AIR EMISSIONS TEST

BIBLER BROTHERS LUMBER COMPANY

SN-13G – NO. 1 CONTINUOUS DRY KILN AND WOOD BURNER

PERMIT NO. 1628-AOP-R5
AFIN 58-00014

Russellville, Arkansas
February 23, 2010

Bibler Brothers Lumber Company
2401 South Arkansas Avenue
Russellville, Arkansas 72801

Performed by:

ENVIRONMENTAL MONITORING LABORATORIES, INC.

624 Ridgewood Road
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Ridgeland, Mississippi 39158

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REPORT OF
AIR EMISSIONS TEST FOR

BIBLER BROTHERS LUMBER COMPANY

SN-13G – NO. 1 CONTINUOUS DRY KILN AND WOOD BURNER

Russellville, Arkansas
February 23, 2010

Bibler Brothers Lumber Company
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EXECUTIVE SUMMARY OF STACK EMISSIONS TEST

April 25, 2010

Subject: Bibler Brothers Lumber Company – Russellville, Arkansas
Triple Length Continuous Kiln

On February 23, 2010, Environmental Monitoring Laboratories performed air emissions tests for Bibler Brothers Lumber Mill in Russellville, Arkansas. Testing was performed to measure particulate, nitrogen oxide (NOx), carbon monoxide (CO), volatile organic compounds (VOC (as C)), and formaldehyde (HCHO) emissions from the SN-13G – No. 1 continuous dry kiln and wood burner. This testing was done in accordance with requirements of Permit NO. 1628-AOP-R5 administered by the Arkansas Department of Environmental Quality (ADEQ).

Results of the test:

	#/hr	concentration	#/MBF
Particulate	0.457	0.0042 grains/dscf	0.042
CO	11.21	201 ppm	1.018
NOx	0.376	4.1 ppm	0.034
VOC (as C)	41.22	1722 ppm	3.741
HCHO	0.775	13 ppm	0.0704

Mr. Keith Zimmerman of Environmental Enterprise Group coordinated the testing project. Mr. Matt Hagenlocker of Bibler Brothers supervised on site efforts. Mr. Brent Day and Ms Shanetta Brown of the ADEQ were present to witness the testing. Danny Russell and Bill Norwood of Environmental Monitoring Laboratories were responsible for sample collection. Formaldehyde samples were shipped to Enthalpy Analytical in Durham, NC for analysis.

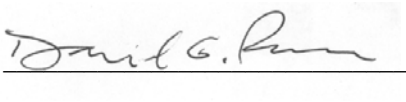
Following is a report of the test.

REPORT OF AIR EMISSIONS TEST
FOR BIBLER BROTHERS LUMBER COMPANY
SN-13G -- NO. 1 CONTINUOUS KILN AND WOOD BURNER
RUSSELLVILLE, ARKANSAS
FEBRUARY 23, 2010

CONTENTS

REPORT CERTIFICATION

I certify that I have examined the information submitted herein, and based upon inquires of those responsible for obtaining the data or upon my direct acquisition of data, I believe the submitted information is true, accurate and complete.

Signed 

Daniel G. Russell

2.0 SOURCE DESCRIPTION

Kiln

The kiln is 33' wide and 200' long with a 16'-0" high door opening. The two 8' wide lumber loads are pushed through the kiln on trams at a rate of about 10,000 board feet per hour. Actual throughput is dictated by moisture content of the green wood and the target ending moisture content. The two loads move in opposing directions. There are no vents. Fume and water vapor generated by the drying wood exhausts primarily through the ends of the kiln. Lumber is dried from its initial green lumber moisture content coming from the sawmill to a target of 13-17% average moisture content. Unlike typical batch dry kilns, this one operates continuously. Burner function and heat input vary only to maintain heat demand by the varying wood quality and moisture content.

Burner:

The heat source for the kiln is a 5 grate (245 square feet) wood burner with a sloped-grate design. It is nominally rated at 25 MM Btu/hr heat input. The sawdust is delivered from the sawmill and enters the burner at moisture contents ranging from 45-55% (wet basis). The sawdust is gasified in the burner box at temperatures in the 700 ^{O}F range, and the gas is combusted in firebrick-lined ductwork at temperatures in the 2000 ^{O}F range. The combustion gases are blended with return air from the kiln to produce a final heat supply temperature of approximately 500 ^{O}F; the supply air is then distributed inside the kiln to maintain a controlled dry bulb temperature. Wood fuel usage for the continuous drying process averaged 5444 pounds per hour during the test. Analysis of wood fuel samples were made to determine a source specific F-Factor of 9057 dscf/MM Btu and a heat value of 4019 Btu per pound. Heat input averaged 21.3 MM Btu per hour. A report of the wood fuel analysis done by Standard Laboratories is provided in Appendix F.

Temporary Test Stack

A temporary stack was installed in the kiln roof near one end of the kiln to provide a site with a consistent and laminar air flow for particulate sampling. A vertical rectangular stack was constructed over an existing but non functioning vent door. The vent door was removed and a housing was built to enclose that opening and funnel exhaust gases through the 33 inch tall stack extension that was 15.0 inches by 10.0 inches in cross section.

3.0 TEST PROCEDURES:

Test procedures used are those described in the Code of Federal Regulations, Title 40, Part 60, Appendix A. All test parameters were measured simultaneously. Each test consisted of triplicate 60 minute sample runs.

Because it is impractical to capture the entire exhaust of a lumber kiln, a temporary test stack was constructed in which a measureable laminar flow was produced. The flow rate from the stack was measured for the purpose of making an isokinetic sample, but that measured flow rate could not be related to the total flow lost from the kiln. Rather, total flow rate from the kiln was determined by taking advantage of the predictable oxygen consumption of the direct fire burner supplying heat to the kiln. The oxygen content was continuously monitored as well as the fuel rate. Given those two factors and assuming air quality is relatively homogenous throughout the positive pressure kiln, total air loss can be calculated. It was that calculated total air loss that was used to calculate mass emission rates of the measured pollutants.

Sample and Velocity Traverses – EPA Method 1

Selection of sampling locations was as described in Method 1. Sample ports are installed at locations meeting requirements of the Method. Laminar air flow at sample locations was confirmed using the null Pitot technique.

Determination of Stack Gas Velocity and Volumetric Flowrate – EPA Method 2

Stack gas velocity was measured using an S-Type Pitot tube and Method 2. Pitot tube design and its orientation with respect to the sample probe and nozzle permitted the use of a correction factor (Cp) of 0.84 as described in Method 2. Stack temperature measurements were be made with a type K thermocouple and NBS calibration traceable digital thermometer.

Gas Analysis for the Determination of Dry Molecular Weight – EPA Method 3A

Oxygen and carbon dioxide content was measured by continuous monitoring with calibrated analyzers as described in Method 3A.

Determination of moisture content in stack gas – EPA Method 4

Moisture content was determined from volumetric and gravimetric analysis of impinger contents of the Method 5 sample train.

Determination of Particulate Emissions – EPA Method 5

Particulate emissions were measured as described in Method 5 with no significant departures from the prescribed procedures. Method 5 incorporates the use of Methods 1 through 4. The sample train used was identical to that described in Method 5 except that the cyclone was omitted. Glass fiber filters were used. A stainless steel probe liner and nozzle was used. Reagent grade acetone was used for sample recovery. All particulate measured is presumed to be less than 10 microns.

Determination of Nitrogen Oxides Emissions – EPA Method 7E

Nitrogen oxide was measured by continuously directing a conditioned gas sample to a TECO Model 42C chemiluminescence NOx analyzer as described in Method 7E. A sample was extracted from the source by way of a stainless steel probe, heated sample line, minimum contact moisture knockout trap, glass wool filter and vacuum sample pump. The NOx analyzer was calibrated prior to use in the appropriate range using zero, mid, and high range concentrations of NO in nitrogen. Zero and mid level span checks were performed following each 60 minute sample run. Calibrations and post run zero and span checks were made through the sample system by introducing calibration gas at the inlet to the sample probe.

Determination of Carbon Monoxide – EPA Method 10

Carbon monoxide was measured by continuously directing a conditioned gas sample to a TECO Model 48C gas filter correlation CO analyzer as described in the continuous monitoring technique described in Method 10. A sample was extracted from the source by way of a stainless steel probe, minimum contact moisture knockout trap, glass wool filter and vacuum sample pump. The CO analyzer was calibrated prior to use in the appropriate range using zero, low, mid range, and span concentrations of CO in nitrogen. Zero and mid range checks were performed following each 60 minute sample run. Pre test calibrations and post run zero and span checks were made through the sample system by introducing calibration gas at the inlet to the sample probe.

Determination of Total Volatile Organic Compounds – EPA Method 25A

VOC (as carbon) was measured using Method 25A. A calibrated TECO Model 51 heated flame ionization detector was used to continuously monitor VOC concentration on a wet basis. A sample was directed to the analyzers by way of a Teflon sample line heated to 250^{O} F. A helium/hydrogen fuel was used to reduce oxygen synergism impact on the measurements. The instrument was calibrated with known concentrations of propane. Since the instrument was calibrated to propane, instrument response was multiplied by three as described in Method 25A to correct the results to an "as carbon" basis. Triplicate 60 minute sampling periods constituted a test. A four point instrument calibration was performed initially, and a calibration check at zero and mid point followed each 60 minute test period. Any necessary adjustments to the calibration were made after recording the response of the mid range calibration gas which was introduced at the inlet to the VOC sampling probe.

Preparation of Calibration Gases – EPA Method 205

Calibration gas concentrations were prepared using cylinders of EPA Protocol 1 gas mixtures and an Environics gas diluter verified by Method 205.

Data Acquisition

Instrument data was recorded on a Fluke Hydra data logger at 5 second intervals reduced to 60 second averages. The arithmetic average of each instrument's output was used to calculate emissions.

Determination of Formaldehyde Emissions – EPA Method 316

Formaldehyde emissions were measured in accordance with Method 316. Samples were sent to Enthalpy Analytical in Durham, NC for analysis. A report of the analysis prepared by Enthalpy is provided in Appendix E.

4.0 DATA REDUCTION

1.0 TEST RESULTS

The following table is a summary of the measured flow parameters and test results for air emissions testing done on February 23, 2010, for the SN-13G No. 1 continuous kiln and wood burner at Bibler Brothers Lumber Company in Russellville, Arkansas.

PM, CO, NOx, VOC and Formaldehyde Emissions Test - February 23, 2010

Run No.		1	2	3	AVG.
Date		02/23/10	02/23/10	02/23/10	-------
Time Start		1228	1435	1625	-----
Time End		1332	1539	1729	-----
PARTICULATE EMISSIONS	#/hr	0.457	0.507	0.407	0.457
PARTICULATE EMISSIONS, total	grains/dscf	0.0043	0.0045	0.0037	0.0042
PARTICULATE EMISSIONS, total	#/MBF	0.042	0.046	0.037	0.042
VOC EMISSIONS as Carbon	#/hr	33.996	47.368	42.283	41.216
VOC EMISSIONS as Carbon	ppm	1481.9	1929.2	1753.3	1721.5
VOC EMISSIONS as Carbon	#/MBF	3.085	4.299	3.838	3.741
NOx EMISSIONS	#/hr	0.322	0.347	0.460	0.376
NOx EMISSIONS	ppm	3.7	3.7	5.0	4.1
NOx EMISSIONS	#/MBF	0.029	0.031	0.042	0.034
CO EMISSIONS	#/hr	9.820	12.756	11.060	11.212
CO EMISSIONS	ppm	183.5	222.6	196.6	200.9
CO EMISSIONS	#/MBF	0.891	1.158	1.004	1.018
HCHO EMISSIONS	#/hr	0.414	0.981	0.931	0.775
HCHO EMISSIONS	ppm	7.2	16.0	15.4	12.9
HCHO EMISSIONS	#/MBF	0.0376	0.0890	0.0845	0.0704
FUEL BURN RATE	#/hr	5294	5372	5232	5299
HEAT INPUT	MM Btu/hr	21.28	21.59	21.03	21.30
THROUGHPUT	BF/hr	11018	11018	11018	11018
VOLUMETRIC FLOW RATE [1]	dscfm	12270	13133	12899	12767
VOLUMETRIC FLOW RATE	acfm	930	1219	1258	1136
VOLUMETRIC FLOW RATE	dscfm	672	760	759	730
VELOCITY	ft./sec.	14.9	19.5	20.1	18.2
STACK TEMPERATURE	^{o}F	145	171	169	162
MOISTURE	%	16.6	25.0	27.6	23.1
SAMPLE RATE	% Isokinetic	94.1	97.5	101.3	97.6

[1] Total volumetric flow rate was calculated from the measured oxygen content, measured fuel burn rate, and an F-Factor of 9095 for the mixed wood fuel.

PM, CO, NOx, VOC Emissions Test - February 23, 2010

Collected Test Data:			RUN 1	RUN 3	RUN 3
	Date	:	02/23/10	02/23/10	02/23/10
	Time start	:	1228	1435	1625
	Time end	:	1332	1539	1729
1.	As	: sq ft	1.0417	1.0417	1.0417
2.	Dn	: in.	0.625	0.430	0.430
3.	Cp	: dimensionless	0.84	0.84	0.84
4.	Theta	: minutes	62.50	62.50	62.50
5.	Y	: dimensionless	1.028	1.028	1.028
6.	Pbar	: in. Hg	29.73	29.73	29.73
7.	Pg	: in. H2O	-0.04	-0.04	-0.04
8.	Vm	: cf (dry gas)	78.346	43.841	45.502
9.	sqr(ΔP),avg	: in.H2O^.5	0.2410	0.3041	0.3123
10.	ΔH	: in. H2O	4.9020	1.4640	1.5660
11.	ts	: degrees F	145.28	170.96	169.16
12.	tm	: degrees F	68.72	69.04	70.00
13.	Vlc	: ml	341	318	377
14.	CO2	: percent	5.29	5.14	5.19
15.	O2	: percent	15.43	15.74	15.78
16.	C,CO	: ppm (dry)	183.5	222.6	196.6
17.	C,NOx	: ppm	3.66	3.69	4.97
18.	M,PM	: milligrams	22.8	13.1	11.1
19.	C,VOC	: ppm as C (wet basis)	412.2	482.2	423.0
20.	C,HCHO	: ppm (M316)	7.2	16.0	15.4
21.	Fuel Rate	: lb/hr	5294	5372	5232
22.	Heat Value	: Btu/lb	4019	4019	4019
23.	F	: scf/MM Btu	9057	9057	9057
24.	Through put	: BF/hr (board feet/hr)	11018	11018	11018

PM, CO, NOx, VOC Emissions Test - February 23, 2010

Calculations:		RUN 1	RUN 3	RUN 3	AVG.
1. Pm	: in.Hg (ΔH/13.6)+Pbar	30.0904	29.8376	29.8451	
2. Ps	: in. Hg (Pg/13.6)+Pbar	29.7271	29.7271	29.7271	
3. An	: sq ft ((Dn/24)^2)(3.1416)	2.13E-03	1.01E-03	1.01E-03	
4. Vmstd	: dscf Vm Y(Pm/Pstd)(Tstd/Tm)	80.888	44.856	46.483	57.409
5. Vwstd	: scf (.04707cf/ml)(Vlc)	16.051	14.968	17.745	
6. Bws	: dimensionless Vwstd/(Vwstd+Vmstd)	0.1656	0.2502	0.2763	0.2307
7. Md	: mol.wt. dry basis .44 CO2+.32 O2+.28(CO+N2)	29.46	29.45	29.46	
8. Ms	: mol.wt. wet basis Md(1-Bws)+18 Bws	27.57	26.59	26.29	
9. Vs	: ft/sec Kp Cp (sqrΔP)sqr(Ts/(Ps Ms))	14.87	19.51	20.12	18.17
10. HeatInput	: MM Btu/hr (Fuel rate)(heat value)/1000000	21.277	21.590	21.027	21.298
11. $Qstd_T$	: dscfm *(total from kiln)* (Heat Input/60)*(F)*(20.8/(20.9-O2))	12270	13133	12899	12767
12. Q	: cfm *(from temporary stack)* Vs As(60 sec/min)	930	1219	1258	1136
13. Qstw	: scfm *(from temporary stack)* Q(Ps/Pstd)(Tstd/Ts)	806	1014	1049	956
14. Qstd	: dscfm *(from temporary stack)* Qstw(1-Bws)	672	760	759	730
15. I	: percent [(100 Ts)(.002669 Vlc+(Vm Pm/Tm)]/(60 theta Vs Ps An)	94.13	97.53	101.25	97.64

Particulate Emissions		RUN 1	RUN 3	RUN 3	AVG.
16. E,PM	: pounds/hr (M,PM/Vmstd)(Qstd)(60)/(453590)	0.457	0.507	0.407	0.457
17. C,PM	: grains/dscf (M,PM/Vmstd)(.0154 grains/mg)	0.0043	0.0045	0.0037	0.0042
18. E'PM	: pounds/MBF E,PM/(Throughput/1000)	0.042	0.046	0.037	0.042

Carbon Monoxide Emissions					
19. E,CO	: pounds/hr (C,CO*7.2708e-8)(60)(Qstd)	9.82	12.76	11.06	11.21
20. E'CO	: pounds/MM Btu E,CO/Heat Input	0.4616	0.5908	0.5260	0.5261
21. C'CO	: ppm at 7% O2 C,CO (13.9/(21-O2))	466	600	534	533
22. E'CO	: pounds/MBF E,PM/(Throughput/1000)	0.891	1.158	1.004	1.018

NOx Emissions					
23. E,NOx	: pounds/hr (C,NOx*1.194e-7)(60)(Qstd)	0.32	0.35	0.46	0.38
24. E'NOx	: pounds/MM Btu E,NOx/Heat Input	0.0151	0.0161	0.0219	0.0177
25. E'NOx	: pounds/MBF E,NOx/(Throughput/1000)	0.029	0.031	0.042	0.034

VOC Emissions as Carbon					
26. C'VOC	: ppm as Carbon, dry ((C,VOC)*3)/(1-Bws)	1481.92	1929.20	1753.34	1721.49
27. E,VOC	: pounds/hr as C (C'VOC)(3.116e-8)(Qstd)(60)	33.996	47.368	42.283	41.216
28. E'VOC	: pounds/MBF as C E,VOC/(Throughput/1000)	3.085	4.299	3.838	3.741

Formaldehyde Emissions (Method 316)					
29. E,HCHO	: #/hr ((ppm HCHO/1000000)*Qstd*60)/385.1)*30	0.41	0.98	0.93	0.78
30. E'HCHO	E,HCHO/(Throughput/1000)	0.0376	0.0890	0.0845	0.0704

DRIFT AND BIAS CORRECTIONS

Analyte, units	Level	Cal. Value	Pre-Test				Run No. 1			Run No. 2			Run No. 3		
			Cal. Reading	% Cal. Error	Bias Reading	% Bias	Reading	% Bias	% Drift	Reading	% Bias	% Drift	Reading	% Bias	% Drift
% CO2	Low	0.0	0.0	0.0	0.1	0.6	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0
	Mid	9.0	9.1	0.6	9.0	0.0	9.0	0.0	0.0	9.0	0.0	0.0	9.0	0.0	0.0
	High	18.0	18.0	0.0											
	SPAN =	18.0			Measured Result		5.3			5.1			5.2		
					Corrected Result		5.29			5.14			5.19		
% O2	Low	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Mid	10.6	10.6	0.0	10.6	0.0	10.5	0.5	0.5	10.6	0.0	0.5	10.6	0.0	0.0
	High	20.9	20.9	0.0											
	SPAN =	20.9			Measured Result		15.4			15.7			15.8		
					Corrected Result		15.43			15.81			15.78		
ppm CO	Low	0	1	0.7	1	0.7	1	0.7	0.0	1	0.7	0.0	1	1.3	0.0
	Mid	150	151	0.7	151	0.7	152	1.3	0.7	149	0.7	2.0	149	0.7	0.0
	High	75	74	0.7											
	SPAN =	150			Measured Result		185.07			222.65			196.56		
					Corrected Result		183.46			222.39			198.20		
ppm NOx	Low	0.0	0.4	0.6	0.4	0.6	0.4	0.6	0.0	0.4	0.6	0.0	0.4	0.6	0.0
	Mid	33.0	33.4	0.6	33.4	0.6	33.2	0.3	0.3	33.6	0.9	0.6	33.6	0.9	0.0
	High	65.0	65.1												
	SPAN =	65.0			Measured Result		4.05			3.69			4.97		
					Corrected Result		3.66			3.29			4.55		

Calibration Error Allowable	< 2% of span	[((Cyl. Value - Reading) / span)* 100%]
System Bias	< 5% span	[(System Cal - Reading)/span*100%]
Drift	< 3% .....(Method 20 = 2 %).....	[(Initial System Cal. - Final System Cal.) / Span * 100%]

M 316 Formaldehyde Emissions Test - February 23, 2010

Collected Test Data:			RUN 1	RUN 3	RUN 3
Date	:		02/23/10	02/23/10	02/23/10
Time start	:		1228	1435	1625
Time end	:		1332	1539	1729
1. As	:	sq ft	1.0417	1.0417	1.0417
2. Dn	:	in.	0.505	0.432	0.432
3. Cp	:	dimensionless	0.84	0.84	0.84
4. Theta	:	minutes	62.50	62.50	62.50
5. Y	:	dimensionless	1.035	1.035	1.035
6. Pbar	:	in. Hg	29.73	29.73	29.73
7. Pg	:	in. H2O	-0.04	-0.04	-0.04
8. Vm	:	cf (dry gas)	55.941	45.513	48.383
9. sqr(ΔP),avg	:	in.H2O^.5	0.2666	0.3077	0.3257
10. ΔH	:	in. H2O	3.0440	1.8420	1.9620
11. ts	:	degrees F	141.32	171.12	168.96
12. tm	:	degrees F	70.10	70.88	71.36
13. Vlc	:	ml	427	329	412
14. CO2	:	percent	5.29	5.14	5.19
15. O2	:	percent	15.43	15.74	15.78
16. CO	:	percent	0.02	0.02	0.02
17. C,HCHO	:	mg (M 316)	14.720	26.402	27.122

M 316 Formaldehyde Emissions Test - February 23, 2010

Calculations:			RUN 1	RUN 3	RUN 3	AVG.
1.	Pm : in.Hg (ΔH/13.6)+Pbar		29.9538	29.8654	29.8743	
2.	Ps : in. Hg (Pg/13.6)+Pbar		29.7271	29.7271	29.7271	
3.	An : sq ft ((Dn/24)^2)(3.1416)		1.39E-03	1.02E-03	1.02E-03	
4.	Vmstd : dscf Vm Y(Pm/Pstd)(Tstd/Tm)		57.735	46.765	49.684	51.394
5.	Vwstd : scf (.04707cf/ml)(Vlc)		20.099	15.486	19.393	
6.	Bws : dimensionless Vwstd/(Vwstd+Vmstd)		0.2582	0.2488	0.2807	0.2626
7.	Md : mol.wt. dry basis .44 CO2+.32 O2+.28(CO+N2)		29.46	29.45	29.46	
8.	Ms : mol.wt. wet basis Md(1-Bws)+18 Bws		26.50	26.60	26.24	
9.	Vs : ft/sec Kp Cp (sqrΔP)sqr(Ts/(Ps Ms))		16.73	19.74	21.00	19.16
10.	I : percent [(100 Ts)(.002669 Vlc+(Vm Pm/Tm)]/(60 theta Vs Ps An)		102.28	99.41	103.33	101.68

Formaldehyde Emissions (Method 316)

11.	C,HCHO : ppm (M,HCHO/Vmstd)(849/mw)		7.2	16.0	15.4	12.9

Calculation of the site specific F-Factor

	R1	R2	R3	AVG		
Moisture	56.16	54.05	56.03	55.41	%	
Carbon	51.24	51.7	51.41	51.45	%	dry basis
Hydrogen	6.32	6.25	6.31	6.29	%	dry basis
Nitrogen	0.11	0.04	0.08	0.08	%	dry basis
Sulfur	0.02	0.02	0.02	0.02	%	dry basis
Ash	0.76	0.58	0.66	0.67	%	dry basis
Oxygen	41.55	41.41	41.52	41.49	%	dry basis
GCV	9125	9089	9133	9116	Btu/dry lb.	neat value dry basis)
GCV	4000	4042	4016	4019	Btu/wet lb.	neat value wet basis)

$F = 10^6 * [3.64(\%H)+1.53(\%C)+.57(\%S)+0.14(\%N)-0.46(\%O)]/GCV$

F =	9021	9112	9039	9057

5.0 NOMENCLATURE

SYMBOL	UNITS	DESCRIPTION
An	ft^2	Nozzle cross sectional area
As	ft^2	Stack cross sectional area
Bws	dimensionless	Wet gas fraction
CO_2	percent	Carbon dioxide content by volume
CO	percent	Carbon monoxide content by volume
Cp	dimensionless	Pitot correction factor
C,X	as labeled	Concentration of pollutant X
DGF	dimensionless	Dry gas fraction
Dn	inches	Nozzle diameter
ΔH (delta H)	in. H_2O	Pressure drop across meter orifice
ΔP (delta P)	in. H_2O	Stack gas velocity pressure
E,X	#/hr	Emission rate of pollutant X
E'X	#/MM Btu	Emission rate of pollutant X
F	dscf	Volume of flue gas per MM Btu
I	percent	Nozzle velocity/stack gas velocity
Kp	consistent	Pitot tube constant
M,X	milligrams	Sample weight of pollutant X
Md	#/# mole	Dry molecular weight of stack gas
Ms	#/# mole	Wet molecular weight of stack gas
N2	percent	Nitrogen content by volume, dry basis
O_2	percent	Oxygen content by volume, dry basis
Pbar	in. Hg	Barometric pressure
Pg	in. Hg	Stack static pressure
Pm	in. Hg	Total pressure at meter (Pbar+(ΔH/13.6)
Ps	in. Hg	Total stack pressure (Pbar+(Pg/13.6))
Pstd	in. Hg	Standard barometric pressure = 29.92
Q	acfm	Volumetric flow rate at stack conditions
Qstd	dscfm	Volumetric flow rate at standard conditions, dry basis
Qstdw	scfm	Volumetric flow rate at standard conditions, wet basis
θ (theta)	minutes	Sample duration
tm	^oF	Meter temperature (Tm denotes ^oR)
ts	^oF	Stack temperature (Ts denotes ^oR)
Tstd	^oR	Standard temperature = 528^oR
Vlc	ml	volume of water collected
Vm	ft^3	Volume of dry gas sampled through meter
Vmstd	dscf	Sample volume at standard conditions
Vwstd	scf	Sample volume of water vapor
Y	dimensionless	Meter coefficient
Xsair	percent	Excess air

6.0 CALIBRATIONS:

Measurement devices used by Environmental Monitoring Laboratories and subject to changes in measurement precision are initially calibrated prior to use. Those instruments for which calibration factors are subject to change or for which calibration checks are required are calibrated following each field use or as otherwise directed and noted. Calibration procedures for specific equipment are as follows.

Dry Gas Meter:

Dry gas meters are periodically removed from the sampling consoles and cleaned and repaired (new gaskets etc. as required). Following the overhaul of a meter, the measuring precision is checked by the Bell Prover Method and adjusted when necessary to read to within 2% of 100% accuracy. This service is provided by Big Three Meter Company in Jackson, Mississippi. Overhaul service or any six month period is followed by a five point calibration described in APTD-0576 using either a wet test meter or calibrated dry gas meter (used exclusively for calibrations) as a standard reference. Following field use, gas meter calibration is checked by performing three calibration checks at intermediate orifice settings. If a meter coefficient obtained from pre-test and post-test checks differs by more than 5%, the coefficient (Y) giving the lower sample volume is used in the calculations.

Orifice:

The orifice coefficient is initially determined and is rechecked following a major gas meter repair and calibration. The calibration is included with the Dry Gas Meter Calibration

Nozzles:

Nozzles are checked before each field use with a precision (.001 in.) dial caliper. Three measurements on different axes are made; an average of those three readings is used in calculations. If the tolerance among measurements exceeds 0.004 inches (highest to lowest reading) the nozzle is repaired and recalibrated or discarded.

Pitot Tubes:

Pitot tubes meeting EPA geometry standards are assigned a coefficient of 0.84. Pitot tubes are visually inspected for damage before, during and after use. Those pitot tubes not meeting the geometry standards are assigned a coefficient from the manufacturer's calibration that it retains unless damaged. All pitot tubes used by Environmental Monitoring Laboratories are manufactured by NuTech, Inc.

Temperature Measuring Instruments:

All temperature measurements are made with type K thermocouples and digital thermocouple thermometers, which have an initial calibration traceable to NBS. Thermocouples are checked during a test series against an ASTM mercury in glass thermometer at ambient temperature. Continuity and proper thermocouple contact location are checked by challenging the thermocouple with a temperature change. (EMTIC GD-028 -- June 21, 1994)

Barometer:

Aneroid field barometers are checked against and adjusted to readings from a mercury barometer or readings obtained from local weather authorities.

Differential Pressure Gauges:

Velocity head (delta P) and orifice pressure differential (delta H) measurements are made using water manometers of the appropriate range unless otherwise noted in the test data. Manometers do not require calibration.

Analytical Balance:

The analytical balance used was initially calibrated by the manufacturer. Additionally, the balance is equipped with an automatic zero and calibration feature that is used daily or prior to each use. Prior to each use, or daily, a quality control check is made using Class A weights of 0.5000 grams and 100.0000 grams.

7.0 APPENDICES

A. Field and Laboratory Data

B. Calibration Data

C. Analyzers Data Log

D. Operating Records (Bibler Bros.)

E. Formaldehyde Analysis (Enthalpy Analytical)

F. Wood Fuel Analysis (Standard Labs)

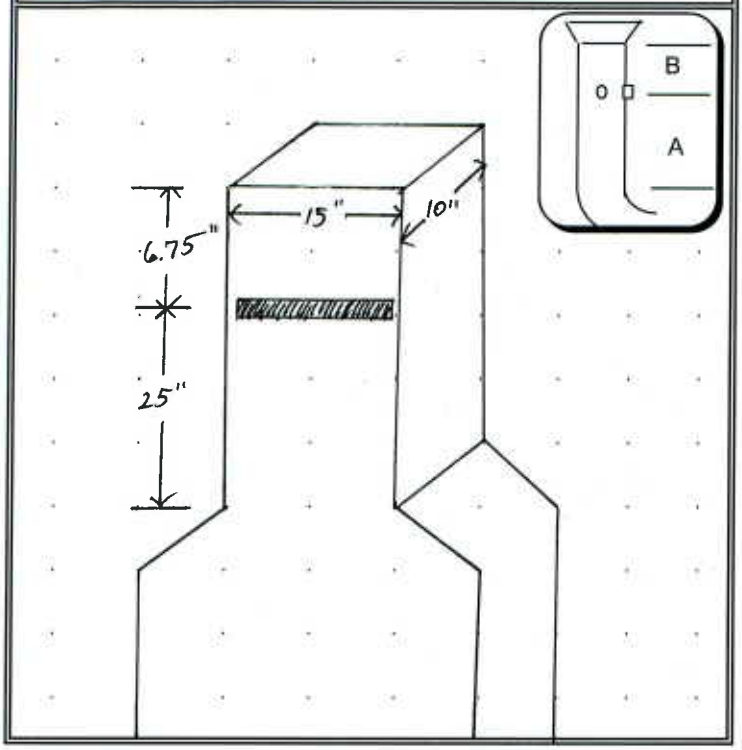
APPENDIX A

FIELD AND LABORATORY DATA

STACK CONFIGURATION AND SAMPLE POINT LAYOUT

PLANT: Bibler Brothers Lumber Co. **Date:** 2-23-10
SOURCE: SN136 Dry Kiln No. # 1
TEST FOR: PM Setup
TEST OPERATORS: Norwood / Thompson / Wallace

SKETCH OF STACK



PERCENT OF DIAMETER (for circular stacks)

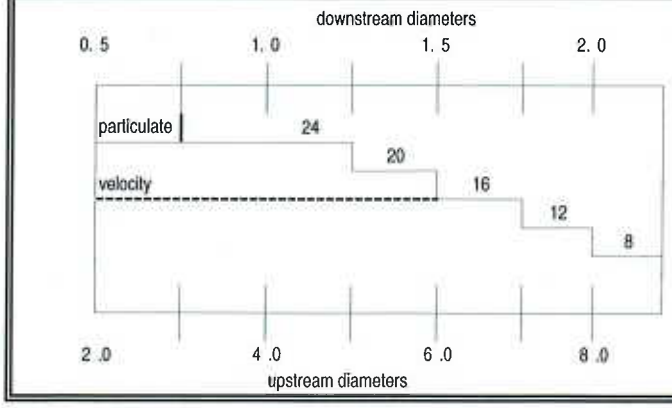
point no.	points on a diameter: 2	4	6	8	10	12	14	16
1	14.6	6.7	4.4	3.2	2.6	2.1	1.8	1.6
2	85.4	25.0	14.6	10.5	8.2	6.7	5.7	4.9
3		75.0	29.6	19.4	14.6	11.8	9.9	8.5
4		93.3	70.4	32.3	22.6	17.7	14.6	12.5
5			85.4	67.7	34.2	25.0	20.1	16.9
6			95.6	80.6	65.8	35.6	26.9	22.0
7				89.5	77.4	64.4	36.6	28.3
8				96.8	85.4	75.0	63.4	37.5
9					91.8	82.3	73.1	62.5
10					97.4	88.2	79.9	71.7
11						93.3	85.4	78.0
12						97.9	90.1	83.1
13							94.3	87.5
14							98.2	91.5
15								95.1
16								98.4

STACK DIAMETER: 10"X15" De = 12.0

Distance from ports to disturbance:	
A. to upstream disturbance	25"
B. to downstream disturbance	6.75"
Upstream diameters:	2.1
Downstream diameters:	0.6
Minimum No. sample points required:	24
No. sample points selected:	5X5
Port Length:	0
Port Type:	Slot
Port Access:	Roof / Board

Point No.	inches from wall	velocity head
		Ports
1	1.0	1 2 3 4 5
2	3.0	1.5 4.5 7.5 10.5 13.5
3	5.0	
4	7.0	
5	9.0	

MINIMUM NO. OF POINTS ON A DIAMETER



Pitot ID: 2' Pitot Cp: 0.84 Stack Temp:

Remarks:

Plant: Bibler Brothers Lumber Co. Russellville, AR
Source: SN-76 BN 2-23-10 Dry Kiln No. 8.1 SN-13G
Test For: PM
Test Operators: Norwood / Thompson / Wallace

RUN NO. 1
Date 2-23-10
Time start 1228 end 1332

Meter Box NT3Y=1.028
Sample Box No. 2
Probe/Pitot 3' Tef. 1-18-05-7
Pitot Cp 0.84
Nozzle Dia. BN 2-23-10 ~~0.433~~ 0.625
Filter No. 3983

No. Sample Pts. 5X5
Minutes/Pt. 2.5

K FACTOR SETUP

ΔH@	1.55	
Meter Temp	65	70
%H_2O	13	20
Stack Temp.	130	140 84.9
K Factor	BN 2-23-10 ~~23.30~~	101.10

GAS ANALYSIS: CEM

CO_2			
O_2			
CO			
Time			

CONDENSATE: init. 200 final 510
SILICA GEL: init. 826 final 857

Notes:

Nozzle:
Ø 0.625
Ø 0.625 } 0.625
Ø 0.625

Amb. Temp. °F 45
Bar. Press "Hg 29.73
Static Press. "H_2O -0.040

Port Point	Elapsed Time Min/sec	DGM Reading Ft.³	Velocity Head ΔP in. H_2O	Orifice ΔH in. H_2O	Stack Temp °F	Meter Temp °F in	Meter Temp °F out	Oven Temp °F	Imp. Temp °F	VAC in Hg
1 1	000	224.~~688~~ 794 BN 2-23-10	0.015	1.50	127	63	63	266	47	2
2	230	226.5	0.030	3.00	127	63	63	245	42	3
3	500	229.3	0.030	3.00	132	63	63	242	44	3
4	730	231.4	0.040	4.05	131	63	64	242	48	4
5	1000	234.1	0.040	4.05	134	63	64	244	51	4
6		.	.	.						
2 1	1230	236.925	0.054	5.45	140	64	64	240	60	6
2	1500	240.5	0.055	5.55	145	66	65	240	62	6
3	1730	243.9	0.055	5.55	146	67	65	242	66	6
4	2000	246.8	0.050	5.05	149	68	66	243	67	6
5	2230	250.0	0.060	5.10	136	69	66	240	68	6
12		.	.	.						
3 1	2500	253.090	0.060	5.10	138	70	67	244	68	6
2	2730	256.6	0.080	6.50	138	71	67	242	68	7
3	3000	259.7	0.080	6.50	135	71	67	240	69	7
4	3230	263.4	0.080	6.40	141	72	68	238	68	7
5	3500	266.8	0.085	6.30	151	73	68	238	68	7
18		.	.	.						
4 1	3730	270.322	0.065	5.50	147	74	69	240	67	7
2	4000	273.7	0.075	6.35	154	74	69	240	67	8
3	4230	277.2	0.075	6.35	162	75	69	238	68	8
4	4500	280.7	0.070	5.95	154	75	70	240	68	8
5	4730	284.2	0.070	5.95	150	75	70	240	68	8
24		.	.	.						
5 1	5000	287.567	0.075	6.35	144	75	71	244	68	8
2	5230	291.2	0.065	5.50	158	75	71	242	63	7
3	5500	294.4	0.065	5.50	164	75	71	240	62	7
4	5730	297.6	0.075	4.70	167	75	71	243	60	7
5	6000	300.7	0.045	2.85	162	75	71	242	60	6
end	6230	303.140	.	.						
31		.	.	.						
32		78.346	0.2410	~~4.9020~~ 5.1240	145.28		68.72			
33		.	.	.						

COMPLETED mar 2 '10

Leak Checks:

Sample Train: 0.060 --> 0.063 = 0.003 efm @ 10 "Hg
Pitot Tubes: High ☑ @ 6.2 "H_2O || Low ☑ @ 5.8 "H_2O

Pretest: Sample Train ☐
Pitot Tubes ☐

Plant: Bibler Brothers Lumber Co. Russellville, AR
Source: SN-13G Dry Kiln No. 1
Test For: PM
Test Operators: Norwood/Thompson/Wallace

RUN NO. 2
Date 2-23-10
Time start 1435 end 1539

Meter Box	NT3 Y=1.028
Sample Box	No. 2
Probe/Pitot	3'Tef. 1-18-05-7
Pitot Cp	0.84
Nozzle Dia.	~~0.496~~ 0.430
Filter No.	3984

No. Sample Pts.	5 X 5
Minutes/Pt.	2.5

K FACTOR SETUP

ΔH@	1.55
Meter Temp	70
%H_2O	26
Stack Temp.	155
K Factor	15.88

GAS ANALYSIS: CEM

CO_2			
O_2			
CO			
Time			

CONDENSATE: init. 200 final 506
SILICA GEL: init. 881 final 893

Notes:

Nozzle:
Ø 0.496 | 0.429
Ø 0.494 | 0.496 0.431 | 0.4
Ø 0.497 | 0.430

Amb. Temp. °F	50
Bar. Press "Hg	29.73
Static Press. "H_2O	-0.040

Port Point	Elapsed Time Min/sec	DGM Reading Ft.³	Velocity Head ΔP in. H_2O	Orifice ΔH in. H_2O	Stack Temp °F	Meter Temp °F in	Meter Temp °F out	Oven Temp °F	Imp. Temp °F	VAC in Hg
1 1	0 00	303.212	0.095	1.50	176	63	66	235	47	2
2	230	305.1	0.090	1.45	178	63	66	238	44	2
3	500	306.7	0.105	1.65	179	62	65	240	44	2
4	730	308.5	0.080	1.25	179	62	65	242	44	3
5	1000	310.2	0.090	1.40	178	64	65	244	44	3
6		.	.	.						
2 1	1230	311.880	0.110	1.75	155	64	66	244	44	3
2	1500	313.7	0.085	1.35	175	65	66	252	45	3
3	1730	315.5	0.100	1.60	178	67	66	258	45	3
4	2000	317.2	0.090	1.40	174	68	67	263	46	3
5	2230	318.9	0.090	1.40	150	68	67	266	46	3
12		.	.	.						
3 1	2500	320.621	0.105	1.65	156	69	68	269	47	3
2	2730	322.5	0.100	1.60	163	70	68	272	47	4
3	3000	324.3	0.105	1.65	173	71	68	272	47	4
4	3230	326.1	0.092	1.45	178	71	69	271	47	4
5	3500	327.9	0.085	1.35	176	72	69	268	48	4
18		.	.	.						
4 1	3730	329.595	0.110	1.75	168	72	70	266	48	4
2	4000	331.5	0.095	1.50	178	73	70	266	47	4
3	4230	333.3	0.095	1.50	178	74	71	267	49	4
4	4500	335.1	0.090	1.40	173	74	71	269	49	4
5	4730	336.9	0.085	1.35	170	75	71	269	49	4
24		.	.	.						
5 1	5000	338.525	0.090	1.40	155	74	72	265	51	3
2	5230	340.4	0.075	1.20	168	74	72	263	50	3
3	5500	341.9	0.085	1.35	176	74	72	256	50	3
4	5730	343.6	0.085	1.35	175	74	72	253	51	3
5	6000	345.4	0.085	1.35	165	74	73	256	50	3
end	62/30	347.053	.	.						
31		.	.	.						
32		43.8641	0.3041	1.4640	170.96		69.04			
33		.	.	.						

COMPLETED

Leak Checks:
Sample Train: 0.080 --> 0.082 = 0.002 cfm @ 10 "Hg
Pitot Tubes: High ✓ @ 5.7 "H_2O || Low ✓ @ 5.9 "H_2O

Pretest: Sample Train ✓
Pitot Tubes ✓

Plant: Bibler Brothers Lumber Co. Russellville, AR
Source: SN-13G Dry Kiln No. 1
Test For: PM
Test Operators: Norwood / Thompson / Wallace

RUN NO. 3
Date 2-23-10
Time start 1625 end 1729

Meter Box	UT3 Y=1.028
Sample Box	No. 2
Probe/Pitot	3' Tef. 178-05-7
Pitot Cp	0.84
Nozzle Dia.	0.430
Filter No.	3985

No. Sample Pts.	5 x 5
Minutes/Pt.	2.5

K FACTOR SETUP

ΔH@	1.55
Meter Temp	70
%H_2O	25
Stack Temp.	165
K Factor	16.05

GAS ANALYSIS: CEM

CO_2			
O_2			
CO			
Time			

Notes:

Amb. Temp. °F	55
Bar. Press "Hg	29.73
Static Press. "H_2O	-0.040

CONDENSATE: init. 200 final 565
SILICA GEL: init. 893 final 905

Port Point	Elapsed Time Min/sec	DGM Reading Ft³	Velocity Head ΔP in. H_2O	Orifice ΔH in. H_2O	Stack Temp °F	Meter Temp °F in	Meter Temp °F out	Oven Temp °F	Imp. Temp °F	VAC in Hg
1 1	0 00	347.135	0.095	1.50	160	68	71	232	41	2
2	2 30	348.9	0.100	1.60	175	68	70	235	41	2
3	5 00	350.8	0.100	1.60	174	68	70	238	41	2
4	7 30	352.6	0.100	1.60	144	67	70	240	42	2
5	10 00	354.5	0.090	1.45	145	67	70	242	43	2
6										
2 1	12 30	356.209	0.090	1.45	157	67	69	247	44	2
2	15 00	358.1	0.120	1.95	164	67	69	252	45	2
3	17 30	359.9	0.100	1.60	178	66	69	251	46	3
4	20 00	361.8	0.110	1.75	171	66	69	255	47	3
5	22 30	363.7	0.105	1.70	162	67	68	260	47	3
12										
3 1	25 00	365.620	0.125	2.00	169	68	68	263	48	3
2	27 30	367.6	0.110	1.75	181	69	69	261	49	3
3	30 00	369.5	0.100	1.60	181	70	69	262	50	3
4	32 30	371.5	0.100	1.60	174	70	69	264	51	3
5	35 00	373.3	0.090	1.45	170	71	70	261	52	3
18										
4 1	37 30	375.005	0.090	1.45	147	72	70	260	53	3
2	40 00	376.8	0.095	1.50	163	72	70	259	54	3
3	42 30	378.6	0.090	1.45	177	72	70	259	53	3
4	45 00	380.4	0.085	1.35	177	73	71	260	50	3
5	47 30	382.1	0.085	1.35	172	73	71	261	49	3
24										
5 1	50 00	383.755	0.100	1.60	165	73	71	262	48	3
2	52 30	385.6	0.095	1.50	179	74	71	260	49	3
3	55 00	387.4	0.090	1.45	182	74	72	258	48	3
4	57 30	389.1	0.090	1.45	183	74	72	258	48	3
5	60 00	391.2	0.090	1.45	179	74	72	260	48	3
end	62 30	392.637								
31										
32		45.502	0.3123	1.5660	169.16		70.02 / 70.00			
33										

COMPLETED 3-1-10

Leak Checks:
Sample Train: 0.080 --> 0.082 = 0.002 efm @ 6 "Hg
Pitot Tubes: High ✓ @ 5.7 "H_2O || Low ✓ @ 6.1 "H_2O

Pretest: Sample Train ✓
Pitot Tubes ✓

Plant: Bibler Brothers Lumber Co. Russellville, AR
Source: SN-13G Dry Kiln No. # 1
Test For: HCHO
Test Operators: Russell / Wellen / Thompson

RUN NO. 1
Date 2-23-10
Time start 1228 end 1232

Meter Box NT1 Y = 1.035
Sample Box No. 1
Probe/Pitot 2 Tef. 1-18-05-8
Pitot Cp 0.84
Nozzle Dia. .505 0.4320
Filter No.

No. Sample Pts. 5 X 5
Minutes/Pt. 2.5

K FACTOR SETUP
ΔH@ 1.80

Meter Temp	70	70	70	70
%H2O	25	13	20	30
Stack Temp.	160	130	140	160
K Factor	3	53	52.55	42.07

GAS ANALYSIS: CEM

CO2			
O2			
CO			
Time			

CONDENSATE: init. 200 final 915
SILICA GEL: init. 865 final 887

Notes:
N622/-
0.505
0.505
0.505
VSOLN = 573 ml

Amb. Temp. °F 45
Bar. Press "Hg 29.73
Static Press. "H2O -.040

Port Point	Elapsed Time Min/sec	DGM Reading Ft.³	Velocity Head ΔP in. H2O	Orifice ΔH in. H2O	Stack Temp °F	Meter Temp °F in	Meter Temp °F out	Oven Temp °F	Imp. Temp °F	VAC in Hg
1 1	000	965.079	0.030	1.60	124	65	65	N/A	55	2
2	230	967.0	0.041	2.05	130	64	65		55	2
3	500	968.2	0.042	2.10	128	65	65		54	2
4	730	970.2	0.055	2.80	125	65	66		55	2
5	1000	972.3	0.055	2.80	133	65	66		57	3
6										
2 1	1230	974.8	0.061	3.10	136	67	66		59	3
2	1500	977.1	0.062	3.15	132	68	67		69	3
3	1730	980.0	0.070	3.55	130	69	68		72	3
4	2000	982.1	0.060	3.05	142	72	68		73	4
5	2230	984.6	0.070	2.95	137	72	68		73	4
12										
3 1	2500	986.6	0.081	3.40	135	73	69		72	5
2	2730	989.2	0.082	3.45	125	73	69		72	5
3	3000	991.2	0.082	3.45	125	73	69		72	5
4	3230	993.0	0.084	3.55	134	73	70		68	5
5	3500	996.7	0.090	3.80	130	73	70		68	5
18										
4 1	3730	998.6	0.090	3.80	146	73	70		68	5
2	4000	001.3	0.100	4.20	148	73	70		67	5
3	4230	003.3	0.090	3.25	154	75	71		66	5
4	4500	005.9	0.090	3.25	153	75	71		66	5
5	4730	008.2	0.090	3.25	150	75	72		66	5
24										
5 1	5000	010.408	0.091	3.30	159	75	72		63	5
2	5230	012.9	0.085	3.10	163	74	72		64	5
3	5500	015.4	0.095	3.45	165	74	72		64	5
4	5730	017.8	0.078	2.45	167	74	72		61	5
5	6000	019.5	0.040	1.25	162	75	72		62	5
end	62/30	021.020								
31										
32		55.941	D. 2666	3.0440	1432		70.10			
33										

COMPLETED mcm 3/10

Leak Checks:
Sample Train: .045 --> .015 = 0.020 efm @ 13 "Hg
Pitot Tubes: High ☑ @ 73 "H2O || Low ☑ @ 73 "H2O

Pretest: Sample Train ☑ Pitot Tubes ☑

Plant: Bibler Brothers Lumber Co. Russellville, AR
Source: SN-13G Dry Kiln No. 1
Test For: HCHO
Test Operators: Russum / Walden / Thompson / Norwood

RUN NO. 2
Date 2-23-10
Time start 1435 end 1539

Meter Box	NT1 Y=1.035
Sample Box	No. 1
Probe/Pitot	2' Tef. 1-18-05-8
Pitot Cp	0.84
Nozzle Dia.	.432 G
Filter No.	N/A

No. Sample Pts.	5 x 5
Minutes/Pt.	2.5

K FACTOR SETUP

ΔH@	1.80	
Meter Temp	72	70
%H_2O	26	24
Stack Temp.	155	170
K Factor	18.86	14.35

GAS ANALYSIS: CEM

CO_2			
O_2			
CO			
Time			

CONDENSATE: init. 200 final 503
SILICA GEL: init. 820 final 846

Notes:

Amb. Temp. °F	50
Bar. Press "Hg	29.73
Static Press. "H_2O	-.04

Port Point	Elapsed Time Min/sec	DGM Reading Ft.³	Velocity HeadΔP in. H_2O	Orifice ΔH in. H_2O	Stack Temp °F	Meter Temp °F in	Meter Temp °F out	Oven Temp °F	Imp. Temp °F	VAC in Hg
1 1	000	021.852	0.075	1.40	177	66	65	N/A	57	3
2	230	023.2	0.080	1.50	171	66	65		57	3
3	500	024.9	0.085	1.60	173	65	65		52	3
4	730	026.5	0.085	1.60	173	65	65		53	3
5	1000	028.0	0.090	1.70	166	66	65		52	3
6		.	.	.						
2 1	1230	030.0	0.095	1.85	170	67	65		55	3
2	1500	031.5	0.090	1.80	177	64	66		56	3
3	1730	033.5	0.080	1.55	176	69	67		57	3
4	2000	035.0	0.090	1.80	173	69	67		56	3
5	2230	037.0	0.090	1.80	162	71	68		58	3
12		.	.	.						
3 1	2500	039.1	0.100	1.95	163	72	69		50	3
2	2730	040.9	0.095	1.85	162	72	69		51	3
3	3000	042.5	0.110	2.15	164	73	70		57	3
4	3230	044.3	0.090	1.75	177	74	70		55	3
5	3500	045.9	0.100	1.95	178	75	70		58	3
18		.	.	.						
4 1	3730	048.0	0.120	2.30	178	75	71		59	3
2	4000	049.8	0.095	1.85	176	76	72		59	3
3	4230	052.0	0.095	1.85	171	77	72		59	3
4	4500	053.4	0.100	1.95	170	77	72		60	3
5	4730	055.8	0.095	1.85	164	77	73		61	3
24		.	.	.						
5 1	5000	057.795	0.105	2.05	175	78	73		61	3
2	5230	059.6	0.090	1.75	177	78	73		60	3
3	5500	061.6	0.100	1.95	169	78	74		60	3
4	5730	063.4	0.100	1.95	172	78	74		60	3
5	6000	064.9	0.120	2.30	164	78	74		60	3
end	6230	067.765	.	.						
31		.	.	.						
32		45.513	.3077	1.8420	171.12		70.88			
33		.	.	.						

COMPLETED mar 1-10

Leak Checks:
Sample Train: 0.050 --> 0.053 = 0.003 efm @ 7 "Hg
Pitot Tubes: High ☑ @ 6.2 "H_2O || Low ☑ @ 6.1 "H_2O

Pretest: Sample Train ☑ Pitot Tubes ☑

Plant: Bibler Brothers Lumber Co. Russellville, AR
Source: SN-13G Dry Kiln No.1
Test For: HCHO
Test Operators: R

RUN NO. 3
Date 2-23-10
Time start 1625 end 1729

Meter Box NT1 Y=1.035
Sample Box No.1
Probe/Pitot 2' Tef. 1-18-05-8
Pitot Cp 0.84
Nozzle Dia. ~~N/A~~ .432 G
Filter No. N/A

No. Sample Pts. 5 x 5
Minutes/Pt. 2.5

K FACTOR SETUP
ΔH@ 1.80
Meter Temp 70
%H_2O 26
Stack Temp. 170
K Factor 18.34

GAS ANALYSIS: CEM

CO_2			
O_2			
CO			
Time			

CONDENSATE: init. 200 final 579
SILICA GEL: init. 863 final 896

Notes:

Amb. Temp. °F 51
Bar. Press "Hg 29.73
Static Press. "H_2O -.04

Port Point	Elapsed Time Min/sec	DGM Reading Ft.³	Velocity Head ΔP in. H_2O	Orifice ΔH in. H_2O	Stack Temp °F	Meter Temp °F in	Meter Temp °F out	Oven Temp °F	Imp. Temp °F	VAC in Hg
1 1	0 00	067.559	0.110	2.00	167	70	70	259	50	3
2	230	069.9	0.090	1.65	177	69	69	N/A	50	3
3	500	071.2	0.090	1.65	170	69	69		50	3
4	730	073.2	0.090	1.65	170	69	69		51	3
5	1000	074.9	0.100	1.85	170	69	68		54	3
6										
2 1	1230	076.9	0.130	2.40	159	69	68		55	3
2	1500	079.1	0.120	2.20	174	69	68		57	3
3	1730	081.2	0.100	1.85	174	69	68		58	3
4	2000	083.0	0.110	2.00	159	69	68		59	3
5	2230	084.9	0.165	1.95	159	69	68		60	3
12										
3 1	2500	086.7	0.110	2.00	164	71	68		66	3
2	2730	088.9	0.125	2.30	177	72	69		62	3
3	3000	090.8	0.120	2.20	170	73	69		67	3
4	3230	092.7	0.115	2.10	163	73	69		64	3
5	3500	094.8	0.090	1.65	163	74	70		65	3
18										
4 1	3730	096.5	0.120	2.20	153	75	70		64	3
2	4000	098.8	0.110	2.00	179	76	71		66	3
3	4230	100.6	0.100	1.85	186	76	71		66	3
4	4500	102.3	0.090	1.65	165	76	71		65	3
5	4730	104.7	0.100	2.00	157	77	72		64	3
24										
5 1	5000	105.877	0.130	2.40	168	77	72		61	3
2	5230	107.6	0.105	1.95	183	77	72		61	3
3	5500	109.5	0.100	1.85	180	77	73		61	3
4	5730	111.9	0.100	1.85	180	77	73		61	3
5	6000	114.4	0.100	1.85	163	78	73		67	3
end	62/30	115.942								
31										
32		48.383	.325	1.9620	168.96		71.36			
33										

COMPLETED mcr 3-2-10

Leak Checks:
Sample Train: ____ --> ____ = ____ efm @ ____ "Hg
Pitot Tubes: High ☐ @ ____ "H_2O || Low ☐ @ ____ "H_2O

Pretest: Sample Train ☑
Pitot Tubes ☑

PARTICULATE CATCH ANALYSIS

SAMPLES: Bibler Brothers Lumber Co. - No. 1 Kiln SN-13G

DATE TAKEN: 2-23-10 DATE ANALYZED: 2-26-10

DELIVERED BY: BN RECEIVED BY: BN

ANALYZED BY: BN

(Attach chain of custody if additional exchanges occur)

FILTERS:

RUN NO.	1	2	3	
FILTER NO.	3983	3984	3985	
FILTER TARE, gms.	.4035	.4011	.4013	
	0.4132	0.4065	0.4069	
	.4150	.4069	.4072	
FINAL WEIGHT, gms.	.4146	.4065	.4070	
NET GAIN, gms.	.0111	.0054	.0057	

PROBE WASH:

RUN NO.	1	2	3	
CONTAINER I.D.	BBLC SN-13G R1	BBLC SN-13G R2	BBLC SN-13G R3	
VOLUME INTACT?	Y	Y	Y	
VOLUME, ml	150	150	175	
	(314)	(320)	(423)	( )
TARE WEIGHT, gms.	114.1255	102.1190	105.3842	
	114.1372	102.1267	105.3894	
FINAL WEIGHT, gms	114.1372	102.1267	105.3896	
NET GAIN, gms.	.0117	.0077	.0054	
LESS BLANK, gms.				

COMPLETED
MCR
3-7-10

PARTICULATE SAMPLE WEIGHT:

RUN NO.	1	2	3	
filter + probe, mg.	22.8	13.1	11.1	

APPENDIX B

CALIBRATION DATA

DRY GAS METER CALIBRATION
By Critical Orifice

Meter ID	Nutech 1	**Date**	07/17/09
Orifice ID	1312	**By**	Thompson
T, Amb	70	**Pbar**	30.15

Orifice			ΔH	VAC	Time	Meter						Vmstd	Vcrstd	Y	Q	K	ΔH@
No.	K'	Q'	in.	in.	min.	Vi	Vf	Temp. in		Temp out							
		cfm	H_2O	Hg		ft^3	ft^3	init.	final	init.	final						
12	0.3169	0.42	0.56	22	13.00	833.761	839.022	68	66	66	66	5.317	5.481	1.031	0.42	0.72	1.783
17	0.4391	0.58	1.10	20	13.00	839.022	846.316	66	68	66	66	7.371	7.569	1.027	0.58	0.71	1.834
23	0.6091	0.80	2.00	17	8.00	846.316	852.478	68	69	66	66	6.218	6.425	1.033	0.79	0.73	1.749
26	0.6905	0.92	2.70	14	6.00	852.478	857.962	69	71	67	67	5.521	5.541	1.004	0.91	0.72	1.779
31	0.8293	1.10	4.00	11	6.00	857.962	864.056	71	72	67	68	6.123	6.626	1.082	1.09	0.71	1.836
														1.035			**1.80**

Calculations:

Vm = [Vf-Vi]

Vmstd = [(17.64)(Vm)(Pbar+ΔH/13.6)/Tm]

Vcrstd = K'[(Pbar)(θ)/(T,amb)]

Y = [(Vcrstd/Vmstd)]

Q = [(Vm/θ)(Tm out/Tm)(Y)]

K = [Q(sqrt((Pm Mm)/((Tm out)(ΔH))]

ΔH@ = [$0.921/K^2$]

Where:

Pbar = Barometric pressure; in. Hg

Tm = Average Temp. at meter, ^oR

Pm = Meter pressure, (Pbar + ΔH/13.6); in. Hg

Mm = molecular weight of air (29)

Y = Meter correction factor; dimensionless

DRY GAS METER CALIBRATION

By Critical Orifice

Meter ID	Nutech 1	**Date**	02/25/10
Orifice ID	1312	**By**	Rayburn
T, Amb	55	**Pbar**	29.96

Orifice			ΔH	VAC	Time	Meter						Vmstd	Vcrstd	Y	ΔH@
No.	K'	Q' cfm	in. H_2O	in. Hg	min.	Vi ft^3	Vf ft^3	Temp. in init.	Temp. in final	Temp out init.	Temp out final				
17	0.4391	0.58	1.10	19	13.00	118.008	125.207	54	57	51	54	7.405	7.741	1.045	1.789
23	0.6091	0.80	2.00	17.5	10.00	125.207	132.805	57	58	54	54	7.789	8.213	1.054	1.701
26	0.6905	0.92	2.65	16	9.00	132.805	140.629	58	60	54	56	8.001	8.500	1.062	1.698
														1.054	**1.73**

Calculations:

Vm = [Vf-Vi]

Vmstd = [(17.64)(Vm)(Pbar+ΔH/13.6)/Tm]

Vcrstd = K'[(Pbar)(θ)/(T,amb)]

Y = [(Vcrstd/Vmstd)]

Q = [(Vm/θ)(Tm out/Tm)(Y)]

K = [Q(sqrt((Pm Mm)/((Tm out)(ΔH))]

ΔH@ = [$0.921/K^2$]

Where:

Pbar = Barometric pressure; in. Hg

Tm = Average Temp. at meter, ^oR

Pm = Meter pressure, (Pbar +ΔH/13.6); in. Hg

Mm = molecular weight of air (29)

Y = Meter correction factor; dimensionless

DRY GAS METER CALIBRATION
By Critical Orifice

Meter ID	Nutech 3	**Date**	12/29/09
Orifice ID	1312	**By**	Wallace
T, Amb	70	**Pbar**	30.15

Orifice			ΔH	VAC	Time	Meter						Vmstd	Vcrstd	Y	ΔH@
No.	K'	Q'	in.	in.	min.	Vi	Vf	Temp. in		Temp out					
		cfm	H_2O	Hg		ft^3	ft^3	init.	final	init.	final				
12	0.3169	0.42	0.45	22	13.00	74.935	80.147	66	66	66	66	5.272	5.481	1.040	1.433
17	0.4391	0.58	0.92	19	10.00	80.147	85.760	66	67	66	67	5.672	5.823	1.026	1.534
23	0.6091	0.80	1.85	17	7.00	85.760	91.106	67	68	67	67	5.395	5.622	1.042	1.616
26	0.6905	0.92	2.45	16	6.00	91.106	96.567	68	69	67	68	5.503	5.541	1.007	1.614
31	0.8293	1.10	3.40	14	5.00	96.567	101.924	69	70	68	68	5.391	5.521	1.024	1.562
														1.028	1.55

Calculations:

Vm = [Vf-Vi]

Vmstd = [(17.64)(Vm)(Pbar+ΔH/13.6)/Tm]

Vcrstd = K'[(Pbar)(θ)/(T,amb)]

Y = [(Vcrstd/Vmstd)]

Q = [(Vm/θ)(Tm out/Tm)(Y)]

K = [Q(sqrt((Pm Mm)/((Tm out)(ΔH))]

ΔH@ = [$0.921/K^2$]

Where:

Pbar = Barometric pressure; in. Hg

Tm = Average Temp. at meter, ^oR

Pm = Meter pressure, (Pbar +ΔH/13.6); in. Hg

Mm = molecular weight of air (29)

Y = Meter correction factor; dimensionless

DRY GAS METER CALIBRATION

By Critical Orifice

Meter ID	Nutech 3	**Date**	03/05/10
Orifice ID	1312	**By**	Rayburn
T, Amb	60		29.92

Orifice			ΔH	VAC	Time	Meter						Vmstd	Vcrstd	Y	ΔH@
No.	K'	Q'	in.	in.	min.	Vi	Vf	Temp. in		Temp out					
		cfm	H_2O	Hg		ft^3	ft^3	init.	final	init.	final				
17	0.4391	0.58	0.93	19	10.00	61.231	66.725	59	60	59	60	5.584	5.889	1.055	1.524
23	0.6091	0.80	1.85	16	7.00	66.725	72.064	60	62	60	61	5.413	5.686	1.050	1.587
26	0.6905	0.92	2.40	15	6.00	72.064	77.328	62	63	61	61	5.327	5.605	1.052	1.553
														1.052	1.55

Calculations:

Vm = [Vf-Vi]

Vmstd = [(17.64)(Vm)(Pbar+ΔH/13.6)/Tm]

Vcrstd = K'[(Pbar)(θ)/(T,amb)]

Y = [(Vcrstd/Vmstd)]

Q = [(Vm/θ)(Tm out/Tm)(Y)]

K = [Q(sqrt((Pm Mm)/((Tm out)(ΔH))]

ΔH@ = [$0.921/K^2$]

Where:

Pbar = Barometric pressure; in. Hg

Tm = Average Temp. at meter, ^oR

Pm = Meter pressure, (Pbar +ΔH/13.6); in. Hg

Mm = molecular weight of air (29)

Y = Meter correction factor; dimensionless

4 L S
15 8

ANALYZER CALIBRATION RECORD

Plant	Bibler Brothers Lumber Co. Russellville, AR	Run No	1	2	3
Source	SN-7B Dry Kiln No. 1 SN-13G	Date	2-23-10	2-23-10	2-23-10
Test For	CO · NO_x · VOC	Time Start	1228	1433	1625
Operators	Russell / Norwood	Time End	1332	1539	1729

Analyte, units / Analyzer ID / Span / DAQ Channel	Level	Cal. Value	Cyl. Ref.	Diluted Y/N	Pre-Test Cal. Reading	Pre-Test % Cal. Error	Pre-Test Bias Reading	Pre-Test % Bias	Run No. 1 Reading	Run 1 % Bias	Run 1 % Drift	Run No. 2 Reading	Run 2 % Bias	Run 2 % Drift	Run No. 3 Reading	Run 3 % Bias	Run 3 % Drift
CO_2, %	Zero	0.0	N_2		0.0		0.1		0.0			0.0			0.0		
01440C1CO2/2942	Low																
18.0	Mid	9.0	1		9.1		9.0		9.0			9.0			9.0		
2	High	18.0	1		18.0												
O_2, %	Zero	0.0	N_2		0.0		0.0		0.0			0.0			0.0		
01420/B157	Low																
20.9	Mid	10.6	1		10.6		10.6		10.5			10.6			10.6		
3	High	20.9	Air														
CO, ppm	Zero	0	Air/N_2		1		1		1			1			1		
48I 0517511690	Low																
150	Mid	75	2		74		74		74								
4	High	150	2		151		151		152			145			149		
NO_x, ppm	Zero	0.2	Air/N_2		0.4		0.4		0.4			0.4			0.4		
42CHL 52482-308	Low																
65	Mid	33	2		33.4		33.4		33.2			33.6			33.6		
5	High	65	2		65.1				64.7								
C_3H_8, ppmw	Zero	0	Air		0				0			0			0		
06181171814	Low	100	3		98												
375	Mid	250	3		250												
7	High	300	3		300				304			303			302		
	Zero	~~0~~															
CO high(2)	Low	300							305						~~308~~		
VOC high(2)	Mid	525							513			525					
	High 2	~~300~~															

Cylinder Ref.	Cylinder No.	Contents	Expiration Date	Notes:
1	CC62866	10.6% O_2, 18.0% CO_2	1-18-13	
2	CC69873	533 ppm CO, 231 ppm NO	8-14-11	
3	CC236950	2003 ppm C_3H_8	1-20-12	
				ADEQ Brent Day
				Shanetta Brown

Analyst's signature: _____

Method Specifications:

Methods 3A, 6C, 7E	Method 25A
Zero < 20 % of span (can be zero)	Zero < 0.1 % of span
Mid = 40 to 60 % of span	Low = 25 to 35 % of span
High = span	Mid = 45 to 60 % of span
	High = 80 to 90 % of span

Error Specifications:

Calibration Error Allowable	< 2% of span	[((Cyl. Value - Reading) / span)* 100%]
25A Calibration Error Allowable	< 5% Cyl. Value	[(Cyl. Value - Reading) / (Cyl Value) *100%]
System Bias	< 5% span (not for 20 & 25A)	[(System Cal - Reading)/span*100]
Drift	< 3%	[(Initial System Cal. - Final System Cal.) / Span * 100%]
Method 20 Drift	< 2%	[(initial system cal. - final system cal.) / Span * 100%]

METHOD 205 - VERIFICATION OF GAS DILUTION SYSTEMS FOR FIELD INSTRUMENT CALIBRATIONS

DATE	02.22.10

PROJECT: Bibler Brothers Lumber Co. Russellville, AR
SN-7G Dry Kiln No. 3

ANALYST: D. Russell SIGNATURE: D. Russell

DILUTION SYSTEM

MAKE	Environics
MODEL	4040
NO. OF DIL. DEVICES	4
TYPE OF DIL. DEVICE	MFC

REFERENCE MONITOR

TYPE	Oxygen
MAKE	Servomex
MODEL	1400
SPAN	20.9

HIGH LEVEL SUPPLY GAS CONC.	20.9	21.0 CYLINDER ID	Zero Air
MID LEVEL SUPPLY GAS CONC.	10.6	10.6 CYLINDER ID	CC62866
DILUTION GAS	0.0	0.0 CYLINDER ID	Zero N_2

MFC No.	1								
Target Value	10.5	15.7							

Injections (Triplicate injection of 2 dilutions per MFC to be used)

1st	10.5	5.2							
2nd	10.5	5.2							
3rd	10.5	5.2							
Average	10.5								

% Difference = ((target conc. - Avg. conc.)/target conc.)*100 Must be within 2% of avg.

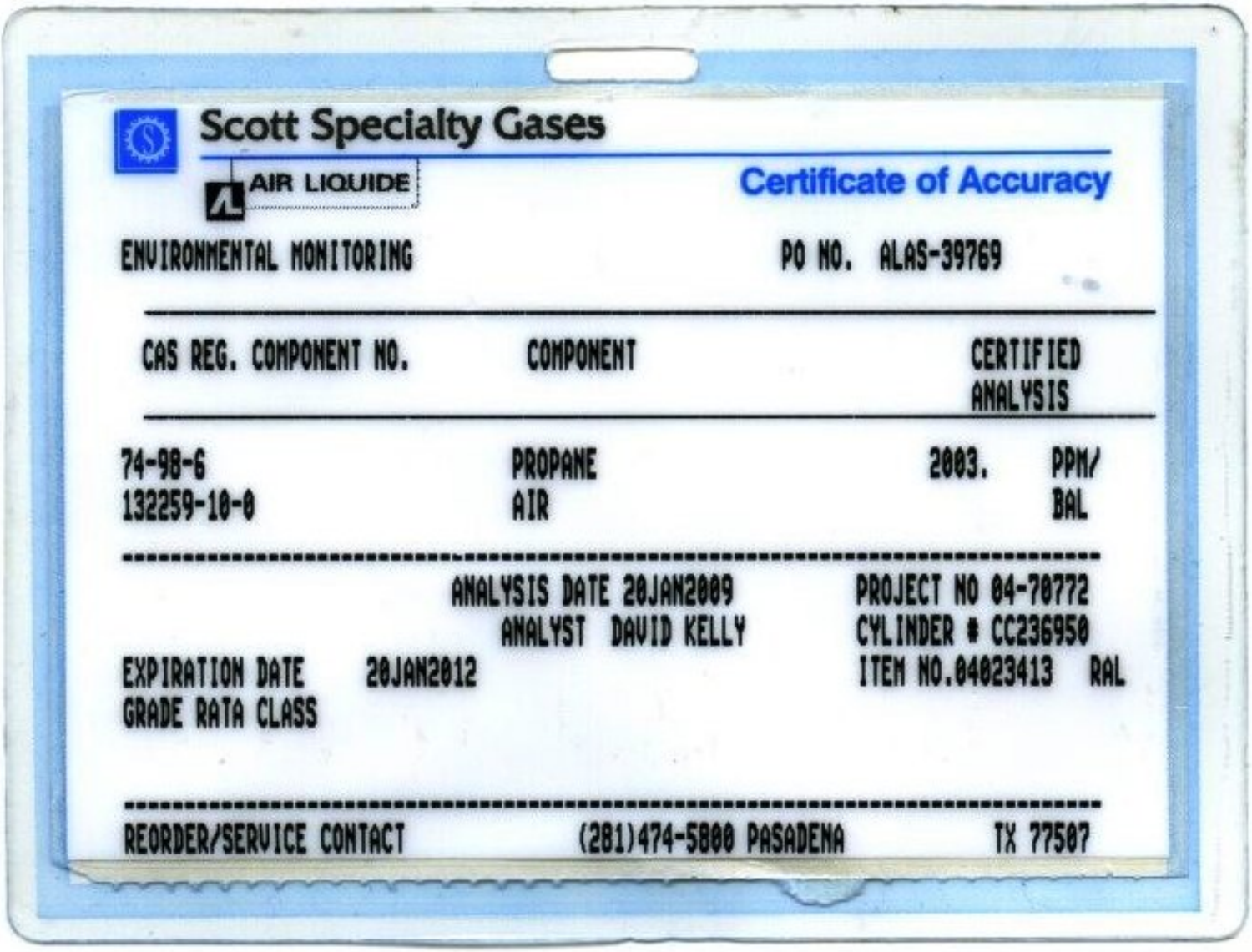
1st inject	0.0	0.0							
2nd inject	0.0	0.0							
3rd inject	0.5	1.9							

Triplicate injection of Mid Level Gas to Reference Monitor. Must be within 10% of one dilution

	Response		% Difference
1st	10.7	10.6	0.0
2nd	10.6		0.0
3rd	10.7		0.9
Average			

Average must be within +/- 2% of the certified gas concentration.

$10.5\%O_2 = 49.7\%$
$5.2\%O_2 = 25.1\%$



Scott Specialty Gases

AIR LIQUIDE

Certificate of Accuracy

ENVIRONMENTAL MONITORING

PO NO. ALAS-39769

CAS REG. NO.	COMPONENT	CERTIFIED ANALYSIS	
74-98-6	PROPANE	2003.	PPM/
132259-10-0	AIR		BAL

ANALYSIS DATE 20JAN2009
ANALYST DAVID KELLY

PROJECT NO 04-70772
CYLINDER # CC236950
ITEM NO.04023413 RAL

EXPIRATION DATE 20JAN2012
GRADE RATA CLASS

REORDER/SERVICE CONTACT (281)474-5800 PASADENA TX 77507

AIR LIQUIDE Air Liquide America Specialty Gases LLC Scott™

RATA CLASS

Dual-Analyzed Calibration Standard

9810 BAY AREA BLVD, PASADENA, TX 77507 Phone: 281-474-5800 Fax: 281-474-5857

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

Assay Laboratory

AIR LIQUIDE AMERICA SPECIALTY GASES LLC
9810 BAY AREA BLVD
PASADENA, TX 77507

P.O. No.: PT FOR 75817/005
Project No.: 04-75970-001

Customer

SCOTT SPECIALTY GASES

PT SAMPLE FOR 75817/005
TEXAS STOCK
9810 BAY AREA BLVD
PASADENA TX 77507

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: CC69873 **Certification Date:** 14Aug2009 **Exp. Date:** 14Aug2011
Cylinder Pressure*:** 1925 PSIG

COMPONENT	CERTIFIED CONCENTRATION (Moles)		ACCURACY**	TRACEABILITY
CARBON MONOXIDE	533	PPM	+/- 1%	Direct NIST and NMi
NITRIC OXIDE	231	PPM	+/- 1%	Direct NIST and NMi
NITROGEN - OXYGEN FREE		BALANCE		
TOTAL OXIDES OF NITROGEN	231.	PPM		Reference Value Only

*** Do not use when cylinder pressure is below 150 psig.
** Analytical accuracy is based on the requirements of EPA Protocol Procedure G1, September 1997.

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 1680	02Oct2011	KAL003944	499.8 PPM	CARBON MONOXIDE
NTRM 1685	01Sep2010	KAL003490	247.1 PPM	NITRIC OXIDE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
FTIR//000929060	30Jul2009	FTIR
FTIR//000929060	22Jul2009	FTIR

ANALYZER READINGS

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

First Triad Analysis

CARBON MONOXIDE
Date: 07Aug2009 Response Unit:PPM
Z1=-0.02559 R1=497.9423 T1=530.6561
R2=498.2952 Z2=0.05302 T2=531.1979
Z3=0.29869 T3=531.5201 R3=498.4028
Avg. Concentration: 532.8 PPM

NITRIC OXIDE
Date: 07Aug2009 Response Unit:PPM
Z1=0.11668 R1=247.9055 T1=231.4030
R2=247.9528 Z2=0.13153 T2=231.5606
Z3=0.23650 T3=231.7309 R3=248.0996
Avg. Concentration: 230.7 PPM

Second Triad Analysis

CARBON MONOXIDE
Date: 14Aug2009 Response Unit: PPM
Z1=0.05927 R1=499.0558 T1=531.7112
R2=499.1940 Z2=0.34003 T2=531.8007
Z3=0.36888 T3=531.9143 R3=499.8740
Avg. Concentration: 532.3 PPM

NITRIC OXIDE
Date: 14Aug2009 Response Unit: PPM
Z1=-0.10916 R1=247.7431 T1=231.0357
R2=247.8270 Z2=0.03752 T2=231.2556
Z3=0.09872 T3=231.2913 R3=247.9764
Avg. Concentration: 230.5 PPM

Calibration Curve

Concentration=A+Bx+Cx2+Dx3+Ex4
r=9.99999E-1
Constants: A=0.00000E+0
B=4.40768E-1 C=1.88000E-4
D=0.00000E+0 E=0.00000E+0

Concentration=A+Bx+Cx2+Dx3+Ex4
r=9.99997E-1
Constants: A=0.00000E+0
B=6.85076E-1 C=9.00000E-5
D=0.00000E+0 E=0.00000E+0

Special Notes: LOT# PAS01143

APPROVED BY: GARY WRIGHT

AIR LIQUIDE Air Liquide America Specialty Gases LLC SCOTT™

RATA CLASS

Dual-Analyzed Calibration Standard

11426 FAIRMONT PKWY, LA PORTE, TX 77571 Phone: 800-248-1427 Fax: 281-474-8419

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

Assay Laboratory

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

P.O. No.: DANIEL RUSSELL
Project No.: 04-79685-001

Customer

ENVIRONMENTAL MONITORING
DANIEL RUSSELL
624 RIDGEWOOD ROAD
RIDGELAND MS 39157

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: CC62866 **Certification Date:** 18Jan2010 **Exp. Date:** 18Jan2013
Cylinder Pressure*:** 1850 PSIG **Batch No:** LAP0007769

COMPONENT	CERTIFIED CONCENTRATION (Moles)	ANALYTICAL ACCURACY**	TRACEABILITY
CARBON DIOXIDE	18.0 %	+/- 1%	Direct NIST and VSL
OXYGEN	10.6 %	+/- 1%	
NITROGEN	BALANCE		

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

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

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 1800	01Mar2013	K017950	17.87 %	CARBON DIOXIDE
NTRM 2350	01Apr2012	A6820	23.51 %	OXYGEN

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
FTIR//000929060	29Dec2009	FTIR
BIG SERVOMEX/1101-4605C/4605C	07Jan2010	PARAMAGNETIC

ANALYZER READINGS

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

First Triad Analysis **Second Triad Analysis** **Calibration Curve**

CARBON DIOXIDE

Date: 18Jan2010 Response Unit: %

Z1 = 0.00128	R1 = 17.80599	T1 = 17.93424
R2 = 17.80674	Z2 = 0.01667	T2 = 17.95282
Z3 = 0.02127	T3 = 17.96406	R3 = 17.82594

Avg. Concentration: 18.01 %

Concentration = A + Bx + Cx2 + Dx3 + Ex4
r = 9.99997E-1

Constants:	A = 0.00000E+0
B = 5.93692E-1	C = 4.32000E-3
D = 0.00000E+0	E = 0.00000E+0

OXYGEN

Date: 20Jan2010 Response Unit: %

Z1 = 0.00000	R1 = 23.51000	T1 = 10.65000
R2 = 23.50000	Z2 = 0.00000	T2 = 10.63000
Z3 = 0.00000	T3 = 10.63000	R3 = 23.50000

Avg. Concentration: 10.59 %

Concentration = A + Bx + Cx2 + Dx3 + Ex4
r = 0.9999882

Constants:	A = -0.02610467
B = 0.998931428	C =
D =	E =

Special Notes: CERTS AND TAGS: doc#35825224 ENVIRONMENTAL MONITORING

APPROVED BY: DAVID KELLY

APPENDIX C

ANALYZERS DATA LOG

Time	% CO2	% O2	ppm CO	ppm Nox	ppmw C3
02/22/10 17:31	0.0	2.2	1.6	-0.4	-0.1
02/22/10 17:32	0.0	9.8	1.8	-0.5	-0.1
02/22/10 17:33	0.0	21.9	1.8	-0.6	-0.1
02/22/10 17:34	0.0	21.1	1.8	-0.6	-0.1
02/22/10 17:35	0.0	21.0	1.8	-0.5	-0.1
02/22/10 17:36	0.0	21.0	1.8	-0.5	-0.1
02/22/10 17:37	0.0	16.2	1.6	-0.4	-0.1
02/22/10 17:38	0.0	10.6	1.5	-0.5	-0.1
02/22/10 17:39	0.0	6.7	1.4	-0.5	-0.1
02/22/10 17:40	0.0	6.2	1.5	-0.5	-0.1
02/22/10 17:41	0.0	10.5	1.5	-0.6	-0.1
02/22/10 17:42	0.0	5.1	1.6	-0.6	-0.1
02/22/10 17:43	0.0	7.7	1.6	-0.5	-0.1
02/22/10 17:44	0.0	10.7	1.6	-0.4	-0.1
02/22/10 17:45	0.0	9.3	1.6	-0.4	-0.1
02/22/10 17:46	0.0	5.2	1.7	-0.4	-0.1
02/22/10 17:47	7.8	11.4	1.4	-0.4	-0.1
02/22/10 17:48	16.9	10.7	1.1	-0.5	-0.1
02/22/10 17:49	8.6	15.5	1.3	-0.5	-0.2
02/22/10 17:50	17.1	10.9	1.0	-0.5	-0.2
02/22/10 17:51	12.0	13.2	1.3	-0.4	-0.2
02/22/10 17:52	14.3	13.1	1.1	-0.5	-0.2
02/22/10 17:53	17.0	10.9	1.1	-0.5	-0.2
02/22/10 17:54	10.3	14.2	1.4	-0.5	-0.2
02/22/10 17:55	1.0	20.3	1.8	-0.6	-0.2
02/22/10 17:56	0.2	21.0	1.8	-0.9	-0.2
02/22/10 17:57	0.1	21.1	1.9	-0.6	-0.2
02/23/10 7:32	0.1	20.9	6.0	-0.1	0.7
02/23/10 11:52	0.1	20.8	1.2	0.2	-0.5
02/23/10 11:53	0.1	20.8	1.1	0.2	-0.5
02/23/10 11:54	0.1	20.8	1.2	0.2	-0.3
02/23/10 11:55	0.1	20.8	1.2	0.2	-0.1
02/23/10 11:56	0.1	20.8	1.2	0.2	-0.3
02/23/10 11:57	0.1	20.8	1.1	0.2	-0.4
02/23/10 11:58	0.1	20.8	1.2	0.2	-0.2
02/23/10 11:59	0.1	20.9	1.1	0.2	-0.2
02/23/10 12:00	0.1	20.9	1.3	0.2	-0.1
02/23/10 12:01	0.1	20.9	1.2	0.2	-0.4
02/23/10 12:02	0.1	20.9	1.3	0.2	1.0
02/23/10 12:03	0.1	20.8	1.6	0.2	-0.2
02/23/10 12:04	0.1	20.9	1.2	0.2	-0.2
02/23/10 12:05	0.1	20.8	1.2	0.2	-0.3
02/23/10 12:06	0.1	20.8	1.4	0.2	2.5
02/23/10 12:07	1.1	19.9	23.4	1.8	104.1
02/23/10 12:08	4.3	16.5	63.7	3.9	134.6
02/23/10 12:09	4.2	16.5	62.6	3.8	133.5
02/23/10 12:10	4.1	16.6	61.5	4.0	133.8
02/23/10 12:11	4.0	16.7	60.7	4.3	135.3
02/23/10 12:12	4.0	16.7	61.6	4.6	139.7
02/23/10 12:13	4.0	16.7	62.5	4.5	140.2
02/23/10 12:14	4.0	16.8	63.1	4.3	141.8
02/23/10 12:15	3.9	16.8	64.0	3.9	142.2
02/23/10 12:16	3.9	16.9	64.8	3.6	143.0
02/23/10 12:17	3.8	17.0	65.4	3.4	144.3
02/23/10 12:18	3.8	17.0	66.8	3.3	148.9
02/23/10 12:19	3.8	17.0	69.6	3.3	154.3
02/23/10 12:20	3.7	17.1	68.9	3.3	152.3
02/23/10 12:21	3.8	17.0	75.0	3.6	162.9
02/23/10 12:22	3.8	17.0	76.1	3.4	164.3
02/23/10 12:23	3.8	17.0	77.8	3.2	168.4
02/23/10 12:24	3.7	17.1	78.7	3.0	169.6
02/23/10 12:25	3.7	17.1	79.9	2.9	170.9
02/23/10 12:26	3.7	17.2	80.4	2.8	172.1
02/23/10 12:27	3.6	17.2	80.7	2.8	173.2

START RUN 1	% CO2	% O2	ppm CO	ppm NOx	ppmw C3
02/23/10 12:28	3.7	17.2	84.7	2.9	193.2
02/23/10 12:29	4.2	16.7	102.3	3.3	234.4
02/23/10 12:30	5.0	15.8	129.2	4.0	277.5
02/23/10 12:31	5.6	15.2	145.3	4.7	300.6
02/23/10 12:32	5.8	14.8	152.5	5.2	316.4
02/23/10 12:33	5.9	14.7	155.5	5.7	326.7
02/23/10 12:34	6.0	14.6	157.5	6.0	334.6
02/23/10 12:35	6.0	14.6	157.6	6.2	340.1
02/23/10 12:36	5.9	14.7	157.6	5.9	341.4
02/23/10 12:37	5.8	14.8	157.8	5.5	340.2
02/23/10 12:38	5.8	14.9	157.7	5.2	342.1
02/23/10 12:39	5.7	15.0	158.4	4.9	347.6
02/23/10 12:40	5.6	15.0	159.4	4.6	353.2
02/23/10 12:41	5.6	15.1	160.7	4.6	357.1
02/23/10 12:42	5.5	15.1	160.6	4.6	359.2
02/23/10 12:43	5.5	15.2	161.8	4.6	362.4

02/23/10 12:44	5.5	15.2	164.2	4.4	367.9
02/23/10 12:45	5.5	15.2	168.2	4.4	375.1
02/23/10 12:46	5.5	15.2	170.1	4.2	372.6
02/23/10 12:47	5.4	15.2	170.6	4.1	372.6
02/23/10 12:48	5.4	15.3	171.5	4.0	380.1
02/23/10 12:49	5.4	15.3	174.1	4.1	386.6
02/23/10 12:50	5.4	15.3	175.4	4.2	391.1
02/23/10 12:51	5.4	15.3	175.3	4.2	396.0
02/23/10 12:52	5.3	15.3	175.4	4.2	396.7
02/23/10 12:53	5.2	15.4	172.6	4.3	388.1
02/23/10 12:54	5.1	15.6	168.6	4.4	386.8
02/23/10 12:55	5.0	15.7	166.1	4.6	394.3
02/23/10 12:56	5.1	15.6	171.2	4.4	400.5
02/23/10 12:57	5.1	15.5	173.2	4.2	402.5
02/23/10 12:58	5.1	15.6	173.8	4.0	408.3
02/23/10 12:59	5.1	15.5	179.2	3.9	414.3
02/23/10 13:00	5.1	15.6	179.2	3.6	412.6
02/23/10 13:01	5.0	15.6	181.4	3.5	423.7
02/23/10 13:02	5.2	15.5	190.5	3.4	437.5
02/23/10 13:03	5.2	15.4	191.3	3.4	439.2
02/23/10 13:04	5.1	15.5	192.0	3.4	432.6
02/23/10 13:05	5.2	15.5	197.8	3.4	444.2
02/23/10 13:06	5.3	15.3	205.2	3.6	454.2
02/23/10 13:07	5.4	15.3	210.7	3.5	461.3
02/23/10 13:08	5.4	15.3	211.1	3.4	457.8
02/23/10 13:09	5.3	15.3	211.9	3.4	464.5
02/23/10 13:10	5.4	15.3	217.3	3.6	474.3
02/23/10 13:11	5.4	15.2	219.5	3.6	475.7
02/23/10 13:12	5.4	15.3	219.8	3.6	478.0
02/23/10 13:13	5.3	15.3	218.9	3.6	479.9
02/23/10 13:14	5.2	15.4	217.0	3.6	481.0
02/23/10 13:15	5.2	15.5	216.0	3.7	479.4
02/23/10 13:16	5.2	15.5	219.2	3.5	486.3
02/23/10 13:17	5.2	15.4	220.3	3.4	485.7
02/23/10 13:18	5.2	15.5	221.1	3.3	491.9
02/23/10 13:19	5.2	15.4	225.0	3.3	496.0
02/23/10 13:20	5.2	15.5	223.4	3.3	500.5
02/23/10 13:21	5.2	15.4	225.1	3.5	501.9
02/23/10 13:22	5.2	15.5	225.9	3.5	501.5
02/23/10 13:23	5.1	15.6	224.3	3.4	505.2
02/23/10 13:24	5.2	15.5	231.5	3.4	523.7
02/23/10 13:25	5.3	15.4	234.0	3.4	522.8
02/23/10 13:26	5.2	15.4	233.6	3.5	531.3
02/23/10 13:27	5.2	15.4	233.2	3.6	528.0
AVG R 1	5.3	15.4	185.1	4.0	412.2
02/23/10 13:28	5.2	15.4	235.8	3.6	536.7
02/23/10 13:29	5.0	15.6	218.1	3.6	452.1
02/23/10 13:30	4.0	16.7	169.8	3.1	378.4
02/23/10 13:31	3.3	17.4	143.0	2.7	344.6
02/23/10 13:32	3.1	17.7	133.3	2.6	336.3
02/23/10 13:33	2.9	17.8	124.0	2.5	313.1
02/23/10 13:34	2.6	18.1	113.2	2.3	295.1
02/23/10 13:35	2.0	18.5	70.4	1.7	93.3
02/23/10 13:36	0.1	13.5	1.7	0.6	10.1
02/23/10 13:37	0.0	0.0	1.0	0.6	6.5
02/23/10 13:38	0.0	-0.1	1.0	0.6	4.6
02/23/10 13:39	0.0	0.1	1.0	0.4	4.2
02/23/10 13:40	8.0	11.3	0.8	0.4	2.1
02/23/10 13:41	17.7	10.5	0.4	0.4	1.5
02/23/10 13:42	17.8	10.5	0.4	0.4	1.0
02/23/10 13:43	16.6	11.0	0.5	0.4	1.0
02/23/10 13:44	9.3	15.3	0.7	0.4	0.8
02/23/10 13:45	9.0	15.6	0.7	0.4	0.6
02/23/10 13:46	9.0	15.6	0.7	0.4	0.5
02/23/10 13:47	9.0	15.7	0.7	0.4	0.4
02/23/10 13:48	8.9	15.7	0.7	0.4	1.1
02/23/10 13:49	2.3	19.1	20.1	4.0	1.6
02/23/10 13:50	0.2	17.9	71.9	27.3	0.5
02/23/10 13:51	0.1	17.8	72.8	31.5	0.3
02/23/10 13:52	0.1	17.8	74.1	31.9	0.3
02/23/10 13:53	0.1	17.5	99.7	42.7	0.1
02/23/10 13:54	0.1	15.1	152.1	63.1	0.0
02/23/10 13:55	0.1	15.0	153.2	63.8	0.0
02/23/10 13:56	0.1	15.0	153.6	64.0	-0.1
02/23/10 13:57	0.1	15.0	153.9	64.5	-0.2
02/23/10 13:58	0.1	15.0	154.0	64.6	-0.2
02/23/10 13:59	0.1	15.0	154.3	64.6	-0.2
02/23/10 14:00	0.1	15.0	154.6	64.6	-0.3
02/23/10 14:01	0.1	15.0	154.5	64.6	-0.3
02/23/10 14:02	0.1	15.0	154.6	64.7	-0.3
02/23/10 14:03	0.1	15.0	154.7	64.6	-0.3
02/23/10 14:04	0.1	15.0	154.9	64.6	-0.4
02/23/10 14:05	0.1	15.0	154.8	64.8	-0.5
02/23/10 14:06	0.1	15.0	154.7	64.7	-0.5

02/23/10 14:07	0.1	15.0	154.9	64.7	-0.5
02/23/10 14:08	0.1	15.0	152.4	64.8	-0.5
02/23/10 14:09	0.1	15.0	151.3	65.0	-0.5
02/23/10 14:10	0.1	15.0	151.4	65.0	-0.5
02/23/10 14:11	0.1	15.0	151.6	65.0	-0.5
02/23/10 14:12	0.1	15.0	151.6	64.9	-0.5
02/23/10 14:13	0.1	14.2	203.0	84.3	-0.7
02/23/10 14:14	0.1	9.1	311.2	131.5	-0.8
02/23/10 14:15	0.1	9.0	311.4	131.4	-0.8
02/23/10 14:16	0.1	9.0	311.7	131.7	-0.8
02/23/10 14:17	0.1	9.0	311.8	131.8	-0.8
02/23/10 14:18	0.1	9.0	306.1	132.0	-0.9
02/23/10 14:19	0.1	9.2	266.9	117.4	4.3
02/23/10 14:20	0.1	18.5	34.6	24.5	395.7
02/23/10 14:21	0.1	20.5	3.2	2.7	541.3
02/23/10 14:22	0.0	20.8	2.5	1.3	404.7
02/23/10 14:23	0.1	20.8	1.4	0.8	289.8
02/23/10 14:24	0.1	20.9	1.2	0.4	465.0
02/23/10 14:25	0.1	20.9	1.3	0.4	516.3
02/23/10 14:26	2.7	18.6	163.7	2.8	541.3
02/23/10 14:27	5.3	15.6	255.5	4.0	521.0
02/23/10 14:28	5.3	15.6	255.4	3.7	502.0
02/23/10 14:29	5.3	15.5	254.9	3.6	466.5
02/23/10 14:30	5.2	15.6	250.3	3.6	431.8
02/23/10 14:31	5.2	15.6	248.3	3.5	449.6
02/23/10 14:32	5.2	15.6	247.8	3.4	473.1
02/23/10 14:33	5.1	15.7	247.4	3.4	455.1
02/23/10 14:34	5.2	15.6	249.8	3.4	439.7

START RUN 2	% CO2	% O2	ppm CO	ppm NOx	ppmw C3
02/23/10 14:35	5.2	15.6	248.9	3.3	421.6
02/23/10 14:36	5.2	15.6	248.4	3.4	417.4
02/23/10 14:37	5.2	15.6	248.0	3.4	461.3
02/23/10 14:38	5.2	15.6	247.2	3.4	457.9
02/23/10 14:39	5.2	15.6	246.4	3.4	464.5
02/23/10 14:40	5.2	15.6	245.6	3.2	474.3
02/23/10 14:41	5.2	15.6	241.3	3.2	445.7
02/23/10 14:42	5.2	15.7	239.4	3.2	471.0
02/23/10 14:43	5.2	15.7	239.8	3.2	496.1
02/23/10 14:44	5.1	15.8	233.5	3.2	484.2
02/23/10 14:45	5.1	15.8	231.5	3.2	471.6
02/23/10 14:46	5.1	15.8	232.6	3.2	469.0
02/23/10 14:47	5.2	15.7	233.2	3.2	466.1
02/23/10 14:48	5.2	15.7	231.6	3.2	422.4
02/23/10 14:49	5.2	15.7	230.0	3.2	459.8
02/23/10 14:50	5.1	15.8	226.0	3.2	461.2
02/23/10 14:51	5.1	15.8	222.5	3.2	461.8
02/23/10 14:52	5.1	15.8	222.6	3.2	463.9
02/23/10 14:53	5.1	15.8	222.1	3.2	477.2
02/23/10 14:54	5.1	15.8	221.3	3.2	474.0
02/23/10 14:55	5.1	15.8	221.4	3.2	466.1
02/23/10 14:56	5.1	15.8	219.1	3.2	440.2
02/23/10 14:57	5.1	15.8	218.7	3.2	334.7
02/23/10 14:58	5.0	15.9	217.3	3.2	514.1
02/23/10 14:59	5.0	15.9	216.3	3.2	510.6
02/23/10 15:00	5.0	15.9	214.4	3.2	505.3
02/23/10 15:01	4.9	16.0	212.9	3.2	501.1
02/23/10 15:02	4.9	16.0	211.9	3.2	505.1
02/23/10 15:03	5.0	15.9	217.4	3.4	515.1
02/23/10 15:04	5.1	15.7	222.6	3.5	509.8
02/23/10 15:05	5.1	15.8	219.4	3.6	508.1
02/23/10 15:06	5.0	15.8	219.2	3.6	506.5
02/23/10 15:07	5.0	15.9	218.1	3.8	503.3
02/23/10 15:08	5.0	15.9	219.1	3.8	500.6
02/23/10 15:09	5.0	15.9	217.7	3.8	497.2
02/23/10 15:10	5.0	15.9	218.7	4.0	506.2
02/23/10 15:11	5.1	15.8	221.2	4.2	500.5
02/23/10 15:12	5.1	15.8	218.9	4.4	498.4
02/23/10 15:13	5.1	15.8	218.3	4.4	495.7
02/23/10 15:14	5.1	15.8	218.4	4.2	491.9
02/23/10 15:15	5.1	15.8	219.5	4.2	493.4
02/23/10 15:16	5.1	15.8	219.4	4.2	495.2
02/23/10 15:17	5.2	15.7	223.7	4.4	496.0
02/23/10 15:18	5.2	15.7	224.4	4.4	504.8
02/23/10 15:19	5.3	15.6	226.2	4.4	500.6
02/23/10 15:20	5.2	15.7	221.9	4.4	500.5
02/23/10 15:21	5.2	15.7	219.5	4.2	497.7
02/23/10 15:22	5.2	15.7	217.5	4.2	497.4
02/23/10 15:23	5.2	15.7	217.2	4.0	495.7
02/23/10 15:24	5.2	15.7	216.4	4.1	497.3
02/23/10 15:25	5.2	15.7	214.5	4.2	498.0
02/23/10 15:26	5.2	15.7	211.7	4.2	490.8
02/23/10 15:27	5.3	15.6	210.5	4.2	490.2
02/23/10 15:28	5.2	15.7	205.6	4.1	484.9
02/23/10 15:29	5.2	15.7	206.2	4.0	494.2

02/23/10 15:30	5.3	15.6	207.9	4.2	494.2
02/23/10 15:31	5.4	15.5	208.1	4.2	496.3
02/23/10 15:32	5.4	15.5	207.0	4.2	491.8
02/23/10 15:33	5.3	15.5	205.0	4.1	492.5
02/23/10 15:34	5.3	15.5	203.7	4.0	487.1
AVG R 2	5.1	15.7	222.6	3.7	482.2
02/23/10 15:35	5.3	15.6	203.5	4.0	498.0
02/23/10 15:36	5.3	15.5	203.9	4.0	499.1
02/23/10 15:37	3.7	12.8	111.7	3.0	105.7
02/23/10 15:38	0.1	0.3	1.5	1.0	14.9
02/23/10 15:39	0.0	0.1	1.1	0.8	9.3
02/23/10 15:40	0.0	0.1	1.1	0.8	6.3
02/23/10 15:41	0.1	5.6	1.3	0.6	7.7
02/23/10 15:42	0.1	20.3	2.1	0.6	7.6
02/23/10 15:43	0.1	20.7	2.2	0.6	8.6
02/23/10 15:44	3.3	19.2	1.8	0.6	8.2
02/23/10 15:45	17.2	10.9	0.6	0.5	1.6
02/23/10 15:46	17.8	10.6	0.6	0.4	1.8
02/23/10 15:47	11.6	13.7	0.7	0.4	1.3
02/23/10 15:48	9.0	15.5	0.7	0.4	1.1
02/23/10 15:49	9.0	15.6	0.7	0.4	2.2
02/23/10 15:50	2.6	17.8	62.1	26.3	1.6
02/23/10 15:51	0.2	15.5	146.0	63.7	0.9
02/23/10 15:52	0.1	15.5	147.1	65.0	0.6
02/23/10 15:53	0.1	15.4	147.4	65.2	0.6
02/23/10 15:54	0.1	15.5	147.5	65.4	0.6
02/23/10 15:55	0.1	15.4	147.8	65.4	0.3
02/23/10 15:56	0.1	15.3	147.6	65.4	0.3
02/23/10 15:57	0.1	15.3	148.7	65.4	0.3
02/23/10 15:58	0.1	16.0	118.1	48.7	5.7
02/23/10 15:59	0.1	18.2	71.9	33.5	0.3
02/23/10 16:00	0.1	18.8	42.6	16.7	5.0
02/23/10 16:01	0.1	20.9	2.4	0.8	6.2
02/23/10 16:02	0.1	20.6	8.5	5.3	308.8
02/23/10 16:03	0.1	20.7	2.4	1.1	520.6
02/23/10 16:04	0.1	20.8	1.2	0.6	523.4
02/23/10 16:05	0.1	20.8	1.2	0.6	524.9
02/23/10 16:06	0.1	20.8	2.6	0.6	363.5
02/23/10 16:07	0.1	20.8	1.4	0.6	303.5
02/23/10 16:08	0.1	20.9	1.2	0.4	303.6
02/23/10 16:09	0.1	20.9	1.2	0.4	303.5
02/23/10 16:10	0.1	20.9	1.2	0.4	303.5
02/23/10 16:11	0.1	20.9	1.2	0.4	132.5
02/23/10 16:12	0.1	20.9	2.5	0.6	10.1
02/23/10 16:13	0.1	20.8	2.6	0.6	10.9
02/23/10 16:14	1.1	20.1	55.0	1.7	365.5
02/23/10 16:15	4.8	16.2	187.7	5.2	477.5
02/23/10 16:16	5.2	15.7	201.3	5.5	468.5
02/23/10 16:17	5.3	15.4	208.6	5.7	460.6
02/23/10 16:18	5.3	15.5	208.7	5.7	462.4
02/23/10 16:19	5.4	15.4	213.7	5.5	467.5
02/23/10 16:20	5.4	15.3	216.2	5.3	467.3
02/23/10 16:21	5.4	15.4	215.2	5.0	460.8
02/23/10 16:22	5.4	15.4	214.6	4.8	456.0
02/23/10 16:23	5.3	15.5	212.7	4.7	449.2
02/23/10 16:24	5.3	15.5	210.9	4.7	455.2

START RUN 3	% CO2	% O2	ppm CO	ppm NOx	ppmw C3
02/23/10 16:25	5.3	15.5	210.7	4.6	452.0
02/23/10 16:26	5.3	15.5	211.1	4.7	454.4
02/23/10 16:27	5.3	15.5	210.8	4.7	447.2
02/23/10 16:28	5.3	15.5	211.8	4.7	443.7
02/23/10 16:29	5.3	15.5	209.8	4.5	450.1
02/23/10 16:30	5.3	15.5	210.5	4.6	453.1
02/23/10 16:31	5.3	15.5	210.7	4.5	451.7
02/23/10 16:32	5.3	15.5	211.9	4.6	449.2
02/23/10 16:33	5.3	15.5	211.2	4.7	449.1
02/23/10 16:34	5.3	15.5	210.5	4.7	448.1
02/23/10 16:35	5.3	15.5	210.7	4.7	447.6
02/23/10 16:36	5.3	15.5	209.8	4.7	441.8
02/23/10 16:37	5.3	15.5	207.6	4.7	435.7
02/23/10 16:38	5.3	15.5	207.0	4.7	437.3
02/23/10 16:39	5.3	15.5	206.5	4.7	435.7
02/23/10 16:40	5.2	15.6	204.5	4.8	438.3
02/23/10 16:41	5.3	15.5	205.7	4.8	425.9
02/23/10 16:42	5.2	15.6	204.1	4.8	430.0
02/23/10 16:43	5.3	15.5	206.1	4.8	440.3
02/23/10 16:44	5.3	15.5	206.6	4.8	440.0
02/23/10 16:45	5.3	15.5	204.8	4.8	436.9
02/23/10 16:46	5.3	15.5	207.0	4.8	443.7
02/23/10 16:47	5.3	15.5	208.0	4.8	438.6
02/23/10 16:48	5.3	15.5	207.9	4.8	438.2
02/23/10 16:49	5.4	15.5	210.7	4.8	438.2
02/23/10 16:50	5.3	15.6	206.2	4.8	432.2
02/23/10 16:51	5.3	15.5	207.4	4.8	437.5

02/23/10 16:52	5.3	15.5	208.3	4.8	436.4
02/23/10 16:53	5.3	15.6	205.6	4.8	434.9
02/23/10 16:54	5.2	15.6	202.0	4.8	427.7
02/23/10 16:55	5.2	15.7	197.8	4.9	422.1
02/23/10 16:56	5.1	15.8	193.7	5.1	418.9
02/23/10 16:57	5.1	15.8	193.7	5.3	419.0
02/23/10 16:58	5.0	15.9	189.8	5.5	413.9
02/23/10 16:59	5.0	15.9	188.8	5.6	415.4
02/23/10 17:00	5.1	15.9	188.0	5.6	410.7
02/23/10 17:01	5.0	16.0	186.6	5.6	410.0
02/23/10 17:02	5.0	15.9	186.5	5.6	409.9
02/23/10 17:03	5.0	16.0	183.9	5.4	402.5
02/23/10 17:04	5.0	16.1	182.2	5.4	403.4
02/23/10 17:05	4.9	16.1	179.6	5.4	396.2
02/23/10 17:06	4.9	16.2	176.1	5.2	393.4
02/23/10 17:07	4.9	16.2	175.4	5.3	394.1
02/23/10 17:08	4.8	16.3	174.0	5.2	394.5
02/23/10 17:09	4.9	16.3	174.8	5.2	393.0
02/23/10 17:10	4.9	16.4	174.5	5.2	391.9
02/23/10 17:11	4.9	16.4	174.6	5.1	395.8
02/23/10 17:12	4.9	16.3	175.7	5.1	391.1
02/23/10 17:13	4.9	16.4	175.8	5.0	389.5
02/23/10 17:14	4.9	16.6	175.5	5.0	390.7
02/23/10 17:15	4.9	16.6	177.3	5.0	391.4
02/23/10 17:16	5.0	16.4	178.8	5.0	392.0
02/23/10 17:17	5.1	16.3	184.6	5.1	410.5
02/23/10 17:18	5.3	15.9	192.1	5.2	414.4
02/23/10 17:19	5.4	15.8	194.0	5.2	414.0
02/23/10 17:20	5.4	15.8	194.1	5.1	414.2
02/23/10 17:21	5.5	15.7	195.2	5.0	415.0
02/23/10 17:22	5.5	15.6	195.3	5.0	412.5
02/23/10 17:23	5.5	15.6	194.5	5.1	409.5
02/23/10 17:24	5.5	15.5	194.9	5.2	413.4
AVG R 3	5.2	15.8	196.6	5.0	423.0
02/23/10 17:25	5.5	15.5	196.0	5.2	414.2
02/23/10 17:26	5.5	15.6	194.8	5.2	413.8
02/23/10 17:27	5.5	15.5	196.0	5.4	412.6
02/23/10 17:28	5.5	15.6	193.7	5.4	410.3
02/23/10 17:29	5.5	15.7	193.7	5.4	416.9
02/23/10 17:30	5.5	15.8	194.0	5.6	416.4
02/23/10 17:31	5.4	15.9	191.9	5.6	414.6
02/23/10 17:32	5.4	15.8	189.7	5.6	413.0
02/23/10 17:33	3.6	12.6	104.2	3.8	69.4
02/23/10 17:34	0.1	0.2	1.3	1.1	11.6
02/23/10 17:35	0.0	0.0	1.0	0.9	8.1
02/23/10 17:36	0.0	0.0	1.0	0.8	7.9
02/23/10 17:37	8.6	8.8	0.8	0.8	4.0
02/23/10 17:38	17.7	11.0	0.4	0.8	2.9
02/23/10 17:39	17.7	10.9	0.4	0.8	1.8
02/23/10 17:40	16.2	11.2	0.5	0.6	1.7
02/23/10 17:41	9.2	15.4	0.7	0.6	1.3
02/23/10 17:42	9.0	15.6	0.7	0.6	1.1
02/23/10 17:43	9.0	15.6	0.7	0.6	0.9
02/23/10 17:44	9.0	15.6	0.7	0.7	0.9
02/23/10 17:45	9.0	15.7	0.7	0.7	0.9
02/23/10 17:46	3.0	18.9	0.8	0.7	2.0
02/23/10 17:47	1.0	20.0	34.5	15.4	1.3
02/23/10 17:48	0.2	15.2	144.7	63.7	0.6
02/23/10 17:49	0.1	15.0	147.1	65.6	0.5
02/23/10 17:50	0.1	15.0	147.6	65.9	0.3
02/23/10 17:51	0.1	15.0	148.7	66.3	0.3
02/23/10 17:52	0.1	14.2	197.2	86.3	0.1
02/23/10 17:53	0.1	9.2	308.3	134.0	0.0
02/23/10 17:54	0.1	9.1	308.7	134.6	0.0
02/23/10 17:55	0.1	9.0	308.8	134.6	0.0
02/23/10 17:56	0.1	9.0	308.9	134.7	0.0
02/23/10 17:57	0.1	9.0	308.9	135.0	-0.2
02/23/10 17:58	0.1	9.0	308.5	131.6	3.8
02/23/10 17:59	0.1	14.5	126.1	44.3	4.0
02/23/10 18:00	0.1	17.8	72.6	34.4	0.1
02/23/10 18:01	0.1	17.8	74.3	34.2	0.0
02/23/10 18:02	0.1	17.9	74.0	34.0	0.0
02/23/10 18:03	0.1	17.9	73.5	33.7	0.0
02/23/10 18:04	0.1	17.9	73.5	33.7	0.0
02/23/10 18:05	0.1	17.9	73.6	33.7	0.0
02/23/10 18:06	0.1	17.9	73.5	33.6	0.0
02/23/10 18:07	0.1	17.9	73.6	33.7	0.0
02/23/10 18:08	0.1	19.0	34.9	13.8	210.9
02/23/10 18:09	0.1	20.8	2.2	1.0	268.2
02/23/10 18:10	0.1	20.9	1.2	0.6	1.4
02/23/10 18:11	0.1	20.9	1.0	0.6	0.8
02/23/10 18:12	0.1	20.9	0.8	0.4	0.4
02/23/10 18:13	0.1	20.9	0.9	0.4	0.2

APPENDIX D

OPERATING RECORDS

(BIBLER BROS.)

Date	Tuesday, February 23, 2010

Kiln Three (SN 7G)		
	Lumber Pushed	Sawdust in lbs/hr
Test 1	11,304	5,549
Test 2	11,304	5,420
Test 3	11,304	5,375
	33,912	16,344

Kiln One (SN 13G)		
	Lumber Pushed	Sawdust in lbs/hr
Test 1	11,018	5,294
Test 2	11,018	5,372
Test 3	11,018	5,232
	33,054	15,898

APPENDIX E

FORMALDEHYDE ANALYSIS

(ENTHALPY)

This Appendix contains the first 13 pages of a 58 page report prepared by Enthalpy Analytical. The remaining pages are copies of spectra. The entire report can be provided upon request

Environmental Monitoring Labs

624 Ridgewood Rd.
Ridgeland, MS 39158

Bilbler Brothers - Kiln 1
Russellville, AR

Analytical Report
(0210-110)

EPA Method 316 & 316-Type
Formaldehyde

Enthalpy Analytical, Inc.
Phone: (919) 850 - 4392 / Fax: (919) 850 - 9012 / www.enthalpy.com
2202 Ellis Road Durham, NC 27703 - 5518

I certify that to the best of my knowledge all analytical data presented in this report:

- Have been checked for completeness
- Are accurate, error-free, and legible
- Have been conducted in accordance with approved protocol, and that all deviations and analytical problems are summarized in the appropriate narrative(s)

This analytical report was prepared in Portable Document Format (.PDF) and contains 36 pages.

Valgena Respass

QA Review Performed by – Valgena Respass

Summary of Results

Company	EML
Analyst	EO
Parameters	EPA Method 316
# Samples	6 Runs & 1 blank

Client #	Bilbler Brothers - Kiln 1
Job #	0210-110
PO #	Verbal
Report Date	3/12/2010

Compound	Sample ID / Catch Weight (µg)		
	Kiln 1 HCNO R1	***Kiln 1 HCNO R2***	***Kiln 1 HCNO R3***
Formaldehyde	14,720	26,402	27,122
	Kiln 1 HCNO (PM) R1	***Kiln 1 HCNO (PM) R2***	***Kiln 1 HCNO (PM) R3***
Formaldehyde	19,863	25,845	26,265
	Blank		
Formaldehyde	0.680 ND		

Results

Company	EML
Analyst	EO
Parameters	EPA Method 316
# Samples	6 Runs & 1 blank

Client #	Bilbler Brothers - Kiln 1
Job #	0210-110
PO #	Verbal
Report Date	3/12/2010

MDL 0.0200 (µg/mL)
LOQ 0.273 (µg/mL)
Compound Formaldehyde

Lower Curve Limit 0.273 (µg/mL)
Upper Curve Limit 3.28 (µg/mL)

Sample ID	Lab ID	Absorbance	Analytical Concentration (µg/mL)	Dilution	Volume (mL)	Catch Weight (µg)	Qual
Kiln 1 HCNO R1	7	0.5020	1.0276	25	573	14,720	
Kiln 1 HCNO R2	8	0.7758	1.5881	25	665	26,402	
Kiln 1 HCNO R3	9	0.6964	1.4256	25	761	27,122	
Kiln 1 HCNO (PM) R1	10	0.6447	1.3198	25	602	19,863	
Kiln 1 HCNO (PM) R2	11	0.8042	1.6462	25	628	25,845	
Kiln 1 HCNO (PM) R3	12	0.7824	1.6015	25	656	26,265	
Blank	17	0.0000	0.0200	1	34.0	0.680	ND
Method Blank	10	0.0026	0.0200	1	1.00	0.0200	ND
Method Blank	3	0.0013	0.0200	1	1.00	0.0200	ND
LD / Kiln 1 HCNO R1	14	0.5133	1.0507	25	573	15,051	
					% Difference	2.2%	
AD / Kiln 1 HCNO R1	15	0.2600	0.5323	50	573	15,251	
					%Difference	3.6%	
MS / Kiln 1 HCNO R1	16	1.0262	2.1006	1	2.50	5.25	
					spike amount (ug)	2.73	
					native amount (ug)	2.54	
					Spike recovery	99.4%	
Spec32pg50 SS#1	8	0.6169	1.2629	1	1.00	1.26	
					spike amount (ug)	1.20	
					Spike recovery	105%	
Spec32pg50 SS#2	9	0.6276	1.2847	1	1.00	1.28	
					spike amount (ug)	1.20	
					Spike recovery	107%	

Narrative Summary

Enthalpy Analytical Narrative Summary

Company	EML
Analyst	EO
Parameters	EPA Method 316 & 316-Type
# Samples	6 Runs & 1 blank

Client #	Bilbler Brothers-Kiln 1
Job #	0210-110
PO #	Verbal
Report Date	March 11, 2010

Custody

Heather Tarjeft of Enthalpy Analytical, Inc. received the samples on 2/26/10 at 4.8 °C after being relinquished by Environmental Monitoring Labs. The samples were received in good condition. Prior to and during analysis, the samples were kept under lock with access only to authorized personnel by Enthalpy Analytical, Inc.

Analysis

The samples were analyzed for formaldehyde using the analytical procedures in EPA Method 316, Sampling and Analysis for Formaldehyde Emissions from Stationary Sources in the Mineral Wool and Wool Fiberglass Industries (40 CFR Part 63, Appendix A).

Formaldehyde standards were made by diluting a certified solution with DIUF-grade water. Any sample dilutions were performed on an aliquot of the original sample prior to the addition of reagent.

The Hewlett Packard Model 8452A, Diode Array Spectrophotometer "Larry" (S/N 2610A 00705) was operated at 570 nm for these analyses.

Calibration

The calibration curves are included in the Calibration Curve Chromatograms section of this report and referenced in the Analysis Method column on the Detailed Results page.

Chromatographic Conditions

The acquisition method NAIMA.M was used for these analyses.

QC Notes

A field blank, method blank, laboratroy duplicate, alternate dilution, and matrix spike were analyzed with these samples. The spike recovery and percent difference values arepresented in the Results section of this report. These QC sample met all acceptance criteria.

All samples were analyzed within the 14 day holding time specified in the method.

Reporting Notes

The sample volumes provided on the chain-of-custody were used to determine the mass of formaldehyde in the samples. The volume of the field blank received with these samples was measured by laboratory personnel, prior to analysis.

The Method 316-type analyses refers to the samples that were collected with a sampling traning that included a filter.

The results presented in this report are representative of the samples as provided to the laboratory.

Enthalpy Analytical, Inc. is accredited to perform EPA Method 316 for compliance purposes by the National Environmental Laboratory Accreditation Conference (NELAC) through the Louisiana Environmental Laboratory Accreditation Program (LELAP), certificate number 04010.

General Reporting Notes

The following are general reporting notes that are a pplicable to all Enthalpy Analytical, Inc. data reports, unless specifically noted otherwise.

- The acronym ***MDL*** represents the Minim um Detection Lim it. Below this value the laboratory cannot determine the presence of the analyte of interest reliably.
- The acrony m ***LOQ*** represents the Lim it of Quantification. Below this value the laboratory cannot quantitate the analyte of interest within the criteria of the method.
- The acronym ***ND*** following a value indicates a non-detect or analytical result below the MDL.
- The letter ***J*** following a value indicates an analy tical result between the MDL and the LOQ. A J flag indicates that the laboratory can positively identify th e analyte of interest as present, but the value should be considered an estimate.
- The letter ***E*** following a value indicates an analy tical result exceeding 100% of the highest calibration point. The associated value should be considered as an estimate.
- The acronym ***DF*** represents Dilution Factor. This num ber represents dilution of the sam ple during the preparation and/or analy sis process. The analy tical result taken from a laboratory instrum ent is multiplied by the DF to determine the final undiluted sample results.
- The addition of ***MS*** to the Sam ple ID represents a Matrix Spike. An aliquot of an actual sam ple is spiked with a known amount of analyte so that a percent recovery value can be determined. This shows what effect the sample matrix may have on the target analyte, i.e. whether or not anything in the sample matrix interferes with the analysis of the analyte(s).
- The addition of ***MSD*** to the Sam ple ID represents a Matrix Spike Duplicate. Prepared in the sam e manner as an MS, the use of duplicate m atrix spikes allows further confirmation of laboratory quality by showing the consistency of results gained by performing the same steps multiple times.
- The addition of ***LD*** to the Sam ple ID represents a Laborat ory Duplicate. The analy st prepares an additional aliquot of sam ple for testing and the resu lts of the duplicate analy sis are compared to the initial result. The result should have a difference value of within 10% of the initial result (if the results of the original analysis are greater than the LOQ).
- The addition of ***AD*** to the Sam ple ID represents an Alte rnate Dilution. The analy st prepares an additional aliquot at a different dilution factor (usu ally double the initial factor). This analy sis helps confirm that no additional compound is present and coeluting or sharing absorbance with the analyte of interest, as they would have a different response/absorbance than the analyte of interest.
- The Sample ID ***LCS*** represents a Laboratory Control Sample. Clean matrix, similar to the client sample matrix, prepared and analy zed by the laboratory using the sam e reagents, spiking standards and procedures used for the client sam ples. The LCS is used to assess the control of the laboratory 's analytical system. Whenever spikes are prepared for our client projects, two extra spikes are prepared. The extras (randomly chosen) are labeled with the asso ciated project num ber and kept in-house at the appropriate temperature conditions. When the project sam ples are received for analy sis, the LCSs are analyzed to confirm that the analy te could be recovered from the m edia, separate from the samples which were used on the project and which m ay have been affected by source matrix, sample collection and/or sample transport.

General Reporting Notes

(continued)

- **Significant Figures**: Where the reported value is much greater than unity (1.00) in the units expressed, the number is rounded to a whole number of units, rather than to 3 significant figures. For example, a value of 10,456.45 ug catch is rounded to 10,456 ug. There are five significant digits displayed, but no confidence should be placed on more than two significant digits.
- **Manual Integration**: The data systems used for processing will flag manually integrated peaks with an "M". There are several reasons a peak may be manually integrated. These reasons will be identified by the following two letter designations. The peak was ***not integrated*** by the software **"NI"**, the peak was ***integrated incorrectly*** by the software **"II"** or the ***wrong peak*** was integrated by the software **"WP"**. These codes will accompany the analyst's manual integration stamp placed next to the compound name.

Sample Custody

CHAIN OF CUSTODY AND REQUEST FOR ANALYSIS

PAGE 1 OF 1

ENVIRONMENTAL MONITORING LABORATORIES POST OFFICE BOX 655 RIDGELAND, MISSISSIPPI 39158 PHONE: 601/856-3092 FAX: 601/853-2151 Attention: Danny Russell	Laboratory: Enthalpy Analytical, Inc. 2202 Ellis Road Durham, NC 27703-5518 PHONE: 919/850-4392 Attention: Bryan Tyler

Project:
Bilbler Brothers - Russellville, AR
Kiln 1 Emissions Test Febryary 23, 2010

Rush [ ] Routine [✓] Fax Results [X]

ANALYSES REQUESTED

Formaldehyde by Method 316

No. of containers	SAMPLE ID	Date	Time	Sample aq. volume, ml		UNITS
1	Kiln 1 HCHO R1	02/23/10		573	x	µg
1	Kiln 1 HCHO R2	02/23/10		665	x	µg
1	Kiln 1 HCHO R3	02/23/10		761	x	µg
1	Kiln 1 HCHO (PM) R1	02/23/10		602	x	µg
1	Kiln 1 HCHO (PM) R2	02/23/10		628	x	µg
1	Kiln 1 HCHO (PM) R3	02/23/10		656	x	µg
1	Blank	02/23/10			x	µg/ml

Relinquished by: (print name; initial)	Date/time	Received by: (print name; initial)	Date/time
Daniel G. Russell	02/25/10	Daniel G. Russell	02/26/10
Relinquished by: (print name; initial)		Received by: (print name; initial)	Date/time
Relinquished by: (print name; initial)	Date/time	Received by: (print name; initial)	Date/time
COURIER FED EX	Date Shipped 02/25/10	Received for lab by:	Date/time 2/26/10 11:30am

Temp 4.8°C Rawlek cont# 1 HCT

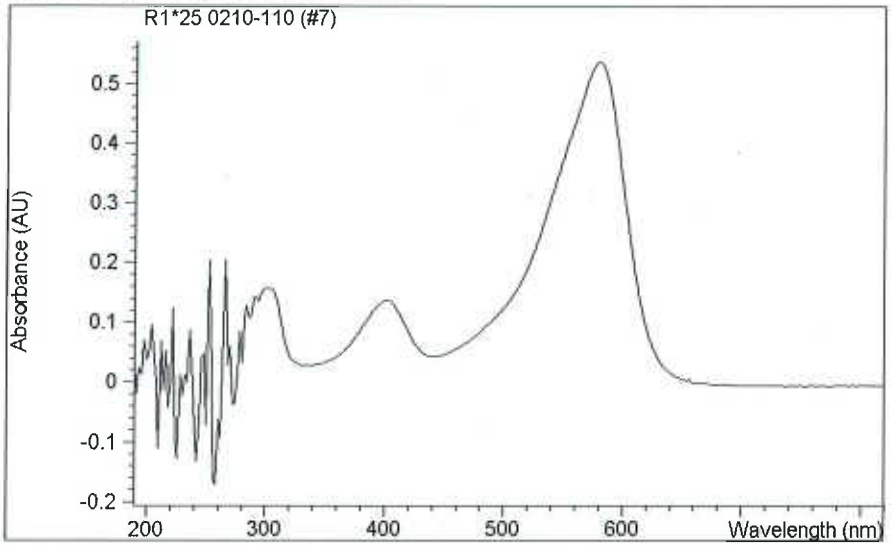
Sample Spectra

*** Results Report ***

Method file (modified)
NAIMA.M
Number of Samples 12
Operator eo

Sample 1

Processed Sample Spectrum



Data Analysis Result

Analyte Name	Value	Std.Dev.	Unit
Formaldehyde	1.02759	0.01051	ug/mL

Sample 2

APPENDIX F

WOOD FUEL ANALYSIS

(STANDARD LAB)

STANDARD LABORATORIES, INC.
8451 River King Drive
Freeburg , IL 62243

Lab No. 2010-00502-001

Date Rec'd. 2/26/2010

Date Sampled 2/23/2010 to 2/23/2010

Sampled By Client

Date: 03/05/2010 08:11:26

Sample ID: 20100050201

BIBLER BROS LUMBER CO

P.O.#

PO BOX 490
RUSSELLVILLE, AR 72811
ATTN: MATT HAGENLOCKER

Remark: SOUTHERN YELLOW PINE SAWDUST - KILN #1 STACK 13G 12:28 PM

PROXIMATE ANALYSIS		As Received	Dry Basis
% Moisture	D3302	56.16	*****
% Ash	D3174	0.33	0.76
% Volatile	D3175	*****	*****
% Fixed Carbon	D3172	*****	*****
BTU	D5865	4000	9125
MAF-BTU	D3180	9195	
% Total Sulfur	D4239B	< 0.01	0.02

SULFUR FORMS			
% Pyritic	D2492	*****	*****
% Sulfate	D2492	*****	*****
% Organic	D2492	*****	*****
% Total Sulfur	D4239B	< 0.01	0.02

WATER SOLUBLE			
% Na2O	ASME1974	*****	*****
% K2O	ASME1974	*****	*****
% Chlorine	ASME1974	*****	*****
Alkalies as Na2O	ASME1974	*****	*****

FUSION TEMP. OF ASH D1857	Reducing	Oxidizing
I.D.	*****	*****
H=W	*****	*****
H=1/2W	*****	*****
Fluid	*****	*****

GRINDABILITY INDEX D409 ***** @ ***** % Moist.
GRIND INDEX UNCONDITIONED ***** @ ***** % Moist.

FREE SWELLING INDEX D720 *****

Apparent Specific Gravity of Coal ModIC7113 *****

% Equilibrium Moisture D1412 *****

ULTIMATE ANALYSIS		Weight % As Received	Dry Basis
% Moisture	D3302	56.16	*****
% Carbon	D5373	22.46	51.24
% Hydrogen	D5373	2.77	6.32
% Nitrogen	D5373	0.05	0.11
% Chlorine	D6721	*****	*****
% Sulfur	D4239B	< 0.01	0.02
% Ash	D3174	0.33	0.76
% Oxygen (Diff.)	D3176	18.22	41.55
(Chlorine D6721 Dry Basis ug/g		*****	)

MINERAL ANALYSIS D6349	% Ignited Basis
Phos. Pentoxide, P2O5	*****
Silica, SiO2	*****
Ferric Oxide, Fe2O3	*****
Alumina, Al2O3	*****
Titania, TiO2	*****
Lime, CaO	*****
Magnesia, MgO	*****
Sulfur Trioxide, SO3	*****
Potassium Oxide, K2O	*****
Sodium Oxide, Na2O	*****
Barium Oxide, BaO	*****
Strontium Oxide, SrO	*****
Manganese Dioxide, MnO2	*****
Undetermined	*****
Type of Ash ASME1974	*****
Silica Value ASME1974	*****
T250 Deg B&W	*****
Base/Acid Ratio ASME1974	*****
lb Ash/mm BTU	0.83
lb SO2/mm BTU	0.04
Fouling Index ASME1974	*****
Slagging Index ASME1974	*****
(Mercury D6722 Dry Basis ug/g	*****)

Respectfully Submitted,

STANDARD LABORATORIES, INC.
8451 River King Drive
Freeburg , IL 62243

Lab No. 2010-00502-002

Date Rec'd. 2/26/2010

Date Sampled 2/23/2010 to 2/23/2010

Sampled By Client

Date: 03/05/2010 08:11:27

Sample ID: 20100050202

BIBLER BROS LUMBER CO

P.O.#

PO BOX 490
RUSSELLVILLE, AR 72811
ATTN: MATT HAGENLOCKER

Remark: SOUTHERN YELLOW PINE SAWDUST - KILN #1 STACK 13G 2:35 PM

PROXIMATE ANALYSIS		As Received	Dry Basis
% Moisture	D3302	< 0.01	*****
% Ash	D3174	1.68	0.58
% Volatile	D3175	*****	*****
% Fixed Carbon	D3172	*****	*****
BTU	D5865	26270	9089
MAF-BTU	D3180	9142	
% Total Sulfur	D4239B	0.06	0.02

SULFUR FORMS			
% Pyritic	D2492	*****	*****
% Sulfate	D2492	*****	*****
% Organic	D2492	*****	*****
% Total Sulfur	D4239B	0.06	0.02

WATER SOLUBLE			
% Na2O	ASME1974	*****	*****
% K2O	ASME1974	*****	*****
% Chlorine	ASME1974	*****	*****
Alkalies as Na2O	ASME1974	*****	*****

FUSION TEMP. OF ASH D1857	Reducing	Oxidizing
I.D.	*****	*****
H=W	*****	*****
H=1/2W	*****	*****
Fluid	*****	*****

GRINDABILITY INDEX D409 ***** @ ***** % Moist.
GRIND INDEX UNCONDITIONED ***** @ ***** % Moist.

FREE SWELLING INDEX D720 *****

Apparent Specific Gravity of Coal ModIC7113 *****

% Equilibrium Moisture D1412 *****

ULTIMATE ANALYSIS		Weight % As Received	Dry Basis
% Moisture	D3302	< 0.01	*****
% Carbon	D5373	149.43	51.70
% Hydrogen	D5373	18.06	6.25
% Nitrogen	D5373	0.12	0.04
% Chlorine	D6721	*****	*****
% Sulfur	D4239B	0.06	0.02
% Ash	D3174	1.68	0.58
% Oxygen (Diff.)	D3176	119.68	41.41
(Chlorine D6721 Dry Basis ug/g			*****)

MINERAL ANALYSIS D6349	% Ignited	Basis
Phos. Pentoxide, P2O5		*****
Silica, SiO2		*****
Ferric Oxide, Fe2O3		*****
Alumina, Al2O3		*****
Titania, TiO2		*****
Lime, CaO		*****
Magnesia, MgO		*****
Sulfur Trioxide, SO3		*****
Potassium Oxide, K2O		*****
Sodium Oxide, Na2O		*****
Barium Oxide, BaO		*****
Strontium Oxide, SrO		*****
Manganese Dioxide, MnO2		*****
Undetermined		*****
Type of Ash	ASME1974	*****
Silica Value	ASME1974	*****
T250 Deg	B&W	*****
Base/Acid Ratio	ASME1974	*****
lb Ash/mm BTU		0.64
lb SO2/mm BTU		0.04
Fouling Index	ASME1974	*****
Slagging Index	ASME1974	*****
(Mercury D6722 Dry Basis ug/g		*****)

Respectfully Submitted,

STANDARD LABORATORIES, INC.
8451 River King Drive
Freeburg , IL 62243

Lab No. 2010-00502-003

Date Rec'd. 2/26/2010

Date Sampled 2/23/2010 to 2/23/2010

Sampled By Client

Date: 03/05/2010 08:11:28

Sample ID: 20100050203

BIBLER BROS LUMBER CO

P.O.#

PO BOX 490
RUSSELLVILLE, AR 72811
ATTN: MATT HAGENLOCKER

Remark: SOUTHERN YELLOW PINE SAWDUST - KILN #1 STACK 13G 4:35 PM

PROXIMATE ANALYSIS		As Received	Dry Basis
% Moisture	D3302	56.03	*****
% Ash	D3174	0.29	0.66
% Volatile	D3175	*****	*****
% Fixed Carbon	D3172	*****	*****
BTU	D5865	4016	9133
MAF-BTU	D3180	9194	
% Total Sulfur	D4239B	< 0.01	0.02

SULFUR FORMS			
% Pyritic	D2492	*****	*****
% Sulfate	D2492	*****	*****
% Organic	D2492	*****	*****
% Total Sulfur	D4239B	< 0.01	0.02

WATER SOLUBLE			
% Na2O	ASME1974	*****	*****
% K2O	ASME1974	*****	*****
% Chlorine	ASME1974	*****	*****
Alkalies as Na2O	ASME1974	*****	*****

FUSION TEMP. OF ASH D1857	Reducing	Oxidizing
I.D.	*****	*****
H=W	*****	*****
H=1/2W	*****	*****
Fluid	*****	*****

GRINDABILITY INDEX D409 ***** @ ***** % Moist.
GRIND INDEX UNCONDITIONED ***** @ ***** % Moist.

FREE SWELLING INDEX D720 *****

Apparent Specific Gravity of Coal ModIC7113 *****

% Equilibrium Moisture D1412 *****

ULTIMATE ANALYSIS		Weight % As Received	Dry Basis
% Moisture	D3302	56.03	*****
% Carbon	D5373	22.61	51.41
% Hydrogen	D5373	2.77	6.31
% Nitrogen	D5373	0.04	0.08
% Chlorine	D6721	*****	*****
% Sulfur	D4239B	< 0.01	0.02
% Ash	D3174	0.29	0.66
% Oxygen (Diff.)	D3176	18.26	41.52
(Chlorine D6721 Dry Basis ug/g		*****	)

MINERAL ANALYSIS D6349	% Ignited Basis
Phos. Pentoxide, P2O5	*****
Silica, SiO2	*****
Ferric Oxide, Fe2O3	*****
Alumina, Al2O3	*****
Titania, TiO2	*****
Lime, CaO	*****
Magnesia, MgO	*****
Sulfur Trioxide, SO3	*****
Potassium Oxide, K2O	*****
Sodium Oxide, Na2O	*****
Barium Oxide, BaO	*****
Strontium Oxide, SrO	*****
Manganese Dioxide, MnO2	*****
Undetermined	*****
Type of Ash ASME1974	*****
Silica Value ASME1974	*****
T250 Deg B&W	*****
Base/Acid Ratio ASME1974	*****
lb Ash/mm BTU	0.72
lb SO2/mm BTU	0.04
Fouling Index ASME1974	*****
Slagging Index ASME1974	*****
(Mercury D6722 Dry Basis ug/g	*****)

Respectfully Submitted,

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OF THIS REPORT