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:

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January 10, 2013

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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.

1/10/13 Date

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 2Emission SummaryBroder Cremation ServicesEmission 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 (CO₂) and carbon monoxide (CO) concentrations from the effluent of EU-03 and then calculating the combustion efficiency by dividing the CO₂ concentration by the sum of the CO and CO₂ 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 <u>www.epa.gov/ttn/emc/</u>.

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 O₂/CO₂ and CO Determination

USEPA Method 3A

The O_2 and CO_2 analysis was performed using a California Analytics Model 601P nondispersive 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 15second 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:		(Run 1)	Observation Date: 2-15-12			St	Start Time:			op Tin 77	ne:	
Address:		а. Б	Min\Sec	0	15	30	45	Min\Sec	0	15	30	45
Brader Lrematoric	A		1	0	0	0	0	31	0	0	0	0
City: 5+ Charles	State: MO	Zip: 63301	2	0	0	0	0	32	0	0	0	0
Phone:	Source I.D. No.: 3		3	0	0	0	0	33	0	0	0	<u>S</u>
Process Equipment:	Operating Mode:		4	0	0	0	0	34	0	0	0	0
Licenergior	Normal		5	0	0	0	0	35	0	0	0	0
Control Edipment:	Operating Mode:		b 7	0	0	0	0	30	0	0	0	0
Describe	8	0	0	0	0	37	B	0	0	0		
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Start: 15++ Stop: 15++	Start: 15 F4	Stop: 15F7	11	0	0	0	0	41	0	0	0	õ
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Describ	e Emissions		14	0	0	0	0	44	0	0	0	0
Start: NA	Stop: N/A		15	0	0	0	0	45	0	0	0	0
Emission Color	Plume Type:	Continuous)	16	0	0	0	0	46	G	0	0	0
Start: N/D Stop: NIA	Fugitive	Intermittent	17	0	0	0	0	47	0	0	0	0
Water Droplets Present:	If Water Dro	plet Plume:	18	0	0	0	0	48	0	0	0	0
No Yes	Attached	Detached	19	0	0	0	0	49	0	0	0	0
Point in the Plume at which opacity was determined				0	0	0	0	50	0	0	0	0
Start: Stop:				0	0	0	0	51	0	0	0	0
Describe Background			22	0	0	0	0	52	0	0	0	0
Start: OVERCAST SKY	Stop: OVERCAS	TSKY	23	0	0	0	0	53	0	0	0	0
Background Color	Sky Con	ditions	24	0	0	0	0	54	0	0	0	0
Start: WHITE Stop: WHITE	Start: OVER CAST	Stop:	25	0	0	0	0	55	0	0	0	0
Wind Speed	Wind Dir	recction	26	0	0	0	0	56	0	0	0	0
Start CALM Stop CALM	Start N	Stop //	27	0	0	0	0	57	0	0	0	0
Ambient Temp.	Wet Bulb Temp.	RH,percent	28	0	0	0	0	58	0	0	0	0
Start 40° Stop 40°			29	0	0	0	0	59	0	0	0	0
Draw North Arrow	ayout Sketch		30		O	For Hi	C	60 Num	Dorof	O	ingo A	O
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Background Color Sky Conditions 24 0 0 54 0 0 0 54 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 <th0< th=""> <t< td=""><td>Start: OVER</td><td>CAT SKY</td><td>Stop: OVERCAS</td><td>ST SKY</td><td>23</td><td>0</td><td>0</td><td>0</td><td>0</td><td>53</td><td>0</td><td>0</td><td>0</td><td>0</td></t<></th0<>	Start: OVER	CAT SKY	Stop: OVERCAS	ST SKY	23	0	0	0	0	53	0	0	0	0
Start: Wind Speed Wind Direction 26 0 0 55 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Backgro	ound Color	Sky Con	ditions	24	2	0	0	0	54	0	0	0	0
Wind Speed Wind Direction 26 0 0 56 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 <th0< th=""> 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0<!--</th--><th>Start: WHITE</th><th>Stop: W H HE</th><th>Stant OUCE CAST</th><th>Stop: 0 VELCAST</th><th>25</th><th>0</th><th>0</th><th>0</th><th>0</th><th>55</th><th>0</th><th>0</th><th>0</th><th>0</th></th0<>	Start: WHITE	Stop: W H HE	Stant OUCE CAST	Stop: 0 VELCAST	25	0	0	0	0	55	0	0	0	0
Start // A stop // A bit in the stop // A	Wind	Speed	Wind Dir	ecction	26	8	0	0	0	56	0	0	0	0
Ambient Temp. Wet Buils Temp. RH,percent 28 0 0 58 0 0 0 Start # 3 ** Stop # 3** 29 0 0 60 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 <	Start L ALA	Stop CALM	Start N	Stop N	2/	0	0	0	0	5/	0	0	0	0
Start * 3 Stop # 3 Zi Zi Display 20 Stop # 3 Display 20 Stop # 3 Display 20	Amble	ent Temp.	Wet Bulb Temp.	RH,percent	28	0	0	0	8	58	0	0	0	0
Source Layout Sketch Source Layout Sketch Draw North Arrow X - Emission Point Average Opacity For Highest Number of Readings Above Period 2 % were Observers Position Maximum: Observer's Name (Print) 2 Sun Location Line Observer's Signature Note: Sun X Wind Sun X Plume and Stack Organization: Certified By: I have received a copy of these opacity observations Signature: Date: Titile: Date:	Start 43	Stop 43	avout Skatah	and the second	29	2	10	0	2	60	0	6	0	0
X - Emission Point Period 10 % were Observers Position Range of Opacity Readings Minimum: Maximum: Observer's Name (Print) 0 Sun Location Line Observer's Signature Date: Note: Sun Location Line Organization: Comments: Organization: Control of these opacity observations Signature: Date: Date: Titile: Date: Date:	Draw North Arr	Source	ayout Sketch		Avera		Dacity	For H	ighest	Num	ber of	Read	lings A	hove
Observers Position Observer's Position Observer's Position Maximum: Observer's Name (Print) Observer's Name (Print) Sun Location Line Observer's Signature Note: Date: Sun X Wind Plume and Stack Organization: Comments: Organization: I have received a copy of these opacity observations Oate: Signature: Date: Titile: Date:		000	X - Emission Point			ge of	Period	1	gilloot	1	0	% wer	e	
Range of Opacity Readings Observers Position Maximum: Observer's Name (Print) Observer's Name (Print) Sun X Wind Plume and Stack Observer's Signature Date: Comments: Organization: Organization: Output Date: I have received a copy of these opacity observations Verified By: Date: Date: Signature: Date: Date: Date:							0				C	2		
Observers Position Minimum: Maximum: Observer's Name (Print) Observer's Name (Print) Observer's Signature Note: Sun X Wind Plume and Stack Observer's Signature Date: Comments: Organization: Comments: Organization: Comments: I have received a copy of these opacity observations Organization: Date: Date: Signature: Overified By: Date: Date: Titile: Date: Date: Date:						- 19 Kara	Ra	ange	of Opa	city R	eadin	gs		
Observer's Position Observer's Name (Print) Jate Jate Sun Location Line Observer's Signature Note: Sun X Wind Sun X Plume and Stack Comments: Organization: I have received a copy of these opacity observations Organization: Signature: Verified By: Date: Titile: Date:			Observers Desitie	~	Minim	ium:	0			Maxir	num:			
Note: Sun Location Line Sun X Wind Plume and Stack Support Comments: Organization: I have received a copy of these opacity observations Orginization: Signature: Verified By: Titile: Date:		N	Observers Positio	n	Ohse	n/or's	Name	(Print			0			
Sun Location Line Observer's Signature Date: Note: Sun X Wind Plume and Stack Image: Comments: Organization: Image: Certified By: Date: I have received a copy of these opacity observations Verified By: Date: Signature: Date: Titile: Date:		1	40°		L		ß	YA	.)					
Note: Sun X Wind Plume and Stack Sun X Plume and Stack Plume and	-	Sun Loo	cation Line	-	Obse	rver's	Signa	ture				Date	et	
Sun X Wind Plume and Stack Wind 2-15-12 Comments: Organization: Cinit 1 Environmental Cont Date: I have received a copy of these opacity observations Certified By: Date: Signature: Date: Date:	Note:			-		P								
Comments: Organization: I have received a copy of these opacity observations Certified By: Signature: Date: Titile: Date:	Sun X Wind Plume and Stack			2	20	129	2				2-	15-1	2	
Control Contr	Comments:				Organ	nizatio	n:			11	C			
I have received a copy of these opacity observations Verified By: Date: Signature: Date: Date:					Certif	ied By	En	VICA	MEN	141	20/	Date		
Signature: Verified By: Date: Titile: Date:	I have r	eceived a copy	of these opacity ob	servations										
Titile: Date:	Signature:				Verifi	ed By:						Date	2	
	Titile:			Date:										

					VISIBLE EMISSION OBSERVATION FORM							
Source Name:	1	(Run 3)	Ob: 2:	Deservation Date: St 2-15-12 125			St [2.5	Start Time:		St	Stop Time:	
Address:			Min\Sec	0	15	30	45	Min\Sec	0	15	30	45
Broder Cremator	rium		1	Ø	0	0	0	31	0	0	O	0
City: 57 Charles	State: MO	Zip:63301	2	0	0	0	0	32	0	0	0	0
Phone:	Source I.D. No .:		3	0	0	0	0	33	0	0	0	0
Process Equipment:	Operating Mode:		4	σ	0	0	0	34	0	0	0	0
Incenerator	Normal		5	0	0	0	0	35	0	0	0	0
Control Eqipment:	Operating Mode:		6	0	0	0	0	36	0	0	0	0
			7	0	0	0	0	37	0	0	0	0
Describe Emission Point				0	0	0	9	38	0	0	0	0
Start: Top of Stack	Stop: Top of S	Stack	9	0	0	0	0	39	0	0	0	O
Height Above Ground Level	Height Relative	e to Observer	10	0	0	0	0	40	0	0	0	6
Start: / SF4 Stop: / SF4	Start: IS F4	Stop: /Sft	11	0	0	0	0	41	0	0	0	0
Distance Form Observer	Direction Fro	m Observer	12	0	0	0	0	42	G	0	0	0
Start: 40f+ Stop: 40f+	Start: W	Stop: W	13	0	0	0	0	43	0	0	0	0
Descrit	e Emissions		14	0	0	0	0	44	0	0	0	0
Start:	Stop:		15	0	0	0	0	45	0	0	0	0
Emişsion Color	Plume Type:	Continuous	16	0	0	0	0	46	0	0	0	0
Start: VIA Stop: NIA	Fugitive	Intermittent	17	0	0	0	0	47	0	0	0	0
Water Droplets Present:	If Water Dro	plet Plume:	18	0	0	0	0	48	0	0	0	0
No X Yes	Attached	Detached	19	0	0	0	0	49	G	0	0	0
Point in the Plume at w	hich opacity was d	etermined	20	0	0	0	0	50	0	0	0	0
Start: Stop:			21	0	0	0	0	51	0	0	0	0
Describ	e Background	L'aliente role	22	0	0	0	0	52	0	0	0	0
Start: OVERCAST SKY	Stop: OVER CA	ST SKY	23	0	0	0	0	53	0	0	0	0
Background Color	Sky Con	ditions	24	0	0	0	0	54	0	0	0	0
Start: WHITE Stop: WHITE	Start: OVERCAST	Stop: OVER CAST	25	0	0	0	0	55	0	0	0	0
Wind Speed	Wind Dir	recction	26	0	0	0	0	56	0	0	0	0
Start CALM Stop CALM	Start N	Stop N	27	0	0	0	0	57	0	0	0	0
Ambient Temp.	Wet Bulb Temp.	RH,percent	28	0	0	0	0	58	0	0	0	0
Start 47 Stop 47			29	0	0	0	0	59	0	0	0	0
Source	Layout Sketch		30	0	0	0	0	60	0	0	0	0
Draw North Arrow	V. Caricolas Daiat		Avera	ige Op	bacity	For H	ighest	Num	ber of	Read	lings A	Above
	I - Emission Point		-	1. 444	Period	1		10		% wer	e	
			1.000		Ra	nae	of Opa	icity R	eadin	as	100	1111
			Minim	um:	6	ange (Maxir	num:	.90		
	Observers Positio	n							C	2		
A			Obser	ver's	Name	(Print)					
		_	<u><u></u></u>	ZRA	1504	ρ	_			Data		
Note:	cation Line		Ubsei	vers	Signal	ure				Date	-	
Sun X Wind	Plume and Stack	\rightarrow	5	ca'	/K	1				2-	5-12	2
Comments:				izatio	n:	4				120		
				416	EN	NUIRO	ME	NTAL	. 60	>Λ,		
				ied By						Date	:	
I have received a copy	of these opacity ob	servations										
Signature			Verifie	ed By:						Date	:	
Signature.			-									
Titile:		Date:									_	



APPENDIX B

CEMS DATA

CO Stratification Check

Plant:Broder CremationDate:2/15/2012Source:StackFuel:Natural GasTime:

Operator: AJA

			% difference from
Sample Point	Time	CO ppm	mean
1	833	0.00	#DIV//01
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.

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

 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 CremationDate:2/15/2012Source:StackFuel:Natural GasTime:Operator:AJA

			% difference from
Sample Point	Time	CO2 %	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

 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 Lin	e Length: 100 ft	Gas Flow:	7 lpm						
Run No.	Scale)	Monitor Response Time (Min:Sec)						
1	Downsc	ale	01:09						
2	Upsca	le	01:06						
3	Downso	ale	01:16						
4	Upsca	le	01:04						
5	Downsc	ale	01:04						
6	Upsca	le	01:03						
D	ownscale Avera	ge	01:10						
	Upscale Average	01:04							

rvices ïme	Broder Cremation Services System Response Time						
/15/2012		Monitor:	O2/CO2 - High	Date:	2/15/2012		
-251.6 ppm		Source ID:	Stack	Span:	0 - 22.12 % 0 - 21.7%		
í lpm		Heated Line	e Length: 100 ft	Gas Flow:	7 lpm		
Monitor Response Time (Min:Sec)		Run No.	Scale		Monitor Response Time (Min:Sec)		
01:09		1	Downsc	ale	00:32		
01:06		2	Upsca	е	00:34		
01:16		3	Downsc	ale	00:36		
01:04		4	Upsca	е	00:33		
01:04		5	Downsc	ale	00:30		
01:03		6	Upsca	е	00:33		
01:10		Do	ownscale Avera	ge	00:33		
01:04		Upscale Average			00:33		

Calibration Error Test, Run 1 STRATA Version 3.2 Operator: CEC Plant Name: Broder Crematorium									
Location: St. Charles									
Refe	rence Cyli	nder Numbe	ers						
Zero		Low-range	e Mid-	range	High-range				
C02		500	CC19	776	CC287716				
02			CC19	776	CC287716				
CO			CC18	4371	CC287				
Data (Tima	02-15-201	2	07.57.50		DACCED				
Date/IIme	02-15-201	2	07:57:59		PASSED				
Analyte	02	02	00						
UNIUS Rome Def Gul	ة 0 000	5 0 0 0 0	ppm						
zero Rei 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 Er	ror Test E	nd							

Initial System Bias Check, Run 1 STRATA Version 3.2 Operator: CEC Plant Name: Broder Crematorium St. Charles Location: Reference Cylinder Numbers Zero Span C02 CC19776 02 CC19776 со CC184371 Date/Time 02-15~2012 08:06:28 02 % CO2 Analyte CO ppm 0.00 Units 용 0.000 0.000 Zero Ref Cyl Zero Cal 0.254 -0.066 -1.25 Zero Avg 0.262 -0.068 -1.16 0.0% 0.0% Zero Bias% 0.0% Zero Drift% 9.984 Span Ref Cyl 10.040 98.80 Span Cal 10.262 10.053 98.95 9.865 10.042 98.86 Span Avg Span Bias% 0.0% 1.3% 0.1% Span Drift% System Bias Check End

Test Run 1 STRATA Ve	rsion 3.2			
	CO2	02	CO	
	00	8	ppm	
Begin calculating run	averages	15 000	0 7 4	
02-15-2012 09:08:28	3.561	15.277	-0.74	
02-15-2012 09:09:28	4.820	10 260	-0.57	
02-15-2012 09:10:28	5 746	12 642	2.35	
02-15-2012 09.11.20	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 $09:23:28$	5.320	12.045	1,38	
02-15-2012 09:24:20	5 411	12.147	1 25	
02-15-2012 09.26.28	5 427	12.175	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 09:39:20 02 - 15 - 2012 09:40:28	5 249	12.444	-0.12	
02-15-2012 09:41:28	5 265	12.525	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	5.110	12.818	-0.47	
02-15-2012 09:52:20	5 110	12.741	-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	5.13/	12./9/	-0.79	
02-15-2012 10:04:28	5 054	12 031	-0.89	
02-15-2012 10:05:28	5 042	12.954	~0.98	
02-15-2012 10:07:28	5,427	12.443	-0,98	
Run Averages	CO2	02	co	
· · · · · · · · · · · · · · · · · · ·		90	ppm	
02-15-2012 10:07:28	5.203	12.710	0.42	
Operator:	CEC			
Plant Name:	Broder Cre	matorium		
Location:	St. Charle	S		
Test Run 1 End				

Final System Bias Check, Run 1 STRATA Version 3.2 Operator: CEC Broder Crematorium Plant Name: St. Charles Location: Reference Cylinder Numbers Zero Span C02 CC19776 02 CC19776 CO CC184371 Date/Time 02-15-2012 10:17:28 CO2 02 % Analyte СО Units 8 ppm 0.000 0.254 0.270 Zero Ref Cyl 0.00 0.000 Zero Cal -0.066 -1.25 Zero Avg -0.061 -1.59 0.18 0.0% Zero Bias% 0.1% -0.1% Zero Drift% Span Ref Cyl 9.984 10.040 98.80 Span Kei Cyi9.984Span Cal10.262Span Avg9.885Span Bias%1.3%Span Drift%0.1% 10.053 10.067 98.95 98.90 0.1% 0.0% Span Drift% 0.1% 0.262 9.865 -0.068 10.042 Ini Zero Avg -1.16 98.86 Ini Span Avg Run Avg 5.203 12.710 0.42 Со 0.266 -0.064 -1.37 9.875 5.130 10.054 98.88 Cm Correct Avg 12.675 1.76 System Bias Check End

Test	Run 2	STRATA Ve	rsion 3.2		
			CO2	02	CO
			90	9	ppm
Begir	ı calcu	lating run	averages		
02-15	5-2012	10:39:09	5.282	12.725	-0.38
02-15	5-2012	10:40:09	5.584	12.303	-0.24
02-15	5-2012	10:41:09	5.620	12.230	-0.17
02-15	5-2012	10:42:09	5.224	13.119	0.80
02-15	5-2012	10:43:09	5.757	12.080	0.83
02-15	5-2012	10:44:09	5.599	12.264	0.18
02-15	5-2012	10:45:09	6.347	11.343	0.08
02-19	5-2012	10:46:09	6.383	11.308	0.04
02-15	5-2012	10:47:09	6.324	11.386	0.27
02-15	5-2012	10:48:09	6.327	11.340	0.19
02-1:	5-2012	10:49:09	6.280	11.41/	0.35
02-13	5-2012	10:50:09	0.282	11.394	0.45
02 - 13	5-2012	10:51:09	6.171	11.549	0.01
02-10	5-2012	10:52:09	6.073	11 724	0.23
02 - 10 02 - 10	5-2012	10.53.09	5 999	11.724	0.08
02 - 1	5-2012	10.55.09	5 948	11 791	0.09
02-1	5-2012	10.56.09	5 871	11 835	0.10
02-1	5-2012	10.57:09	5.816	11 890	-0.03
02-1	5-2012	10:58:09	5.861	11 912	-0.14
02 - 19	5-2012	10:59:09	5.795	12.004	-0.29
02-1	5-2012	11:00:09	5.720	12.087	-0.31
02-15	5-2012	11:01:09	5.658	12,155	-0.39
02-15	5-2012	11:02:09	5.587	12.267	-0.43
02-15	5-2012	11:03:09	5.727	12.022	-0.43
02-15	5-2012	11:04:09	5.704	12.004	-0.36
02-15	5-2012	11:05:09	5.623	12.137	-0.19
02-1	5-2012	11:06:09	5.593	12.164	-0.54
02-1	5-2012	11:07:09	5.496	12.303	-0.54
02-1	5-2012	11:08:09	5.510	12.269	-0.67
02-1	5-2012	11:09:09	5.455	12.359	-0.69
02-1	5-2012	11:10:09	5.397	12.443	-0.59
02-1	5-2012	11:11:09	5.373	12.383	-0.56
02 - 1	5-2012	11:12:09	5.409	12.445	-0.76
02 - 13	5-2012	11,14,09	5.333	12.004	-0.74
02 - 13	5-2012	11.15.09	5 242	12.047	-0.87
02-1	5-2012	11.16.09	5 194	12.629	-0.66
02 - 19	5-2012	11:17:09	5.150	12.756	-0.92
02-1	5-2012	11:18:09	5.074	12.853	-1.08
02-1	5-2012	11:19:09	5.099	12.809	-1.13
02-1	5-2012	11:20:09	5.056	12.856	-1.15
02-1	5-2012	11:21:09	5.013	12.915	~0.98
02-1	5-2012	11:22:09	4.687	13.623	-1.17
02-1	5-2012	11:23:09	4.738	13.729	-1.10
02-1	5-2012	11:24:09	5.212	12.684	-1.24
02-1	5-2012	11:25:09	5.065	12.866	-1.26
02-1	5-2012	11:26:09	4.959	13.008	-1.21
02-1	5-2012	11:27:09	4.886	13.118	-1.19
02-1	5-2012	11:28:09	4.887	13.080	-1.41
02-1	5-2012	11:29:09	4.846	13.133	-1.51
02-1	5 - 2012	11.21.00	4.700	12 275	-1.32
02-1	5 - 2012 5 - 2012	11.32.00	4.703	12.270	-1.20
02 - 1	5 - 2012 5 - 2012	11.32.09	4.645	13 403	-1.29
02 - 1	5-2012	11:34:09	4.615	13.506	-1 52
02-1	5-2012	11:35:09	4.602	13.516	-1.58
02-1	5-2012	11:36:09	4.613	13,506	-1.56
02-1	5-2012	11:37:09	4.619	13.463	-1.48
02-1	5-2012	11:38:09	4.576	13.533	-1.70
Run	Average	es	CO2	02	CO
	-		90	010	ppm
02-1	5-2012	11:38:09	5.404	12.485	-0.58
Oper	ator:		CEC		
Plan	t Name:	:	Broder Crem	natorium	
Loca	LION:	End	St. Charles	5	
rest	Run Z	Ena			

Final System Bias Check, Run 2 STRATA Version 3.2 Operator: CEC Plant Name: Broder Crematorium St. Charles Location: Reference Cylinder Numbers Zero Span CO2 CC19776 02 CC19776 СО CC184371 Date/Time 02-15-2012 11:47:19 Analyte CO2 02 CO 8 Units 8 ppm 0.000 Zero Ref Cyl 0.000 0.00 Zero Cal 0.254 -0.066 -1.25 Zero Avg 0.290 -0.055 -1.31 0.1% 0.0% 0.0% Zero Bias% Zero Drift% 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 0.0% Span Biás% 1.2% 0.0% Span Drift% 0.1% 0.0% 0.0% 0.270 -0.061 -1.59 Ini Zero Avg 10.067 98.90 9.885 Ini Span Avg 5.404 12.485 -0.58 Run Avg Со 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 Ve	rsion 3.2		
		CO2	02	CO
		6	90	mqq
Begin calcu	lating 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	13.02.10	6 098	11 662	_2.90
02-15-2012	13.02.19	6 611	11 146	_2.00
02 15 2012 02 15 2012	13.04.19	6 434	11 607	-2.90
02-15-2012	12.05.10	6 420	11.007	-3.00
02-15-2012	12.06.10	6.430	12 160	-3.24
02-15-2012	13:00:19	0.217	12.109	-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	-2.33
02-15-2012	13.27.19	6 144	12 158	-2.02
02-15-2012	13.28.19	6 009	12 304	-2.53
02 15 2012	13.20.10	5 9/1	12.304	-2.55
02-15-2012	13.30.10	6 269	11 002	-2.30
02-15-2012	12.21.10	6 509	11 104	-2.22
02-15-2012	12.22.10	6.343	11 441	-2.43
02-15-2012	13:32:19	0.343	11.441	-2.28
02-15-2012	13:33:19	6.264	11.529	-2.39
02-15-2012	13:34:19	0.110	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 Average	es	CO2	02	CO
		cło	olo	maa
02-15-2012	13:55:19	6.037	12.169	-0.16
Operator:		CEC		
Plant Name	:	Broder Crem	natorium	
Location:		St. Charles	5	
Test Run 3	End			

Final System Bias Check, Run 3 STRATA Version 3.2 Operator: CEC Plant Name: Broder Crematorium St. Charles Location: Reference Cylinder Numbers Zero Span CO2 CC19776 02 CC19776 СО CC184371 Date/Time 02-15-2012 14:03:39 Analyte CO2 02 СО ppm 0.00 8 Units 윿 Zero Ref Cyl 0.000 0.000 Zero Cal 0.254 -0.066 -1.25 Zero Avg 0.355 -0.053 -2.35 0.3% 0.2% 0.1% Zero Bias% Zero Drift% 0.0% 9.984 10.040 Span Ref Cyl 98.80 Span Cal 10.262 10.053 98.95 Span Avg 9.955 10.060 97.81 1.0% Span Bias% 0.0% 0.2% Span Drift% -0.2% 0.2% 0.0% Ini Zero Avg 0.290 -0.055 -1.31 9.902 10.056 98.94 Ini Span Avg Run Avg 6.037 12.169 -0.16 Со 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

%	5.13	Enter Value
ppm	51300	Calculated
ppm	1.76	Enter Value
1	0.99997	Calculated
	% ppm ppm	% 5.13 ppm 51300 ppm 1.76 0.99997

1

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

%	5.94	Enter Value
ppm	59400	Calculated
ppm	1.65	Enter Value
	0.99997	Calculated
	% ppm ppm	% 5.94 ppm 59400 ppm 1.65 0.99997

Note: Combustion Efficinecy must meet 99.9%

1 % = 10,000 ppm



APPENDIX D

EQUIPMENT CALIBRATION DATA



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

www.aeromet.ora [P] 573,636,6393



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< td=""><td>0.12 PPM</td><td></td></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< td=""><td>0.12 PPM</td><td></td></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 Page 1 of 40-111471794-7



CERTIFICATE OF ANALYSIS Grade of Product: EPA Protocol

Customer:
Part Number:
Cylinder Number:
Laboratory:
PGVP Number:
Analysis Date:

CIVIL & ENVIRONM E02NI99E15A0077 CC184371 ASG - Chicago - IL B12011 Aug 09, 2010

CIVIL & ENVIRONMENTAL CONSULTANTS INC

Reference Number:54-124229164-1Cylinder Volume:144 Cu.Ft.Cylinder Pressure:2015 PSIGValve Outlet:350

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 RE	ESULTS	
Component		Requested	Actual	Protocol	Total Relative
		Concentra	tion Concentration	Method	Uncertainty
CARBON MONOXIDE		100.0 PPM	98.80 PPM	G1	+/- 1% NIST Traceable
NITROGEN		Balance			
		С	CALIBRATION STA	NDARDS	
Туре	Lot ID	Cylinder No	Concentration		Expiration Date
NTRM/CO	90605	CC280458	98.88PPM CARBON MONOXIDE/		Feb 01, 2013
			ANALYTICAL EQU	JIPMENT	
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



CERTIFICATE OF ANALYSIS Grade of Product: EPA Protocol

Expiration Date: May 31, 2013

Part Number: Cylinder Number: Laboratory: PGVP Number: Analysis Date:

E04NI99E15A0045 CC287 ASG - Chicago - IL B12011 May 31, 2011

Reference Number: 54-124266106-2 Cylinder Volume: Cylinder Pressure: Valve Outlet:

144 Cu.Ft. 2015 PSIG 660

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

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

	ANAL	YTICAL RESULT	rs	
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					
Туре	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	
1		AN	VALYTICAL EQUIPMENT		
Instrument/Make/Model Analytical Principle Last Multipoint Calibratio			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: Cylinder Number: Laboratory: PGVP Number: Gas Code:

E03NI56E15A1055
CC287716
ASG - Chicago - IL
B12011
OC2

055Reference Number:54-124281819-4Cylinder Volume:162 Cu.Ft.ILCylinder Pressure:2015 PSIGValve Outlet:590Analysis Date:Sep 13, 2011Expiration 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	
NITRÖGEN	Balance				

CALIBRATION STANDARDS					
Туре	Lot ID	Cylinder No	Concentration	Expiration Date	
NTRM/CO2	06120403	CC185079	19.66% CARBON DIOXIDE/NITROGEN	May 01, 2016	
NTRM/02	06120209	CC195591	20.9% OXYGEN/NITROGEN	Dec 01, 2015	
ANALYTICAL EQUIPMENT					
Instrument/	Make/Model		Analytical Principle	Last Multipoint Calibration	
(CO2-1)HORI	BA VIA-510		NDIR	Aug 26, 2011	
(O2-1)HORIB	A MPA-510		Paramagnetic	Aug 26, 2011	

Triad Data Available Upon Request

1RA2

Notes:

Approved for Release

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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:
Cylinder Number:
Laboratory:
PGVP Number:
Gas Code:

E03NI80E15A0138 CC19776 ASG - Chicago - IL B12012 OC2 Expiration Date

te:	Jan 23, 2015	
Α	nalysis Date:	Ja
Valve Outlet:		59
Cylinder Pressure:		20
Cylinder Volume:		1
Reference Number:		

4-124299682-2 51 Cu.Ft. 015 PSIG 90 an 23, 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

	22 A. W. S.	ANA	LYTICAL RESULT	rs		
Component		Requested	Actual	Protocol	Total Relative	
		Concentration	Concentration	Method	Uncertainty	
CARBON DIO	KIDE	10.00 %	9:904 %	G1	+/- 1% NIST Traceable	
OXYGEN		10.00 %	10.04 %	G1	+/- 1% NIST Traceable	
NITROGEN		Balance				
CALIBRATION STANDARDS						
Туре	Lot ID	Cylinder No C	oncentration		Expiration Date	
NTRM/O2	06120108	CC195599 9	.898% OXYGEN/NITROGE	N	Oct 02, 2012	
NTRM/CO2	09060623	CC262373N 9	.921% CARBON DIOXIDE/	NITROGEN	Apr 10, 2013	
		ANAL	TICAL EQUIPM	ENT		
Instrument/M	/lake/Model	and the second	nalytical Principle		Last Multipoint Calibration	
(CO2-1)HORIBA VIA-510		1. 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	NDIR		Dec 26, 2011	
(O2-1)HORIBA	MPA-510	No. Contraction P	aramagnetic		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



Aug. . .