5700 South Alameda Street
Los Angeles, CA 90058
Tel: (323) 585-2154 Fax:(714) 542-6689
PGVPID: F22013

DocNumber: 000048140

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

Customer & Order Information:

PRAXAIR WHSE HAYWARD CA
23133 KIDDER ST
HAYWARD CA 945450

Praxair Order Number: 22370429
Customer P. O. Number: 04206409
Customer Reference Number:

Fill Date: 12/20/2012
Part Number: EV NICONOE210AS
Lot Number: 108235501
Cylinder Style & Outlet: AS CGA 660
Cylinder Pressure & Volume: 2000 psig 140 cu ft

Certified Concentration:

Expiration Date:	1/22/2021	NIST Traceable
Cylinder Number:	CC200170	Analytical Uncertainty:
124 ppm	CARBON MONOXIDE	± 1 %
124 ppm	NITRIC OXIDE	± 1 %
Balance	NITROGEN	

NOx = 124 ppm

NOx for Reference Only

Certification Information: *Certification Date:* 1/22/2013 *Term:* 96 Months *Expiration Date:* 1/22/2021

This cylinder was certified according to the 1997 EPA Traceability Protocol, Document #EPA-600/R-97/121, using Procedure G1

Do Not Use this Standard if Pressure is less than 150 PSIG

The certification expiration date is assigned using the May 2012 revision of the EPA Traceability Protocol document.

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

1. Component: CARBON MONOXIDE

Requested Concentration: 125 ppm
Certified Concentration: 124 ppm
Instrument Used: HORIBA, VIA-510 575 876 016
Analytical Method: NDIR
Last Multipoint Calibration: 1/4/2013

Reference Standard Type: GMIS
Ref. Std. Cylinder # : CC141663
Ref. Std. Conc: 100.6 ppm
Ref Std. Traceable to SRM # : vs. 1678c
SRM Sample # : 3-I-45
SRM Cylinder # : FF28593

First Analysis Data:						Date:	1/13/2013
Z: 0	R: 100.6	C: 124.4	Conc:	124			
R: 100.6	Z: 0	C: 124.5	Conc:	124			
Z: 0	C: 124.4	R: 100.6	Conc:	124			
UOM: ppm		Mean Test Assay:		124 ppm			

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

2. Component: NITRIC OXIDE

Requested Concentration: 125 ppm
Certified Concentration: 124 ppm
Instrument Used: Thermo Electron 42i S/N 072802432C
Analytical Method: Chemiluminescence
Last Multipoint Calibration: 1/4/2013

Reference Standard Type: GMIS
Ref. Std. Cylinder # : CC145330
Ref. Std. Conc: 103.2 ppm
Ref. Std. Traceable to SRM # : vs. 1684b
SRM Sample # : 44-S-61
SRM Cylinder # : CAL015454

First Analysis Data:						Date:	1/13/2013
Z: 0	R: 103.2	C: 123.9	Conc:	124			
R: 103.2	Z: 0	C: 123.7	Conc:	124			
Z: 0	C: 123.9	R: 103.2	Conc:	124			
UOM: ppm		Mean Test Assay:		124 ppm			

Second Analysis Data:						Date:	1/20/2013
Z: 0	R: 103.2	C: 123.2	Conc:	123			
R: 103.2	Z: 0	C: 123.2	Conc:	123			
Z: 0	C: 122.9	R: 103.2	Conc:	123			
UOM: ppm		Mean Test Assay:		123 ppm			

Analyzed by: Nelson Ma
Nelson Ma

Certified by: Chas Manning

Airgas

CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Airgas Specialty Gases
11711 South Alameda Street
Los Angeles, CA 90059
(323) 568-2203 Fax: (323) 587-3686
www.airgas.com

Part Number:	E03NI99E15A73N4	Reference Number:	48-124309073-8
Cylinder Number:	CC128199	Cylinder Volume:	144 Cu.Ft.
Laboratory:	ASG - Los Angeles - CA	Cylinder Pressure:	2015 PSIG
PGVP Number:	B32012	Valve Outlet:	660
Gas Code:	NC	Analysis Date:	Apr 03, 2012

Expiration Date: Apr 03, 2014

Certification performed in accordance with "EPA Traceability Protocol (Sept. 1997)" using the assay procedures listed. Analytical Methodology does not require correction for analytical interferences. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.
Do Not Use This Cylinder below 150 psig.i.e. 1 Mega Pascal

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty
CARBON MONOXIDE	225.0 PPM	228.3 PPM	G1	+/- 1% NIST Traceable
NITRIC OXIDE	225.0 PPM	224.4 PPM	G1	+/- 1% NIST Traceable
NITROGEN	Balance			
Total oxides of nitrogen		225.5 PPM		For Reference Only

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTRM	110601	CC330493	248.4PPM NITRIC OXIDE/NITROGEN	Jan 11, 2017
NTRM	120603	CC353934	249.3PPM CARBON MONOXIDE/NITROGEN	Oct 26, 2017

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicolet 6700 AHR0801551 CO	FTIR	Mar 12, 2012
Nicolet 6700 AMP0900118 NO	FTIR	Mar 12, 2012

Triad Data Available Upon Request

Notes:

Approved for Release

Praxair
5700 South Alameda Street
Los Angeles, CA 90058
Tel: (323) 585-2154 Fax:(714) 542-6689
PGVPID: F22014

DocNumber: 000067164

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

Customer & Order Information:

PRAXAIR WHSE HAYWARD CA
23133 KIDDER ST
HAYWARD CA 945450

Praxair Order Number: 27254955
Customer P. O. Number: 04918033
Customer Reference Number:

Fill Date: 5/7/2014
Part Number: NI CO450N3E-AS
Lot Number: 109412709
Cylinder Style & Outlet: AS CGA 660
Cylinder Pressure & Volume: 2000 psig 140 cu. ft.

Certified Concentration:

Expiration Date:	5/19/2022	NIST Traceable Analytical Uncertainty:
Cylinder Number:	CC198990	
453 ppm	CARBON MONOXIDE	± 0.9 %
448 ppm	NITRIC OXIDE	± 0.4 %
Balance	NITROGEN	

NOx = 449 ppm — NOx for Reference Only

Certification Information: *Certification Date:* 5/19/2014 *Term:* 96 Months *Expiration Date:* 5/19/2022

This cylinder was certified according to the 2012 EPA Traceability Protocol, Document #EPA-600/R-12/531, using Procedure G1. Do Not Use this Standard if Pressure is less than 100 PSIG.

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

1. Component: CARBON MONOXIDE

Requested Concentration: 450 ppm
Certified Concentration: 453 ppm
Instrument Used: HORIBA, VIA-510 576 876 015
Analytical Method: NDIR
Last Multipoint Calibration: 5/8/2014

First Analysis Data:						Date: 5/12/2014
Z: 0	R: 992	C: 452	Conc: 452.14			
R: 992	Z: 0	C: 453	Conc: 453.14			
Z: 0	C: 453	R: 992	Conc: 453.14			
UOM: ppm		Mean Test Assay: 452.80 ppm				

Reference Standard Type: GMIS
Ref. Std. Cylinder # : CC313007
Ref. Std. Conc: 992.3 ppm
Ref. Std. Traceable to SRM # : vs. 1681b
SRM Sample # : 1-28-I
SRM Cylinder # : CLM-009404

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

2. Component: NITRIC OXIDE

Requested Concentration: 450 ppm
Certified Concentration: 448 ppm
Instrument Used: Thermo Electron 42i S/N 072602432C
Analytical Method: Chemiluminescence
Last Multipoint Calibration: 5/3/2014

First Analysis Data:						Date: 5/12/2014
Z: 0	R: 482	C: 449	Conc: 449			
R: 482	Z: 0	C: 447	Conc: 447			
Z: 0	C: 447	R: 482	Conc: 447			
UOM: ppm		Mean Test Assay: 447.67 ppm				

Reference Standard Type: GMIS
Ref. Std. Cylinder # : CC108004
Ref. Std. Conc: 482 ppm
Ref. Std. Traceable to SRM # : 1687b
SRM Sample # : 41-K-34
SRM Cylinder # : FF31384

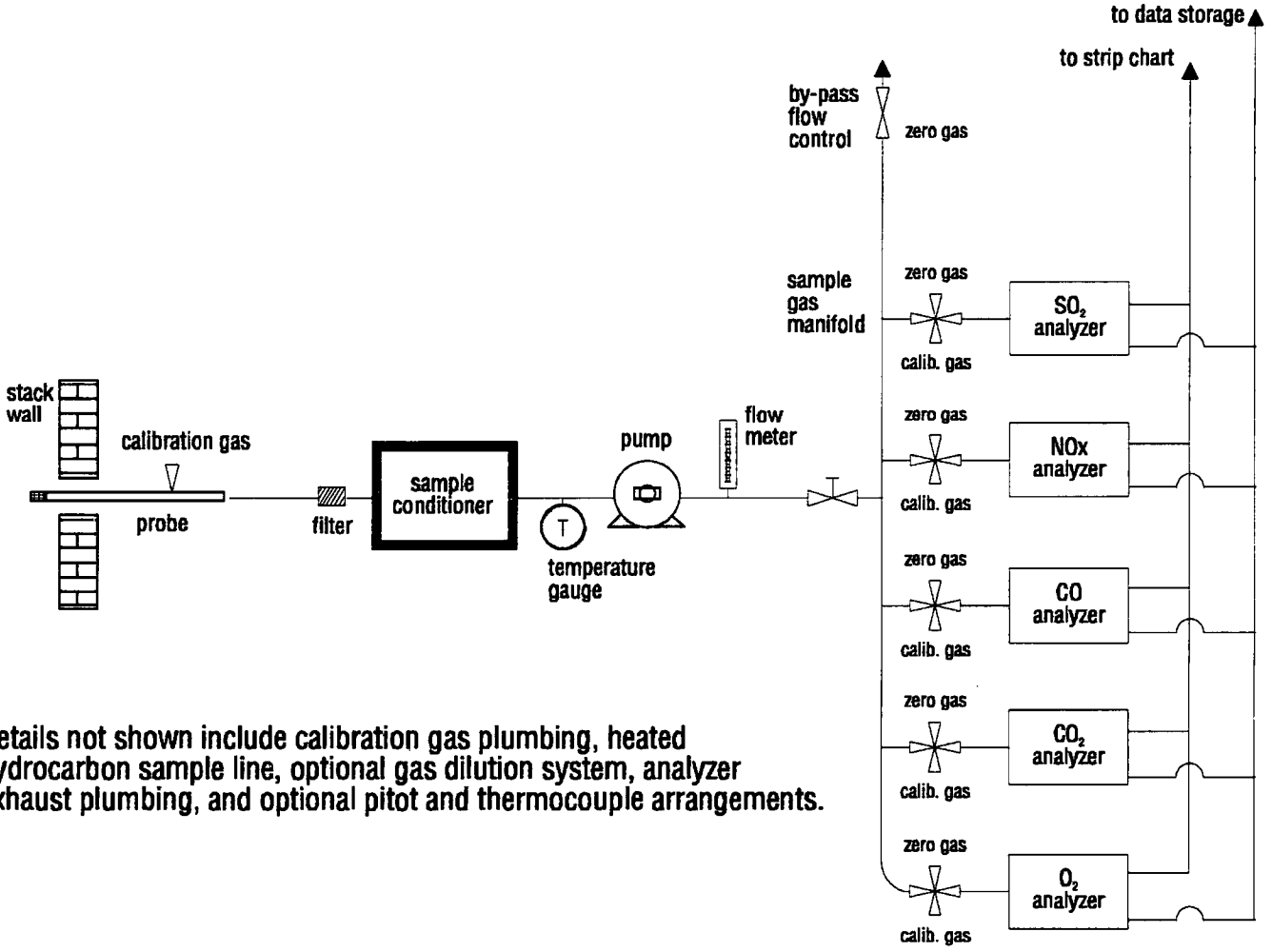
Second Analysis Data:						Date: 5/19/2014
Z: 0	R: 482	C: 448	Conc: 448			
R: 482	Z: 0	C: 449	Conc: 449			
Z: 0	C: 448	R: 482	Conc: 448			
UOM: ppm		Mean Test Assay: 447.67 ppm				

Analyzed by: Nelson Ma
Nelson Ma

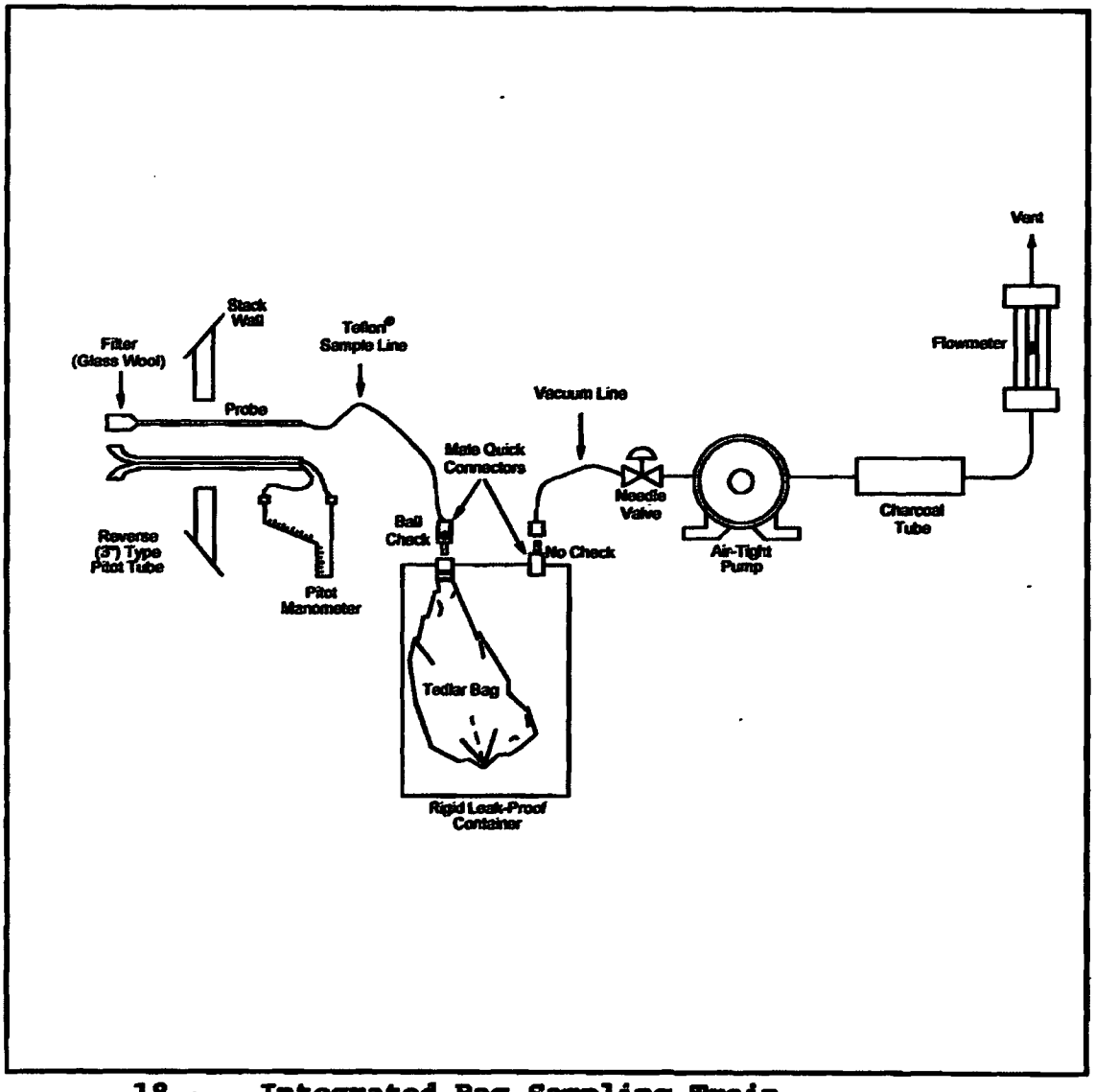
Certified by:
Jacqueline Fiero

H
Sample Train Configuration and Stack Diagrams

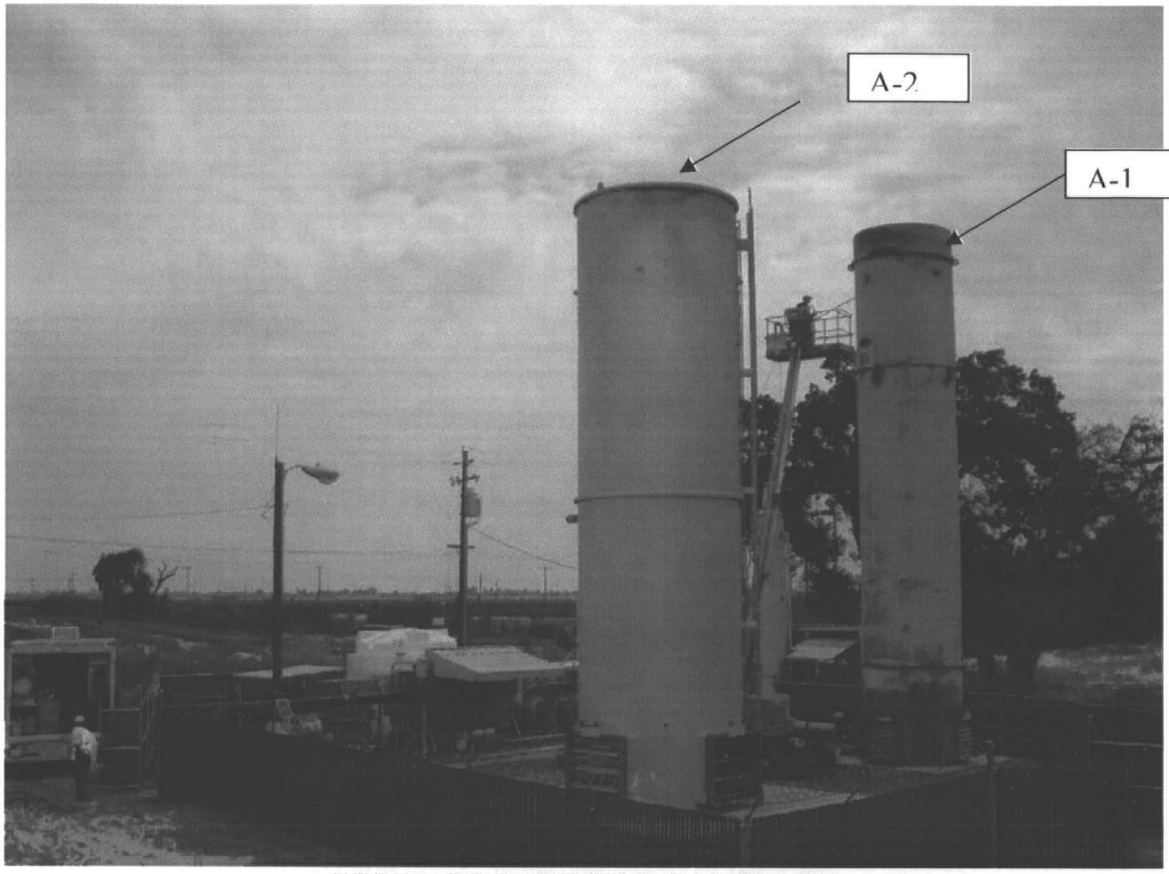
FIGURE 100.1
Method 100 Sample Train Assembly



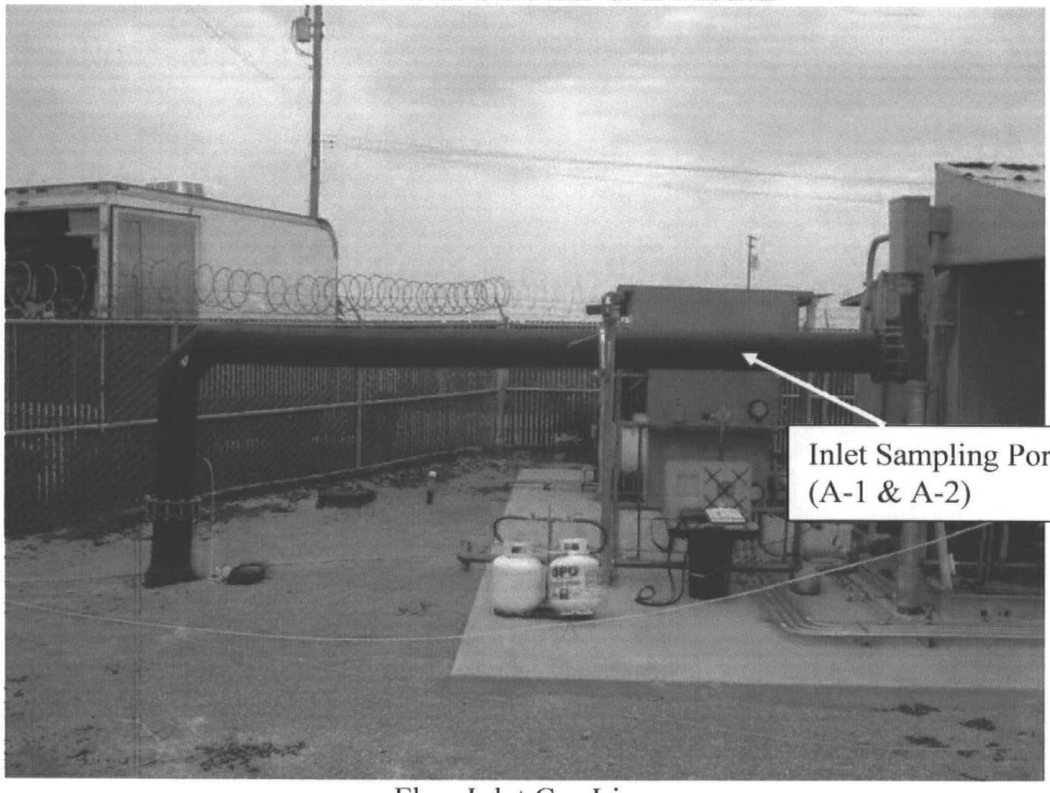
* Details not shown include calibration gas plumbing, heated hydrocarbon sample line, optional gas dilution system, analyzer exhaust plumbing, and optional pitot and thermocouple arrangements.



18 · **Integrated Bag Sampling Train.**



FORWARD LANDFILL GAS FLARE



Flare Inlet Gas Line

I
Related Correspondence (Source Test Plan)

Blue Sky Environmental, Inc
624 San Gabriel Avenue
Albany, California 94706
Cell (510) 508-3469
Office (510) 525-1261
blueskyenvironmental@yahoo.com

April 8, 2014

Attn.: Scott VanDyken
San Joaquin Valley APCD
4230 Kiernan Ave, Ste. 130
Modesto, CA 95356

Scheduled Source Test May 6th, 2014

Re: Source Test Plan (STP) to perform testing as required on the (S-1) 48 MMBTUH & (S-2) 102 MMBtu/hr enclosed flare at Forward Landfill (Facility N-339-17-11), located at 9999 S. Austin Road, Manteca, CA 95336.

Dear, Mr VanDyken

Blue Sky Environmental is pleased to present this Source Test Plan for the above referenced sampling project. Testing will include the following:

1) Three 30 minute test runs will be performed at each Flare exhaust for NOx, CO, CO_2 and O_2 using CARB Method 100. NMOC will be measured per run from Tedlar Bag or SUMMA Canisters using EPA MM18 GC Analysis.
2) Integrated Tedlar bag samples of the Landfill Gas (LFG) will be collected during every test run, and will be analyzed for HHV, CO_2, N_2, O_2, NMOC and CH_4, using ASTM 1945/3588 (EPA 25C). Also, the LFG samples will be analyzed for TRS and sulfur species by ASTM 5504 or SCAQMD 307-91. The samples will be analyzed within 72 hours.
3) Fuel flowrate and moisture will be measured every run by CARB Methods 1 & 2. Moisture will be measured by CARB Method 4 (wet bulb–dry bulb). The exhaust flowrate will be determined by EPA 19 based on fuel analysis and stack oxygen.

Test Parameters	**Inlet**	**Outlet**	**Limits**
O_2, CO_2	ASTM 1945	CARB 100	
CO		CARB 100	CO 0.2 lbs/MMBtu
NO_x		CARB 100	NOx 0.05 lbs/MMBtu
SO_2	ASTM 5504	Calculated	SO_2 0.0215 lbs/MMBtu
VOC (NMOC)	M25C	MM18	VOC D.E. 98% or 20 ppm as Hexane @3%O_2 or 0.0113 lb VOC/MMBtu
CH_4	ASTM 1945	MM18	CH_4 D.E. >99% AB32
Flow	M2	M19	
Moisture	M4 WBDB	N/A	

4) A report will be submitted to the client within four weeks of test program completion (meeting all APCD/AQMD requirements). The report will include a test description and tables presenting emission concentrations, emission factors and/or rates (lbs/hr) for all compliance parameters. All supporting documentation will be included (strip charts, field data sheets, calibrations, calculations, etc.).

This test program is scheduled for May 6th, 2014. The facility contact is Erin Fanning who may be reached at 209 684 4733. If you have any questions, please contact Guy Worthington at 510-525-1261 or 510-508-3469.

Sincerely,

Guy Worthington

SJVAPCD- email: sourcetestN@valleyair.org

San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

HEALTHY AIR LIVING™

April 23, 2014

Mr. Guy Worthington
Blue Sky Environmental
624 San Gabriel Ave
Albany, CA 94706

RE: Approval of Test Protocol
Facility: Forward Inc Landfill
Scheduled Test Date(s): 05/06/2014
Permit(s): N-339-17-8

NOTE: Correct Permit to Operate is N-339-17-8.

District staff has completed the review of the test protocol submitted for the testing of Forward Inc Landfill. The staff finds the protocol will meet the District's requirements. Should the test date or test methods change from the approved protocol, then a modified protocol shall be submitted for review no later than seven (7) days prior to the scheduled test date. Submittal of the modified protocol after this date may result in test cancellation by District staff.

Standard conditions include the following:

1) All data must be recorded by a data logger and shall be submitted to the District in hard copy and in electronic form on cd.
2) A colored copy of the original strip chart must be submitted with the report.
3) If at any time during a test run the measured concentration exceeds the span, the test run shall be considered invalid for determining compliance (in some cases, two recorders or a dual-range recorder may be necessary). The emission standard shall not be less than 30% of the monitoring range.
4) Source test is being performed in accordance with the most recent PTO/ATC.
5) All testing must be done during normal District business hours unless otherwise approved.

All source testing must strictly adhere to the SJVAPCD's Source Test Guidelines, as revised on March 8, 2007. This policy may be found on the District's website (www.valleyair.org). If you have any questions, please contact Scott Van Dyken at (209) 557-6400.

Sincerely,

Thomas J Busenbark

Thomas J Busenbark
Supervising Air Quality Inspector

J
Permit

San Joaquin Valley
Air Pollution Control District

PERMIT UNIT: N-339-17-8 **EXPIRATION DATE:** 07/31/2016

EQUIPMENT DESCRIPTION:
13.8 MILLION CUBIC YARD CAPACITY (218 ACRES) LANDFILL WITH LANDFILL GAS COLLECTION SYSTEM CONTROLLED BY A 2000 SCFM (EQUIVALENT TO 48.0 MMBTU/HR) ENCLOSED FLARE AND CARBON ADSORPTION SYSTEM (CAS), AND A 3400 SCFM (EQUIVALENT TO 102 MMBTU/HR) PERRENIAL ENERGY MODEL GHS-301 LFG-FIRED ENCLOSED FLARE WITH LPG PILOT

PERMIT UNIT REQUIREMENTS

1. All equipment shall be constructed, maintained and operated according to the specifications and plans contained in the permit application except as otherwise specified herein. [District NSR Rule] Federally Enforceable Through Title V Permit
2. All landfill gas collected shall be controlled by the flare. [District NSR Rule] Federally Enforceable Through Title V Permit
3. VOC (NMOC) emissions from the landfill shall not exceed 302.0 lb per day (50 Mg/year). [District NSR Rule] Federally Enforceable Through Title V Permit
4. The VOC destruction efficiency for the flare shall be at least 98% by weight. [District NSR Rule] Federally Enforceable Through Title V Permit
5. The flare shall maintain a temperature of at least 1,400 degrees F during operation. [District NSR Rule] Federally Enforceable Through Title V Permit
6. The landfill gas consumption rate for the flare shall not exceed 48.0 MMBtu per hour. [District NSR Rule] Federally Enforceable Through Title V Permit
7. Landfill gas consumption rate for the flare shall not exceed 804 MMSCF per year. [District NSR Rule] Federally Enforceable Through Title V Permit
8. Emissions from the flare shall not exceed any of the following emission limits: 0.05 lb NOx/MMbtu, 0.0215 lb SOx/MMbtu, 0.2 lb CO/MMbtu, 0.0113 lb VOC/MMbtu (20 ppmv), or 0.034 lb PM10/MMbtu. [District NSR Rule] Federally Enforceable Through Title V Permit
9. The facility shall install and maintain in proper operating condition a gas flow meter with a continuous recording device which measures the amount of landfill gas consumed per day. [District NSR Rule] Federally Enforceable Through Title V Permit
10. The flare shall be equipped with a temperature indicator and recorder that measures and records the operating temperature. The temperature indicator and recorder must operate continuously. [District NSR Rule] Federally Enforceable Through Title V Permit
11. The enclosed flare shall be equipped with automatic dampers, an automatic shutdown device, and a flame arrester. [District NSR Rule] Federally Enforceable Through Title V Permit
12. The enclosed flare shall be equipped with an LPG or natural gas fired pilot. [District NSR Rule] Federally Enforceable Through Title V Permit

PERMIT UNIT REQUIREMENTS CONTINUE ON NEXT PAGE

13. Source testing on the flare shall be performed to demonstrate compliance with the NOx and CO limits, and the VOC destruction efficiency of 98% as required by this permit shall be conducted annually. [District NSR Rule] Federally Enforceable Through Title V Permit
14. Source testing for NOx shall be conducted using CARB Method 7 or Method 20. [District Rule 1081] Federally Enforceable Through Title V Permit
15. Source testing for CO shall be conducted using EPA Method 10 or 10B, CARB Methods 1 through 5 with 10, or CARB Method 100. [District Rule 1081] Federally Enforceable Through Title V Permit
16. VOC emissions shall be measured by EPA Method 18 or 25. [District Rule 1081] Federally Enforceable Through Title V Permit
17. H2S concentration of the influent landfill gas to the flare shall not exceed 46.9 ppmv. [District NSR Rule] Federally Enforceable Through Title V Permit
18. Gas combusted in the flare shall be tested for H2S content on a quarterly basis using draeger tubes. If compliance is shown for two consecutive quarters, the testing frequency may be changed to annual. Quarterly testing shall resume if any annual test shows noncompliance. [District Rule 1081] Federally Enforceable Through Title V Permit
19. Carbon canister on condensate storage tank vent shall be inspected monthly for breakthrough with a District-approved portable analyzer. [District NSR Rule] Federally Enforceable Through Title V Permit
20. The gas collection system shall be operated in such a manner that the surface emissions testing of the landfill shows the concentrations of total organic compounds (measured as methane) do not exceed 1,000 ppmv at any point on the surface of the solid waste disposal site or along the gas transfer path of the gas collection system. Sampling ports shall be installed on each well head. [District NSR Rule] Federally Enforceable Through Title V Permit
21. Gas collection system shall be operated in a manner which maximizes the amount of landfill gas extracted while preventing overdraw that can cause fires or damage the gas collection system. [District NSR Rule] Federally Enforceable Through Title V Permit
22. During maintenance of the gas collection system or incineration device, emissions of landfill gas shall be minimized during shutdown. [District NSR Rule] Federally Enforceable Through Title V Permit
23. Maintenance is defined as work performed on a gas collection system and/or control device in order to ensure continued compliance with District rules, regulations, and/or Permits to Operate, and to prevent its failure or malfunction. [District NSR Rule] Federally Enforceable Through Title V Permit
24. The gas collection system shall be operated such that the concentration of total organic compounds (as CH4) shall not exceed 1,000 ppmv at any point along the gas transfer path of the gas collection system. [District NSR Rule] Federally Enforceable Through Title V Permit
25. The entire gas collection system shall be inspected for leaks with a portable analyzer in accordance with EPA Method 21 at least quarterly. After four successful inspections, the frequency shall be annually. If a leak is detected, quarterly inspections shall resume. A leak is defined as a measurement in excess of 1,000 ppm (measured as methane) above background when measured at a distance of one (1) centimeter from the potential source. Leaks shall be repaired within 15 calendar days after it is detected. [District NSR Rule] Federally Enforceable Through Title V Permit
26. The permittee shall notify the APCO by telephone at least 24 hours before performing any maintenance work that requires the system to be shutdown. The notification shall include a description of work, the date work will be performed and the amount of time needed to complete the maintenance work. [District NSR Rule] Federally Enforceable Through Title V Permit
27. Permittee shall maintain records of system inspections including: date, time and inspection results. [District Rule 1070] Federally Enforceable Through Title V Permit
28. Permittee shall maintain records of maintenance related or other collection system and control device downtime, including individual well shutdown. [District Rule 1070] Federally Enforceable Through Title V Permit

PERMIT UNIT REQUIREMENTS CONTINUE ON NEXT PAGE

29. The operator shall record emission control device source tests (emissions of CO, NOx, and VOC) in pounds per MMbtu heat input. Operator shall also record VOC destruction/treatment efficiency. [District Rule 1081] Federally Enforceable Through Title V Permit

30. Permittee shall maintain daily records of landfill gas flow rate to the flare. [District Rule 1070] Federally Enforceable Through Title V Permit

31. Permittee shall maintain annual records of landfill gas flow rate to the flare. [District NSR Rule] Federally Enforceable Through Title V Permit

32. All records shall be retained for a period of at least 5 years and shall be made available for District inspection upon request. [District Rule 1070] Federally Enforceable Through Title V Permit

33. A record of continuous flare combustion temperature, continuous volumetric gas flow rate, net heating value of landfill gas being combusted, daily average fuel consumption, daily average heat input, and carbon canister inspection shall be maintained, retained on the premises for a period of at least five years and made readily available for District inspection upon request. [District NSR Rule] Federally Enforceable Through Title V Permit

34. This operating permit may be cancelled with APCO approval when the landfill is closed, pursuant to the requirements of this permit, if the landfill is not otherwise subject to the requirements of either 40 CFR part 70 or part 71 and if either 1) it was never subject to the requirement for a control system under 40 CFR 60.752(b)(2); or 2) the owner or operator meets the conditions for control system removal specified in 40 CFR 60.752(b)(2)(v). [40 CFR 60.752(d)] Federally Enforceable Through Title V Permit

35. If the landfill is permanently closed, a closure notification shall be submitted to the APCO within 30 days of waste disposal cessation. A permanent closure must take place in accordance with 40 CFR 258.60. If a closure report has been submitted, no additional waste may be placed in the landfill without filing a notification of modification to the APCO, pursuant to 40 CFR 60.7(a)(4). [40 CFR 60.752(b)(1)(ii)(B), 60.757(d)] Federally Enforceable Through Title V Permit

36. An active collection system shall be designed to handle the maximum expected gas flow rate from the entire area of the landfill that warrants control over the intended use period of the gas control or treatment system equipment, collect has from each area, cell, or group of cells in the landfill in which the initial solid waste has been placed for a period of 5 years or more if active; or 2 years or more if closed or at final grade, collect gas at a sufficient extraction rate, and be designed to minimize off-site migration of subsurface gas. [40 CFR 60.752(b)(2)(ii)(A)] Federally Enforceable Through Title V Permit

37. All collected gas shall be routed to a control system designed and operated to reduce the NMOC by 98 weight percent or reduce the outlet NMOC concentration to less than 20 parts per million by volume, dry basis as hexane at 3 percent oxygen. The reduction efficiency shall be established by an initial performance test to be completed no later than 180 days after the initial startup of the approved control system using the test methods specified in Section 60.754(d). [40 CFR 60.752(b)(2)(iii)(B)] Federally Enforceable Through Title V Permit

38. Permittee shall operate the collection system so that the methane concentration is less than 500 parts per million above background at the surface of the landfill. To determine if this level is exceeded, the owner or operator shall conduct surface testing around the perimeter of the collection area and along a pattern that traverses the landfill at 30 meter intervals and where visual observations indicate elevated concentrations of landfill gas, such as distressed vegetation and cracks or seeps in the cover. The owner or operator may establish an alternative traversing pattern that ensures equivalent coverage. A surface monitoring design plan shall be developed that includes a topographical map with the monitoring route and the rationale for any site-specific deviations from the 30 meter intervals. Areas with steep slopes or other dangerous areas may be excluded from the surface testing. [40 CFR 60.753(d)] Federally Enforceable Through Title V Permit

39. Compliance with this surface methane operational standard shall be demonstrated using the procedures outlined in 40 CFR 60.755(c) within 180 days of installation and startup of the collection and control system and quarterly thereafter. [40 CFR 60.753(d), 40 CFR 60.755(c), and 40 CFR 60.8] Federally Enforceable Through Title V Permit

40. Permittee shall operate the enclosed flare at all times when the collected gas is routed to it. [40 CFR 60.753(f)] Federally Enforceable Through Title V Permit

PERMIT UNIT REQUIREMENTS CONTINUE ON NEXT PAGE

41. Permittee shall operate the landfill gas collection system such that gas is collected from each area, cell, or group of cells in the MSW landfill in which solid waste has been in place for: (1) five years or more if active; or (2) two years or more if closed or at final grade. [40 CFR 60.753(a)] Federally Enforceable Through Title V Permit

42. Permittee shall operate the landfill gas collection system with negative pressure at each wellhead except under the following conditions: (1) A fire or increased well temperature. The owner or operator shall record instances when positive pressure occurs in efforts to avoid a fire. These records shall be submitted with the annual reports ass provided in 60.757(f)(1); (2) Use of a geomembrane or synthetic cover. The owner or operator shall develop acceptable pressure limits in the design plan; (3) A decommissioned well. A well may experience a static positive pressure after shut down to accommodate for declining flows. All design changes shall be approved by the APCO. [40 CFR 60.753(b)] Federally Enforceable Through Title V Permit

43. The collection system shall be operated so that the methane concentration is less than 500 parts per million above background at the surface of the landfill, and such that all collected gases are vented to a control system designed and operated in compliance with ⊥ 60.752(b)(2)(iii). In the event the collection or control system is inoperable, the gas mover system shall be shut down and all valves in the collection and control system contributing to venting of the gas to the atmosphere shall be closed within 1 hour. [40 CFR 60.753(d), (e)] Federally Enforceable Through Title V Permit

44. If monitoring demonstrates that the operational requirements in paragraphs (b), (c), or (d) of section 60.753 are not met, corrective action shall be taken as specified in 40 CFR 60.755(a)(3 - 5) or (c). If corrective actions are taken as specified in 60.755, the monitored exceedance is not a violation of the operational requirements in this section. [40 CFR 60.753(g)] Federally Enforceable Through Title V Permit

45. For each interior wellhead, the nitrogen level shall be determined using Method 3C, unless an alternative test method is established as allowed by 60.752(b)(2)(i) of this subpart. [40 CFR 60.753(c)(1)] Federally Enforceable Through Title V Permit

46. For each interior wellhead, unless an alternative test method is established as allowed by 60.752(b)(2)(i) of this subpart, the oxygen shall be determined by an oxygen meter using Method 3A or 3C except that: (i) The span shall be set so that the regulatory limit is between 20 and 50 percent of the span; (ii) A data recorder is not required; (iii) Only two calibration gases are required, a zero and span, and ambient air may be used as the span; (iv) A calibration error check is not required; (v) The allowable sample bias, zero drift, and calibration drift are fi10 percent. [40 CFR 60.753(c)(2)] Federally Enforceable Through Title V Permit

47. Permittee shall calculate the NMOC emission rate for purposes of determining when the collection and control system can be removed as provided in 40 CFR 60.752(b)(2)(v) by using the equation found in 40 CFR 60.754(b). [40 CFR 60.754(b)] Federally Enforceable Through Title V Permit

48. For the performance test required in 60.752(b)(2)(iii)(B), Method 25, 25C, or Method 18 of Appendix A must be used to determine compliance with the 98 weight percent efficiency or the 20 ppmv outlet concentration level, unless another method to demonstrate compliance has been approved by the APCO as provided by 60.752(b)(2)(i)(B). Method 3 or 3A shall be used to determine oxygen for correcting the NMOC concentration as hexane to 3 percent. In cases where the outlet concentration is less than 50 ppm NMOC as carbon (8 ppm NMOC as hexane), Method 25A should be used in place of Method 25. If using Method 18 of appendix A, the minimum list of compounds to be tested shall be those published in the most recent Compilation of Air Pollutant Emission Factors (AP-42). The following equation shall be used to calculate efficiency: (NMOCin - NMOCout)/NMOCin. The District must be notified at least 30 days prior to any compliance source test, and a source test plan must be submitted for approval at least 15 days prior to testing. [District Rule 1081; 40 CFR 60.754(d)] Federally Enforceable Through Title V Permit

49. For the purposes of calculating the maximum expected gas generation flow rate from the landfill to determine compliance with 60.752(b)(2)(ii)(A)(1), one of the equations in Section 60.755(a)(1)(i) or (ii) or (iii) shall be used. [40 CFR 60.755(a)(1)] Federally Enforceable Through Title V Permit

50. For the purposes of determining sufficient density of gas collectors for compliance with 60.752(b)(2)(ii)(A)(2), the owner or operator shall design a system of vertical wells, horizontal collectors, or other collection devices, satisfactory to the APCO, capable of controlling and extracting gas from all portions of the landfill sufficient to meet all operational and performance standards. [40 CFR 60.755(a)(2)] Federally Enforceable Through Title V Permit

PERMIT UNIT REQUIREMENTS CONTINUE ON NEXT PAGE

51. For the purpose of demonstrating whether the gas collection system flow rate is sufficient to determine compliance with 60.752(b)(2)(ii)(A)(3), the owner or operator shall measure gauge pressure in the gas collection header at each individual well, monthly. If a positive pressure exists, action shall be initiated to correct the exceedance within 5 calendar days, except for the three conditions allowed under 60.753(b). If negative pressure cannot be achieved without excess air infiltration within 15 calendar days of the first measurement, the gas collection system shall be expanded to correct the exceedance within 120 days of the initial measurement of positive pressure. Any attempted corrective measure shall not cause exceedances of other operational or performance standards. An alternative timeline for correcting the exceedance may be submitted to the APCO for approval. [40 CFR 60.755(a)(3)] Federally Enforceable Through Title V Permit

52. Owners or operators are not required to expand the system as required in paragraph 60.755(a)(3) during the first 180 days after gas collection system startup. [40 CFR 60.755(a)(4)] Federally Enforceable Through Title V Permit

53. For the purpose of identifying whether excess air infiltration into the landfill is occurring, the owner or operator shall monitor each well monthly for temperature and nitrogen or oxygen as provided in 60.753(c). If a well exceeds one of these operating parameters, action shall be initiated to correct the exceedance within 5 calendar days. If correction of the exceedance cannot be achieved within 15 calendar days of the first measurement, the gas collection system shall be expanded to correct the exceedance within 120 days of the initial exceedance. Any attempted corrective measure shall not cause exceedance of other operational or performance standards. An alternative timeline for corrected in the exceedance may be submitted to the APCO for approval. [40 CFR 60.755(a)(5)] Federally Enforceable Through Title V Permit

54. The provisions of this subpart apply at all times, except during periods of start-up, shutdown, or malfunction, provided that the duration of start-up, shutdown, or malfunction shall not exceed 5 days for collection systems and shall not exceed 1 hour for treatment or control devices. [40 CFR 60.755(e)] Federally Enforceable Through Title V Permit

55. Surface testing shall be performed on a quarterly basis using an organic vapor analyzer, flame ionization detector, or other portable monitor meeting the specifications provided in 40 CFR 60.755(d). [40 CFR 60.755(c)(1)] Federally Enforceable Through Title V Permit

56. The background concentration shall be determined by moving the probe inlet upwind and downwind outside the boundary of the landfill at a distance of at least 30 meters from the perimeter wells. [40 CFR 60.755(c)(2)] Federally Enforceable Through Title V Permit

57. Surface emission monitoring shall be performed in accordance with section 4.3.1 of Method 21 of appendix A, except that the probe inlet shall be placed within 5 to 10 centimeters of the ground. Monitoring shall be performed during typical meteorological conditions. Any reading of 500 parts per million or more above background at any location shall be recorded as a monitored exceedance and the actions specified in 40 CFR 60.755(c)(4)(i-v) shall be taken. As long as the specified actions are taken, the exceedance is not a violation of the operational requirements of 60.753(d). [40 CFR 60.755(c)(3), (4)] Federally Enforceable Through Title V Permit

58. Permittee shall implement a program to monitor for cover integrity and implement cover repairs as necessary on a monthly basis. [40 CFR 60.755(c)(5)] Federally Enforceable Through Title V Permit

59. The portable analyzer shall meet the instrument specifications of Method 21, section 3 (except that "methane" shall replace all references to VOC). The calibration gas shall be methane, diluted to a nominal concentration of 500 parts per million in air. To meet the performance evaluation requirements of Method 21, section 3.1.3, the instrument evaluation procedures of Method 21, section 4.4 shall be used. The calibration procedures provided in Method 21, section 4.2 shall be followed immediately before commencing a surface monitoring survey. The provisions of this condition apply at all times, except during periods of start-up, shutdown, or malfunction which shall not exceed 5 days for collections systems and shall not exceed 1 hour for treatment or control devices. [40 CFR 60.755(d), (e)] Federally Enforceable Through Title V Permit

60. Each wellhead shall have a sampling port and a thermometer, other temperature-measuring device, or an access port for temperature measurements. [40 CFR 60.756(a)] Federally Enforceable Through Title V Permit

PERMIT UNIT REQUIREMENTS CONTINUE ON NEXT PAGE

61. The enclosed flare shall be equipped with a temperature monitoring device equipped with a continuous recorder and having a minimum accuracy of fi1 percent of the temperature being measured expressed in degrees Celsius or fi 0.5 degrees Celsius, whichever is greater. [District NSR Rule; 40 CFR 60.756(b)(1)] Federally Enforceable Through Title V Permit

62. The enclosed flare shall be equipped with either a device that records flow to the control device. The owner or operator shall install, calibrate, and maintain a gas flow rate measuring device that shall record the flow to the control device at least every 15 minutes. [40 CFR 60.756(b)(2)] Federally Enforceable Through Title V Permit

63. Operator shall measure the gauge pressure in the gas collection header on a monthly basis as provided in $^{\perp}$ 60.755(a)(3); and monitor nitrogen or oxygen concentration in the landfill gas on a monthly basis as provided in $^{\perp}$ 60.755(a)(5); and monitor temperature of the landfill gas on a monthly basis as provided in $^{\perp}$ 60.755(a)(5). [40 CFR 60.756(a)] Federally Enforceable Through Title V Permit

64. Any closed landfill that has no monitored exceedances of the operational standard in three consecutive quarterly monitoring periods may skip to annual monitoring. Any methane reading of 500 ppm or more above background detected during the annual monitoring returns the frequency for that landfill to quarterly monitoring. [40 CFR 60.756(f)] Federally Enforceable Through Title V Permit

65. Each owner or operator shall keep for at least 5 years up-to-date, readily accessible, on-site records of the maximum design capacity, the current amount of solid waste in-place, and the year-by-year waste acceptance rate. Off-site records may be maintained if they are retrievable within 4 hours. [40 CFR 60.758(a) and District Rule 2520, 9.4.2] Federally Enforceable Through Title V Permit

66. The initial annual report shall be submitted within 180 days of installation and start-up of the collection and control system, and shall include the initial performance test report required under 40 CFR 60.8. The initial report shall include information specified in 40 CFR 60.757(g)(1-6). [40 CFR 60.757(f), (g)] Federally Enforceable Through Title V Permit

67. The following constitute exceedances that shall be recorded and reported under 40 CFR 60.757(f): all 3-hour periods of operation during which the average combustion temperature was more than 28 øC below the average combustion temperature during the most recent performance test (flare source test). [40 CFR 60.758(c)] Federally Enforceable Through Title V Permit

68. Except as provided in 60.752(b)(2)(i)(B), each owner or operator of a controlled landfill shall keep up-to-date, readily accessible records for the life of the control equipment of the data listed in paragraphs 60.758(b)(1) through (b)(4) as measured during the initial performance test or compliance determination. Records of subsequent tests or monitoring shall be maintained for a minimum of 5 years. Records of the control device vendor specifications shall be maintained until removal. [40 CFR 60.758(b)] Federally Enforceable Through Title V Permit

69. Permittee shall keep the following records: (1)(i) the maximum expected gas generation flow rate as calculated in 60.755(a)(1). The owner or operator may use another method to determine the maximum gas generation flow rate, if the method has been approved by the APCO; (ii) the density of wells, horizontal collectors, surface collectors, or other gas extraction devices determined using the procedures specified in 60.759(a)(1); (2)(i) the average combustion temperature measured at least every 15 minutes and averaged over the same time period of the performance test; (ii) the percent reduction of NMOC determined as specified in 60.752(b)(2)(ii)(B) achieved by the control device. [40 CFR 60.758(b)(1) and (2)] Federally Enforceable Through Title V Permit

70. Permittee shall keep up-to-date, readily accessible continuous records of the indication of flow to the enclosed flare. [40 CFR 60.758(c)] Federally Enforceable Through Title V Permit

71. Except as provided in 60.752(b)(2)(i)(B), permittee shall keep, for the life of the collection system, an up-to-date, readily accessible plot map showing each existing and planned collector in the system and providing a unique identification location label for each collector. Permittee shall keep readily accessible documentation of the nature, date of deposition, amount, and location of asbestos-containing or nondegradable waste excluded from collection as well as any nonproductive areas excluded from collection. [40 CFR 60.758(d)] Federally Enforceable Through Title V Permit

PERMIT UNIT REQUIREMENTS CONTINUE ON NEXT PAGE

72. Except as provided in 60.752(b)(2)(i)(B), permittee shall keep for at least 5 years up-to-date, readily accessible records of all collection and control system exceedances of the operational standards in 60.753, the reading in the subsequent month whether or not the second reading is an exceedance, and the location of each exceedance. [40 CFR 60.758(e)] Federally Enforceable Through Title V Permit

73. Each owner or operator seeking to comply with 40 CFR 60.752(b)(2)(i) shall site active collection wells, horizontal collectors, surface collectors, or other extraction devices at a sufficient density throughout all gas producing areas using the following procedures unless alternative procedures have been approved by the APCO as provided in 60.752(b)(2)(i)(C) and (D). [40 CFR 60.759(a)] Federally Enforceable Through Title V Permit

74. The collection devices within the interior and along the perimeter areas shall be certified to achieve comprehensive control of surface gas emissions by a professional engineer. The following issues shall be addressed in the design: depths of refuse, refuse gas generation rates and flow characteristics, cover properties, gas system expandability, leachate and condensate management, accessibility, compatibility with filling operations, integration with closure end use, air intrusion control, corrosion resistance, fill settlement, and resistance to the refuse decomposition heat. [40 CFR 60.759(a)(1)] Federally Enforceable Through Title V Permit

75. The placement of gas collection devices determined in paragraph 60.759(a)(1) shall control all gas producing areas, except as provided by paragraphs 60.759(a)(3)(i) and (a)(3)(ii). [40 CFR 60.759(a)(3)] Federally Enforceable Through Title V Permit

76. The sufficient density of gas collection devices determined in paragraph 60.759(a)(1) shall address landfill gas migration issues and augmentation of the collection system through the use of active or passive systems at the landfill perimeter or exterior. [40 CFR 60.759(a)(2)] Federally Enforceable Through Title V Permit

77. Any segregated area of asbestos or nondegradable material may be excluded from collection if documented as provided under 60.758(d). The documentation shall provide the nature, date of deposition, location and amount of asbestos or nondegradable material deposited in the area, and shall be provided to the Administrator upon request. [40 CFR 60.759(a)(3)(i)] Federally Enforceable Through Title V Permit

. Any nonproductive area of the landfill may be excluded from control provided that the total of all excluded areas can be shown to contribute less than 1 percent of the total amount of NMOC emissions from the landfill. The amount, location, and age of the material shall be documented and provided to the Administrator upon request. A separate NMOC emissions estimate shall be made for each section proposed for exclusion, and the sum of all such sections shall be compared to the NMOC emissions estimate for the entire landfill. Emissions from each section shall be computed using the equation in Section 60.759(a)(3)(ii). [40 CFR 60.759(a)(3)(ii)] Federally Enforceable Through Title V Permit

79. The values for k and CNMOC in equation in Section 60.759(a)(3)(ii) determined in field testing shall be used if field testing has been performed in determining the NMOC emission rate or the radii of influence (this distance from the well center to a point in the landfill where the pressure gradient applied by the blower or compressor approaches zero). If field testing has not been performed, the default values for k, Lo, and CNMOC provided in 60.754(a)(1) or the alternative values from 60.754(a)(5) shall be used. The mass of nondegradable solid waste contained within the given section may be subtracted from the total mass of the section when estimating emissions provided the nature, location, age, and amount of the nondegradable material is documented as provided in paragraph 60.759(a)(3)(i). [40 CFR 60.759(a)(3)(iii)] Federally Enforceable Through Title V Permit

PERMIT UNIT REQUIREMENTS CONTINUE ON NEXT PAGE

80. Each owner or operator seeking to comply with 60.752(b)(2)(i)(A) shall construct the gas collection devices using the following equipment or procedures: (1) The landfill gas extraction components shall be constructed of polyvinyl chloride (PVC), high density polyethylene (HDPE) pipe, fiberglass, stainless steel, or other nonporous corrosion resistant material of suitable dimensions to: convey projected amounts of gases; withstand installation, static, and settlement forces; and withstand planned overburden or traffic loads. The collection system shall extend as necessary to comply with emission and migration standards. Collection devices such as wells and horizontal collectors shall be perforated to allow gas entry without head loss sufficient to impair performance across the intended extent of control. Perforations shall be situated with regard to the need to prevent excessive air infiltration; (2) Vertical wells shall be placed so as not to endanger underlying liners and shall address the occurrence of water within the landfill. Holes and trenches constructed for piped wells and horizontal collectors shall be of sufficient cross-section so as to allow for their proper construction and completion including, for example, centering of pipes and placement of gravel backfill. Collection devices shall be designed so as not to allow indirect short circuiting of air into the cover or refuse into the collection system or gas into the air. Any gravel used around pipe perforations should be of a dimension so as not to penetrate or block perforations; (3) Collection devices may be connected to the collection header pipes below or above the landfill surface. The connector assembly shall include a positive closing throttle valve, any necessary seals and couplings, access couplings and at least one sampling port. The collection devices shall be constructed of PVC, HDPE, fiberglass, stainless steel, or other nonporous material of suitable thickness. [40 CFR 60.759(b)] Federally Enforceable Through Title V Permit

81. Each owner or operator seeking to comply with 60.752(b)(2)(i)(A) shall convey the landfill gas to a control system in compliance with 60.752(b)(2)(iii) through the collection header pipe(s). The gas mover equipment shall be sized to handle the maximum gas generation flow rate expected over the intended use period of the gas moving equipment using the following procedures: (1) For existing collection systems, the flow data shall be used to project the maximum flow rate. If no flow data exists, the procedures in paragraph 60.759(c)(2) shall be used; (2) For new collection systems, the maximum flow rate shall be in accordance with 60.755(a)(1). [40 CFR 60.759(c)] Federally Enforceable Through Title V Permit

82. The gas collection and control system shall comply with the operational standards of 40 CFR 60.753, the compliance provisions of 40 CFR 60.755, the monitoring provisions of 40 CFR 60.756, the reporting and record keeping requirements of 40 CFR 60.757 and 60.758, and the requirements of 40 CFR 60.759 (for active collection systems), except as allowed in conditions 40 and 41. [40 CFR 60.752(b)(2)(ii), 60.753, 60.755, 60.756, 60.757, 60.758, and 60.759] Federally Enforceable Through Title V Permit

83. All exterior vapor extraction wells, leachate collection system components, and perimeter horizontal collectors are exempt from the operational standards of 40 CFR 60.753 and the compliance provisions of 40 CFR 60.755 and shall not be located over any waste. Forward Inc. shall keep records of all components that qualify for this exemption and note their location with respect to the landfill's perimeter. [40 CFR 60.752(b)(2)(ii), 60.753, 60.755, 60.756, 60.757, 60.758, and 60.759] Federally Enforceable Through Title V Permit

84. Components of the gas collection and control system with wellhead oxygen content no greater than 15% by volume are allowed. All other provisions of Condition #82 apply. Forward Inc. shall keep records of all components that qualify for the higher wellhead oxygen limit. Records shall include interior wellhead and collection system landfill gas temperature which shall be less than 55 C (131 F) and shall keep records of methane % by volume to indicate that methanogenic activity is continuing to occur. [40 CFR 60.752(b)(2)(ii), 60.753, 60.755, 60.756, 60.757, 60.758, and 60.759] Federally Enforceable Through Title V Permit

85. Forward Inc. may remove extraction wells from service provided operational requirements of remaining extraction wells and surface emissions are within permit limits. Forward Inc. shall keep records of quarterly surface emission monitoring and probe monitoring for subsurface migration, as required under NSPS to indicate if removal of any of the collectors results in insufficient collection system coverage. [40 CFR 60.752(b)(2)(ii), 60.753, 60.755, 60.756, 60.757, 60.758, and 60.759] Federally Enforceable Through Title V Permit

86. Each owner or operator, required by 40 CFR 60.752(b)(2) of subpart WWW to install a collection and control system, shall comply with the requirements in 40 CFR 63.1960 through 63.1985 and with the general provisions specified in table 1 of 40 CFR 63 subpart AAAA. [40 CFR 63.1955(b)] Federally Enforceable Through Title V Permit

PERMIT UNIT REQUIREMENTS CONTINUE ON NEXT PAGE

87. For approval of collection and control systems that include any alternatives to the operational standards, test methods, procedures, compliance measures, monitoring, recordkeeping or reporting provisions, owner or operator must follow the procedures in 40 CFR 60.752(b)(2). If alternatives have already been approved under 40 CFR part 60 subpart WWW, these alternatives can be used to comply with 40 CFR 63 subpart AAAA, except that all affected sources must comply with the startup, shutdown, and malfunction (SSM) requirements in subpart A of 40 CFR 63 as specified in Table 1 of 40 CFR 63 subpart AAAA and all affected sources must submit compliance reports every 6 months as specified in 40 CFR 63.1980(a) and (b), including information on all deviations that occurred during the 6-month reporting period. Deviations for continuous emission monitors or numerical continuous parameter monitors must be determined using a 3 hour monitoring block average. [40 CFR 63.1955(c)] Federally Enforceable Through Title V Permit

INSPECTION

EXPIRATION DATE: 07/31/2016

LEGAL OWNER OR OPERATOR: FORWARD INC LANDFILL
MAILING ADDRESS: 9999 S AUSTIN RD
MANTECA, CA 95336

WORKSHEET

LOCATION: 9999 S. AUSTIN ROAD
MANTECA, CA 95336

INSPECT PROGRAM PARTICIPANT: NO

EQUIPMENT DESCRIPTION:
13.8 MILLION CUBIC YARD CAPACITY (218 ACRES) LANDFILL WITH LANDFILL GAS COLLECTION SYSTEM CONTROLLED BY A 2000 SCFM (EQUIVALENT TO 48.0 MMBTU/HR) ENCLOSED FLARE AND CARBON ADSORPTION SYSTEM (CAS), AND A 3400 SCFM (EQUIVALENT TO 102 MMBTU/HR) PERRENIAL ENERGY MODEL GHS-301 LFG-FIRED ENCLOSED FLARE WITH LPG PILOT

CONDITIONS

1. All equipment shall be constructed, maintained and operated according to the specifications and plans contained in the permit application except as otherwise specified herein. [District NSR Rule] Federally Enforceable Through Title V Permit
2. All landfill gas collected shall be controlled by the flare. [District NSR Rule] Federally Enforceable Through Title V Permit
3. VOC (NMOC) emissions from the landfill shall not exceed 302.0 lb per day (50 Mg/year). [District NSR Rule] Federally Enforceable Through Title V Permit
4. The VOC destruction efficiency for the flare shall be at least 98% by weight. [District NSR Rule] Federally Enforceable Through Title V Permit
5. The flare shall maintain a temperature of at least 1,400 degrees F during operation. [District NSR Rule] Federally Enforceable Through Title V Permit
6. The landfill gas consumption rate for the flare shall not exceed 48.0 MMBtu per hour. [District NSR Rule] Federally Enforceable Through Title V Permit
7. Landfill gas consumption rate for the flare shall not exceed 804 MMSCF per year. [District NSR Rule] Federally Enforceable Through Title V Permit
8. Emissions from the flare shall not exceed any of the following emission limits: 0.05 lb NOx/MMbtu, 0.0215 lb SOx/MMbtu, 0.2 lb CO/MMbtu, 0.0113 lb VOC/MMbtu (20 ppmv), or 0.034 lb PM10/MMbtu. [District NSR Rule] Federally Enforceable Through Title V Permit
9. The facility shall install and maintain in proper operating condition a gas flow meter with a continuous recording device which measures the amount of landfill gas consumed per day. [District NSR Rule] Federally Enforceable Through Title V Permit
10. The flare shall be equipped with a temperature indicator and recorder that measures and records the operating temperature. The temperature indicator and recorder must operate continuously. [District NSR Rule] Federally Enforceable Through Title V Permit
11. The enclosed flare shall be equipped with automatic dampers, an automatic shutdown device, and a flame arrester. [District NSR Rule] Federally Enforceable Through Title V Permit
12. The enclosed flare shall be equipped with an LPG or natural gas fired pilot. [District NSR Rule] Federally Enforceable Through Title V Permit
13. Source testing on the flare shall be performed to demonstrate compliance with the NOx and CO limits, and the VOC destruction efficiency of 98% as required by this permit shall be conducted annually. [District NSR Rule] Federally Enforceable Through Title V Permit

14. Source testing for NOx shall be conducted using CARB Method 7 or Method 20. [District Rule 1081] Federally Enforceable Through Title V Permit
15. Source testing for CO shall be conducted using EPA Method 10 or 10B, CARB Methods 1 through 5 with 10, or CARB Method 100. [District Rule 1081] Federally Enforceable Through Title V Permit
16. VOC emissions shall be measured by EPA Method 18 or 25. [District Rule 1081] Federally Enforceable Through Title V Permit
17. H2S concentration of the influent landfill gas to the flare shall not exceed 46.9 ppmv. [District NSR Rule] Federally Enforceable Through Title V Permit
18. Gas combusted in the flare shall be tested for H2S content on a quarterly basis using draeger tubes. If compliance is shown for two consecutive quarters, the testing frequency may be changed to annual. Quarterly testing shall resume if any annual test shows noncompliance. [District Rule 1081] Federally Enforceable Through Title V Permit
19. Carbon canister on condensate storage tank vent shall be inspected monthly for breakthrough with a District-approved portable analyzer. [District NSR Rule] Federally Enforceable Through Title V Permit
20. The gas collection system shall be operated in such a manner that the surface emissions testing of the landfill shows the concentrations of total organic compounds (measured as methane) do not exceed 1,000 ppmv at any point on the surface of the solid waste disposal site or along the gas transfer path of the gas collection system. Sampling ports shall be installed on each well head. [District NSR Rule] Federally Enforceable Through Title V Permit
21. Gas collection system shall be operated in a manner which maximizes the amount of landfill gas extracted while preventing overdraw that can cause fires or damage the gas collection system. [District NSR Rule] Federally Enforceable Through Title V Permit
22. During maintenance of the gas collection system or incineration device, emissions of landfill gas shall be minimized during shutdown. [District NSR Rule] Federally Enforceable Through Title V Permit
23. Maintenance is defined as work performed on a gas collection system and/or control device in order to ensure continued compliance with District rules, regulations, and/or Permits to Operate, and to prevent its failure or malfunction. [District NSR Rule] Federally Enforceable Through Title V Permit
24. The gas collection system shall be operated such that the concentration of total organic compounds (as CH4) shall not exceed 1,000 ppmv at any point along the gas transfer path of the gas collection system. [District NSR Rule] Federally Enforceable Through Title V Permit
25. The entire gas collection system shall be inspected for leaks with a portable analyzer in accordance with EPA Method 21 at least quarterly. After four successful inspections, the frequency shall be annually. If a leak is detected, quarterly inspections shall resume. A leak is defined as a measurement in excess of 1,000 ppm (measured as methane) above background when measured at a distance of one (1) centimeter from the potential source. Leaks shall be repaired within 15 calendar days after it is detected. [District NSR Rule] Federally Enforceable Through Title V Permit
26. The permittee shall notify the APCO by telephone at least 24 hours before performing any maintenance work that requires the system to be shutdown. The notification shall include a description of work, the date work will be performed and the amount of time needed to complete the maintenance work. [District NSR Rule] Federally Enforceable Through Title V Permit
27. Permittee shall maintain records of system inspections including: date, time and inspection results. [District Rule 1070] Federally Enforceable Through Title V Permit
28. Permittee shall maintain records of maintenance related or other collection system and control device downtime, including individual well shutdown. [District Rule 1070] Federally Enforceable Through Title V Permit
29. The operator shall record emission control device source tests (emissions of CO, NOx, and VOC) in pounds per MMbtu heat input. Operator shall also record VOC destruction/treatment efficiency. [District Rule 1081] Federally Enforceable Through Title V Permit
30. Permittee shall maintain daily records of landfill gas flow rate to the flare. [District Rule 1070] Federally Enforceable Through Title V Permit

31. Permittee shall maintain annual records of landfill gas flow rate to the flare. [District NSR Rule] Federally Enforceable Through Title V Permit

32. All records shall be retained for a period of at least 5 years and shall be made available for District inspection upon request. [District Rule 1070] Federally Enforceable Through Title V Permit

33. A record of continuous flare combustion temperature, continuous volumetric gas flow rate, net heating value of landfill gas being combusted, daily average fuel consumption, daily average heat input, and carbon canister inspection shall be maintained, retained on the premises for a period of at least five years and made readily available for District inspection upon request. [District NSR Rule] Federally Enforceable Through Title V Permit

34. This operating permit may be cancelled with APCO approval when the landfill is closed, pursuant to the requirements of this permit, if the landfill is not otherwise subject to the requirements of either 40 CFR part 70 or part 71 and if either 1) it was never subject to the requirement for a control system under 40 CFR 60.752(b)(2); or 2) the owner or operator meets the conditions for control system removal specified in 40 CFR 60.752(b)(2)(v). [40 CFR 60.752(d)] Federally Enforceable Through Title V Permit

35. If the landfill is permanently closed, a closure notification shall be submitted to the APCO within 30 days of waste disposal cessation. A permanent closure must take place in accordance with 40 CFR 258.60. If a closure report has been submitted, no additional waste may be placed in the landfill without filing a notification of modification to the APCO, pursuant to 40 CFR 60.7(a)(4). [40 CFR 60.752(b)(1)(ii)(B), 60.757(d)] Federally Enforceable Through Title V Permit

36. An active collection system shall be designed to handle the maximum expected gas flow rate from the entire area of the landfill that warrants control over the intended use period of the gas control or treatment system equipment, collect has from each area, cell, or group of cells in the landfill in which the initial solid waste has been placed for a period of 5 years or more if active; or 2 years or more if closed or at final grade, collect gas at a sufficient extraction rate, and be designed to minimize off-site migration of subsurface gas. [40 CFR 60.752(b)(2)(ii)(A)] Federally Enforceable Through Title V Permit

37. All collected gas shall be routed to a control system designed and operated to reduce the NMOC by 98 weight percent or reduce the outlet NMOC concentration to less than 20 parts per million by volume, dry basis as hexane at 3 percent oxygen. The reduction efficiency shall be established by an initial performance test to be completed no later than 180 days after the initial startup of the approved control system using the test methods specified in Section 60.754(d). [40 CFR 60.752(b)(2)(iii)(B)] Federally Enforceable Through Title V Permit

38. Permittee shall operate the collection system so that the methane concentration is less than 500 parts per million above background at the surface of the landfill. To determine if this level is exceeded, the owner or operator shall conduct surface testing around the perimeter of the collection area and along a pattern that traverses the landfill at 30 meter intervals and where visual observations indicate elevated concentrations of landfill gas, such as distressed vegetation and cracks or seeps in the cover. The owner or operator may establish an alternative traversing pattern that ensures equivalent coverage. A surface monitoring design plan shall be developed that includes a topographical map with the monitoring route and the rationale for any site-specific deviations from the 30 meter intervals. Areas with steep slopes or other dangerous areas may be excluded from the surface testing. [40 CFR 60.753(d)] Federally Enforceable Through Title V Permit

39. Compliance with this surface methane operational standard shall be demonstrated using the procedures outlined in 40 CFR 60.755(c) within 180 days of installation and startup of the collection and control system and quarterly thereafter. [40 CFR 60.753(d), 40 CFR 60.755(c), and 40 CFR 60.8] Federally Enforceable Through Title V Permit

40. Permittee shall operate the enclosed flare at all times when the collected gas is routed to it. [40 CFR 60.753(f)] Federally Enforceable Through Title V Permit

41. Permittee shall operate the landfill gas collection system such that gas is collected from each area, cell, or group of cells in the MSW landfill in which solid waste has been in place for: (1) five years or more if active; or (2) two years or more if closed or at final grade. [40 CFR 60.753(a)] Federally Enforceable Through Title V Permit

42. Permittee shall operate the landfill gas collection system with negative pressure at each wellhead except under the following conditions: (1) A fire or increased well temperature. The owner or operator shall record instances when positive pressure occurs in efforts to avoid a fire. These records shall be submitted with the annual reports ass provided in 60.757(f)(1); (2) Use of a geomembrane or synthetic cover. The owner or operator shall develop acceptable pressure limits in the design plan; (3) A decommissioned well. A well may experience a static positive pressure after shut down to accommodate for declining flows. All design changes shall be approved by the APCO. [40 CFR 60.753(b)] Federally Enforceable Through Title V Permit

43. The collection system shall be operated so that the methane concentration is less than 500 parts per million above background at the surface of the landfill, and such that all collected gases are vented to a control system designed and operated in compliance with $^{\perp}$ 60.752(b)(2)(iii). In the event the collection or control system is inoperable, the gas mover system shall be shut down and all valves in the collection and control system contributing to venting of the gas to the atmosphere shall be closed within 1 hour. [40 CFR 60.753(d), (e)] Federally Enforceable Through Title V Permit

44. If monitoring demonstrates that the operational requirements in paragraphs (b), (c), or (d) of section 60.753 are not met, corrective action shall be taken as specified in 40 CFR 60.755(a)(3 - 5) or (c). If corrective actions are taken as specified in 60.755, the monitored exceedance is not a violation of the operational requirements in this section. [40 CFR 60.753(g)] Federally Enforceable Through Title V Permit

45. For each interior wellhead, the nitrogen level shall be determined using Method 3C, unless an alternative test method is established as allowed by 60.752(b)(2)(i) of this subpart. [40 CFR 60.753(c)(1)] Federally Enforceable Through Title V Permit

46. For each interior wellhead, unless an alternative test method is established as allowed by 60.752(b)(2)(i) of this subpart, the oxygen shall be determined by an oxygen meter using Method 3A or 3C except that: (i) The span shall be set so that the regulatory limit is between 20 and 50 percent of the span; (ii) A data recorder is not required; (iii) Only two calibration gases are required, a zero and span, and ambient air may be used as the span; (iv) A calibration error check is not required; (v) The allowable sample bias, zero drift, and calibration drift are ñ10 percent. [40 CFR 60.753(c)(2)] Federally Enforceable Through Title V Permit

47. Permittee shall calculate the NMOC emission rate for purposes of determining when the collection and control system can be removed as provided in 40 CFR 60.752(b)(2)(v) by using the equation found in 40 CFR 60.754(b). [40 CFR 60.754(b)] Federally Enforceable Through Title V Permit

48. For the performance test required in 60.752(b)(2)(iii)(B), Method 25, 25C, or Method 18 of Appendix A must be used to determine compliance with the 98 weight percent efficiency or the 20 ppmv outlet concentration level, unless another method to demonstrate compliance has been approved by the APCO as provided by 60.752(b)(2)(i)(B). Method 3 or 3A shall be used to determine oxygen for correcting the NMOC concentration as hexane to 3 percent. In cases where the outlet concentration is less than 50 ppm NMOC as carbon (8 ppm NMOC as hexane), Method 25A should be used in place of Method 25. If using Method 18 of appendix A, the minimum list of compounds to be tested shall be those published in the most recent Compilation of Air Pollutant Emission Factors (AP-42). The following equation shall be used to calculate efficiency: (NMOCin - NMOCout)/NMOCin. The District must be notified at least 30 days prior to any compliance source test, and a source test plan must be submitted for approval at least 15 days prior to testing. [District Rule 1081; 40 CFR 60.754(d)] Federally Enforceable Through Title V Permit

49. For the purposes of calculating the maximum expected gas generation flow rate from the landfill to determine compliance with 60.752(b)(2)(ii)(A)(1), one of the equations in Section 60.755(a)(1)(i) or (ii) or (iii) shall be used. [40 CFR 60.755(a)(1)] Federally Enforceable Through Title V Permit

50. For the purposes of determining sufficient density of gas collectors for compliance with 60.752(b)(2)(ii)(A)(2), the owner or operator shall design a system of vertical wells, horizontal collectors, or other collection devices, satisfactory to the APCO, capable of controlling and extracting gas from all portions of the landfill sufficient to meet all operational and performance standards. [40 CFR 60.755(a)(2)] Federally Enforceable Through Title V Permit

51. For the purpose of demonstrating whether the gas collection system flow rate is sufficient to determine compliance with 60.752(b)(2)(ii)(A)(3), the owner or operator shall measure gauge pressure in the gas collection header at each individual well, monthly. If a positive pressure exists, action shall be initiated to correct the exceedance within 5 calendar days, except for the three conditions allowed under 60.753(b). If negative pressure cannot be achieved without excess air infiltration within 15 calendar days of the first measurement, the gas collection system shall be expanded to correct the exceedance within 120 days of the initial measurement of positive pressure. Any attempted corrective measure shall not cause exceedances of other operational or performance standards. An alternative timeline for correcting the exceedance may be submitted to the APCO for approval. [40 CFR 60.755(a)(3)] Federally Enforceable Through Title V Permit

52. Owners or operators are not required to expand the system as required in paragraph 60.755(a)(3) during the first 180 days after gas collection system startup. [40 CFR 60.755(a)(4)] Federally Enforceable Through Title V Permit

53. For the purpose of identifying whether excess air infiltration into the landfill is occurring, the owner or operator shall monitor each well monthly for temperature and nitrogen or oxygen as provided in 60.753(c). If a well exceeds one of these operating parameters, action shall be initiated to correct the exceedance within 5 calendar days. If correction of the exceedance cannot be achieved within 15 calendar days of the first measurement, the gas collection system shall be expanded to correct the exceedance within 120 days of the initial exceedance. Any attempted corrective measure shall not cause exceedance of other operational or performance standards. An alternative timeline for corrected in the exceedance may be submitted to the APCO for approval. [40 CFR 60.755(a)(5)] Federally Enforceable Through Title V Permit

54. The provisions of this subpart apply at all times, except during periods of start-up, shutdown, or malfunction, provided that the duration of start-up, shutdown, or malfunction shall not exceed 5 days for collection systems and shall not exceed 1 hour for treatment or control devices. [40 CFR 60.755(e)] Federally Enforceable Through Title V Permit

55. Surface testing shall be performed on a quarterly basis using an organic vapor analyzer, flame ionization detector, or other portable monitor meeting the specifications provided in 40 CFR 60.755(d). [40 CFR 60.755(c)(1)] Federally Enforceable Through Title V Permit

56. The background concentration shall be determined by moving the probe inlet upwind and downwind outside the boundary of the landfill at a distance of at least 30 meters from the perimeter wells. [40 CFR 60.755(c)(2)] Federally Enforceable Through Title V Permit

57. Surface emission monitoring shall be performed in accordance with section 4.3.1 of Method 21 of appendix A, except that the probe inlet shall be placed within 5 to 10 centimeters of the ground. Monitoring shall be performed during typical meteorological conditions. Any reading of 500 parts per million or more above background at any location shall be recorded as a monitored exceedance and the actions specified in 40 CFR 60.755(c)(4)(i-v) shall be taken. As long as the specified actions are taken, the exceedance is not a violation of the operational requirements of 60.753(d). [40 CFR 60.755(c)(3), (4)] Federally Enforceable Through Title V Permit

58. Permittee shall implement a program to monitor for cover integrity and implement cover repairs as necessary on a monthly basis. [40 CFR 60.755(c)(5)] Federally Enforceable Through Title V Permit

59. The portable analyzer shall meet the instrument specifications of Method 21, section 3 (except that "methane" shall replace all references to VOC). The calibration gas shall be methane, diluted to a nominal concentration of 500 parts per million in air. To meet the performance evaluation requirements of Method 21, section 3.1.3, the instrument evaluation procedures of Method 21, section 4.4 shall be used. The calibration procedures provided in Method 21, section 4.2 shall be followed immediately before commencing a surface monitoring survey. The provisions of this condition apply at all times, except during periods of start-up, shutdown, or malfunction which shall not exceed 5 days for collections systems and shall not exceed 1 hour for treatment or control devices. [40 CFR 60.755(d), (e)] Federally Enforceable Through Title V Permit

60. Each wellhead shall have a sampling port and a thermometer, other temperature-measuring device, or an access port for temperature measurements. [40 CFR 60.756(a)] Federally Enforceable Through Title V Permit

61. The enclosed flare shall be equipped with a temperature monitoring device equipped with a continuous recorder and having a minimum accuracy of ñ1 percent of the temperature being measured expressed in degrees Celsius or ñ 0.5 degrees Celsius, whichever is greater. [District NSR Rule; 40 CFR 60.756(b)(1)] Federally Enforceable Through Title V Permit

62. The enclosed flare shall be equipped with either a device that records flow to the control device. The owner or operator shall install, calibrate, and maintain a gas flow rate measuring device that shall record the flow to the control device at least every 15 minutes. [40 CFR 60.756(b)(2)] Federally Enforceable Through Title V Permit

63. Operator shall measure the gauge pressure in the gas collection header on a monthly basis as provided in ⊥ 60.755(a)(3); and monitor nitrogen or oxygen concentration in the landfill gas on a monthly basis as provided in ⊥ 60.755(a)(5); and monitor temperature of the landfill gas on a monthly basis as provided in ⊥ 60.755(a)(5). [40 CFR 60.756(a)] Federally Enforceable Through Title V Permit

64. Any closed landfill that has no monitored exceedances of the operational standard in three consecutive quarterly monitoring periods may skip to annual monitoring. Any methane reading of 500 ppm or more above background detected during the annual monitoring returns the frequency for that landfill to quarterly monitoring. [40 CFR 60.756(f)] Federally Enforceable Through Title V Permit

65. Each owner or operator shall keep for at least 5 years up-to-date, readily accessible, on-site records of the maximum design capacity, the current amount of solid waste in-place, and the year-by-year waste acceptance rate. Off-site records may be maintained if they are retrievable within 4 hours. [40 CFR 60.758(a) and District Rule 2520, 9.4.2] Federally Enforceable Through Title V Permit

66. The initial annual report shall be submitted within 180 days of installation and start-up of the collection and control system, and shall include the initial performance test report required under 40 CFR 60.8. The initial report shall include information specified in 40 CFR 60.757(g)(1-6). [40 CFR 60.757(f), (g)] Federally Enforceable Through Title V Permit

67. The following constitute exceedances that shall be recorded and reported under 40 CFR 60.757(f): all 3-hour periods of operation during which the average combustion temperature was more than 28 øC below the average combustion temperature during the most recent performance test (flare source test). [40 CFR 60.758(c)] Federally Enforceable Through Title V Permit

68. Except as provided in 60.752(b)(2)(i)(B), each owner or operator of a controlled landfill shall keep up-to-date, readily accessible records for the life of the control equipment of the data listed in paragraphs 60.758(b)(1) through (b)(4) as measured during the initial performance test or compliance determination. Records of subsequent tests or monitoring shall be maintained for a minimum of 5 years. Records of the control device vendor specifications shall be maintained until removal. [40 CFR 60.758(b)] Federally Enforceable Through Title V Permit

69. Permittee shall keep the following records: (1)(i) the maximum expected gas generation flow rate as calculated in 60.755(a)(1). The owner or operator may use another method to determine the maximum gas generation flow rate, if the method has been approved by the APCO; (ii) the density of wells, horizontal collectors, surface collectors, or other gas extraction devices determined using the procedures specified in 60.759(a)(1); (2)(i) the average combustion temperature measured at least every 15 minutes and averaged over the same time period of the performance test; (ii) the percent reduction of NMOC determined as specified in 60.752(b)(2)(ii)(B) achieved by the control device. [40 CFR 60.758(b)(1) and (2)] Federally Enforceable Through Title V Permit

70. Permittee shall keep up-to-date, readily accessible continuous records of the indication of flow to the enclosed flare. [40 CFR 60.758(c)] Federally Enforceable Through Title V Permit

71. Except as provided in 60.752(b)(2)(i)(B), permittee shall keep, for the life of the collection system, an up-to-date, readily accessible plot map showing each existing and planned collector in the system and providing a unique identification location label for each collector. Permittee shall keep readily accessible documentation of the nature, date of deposition, amount, and location of asbestos-containing or nondegradable waste excluded from collection as well as any nonproductive areas excluded from collection. [40 CFR 60.758(d)] Federally Enforceable Through Title V Permit

72. Except as provided in 60.752(b)(2)(i)(B), permittee shall keep for at least 5 years up-to-date, readily accessible records of all collection and control system exceedances of the operational standards in 60.753, the reading in the subsequent month whether or not the second reading is an exceedance, and the location of each exceedance. [40 CFR 60.758(e)] Federally Enforceable Through Title V Permit

73. Each owner or operator seeking to comply with 40 CFR 60.752(b)(2)(i) shall site active collection wells, horizontal collectors, surface collectors, or other extraction devices at a sufficient density throughout all gas producing areas using the following procedures unless alternative procedures have been approved by the APCO as provided in 60.752(b)(2)(i)(C) and (D). [40 CFR 60.759(a)] Federally Enforceable Through Title V Permit

74. The collection devices within the interior and along the perimeter areas shall be certified to achieve comprehensive control of surface gas emissions by a professional engineer. The following issues shall be addressed in the design: depths of refuse, refuse gas generation rates and flow characteristics, cover properties, gas system expandability, leachate and condensate management, accessibility, compatibility with filling operations, integration with closure end use, air intrusion control, corrosion resistance, fill settlement, and resistance to the refuse decomposition heat. [40 CFR 60.759(a)(1)] Federally Enforceable Through Title V Permit

75. The placement of gas collection devices determined in paragraph 60.759(a)(1) shall control all gas producing areas, except as provided by paragraphs 60.759(a)(3)(i) and (a)(3)(ii). [40 CFR 60.759(a)(3)] Federally Enforceable Through Title V Permit

76. The sufficient density of gas collection devices determined in paragraph 60.759(a)(1) shall address landfill gas migration issues and augmentation of the collection system through the use of active or passive systems at the landfill perimeter or exterior. [40 CFR 60.759(a)(2)] Federally Enforceable Through Title V Permit

77. Any segregated area of asbestos or nondegradable material may be excluded from collection if documented as provided under 60.758(d). The documentation shall provide the nature, date of deposition, location and amount of asbestos or nondegradable material deposited in the area, and shall be provided to the Administrator upon request. [40 CFR 60.759(a)(3)(i)] Federally Enforceable Through Title V Permit

78. Any nonproductive area of the landfill may be excluded from control provided that the total of all excluded areas can be shown to contribute less than 1 percent of the total amount of NMOC emissions from the landfill. The amount, location, and age of the material shall be documented and provided to the Administrator upon request. A separate NMOC emissions estimate shall be made for each section proposed for exclusion, and the sum of all such sections shall be compared to the NMOC emissions estimate for the entire landfill. Emissions from each section shall be computed using the equation in Section 60.759(a)(3)(ii). [40 CFR 60.759(a)(3)(ii)] Federally Enforceable Through Title V Permit

79. The values for k and CNMOC in equation in Section 60.759(a)(3)(ii) determined in field testing shall be used if field testing has been performed in determining the NMOC emission rate or the radii of influence (this distance from the well center to a point in the landfill where the pressure gradient applied by the blower or compressor approaches zero). If field testing has not been performed, the default values for k, Lo, and CNMOC provided in 60.754(a)(1) or the alternative values from 60.754(a)(5) shall be used. The mass of nondegradable solid waste contained within the given section may be subtracted from the total mass of the section when estimating emissions provided the nature, location, age, and amount of the nondegradable material is documented as provided in paragraph 60.759(a)(3)(i). [40 CFR 60.759(a)(3)(iii)] Federally Enforceable Through Title V Permit

80. Each owner or operator seeking to comply with 60.752(b)(2)(i)(A) shall construct the gas collection devices using the following equipment or procedures: (1) The landfill gas extraction components shall be constructed of polyvinyl chloride (PVC), high density polyethylene (HDPE) pipe, fiberglass, stainless steel, or other nonporous corrosion resistant material of suitable dimensions to: convey projected amounts of gases; withstand installation, static, and settlement forces; and withstand planned overburden or traffic loads. The collection system shall extend as necessary to comply with emission and migration standards. Collection devices such as wells and horizontal collectors shall be perforated to allow gas entry without head loss sufficient to impair performance across the intended extent of control. Perforations shall be situated with regard to the need to prevent excessive air infiltration; (2) Vertical wells shall be placed so as not to endanger underlying liners and shall address the occurrence of water within the landfill. Holes and trenches constructed for piped wells and horizontal collectors shall be of sufficient cross-section so as to allow for their proper construction and completion including, for example, centering of pipes and placement of gravel backfill. Collection devices shall be designed so as not to allow indirect short circuiting of air into the cover or refuse into the collection system or gas into the air. Any gravel used around pipe perforations should be of a dimension so as not to penetrate or block perforations; (3) Collection devices may be connected to the collection header pipes below or above the landfill surface. The connector assembly shall include a positive closing throttle valve, any necessary seals and couplings, access couplings and at least one sampling port. The collection devices shall be constructed of PVC, HDPE, fiberglass, stainless steel, or other nonporous material of suitable thickness. [40 CFR 60.759(b)] Federally Enforceable Through Title V Permit

81. Each owner or operator seeking to comply with 60.752(b)(2)(i)(A) shall convey the landfill gas to a control system in compliance with 60.752(b)(2)(iii) through the collection header pipe(s). The gas mover equipment shall be sized to handle the maximum gas generation flow rate expected over the intended use period of the gas moving equipment using the following procedures: (1) For existing collection systems, the flow data shall be used to project the maximum flow rate. If no flow data exists, the procedures in paragraph 60.759(c)(2) shall be used; (2) For new collection systems, the maximum flow rate shall be in accordance with 60.755(a)(1). [40 CFR 60.759(c)] Federally Enforceable Through Title V Permit

82. The gas collection and control system shall comply with the operational standards of 40 CFR 60.753, the compliance provisions of 40 CFR 60.755, the monitoring provisions of 40 CFR 60.756, the reporting and record keeping requirements of 40 CFR 60.757 and 60.758, and the requirements of 40 CFR 60.759 (for active collection systems), except as allowed in conditions 40 and 41. [40 CFR 60.752(b)(2)(ii), 60.753, 60.755, 60.756, 60.757, 60.758, and 60.759] Federally Enforceable Through Title V Permit

83. All exterior vapor extraction wells, leachate collection system components, and perimeter horizontal collectors are exempt from the operational standards of 40 CFR 60.753 and the compliance provisions of 40 CFR 60.755 and shall not be located over any waste. Forward Inc. shall keep records of all components that qualify for this exemption and note their location with respect to the landfill's perimeter. [40 CFR 60.752(b)(2)(ii), 60.753, 60.755, 60.756, 60.757, 60.758, and 60.759] Federally Enforceable Through Title V Permit

84. Components of the gas collection and control system with wellhead oxygen content no greater than 15% by volume are allowed. All other provisions of Condition #82 apply. Forward Inc. shall keep records of all components that qualify for the higher wellhead oxygen limit. Records shall include interior wellhead and collection system landfill gas temperature which shall be less than 55 C (131 F) and shall keep records of methane % by volume to indicate that methanogenic activity is continuing to occur. [40 CFR 60.752(b)(2)(ii), 60.753, 60.755, 60.756, 60.757, 60.758, and 60.759] Federally Enforceable Through Title V Permit

85. Forward Inc. may remove extraction wells from service provided operational requirements of remaining extraction wells and surface emissions are within permit limits. Forward Inc. shall keep records of quarterly surface emission monitoring and probe monitoring for subsurface migration, as required under NSPS to indicate if removal of any of the collectors results in insufficient collection system coverage. [40 CFR 60.752(b)(2)(ii), 60.753, 60.755, 60.756, 60.757, 60.758, and 60.759] Federally Enforceable Through Title V Permit

86. Each owner or operator, required by 40 CFR 60.752(b)(2) of subpart WWW to install a collection and control system, shall comply with the requirements in 40 CFR 63.1960 through 63.1985 and with the general provisions specified in table 1 of 40 CFR 63 subpart AAAA. [40 CFR 63.1955(b)] Federally Enforceable Through Title V Permit

87. For approval of collection and control systems that include any alternatives to the operational standards, test methods, procedures, compliance measures, monitoring, recordkeeping or reporting provisions, owner or operator must follow the procedures in 40 CFR 60.752(b)(2). If alternatives have already been approved under 40 CFR part 60 subpart WWW, these alternatives can be used to comply with 40 CFR 63 subpart AAAA, except that all affected sources must comply with the startup, shutdown, and malfunction (SSM) requirements in subpart A of 40 CFR 63 as specified in Table 1 of 40 CFR 63 subpart AAAA and all affected sources must submit compliance reports every 6 months as specified in 40 CFR 63.1980(a) and (b), including information on all deviations that occurred during the 6-month reporting period. Deviations for continuous emission monitors or numerical continuous parameter monitors must be determined using a 3 hour monitoring block average. [40 CFR 63.1955(c)] Federally Enforceable Through Title V Permit

Blue Sky Environmental, Inc
624 San Gabriel Avenue
Albany, California 94706
Cell (510) 508-3469
Office (510) 525-1261
blueskyenvironmental@yahoo.com

April 8, 2014

Attn.: Scott VanDyken
San Joaquin Valley APCD
4230 Kiernan Ave, Ste. 130
Modesto, CA 95356

Scheduled Source Test May 6th, 2014

Re: Source Test Plan (STP) to perform testing as required on the (S-1) 48 MMBTUH & (S-2) 102 MMBtu/hr enclosed flare at Forward Landfill (Facility N-339-17-~~1~~8), located at 9999 S. Austin Road, Manteca, CA 95336.

Dear, Mr VanDyken

Blue Sky Environmental is pleased to present this Source Test Plan for the above referenced sampling project. Testing will include the following:

1) Three 30 minute test runs will be performed at each Flare exhaust for NOx, CO, CO_2 and O_2 using CARB Method 100. NMOC will be measured per run from Tedlar Bag or SUMMA Canisters using EPA MM18 GC Analysis.

2) Integrated Tedlar bag samples of the Landfill Gas (LFG) will be collected during every test run, and will be analyzed for HHV, CO_2, N_2, O_2, NMOC and CH_4, using ASTM 1945/3588 (EPA 25C). Also, the LFG samples will be analyzed for TRS and sulfur species by ASTM 5504 or SCAQMD 307-91. The samples will be analyzed within 72 hours.

3) Fuel flowrate and moisture will be measured every run by CARB Methods 1 & 2. Moisture will be measured by CARB Method 4 (wet bulb–dry bulb). The exhaust flowrate will be determined by EPA 19 based on fuel analysis and stack oxygen.

Test Parameters	**Inlet**	**Outlet**	**Limits**
O_2, CO_2	ASTM 1945	CARB 100	
CO		CARB 100 ✓	CO 0.2 lbs/MMBtu ✓
NO_x		CARB 100 ✓	NOx 0.05 lbs/MMBtu ✓
SO_2	ASTM 5504	Calculated	SO_2 0.0215 lbs/MMBtu ✓
VOC (NMOC)	M25C	MM18 ✓	VOC D.E. 98% ~~or~~ 20 ppm as Hexane @3%O_2 or 0.0113 lb VOC/MMBtu ✓
CH_4	ASTM 1945	MM18	CH_4 D.E. >99% AB32
Flow	M2	M19	
Moisture	M4 WBDB	N/A	

4) A report will be submitted to the client within four weeks of test program completion (meeting all APCD/AQMD requirements). The report will include a test description and tables presenting emission concentrations, emission factors and/or rates (lbs/hr) for all compliance parameters. All supporting documentation will be included (strip charts, field data sheets, calibrations, calculations, etc.).

This test program is scheduled for May 6th, 2014. The facility contact is Erin Fanning who may be reached at 209 684 4733. If you have any questions, please contact Guy Worthington at 510-525-1261 or 510-508-3469.

Sincerely,

Guy Worthington

SJVAPCD- email: sourcetestN@valleyair.org

Dottie Shoffner

From: GUY WORTHINGTON <blueskyenvironmental@yahoo.com>
Sent: Tuesday, April 08, 2014 5:18 PM
To: Source Test North; Scott Van Dyken
Cc: Erin Fanning; Chuck Arrivas
Subject: FORWARD Landfill Source Test Plan
Attachments: RS-Forward 2flare-stp.pdf

Hi Scott,
Please see STP attached for your review.
Thanks

Sincerely,
Guy Worthington

BLUE SKY ENVIRONMENTAL, INC
624 San Gabriel Ave
Albany, CA 94706
Mobile 510 508 3469
Office 510 525 1261
blueskyenvironmental@yahoo.com

San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

HEALTHY AIR LIVING™

March 6, 2014

Mr. Don Litchfield
Forward Inc Landfill
999 S Austin Rd
Manteca, CA 95336

RE: DETERMINATION OF COMPLIANCE EMISSION TESTING

Dear Mr. Litchfield,

This letter is to notify you that your Permit(s) To Operate issued for the stationary source(s) listed below requires that you perform a compliance test at specified periodic intervals. Our records indicate that your facility is required to conduct a compliance test by the due date(s) listed below:

Permit Number	Unit ID	Due Date
N-339-17-8	Flare #1	05/26/2014
N-339-17-8	Flare #2	05/26/2014

Please contact your source testing company and schedule the required test(s) to be completed prior to the date(s) listed. The District must also be notified 30 days prior to each test. Failure to conduct the test within thirty days (+/- 30) days of the date indicated above will result in legal action. The results of each source test shall be submitted to the District within 60 days thereafter.

If you have questions regarding this letter please call Scott Van Dyken at (209) 557-6400.

Sincerely,

Thomas J Busenbark

Thomas J Busenbark
Supervising Air Quality Inspector

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