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Survey of Source Emissions
for
Bibler Brothers Lumber Company
Russellville, Arkansas

Operating Permit 1628-AOP-R8 AFIN 58-00014

SN-07G Kiln #3 (PM, NO_X, CO, VOC and Formaldehyde)

Test Date: July 6, 2011

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1.1 Scope of Work

At the request of Mr. Matt Hagenlocker of Bibler Brothers Lumber Company, Environmental Services Company, Inc. (ESC) performed air emissions testing on July 6, 2011 at the Bibler Brothers Lumber Company facility in Russellville, Arkansas. The scope of the work consisted of testing Kiln #3 (SN-07G) for particulate matter (PM), nitrogen oxides (NO_X), carbon monoxide (CO), volatile organic compounds (VOC) and formaldehyde (HCHO). The testing performed on this source is required by the facility's Operating Permit (Permit #1628-AOP-R8 AFIN 58-00014). The purpose of the testing was to learn whether the source in question is in compliance with the emission rates as set forth in the permit.

1.2 Process Description

All of the lumber processed at Bibler Brothers Lumber Company is dried in one of three kilns (Kiln #1, Kiln #3 or Kiln #4). Kiln #1 (SN-13G) and Kiln #3 (SN-07G) are continuously operating, wood waste-fired units. Both Kilns were built in 2008. Each kiln has a burner startup abort stack (SN-07GX) and SN-13GX) that is used up to 12 hours per kiln start and 144 hours per year per kiln. Kilns #1 and #3 are equipped with "green sawdust gasifiers." Each gasifier has a rated heat input capacity of 23.0 MMBtu/hr.

Kiln #4 (SN-10B) is a batch, steam-heated unit built in 1997. Two natural gas-fired boilers (SN-10A1 and SN-10A2) provide steam for Kiln #4. Both boilers are NSPS Subpart Dc affected units.

1.3 Facility, Test and Regulatory Contacts

Facility Contact
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Mr. Clark and Ms. Megan Ruffin were present to observe the testing.

1.4 Acknowledgements and Certification

The staff of Environmental Services Company, Inc. (ESC) sincerely wishes to thank all personnel involved in the success of the testing program, especially Mr. Matt Hagenlocker of Bibler Brothers Lumber Company.

Having worked on this project, reviewed all data, and prepared this report, I hereby certify that the information contained herein is accurate and true according to the methods and procedures used and take responsibility for the contents thereof. Additionally, this report shall not be reproduced, except in full, without the written approval of the testing organization.

Jeffrey N. Woosley

Digitally signed by Jeffrey N. Woosley
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Special Projects Manager

1.5 Discussion of Results

The results from this testing program are summarized in the attached tables. The tables provide a detail of the stack gas and process parameters during the testing along with a detail of the concentration and emission rate of each pollutant. Particulate concentration is expressed in grains per dry standard cubic feet (gr/dscf). Nitrogen oxides, carbon monoxide, volatile organic compounds (as carbon) and formaldehyde concentrations are expressed in parts per million by volume dry (ppmvd). Emissions of the aforementioned pollutants are expressed in pounds per hour (lbs/hr) and, in the case of volatile organic compounds and formaldehyde, pounds per thousand board feet (lbs/MBF). Also included is a detail of the calculated stack test values and pollutant concentration trends during the testing program. The nomenclature and calculations for each method employed are detailed in Section 3.3 of this report.

A temporary stack was installed in the kiln roof near one end of the kiln to provide a site with a consistent, laminar air flow for formaldehyde sampling. A vertical rectangular stack was constructed over an existing but non-functioning vent door. The vent door was removed and a housing built to enclose the opening and funnel exhaust gasses through the 33" tall stack extension. The temporary stack had a 10" by 15" cross section.

The flow rate from the temporary stack was measured for the purpose of isokinetic sampling required by USEPA Methods 5 and 316. However, that measured flow rate could not be related to the total flow lost from the kiln. Rather, total kiln flow was determined by applying the predicted oxygen consumption of the burner supplying heat to the kiln and utilizing the principles described in USEPA Method 19 to calculate total kiln flow. The total kiln flow along with pollutant concentrations from the temporary stack were used to calculate total kiln emissions. A report of the wood fuel analysis performed by Standard Laboratories is provided in Section 4.3 of this report.

1.5.1 Summary of Results - Particulate and Gaseous Pollutants

SUMMARY OF RESULTS BIBLER BROTHERS LUMBER COMPANY RUSSELLVILLE, ARKANSAS KILN #3 (SN-07G)					
	Run #1	Run #2	Run #3	Average	Regulatory Limit
Sample date	07/06/11	07/06/11	07/06/11		
Sample time	1103-1204	1302-1403	1455-1556		
Stack Parameters					
Flow, acfm	889.18	769.39	843.35	833.97	--
Flow, dscf/hr	35,629.53	33,117.42	35,332.74	34,693.23	--
O_2, % dry	17.72	18.21	18.28	18.07	--
CO_2, % dry	2.88	2.34	2.27	2.50	--
Moisture, %	22.88	18.24	20.28	20.46	--
Temperature, ^oF	152	144	145	147	--
Kiln Parameters					
Sawdust feed rate, lbs/hr	5,511	5,954	5,530	5,665	
Heat Input, MMBtu/hr	26.72	28.86	26.81	27.46	--
Flow, dscf/hr	1,618,072.00	2,069,847.13	1,974,353.08	1,887,424.07	--
Particulate (kiln total)					
Concentration, ppmvd	0.0043	0.0035	0.0015	0.0031	--
Emission rate, lbs/hr	0.99	1.03	0.44	0.82	1.7
Nitrogen oxides (kiln total)					
Concentration, ppmvd	4.27	3.27	2.74	3.43	--
Emission rate, lbs/hr	0.82	0.81	0.65	0.76	3.4
Carbon monoxide (kiln total)					
Concentration, ppmvd	104.85	81.63	79.26	88.58	--
Emission rate, lbs/hr	12.34	12.28	11.38	12.00	8.2
VOC as C (kiln total)					
Concentration, ppmvd as C	869.29	615.56	715.68	733.51	--
Emission rate, lbs/hr as C	43.83	39.70	44.03	42.52	46.5
Emission rate, lbs/MBF as C	3.85	3.49	3.87	3.74	3.8

SUMMARY OF TEST DATA
USEPA METHODS 5 AND 19
Particulate Matter (PM)

		Run #1	Run #2	Run #3
	Identification:			Kiln #3 (SN-07G)
	Date:	07/06/11	07/06/11	07/06/11
	Time:	1103-1204	1302-1403	1455-1556
C_p	Pitot correction factor, dimensionless	0.840	0.840	0.840
$\sqrt{\Delta P}$	Average of the square roots of the pressure heads, in. H_2O	0.2264	0.1989	0.2169
D_n	Probe tip diameter, inches	0.466	0.466	0.466
D_s	Stack diameter, ft.	0.0000	0.0000	0.0000
STK L	Stack length, ft.	1.2500	1.2500	1.2500
STK W	Stack width, ft.	0.8333	0.8333	0.8333
T_s	Average stack temperature, °F	152	144	145
T_m	Average meter temperature, °F	86	92	95
ΔH	Average pressure differential across the orifice meter, in. H_2O	1.5000	1.2444	1.5333
P_{bar}	Barometric pressure at sampling site, in. Hg	30.03	30.03	30.03
P_g	Stack static pressure, in. Hg	0.00	0.00	0.00
M_p	Total amount of particulate matter collected, mg	11.2	8.4	4.1
Vic	Total volume of liquid collected in the impingers and silica gel, mls	254.4	175.2	220.6
V_m	Volume of gas sample as measured by the dry gas meter, cf	41.254	38.224	42.382
T_{min}	Total sampling time, minutes	60.0	60.0	60.0
$\%O_2$	Percent O_2 by volume, dry basis	17.72	18.21	18.28
$\%CO_2$	Percent CO_2 by volume, dry basis	2.88	2.34	2.27
$\%CO+N_2$	Percent $CO+N_2$ by volume, dry basis	79.40	79.45	79.45
Y	Dry gas meter calibration factor	1.005	1.005	1.005
F_d	Volume of combustion components per unit of heat content, dscf/MMBtu	9,220	9,220	9,220
$GCV_{sd(d)}$	Gross caloric value of sawdust, dry basis, Btu/lb	9,147	9,147	9,147
$GCV_{sd(w)}$	Gross caloric value of sawdust, wet basis, Btu/lb	4,848	4,848	4,848
FF_{sd}	Feed rate of sawdust to kiln, lbs/hr	5,511	5,954	5,530
HI_{kiln}	Heat input to kiln, MMBtu/hr	26.72	28.86	26.81
M_d	Dry molecular weight of stack gasses, lb/lb-mole	29.1703	29.1024	29.0940
$V_{w(std)}$	Volume of water vapor in the gas sample, dscf	11.9746	8.2467	10.3836
P_s	Absolute stack gas pressure, in. Hg	30.0300	30.0300	30.0300
$V_{m(std)}$	Volume of metered gas sample, dscf	40.3725	36.9776	40.8071

SUMMARY OF TEST DATA
USEPA METHODS 5 AND 19
Particulate Matter (PM)

		Run #1	Run #2	Run #3
	Identification:			Kiln #3 (SN-07G)
	Date:	07/06/11	07/06/11	07/06/11
	Time:	1103-1204	1302-1403	1455-1556
B_{ws}	Water vapor in the gas stream, proportion by volume	0.2288	0.1824	0.2028
M_s	Wet molecular weight of stack gasses, lb/lb-mole	26.6145	27.0773	26.8441
A	Area of the stack, ft^2	1.0417	1.0417	1.0417
A_n	Area of the nozzle, ft^2	0.001184	0.001184	0.001184
V_s	Velocity in the stack, ft/sec	14.2269	12.3103	13.4937
V_{acfm}	Velocity in the stack, acfm	889.18	769.39	843.35
Q_{std}	Average stack gas dry volumetric flow rate from the temporary stack, dscf/hr	35,629.53	33,117.42	35,332.74
$Q_{std(kiln)}$	Average stack gas dry volumetric flow rate from the kiln, dscf/hr	1,618,072.00	2,069,847.13	1,974,353.08
I	Isokinetic ratio, %	99.74	98.28	101.65
C_p	Particulate concentration, grains/dscf	0.0043	0.0035	0.0015
$E_{p(lbs/hr)}$	Particulate emission rate from kiln, lbs/hr	0.99	1.03	0.44

SUMMARY OF TEST DATA
USEPA METHODS 7E AND 19
Nitrogen Oxides (NO_X)

		Run #1	Run #2	Run #3
	Identification:			Kiln #3 (SN-07G)
	Date:	07/06/11	07/06/11	07/06/11
	Time:	1103-1204	1302-1403	1455-1556
C	Average nitrogen oxides concentration indicated by the gas analyzer, ppmvd	4.22	3.24	2.73
C_o	Average of initial and final system calibration bias check responses for the zero calibration gas, ppmvd	0.05	0.05	0.05
C_m	Average of initial and final system calibration bias check responses for the upscale calibration gas, ppmvd	5.52	5.52	5.52
C_{ma}	Actual concentration of the upscale calibration gas, ppmvd	5.59	5.59	5.59
$Q_{std(kiln)}$	Average stack gas dry volumetric flow rate from the kiln, dscf/hr	1,618,072.00	2,069,847.13	1,974,353.08
C_{nox}	Nitrogen oxides concentration, ppmvd	4.27	3.27	2.74
$E_{nox(lbs/hr)}$	Nitrogen oxides emission rate from kiln, lbs/hr	0.82	0.81	0.65

SUMMARY OF TEST DATA
USEPA METHODS 10 AND 19
Carbon Monoxide (CO)

		Run #1	Run #2	Run #3
	Identification:			Kiln #3 (SN-07G)
	Date:	07/06/11	07/06/11	07/06/11
	Time:	1103-1204	1302-1403	1455-1556
C	Average carbon monoxide concentration indicated by the gas analyzer, ppmvd	105.66	82.50	80.14
C_o	Average of initial and final system calibration bias check responses for the zero calibration gas, ppmvd	1.10	1.10	1.10
C_m	Average of initial and final system calibration bias check responses for the upscale calibration gas, ppmvd	230.46	230.46	230.46
C_{ma}	Actual concentration of the upscale calibration gas, ppmvd	230.00	230.00	230.00
$Q_{std(kiln)}$	Average stack gas dry volumetric flow rate from the kiln, dscf/hr	1,618,072.00	2,069,847.13	1,974,353.08
C_{co}	Carbon monoxide concentration, ppmvd	104.85	81.63	79.26
$E_{co(lbs/hr)}$	Carbon monoxide emission rate from kiln, lbs/hr	12.34	12.28	11.38

SUMMARY OF TEST DATA
USEPA METHODS 25A AND 19
Volatile Organic Compounds (VOC)

		Run #1	Run #2	Run #3
	Identification:			Kiln #3 (SN-07G)
	Date:	07/06/11	07/06/11	07/06/11
	Time:	1103-1204	1302-1403	1455-1556
$C_{c3h8(wet)}$	VOC concentration as propane, ppmvw	223.48	167.77	190.17
B_{ws}	Water vapor in the gas stream, proportion by volume	0.2288	0.1824	0.2028
$Q_{std(kiln)}$	Average stack gas dry volumetric flow rate from the kiln, dscf/hr	1,618,072.00	2,069,847.13	1,974,353.08
PROD	Board feet throughput rate, BF/hr	11,382	11,382	11,382
C_{voc}	VOC concentration as carbon, ppmvd	869.29	615.56	715.68
$E_{voc(lbs/hr)}$	VOC emission rate as carbon from kiln, lbs/hr	43.83	39.70	44.03
$E_{voc(lbs/MBF)}$	VOC emission rate as carbon from kiln, lbs/MBF	3.85	3.49	3.87

SUMMARY OF TEST DATA
USEPA METHOD 3A
Oxygen (O_2) and Carbon Dioxide (CO_2)

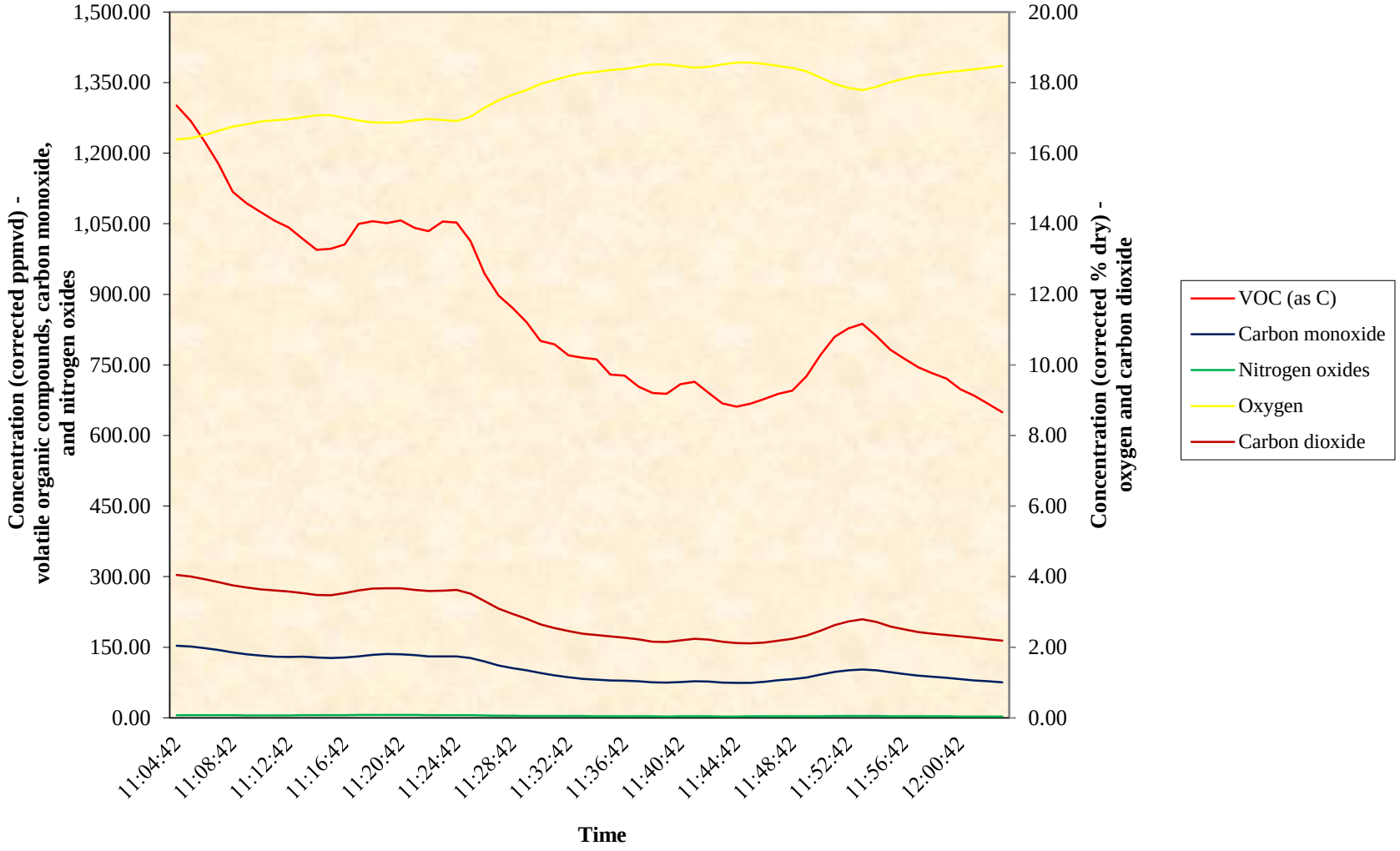
PM and Gasses		**Run #1**	**Run #2**	**Run #3**
	Identification:			Kiln #3 (SN-07G)
	Date:	07/06/11	07/06/11	07/06/11
	Time:	1103-1204	1302-1403	1455-1556
C	Average oxygen concentration indicated by the gas analyzer, % dry	17.63	18.12	18.19
C_o	Average of initial and final system calibration bias check responses for the zero calibration gas, %	0.08	0.08	0.08
C_m	Average of initial and final system calibration bias check responses for the upscale calibration gas, %	19.99	19.99	19.99
C_{ma}	Actual concentration of the upscale calibration gas, %	20.10	20.10	20.10
C_{o2}	Oxygen concentration, % dry	17.72	18.21	18.28

		Run #1	**Run #2**	**Run #3**
				Kiln #3 (SN-07G)
		07/06/11	07/06/11	07/06/11
		1103-1204	1302-1403	1455-1556
C	Average carbon dioxide concentration indicated by the gas analyzer, % dry	2.94	2.39	2.32
C_o	Average of initial and final system calibration bias check responses for the zero calibration gas, %	0.05	0.05	0.05
C_m	Average of initial and final system calibration bias check responses for the upscale calibration gas, %	9.80	9.80	9.80
C_{ma}	Actual concentration of the upscale calibration gas, %	9.72	9.72	9.72
C_{co2}	Carbon dioxide concentration, % dry	2.88	2.34	2.27

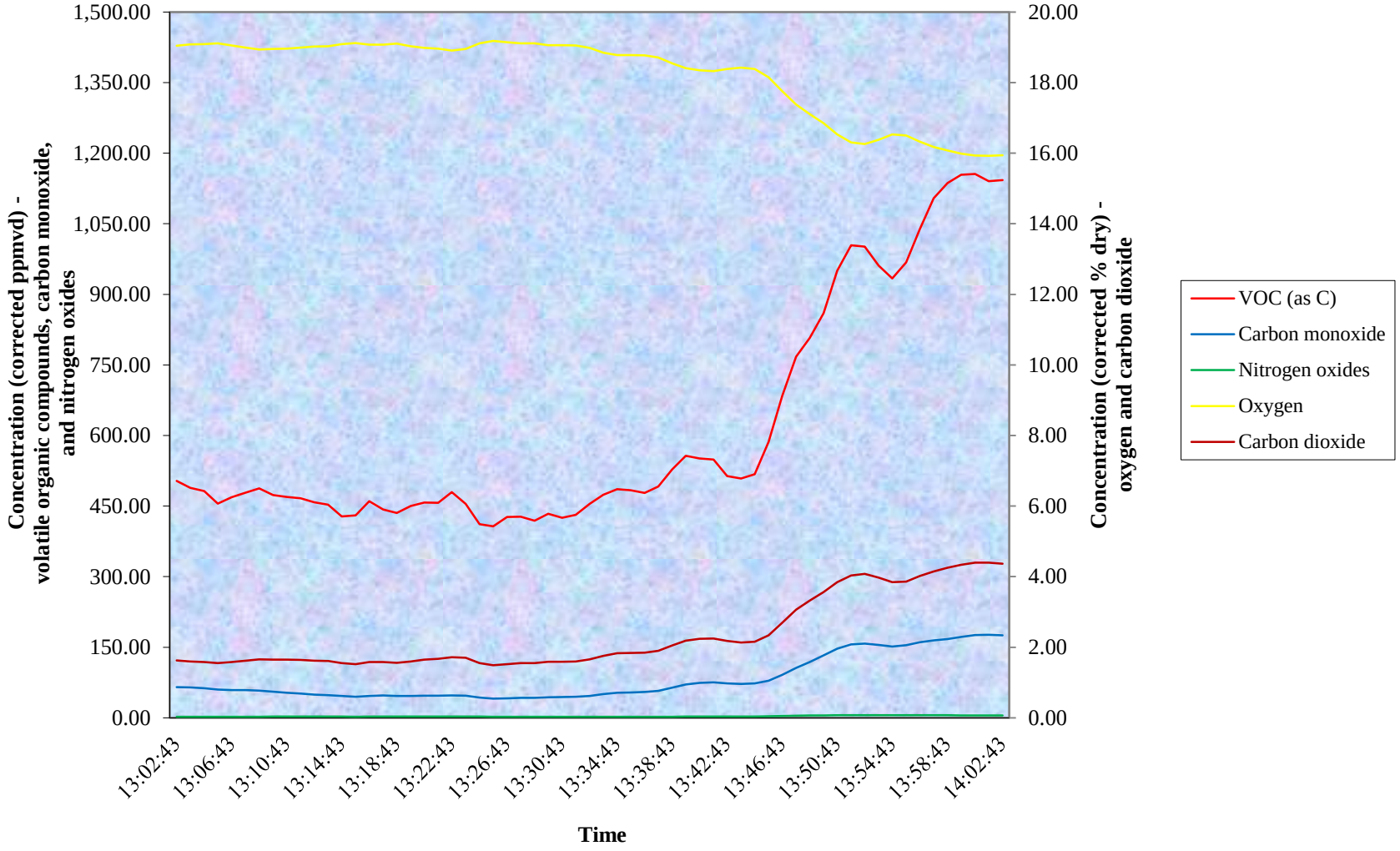
SUMMARY OF TEST DATA
USEPA METHOD 19
"F_d" Calculations

	Identification:	Kiln #3 (SN-07G)
	Date:	7/6/2011
K	Conversion factor, unitless	1.00E+06
$\%H_{sd}$	Concentration of hydrogen in sawdust from ultimate fuel analysis, percent by weight, dry basis	6.19
$\%C_{sd}$	Concentration of carbon in sawdust from ultimate fuel analysis, percent by weight, dry basis	52.63
$\%S_{sd}$	Concentration of sulfur in sawdust from ultimate fuel analysis, percent by weight, dry basis	0.00
$\%N_{sd}$	Concentration of nitrogen in sawdust from ultimate fuel analysis, percent by weight, dry basis	0.07
$\%O_{sd}$	Concentration of oxygen in sawdust from ultimate fuel analysis, percent by weight, dry basis	40.71
K_{hd}	Constant, (dscf/lb)/%	3.64
K_c	Constant, (dscf/lb)/%	1.53
K_s	Constant, (dscf/lb)/%	0.57
K_n	Constant, (dscf/lb)/%	0.14
K_o	Constant, (dscf/lb)/%	0.46
$GCV_{sd(d)}$	Gross caloric value of sawdust from ultimate fuel analysis, dry basis, Btu/lb	9,147
$GCV_{sd(w)}$	Gross caloric value of sawdust from ultimate fuel analysis, wet basis, Btu/lb	4,848
F_d	Volume of combustion components per unit of heat content for sawdust, dscf/MMBtu	9,220

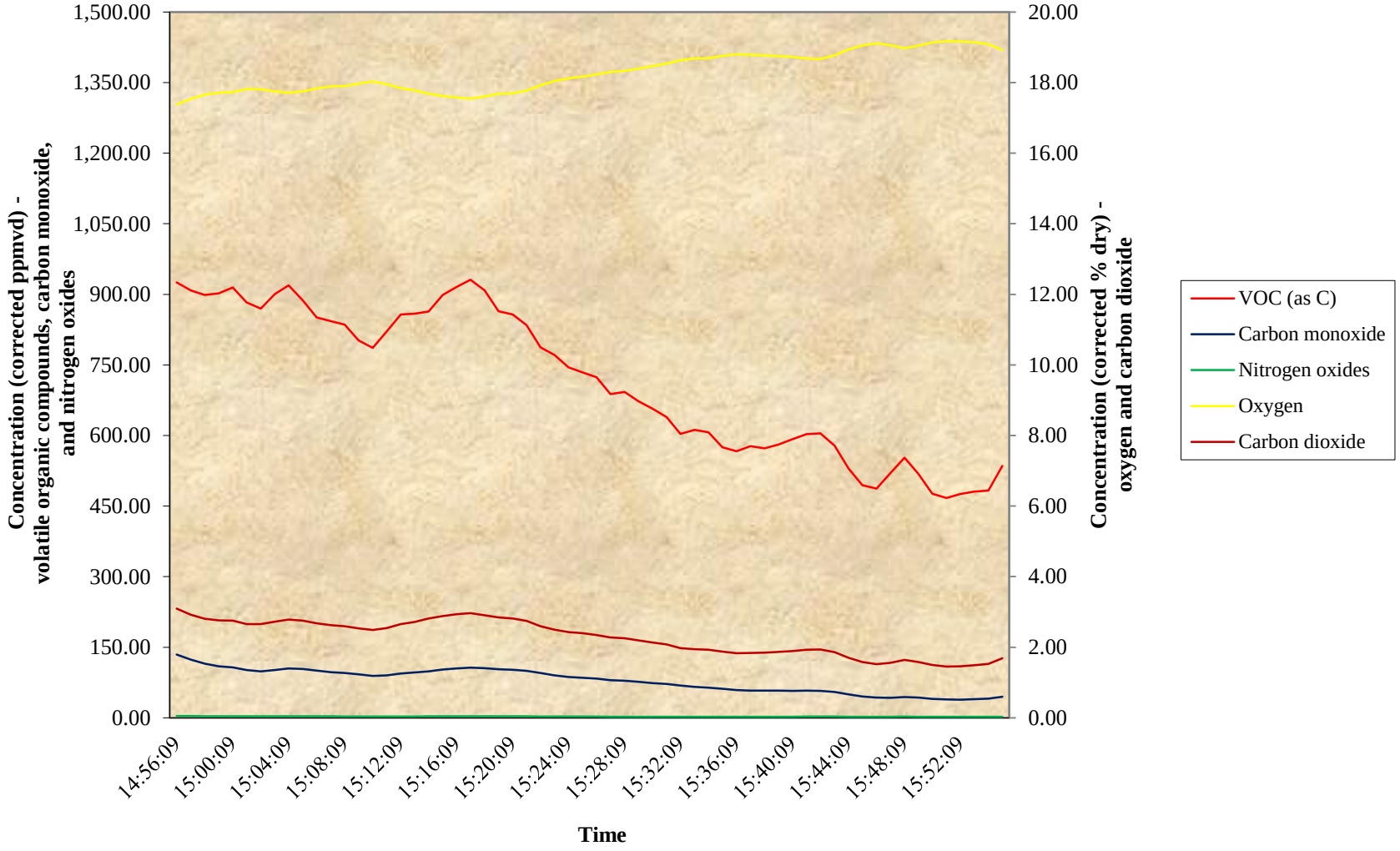
Bibler Brothers Lumber Company Russellville, Arkansas
Kiln #3 (SN-07G) July 6, 2011 Run #1



Bibler Brothers Lumber Company Russellville, Arkansas
Kiln #3 (SN-07G) July 6, 2011 Run #2



Bibler Brothers Lumber Company Russellville, Arkansas
Kiln #3 (SN-07G) July 6, 2011 Run #3



1.5.2 Summary of Results - Formaldehyde

SUMMARY OF RESULTS BIBLER BROTHERS LUMBER COMPANY RUSSELLVILLE, ARKANSAS KILN #3 (SN-07G)					
	Run #1	Run #2	Run #3	Average	Regulatory Limit
Sample date	07/06/11	07/06/11	07/06/11		
Sample time	1010-1046	1215-1251	1413-1449		
Stack Parameters					
Flow, acfm	904.24	860.61	790.35	851.73	--
Flow, dscf/hr	35,924.74	34,527.03	31,773.65	34,075.14	--
O_2, % dry	16.97	17.26	16.74	16.99	--
CO_2, % dry	3.55	3.25	3.65	3.49	--
Moisture, %	23.66	22.78	22.75	23.06	--
Temperature, ^{o}F	151	152	151	151	--
Kiln Parameters					
Sawdust feed rate, lbs/hr	5,466	5,525	5,580	5,524	
Heat Input, MMBtu/hr	26.50	26.79	27.05	26.78	--
Flow, dscf/hr	1,299,771.82	1,419,558.10	1,252,854.09	1,324,061.34	--
Formaldehyde (kiln total)					
Concentration, ppmvd	9.86	8.44	9.54	9.28	--
Emission rate, lbs/hr	1.00	0.93	0.93	0.96	0.46
Emission rate, lbs/MBF	0.0878	0.0821	0.0818	0.0839	0.038

SUMMARY OF TEST DATA
USEPA METHODS 316 AND 19
Formaldehyde

		Run #1	Run #2	Run #3
	Identification:			Kiln #3 (SN-07G)
	Date:	07/06/11	07/06/11	07/06/11
	Time:	1010-1046	1215-1251	1413-1449
C_p	Pitot correction factor, dimensionless	0.840	0.840	0.840
$\sqrt{\Delta P}$	Average of the square roots of the pressure heads, in. H_2O	0.2303	0.2193	0.2017
D_n	Probe tip diameter, inches	0.467	0.467	0.467
D_s	Stack diameter, ft.	0.0000	0.0000	0.0000
STK L	Stack length, ft.	1.2500	1.2500	1.2500
STK W	Stack width, ft.	0.8333	0.8333	0.8333
T_s	Average stack temperature, °F	151	152	151
T_m	Average meter temperature, °F	78	88	94
ΔH	Average pressure differential across the orifice meter, in. H_2O	1.4556	1.5444	1.2333
P_{bar}	Barometric pressure at sampling site, in Hg	30.03	30.03	30.03
P_g	Stack static pressure, in. Hg	0.00	0.00	0.00
M_{hcho}	Total amount of formaldehyde collected in the sampling train, ug	8,125	7,295	7,311
Vic	Total volume of liquid collected in the impingers and silica gel, mls	153.3	153.1	135.6
V_m	Volume of gas sample as measured by the dry gas meter, cf	23.449	25.050	22.488
T_{min}	Total sampling time, minutes	36.0	36.0	36.0
$\%O_2$	Percent O_2 by volume, dry basis	16.97	17.26	16.74
$\%CO_2$	Percent CO_2 by volume, dry basis	3.55	3.25	3.65
$\%CO+N_2$	Percent $CO+N_2$ by volume, dry basis	79.48	79.48	79.61
Y	Dry gas meter calibration factor	1.005	1.005	1.005
F_d	Volume of combustion components per unit of heat content, dscf/MMBtu	9,220	9,220	9,220
$GCV_{sd(d)}$	Gross caloric value of sawdust, dry basis, Btu/lb	9,147	9,147	9,147
$GCV_{sd(w)}$	Gross caloric value of sawdust, wet basis, Btu/lb	4,848	4,848	4,848
FF_{sd}	Feed rate of sawdust to kiln, lbs/hr	5,466	5,525	5,580
PROD	Board feet throughput rate, BF/hr	11,382	11,382	11,382
MW_{hcho}	Molecular weight of formaldehyde, g/g-mole	30.03	30.03	30.03
HI_{kiln}	Heat input to kiln, MMBtu/hr	26.50	26.79	27.05
M_d	Dry molecular weight of stack gasses, lb/lb-mole	29.2472	29.2111	29.2539
$V_{w(std)}$	Volume of water vapor in the gas sample, dscf	7.2158	7.2064	6.3827
P_s	Absolute stack gas pressure, in. Hg	30.0300	30.0300	30.0300

SUMMARY OF TEST DATA
USEPA METHODS 316 AND 19
Formaldehyde

		Run #1	Run #2	Run #3
	Identification:			Kiln #3 (SN-07G)
	Date:	07/06/11	07/06/11	07/06/11
	Time:	1010-1046	1215-1251	1413-1449
$V_{m(std)}$	Volume of metered gas sample, dscf	23.2867	24.4279	21.6756
B_{ws}	Water vapor in the gas stream, proportion by volume	0.2366	0.2278	0.2275
M_s	Wet molecular weight of stack gasses, lb/lb-mole	26.5861	26.6572	26.6936
A	Area of the stack, ft^2	1.0417	1.0417	1.0417
A_n	Area of the nozzle, ft^2	0.001189	0.001189	0.001189
V_s	Velocity in the stack, ft/sec	14.4679	13.7697	12.6456
V_{acfm}	Velocity in the stack, acfm	904.24	860.61	790.35
Q_{std}	Average stack gas dry volumetric flow rate from the temporary stack, dscf/hr	35,924.74	34,527.03	31,773.65
$Q_{std(kiln)}$	Average stack gas dry volumetric flow rate from the kiln, dscf/hr	1,299,771.82	1,419,558.10	1,252,854.09
I	Isokinetic ratio, %	94.69	103.35	99.65
C_{hcho}	Formaldehyde concentration, ppmvd	9.86	8.44	9.54
$E_{hcho(lbs/hr)}$	Formaldehyde emission rate from kiln, lbs/hr	1.00	0.93	0.93
$E_{hcho(lbs/MBF)}$	Formaldehyde emission rate from kiln, lbs/MBF	0.088	0.082	0.082

SUMMARY OF TEST DATA
USEPA METHOD 3A
Oxygen (O_2) and Carbon Dioxide (CO_2) Concentration

Formaldehyde		**Run #1**	**Run #2**	**Run #3**
	Identification:			Kiln #3 (SN-07G)
	Date:	07/06/11	07/06/11	07/06/11
	Time:	1010-1046	1215-1251	1413-1449
C	Average oxygen concentration indicated by the gas analyzer, % dry	16.89	17.18	16.66
C_o	Average of initial and final system calibration bias check responses for the zero oxygen gas, %	0.08	0.08	0.08
C_m	Average of initial and final system calibration bias check responses for the upscale oxygen calibration gas, %	19.99	19.99	19.99
C_{ma}	Actual concentration of the upscale oxygen calibration gas, %	20.10	20.10	20.10
C_{o2}	Oxygen concentration, % dry	16.97	17.26	16.74

		Run #1	**Run #2**	**Run #3**
	Identification:			Kiln #3 (SN-07G)
	Date:	07/06/11	07/06/11	07/06/11
	Time:	1010-1046	1215-1251	1413-1449
C	Average carbon dioxide concentration indicated by the gas analyzer, % dry	3.61	3.31	3.71
C_o	Average of initial and final system calibration bias check responses for the zero carbon dioxide gas, %	0.05	0.05	0.05
C_m	Average of initial and final system calibration bias check responses for the upscale carbon dioxide calibration gas, %	9.80	9.80	9.80
C_{ma}	Actual concentration of the upscale carbon dioxide calibration gas, %	9.72	9.72	9.72
C_{co2}	Carbon dioxide concentration, % dry	3.55	3.25	3.65

2.1 Operating Data

The following pages detail the production/throughput data maintained during the testing program.

Bilber Brothers Lumber Company
Kiln #3 (SN-07G)
July 6, 2011

Test	Sawdust Burned Time	Usage (lbs/hr)
Formaldehyde Run #1	1010-1046	5,466
Particulate Run #1	1103-1204	5,511
Formaldehyde Run #2	1215-1251	5,525
Particulate Run #2	1302-1403	5,954
Formaldehyde Run #3	1413-1449	5,580
Particulate Run #3	1455-1556	5,530

Total Bdfeet per Hour	11,382

3.1 Sampling Methods

The emissions testing conducted on the source in question was performed in accordance with methodology as outlined in 40 CFR Part 60, Appendix A. Specifically, the following methods are referenced in this sampling program:

- ⇒ Method 1 — Sample and Velocity Traverses for Stationary Sources
- ⇒ Method 2 — Determination of Stack Gas Velocity and Volumetric Flow Rate (Type S Pitot Tube)
- ⇒ Method 3A — Determination of Oxygen and Carbon Dioxide Concentrations in Emissions From Stationary Sources (Instrumental Analyzer Procedure)
- ⇒ Method 5 — Determination of Particulate Emissions From Stationary Sources
- ⇒ Method 7E — Determination of Nitrogen Oxides Emissions From Stationary Sources (Instrumental Analyzer Procedure)
- ⇒ Method 10 — Determination of Carbon Monoxide Emissions From Stationary Sources
- ⇒ Method 25A — Determination of Total Gaseous Organic Concentration Using a Flame Ionization Analyzer
- ⇒ Method 316 — Sampling and Analysis for Formaldehyde Emissions from Stationary Sources in the Mineral Wool and Wool Fiberglass Industries
- ⇒ Method 19 — Determination of Sulfur Dioxide Removal Efficiency and Particulate Matter, Sulfur Dioxide and Nitrogen Oxide Emission Rates

The aforementioned methods were employed without deviation from prescribed procedures except as allowed by the Arkansas Department of Environmental Quality.

3.2 Sampling Procedure

Particulate and formaldehyde sampling was conducted using an Environmental Supply Company C-5000 Source Sampler.

Section 8.3.4 of Method 316 states the following:

A minimum of 30 ft^3 of sample volume is suggested for emission sources with stack concentrations not greater than 23,000,000 ppbv. Additional sample volume shall be collected as necessitated by the capacity of the water reagent and analytical detection limit constraint. Reduced sample volume may be collected as long as the final concentration of formaldehyde in the stack sample is greater than 10 (ten) times the detection limit.

The testing firm ran 36 minute test runs for formaldehyde, relying on historical test data from like sources at the facility. The analytical detection limit for this sampling program, found in the laboratory report, was 0.0271 ug/ml. The analytical results showed a stack concentration of 0.5276, 0.4737 and 0.4610 ug/ml for Runs 1-3, respectively. These results, when measured against the analytical detection limit, show an order of magnitude of 19.4, 17.4 and 17.0, respectively, for the three sampling runs. Therefore, the shorter test runs were permitted by the aforementioned section of the method.

Oxygen and carbon dioxide concentrations were determined according to Method 3A utilizing a Servomex 1400 O_2/CO_2 monitor. The O_2 monitor was calibrated on a range of 0-20.10% with a 0, 9.95 and 20.10% gas, while the CO_2 monitor was calibrated on a range of 0-9.72% with a 0, 4.95 and 9.72% gas.

Nitrogen oxides concentrations were determined according to Method 7E utilizing a California Analytical Instruments (CAI) Model 600 monitor, which operates on the principles of chemiluminescence. The monitor was calibrated on a range of 0-9.50 ppm with a 0, 5.59 and 9.50 ppm gas.

Carbon monoxide concentrations were determined according to Method 10 utilizing a TECO Model 48C nondispersive infrared (NDIR) monitor. The monitor was calibrated on a range of 0-449.0 ppm with a 0, 230.0 and 449.0 ppm gas.

Volatile organic compound concentrations were determined according to Method 25A utilizing a TECO Model 51 flame ionization detector (FID). Sample was delivered to the FID through a sample line heated to a minimum of 250 °F. The analyzer was calibrated on a range of 0-1,000 ppm with a 0, 268.3, 500.0 and 940.6 ppm propane gas.

Output from the pollutant analyzers was directed to a DasyLab 6.0 Data Acquisition System and downloaded continuously to the hard drive of a personal computer (PC). Readings were taken every second, averaged and displayed every minute and averaged over the test run.

3.3 Source Test Nomenclature and Calculations

The following pages detail the source test nomenclature and calculations for each test method employed in this sampling program.

SOURCE TEST CALCULATIONS
USEPA Method 3A – Oxygen and Carbon Dioxide

Definitions

C	Average gas concentration indicated by gas analyzer, % dry
C_0	Average initial and final system calibration bias check responses for the zero gas, %
C_m	Average of initial and final system calibration bias check responses for the upscale calibration gas, %
C_{ma}	Actual concentration of the upscale calibration gas, %

Calculations

C_{gas} Gas concentration, % dry = $(C - C_o)\left(\frac{C_{ma}}{C_m - C_o}\right)$

SOURCE TEST DEFINITIONS
USEPA Methods 5 and 19 – Particulate Matter

C_p	Pitot correction factors, dimensionless
$\sqrt{\Delta P}$	Average of the square roots of the pressure heads, in. H_2O
D_n	Probe tip diameter, inches
D_s	Stack diameter or dimensions, ft
T_s	Average stack temperature, °F
T_m	Average meter temperature, °F
ΔH	Average pressure differential across the orifice meter, in. H_2O
P_{bar}	Barometric pressure at sampling site, in. Hg
P_g	Stack static pressure, in. Hg
M_p	Total amount of particulate matter collected, mg
V_{ic}	Total volume of liquid collected in impingers and silica gel, mls
V_m	Volume of gas sample as measured by dry gas meter, ft^3
T_{min}	Total sampling time, minutes
$\%O_2$	Percent O_2 by volume, dry basis
$\%CO_2$	Percent CO_2 by volume, dry basis
$\%CO+\%N_2$	Percent $CO+N_2$ by volume, dry basis
Y	Dry gas meter calibration factor
F_d	Volume of combustion components per unit of heat content, dscf/MMBtu
$GCV_{sd(d)}$	Gross caloric value of sawdust, dry basis, Btu/lb
$GCV_{sd(w)}$	Gross caloric value of sawdust, wet basis, Btu/lb
FF_{sd}	Feed rate of sawdust to kiln, lbs/hr

SOURCE TEST CALCULATIONS
USEPA Methods 5 and 19 – Particulate Matter

HI_{kiln} Heat input to kiln, MMBtu/hr = $\frac{GCV_{sd(w)} \text{ x } FF_{sd}}{1{,}000{,}000}$

M_d Dry molecular weight of stack gasses, lb/lb-mole = $0.44(\%CO_2) + 0.32(\%O_2) + 0.28(\%CO + N_2)$

$V_{w(std)}$ Volume of water vapor in the gas sample, dscf = $0.04707V_{ic}$

P_s Absolute stack gas pressure, in. Hg = $P_{bar} + P_g$

$V_{m(std)}$ Volume of metered gas sample, dscf = $17.64V_m Y \frac{P_{bar} + \left(\frac{\Delta H}{13.6}\right)}{460 + T_m}$

B_{ws} Water vapor in the gas stream, proportion by volume = $\frac{V_{w(std)}}{V_{m(std)} + V_{w(std)}}$

M_s Wet molecular weight of stack gasses, lb/lb-mole = $M_d(1 - B_{ws}) + 18.0B_{ws}$

A Area of stack, ft^2 = $\left(\frac{D_s}{2}\right)^2$ x 3.1416 or cross-section length x width

A_n Area of nozzle, ft^2 = $\left(\frac{D_n}{2}\right)^2$ x 3.1416

V_s Velocity in the stack, ft/sec = $85.49C_p\sqrt{\Delta P}_{avg}\sqrt{\frac{460 + T_s}{P_s M_s}}$

V_{acfm} Velocity in the stack, acfm = $60 \text{ x A } V_s$

Q_{std} Average stack gas dry volumetric flow rate from the temporary stack, dscf/hr = $3600(1 - B_{ws})V_s A\left[\frac{528}{460 + T_s} \text{ x } \frac{P_s}{29.92}\right]$

$Q_{std(kiln)}$ Average stack gas dry volumetric flow rate from the kiln, dscf/hr = $\frac{F_d \text{ x } HI_{kiln} \text{ x } 20.9}{(20.9 - \%O_2)}$

I Isokinetic ratio, % = $\frac{100(460 + T_s)\left(\left[0.002669V_{ic} + \left(\frac{V_m Y}{460 + T_m}\right)x\left((P_{bar} + \frac{\Delta H}{13.6})\right)\right]\right)}{60T_{min}V_s P_s A_n}$

C_p Particulate concentration, gr/dscf = $15.43(0.001)\left(\frac{M_p}{V_{m(std)}}\right)$

$E_{p(lbs/hr)}$ Particulate emission rate from kiln, lbs/hr = $\frac{C_p \text{ x } Q_{std(kiln)}}{7000}$

SOURCE TEST CALCULATIONS
USEPA Methods 7E and 19 – Nitrogen Oxides

Definitions	
C	Average nitrogen oxides concentration indicated by the gas analyzer, ppmvd
C_o	Average initial and final system calibration bias check responses for the zero calibration gas, ppmvd
C_m	Average of initial and final system calibration bias check responses for the upscale calibration gas, ppmvd
C_{ma}	Actual concentration of the upscale calibration gas, ppmvd
$Q_{std(kiln)}$	Average stack gas dry volumetric flow rate from the kiln, dscf/hour

Calculations	
C_{nox}	Nitrogen oxides concentration, ppmvd = $(C - C_o)\ \frac{C_{ma}}{C_m - C_o}$
$E_{nox(lbs/hr)}$	Nitrogen oxides emission rate from kiln, lbs/hr = $C_{nox}\ x\ 1.194E-07\ x\ Q_{std(kiln)}$

SOURCE TEST CALCULATIONS
USEPA Methods 10 and 19 – Carbon Monoxide

Definitions	
C	Average carbon monoxide concentration indicated by the gas analyzer, ppmvd
C_o	Average initial and final system calibration bias check responses for the zero calibration gas, ppmvd
C_m	Average of initial and final system calibration bias check responses for the upscale calibration gas, ppmvd
C_{ma}	Actual concentration of the upscale calibration gas, ppmvd
$Q_{std(kiln)}$	Average stack gas dry volumetric flow rate from the kiln, dscf/hr

Calculations	
C_{co}	Carbon monoxide concentration, ppmvd = $(C - C_o)\left(\frac{C_{ma}}{C_m - C_o}\right)$
$E_{co(lbs/hr)}$	Carbon monoxide emission rate from kiln, lbs/hr = $\frac{C_{co} \times 28 \times Q_{std(kiln)}}{385.1E06}$

SOURCE TEST CALCULATIONS
USEPA Methods 25A and 19 – Volatile Organic Compounds

Definitions

$C_{c3h8(wet)}$	VOC concentration as propane, ppmvw
B_{ws}	Water vapor in the gas stream, proportion by volume
$Q_{std(kiln)}$	Average stack gas dry volumetric flow rate from the kiln, dscf/hr
PROD	Board feet per hour through the kiln, BF/hr

Calculations

$C_{c(dry)}$ VOC concentration as carbon, ppmvd = $\frac{3 \times C_{c3h8(wet)}}{(1 - B_{ws})}$

$E_{voc(lbs/hr)}$ VOC emission rate as carbon from kiln, lbs/hr = $\frac{C_{c(dry)} \times 12 \times Q_{std(kiln)}}{385.1E06}$

$E_{voc(lbs/MBF)}$ VOC emission rate as carbon from kiln, lbs/MBF = $\frac{E_{voc(lbs/hr)} \times 1000}{PROD}$

SOURCE TEST DEFINITIONS
USEPA Method 316 and 19 – Formaldehyde

C_p	Pitot correction factors, dimensionless
$\sqrt{\Delta P}$	Average of the square roots of the pressure heads, in. H_2O
D_n	Probe tip diameter, inches
D_s	Stack diameter or dimensions, ft
T_s	Average stack temperature, °F
T_m	Average meter temperature, °F
ΔH	Average pressure differential across the orifice meter, in. H_2O
P_{bar}	Barometric pressure at sampling site, in. Hg
P_g	Stack static pressure, in. Hg
M_{hcho}	Total amount of formaldehyde collected in the sampling train, ug
V_{ic}	Total volume of liquid collected in impingers and silica gel, mls
V_m	Volume of gas sample as measured by dry gas meter, ft^3
T_{min}	Total sampling time, minutes
$\%O_2$	Percent O_2 by volume, dry basis
$\%CO_2$	Percent CO_2 by volume, dry basis
$\%CO+\%N_2$	Percent $CO+N_2$ by volume, dry basis
Y	Dry gas meter calibration factor
F_d	Volume of combustion components per unit of heat content, dscf/MMBtu
$GCV_{sd(d)}$	Gross caloric value of sawdust, dry basis, Btu/lb
$GCV_{sd(w)}$	Gross caloric value of sawdust, wet basis, Btu/lb
FF_{sd}	Feed rate of sawdust to kiln, lbs/hr
PROD	Board feet per hour through the kiln, BF/hr
MW_{hcho}	Molecular weight of formaldehyde, g/g-mole

SOURCE TEST CALCULATIONS
USEPA Method 316 and 19 – Formaldehyde

HI_{kiln} Heat input to kiln, MMBtu/hr = $\frac{GCV_{sd(w)} \text{ x } FF_{sd}}{1{,}000{,}000}$

M_d Dry molecular weight of stack gasses, lb/lb-mole = $0.44(\%CO_2) + 0.32(\%O_2) + 0.28(\%CO + N_2)$

$V_{w(std)}$ Volume of water vapor in the gas sample, dscf = $0.04707V_{ic}$

P_s Absolute stack gas pressure, in. Hg = $P_{bar} + P_g$

$V_{m(std)}$ Volume of metered gas sample, dscf = $17.64V_m Y \frac{P_{bar} + \left(\frac{\Delta H}{13.6}\right)}{460 + T_m}$

B_{ws} Water vapor in the gas stream, proportion by volume = $\frac{V_{w(std)}}{V_{m(std)} + V_{w(std)}}$

M_s Wet molecular weight of stack gasses, lb/lb-mole = $M_d(1 - B_{ws}) + 18.0B_{ws}$

A Area of stack, ft^2 = $\left(\frac{D_s}{2}\right)^2$ x 3.1416 or cross-section length x width

A_n Area of nozzle, ft^2 = $\left(\frac{D_n}{2}\right)^2$ x 3.1416

V_s Velocity in the stack, ft/sec = $85.49C_p\sqrt{\Delta P}_{avg}\sqrt{\frac{460 + T_s}{P_s M_s}}$

V_{acfm} Velocity in the stack, acfm = 60 x A x V_s

Q_{std} Average stack gas dry volumetric flow rate from the temporary stack, dscf/hr = $3600(1 - B_{ws})V_s A\left[\frac{528}{460 + T_s} \text{ x } \frac{P_s}{29.92}\right]$

$Q_{std(kiln)}$ Average stack gas dry volumetric flow rate from the kiln, dscf/hr = $\frac{F_d \text{ x } HI_{kiln} \text{ x } 20.9}{(20.9 - \%O_2)}$

I Isokinetic ratio, % = $\frac{100(460 + T_s)\left(0.002669V_{ic} + \frac{V_m Y}{460 + T_m} \text{ x } \left(P_{bar} + \frac{\Delta H}{13.6}\right)\right)}{60T_{min}V_s P_s A_n}$

HI_{kiln} Heat input to kiln, MMBtu/hr = $\frac{FF_{sd} \text{ x } GCV_{sd(w)}}{1{,}000{,}000}$

C_{hcho} Formaldehyde concentration, ppmvd = $\frac{M_{hcho} \text{ x } 0.02404}{V_{m(std)} \text{ x } 0.028317 \text{ x } MW_{hcho}}$

$E_{hcho(lbs/hr)}$ Formaldehyde emission rate from kiln, lbs/hr = $\frac{C_{hcho} \text{ } MW_{hcho} \text{ x } Q_{std(kiln)}}{385.1E06}$

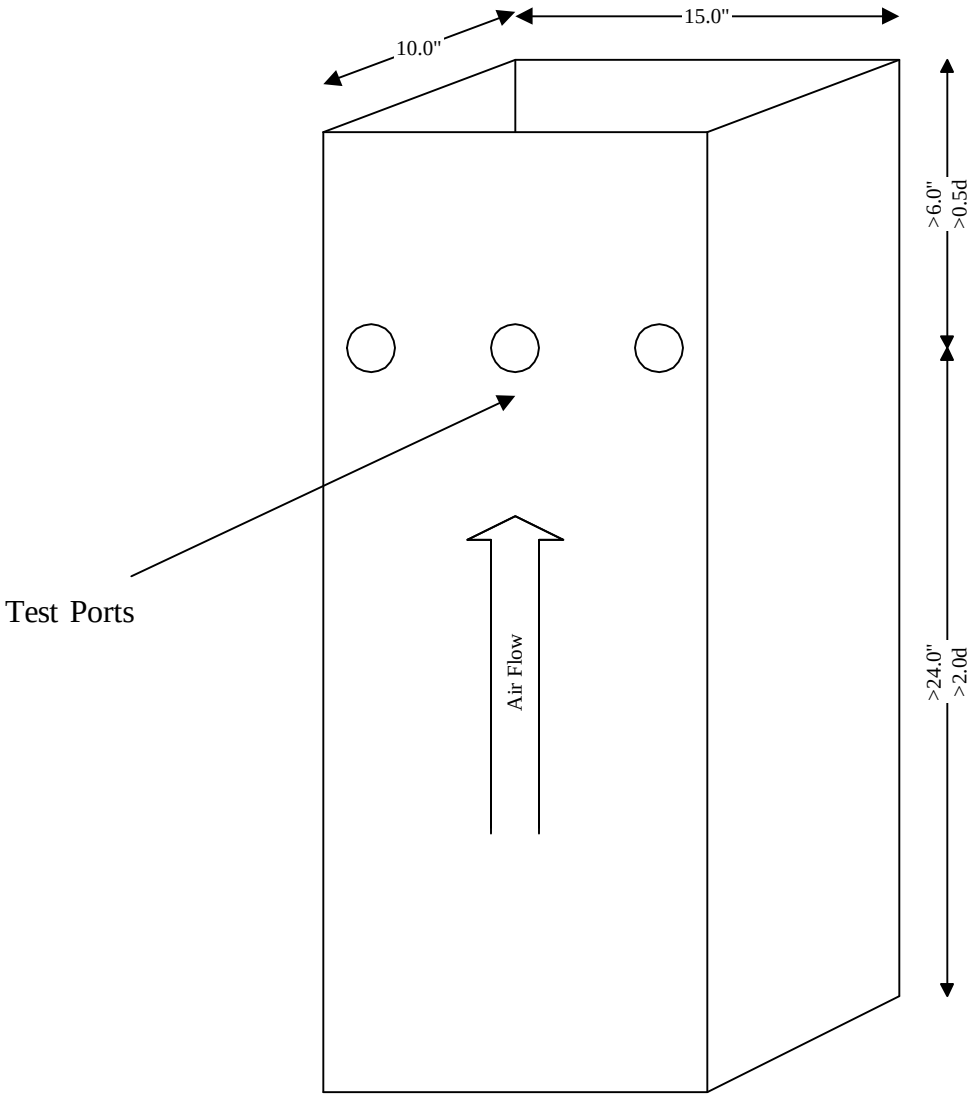
$E_{hcho(lbs/MBF)}$ Formaldehyde emission rate from kiln, lbs/MBF = $\frac{E_{hcho(lbs/hr)} \text{ x } 1{,}000}{PROD}$

SOURCE TEST CALCULATIONS
USEPA Method 19 – "F_d" Calculations

K	Conversion factor, unitless = 10^6 Btu/MMBtu
$\%H_{sd}$	Concentration of hydrogen in sawdust from ultimate fuel analysis, percent by weight
$\%C_{sd}$	Concentration of carbon in sawdust from ultimate fuel analysis, percent by weight
$\%S_{sd}$	Concentration of sulfur in sawdust from ultimate fuel analysis, percent by weight
$\%N_{sd}$	Concentration of nitrogen in sawdust from an ultimate fuel analysis, percent by weight
$\%O_{sd}$	Concentration of oxygen in sawdust from ultimate fuel analysis, percent by weight
K_{hd}	Constant, (dscf/lb)/% = (3.64 dscf/lb)/%
K_c	Constant, (dscf/lb)/% = (1.53 dscf/lb)/%
K_s	Constant, (dscf/lb)/% = (0.57 dscf/lb)/%
K_n	Constant, (dscf/lb)/% = (0.14 dscf/lb)/%
K_o	Constant, (dscf/lb)/% = (0.46 dscf/lb)/%
$GCV_{sd(d)}$	Gross caloric value of sawdust from ultimate fuel analysis, dry basis, Btu/lb
$GCV_{sd(w)}$	Gross caloric value of sawdust from ultimate fuel analysis, wet basis, Btu/lb
F_d	Volume of combustion components per unit of heat content for sawdust, dscf/MMBtu = $\frac{K\left(K_{hd}\%H_{sd} + K_c\%C_{sd} + K_sS_{sd} + K_n\%N_{sd} - K_o\%O_{sd}\right)}{GCV_{sd(d)}}$

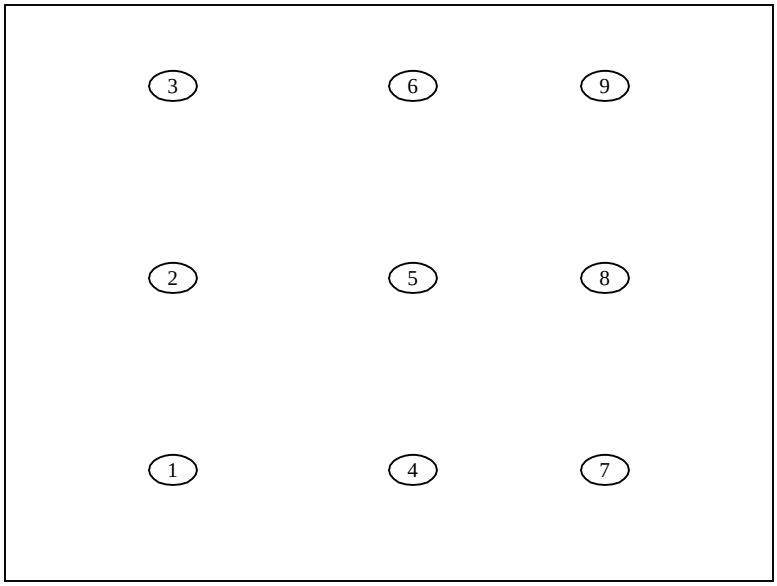
3.4 Stack Schematics

Traverse points were determined by Method 1 of 40 CFR Part 60, Appendix A - "Sample and Velocity Traverses for Stationary Sources." Method 1 implements the use of stack dimensions for the determination of the location of sample ports and traverse points. The diameter of the duct is taken into consideration in order to meet criteria concerning the location of test port openings. Traverse points are determined as a percentage of the stack diameter as measured from the inside wall of the stack. Method 1 provides guidelines for the calculation and location of each traverse point based on the stack diameter. Schematic drawings of the sample traverse points are detailed on the following pages.



BIBLER BROTHERS LUMBER COMPANY
RUSSELLVILLE, ARKANSAS

SN-07G Kiln #3
Side View



Sample Point	Location
1, 4, and 7	2.50"
2, 5 and 8	5.00"
3, 6 and 9	7.50"

BIBLER BROTHERS LUMBER COMPANY
RUSSELLVILLE, ARKANSAS

SN-07G Kiln #3
Sample Points

Field and Laboratory Data

4.1 Field Data

The following pages represent the field data for the source tested during this testing program.

Environmental Services Co., Inc.

STACK SAMPLING FIELD DATA

Plant Name: Bibler Brothers Lumber Company Stack Name: SN-07G

Operator: JNW Run Number: 1 EPA Method: 5

Date: 07/06/11 Control Number: 1107010258

Stack Dia. (ft): 1.2500 x 0.83333 Bar. Pres. (in. Hg): 30.03 Static Pres. (in. Hg): 0.00

Probe Tip Diameter (in): 0.466 Pitot Factor: 0.840 Meter Factor: SN 1224→1.005

Start Time: 1103 Stop Time: 1204

Percent O_2: Percent CO_2: Percent CO + N_2:

Pre-Leak Checks: Pitots: ok System: ok @15"Hg<0.005

Post-Leak Checks: Pitots: ok System: ok @16"Hg<0.005

Point	Sample Time	Dwell Time	Dry Gas Meter Reading	ΔP Inches H_2O	ΔH Inches H_2O	Dry Gas Meter Temperature °F		Vacuum In. Hg	Dryer Temp ºF	Probe Temp ºF	Oven Temp ºF	Stack Temp ºF
			513.602			Inlet	Outlet					
1	6.75	1103	518.400	0.07	1.90	83	81	6.0	92	254	253	149
2	6.75	1109	523.000	0.06	1.60	86	82	6.0	79	252	252	156
3	6.75	1116	529.100	0.06	1.60	86	82	6.0	72	254	252	156
4	6.75	1123	533.000	0.07	1.90	87	83	7.0	64	253	251	156
5	6.75	1129	537.100	0.04	1.20	89	84	6.0	63	254	251	152
6	6.75	1136	541.300	0.04	1.20	89	84	6.0	65	254	252	151
7	6.75	1143	546.400	0.06	1.80	90	85	7.0	62	252	251	150
8	6.75	1150	550.900	0.04	1.30	90	85	6.0	63	252	250	151
9	6.75	1157	554.856	0.03	1.00	91	86	6.0	65	253	250	151
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Environmental Services Co., Inc.
IMPINGER CATCH

Plant Name: Bibler Brothers Lumber Company

Stack Name: SN-07G Sample Date: 07/06/11

Run #: 1 Control Number: 1107010258

Impinger Number	Solution Used	Amount of Solution (millimeters)	Weight (grams)	
			Final:	876.8
			Initial:	732.0
1	H2O	100	Weight Gain:	144.8
			Final:	766.7
			Initial:	722.1
2	H2O	100	Weight Gain:	44.6
			Final:	713.5
			Initial:	655.5
3	Empty	0	Weight Gain:	58.0
			Final:	921.1
			Initial:	914.1
4	Silica Gel	200g	Weight Gain:	7.0

TOTAL WEIGHT GAIN OF IMPINGERS (GRAMS) 254.4

Environmental Services Co., Inc.

STACK SAMPLING FIELD DATA

Plant Name: Bibler Brothers Lumber Company Stack Name: SN-07G

Operator: JNW Run Number: 2 EPA Method: 5

Date: 07/06/11 Control Number: 1107010259

Stack Dia. (ft): 1.2500 x 0.83333 Bar. Pres. (in. Hg): 30.03 Static Pres. (in. Hg): 0.00

Probe Tip Diameter (in): 0.466 Pitot Factor: 0.840 Meter Factor: SN 1224→1.005

Start Time: 1302 Stop Time: 1403

Percent O_2: Percent CO_2: Percent CO + N_2:

Pre-Leak Checks: Pitots: ok System: ok @14"Hg<0.005

Post-Leak Checks: Pitots: ok System: ok @15"Hg<0.005

Point	Sample Time	Dwell Time	Dry Gas Meter Reading	ΔP Inches H_2O	ΔH Inches H_2O	Dry Gas Meter Temperature °F		Vacuum In. Hg	Dryer Temp °F	Probe Temp °F	Oven Temp °F	Stack Temp °F
			581.500			Inlet	Outlet					
1	6.75	1302	585.800	0.04	1.20	91	89	5.0	96	240	251	144
2	6.75	1308	590.600	0.05	1.60	92	89	5.0	74	251	250	145
3	6.75	1315	595.000	0.03	1.40	93	90	5.0	67	252	252	144
4	6.75	1322	599.700	0.04	1.50	94	90	5.0	64	255	250	144
5	6.75	1329	604.500	0.05	1.60	95	90	6.0	64	252	250	141
6	6.75	1335	608.000	0.03	0.80	96	90	5.0	64	253	252	144
7	6.75	1342	611.500	0.03	0.80	95	91	5.0	61	252	250	144
8	6.75	1349	615.400	0.04	1.00	95	91	5.5	64	252	251	146
9	6.75	1356	619.724	0.05	1.30	95	92	6.0	66	252	251	147
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Environmental Services Co., Inc.
IMPINGER CATCH

Plant Name: Bibler Brothers Lumber Company

Stack Name: SN-07G Sample Date: 07/06/11

Run #: 2 Control Number: 1107010259

Impinger Number	Solution Used	Amount of Solution (millimeters)	Weight (grams)	
			Final:	850.6
			Initial:	725.9
1	H2O	100	Weight Gain:	124.7
			Final:	756.2
			Initial:	717.1
2	H2O	100	Weight Gain:	39.1
			Final:	664.4
			Initial:	657.5
3	Empty	0	Weight Gain:	6.9
			Final:	925.6
			Initial:	921.1
4	Silica Gel	200g	Weight Gain:	4.5

TOTAL WEIGHT GAIN OF IMPINGERS (GRAMS) 175.2

Environmental Services Co., Inc.

STACK SAMPLING FIELD DATA

Plant Name: Bibler Brothers Lumber Company Stack Name: SN-07G

Operator: JNW Run Number: 3 EPA Method: 5

Date: 07/06/11 Control Number: 1107010260

Stack Dia. (ft): 1.2500 x 0.83333 Bar. Pres. (in. Hg): 30.03 Static Pres. (in. Hg): 0.00

Probe Tip Diameter (in): 0.466 Pitot Factor: 0.840 Meter Factor: SN 1224→1.005

Start Time: 1455 Stop Time: 1556

Percent O_2: Percent CO_2: Percent CO + N_2:

Pre-Leak Checks: Pitots: ok System: ok @15"Hg<0.005

Post-Leak Checks: Pitots: ok System: ok @13"Hg<0.005

Point	Sample Time	Dwell Time	Dry Gas Meter Reading	ΔP Inches H_2O	ΔH Inches H_2O	Dry Gas Meter Temperature °F		Vacuum In. Hg	Dryer Temp °F	Probe Temp °F	Oven Temp °F	Stack Temp °F
			642.850			Inlet	Outlet					
1	6.75	1455	647.800	0.06	1.80	95	93	5.0	98	255	240	143
2	6.75	1501	652.800	0.06	1.80	96	93	6.0	76	252	250	149
3	6.75	1508	657.300	0.04	1.40	97	93	6.0	69	249	252	144
4	6.75	1515	661.200	0.03	1.00	98	93	6.0	66	251	250	146
5	6.75	1522	665.900	0.05	1.50	98	93	6.0	67	252	251	149
6	6.75	1528	671.000	0.06	1.80	98	93	6.0	63	253	250	146
7	6.75	1535	676.400	0.05	1.70	98	93	6.0	67	253	251	142
8	6.75	1542	681.100	0.05	1.70	98	93	6.0	65	251	251	144
9	6.75	1549	685.232	0.03	1.10	98	94	5.5	60	254	251	139
10												
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	60.75		42.382	√ 0.2169	1.5333		95					145

Environmental Services Co., Inc.
IMPINGER CATCH

Plant Name: Bibler Brothers Lumber Company

Stack Name: SN-07G | Sample Date: 07/06/11

Run #: 3 | Control Number: 1107010260

Impinger Number	Solution Used	Amount of Solution (millimeters)	Weight (grams)	
			Final:	847.7
			Initial:	712.9
1	H2O	100	Weight Gain:	134.8
			Final:	820.6
			Initial:	756.2
2	H2O	100	Weight Gain:	64.4
			Final:	678.2
			Initial:	664.4
3	Empty	0	Weight Gain:	13.8
			Final:	933.2
			Initial:	925.6
4	Silica Gel	200g	Weight Gain:	7.6

TOTAL WEIGHT GAIN OF IMPINGERS (GRAMS) 220.6

Environmental Services Co., Inc.

STACK SAMPLING FIELD DATA

Plant Name: Bibler Brothers Lumber Company Stack Name: SN-07G

Operator: JNW Run Number: 1 EPA Method: 316

Date: 07/06/11 Control Number: 1107010262

Stack Dia. (ft): 1.2500 x 0.83333 Bar. Pres. (in. Hg): 30.03 Static Pres. (in. Hg): 0.00

Probe Tip Diameter (in): 0.467 Pitot Factor: 0.840 Meter Factor: SN 1224→1.005

Start Time: 1010 Stop Time: 1046

Percent O_2: Percent CO_2: Percent CO + N_2:

Pre-Leak Checks: Pitots: ok System: ok @17"Hg<0.005

Post-Leak Checks: Pitots: ok System: ok @14"Hg<0.005

Point	Sample Time	Dwell Time	Dry Gas Meter Reading	ΔP Inches H_2O	ΔH Inches H_2O	Dry Gas Meter Temperature °F		Vacuum In. Hg	Dryer Temp ºF	Probe Temp ºF	Oven Temp ºF	Stack Temp ºF
			489.704			Inlet	Outlet					
1	4.00	1010	492.300	0.05	1.50	74	73	7.0	69	247	252	146
2	4.00	1014	495.200	0.06	1.80	77	74	7.0	63	245	251	147
3	4.00	1018	497.800	0.05	1.30	78	74	7.0	62	249	251	148
4	4.00	1022	500.700	0.07	1.80	80	75	7.0	66	255	252	150
5	4.00	1026	503.200	0.06	1.50	80	75	6.5	66	248	252	150
6	4.00	1030	505.700	0.05	1.20	80	76	6.0	63	250	252	154
7	4.00	1034	508.200	0.05	1.40	83	77	6.0	65	249	250	153
8	4.00	1038	510.800	0.05	1.40	83	78	6.0	67	254	251	154
9	4.00	1042	513.153	0.04	1.20	84	78	6.0	67	251	250	155
10												
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30												
	36.00		23.449	√ 0.2303	1.4556		78					151

Environmental Services Co., Inc.
IMPINGER CATCH

Plant Name: Bibler Brothers Lumber Company

Stack Name: SN-07G Sample Date: 07/06/11

Run #: 1 Control Number: 1107010262

Impinger Number	Solution Used	Amount of Solution (millimeters)	Weight (grams)	
			Final:	889.5
			Initial:	805.4
1	Milli Q H2O	200	Weight Gain:	84.1
			Final:	864.4
			Initial:	816.5
2	Milli Q H2O	200	Weight Gain:	47.9
			Final:	801.9
			Initial:	786.1
3	Milli Q H2O	200	Weight Gain:	15.8
			Final:	933.3
			Initial:	927.8
4	Silica Gel	200g	Weight Gain:	5.5

TOTAL WEIGHT GAIN OF IMPINGERS (GRAMS) 153.3

Environmental Services Co., Inc.

STACK SAMPLING FIELD DATA

Plant Name: Bibler Brothers Lumber Company Stack Name: SN-07G

Operator: JNW Run Number: 2 EPA Method: 316

Date: 07/06/11 Control Number: 1107010263

Stack Dia. (ft): 1.2500 x 0.83333 Bar. Pres. (in. Hg): 30.03 Static Pres. (in. Hg): 0.00

Probe Tip Diameter (in): 0.467 Pitot Factor: 0.840 Meter Factor: SN 1224→1.005

Start Time: 1215 Stop Time: 1251

Percent O_2: Percent CO_2: Percent CO + N_2:

Pre-Leak Checks: Pitots: ok System: ok @14"Hg<0.005

Post-Leak Checks: Pitots: ok System: ok @16"Hg<0.005

Point	Sample Time	Dwell Time	Dry Gas Meter Reading	ΔP Inches H_2O	ΔH Inches H_2O	Dry Gas Meter Temperature °F		Vacuum In. Hg	Dryer Temp °F	Probe Temp °F	Oven Temp °F	Stack Temp °F
			556.200			Inlet	Outlet					
1	4.00	1215	559.000	0.05	1.70	83	80	7.0	87	248	252	141
2	4.00	1219	561.900	0.05	1.60	87	83	7.0	83	249	251	150
3	4.00	1223	564.900	0.06	1.90	90	87	7.0	74	254	251	153
4	4.00	1227	568.200	0.07	2.10	90	87	7.0	67	249	252	155
5	4.00	1231	571.100	0.05	1.60	92	88	7.0	63	251	251	156
6	4.00	1235	573.800	0.05	1.50	92	87	7.0	64	253	251	154
7	4.00	1239	576.600	0.05	1.50	92	89	7.0	64	255	251	152
8	4.00	1243	579.000	0.03	1.00	93	89	6.5	64	249	250	152
9	4.00	1247	581.250	0.03	1.00	93	89	6.5	63	251	249	151
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	36.00		25.050	√ 0.2193	1.5444		88					152

Environmental Services Co., Inc.
IMPINGER CATCH

Plant Name: Bibler Brothers Lumber Company

Stack Name: SN-07G Sample Date: 07/06/11

Run #: 2 Control Number: 1107010263

Impinger Number	Solution Used	Amount of Solution (millimeters)	Weight (grams)	
			Final:	909.0
			Initial:	809.0
1	Milli Q H2O	200	Weight Gain:	100.0
			Final:	808.0
			Initial:	791.1
2	Milli Q H2O	200	Weight Gain:	16.9
			Final:	829.7
			Initial:	796.6
3	Milli Q H2O	200	Weight Gain:	33.1
			Final:	936.3
			Initial:	933.2
4	Silica Gel	200g	Weight Gain:	3.1

TOTAL WEIGHT GAIN OF IMPINGERS (GRAMS) 153.1

Environmental Services Co., Inc.

STACK SAMPLING FIELD DATA

Plant Name: Bibler Brothers Lumber Company Stack Name: SN-07G

Operator: JNW Run Number: 3 EPA Method: 316

Date: 07/06/11 Control Number: 1107010264

Stack Dia. (ft): 1.2500 x 0.83333 Bar. Pres. (in. Hg): 30.03 Static Pres. (in. Hg): 0.00

Probe Tip Diameter (in): 0.467 Pitot Factor: 0.840 Meter Factor: SN 1224→1.005

Start Time: 1413 Stop Time: 1449

Percent O_2: Percent CO_2: Percent CO + N_2:

Pre-Leak Checks: Pitots: ok System: ok @15"Hg<0.005

Post-Leak Checks: Pitots: ok System: ok @14"Hg<0.005

Point	Sample Time	Dwell Time	Dry Gas Meter Reading	ΔP Inches H_2O	ΔH Inches H_2O	Dry Gas Meter Temperature °F		Vacuum In. Hg	Dryer Temp °F	Probe Temp °F	Oven Temp °F	Stack Temp °F
			620.100			Inlet	Outlet					
1	4.00	1413	622.600	0.04	1.20	93	92	6.0	99	249	259	145
2	4.00	1417	625.600	0.06	1.80	95	92	7.0	77	239	254	152
3	4.00	1421	628.100	0.04	1.20	95	92	6.5	64	244	250	153
4	4.00	1425	630.800	0.05	1.50	95	92	6.5	64	251	250	154
5	4.00	1429	633.300	0.04	1.20	96	92	6.5	63	256	252	152
6	4.00	1433	635.800	0.04	1.20	96	93	6.5	64	259	250	150
7	4.00	1437	638.000	0.03	0.90	96	93	6.0	58	246	251	150
8	4.00	1441	640.100	0.03	0.90	96	93	6.0	56	247	253	151
9	4.00	1445	642.588	0.04	1.20	96	93	6.5	62	248	251	151
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	36.00		22.488	√ 0.2017	1.2333		94					151

Environmental Services Co., Inc.
IMPINGER CATCH

Plant Name: Bibler Brothers Lumber Company

Stack Name: SN-07G Sample Date: 07/06/11

Run #: 3 Control Number: 1107010264

Impinger Number	Solution Used	Amount of Solution (millimeters)	Weight (grams)	
			Final:	850.9
			Initial:	807.4
1	Milli Q H2O	200	Weight Gain:	43.5
			Final:	877.5
			Initial:	808.2
2	Milli Q H2O	200	Weight Gain:	69.3
			Final:	852.7
			Initial:	835.7
3	Milli Q H2O	200	Weight Gain:	17.0
			Final:	942.1
			Initial:	936.3
4	Silica Gel	200g	Weight Gain:	5.8

TOTAL WEIGHT GAIN OF IMPINGERS (GRAMS) 135.6

Environmental Services Company, Inc.
13715 West Markham
LIttle Rock, Arkansas 72211

ANALYZER CALIBRATION

Plant Name:	Bibler Brothers Lumber Company
Stack Name:	SN-07G
Date:	07/06/11

Parameter	O2	CO2	NOx	CO	SO2	THC
Zero Gas Value	0.00	0.00	0.00	0.00		0.00
Analyzer Value	0.07	0.05	0.03	0.33		0.87
Captured Time	08:16:06	08:16:06	08:24:23	08:16:06		10:50:57
Calibration Error, %	0.35	0.51	0.32	0.07		
Status	Pass	Pass	Pass	Pass		
Low Span Gas Value						268.30
Analyzer Value						267.22
Captured Time						10:54:29
Predicted Cal Response						267.95
Calibration Error, %						0.27
Status						Pass
Mid Span Gas Value	9.95	4.95	5.59	230.00		500.00
Analyzer Value	9.94	4.93	5.56	231.70		508.83
Captured Time	08:24:23	08:24:23	08:50:15	08:25:58		10:52:50
Predicted Cal Response						499.36
Calibration Error, %	0.05	0.21	0.32	0.38		1.89
Status	Pass	Pass	Pass	Pass		Pass
High Span Gas Value	20.10	9.72	9.50	449.00		940.60
Analyzer Value	20.17	9.79	9.52	449.81		940.26
Captured Time	08:21:19	08:21:19	08:46:23	08:24:23		10:49:08
Calibration Error, %	0.35	0.72	0.21	0.18		
Calibration Slope						0.9987
Status	Pass	Pass	Pass	Pass		

THC BASIS ***C3***

Environmental Services Company, Inc.
13715 West Markham
LIttle Rock, Arkansas 72211

ANALYZER BIAS/DRIFT

Plant Name:	Bibler Brothers Lumber Company
Stack Name:	SN-07G
Date:	07/06/11

Parameter	O2	CO2	NOx	CO	SO2	THC
Zero Gas						
Analyzer Cal Response	0.07	0.05	0.03	0.33		
Initial Cal Response	0.06	0.08	0.04	0.62		0.87
Captured Time	09:55:00	09:55:00	09:55:00	09:55:00		10:50:57
Initial System Bias, %	0.05	0.31	0.11	0.06		
Status	Pass	Pass	Pass	Pass		
Final Cal Response	0.09	0.01	0.05	1.58		1.26
Captured Time	16:06:14	16:06:14	16:06:14	16:06:14		16:00:58
Final System Bias, %	0.10	0.41	0.21	0.28		
Status	Pass	Pass	Pass	Pass		
Drift, %	0.15	0.72	0.11	0.21		0.04
Status	Pass	Pass	Pass	Pass		Pass
High Level Gas						268.30
Analyzer Cal Response	20.17	9.79	5.56	231.70		
Initial Cal Response	20.02	9.77	5.52	231.45		267.22
Captured Time	10:02:49	10:02:49	10:06:31	10:00:17		10:54:29
Initial System Bias, %	0.75	0.21	0.42	0.06		
Status	Pass	Pass	Pass	Pass		
Final Cal Response	19.96	9.83	5.51	229.47		266.97
Captured Time	16:09:47	16:09:47	16:14:40	16:10:21		15:57:54
Final System Bias, %	1.04	0.41	0.53	0.50		
Status	Pass	Pass	Pass	Pass		
Drift, %	0.30	0.62	0.11	0.44		0.03
Status	Pass	Pass	Pass	Pass		Pass

DASYLab - V 7.00.04
WORKSHEET : o2-co2-co-nox-no-no2
Recording Date : 7/6/2011, 8:11:21 AM
Block Length : 1
Delta : 1 sec.
Number of Channels : 5

Date	Time	O2 [ppm]	CO2 [ppm]	VOC [ppm]	CO [ppm]	NOx [ppm]
7/6/2011	8:11:21	20.94	0.2	-6.8	1.28	4.29
7/6/2011	8:11:49	20.94	0.19	1.23	1.26	0.26
7/6/2011	8:11:50	20.94	0.2	-1.24	1.63	0.27
7/6/2011	8:16:06	0.07	0.05	2.19	0.33	0.25
7/6/2011	8:21:19	20.17	9.79	2	932.6	0.09
7/6/2011	8:24:23	9.94	4.93	1.86	449.81	0.03
7/6/2011	8:25:58	0.05	0.05	1.61	231.7	47.89
7/6/2011	8:41:01	0.06	0.18	1.95	0.91	46.32
7/6/2011	8:41:16	0.05	0.18	2.07	1.08	46.31
7/6/2011	8:41:31	0.05	0.18	2.22	1.16	46.27
7/6/2011	8:41:46	0.05	0.19	2.12	1.03	46.31
7/6/2011	8:42:01	0.06	0.19	2.06	0.99	46.28
7/6/2011	8:46:23	0.06	0.07	2.25	0.38	9.52
7/6/2011	8:50:15	0.06	0.07	2.16	0.47	5.56
7/6/2011	9:55:00	0.06	0.08	1.11	0.62	0.04
7/6/2011	10:00:14	0.02	0.04	5.65	243	47.3
7/6/2011	10:00:15	0.01	0.05	5.92	234.98	47.28
7/6/2011	10:00:16	0.02	0.05	5.88	233.41	47.28
7/6/2011	10:00:17	0.03	0.04	6.37	231.45	47.34
7/6/2011	10:02:49	20.02	9.77	7.69	927.66	6.91
7/6/2011	10:06:31	0.03	0.04	8.23	0.59	5.52
7/6/2011	10:11:02	17.86	2.74	207.91	103.73	3.48
7/6/2011	10:12:02	17.78	2.82	210.5	105.12	3.54
7/6/2011	10:13:02	17.74	2.85	210.46	104.89	3.61
7/6/2011	10:14:02	17.75	2.83	208.06	103.15	3.62
7/6/2011	10:15:02	17.77	2.82	207.09	102.25	3.59
7/6/2011	10:16:02	17.78	2.81	204.27	102.57	3.5
7/6/2011	10:17:02	17.74	2.84	205.26	105.14	3.5
7/6/2011	10:18:02	17.63	2.95	215.15	109.93	3.53
7/6/2011	10:19:02	17.43	3.15	231.72	117.78	3.68
7/6/2011	10:20:02	17.22	3.35	244.35	125.91	3.8
7/6/2011	10:21:02	17.07	3.5	250.25	132.42	3.89
7/6/2011	10:22:02	17.01	3.54	247.79	136.94	3.91
7/6/2011	10:23:02	17.06	3.5	241.69	137.39	3.77
7/6/2011	10:24:02	17.09	3.46	229.06	138.09	3.8
7/6/2011	10:25:02	17.08	3.46	231.44	140.43	3.85
7/6/2011	10:26:02	16.99	3.53	236.82	145.29	3.95
7/6/2011	10:27:02	16.91	3.59	243.2	150.15	4.09
7/6/2011	10:28:02	16.87	3.64	246.48	152.04	4.21
7/6/2011	10:29:02	16.81	3.68	244.32	152.55	4.3
7/6/2011	10:30:02	16.68	3.79	252.17	154.25	4.47
7/6/2011	10:31:02	16.56	3.89	261.62	157.9	4.62
7/6/2011	10:32:02	16.54	3.91	267.6	157.43	4.82
7/6/2011	10:33:02	16.56	3.88	269.21	154.74	4.95
7/6/2011	10:34:02	16.55	3.89	272.24	152.6	5.19

7/6/2011	10:35:02	16.49	3.94	276.95	152.8	5.47
7/6/2011	10:36:02	16.41	4.01	281.5	153.93	5.78
7/6/2011	10:37:02	16.38	4.04	285.33	153.36	6
7/6/2011	10:38:02	16.33	4.09	292.18	153.92	6.23
7/6/2011	10:39:02	16.27	4.15	294.76	155.31	6.35
7/6/2011	10:40:02	16.18	4.23	302.16	158.41	6.56
7/6/2011	10:41:02	16.12	4.28	120.01	160.6	6.65
7/6/2011	10:42:02	16.12	4.29	4.25	160.8	6.84
7/6/2011	10:43:02	16.14	4.25	516.72	158.66	7.01
7/6/2011	10:44:02	16.26	4.16	796.44	154.21	6.99
7/6/2011	10:45:02	16.36	4.07	336.85	148.3	6.9
7/6/2011	10:46:02	16.37	4.06	343.54	145.56	7
7/6/2011	10:49:03	20.33	0.22	938.8	42.94	0.35
7/6/2011	10:49:08	20.34	0.23	940.26	42.05	0.34
7/6/2011	10:50:57	20.34	0.21	0.87	41.1	0.36
7/6/2011	10:52:50	20.33	0.21	508.83	37.55	0.2
7/6/2011	10:54:29	20.34	0.22	267.22	39.1	0.17
7/6/2011	11:04:42	16.31	4.11	334.53	154.8	5.66
7/6/2011	11:05:42	16.35	4.06	325.95	152.87	5.65
7/6/2011	11:06:42	16.44	3.99	314.83	149.45	5.63
7/6/2011	11:07:42	16.56	3.9	302.56	145.26	5.5
7/6/2011	11:08:42	16.67	3.81	287.33	140.47	5.29
7/6/2011	11:09:42	16.74	3.75	281.1	136.58	5.16
7/6/2011	11:10:42	16.81	3.7	276.2	133.44	5.09
7/6/2011	11:11:42	16.85	3.67	271.56	131.11	5.09
7/6/2011	11:12:42	16.88	3.64	267.96	130.87	5.19
7/6/2011	11:13:42	16.93	3.59	261.68	131.04	5.28
7/6/2011	11:14:42	16.99	3.54	255.71	129.57	5.43
7/6/2011	11:15:42	16.99	3.53	256.2	128.41	5.58
7/6/2011	11:16:42	16.92	3.59	258.63	129.45	5.74
7/6/2011	11:17:42	16.84	3.67	269.76	131.99	5.92
7/6/2011	11:18:42	16.79	3.72	271.27	135.07	6
7/6/2011	11:19:42	16.78	3.73	270.22	137.04	6.1
7/6/2011	11:20:42	16.79	3.73	271.76	136.56	6.18
7/6/2011	11:21:42	16.85	3.68	267.56	134.44	6.02
7/6/2011	11:22:42	16.89	3.65	265.82	132.1	5.8
7/6/2011	11:23:42	16.86	3.66	271.08	132.08	5.65
7/6/2011	11:24:42	16.83	3.68	270.53	131.67	5.55
7/6/2011	11:25:42	16.95	3.58	260.51	128.71	5.31
7/6/2011	11:26:42	17.2	3.36	242.53	120.91	4.91
7/6/2011	11:27:42	17.41	3.15	230.67	112.74	4.51
7/6/2011	11:28:42	17.57	3	223.9	106.85	4.21
7/6/2011	11:29:42	17.7	2.86	216.11	102.22	4
7/6/2011	11:30:42	17.87	2.7	205.95	96.39	3.91
7/6/2011	11:31:42	17.98	2.6	204.06	91.68	3.82
7/6/2011	11:32:42	18.09	2.51	198.05	87.66	3.72
7/6/2011	11:33:42	18.17	2.44	196.77	84.05	3.63
7/6/2011	11:34:42	18.21	2.4	195.76	82.21	3.52
7/6/2011	11:35:42	18.26	2.36	187.52	80.72	3.45
7/6/2011	11:36:42	18.29	2.32	186.96	80.06	3.36
7/6/2011	11:37:42	18.35	2.28	180.96	79.19	3.2
7/6/2011	11:38:42	18.42	2.21	177.42	76.91	3.06

7/6/2011	11:39:42	18.42	2.2	176.99	76	3.02
7/6/2011	11:40:42	18.37	2.25	182.19	77.16	3.06
7/6/2011	11:41:42	18.33	2.29	183.53	78.68	3.13
7/6/2011	11:42:42	18.35	2.27	177.54	78.27	3.1
7/6/2011	11:43:42	18.42	2.21	171.75	76.39	3.02
7/6/2011	11:44:42	18.47	2.17	170	75.41	3.02
7/6/2011	11:45:42	18.47	2.16	171.65	75.77	3.04
7/6/2011	11:46:42	18.43	2.19	174.2	77.54	3.19
7/6/2011	11:47:42	18.37	2.24	176.96	81.08	3.22
7/6/2011	11:48:42	18.32	2.29	178.8	83.65	3.3
7/6/2011	11:49:42	18.22	2.38	186.64	87.06	3.36
7/6/2011	11:50:42	18.05	2.52	198.13	92.98	3.51
7/6/2011	11:51:42	17.87	2.68	208.04	98.88	3.66
7/6/2011	11:52:42	17.76	2.79	212.79	102.4	3.84
7/6/2011	11:53:42	17.7	2.85	215.23	103.77	3.87
7/6/2011	11:54:42	17.79	2.77	208.59	102.04	3.71
7/6/2011	11:55:42	17.92	2.64	201.11	98.08	3.51
7/6/2011	11:56:42	18.02	2.56	196.07	94.47	3.35
7/6/2011	11:57:42	18.1	2.48	191.41	90.82	3.23
7/6/2011	11:58:42	18.15	2.44	188.28	88.46	3.16
7/6/2011	11:59:42	18.2	2.4	185.27	86.2	3.11
7/6/2011	12:00:42	18.24	2.36	179.54	83.41	3.01
7/6/2011	12:01:42	18.28	2.32	175.93	80.89	2.93
7/6/2011	12:02:42	18.33	2.28	171.46	78.85	2.85
7/6/2011	12:03:42	18.38	2.24	167	76.89	2.73
7/6/2011	12:16:42	17.85	2.68	195.94	98.7	3.31
7/6/2011	12:17:42	17.71	2.79	204.63	100.82	3.49
7/6/2011	12:18:42	17.35	3.1	227.96	109.4	3.9
7/6/2011	12:19:42	17.05	3.39	243.96	119.65	4.24
7/6/2011	12:20:42	16.87	3.56	247.94	127.65	4.39
7/6/2011	12:21:42	16.68	3.72	254.62	146.64	4.4
7/6/2011	12:22:42	16.41	3.96	271.62	176.63	4.57
7/6/2011	12:23:42	16.22	4.13	280.73	199.42	4.76
7/6/2011	12:24:42	16.2	4.17	274.17	207.47	4.73
7/6/2011	12:25:42	16.3	4.1	268.15	204.83	4.61
7/6/2011	12:26:42	16.35	4.05	266.63	198.19	4.65
7/6/2011	12:27:42	16.32	4.09	271.35	195.42	4.87
7/6/2011	12:28:42	16.28	4.13	276.74	194.18	5.06
7/6/2011	12:29:42	16.27	4.15	281.3	192.39	5.19
7/6/2011	12:30:42	16.39	4.05	273.74	183.79	5.19
7/6/2011	12:31:42	16.47	3.98	275.21	175.07	5.19
7/6/2011	12:32:42	16.5	3.95	277.04	172.57	5.19
7/6/2011	12:33:42	16.57	3.89	276.02	169.44	5.07
7/6/2011	12:34:42	16.75	3.73	261.46	162.84	4.85
7/6/2011	12:35:42	16.94	3.56	250.51	154.85	4.48
7/6/2011	12:36:42	17.06	3.45	244.29	149.57	4.25
7/6/2011	12:37:42	17.07	3.44	245.75	148.2	4.13
7/6/2011	12:38:42	17.01	3.49	254.59	150.8	4.11
7/6/2011	12:39:42	17	3.49	253.98	151.96	4.02
7/6/2011	12:40:42	17.03	3.46	252.42	150.97	3.95
7/6/2011	12:41:42	17.11	3.39	250.69	148.97	3.82
7/6/2011	12:42:42	17.43	3.1	226.54	139.37	3.49

7/6/2011	12:43:42	17.87	2.68	196.54	122.22	2.99
7/6/2011	12:44:42	18.22	2.37	179.47	106.33	2.62
7/6/2011	12:45:42	18.45	2.18	169.66	95.51	2.4
7/6/2011	12:46:42	18.53	2.1	170.56	90.03	2.34
7/6/2011	12:47:42	18.63	2.02	160.68	85.03	2.24
7/6/2011	12:48:42	18.73	1.92	150.41	78.64	2.13
7/6/2011	12:49:42	18.8	1.85	141.68	73.61	2.07
7/6/2011	12:50:42	18.84	1.8	139.57	69.86	2.04
7/6/2011	13:02:43	18.94	1.68	137.23	66.25	2.17
7/6/2011	13:03:43	18.98	1.65	133.17	65.65	2.17
7/6/2011	13:04:43	18.99	1.63	131.39	63.9	2.18
7/6/2011	13:05:43	19.01	1.6	124.08	61.35	2.21
7/6/2011	13:06:43	18.95	1.63	127.81	60.04	2.31
7/6/2011	13:07:43	18.89	1.67	130.43	59.97	2.4
7/6/2011	13:08:43	18.84	1.71	132.95	59.28	2.44
7/6/2011	13:09:43	18.85	1.7	129.05	56.92	2.48
7/6/2011	13:10:43	18.86	1.7	127.96	54.24	2.49
7/6/2011	13:11:43	18.89	1.69	127.23	52.51	2.54
7/6/2011	13:12:43	18.92	1.67	124.9	50.48	2.53
7/6/2011	13:13:43	18.93	1.66	123.51	49.35	2.55
7/6/2011	13:14:43	18.99	1.6	116.69	47.48	2.5
7/6/2011	13:15:43	19.02	1.57	117.29	45.68	2.41
7/6/2011	13:16:43	18.97	1.63	125.51	47.55	2.53
7/6/2011	13:17:43	18.97	1.63	120.66	48.72	2.57
7/6/2011	13:18:43	19	1.61	118.67	47.85	2.57
7/6/2011	13:19:43	18.93	1.65	122.71	47.57	2.61
7/6/2011	13:20:43	18.88	1.7	124.62	48.3	2.69
7/6/2011	13:21:43	18.86	1.72	124.46	47.97	2.75
7/6/2011	13:22:43	18.81	1.77	130.72	48.54	2.85
7/6/2011	13:23:43	18.85	1.75	123.98	48.29	2.78
7/6/2011	13:24:43	19.01	1.6	112.13	44.49	2.51
7/6/2011	13:25:43	19.08	1.54	110.89	42.1	2.38
7/6/2011	13:26:43	19.04	1.57	116.3	42.44	2.34
7/6/2011	13:27:43	19.01	1.6	116.47	43.61	2.36
7/6/2011	13:28:43	19.01	1.6	114.16	43.56	2.33
7/6/2011	13:29:43	18.96	1.64	118.21	44.8	2.34
7/6/2011	13:30:43	18.96	1.64	115.87	45.45	2.24
7/6/2011	13:31:43	18.95	1.65	117.56	46.11	2.25
7/6/2011	13:32:43	18.88	1.71	123.98	47.9	2.27
7/6/2011	13:33:43	18.75	1.81	129.11	51.39	2.33
7/6/2011	13:34:43	18.68	1.88	132.44	54.24	2.36
7/6/2011	13:35:43	18.68	1.89	131.79	55.33	2.32
7/6/2011	13:36:43	18.67	1.9	130.25	56.34	2.27
7/6/2011	13:37:43	18.61	1.95	133.93	58.66	2.25
7/6/2011	13:38:43	18.45	2.1	143.91	65.22	2.45
7/6/2011	13:39:43	18.31	2.24	151.71	72.35	2.67
7/6/2011	13:40:43	18.25	2.29	150.15	75.63	2.81
7/6/2011	13:41:43	18.23	2.3	149.57	76.64	2.84
7/6/2011	13:42:43	18.29	2.23	140.04	74.68	2.78
7/6/2011	13:43:43	18.33	2.19	138.63	73.12	2.78
7/6/2011	13:44:43	18.29	2.21	141.12	74.27	2.86
7/6/2011	13:45:43	18.06	2.39	159.75	80.09	3.2

7/6/2011	13:46:43	17.67	2.75	186.49	92.81	3.87
7/6/2011	13:47:43	17.29	3.12	209.11	107.47	4.43
7/6/2011	13:48:43	17.02	3.38	220.05	120.15	4.77
7/6/2011	13:49:43	16.77	3.62	234.36	133.96	5.09
7/6/2011	13:50:43	16.45	3.9	259.02	148.37	5.48
7/6/2011	13:51:43	16.23	4.09	273.75	157.33	5.75
7/6/2011	13:52:43	16.18	4.14	272.84	159.44	5.79
7/6/2011	13:53:43	16.3	4.03	261.91	156.05	5.63
7/6/2011	13:54:43	16.45	3.9	254.45	152.9	5.41
7/6/2011	13:55:43	16.42	3.92	263.85	155.51	5.37
7/6/2011	13:56:43	16.25	4.08	282.94	161.86	5.48
7/6/2011	13:57:43	16.1	4.21	300.89	165.79	5.48
7/6/2011	13:58:43	16	4.31	309.75	169.09	5.34
7/6/2011	13:59:43	15.91	4.4	314.52	173.64	5.12
7/6/2011	14:00:43	15.86	4.46	314.96	177.29	5.03
7/6/2011	14:01:43	15.85	4.46	310.75	177.81	5.03
7/6/2011	14:02:43	15.87	4.43	311.38	176.91	5.06
7/6/2011	14:13:13	15.95	4.32	295.71	198.21	4.6
7/6/2011	14:14:13	15.97	4.29	290.48	200.21	4.54
7/6/2011	14:15:13	16.07	4.19	282.5	198.36	4.46
7/6/2011	14:16:13	16.13	4.15	284.06	196.57	4.33
7/6/2011	14:17:13	16.11	4.16	296.83	199.29	4.23
7/6/2011	14:18:13	16.09	4.18	293.39	203.56	4.23
7/6/2011	14:19:13	16.1	4.16	289.91	205.54	4.21
7/6/2011	14:20:13	16.09	4.19	292.3	207.01	4.19
7/6/2011	14:21:13	15.98	4.28	299.62	211.29	4.29
7/6/2011	14:22:13	15.87	4.39	305.32	219.16	4.37
7/6/2011	14:23:13	15.88	4.39	303.65	224.14	4.31
7/6/2011	14:24:13	15.9	4.37	303.5	226.11	4.25
7/6/2011	14:25:13	15.75	4.51	317.88	232.03	4.33
7/6/2011	14:26:13	15.56	4.7	333.88	240.2	4.47
7/6/2011	14:27:13	15.6	4.68	335.59	237.97	4.48
7/6/2011	14:28:13	15.89	4.42	310.22	223.68	4.22
7/6/2011	14:29:13	16.12	4.22	303.31	213.61	3.95
7/6/2011	14:30:13	16.33	4.05	289.49	207.74	3.59
7/6/2011	14:31:13	16.61	3.81	275.11	199.43	3.23
7/6/2011	14:32:13	17.06	3.41	239.98	181.67	2.88
7/6/2011	14:33:13	17.48	3.02	222.53	159.04	2.58
7/6/2011	14:34:13	17.77	2.72	209.64	139.38	2.47
7/6/2011	14:35:13	17.94	2.56	208.3	124.61	2.45
7/6/2011	14:36:13	17.98	2.53	211.09	115.21	2.57
7/6/2011	14:37:13	17.88	2.6	224.13	112.54	2.84
7/6/2011	14:38:13	17.76	2.71	231.16	112.94	3.13
7/6/2011	14:39:13	17.65	2.81	240	114.08	3.3
7/6/2011	14:40:13	17.58	2.89	245.12	115.6	3.45
7/6/2011	14:41:13	17.62	2.86	236.65	113.13	3.51
7/6/2011	14:42:13	17.57	2.9	232.32	112.61	3.72
7/6/2011	14:43:13	17.37	3.07	243.36	119.27	4.09
7/6/2011	14:44:13	17.07	3.32	259.3	130.15	4.53
7/6/2011	14:45:13	16.89	3.48	263.85	142.36	4.85
7/6/2011	14:46:13	16.77	3.6	272.49	149.91	5.04
7/6/2011	14:47:13	16.66	3.71	281.28	155.47	5.19

7/6/2011	14:48:13	16.55	3.82	283.41	160.7	5.39
7/6/2011	14:56:09	17.29	3.15	245.81	135.96	4.01
7/6/2011	14:57:09	17.45	2.98	241.37	125.15	3.75
7/6/2011	14:58:09	17.57	2.86	238.82	116.76	3.56
7/6/2011	14:59:09	17.62	2.82	239.7	110.58	3.48
7/6/2011	15:00:09	17.64	2.81	243.06	108.29	3.46
7/6/2011	15:01:09	17.73	2.71	234.58	103	3.33
7/6/2011	15:02:09	17.72	2.71	231.07	100.03	3.31
7/6/2011	15:03:09	17.66	2.78	239.19	102.86	3.34
7/6/2011	15:04:09	17.62	2.84	244.21	105.99	3.39
7/6/2011	15:05:09	17.66	2.81	235.82	105.2	3.34
7/6/2011	15:06:09	17.74	2.73	226.11	101.6	3.2
7/6/2011	15:07:09	17.8	2.68	224.03	98.31	3.04
7/6/2011	15:08:09	17.81	2.65	222.04	96.36	2.98
7/6/2011	15:09:09	17.88	2.59	213.13	94.02	2.83
7/6/2011	15:10:09	17.94	2.54	208.88	90.48	2.78
7/6/2011	15:11:09	17.86	2.6	218.17	91.69	2.83
7/6/2011	15:12:09	17.75	2.71	227.78	95.44	2.95
7/6/2011	15:13:09	17.69	2.77	228.29	97.51	3.02
7/6/2011	15:14:09	17.59	2.87	229.38	100.27	3.12
7/6/2011	15:15:09	17.53	2.94	238.72	103.93	3.14
7/6/2011	15:16:09	17.49	2.99	243.29	106.1	3.22
7/6/2011	15:17:09	17.46	3.02	247.39	108.01	3.24
7/6/2011	15:18:09	17.52	2.96	241.37	106.99	3.22
7/6/2011	15:19:09	17.59	2.9	229.61	104.74	3.21
7/6/2011	15:20:09	17.61	2.87	227.8	103.14	3.15
7/6/2011	15:21:09	17.68	2.8	221.67	101.21	3.05
7/6/2011	15:22:09	17.83	2.65	209.23	96.55	2.97
7/6/2011	15:23:09	17.95	2.55	204.88	91.6	2.89
7/6/2011	15:24:09	18.03	2.48	197.9	87.89	2.82
7/6/2011	15:25:09	18.07	2.45	195	86.42	2.73
7/6/2011	15:26:09	18.14	2.4	192.27	84.45	2.54
7/6/2011	15:27:09	18.21	2.33	182.78	81.28	2.44
7/6/2011	15:28:09	18.24	2.31	184.01	80.01	2.4
7/6/2011	15:29:09	18.3	2.25	178.8	77.8	2.31
7/6/2011	15:30:09	18.37	2.19	174.58	75.18	2.26
7/6/2011	15:31:09	18.44	2.13	169.78	73.33	2.22
7/6/2011	15:32:09	18.54	2.03	160.36	69.58	2.14
7/6/2011	15:33:09	18.58	2	162.65	67.13	2.13
7/6/2011	15:34:09	18.59	1.98	161.26	65.58	2.19
7/6/2011	15:35:09	18.66	1.93	152.87	63.09	2.12
7/6/2011	15:36:09	18.7	1.88	150.6	60.06	2.07
7/6/2011	15:37:09	18.69	1.89	153.46	59.23	2.1
7/6/2011	15:38:09	18.67	1.9	152.24	58.96	2.15
7/6/2011	15:39:09	18.65	1.92	154.26	59	2.17
7/6/2011	15:40:09	18.63	1.94	157.32	58.52	2.3
7/6/2011	15:41:09	18.58	1.98	160.24	58.94	2.5
7/6/2011	15:42:09	18.57	1.99	160.64	58.52	2.62
7/6/2011	15:43:09	18.67	1.91	153.69	55.95	2.57
7/6/2011	15:44:09	18.84	1.75	140.93	51.13	2.39
7/6/2011	15:45:09	18.95	1.63	131.37	46.69	2.24
7/6/2011	15:46:09	19.01	1.57	129.38	44.25	2.22

7/6/2011	15:47:09	18.96	1.61	138.17	43.79	2.35
7/6/2011	15:48:09	18.87	1.69	146.87	45.51	2.5
7/6/2011	15:49:09	18.94	1.63	137.71	44.4	2.43
7/6/2011	15:50:09	19.03	1.55	126.62	41.63	2.28
7/6/2011	15:51:09	19.07	1.5	124.13	40.13	2.19
7/6/2011	15:52:09	19.06	1.51	126.46	39.79	2.14
7/6/2011	15:53:09	19.04	1.54	127.69	41.04	2.13
7/6/2011	15:54:09	18.99	1.58	128.35	41.71	2.07
7/6/2011	15:55:09	18.82	1.74	142.26	45.84	2.24
7/6/2011	15:57:54	18.34	2.17	266.97	57.87	2.83
7/6/2011	16:00:58	18.82	1.75	1.26	49.05	2.28
7/6/2011	16:06:14	0.09	0.01	0.66	1.58	0.05
7/6/2011	16:10:21	0.08	0.03	-0.04	229.47	46.96
7/6/2011	16:09:47	19.96	9.83	-0.14	929.12	0.45
7/6/2011	16:14:40	0.08	0.02	-0.13	1.61	5.51

4.2 Laboratory Data

Attached is a copy of the laboratory reports from the analysis of the samples from this testing program.

4.2.1 Laboratory Data – Particulate

Laboratory Analysis of Particulate Catch
USEPA Method 5

Laboratory Control Number	1107010261	1107010258	1107010259	1107010260
Sample Identification	Blank	SN 07G Run #1	SN 07G Run #2	SN 07G Run #3
Filter Analysis				
1st Tare Weight (g)		0.3762	0.3724	0.3748
2nd Tare Weight (g)		0.3762	0.3724	0.3748
1st Final Weight (g)		0.3859	0.3786	0.3773
2nd Final Weight (g)		0.3860	0.3787	0.3774
Collected Weight (mg)		9.8	6.3	2.6
Probe & Cyclone Wash Analysis				
Sample Volume (ml)	100.0	97.0	124.0	313.0
1st Tare Weight (g)	104.2400	111.8683	110.0096	113.3735
2nd Tare Weight (g)	104.2401	111.8684	110.0098	113.2737
1st Final Weight (g)	104.2402	111.8698	110.0110	113.2754
2nd Final Weight (g)	104.2402	111.8699	110.0120	113.2755
Collected Weight (mg)	0.1	1.5	2.2	1.8
Analysis Date	07/12/11	07/12/11	07/12/11	07/12/11
Analyst	NTR	NTR	NTR	NTR
Acetone Blank Concentration		0.0001%		

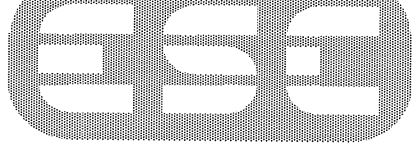
Acetone Blank Concentration = M_a / (V_a P_a), where

M_a = Acetone residue mass (mg)
V_a = Volume of acetone blank (ml)
P_a = Density of acetone (mg/ml)

Results				
Total Particulate Matter (mg)		11.2	8.4	4.1

Total Particulate Matter = (filter residue + wash residue) - residue from acetone

Environmental Services Company, Inc.
Corporate Office
13715 West Markham
Little Rock, AR 72211
P.O. Box 55146
Little Rock, AR 72215
website: **www.esclabs.com**
Phone: 501-221-2565
Fax: 501-221-1341



Environmental Services Company, Inc.
Northwest Branch
1107 Century
Springdale, AR 72764
Phone : 479-750-1170
Fax: 479-750-1172

CHAIN OF CUSTODY

Client Information		Project Information		Requested Parameters
Company Name:	Bibler Brothers	Permit/Project #:		PM per Method 5
Address:	2401 South Arkansas Avenue	Purchase Order #:		
	Russellville, AR 72801	Work Order #		
Telephone:	479-968-4986	Sampler Name(s):	Jeff Woosley	
FAX:				
Contact:	Mr. Matt Hagenlocker	and Signature(s):		
ESC Client Number:	1511			

Sample Identification		Sample Collection				Sample Containers				
Identification	ESC Control #	Date	Time	Type	Matrix	Type	Volume	Preservative	#	PM per Method 5
SN-07G Run #1	1107010258	07/06/11	1103-1204	Comp.	Acetone	Glass	As marked	N/A	1	X
SN-07G Run #1	1107010258	"	"	"	Filter	Petri	N/A	"	1	X
SN-07G Run #2	1107010259	"	1302-1403	"	Acetone	Glass	As marked	"	1	X
SN-07G Run #2	1107010259		"	"	Filter	Petri	N/A	"	1	X
SN-07G Run #3	1107010260		1455-1556	"	Acetone	Glass	As marked	"	1	X
SN-07G Run #3	1107010260		"	"	Filter	Petri	N/A	"	1	X
Acetone Blank	1107010261		1423	Grab	Acetone	Glass	As marked	"	1	X

Relinquished By: (Signature and Printed Name) Jeff Woosley	Date 7-11-11	Time 1705	Received By: (Signature and Printed Name)	Date	Time
Relinquished By: (Signature and Printed Name)	Date	Time	Received By: (Signature and Printed Name)	Date	Time
Relinquished By: (Signature and Printed Name)	Date	Time	Received for Lab By: (Signature and Printed Name) Ned Ryerson	Date 7-11-11	Time 1705

Custody Seals: Used? ☐ Intact? ☐
Turnaround: Regular ☐ Special ☐
Were samples properly preserved: Yes ☐ No ☐

Cool all samples to 4 degrees C with ice.

Comments:

Flow Data		Field Test	Time	Analyst
Analyst:		pH:		
Time:		DO:		
Reading:		Temp:		
Units:		Debris		
Chlorinated? Y N		Fecal Start:		

Result	Result	Units
		C F

This Document is Page 1 of 1

4.2.2 Laboratory Data – Formaldehyde

Environmental Services Company, Inc.

13715 West Markham
Little Rock, AR 72211

Little Rock, AR

Project # 1511

Analytical Report (0711-90)

EPA Method 316

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 ??? pages.

Report Issued: xx/xx/xxxx

Summary of Results

Company	Environmental Services Co.	Client #	1511
Analyst	AMP	Job #	0711-90
Parameters	EPA Method 316	# Samples	3 Runs, 1 Blank

Compound	Sample ID / Catch Weight (µg)		
		SN-07G	
	Run #1	***Run #2***	***Run #3***
Formaldehyde	8,125	7,295	7,311
	H2O Blank		
Formaldehyde	14.4 ND		

Results

Company	Environmental Services Co.	Client #	1511
Analyst	AMP	Job #	0711-90
Parameters	EPA Method 316	# Samples	3 Runs, 1 Blank

MDL 0.0271 (µg/mL) Lower Curve Limit 0.271 (µg/mL)
LOQ 0.271 (µg/mL) Upper Curve Limit 3.25 (µg/mL)
Compound Formaldehyde

Sample ID	Lab ID	Absorbance	Analytical Concentration (µg/mL)	Dilution	Volume (mL)	Catch Weight (ug)	Qual
Run #1 1107010262	17	0.2334	0.5276	20	770	8,125	
Run #2 1107010263	18	0.2096	0.4737	20	770	7,295	
Run #3 1107010264	19	0.2128	0.4810	20	760	7,311	
H2O Blank 1107010265	20	0.0000	0.0271	1	530	14.4	ND
Method Blank	10	0.0000	0.0271	1	1	0.0271	ND
Method Blank	33	0.0000	0.0271	1	1	0.0271	ND
LD / Run #1 1107010262	30	0.2349	0.5309	20	770	8,176	
					% Difference	0.6%	
AD / Run #1 1107010262	31	0.1872	0.4232	25	770	8,146	
					% Difference	0.3%	
MS / Run #1 1107010262	34	1.1901	2.6898	1	2.50	6.72	
					spike amount (ug)	5.41	
					native amount (ug)	1.29	
					Spike recovery	100%	
MSD / Run #1 1107010262	35	1.1895	2.6883	1	2.50	6.72	
					spike amount (ug)	5.41	
					native amount (ug)	1.29	
					Spike recovery	100%	
Spec36pg52 SS#1	8	0.5762	1.3023	1	1.00	1.30	
					Tag amount (ug)	1.30	
					Spike recovery	100%	
Spec36pg52 SS#2	9	0.5677	1.2830	1	1.00	1.28	
					Tag amount (ug)	1.30	
					Spike recovery	98.8%	

Narrative Summary

Enthalpy Analytical Narrative Summary

Company	Environmental Services Company, Inc.
Analyst	AMP
Parameters	EPA Method 316

Client #	1511
Job #	0711-90
# Samples	3 Runs, 1 Blank

Custody

Lindsey Chatterton received the samples on 7/12/11 after being relinquished by Environmental Services Company, Inc. The samples were received at 4.5°C in good condition. Prior to, during, and after 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).

The sodium sulfite reagent was used within 24 hours of preparation. Formaldehyde standards were made by diluting a certified solution with DIUF-grade water. Samples and standards were analyzed following the procedures in Section 11.0. Any sample dilutions were performed on an aliquot of the original sample prior to the addition of pararosaniline reagent.

The Hewlett Packard Model 8453A, Diode Array Spectrophotometer ("Gomez" S/N US53400446) was operating at 570 nm.

QC Notes

The following Quality Control Samples (9.0) were analyzed: field blank (9.2.1), method blank (9.2.3) and an alternate dilution (not required by the method). All samples met the method-specified quality control limits.

Formaldehyde was not identified above the MDL in the analyses of the method blanks and client blank.

The laboratory duplicates (LD; a second aliquot of sample analyzed in the same manner as the initial aliquot) and an alternate dilution (AD; an additional aliquot of the sample diluted to a different level than the initial analysis) were analyzed using sample ***Run #1 1107010262***. The LD and AD results differed from the initial results by less than 1%.

Matrix spikes (MS) were prepared using aliquots of sample ***Run #1 1107010262***. The recovery values were both 100%.

Enthalpy Analytical Narrative Summary
(continued)

QC Notes (continued)	Second source standards (Spec36pg52 #SS1 and Spec36pg52 #SS2) were prepared and used as Laboratory Control Samples and analyzed with the samples. The recovery values were 100% and 98.8%. All sample preparation and analytical holding times specified in the method were met.
Reporting Notes	Enthalpy Analytical, Inc. is accredited to perform this method for compliance purposes by the National Environmental Laboratory Accreditation Conference (NELAC) through the Louisiana Environmental Laboratory Accreditation Program (LELAP), certificate number 04010. The results presented in this report are representative of the samples as provided to the laboratory.

General Reporting Notes

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

- The acronym ***MDL*** represents the Minimum Detection Limit. Below this value the laboratory cannot determine the presence of the analyte of interest reliably.
- The acronym ***LOQ*** represents the Limit 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 analytical result between the MDL and the LOQ. A J flag indicates that the laboratory can positively identify the analyte of interest as present, but the value should be considered an estimate.
- The letter ***E*** following a value indicates an analytical result exceeding 100% of the highest calibration point. The associated value should be considered as an estimate.
- The acronym ***DF*** represents Dilution Factor. This number represents dilution of the sample during the preparation and/or analysis process. The analytical result taken from a laboratory instrument is multiplied by the DF to determine the final undiluted sample results.
- The addition of ***MS*** to the Sample ID represents a Matrix Spike. An aliquot of an actual sample 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 Sample ID represents a Matrix Spike Duplicate. Prepared in the same manner as an MS, the use of duplicate matrix 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 Sample ID represents a Laboratory Duplicate. The analyst prepares an additional aliquot of sample for testing and the results of the duplicate analysis 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 Sample ID represents an Alternate Dilution. The analyst prepares an additional aliquot at a different dilution factor (usually double the initial factor). This analysis 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 analyzed by the laboratory using the same reagents, spiking standards and procedures used for the client samples. 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 associated project number and kept in-house at the appropriate temperature conditions. When the project samples are received for analysis, the LCSs are analyzed to confirm that the analyte could be recovered from the media, separate from the samples which were used on the project and which may 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

Environmental Services Company, Inc.
Corporate Office
13715 West Markham
Little Rock, AR 72211
P.O. Box 55146
Little Rock, AR 72215
website: **www.esclabs.com**
Phone: 501-221-2565 Fax: 501-221-1341

Environmental Services Company, Inc.
Northwest Branch
1107 Century
Springdale, AR 72764
Phone : 479-750-1170 Fax: 479-750-1172

CHAIN OF CUSTODY

Client Information		Project Information	
Company Name:	Environmental Services Co., Inc	Permit/Project #:	
Address:	13715 West Markham	Purchase Order #:	
	Little Rock, AR 72211	Work Order #	
Telephone:	501-221-2565	Sampler Name(s):	Jeff Woosley
FAX:	501-221-1341		
Contact:	Mr. Jeff Woosley	and Signature(s):	
ESC Client Number:	1511		

Sample Identification		Sample Collection				Sample Containers				Requested Parameters
Identification	ESC Control #	Date	Time	Type	Matrix	Type	Volume	Preservative	#	Formaldehyde per Method 316
SN-07G Run #1	1107010262	07/06/11	1010-1046	Comp.	Liquid	Plastic	As marked	N/A	1	X
SN-07G Run #2	1107010263	"	1215-1251	"	"	"	"	"	1	X
SN-07G Run #3	1107010264	"	1413-1449	"	"	"	"	"	1	X
Milli Q H2O Blank	1107010265		1243	Grab	"	"	"	"	1	X

Relinquished By: (Signature and Printed Name)	Date	Time	Received By: (Signature and Printed Name)	Date	Time	Custody Seals: Used? ☐ Intact? ☐
Relinquished By: (Signature and Printed Name)	Date	Time	Received By: (Signature and Printed Name)	Date	Time	Turnaround: Regular ☐ Special ☐
Relinquished By: (Signature and Printed Name)	Date	Time	Received for Lab By: (Signature and Printed Name) Lindsey Chatterton	7/12/11	12:57 pm	Were samples properly preserved: Yes ☒ No ☐

Temp: 4.1 Packed on Ice

Cool all samples to 4 degrees C with ice.

Comments:	Flow Data	Field Test	Time	Analyst	Result	Result	Units
Volume to use in blank correction:	Analyst:	pH:					
Run #1: Take total sample volume and subtract 147.8	Time:	DO:					
Run #2: Take total sample volume and subtract 150.0	Reading:	Temp:					C F
Run #3: Take total sample volume and subtract 129.8	Units:	Debris					
	Chlorinated? Y N	Fecal Start:			This Document is Page 1 of 1		

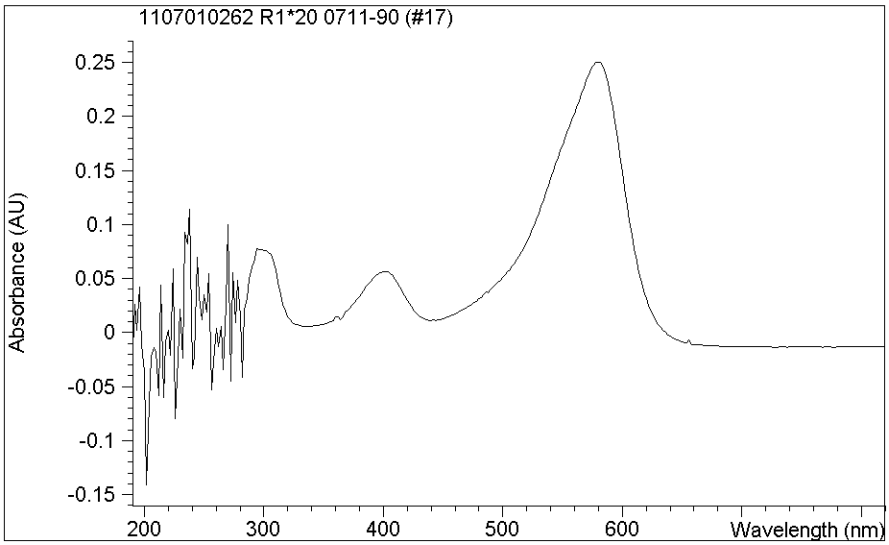
Sample Spectra

*** Results Report ***

Method file (modified)
NAIMA.M
Number of Samples 10
Operator AMP

Sample 1

Processed Sample Spectrum

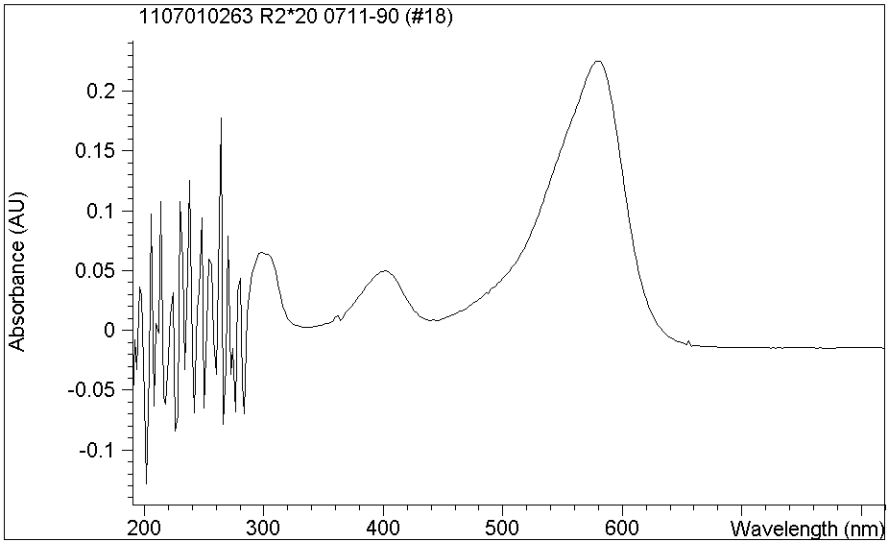


Data Analysis Result

Analyte Name	Value	Std.Dev.	Unit
Formaldehyde	0.52757	0.00718	ug/mL

Sample 2

Processed Sample Spectrum

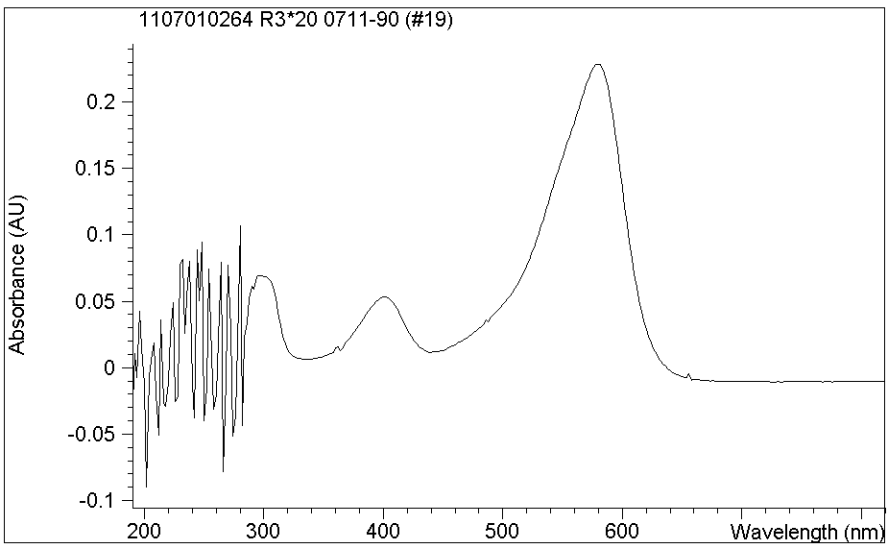


Data Analysis Result

Analyte Name	Value	Std.Dev.	Unit
Formaldehyde	0.47368	0.00716	ug/mL

Sample 3

Processed Sample Spectrum

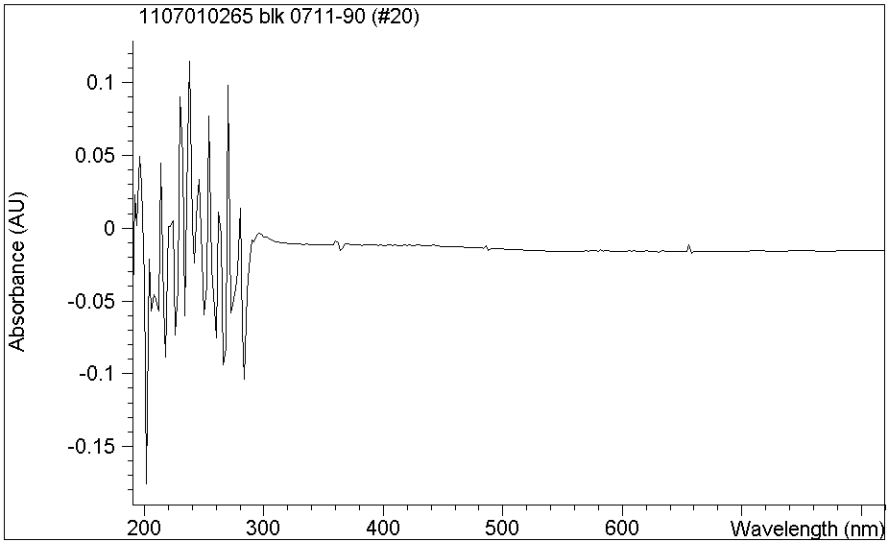


Data Analysis Result

Analyte Name	Value	Std.Dev.	Unit
Formaldehyde	0.48097	0.00717	ug/mL

Sample 4

Processed Sample Spectrum

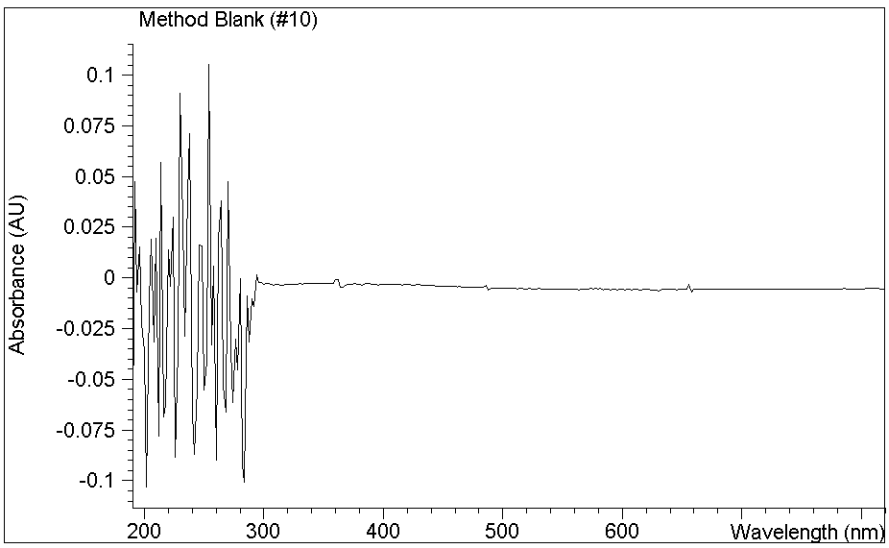


Data Analysis Result

Analyte Name	Value	Std.Dev.	Unit
Formaldehyde	-0.03513	0.00712	ug/mL

Sample 5

Processed Sample Spectrum

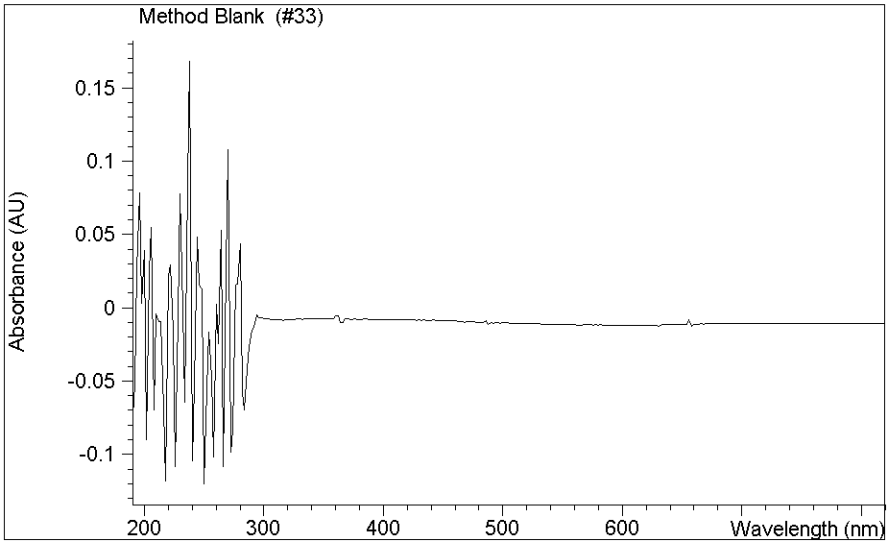


Data Analysis Result

Analyte Name	Value	Std.Dev.	Unit
Formaldehyde	-0.01213	0.00712	ug/mL

Sample 6

Processed Sample Spectrum

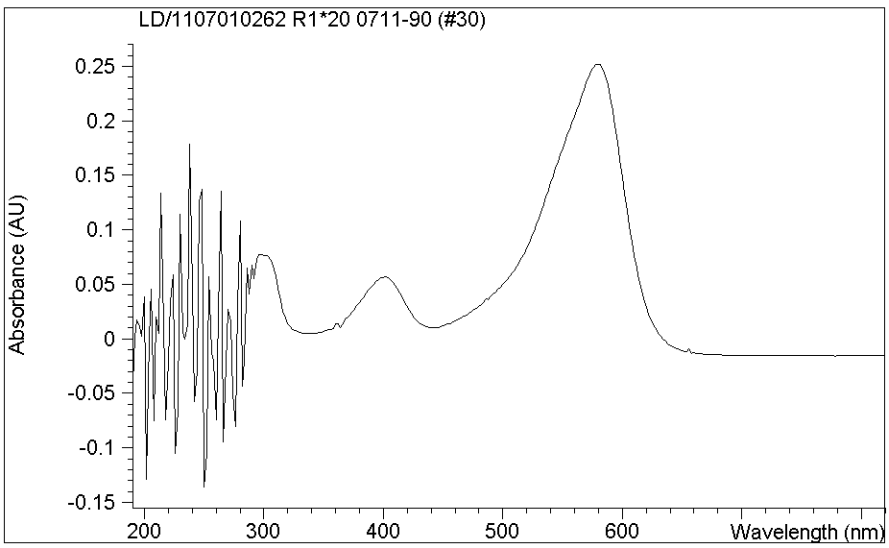


Data Analysis Result

Analyte Name	Value	Std.Dev.	Unit
Formaldehyde	-0.02608	0.00712	ug/mL

Sample 7

Processed Sample Spectrum

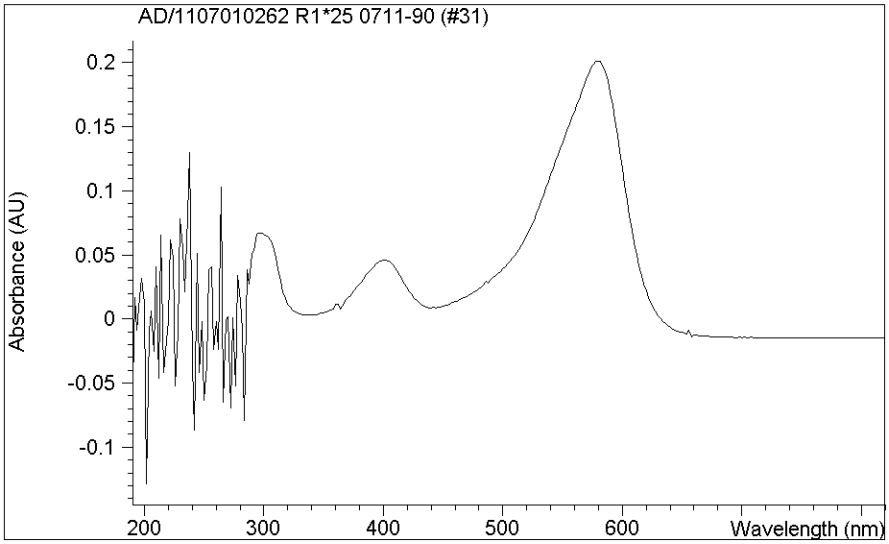


Data Analysis Result

Analyte Name	Value	Std.Dev.	Unit
Formaldehyde	0.53088	0.00718	ug/mL

Sample 8

Processed Sample Spectrum

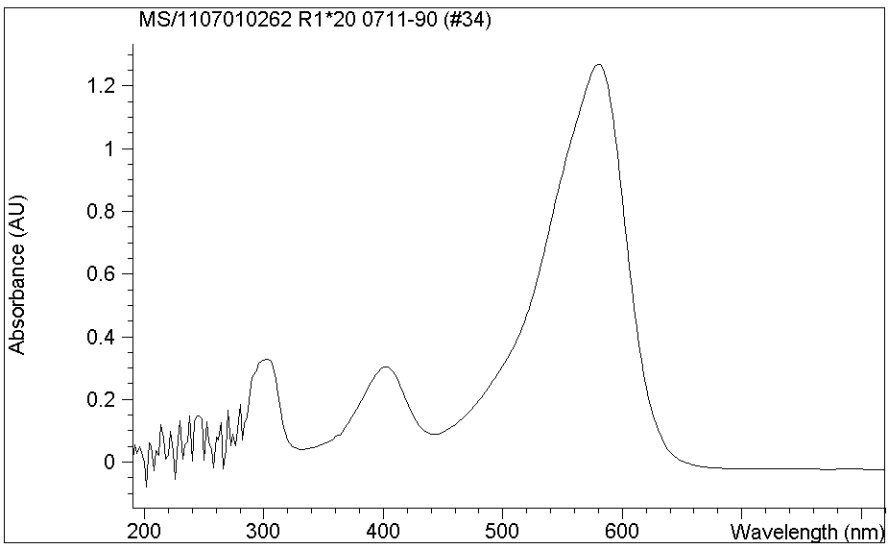


Data Analysis Result

Analyte Name	Value	Std.Dev.	Unit
Formaldehyde	0.42318	0.00715	ug/mL

Sample 9

Processed Sample Spectrum

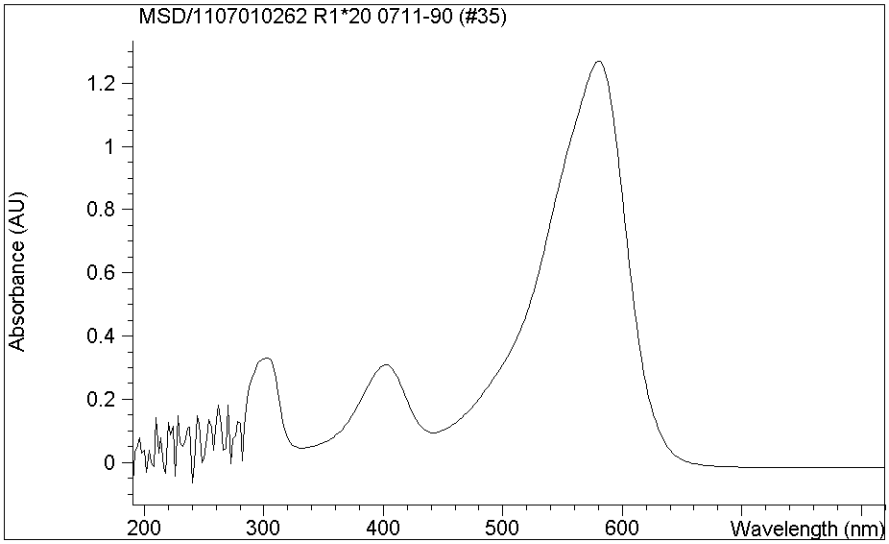


Data Analysis Result

Analyte Name	Value	Std.Dev.	Unit
Formaldehyde	2.68984	0.00852	ug/mL

Sample 10

Processed Sample Spectrum



Data Analysis Result

Analyte Name	Value	Std.Dev.	Unit
Formaldehyde	2.68833	0.00851	ug/mL

*** End Results Report ***

SCA Quantification Results

#	Sample Name	WL Result	Std.Dev.	Value(ug/mL)	Std.Dev.	95% PI
1	1107010262 R1*20 071	0.23343	7.6328E-5	0.52757	7.1754E-3	1.8445E-2
2	1107010263 R2*20 071	0.20958	7.3337E-5	0.47368	7.1640E-3	1.8416E-2
3	1107010264 R3*20 071	0.21281	8.7494E-5	0.48097	7.1655E-3	1.8419E-2
4	1107010265 blk 0711-	-1.5545E-2	7.1343E-5	-3.5133E-2	7.1168E-3	1.8294E-2
5	Method Blank (#10)	-5.3668E-3	6.9187E-5	-1.2129E-2	7.1165E-3	1.8294E-2
6	Method Blank (#33)	-1.1539E-2	8.1529E-5	-2.6078E-2	7.1167E-3	1.8294E-2
7	LD/1107010262 R1*20	0.23489	8.9909E-5	0.53088	7.1761E-3	1.8447E-2
8	AD/1107010262 R1*25	0.18724	1.1270E-4	0.42318	7.1544E-3	1.8391E-2
9	MS/1107010262 R1*20	1.19010	4.7681E-4	2.68980	8.5155E-3	2.1890E-2
10	MSD/1107010262 R1*20	1.18950	4.7684E-4	2.68830	8.5140E-3	2.1886E-2

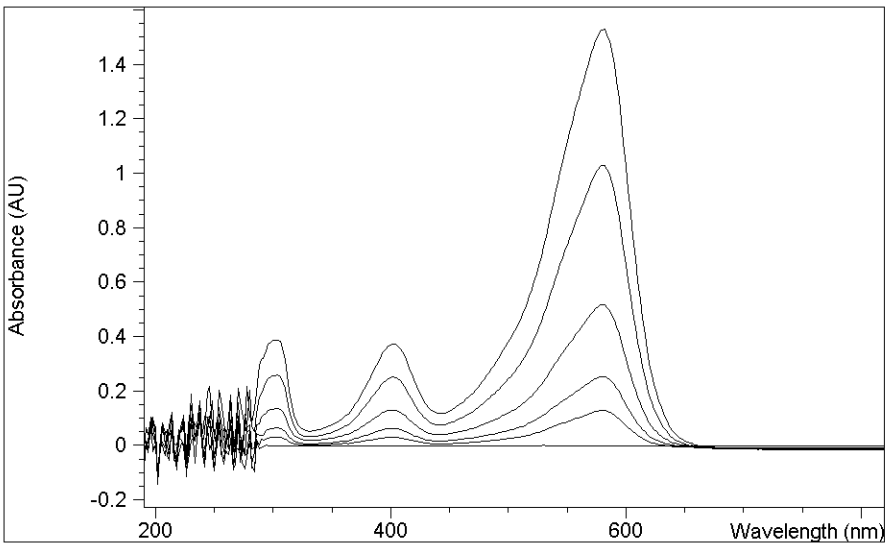
*** End Hardcopy window ***

Calibration Curve Spectra

*** Calibration Report ***

Number of Standards 6

Standard Spectra



#	Standard	Path Length Unit	Date	Time
1	Spec36pg52 #1 (#	1.000 cm	7/20/11	21:27:47
2	Spec36pg52 #2 (#	1.000 cm	7/20/11	21:27:56
3	Spec36pg52 #3 (#	1.000 cm	7/20/11	21:28:04
4	Spec36pg52 #4 (#	1.000 cm	7/20/11	21:28:11
5	Spec36pg52 #5 (#	1.000 cm	7/20/11	21:28:19
6	Spec36pg52 #6 (#	1.000 cm	7/20/11	21:28:26

Data Analysis:

Spectral Processing:

Absorbance

Use Wavelength(s):

Single (nm): 570

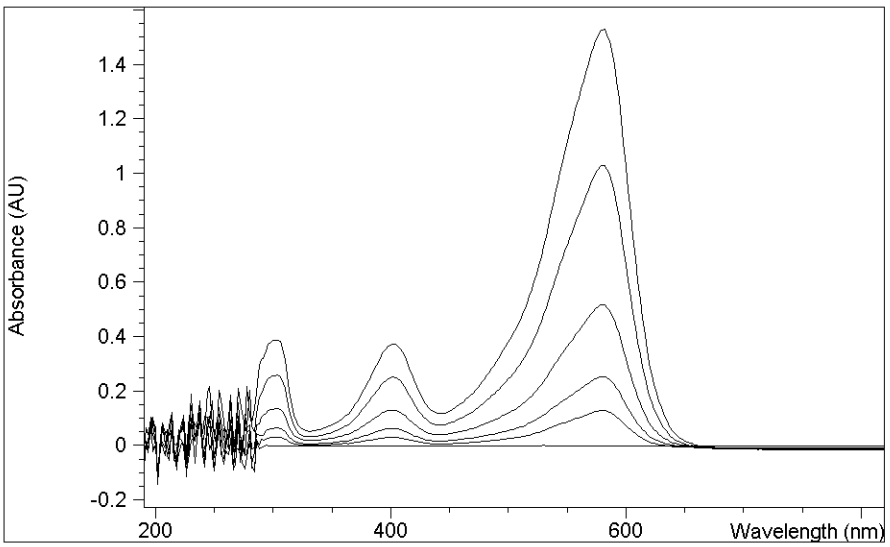
Evaluation: SCA

Calibrated at: Date 7/20/2011 Time 9:32:16 PM
Operator: AMP

Weighting Method: Least squares
Calibration Curve: C = k1 * A

Analyte Name	Unit
Formaldehyde	ug/mL

Processed Standard Spectra



Coefficients

k#	Value
1	2.26009

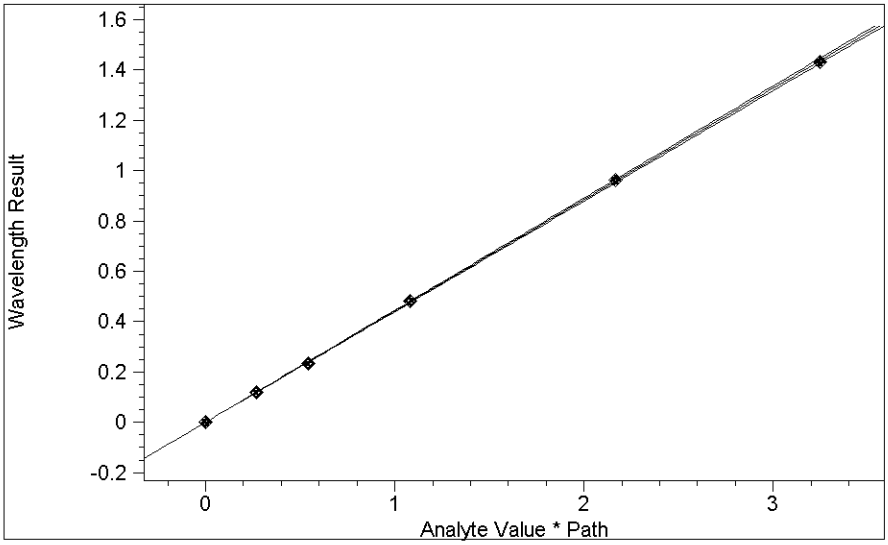
Used Wavelength Results (Absorbance (AU))

#	Value
1	-0.00047
2	0.11819
3	0.23491
4	0.48150
5	0.96107
6	1.43377

Calibration Table of Formaldehyde (ug/mL)

#	Standard Name	Value	Fitted Val.	Error (%)
1	Spec36pg52 #1 (#	0.00000	-0.00106	-100.0
2	Spec36pg52 #2 (#	0.27100	0.26713	1.4
3	Spec36pg52 #3 (#	0.54100	0.53091	1.9
4	Spec36pg52 #4 (#	1.08200	1.08824	-0.6
5	Spec36pg52 #5 (#	2.16400	2.17209	-0.4
6	Spec36pg52 #6 (#	3.24600	3.24045	0.2

Calibration Curve



SCA Summary

Analyte Name	Formaldehyde
Number of Standards	6
Calculation Method	LSQ
Calibration Curve	C = k1 * A
Coefficient k1	2.26010 ug/mL
Std.Dev. of k1	3.9292E-3 ug/mL
Std.Dev. of Calibration	7.1165E-3 ug/mL
Correl. Coeff. (R^2)	0.99998
Uncertainty	0.72 %

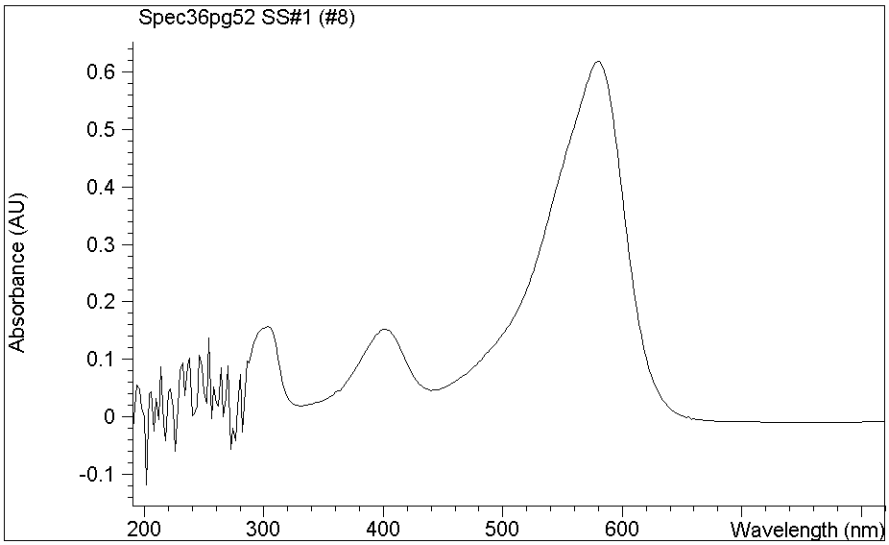
*** End Calibration Report ***

*** Results Report ***

Method file (modified)
NAIMA.M
Number of Samples 2
Operator AMP

Sample 1

Processed Sample Spectrum

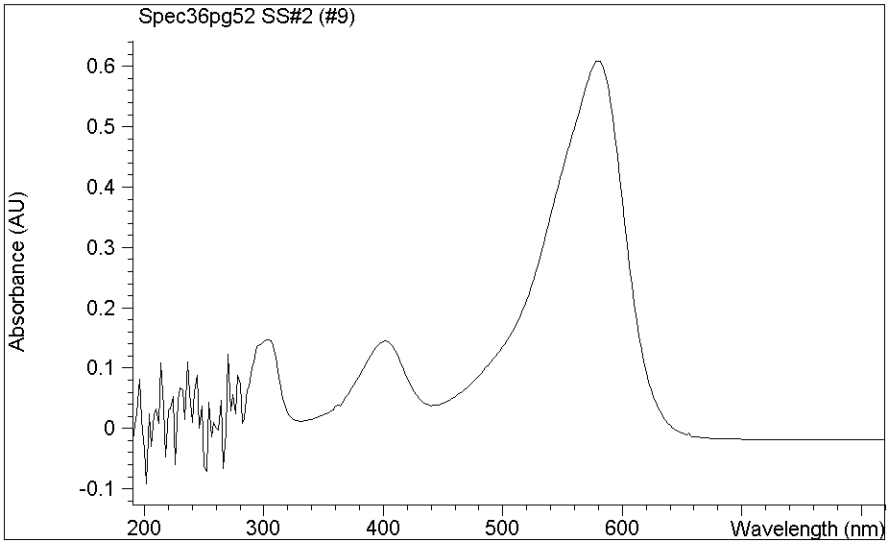


Data Analysis Result

Analyte Name	Value	Std.Dev.	Unit
Formaldehyde	1.30227	0.00747	ug/mL

Sample 2

Processed Sample Spectrum



Data Analysis Result

Analyte Name	Value	Std.Dev.	Unit
Formaldehyde	1.28303	0.00746	ug/mL

*** End Results Report ***

SCA Quantification Results

#	Sample Name	WL Result	Std.Dev.	Value(ug/mL)	Std.Dev.	95% PI
1	Spec36pg52 SS#1 (#8)	0.57621	1.9699E-4	1.30230	7.4680E-3	1.9197E-2
2	Spec36pg52 SS#2 (#9)	0.56769	1.1360E-4	1.28300	7.4579E-3	1.9171E-2

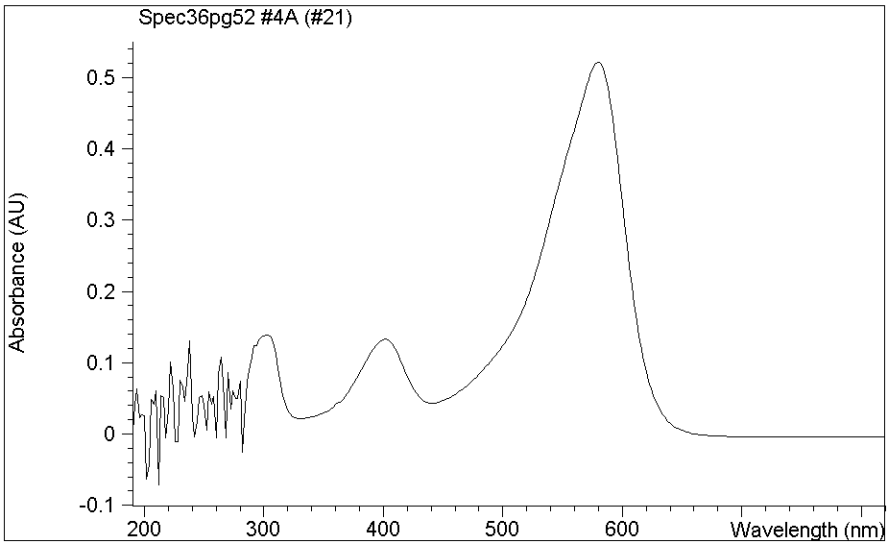
*** End Hardcopy window ***

*** Results Report ***

Method file (modified)
NAIMA.M
Number of Samples 3
Operator AMP

Sample 1

Processed Sample Spectrum

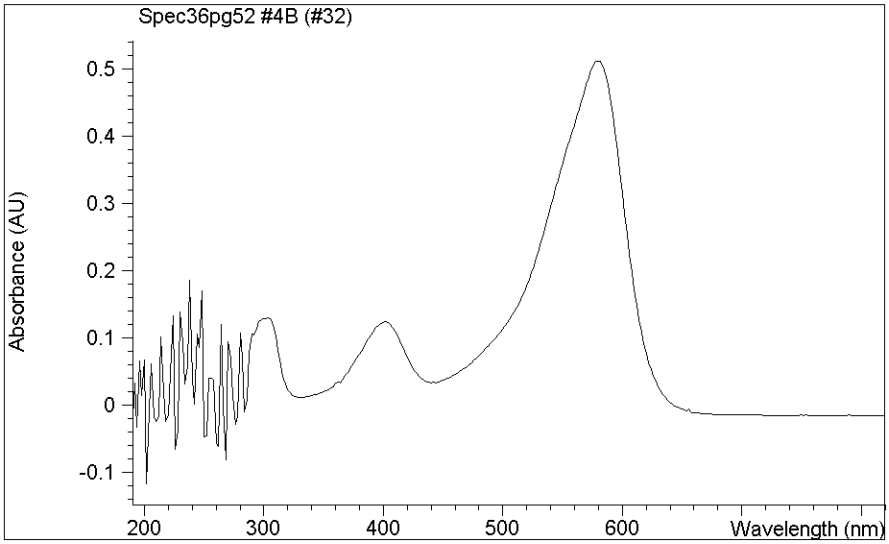


Data Analysis Result

Analyte Name	Value	Std.Dev.	Unit
Formaldehyde	1.10003	0.00737	ug/mL

Sample 2

Processed Sample Spectrum

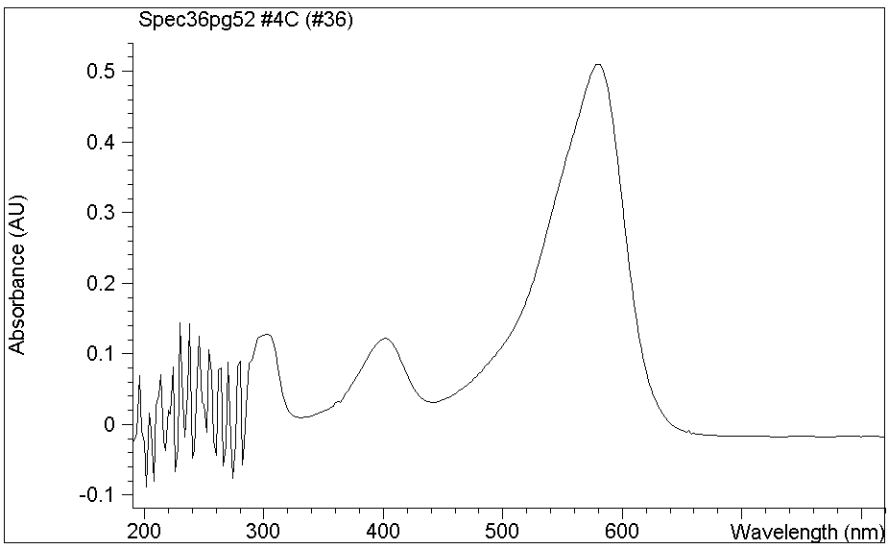


Data Analysis Result

Analyte Name	Value	Std.Dev.	Unit
Formaldehyde	1.07888	0.00736	ug/mL

Sample 3

Processed Sample Spectrum



Data Analysis Result

Analyte Name	Value	Std.Dev.	Unit
Formaldehyde	1.07346	0.00736	ug/mL

*** End Results Report ***

SCA Quantification Results

#	Sample Name	WL Result	Std.Dev.	Value(ug/mL)	Std.Dev.	95% PI
1	Spec36pg52 #4A (#21)	0.48672	1.0938E-4	1.10000	7.3690E-3	1.8943E-2
2	Spec36pg52 #4B (#32)	0.47736	1.2625E-4	1.07890	7.3595E-3	1.8918E-2
3	Spec36pg52 #4C (#36)	0.47496	1.6049E-4	1.07350	7.3571E-3	1.8912E-2

*** End Hardcopy window ***

Automation Table: F:\UV2011Q3\JULY\DATA\0711-56A.A

Run Automation From Line: 1 To Line: 36

#	Srce	Sample Name	Action	Parameter
~~1~~	~~1~~	~~Lab Blank H2O~~	~~Measure Blank~~	
2	2	Spec36pg52 #1	Measure Standard	
3	3	Spec36pg52 #2	Measure Standard	
4	4	Spec36pg52 #3	Measure Standard	
5	5	Spec36pg52 #4	Measure Standard	
6	6	Spec36pg52 #5	Measure Standard	
7	7	Spec36pg52 #6	Measure Standard	
8	8	Spec36pg52 SS#1	Measure Sample	
9	9	Spec36pg52 SS#2	Measure Sample	
10	10	Method Blank	Measure Sample	
~~11~~	~~11~~	~~P1-M316-R1 0711-5~~	~~Measure Sample~~	
12	12	P1-M316-R2 0711-5	Measure Sample	
13	13	P1-M316-R3 0711-5	Measure Sample	
14	14	M316-Blank 0711-56	Measure Sample	
15	15	B1R-M316-R1*5 071	Measure Sample	
~~16~~	~~16~~	~~M316-Blank 0711-42~~	~~Measure Sample~~	
17	17	1107010262 R1*20 0	Measure Sample	
18	18	1107010263 R2*20 0	Measure Sample	
19	19	1107010264 R3*20 0	Measure Sample	
20	20	1107010265 blk 071	Measure Sample	
21	21	Spec36pg52 #4A	Measure Sample	
~~22~~	~~22~~	~~LD/P1-M316-R1 071~~	~~Measure Sample~~	
23	23	AD/P1-M316-R1*2 0	Measure Sample	
24	24	MS/P1-M316-R1 071	Measure Sample	
25	25	MSD/P1-M316-R1 07	Measure Sample	
26	26	LD/B1R-M316-R1*5	Measure Sample	
27	27	AD/B1R-M316-R1*4	Measure Sample	
28	28	MS/B1R-M316-R1*5	Measure Sample	
~~29~~	~~29~~	~~MSD/B1R-M316-R1*5~~	~~Measure Sample~~	
30	30	LD/1107010262 R1*2	Measure Sample	
31	31	AD/1107010262 R1*2	Measure Sample	
32	32	Spec36pg52 #4B	Measure Sample	
33	33	Method Blank	Measure Sample	
34	34	MS/1107010262 R1*2	Measure Sample	
35	35	MSD/1107010262 R1*	Measure Sample	
36	36	Spec36pg52 #4C	Measure Sample	

*** End Automation Table ***

This Is The Last Page Of This Report.

4.2.3 Laboratory Data – Fuel Analysis

Lab No : 201101998-001

Date Rec'd : 7/11/2011

Date Sampled: 7/6/2011 to 7/6/2011

Sampled By: CLIENT

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

Date :7/19/2011 12:13:59 PM

P.O.# :

Sample ID : 201101998-001

BIBLER BROS LUMBER CO

PO BOX 490
RUSSELLVILLE, AR 72811
ATTN: MATT HAGENLOCKER

Remark: SOUTHERN YELLOW PINE SAWDUST

PROXIMATE ANALYSIS		As-Received	Dry Basis
% Moisture	D3302	47.00	******
% Ash	D3174	0.21	0.40
% Volatile	D3175	******	******
% Fixed Carbon	D3172	******	******
BTU	D5865	4848	9147
MAF BTU	D3180		9184
% Total Sulfur	D4239	< 0.01	< 0.01
SULFUR FORMS			
% Pyritic	D2492	******	******
% Sulfate	D2492	******	******
% Organic	D2492	******	******
% Total Sulfur	D4239	< 0.01	< 0.01
WATER SOLUBLE			
% Na2O	ASME1974	******	******
% K20	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.

FREE SWELLING INDEX D720 ******

Apparent Specific Gravity of Coal ModIC7113 ******

% Equilibrium Moisture D1412 ******

Weight %

ULTIMATE ANALYSIS		As-Received	Dry Basis
% Moisture	D3302	47.00	******
% Carbon	D5373	27.89	52.63
% Hydrogen	D5373	3.28	6.19
% Nitrogen	D5373	0.04	0.07
% Chlorine	D6721	******	******
% Sulfur	D4239	< 0.01	< 0.01
% Ash	D3174	0.21	0.40
% Oxygen (Diff.)	D3176	21.58	40.71

(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 BW	******
Base/Acid Ratio ASME1974	******
lb Ash/mm BTU	0.44
lb SO2/mm BTU	< 0.01
Fouling Index ASME1974	******
Slagging Index ASME1974	******

(Mercury D6722 Dry Basis ug/g ******)

Respectfully Submitted,

Project No. 1106520001

5.1 Probe Nozzles

The probe nozzles were measured with a micrometer and inspected prior to use as outlined in 40 CFR Part 60, Method 5, Section 10.1.

Environmental Services Co., Inc.
Nozzle Calibration
Per 40 CFR Part 60, Appendix A, Method 5, Section 10.1

Customer:	Bibler Brothers Lumber Company
Project No:	1106520001
Source No:	SN-07G - PM

Visual Inspection

1.	Is nozzle nicked?	N	(Y/N)
2.	Is nozzle dented?	N	(Y/N)
3.	Is nozzle corroded?	N	(Y/N)

Measurement Calibration

1.	Measurement #1	0.466	in.
2.	Measurement #2	0.465	in.
3.	Measurement #3	0.466	in.
4.	Difference between low and high measurement	0.001	in.
5.	Average diameter	0.466	in.

In order to meet the specifications of Section 10.1, the nozzle must not be nicked, dented or corroded and the difference between the low and high measurements must be ≤0.004 inches.

Environmental Services Co., Inc.
Nozzle Calibration
Per 40 CFR Part 60, Appendix A, Method 5, Section 10.1

Customer:	Bibler Brothers Lumber Company
Project No:	1106520001
Source No:	SN-07G - HCHO

Visual Inspection

1.	Is nozzle nicked?	N	(Y/N)
2.	Is nozzle dented?	N	(Y/N)
3.	Is nozzle corroded?	N	(Y/N)

Measurement Calibration

1.	Measurement #1	0.467	in.
2.	Measurement #2	0.467	in.
3.	Measurement #3	0.467	in.
4.	Difference between low and high measurement	0.000	in.
5.	Average diameter	0.467	in.

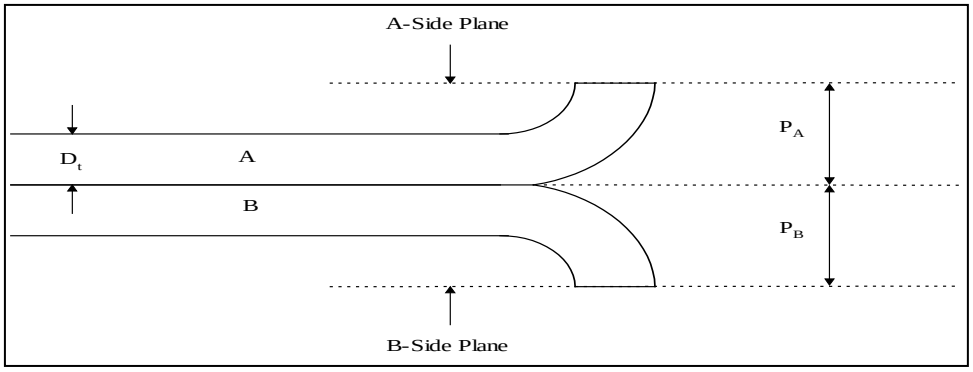
In order to meet the specifications of Section 10.1, the nozzle must not be nicked, dented or corroded and the difference between the low and high measurements must be ≤0.004 inches.

5.2 Pitot Tubes

The pitot tubes used during this test program were fabricated according to the specifications described and illustrated in 40 CFR Part 60, Appendix A, Method 2. The pitot tubes were recalibrated before field use as prescribed in Method 2, Section 6.1.1.

Environmental Services Co., Inc.
Pitot Calibration
Per 40 CFR Part 60, Appendix A, Method 2, Section 6.1.1

Customer:	Bibler Brothers Lumber Company
Project No:	1106520001
Source No:	SN-07G - PM
Pitot ID:	4-S1



Measurements

D_t	0.375	in.
P_A	0.500	in.
P_B	0.500	in.

Calculations

$1.05D_t$	0.3938	in.
$1.50D_t$	0.5625	in.

Calibration:

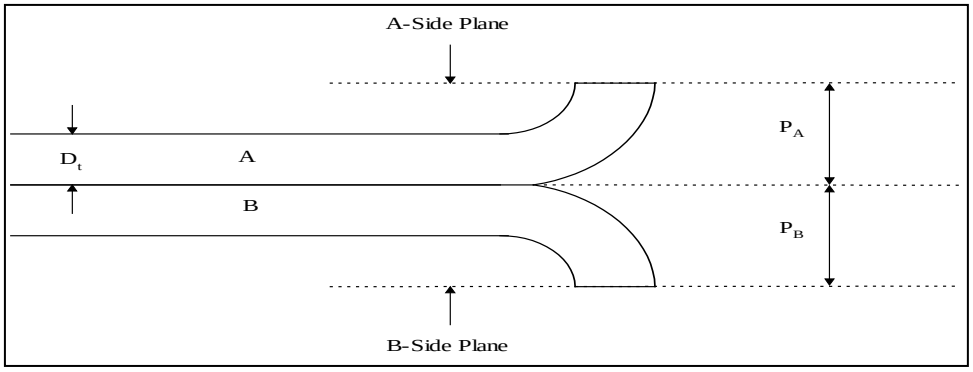
In order to meet the specifications of Section 6.1.1, the following criteria must be met:

1. D_t must be between 3/16 and 3/8 inch
2. $P_A = P_B$
3. $1.05\ D_t < P < 1.50\ D_t$

Do pitots meet calibration specifications? Y (Y/N)

Environmental Services Co., Inc.
Pitot Calibration
Per 40 CFR Part 60, Appendix A, Method 2, Section 6.1.1

Customer:	Bibler Brothers Lumber Company
Project No:	1106520001
Source No:	SN-07G - HCHO
Pitot ID:	4-G1



Measurements

D_t	0.375	in.
P_A	0.500	in.
P_B	0.500	in.

Calculations

$1.05D_t$	0.3938	in.
$1.50D_t$	0.5625	in.

Calibration:

In order to meet the specifications of Section 6.1.1, the following criteria must be met:

1. D_t must be between 3/16 and 3/8 inch
2. $P_A = P_B$
3. $1.05\ D_t < P < 1.50\ D_t$

Do pitots meet calibration specifications? Y (Y/N)

5.3 Metering Systems

The test meters were calibrated according to Method 5, Section 10.3. A copy of the pre-test and post-test calibration for the test meter used in this test program is attached.

Environmental Services Co., Inc.

EPA Method 5

ESC Meter Box Calibration

Post-Test Orifice Method

English Meter Box Units, English K' Factor

Model #: C-5000

Serial #: 1224

Date: ----------> 04/14/11

Barometric Pressure: ---------> 29.82 in. Hg

Theoretical Critical Vacuum: > 14.07 in. Hg

IMPORTANT For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above.

IMPORTANT The Critical Orifice Coefficient, K', must be entered in English units, $(ft^3)*(°R)^{0.05}/((in\ .\ Hg)*(min))$.

---------- DRY GAS METER READINGS ----------									-CRIT. ORIFICE READINGS-		AMBIENT TEMPERATURE		
		Volume	Volume	Volume	Initial Temps		Final Temps.		Orifice	K' Orifice	Actual			
dH	Time	Initial	Final	Total	Inlet	Outlet	Inlet	Outlet	Serial #	Coeff.	Vacuum	Initial	Final	Average
(in H2O)	(min)	(ft^3)	(ft^3)	(ft^3)	(°F)	(°F)	(°F)	(°F)	(number)	(above)	(in. Hg)	(°F)	(°F)	(°F)
0.56	25.00	965.100	975.736	10.636	71.0	70.0	74.0	71.0	CT48	0.3297	22.5	71.8	63.0	67.4
1.10	17.00	954.800	964.475	9.675	70.0	69.0	71.0	69.0	CT55	0.4379	21.0	71.4	71.6	71.5
1.80	14.00	917.000	927.142	10.142	64.0	61.0	66.0	63.0	CT63	0.5613	16.5	64.8	65.8	65.3
3.50	10.00	943.000	952.868	9.868	69.0	67.0	71.0	68.0	CT73	0.7738	16.0	68.4	69.6	69.0
5.20	8.50	978.000	988.643	10.643	75.0	74.0	78.0	74.0	CT81	0.9652	15.0	75.4	75.4	75.4

---------- DRY GAS METER ----------		---------- ORIFICE ----------		DRY GAS METER	---------- ORIFICE ----------				
VOLUME	VOLUME	VOLUME	VOLUME	VOLUME	CALIBRATION		CALIBRATION FACTOR		
CORRECTED	CORRECTED	CORRECTED	CORRECTED	NOMINAL	FACTOR "Y"		dH@		
Vm(std)	Vm(std)	Vcr(std)	Vcr(std)	Vcr	Value	Variation	Value	Value	Variation
(ft^3)	(liters)	(ft^3)	(liters)	(ft^3)	(number)	(number)	(in H2O)	(mm H2O)	(in H2O)
10.541	298.5	10.703	303.1	10.731	1.015	0.010	1.705	43.30	-0.165
9.633	272.8	9.629	272.7	9.729	1.000	-0.005	1.919	48.73	0.048
10.236	289.9	10.224	289.5	10.210	0.999	-0.006	1.914	48.61	0.044
9.902	280.4	10.032	284.1	10.089	1.013	0.008	1.951	49.56	0.081
10.594	300.0	10.573	299.4	10.762	0.998	-0.007	1.863	47.32	-0.007
			Average Y ---------->		1.005				
				Average dH@ ---------->			1.870	47.51	

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is ±0.02.

For Orifice Calibration Factor dH@, the orifice differential pressure in inches of H2O that equates to 0.75 cfm of air at 68°F and 29.92" Hg, acceptable tolerance of individual values from the average is ±0.2.

Environmental Services Co., Inc.

EPA Method 5

ESC Meter Box Calibration

Post-Test Orifice Method

English Meter Box Units, English K' Factor

Model #: C-5000

Serial #: 1224

Date: ----------> 07/04/11

Barometric Pressure: ----------> 30.06 in. Hg

Theoretical Critical Vacuum: ------> 14.18 in. Hg

IMPORTANT For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above.

IMPORTANT The Critical Orifice Coefficient, K', must be entered in English units, $(ft^3)*(°R)^{0.05}/((in\ .\ Hg)*(min))$.

---------- DRY GAS METER READINGS ----------									-CRIT. ORIFICE READINGS-		AMBIENT TEMPERATURE		
		Volume	Volume	Volume	Initial Temps		Final Temps.		Orifice	K' Orifice	Actual			
dH	Time	Initial	Final	Total	Inlet	Outlet	Inlet	Outlet	Serial #	Coeff.	Vacuum	Initial	Final	Average
(in H2O)	(min)	(ft^3)	(ft^3)	(ft^3)	(°F)	(°F)	(°F)	(°F)	(number)	(above)	(in. Hg)	(°F)	(°F)	(°F)
1.10	9.25	472.900	478.183	5.283	68.0	68.0	68.0	68.0	CT55	0.4379	20.5	69.2	70.0	69.6
1.90	7.25	478.400	483.624	5.224	68.0	68.0	69.0	68.0	CT63	0.5613	18.0	70.2	69.6	69.9
3.70	5.25	484.000	489.258	5.258	69.0	68.0	70.0	68.0	CT73	0.7738	16.0	69.6	70.0	69.8

---------- DRY GAS METER ----------		---------- ORIFICE ----------		DRY GAS METER	---------- ORIFICE ----------				
VOLUME	VOLUME	VOLUME	VOLUME	VOLUME	CALIBRATION		CALIBRATION FACTOR		
CORRECTED	CORRECTED	CORRECTED	CORRECTED	NOMINAL	FACTOR "Y"		dH@		
Vm(std)	Vm(std)	Vcr(std)	Vcr(std)	Vcr	Value	Variation	Value	Value	Variation
(ft^3)	(liters)	(ft^3)	(liters)	(ft^3)	(number)	(number)	(in H2O)	(mm H2O)	(in H2O)
5.320	150.659	5.291	149.839	5.284	0.995	-0.006	1.900	48.26	-0.082
5.268	149.196	5.314	150.494	5.310	1.009	0.009	1.999	50.76	0.017
5.321	150.683	5.305	150.250	5.301	0.997	-0.003	2.047	52.01	0.065
				Average Y ---------->	1.000				
				Average dH@ ---------->			1.982	50.34	

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is ±0.02.

For Orifice Calibration Factor dH@, the orifice differential pressure in inches of H2O that equates to 0.75 cfm of air at 68°F and 29.92" Hg, acceptable tolerance of individual values from the average is ±0.2.

Environmental Services Co., Inc.

EPA Method 5

ESC Meter Box Calibration

Post-Test Orifice Method

English Meter Box Units, English K' Factor

Model #: C-5000

Serial #: 1224

Date: ----------> 07/15/11

Barometric Pressure: ----------> 30.11 in. Hg

Theoretical Critical Vacuum: ----------> 14.20 in. Hg

IMPORTANT For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above.

IMPORTANT The Critical Orifice Coefficient, K', must be entered in English units, $(ft^3)*(°R)^{0.05}/((in\ .\ Hg)*(min))$.

		DRY GAS METER READINGS							-CRIT. ORIFICE READINGS-		AMBIENT TEMPERATURE		
		Volume	Volume	Volume	Initial Temps		Final Temps.		Orifice	K' Orifice	Actual			
dH	Time	Initial	Final	Total	Inlet	Outlet	Inlet	Outlet	Serial #	Coeff.	Vacuum	Initial	Final	Average
(in H2O)	(min)	(ft^3)	(ft^3)	(ft^3)	(°F)	(°F)	(°F)	(°F)	(number)	(above)	(in. Hg)	(°F)	(°F)	(°F)
1.10	9.25	883.200	888.471	5.271	72.0	72.0	72.0	72.0	CT55	0.4379	20.5	71.2	71.6	71.4
2.00	7.25	889.000	894.291	5.291	72.0	72.0	74.0	72.0	CT63	0.5613	18.0	71.6	71.8	71.7
3.70	5.25	894.600	899.835	5.235	74.0	72.0	75.0	73.0	CT73	0.7738	16.5	71.8	72.0	71.9

DRY GAS METER		ORIFICE		DRY GAS METER	ORIFICE				
VOLUME	VOLUME	VOLUME	VOLUME	VOLUME	CALIBRATION		CALIBRATION FACTOR		
CORRECTED	CORRECTED	CORRECTED	CORRECTED	NOMINAL	FACTOR "Y"		dH@		
Vm(std)	Vm(std)	Vcr(std)	Vcr(std)	Vcr	Value	Variation	Value	Value	Variation
(ft^3)	(liters)	(ft^3)	(liters)	(ft^3)	(number)	(number)	(in H2O)	(mm H2O)	(in H2O)
5.277	149.434	5.291	149.834	5.293	1.003	-0.002	1.889	47.98	-0.116
5.303	150.189	5.314	150.489	5.319	1.002	-0.002	2.092	53.13	0.086
5.259	148.933	5.304	150.202	5.311	1.009	0.004	2.035	51.69	0.030
				Average Y ---------->	1.004				
				Average dH@ ---------->			2.005	50.93	

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is ±0.02.

For Orifice Calibration Factor dH@, the orifice differential pressure in inches of H2O that equates to 0.75 cfm of air at 68°F and 29.92" Hg, acceptable tolerance of individual values from the average is ±0.2.

5.4 Temperature Gauges

All thermocouples were calibrated against a reference thermocouple that was certified against a National Bureau of Standards (NSB) traceable mercury-in-glass thermometer as outlined in Approved Alternative Method ALT-011.

METHOD 5 THERMOCOUPLE CALIBRATION FORM
APPROVED ALTERNATIVE METHOD ALT-011
THERMOCOUPLE CALIBRATION FORM

Type of Thermocouple	Standard	
Type K	Fluke-52 SN 5820128	
Identification		Job ID
Console 1224, Probe 4-S1, Probe 4-G1, #4 Adapter ESC003		1106520001
METER INLET		
Standard Temperature °F	Test Thermocouple Temperature °F	Temperature Difference*
73.6	74	0.54%
METER OUTLET		
Standard Temperature °F	Test Thermocouple Temperature °F	Temperature Difference*
73.2	73	0.27%
STACK TEMPERATURE (4-S1)		
Standard Temperature °F	Test Thermocouple Temperature °F	Temperature Difference*
155.0	156	0.65%
STACK TEMPERATURE (4-G1)		
Standard Temperature °F	Test Thermocouple Temperature °F	Temperature Difference*
146.2	147	0.55%
DRYER IMPINGER		
Standard Temperature °F	Test Thermocouple Temperature °F	Temperature Difference*
62.6	63	0.64%
PROBE TEMPERATURE (4-S1)		
Standard Temperature °F	Test Thermocouple Temperature °F	Temperature Difference*
252.6	254	0.55%
PROBE TEMPERATURE (4-G1)		
Standard Temperature °F	Test Thermocouple Temperature °F	Temperature Difference*
248.8	247	0.72%
OVEN TEMPERATURE		
Standard Temperature °F	Test Thermocouple Temperature °F	Temperature Difference*
252.2	251	0.48%

$$\text{Temperature Difference} = \frac{\left|\text{Standard Temperature - Test Thermocouple Temperature}\right|}{\text{Standard Temperature}} \text{ x } 100 = \leq 2.0\%$$

Complies with the requirements of ANSI/NCSL Z540.1-1994 (R2002) Z540.1

FLUKE ® Everett Service Center

1420 75th St. SW
Everett, Washington 98203
USA

Calibration Certificate

NQA ISO 9001:2000 (10100/2)

Description:	K/J THERMOMETER	**Certificate Number:**	**762716-5820128:1279179569**
Manufacturer:	FLUKE	**Date of Calibration:**	15 July 2010
Model:	52	**Date of Certificate:**	15 July 2010
Serial Number:	5820128	**Recommended Due Date:**	15 July 2011
Customer Name:		**Procedure Name:**	
ENVIRONMENTAL SERVICES COMPANY INC		FLUKE 52: (1 YEAR) CAL VER	
City, State:	LITTLE ROCK, AR	**Procedure Revision:**	1.4
Customer Item ID:	5820128	**Data Type:**	FOUND-LEFT
PO Number:	WOOSLEY CCS	**Temperature:**	22.30 °Celsius
RMA Number:	4515729	**Relative Humidity:**	37 %
Result Summary:	PASS		
Received Date:			

In the attached measurement measurement results, deviation may be expressed with units, Measured Value (MV) - Nominal Value (NV) or as a proportion of the nominal value ((MV-NV)/NV), expressed without units with a scalar multiplier such as % (0.01), or as a ratio of the units (mA/A, µV/V, etc.) Descriptions such as µA/A, µV/V, and others, where used to annotate results or column headings are the preferred replacements for what was historically labeled as "ppm" or parts-per-million and described the results in that column, unless otherwise noted by units symbols.

The Data type that could be found in this certificate must be interpreted as:

- As-Found - Calibration data collected before the unit is adjusted and/or repaired.
- As-Left - Calibration data collected after the unit is adjusted and/or repaired.
- Found-Left - Calibration data collected without any adjustment and/or repair performed.

Unless otherwise stated the TUR (Test Uncertainty Ratio) of this calibration is 4:1 or greater.

This Calibration conforms to ANSI/NCSL Z540.1-1994(R2002)

Results are reviewed to establish where any measurement results exceeded the manufacturer's specifications.
Measured values greater than the Manufacturer's specification (Spec) are indicated by "!".

Comments:

Long Le
Metrology Technician

Dennis Destefan
Lead Metrologist

Traceability Information
For each parameter listed below the calibration was conducted using an unbroken chain of standards to:

DC Voltage
The Voltage Reference standard group, traceable to the Fluke Primary Standards Laboratory, which is traceable to the U.S. representation of the volt, through the internationally accepted value of the Josephson constant Kj=483597.9 GHz/V and a 10 Volt Josephson Array Voltage Standard.

Frequency and Period
The GPS-Rubidium Disciplined oscillator frequency standard, traceable to the United States Naval Observatory (USNO), which is traceable to the National Institute of Standards and Technology.

AC Voltage, Resistance, DC Current, AC Current, Capacitance, Inductance, Phase
The Fluke Primary Standards Laboratory, which is traceable to the National Institute of Standards and Technology.

AC Voltage Flatness
The Fluke Primary Standards Laboratory, or Agilent Technologies Standards Laboratory which are traceable to the National Institute of Standards and Technology.

Humidity
The Vaisala Measurement Standards Laboratory Primary Salt calibration bath, with traceability based on the physical phenomena in which the equilibrium relative humidity values associated with certain saturated salt solutions are known.

Rise Time
The Tektronix GmbH Calibration Laboratory which is traceable to the Physikalisch-Tecnische Bundensanstalt.

Radiation Temperature
The National Institute of Standards and Technology, the Physikalisch-Tecnische Bundensanstalt, or Hart Scientific.

Contact Temperature
The Fluke Primary Standards Laboratory, Hart Scientific, which are traceable to the National Institute of Standards and Technology.

Gas Flow
The DHI Calibration Laboratory, which is traceable to the National Institute of Standards and Technology.

Pressure
The DHI Calibration Laboratory, which is traceable to the Laboratoire National D'Essais, Physikalisch-Technische Bundesanstalt and National Institute of Standards and Technology, or traceable to the Mensor or Ashcroft Calibration Laboratories, which are traceable to the National Institute of Standards and Technology.

Standards Used

Asset #	Instrument Model	Cal Date	Cal Due
10054	FLUKE 5500A CALIBRATOR	02 November 2009	02 November 2010

Calibration Results

Function/Range	Nominal Value	Measured Value	TUR	Manufacturer's Specifications Lower Limit	Upper Limit
The UUT Offset Adjustment has been adjusted prior to this procedure.					
DISPLAY TEST					
Result of Operator Evaluation		PASS			
MEASUREMENT TEST					
INPUT 1 (K-TYPE)					
Was UUT Zero reading 0.0 +/- 0.4U?		PASS			
-182.0 °C	-182.00	-182.3		-182.9	-181.1
The preceding test uses a guardbanding technique					

Calibration Results

Function/Range	Nominal Value	Measured Value	TUR	Manufacturer's Specifications Lower Limit	Upper Limit
to maintain the same Consumer Risk as a 4:1 TUR.					
-89.0 °C	-89.00	-89.0		-89.8	-88.2
530.0 °C	530.00	530.6		528.8	531.2
1355.0 °C	1355.00	1356.6		1352.9	1357.1
-295.6 °F	-295.60	-296.0		-297.2	-294.0
The preceding test uses a guardbanding technique to maintain the same Consumer Risk as a 4:1 TUR.					
-128.2 °F	-128.20	-128.0		-129.6	-126.8
986.0 °F	986.00	987.2		983.7	988.3
2471.0 °F	2471.00	2474.0		2467.2	2474.8
INPUT 2 (K-TYPE)					
Was UUT Zero reading 0.0 +/- 0.4U?		PASS			
-182.0 °C	-182.00	-182.4		-182.9	-181.1
The preceding test uses a guardbanding technique to maintain the same Consumer Risk as a 4:1 TUR.					
-89.0 °C	-89.00	-89.1		-89.8	-88.2
530.0 °C	530.00	530.3		528.8	531.2
1355.0 °C	1355.00	1356.4		1352.9	1357.1
-295.6 °F	-295.60	-296.6		-297.2	-294.0
The preceding test uses a guardbanding technique to maintain the same Consumer Risk as a 4:1 TUR.					
-128.2 °F	-128.20	-128.2		-129.6	-126.8
986.0 °F	986.00	986.8		983.7	988.3
2471.0 °F	2471.00	2473.4		2467.2	2474.8
INPUT 1 (J-TYPE)					
Was UUT Zero reading 0.0 +/- 0.4U?		PASS			
-197.0 °C	-197.00	-197.4		-198.0	-196.0
258.0 °C	258.00	258.3		256.9	259.1
705.0 °C	705.00	705.5		703.5	706.5
-322.6 °F	-322.60	-323.4		-324.3	-320.9
496.4 °F	496.40	496.8		494.5	498.3
1301.0 °F	1301.00	1302.2		1298.3	1303.7
INPUT 2 (J-TYPE)					

FLUKE ®

Certificate Number:
762716-5820128:1279179569

Calibration Date:
15-Jul-10

Calibration Results

Function/Range	Nominal Value	Measured Value	TUR	Manufacturer's Specifications Lower Limit	Upper Limit
Was UUT Zero reading 0.0 +/- 0.4U?		PASS			
-197.0 °C	-197.00	-197.0		-198.0	-196.0
258.0 °C	258.00	258.4		256.9	259.1
705.0 °C	705.00	705.7		703.5	706.5
-322.6 °F	-322.60	-323.2		-324.3	-320.9
496.4 °F	496.40	497.0		494.5	498.3
1301.0 °F	1301.00	1302.4		1298.3	1303.7

End of Report

5.5 Calibration Gasses

All calibration standards are guaranteed and certified by the manufacturer to be prepared in accordance to regulations set forth by the United States Environmental Protection Agency concerning the production of calibration standards. A copy of the manufacturer's certificate for each cylinder used in this testing program is attached.

Certificate of Analysis

- EPA PROTOCOL GAS -

Customer	Environmental Services Company (Little Rock, AR)
Date	February 14, 2011
Delivery Receipt	DR-32263
Gas Standard	400-475 ppm CO, 5.00% Carbon Dioxide, 10.0% Oxygen/Nitrogen
Final Analysis Date	February 14, 2011
Expiration Date	February 14, 2014
Component	Carbon Monoxide, Carbon Dioxide, Oxygen
Balance Gas	Nitrogen

DO NOT USE BELOW 150 psig

Analytical Data:
PA Protocol, Section No. 2.2, Procedure G-1

Reported Concentrations

Carbon Monoxide: 449 ppm +/- 4.4 ppm
Carbon Dioxide: 4.95% +/- 0.04%
Oxygen: 9.95% +/- 0.09%
Nitrogen: Balance

Reference Standards:

SRM/GMIS:	GMIS/GMIS	GMIS	GMIS
Cylinder Number:	CC-184406/CC-92958	CC-159026	CC-231332
Concentration:	256.38 ppm CO/508.66 ppm CO	4.974% CO2	10.1% Oxygen/Nitrogen
Expiration Date:	10/22/12 - 09/23/12	10/14/12	03/04/11

Certification Instrumentation

Component:	Carbon Monoxide	Carbon Dioxide	Oxygen
Make/Model:	Horiba - VIA 510	Horiba - VIA 510	Servomex 244a
Serial Number:	UUBKWXYV	SN075GSF	1847
Principal of Measurement:	NDIR	NDIR	Paramagnetic
Last Calibration:	February 03, 2011	February 03, 2011	February 03, 2011

Cylinder Data

Cylinder Serial Number:	EB-0016028	Cylinder Outlet:	CGA 590
Cylinder Volume:	136 Cubic Feet	Cylinder Pressure:	1950 psig, 70°F

Analytical Uncertainty and NIST Traceability are in compliance with EPA-600/R-97/121.

Certified by:

Adam Strickland

2048 APEX COURT APOPKA, FLORIDA 32703 ~ PHONE (407)-292-2990 FAX (407)-292-3313
WWW.LIQUIDTECHCORP.COM

LIQUID TECHNOLOGY CORPORATION

"INDUSTRY LEADER IN SPECIALTY GASES"

Certificate of Analysis

- EPA PROTOCOL GAS -

Customer	Environmental Services Company (Little Rock, AR)
Date	February 14, 2011
Delivery Receipt	DR-32263
Gas Standard	875-975 ppm CO, 10.0% Carbon Dioxide, 20.0% Oxygen/Nitrogen
Final Analysis Date	February 14, 2011
Expiration Date	February 14, 2014

Component	Carbon Monoxide, Carbon Dioxide, Oxygen
Balance Gas	Nitrogen

Analytical Data: **DO NOT USE BELOW 150 psig**

PA Protocol, Section No. 2.2, Procedure G-1

Reported Concentrations

Carbon Monoxide: 931 ppm +/- 9.3 ppm

Carbon Dioxide: 9.72% +/- 0.09%

Oxygen: 20.1% +/- 0.20%

Nitrogen: Balance

Reference Standards:

SRM/GMIS:	GMIS/GMIS	GMIS	GMIS
Cylinder Number:	CC-251967/CC-165377	CC-165377	CC-85458
Concentration:	769.5 ppm CO/1043.556 ppm CO	9.924% CO2	20.97% Oxygen/Nitrogen
Expiration Date:	11/10/12 - 12/01/12	10/14/12	04/15/11

Certification Instrumentation

Component:	Carbon Monoxide	Carbon Dioxide	Oxygen
Make/Model:	Horiba - VIA 510	Horiba - VIA 510	Servomex 244a
Serial Number:	UUBKWXYV	SN075GSF	1847
Principal of Measurement:	NDIR	NDIR	Paramagnetic
Last Calibration:	February 03, 2011	February 03, 2011	February 03, 2011

Cylinder Data

Cylinder Serial Number:	CC-92948	Cylinder Outlet:	CGA 590
Cylinder Volume:	136 Cubic Feet	Cylinder Pressure:	1950 psig, 70°F

Analytical Uncertainty and NIST Traceability are in compliance with EPA-600/R-97/121.

Certified by:

Adam Strickland

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WWW.LIQUIDTECHCORP.COM

AIR LIQUIDE Air Liquide America Specialty Gases LLC Scott

RATA CLASS

Dual-Analyzed Calibration Standard

6141 EASTON ROAD, BLDG 1, PLUMSTEADVILLE, PA 18949-0310 Phone: 800-331-4953 Fax: 215-766-7226

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory - PGVP Vendor ID: A12011

AIR LIQUIDE AMERICA SPECIALTY GASES LLC
6141 EASTON ROAD, BLDG 1
PLUMSTEADVILLE, PA 18949-0310

P.O. No.: 5918
Document # : 41910321-002

Customer
ENVIRONMENTAL SERVICES CO

13715 WEST MARKHAM
LITTLE ROCK AR 72211
US

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: AAL072094 **Certification Date:** 31May2011 **Exp. Date:** 30May2013
Cylinder Pressure*:** 2000 PSIG **Batch No:** PLU0041707

COMPONENT	CERTIFIED CONCENTRATION (Moles)		ACCURACY**	TRACEABILITY
NITRIC OXIDE	5.59	PPM	+/- 1%	Direct NIST and VSL
NITROGEN - OXYGEN FREE		BALANCE		
TOTAL OXIDES OF NITROGEN	5.61	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 2628	20Jul2012	KAL004106	10.12 PPM	NITRIC OXIDE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
HORIBA/CLA220/5708850810	24May2011	CHEMILUMINESCENCE

ANALYZER READINGS

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

First Triad Analysis

NITRIC OXIDE
Date: 24May2011 Response Unit:VOLTS
Z1 = 0.00140 R1 = 2.29510 T1 = 1.26700
R2 = 2.29760 Z2 = 0.00200 T2 = 1.26620
Z3 = 0.00150 T3 = 1.26590 R3 = 2.29630
Avg. Concentration: 5.587 PPM

Second Triad Analysis

Date: 31May2011 Response Unit: VOLTS
Z1 = -0.00080 R1 = 2.30680 T1 = 1.27160
R2 = 2.30920 Z2 = 0.00020 T2 = 1.27200
Z3 = 0.00190 T3 = 1.27080 R3 = 2.30650
Avg. Concentration: 5.585 PPM

Calibration Curve

Concentration = A + Bx + Cx2 + Dx3 + Ex4
r = 0.9999986
Constants: A = 0.00991591
B = 4.432508996 C =
D = E =

APPROVED BY: JAMES L. MCHALE

Project No. 1106520001

AIR LIQUIDE Air Liquide America Specialty Gases LLC

Scott

RATA CLASS

Dual-Analyzed Calibration Standard

6141 EASTON ROAD, BLDG 1, PLUMSTEADVILLE, PA 18949-0310 Phone: 800-331-4953 Fax: 215-766-7226

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory - PGVP Vendor ID: A12011

AIR LIQUIDE AMERICA SPECIALTY GASES LLC
6141 EASTON ROAD, BLDG 1
PLUMSTEADVILLE, PA 18949-0310

P.O. No.: 5918
Document # : 41910321-003

Customer
ENVIRONMENTAL SERVICES CO

13715 WEST MARKHAM
LITTLE ROCK AR 72211
US

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: CC113751 **Certification Date:** 07Jun2011 **Exp. Date:** 06Jun2013
Cylinder Pressure*:** 2000 PSIG

COMPONENT	CERTIFIED CONCENTRATION (Moles)		ACCURACY**	TRACEABILITY
NITRIC OXIDE	9.50	PPM	+/- 1%	Direct NIST and VSL
NITROGEN - OXYGEN FREE		BALANCE		
TOTAL OXIDES OF NITROGEN	9.52	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 2628	20Jul2012	KAL004106	10.12 PPM	NITRIC OXIDE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
HORIBA/CLA220/5708850810	24May2011	CHEMILUMINESCENCE

ANALYZER READINGS

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

First Triad Analysis

NITRIC OXIDE
Date: 24May2011 Response Unit:MV
Z1 = -0.00020 R1 = 2.31210 T1 = 2.17030
R2 = 2.31200 Z2 = 0.00180 T2 = 2.16830
Z3 = 0.00020 T3 = 2.16870 R3 = 2.31140
Avg. Concentration: 9.500 PPM

Second Triad Analysis

Date: 07Jun2011 Response Unit: MV
Z1 = 0.00140 R1 = 2.29150 T1 = 2.14990
R2 = 2.29250 Z2 = 0.00330 T2 = 2.15230
Z3 = 0.00310 T3 = 2.15200 R3 = 2.29140
Avg. Concentration: 9.500 PPM

Calibration Curve

Concentration = A + Bx + Cx2 + Dx3 + Ex4
r = 0.999998615
Constants: A = 0.00915907
B = 4.432508996 C =
D = E =

APPROVED BY: _____
JOHN OSHEA

123

Project No. 1106520001

Certificate of Analysis

- EPA PROTOCOL GAS -

Customer	Environmental Services Company (Little Rock, AR)
Date	January 11, 2011
Delivery Receipt	DR-31908
Gas Standard	50.0 ppm Nitrogen Dioxide/Air - EPA PROTOCOL
Purchase Order	Verbal - Jeff
Final Analysis Date	January 10, 2011
Expiration Date	July 10, 2011

DO NOT USE BELOW 150 psig

Cylinder Data

Cylinder Serial Number:	CC-251945	Cylinder Outlet:	CGA 660
Cylinder Volume:	133 Cubic Feet	Cylinder Pressure:	1900 psig, 70°F
Expiration Date:	July 10, 2011		

Analytical Data

EPA Protocol, Section No. 2.2, Procedure G-1

- Replicate Concentrations (NO_2) -
Nitrogen Dioxide: 50.4 ppm +/- 0.50 ppm
Air: Balance

Reference Standard(s):

SRM/GMIS:	GMIS
Cylinder Number:	CC-178320
Concentration:	50.9 ppm NO_2/Nitrogen
Expiration Date:	March 26, 2011

Certification Instrumentation

Component:	Nitrogen Dioxide
Make/Model:	Horiba - CLA 510
Serial Number:	43331870031
Principal of Measurement:	Chemiluminescence
Last Calibration:	January 03, 2011

Analytical uncertainty and NIST Traceability are in compliance with EPA-600/R-97/121.

Certified by:

Adam Strickland

LIQUID TECHNOLOGY CORPORATION

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Certificate of Analysis

- EPA PROTOCOL GAS -

Customer	Environmental Services Company (Little Rock, AR)
Date	December 15, 2010
Delivery Receipt	DR-31630
Gas Standard	45-55 ppm Nitric Oxide, 200-250 ppm Carbon Monoxide/Nitrogen
Final Analysis Date	December 13, 2010
Expiration Date	December 13, 2012

DO NOT USE BELOW 150 psig

Analytical Data:
EPA Protocol, Section No. 2.2, Procedure G-1.

Reported Concentrations:
Nitric Oxide: 47.9 ppm +/- 0.47 ppm
Carbon Monoxide: 230 ppm +/- 2.3 ppm
Nitrogen: Balance
Total NOx: 48.3 ppm
** Total NOx for Reference Use Only **

Reference Standards

SRM/GMIS	GMIS	GMIS/GMIS
Cylinder Number:	CC-184190	CC-129043/CC-184406
Concentration:	49.07 ppm NO	105.88 ppm CO/256.38 ppm CO
Expiration Date:	09/20/12	10/21/12 - 10/22/12

Certification Instrumentation

Component:	Nitric Oxide	Carbon Monoxide
Make/Model:	Horiba - CLA 510	Horiba - VIA 510
Serial Number:	43331870031	UUBKWXYV
Principal of Measurement:	Chemiluminescence	NDIR
Last Calibration:	December 03, 2010	December 03, 2010

Cylinder Data

Cylinder Number:	CC-231362	Cylinder Volume:	140 Cubic Feet
Cylinder Outlet:	CGA 660	Cylinder Pressure:	2000 psig, 70°F
Expiration Date:	December 13, 2012		

Analytical Uncertainty and NIST Traceability are in compliance with EPA-600/R-97/121.

Certified by:

Adam Strickland

2564 PEMBERTON DRIVE APOPKA, FLORIDA 32703 ~ PHONE (407)-292-2990 FAX (407)-292-3313
WWW.LIQUIDTECHCORP.COM

Liquid Technology Corporation

Industry Leader in Specialty Gases, Equipment and Service

Certificate of Analysis

- EPA PROTOCOL GAS -

Customer	Environmental Services Company (Little Rock, AR)
Date	December 09, 2009
Delivery Receipt	DR-26972
Gas Standard	275.0 ppm Propane/Nitrogen - EPA PROTOCOL
Final Analysis Date	December 08, 2009
Expiration Date	December 08, 2012

Component	Propane
Balance Gas	Nitrogen

Analytical Data: **DO NOT USE BELOW 150 psig**

EPA Protocol, Section No. 2.2, Procedure G-1

Reported Concentrations

Propane: 268.3 ppm +/- 2.6 ppm

Nitrogen: Balance

Reference Standards:

SRM/GMIS:	GMIS	GMIS
Cylinder Number:	CC-166582	CC-166431
Concentration:	103.2 ppm Propane/Nitrogen	494.8 ppm Propane/Nitrogen
Expiration Date:	May 02, 2010	May 02, 2010

Certification Instrumentation

Component:	Propane
Make/Model:	Agilent 7890A
Serial Number:	CN10736166
Principal of Measurement:	GC-FID
Last Calibration:	December 05, 2009

Cylinder Data

Cylinder Serial Number:	EB-0014538	Cylinder Outlet:	CGA 350
Cylinder Volume:	140 Cubic Feet	Cylinder Pressure:	2000 psig, 70°F

Analytical Uncertainty and NIST Traceability are in compliance with EPA-600/R-97/121.

Certified by: Mike Duncan

Mike Duncan

Unmatched Excellence

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~ www.liquidtechcorp.com ~

Project No. 1106520001

LIQUID TECHNOLOGY CORPORATION

"INDUSTRY LEADER IN SPECIALTY GASES"

Certificate of Analysis

- EPA PROTOCOL GAS -

Customer	Environmental Services Company (Little Rock, AR)
Date	January 18, 2011
Delivery Receipt	DR-31944
Gas Standard	450 - 550 ppm Propane/Nitrogen - EPA PROTOCOL
Final Analysis Date	January 18, 2011
Expiration Date	January 18, 2014

Component	Propane
Balance Gas	Nitrogen

Analytical Data: **DO NOT USE BELOW 150 psig**

EPA Protocol, Section No. 2.2, Procedure G-1

Reported Concentrations

Propane: 500 ppm +/- 5.0 ppm

Nitrogen: Balance

Reference Standards:

SRM/GMIS:	GMIS
Cylinder Number:	CC-125618
Concentration:	489.19 ppm Propane/Nitrogen
Expiration Date:	February 10, 2012

Certification Instrumentation

Component:	Propane
Make/Model:	Agilent 7890A
Serial Number:	CN10736166
Principal of Measurement:	GC-FID
Last Calibration:	January 03, 2011

Cylinder Data

Cylinder Serial Number:	EB-0029956	Cylinder Outlet:	CGA 350
Cylinder Volume:	140 Cubic Feet	Cylinder Pressure:	2000 psig, 70°F

Analytical Uncertainty and NIST Traceability are in compliance with EPA-600/R-97/121.

Certified by:

Adam Strickland

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Liquid Technology Corporation

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Certificate of Analysis

- EPA PROTOCOL GAS -

Customer	Environmental Services Company (Little Rock, AR)
Date	December 09, 2009
Delivery Receipt	DR-26972
Gas Standard	975.0 ppm Propane/Nitrogen - EPA PROTOCOL
Final Analysis Date	December 08, 2009
Expiration Date	December 08, 2012

Component	Propane
Balance Gas	Nitrogen

Analytical Data: **DO NOT USE BELOW 150 psig**

EPA Protocol, Section No. 2.2, Procedure G-1

Reported Concentrations

Propane: 940.6 ppm +/- 9.4 ppm

Nitrogen: Balance

Reference Standards:

SRM/GMIS:	GMIS	GMIS
Cylinder Number:	CC-166431	CC-231417
Concentration:	494.8 ppm Propane/Nitrogen	1003.2 ppm Propane/Nitrogen
Expiration Date:	May 02, 2010	April 07, 2010

Certification Instrumentation

Component:	Propane
Make/Model:	Agilent 7890A
Serial Number:	CN10736166
Principal of Measurement:	GC-FID
Last Calibration:	December 05, 2009

Cylinder Data

Cylinder Serial Number:	EB-0017357	Cylinder Outlet:	CGA 350
Cylinder Volume:	140 Cubic Feet	Cylinder Pressure:	2000 psig, 70°F

Analytical Uncertainty and NIST Traceability are in compliance with EPA-600/R-97/121.

Certified by: Mike Duncan

Mike Duncan

Unmatched Excellence

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~ www.liquidtechcorp.com ~

Project No. 1106520001

5.6 NO_2 to NO Conversion Efficiency

An NO_2 to NO conversion efficiency was performed as detailed in Section 8.2.4.1 of 40 CFR Part 60, Appendix A, Method 7E. A copy of the conversion efficiency, copied from the data acquisition file, is attached.

Environmental Services Co., Inc.
NO_2 to NO Converter Efficiency
Per 40 CFR Part 60, Appendix A, Method 7E, Section 8.2.4.1

Date	Time	NO_x reading	NO_2 gas value	Difference	Converter efficiency
07/06/11	08:41:01	46.32	50.40	4.08	91.90%
07/06/11	08:41:16	46.31	50.40	4.09	91.88%
07/06/11	08:41:31	46.27	50.40	4.13	91.81%
07/06/11	08:41:46	46.31	50.40	4.09	91.88%
07/06/11	08:42:01	46.28	50.40	4.12	91.83%