REVISED COMBUSTION EFFICIENCY & OPACITY EMISSION TESTING
AMERICAN CREMATORY EQUIPMENT COMPANY
MODEL A-250-WH
EMISSION UNIT-03

BRODER CREMATION SERVICES
INSTALLATION NO. 183-0248

Prepared For:

BRODER CREMATION SERVICES
3421 EHLMANN ROAD
ST. CHARLES, MO 63301

Prepared By:

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.
HAZELWOOD, MISSOURI

CEC Project 120-114

January 10, 2013

TEST REPORT CERTIFICATION

This report, testing details, and results have been compiled under the supervision and reviewed by the persons named below. The results contained in this report relate only to the emission source tested.

Date 1/10/13 Signature _____

Joe Heilweck, QSTI
Project Manager
Civil & Environmental Consultants, Inc.

Date 1/10/13 Signature _____

Christopher Dawdy
Vice President
Civil & Environmental Consultants, Inc.

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1.0 INTRODUCTION

CEC was contracted by Broder Cremation Services to conduct an emission compliance testing program on the human crematory to satisfy the emissions testing requirements outlined in Broder's Construction Permit 2011-06-058. CEC submitted the required test protocol on February 8, 2012 to the Missouri Department of Natural Resources (MDNR) as required by regulation. CEC submitted the test plan to Peter Yronwode of MDNR and Mr. Yronwode agreed to waive the 30 day notification and allowed the emissions testing to be conducted at the convenience of the facility.

The emission testing for the human crematory was conducted in accordance with USEPA approved test methods listed in 40 Code of Federal Regulations Part 60 Appendix A. Three (3), 1-hour test runs were conducted on the outlet exhaust stack of the crematory unit in order to determine combustion control efficiency and opacity.

CEC performed the emission testing utilizing United States Environmental Protection Agency (USEPA) Methods 3A, 9 and 10 for determination of molecular weight, opacity and carbon monoxide, respectively. The sampling analytical matrix used for the cremation unit sampling is presented in Table 1.

Table 1
Sampling and Analytical Matrix
Broder Cremation Services

Parameter	Test Method	Analytical Procedure	Test Run Duration	Number of Test Runs
O_2/CO_2	Method 3A	CEM	1-hr	3
Opacity	Method 9	Certified Observer	1-hr	3
Carbon Monoxide/Combustion Efficiency Determination	Method 10	CEM	1-hr	3

This report contains a detailed discussion of the procedures and reference methods (RM) used to conduct the testing. A summary of the test results is also presented in this report. Copies of all field data sheets, process data, and equipment calibrations certifications are included as appendices to this report.

2.0 SUMMARY OF TEST RESULTS

The emission testing was conducted February 15, 2012. The first test run commenced at 0908 hours. The third test run was completed at 1355 hours. Three one-hour test runs were conducted.

A summary of the emission test results is presented in Table 2.

Table 2
Emission Summary
Broder Cremation Services
Emission Unit 03

Run Number	Opacity (%)	Opacity Limit (%)	Combustion Efficiency (%)	Combustion Efficiency Limit (%)
1	0	<10	99.997	99.9
2	0	<10	99.998	99.9
3	0	<10	99.997	99.9
Average	0	<10	99.997	99.9

Appendix A of this report contains the raw field data measured during each test period. Appendix B contains copies of the CEMS data. Appendix C presents example calculations used to determine the combustion efficiency. Appendix D presents opacity certifications and Protocol-One gas certifications. Appendix E presents the process operations data.

3.0 EMISSION SOURCE AND POLLUTION CONTROL EQUIPMENT

Broder Cremation Services operates an American Crematory Equipment Company Model A-250-WH, Emission Unit 03 (EU-03) which is included in Broder's Permit To Construct (2011-06-058). Special Condition 6 of the Permit To Construct includes requirements to conduct opacity and combustion efficiency testing on EU-03. As stated in the permit, combustion efficiency was determined by measuring the carbon dioxide (CO_2) and carbon monoxide (CO) concentrations from the effluent of EU-03 and then calculating the combustion efficiency by dividing the CO_2 concentration by the sum of the CO and CO_2 concentrations. The unit is required to meet at least 99.9% combustion efficiency. The opacity limit is 10%.

The burn cycle is approximately 2 hours in duration (depending on body weight) and that approximately a one and half-hour cool down is required prior to re-charging. The cremation unit is equipped with a temperature recording that records the temperature of the secondary chamber.

4.0 ACTIVITIES DURING THE TESTING

Messrs. Andrew Anderson and Ezra Boyd of CEC conducted the emissions testing. Mr. Dan Broder of Broder Cremation Services was the primary contact for the testing and was responsible for operation of the crematory unit.

The emission test consisted of three, 60-minute test runs conducted on February 15, 2012. Test Runs 1 and 2 were conducted on the first case. The crematory unit was then allowed to cool down, cleaned and re-charged with a second case. The third test run was completed during the cremation of the second case.

5.0 TEST APPROACH AND SAMPLING METHODS

This section describes the sampling strategy, sampling and analytical methods, and quality assurance/quality control procedures that were implemented during this project.

5.1 Sampling Strategy

The USEPA methods that were utilized in this sampling program were:

- Method 3A for the determination of carbon dioxide;
- Method 9 for the determination of opacity:
- Method 10 for the determination of carbon monoxide

These test methods are available in the Code of Federal Regulations Volume 40, Part 60, US EPA's web site www.epa.gov/ttn/emc/.

5.2 Sampling and Analytical Procedures

A sampling and analysis synopsis for these methods are discussed briefly in the following subsections.

5.3 USEPA Method 3A and 10 for O_2/CO_2 and CO Determination

USEPA Method 3A

The O_2 and CO_2 analysis was performed using a California Analytics Model 601P non-dispersive infrared analyzer (NDIR) and paramagnetic analyzer. The CO analysis was performed using a Thermo Model 48 gas filter correlation analyzer. The electrical output response signal from each analyzer was recorded with a STRATA Version 3.2 data acquisition system.

For this test program the gas sample was continuously extracted from the stack and transported to the analyzers via a heated Teflon® sample line. The effluent gas sample was pulled from the stack through the Teflon® tubing to a Universal condenser where the water vapor was removed. The gas sample was pumped to the analyzer's inlet at a constant flow rate and pressure.

An analyzer calibration error test was performed on the CO_2 and CO analyzer by introducing a zero, mid and high-range calibration gas to the gas analyzer inlet. No adjustments were made to the analyzer. A zero gas (nitrogen) concentration of less than 0.25% of span, a certified Protocol-1 mid-range gas (40-60% of span) and a certified Protocol-1 high-range gas (80%-100% of span) was used for the calibration error test.

A sample system pre and posttest bias and drift check were performed on each of the analyzer sampling systems by introducing a zero and a mid-range calibration gas at the calibration valve that was installed on the end of the sampling probe. The sampling system was operated at the

normal sampling rate and no adjustments were made to the measurement system during the bias test.

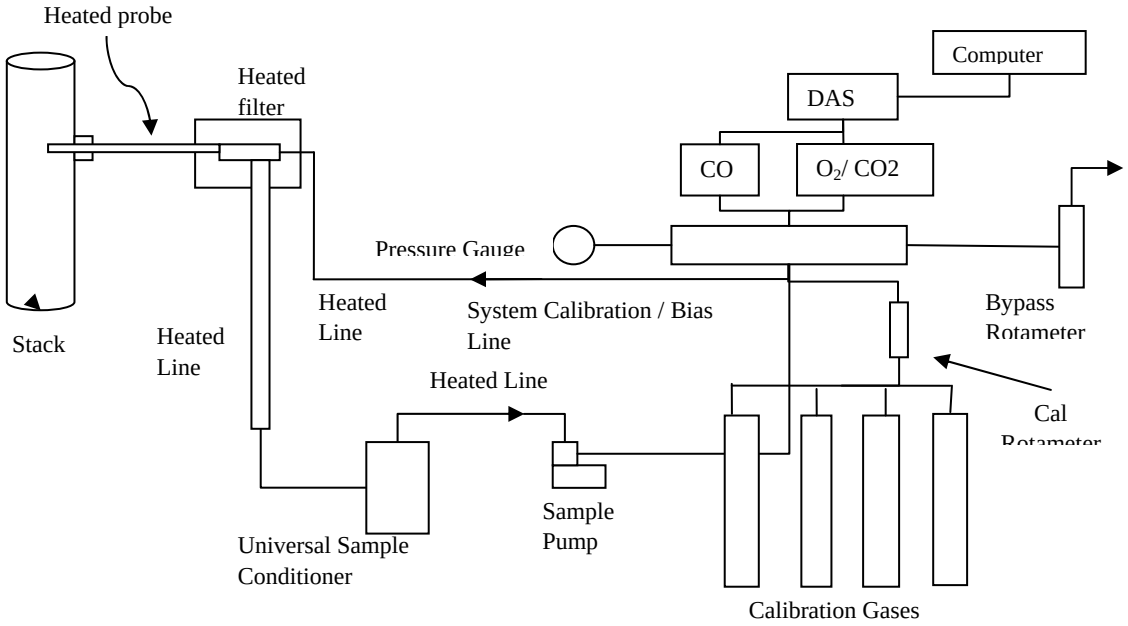


Figure 1: USEPA Method 3A/10 Sampling System

5.4 VISUAL DETERMINATION OF OPACITY

Method 9 involves the determination of stack plume opacity by an individual properly trained and certified in performing visual emission observations. Opacity is the degree to which light or an image is obscured when viewed through a plume. The observer's responsibility is to determine the degree to which light is obscured to the nearest 5% increment of opacity. Instantaneous readings are made every 15 seconds and the value recorded on the appropriate form. When making visual emission determinations the observer must apply specific criteria to each source layout in order to eliminate any bias, which exerts a significant influence upon plume appearance. These variables include:

- Angle of the observer with respect to the plume;
- Angle of the observer with respect to the sun;
- Point of observation of attached and detached steam plume; and
- Angle of the observer with respect to a plume emitted from a rectangular stack with a large length to width ratio.

A set of opacity data reduction calculations is defined as the average of any 24 consecutive 15-second observations. Sets need not be consecutive in time and in no case shall two sets overlap. The highest six-minute average of a 60-minute test is recorded on the field data sheet.

APPENDIX A

OPACITY FIELD DATA FORMS

VISIBLE EMISSION OBSERVATION FORM

Source Name: Unit 3 (Run 1)	Observation Date: 2-15-12
Address: Broder Crematorium	Start Time: 0907
City: St Charles State: MO Zip: 63301	Stop Time: 1007
Phone: Source I.D. No.: 3	
Process Equipment: Incinerator	Operating Mode: Normal
Control Eqipment:	Operating Mode:

Describe Emission Point	
Start: Top of Stack	Stop: Top of Stack
Height Above Ground Level	**Height Relative to Observer**
Start: 15ft Stop: 15ft	Start: 15ft Stop: 15ft
Distance Form Observer	**Direction From Observer**
Start: 40ft Stop: 40ft	Start: W Stop: W
Describe Emissions	
Start: N/A	Stop: N/A

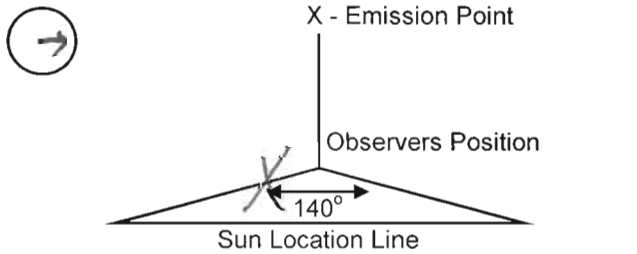
Emission Color		Plume Type:	
Start: N/A	Stop: N/A	Fugitive	Intermittent (Continuous)
Water Droplets Present:		**If Water Droplet Plume:**	
No X	Yes	Attached	Detached

Point in the Plume at which opacity was determined	
Start:	Stop:
Describe Background	
Start: OVERCAST SKY	Stop: OVERCAST SKY

Background Color		Sky Conditions	
Start: WHITE	Stop: WHITE	Start: OVERCAST	Stop:
Wind Speed		**Wind Direcction**	
Start CALM	Stop CALM	Start N	Stop N
Ambient Temp.	**Wet Bulb Temp.**	**RH,percent**	
Start 40°	Stop 40°		

Source Layout Sketch

Draw North Arrow



Note:
Sun X Wind → Plume and Stack >

Min\Sec	0	15	30	45	Min\Sec	0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

Average Opacity For Highest Period	Number of Readings Above 10 % were
0	0

Range of Opacity Readings	
Minimum: 0	Maximum: 0

Observer's Name (Print): Ezra Boyd

Observer's Signature	Date:
Ezra Boyd	2-15-12

Organization: Civil & Environmental Con.

Certified By:	Date:

Verified By:	Date:

Comments:

I have received a copy of these opacity observations

Signature:

Titile: **Date:**

VISIBLE EMISSION OBSERVATION FORM

Source Name: Unit 3 (Run 2)	Observation Date: 2-15-12
Address: Broder Crematorium	Start Time: 1038
City: St Charles / State: Mo / Zip: 63301	Stop Time: 1138
Phone: / Source I.D. No.: 3	
Process Equipment: Incinerator	**Operating Mode:** Normal
Control Eqipment:	**Operating Mode:**

Min\Sec	0	15	30	45	Min\Sec	0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

Describe Emission Point

Start: Top of Stack Stop: Top of Stack

Height Above Ground Level		Height Relative to Observer	
Start: 15 ft	Stop: 15 ft	Start: 15 ft	Stop: 15 ft

Distance Form Observer		Direction From Observer	
Start: 40ft	Stop: 40 ft	Start: W	Stop: W

Describe Emissions

Start: N/A Stop: N/A

Emission Color		Plume Type:	
Start: N/A	Stop: N/A	Fugitive	Intermittent (Continuous)

Water Droplets Present:		If Water Droplet Plume:	
No X	Yes	Attached	Detached

Point in the Plume at which opacity was determined

Start: Stop:

Describe Background

Start: OVERCAST SKY Stop: OVERCAST SKY

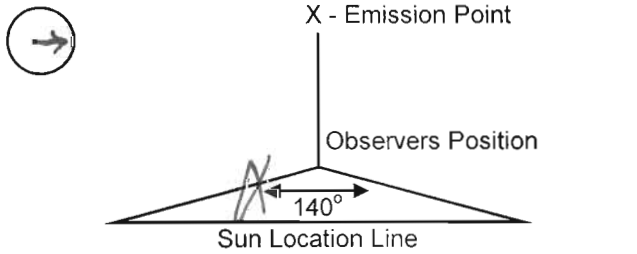
Background Color		Sky Conditions	
Start: WHITE	Stop: WHITE	Start: OVERCAST	Stop: OVERCAST

Wind Speed		Wind Direcction	
Start CALM	Stop CALM	Start N	Stop N

Ambient Temp.	Wet Bulb Temp.	RH,percent
Start 43° Stop 43°		

Source Layout Sketch

Draw North Arrow



Note:

Sun X Wind → Plume and Stack >

Average Opacity For Highest Period	Number of Readings Above 10 % were
0	0

Range of Opacity Readings

Minimum:	Maximum:
0	0

Observer's Name (Print): Ezra Boyd

Observer's Signature: Ezra Boyd Date: 2-15-12

Organization: Civil & Environmental Con

Certified By: Date:

Verified By: Date:

Comments:

I have received a copy of these opacity observations

Signature:

Titile: **Date:**

VISIBLE EMISSION OBSERVATION FORM

Source Name: Unit 3 (Run 3)		Observation Date: 2-15-12	Start Time: 1255
Address: Broder Crematorium			Stop Time:
City: St. Charles	State: MO	Zip: 63301	
Phone:	Source I.D. No.:		
Process Equipment: Incinerator	**Operating Mode:** Normal		
Control Eqipment:	**Operating Mode:**		

Describe Emission Point	
Start: Top of Stack	Stop: Top of Stack
Height Above Ground Level	**Height Relative to Observer**
Start: 15ft Stop: 15ft	Start: 15ft Stop: 15ft
Distance Form Observer	**Direction From Observer**
Start: 40ft Stop: 40ft	Start: W Stop: W

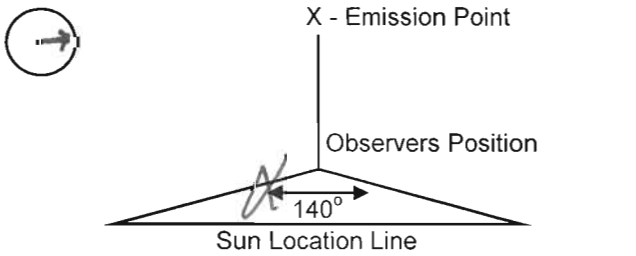
Describe Emissions			
Start:	Stop:		
Emission Color		**Plume Type:**	Continuous
Start: N/A Stop: N/A		Fugitive	Intermittent
Water Droplets Present:		**If Water Droplet Plume:**	
No X	Yes	Attached	Detached

Point in the Plume at which opacity was determined	
Start:	Stop:

Describe Background			
Start: OVERCAST SKY	Stop: OVERCAST SKY		
Background Color		**Sky Conditions**	
Start: WHITE Stop: WHITE		Start: OVERCAST Stop: OVERCAST	
Wind Speed		**Wind Direcction**	
Start CALM Stop CALM		Start N Stop N	
Ambient Temp.	**Wet Bulb Temp.**	**RH,percent**	
Start 47 Stop 47			

Source Layout Sketch

Draw North Arrow



Note:
Sun X Wind → Plume and Stack >

Min\Sec	0	15	30	45	Min\Sec	0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

Average Opacity For Highest Period	Number of Readings Above 10 % were
0	0

Range of Opacity Readings

Minimum:	Maximum:
0	0

Observer's Name (Print): EZRA BOYD

Observer's Signature: Ezra Boyd — Date: 2-15-12

Organization: CIVIL & ENVIRONMENTAL CON.

Certified By: — Date:

Verified By: — Date:

Comments:

I have received a copy of these opacity observations

Signature:

Titile: **Date:**

APPENDIX B

CEMS DATA

CO Stratification Check

Plant: Broder Cremation
Date: 2/15/2012
Source: Stack
Fuel: Natural Gas
Time:
Operator: AJA

Sample Point	Time	CO ppm	% difference from mean
1	833	0.00	#DIV/0!
2	836	0.00	#DIV/0!
3	839	0.00	#DIV/0!
4	842	0.00	#DIV/0!
5	845	0.00	#DIV/0!
6	848	0.00	#DIV/0!
7	851	0.00	#DIV/0!
8	854	0.00	#DIV/0!
9	857	0.00	#DIV/0!
10	900	0.00	#DIV/0!
11	903	0.00	#DIV/0!
12	906	0.00	#DIV/0!
	Mean	**0.00**	

Notes:

1) If the concentration at each traverse point differs from the mean concentration for all traverse points by no more than 5% or 0.5 ppm (whichever is less restrictive), the gas stream is considered unstratified and you may collect samples from a single point that most closely matches the mean.

2) If the 5% criteria is not met but the the concentration at each traverse point differs from the mean concentration for all traverse points by no more than 10% or 1.0 ppm (whichever is less restrictive), the gas stream is considered minimally stratified and you may collect samples from three points, spaced 16.7, 50.0, and 83.3% of the measurement line

3) If the gas stream is found to be stratified, locate 12 points for the test in accordance with Table 1-1 or Table 1-2 of Method 1.

CO2 Stratification Check

Plant: Broder Cremation
Date: 2/15/2012
Source: Stack
Fuel: Natural Gas
Time:
Operator: AJA

Sample Point	Time	CO2 %	% difference from mean
1	833	4.20	0.60%
2	836	4.30	2.99%
3	839	4.20	0.60%
4	842	4.30	2.99%
5	845	4.10	-1.80%
6	848	4.00	-4.19%
7	851	4.30	2.99%
8	854	4.20	0.60%
9	857	4.20	0.60%
10	900	4.10	-1.80%
11	903	4.10	-1.80%
12	906	4.10	-1.80%
	Mean	**4.18**	

Notes:

1) If the concentration at each traverse point differs from the mean concentration for all traverse points by no more than 5% or 0.5 ppm (whichever is less restrictive), the gas stream is considered unstratified and you may collect samples from a single point that most closely matches the mean.

2) If the 5% criteria is not met but the the concentration at each traverse point differs from the mean concentration for all traverse points by no more than 10% or 1.0 ppm (whichever is less restrictive), the gas stream is considered minimally stratified and you may collect samples from three points, spaced 16.7, 50.0, and 83.3% of the measurement line

3) If the gas stream is found to be stratified, locate 12 points for the test in accordance with Table 1-1 or Table 1-2 of Method 1.

Broder Cremation Services
System Response Time

Monitor:	CO - High	Date:	2/15/2012
Source ID:	Stack	Span:	0-251.6 ppm
Heated Line Length: 100 ft		Gas Flow:	7 lpm

Run No.	Scale	Monitor Response Time (Min:Sec)
1	Downscale	01:09
2	Upscale	01:06
3	Downscale	01:16
4	Upscale	01:04
5	Downscale	01:04
6	Upscale	01:03
Downscale Average		**01:10**
Upscale Average		**01:04**

Broder Cremation Services
System Response Time

Monitor:	O2/CO2 - High	Date:	2/15/2012
Source ID:	Stack	Span:	0 - 22.12 % 0 - 21.7%
Heated Line Length: 100 ft		Gas Flow:	7 lpm

Run No.	Scale	Monitor Response Time (Min:Sec)
1	Downscale	00:32
2	Upscale	00:34
3	Downscale	00:36
4	Upscale	00:33
5	Downscale	00:30
6	Upscale	00:33
Downscale Average		**00:33**
Upscale Average		**00:33**

Calibration Error Test, Run 1 STRATA Version 3.2

Operator: CEC
Plant Name: Broder Crematorium
Location: St. Charles

	Reference Cylinder Numbers			
	Zero	Low-range	Mid-range	High-range
CO2		500	CC19776	CC287716
O2			CC19776	CC287716
CO			CC184371	CC287

Date/Time 02-15-2012 07:57:59 PASSED

Analyte	CO2	O2	CO
Units	%	%	ppm
Zero Ref Cyl	0.000	0.000	0.00
Zero Avg	0.254	-0.066	-1.25
Zero Error%	0.8%	0.3%	0.3%
Low Ref Cyl			
Low Avg			
Low Error%			
Mid Ref Cyl	9.984	10.040	98.80
Mid Avg	10.262	10.053	98.95
Mid Error%	0.9%	0.1%	0.0%
High Ref Cyl	21.700	22.120	251.60
High Avg	21.757	22.421	249.59
High Error%	0.2%	1.3%	0.4%

Calibration Error Test End

Initial System Bias Check, Run 1 STRATA Version 3.2
Operator: CEC
Plant Name: Broder Crematorium
Location: St. Charles

	Reference Cylinder Numbers Zero	Span
CO2		CC19776
O2		CC19776
CO		CC184371

Date/Time 02-15-2012 08:06:28 PASSED

Analyte	CO2	O2	CO
Units	%	%	ppm
Zero Ref Cyl	0.000	0.000	0.00
Zero Cal	0.254	-0.066	-1.25
Zero Avg	0.262	-0.068	-1.16
Zero Bias%	0.0%	0.0%	0.0%
Zero Drift%			
Span Ref Cyl	9.984	10.040	98.80
Span Cal	10.262	10.053	98.95
Span Avg	9.865	10.042	98.86
Span Bias%	1.3%	0.1%	0.0%
Span Drift%			

System Bias Check End

Test Run 1 STRATA Version 3.2

	CO2	O2	CO
	%	%	ppm
Begin calculating run averages			
02-15-2012 09:08:28	3.561	15.277	-0.74
02-15-2012 09:09:28	4.826	13.171	-0.57
02-15-2012 09:10:28	7.453	10.368	2.39
02-15-2012 09:11:28	5.746	12.642	4.35
02-15-2012 09:12:28	5.577	12.409	3.00
02-15-2012 09:13:28	5.291	12.807	2.33
02-15-2012 09:14:28	5.108	13.032	2.17
02-15-2012 09:15:28	4.975	13.207	1.95
02-15-2012 09:16:28	5.006	13.195	1.47
02-15-2012 09:17:28	4.940	13.284	1.51
02-15-2012 09:18:28	4.834	13.432	1.32
02-15-2012 09:19:28	4.900	13.440	1.57
02-15-2012 09:20:28	4.733	13.688	1.23
02-15-2012 09:21:28	4.666	13.693	0.93
02-15-2012 09:22:28	5.954	11.424	0.85
02-15-2012 09:23:28	5.520	12.045	1.38
02-15-2012 09:24:28	5.448	12.147	1.41
02-15-2012 09:25:28	5.411	12.173	1.25
02-15-2012 09:26:28	5.427	12.191	0.98
02-15-2012 09:27:28	5.492	12.081	1.10
02-15-2012 09:28:28	5.407	12.219	1.27
02-15-2012 09:29:28	5.347	12.330	1.47
02-15-2012 09:30:28	5.355	12.327	1.17
02-15-2012 09:31:28	5.327	12.381	1.12
02-15-2012 09:32:28	5.290	12.440	0.98
02-15-2012 09:33:28	5.266	12.423	1.00
02-15-2012 09:34:28	5.214	12.534	0.57
02-15-2012 09:35:28	5.196	12.582	0.38
02-15-2012 09:36:28	5.222	12.480	0.50
02-15-2012 09:37:28	5.201	12.556	0.33
02-15-2012 09:38:28	5.280	12.443	0.47
02-15-2012 09:39:28	5.284	12.444	0.24
02-15-2012 09:40:28	5.249	12.529	-0.12
02-15-2012 09:41:28	5.265	12.516	0.10
02-15-2012 09:42:28	5.222	12.612	0.33
02-15-2012 09:43:28	5.206	12.632	0.13
02-15-2012 09:44:28	5.237	12.600	-0.31
02-15-2012 09:45:28	5.151	12.734	0.00
02-15-2012 09:46:28	5.238	12.604	0.06
02-15-2012 09:47:28	5.162	12.751	-0.07
02-15-2012 09:48:28	5.119	12.862	-0.47
02-15-2012 09:49:28	5.157	12.768	-0.30
02-15-2012 09:50:28	5.148	12.752	-0.36
02-15-2012 09:51:28	5.116	12.818	-0.47
02-15-2012 09:52:28	5.167	12.741	-0.47
02-15-2012 09:53:28	5.110	12.814	-0.67
02-15-2012 09:54:28	5.154	12.726	-0.62
02-15-2012 09:55:28	5.134	12.795	-0.55
02-15-2012 09:56:28	5.134	12.792	-0.86
02-15-2012 09:57:28	5.101	12.818	-0.83
02-15-2012 09:58:28	5.109	12.856	-0.92
02-15-2012 09:59:28	5.101	12.826	-0.67
02-15-2012 10:00:28	5.029	12.957	-0.72
02-15-2012 10:01:28	5.110	12.817	-0.94
02-15-2012 10:02:28	5.037	12.959	-0.79
02-15-2012 10:03:28	5.137	12.797	-0.79
02-15-2012 10:04:28	5.084	12.911	-0.89
02-15-2012 10:05:28	5.054	12.934	-1.05
02-15-2012 10:06:28	5.042	12.961	-0.98
02-15-2012 10:07:28	5.427	12.443	-0.98

Run Averages	CO2	O2	CO
	%	%	ppm
02-15-2012 10:07:28	5.203	12.710	0.42

Operator: CEC
Plant Name: Broder Crematorium
Location: St. Charles
Test Run 1 End

Final System Bias Check, Run 1 STRATA Version 3.2
Operator: CEC
Plant Name: Broder Crematorium
Location: St. Charles

	Reference Cylinder Numbers Zero	Span
CO2		CC19776
O2		CC19776
CO		CC184371

Date/Time 02-15-2012 10:17:28 PASSED

Analyte	CO2	O2	CO
Units	%	%	ppm
Zero Ref Cyl	0.000	0.000	0.00
Zero Cal	0.254	-0.066	-1.25
Zero Avg	0.270	-0.061	-1.59
Zero Bias%	0.1%	0.0%	0.1%
Zero Drift%	0.0%	0.0%	-0.1%
Span Ref Cyl	9.984	10.040	98.80
Span Cal	10.262	10.053	98.95
Span Avg	9.885	10.067	98.90
Span Bias%	1.3%	0.1%	0.0%
Span Drift%	0.1%	0.1%	0.0%
Ini Zero Avg	0.262	-0.068	-1.16
Ini Span Avg	9.865	10.042	98.86
Run Avg	5.203	12.710	0.42
Co	0.266	-0.064	-1.37
Cm	9.875	10.054	98.88
Correct Avg	5.130	12.675	1.76

System Bias Check End

Test Run 2 STRATA Version 3.2

	CO2	O2	CO
	%	%	ppm
Begin calculating run averages			
02-15-2012 10:39:09	5.282	12.725	-0.38
02-15-2012 10:40:09	5.584	12.303	-0.24
02-15-2012 10:41:09	5.620	12.230	-0.17
02-15-2012 10:42:09	5.224	13.119	0.80
02-15-2012 10:43:09	5.757	12.080	0.83
02-15-2012 10:44:09	5.599	12.264	0.18
02-15-2012 10:45:09	6.347	11.343	0.08
02-15-2012 10:46:09	6.383	11.308	0.04
02-15-2012 10:47:09	6.324	11.386	0.27
02-15-2012 10:48:09	6.327	11.340	0.19
02-15-2012 10:49:09	6.280	11.417	0.35
02-15-2012 10:50:09	6.282	11.394	0.45
02-15-2012 10:51:09	6.171	11.549	0.61
02-15-2012 10:52:09	6.073	11.666	0.23
02-15-2012 10:53:09	6.012	11.724	0.08
02-15-2012 10:54:09	5.989	11.757	0.09
02-15-2012 10:55:09	5.948	11.791	0.10
02-15-2012 10:56:09	5.871	11.835	0.02
02-15-2012 10:57:09	5.816	11.890	-0.03
02-15-2012 10:58:09	5.861	11.912	-0.14
02-15-2012 10:59:09	5.795	12.004	-0.29
02-15-2012 11:00:09	5.720	12.087	-0.31
02-15-2012 11:01:09	5.658	12.155	-0.39
02-15-2012 11:02:09	5.587	12.267	-0.43
02-15-2012 11:03:09	5.727	12.022	-0.43
02-15-2012 11:04:09	5.704	12.004	-0.36
02-15-2012 11:05:09	5.623	12.137	-0.19
02-15-2012 11:06:09	5.593	12.164	-0.54
02-15-2012 11:07:09	5.496	12.303	-0.54
02-15-2012 11:08:09	5.510	12.269	-0.67
02-15-2012 11:09:09	5.455	12.359	-0.69
02-15-2012 11:10:09	5.397	12.443	-0.59
02-15-2012 11:11:09	5.373	12.383	-0.56
02-15-2012 11:12:09	5.409	12.445	-0.76
02-15-2012 11:13:09	5.333	12.534	-0.74
02-15-2012 11:14:09	5.242	12.647	-0.87
02-15-2012 11:15:09	5.242	12.623	-0.92
02-15-2012 11:16:09	5.194	12.669	-0.66
02-15-2012 11:17:09	5.150	12.756	-0.92
02-15-2012 11:18:09	5.074	12.853	-1.08
02-15-2012 11:19:09	5.099	12.809	-1.13
02-15-2012 11:20:09	5.056	12.856	-1.15
02-15-2012 11:21:09	5.013	12.915	-0.98
02-15-2012 11:22:09	4.687	13.623	-1.17
02-15-2012 11:23:09	4.738	13.729	-1.10
02-15-2012 11:24:09	5.212	12.684	-1.24
02-15-2012 11:25:09	5.065	12.866	-1.26
02-15-2012 11:26:09	4.959	13.008	-1.21
02-15-2012 11:27:09	4.886	13.118	-1.19
02-15-2012 11:28:09	4.887	13.080	-1.41
02-15-2012 11:29:09	4.846	13.133	-1.51
02-15-2012 11:30:09	4.755	13.297	-1.32
02-15-2012 11:31:09	4.703	13.375	-1.28
02-15-2012 11:32:09	4.643	13.483	-1.29
02-15-2012 11:33:09	4.629	13.443	-1.39
02-15-2012 11:34:09	4.615	13.506	-1.52
02-15-2012 11:35:09	4.602	13.516	-1.58
02-15-2012 11:36:09	4.613	13.506	-1.56
02-15-2012 11:37:09	4.619	13.463	-1.48
02-15-2012 11:38:09	4.576	13.533	-1.70

Run Averages	CO2	O2	CO
	%	%	ppm
02-15-2012 11:38:09	5.404	12.485	-0.58

Operator: CEC
Plant Name: Broder Crematorium
Location: St. Charles
Test Run 2 End

Final System Bias Check, Run 2 STRATA Version 3.2
Operator: CEC
Plant Name: Broder Crematorium
Location: St. Charles

	Reference Cylinder Numbers	
	Zero	Span
CO2		CC19776
O2		CC19776
CO		CC184371

Date/Time 02-15-2012 11:47:19 PASSED

Analyte	CO2	O2	CO
Units	%	%	ppm
Zero Ref Cyl	0.000	0.000	0.00
Zero Cal	0.254	-0.066	-1.25
Zero Avg	0.290	-0.055	-1.31
Zero Bias%	0.1%	0.0%	0.0%
Zero Drift%	0.1%	0.0%	0.1%
Span Ref Cyl	9.984	10.040	98.80
Span Cal	10.262	10.053	98.95
Span Avg	9.902	10.056	98.94
Span Bias%	1.2%	0.0%	0.0%
Span Drift%	0.1%	0.0%	0.0%
Ini Zero Avg	0.270	-0.061	-1.59
Ini Span Avg	9.885	10.067	98.90
Run Avg	5.404	12.485	-0.58
Co	0.280	-0.058	-1.45
Cm	9.893	10.061	98.92
Correct Avg	5.322	12.445	0.85

System Bias Check End

Test Run 3 STRATA Version 3.2

	CO2	O2	CO
	%	%	ppm
Begin calculating run averages			
02-15-2012 12:56:19	4.119	14.252	-2.59
02-15-2012 12:57:19	8.230	9.606	31.52
02-15-2012 12:58:19	6.549	12.663	110.64
02-15-2012 12:59:19	5.275	13.199	-2.25
02-15-2012 13:00:19	5.346	12.912	-2.61
02-15-2012 13:01:19	5.480	12.581	-2.96
02-15-2012 13:02:19	6.098	11.662	-2.95
02-15-2012 13:03:19	6.611	11.146	-2.90
02-15-2012 13:04:19	6.434	11.607	-3.08
02-15-2012 13:05:19	6.430	11.763	-3.24
02-15-2012 13:06:19	6.217	12.169	-3.03
02-15-2012 13:07:19	6.058	12.443	-2.93
02-15-2012 13:08:19	5.988	12.625	-3.05
02-15-2012 13:09:19	5.864	12.840	-3.24
02-15-2012 13:10:19	5.984	12.785	-3.03
02-15-2012 13:11:19	6.652	11.891	-3.09
02-15-2012 13:12:19	6.595	12.292	-3.17
02-15-2012 13:13:19	6.446	12.402	-3.11
02-15-2012 13:14:19	6.476	12.316	-2.89
02-15-2012 13:15:19	6.431	12.319	-3.06
02-15-2012 13:16:19	6.428	12.281	-3.10
02-15-2012 13:17:19	6.371	12.295	-2.87
02-15-2012 13:18:19	6.266	12.387	-2.81
02-15-2012 13:19:19	6.422	12.090	-2.96
02-15-2012 13:20:19	6.395	12.139	-3.08
02-15-2012 13:21:19	6.683	11.699	-2.81
02-15-2012 13:22:19	6.644	11.693	-2.70
02-15-2012 13:23:19	6.682	11.594	-2.63
02-15-2012 13:24:19	6.601	11.682	-2.75
02-15-2012 13:25:19	6.451	11.838	-2.53
02-15-2012 13:26:19	6.262	12.036	-2.32
02-15-2012 13:27:19	6.144	12.158	-2.42
02-15-2012 13:28:19	6.009	12.304	-2.53
02-15-2012 13:29:19	5.941	12.373	-2.36
02-15-2012 13:30:19	6.268	11.892	-2.22
02-15-2012 13:31:19	6.598	11.184	-2.43
02-15-2012 13:32:19	6.343	11.441	-2.28
02-15-2012 13:33:19	6.264	11.529	-2.39
02-15-2012 13:34:19	6.110	11.711	-2.29
02-15-2012 13:35:19	6.101	11.714	-2.18
02-15-2012 13:36:19	5.960	11.912	-2.26
02-15-2012 13:37:19	5.919	11.940	-2.31
02-15-2012 13:38:19	5.826	12.075	-2.28
02-15-2012 13:39:19	5.771	12.153	-2.13
02-15-2012 13:40:19	5.703	12.227	-2.13
02-15-2012 13:41:19	5.628	12.252	-2.30
02-15-2012 13:42:19	5.644	12.275	-2.36
02-15-2012 13:43:19	5.582	12.340	-2.08
02-15-2012 13:44:19	5.575	12.359	-2.23
02-15-2012 13:45:19	5.626	12.260	-2.33
02-15-2012 13:46:19	5.588	12.360	-2.38
02-15-2012 13:47:19	5.656	12.245	-2.36
02-15-2012 13:48:19	5.658	12.278	-2.25
02-15-2012 13:49:19	5.691	12.193	-2.49
02-15-2012 13:50:19	5.634	12.242	-2.46
02-15-2012 13:51:19	5.460	12.523	-2.33
02-15-2012 13:52:19	5.439	12.543	-2.32
02-15-2012 13:53:19	5.327	12.688	-2.47
02-15-2012 13:54:19	5.313	12.687	-2.55
02-15-2012 13:55:19	5.278	12.746	-2.35

Run Averages	CO2	O2	CO
	%	%	ppm
02-15-2012 13:55:19	6.037	12.169	-0.16

Operator: CEC
Plant Name: Broder Crematorium
Location: St. Charles
Test Run 3 End

Final System Bias Check, Run 3 STRATA Version 3.2
Operator: CEC
Plant Name: Broder Crematorium
Location: St. Charles

	Reference Cylinder Numbers Zero	Span
CO2		CC19776
O2		CC19776
CO		CC184371

Date/Time 02-15-2012 14:03:39 PASSED

Analyte	CO2	O2	CO
Units	%	%	ppm
Zero Ref Cyl	0.000	0.000	0.00
Zero Cal	0.254	-0.066	-1.25
Zero Avg	0.355	-0.053	-2.35
Zero Bias%	0.3%	0.1%	0.2%
Zero Drift%	0.2%	0.0%	-0.2%
Span Ref Cyl	9.984	10.040	98.80
Span Cal	10.262	10.053	98.95
Span Avg	9.955	10.060	97.81
Span Bias%	1.0%	0.0%	0.2%
Span Drift%	0.2%	0.0%	-0.2%
Ini Zero Avg	0.290	-0.055	-1.31
Ini Span Avg	9.902	10.056	98.94
Run Avg	6.037	12.169	-0.16
Co	0.323	-0.054	-1.83
Cm	9.928	10.058	98.38
Correct Avg	5.940	12.137	1.65

System Bias Check End

APPENDIX C

EXAMPLE CALCULATIONS

Broder Cremation Services EU-03
Run 1 Combustion Efficiency Calculation

Carbon Dioxide Concentration	%	5.13	Enter Value
Carbon Dioxide Concentration	ppm	51300	Calculated
Carbon Monoxide	ppm	1.76	Enter Value

Combustion Efficiency	**0.99997**	Calculated

Note: Combustion Efficinecy must meet 99.9%

1 % = 10,000 ppm

Broder Cremation Services EU-03
Run 2 Combustion Efficiency Calculation

Carbon Dioxide Concentration	%	5.322	Enter Value
Carbon Dioxide Concentration	ppm	53220	Calculated
Carbon Monoxide	ppm	0.85	Enter Value
Combustion Efficiency		**0.99998**	Calculated

Note: Combustion Efficinecy must meet 99.9%

1 % = 10,000 ppm

Broder Cremation Services EU-03
Run 3 Combustion Efficiency Calculation

Carbon Dioxide Concentration	%	5.94	Enter Value
Carbon Dioxide Concentration	ppm	59400	Calculated
Carbon Monoxide	ppm	1.65	Enter Value
Combustion Efficiency		**0.99997**	Calculated

Note: Combustion Efficinecy must meet 99.9%

1 % = 10,000 ppm

APPENDIX D

EQUIPMENT CALIBRATION DATA

AeroMet
Engineering, Inc.
Solutions for a Changing Environment

Certification of Visible Opacity Reading

Ezra M Boyd

qualified to conduct EPA Method 9 Tests for visible opacity in accordance with the methods established for such qualification in 40 CFR Part 60 Appendix A.

Certification Date: September 9, 2011

Expiration Date: March 9, 2012

AeroMet Instructor:

Josh Haslag

[P] 573.636.6393

www.aeromet.org

Airgas

CERTIFICATE OF BATCH ANALYSIS

NITROGEN - CEM-CAL ZERO

Airgas Mid America
3500 Bernard Street
St. Louis, MO 63103
(314) 533-3100 Fax: (314) 533-7328
www.airgas.com

Part Number:	NI CZ15A	Reference Number:	40-111497229-5
Cylinder Analyzed:	CC252959	Cylinder Volume:	142 Cubic Feet
Laboratory:	MID - Saint Louis SGL - MO	Cylinder Pressure:	2000 PSIG
Analysis Date:	Jul 07, 2011	Valve Outlet:	580
Lot #:	40-111497229-5		

Expiration Date: Jul 07, 2016

ANALYTICAL RESULTS

Component	Reguested Purity		Certified Concentration
NitrogenCEM	99.9995%		99.9995%
CARBON DIOXIDE	< 1 PPM	<LDL	0.12 PPM
Moisture	< 1 PPM		0.675 PPM
NOx	< 0.1 PPM	<	0.1 PPM
SO2	< 0.1 PPM	<	0.1 PPM
THC	< 0.1 PPM		0.08 PPM
CARBON MONOXIDE	< 0.5 PPM	<LDL	0.12 PPM
Oxygen	< 0.5 PPM		0.49 PPM

Cylinders in Batch:

CC111710@, CC28751, CC304140, CC50135

Notes:

Meets Federal Register specifications Title 40 C.F.R. 72.2

Impurities verified against analytical standards traceable to NIST by weight and/or analysis.

Approved for Release

Airgas

CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Customer:	CIVIL & ENVIRONMENTAL CONSULTANTS INC		
Part Number:	E02NI99E15A0077	Reference Number:	54-124229164-1
Cylinder Number:	CC184371	Cylinder Volume:	144 Cu.Ft.
Laboratory:	ASG - Chicago - IL	Cylinder Pressure:	2015 PSIG
PGVP Number:	B12011	Valve Outlet:	350
Analysis Date:	Aug 09, 2010		

Expiration Date: Aug 09, 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	100.0 PPM	98.80 PPM	G1	+/- 1% NIST Traceable
NITROGEN	Balance			

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTRM/CO	90605	CC280458	98.88PPM CARBON MONOXIDE/	Feb 01, 2013

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nexus 470 AEP0000428	FTIR	Aug 03, 2010

Triad Data Available Upon Request

Notes:CUSTOMER PO # 10-142
AIRGAS ORDER # 233574-00

Signature on file

Approved for Release

Airgas

Airgas Specialty Gases
12722 South Wentworth Avenue
Chicago, IL, 60628
773-785-3000 Fax: 773-785-1928
http://www.airgas.com

CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Part Number:	E04NI99E15A0045	Reference Number:	54-124266106-2
Cylinder Number:	CC287	Cylinder Volume:	144 Cu.Ft.
Laboratory:	ASG - Chicago - IL	Cylinder Pressure:	2015 PSIG
PGVP Number:	B12011	Valve Outlet:	660
Analysis Date:	May 31, 2011		

Expiration Date: May 31, 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
NITRIC OXIDE	175.0 PPM	180.1 PPM	G1	+/- 1% NIST Traceable
PROPANE	200.0 PPM	200.5 PPM	G1	+/- 1% NIST Traceable
CARBON MONOXIDE	250.0 PPM	251.6 PPM	G1	+/- 1% NIST Traceable
NITROGEN	Balance			
Total oxides of nitrogen		180.3 PPM		For Reference Only

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTRM/C3H8	08061103	CC262063	249.1PPM PROPANE/AIR	Jul 15, 2012
NTRM/CO	09060427	CC287206	501.3PPM CARBON MONOXIDE/	Feb 01, 2013
NTRM	11060128	CC330714	248.4PPM NITRIC OXIDE/	Jan 17, 2017

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nexus 470 AEP0000428	FTIR	May 21, 2011
Nexus 470 AEP0000428	FTIR	May 21, 2011
Nexus 470 AEP0000428	FTIR	May 21, 2011

Triad Data Available Upon Request

Notes:

Approved for Release

Airgas

CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Airgas Specialty Gases
12722 S Wentworth Ave.
Chicago, IL 60628
(773) 785-3000 Fax: (773) 785-1928
www.airgas.com

Part Number:	E03NI56E15A1055	Reference Number:	54-124281819-4
Cylinder Number:	CC287716	Cylinder Volume:	162 Cu.Ft.
Laboratory:	ASG - Chicago - IL	Cylinder Pressure:	2015 PSIG
PGVP Number:	B12011	Valve Outlet:	590
Gas Code:	OC2	Analysis Date:	Sep 13, 2011

Expiration Date: Sep 13, 2014

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

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty
CARBON DIOXIDE	22.00 %	21.70 %	G2	+/- 1% NIST Traceable
OXYGEN	22.00 %	22.12 %	G2	+/- 1% NIST Traceable
NITROGEN	Balance			

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTRM/CO2	06120403	CC185079	19.66% CARBON DIOXIDE/NITROGEN	May 01, 2016
NTRM/O2	06120209	CC195591	20.9% OXYGEN/NITROGEN	Dec 01, 2015

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
(CO2-1)HORIBA VIA-510	NDIR	Aug 26, 2011
(O2-1)HORIBA MPA-510	Paramagnetic	Aug 26, 2011

Triad Data Available Upon Request

Notes:

Approved for Release

Airgas

CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Airgas Specialty Gases
12722 South Wentworth Avenue
Chicago, IL 60628
(773) 785-3000 Fax: (773) 785-1928
www.airgas.com

Part Number:	E03NI80E15A0138	Reference Number:	54-124299682-2
Cylinder Number:	CC19776	Cylinder Volume:	151 Cu.Ft.
Laboratory:	ASG - Chicago - IL	Cylinder Pressure:	2015 PSIG
PGVP Number:	B12012	Valve Outlet:	590
Gas Code:	OC2	Analysis Date:	Jan 23, 2012

Expiration Date: Jan 23, 2015

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	10.00 %	9.904 %	G1	+/- 1% NIST Traceable
OXYGEN	10.00 %	10.04 %	G1	+/- 1% NIST Traceable
NITROGEN	Balance			

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTRM/O2	06120108	CC195599	9.898% OXYGEN/NITROGEN	Oct 02, 2012
NTRM/CO2	09060623	CC262373N	9.921% CARBON DIOXIDE/NITROGEN	Apr 10, 2013

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
(CO2-1)HORIBA VIA-510	NDIR	Dec 26, 2011
(O2-1)HORIBA MPA-510	Paramagnetic	Dec 26, 2011

Triad Data Available Upon Request

Notes:

Approved for Release

APPENDIX E

PROCESS DATA

Broder Cremation Services

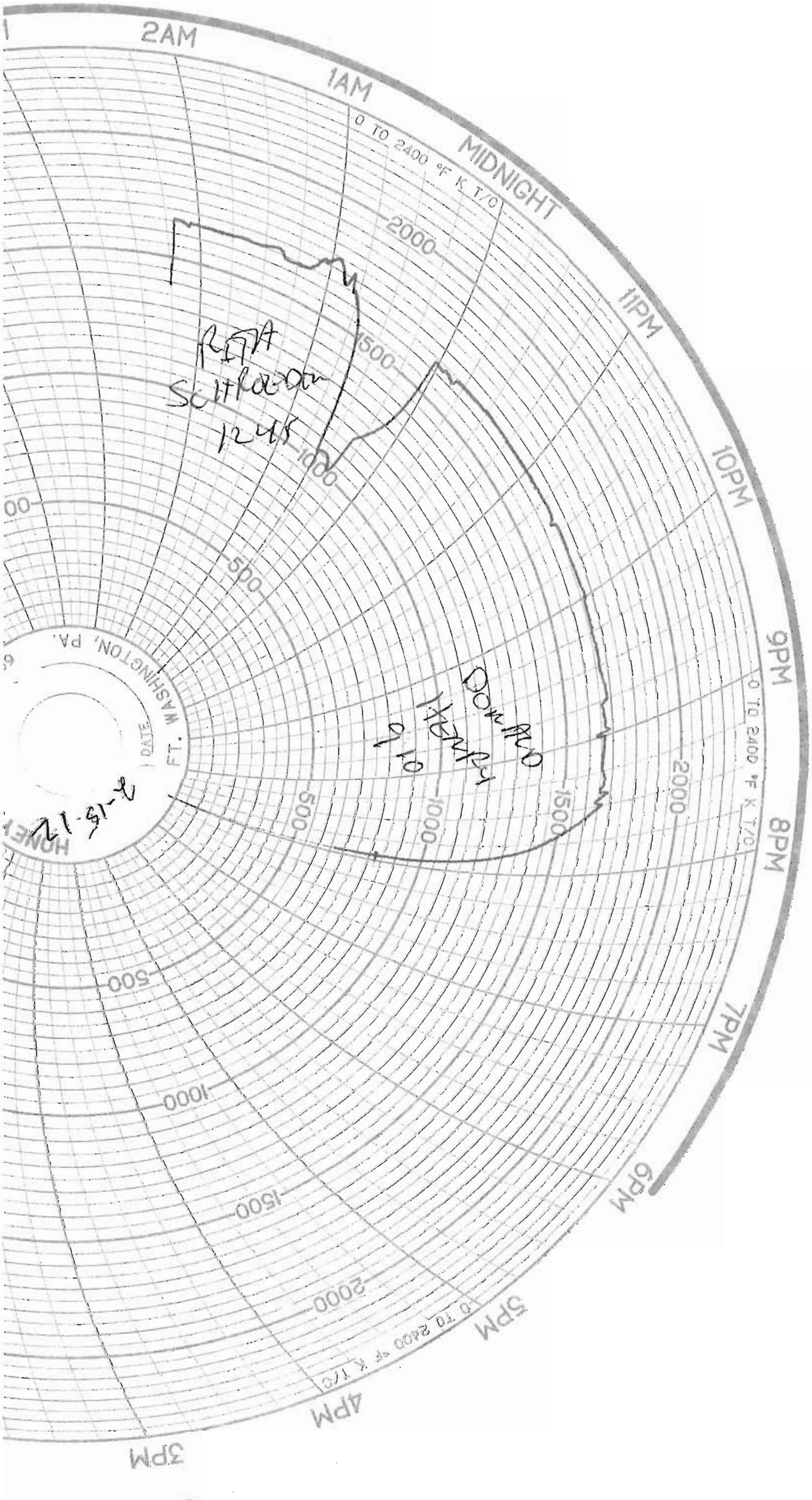
Final Chamber Temperature Data

Test Run 1 = 1650 °F

Test Run 2 = 1650 °F

Test Run 3 = 1650 °F

A copy of the strip chart recording is presented in Appendix E


2AM
1AM
MIDNIGHT
11PM
10PM
9PM
8PM
7PM
6PM
5PM
4PM
3PM
0 TO 2400 °F K T/C
500
1000
1500
2000
FT. WASHINGTON, PA.
DATE
9-13-12
1245
9:10