PERFORMANCE TESTING
FEBRUARY 2011

As Defined By

Code of Federal Regulations; Title 40 Part 60, Subpart JJJJ, 30 TAC 117.2135(d) & Standard Permit for Electrical Generating Units

RMCEINC Project #2010-15969

WASTE MANAGEMENT RENEWABLE ENERGY, LLC.
CITY OF FARMERS BRANCH CAMELOT LANDFILL GAS TO ENERGY FACILITY
LEWISVILLE, TEXAS

TWO (2) INSTALLED CATERPILLAR 3520 INTERNAL COMBUSTION ENGINES
(EPN: ENG01 and ENG02)

STANDARD PERMIT NUMBER: 91989

PREPARED FOR:

WASTE MANAGEMENT RENEWABLE ENERGY, LLC.

BY:

RMC ENVIRONMENTAL, INC. – CHICAGO REGIONAL OFFICE

REPORT CERTIFICATION

The sampling, analysis, and data collection performed for this report were carried out under my direction and supervision, and I hereby certify that the test report is authentic and accurate, to the best of my knowledge.

Date 3 March 2011

Signature

Rachel Chleborowicz, QSTI
Project Manager
RMC ENVIRONMENTAL, INC.

TABLE OF CONTENTS

1.0 PROJECT INFORMATION 1

1.1 COMPANY INFORMATION 1
1.2 TESTING FIRM INFORMATION 1
1.3 TEST INFORMATION 1

2.0 SOURCE IDENTIFICATION 1

3.0 SUMMARY AND DISCUSSION OF RESULTS 2

4.0 POLLUTANTS AND TEST METHODS 3

5.0 TEST PROCEDURES AND RESULTS 3

5.1 SAMPLING PROCEDURES 3

6.0 EQUIPMENT CALIBRATION AND QUALITY ASSURANCE 7

APPENDIX A. TEST SUMMARY SHEETS ..... A

Emissions Summary

APPENDIX B. FIELD TEST DATA W/ INSTRUMENTAL TEST DATA ..... B

Method 1-4 Field Data
Flow Rate Determinations
Calibration Summaries
Instrumental Test Run Data
Reference Data Summary

APPENDIX C. TEST QA/ QC FORMS C

Calibration Gas Certificates of Analysis
Meterbox Calibrations
Pitot Calibration

APPENDIX D. PROCESS DATA ..... D

APPENDIX E. RESUMES OF TEST PERSONNEL ..... E

1.0 PROJECT INFORMATION

1.1 Company Information

Name and Address:	**CAMELOT LANDFILL GAS TO ENERGY FACILITY** Waste Management Renewable Energy, LLC. 590 Huffines Road Lewisville, Texas 76106
Contact:	Mr. Vic Saufley
Telephone Number:	713-328-7348 VSaufley@wm.com
Source Tested:	Two IC Engines – Landfill Gas Treatment / Electric Generating Plant EPN: ENG01, ENG02 SN: GZJ00442, GZJ00443

1.2 Testing Firm Information

Name and Address:	RMC ENVIRONMENTAL, INC. 9226 North 2nd Street Machesney Park, Illinois 61115
Contact:	Rachel Chleborowicz
Telephone Number:	815-378-6150 Mobile 815-425-1102 Fax RMCE@AirMonitoring.com / RMCEInc@aol.com

1.3 Test Information

Test Requested By:	Waste Management Renewable Energy, LLC.
Source Contact:	Mr. Vic Saufley
Telephone Number:	713-328-7348
Test Objective:	Title 40, Code of Federal Regulations, Part 60, Subpart JJJJ Initial Compliance Testing, 30 TAC 117.2135(d), and Standard Permit for Electric Generating Units Certification
Test Methods:	EPA Methods 1-4, 3A, 7E, 10 and 25A/18
Test Dates:	February 28, 2011
Source Test Coordinators:	Mr. Danny Cotton Waste Management, Inc.
Test Personnel:	Rachel Chleborowicz RMCEInc Andrew McDermand RMCEInc
Laboratory Analysis:	Core Laboratories

2.0 SOURCE IDENTIFICATION

Name and Address:	**CAMELOT LANDFILL GAS TO ENERGY FACILITY** Waste Management Renewable Energy, LLC. 590 Huffines Road Lewisville, Texas 76106
Contact:	Mr. Vic Saufley
Telephone Number:	713-328-7348 VSaufley@wm.com

Source Tested:	Two IC Engines – Landfill Gas Treatment / Electric Generating Plant EPN: ENG01, ENG02 - SN: GZJ00442, GZJ00443
Fuel:	Landfill Gas
Duct Dimensions:	Height 8' ID – ~15"
Sampling Location:	~ 24" Downstream and ~ 26" Upstream from any flow disturbance

- Senior Project Manager works directly with the site coordinator and the facility's operators during the testing to coordinate the testing. They are also responsible for operating and monitoring the instrumental test methods within the mobile test laboratory.
- The Site Coordinator is the facility's representative for the test program.

3.0 SUMMARY AND DISCUSSION OF RESULTS

The compliance test results for Waste Management Renewable Energy – Camelot Landfill Gas to Energy Facility are shown in **Table 3-1**. The indicated pollutants are VOC/NMOC, CO and NOx emissions in units of the emission rates (lb/Hr, g/BHP-Hr and lb/Mw-Hr). The reference test data are enclosed in **Appendices A & B** and the corresponding process data collected from the engine operations screen and the on-site Gas Chromatograph (GC) are included in **Appendix D.**

This data is an average of the three one-hour test runs conducted on each turbine. Each engine is rated for 2233 horsepower with ~1600 Kw of power produced. The testing was conducted at those levels.

TABLE 3-1. COMPLIANCE TEST RESULTS
February 28, 2011

Parameter	Result	Permit Limit
Engine #1 – 2/28/11 (EPN/FIN: ENG01)		
Engine #1 – NOx g/BHP-Hr	0.37	30 TAC §117.2110 - 0.6 g NOx / BHP-Hr Subpart JJJJ Specification - 3.0 g NOx/BHP-Hr
NOx lb/Mw-Hr	1.19	Standard Permit No. 91989 - 1.9 lb/Mw-Hr
Engine #1 – CO g/BHP-Hr	1.85	Standard Permit No. 91989 - 3.0 g CO / BHP-Hr Subpart JJJJ Specification - 5.0 g CO/BHP-Hr
Engine #1 – NMOC lb/Hr	0.59	Standard Permit No. 91989 - 0.92 lb/Hr
NMOC g/BHP-Hr	0.12	Subpart JJJJ Specification - 1.0 g NMOC/BHP-Hr
Engine #2 – 2/28/11 (EPN/FIN: ENG02)		
Engine #2 – NOx g/BHP-Hr	0.42	30 TAC §117.2110 - 0.6 g NOx / BHP-Hr Subpart JJJJ Specification - 3.0 g NOx/BHP-Hr
NOx lb/Mw-Hr	1.33	Standard Permit No. 91989 - 1.9 lb/Mw-Hr
Engine #2 – CO g/BHP-Hr	1.90	Standard Permit No. 91989 - 3.0 g CO / BHP-Hr Subpart JJJJ Specification - 5.0 g CO/BHP-Hr
Engine #2 – NMOC lb/Hr	0.12	Standard Permit No. 91989 - 0.92 lb/Hr
NMOC g/BHP-Hr	0.02	Subpart JJJJ Specification - 1.0 g VOC/BHP-Hr

[1]**The procedures and calculations outlined in 40 CFR 60.4244 were followed for this test project.**

4.0 POLLUTANTS AND TEST METHODS

Pollutant Tested:	NO_x	EPA Method 7E – Title 40 CFR 60, Appendix A
	CO	EPA Method 10 – Title 40 CFR 60, Appendix A
	NMOC	EPA Method 25A/18 – Title 40 CFR 60 Appendix A

5.0 TEST PROCEDURES AND RESULTS

5.1 Sampling Procedures

Testing was completed per EPA Test Methods 1, 2, 3A, 4, 7E, 10 and 25A/18 defined in Title 40 CFR Part 60, Appendix A.

5.10 Volumetric Flow Rates

RMCEINC determined the number and location of the traverse points for volumetric flow rate measurement according to the procedures outlined in EPA Method 1. When determining the location and number of sample points, RMCEINC took into account the number of sample ports, duct configuration, and location of upstream and downstream flow disturbances. **Figures 5-1** is a diagram of the engine showing the exhaust to the silencer and the ports used for testing. **Figure 5-2** presents the EPA Method 1 data sheets illustrating the port locations and the points used for each Method 2 traverse.

The flue gas velocity and volumetric flow rate were determined according to the procedures of EPA Method 2. A Type S pitot tube with a Type K thermocouple was used to measure velocity pressure and stack gas temperature at each sample point. Each pitot tube conformed to the geometric specifications of EPA Method 2 and was assigned a coefficient of 0.84. An umbilical cord connected the pitot tube to the meter box inclined manometer and digital temperature readout. RMCEINC leak-checked the pitot tube prior to and after conducting the traverse.

RMCEINC determined the flue gas composition and molecular weight using EPA Methods 3A and 4 procedures.

Figure 5-1 – Engine Schematic / Diagram.

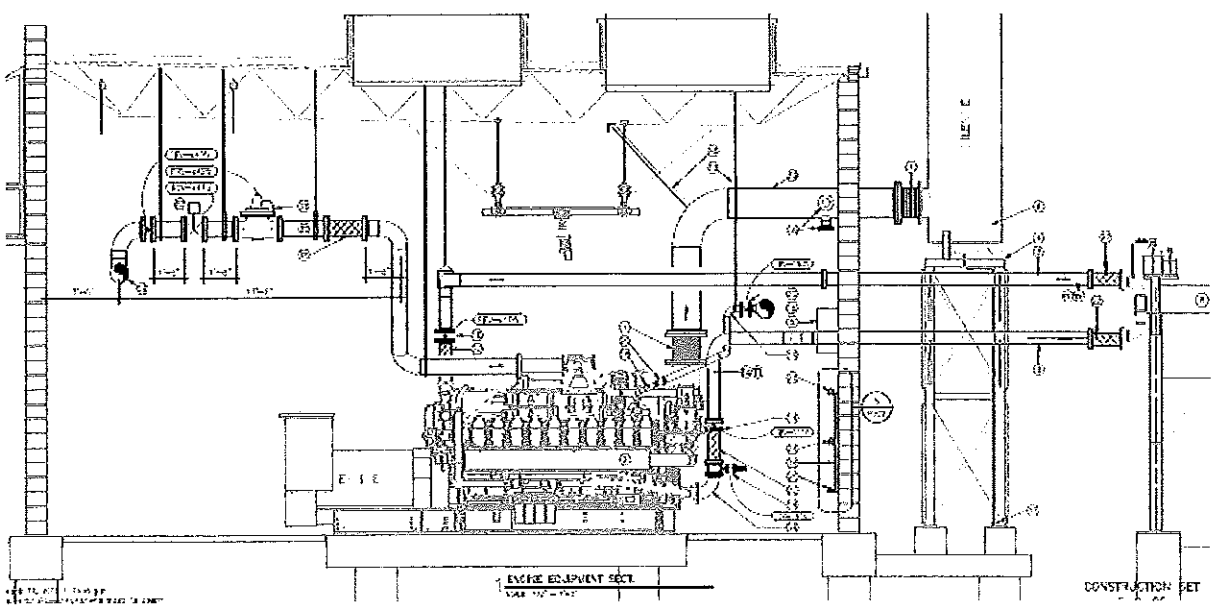
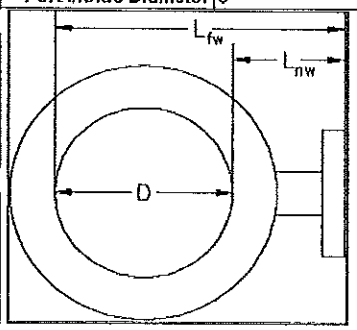


Figure 5-2 – EPA Method 1 Data – Engines 1 & 2

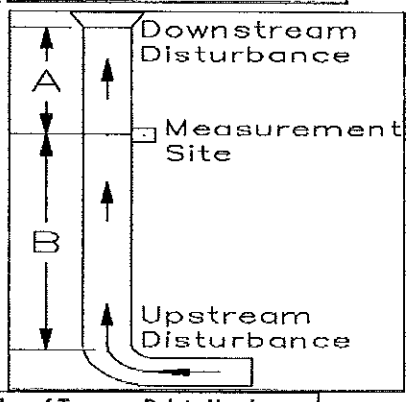
METHOD 1 - SAMPLE AND VELOCITY TRAVERSES FOR CIRCULAR SOURCES

Plant Name	Camelot Landfill Gas To Energy Facility	Date	02/28/11
Sampling Location	LFG Engines 1 & 2	Project #	2011-17009
Operator	RC	# of Ports Available	2
Stack Type	Circular	# of Ports Used	2
Stack Size	Small	Port Inside Diameter	3

Circular Stack or Duct Diameter			
Distance to Far Wall of Stack	(L_{fw})	21.00	in
Distance to Near Wall of Stack	(L_{nw})	6.00	in
(=Lfw - Lnw) Diameter of Stack	(D)	15.00	in
(=3.14(D/2)^2/144) Area of Stack	(A_s)	1.23	ft^2



Distance from Port to Disturbances			
Distance Upstream	(B)	22.50	in
(=B/D) Diameters Upstream	(B_D)	1.50	diameters
Distance Downstream	(A)	22.50	in
(=A/D) Diameters Downstream	(A_D)	1.50	diameters



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

[1] Check Minimum Number of Points for the Upstream and Downstream conditions, then use the largest.
[2] 8 for Circular Stacks 12 to 24 inches
12 for Circular Stacks over 24 inches

Number of Traverse Points Used			
2	Ports by	8	Across
16	Pts Used	16	Required
☐	Particulate	☑	Velocity

Location of Traverse Points in Circular Stacks						
Traverse Point Number	(Fraction of Stack Diameter from Inside Wall to Traverse Point) Number of Traverse Points on a Diameter					
	2	4	6	8	10	12
1	.146	.067	.044	.032	.026	.021
2	.854	.250	.146	.105	.082	.067
3		.750	.296	.194	.146	.118
4		.933	.704	.323	.226	.177
5			.854	.677	.342	.250
6			.956	.806	.658	.356
7				.895	.774	.644
8				.968	.854	.750
9					.918	.823
10					.974	.882
11						.933
12						.979

Traverse Point Locations			
Traverse Point Number	Fraction of Stack Diameter	Distance from Inside Wall	Distance Including Nipple Length
		in	in
1	0.032	4/8	6 4/8
2	0.105	1 5/8	7 5/8
3	0.194	2 7/8	8 7/8
4	0.323	4 7/8	10 7/8
5	0.677	10 1/8	16 1/8
6	0.806	12 1/8	18 1/8
7	0.895	13 3/8	19 3/8
8	0.968	14 4/8	20 4/8
9			
10			
11			
12			

5.11 Instrumental Test Equipment and Procedures

The test program includes the measurement of exhaust gas concentrations of NMOC, CO, NO_x, and O_2. RMCEINC used the procedures that conform to the requirements of Title 40 CFR, Part 60, Appendix A, Methods 1, 2, 3A, 4, 7E, 10 and 25A/18. Each of the three test runs included a minimum of one hour of continuous flue gas sampling.

Concentration measurements of O_2, CO, NOx and NMOC, were made using the analyzers listed in **Table 5-1. Figure 5-3** is a schematic of the wet/dry extractive reference measurement gas sampling system used by RMCEINC. All components of the sampling system that contact the sample are stainless steel, glass, or Teflon.

RMCEINC uses a standard manual probe sampling system. The manual sampling probe uses a heated stainless steel tubing and 3-way valve to provide a means of conducting the three-point traverse and calibration checks. The probe assembly will be constructed of Type 316 stainless steel and may be heated electrically to maintain the sample temperature above the dew point of the stack gases or 250° F. At the Camelot Landfill, the exhaust stack temperatures are over 600 degrees. Therefore, due to the excessive heat, the sampling probe will not be externally heated. A length of heated Teflon tubing, heated to over 250° F, will connect the probe to a moisture removal chiller. The condensed portion of the sample is routed to the wet / dry extractive system for distribution to the dry NOx, CO, NMOC and O_2/CO_2 analyzers.

Before the moisture removal system, a portion of the wet effluent is diverted to the VOC analyzer. This analyzer requires the sample to be unconditioned which allows for the full VOC concentration in the sample to be analyzed. In order to obtain NMOC (Non-Methane Organic Carbon) concentrations, an onsite, inline GC measured the methane concentrations in the effluent, real-time. The methane concentration was then subtracted from the total VOC concentration to provide an NMOC result.

TABLE 5-1 REFERENCE METHOD ANALYZERS

Parameter	Analyzer	Analytical Technique	Instrument Span
NO_x	Thermo Environmental Instruments Model 42	Chemiluminescence	0-250, ppm
CO	Thermo Environmental Instruments Model 48	Gas Filter Correlation	0-1000, ppm
VOC / NMOC	VID Industries Model 220/200	FID / GC	0-1000/5000 ppm
O_2	Servomex 1440	Paramagnetic	0-21 %

5.12 Instrumental Analytical Data

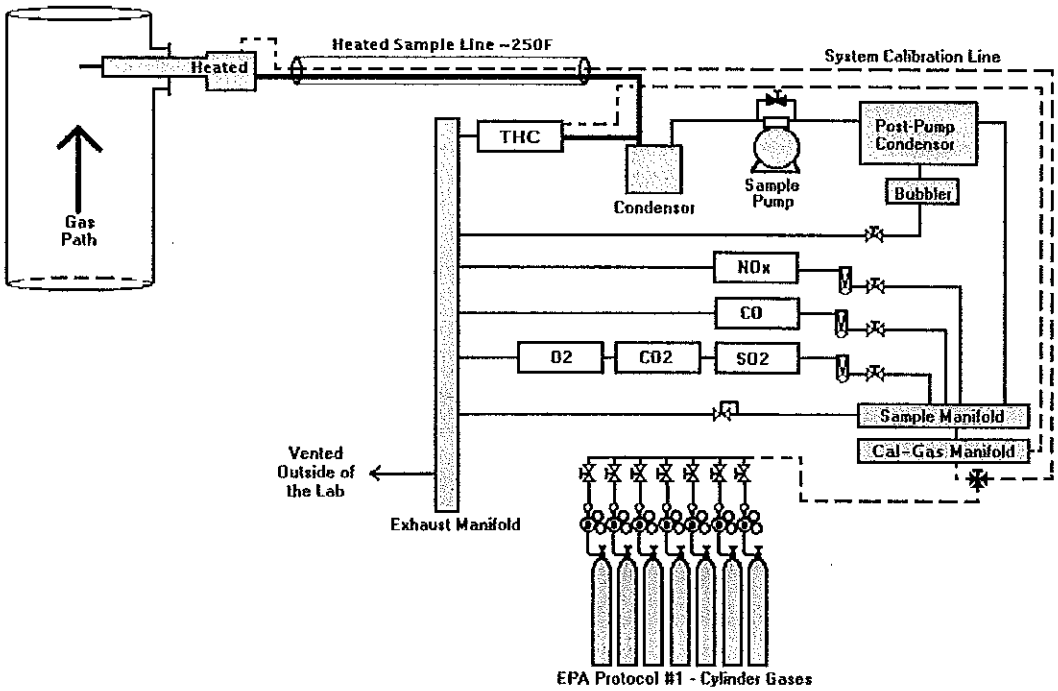
RMCEINC performed test runs to measures the flue gas for NMOC, NO_x and CO in terms of an emission rate (lb/BHP-Hr). A three-point (zero, mid-range, and high-range) analyzer calibration error check on each reference analyzer was performed before initiating the testing. This check is conducted after final calibration adjustments are made by injecting the calibration gases directly into each gas analyzer and recording the responses on the reference data acquisition system.

RMCEINC conducts zero and upscale calibration checks both before and after each test run in order to quantify measurement system calibration drift and sampling system bias. Upscale is either the low-, mid- or high-range gas, whichever most closely approximates the flue gas level. During these checks, the calibration gases are introduced into the sampling system through a 3-way valve assembly at the probe outlet so that the calibration gases are analyzed in the same manner as the flue gas samples.

RMCEINC recorded the reference analyzer measurements as 1-minute and 60-minute averages on its DAS. All test run concentration results were determined from the average gas concentrations measured during the run and adjusted based on the zero and upscale sampling system bias check results (Equation 7E-1 presented in Title 40 CFR Part 60, Method 7E, Section 8). The reference NMOC, CO and NO_x emission values in terms of pounds per hour and grams

per break horsepower hour were computed from each test run average of adjusted, dry basis NMOC, CO, NO_x and percent O_2 using the Title 40 CFR Part 60 Appendix A Method 19.

Figure 5-3. Reference Method Gas Sampling System Diagram



6.0 EQUIPMENT CALIBRATION AND QUALITY ASSURANCE

RMCEINC followed the calibration and quality assurance procedures of EPA Methods 1, 2, 3A, 4, 7E, 10 and 25A/18 throughout the test program. The maintenance for our meterboxes, probes, analyzers and a majority of our other test equipment is performed off site by either Clean Air Engineering or Millenium Instruments. These companies ensure that our equipment is operating correctly and within the specification of the respective methods. All equipment is calibrated in accordance with the EPA Methods and guidelines.

The results of sampling system bias and calibration drift tests for each test run are calculated and presented in the test report. Cylinder gases used during the testing are certified to meet or exceed EPA Protocol 1 requirements. The meter box calibrations, pitot tube inspections, calibration gas certificates of analysis and the analyzer quality assurance checks are included in **Appendix C**.

RMCEINC uses computers throughout the test program. Spreadsheets and software programs are checked in our office for accuracy. Software used by RMCEINC is structured to eliminate human errors in data entry where possible by automating the process. When possible RMCEINC, inputs field data directly into the DAS system and eliminates the hand written field data sheets. These systems provide an accurate measurement of the raw test data and are not used to modify or change test data in any manner. Equations used in these systems are taken directly from the CFR when possible, and notations are provided if originated from an alternate source or customized in any manner.

APPENDIX A. TEST SUMMARY SHEETS

Emissions Summary

REFERENCE DA.. SUMMARY

Company: WMRE - Farmers Branch
Source: Engine #1 & #2

Date: 2/28/2011
Project #: 2011-17009

RUN #	Test Duration 7:07 Start Time	End Time	O2-A %	CO2-A %	CO-A ppm	NOx-A ppm	VOC-A ppm	NMOC ppm	CH4-A ppm	CO-A	NOx-A	NMOC	DSCFM
			DATA Link from the DATA Logger							As Propane			
												lbs/mmBtu	
				Engine #1								Engine #1	Engine #1
1	2/28/2011 9:40	10:40	8.26	12.87	488.40	59.44	565.67	77.50	1619.50	0.5526	0.111	0.038	4323.0
2	2/28/2011 10:50	11:50	8.38	12.01	469.10	58.97	584.96	70.78	1684.10	0.5357	0.111	0.035	4318.0
3	2/28/2011 12:00	13:00	8.31	12.67	492.10	59.29	571.37	70.81	1643.30	0.5589	0.111	0.035	4341.0
				Engine #2								Engine #2	Engine #2
4	2/28/2011 13:25	14:25	8.28	13.18	503.30	67.81	572.64	10.41	1707.50	0.5702	0.126	0.005	4298.0
5	2/28/2011 14:35	15:35	8.70	11.95	512.40	68.50	567.38	-8.75	1710.90	0.6007	0.132	-0.004	4208.0
6	2/28/2011 15:47	16:47	8.43	12.65	501.60	66.08	590.72	44.35	1727.80	0.5754	0.125	0.022	4259.0
7		17:53											
8		18:59											
9		20:05											
10		21:11											
11		22:17											
12		23:23											
13		0:29											
14		1:35											
15		2:41											
		AVERAGE	8.39	12.56	494.48	63.35	575.46	44.18	1682.18	0.5656	0.119	0.022	

	Start Time	End Time	VOC-A ppmw	NOx lb/Mw-Hr	CO-A	NOx-A	NMOC g/HP-Hr	CO-A	NOx-A	NMOC
			Wet based measurements corrected from DATA Logger					As Propane		
										lbs/Hr
			Engine #1				Engine #1			Engine #1
1	2/28/2011 9:40	10:40	502.20	1.19	1.87	0.37	0.13	9.201	1.84	0.63
2	2/28/2011 10:50	11:50	515.70	1.18	1.79	0.37	0.12	8.827	1.82	0.57
3	2/28/2011 12:00	13:00	506.80	1.19	1.89	0.37	0.12	9.309	1.84	0.58
			Engine #2				Engine #2			Engine #2
4	2/28/2011 13:25	14:25	508.70	1.35	1.91	0.42	0.02	9.43	2.09	0.08
5	2/28/2011 14:35	15:35	500.40	1.33	1.91	0.42	-0.01	9.40	2.07	-0.07
6	2/28/2011 15:47	16:47	519.20	1.30	1.89	0.41	0.07	9.31	2.02	0.35
7		17:53								
8		18:59								
9		20:05								
10		21:11								
11		22:17								
12		23:23								
13		0:29								
14		1:35								
15		2:41								
		AVERAGE	508.83	1.26	1.88	0.40	0.07	9.25	1.97	0.30

APPENDIX B. FIELD TEST DATA W/ INSTRUMENTAL TEST DATA

Method 1-4 Field Data

Flow Rate Determinations

Calibration Summaries

Instrumental Test Run Data

Reference Data Summary

CEM Traverse Points

Company: WMRE - Farmers Branch **Date:** 2/28/2011

Sampling Location: Engine #1 & #2 - Exhaust Duct **Project #:** 2011-17009

Stack Dia. *(in)*	Nipple *(in)*
15.5	8

		Select Short Traverse	Y
Stratification	N	*SHORT Traverse not allowed*	
Wet Scrubber	N		
Two Gas Streams	N		
Dia. < 2.4 Meters	Y		

STANDARD TRAVERSE MEASUREMENTS

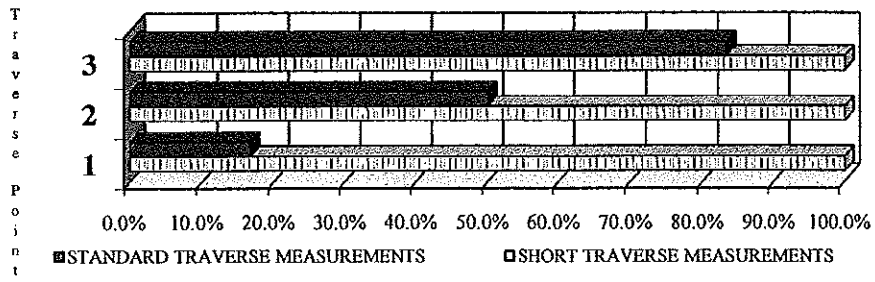
Traverse Points	*Requirement Dist. from Inside Wall*	Length (ft-in)
1	*16.7%*	0' 10-2/4"
2	*50.0%*	1' 3-3/4"
3	*83.3%*	1' 9"

SHORT TRAVERSE MEASUREMENTS

Traverse Points	*Requirement Dist. from Inside Wall*	Length (ft-in)
1	*0.4 m*	
2	*1.2 m*	
3	*2.0 m*	

STANDARD Traverse Used

Distance of Traverse Points From Inside Wall



Calibration Error Test at Run 1 . STRATA Version 2.01

Operator:	RMC Environmental, Inc.			
Plant Name:	WM-Farmers Branch			
Location:	Eng 1 Testing			
	Reference Cylinder Numbers			
	Zero	Low-range	Mid-range	High-range
O2-A	CC208529		CC179563	CC147760
CO2-A	CC208529		CC179563	CC147760
CO-A	CC208529	CC10309	CC10518	SG9198829
NOx-A	CC179563	CC86991	CC208529	CC177437
VOC-A	CC208529	~~CC171154~~ SG9160031	SG9128607	CC21153
CH4-A	CC208529	ALM011625	ALM033374	ALM059469

Date/Time	2/28/2011	9:18:09 PASSED				
Analyte	O2-A	CO2-A	CO-A	NOx-A	VOC-A	CH4-A
Units	%	%	%	ppm	ppm	ppm
Zero Ref Cyl	0.00	0.00	0.00	0.00	0.00	0.00
Zero Avg	0.19	0.13	7.60	2.38	15.30	1.20
Zero Error%	0.90	0.70	0.80	1.00	1.50	0.00
Low Ref Cyl			255.80	51.34	300.20	1510.00
Low Avg			250.40	50.45	308.90	1577.10
Low Error%			0.50	0.40	0.90	1.30
Mid Ref Cyl	12.48	9.44	502.80	119.20	499.20	2540.00
Mid Avg	12.26	9.71	497.50	117.93	489.20	2539.10
Mid Error%	1.10	1.50	0.50	0.50	1.00	0.00
High Ref Cyl	20.85	16.98	1004.00	256.90	842.90	4540.00
High Avg	20.66	16.94	998.80	254.28	844.70	4501.20
High Error%	0.90	0.30	0.50	1.00	0.20	0.80

Initial System Bias Check for Run 1 . STRATA Version 2.01

Operator:	RMC Environmental, Inc.	
Plant Name:	WM-Farmers Branch	
Location:	Eng 1 Testing	
	Reference Cylinder Numbers	
	Zero	Span
O2-A	CC208529	CC179563
CO2-A	CC208529	CC179563
CO-A	CC208529	CC10518
NOx-A	CC179563	CC208529
VOC-A	CC208529	SG9128607
CH4-A	CC208529	ALM033374

Date/Time	2/28/2011	9:26:39 PASSED				
Analyte	O2-A	CO2-A	CO-A	NOx-A	VOC-A	CH4-A
Units	%	%	%	ppm	ppm	ppm
Zero Ref Cyl	0.00	0.00	0.00	0.00	0.00	0.00
Zero Cal	0.19	0.13	7.60	2.38	15.30	1.20
Zero Avg	0.43	0.09	8.00	5.66	15.50	50.80
Zero Bias%	1.20	0.20	0.00	1.30	0.00	1.00
Zero Drift%						
Span Ref Cyl	12.48	9.44	502.80	119.20	499.20	2540.00
Span Cal	12.26	9.71	497.50	117.93	489.20	2539.10
Span Avg	12.31	9.58	507.60	118.47	511.70	2597.20
Span Bias%	0.30	0.80	1.00	0.20	2.20	1.20
Span Drift%						

Test Run 1 Begin. STRATA Version 2.01
Operator: RMC Environmental, Inc.
Plant Name: WM-Farmers Branch
Location: Eng 1 Testing

		O2-A	CO2-A	CO-A	NOx-A	VOC-A	CH4-A
		%	%	%	ppm	ppm	ppm
Begin calculating run averages							
2/28/2011	9:41:16	8.126	12.179	497	63.51	494.7	1549.6
2/28/2011	9:42:15	8.157	12.219	494.3	62.13	511.2	1661.5
2/28/2011	9:43:15	8.095	12.321	510.7	66.89	485.1	1603
2/28/2011	9:44:14	8.121	12.364	501.4	65.65	494.5	1622.3
2/28/2011	9:45:16	8.117	12.433	495.9	62.37	493.9	1611.3
2/28/2011	9:46:16	8.118	12.441	499.1	63.98	491.2	1612.9
2/28/2011	9:47:16	8.128	12.463	499.7	64.15	499.8	1621.1
2/28/2011	9:48:15	8.136	12.527	496.9	62.62	489.9	1588.1
2/28/2011	9:49:15	8.145	12.533	495.3	61.62	492.3	1614.7
2/28/2011	9:50:14	8.132	12.549	497.6	62.27	500.1	1618.8
2/28/2011	9:51:16	8.131	12.598	498.2	62.79	501	1615.7
2/28/2011	9:52:15	8.115	12.627	497.2	62.06	493	1564.9
2/28/2011	9:53:15	8.132	12.672	500.5	64.26	493.6	1604.9
2/28/2011	9:54:14	8.131	12.69	499	63.18	491.6	1617.1
2/28/2011	9:55:16	8.133	12.659	501.2	63.39	497.1	1629.9
2/28/2011	9:56:15	8.142	12.682	499	62.96	499.2	1610.8
2/28/2011	9:57:15	8.12	12.738	498.3	62.23	502.8	1603.8
2/28/2011	9:58:14	8.118	12.786	501.8	64.17	499.3	1562.5
2/28/2011	9:59:16	8.12	12.872	499.8	62.29	491.5	1589.5
2/28/2011	10:00:16	8.129	12.877	501.9	63.44	498.1	1592.3
Begin Traverse							
2/28/2011	10:01:15	8.143	12.906	500.6	63.48	499.8	1627.9
2/28/2011	10:02:15	8.121	12.982	497.6	61.75	499.4	1614.5
2/28/2011	10:03:16	8.15	12.97	499.1	63.21	500.1	1648.3
2/28/2011	10:04:16	8.135	12.997	494.6	60.28	508.9	1624.2
2/28/2011	10:05:15	8.126	13.069	499.6	62.17	504	1611.1
2/28/2011	10:06:15	8.121	13.123	499.8	62.38	498.6	1624.1
2/28/2011	10:07:16	8.116	13.157	501.2	63.51	499.4	1606
2/28/2011	10:08:16	8.155	13.153	497.5	61.87	502.8	1639.5
2/28/2011	10:09:15	8.134	13.198	495.3	59.85	502.4	1629.2
2/28/2011	10:10:15	8.143	13.217	498	62.25	502.6	1636
2/28/2011	10:11:14	8.139	13.248	498.7	62.18	506.3	1656.2
2/28/2011	10:12:16	8.145	13.283	496.9	61.42	504.2	1642.6
2/28/2011	10:13:15	8.125	13.31	497.4	61.09	504.1	1627
2/28/2011	10:14:15	8.136	13.305	499.8	62.04	507.5	1632
2/28/2011	10:15:14	8.123	13.353	499.5	61.43	506.8	1617.7
2/28/2011	10:16:16	8.137	13.356	500	62.56	500	1625.3
2/28/2011	10:17:16	8.117	13.398	498.1	61.64	494.8	1622.1
2/28/2011	10:18:15	8.118	13.397	500.4	62.85	498.4	1598.9
2/28/2011	10:19:15	8.127	13.404	499.8	62.83	504.9	1619.2

2/28/2011	10:20:15	8.13	13.431	499.5	62.88	507.7	1648.5
Begin Traverse							
2/28/2011	10:21:14	8.144	13.466	498.3	61.63	509.8	1636.1
2/28/2011	10:22:16	8.154	13.473	497.4	60.75	504.9	1613.9
2/28/2011	10:23:16	8.144	13.491	497.7	61.04	504.1	1628.3
2/28/2011	10:24:15	8.139	13.5	497.5	61.33	511.8	1619.3
2/28/2011	10:25:15	8.208	13.508	500.7	63.18	529.2	1706.9
2/28/2011	10:26:15	8.056	13.614	507.3	61.98	488.3	1585.9
2/28/2011	10:27:16	8.131	13.597	509	67.66	504.9	1593.2
2/28/2011	10:28:16	8.136	13.607	498	61.18	505.4	1615
2/28/2011	10:29:16	8.164	13.592	496.5	61.25	502.4	1650.6
2/28/2011	10:30:15	8.123	13.621	498.6	60.75	509	1637.1
2/28/2011	10:31:15	8.131	13.62	499.2	62.05	506.1	1634.8
2/28/2011	10:32:14	8.139	13.659	499.4	62.51	506.7	1641.3
2/28/2011	10:33:16	8.137	13.685	497.3	61.3	507.6	1630.1
2/28/2011	10:34:15	8.127	13.724	499.3	62.27	502.3	1627.8
2/28/2011	10:35:15	8.108	13.73	499.7	61.82	503.1	1624.8
2/28/2011	10:36:15	8.121	13.707	503.5	64.02	509.1	1618.4
2/28/2011	10:37:16	8.132	13.713	501.3	63.14	507.9	1624.4
2/28/2011	10:38:16	8.136	13.731	501.5	63.42	509.2	1627.6
2/28/2011	10:39:15	8.136	13.731	500	62.24	516	1590.3
2/28/2011	10:40:15	8.147	13.739	497.9	60.88	519.6	1621.7
Average of Test Run		O2-A	CO2-A	CO-A	NOx-A	VOC-A	CH4-A
		%	%	%	ppm	ppm	ppm
2/28/2011	10:40:15	8.132	13.133	499.3	62.54	502.2	1619.5
Test Run 1 End							

Final System Bias Check for Run 1 . STRATA Version 2.01

Operator: RMC Environmental, Inc.
Plant Name: WM-Farmers Branch
Location: Eng 1 Testing

	Reference Cylinder Numbers	
	Zero	Span
O2-A	CC208529	CC179563
CO2-A	CC208529	CC179563
CO-A	CC208529	CC10518
NOx-A	CC179563	CC208529
VOC-A	CC208529	SG9128607
CH4-A	CC208529	ALM033374

Date/Time 2/28/2011 10:48:26 PASSED

Analyte	O2-A	CO2-A	CO-A	NOx-A	VOC-A	CH4-A
Units	%	%	%	ppm	ppm	ppm
Zero Ref Cyl	0.00	0.00	0.00	0.00	0.00	0.00
Zero Cal	0.19	0.13	7.60	2.38	15.30	1.20
Zero Avg	-0.05	0.36	8.40	5.85	6.40	4.80
Zero Bias%	1.20	1.20	0.10	1.40	0.90	0.10
Zero Drift%	-2.30	1.50	0.00	0.10	-0.90	-0.90
Span Ref Cyl	12.48	9.44	502.80	119.20	499.20	2540.00
Span Cal	12.26	9.71	497.50	117.93	489.20	2539.10
Span Avg	12.06	9.81	520.10	120.78	508.50	2569.30
Span Bias%	0.90	0.50	2.30	1.10	1.90	0.60
Span Drift%	-1.20	1.30	1.30	0.90	-0.30	-0.60
Ini Zero Avg	0.43	0.09	8.00	5.66	15.50	50.80
Ini Span Avg	12.31	9.58	507.60	118.47	511.70	2597.20
Run Avg	8.13	13.13	499.30	62.54	502.20	1619.50
Co	0.19	0.22	8.20	5.75	10.90	27.80
Cm	12.19	9.69	513.80	119.62	510.10	2583.30
Correct Avg	8.26	12.87	488.40	59.44	491.30	1582.10

Test Run 2 Begin. STRATA Version 2.01
Operator: RMC Environmental, Inc.
Plant Name: WM-Farmers Branch
Location: Eng 1 Testing

		O2-A %	CO2-A %	CO-A %	NOx-A ppm	VOC-A ppm	CH4-A ppm
Begin calculating run averages							
2/28/2011	10:51:02	8.141	12.117	476.4	61.6	504.9	1621.7
2/28/2011	10:52:02	8.131	12.126	475.3	61.87	503.8	1607.1
2/28/2011	10:53:02	8.15	12.155	477.3	62.73	510.3	1635.7
2/28/2011	10:54:03	8.142	12.159	474.4	60.81	519.8	1616.9
2/28/2011	10:55:03	8.144	12.154	475.7	61.93	528	1639.3
2/28/2011	10:56:02	8.158	12.159	475.7	61.63	521.5	1652.3
2/28/2011	10:57:01	8.141	12.183	475.4	61.98	515	1626.5
2/28/2011	10:58:03	8.133	12.201	474.6	61.78	504.9	1627.5
2/28/2011	10:59:02	8.144	12.196	474.6	61.6	522.2	1651.2
2/28/2011	11:00:02	8.119	12.208	475.8	61.44	514.5	1609
2/28/2011	11:01:01	8.13	12.212	480.2	63.95	522.2	1597.5
2/28/2011	11:02:03	8.13	12.219	477.7	62.85	519.9	1629.1
2/28/2011	11:03:03	8.127	12.24	475.9	61.76	520.6	1640.9
2/28/2011	11:04:02	8.137	12.23	475.9	61.57	523.2	1638.9
2/28/2011	11:05:02	8.12	12.229	475.6	60.66	512.7	1631
2/28/2011	11:06:01	8.136	12.234	477.4	62.7	518.6	1637.7
2/28/2011	11:07:03	8.125	12.251	476	61.05	520.1	1619.3
2/28/2011	11:08:02	8.123	12.249	479.4	62.88	518.7	1653.6
2/28/2011	11:09:02	8.14	12.253	476.3	62.12	530.7	1676
2/28/2011	11:10:01	8.096	12.297	492	66.84	518	1635.3
2/28/2011	11:11:03	8.121	12.309	479.5	64.55	524.4	1649.7
2/28/2011	11:12:02	8.125	12.329	478.1	62.72	525.6	1651.2
2/28/2011	11:13:02	8.138	12.335	475.7	61.01	529.7	1658.2
2/28/2011	11:14:01	8.136	12.346	476.5	62	531	1644.9
2/28/2011	11:15:03	8.146	12.334	474.6	60.8	527.5	1657.4
2/28/2011	11:16:02	8.134	12.329	474.2	60.19	525.1	1669.3
2/28/2011	11:17:02	8.129	12.337	477.5	61.6	528.6	1746
2/28/2011	11:18:02	8.129	12.357	476	61.14	525.4	1742
2/28/2011	11:19:01	8.139	12.349	477.7	62.55	522.2	1688.7
2/28/2011	11:20:03	8.151	12.35	475.3	61.27	526.4	1684.6
2/28/2011	11:21:02	8.147	12.361	473	59.84	527.6	1710.9
2/28/2011	11:22:02	8.129	12.392	474.6	60.55	521.2	1692.7
2/28/2011	11:23:01	8.133	12.407	476.3	60.8	527.2	1680.5
2/28/2011	11:24:03	8.133	12.404	475.4	61.37	522.5	1709.1
2/28/2011	11:25:02	8.13	12.385	477.9	62.41	524.4	1682.5
2/28/2011	11:26:02	8.127	12.412	477.4	62.59	526.3	1689
2/28/2011	11:27:01	8.128	12.428	478.2	62.97	525.3	1705.3
2/28/2011	11:28:03	8.126	12.441	477.7	62.52	535.9	1713.9
2/28/2011	11:29:02	8.133	12.435	479.9	63.77	539.3	1728.7
2/28/2011	11:30:02	8.118	12.418	477.2	62.66	518.2	1706.4

2/28/2011	11:31:01	8.13	12.421	478.7	63.28	527.6	1717.9
2/28/2011	11:32:03	8.128	12.481	477.1	62.1	526.2	1715.1
2/28/2011	11:33:02	8.136	12.496	478.6	63.24	532.3	1707.1
2/28/2011	11:34:02	8.13	12.479	477.8	62.56	531.1	1704.8
2/28/2011	11:35:01	8.137	12.455	477.5	62.05	536.9	1705.3
2/28/2011	11:36:01	8.147	12.473	475.5	60.54	482.5	1728.1
2/28/2011	11:37:03	8.128	12.523	477.4	61.41	473.9	1717.2
2/28/2011	11:38:02	8.145	12.508	477.7	62.51	496.7	1753.6
2/28/2011	11:39:01	8.148	12.487	477.4	63.02	495.1	1715.5
2/28/2011	11:40:01	8.131	12.497	472.3*	59.94	489.5	1706.5
2/28/2011	11:41:03	8.134	12.509	478.5	62.48	493.1	1700.4
2/28/2011	11:42:02	8.125	12.502	477.1	61.76	489.5	1727.4
2/28/2011	11:43:02	8.13	12.503	478.4	62.62	494.4	1743.9
2/28/2011	11:44:01	8.148	12.516	474.9	61.35	500.4	1752.1
2/28/2011	11:45:03	8.144	12.509	473	59.58	501.1	1750.3
2/28/2011	11:46:02	8.119	12.524	476.3	60.3	500.1	1721.6
2/28/2011	11:47:01	8.127	12.529	479.8	62.31	498.2	1735.1
2/28/2011	11:48:03	8.136	12.513	478.6	62.57	495.3	1753.9
2/28/2011	11:49:02	8.142	12.517	473.9	59.81	500.1	1764.5
2/28/2011	11:50:02	8.118	12.543	475.4	60.35	496.9	1770.2
Average of Test Run		O2-A	CO2-A	CO-A	NOx-A	VOC-A	CH4-A
		%	%	%	ppm	ppm	ppm
2/28/2011	11:50:02	8.133	12.359	476.8*	61.91	515.7	1684.1

Test Run 2 End

Final System Bias Check for Run 2 . STRATA Version 2.01

Operator:	RMC Environmental, Inc.	
Plant Name:	WM-Farmers Branch	
Location:	Eng 1 Testing	
	Reference Cylinder Numbers	
	Zero	Span
O2-A	CC208529	CC179563
CO2-A	CC208529	CC179563
CO-A	CC208529	CC10518
NOx-A	CC179563	CC208529
VOC-A	CC208529	SG9128607
CH4-A	CC208529	ALM033374

Date/Time	2/28/2011	11:57:20 PASSED				
Analyte	O2-A	CO2-A	CO-A	NOx-A	VOC-A	CH4-A
Units	%	%	%	ppm	ppm	ppm
Zero Ref Cyl	0.00	0.00	0.00	0.00	0.00	0.00
Zero Cal	0.19	0.13	7.60	2.38	15.30	1.20
Zero Avg	0.36	0.16	7.80	4.53	7.20	3.40
Zero Bias%	0.80	0.10	0.00	0.90	0.80	0.00
Zero Drift%	1.90	-1.10	-0.10	-0.50	0.10	0.00
Span Ref Cyl	12.48	9.44	502.80	119.20	499.20	2540.00
Span Cal	12.26	9.71	497.50	117.93	489.20	2539.10
Span Avg	12.02	9.73	500.90	118.93	503.30	2557.90
Span Bias%	1.10	0.10	0.30	0.40	1.40	0.40
Span Drift%	-0.20	-0.50	-1.90	-0.70	-0.50	-0.20
Ini Zero Avg	-0.05	0.36	8.40	5.85	6.40	4.80
Ini Span Avg	12.06	9.81	520.10	120.78	508.50	2569.30
Run Avg	8.13	12.36	476.80	61.91	515.70	1684.10
Co	0.15	0.26	8.10	5.19	6.80	4.10
Cm	12.04	9.77	510.50	119.86	505.90	2563.60
Correct Avg	8.38	12.01	469.10	58.97	509.00	1667.20

Test Run 3 Begin. STRATA Version 2.01
Operator: RMC Environmental, Inc.
Plant Name: WM-Farmers Branch
Location: Eng 1 Testing

		O2-A	CO2-A	CO-A	NOx-A	VOC-A	CH4-A
		%	%	%	ppm	ppm	ppm
Begin calculating run averages							
2/28/2011	12:01:44	8.137	12.561	491.7	61.13	485.3	2036.5
2/28/2011	12:02:44	8.105	12.612	492.5	61.46	491.1	1623
2/28/2011	12:03:43	8.117	12.608	495.3	63.23	487.1	1622.3
2/28/2011	12:04:43	8.107	12.625	492.8	61.65	494.3	1660.3
2/28/2011	12:05:45	8.119	12.659	494.3	62.35	492.9	1666.1
2/28/2011	12:06:44	8.127	12.672	492.8	62.07	499.4	1669.9
2/28/2011	12:07:44	8.124	12.686	494.1	61.97	510.5	1688.9
2/28/2011	12:08:43	8.115	12.71	492.7	62.3	495.1	1662
2/28/2011	12:09:45	8.111	12.735	494.1	62.59	492.2	1642.8
2/28/2011	12:10:44	8.109	12.745	494.5	62.61	494.5	1656.1
2/28/2011	12:11:44	8.113	12.733	492.4	61.73	501.9	1666.8
2/28/2011	12:12:43	8.118	12.72	491.9	61.81	502.8	1681.2
2/28/2011	12:13:45	8.126	12.72	492.2	61.54	499.5	1689.5
2/28/2011	12:14:44	8.115	12.731	491.7	61.34	496.7	1671.7
2/28/2011	12:15:44	8.111	12.731	493.8	62.52	509.3	1492.4
2/28/2011	12:16:43	8.105	12.711	493.2	61.91	504.5	1499.5
2/28/2011	12:17:43	8.112	12.76	494.3	62.78	503.1	1489.4
2/28/2011	12:18:44	8.105	12.76	493.5	62.05	493.7	1481.8
2/28/2011	12:19:44	8.108	12.76	495.3	62.81	500.3	1494.6
2/28/2011	12:20:44	8.12	12.759	491.4	60.94	508.1	1481.7
2/28/2011	12:21:43	8.128	12.757	490.7	60.85	498.2	1494.4
2/28/2011	12:22:45	8.114	12.755	491.8	61.61	502	1579.1
2/28/2011	12:23:44	8.106	12.76	493.1	62.21	506.6	1586.6
2/28/2011	12:24:44	8.119	12.757	493.7	62.57	500.7	1606.2
2/28/2011	12:25:43	8.106	12.749	491.7	61.21	501.4	1599.5
2/28/2011	12:26:45	8.115	12.761	493.2	62.65	504.4	1610.1
2/28/2011	12:27:44	8.116	12.729	492.4	61.56	505.5	1595.4
2/28/2011	12:28:44	8.102	12.758	492.1	61.01	509.6	1575.3
2/28/2011	12:29:43	7.942	12.856	492.2	61.32	501.5	1584.6
2/28/2011	12:30:45	7.744	12.945	498.3	59.17	492.9	1571.9
2/28/2011	12:31:44	7.858	12.883	508.9	63.4	491.4	1564.4
2/28/2011	12:32:44	8.099	12.734	502	64.34	492.7	1583.3
2/28/2011	12:33:43	8.102	12.723	493.7	61.79	500.4	1575.2
2/28/2011	12:34:45	8.11	12.733	494	61.7	504.7	1586.2
2/28/2011	12:35:44	8.15	12.732	490.9	60.51	518.5	1615.3
2/28/2011	12:36:44	8.085	12.759	505.6	65.52	503.3	1754.5
2/28/2011	12:37:43	8.145	12.705	494.3	63.5	508.1	1787.2
2/28/2011	12:38:45	8.226	12.668	489.2	62.17	511.2	1810.9
2/28/2011	12:39:45	8.218	12.667	486.9	61.78	514.1	1819.8
2/28/2011	12:40:44	8.209	12.694	486.4	61.14	517	1823.3

2/28/2011	12:41:43	8.213	12.695	486.5	60.65	515.2	1648.5
2/28/2011	12:42:43	8.202	12.669	488.2	61.55	511.1	1642.5
2/28/2011	12:43:45	8.205	12.684	487.5	61.4	513.8	1680.7
2/28/2011	12:44:44	8.206	12.675	489.4	62.07	515.3	1682.4
2/28/2011	12:45:44	8.214	12.682	488.9	62.2	513	1700.8
2/28/2011	12:46:43	8.207	12.686	486.2	61.2	510.8	1685.6
2/28/2011	12:47:45	8.211	12.682	487.4	61.5	514.3	1678.1
2/28/2011	12:48:44	8.21	12.698	487.1	61.64	517.9	1653.7
2/28/2011	12:49:44	8.205	12.696	486	60.55	514.9	1680.6
2/28/2011	12:50:43	8.212	12.686	488.6	61.87	516.5	1693.4
2/28/2011	12:51:45	8.23	12.699	485.1	60.57	529.2	1702.9
2/28/2011	12:52:44	8.2	12.743	487.3	61.39	518.8	1686.5
2/28/2011	12:53:44	8.211	12.743	490.2	63.29	515.8	1686.2
2/28/2011	12:54:43	8.219	12.731	487.9	62.19	518.6	1685.3
2/28/2011	12:55:43	8.249	12.694	487.4	61.79	521.7	1685.3
2/28/2011	12:56:45	8.264	12.727	484.9	60.18	521.9	1693.8
2/28/2011	12:57:44	8.331	12.72	487	61.45	527	1716.2
2/28/2011	12:58:44	8.981	12.744	488.2	61.44	521.5	1704.2
2/28/2011	12:59:43	9.034	12.753	489	62.24	523.4	1694.1
2/28/2011	13:00:45	8.924	12.751	488.5	61.91	518.9	1693
Average of Test Run		O2-A	CO2-A	CO-A	NOx-A	VOC-A	CH4-A
		%	%	%	ppm	ppm	ppm
2/28/2011	13:00:45	8.18	12.721	491.6	61.86	506.8	1643.3

Test Run 3 End

Final System Bias Check for Run 3 . STRATA Version 2.01

Operator:	RMC Environmental, Inc.	
Plant Name:	WM-Farmers Branch	
Location:	Eng 1 Testing	
	Reference Cylinder Numbers	
	Zero	Span
O2-A	CC208529	CC179563
CO2-A	CC208529	CC179563
CO-A	CC208529	CC10518
NOx-A	CC179563	CC208529
VOC-A	CC208529	SG9128607
CH4-A	CC208529	ALM033374

Date/Time	2/28/2011	13:06:51 PASSED				
Analyte	O2-A	CO2-A	CO-A	NOx-A	VOC-A	CH4-A
Units	%	%	%	ppm	ppm	ppm
Zero Ref Cyl	0.00	0.00	0.00	0.00	0.00	0.00
Zero Cal	0.19	0.13	7.60	2.38	15.30	1.20
Zero Avg	0.02	0.15	7.70	6.85	6.00	2.10
Zero Bias%	0.80	0.10	0.00	1.80	0.90	0.00
Zero Drift%	-1.60	0.00	0.00	0.90	-0.10	0.00
Span Ref Cyl	12.48	9.44	502.80	119.20	499.20	2540.00
Span Cal	12.26	9.71	497.50	117.93	489.20	2539.10
Span Avg	12.37	9.31	503.50	118.31	507.70	2513.60
Span Bias%	0.50	2.30	0.60	0.20	1.90	0.50
Span Drift%	1.70	-2.30	0.30	-0.20	0.40	-0.90
Ini Zero Avg	0.36	0.16	7.80	4.53	7.20	3.40
Ini Span Avg	12.02	9.73	500.90	118.93	503.30	2557.90
Run Avg	8.18	12.72	491.60	61.86	506.80	1643.30
Co	0.19	0.15	7.80	5.69	6.60	2.70
Cm	12.19	9.52	502.20	118.62	505.50	2535.80
Correct Avg	8.31	12.67	492.10	59.29	500.50	1645.00

Test Run 4 Begin. STRATA Version 2.01
Operator: RMC Environmental, Inc.
Plant Name: WM-Farmers Branch
Location: Eng 2 Testing

		O2-A %	CO2-A %	CO-A %	NOx-A ppm	VOC-A ppm	CH4-A ppm
Begin calculating run averages							
2/28/2011	13:26:13	8.137	12.897	498.9	70.91	507.6	1674.6
2/28/2011	13:27:12	8.148	12.872	496.9	69.32	514.8	1680.4
2/28/2011	13:28:12	8.143	12.887	496.4	68.87	508.6	1680.2
2/28/2011	13:29:13	8.138	12.914	497.6	69.85	517	1679.6
2/28/2011	13:30:13	8.134	12.9	496.5	68.64	510.7	1689
2/28/2011	13:31:12	8.15	12.888	495.4	68.94	514.8	1710.7
2/28/2011	13:32:12	8.145	12.879	494.9	67.69	515.8	1674
2/28/2011	13:33:11	8.184	12.895	495.9	67.59	510.8	1684.2
2/28/2011	13:34:13	8.122	12.927	498.5	69.37	517.4	1685.7
2/28/2011	13:35:13	8.138	12.898	496.5	69.5	521.7	1739.4
2/28/2011	13:36:12	8.142	12.87	493.6	67.72	522.3	1722.5
2/28/2011	13:37:12	8.135	12.914	494.9	68.12	528	1726.5
2/28/2011	13:38:13	8.133	12.889	495.5	68.61	540	1737.8
2/28/2011	13:39:13	8.119	12.868	496	68.4	522.4	1687.4
2/28/2011	13:40:12	8.122	12.862	497.9	68.72	533.1	1682.1
2/28/2011	13:41:12	8.129	12.841	498.2	69.76	528.9	1704.9
2/28/2011	13:42:13	8.126	12.84	495.6	68.93	522.2	1697.2
2/28/2011	13:43:13	8.129	12.827	495.3	69.06	525.7	1700.3
2/28/2011	13:44:12	8.125	12.821	495.4	68.8	528.1	1698.8
2/28/2011	13:45:12	8.126	12.858	495.1	68.68	533.4	1705.9
Begin Traverse							
2/28/2011	13:46:11	8.133	12.859	494.5	68.6	537.8	1718.2
2/28/2011	13:47:13	8.108	12.874	495.5	69.18	533	1696.8
2/28/2011	13:48:12	8.116	12.869	496.8	70.03	526.2	1694.5
2/28/2011	13:49:12	8.105	12.87	496	69.19	534.3	1699.3
2/28/2011	13:50:11	8.126	12.864	498.3	71.13	537	1709.9
2/28/2011	13:51:13	8.115	12.867	494.8	69	533.8	1684.3
2/28/2011	13:52:12	8.107	12.902	497.7	70.61	537.4	1690.2
2/28/2011	13:53:12	8.112	12.896	496.9	70.62	527	1713
2/28/2011	13:54:11	8.114	12.905	495.5	69.48	481.8	1707.5
2/28/2011	13:55:13	8.115	12.909	495.1	69.49	484.9	1714.2
2/28/2011	13:56:12	8.11	12.942	495.2	69.11	492.9	1710.2
2/28/2011	13:57:12	8.084	12.966	496.1	70.53	480.8	1693.1
2/28/2011	13:58:11	8.091	12.963	499.2	72.15	484.9	1699.3
2/28/2011	13:59:13	8.082	12.994	499.5	71.53	486.3	1713.9
2/28/2011	14:00:13	8.105	13.004	498.3	71.56	491.6	1692.8
2/28/2011	14:01:12	8.102	12.999	495.7	70.18	493.3	1716.8
2/28/2011	14:02:12	8.14	12.937	496.4	71.77	498.7	1741.2
2/28/2011	14:03:13	8.035	12.991	506.8	71.38	478	1671.1
2/28/2011	14:04:13	8.099	12.966	500.8	73.73	491	1715.5

2/28/2011	14:05:12	8.099	12.962	494.4	70.49	491.2	1735.3
Begin Traverse							
2/28/2011	14:06:12	8.086	12.967	497	71.56	483.7	1700.4
2/28/2011	14:07:13	8.092	12.932	494.9	70.2	487.3	1710.9
2/28/2011	14:08:13	8.107	12.951	493.9	70.3	490	1724.7
2/28/2011	14:09:12	8.101	12.959	494.8	70.81	492.4	1719
2/28/2011	14:10:11	8.09	12.929	493.3	69.77	491.6	1718.3
2/28/2011	14:11:13	8.089	12.919	493	70.45	497.8	1724.7
2/28/2011	14:12:12	8.064	12.949	494.9	70.71	493.6	1701.7
2/28/2011	14:13:12	8.068	12.943	499.2	72.57	490.7	1709.4
2/28/2011	14:14:13	8.088	12.896	496.7	71.82	503.3	1724.9
2/28/2011	14:15:13	8.087	12.898	494.3	71.16	503.1	1722.2
2/28/2011	14:16:12	8.076	12.923	497.8	72.33	502.2	1708.6
2/28/2011	14:17:11	8.114	12.922	492.9	71.37	499.2	1726.1
2/28/2011	14:18:13	8.104	12.912	493.7	70.7	506.6	1735
2/28/2011	14:19:12	8.104	12.89	495	71.59	494.7	1717.3
2/28/2011	14:20:11	8.101	12.881	494	71.62	504.5	1727.8
2/28/2011	14:21:13	8.116	12.878	491.4	70.45	509.2	1742.5
2/28/2011	14:22:12	8.11	12.882	493.2	71.36	510.4	1723.4
2/28/2011	14:23:11	8.096	12.903	496	73.38	510.6	1714.7
2/28/2011	14:24:13	8.093	12.897	499.2	74.35	505.7	1717.5
2/28/2011	14:25:12	8.085	12.898	494.2	72.02	499.3	1701.5
Average of Test Run		O2-A	CO2-A	CO-A	NOx-A	VOC-A	CH4-A
		%	%	%	ppm	ppm	ppm
2/28/2011	14:25:12	8.112	12.907	496.1	70.26	508.7	1707.5
Test Run 4 End							

Final System Bias Check for Run 4 . STRATA Version 2.01

Operator:	RMC Environmental, Inc.	
Plant Name:	WM-Farmers Branch	
Location:	Eng 2 Testing	
	Reference Cylinder Numbers	
	Zero	Span
O2-A	CC208529	CC179563
CO2-A	CC208529	CC179563
CO-A	CC208529	CC10518
NOx-A	CC179563	CC208529
VOC-A	CC208529	SG9128607
CH4-A	CC208529	ALM033374

Date/Time	2/28/2011	14:33:40 PASSED				
Analyte	O2-A	CO2-A	CO-A	NOx-A	VOC-A	CH4-A
Units	%	%	%	ppm	ppm	ppm
Zero Ref Cyl	0.00	0.00	0.00	0.00	0.00	0.00
Zero Cal	0.19	0.13	7.60	2.38	15.30	1.20
Zero Avg	0.36	-0.07	6.80	7.76	4.50	0.60
Zero Bias%	0.80	1.10	0.10	2.20	1.10	0.00
Zero Drift%	1.60	-1.20	-0.10	0.40	-0.10	0.00
Span Ref Cyl	12.48	9.44	502.80	119.20	499.20	2540.00
Span Cal	12.26	9.71	497.50	117.93	489.20	2539.10
Span Avg	11.90	9.22	487.90	117.65	492.00	2418.80
Span Bias%	1.70	2.80	1.00	0.10	0.30	2.40
Span Drift%	-2.20	-0.50	-1.60	-0.30	-1.60	-1.90
Ini Zero Avg	0.02	0.15	7.70	6.85	6.00	2.10
Ini Span Avg	12.37	9.31	503.50	118.31	507.70	2513.60
Run Avg	8.11	12.91	496.10	70.26	508.70	1707.50
Co	0.19	0.04	7.30	7.31	5.30	1.30
Cm	12.13	9.26	495.70	117.98	499.90	2466.20
Correct Avg	8.28	13.18	503.30	67.81	508.10	1758.20

Test Run 5 Begin. STRATA Version 2.01
Operator: RMC Environmental, Inc.
Plant Name: WM-Farmers Branch
Location: Eng 2 Testing

Begin calculating run averages

		O2-A %	CO2-A %	CO-A %	NOx-A ppm	VOC-A ppm	CH4-A ppm
2/28/2011	14:36:36	8.33	10.042	497.1	73.64	522.1	1733.3
2/28/2011	14:37:36	8.329	10.001	495.2	72.41	523.1	1731.8
2/28/2011	14:38:35	8.313	10	496.8	72.85	511.4	1711.5
2/28/2011	14:39:35	8.3	10.023	500.2	74.31	519.2	1717.4
2/28/2011	14:40:36	8.331	10.043	499.1	74.42	530.3	1744.8
2/28/2011	14:41:36	8.342	10.048	497.5	73.82	521	1724.1
2/28/2011	14:42:35	8.345	10.031	495.1	71.65	523.9	1736.5
2/28/2011	14:43:35	8.372	10.042	494.4	70.93	510.7	1711.2
2/28/2011	14:44:37	8.355	10.035	495.4	70.44	512.9	1728
2/28/2011	14:45:36	8.382	10.062	495.2	71.68	518.6	1749
2/28/2011	14:46:36	8.308	10.137	509.1	73.46	502	1692.3
2/28/2011	14:47:35	8.357	10.133	501.7	74.48	509.7	1720.4
2/28/2011	14:48:37	8.362	10.139	497	71.86	507.5	1679.9
2/28/2011	14:49:36	8.363	10.163	497.5	71.74	505.2	1719.8
2/28/2011	14:50:36	8.376	10.158	497.3	72.04	501.9	1716.5
2/28/2011	14:51:35	8.786	10.186	495.4	70.68	502.9	1717
2/28/2011	14:52:35	8.374	10.223	498.8	71.62	500.5	1710.1
2/28/2011	14:53:36	8.502	10.204	497.5	70.9	505.1	1715.7
2/28/2011	14:54:36	8.407	10.187	497.9	70.47	506.3	1726.8
2/28/2011	14:55:35	8.381	10.168	495	69.1	496.4	1698.5
2/28/2011	14:56:37	8.378	11.25	496.3	69.48	503.6	1704
2/28/2011	14:57:36	8.265	12.83	503.9	70.95	485.4	1659.8
2/28/2011	14:58:36	8.348	12.789	522	82.58	500.3	1716.5
2/28/2011	14:59:35	8.381	12.788	501	72.89	507.4	1740.6
2/28/2011	15:00:37	8.369	12.821	498.6	70.53	501.6	1727.3
2/28/2011	15:01:36	8.376	12.798	497.7	69.23	491.7	1728.4
2/28/2011	15:02:36	8.375	12.814	499.6	70.03	502.4	1734.7
2/28/2011	15:03:35	8.476	12.79	488	65.24	515.1	1777.5
2/28/2011	15:04:35	8.374	12.832	492.7	65.01	490.9	1694.9
2/28/2011	15:05:36	8.426	12.857	501.8	71.31	491.6	1690.1
2/28/2011	15:06:36	8.37	12.871	500.1	70.21	489.2	1643.6
2/28/2011	15:07:35	8.39	12.86	500.1	70.71	498.5	1689.4
2/28/2011	15:08:35	9.014	12.882	500.7	70.46	489.5	1693.1
2/28/2011	15:09:37	8.7	12.891	501.1	71.4	495.9	1690.3
2/28/2011	15:10:36	8.405	12.928	498.8	69.45	492.6	1695.2
2/28/2011	15:11:35	8.388	12.952	500.8	70.89	483.9	1692.7
2/28/2011	15:12:35	8.384	12.961	500.8	71.23	495.3	1729
2/28/2011	15:13:37	8.38	12.98	501.3	70.47	487.6	1711.2
2/28/2011	15:14:36	8.384	12.984	499.3	70.52	497.6	1724.4
2/28/2011	15:15:36	8.363	13.034	501.7	70.67	487.9	1699.1

2/28/2011	15:16:35	8.375	13.029	503.3	71.68	491.6	1665.9
2/28/2011	15:17:37	8.377	13.007	501.8	70.49	484.6	1688
2/28/2011	15:18:36	8.384	12.992	502.4	70.73	491	1697.6
2/28/2011	15:19:36	8.392	12.979	498.4	68.73	492.8	1694.7
2/28/2011	15:20:35	8.378	13.04	500	69.35	497.9	1706.9
2/28/2011	15:21:35	8.384	13.1	501.7	69.9	492.2	1702
2/28/2011	15:22:36	8.398	13.079	500.8	69.87	501	1713.7
2/28/2011	15:23:36	8.403	13.087	499.9	69.9	494.3	1721.8
2/28/2011	15:24:35	8.402	13.072	497.9	67.82	490.5	1716.2
2/28/2011	15:25:35	8.388	13.085	500.4	68.95	493	1708.1
2/28/2011	15:26:37	8.396	13.108	501.6	69.66	503.5	1737.1
2/28/2011	15:27:36	8.398	13.117	501	69.99	499.3	1729.8
2/28/2011	15:28:36	8.46	13.071	500.6	69.77	511.8	1784
2/28/2011	15:29:35	8.326	13.113	502.7	66.18	482.2	1666.5
2/28/2011	15:30:37	8.378	13.123	515.8	76.92	494.2	1704.8
2/28/2011	15:31:36	8.407	13.111	503.3	71.71	494.7	1709.3
2/28/2011	15:32:36	8.405	13.114	500.5	69.52	490.1	1694.5
2/28/2011	15:33:35	8.371	13.049	496.6	67.6	492.1	1686.3
2/28/2011	15:34:37	8.394	13.064	498.9	68.86	497.3	1706.4
2/28/2011	15:35:37	8.382	13.14	501.2	69.26	490.9	1691
Average of Test Run		O2-A	CO2-A	CO-A	NOx-A	VOC-A	CH4-A
		%	%	%	ppm	ppm	ppm
2/28/2011	15:35:37	8.399	11.99	499.8	70.88	500.4	1710.9

Test Run 5 End

Final System Bias Check for Run 5 . STRATA Version 2.01

Operator:	RMC Environmental, Inc.
Plant Name:	WM-Farmers Branch
Location:	Eng 2 Testing

Reference Cylinder Numbers

	Zero	Span
O2-A	CC208529	CC179563
CO2-A	CC208529	CC179563
CO-A	CC208529	CC10518
NOx-A	CC179563	CC208529
VOC-A	CC208529	SG9128607
CH4-A	CC208529	ALM033374

Date/Time	2/28/2011	15:44:09 PASSED				
Analyte	O2-A	CO2-A	CO-A	NOx-A	VOC-A	CH4-A
Units	%	%	%	ppm	ppm	ppm
Zero Ref Cyl	0.00	0.00	0.00	0.00	0.00	0.00
Zero Cal	0.19	0.13	7.60	2.38	15.30	1.20
Zero Avg	-0.13	-0.02	7.70	8.33	2.90	-1.30
Zero Bias%	1.50	0.80	0.00	2.40	1.20	0.10
Zero Drift%	-2.30	0.30	0.10	0.20	-0.20	0.00
Span Ref Cyl	12.48	9.44	502.80	119.20	499.20	2540.00
Span Cal	12.26	9.71	497.50	117.93	489.20	2539.10
Span Avg	12.09	9.72	493.20	117.14	495.80	2452.10
Span Bias%	0.80	0.00	0.40	0.30	0.70	1.70
Span Drift%	0.90	2.80	0.50	-0.20	0.40	0.70
Ini Zero Avg	0.36	-0.07	6.80	7.76	4.50	0.60
Ini Span Avg	11.90	9.22	487.90	117.65	492.00	2418.80
Run Avg	8.40	11.99	499.80	70.88	500.40	1710.90
Co	0.12	-0.05	7.30	8.04	3.70	-0.30
Cm	11.99	9.47	490.60	117.40	493.90	2435.40
Correct Avg	8.70	11.95	512.40	68.50	505.90	1784.40

Test Run 6 Begin. STRATA Version 2.01
Operator: RMC Environmental, Inc.
Plant Name: WM-Farmers Branch
Location: Eng 2 Testing

		O2-A	CO2-A	CO-A	NOx-A	VOC-A	CH4-A
		%	%	%	ppm	ppm	ppm
Begin calculating run averages							
2/28/2011	15:48:02	8.345	12.883	499	69.31	492.3	1666.9
2/28/2011	15:49:02	8.334	12.871	505.2	72.42	496.1	1678.3
2/28/2011	15:50:01	8.351	12.913	500	70.57	503.4	1727.2
2/28/2011	15:51:01	8.361	12.937	498.8	70.16	501.6	1728.4
2/28/2011	15:52:02	8.353	12.922	496.3	68.36	502.4	1697.6
2/28/2011	15:53:02	8.34	12.935	498.1	68.62	502.2	1710.9
2/28/2011	15:54:01	8.351	12.923	496.6	68.91	504.8	1734.7
2/28/2011	15:55:01	8.334	12.965	499	69.74	498.5	1745.9
2/28/2011	15:56:02	8.339	12.966	496.8	69.02	500.9	1751.6
2/28/2011	15:57:02	8.338	12.984	500.2	69.57	507.3	1740.2
2/28/2011	15:58:01	8.339	13.009	500.1	69.77	506.9	1741.9
2/28/2011	15:59:01	8.364	13.026	496.4	68.42	511.4	1749.5
2/28/2011	16:00:03	8.363	13.047	494.8	67.58	508.2	1749.7
2/28/2011	16:01:02	8.333	13.052	495.5	67.19	504.6	1695
2/28/2011	16:02:02	8.352	13.092	499.1	69.74	503.8	1733.3
2/28/2011	16:03:01	8.34	13.144	496.2	68.25	502.2	1727.8
2/28/2011	16:04:03	8.34	13.151	499.6	69.12	510.4	1738.9
2/28/2011	16:05:02	8.327	13.111	498.5	69.52	510	1731.6
2/28/2011	16:06:02	8.324	13.135	501.9	71	507.2	1731.4
2/28/2011	16:07:01	8.345	13.161	498.4	70.22	512.5	1735.2
2/28/2011	16:08:03	8.314	13.149	496.3	68.63	500.3	1725.9
2/28/2011	16:09:02	8.323	13.101	500.9	71.12	513.5	1735.4
2/28/2011	16:10:02	8.333	13.128	497	68.55	519.3	1763.9
2/28/2011	16:11:01	8.333	13.116	498.9	69.52	511.5	1751.9
2/28/2011	16:12:01	8.408	13.067	496.9	68.87	538.3	1833.5
2/28/2011	16:13:02	8.274	13.122	503.5	65.57	499.4	1688.1
2/28/2011	16:14:02	8.355	13.083	509.7	75.74	511.1	1732.4
2/28/2011	16:15:01	8.352	13.14	498.4	69.87	512.6	1752.8
2/28/2011	16:16:01	8.382	13.073	494.6	68.38	520.7	1767.4
2/28/2011	16:17:02	8.367	13.073	492.8	66.55	517	1750.7
2/28/2011	16:18:02	8.352	13.075	497.1	68.36	509.5	1737.7
2/28/2011	16:19:01	8.356	13.092	496.9	68.61	515.6	1758.9
2/28/2011	16:20:01	8.353	13.095	497.7	69.21	517.1	1739.1
2/28/2011	16:21:02	8.361	13.096	495.9	68	528.7	1761.5
2/28/2011	16:22:02	8.342	13.13	496.4	67.67	520	1775.6
2/28/2011	16:23:01	8.337	13.115	497.3	68.78	526.6	1813.4
2/28/2011	16:24:01	8.334	13.175	500	69.28	522.6	1811.9
2/28/2011	16:25:03	8.365	13.112	494.9	67.54	528.2	1821.8
2/28/2011	16:26:02	8.359	13.127	494.3	66.72	528.3	1837.7
2/28/2011	16:27:02	8.365	13.156	494.3	67	537	1855.3

2/28/2011	16:28:01	8.351	13.172	495.3	67.99	534	1830.9
2/28/2011	16:29:03	8.352	13.146	496.1	68.44	538.8	1859.5
2/28/2011	16:30:02	8.377	13.111	499.2	70.2	535.5	1858
2/28/2011	16:31:02	8.354	13.132	498.5	69.07	534.1	1814.6
2/28/2011	16:32:01	8.375	13.147	500.5	70.31	538.3	1817.4
2/28/2011	16:33:03	8.376	13.134	497.6	68.92	529.9	1819.6
2/28/2011	16:34:02	8.493	13.17	499.6	69.16	527.1	1789.2
2/28/2011	16:35:02	8.557	13.16	498.6	68.75	527.6	1786.2
2/28/2011	16:36:01	8.365	13.135	500.7	69.11	529.9	1808.1
2/28/2011	16:37:03	8.377	13.143	501.8	70.24	533.8	1818.4
2/28/2011	16:38:02	8.376	13.168	497.6	67.9	531.9	1826.8
2/28/2011	16:39:02	8.374	13.132	501.4	69.77	531.8	1785.6
2/28/2011	16:40:01	8.366	13.158	501.8	70.45	536.5	1406.8
2/28/2011	16:41:01	8.394	13.166	498.1	68.59	537.6	1571
2/28/2011	16:42:02	8.251	12.968	493.5	68.14	533.8	1336.2
2/28/2011	16:43:02	8.379	13.142	495.8	68.03	533.5	1397.7
2/28/2011	16:44:01	8.369	13.192	498.8	69.35	537.6	1385.4
2/28/2011	16:45:01	8.39	13.209	497.8	69.02	540	1741.1
2/28/2011	16:46:03	8.37	13.19	497.7	68.22	535.6	1445.5
2/28/2011	16:47:02	8.385	13.192	494.5	67.27	539.8	1651.4
Average of Test Run		O2-A	CO2-A	CO-A	NOx-A	VOC-A	CH4-A
		%	%	%	ppm	ppm	ppm
2/28/2011	16:47:02	8.358	13.09	498.1	69	519.2	1727.8

Test Run 6 End

Final System Bias Check for Run 6 . STRATA Version 2.01

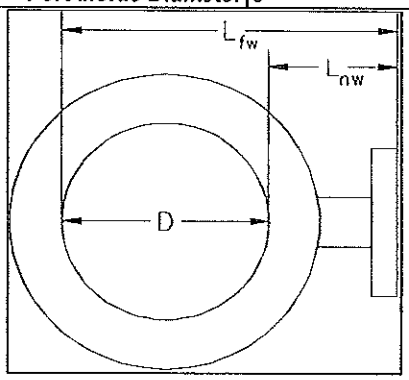
Operator:	RMC Environmental, Inc.	
Plant Name:	WM-Farmers Branch	
Location:	Eng 2 Testing	
	Reference Cylinder Numbers	
	Zero	Span
O2-A	CC208529	CC179563
CO2-A	CC208529	CC179563
CO-A	CC208529	CC10518
NOx-A	CC179563	CC208529
VOC-A	CC208529	SG9128607
CH4-A	CC208529	ALM033374

Date/Time	2/28/2011	16:56:54 PASSED				
Analyte	O2-A	CO2-A	CO-A	NOx-A	VOC-A	CH4-A
Units	%	%	%	ppm	ppm	ppm
Zero Ref Cyl	0.00	0.00	0.00	0.00	0.00	0.00
Zero Cal	0.19	0.13	7.60	2.38	15.30	1.20
Zero Avg	0.21	-0.48	7.90	8.63	6.00	18.00
Zero Bias%	0.10	3.40	0.00	2.50	0.90	0.30
Zero Drift%	1.60	-2.60	0.00	0.10	0.30	0.40
Span Ref Cyl	12.48	9.44	502.80	119.20	499.20	2540.00
Span Cal	12.26	9.71	497.50	117.93	489.20	2539.10
Span Avg	12.61	9.70	505.30	118.17	500.50	2553.50
Span Bias%	1.70	0.10	0.80	0.10	1.10	0.30
Span Drift%	2.50	-0.10	1.20	0.40	0.50	2.00
Ini Zero Avg	-0.13	-0.02	7.70	8.33	2.90	-1.30
Ini Span Avg	12.09	9.72	493.20	117.14	495.80	2452.10
Run Avg	8.36	13.09	498.10	69.00	519.20	1727.80
Co	0.04	-0.25	7.80	8.48	4.50	8.40
Cm	12.35	9.71	499.30	117.66	498.10	2502.80
Correct Avg	8.43	12.65	501.60	66.08	520.50	1750.90

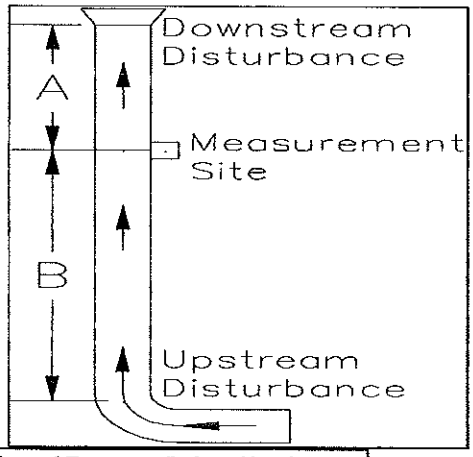
METHOD 1 - SAMPLE AND VELOCITY TRAVERSES FOR CIRCULAR SOURCES

Plant Name	Camelot Landfill Gas To Energy Facility	Date	02/28/11
Sampling Location	LFG Engines 1 & 2	Project #	2011-17009
Operator	RC	# of Ports Available	2
Stack Type	Circular	# of Ports Used	2
Stack Size	Small	Port Inside Diameter	3

Circular Stack or Duct Diameter			
Distance to Far Wall of Stack	(L_{fw})	21.00	in
Distance to Near Wall of Stack	(L_{nw})	6.00	in
(=Lfw - Lnw) Diameter of Stack	(D)	15.00	in
(=3.14(D/2/Cunits)2) Area of Stack	(A_s)	1.23	ft^2



Distance from Port to Disturbances			
Distance Upstream	(B)	22.50	in
(=B/D) Diameters Upstream	(B_D)	1.50	diameters
Distance Downstream	(A)	22.50	in
(=A/D) Diameters Downstream	(A_D)	1.50	diameters



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

[1] Check Minimum Number of Points for the Upstream and Downstream conditions, then use the largest.
[2] 8 for Circular Stacks 12 to 24 inches
12 for Circular Stacks over 24 inches

Number of Traverse Points Used			
2	Ports by	8	Across
16	Pts Used	16	Required
☐	Particulate	☑	Velocity

Location of Traverse Points in Circular Stacks						
Traverse Point Number	(Fraction of Stack Diameter from Inside Wall to Traverse Point) Number of Traverse Points on a Diameter					
	2	4	6	8	10	12
1	.146	.067	.044	.032	.026	.021
2	.854	.250	.146	.105	.082	.067
3		.750	.296	.194	.146	.118
4		.933	.704	.323	.226	.177
5			.854	.677	.342	.250
6			.956	.806	.658	.356
7				.895	.774	.644
8				.968	.854	.750
9					.918	.823
10					.974	.882
11						.933
12						.979

Traverse Point Locations			
Traverse Point Number	Fraction of Stack Diameter	Distance from Inside Wall	Distance Including Nipple Length
		in	in
1	0.032	4/8	6 4/8
2	0.105	1 5/8	7 5/8
3	0.194	2 7/8	8 7/8
4	0.323	4 7/8	10 7/8
5	0.677	10 1/8	16 1/8
6	0.806	12 1/8	18 1/8
7	0.895	13 3/8	19 3/8
8	0.968	14 4/8	20 4/8
9			
10			
11			
12			

METHOD 4 RUN SUMMARY SHEET

Company: WMRE - Camelot Landfill Gas To Energy Pl: **Load:** 1600 kW
Source: Engine #1
Test Location: Exhaust Duct

Run:	M4-R1	M4-R2	M4-R3
Flow Runs:	1	2	3
Start Time:	2/28/2011 9:40	2/28/2011 10:50	2/28/2011 12:00
End Time:	2/28/2011 10:40	2/28/2011 11:50	2/28/2011 13:00

RUN DATA

Meter voume start (cu. ft.):	422.161	445.310	468.559
Meter volume finish (cu. ft.):	444.755	468.028	491.017
Meter calib. factor (Y):	1.0010	1.0010	1.0010
Barometric pressure (in. Hg):	30.03	30.03	29.92
Average Delta-H (in. H2O):	1.77	1.77	1.77
Gas meter temperature (deg F):	85.0	83.0	89.0
Sil-Gel total wt. H2O collected (grams):	5.3	5.6	5.1
Impinger total volume H2O collected (ml):	54	58	54

CALCULATED RESULTS

Gas volume sampled (DSCF)*:	22.087	22.281	21.706
Water vapor volume (SCF)*:	2.791	2.994	2.782
Moisture content (% volume):	**11.2**	**11.8**	**11.4**

* 68 deg F (20 deg C) - 29.92 in. Hg

VOLUMETRIC FLOW RATE DETERMINATION

Company: WMRE - Camelot Landfill Gas To Energy Plant
Source: Engine #1
Test Location: Exhaust Duct

Conducted By: AM/RC

Load: 1600 kW
Run: 1
Start Time: 2/28/11 9:40
End Time: 2/28/11 10:40

TEST DATA

Test Point	Delta P (in H2O)	Temp. (Deg F)	Test Point	Delta P (in H2O)	Temp. (Deg F)
A-1	2.100	954	B-5	3.900	985
A-2	3.400	954	B-6	3.600	985
A-3	3.700	954	B-7	3.400	985
A-4	3.900	954	B-8	3.000	985
A-5	4.000	954			
A-6	3.600	954			
A-7	3.200	954			
A-8	3.000	954			
B-1	2.700	985			
B-2	2.900	985			
B-3	3.300	985			
B-4	3.700	985			

Duct Area:	188.7	(A)	sq. inches
Barometric Pressure:	30.03	(Pbar)	inches Hg
Static Pressure:	-2.50	(PG)	inches H2O
Pitot Tube Coefficient:	0.84	(Cp)	
Percent O2:	8.3	% O2	
Percent CO2:	12.9	% CO2	
Percent Nitrogen:	78.9	% N2	
Percent Moisture:	11.2	$\%H_2O$	
Average Delta P:	3.34		inches H2O
Root Mean Sq. Delta P:	3.32	(Pavg)	inches H2O
Mean Temperature:	969.5	(Ts)	Degrees F
Number Of Traverse Points:	16		

CALCULATIONS

DRY MOLE FRACTION OF STACK GAS: $Mfd = 1 - (\%H_2O / 100)$	Mfd =	0.888	
ABSOLUTE STACK GAS PRESSURE: $Ps = Pbar + (Pg / 13.6)$	Ps =	29.85	in. Hg
DRY MOLECULAR WEIGHT OF STACK GAS: $Md = 0.44 (\%CO_2) + 0.32 (\%O_2) + 0.28 (\%N_2)$	Md =	30.39	lb/lb-mole
WET MOLECULAR WEIGHT OF STACK GAS: $Ms = (Md)(Mfd) + 0.18 (\%H_2O)$	Ms =	29.00	lb/lb-mole
AVERAGE STACK GAS VELOCITY: $Vs = 85.49(Cp) X \{(Pavg)(Ts + 460)/[(Ps)(Ms)]\}^{0.5}$	Vs =	168.1	ft/sec
DRY VOLUMETRIC FLOW RATE: $Qsd = 7.353(60)(Mfd)(Vs)(A)(Ps) / (Ts + 460)$	Qsd =	4,323	DSCFM (DRY)
WET VOLUMETRIC FLOW RATE: $Qsw = Qsd / Mfd$	Qaw =	4,869.6	SCFM (WET)

VOLUMETRIC FLOW RATE DETERMINATION

Company: WMRE - Camelot Landfill Gas To Energy Plant
Source: Engine #1
Test Location: Exhaust Duct

Conducted By: AM/RC

Load: 1600 kW
Run: 2
Start Time: 2/28/11 10:50
End Time: 2/28/11 11:50

TEST DATA

Test Point	Delta P (in H2O)	Temp. (Deg F)	Test Point	Delta P (in H2O)	Temp. (Deg F)
A-1	2.500	976	B-5	4.000	983
A-2	3.600	976	B-6	3.700	983
A-3	3.800	976	B-7	3.300	983
A-4	4.100	976	B-8	3.100	983
A-5	4.000	976			
A-6	3.500	976			
A-7	3.300	976			
A-8	2.800	976			
B-1	2.600	983			
B-2	2.800	983			
B-3	3.200	983			
B-4	3.800	983			

Duct Area:	188.7	(A)	sq. inches
Barometric Pressure:	30.03	(Pbar)	inches Hg
Static Pressure:	-3.00	(PG)	inches H2O
Pitot Tube Coefficient:	0.84	(Cp)	
Percent O2:	8.4	% O2	
Percent CO2:	12.0	% CO2	
Percent Nitrogen:	79.6	% N2	
Percent Moisture:	11.8	$\%H_2O$	
Average Delta P:	3.38		inches H2O
Root Mean Sq. Delta P:	3.36	(Pavg)	inches H2O
Mean Temperature:	979.5	(Ts)	Degrees F
Number Of Traverse Points:	16		

CALCULATIONS

DRY MOLE FRACTION OF STACK GAS: $Mfd = 1 - (\%H_2O / 100)$	Mfd =	0.882	
ABSOLUTE STACK GAS PRESSURE: $Ps = Pbar + (Pg / 13.6)$	Ps =	29.81	in. Hg
DRY MOLECULAR WEIGHT OF STACK GAS: $Md = 0.44 (\%CO_2) + 0.32 (\%O_2) + 0.28 (\%N_2)$	Md =	30.26	lb/lb-mole
WET MOLECULAR WEIGHT OF STACK GAS: $Ms = (Md)(Mfd) + 0.18 (\%H_2O)$	Ms =	28.80	lb/lb-mole
AVERAGE STACK GAS VELOCITY: $Vs = 85.49(Cp) X \{(Pavg)(Ts + 460)/[(Ps)(Ms)]\}^{0.5}$	Vs =	170.5	ft/sec
DRY VOLUMETRIC FLOW RATE: $Qsd = 7.353(60)(Mfd)(Vs)(A)(Ps) / (Ts + 460)$	Qsd =	4,318	DSCFM (DRY)
WET VOLUMETRIC FLOW RATE: $Qsw = Qsd / Mfd$	Qaw =	4,898.6	SCFM (WET)

VOLUMETRIC FLOW RATE DETERMINATION

Company: WMRE - Camelot Landfill Gas To Energy Plant
Source: Engine #1
Test Location: Exhaust Duct

Conducted By: AM/RC

Load: 1600 kW
Run: 3
Start Time: 2/28/11 12:00
End Time: 2/28/11 13:00

TEST DATA

Test Point	Delta P (in H2O)	Temp. (Deg F)	Test Point	Delta P (in H2O)	Temp. (Deg F)
A-1	2.600	979	B-5	4.100	982
A-2	2.900	979	B-6	3.700	982
A-3	3.300	979	B-7	3.400	982
A-4	3.700	979	B-8	3.000	982
A-5	4.200	979			
A-6	4.100	979			
A-7	3.600	979			
A-8	3.100	979			
B-1	2.700	982			
B-2	2.900	982			
B-3	3.300	982			
B-4	3.700	982			

Duct Area:	188.7	(A)	sq. inches
Barometric Pressure:	30.03	(Pbar)	inches Hg
Static Pressure:	-2.50	(PG)	inches H2O
Pitot Tube Coefficient:	0.84	(Cp)	
Percent O2:	8.3	% O2	
Percent CO2:	12.7	% CO2	
Percent Nitrogen:	79.1	% N2	
Percent Moisture:	11.4	$\%H_20$	
Average Delta P:	3.39		inches H2O
Root Mean Sq. Delta P:	3.38	(Pavg)	inches H2O
Mean Temperature:	980.5	(Ts)	Degrees F
Number Of Traverse Points:	16		

CALCULATIONS

DRY MOLE FRACTION OF STACK GAS: $Mfd = 1 - (\%H_2O / 100)$	Mfd =	0.886	
ABSOLUTE STACK GAS PRESSURE: $Ps = Pbar + (Pg / 13.6)$	Ps =	29.85	in. Hg
DRY MOLECULAR WEIGHT OF STACK GAS: $Md = 0.44 (\%CO_2) + 0.32 (\%O_2) + 0.28 (\%N_2)$	Md =	30.36	lb/lb-mole
WET MOLECULAR WEIGHT OF STACK GAS: $Ms = (Md)(Mfd) + 0.18 (\%H_2O)$	Ms =	28.95	lb/lb-mole
AVERAGE STACK GAS VELOCITY: $Vs = 85.49(Cp) X \{(Pavg)(Ts + 460)/[(Ps)(Ms)]\}^{0.5}$	Vs =	170.4	ft/sec
DRY VOLUMETRIC FLOW RATE: $Qsd = 7.353(60)(Mfd)(Vs)(A)(Ps) / (Ts + 460)$	Qsd =	4,341	DSCFM (DRY)
WET VOLUMETRIC FLOW RATE: $Qsw = Qsd / Mfd$	Qaw =	4,897.3	SCFM (WET)

METHOD 4 RUN SUMMARY SHEET

Company: WMRE - Camelot Landfill Gas To Energy **Load:** 1600 kW
Source: Engine #2
Test Location: Exhaust Duct

Run:	**M4-R1**	**M4-R2**	**M4-R3**
Flow Runs:	1	2	3
Start Time:	2/28/2011 13:25	2/28/2011 14:35	2/28/2011 15:47
End Time:	2/28/2011 14:24	2/28/2011 15:35	2/28/2011 16:47

RUN DATA

Meter voume start (cu. ft.):	491.457	514.319	537.967
Meter volume finish (cu. ft.):	513.926	536.972	560.479
Meter calib. factor (Y):	1.0010	1.0010	1.0010
Barometric pressure (in. Hg):	30.03	30.03	30.03
Average Delta-H (in. H2O):	1.77	1.77	1.77
Gas meter temperature (deg F):	65.0	64.0	67.0
Sil-Gel total wt. H2O collected (grams):	5.0	5.5	5.6
Impinger total volume H2O collected (ml):	56	60	61

CALCULATED RESULTS

Gas volume sampled (DSCF)*:	22.793	23.023	22.749
Water vapor volume (SCF)*:	2.871	3.083	3.135
Moisture content (% volume):	**11.2**	**11.8**	**12.1**

* 68 deg F (20 deg C) - 29.92 in. Hg

VOLUMETRIC FLOW RATE DETERMINATION

Company: WMRE - Camelot Landfill Gas To Energy Plant
Source: Engine #2
Test Location: Exhaust Duct

Conducted By: AM/RC

Load: 1600 kW
Run: 1
Start Time: 2/28/2011 13:25
End Time: 2/28/2011 14:24

TEST DATA

Test Point	Delta P (in H2O)	Temp. (Deg F)	Test Point	Delta P (in H2O)	Temp. (Deg F)
A-1	2.700	984	B-5	3.900	988
A-2	3.200	984	B-6	3.700	988
A-3	3.400	984	B-7	3.300	988
A-4	3.700	984	B-8	3.100	988
A-5	3.900	984			
A-6	4.000	984			
A-7	3.800	984			
A-8	3.000	984			
B-1	2.400	988			
B-2	2.700	988			
B-3	2.900	988			
B-4	3.300	988			

Duct Area:	188.7	(A)	sq. inches
Barometric Pressure:	30.03	(Pbar)	inches Hg
Static Pressure:	-3.20	(PG)	inches H2O
Pitot Tube Coefficient:	0.84	(Cp)	
Percent O2:	8.0	% O2	
Percent CO2:	13.2	% CO2	
Percent Nitrogen:	78.8	% N2	
Percent Moisture:	11.2	$\%H_2O$	
Average Delta P:	3.31		inches H2O
Root Mean Sq. Delta P:	3.29	(Pavg)	inches H2O
Mean Temperature:	986.0	(Ts)	Degrees F
Number Of Traverse Points:	16		

CALCULATIONS

DRY MOLE FRACTION OF STACK GAS: $Mfd = 1 - (\%H_2O / 100)$	Mfd =	0.888	
ABSOLUTE STACK GAS PRESSURE: $Ps = Pbar + (Pg / 13.6)$	Ps =	29.79	in. Hg
DRY MOLECULAR WEIGHT OF STACK GAS: $Md = 0.44 (\%CO_2) + 0.32 (\%O_2) + 0.28 (\%N_2)$	Md =	30.43	lb/lb-mole
WET MOLECULAR WEIGHT OF STACK GAS: $Ms = (Md)(Mfd) + 0.18 (\%H_2O)$	Ms =	29.04	lb/lb-mole
AVERAGE STACK GAS VELOCITY: $Vs = 85.49(Cp) X \{(Pavg)(Ts + 460)/[(Ps)(Ms)]\}^{0.5}$	Vs =	168.5	ft/sec
DRY VOLUMETRIC FLOW RATE: $Qsd = 7.353(60)(Mfd)(Vs)(A)(Ps) / (Ts + 460)$	Qsd =	4,279	DSCFM (DRY)
WET VOLUMETRIC FLOW RATE: $Qsw = Qsd / Mfd$	Qaw =	4,817.6	KSCFH (WET)
WET VOLUMETRIC FLOW RATE: $Qsw = Qsd / Mfd / 60$	Qaw =	80.3	KSCFM (WET)

VOLUMETRIC FLOW RATE DETERMINATION

Company: WMRE - Camelot Landfill Gas To Energy Plant
Source: Engine #2
Test Location: Exhaust Duct

Conducted By: AM/RC

Load: 1600 kW
Run: 2
Start Time: 2/28/2011 14:35
End Time: 2/28/2011 15:35

TEST DATA

Test Point	Delta P (in H2O)	Temp. (Deg F)	Test Point	Delta P (in H2O)	Temp. (Deg F)
A-1	2.500	985	B-5	4.000	982
A-2	3.100	985	B-6	3.400	982
A-3	3.500	985	B-7	3.100	982
A-4	3.900	985	B-8	2.700	982
A-5	4.200	985			
A-6	3.700	985			
A-7	3.600	985			
A-8	2.800	985			
B-1	2.300	982			
B-2	2.500	982			
B-3	2.900	982			
B-4	3.400	982			

Duct Area:	188.7	(A)	sq. inches
Barometric Pressure:	30.03	(Pbar)	inches Hg
Static Pressure:	-3.40	(PG)	inches H2O
Pitot Tube Coefficient:	0.84	(Cp)	
Percent O2:	8.1	% O2	
Percent CO2:	12.0	% CO2	
Percent Nitrogen:	80.0	% N2	
Percent Moisture:	11.8	$\%H_2O$	
Average Delta P:	3.23		inches H2O
Root Mean Sq. Delta P:	3.20	(Pavg)	inches H2O
Mean Temperature:	983.5	(Ts)	Degrees F
Number Of Traverse Points:	16		

CALCULATIONS

DRY MOLE FRACTION OF STACK GAS: $Mfd = 1 - (\%H_2O / 100)$	Mfd =	0.882	
ABSOLUTE STACK GAS PRESSURE: $Ps = Pbar + (Pg / 13.6)$	Ps =	29.78	in. Hg
DRY MOLECULAR WEIGHT OF STACK GAS: $Md = 0.44 (\%CO_2) + 0.32 (\%O_2) + 0.28 (\%N_2)$	Md =	30.24	lb/lb-mole
WET MOLECULAR WEIGHT OF STACK GAS: $Ms = (Md)(Mfd) + 0.18 (\%H_2O)$	Ms =	28.79	lb/lb-mole
AVERAGE STACK GAS VELOCITY: $Vs = 85.49(Cp) X \{(Pavg)(Ts + 460)/[(Ps)(Ms)]\}^{0.5}$	Vs =	166.7	ft/sec
DRY VOLUMETRIC FLOW RATE: $Qsd = 7.353(60)(Mfd)(Vs)(A)(Ps) / (Ts + 460)$	Qsd =	4,208	DSCFM (DRY)
WET VOLUMETRIC FLOW RATE: $Qsw = Qsd / Mfd$	Qaw =	4,771.3	KSCFH (WET)
WET VOLUMETRIC FLOW RATE: $Qsw = Qsd / Mfd / 60$	Qaw =	79.5	KSCFM (WET)

VOLUMETRIC FLOW RATE DETERMINATION

Company: WMRE - Camelot Landfill Gas To Energy Plant
Source: Engine #2
Test Location: Exhaust Duct

Conducted By: AM/RC

Load: 1600 kW
Run: 3
Start Time: 2/28/2011 15:47
End Time: 2/28/2011 16:47

TEST DATA

Test Point	Delta P (in H2O)	Temp. (Deg F)	Test Point	Delta P (in H2O)	Temp. (Deg F)
A-1	2.600	979	B-5	3.900	981
A-2	3.300	979	B-6	3.300	981
A-3	3.700	979	B-7	3.000	981
A-4	3.900	979	B-8	2.600	981
A-5	4.300	979			
A-6	4.100	979			
A-7	3.500	979			
A-8	3.000	979			
B-1	2.400	981			
B-2	2.600	981			
B-3	3.000	981			
B-4	3.600	981			

Duct Area:	188.7	(A)	sq. inches
Barometric Pressure:	30.03	(Pbar)	inches Hg
Static Pressure:	-3.00	(PG)	inches H2O
Pitot Tube Coefficient:	0.84	(Cp)	
Percent O2:	8.1	% O2	
Percent CO2:	11.3	% CO2	
Percent Nitrogen:	80.6	% N2	
Percent Moisture:	12.1	$\%H_2O$	
Average Delta P:	3.30		inches H2O
Root Mean Sq. Delta P:	3.28	(Pavg)	inches H2O
Mean Temperature:	980.0	(Ts)	Degrees F
Number Of Traverse Points:	16		

CALCULATIONS

DRY MOLE FRACTION OF STACK GAS: $Mfd = 1 - (\%H_2O / 100)$	Mfd =	0.879	
ABSOLUTE STACK GAS PRESSURE: $Ps = Pbar + (Pg / 13.6)$	Ps =	29.81	in. Hg
DRY MOLECULAR WEIGHT OF STACK GAS: $Md = 0.44 (\%CO_2) + 0.32 (\%O_2) + 0.28 (\%N_2)$	Md =	30.13	lb/lb-mole
WET MOLECULAR WEIGHT OF STACK GAS: $Ms = (Md)(Mfd) + 0.18 (\%H_2O)$	Ms =	28.66	lb/lb-mole
AVERAGE STACK GAS VELOCITY: $Vs = 85.49(Cp) X \{(Pavg)(Ts + 460)/[(Ps)(Ms)]\}^{0.5}$	Vs =	168.7	ft/sec
DRY VOLUMETRIC FLOW RATE: $Qsd = 7.353(60)(Mfd)(Vs)(A)(Ps) / (Ts + 460)$	Qsd =	4,259	DSCFM (DRY)
WET VOLUMETRIC FLOW RATE: $Qsw = Qsd / Mfd$	Qaw =	4,845.7	KSCFH (WET)
WET VOLUMETRIC FLOW RATE: $Qsw = Qsd / Mfd / 60$	Qaw =	80.8	KSCFM (WET)

APPENDIX C. TEST QA/ QC FORMS

Calibration Gas Certificates of Analysis

Meterbox Calibrations

Pitot Calibration

EXAMPLE CALCULATIONS
Instrumental Methods

Company: WMRE - Farmers Branch
Source: Engine #1 & #2
Test Location: Exhaust Duct
RMCEInc Project #: 2011-17009

Normal Load: HIGH LOAD
Run: 1
Start Time: 2/28/2011 9:40
End Time: 2/28/2011 10:40
Run Duration (Min.) : 1:00

Volume Of Water Collected (g)

Vlc = (Sil-Gel Total wt. H_2O collected) + (Impingers Volume H_2O collected)

Vlc = 5.3 + 54.0

Vlc = 59.3 g

Volume Of Water Vapor (SCF)

Vwstd = 0.04707 * Vlc

Vwstd = 0.04707 * 59.3

Vwstd = 54.2495 SCF

Dry Mole Fraction Of Flue Gas

Mfd = 1 - (%H_2O/100)

Mfd = 1 - (11.2% / 100)

Mfd = 0.888

Volume Of Dry Gas Sampled @ Standard Conditions - 68F and 29.92"Hg (DSCF)

$$V_{mstd} = Y * Vm * \frac{(Pbar + Delta\ H/13.6)}{Pstd} * \frac{(460 + tstd)}{(460 + tm)}$$

$$V_{mstd} = 1.0010 * 22.594 * \frac{(30.03 + 1.772 / 13.6))}{29.92} * \frac{(460 + 85)}{(460 + 68)}$$

V_{mstd} = 22.0871 DSCF

Percent Moisture, By Volume, As Measured In Flue Gas (%H_2O)

%H_2O = 100 * Vwstd / (Vwstd + Vmstd)

%H_2O = 100 * 2.791 / (2.791 + 22.087)

%H_2O = 11.22

FUEL Factor

F_o = (20.9 - %O_{2d}) / %CO_{2d}

F_o = (20.9 - 8.3) / 12.9

F_o = 0.982

Dry Molecular Weight Of The Flue Gas (lb/lb-mole, Dry)

M_d = (%CO_2 * 0.44) + (%O_2 * 0.32) + (N_2 * 0.28)

M_d = (%CO_2 * 0.44) + (%O_2 * 0.32) + ((100 - %O2 - %CO2) * 0.28)

M_d = (12.9 * 0.44) + (8.3 * 0.32) + ((100 - 8.3 - 12.9) * 0.28)

M_d = 30.39 lb/lb-mole, dry

EXAMPLE CALCULATIONS
Instrumental Methods

Company: WMRE - Farmers Branch
Source: Engine #1 & #2
Test Location: Exhaust Duct
RMCEInc Project #: 2011-17009

Normal Load: HIGH LOAD
Run: 1
Start Time: 2/28/2011 9:40
End Time: 2/28/2011 10:40
Run Duration (Min.) : 1:00

Wet Molecular Weight Of The Flue Gas (lb/lb-mole, Wet)

M_s = (Mfd * Md) + (0.18 * %H_2O)

M_s = (0.888 * 30.39) + (0.18 * 11.2)

M_s = 29.00 lb/lb-mole, wet

Dry Parts Per Million (ppm_d) from a wet Measurement (ppm_w)

VOC ppm_d = VOC ppm_w / Mfd

VOC ppm_d = 502.2 / 0.888

VOC ppm_d = 565.67

Emission Rate (lbs/mmBtu)

NO_xlbs/mmbtu = F-Factor * Conv-Factor * NOxppmd * 20% O2 / (20.9% O2 -O2%d)

NO_xlbs/mmbtu = 59.44 * 9420 * 0.0000001194 * 20.9 / (20.9- 8.26)

NO_xlbs/mmbtu = 0.111

Emission Rate (lbs/Hr)

NMOC lbs/Hr = 60 * Conv-Factor * VOC ppmd * "Flowrate

NMOC lbs/Hr = 77.496188209361 * 60 * 0.0000000312 * "4323

NMOC lbs/Hr = 0.627

NOx lb/Hr = ppm NOx * 60 * Conv Factor * Flowrate

NOx lb/Hr = 59.44 * 0.00000001194 * 60 * 4323

NOx lb/Hr = 1.84

Emission Rate (g/BHP-Hr)

NO_xg/BHP-Hr = 456.593/(Horsepower) * lb/Hr

NOxg/BHP-Hr = 1.84085513568 * 453.593 / 2233

NO_xg/BHP-Hr = 0.37

NO2-NO CONVERSION EFFICIENCY

RMCEInc-Air Monitoring Division

Manufacture/ Model: TECO 42i-HL
Serial Number: 42iHL-ANSBPCC

Instrument Span: 250
Date Of Test: 2/28/11

RESULTS	
Peak response recorded during converter efficiency test:	25.84 ppm
Response recorded at the end of the 30-minute test:	25.59 ppm
Percent decrease from the peak response:	0.97%
Converter Efficiency:	**99.03%**

SPECIFICATIONS (EPA METHOD 7E): RESPONSE AT 30 MINUTES MUST NOT DECREASE BY MORE THAN 2% OF THE PEAK RESPONSE VALUE.

NO2-NO CONVERTER EFFICIENCY TEST PROCEDURES

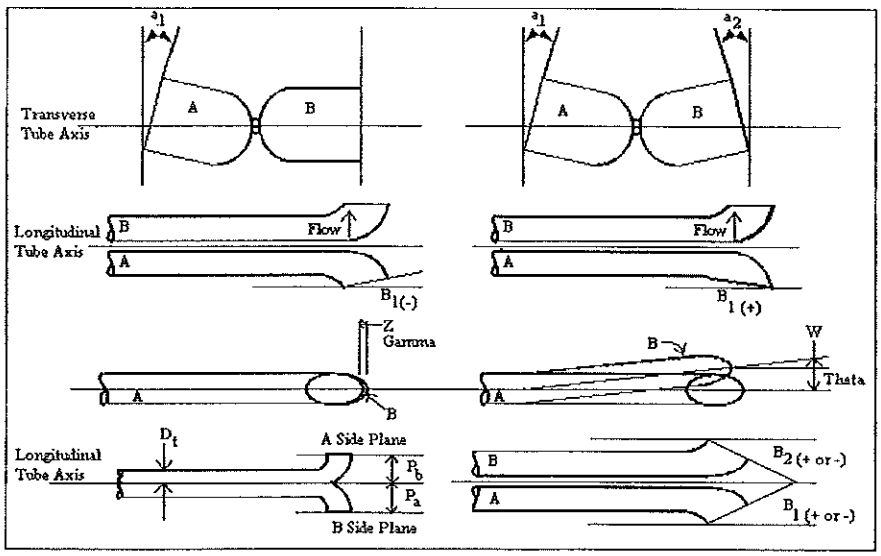
RMCEInc-AMD followed the manufacturer's recommended set-up procedures contained in the analyzer manual. After the initial set-up procedures were completed, the electronics of the monitor were adjusted according to the manufacturer's guidelines. The monitor was then calibrated by flowing NO calibration gases into the instrument. A calibration gas was then diluted (1:1) with purified compressed air. The gas mixture was routed through a manifold into a Tedlar bag, which was previously leak tested and evacuated. This arrangement afforded sufficient volume to allow the sampling system to operate for the required 30 minutes. Immediately after the bag was filled, the manifold was connected to the sampling system. The system was turned on and the analyzer response was recorded on a data acquisition system. The one minute averages from the data acquisition system was analyzed for the peak response and the response at the end of the 30-minute sampling period.

2/28/11

S-TYPE PITOT TUBE INSPECTION

Project Number	**2011-17009**		
Pitot Tube Number	**M2-36-2**		
Level	Y	(Y/N)	PASS
Obstructions	N	(Y/N)	PASS
Damaged	N	(Y/N)	PASS
Type of material	SS		
-10 < alpha1 < +10	0.5	Degrees	PASS
-10 < alpha2 < +10	0.5	Degrees	PASS
-5 < Beta1 < +5	0.0	Degrees	PASS
-5 < Beta2 < +5	0.0	Degrees	PASS
z or Gamma	0.0	Degrees	
w or Theta	0.5	Degrees	
A	0.795	Inches	
{z = A Tan (Gamma)} < 0.125	0.004	Inches	PASS
{w = A Tan (Theta)} < 0.03125	0.008	Inches	PASS
$0.1875 < D_t < 0.375$	0.375	Inches	PASS
$1.05\ D_t < P_a < 1.5\ D_t$	0.395	Inches	PASS
$1.05\ D_t < P_b < 1.5\ D_t$	0.394	Inches	PASS
$\lvert P_a - P_b \rvert < 0.0625$	0.001	Inches	PASS
Distance T/C set back > 2.0	2.440	Inches	PASS

alpha1 & alpha 2	are the angles of deflection that faces of the pitot tube are off from the perpendicular line of the traverse axis.
Beta1 & Beta2	are the angles of deflection that faces of the pitot tube from the line parallel to the longitudinal tube axis.
Gamma	is the angle between the line between the two pitot tips and the theoretical level line between the tips.
Theta	is the angle between the two center lines of the pitot faces.
A	is the distance between the two pitot tips.
z	is the distance between the two lengths of the pitot tips.
w	is the distance between the two center lines of each of the pitot tubes.
D_t	is the outside diameter of the tubing used.
P_a & P_b	is the distance between the pitot tube face and the longitudinal tube axis.



COMMENTS: _____

I certify that this pitot tube meets or exceeds all specifications, criteria and/ or applicable design features and is hereby assigned a pitot tube calibration factor of 0.84.

Signature: _____

Date: 2/28/11

RMC ENvironmental, Inc.

PreTest Meterbox Audit

Plant: WMRE - Camelot Landfil Gas to Energy
Location: Lewisville, TX

Test Date: 2/28/2011
Auditor: RC
Project #: 2011-17009

Meterbox I.D.:	RMC003	**Level Manometer:**	Yes
Gamma:	1.001	**Zero Manometer:**	Yes
Delta H@	1.772	**Barometric Pressure:**	30.03

	Audit Time (Min)	Dry Gas Meter Reading (Ft^3)	Dry Gas Meter Temperature (°F)
Initial Readings =	0.0	422.161	83
Final Readings =	10.0	429.747	84

Run Time (Minutes) **Theta** =	10
Gas Volume Sampled V_m =	7.5860
Average T_m =	83.5

	Audit Gamma Limits
Lower Gamma Limit **LGL**=	*0.96 * Y =* 0.961
Upper Gamma Limit **UGL**=	*1.04 * Y =* 1.041

Audit Gamma Y_c =	**1.0012**
Meter Box Audit =	**Passed**

Ideal Sampling Rate = 0.75

$$Y_c = (Theta / V_m) * [\{(29.92 / (460 + 68) * 0.75^2) * (T_m + 460)\} / P_{bar}]^{0.5}$$

Passed = LGL < Y_c < UGL

Failed = LGL > Y_c or Y_c > UGL

Audit Performed By: [signature]

RMC Environmental, Inc.

Airgas.

CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Part Number:	E03NI61E15A2839	Reference Number:	54-124193110-4
Cylinder Number:	CC147760	Cylinder Volume:	158 Cu.Ft.
Laboratory:	ASG - Chicago - IL	Cylinder Pressure:	2015 PSIG
Analysis Date:	Oct 06, 2009	Valve Outlet:	590

Expiration Date: Oct 06, 2012

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 DIOXIDE	17.50 %	16.98 %	G1	+/- 1% NIST Traceable
OXYGEN	20.90 %	20.85 %	G1	+/- 1% NIST Traceable
NITROGEN	Balance			

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Expiration Date
,TRM/O2	60608	CC207980	22.51% OXYGEN/NITROGEN	May 01, 2010
NTRM/CO2	40604	XC034327B	19.84% CARBON DIOXIDE/	May 15, 2012

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
(CO-1)HORIBA VIA-510	NDIR	Sep 21, 2009
(O2-1)HORIBA MPA-510	Paramagnetic	Sep 21, 2009

Triad Data Available Upon Request

Notes:

Signature on file

QA Approval

Airgas.

CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Part Number:	E03NI78E15A56Y2	Reference Number:	54-124224926-2
Cylinder Number:	CC179563	Cylinder Volume:	151 Cu.Ft.
Laboratory:	ASG - Chicago - IL	Cylinder Pressure:	2015 PSIG
Analysis Date:	Jul 02, 2010	Valve Outlet:	590

Expiration Date: Jul 02, 2013

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 DIOXIDE	9.500 %	9.443 %	G1	+/- 1% NIST Traceable
OXYGEN	12.50 %	12.48 %	G1	+/- 1% NIST Traceable
NITROGEN	Balance			

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTRM/CO2	1	CC59142	13.78% CARBON DIOXIDE/	Oct 02, 2012
NTRM/O2	981202	CC73607	14.84% OXYGEN/	Oct 02, 2012

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
(CO2-1)HORIBA VIA-510	NDIR	Jun 03, 2010
(O2-1)HORIBA MPA-510	Paramagnetic	Jun 03, 2010

Triad Data Available Upon Request

Notes:

Signature on file

QA Approval

Airgas

CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Airgas Specialty Gases
6421 Monclova Road
Maumee, OH 43537-9760
(419) 893-7226
FAX: (419) 893-2963
www.airgas.com

Part Number:	E02NI99E15A0080	Reference Number:	113-124136020-8
Cylinder Number:	CC10309	Cylinder Volume:	144 Cu.Ft.
Laboratory:	ASG - Maumee - OH	Cylinder Pressure:	2015 PSIG
Analysis Date:	May 08, 2008	Valve Outlet:	350

Expiration Date: May 08, 2011

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	250.0 PPM	255.8 PPM	G1	+/- 1% NIST Traceable
NITROGEN	Balance			

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTRM	051204	CC180009	99.49PPM CARBON MONOXIDE/NITROGEN	Feb 02, 2009
NTRM	051205	CC180694	495.8PPM CARBON MONOXIDE/NITROGEN	Feb 02, 2009

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
022-Horiba VIA-510	NDIR	Apr 16, 2008

Triad Data Available Upon Request

Notes:

Rij Yolen

QA Approval

Airgas

Airgas Speciality Gases
12722 S. Wentworth Avenue
Chicago, IL 60628
1-773-785-3000
FAX: 1-773-785-1928
www.airgas.com

CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Part Number:	E02NI99E15A3168	Reference Number:	54-124152573-3
Cylinder Number:	CC10518	Cylinder Volume:	144 Cu.Ft.
Laboratory:	ASG - Chicago - IL	Cylinder Pressure:	2015 PSIG
Analysis Date:	Sep 30, 2008	Valve Outlet:	580

Expiration Date: Sep 30, 2011

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	500.0 PPM	502.8 PPM	G1	+/- 1% NIST Traceable
NITROGEN	Balance			

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTRM/CO	5120510	CC179949	495.8PPM CARBON MONOXIDE/	Feb 02, 2009

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicolet Nexus	FTIR	Sep 08, 2008

Triad Data Available Upon Request

Notes:

QA Approval

Airgas

Airgas Specialty Gases
12722 S. Wentworth Avenue
Chicago, IL 60628
1-773-785-3000
FAX: 1-773-785-1928
www.airgas.com

CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Part Number:	E02NI99E15A0101	Reference Number:	54-124176834-1
Cylinder Number:	SG9198829BAL	Cylinder Volume:	144 Cu.Ft.
Laboratory:	ASG - Chicago - IL	Cylinder Pressure:	2015 PSIG
Analysis Date:	May 12, 2009	Valve Outlet:	350

Expiration Date: May 12, 2012

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	1000 PPM	1004 PPM	G1	+/- 1% NIST Traceable
NITROGEN	Balance			

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTRM/CO	80604	CC255866	1002.4PPM CARBON MONOXIDE/NITROGEN	Apr 15, 2012

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicolet Nexus	FTIR	May 06, 2009

Triad Data Available Upon Request

Notes:

QA Approval

Airgas

Airgas Specialty Gases
12722 S. Wentworth Avenue
Chicago, IL 60628
1-773-785-3000
FAX: 1-773-785-1928
www.airgas.com

CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Part Number:	E03NI99E15A0370	Reference Number:	54-124190567-3A
Cylinder Number:	CC86991	Cylinder Volume:	144 Cu.Ft.
Laboratory:	ASG - Chicago - IL	Cylinder Pressure:	2015 PSIG
Analysis Date:	Sep 18, 2009	Valve Outlet:	660

Expiration Date: Sep 18, 2011

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
NITRIC OXIDE	50.00 PPM	51.26 PPM	G1	+/- 1% NIST Traceable
SULFUR DIOXIDE	50.00 PPM	50.99 PPM	G1	+/- 1% NIST Traceable
NITROGEN	Balance			
Total oxides of nitrogen		51.34 PPM		For Reference Only

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTRM/SO2	052405	CC207598	45.91PPM SULFUR DIOXIDE/	Sep 12, 2010
NTRM	071201	CC240217	48.47PPM NITRIC OXIDE/	May 01, 2011

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Thermo 6700	FTIR	Aug 29, 2009
Thermo 6700	FTIR	Aug 29, 2009

Triad Data Available Upon Request

Notes:

Curt Stewart

QA Approval

Airgas

Airgas Specialty Gases
12722 S. Wentworth Avenue
Chicago, IL 60628
1-773-785-3000
FAX: 1-773-785-1928
www.airgas.com

CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Part Number:	E03NI99E15A01Q4	Reference Number:	54-124218515-5
Cylinder Number:	CC208529	Cylinder Volume:	144 Cu.Ft.
Laboratory:	ASG - Chicago - IL	Cylinder Pressure:	2015 PSIG
Analysis Date:	May 18, 2010	Valve Outlet:	660

Expiration Date: May 18, 2012

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
NITRIC OXIDE	115.0 PPM	119.2 PPM	G1	+/- 1% NIST Traceable
SULFUR DIOXIDE	115.0 PPM	114.0 PPM	G1	+/- 1% NIST Traceable
NITROGEN	Balance			
Total oxides of nitrogen		119.2 PPM		For Reference Only

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTRM/SO2	8061603	CC255249	247PPM SULFUR DIOXIDE/	Oct 15, 2012
NTRM/NO	090603	CC287366	250.6PPM NITRIC OXIDE/NITROGEN	Feb 01, 2011

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
(FTIR-3)Thermo 6700	FTIR	May 14, 2010
(FTIR-3)Thermo 6700	FTIR	May 14, 2010

Triad Data Available Upon Request

Notes:

Approved for Release

Airgas

CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Part Number:	E03NI99E15A0391	Reference Number:	54-124193110-6
Cylinder Number:	CC177437	Cylinder Volume:	144 Cu.Ft.
Laboratory:	ASG - Chicago - IL	Cylinder Pressure:	2015 PSIG
Analysis Date:	Oct 08, 2009	Valve Outlet:	660

Expiration Date: Oct 08, 2011

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
NITRIC OXIDE	250.0 PPM	256.8 PPM	G1	+/- 1% NIST Traceable
SULFUR DIOXIDE	250.0 PPM	249.5 PPM	G1	+/- 1% NIST Traceable
NITROGEN	Balance			
Total oxides of nitrogen		256.9 PPM		For Reference Only

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTRM/SO2	08061603	CC254551	247PPM SULFUR DIOXIDE/	Oct 15, 2012
NTRM/NO	1	CC286544	250.6PPM NITRIC OXIDE/NITROGEN	Feb 01, 2011

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
(FTIR-3)Thermo 6700	FTIR	Sep 29, 2009
(FTIR-3)Thermo 6700	FTIR	Sep 29, 2009

Triad Data Available Upon Request

Notes:

Signature on file

QA Approval

AIR LIQUIDE Air Liquide America Specialty Gases LLC Scott™

COMPLIANCE CLASS

Dual-Analyzed Calibration Standard

1290 COMBERMERE STREET, TROY, MI 48083 Phone: 248-589-2950 Fax: 248-589-2134

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory

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

P.O. No.: 57809-71-65000
Project No.: 05-82398-008

Customer

CLEAN AIR ENGINEERING
DON ALLEN
500 W. WOOD STREET
PALATINE IL 60067

ANALYTICAL INFORMATION

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

Cylinder Number: ALM011625 Certification Date: 01Dec2009 Exp. Date: 30Nov2012
Cylinder Pressure***: 1925 PSIG

COMPONENT	CERTIFIED CONCENTRATION (Moles)		ANALYTICAL ACCURACY**	TRACEABILITY
METHANE	1,510	PPM	+/- 2%	NIST and VSL
AIR		BALANCE		

*** Do not use when cylinder pressure is below 150 psig.
** Analytical accuracy is based on the requirements of EPA Protocol procedures , September 1997.

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 1000	01Jul2011	K005406	1001. PPM	METHANE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
HORIBA/FIA-220/G05000JAS	01Dec2009	FLAME IONIZATION

APPROVED BY: ROBERT LESNIAK

AIR LIQUIDE Air Liquide America Specialty Gases LLC SCOTT™

COMPLIANCE CLASS

Dual-Analyzed Calibration Standard

1290 COMBERMERE STREET, TROY, MI 48083 Phone: 248-589-2950 Fax: 248-589-2134

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory

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

P.O. No.: 56986-71-65000
Project No.: 05-69870-009

Customer

CLEAN AIR ENGINEERING
DON ALLEN
500 W. WOOD STREET
PALATINE IL 60067

ANALYTICAL INFORMATION

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

Cylinder Number: ALM033374 Certification Date: 27Oct2008 Exp. Date: 27Oct2011
Cylinder Pressure***: 1900 PSIG

COMPONENT	CERTIFIED CONCENTRATION (Moles)		ANALYTICAL ACCURACY**	TRACEABILITY
METHANE	2,540	PPM	+/- 2%	NIST and NMI
AIR		BALANCE		

*** Do not use when cylinder pressure is below 150 psig.
** Analytical accuracy is based on the requirements of EPA Protocol procedures , September 1997.

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 1000	01Jul2011	K005406	1001. PPM	METHANE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
HORIBA/FIA-220/G05000JAS	27Oct2008	FLAME IONIZATION

APPROVED BY: ROBERT LESNIAK

AIR LIQUIDE Air Liquide America Specialty Gases LLC Scott

COMPLIANCE CLASS

Dual-Analyzed Calibration Standard

1290 COMBERMERE STREET, TROY, MI 48083 Phone: 248-589-2950 Fax: 248-589-2134

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory

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

P.O. No.: 58028-71-65000
Project No.: 05-86284-019

Customer

CLEAN AIR ENGINEERING
DON ALLEN
500 W. WOOD STREET
PALATINE IL 60067

ANALYTICAL INFORMATION

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

Cylinder Number: ALM059469 Certification Date: 05Apr2010 Exp. Date: 04Apr2013
Cylinder Pressure***: 2000 PSIG

COMPONENT	CERTIFIED CONCENTRATION (Moles)		ANALYTICAL ACCURACY**	TRACEABILITY
METHANE	4,540	PPM	+/- 2%	NIST and VSL
NITROGEN		BALANCE		

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

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

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 1000	01Jul2011	K005406	1001. PPM	METHANE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
VARIAN/3400/7506	26Mar2010	TCD/FID

APPROVED BY:
ROBERT LESNIAK

Airgas

Airgas Specialty Gases
12722 S. Wentworth Avenue
Chicago, IL 60628
1-773-785-3000
FAX: 1-773-785-1928
www.airgas.com

CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Part Number:	E02NI99E15A0477	Reference Number:	54-124152570-1
Cylinder Number:	CC21153	Cylinder Volume:	144 Cu Ft.
Laboratory:	ASG - Chicago - IL	Cylinder Pressure:	2015 PSIG
Analysis Date:	Sep 19, 2008	Valve Outlet:	350

Expiration Date: Sep 19, 2011

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
PROPANE	850.0 PPM	842.9 PPM	G1	+/- 1% NIST Traceable
NITROGEN	Balance			

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTRM	010506	SG9133675	965.6PPM PROPANE/	May 01, 2012

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicolet Nexus	FTIR	Sep 08, 2008

Triad Data Available Upon Request

Notes:

Curt Stewart

QA Approval

Airgas

Airgas Speciality Gases
12722 S. Wentworth Avenue
Chicago, IL 60628
1-773-785-3000
FAX: 1-773-785-1928
www.airgas.com

CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Part Number:	E02NI99E15A3168	Reference Number:	54-124218515-3
Cylinder Number:	SG9128607BAL	Cylinder Volume:	144 Cu.Ft.
Laboratory:	ASG - Chicago - IL	Cylinder Pressure:	2015 PSIG
Analysis Date:	May 17, 2010	Valve Outlet:	350

Expiration Date: May 17, 2013

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	500.0 PPM	499.2 PPM	G1	+/- 1% NIST Traceable
NITROGEN	Balance			

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTRM/CO	09060427	CC286630	501.3PPM CARBON MONOXIDE/	Feb 01, 2013

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
(FTIR-1)Nicolet Nexus	FTIR	May 14, 2010

Triad Data Available Upon Request

Notes:

Approved for Release

CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Part Number:	E02NI99E15A0681	Reference Number:	54-124152570-4
Cylinder Number:	SG9102081ALB	Cylinder Volume:	144 Cu.Ft.
Laboratory:	ASG - Chicago - IL	Cylinder Pressure:	2015 PSIG
Analysis Date:	Sep 19, 2008	Valve Outlet:	660

Expiration Date: Sep 19, 2011

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
PROPANE	300.0 PPM	300.0 PPM	G1	+/- 1% NIST Traceable
NITROGEN	Balance			

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTRM/C3H8	51919	SG9101963ALB	483.6PPM PROPANE/	Jul 01, 2009

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicolet Nexus	FTIR	Sep 08, 2008

Triad Data Available Upon Request

Notes:

Signature on file

QA Approval

APPENDIX D. PROCESS DATA

PROCESS DATA FOR LFG ENGINES 1 & 2

Company: WMRE - Camelot Gas to Energy Plant
Source: Engines 1 & 2

Date: 2/28/2011

								HOURS	523.05
Start Time		KW	Fuel Flow	Air Flow	BTU	CH4 %	CO2 %	O2 %	ENGINE #
940	Run 1	1568	541	4147	521	51.22	39.56	0.40	1
955		1587	538	4219	521				1
1010		1612	534	4207	521				1
1025		1584	540	4256	521				1
1040		1593	537	4228	521				1
1045	Run 2	1585	531	4222	518	51.04	39.44	0.44	1
1100		1615	543	4226	518				1
1115		1609	536	4232	518				1
1130		1597	541	4251	518				1
1145		1576	535	4198	518				1
1200	Run 3	1598	539	4227	517	50.99	39.40	0.44	1
1215		1631	541	4191	517				1
1230		1618	535	4204	517				1
1245		1574	532	4251	517				1
1300		1604	544	4198	517				1
	AVERAGE	1597	538	4217	519	51.08	39.47	0.43	

								HOURS	542.46
Start Time		KW	Fuel Flow	Air Flow	BTU	CH4 %	CO2 %	O2 %	ENGINE #
1330	Run 1	1588	536	4189	519	51.00	39.41	0.42	2
1345		1566	532	4149	519				2
1400		1628	538	4276	519				2
1415		1605	537	4180	519				2
1430		1592	534	4233	519				2
1445	Run 2	1584	535	4199	520	51.15	39.50	0.39	2
1500		1602	539	4258	520				2
1515		1573	533	4190	520				2
1530		1592	536	4235	520				2
1545		1584	537	4206	520				2
1600	Run 3	1678	530	4046	522	51.33	39.58	0.35	2
1615		1636	533	4171	522				2
1630		1585	541	4228	522				2
1645		1599	540	4256	522				2
1700		1604	536	4272	522				2
	AVERAGE	1601	536	4206	520	51.16	39.50	0.39	

APPENDIX E. RESUMES OF TEST PERSONNEL

Rachel Chleborowicz-QSTI

Senior Technical Staff

Primary Role: Sr. Project Manager

Other Role(s): Source Testing
Ambient Monitoring
Laboratory Analysis
Emissions Factors Development
Regulatory Support
Data Analysis

Firm: RMC Environmental, Inc.

Level: Professional Level 4

Experience: 20 years

Education: BS, 1990, Biology and Chemistry, UNC-Chapel Hill

QSTI Certification - 2009

Basis for Selection:

- **Currently Sr. Project Manager on confidential clients' project to characterize air emissions from landfill gas engines around the country.**
- **Served as Sr. Program Manager on over 1250 compliance and source emissions tests encompassing over 12 different source categories.**
- **Managed more than 100 projects conducted to evaluate applicability of current AP-42 factors.**

Ms. Chleborowicz has specialized in source testing and ambient air monitoring for over 20 years. She is responsible for administrative and technical management of RMC Environmental, Inc., a woman owned source testing company headquartered in Chicago, Illinois. Her experience on over 1000 projects for private clients through out the country and Canada includes developing potential air emissions and air pollution emission inventories, conducting compliance assessments, preparing operating permit applications, supporting regulatory development, evaluating regulatory applicability, and performing QA/QC activities for air quality projects.

Relevant Experience:

Source Testing

Evaluated emissions from landfill gas engines, Private Clients. Conducting emissions tests at numerous LFG plants around the US to quantify controlled and uncontrolled emissions as well as determined the destruction efficiencies for combined and individual HAPs.

Evaluated Emissions from Glass Bead Production, Private Client. Conducted testing of total particulate, PM 10 and PM 2.5 emissions from a glass bead production facility – this facility makes the glass beads added to paints to give them their reflective properties. Prepared Site-Specific Test Plans and a Quality Assurance Project Plan (QAPP), field testing, laboratory analyses, data reduction and report preparation.

Evaluated Emissions from Gas turbines, Private Clients. Conducted testing of formaldehyde, benzene and other HAPS emissions from newly installed gas turbines comparing analytical results from EPA Method 0030, the "Chilled Impinger Method" from NCASI, TO-12, TO-15, EPA Method 18 and EPA Method 25A. Prepared Site-Specific Test Plans, field testing, laboratory analyses, data reduction and report preparation.

Evaluated Compliance of Air Emissions from 23 dust collectors, Private Client. Evaluated air emissions from a newly built utility with almost 23 individual dust collectors. Tested these collectors under maximum and minimum production to determine where the manufacturer and consultant varied on the permitted limits. Developed a test protocol acceptable to the regulatory agency and assisted the regulatory agency in calculating applicable and attainable permit limits for the facility.

Development of General Work Plans, and Site-Specific Test Plans (SSTPs), Private Clients. Prepared more than 750 work plans, for clients, ranging from single, routine compliance test programs to complex startups. Prepared more than 225 SSTPs, including projects for clients that included FTIRS, ammonia testing, ambient monitoring and on-site GC/MS.

Ambient Monitoring

Installed and quantified ambient baseline emissions, Private Client. Installed and responsible for four continuous monitoring locations for measuring suspended particulates and gaseous pollutants. Conducted to determine pollutant effects and effects of air pollution on vegetation, surrounding residences and wildlife.

Indoor air quality at US Army Base, Fort Bragg, NC. Responsible for gathering baseline air quality (metals, total particulate, HAPs and VOCs) for tactical / field welding "Pods" for solders working in both enclosed and open "Pods." Selected and procured sampling equipment, and trained us army personnel to operate the equipment, coordinated with US Army personnel, and provided trouble-shooting and support services.

Laboratory Analysis

Managed Routine and Complex Analyses, Private Clients. Responsible for analyses performed in-house by RMC Environmental, Inc. and by outside contract laboratories. Ensures that source emissions samples are analyzed in a manner consistent with EPA reference Methods or other standard methodologies. Samples analyzed include air emission samples, (e.g., particulates, fluorides, H_2S, total VOC, dioxin/furan, trace metals, and PCBs) and process samples (e.g, solid, liquid, and gaseous fuels; inks, paints, solvents; water and wastewater).

Analyzed TSP and PM10 Samples, Private Client. Provide analytical services to support an ambient sampling program at a recently closed hazardous waste landfill. Developed SOPs for TSP and PM10 analyses, provided filter media, and provided gravimetric analyses of the collected samples. Analyzed more than 600 individual samples.

Regulatory Support

Supported Air Standard Development, State Agencies. Regularly provide regulatory support by preparing responses regarding testing and permitting issues, VOC capture efficiency test protocols, sampling and analytical procedures, and review and comment on general policy guidance. Participated in the development of standardized State forms for protocol and report preparation. Have conducting site visits to evaluate with state agencies to evaluate the feasibility of using specific methodologies and enclosures for printing and VOC producing facilities.

Data Analysis

BETA and final testing of PC-based Data Reduction ISOCALC Program, Private Client. Involved in development of PC-based data reduction tool for use in calculating results for EPA Methods 1 through 5. This program is utilized by testing companies and state agencies.

Quality Assured Emissions Test Data Calculations, Private Clients. In the performance of source testing projects, responsible for field and laboratory data reduction, and calculation and tabulation of final results. These projects range in complexity from routine Method 5 compliance tests to more sophisticated calculations for trace metals, dioxin/furan, PCBs, volatile and semi-volatile organics, CEMS, and DRE testing.

Gregory Chleborowicz

Senior Technical Staff

Primary Role: Source Testing

Other Role(s): Ambient Monitoring
Laboratory Analysis
Data Analysis

Firm: RMC Environmental, Inc.

Level: Professional Level 3

Experience: 12 years

Education: BS, 1997, Chemical Engineering, UNC-Charlotte

Basis for Selection:

- **Currently Project Manager on Private Client – offset and gravure printing process for VOC/HAPS and emissions inventory.**
- **Served as Program Manager on over 500compliance and source emissions tests encompassing over 12 different source categories.**
- **Managed more than 25 projects conducted to evaluate applicability of current AP-42 factors.**

Mr. Chleborowicz has specialized in source testing and ambient air monitoring for over 9 years. He is responsible for overseeing the technical management and source-testing personnel of RMC Environmental, Inc., a woman owned source testing company headquartered in Chicago, Illinois. His experience on over 700 projects for private clients through out the country and Canada includes developing potential air emissions and air pollution emission inventories, conducting compliance assessments, supporting regulatory development, evaluating regulatory applicability, and performing QA/QC activities for air quality projects.

Relevant Experience:

Source Testing

Evaluating VOC / HAPs emissions from Offset and Gravure Printing Presses, Private Client. Conducting emissions tests at 10 different printing facilities plants to quantify controlled and uncontrolled emissions as well as determined the destruction efficiencies for individual total VOCs HAPs. Optimizing the oxidizers associated with these presses to minimize the amount of wasted natural gas thereby lowering the costs associated with running these oxidizers and minimize the Total VOC and HAPS output.

Evaluated Emissions from Glass Bead Production, Private Client. Conducted testing of total particulate, PM 10 and PM 2.5 emissions from a glass bead production facility – this facility makes the glass beads added to paints to give them their reflective properties. Prepared Site-Specific Test Plans and a Quality Assurance Project Plan (QAPP), field testing, laboratory analyses, data reduction and report preparation.

Evaluated Emissions from 8 Gas turbines, Private Client. Conducted testing of formaldehyde, emissions from eight newly installed gas turbines comparing analytical results from EPA method 0030 and the "Chilled Impinger Method" from NCASI. Prepared Site-Specific Test Plans, field testing, laboratory analyses, data reduction and report preparation.

Evaluated Compliance of Air Emissions from 23 dust collectors, Private Client. Evaluated air emissions from a newly built utility with almost 23 individual dust collectors. Tested these collectors under maximum and minimum production to determine where the manufacturer and consultant varied on the permitted limits. Developed a test protocol acceptable to the regulatory agency and assisted the regulatory agency in calculating applicable and attainable permit limits for the facility.

Development of General Work Plans, and Site-Specific Test Plans (SSTPs), Private Clients. Prepared more than 100 work plans, for clients, ranging from single, routine compliance test programs to complex startups. Prepared more than 50 SSTPs, including projects for clients that

included FTIRS, ammonia testing, ambient monitoring and on-site GC/MS.

Ambient Monitoring

Installed and quantified ambient baseline emissions, Private Client. Installed and responsible for four continuous monitoring locations for measuring suspended particulates and gaseous pollutants. Conducted to determine pollutant effects and effects of air pollution on vegetation, surrounding residences and wildlife.

Indoor air quality at US Army Base, Fort Bragg, NC. Managed the baseline air quality testing (metals, total particulate, HAPs and VOCs) for tactical / field welding "Pods" for solders working in both enclosed and open "Pods." Selected and procured sampling equipment, and trained us army personnel to operate the equipment, coordinated with US Army personnel, and provided trouble-shooting and support services.

Laboratory Analysis

Managed Routine and Complex Analyses, Private Clients. Responsible for analyses performed in-house by RMC Environmental, Inc. and by outside contract laboratories. Ensures that source emissions samples are analyzed in a manner consistent with EPA reference Methods or other standard methodologies. Samples analyzed include air emission samples, (e.g., particulates, fluorides, H_2S, total VOC, dioxin/furan, trace metals, and PCBs) and process samples (e.g., solid, liquid, and gaseous fuels; inks, paints, solvents; water and wastewater).

Analyzed TSP and PM10 Samples, Private Client. Provide analytical services to support an ambient sampling program at a recently closed hazardous waste landfill. Developed SOPs for TSP and PM10 analyses, provided filter media, and provided gravimetric analyses of the collected samples. Analyzed more than 100 individual samples.

Regulatory Support

Supported Air Standard Development, State Agencies. Regularly provides regulatory support by preparing responses regarding testing and permitting issues, VOC capture efficiency test protocols, sampling and analytical procedures, and review and comment on general policy guidance. Participated in the development of standardized State forms for protocol and report preparation. Have conducting site visits to evaluate with state agencies to evaluate the feasibility of using specific methodologies and enclosures for printing and VOC producing facilities.

Data Analysis

BETA and final testing of PC-based Data Reduction ISOCALC Program, Private Client. Involved in development of PC-based data reduction tool for use in calculating results for EPA Methods 1 through 5. This program is utilized by testing companies and state agencies.

Quality Assured Emissions Test Data Calculations, Private Clients. In the performance of source testing projects, responsible for field and laboratory data reduction, and calculation and tabulation of final results. These projects range in complexity from routine Method 5 compliance tests to more sophisticated calculations for trace metals, dioxin/furan, PCBs, volatile and semi-volatile organics, CEMS, and DRE testing.

Andrew McDermand

Technical Staff

Primary Role: Source Testing

Other Role(s): Ambient Monitoring
Laboratory Analysis
Data Analysis

Firm: RMC Environmental, Inc.

Level: Technical Level 2

Experience: 5 years

Education: AS, 2003, Biology, McHenry County College

Basis for Selection:

- **Currently Assistant Project Manager for Private Client – offset and gravuere printing process for VOC/HAPS and emissions inventory.**
- **Served as Program Manager on over 250 compliance and source emissions tests encompassing over 12 different source categories.**
- **Managed more than 25 projects conducted to evaluate applicability of current AP-42 factors.**

Mr. McDermand has specialized in source testing and ambient air monitoring for over 5 years. He is responsible for overseeing the technical management and source-testing personnel of RMC Environmental, Inc., a woman owned source testing company headquartered in Chicago, Illinois. His experience on over 700 projects for private clients through out the country and Canada includes developing potential air emissions and air pollution emission inventories, conducting compliance assessments, supporting regulatory development, evaluating regulatory applicability, and performing QA/QC activities for air quality projects.

Relevant Experience:

Source Testing

Evaluating VOC / HAPs emissions from Offset and Gravuere Printing Presses, Private Client. Conducting emissions tests at 10 different printing facilities / plants to quantify controlled and uncontrolled emissions as well as determined the destruction efficiencies for individual total VOCs HAPs. Assisting with the optimization of oxidizers associated with these presses to minimize the amount of wasted natural gas thereby lowering the costs associated with running these oxidizers and minimize the Total VOC and HAPS output.

Evaluated Emissions from Glass Bead Production, Private Client. Conducted testing of total particulate, PM 10 and PM 2.5 emissions from a glass bead production facility – this facility makes the glass beads added to paints to give them their reflective properties.

Evaluated Emissions from Engines & Gas turbines, Private Client. Conducted testing of formaldehyde, emissions from eight newly installed gas turbines comparing analytical results from EPA method 0030 and the "Chilled Impinger Method" from NCASI. Prepared Site-Specific Test Plans, field testing, laboratory analyses, data reduction and report preparation.

Evaluated Compliance of Air Emissions from 23 dust collectors, Private Client. Evaluated air emissions from a newly built utility with almost 23 individual dust collectors. Tested these collectors under maximum and minimum production to determine where the manufacturer and consultant varied on the permitted limits. Developed a test protocol acceptable to the regulatory agency and assisted the regulatory agency in calculating applicable and attainable permit limits for the facility.

Development of General Work Plans, and Site-Specific Test Plans (SSTPs), Private Clients. Prepared more than 100 work plans, for clients, ranging from single, routine compliance test programs to complex startups. Prepared more than 50 SSTPs, including projects for clients that included FTIRS, ammonia testing, ambient monitoring and on-site GC/MS.

Ambient Monitoring

Installed and quantified ambient baseline emissions, Private Client. Installed and responsible for four continuous monitoring locations for measuring suspended particulates and gaseous pollutants. Conducted to determine pollutant effects and effects of air pollution on vegetation, surrounding residences and wildlife.

Indoor air quality at US Army Base, Fort Bragg, NC. Managed the baseline air quality testing (metals, total particulate, HAPs and VOCs) for tactical / field welding "Pods" for solders working in both enclosed and open "Pods." Selected and procured sampling equipment, and trained us army personnel to operate the equipment, coordinated with US Army personnel, and provided trouble-shooting and support services.

Laboratory Analysis

Managed Routine and Complex Analyses, Private Clients. Responsible for analyses performed in-house by RMC Environmental, Inc. and by outside contract laboratories. Ensures that source emissions samples are analyzed in a manner consistent with EPA reference Methods or other standard methodologies. Samples analyzed include air emission samples, (e.g., particulates, fluorides, H_2S, total VOC, dioxin/furan, trace metals, and PCBs) and process samples (e.g, solid, liquid, and gaseous fuels; inks, paints, solvents; water and wastewater).

Analyzed TSP and PM10 Samples, Private Client. Provide analytical services to support an ambient sampling program at a recently closed hazardous waste landfill. Developed SOPs for TSP and PM10 analyses, provided filter media, and provided gravimetric analyses of the collected samples. Analyzed more than 100 individual samples.