

**United States
Environmental Protection Agency
Wood Heater Certification Test Report**

**Country Stoves, Inc.
1502 14th Street Northwest
Auburn, WA 98071-0959**

MONTAGE

Volume 1

Report By:

Chip Wadington

CONFIDENTIAL

**RELEASED ONLY BY
AUTHORIZED PERSONNEL**

November 5, 2007

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	(if necessary)	
	Insert Confirmation	varies
	(if necessary)	
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M-5H INDIVIDUAL TEST RUN PAGE INDEX

The data sheets in the individual test runs are organized in the following sequence:

A. Computer Printouts

Table 1	Field Data
Table 2	Field Data
Table 3	Field Data Averages
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Table 5	Proportional Rate Variation

B. Raw Data Sheets

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Data Sheet # 1	Computer Input Data	1
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Data Sheet # 16	Quality Checks	1

TEST SERIES INFORMATION

Unit name and model number: MONTAGE

Type of unit: Wood Heater

Manufacturer: Country Stoves, Inc.
Address: 1502 14th Street Northwest
Auburn, WA 98071-0959

Contact: Loren Sutphin
Phone Number: 206-735-1100
Fax Number: 206-931-1271

Observers: None

Date Received: 9/28/2007 **Aged:** 10/2/07 **Tested:** 10/4-9/2007

Tested by: LoKee Testing Lab using EPA Methods 28, 28A and 5H where applicable.

Test Location: 13235 Prairie Circle East
Bonney Lake, WA 98391-7250
Test Site Elevation: 631 feet above sea level

LoKee's Field Team

Team Members: Chip Wadington

The following pages contain (1) test unit storage information, (2) a diagram showing the height and location of the stack components and sampling ports, and (3) copies of the certification test notices and cancellations sent to the EPA.

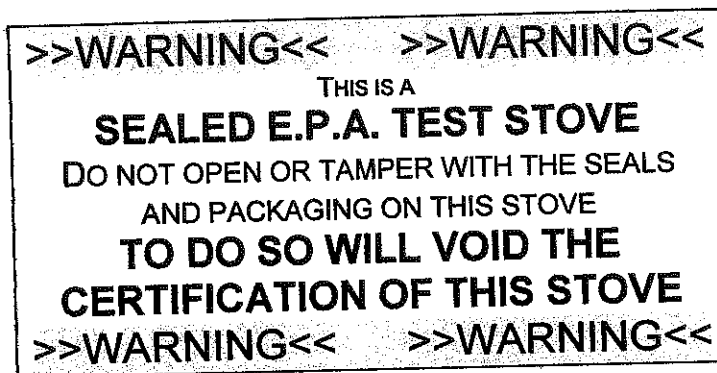
STOVE STORAGE INFORMATION

1. Temporary Storage at LoKee Testing Laboratory

A single, steel, banding strap is place around the unit, preventing opening of the loading door.

2. Permanent Storage

After certification is granted, additional banding is placed both horizontally and vertically around the unit to prevent access to the interior of the unit. An address label is then taped over the intersecting bands to act as a seal. Warning labels are affixed on the unit. The unit is then shipped via common carrier to the manufacturer's designated storage facility unless otherwise noted. A sample of the warning label follows.

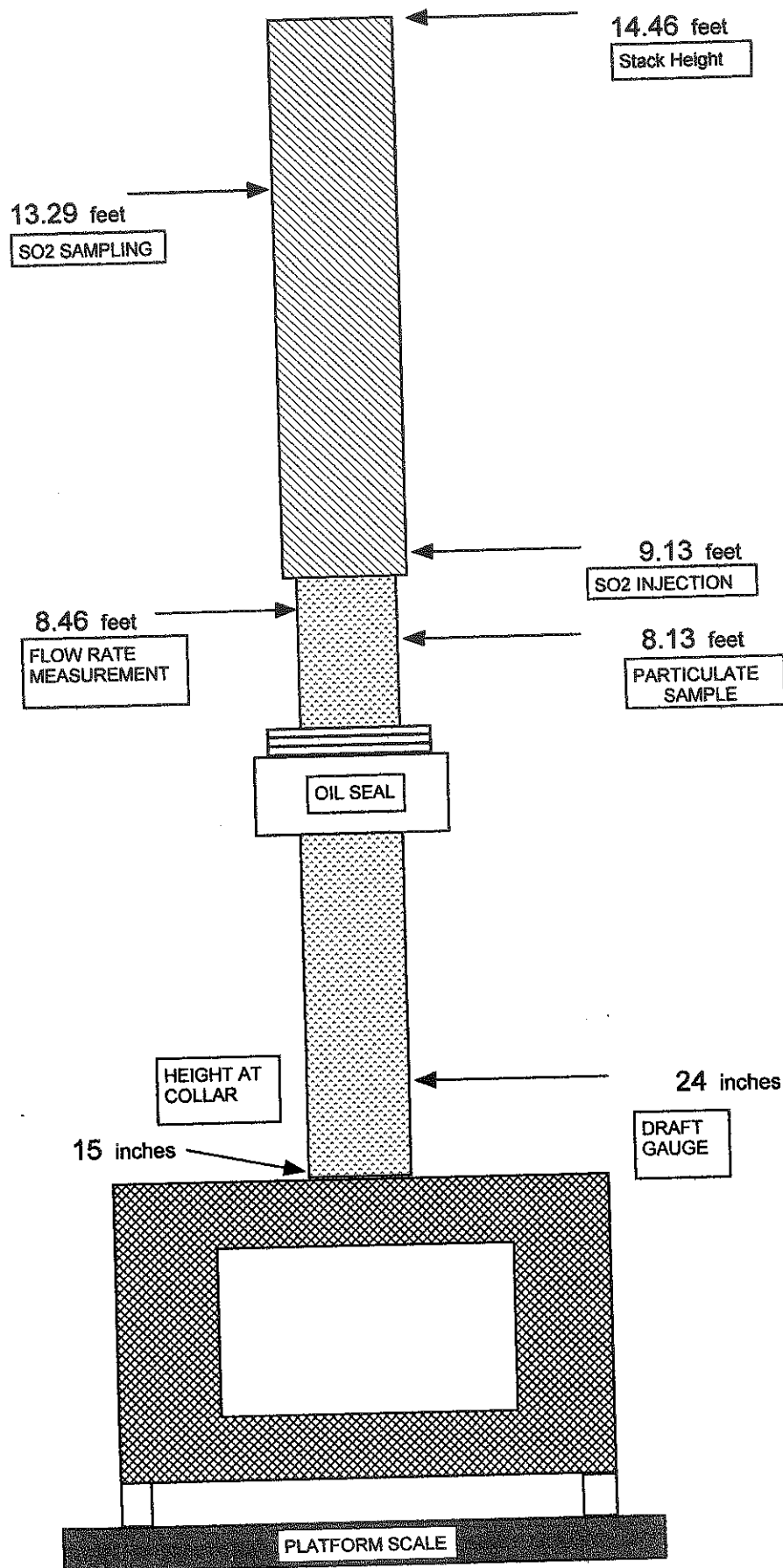


COUNTRY STOVES, INC.
MONTAGE

STORAGE OF TEST UNIT DOES NOT APPLY
FOR QUALITY ASSURANCE TESTING

Model: Country Stoves-MONTAGE

Date: 10/10/07



AGING DATA SHEET

UNIT: Country Stores Montage DATE: 10-2-2007

Hr #	DATE	TIME	TEMP TOP 1	TEMP REF 2
1	10-2-07	1000	714	337
2	"	1100	731	352
3	"	1200	485	228
4	"	1300	471	219
5	"	1400	486	224
6	"	1500	502	225
7	"	1600	478	224
8	"	1700	501	228
9	"	1800	516	231
10	"	1900	505	236
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				

Hr #	DATE	TIME	TEMP 1	TEMP 2
26				
27				
28				
29				
30				
31				
32				
33				
34				
35				
36				
37				
38				
39				
40				
41				
42				
43				
44				
45				
46				
47				
48				
49				
50				

COMMENTS:

LOKER

Laboratory

13235 PRAIRIE CIRCLE EAST, BONNEY LAKE, WA 98391
TELEPHONE: 360-897-9685

October 6, 2007

Mr. John Dupree
Federal Programs Section
U.S. EPA
Stationary Source Compliance Division
Mail Code 2223A Room #7124
1200 Pennsylvania Avenue NW
Washington, DC 20460

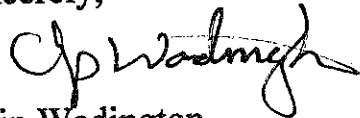
Mr. Dupree:

This is a request to waive the 30 notification for testing in order run certification tests on the:

Country Stoves:
Model:MONTAGE

If you have any questions please feel free to call.

Sincerely,



Chip Wadington
Owner

LOKEE

Laboratory

13235 PRAIRIE CIRCLE EAST, BONNEY LAKE, WA 98391
TELEPHONE: 360-897-9685

November 5, 2007

Mr. John Dupree
Federal Programs Section
U.S. EPA
Stationary Source Compliance Division
Mail Code 2223A Room #7138
1200 Pennsylvania Avenue NW
Washington, DC 20460

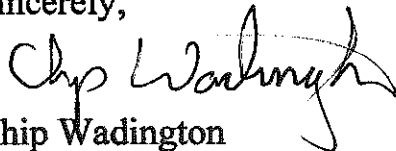
Mr. Dupree:

On October 6, 2007 at 12:23 pm PST, Irvin Keefer waived the 30 day intent to certify notice at the request of LoKee Testing Laboratory in order to run certification tests on the:

Country Stoves
Model: MONTAGE

If you have any questions please feel free to call.

Sincerely,



Chip Wadington
Owner

Wood Heater Emission Test Summary

Laboratory/Wood Heater Information

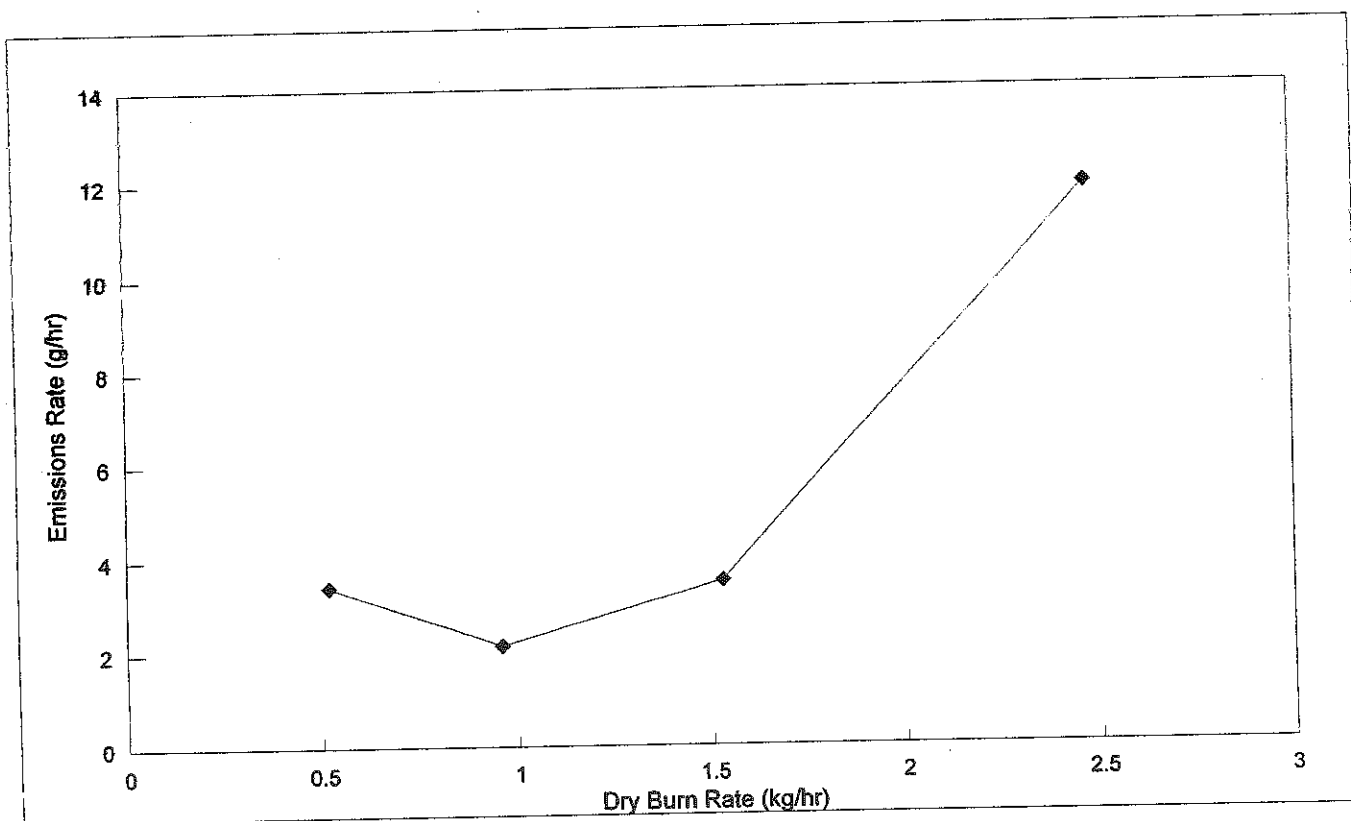
Stove Manufacturer: Country Stoves
Model Identification: MONTAGE
Stove Type> 1=cat,
2=noncat, 3=pellet: 2

Laboratory Name: Lokee Testing
Laboratory Contact: CHIP WADINGTON
Telephone no.: 360-897-9685

Test Dates: 10/4-9/7

Test Methods Used
Method 28/Other: 28
Sampling Method: 5H

Run no.	Burn Rate (kg/hr)	Emission Rate (g/hr)	Heat Output (Btu/hr)	Wtd Avg (g/hr) 4.03
2	0.52	3.42	6270	
4	0.96	2.15	11576	
3	1.53	3.52	18449	
1	2.47	11.90	29784	



Qatar

DATA SUMMARY

Unit:Country Stoves. - Montage

	RUN #	2	4	3	1	
Particulate Emissions:						
Concentration:	grains/dscf:	.0887	.0384	.0202	.0513	
Emissions Rate	grams/hr:	3.42	2.15	3.52	11.9	
Emissions Factor	grams/kg:	6.55	2.24	2.31	4.82	
Front Half Catch	% of total	68.9	39.7	72.2	75.5	
Total Mass Captured	total catch:	.2076	.0889	.0471	.1210	
Heat Output (EPA Default):	BTU/hr	7799	14349.9	22773	36815.4	
Fuel Burn Rates:						
Average kg/hr (dry)	Kg/hr	.52	.96	1.53	2.47	
Fuel Moisture Content:						
Kindling (wet basis)	%	N/a	N/a	N/a	N/a	
Pretest Fuel (wet basis)	%	7.863	7.863	7.863	7.863	
Test Fuel (wet basis)	%	7.863	7.863	7.863	7.863	
Air to Fuel Ratio		-	-	-	-	
Average Stack Gas						
Avg CO ₂	%	1.82	2.65	3.85	7.49	
Avg O ₂	%	-	-	-	-	
Avg CO	%	.02	.04	.01	0.0	
Avg Moisture	%	2.54	3.36	10.08	18.69	
Avg Stack Gas Emissions:						
CO	g/Kg	8.24	11.31	3.19	0.0	
	g/hr	4.3	10.87	4.86	0.0	

	RUN #	2	4	3	1		
Avg Stack Gas Flow Rate							
EPA CMB	dscfm	9.9	14.39	17.67	16.81		
Tracer Gas	dscfm	12.419	16.985	14.984	11.032		
Draft (static)	in H ₂ O	-.030	-.036	-.044	-.050		
Proportionality Average	%	100	100	100	100	100	100
Average Temperatures							
Stack Gas	°F	176	225	279	354		
Firebox	°F	-	-	-	-		
Secondary	°F	-	-	-	-		
Catalytic Combustor	°F	-	-	-	-		
Top	°F	264	370	453	682		
Left Side	°F	106	128	153	246		
Back	°F	157	205	245	348		
Right Side	°F	135	177	220	373		
Bottom	°F	184	244	310	523		
Temperature Change	°F	+1.1	+6.4	-6.9	-56.0		
Test Chamber Environment							
Average Barometer	in. Hg	30.12	29.68	29.88	29.75		
Average Temperature	°F	76	74	75	80		
Ambient Moisture	% H ₂ O	1.45	1.5	1.35	1.75		
Relative Humidity	%RH	38.5	42	33	34		
Air Velocity	m/sec	0	0	0	0	0	0
Fuel Weight and Burn Time							
Density (dry basis)	gm/cm ³	-	-	-	-		
Coal Bed Weight	lbs	N/a	N/a	N/a	N/a		
Pre Test Fuel (inc kindling)	lbs	N/a	N/a	N/a	N/a		
Test Fuel	lbs	2.5	4.6	7.3	11.8		
Burn Time	min	120	120	120	120		

Minimum
DBR

TABLE 1 ---- RAW DATA

TEST No. :

2

CLIENT : Country Stoves

DATE: 04-Oct-07

MODEL: Montage

TIME (MIN.)	METER READING (C F)	DELTA H (IN. H ₂ O)	METER TEMP. (DEG. F)	PERCENT CO (%)	PERCENT CO ₂ (%)	SO ₂ COCENTR. PPM
0	261.000	0.140	84	0.01	2.10	275
5	262.500	0.140	86	0.03	1.40	275
10	264.045	0.140	86	0.03	1.80	275
15	265.591	0.140	87	0.03	2.20	275
20	267.142	0.140	88	0.01	1.70	275
25	268.699	0.140	89	0.06	2.00	275
30	270.261	0.140	89	0.01	1.60	275
35	271.823	0.140	90	0.01	2.00	275
40	273.391	0.140	90	0.04	1.80	275
45	274.960	0.140	90	0.01	1.90	275
50	276.528	0.140	91	0.01	2.50	275
55	278.101	0.140	91	0.01	1.10	275
60	279.675	0.140	91	0.01	3.10	275
65	281.252	0.140	91	0.03	2.10	275
70	282.828	0.140	91	0.02	1.10	275
75	284.405	0.140	91	0.01	2.70	275
80	285.981	0.140	91	0.02	1.40	275
85	287.557	0.140	91	0.03	1.60	275
90	289.134	0.140	92	0.01	1.40	275
95	290.716	0.140	92	0.04	1.30	275
100	292.298	0.140	92	0.03	2.10	275
105	293.880	0.140	92	0.02	1.30	275
110	295.462	0.140	92	0.02	2.30	275
115	297.045	0.140	92	0.02	2.10	275
120	298.627	0.140	92	0.02	0.90	275
125						

TABLE 2--RAW DATA

CLIENT : Country Stoves

TEST No.

2

MODEL: Montage

DATE:

04-Oct-07

METER CAL. FACTOR (Y) -----	0.993	Wt. WOOD BURNED(LB) -----	2.5	Lbs
BAROMETRIC PRESS.(Pb) -----	30.12 in Hg	WET,FUEL MOISTURE % -----	7.863	%
LEAK RATE POST (Lp) -----	0.000 cfm	Wt. PART. COLLECTED -----	0.2076	g
WATER VOL. (V1c) -----	20 MI	METER VOLUME Vm -----	37.627	mcf
TEST TIME (MIN) -----	120 min	HC MOLE FRACTION -----	0.0132	

TABLE 3 —FIELD DATA AVERAGES

CLIENT : Country Stoves

TEST No. 2

MODEL: Montage

DATE: 04-Oct-07

AVG DELTA H	-----	0.14 in H2O	AVG PRCNT CO	-----	0.02	%
AVG METER TEMP. Tm	-----	90 deg F	AVG PRCNT CO2	-----	1.82	%
AVG PPM SO2	-----	275 PPM	AVG BAL CO2/CO	-----	84.26	%

TABLE 4 ---- CALCULATIONS

CLIENT : Country Stoves

TEST No.

2

MODEL: Montage

DATE: 04-Oct-07

STD SAMPLE
VOL. Vm(std) d) -----

36.13 dscf

STACK GAS
FLOW Qsd -----

594.730

dscf/Hr
&

9.91 dscf/min

VOL. WATER
VAPOR Vw(s td) -----

0.941 scf

PARTICULATE
CONCRT. C s -----

0.0057

g/dscf

PRCNT
MSTR Bws -----

2.54 %

PARTC.EMISS.
RATE E -----

3.42

g/Hr

BURN
RATE BR -----

0.52 Kg/Hr

MOLES OF GAS
PER Lb WOOD Nt ----

1.34

Lb-mole/Lb

CO EMISSION
RATE -----4.30 g/Hr
&
8.24 g/Kgdry
fuelPART.EMISS.
RATE -----

6.55

g/Kgdry
fuel

TABLE 5 — PROPORTIONAL RATE VARIATION

CLIENT : Country Stoves

TEST No. : 2

MODEL: Montage

DATE: 04-Oct-07

TIME INTEVAL Ti	PPM * Vm	PROPRTN. RATE VAR. PR	PROPRTN RATE VAR. AVERAGE
=====	=====	=====	=====
5	399.7	97	100
10	410.9	99	
15	410.8	99	
20	411.4	99	
25	412.2	100	
30	413.2	100	
35	412.8	100	
40	414.0	100	
45	414.3	100	
50	413.6	100	
55	414.6	100	
60	414.8	100	
65	415.6	100	
70	415.4	100	
75	415.6	100	
80	415.4	100	
85	415.4	100	
90	415.3	100	
95	416.2	101	
100	416.2	101	
105	416.2	101	
110	416.2	101	
115	416.5	101	
120	416.2	101	
125			

COMPUTER INPUT DATA SHEET #1

3.42

Client: Country StoresAddress: 1502 14th Street NorthwestAuburn, WA 98071-0959Phone: 253-735-1100 Fax: 253-931-1271Run No.: 2 Date of Test: 10-5-2007 Burn Rate: .5224Model No.: Montage Pellet stove ☒ min ☐ min-1.25 ☐ fanStove Type: ☐ Cat ☐ Non Cat ☒ Pellet ☐ 1.25-1.9 ☐ max ☐ insertDry Gas Meter Y Factor: 993 Post Leak Rate: .000 cfm Time: 120 min.
(0.000) (Data Sheet #2) (.000) (Data Sheet #2) (000) (Data Sheet #2)Dry Gas Meter Volume: 37.627 cf
(00.000) (Data Sheet #2)Stack Flow: 12.419 dscfm ΔH : .140 in. H₂O
(00.000) (Data Sheet #2) (.000) (Data Sheet #2)Maximum Vac.: 2.0 Barometric Pressure: 30.12 in. Hg
(0.0) (Data Sheet #2) (00.00) (Data Sheet #2)H₂O Captured: 20.0 g
(00.0) (Data Sheet #3)Front Half Catch % Of Total: 68.9 % Total Particulate Catch: 2076 g
(00.0) (Data Sheet #6) (0.0000) (Data Sheet #6)Flue Gas Moisture: 2.5410 %
(00.000) (Data Sheet #7)Particulate Emission: .0887 gr/dscf
(0.0000) (Data Sheet #7)Relative Humidity: 38.5 % RH Ambient Moisture: 1.45 % H₂O
(00.0) (Data Sheet #8) (0.00) (Data Sheet #8)Preburn Fuel Wt.: 1.3 lbs. Coal Bed Wt.: N/A lbs. Test Fuel Wt.: 2.5 lbs.
(00.0) (Data Sheet #8) (00.0) (Data sheet #8) (00.0) (Data sheet #8)Heat Output (EPA Default): 7799.0 BTU/hr
(00,000.0) (Data Sheet #8)Kindling Fuel % Moisture (wet): N/A % Pretest Fuel % Moisture (wet): N/A %
(00.000) (Data Sheet #10) (00.000) (Data Sheet #10)Test Fuel % Moisture (dry): 8.534 % Test Fuel % Moisture (wet): 7.863 %
(00.000) (Data Sheet #10 [wood stove] or #11 [pellet stove])Fuel Higher Heating Value (dry): _____ BTU/lb.
(0000) (Data Sheet #11)Stack Static Pressure: -.030 in. H₂O
(+/- .000) (Data Sheet #12)Average Ambient Temperature: +1.1 °F Stove Temperature Change: 76 °F
(00) (Data Sheet #14) (+/- 000.0) (Data Sheet #14)Test START 1300
END 1500meter Temp 550
26.7863

METER BOX DATA SHEET PAGE # 2

Page: 1 of 2

UNIT: Country Stores Montoya RUN: 2

DATE: 10-5-2007

Meter Box: SH Y Factor: .993

Leak checks: 15 " Hg @ .000 cfm

" Hg @ _____ cfm

15 " Hg @ .000 cfm

" Hg @ _____ cfm

Inject SO₂ @ 100 cc/min.

Nozzle: Probe @ 3/8" od

Initial Volume: 1.500

Inject SO₂ @ 100 cc/min.

ROTOR PRESS: .18

SAMPLING RATIO: 42 : 1

BP: 30.15

MIN	TIME	METER READING	SAMPLE MDCF	STACK DSCFM	DELTA H	METER TEMP	SO2 PPM	ROTO TEMP	PUMP VACC
0	1300	261.000	—	12.567	.15	84	275	84	2.0
5	05	262.500	—	12.521	.14	86	275	86	2.0
10	10	264.045	264.045	12.521	.14	86	275	86	2.0
15	15	265.591	265.591	12.499	.14	87	275	87	2.0
20	20	267.142	267.142	12.476	.14	88	275	88	2.0
25	25	268.699	268.699	12.453	.14	89	275	89	2.0
30	30	270.261	270.261	12.453	.14	89	275	89	2.0
35	35	271.823	271.823	12.430	.14	90	275	90	2.0
40	40	273.391	273.391	12.430	.14	90	275	90	2.0
45	45	274.960	274.960	12.430	.14	90	275	90	2.0
50	50	276.528	276.528	12.408	.14	91	275	91	2.0
55	55	278.101	278.101	12.408	.14	91	275	91	2.0
ROTO PRESS: .18			TOTALS: 149.596		1.69	1061	BP: 30.10		
60	1400	279.675	279.675	12.387	.14	91	275	91	2.0
65	05	281.252	281.252	12.387	.14	91	275	91	2.0
70	10	282.828	282.828	12.387	.14	91	275	91	2.0
75	15	284.405	284.405	12.387	.14	91	275	91	2.0
80	20	285.981	285.981	12.387	.14	91	275	91	2.0
85	25	287.557	287.557	12.387	.14	91	275	91	2.0
90	30	289.134	289.134	12.365	.14	92	275	92	2.0
95	35	290.716	290.716	12.365	.14	92	275	92	2.0
100	40	292.298	292.298	12.365	.14	92	275	92	2.0
105	45	293.880	293.880	12.365	.14	92	275	92	2.0
110	50	295.462	295.462	12.365	.14	92	275	92	2.0
115	55	297.045	297.045	12.365	.14	92	275	92	2.0
			TOTALS: 148.512		1.68	1098	MAX VACC =		
TOTAL Cu Ft.			TOTALS: 298.108		3.37	2159	AVG. BP:		

METER BOX DATA SHEET PAGE # 2

Page: 2 of 2

UNIT: Country Stoves Montage RUN: 2

DATE: 10-5-2007

Meter Box: SH Y Factor: .993

Leak checks: 15 " Hg @ .000 cfm " Hg @ cfm

15 " Hg @ .000 cfm " Hg @ cfm

Inject SO₂ @ 100 cc/min.

Nozzle: Probe @ 3/8" od

Initial Volume: 1,500

ROTO PRESS: <u>.18</u>			SAMPLING RATIO: <u>42</u>			: <u>1</u>			BP: <u>30.10</u>		
MIN	TIME	METER READING	SAMPLE MDCF	STACK DSCFM	DELTA H	METER TEMP	SO2 PPM	ROTO TEMP	PUMP VACC		
120	<u>1500</u>	<u>298.627</u>	<u>298.627</u>	<u>12.365</u>	<u>.14</u>	<u>92</u>	<u>225</u>	<u>92</u>	<u>2.0</u>		
125											
130											
135						<u>225/</u>					
140											
145											
150											
155											
160											
165											
170											
175											
ROTO PRESS:			TOTALS:			BP.:					
180											
185											
190											
195											
200											
205											
210											
215											
220											
225											
230											
235				<u>310.413</u>	<u>3.51</u>						
			TOTALS:			<u>90</u>	MAX VACC =		<u>2.0</u>		
TOTAL Cu Ft			<u>37.627</u>	TOTALS:		<u>12.419</u>	<u>.140</u>	<u>550</u>	AVG. BP: <u>30.12</u>		

PARTICULATE CATCH / MOISTURE DATA SHEET # 3

UNIT: montage RUN: 2 DATE: 10-5-07

SCALE CHECK	LEVEL	ZEROED
INITIAL:	✓	✓
FINAL:	✓	✓

SCALE	WEIGHT
295.0 g	295.0
590.0 g	590.0
885.0 g	885.0

	#1	#2	#3	#4
IMPINGER				
FINAL WT	617.3	580.0	484.5	842.0
INITIAL WT	605.4	579.8	483.7	834.9
NET WT GRAMS	11.9	0.2	0.8	7.1

TOTAL CATCH: 20.0 GRAMS H₂O

FRONT HALF

FILTER #	122F	
FINAL WT g	7315	
INITIAL WT g	6098	
NET WT g	1217	

BEAKER #	196
DESC.	ACETONE
FINAL WT g	104.9113
INITIAL WT g	104.8895
NET WT g	0.0218
VOL. DESC. ml	50

BACK HALF

FILTER #	122B	
FINAL WT g	3715	
INITIAL WT g	3636	
NET WT g	0.0079	

BEAKER #	197	198	199	200	
DESC.	ACETONE	METHCHLOR	H ₂ O	H ₂ O	
FINAL WT g	105.0108	104.5959	106.2545	104.7589	
INITIAL WT g	104.9187	104.5905	106.2462	104.7539	
NET WT g	0.0421	0.0054	0.0083	0.0050	(0.0133)
VOL. DESC ml	75	75	125	75	(200)

FILTER TARE WEIGHTS DATA SHEET #4-1

Into Dessicator : _____ Date : 4-22-07 Time : 1600 By : CP
 Manufacturer S & S Grade : # 25 Glass Front Size : 11 cm Lot No. : G11148458
 Back Size : 8.2 cm Lot No. : B1048950

	DATE: <u>5-9-07</u>	BY: <u>CP</u>	DATE: <u>5-13-07</u>	BY: <u>CP</u>	DATE: _____	BY: _____
FILTER #	FIRST WEIGHT	TIME	SECOND WEIGHT	TIME	THIRD WEIGHT	TIME
121F	.6114	1405	.6113	1635		
122F	.6098	1406	.6098	1636		
123F	.6061	1407	.6061	1637		
124F	.6073	1409	.6073	1638		
125F	.6062	1411	.6060	1640		
126F	.6097	1412	.6095	1641		
127F	.6195	1413	.6193	1642		
128F	.6210	1415	.6209	1643		
129F	.6183	1416	.6184	1644		
130F	.6208	1418	.6206	1645		

121B	.3638	1419	.3638	1646		
122B	.3636	1420	.3636	1647		
123B	.3642	1421	.3642	1648		
124B	.3638	1422	.3640	1649		
125B	.3584	1423	.3582	1650		
126B	.3629	1425	.3630	1651		
127B	.3617	1426	.3617	1652		
128B	.3631	1427	.3630	1653		
129B	.3611	1428	.3612	1655		
130B	.3621	1430	.3621	1656		

Checked by: CTW Date: 5-14-07 Time: 1300

BALANCE ROOM ENVIRONMENTAL CONDITIONS

DATE	TIME	BY	WB	DB	% RH
5-9-07	1400	CP		78	46
5-13-07	1630	CP		76	45

BEAKER TARE WEIGHTS DATA SHEET #4-2

Into Dessicator: Date: 5-10-2007 Time: 1400 By: CP

BEAKER #	FIRST WEIGHT	TIME	SECOND WEIGHT	TIME	THIRD WEIGHT	TIME
176	105.2114	1355	105.2100	1307	105.2101	1607
177	105.0963	1356	105.0945	1308	105.0948	1608
178	104.0238	1357	104.0215	1309	104.0220	1609
179	104.0027	1358	104.0010	1310	104.0014	1610
180	104.1400	1400	104.1383	1311	104.1388	1611
181	103.8771	1401	103.8752	1312	103.8757	1612
182	103.1332	1402	103.1318	1313	103.1323	1613
183	103.8068	1403	103.8055	1314	103.8056	1614
184	104.1707	1404	104.1702	1315		
185	104.6370	1405	104.6365	1317		
186	106.0943	1407	106.0938	1319		
187	105.5787	1408	105.5779	1320	105.5778	1618
188	104.8069	1409	104.8058	1321	104.8063	1620
189	103.2082	1410	103.2072	1322	103.2068	1621
190	103.8514	1411	103.8496	1323	103.8501	1622
191	104.5254	1412	104.5242	1325	104.5247	1623
192	103.4605	1413	103.4593	1327	103.4598	1624
193	101.9855	1414	101.9845	1327	101.9848	1625
194	103.9905	1415	103.9897	1328	103.9900	1627
195	105.4665	1416	105.4650	1329	105.4655	1628
196	104.8902	1417	104.8892	1330	104.8895	1630
197	104.9645	1418	104.9682	1331	104.9687	1631
198	104.5915	1419	104.5901	1333	104.5905	1632
199	106.2472	1420	106.2461	1334	106.2462	1633
200	104.7548	1420	104.7535	1335	104.7539	1635

BALANCE ROOM ENVIRONMENTAL CONDITIONS

DATE	TIME	BY	WB	DB	% RH	Checked by
5-18-07	1350	CP		77	46	Checked by: C. W. [Signature]
5-21-07	1300	CP		72	46	Date: 5-23-2007
5-22-07	1600	CP		78	46	Time: 1307

WOODSTOVE DATA SHEET # 4-3 : CONSTANT WEIGHTS

Page: 1 of

DATE: 10-5-07

RUN: 2

UNIT: 1

Montage

Beaker #	Date	Time	By	Weight	Date	Time	By	Weight	Date	Time	By
196	10-6	1430	CP	104.9108	10-8	1020	CP	104.9113	10-9	1136	CP
197	10-6	1430	CP	105.6106	10-8	1021	CP	105.0108	10-9	1137	CP
198	10-6	1430	CP	104.5954	10-8	1023	CP	104.5959	10-9	1139	CP
199	10-6	1430	CP	106.2541	10-8	1025	CP	106.2545	10-9	1140	CP
200	10-6	1430	CP	104.7584	10-8	1026	CP	104.7589	10-9	1141	CP

Filter #	Date	Time	By	Weight	Date	Time	By	Weight	Date	Time	By
122F	10-5	1545	CP	.7603	10-6	1407	CP	.7312	10-8	1009	CP
122B	10-5	1545	CP	.3718	10-6	1408	CP	.3715	10-8	1010	CP

SCALE ROOM ENVIRONMENTAL CONDITIONS

Weighing Session	Date	Time	By	DB	%RH
1	10-6-07	1400	CP	78	46
2	10-8-07	1000	CP	75	47
3	10-9-07	1130	CP	78	46
4			CP		
5					

Weighing Session	Date	Time	By	DB	%RH
6					
7					
8					
9					
10					

SCALE QA SHEET

[illegible]

WOODSTOVE DATA SHEET #4-4

SCALE QA SHEET

Dates: From 4-26-2007 Through 10-14-2007	Scale: Sartorius	Model: A 120 S	SN: 37010004
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100 g weight	10 g weight	1 g weight	100 mg weight	Tech	Date	Time	Dry Bulb	% RH
99.9997	10.0001	1.0001	.0999	CP	4-26	0815	73	47
100.0002	10.0001	1.0000	.0999	CP	4-27	1400	78	46
99.9999	10.0000	1.0000	.1000	CP	4-29	1100	74	44
100.0003	10.0001	.9999	.1000	CP	5-1	1000	71	45
100.0003	10.0001	.9999	.1000	CP	5-2	1530	76	45
100.0001	9.9999	1.0000	.1000	CP	5-9	1400	78	46
100.0001	10.0000	1.0000	.0998	CP	5-13	1630	76	45
100.0002	10.0001	1.0000	.1000	CP	5-18	1350	77	46
100.0003	10.0001	1.0000	.0998	CP	5-21	1300	72	46
99.9999	10.0001	1.0000	.1000	CP	5-22	1600	78	46
99.9999	10.0001	1.0000	.0996	CP	6-5	1530	74	44
100.0000	10.0001	.9998	.0999	CP	6-7	1030	70	48
100.0000	10.0001	1.0000	.1000	CP	6-8	1000	68	47
99.9998	10.0004	1.0000	.1000	CP	6-9	1300	78	40
99.9997	10.0000	1.0000	.1000	CP	6-10	1530	78	49
100.0003	10.0002	1.0000	.0998	CP	6-11	0900	72	46
99.9998	10.0000	.9999	.0998	CP	6-12	2100	78	40
99.9998	9.9998	1.0000	.0998	CP	6-13	1600	74	47
99.9999	9.9999	1.0000	.0999	CP	6-14	1630	77	49
99.9999	10.0000	1.0000	.1000	CP	6-15	1430	75	48
100.0001	10.0002	1.0001	.1000	CP	6-19	1040	78	46
100.0000	10.0001	.9999	.0997	CP	6-20	1050	75	48
99.9996	9.9998	.9999	.0998	CP	8-24	1830	74	48
100.0002	10.0002	1.0001	.0999	CP	8-31	1000	79	46
99.9999	10.0002	1.0001	.1000	CP	9-1	1130	77	46
99.9999	10.0001	.9999	.0999	CP	9-4	1100	78	43
99.9997	9.9999	.9998	.0998	CP	9-5	1000	78	46
100.0000	10.0000	.9999	.0999	CP	9-6	1300	78	46
99.9997	10.0000	1.0000	.1000	CP	9-7	1745	78	43
100.0001	10.0000	1.0000	.0997	CP	9-8	1500	78	46
100.0002	10.0000	.9999	.1000	CP	10-5	0930	75	48
100.0003	10.0003	1.0000	.0999	CP	10-6	1400	78	46
100.0001	10.0000	1.0000	.0999	CP	10-8	1000	75	44
100.0002	10.0001	1.0000	.0999	CP	10-9	1130	78	46
100.0001	10.0002	.9999	.0997	CP	10-10	1500	74	44
99.9999	10.0000	1.0001	.0999	CP	10-11	1120	75	48
100.0000	9.9999	.9999	.0998	CP	10-12	1130	72	45
100.0003	9.9999	1.0000	.1000	CP	10-13	1030	79	46
99.9999	10.0000	1.0000	.1000	CP	10-14	1410	78	46

WOODSTOVE DATA SHEET #4-4

SCALE QA SHEET

Dates: From 11-3-2009 Through 4-25-2007	Scale: Sartorius	Model: A 120 S	SN: 37010004
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100 g weight	10 g weight	1 g weight	100 mg weight	Tech	Date	Time	Dry Bulb	% RH
99.9997	10.0002	1.0003	.0998	CP	11-3	1645	78	43
100.0003	10.0002	1.0001	.0999	CP	11-4	1400	73	47
100.0002	9.9999	1.0002	.1000	CP	11-5	1145	75	48
100.0000	10.0000	1.0001	.0999	CP	11-7	1100	78	47
100.0004	10.0001	.9998	.0998	CP	11-8	1015	72	46
100.0001	10.0002	.9999	.0998	CP	11-12	1130	69	47
99.9998	10.0000	.9999	.0999	CP	11-13	1015	68	47
100.0001	9.9999	1.0000	.1001	CP	11-14	1615	78	46
100.0001	10.0006	.9999	.0999	CP	11-21	1020	72	49
100.0001	9.9996	1.0000	.0999	CP	11-28	1010	74	37
99.9999	9.9999	1.0001	.1001	CP	2-10-07	1500	77	40
100.0003	10.0000	.9999	.0999	CP	2-12	0945	75	41
100.0004	10.0000	.9999	.0999	CP	2-13	1030	76	45
100.0002	10.0001	.9999	.0999	CP	2-14	0930	74	47
99.9996	10.0000	.9999	.0998	CP	2-16	1030	75	48
99.9999	10.0000	.9999	.0998	CP	2-17	1400	78	46
100.0001	10.0003	1.0001	.1000	CP	2-19	1300	70	48
99.9998	10.0000	1.0000	.0999	CP	2-20	1000	73	47
100.0001	10.0001	.9999	.0999	CP	2-22	1000	69	44
100.0003	10.0002	.9999	.1000	CP	2-23	1000	71	45
100.0004	9.9999	.9999	.0998	CP	3-6	1730	77	49
100.0004	10.0006	.9998	.0999	CP	3-7	0740	77	42
99.9999	9.9997	.9999	.0999	CP	3-8	1900	74	47
100.0000	10.0000	1.0001	.0999	CP	3-9	0740	78	40
100.0002	10.0000	1.0000	.1001	CP	3-10	1310	78	46
99.9999	10.0001	1.0000	.0999	CP	3-13	1730	70	48
99.9998	9.9997	1.0000	.0999	CP	3-14	0900	77	42
100.0000	10.0000	.9999	.0999	CP	3-15	1030	68	43
100.0004	10.0003	1.0000	.1001	CP	3-16	0940	74	44
100.0003	10.0000	1.0001	.0999	CP	3-17	1715	77	49
100.0004	10.0001	1.0001	.1000	CP	3-18	1200	76	49
99.9998	10.0006	.9999	.0998	CP	3-20	1000	67	47
100.0000	10.0002	1.0000	.1000	CP	3-21	1330	76	45
100.0002	10.0002	1.0000	.0999	CP	3-23	1340	75	48
100.0002	10.0001	1.0000	.0997	CP	4-21	1100	74	44
100.0003	10.0003	.9998	.0998	CP	4-22	1100	75	45
100.0000	10.0001	1.0000	.0999	CP	4-23	0900	71	49
99.9999	10.0000	.9998	.1000	CP	4-24	1000	78	46
100.0000	10.0000	.9999	.1001	CP	4-25	1000	73	47

WOODSTOVE DATA SHEET #4-4

SCALE QA SHEET

Dates: From	6-1-2006 Through 11-1-2006	Scale: Sartorius	Model: A 120 S	SN: 37010004
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100 g weight	10 g weight	1 g weight	100 mg weight	Tech	Date	Time	Dry Bulb	% RH
100.0001	9.9999	1.0000	.0999	CP	6-1	1020	78	43
100.0002	10.0000	.9999	.0999	CP	6-2	1810	75	48
100.0002	10.0000	.9998	.1000	KL	6-5	1300	76	45
100.0002	10.0001	1.0000	.0999	CP	6-6	0900	76	46
99.9996	10.0001	1.0000	.0998	CP	6-7	1015	76	49
100.0000	10.0002	1.0000	.0998	CP	6-12	915	77	46
99.9996	9.9999	1.0000	.0999	CP	6-13	1235	78	46
100.0003	9.9999	1.0001	.0999	CP	6-14	1230	76	49
100.0004	10.0001	1.0001	.1000	CP	6-15	0840	75	48
99.9999	10.0001	1.0002	.0998	CP	6-16	1020	77	48
99.9998	10.0001	1.0000	.0999	CP	7-29	1545	77	46
100.0000	10.0001	.9997	.0999	CP	7-30	1900	75	48
99.9997	10.0000	1.0000	.0999	CP	7-31	0830	77	42
99.9996	10.0002	1.0001	.0998	CP	8-1	1100	78	46
100.0000	10.0001	1.0000	.1000	CP	8-2	1800	77	49
99.9998	10.0001	1.0001	.0998	CP	8-3	1140	76	49
99.9998	10.0003	.9999	.0999	CP	8-4	2030	76	49
100.0000	10.0002	.9999	.0999	CP	8-5	1130	76	45
99.9999	10.0000	.9999	.0997	CW	8-16	1030	75	48
99.9996	9.9999	.9999	.0998	CW	8-17	1035	76	49
100.0002	10.0002	.9999	.0999	CW	8-18	1010	70	48
100.0000	10.0002	1.0000	.0998	CW	8-31	0850	73	47
99.9999	10.0002	.9999	.0998	CW	9-1	1015	78	46
100.0000	10.0000	1.0001	.1000	CW	10-6	1030	78	46
99.9998	10.0000	1.0002	.0999	CW	10-7	1150	77	49
100.0000	10.0002	1.0000	.0999	CW	10-8	1545	75	48
99.9998	10.0001	.9999	.1002	CW	10-9	0820	73	47
99.9997	10.0001	.9999	.0999	CP	10-10	1430	78	46
100.0001	10.0001	1.0001	.0998	CP	10-12	0900	70	48
100.0003	10.0001	1.0000	.0999	CP	10-13	1025	71	49
100.0003	9.9999	.9999	.0999	CP	10-14	0955	69	47
100.0004	10.0002	.9999	.1000	CP	10-15	1700	74	47
99.9998	10.0000	1.0000	.0999	CP	10-16	0915	73	47
99.9998	10.0001	.9999	.0998	KL	10-17	0930	70	48
99.9999	10.0002	1.0000	.0999	KL	10-18	1100	70	47
100.0001	10.0001	.9999	.0999	KL	10-27	0936	75	48
100.0004	9.9999	1.0000	.1000	CP	10-28	1810	73	47
100.0001	10.0002	.9999	.0998	CP	10-31	1230	73	47
99.9998	10.0001	.9999	.1000	CP	11-1	1600	76	38

WOODSTOVE DATA SHEET #4-4

SCALE QA SHEET

Dates: From 12-8-2005 Through 5-31-2006	Scale: Sartorius	Model: A 120 S	SN: 37010004
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100 g weight	10 g weight	1 g weight	100 mg weight	Tech	Date	Time	Dry Bulb	% RH
99.9996	9.9998	.9999	.0998	Ch	12-8	0950	67	38
100.0001	10.0001	1.0000	.0998	Ch	12-27	1800	77	49
100.0000	10.0002	1.0000	.0999	KV	12-28	1125	70	48
100.0004	10.0003	1.0000	.1000	KV	12-29	1000	74	44
99.9999	10.0002	1.0000	.0999	KV	12-30	1030	76	42
99.9998	10.0002	1.0000	.0999	KV	12-31	1200	76	45
100.0003	10.0001	.9999	.0998	KV	1-1	1345	75	44
100.0004	10.0001	.9997	.0999	Ch	1-2	1230	77	48
100.0003	10.0000	1.0001	.0999	Ch	1-4	1430	74	44
100.0003	9.9999	1.0000	.0999	Ch	1-5	1206	74	47
100.0002	9.9999	1.0000	.0999	Ch	1-6	1000	77	49
100.0000	10.0001	.9999	.0997	KV	1-8	1000	71	41
100.0002	10.0000	1.0000	.0999	Ch	1-9	1400	75	48
100.0000	10.0001	1.0000	.0999	Ch	1-12	1200	74	47
100.0001	10.0001	.9999	.0998	Ch	1-13	1500	73	49
99.9999	10.0003	.9998	.0998	Ch	1-15	1230	69	49
100.0003	10.0001	1.0001	.1000	Ch	1-16	1415	70	48
100.0003	10.0001	.9998	.0996	KV	1-24	1015	67	46
100.0003	10.0001	1.0000	.1000	KV	1-25	920	70	44
100.0001	10.0000	1.0000	.0999	Ch	2-2	530	74	48
100.0003	10.0002	.9999	.0998	KV	2-2	0930	75	48
100.0004	10.0002	.9999	.0999	KV	2-3	0900	74	47
100.0001	10.0002	1.0000	.1000	Ch	2-4	1100	77	42
100.0002	10.0000	1.0000	.1000	KV	2-6	1202	74	44
100.0000	10.0001	1.0000	.1000	KV	2-7	1119	73	43
99.9999	10.0001	1.0001	.0999	Ch	2-8	1135	75	41
100.0002	10.0001	.9999	.0999	KV	2-10	0930	72	42
100.0000	10.0000	.9999	.0999	Ch	2-13	0940	75	46
100.0001	10.0002	1.0000	.0999	KV	2-20	1200	71	44
100.0003	10.0001	.9999	.0999	Ch	3-1	1215	78	43
100.0004	10.0001	1.0000	.0999	Ch	3-2	1515	74	49
100.0001	10.0003	1.0001	.1001	KV	3-3	1100	74	44
100.0004	10.0002	1.0000	.0998	Ch	3-6	1300	75	48
100.0002	10.0001	1.0002	.0999	Ch	3-7	1905	75	48
100.0002	9.9999	.9999	.0999	Ch	5-24	1600	78	46
100.0004	10.0001	.9999	.0999	Ch	5-25	0830	76	45
100.0000	9.9999	.9997	.0999	Ch	5-26	0840	74	47
100.0003	9.9999	1.0000	.0998	Ch	5-30	1220	73	48
100.0002	10.0001	.9999	.1000	Ch	5-31	1015	78	46

WOODSTOVE DATA SHEET #4-4

SCALE QA SHEET

Dates: From 10-21-2005 Through 12-6-2005	Scale: Sartorius	Model: A 120 S	SN: 37010004
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100 g weight	10 g weight	1 g weight	100 mg weight	Tech	Date	Time	Dry Bulb	% RH
99.9996	9.9998	1.0000	.0999	CP	10-21	0900	74	44
100.0000	10.0001	1.0000	.0999	CP	10-22	1630	78	46
99.9998	10.0000	.9998	.0998	CP	10-23	1130	74	49
99.9996	10.0000	.9998	.0997	KV	10-24	9:00	77	52
100.0000	10.0003	1.0000	.0999	KV	10-25	9:30	76	49
99.9999	10.0001	.9999	.0997	KV	10-26	9:50	70	48
99.9998	10.0000	.9999	.0998	KV	10-27	8:25	75	47
99.9996	10.0003	1.0001	.0999	KV	10-28	10:45	68	47
99.9999	10.0001	1.0000	.1000	CP	10-29	1900	75	44
99.9998	10.0003	1.0000	.0999	CP	10-30	1145	72	47
99.9999	10.0000	0.9998	.0998	KV	10-31	9:00	78	44
100.0001	10.0000	0.9997	.1000	KV	11-1	0850	75	42
99.9996	9.9998	.9998	.0996	KV	11-2	0915	72	49
99.9996	10.0000	1.0000	.0998	KV	11-3	1429	73	46
99.9997	10.0000	.9999	.0999	KV	11-4	1100	72	42
100.0002	10.0000	1.0001	.1000	CP	11-5	1015	69	44
99.9998	10.0001	1.0000	.0999	KV	11-7	0930	75	41
99.9998	10.0000	.9998	.0999	KV	11-9	1111	70	48
100.0002	10.0001	.9999	.1000	KV	11-10	1040	73	47
99.9999	10.0001	.9999	.0998	CP	11-12	1600	67	49
100.0001	10.0000	1.0000	.0999	CP	11-13	1430	74	47
99.9999	10.0000	1.0000	.0999	CP	11-15	1500	72	44
100.0002	10.0000	.9999	.0999	KV	11-16	0835	70	44
100.0005	10.0000	1.0000	.0999	CP	11-17	0930	72	46
100.0004	10.0002	1.0001	.1000	CP	11-18	1600	72	48
100.0003	10.0001	.9999	.0999	CP	11-20	1100	68	47
100.0004	10.0002	1.0000	.1000	CP	11-21	1200	74	44
100.0002	10.0002	.9999	.0998	CP	11-22	1030	74	42
99.9999	10.0000	1.0000	.0999	CP	11-25	1000	69	47
100.0002	10.0001	.9999	.0999	KV	11-26	1330	72	47
100.0000	10.0001	.9999	.0999	KV	11-27	1145	73	43
100.0001	10.0002	1.0000	.1000	CP	11-28	1000	72	42
100.0004	10.0000	1.0000	.0998	Chp	11-29	0940	72	42
99.9999	10.0001	1.0001	.0999	KV	11-30	0930	70	44
100.0001	10.0001	1.0000	.0998	CP	12-1	0900	70	41
100.0000	10.0000	.9999	.1000	CP	12-2	1340	72	42
100.0000	10.0000	.9998	.0999	CP	12-3	1400	68	43
99.9999	9.9998	.9999	.0996	CP	12-5	1620	71	45
99.9997	10.0001	1.0000	.0994	CP	12-6	1430	69	44

WOODSTOVE DATA SHEET #4-4

SCALE QA SHEET

Dates: From 07/15/05 Through 10-20-2005	Scale: Sartorius	Model: A 120 S	SN: 37010004
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100 g weight	10 g weight	1 g weight	100 mg weight	Tech	Date	Time	Dry Bulb	% RH
99.9998	9.9999	.9999	.0998	BL	07/15	2000	78	46
99.9997	9.9998	1.0000	.1000	BL	07/19	2250	78	46
100.0000	9.9999	.9999	.0999	BL	07/20	0740	78	46
100.0000	9.9999	1.0000	.1000	BL	07/21	2100	78	46
99.9998	9.9998	.9999	.1000	BL	07/24	2200	78	46
100.0001	10.0000	1.0000	.1000	BL	07/27	1515	78	49
99.9998	10.0000	.9998	.1000	BL	07/28	0600	78	49
99.9999	10.0001	1.0000	.1000	BL	07/29	1210	78	49
100.0000	10.0000	1.0001	.0998	CW	9-6	0930	74	48
100.0000	9.9998	.9998	.0996	CW	9-7	0955	72	47
99.9999	10.0000	1.0001	.1000	CW	9-8	1010	78	43
99.9999	10.0001	.9999	.0999	CW	9-9	0945	75	48
99.9996	9.9999	1.0000	.1000	CW	9-10	1130	75	48
99.9999	9.9999	1.0000	.0999	CW	9-11	1300	75	44
99.9997	10.0000	1.0000	.0998	CW	9-12	0920	74	48
99.9998	10.0001	.9999	.0999	CW	9-13	0945	74	47
99.9996	10.0001	.9999	.0999	CW	9-14	1400	77	46
99.9997	10.0001	1.0001	.0999	CW	9-15	0815	75	48
99.9994	10.0000	1.0000	.1000	CW	9-16	0955	76	49
99.9998	10.0001	.9999	.0998	CW	9-17	1200	76	45
99.9997	9.9998	.9999	.0998	CW	9-18	1430	73	47
100.0004	10.0002	1.0000	.0998	CW	9-19	0810	74	44
100.0000	10.0000	1.0000	.1000	CW	9-20	1910	77	49
100.0000	10.0000	1.0000	.0998	CW	9-21	1620	78	46
100.0000	10.0001	1.0000	.0999	CW	9-22	1420	76	49
100.0004	10.0003	1.0000	.0997	CW	9-23	1300	72	46
99.9998	10.0001	1.0000	.0999	CW	10-1	1830	74	47
100.0000	10.0000	1.0000	.0999	CW	10-2	1830	69	47
100.0001	10.0001	.9998	.0999	CW	10-5	0840	74	47
99.9998	10.0001	1.0000	.0999	CW	10-6	0930	77	47
99.9998	10.0002	.9999	.1000	CW	10-8	1340	75	45
100.0000	10.0002	.9999	.0998	CW	10-10	1330	76	48
99.9999	10.0000	1.0001	.1000	CW	10-11	1020	77	46
99.9998	10.0002	.9999	.1000	CW	10-12	1000	74	44
100.0001	10.0001	1.0000	.0997	CW	10-13	1020	70	48
99.9999	10.0000	1.0001	.0999	CW	10-14	1000	70	48
100.0000	10.0001	.9999	.0999	CW	10-15	1440	72	46
99.9997	9.9999	1.0000	.1000	CW	10-20	1000	77	49

BLANK PROCESSING DATA SHEET # 5

UNIT: Montage RUN: 2 DATE: 10-5-07

BLANKS DONE: 10-11-2005

BEAKER	A	B	C
	200 ml ACETONE	75 ml DICHLOR	200 ml WATER
	FISHER OPTIMA LOT # 023283	FISHER OPTIMA LOT # 035941	DWNA, Inc Sparklettes Distilled
FINAL WEIGHT	108.9008	106.3077	106.9670
TARE WEIGHT	108.8995	106.3066	106.9645
NET WEIGHT	.0013	.0011	.0025

TARE BEAKERS INTO DESC: TIME: 1900 DATE: 10-2-2005

DATE: 10-5 BY: Op DATE: 10-6 BY: Op DATE: BY:

BEAKER	1 ST WT	TIME	2 ND WT	TIME	3 RD WT	TIME
A	108.8996	0912	108.8995	1001	✓	
B	106.3065	0913	106.3066	1002	✓	
C	106.9642	0914	106.9645	1003	✓	

FINAL BEAKERS INTO DESC: TIME: 1000 DATE: 10-8-05

DATE: 10-10 BY: Op DATE: 10-11 BY: Op DATE: BY:

BEAKER	1 ST WT	TIME	2 ND WT	TIME	3 RD WT	TIME
A	108.9010	1348	108.9008	1105	✓	
B	106.3076	1349	106.3077	1106	✓	
C	106.9675	1350	106.9670	1109	✓	

TARE QC

DATE	TIME	BY	WB	DB	%
10-5	0840	Op	5	74	44
10-6	0930	Op	5	77	47

FINAL QC

DATE	TIME	BY	WB	DB	%
10-10	1330	Op	5	76	48
10-11	1020	Op	5	77	46

NET PARTICULATE CATCH CALCULATION DATA SHEET #6

UNIT: Montage RUN: 2 DATE: 10-5-07

Blank Audit by CLW 10-14-2005

BLANK CALCULATIONS

Acetone: $\frac{.0013}{.0011} \text{ g} \div \frac{200}{75} \text{ ml} = \frac{.000007}{.000015} \text{ g/ml}$
 Dichloromethane: $\frac{.0011}{.0025} \text{ g} \div \frac{200}{75} \text{ ml} = \frac{.000013}{.000013} \text{ g/ml}$
 Distilled Water: $\frac{.0025}{.0025} \text{ g} \div \frac{200}{75} \text{ ml} = \frac{.000013}{.000013} \text{ g/ml}$

FRONT HALF CATCH

FILTERS: $\frac{.1217}{.0218} \text{ g} - \frac{1}{50} \text{ (# of Filters)} \frac{(.0000 \text{ g})}{(.000007 \text{ g})} = \frac{.1217}{.0214} \text{ g}$
 BEAKERS: $\frac{.0218}{.0218} \text{ g} - \frac{50}{50} \text{ (ml Acetone)} \frac{(.000007 \text{ g})}{(.000007 \text{ g})} = \frac{.0218}{.0214} \text{ g}$
 TOTAL FRONT HALF CATCH: .1431 g

BACK HALF CATCH

FILTERS: $\frac{.0079}{.0421} \text{ g} - \frac{1}{75} \text{ (# of Filters)} \frac{(.0000 \text{ g})}{(.000007 \text{ g})} = \frac{.0079}{.0416} \text{ g}$
 BEAKERS: $\frac{.0421}{.0054} \text{ g} - \frac{75}{75} \text{ (ml Acetone)} \frac{(.000007 \text{ g})}{(.000015 \text{ g})} = \frac{.0421}{.0043} \text{ g}$
 Extract: $\frac{.0054}{.033} \text{ g} - \frac{75}{200} \text{ (ml Dichloromethane)} \frac{(.000015 \text{ g})}{(.000013 \text{ g})} = \frac{.0054}{.0107} \text{ g}$
 Water: $\frac{.033}{.033} \text{ g} - \frac{200}{200} \text{ (ml Water)} \frac{(.000013 \text{ g})}{(.000013 \text{ g})} = \frac{.033}{.0107} \text{ g}$
 TOTAL BACK HALF CATCH: .0645 g

TOTAL CATCH: .2076 g

% FRONT HALF: 68.9 %

CALCULATIONS DATA SHEET # 7

UNIT: Country Stores Montage

RUN: _____

DATE: 10- 2007

$$1) Vm (std) = \frac{(37.627 Vm) (17.64) (.993 mcf) \left(30.12 \text{ " Hg} + \frac{.140 \text{ " H}_2\text{O}}{13.6} \right)}{(550 TmA)} = \frac{36,1067}{000.0000} \text{ dscf}$$

$$2) Vw (std) = (.04707) \left(\frac{20.0}{ml H_2O} \right) = \frac{.9414}{00.0000} \text{ scf}$$

$$3) Asw = \frac{(.9414 \text{ scf})}{\left(\frac{.9414}{scf} + \frac{36,1067}{dscf} \right)} = \frac{.0254}{.0000} \text{ Bws} \times 100 = \frac{2,5416}{00.0000} \% H_2O$$

$$4) Cs = \frac{(.2076 \text{ g.})}{\left(\frac{36,1067}{dscf} \right)} (15.43) = \frac{.0887}{0.0000} \text{ gr / dscf}$$

$$5) \text{ Estimated g / hr} = \frac{(.2076 \text{ g.})}{\left(\frac{36,1067}{dscf} \right)} \left(\frac{12,419}{00.0000} \text{ dscfm} \right) (60) = \frac{4,2843}{00.0000} \text{ g / hr}$$

Vm =	total cubic feet pulled on meter box during test	(p. 2)	(000.000 Vm)
mcf =	meter correction factor (Y factor) of meter box used for test	(p. 2)	(0.000 mcf)
" Hg =	average barometric pressure during test	(p. 2)	(00.00 " Hg)
" H ₂ O =	average delta H for test	(p. 2)	(.000 " H ₂ O)
TmA =	average meter temperature for test in degrees Absolute	(p. 2)	(000 TmA)
ml H ₂ O =	total water caught during test	(p. 3)	(000.0 ml H ₂ O)
g =	total particulate catch for test	(p. 6)	(00.0000 g.)
dscfm =	average stack flow during test	(p. 2)	(00.000 dscf)

TEST DATA SHEET # 8

UNIT: Country Stoves Montage RUN: 2 DATE: 10-5-2007

Test Chamber Air Velocity Start: 0 Stop: 0 Avg.: 0

Wet Bulb / Dry Bulb
Pre: WB: 64 DB: 81 = 39 % RH 1.4 % H₂O
Post: WB: 66 DB: 84 = 38 % RH 1.5 % H₂O

Average: 38.5 % RH 1.45 % H₂O

Empty Stove Weight (lbs): N/A w/ stack & oil seal: Wet: N/A Dry:

Kindling Weight (lbs): Paper: N/A Wood: N/A

Preburn Fuel Weight: N/A Total: N/A

Kindling & Preburn Fuel Weight (wood only) (lbs): Total: N/A

Coal Bed Wt Range (lbs): N/A - N/A Scale: N/A - N/A

Upper: .25 x fuel weight: Always round DOWN to nearest tenth

Lower: .20 x fuel weight: Always round UP to nearest tenth

Actual Coal Bed Weight: N/A

Maximum Coal Bed Removal (lbs): $(\frac{N/A}{\text{Upper}} + \frac{N/A}{\text{Lower}}) \div 2 \times .25 = \frac{N/A}{\text{round down to nearest tenth}}$

Test Fuel (.75" x 1.5" x 5" spacers) = pcs

Dimensions	Length in inches	No. Pcs	Weight in lbs	% of Load
2" x 4"	<u> </u>	<u> </u>	<u> </u>	<u> </u>
4" x 4"	<u> </u>	<u> </u>	<u> </u>	<u> </u>

Test Fuel Weight: lbs

Estimated Dry Burn Rate:

$$\frac{2.5 - (2.5 \times .07863)}{2.2046} \times \frac{60}{120} = .5224 \text{ kg/hr}$$

$$\text{Estimated BTU's/hr: } 19,140 \times \frac{78}{100} \times \frac{.5224}{\text{DBR}} = 7799.0 \text{ BTU's/hr}$$

EPA Default Efficiencies:

Non-cat: 63

Cat: 72

Pellet: 78

WOOD STOVE OPERATING DATA PAGE #9

Unit: Country Stoves Montage Run: 2 Date: 10-4-2007

FIRE STARTED: 0900

WARM UP AND PREBURN:

PRIMARY AIR: Set wide open for all warm-up / preburn fuel charges. Then set to minimum at start of preburn.

SECONDARY AIR: N/A CAT BYPASS: N/A

CHARCOAL BED PREPARATION:

Raked and leveled prior to each warm-up / preburn charge. At 1 1/2 min. prior to loading last fuel, raked and leveled. In stove N/A sec.

TEST:

DOOR wide open during loading N/A min. N/A sec.

PRIMARY AIR: Opened full for first N/A min., then set to run setting of minimum

SECONDARY AIR: N/A CAT BYPASS: N/A

FAN:

ONLY OFF during warm-up

ON OFF first ALL minutes of test

Fan speed set at Auto

ONLY OFF during preburn

ONLY OFF balance of test run

WOOD DATA: ~~KINDLING: A mix of the grades listed below:~~

	SIZE	MILL	GRADE	SPECIES
PREBURN:	2x4	Manke/Tacoma	Std. or better	s. grn D fir
TEST:	2x4	Packwood	# 2 or better	s. grn D fir
	4x4	Packwood	# 2 or better	s. grn D fir

PELLET FUEL MANUFACTURER: Bear Mt Forest Products BRAND: Bear Mt Premium

All Grades WCLB rules:

WARM UP INFORMATION:

All pre-burn / warm up fuel pieces were either N/A or N/A inches.

1st warm up / pre-burn fuel charge (lbs.) added at

2nd warm up / pre-burn fuel charge (lbs.) added at

3rd warm up / pre-burn fuel charge (lbs.) added at

4th warm up / pre-burn fuel charge (lbs.) added at

5th warm up / pre-burn fuel charge (lbs.) added at

WOOD DENSITY DATA SHEET # 11

Unit Country Store Montage Run : _____ Date : 10- -2007

Wood Piece : Nominal Dimensions : _____ x _____ x _____

Depth (D) : _____ cm

Width (W) : _____ cm

Length (L) : _____ cm

_____ cm Avg. Length = _____ cm

_____ cm

_____ cm Volume : _____ cm³
(D x W x L)

Moisture : Room temperature : _____ °F Correction Factor : _____

	Uncorrected	Corrected
Top :		%
Bottom :		%
Side :		%

Uncorrected meter readings corrected
for temperature? Yes ☐ No ☐

Avg. % Dry Moisture : _____ Avg. % Wet Moisture : _____

% Moisture Dried Basis : _____
[1 - (Dry Wt. + Wet Wt.)] x 100

Scale : Levelled : In ☒ Out ☐ Zeroed : In ☒ Out ☐

Into dryer Date 10-4-07 Time 1115 Temp (°F) 227 Wet Weight : _____ g
Out of dryer 10-11-07 1155 236 Dry Weight : _____ g
Minimum time : 24 hrs. Minimum temp 100 °C (212 °F)

Density : N/A g ÷ N/A cm³ = N/A g / cm³
(dry weight) (volume)

Pellet Fuel Moisture Content Determination

Tare Beaker Weight : 103.9 g
Wet Weight : 265.6 g - 103.9 g = 161.7 g
(gross wet weight) (tare beaker weight) (net wet weight)
Dry Weight : 256.8 g - 103.9 g = 147.9 g
(gross dry weight) (tare beaker weight) (net dry weight)

% Moisture Dried Basis : 8.534 %
[1 - (Dry Wt. + Wet Wt.)] x 100
% Dried : 7.863

GAS DATA SHEET #12

DATE: 10-4-2007

WEIGHT: _____

RUN: 2

PAGE: 1 OF 1

UNIT: Countin Stoves Montage

UNIT: Counting Stoves				Montage				RUN:		PAGE: 1		
TIME	SCALE	FUEL	DROP	V.	CO ₂	V.	O ₂	V.	CO	STATIC	SO ₂ PPM	
0	1400	330.4	2.5	—	.084	2.1	.748	18.7	.002	.01	.030	275
5	05	330.3	2.4	.1	.056	1.4	.777	19.4	.004	.03	.030	275
10	10	330.3	2.4	0	.072	1.8	.759	18.9	.004	.03	.030	275
15	15	330.1	2.2	.2	.088	2.2	.743	18.5	.004	.03	.030	275
20	20	330.1	2.2	0	.068	1.7	.766	19.1	.002	.01	.030	275
25	25	330.0	2.1	.1	.078	2.0	.748	18.6	.007	.06	.030	275
30	30	329.8	1.9	.2	.063	1.6	.770	19.2	.002	.01	.030	275
35	35	329.8	1.9	0	.077	2.0	.754	18.8	.002	.01	.030	275
40	40	329.6	1.7	.2	.071	1.8	.761	19.0	.005	.04	.030	275
45	45	329.5	1.6	.1	.075	1.9	.758	18.9	.002	.01	.030	275
50	50	329.4	1.5	.1	.097	2.5	.736	18.3	.002	.01	.030	275
55	55	329.3	1.4	.1	.041	1.1	.791	19.7	.002	.01	.030	275
SUBTOTAL				*****	*****	*****	*****	*****	*****	*****	.360	*****
60	1400	329.2	1.3	.1	.124	3.1	.709	17.7	.002	.01	.030	275
65	05	329.1	1.2	.1	.082	2.1	.749	18.7	.004	.03	.030	275
70	10	329.0	1.1	.1	.043	1.1	.790	19.7	.003	.02	.030	275
75	15	328.9	1.0	.1	.105	2.7	.728	18.1	.002	.01	.030	275
80	20	328.8	.9	.1	.053	1.4	.780	19.4	.003	.02	.030	275
85	25	328.7	.8	.1	.063	1.6	.771	19.2	.004	.03	.030	275
90	30	328.5	.6	.2	.055	1.4	.779	19.4	.002	.01	.030	275
95	35	328.4	.5	.1	.050	1.3	.783	19.5	.005	.04	.030	275
100	40	328.3	.4	.1	.085	2.1	.750	18.7	.004	.03	.030	275
105	45	328.2	.3	.1	.049	1.3	.784	19.5	.003	.02	.030	275
110	50	328.1	.2	.1	.090	2.3	.742	18.5	.003	.02	.030	275
115	55	328.0	.1	.1	.082	2.1	.750	18.7	.003	.02	.030	275
SUBTOTAL				*****	*****	*****	*****	*****	*****	*****	.360	*****
120	1500	327.9	0	.1	.034	.9	.778	19.9	.003	.02	.030	275
125												
130												
135												
140												
145												
150												
155												
160												
165												
170												
175												
SUBTOTAL				*****	*****	*****	*****	*****	*****	*****		*****
TOTAL				*****	*****	*****	*****	*****	*****	*****	.030	*****

Fan?

(1750)

PREBURN DATA SHEET #13

UNIT Country Stores

RUN: 2

2

DATE: 10-5-2007 PAGE: 1

40

0

[illegible]

Run 2
10/5/07

Temperature Data Sheet 14

Country Stoves-Montage

Time	Stack	Top	LT Side	Back	Rt Side	Bottom	Firebox	Sec/Cat	Ambient	Tube	Furn	Smpl Box	Smpl Out	C-Gas	Box	C-Gas	Out	SO2
*****	Chn 103	Chn 104	Chn 105	Chn 106	Chn 107	Chn 108	Chn 109	Chn 110	Chn 111	Chn 112	Chn 113	Chn 114	Chn 115	Chn 116	Chn 117	Chn 118	Chn 119	Chn 120
0	174	267	104	156	133	183	116	#####	73	1437	236	41	235	34	38			
5	172	257	104	155	133	183	116	#####	73	1418	233	40	240	34	38			
10	171	246	102	151	130	178	116	#####	73	1401	233	40	247	34	38			
15	177	275	104	155	133	183	117	#####	73	1388	234	40	243	35	38			
20	174	253	104	154	132	181	118	#####	74	1376	235	40	237	35	39			
25	179	278	105	157	135	185	118	#####	74	1366	234	40	231	35	39			
30	175	263	107	159	136	187	120	#####	75	1360	235	40	233	35	39			
35	172	250	105	154	133	182	120	#####	74	1354	236	40	232	35	39			
40	177	269	105	156	133	182	120	#####	75	1353	235	40	231	36	39			
45	170	244	104	153	132	178	120	#####	76	1352	236	40	240	36	38			
50	177	267	105	152	133	178	120	#####	76	1349	236	41	241	36	38			
55	173	261	107	157	135	187	121	#####	76	1348	236	41	244	36	37			
60	172	248	104	153	133	181	121	#####	76	1345	236	41	248	36	37			
65	180	276	106	158	137	187	121	#####	76	1343	236	41	248	36	37			
70	179	276	108	163	141	195	124	#####	76	1339	236	41	248	36	37			
75	178	259	107	158	137	187	124	#####	77	1336	236	41	247	36	37			
80	177	267	108	159	139	188	124	#####	77	1334	236	42	247	35	37			
85	182	281	109	160	139	187	125	#####	77	1333	237	42	247	35	36			
90	178	268	109	162	139	189	126	#####	77	1333	237	42	247	35	36			
95	174	252	108	157	136	182	126	#####	77	1332	237	42	247	35	36			
100	180	280	109	157	136	182	125	#####	78	1331	238	42	248	35	36			
105	177	266	110	159	137	186	126	#####	78	1332	238	43	248	35	36			
110	181	269	109	157	136	184	126	#####	78	1331	238	43	248	35	35			
115	181	273	110	162	140	190	127	#####	79	1332	239	43	248	35	35			
120	174	253	109	160	138	187	127	#####	78	1333	239	43	248	35	34			

TEMPERATURE DATA SHEET #14A

STACK AVG	176	TEST TIME	120	TOP AVG	264	LT SIDE AVG	106
BACK AVG	157	RT SIDE AVG	135	BOTTOM AVG			184
FIREBOX AVG	122	SEC/CAT AVG	#####	AMBIENT AVG			76

END	169.5
START	168.4
	<u>1.1</u>
	DELTA T

CIRCLE: LOSS / GAIN

ZERO / SPAN CHECK DATA SHEET #15-1

Date: 10-5-2007 Analyte: CO₂ (15-1)
 Unit: Montague Run #: 2
 Zero Cyl. #: 168TAC 3-A Conc.: 0.00 % CO₂ Cyl. Press.: 710 PSI
 Certified by: AIR LIQUIDE Date: 04-19-04
 Span Cyl. #: CC-41627 Conc.: 12.50 % CO₂ Cyl. Press.: 420 PSI
 Certified by: AIR LIQUIDE Date: 11-1-05
 Analyzer: Make: HORIBA Model: PIR-2000 SN: 407069
 Range: 0 - 25.0 % CO₂ Analyzer Output: 0 - 1.0 v.
 Flow: 1.5 SCFH Measured by: Rotameter

EPA Span Value = 25.0 % CO₂
 EPA Control Limits = $\pm 2.5\%$ of 25.0 % CO₂ = ± 0.625 % CO₂
 Method 28 A = $\pm .2$ % of 25.0 % CO₂ = $\pm .05$ % CO₂

PRE RUN Audit: by: Cpl. [Signature] Time: 1200 Temp: 67 °F

AUDIT RESULTS

Point #	Expected Response			Actual Response			± Conc. Difference	Δ %
	Meter	DVM	%	Meter	DVM	%		
ZERO	00.0	.000	00.0	00.2	.002	.098	.098	.394
SPAN	50.0	.500	12.50	50.0	.500	12.478	-.022	-.087

POST RUN Audit: by: Cpl. [Signature] Time: 1520 Temp: 70 °F

AUDIT RESULTS

Point #	Expected Response			Actual Response			± Conc. Difference	Δ %
	Meter	DVM	%	Meter	DVM	%		
ZERO	00.0	.000	00.0	00.1	.001	.074	.074	.294
SPAN	50.0	.500	12.50	50.2	.502	12.528	.028	.112

$\pm$ Conc. Difference = Act % - Exp (Std) %
 Zero % Difference = $\frac{\text{Act \% (ppm)} - \text{Exp \% (ppm)}}{\text{Full Scale Value}} \times 100$
 Span % Difference = $\frac{\text{Act \% (ppm)} - \text{Exp \% (ppm)}}{\text{Full Scale Value}} \times 100$

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ZERO / SPAN CHECK DATA SHEET #15-2

Date: 10-5-2007 Analyte: O₂ (15-2)
 Unit: montage Run #: 2
 Zero Cyl. #: 168TAC 3A Conc.: 0.00 % O₂ Cyl. Press.: 710 PSI
 Certified by: AIR LIQUIDE Date: 04-19-04
 Span Cyl. #: CC-41627 Conc.: 12.50 % O₂ Cyl. Press.: 420 PSI
 Certified by: AIR LIQUIDE Date: 11-1-05
 Analyzer: Make: TELEDYNE Model: 320 A SN: 37400
 Range: 0 - 25.0 % O₂ Analyzer Output: 0 - 1.0 v.
 Flow: 1.5 SCFH Measured by: Rotameter

EPA Span Value = 25.0 % O₂
 EPA Control Limits = $\pm 2.5\%$ of 25.0 % O₂ = $\pm 0.625 \% O_2$
 Method 28 A = $\pm .2\%$ of 25.0 % O₂ = $\pm .05 \% O_2$

PRE RUN Audit by: Cp Wadsworth Time: 1200 Temp: 67 °F

AUDIT RESULTS

Point #	Expected Response			Actual Response			± Conc. Difference	Δ %
	Meter	DVM	%	Meter	DVM	%		
ZERO	00.0	.000	00.0	00.1	.002	.055	.055	.221
SPAN	12.50	.500	12.50	12.5	.500	12.467	-.033	-.131

POST RUN Audit by: Cp Wadsworth Time: 1520 Temp: 70 °F

AUDIT RESULTS

Point #	Expected Response			Actual Response			± Conc. Difference	Δ %
	Meter	DVM	%	Meter	DVM	%		
ZERO	00.0	.000	00.0	00.1	.003	.080	.080	.321
SPAN	12.50	.500	12.50	12.5	.499	12.442	-.058	-.231

± Conc. Difference = Act % - Exp (Std) %
 Zero % Difference = $\frac{\text{Act \% (ppm)} - \text{Exp \% (ppm)}}{\text{Full Scale Value}} \times 100$
 Span % Difference = $\frac{\text{Act \% (ppm)} - \text{Exp \% (ppm)}}{\text{Full Scale Value}} \times 100$

ZERO / SPAN CHECK DATA SHEET #15-3

Date: 10-5-2007 Analyte: CO (15-3)
 Unit: Montage Run #: 2
 Zero Cyl. #: 168TAC 3-A Conc.: 0.00 % CO Cyl. Press.: 710 PSI
 Certified by: AIR LIQUIDE Date: 04-19-04
 Span Cyl. #: CC-41627 Conc.: 14.99 % CO Cyl. Press.: 420 PSI
 Certified by: AIR LIQUIDE Date: 11-1-05
 Analyzer: Make: HORIBA Model: PIR-2000 SN: 408005
 Range: 0 - 10.0 % CO Analyzer Output: 0 - 1.0 v.
 Flow: 1.5 SCFH Measured by: Rotameter

EPA Span Value = 10.0 % CO
 EPA Control Limits = $\pm 2.5\%$ of 10.0 % CO = $\pm 0.25 % CO$
 Method 28 A = $\pm .2 %$ of 10.0 % CO = $\pm .02 % CO$

PRE RUN Audit: by Cp Wainwright Time: 1200 Temp: 67 °F

AUDIT RESULTS

Point #	Expected Response			Actual Response			± Conc. Difference	Δ %
	Meter	DVM	%	Meter	DVM	%		
ZERO	00.0	.000	00.0	00.0	.001	-.023	-.023	-.228
SPAN	49.9	.499	4.99	50.3	.503	5.024	.034	.340

POST RUN Audit: by Cp Wainwright Time: 1520 Temp: 70 °F

AUDIT RESULTS

Point #	Expected Response			Actual Response			± Conc. Difference	Δ %
	Meter	DVM	%	Meter	DVM	%		
ZERO	00.0	.000	00.0	00.0	.000	-.013	-.013	-.128
SPAN	49.9	.499	4.99	50.1	.501	5.004	.014	.140

$\pm \text{Conc. Difference} = \text{Act \%} - \text{Exp (Std) \%}$
 $\text{Zero \% Difference} = \frac{\text{Act \% (ppm)} - \text{Exp \% (ppm)}}{\text{Full Scale Value}} \times 100$
 $\text{Span \% Difference} = \frac{\text{Act \% (ppm)} - \text{Exp \% (ppm)}}{\text{Full Scale Value}} \times 100$

ZERO / SPAN CHECK DATA SHEET #15-4

Date : 10-5-2007

Analyte : SO₂ (15-4)

Unit : Montage Run # : 2
 Zero Cyl. # : 168TAC 3-A Conc. : 0.00 ppm SO₂ Cyl. Press. : 710 PSI

Certified by : AIR LIQUIDE

Date : 04-19-04

Span Cyl. # : CC82089 Conc. : 1250 ppm SO₂ Cyl. Press. : 1900 PSI

Certified by : AIR LIQUIDE

Date : 01-3-2007

Analyzer : Make : HORIBA
 Range : 0 - 2500 ppm SO₂
 Flow : 1.5 SCFH

Model : PIR-2000

SN : 403019

Analyzer Output : 0 - 1.0 v.

Measured by : Rotameter

EPA Span Value = 2500 ppm SO₂

EPA Control Limits = $\pm 2.5\%$ of 2500 ppm SO₂ = ± 62.5 ppm SO₂

PRE RUN Audit : by CpL Wadmy Time : 1200 Temp : 67 °F

AUDIT RESULTS

Point #	Expected Response			Actual Response			± Conc. Difference	Δ %
	Meter	DVM	PPM	Meter	DVM	%		
ZERO	00.0	.000	00.0	00.2	.002	6.528	6.528	.261
SPAN	50.0	.500	1250	50.3	.503	1251.9	1.900	.076

POST RUN Audit : by CpL Wadmy Time : 1520 Temp : 70 °F

AUDIT RESULTS

Point #	Expected Response			Actual Response			± Conc. Difference	Δ %
	Meter	DVM	PPM	Meter	DVM	%		
ZERO	00.0	.000	00.0	00.0	-.001	-.929	-.929	-.037
SPAN	50.0	.500	1250	50.1	.501	1246.9	-3.100	-.124

± Conc. Difference = Act % - Exp (Std) %

Zero % Difference = $\frac{\text{Act \% (ppm)} - \text{Exp \% (ppm)}}{\text{Full Scale Value}} \times 100$

Span % Difference = $\frac{\text{Act \% (ppm)} - \text{Exp \% (ppm)}}{\text{Full Scale Value}} \times 100$

QUALITY CHECKS DATA SHEET # 16

UNIT Country Stores Mortgage RUN: 2 DATE: 10-5-2007
 Thermocouple Check:

T/C # 1	<u>—</u>	°F	T/C # 13	<u>103.0</u>	°F
T/C # 2	<u>—</u>	°F	T/C # 14	<u>68.0</u>	°F
T/C # 3	<u>183.6</u>	°F	T/C # 15	<u>156.4</u>	°F
T/C # 4	<u>318.5</u>	°F	T/C # 16	<u>72.1</u>	°F
T/C # 5	<u>113.4</u>	°F	T/C # 17	<u>68.6</u>	°F
T/C # 6	<u>181.6</u>	°F	T/C # 18	<u>73.1</u>	°F
T/C # 7	<u>155.7</u>	°F	T/C # 19	<u>77.8</u>	°F
T/C # 8	<u>225.6</u>	°F	T/C # 20	<u>—</u>	°F
T/C # 9	<u>—</u>	°F	T/C # 21	<u>—</u>	°F
T/C # 10	<u>—</u>	°F	T/C # 22	<u>—</u>	°F
T/C # 11	<u>62.8</u>	°F	T/C # 23	<u>—</u>	°F
T/C # 12	<u>1034.0</u>	°F	T/C # 24	<u>—</u>	°F

HOT START

Thermocouple Readout:

Pretest zero and span check and calibration

post test zero and span

% difference

ZERO .3 °F Adj. to 0.0 °F ZERO 0.0 °F Difference 0 %

SPAN 2001.7 °F Adj. to 2000.0 °F SPAN 1999.6 °F Difference .020 %

Thermocouple Readout Pretest Linearity Check:

0	= <u>0.0</u>	°F	200	= <u>199.7</u>	°F	400	= <u>399.3</u>	°F
600	= <u>599.5</u>	°F	800	= <u>799.4</u>	°F	1000	= <u>999.4</u>	°F
1200	= <u>1199.5</u>	°F	1400	= <u>1399.4</u>	°F	1600	= <u>1599.6</u>	°F
1800	= <u>1800.0</u>	°F	2000	= <u>2000.0</u>	°F			

Sample Train Leak Check

Pre ✓

Post ✓

C-gas Train Leak Check

Pre ✓

Post ✓

SO₂ Train Leak Check

Pre ✓

Post ✓

Static Gauge Zero Check

Pre ✓

Post ✓

Scale Check Pre: 340.6 - 330.6 = 10.0

Post: 337.5 - 327.5 = 10.0

Stack Cleaned Prior to Test Run: YES X NO —

MIN - 1.25

TABLE 1 — RAW DATA

CLIENT : Country Stoves

TEST No. :

4

MODEL: Montage

DATE: 04-Oct-07

TIME (MIN.)	METER READING (C F)	DELTA H (IN. H2O)	METER TEMP. (DEG. F)	PERCENT CO (%)	PERCENT CO2 (%)	SO2 COCENTR. PPM
=====	=====	=====	=====	=====	=====	=====
0	338.500	0.150	85	0.03	3.10	200
5	340.000	0.150	85	0.03	2.50	200
10	341.560	0.150	85	0.02	2.50	200
15	343.120	0.150	85	0.01	3.60	200
20	344.680	0.150	85	0.02	2.30	200
25	346.240	0.150	85	0.04	2.50	200
30	347.801	0.150	85	0.02	2.20	200
35	349.361	0.150	85	0.02	2.50	200
40	350.921	0.150	85	0.03	2.10	200
45	352.481	0.150	85	0.02	2.60	200
50	354.041	0.150	85	0.00	2.30	200
55	355.601	0.150	85	0.01	3.40	200
60	357.161	0.150	85	0.03	3.60	200
65	358.722	0.150	85	0.04	2.20	200
70	360.283	0.150	85	0.03	3.50	200
75	361.845	0.015	85	0.03	2.40	200
80	363.406	0.150	85	0.03	2.40	200
85	364.967	0.150	85	0.05	2.20	200
90	366.528	0.150	85	0.05	1.50	200
95	368.089	0.150	85	0.03	2.50	200
100	369.650	0.150	85	0.02	3.60	200
105	371.212	0.150	85	0.01	3.30	200
110	372.773	0.150	85	0.04	2.00	200
115	374.334	0.150	85	0.30	2.40	200
120	375.895	0.150	85	0.03	3.10	200

TABLE 2---RAW DATA

CLIENT : Country Stoves

TEST No.

4

MODEL: Montage

DATE: 04-Oct-07

METER CAL.
FACTOR (Y) -----

0.993

Wt. WOOD
BURNED(LB) -----

4.6

Lbs

BAROMETRIC
PRESS.(Pb) -----

29.68 in Hg

WET,FUEL
MOISTURE % -----

7.863

%

LEAK RATE
POST (Lp) -----

0.002 cfm

Wt. PART.
COLLECTED -----

0.0889

g

WATER
VOL. (V1c) -----

26.4 MI

METER
VOLUME Vm -----

37.395

mcf

TEST
TIME (MIN) -----

120 min

HC MOLE
FRACTION -----

0.0132

TABLE 3 ----FIELD DATA AVERAGES

CLIENT : Country Stoves

TEST No. 4

MODEL: Montage

DATE: 04-Oct-07

AVG DELTA H	-----	0.14 in H2O	AVG PRCNT CO	-----	0.04	%
AVG METER TEMP. Tm	-----	85 deg F	AVG PRCNT CO2	-----	2.65	%
AVG PPM SO2	-----	200 PPM	AVG BAL CO2/CO	-----	70.53	%

TABLE 4 --- CALCULATIONS

CLIENT : Country Stoves

TEST No. 4

MODEL: Montage

DATE: 04-Oct-07

STD SAMPLE
VOL. Vm(std) d) -----

35.71 dscf

STACK GAS
FLOW Qsd -----

863.333

dscf/Hr
&

14.39 dscf/min

VOL. WATER
VAPOR Vw(s td) -----

1.243 scf

PARTICULATE
CONCTRT. C s -----

0.0025

g/dscf

PRCNT
MSTR Bws -----

3.36 %

PARTC.EMISS.
RATE E -----

2.15

g/Hr

BURN
RATE BR -----

0.96 Kg/Hr

MOLES OF GAS
PER Lb WOOD Nt -----

1.06

Lb-mole/Lb

CO EMISSION
RATE -----10.87 g/Hr
&
11.31 g/Kgdry
fuelPART.EMISS.
RATE -----

2.24

g/Kgdry
fuel

TABLE 5 ---- PROPORTIONAL RATE VARIATION

CLIENT : Country Stoves

TEST No. : 4

MODEL: Montage

DATE: 04-Oct-07

TIME INTERVAL Ti	PPM * Vm	PROPRTN. RATE VAR. PR	PROPRTN RATE VAR. AVERAGE
=====	=====	=====	=====
5	286.4	96	100
10	297.9	100	
15	297.9	100	
20	297.9	100	
25	297.9	100	
30	298.1	100	
35	297.9	100	
40	297.9	100	
45	297.9	100	
50	297.9	100	
55	297.9	100	
60	297.9	100	
65	298.1	100	
70	298.1	100	
75	298.3	100	
80	298.0	100	
85	298.1	100	
90	298.1	100	
95	298.1	100	
100	298.1	100	
105	298.3	100	
110	298.1	100	
115	298.1	100	
120	298.1	100	

COMPUTER INPUT DATA SHEET #1

Client: Country Stoves
 Address: 1502 14th Street Northwest
Auburn, WA 98071-0959
 Phone: 253-735-1100 Fax: 253-931-1271 2/15
 Run No.: 4 Date of Test: 10-9-2007 Burn Rate: .9612
 Model No.: Montage Pellet stove ☐ min ☒ min-1.25 ☐ fan
 Stove Type: ☐ Cat ☐ Non Cat ☒ Pellet ☐ 1.25-1.9 ☐ max ☐ insert
 Dry Gas Meter Y Factor: 993 Post Leak Rate: .002 cfm Time: 120 min.
 (0.000) (Data Sheet #2) (0.000) (Data Sheet #2) (0.000) (Data Sheet #2)
 Dry Gas Meter Volume: 37.395 cf
 (00.000) (Data Sheet #2)
 Stack Flow: 116.985 dscfm ΔH : 150 in. H₂O
 (00.000) (Data Sheet #2) (0.000) (Data Sheet #2)
 Maximum Vac.: 2.0 Barometric Pressure: 29.68 in. Hg
 (0.0) (Data Sheet #2) (00.00) (Data Sheet #2)
 H₂O Captured: 26.4 g
 (00.0) (Data Sheet #3)
 Front Half Catch % Of Total: 39.7 % Total Particulate Catch: 1.0889 g
 (00.0) (Data Sheet #6) (0.0000) (Data Sheet #6)
 Flue Gas Moisture: 3.3449 %
 (00.000) (Data Sheet #7)
 Particulate Emission: .0384 gr/dscf
 (0.0000) (Data Sheet #7)
 Relative Humidity: 42 % RH Ambient Moisture: 1.5 % H₂O
 (00.0) (Data Sheet #8) (0.00) (Data Sheet #8)
 Preburn Fuel Wt.: 2.3 lbs. Coal Bed Wt.: N/A lbs. Test Fuel Wt.: 4.6 lbs.
 (00.0) (Data Sheet #8) (00.0) (Data sheet #8) (00.0) (Data sheet #8)
 Heat Output (EPA Default): 14349.9 BTU/hr
 (00,000.0) (Data Sheet #8)
 Kindling Fuel % Moisture (wet): N/A % Pretest Fuel % Moisture (wet): N/A %
 (00.000) (Data Sheet #10) (00.000) (Data Sheet #10)
 Test Fuel % Moisture (dry): 8.534 % Test Fuel % Moisture (wet): 7.863 %
 (00.000) (Data Sheet #10 [wood stove] or #11 [pellet stove])
 Fuel Higher Heating Value (dry): _____ BTU/lb.
 (0000) (Data Sheet #11)
 Stack Static Pressure: -.036 in. H₂O
 (+/- .000) (Data Sheet #12)
 Average Ambient Temperature: 74 °F Stove Temperature Change: 6.4 °F
 (00) (Data Sheet #14) (+/- 000.0) (Data Sheet #14)
 Test START 1445 meter Temp 545
 END 1645

METER BOX DATA SHEET PAGE # 2

Page: 1 of 2

UNIT: Country Stores Montage RUN: 4

DATE: 10-9-2007

Meter Box: SH Y Factor: .993

Leak checks: 15 " Hg @ .001 cfm _____ " Hg @ _____ cfm

15 " Hg @ .002 cfm _____ " Hg @ _____ cfm

Inject SO₂ @ 100 cc/min. Nozzle: Probe @ 3/8" od Initial Volume: 1.500

ROTO PRESS: <u>.18</u>			SAMPLING RATIO: <u>56</u> : <u>1</u>				BP: <u>29.70</u>		
MIN	TIME	METER READING	SAMPLE MDCF	STACK DSCFM	DELTA H	METER TEMP	SO2 PPM	ROTO TEMP	PUMP VACC
0	1445	338.500	—	16.991	.15	85	200	85	2.0
5	50	340.000	—	16.991	.15	85	200	85	2.0
10	55	341.560	341.560	16.991	.15	85	200	85	2.0
15	1500	343.120	343.120	16.991	.15	85	200	85	2.0
20	05	344.680	344.680	16.991	.15	85	200	85	2.0
25	10	346.240	346.240	16.991	.15	85	200	85	2.0
30	15	347.801	347.801	16.991	.15	85	200	85	2.0
35	20	349.361	349.361	16.991	.15	85	200	85	2.0
40	25	350.921	350.921	16.991	.15	85	200	85	2.0
45	30	352.481	352.481	16.991	.15	85	200	85	2.0
50	35	354.041	354.041	16.991	.15	85	200	85	2.0
55	40	355.601	355.601	16.991	.15	85	200	85	2.0
ROTO PRESS: <u>.18</u>			TOTALS:	203.892	1.80	1020	BP: <u>29.68</u>		
60	1545	357.161	357.161	16.980	.15	85	200	85	2.0
65	50	358.722	358.722	16.980	.15	85	200	85	2.0
70	55	360.283	360.283	16.980	.15	85	200	85	2.0
75	1600	361.845	361.845	16.980	.15	85	200	85	2.0
80	05	363.406	363.406	16.980	.15	85	200	85	2.0
85	10	364.967	364.967	16.980	.15	85	200	85	2.0
90	15	366.528	366.528	16.980	.15	85	200	85	2.0
95	20	368.089	368.089	16.980	.15	85	200	85	2.0
100	25	369.650	369.650	16.980	.15	85	200	85	2.0
105	30	371.212	371.212	16.980	.15	85	200	85	2.0
110	35	372.773	372.773	16.980	.15	85	200	85	2.0
115	40	374.334	374.334	16.980	.15	85	200	85	2.0
			TOTALS:	203.760	1.80	1020	MAX VACC =		
TOTAL Cu Ft.			TOTALS:	407.652	3.60	2040	AVG. BP:		

METER BOX DATA SHEET PAGE # 2

Page: 2 of 2

UNIT: Cuntry Stores Montage RUN: 41 DATE: 10-9-2007

Meter Box: SH Y Factor: .993

Leak checks: 15 " Hg @ .001 cfm " Hg @ cfm

15 " Hg @ .002 cfm " Hg @ cfm

Inject SO₂ @ 100 cc/min. Nozzle: Probe @ 3/8" od Initial Volume: 1,500

ROTO PRESS: <u>18</u>			SAMPLING RATIO: <u>56</u>			: 1		BP: <u>29.68</u>	
MIN	TIME	METER READING	SAMPLE MDCF	STACK DSCFM	DELTA H	METER TEMP	SO2 PPM	ROTO TEMP	PUMP VACC
120	<u>1645</u>	<u>375.895</u>	<u>375.895</u>	<u>16.980</u>	<u>.15</u>	<u>85</u>	<u>200</u>	<u>85</u>	<u>20</u>
125									
130									
135									
140									
145									
150									
155									
160									
165									
170									
175									
ROTO PRESS:			TOTALS:			BP.:			
180									
185									
190									
195									
200									
205									
210									
215									
220									
225									
230						<u>2125</u>			
235						<u>85</u>			
			TOTALS:	<u>424.632</u>	<u>3.75</u>		MAX VACC =		<u>210</u>
TOTAL Cu Fl			TOTALS:	<u>16.985</u>	<u>.150</u>	<u>545</u>	AVG. BP:		<u>29.68</u>

PARTICULATE CATCH / MOISTURE DATA SHEET # 3

UNIT: Montage RUN: 4 DATE: 10-9-07

SCALE CHECK	LEVEL	ZEROED
INITIAL:	✓	✓
FINAL:	✓	✓

SCALE	WEIGHT
295.0 g	295.0
590.0 g	590.0
885.0 g	885.0

IMPINGER	#1	#2	#3	#4
FINAL WT	632.4	582.8	484.5	856.1
INITIAL WT	614.4	582.3	483.5	849.2
NET WT GRAMS	18.0	.5	1.0	6.9

TOTAL CATCH: 26.4 GRAMS H₂O

FRONT HALF

FILTER #	124F	
FINAL WT g	.6301	
INITIAL WT g	.6073	
NET WT g	.0228	

BEAKER #	6
DESC.	ACETONE
FINAL WT g	91.2191
INITIAL WT g	91.2062
NET WT g	.0129
VOL. DESC. ml	50

BACK HALF

FILTER #	124B	
FINAL WT g	.3739	
INITIAL WT g	.3640	
NET WT g	.0099	

BEAKER #	7	8	9	10	
DESC.	ACETONE	METHCHLOR	H ₂ O	H ₂ O	
FINAL WT g	97.1726	108.6383	108.0976	105.7329	
INITIAL WT g	97.1374	108.6340	108.0942	105.7276	
NET WT g	.0352	.0043	.0034	.0053	(.0087)
VOL. DESC ml	75	75	100	125	(225)

FILTER TARE WEIGHTS DATA SHEET #4-1

Into Dessicator : _____ Date : 4-22-07 Time : 1600 By : CP
 Manufacturer S & S Grade : # 25 Glass Front Size : 11 cm Lot No. : G11148458
 Back Size : 8.2 cm Lot No. : B1048950

	DATE: <u>5-9-07</u>	BY: <u>CP</u>	DATE: <u>5-13-07</u>	BY: <u>CP</u>	DATE: _____	BY: _____
FILTER #	FIRST WEIGHT	TIME	SECOND WEIGHT	TIME	THIRD WEIGHT	TIME
121F	.6114	1405	.6113	1635		
122F	.6098	1406	.6098	1636		
123F	.6061	1407	.6061	1637		
124F	.6073	1409	.6073	1638		
125F	.6062	1411	.6060	1640		
126F	.6097	1412	.6095	1641		
127F	.6195	1413	.6193	1642		
128F	.6210	1415	.6209	1643		
129F	.6183	1416	.6184	1644		
130F	.6208	1418	.6206	1645		

121B	.3638	1419	.3638	1646		
122B	.3636	1420	.3636	1647		
123B	.3642	1421	.3642	1648		
124B	.3638	1422	.3640	1649		
125B	.3584	1423	.3582	1650		
126B	.3629	1425	.3630	1651		
127B	.3617	1426	.3617	1652		
128B	.3631	1427	.3630	1653		
129B	.3611	1428	.3612	1655		
130B	.3621	1430	.3621	1656		

Checked by: CP Date: 5-14-07 Time: 1300

BALANCE ROOM ENVIRONMENTAL CONDITIONS

DATE	TIME	BY	WB	DB	% RH
5-9-07	1400	CP		78	46
5-13-07	1630	CP		76	45

BEAKER TARE WEIGHTS DATA SHEET #4-2

Into Dessicator: Date: 6-11-2007 Time: 1000 By: CP

BEAKER #	FIRST WEIGHT	TIME	SECOND WEIGHT	TIME	THIRD WEIGHT	TIME
1	104.9167	1045	104.9162	1052	✓	
2	106.2535	1046	106.2530	1053	✓	
3	107.7763	1047	107.7760	1054	✓	
4	108.7728	1048	108.7725	1055	✓	
5	97.4352	1049	97.4348	1056	✓	
6	91.2067	1050	91.2062	1058	✓	
7	97.1379	1051	97.1374	1059	✓	
8	108.6344	1052	108.6340	1100	✓	
9	108.0946	1053	108.0942	1101	✓	
10	105.7280	1054	105.7276	1102	✓	
11	104.7875	1056	104.7870	1104	✓	
12	98.2303	1057	98.2300	1105	✓	
13	104.1752	1058	104.1748	1106	✓	
14	97.9816	1059	97.9811	1107	✓	
15	104.7625	1100	104.7620	1108	✓	
16	95.7413	1101	95.7410	1110	✓	
17	104.5951	1102	104.5948	1111	✓	
18	108.8606	1103	108.8602	1112	✓	
19	106.5444	1104	106.5440	1113	✓	
20	108.5916	1105	108.5914	1114	✓	
21	108.2345	1106	108.2340	1115	✓	
22	105.9357	1107	105.9357	1116	✓	
23	104.5881	1108	104.5877	1117	✓	
24	106.4070	1109	106.4072	1118	✓	
25	99.6737	1110	99.6732	1119	✓	

BALANCE ROOM ENVIRONMENTAL CONDITIONS

DATE	TIME	BY	WB	DB	% RH	Checked by
6-19-07	1040	CP	S	78	46	C. Woodring
6-20-07	1050	CP		75	45	Date: 6-30-07
						Time: 12:00

WOODSTOVE DATA SHEET # 4-3 : CONSTANT WEIGHTS

UNIT : *Montage*

RUN : *4* DATE : *10-9-07* of *1*

Beaker #	Date	Time	By	Weight	Date	Time	By	Weight	Date	Time	By
6	10-10	1530	<i>CP</i>	91.2193	10-11	1140	<i>CP</i>	91.2191	10-12	1142	<i>CP</i>
7	10-10	1530	<i>CP</i>	97.1730	10-11	1141	<i>CP</i>	97.1726	10-12	1143	<i>CP</i>
8	10-10	1530	<i>CP</i>	108.6383	10-11	1142	<i>CP</i>	108.6383	10-12	1144	<i>CP</i>
9	10-10	1530	<i>CP</i>	108.0980	10-11	1143	<i>CP</i>	108.0976	10-12	1145	<i>CP</i>
10	10-10	1530	<i>CP</i>	105.7332	10-11	1145	<i>CP</i>	105.7329	10-12	1146	<i>CP</i>

Filter #	Date	Time	By	Weight	Date	Time	By	Weight	Date	Time	By
124F	10-9	1800	<i>CP</i>	.6425	10-10	1515	<i>CP</i>	.6405	10-11	1128	<i>CP</i>
				.6300	10-13	1035	<i>CP</i>	.6301	10-14	1403	<i>CP</i>
124B	10-9	1800	<i>CP</i>	.3743	10-10	1516	<i>CP</i>	.3739	10-11	1129	<i>CP</i>

SCALE ROOM ENVIRONMENTAL CONDITIONS

Weighing Session	Date	Time	By	DB	%RH
1	10-10-07	1500	<i>CP</i>	74	44
2	10-11-07	1120	<i>CP</i>	75	48
3	10-12-07	1130	<i>CP</i>	72	45
4	10-13-07	1030	<i>CP</i>	78	46
5	10-14-07	1400	<i>CP</i>	78	46

Weighing Session	Date	Time	By	DB	%RH
6					
7					
8					
9					
10					

SCALE QA SHEET

[illegible]

WOODSTOVE DATA SHEET #4-4

SCALE QA SHEET

Dates: From 4-26-2007 Through 10-14-2007	Scale: Sartorius	Model: A 120 S	SN: 37010004
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100 g weight	10 g weight	1 g weight	100 mg weight	Tech	Date	Time	Dry Bulb	% RH
99.9997	10.0001	1.0001	.0999	CP	4-26	0815	73	47
100.0002	10.0001	1.0000	.0999	CP	4-27	1400	78	46
99.9999	10.0000	1.0000	.1000	CP	4-29	1100	74	44
100.0003	10.0001	.9999	.1000	CP	5-1	1000	71	45
100.0003	10.0001	.9999	.1000	CP	5-2	1530	76	45
100.0001	9.9999	1.0000	.1000	CP	5-9	1400	78	46
100.0001	10.0000	1.0000	.0998	CP	5-13	1630	76	45
100.0002	10.0001	1.0000	.1000	CP	5-18	1350	77	46
100.0003	10.0001	1.0000	.0998	CP	5-21	1300	72	46
99.9999	10.0001	1.0000	.1000	CP	5-22	1600	78	46
99.9999	10.0001	1.0000	.0996	CP	6-5	1530	74	44
100.0000	10.0001	.9998	.0999	CP	6-7	1030	70	48
100.0000	10.0001	1.0000	.1000	CP	6-8	1000	68	47
99.9998	10.0004	1.0000	.1000	CP	6-9	1300	78	40
99.9997	10.0000	1.0000	.1000	CP	6-10	1530	78	49
100.0003	10.0002	1.0000	.0998	CP	6-11	0900	72	46
99.9998	10.0000	.9999	.0998	CP	6-12	2100	78	40
99.9998	9.9998	1.0000	.0998	CP	6-13	1600	74	47
99.9999	9.9999	1.0000	.0999	CP	6-14	1630	77	49
99.9999	10.0000	1.0000	.1000	CP	6-15	1430	75	48
100.0001	10.0007	1.0001	.1000	CP	6-19	1040	78	46
100.0000	10.0001	.9999	.0997	CP	6-20	1050	75	48
99.9996	9.9998	.9999	.0998	CP	8-24	1830	74	48
100.0002	10.0002	1.0001	.0999	CP	8-31	1000	78	46
99.9999	10.0002	1.0001	.1000	CP	9-1	1130	77	46
99.9999	10.0001	.9999	.0999	CP	9-4	1100	78	43
99.9997	9.9999	.9998	.0998	CP	9-5	1000	78	46
100.0000	10.0000	.9999	.0999	CP	9-6	1300	78	46
99.9997	10.0000	1.0000	.1000	CP	9-7	1745	78	43
100.0001	10.0000	1.0000	.0997	CP	9-8	1500	78	46
100.0002	10.0000	.9999	.1000	CP	10-5	0930	75	48
100.0003	10.0003	1.0000	.0999	CP	10-6	1400	78	46
100.0001	10.0000	1.0000	.0999	CP	10-8	1000	75	44
100.0002	10.0001	1.0000	.0999	CP	10-9	1130	78	46
100.0001	10.0002	.9999	.0997	CP	10-10	1500	74	44
99.9999	10.0000	1.0001	.0999	CP	10-11	1120	75	48
100.0000	9.9999	.9999	.0998	CP	10-12	1130	72	48
100.0003	9.9999	1.0000	.1000	CP	10-13	1030	79	46
99.9999	10.0000	1.0000	.1000	CP	10-14	1410	78	46

WOODSTOVE DATA SHEET #4-4

SCALE QA SHEET

Dates: From 11-3-2009 Through 4-25-2007	Scale: Sartorius	Model: A 120 S	SN: 37010004
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100 g weight	10 g weight	1 g weight	100 mg weight	Tech	Date	Time	Dry Bulb	% RH
99.9997	10.0002	1.0003	.0998	CP	11-3	1645	78	43
100.0003	10.0002	1.0001	.0999	CP	11-4	1400	73	47
100.0002	9.9999	1.0002	.1000	CP	11-5	1145	75	48
100.0000	10.0000	1.0001	.0999	CP	11-7	1100	78	47
100.0004	10.0001	.9998	.0998	CP	11-8	1045	72	46
100.0001	10.0002	.9999	.0998	CP	11-12	1130	69	47
99.9998	10.0000	.9999	.0999	CP	11-13	1015	68	47
100.0001	9.9999	1.0000	.1001	CP	11-14	1615	78	46
100.0001	10.0006	.9999	.0999	CP	11-21	1020	72	49
100.0001	9.9996	1.0000	.0999	CP	11-28	1010	74	37
99.9999	9.9999	1.0001	.1001	CP	2-10-09	1500	77	40
100.0003	10.0000	.9999	.0999	CP	2-12	0945	75	41
100.0004	10.0000	.9999	.0999	CP	2-13	1030	76	45
100.0002	10.0001	.9999	.0999	CP	2-14	0930	74	47
99.9996	10.0000	.9999	.0998	CP	2-16	1030	75	48
99.9999	10.0000	.9999	.0998	CP	2-17	1400	78	46
100.0001	10.0003	1.0001	.1000	CP	2-19	1300	70	48
99.9998	10.0000	1.0000	.0999	CP	2-20	1000	73	47
100.0001	10.0001	.9999	.0999	CP	2-22	1000	69	44
100.0003	10.0002	.9999	.1000	CP	2-23	1000	71	45
100.0004	9.9999	.9999	.0998	CP	3-6	1730	77	49
100.0004	10.0006	.9998	.0999	CP	3-7	0740	77	42
99.9998	9.9997	.9999	.0999	CP	3-8	1900	74	47
100.0000	10.0000	1.0001	.0999	CP	3-9	0740	78	40
100.0002	10.0000	1.0000	.1001	CP	3-10	1310	78	46
99.9999	10.0001	1.0000	.0999	CP	3-13	1730	70	48
99.9998	9.9997	1.0000	.0999	CP	3-14	0900	77	42
100.0000	10.0000	.9999	.0999	CP	3-15	1030	68	43
100.0004	10.0003	1.0000	.1001	CP	3-16	0940	74	44
100.0003	10.0000	1.0001	.0999	CP	3-17	1715	77	49
100.0004	10.0001	1.0001	.1000	CP	3-18	1200	76	49
99.9998	10.0006	.9999	.0998	CP	3-20	1000	67	47
100.0000	10.0002	1.0000	.1000	CP	3-21	1330	76	45
100.0002	10.0002	1.0000	.0999	CP	3-23	1340	75	48
100.0002	10.0001	1.0000	.0997	CP	4-21	1100	74	44
100.0003	10.0003	.9998	.0998	CP	4-22	1100	75	48
100.0000	10.0001	1.0000	.0999	CP	4-23	0900	71	49
99.9999	10.0000	.9998	.1000	CP	4-24	1000	78	46
100.0000	10.0000	.9999	.1001	CP	4-25	1000	73	47

WOODSTOVE DATA SHEET #4-4

SCALE QA SHEET

Dates: From	6-1-2006 Through 11-1-2006	Scale: Sartorius	Model: A 120 S	SN: 37010004
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100 g weight	10 g weight	1 g weight	100 mg weight	Tech	Date	Time	Dry Bulb	% RH
100.0001	9.9999	1.0000	.0999	Ch	6-1	1020	78	43
100.0002	10.0000	.9999	.0999	Ch	6-2	1810	75	48
100.0002	10.0000	.9998	.1000	Ch	6-5	1300	76	45
100.0002	10.0001	1.0000	.0999	Ch	6-6	0900	76	46
99.9996	10.0001	1.0000	.0998	Ch	6-7	1015	76	49
100.0000	10.0002	1.0000	.0998	Ch	6-12	915	77	46
99.9996	9.9999	1.0000	.0999	Ch	6-13	1235	78	46
100.0003	9.9999	1.0001	.0999	Ch	6-14	1230	76	49
100.0004	10.0001	1.0001	.1000	Ch	6-15	0840	75	48
99.9999	10.0001	1.0002	.0998	Ch	6-16	1020	77	48
99.9998	10.0001	1.0000	.0999	Ch	7-29	1545	77	46
100.0000	10.0001	.9997	.0999	Ch	7-30	1900	75	48
99.9997	10.0000	1.0000	.0999	Ch	7-31	0830	77	42
99.9996	10.0002	1.0001	.0998	Ch	8-1	1100	78	46
100.0000	10.0001	1.0000	.1000	Ch	8-2	1800	77	49
99.9998	10.0001	1.0001	.0998	Ch	8-3	1140	76	49
99.9998	10.0003	.9999	.0999	Ch	8-4	2030	76	49
100.0000	10.0002	.9999	.0999	Ch	8-5	1130	76	45
99.9999	10.0000	.9999	.0997	Ch	8-16	1030	75	48
99.9996	9.9999	.9999	.0998	Ch	8-17	1035	76	49
100.0002	10.0002	.9999	.0999	Ch	8-18	1010	70	48
100.0000	10.0002	1.0000	.0998	Ch	8-31	0850	73	47
99.9999	10.0002	.9999	.0998	Ch	9-1	1015	78	46
100.0000	10.0000	1.0001	.1000	Ch	10-6	1030	78	46
99.9998	10.0000	1.0002	.0999	Ch	10-7	1150	77	49
100.0000	10.0002	1.0000	.0999	Ch	10-8	1545	75	48
99.9998	10.0001	.9999	.1002	Ch	10-9	0820	73	47
99.9997	10.0001	.9999	.0999	Ch	10-10	1430	78	46
100.0001	10.0001	1.0001	.0998	Ch	10-12	0900	70	48
100.0003	10.0001	1.0000	.0999	Ch	10-13	1025	71	49
100.0003	9.9999	.9999	.0999	Ch	10-14	0955	69	47
100.0004	10.0002	.9999	.1000	Ch	10-15	1700	74	47
99.9998	10.0000	1.0000	.0999	Ch	10-16	0915	73	47
99.9998	10.0001	.9999	.0998	Ch	10-17	0930	70	48
99.9999	10.0002	1.0000	.0999	Ch	10-18	1100	70	47
100.0001	10.0001	.9999	.0999	Ch	10-27	0936	75	48
100.0004	9.9999	1.0000	.1000	Ch	10-28	1800	73	47
100.0001	10.0002	.9999	.0998	Ch	10-31	1230	73	47
99.9998	10.0001	.9999	.1000	Ch	11-1	1600	76	38

WOODSTOVE DATA SHEET #4-4

SCALE QA SHEET

Dates: From 12-8-2005 Through 5-31-2006	Scale: Sartorius	Model: A 120 S	SN: 37010004
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100 g weight	10 g weight	1 g weight	100 mg weight	Tech	Date	Time	Dry Bulb	% RH
99.9996	9.9998	.9999	.0998	CP	12-8	0950	67	38
100.0001	10.0001	1.0000	.0998	CP	12-27	1500	77	49
100.0000	10.0002	1.0000	.0999	KV	12-28	1125	70	48
100.0004	10.0003	1.0000	.1000	KV	12-29	1000	74	44
99.9999	10.0002	1.0000	.0999	KV	12-30	1030	76	42
99.9998	10.0002	1.0000	.0999	KV	12-31	1200	76	45
100.0003	10.0001	.9999	.0998	KV	1-1	1345	75	44
100.0004	10.0001	.9997	.0999	CP	1-2	1230	77	48
100.0003	10.0000	1.0001	.0999	CP	1-4	1430	74	44
100.0003	9.9999	1.0000	.0999	CP	1-5	1206	74	47
100.0002	9.9999	1.0000	.0999	CP	1-6	1000	77	49
100.0000	10.0001	.9999	.0997	KV	1-8	1000	71	44
100.0002	10.0000	1.0000	.0999	CP	1-9	1400	75	48
100.0000	10.0001	1.0000	.0999	CP	1-12	1200	74	47
100.0001	10.0001	.9999	.0998	CP	1-13	1500	73	49
99.9999	10.0003	.9998	.0998	CP	1-15	1230	69	49
100.0003	10.0001	1.0001	.1000	CP	1-16	1415	70	48
100.0003	10.0001	.9998	.0996	KV	1-24	1015	67	46
100.0003	10.0001	1.0000	.1000	KV	1-25	920	70	44
100.0001	10.0000	1.0000	.0999	CP	2-2	530	74	48
100.0003	10.0002	.9999	.0998	KV	2-2	0930	75	48
100.0004	10.0002	.9999	.0999	KV	2-3	0900	74	47
100.0001	10.0002	1.0000	.1000	CP	2-4	1100	77	42
100.0002	10.0000	1.0000	.1000	KV	2-6	1202	74	44
100.0000	10.0001	1.0000	.1000	KV	2-7	1119	73	43
99.9999	10.0001	1.0001	.0999	CP	2-8	1135	75	41
100.0002	10.0001	.9999	.0999	KV	2-10	0930	72	42
100.0000	10.0000	.9999	.0999	CP	2-13	0940	75	46
100.0001	10.0002	1.0000	.0999	KV	2-20	1200	71	44
100.0003	10.0001	.9999	.0999	CP	3-1	1215	78	43
100.0002	10.0001	1.0000	.0999	CP	3-2	1515	74	49
100.0001	10.0003	1.0001	.1001	KV	3-3	1100	74	44
100.0004	10.0002	1.0000	.0998	CP	3-6	1300	75	48
100.0002	10.0001	1.0002	.0999	CP	3-7	1905	75	48
100.0002	9.9999	.9999	.0999	CP	5-24	1600	78	46
100.0004	10.0001	.9999	.0999	CP	5-25	0830	76	45
100.0000	9.9999	.9997	.0999	CP	5-26	0840	74	47
100.0003	9.9999	1.0000	.0998	CP	5-30	1220	73	48
100.0002	10.0001	.9999	.1000	CP	5-31	1015	78	46

WOODSTOVE DATA SHEET #4-4

SCALE QA SHEET

Dates: From 10-21-2005 Through 12-6-2005	Scale: Sartorius	Model: A 120 S	SN: 37010004
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100 g weight	10 g weight	1 g weight	100 mg weight	Tech	Date	Time	Dry Bulb	% RH
99.9996	9.9999	1.0000	.0999	Op	10-21	0900	74	44
100.0000	10.0001	1.0000	.0999	Op	10-22	1630	78	46
99.9998	10.0000	.9998	.0998	Op	10-23	1130	74	49
99.9996	10.0000	.9998	.0997	KV	10-24	9:00	77	52
100.0000	10.0003	1.0000	.0999	KV	10-25	9:30	76	49
99.9999	10.0001	.9999	.0997	KV	10-26	9:50	70	48
99.9998	10.0000	.9999	.0998	KV	10-27	8:25	75	47
99.9996	10.0003	1.0001	.0999	KV	10-28	10:45	68	47
99.9999	10.0001	1.0000	.1000	Op	10-29	1900	75	44
99.9998	10.0003	1.0000	.0999	Op	10-30	1145	72	42
99.9999	10.0000	0.9998	.0998	KV	10-31	9:00	78	44
100.0001	10.0000	0.9997	.1000	KV	11-1	0850	75	42
99.9996	9.9998	.9998	.0996	KV	11-2	0915	72	49
99.9996	10.0000	1.0000	.0998	KV	11-3	1429	73	46
99.9997	10.0000	.9999	.0999	KV	11-4	1100	72	42
100.0002	10.0000	1.0001	.1000	Op	11-5	1015	69	44
99.9998	10.0001	1.0000	.0999	KV	11-7	0930	75	41
99.9998	10.0000	.9998	.0999	KV	11-9	1111	70	48
100.0002	10.0001	.9999	.1000	KV	11-10	1040	73	47
99.9999	10.0001	.9999	.0998	Op	11-12	1600	67	49
100.0001	10.0000	1.0000	.0999	Op	11-13	1430	74	47
99.9999	10.0000	1.0000	.0999	Op	11-18	1500	72	44
100.0002	10.0000	.9999	.0999	KV	11-16	0835	70	44
100.0003	10.0000	1.0000	.0999	Op	11-17	0930	72	46
100.0004	10.0002	1.0001	.1000	Op	11-18	1100	72	48
100.0003	10.0001	.9999	.0999	Op	11-20	1100	68	47
100.0004	10.0002	1.0000	.1000	Op	11-21	1200	74	44
100.0002	10.0002	.9999	.0998	Op	11-22	1630	74	42
99.9999	10.0000	1.0000	.0999	Op	11-25	1000	69	47
100.0002	10.0001	.9999	.0999	KV	11-26	1330	72	47
100.0000	10.0001	.9999	.0999	KV	11-27	1145	73	43
100.0001	10.0002	1.0000	.1000	Op	11-28	1000	72	42
100.0004	10.0000	1.0000	.0998	Op	11-29	0940	72	42
99.9999	10.0001	1.0001	.0999	KV	11-30	0930	70	44
100.0001	10.0001	1.0000	.0998	Op	12-1	0900	70	41
100.0000	10.0000	.9999	.1000	Op	12-2	1340	72	42
100.0000	10.0000	.9998	.0999	Op	12-3	1400	68	43
99.9999	9.9998	.9999	.0996	Op	12-5	1620	71	45
99.9997	10.0001	1.0000	.0994	Op	12-6	1430	69	44

WOODSTOVE DATA SHEET #4-4

SCALE QA SHEET

Dates: From 07/15/05 Through 10-20-2005	Scale: Sartorius	Model: A 120 S	SN: 37010004
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100 g weight	10 g weight	1 g weight	100 mg weight	Tech	Date	Time	Dry Bulb	% RH
99.9998	9.9999	.9999	.0998	BL	07/15	2000	78	46
99.9997	9.9998	1.0000	.1000	BL	07/19	2250	78	46
100.0000	9.9999	.9999	.0999	BL	07/20	0740	78	46
100.0000	9.9999	1.0000	.1000	BL	07/21	2100	78	46
99.9998	9.9998	.9999	.1000	BL	07/24	2200	78	46
100.0001	10.0000	1.0000	.1000	BL	07/27	1515	78	49
99.9998	10.0000	.9998	.1000	BL	07/28	0600	78	49
99.9999	10.0001	1.0000	.1000	BL	07/29	1210	78	49
100.0000	10.0000	1.0001	.0998	CW	9-6	0930	74	48
100.0000	9.9998	.9998	.0996	CW	9-7	0955	72	47
99.9999	10.0000	1.0001	.1000	CW	9-8	1010	78	43
99.9999	10.0001	.9999	.0999	CW	9-9	0945	75	48
99.9996	9.9999	1.0000	.1000	CW	9-10	1130	75	48
99.9998	9.9999	1.0000	.0999	CW	9-11	1300	75	44
99.9997	10.0000	1.0000	.0998	CW	9-12	0920	74	48
99.9998	10.0001	.9999	.0999	CW	9-13	0945	74	47
99.9996	10.0001	.9999	.0999	CW	9-14	1400	77	46
99.9997	10.0001	1.0001	.0999	CW	9-15	0815	75	48
99.9996	10.0000	1.0000	.1000	CW	9-16	0955	76	49
99.9998	10.0001	.9999	.0998	CW	9-17	1200	76	45
99.9997	9.9998	.9999	.0998	CW	9-18	1430	73	47
100.0004	10.0002	1.0000	.0998	CW	9-19	0810	74	44
100.0000	10.0000	1.0000	.1000	CW	9-20	1910	77	49
100.0000	10.0000	1.0000	.0998	CW	9-21	1620	78	46
100.0000	10.0001	1.0000	.0999	CW	9-22	1420	76	49
100.0004	10.0003	1.0000	.0997	CW	9-23	1300	72	46
99.9998	10.0001	1.0000	.0999	CW	10-1	1830	74	47
100.0000	10.0000	1.0000	.0999	CW	10-2	1830	69	47
100.0001	10.0001	.9998	.0999	CW	10-5	0840	74	47
99.9998	10.0001	1.0000	.0999	CW	10-6	0930	77	47
99.9998	10.0002	.9999	.1000	CW	10-8	1340	75	45
100.0000	10.0002	.9999	.0997	CW	10-10	1330	76	48
99.9999	10.0000	1.0001	.1000	CW	10-11	1020	77	46
99.9998	10.0002	.9999	.1000	CW	10-12	1000	74	44
100.0001	10.0001	1.0000	.0997	CW	10-13	1020	70	48
99.9999	10.0000	1.0001	.0999	CW	10-14	1000	70	48
100.0000	10.0001	.9999	.0999	CW	10-15	1440	72	46
99.9997	9.9999	1.0000	.1000	CW	10-20	1000	77	49

BLANK PROCESSING DATA SHEET # 5

UNIT: Montage RUN: 4 DATE: 10-9-07

BLANKS DONE: 10-11-2005

BEAKER	A	B	C
	200 ml ACETONE	75 ml DICHLOR	200 ml WATER
	FISHER OPTIMA LOT # 023283	FISHER OPTIMA LOT # 035941	DWNA, Inc Sparklettes Distilled
FINAL WEIGHT	108.9008	106.3077	106.9670
TARE WEIGHT	108.8995	106.3066	106.9645
NET WEIGHT	.0013	.0011	.0025

TARE BEAKERS INTO DESC: TIME: 1900 DATE: 10-2-2005

DATE: 10-5 BY: Op DATE: 10-6 BY: Op DATE: BY:

BEAKER	1 ST WT	TIME	2 ND WT	TIME	3 RD WT	TIME
A	108.8996	0912	108.8995	1001	✓	
B	106.3065	0913	106.3066	1002	✓	
C	106.9642	0914	106.9645	1003	✓	

FINAL BEAKERS INTO DESC: TIME: 1000 DATE: 10-8-05

DATE: 10-10 BY: Op DATE: 10-11 BY: Op DATE: BY:

BEAKER	1 ST WT	TIME	2 ND WT	TIME	3 RD WT	TIME
A	108.9010	1348	108.9008	1105	✓	
B	106.3076	1349	106.3077	1106	✓	
C	106.9675	1350	106.9670	1109	✓	

TARE QC

DATE	TIME	BY	WB	DB	%
10-5	0840	Op	5	74	44
10-6	0930	Op	5	77	47

FINAL QC

DATE	TIME	BY	WB	DB	%
10-10	1330	Op	5	76	48
10-11	1020	Op	5	77	46

NET PARTICULATE CATCH CALCULATION DATA SHEET #6

UNIT: Montage RUN: 4 DATE: 10-9-07

Blank Audit by CWainwright 10-14-2005

BLANK CALCULATIONS

Acetone: $\frac{.0013}{.0011} \text{ g} \div \frac{200}{75} \text{ ml} = \frac{.000007}{.000015} \text{ g/ml}$
 Dichloromethane: $\frac{.0011}{.0025} \text{ g} \div \frac{200}{200} \text{ ml} = \frac{.000013}{.000013} \text{ g/ml}$
 Distilled Water: $\frac{.0025}{.0025} \text{ g} \div \frac{200}{200} \text{ ml} = \frac{.000013}{.000013} \text{ g/ml}$

FRONT HALF CATCH

FILTERS: $\frac{.0228}{.0228} \text{ g} - \frac{1}{1} \text{ (# of Filters)} \frac{(.0000 \text{ g})}{.0000} \text{ Blank Value / Filter} = .0228 \text{ g}$
 BEAKERS: $\frac{.0129}{.0129} \text{ g} - \frac{50}{50} \text{ ml Acetone} \frac{(.000007 \text{ g})}{.000007} \text{ Blank Value / ml Acetone} = .0125 \text{ g}$
 TOTAL FRONT HALF CATCH: .0353 g

BACK HALF CATCH

FILTERS: $\frac{.0099}{.0099} \text{ g} - \frac{1}{1} \text{ (# of Filters)} \frac{(.0000 \text{ g})}{.0000} \text{ Blank Value / Filter} = .0099 \text{ g}$
 BEAKERS: $\frac{.0352}{.0352} \text{ g} - \frac{75}{75} \text{ ml Acetone} \frac{(.000007 \text{ g})}{.000007} \text{ Blank Value / ml Acetone} = .0347 \text{ g}$
 Extract: $\frac{.0043}{.0043} \text{ g} - \frac{75}{75} \text{ ml Dichloromethane} \frac{(.000015 \text{ g})}{.000015} \text{ Blank Value / Dichloromethane} = .0032 \text{ g}$
 Water: $\frac{.0087}{.0087} \text{ g} - \frac{225}{225} \text{ ml Water} \frac{(.000013 \text{ g})}{.000013} \text{ Blank Value / Water} = .0058 \text{ g}$
 TOTAL BACK HALF CATCH: .0536 g

TOTAL CATCH: .0889 g

% FRONT HALF: 39.7 %

UNIT: Country Stores Montage

DATE: 0 1 201

109-707

$$1) V_m(\text{std}) = \frac{(37.395 V_m)(17.64)(.993 \text{ mcf}) \left(29.68'' \text{ Hg} + \frac{150'' \text{ H}_2\text{O}}{13.6} \right)}{(545 \text{ TmA})} = \frac{35.655}{000.0000} \text{ dscf}$$

$$2) V_w(\text{std}) = (.04707) \left(\frac{26.4}{\text{ml H}_2\text{O}} \right) = \frac{1.2426}{00.0000} \text{ scf}$$

$$3) \text{ Asw} = \frac{(1,2426 \text{ scf})}{(1,2426 \text{ scf} + 35,6854 \text{ dscf})} = \frac{0,0334}{0,0000} \text{ Bws} \times 100 = \frac{3,3449}{00,0000} \% \text{ H}_2\text{O}$$

$$4) \text{ Cs} = \frac{(.0884 \text{ g.})}{(35.6854 \text{ dscf})} = \frac{.0384}{0.0000} \text{ gr / dscf}$$

$$5) \text{ Estimated g / hr} = \frac{(\text{.0889 g.})}{(\text{35.6854 dscf})} \left(\frac{16.985 \text{ dscfm}}{00.0000} \right) (60) = \frac{2.5388}{00.0000} \text{ g / hr}$$

Vm =	total cubic feet pulled on meter box during test
mcf =	meter correction factor (Y factor) of meter box used for test
" Hg =	average barometric pressure during test
" H ₂ O =	average delta H for test
TmA =	average meter temperature for test in degrees Absolute
ml H ₂ O =	total water caught during test
g. =	total particulate catch for test
dscfm =	average stack flow during test

(p. 2)	(000.000 Vm)
(p. 2)	(0.000 mcf)
(p. 2)	(00.00 " Hg)
(p. 2)	(.000 " H ₂ O)
(p. 2)	(000 TmA)
(p. 2)	(000.0 ml H ₂ O)
(p. 3)	(00.0000 g.)
(p. 6)	(00.000 dscf)

TEST DATA SHEET # 8

UNIT: Country Stoves Montage RUN: 4 DATE: 10-9-2007

Test Chamber Air Velocity Start: 0 Stop: 0 Avg.: 0

Wet Bulb / Dry Bulb

Pre: WB: 64 DB: 80 = 40 % RH 1.5 % H₂O

Post: WB: 65 DB: 80 = 44 % RH 1.5 % H₂O

Average: 42 % RH 1.5 % H₂O

Empty Stove Weight (lbs): N/A w/ stack & oil seal: Wet: N/A Dry:

Kindling Weight (lbs): Paper: N/A Wood: N/A

Preburn Fuel Weight: N/A Total: N/A

Kindling & Preburn Fuel Weight (wood only) (lbs): Total: N/A

Coal Bed Wt Range (lbs): N/A - N/A Scale: N/A - N/A

Upper: .25 x fuel weight: Always round DOWN to nearest tenth

Lower: .20 x fuel weight: Always round UP to nearest tenth

Actual Coal Bed Weight: N/A

Maximum Coal Bed Removal (lbs): $((\frac{N/A}{\text{Upper}} + \frac{N/A}{\text{Lower}}) \div 2) \cdot .25 = \frac{N/A}{\text{round down to nearest tenth}}$

Test Fuel

(.75" x 1.5" x 5" spacers) = N/A pcs

Dimensions	Length in inches	No. Pcs	Weight in lbs	% of Load
2" x 4"	<u> </u>	<u> </u>	<u> </u>	<u> </u>
4" x 4"	<u> </u>	<u> </u>	<u> </u>	<u> </u>

Test Fuel Weight: 4.6 lbs

Estimated Dry Burn Rate:

$$\frac{4.6 - (4.6 \times .07863)}{2.2046} \times \frac{60}{120} = .9612 \text{ kg/hr}$$

$$\text{Estimated BTU's/hr: } 19,140 \times \frac{78}{100} \times \frac{\text{TIME}}{\text{DBR}} = \frac{.9612}{.9612} = 14349.9 \text{ BTU's/hr}$$

EPA Default Efficiencies:

Non-cat: 63

Cat: 72

Pellet: 78

WOOD STOVE OPERATING DATA PAGE #9

Unit: Country Stoves Montage Run: 4 Date: 10-9-2007

FIRE STARTED: 1130

WARM UP AND PREBURN:

PRIMARY AIR: Set wide open for all warm-up / preburn fuel charges. Then set to #3 at start of preburn.

SECONDARY AIR: N/A CAT BYPASS: N/A

CHARCOAL BED PREPARATION:

Raked and leveled prior to each warm-up / preburn charge. At 1 1/2 min. prior to loading last fuel, raked and leveled. In stove N/A sec.

TEST:

DOOR wide open during loading N/A min. N/A sec.

PRIMARY AIR: Opened full for first N/A min., then set to run setting of #3

SECONDARY AIR: N/A CAT BYPASS: N/A

FAN:

ON / OFF during warm-up

ON / OFF during preburn

ON / OFF first ALL minutes of test

ON / OFF balance of test run

Fan speed set at Auto

WOOD DATA: KINDLING: A mix of the grades listed below:

	SIZE	MILL	GRADE	SPECIES
PREBURN:	2x4	Manke/Tacoma	Std. or better	s. grn D fir
TEST:	2x4	Packwood	# 2 or better	s. grn D fir
	4x4	Packwood	# 2 or better	s. grn D fir

PELLET FUEL MANUFACTURER: Bear Mt Forest Products BRAND: Bear Mt Premium

All Grades WCLB rules:

WARM UP INFORMATION:

All pre-burn / warm up fuel pieces were either N/A or N/A inches.

1st warm up / pre-burn fuel charge (lbs.) added at

2nd warm up / pre-burn fuel charge (lbs.) added at

3rd warm up / pre-burn fuel charge (lbs.) added at

4th warm up / pre-burn fuel charge (lbs.) added at

5th warm up / pre-burn fuel charge (lbs.) added at

WOOD DENSITY DATA SHEET # 11

Unit: Country Store Montage Run: _____ Date: 10-2007

Wood Piece : Nominal Dimensions : _____ x _____ x _____

Depth (D) : _____ cm

Width (W) : _____ cm

Length (L) : _____ cm

Avg. Length = _____ cm

Volume : _____ cm³
(D x W x L)

Moisture : Room temperature : _____ °F Correction Factor: _____

	Uncorrected	Corrected
Top :		%
Bottom :		%
Side :		%

Uncorrected meter readings corrected for temperature? Yes ☐ No ☐

Avg. % Dry Moisture : _____ Avg. % Wet Moisture : _____

% Moisture Dried Basis: _____
[1 - (Dry Wt. + Wet Wt.)] x 100

Scale : Levelled : In ☒ Out ☐

Zeroed : In ☒ Out ☐

Into dryer Date 10-4-07 Time 1115 Temp (°F) 227 Wet Weight : _____ g

Out of dryer 10-11-07 1155 236 Dry Weight : _____ g

Minimum time : 24 hrs. Minimum temp 100 °C (212 °F)

Density : N/A g ÷ N/A cm³ = N/A g / cm³
(dry weight) (volume)

Pellet Fuel Moisture Content Determination

Tare Beaker Weight : 103.9 g

Wet Weight : 265.6 g - 103.9 g = 161.7 g
(gross wet weight) (tare beaker weight) (net wet weight)

Dry Weight : 256.8 g - 103.9 g = 152.9 g
(gross dry weight) (tare beaker weight) (net dry weight)

% Moisture Dried Basis : 8.534 %
[1 - (Dry Wt. + Wet Wt.)] x 100

% Dried : 7.863

GAS DATA SHEET #12

DATE: 10-9-2007

WEIGHT: _____

UNIT: Country Stoves Montage

RUN: 4

PAGE: 1 OF 1

[illegible]

PREBURN DATA SHEET #13

REURN DA 3 SHEET #10
RUN: 4 DATE: 10-9-2007 PAGE: 1 of 1

UNIT: Country Studies

[illegible]

Temperature Data Sheet 14

Country Sierves-Montage

Time	Stack	Top	LT Side	Back	Rt Side	Bottom	Firebox	Sec/Cat	Ambient	Tube	Furn	Smpl Box	Smpl Out	C-Gas Box	C-Gas Out	SO2 Out
*****	Chn 103	Chn 104	Chn 105	Chn 106	Chn 107	Chn 108	Chn 109	Chn 110	Chn 111	Chn 112	Chn 113	Chn 114	Chn 115	Chn 116	Chn 117	
0	223	367	125	199	172	238	140	#####	73	1491	244	54	228	40	40	
5	220	361	124	200	172	238	141	#####	74	1472	248	41	228	40	40	
10	222	365	125	202	174	241	141	#####	74	1455	241	41	229	40	40	
15	224	372	125	203	175	242	142	#####	73	1441	244	41	229	40	40	
20	222	356	125	201	173	238	142	#####	74	1430	239	41	229	40	40	
25	223	363	126	201	175	239	141	#####	74	1421	239	42	229	40	40	
30	221	358	125	201	174	238	142	#####	74	1413	237	42	229	40	40	
35	223	366	126	202	174	239	142	#####	74	1407	239	42	230	40	40	
40	222	366	127	204	176	242	143	#####	74	1400	242	42	230	39	40	
45	225	372	127	203	176	241	143	#####	74	1395	246	43	230	39	40	
50	221	357	129	203	176	242	143	#####	74	1389	245	43	230	39	40	
55	226	375	129	204	177	246	143	#####	74	1379	245	43	230	39	40	
60	227	372	129	203	175	242	144	#####	75	1371	246	43	230	39	40	
65	225	373	129	206	177	245	145	#####	75	1365	247	44	229	39	40	
70	229	375	128	206	178	244	145	#####	75	1360	245	44	229	39	40	
75	228	375	130	208	180	247	145	#####	75	1356	244	44	229	39	40	
80	228	376	129	207	180	248	146	#####	75	1353	244	44	230	39	40	
85	227	375	130	209	182	248	146	#####	75	1351	245	45	230	39	40	
90	227	371	130	209	181	246	147	#####	75	1349	245	45	230	38	39	
95	231	380	130	210	182	248	147	#####	74	1347	244	45	230	38	39	
100	233	384	131	212	184	251	148	#####	75	1349	241	46	232	38	39	
105	226	367	131	210	182	251	148	#####	76	1354	240	46	233	38	39	
110	226	371	130	208	181	251	147	#####	76	1358	240	46	233	38	39	
115	228	370	128	206	179	248	146	#####	75	1361	241	46	233	38	39	
120	227	373	129	206	178	247	146	#####	76	1363	242	46	233	38	39	

TEMPERATURE DATA SHEET #14A

STACK AVG	225	TEST TIME	120	TOP AVG	370	LT SIDE AVG	128
BACK AVG	205	RT SIDE AVG	177	BOTTOM AVG	244	AMBIENT AVG	74
FIREBOX AVG	144	SEC/CAT AVG	#####				

END	226.7
START	220.3
	6.4
	DELTA T

CIRCLE: LOSS / GAIN

ZERO / SPAN CHECK DATA SHEET #15-1

Date: 10-9-2007 Analyte: CO₂ (15-1)
 Unit: montage Run #: 4
 Zero Cyl. #: 168TAC 3-A Conc.: 0.00 % CO₂ Cyl. Press.: 700 PSI
 Certified by: AIR LIQUIDE Date: 04-19-04
 Span Cyl. #: CC-41627 Conc.: 12.50 % CO₂ Cyl. Press.: 400 PSI
 Certified by: AIR LIQUIDE Date: 11-1-05
 Analyzer: Make: HORIBA Model: PIR-2000 SN: 407069
 Range: 0 - 25.0 % CO₂ Analyzer Output: 0 - 1.0 v.
 Flow: 1.5 SCFH Measured by: Rotameter

EPA Span Value = 25.0 % CO₂
 EPA Control Limits = ± 2.5% of 25.0 % CO₂ = ± 0.625 % CO₂
 Method 28 A = ± .2 % of 25.0 % CO₂ = ± .05 % CO₂

PRE RUN Audit: by: Cpl. [Signature] Time: 1330 Temp: 68 °F

AUDIT RESULTS

Point #	Expected Response			Actual Response			± Conc. Difference	Δ %
	Meter	DVM	%	Meter	DVM	%		
ZERO	00.0	.000	00.0	00.2	.002	.098	.098	.394
SPAN	50.0	.500	12.50	12.5	.501	12.503	.003	.012

POST RUN Audit: by: Cpl. [Signature] Time: 1720 Temp: 72 °F

AUDIT RESULTS

Point #	Expected Response			Actual Response			± Conc. Difference	Δ %
	Meter	DVM	%	Meter	DVM	%		
ZERO	00.0	.000	00.0	00.1	.001	.074	.074	.249
SPAN	50.0	.500	12.50	12.5	.499	12.453	-.047	-.187

± Conc. Difference = Act % - Exp (Std) %
 Zero % Difference = $\frac{\text{Act \% (ppm)} - \text{Exp \% (ppm)}}{\text{Full Scale Value}} \times 100$
 Span % Difference = $\frac{\text{Act \% (ppm)} - \text{Exp \% (ppm)}}{\text{Full Scale Value}} \times 100$

ZERO / SPAN CHECK DATA SHEET #15-2

Date : 10-9-2007

Analyte : O₂ (15-2)

Unit : montage

Run # : 4

Zero Cyl. # : 168TAC 3A Conc. : 0.00 % O₂ Cyl. Press. : 700 PSI

Certified by : AIR LIQUIDE

Date : 04-19-04

Span Cyl. # : CC-41627 Conc. : 12.50 % O₂ Cyl. Press. : 400 PSI

Certified by : AIR LIQUIDE

Date : 11-1-05

Analyzer : Make : TELEDYNE Model : 320 A

SN : 37400

Range : 0 - 25.0 % O₂

Analyzer Output : 0 - 1.0 v.

Flow : 1.5 SCFH

Measured by : Rotameter

EPA Span Value = 25.0 % O₂

EPA Control Limits = $\pm 2.5\%$ of 25.0 % O₂ = $\pm 0.625\%$ O₂

Method 28 A = $\pm .2\%$ of 25.0 % O₂ = $\pm .05\%$ O₂

PRE RUN Audit : by : Cp Williams Time : 1330 Temp : 68 °F

AUDIT RESULTS

Point #	Expected Response			Actual Response			± Conc. Difference	Δ %
	Meter	DVM	%	Meter	DVM	%		
ZERO	00.0	.000	00.0	00.1	.002	.055	.055	.221
SPAN	12.50	.500	12.50	12.5	.500	12.467	-.033	-.131

POST RUN Audit : by : Cp Williams Time : 1720 Temp : 72 °F

AUDIT RESULTS

Point #	Expected Response			Actual Response			± Conc. Difference	Δ %
	Meter	DVM	%	Meter	DVM	%		
ZERO	00.0	.000	00.0	00.1	.001	.030	.030	.121
SPAN	12.50	.500	12.50	12.5	.502	12.517	.017	.068

± Conc. Difference = Act % - Exp (Std) %

Zero % Difference = $\frac{\text{Act \% (ppm)} - \text{Exp \% (ppm)}}{\text{Full Scale Value}} \times 100$

Span % Difference = $\frac{\text{Act \% (ppm)} - \text{Exp \% (ppm)}}{\text{Full Scale Value}} \times 100$

ZERO / SPAN CHECK DATA SHEET #15-3

Date : 10-9-2007 Analyte : CO (15-3)
 Unit : montage Run # : 4
 Zero Cyl. # : 168TAC 3-A Conc. : 0.00 % CO Cyl. Press. : 700 PSI
 Certified by : AIR LIQUIDE Date : 04-19-04
 Span Cyl. # : CC-41627 Conc. : 4.99 % CO Cyl. Press. : 460 PSI
 Certified by : AIR LIQUIDE Date : 11-1-05
 Analyzer : Make : HORIBA Model : PIR-2000 SN : 408005
 Range : 0 - 10.0 % CO Analyzer Output : 0 - 1.0 v.
 Flow : 1.5 SCFH Measured by : Rotameter

EPA Span Value = 10.0 % CO
 EPA Control Limits = $\pm 2.5\%$ of 10.0 % CO = ± 0.25 % CO
 Method 28 A = $\pm .2$ % of 10.0 % CO = $\pm .02$ % CO

PRE RUN Audit : by Cp Watling Time : 1330 Temp : 68 °F

AUDIT RESULTS

Point #	Expected Response			Actual Response			± Conc. Difference	Δ %
	Meter	DVM	%	Meter	DVM	%		
ZERO	00.0	.000	00.0	00.0	.000	-.013	-.013	-.128
SPAN	49.9	.499	4.99	49.8	.498	4.974	-.016	-.161

POST RUN Audit : by Cp Watling Time : 1720 Temp : 72 °F

AUDIT RESULTS

Point #	Expected Response			Actual Response			± Conc. Difference	Δ %
	Meter	DVM	%	Meter	DVM	%		
ZERO	00.0	.000	00.0	00.0	.000	-.013	-.013	-.128
SPAN	49.9	.499	4.99	49.7	.497	4.964	-.026	-.261

$\pm \text{Conc. Difference} = \text{Act \%} - \text{Exp (Std) \%}$
 $\text{Zero \% Difference} = \frac{\text{Act \% (ppm)} - \text{Exp \% (ppm)}}{\text{Full Scale Value}} \times 100$
 $\text{Span \% Difference} = \frac{\text{Act \% (ppm)} - \text{Exp \% (ppm)}}{\text{Full Scale Value}} \times 100$

ZERO / SPAN CHECK DATA SHEET #15-4

Date : 10-9-2007 Analyte : SO₂ (15-4)
 Unit : Montana Run # : 4
 Zero Cyl. # : 168TAC 3-A Conc. : 0.00 ppm SO₂ Cyl. Press. : 700 PSI
 Certified by : AIR LIQUIDE Date : 04-19-04
 Span Cyl. # : CC82089 Conc. : 1250 ppm SO₂ Cyl. Press. : 1900 PSI
 Certified by : AIR LIQUIDE Date : 01-3-2007
 Analyzer : Make : HORIBA Model : PIR-2000 SN : 403019
 Range : 0 - 2500 ppm SO₂ Analyzer Output : 0 - 1.0 v.
 Flow : 1.5 SCFH Measured by : Rotameter

EPA Span Value = 2500 ppm SO₂
 EPA Control Limits = $\pm 2.5\%$ of 2500 ppm SO₂ = ± 62.5 ppm SO₂

PRE RUN Audit : by Cp Wadsworth Time : 1330 Temp : 68 °F

AUDIT RESULTS

Point #	Expected Response			Actual Response			± Conc. Difference	Δ %
	Meter	DVM	PPM	Meter	DVM	%		
ZERO	00.0	.000	00.0	00.3	.003	9.014	9.014	.361
SPAN	50.0	.500	1250	49.7	.497	1237.0	-13.043	-.522

POST RUN Audit : by Cp Wadsworth Time : 1720 Temp : 72 °F

AUDIT RESULTS

Point #	Expected Response			Actual Response			± Conc. Difference	Δ %
	Meter	DVM	PPM	Meter	DVM	%		
ZERO	00.0	.000	00.0	00.2	.002	6.528	6.528	.261
SPAN	50.0	.500	1250	49.9	.499	1241.9	-8.100	-.324

$\pm$ Conc. Difference = Act % - Exp (Std) %
 Zero % Difference = $\frac{\text{Act \% (ppm)} - \text{Exp \% (ppm)}}{\text{Full Scale Value}} \times 100$
 Span % Difference = $\frac{\text{Act \% (ppm)} - \text{Exp \% (ppm)}}{\text{Full Scale Value}} \times 100$

QUALITY CHECKS DATA SHEET # 16

UNIT Country Stores Mortgage RUN: 4 DATE: 10-9-2007

Thermocouple Check:

T/C # 1	<u>—</u>	°F	T/C # 13	<u>66.0</u>	°F
T/C # 2	<u>—</u>	°F	T/C # 14	<u>64.8</u>	°F
T/C # 3	<u>66.2</u>	°F	T/C # 15	<u>66.2</u>	°F
T/C # 4	<u>65.1</u>	°F	T/C # 16	<u>64.1</u>	°F
T/C # 5	<u>60.0</u>	°F	T/C # 17	<u>63.3</u>	°F
T/C # 6	<u>59.7</u>	°F	T/C # 18	<u>69.6</u>	°F
T/C # 7	<u>59.8</u>	°F	T/C # 19	<u>61.6</u>	°F
T/C # 8	<u>59.6</u>	°F	T/C # 20	<u>—</u>	°F
T/C # 9	<u>—</u>	°F	T/C # 21	<u>—</u>	°F
T/C # 10	<u>—</u>	°F	T/C # 22	<u>—</u>	°F
T/C # 11	<u>59.7</u>	°F	T/C # 23	<u>—</u>	°F
T/C # 12	<u>70.8</u>	°F	T/C # 24	<u>—</u>	°F

Thermocouple Readout:

Pretest zero and span check and calibration

post test zero and span

% difference

ZERO -1.8 °F Adj. to 0.0 °F

ZERO 0.4 °F

Difference .020 %

SPAN 2003.7 °F Adj. to 2000.0 °F

SPAN 2002.7 °F

Difference .135 %

Thermocouple Readout Pretest Linearity Check:

0	=	<u>0.0</u>	°F	200	=	<u>200.2</u>	°F	400	=	<u>400.0</u>	°F
600	=	<u>600.0</u>	°F	800	=	<u>799.8</u>	°F	1000	=	<u>999.9</u>	°F
1200	=	<u>1199.8</u>	°F	1400	=	<u>1399.6</u>	°F	1600	=	<u>1599.7</u>	°F
1800	=	<u>1800.0</u>	°F	2000	=	<u>2000.0</u>	°F				

Sample Train Leak Check

Pre ✓

Post ✓

C-gas Train Leak Check

Pre ✗

Post ✓

SO₂ Train Leak Check

Pre ✓

Post ✓

Static Gauge Zero Check

Pre ✓

Post ✓

Scale Check Pre: 314.5 — 304.5 = 10.0

Post: 309.4 — 299.4 = 10.0

Stack Cleaned Prior to Test Run: YES X NO —

TABLE 1 ---- RAW DATA

CLIENT : Country Stoves

TEST No. :

3

MODEL: Montage

DATE: 04-Oct-07

TIME (MIN.)	METER READING (C F)	DELTA H (IN. H2O)	METER TEMP. (DEG. F)	PERCENT CO (%)	PERCENT CO2 (%)	SO2 COCENTR. PPM
=====	=====	=====	=====	=====	=====	=====
0	300.000	0.150	90	0.02	4.10	225
5	301.500	0.150	92	0.00	4.60	225
10	303.074	0.150	93	0.02	4.20	225
15	304.653	0.150	93	0.05	3.70	225
20	306.233	0.150	93	0.04	3.80	225
25	307.812	0.150	93	0.02	3.80	225
30	309.391	0.150	93	0.01	4.00	225
35	310.971	0.150	93	0.03	3.90	225
40	312.550	0.150	93	0.01	3.40	225
45	314.130	0.150	93	0.00	3.60	225
50	315.709	0.150	93	0.04	3.50	225
55	317.288	0.150	93	0.01	4.00	225
60	318.868	0.150	93	0.00	4.00	225
65	320.451	0.150	93	0.01	3.20	225
70	322.035	0.150	93	0.01	3.80	225
75	323.619	0.150	93	0.01	3.10	225
80	325.202	0.150	93	0.01	3.80	225
85	326.786	0.150	93	0.01	3.60	225
90	328.370	0.150	93	0.00	4.30	225
95	329.953	0.150	93	0.01	4.00	225
100	331.537	0.150	93	0.01	4.30	225
105	333.121	0.150	93	0.00	3.80	225
110	334.704	0.150	93	0.01	3.70	225
115	336.288	0.150	93	0.00	4.20	225
120	337.872	0.150	93	0.01	3.80	225
125						

TABLE 2--RAW DATA

CLIENT : Country Stoves

TEST No.

3

MODEL: Montage

DATE: 04-Oct-07

METER CAL. FACTOR (Y) -----	0.993	Wt. WOOD BURNED(LB) -----	7.3	Lbs
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BAROMETRIC PRESS.(Pb) -----	29.88 in Hg	WET,FUEL MOISTURE % -----	7.863	%
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LEAK RATE POST (Lp) -----	0.000 cfm	Wt. PART. COLLECTED -----	0.0471	g
------------------------------	-----------	------------------------------	--------	---

WATER VOL. (V1c) -----	33.8 MI	METER VOLUME Vm -----	14.984	mcf
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TEST TIME (MIN) -----	120 min	HC MOLE FRACTION -----	0.0132	
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TABLE 3 ----FIELD DATA AVERAGES

CLIENT : Country Stoves

TEST No. 3

MODEL: Montage

DATE: 04-Oct-07

AVG DELTA H	-----	0.15 in H2O	AVG PRCNT CO	-----	0.01	%
AVG METER TEMP. Tm	-----	93 deg F	AVG PRCNT CO2	-----	3.85	%
AVG PPM SO2	-----	225 PPM	AVG BAL CO2/CO	-----	281.29	%

TABLE 4 ---- CALCULATIONS

CLIENT : Country Stoves

TEST No.

3

MODEL: Montage

DATE: 04-Oct-07

STD SAMPLE VOL. Vm(std) d) -----	14.20 dscf	STACK GAS FLOW Qsd -----	1060.121 17.67	dscf/Hr & dscf/min
VOL. WATER VAPOR Vw(s td) -----	1.591 scf	PARTICULATE CONCTRT. C s -----	0.0033	g/dscf
PRCNT MSTR Bws -----	10.08 %	PARTC.EMISS. RATE E -----	3.52	g/Hr
BURN RATE BR -----	1.53 Kg/Hr	MOLES OF GAS PER Lb WOOD Nt ----	0.82	Lb-mole/Lb
CO EMISSION RATE -----	4.86 g/Hr & 3.19 g/Kgdry fuel	PART.EMISS. RATE -----	2.31	g/Kgdry fuel

TABLE 5 — PROPORTIONAL RATE VARIATION

CLIENT : Country Stoves

TEST No. : 3

MODEL: Montage

DATE: 04-Oct-07

TIME INTERVAL Ti	PPM * Vm	PROPRTN. RATE VAR. PR	PROPRTN RATE VAR. AVERAGE
=====	=====	=====	=====
5	320.9	95	100
10	335.8	100	
15	336.6	100	
20	336.8	100	
25	336.6	100	
30	336.6	100	
35	336.8	100	
40	336.6	100	
45	336.8	100	
50	336.6	100	
55	336.6	100	
60	336.8	100	
65	337.4	100	
70	337.6	100	
75	337.6	100	
80	337.4	100	
85	337.6	100	
90	337.6	100	
95	337.4	100	
100	337.6	100	
105	337.6	100	
110	337.4	100	
115	337.6	100	
120	337.6	100	

COMPUTER INPUT DATA SHEET #1

Client: Country Stoves
 Address: 1502 14th Street Northwest
Auburn, WA 98071-0959 3.52
 Phone: 253-735-1100 Fax: 253-931-1271
 Run No.: 3 Date of Test: 10-8-2007 Burn Rate: 1.525
 Model No.: Montage Pellet stove ☐ min ☐ min-1.25 ☐ fan
 Stove Type: ☐ Cat ☐ Non Cat ☒ Pellet ☒ 1.25-1.9 ☐ max ☐ insert
 Dry Gas Meter Y Factor: 993 Post Leak Rate: 0.000 cfm Time: 120 min.
 (0.000) (Data Sheet #2) (0.000) (Data Sheet #2) (000) (Data Sheet #2)
 Dry Gas Meter Volume: 37.872 cf
 (00.000) (Data Sheet #2)
 Stack Flow: 14.984 dscfm ΔH : 150 in. H₂O
 (00.000) (Data Sheet #2) (0.000) (Data Sheet #2)
 Maximum Vac.: 2.0 Barometric Pressure: 29.86 in. Hg
 (0.0) (Data Sheet #2) (00.00) (Data Sheet #2)
 H₂O Captured: 33.8 g
 (00.0) (Data Sheet #3)
 Front Half Catch % Of Total: 72.2 % Total Particulate Catch: 0.0471 g
 (00.0) (Data Sheet #6) (0.0000) (Data Sheet #6)
 Flue Gas Moisture: 4.211 %
 (00.000) (Data Sheet #7)
 Particulate Emission: 0.0202 gr/dscf
 (0.0000) (Data Sheet #7)
 Relative Humidity: 33 % RH Ambient Moisture: 1.35 % H₂O
 (00.0) (Data Sheet #8) (0.00) (Data Sheet #8)
 Preburn Fuel Wt.: 3.7 lbs. Coal Bed Wt.: N/A lbs. Test Fuel Wt.: 7.3 lbs.
 (00.0) (Data Sheet #8) (00.0) (Data sheet #8) (00.0) (Data sheet #8)
 Heat Output (EPA Default): 22773.0 BTU/hr
 (00,000.0) (Data Sheet #8)
 Kindling Fuel % Moisture (wet): N/A % Pretest Fuel % Moisture (wet): N/A %
 (00.000) (Data Sheet #10) (00.000) (Data Sheet #10)
 Test Fuel % Moisture (dry): 8.534 % Test Fuel % Moisture (wet): 7.863 %
 (00.000) (Data Sheet #10 [wood stove] or #11 [pellet stove])
 Fuel Higher Heating Value (dry): _____ BTU/lb.
 (0000) (Data Sheet #11)
 Stack Static Pressure: -0.044 in. H₂O
 (+/- .000) (Data Sheet #12)
 Average Ambient Temperature: 75 °F Stove Temperature Change: -6.9 °F
 (00) (Data Sheet #14) (+/- 000.0) (Data Sheet #14)
 Test START 1400 meter Temp 552
 END 1600

METER BOX DATA SHEET PAGE # 2

Page: 1 of 2

UNIT: Country Stores Montpelier RUN: 3 DATE: 10-8-2007

Meter Box: SH Y Factor: .993

Leak checks: 15 " Hg @ .000 cfm
54 @ 12 15 " Hg @ .000 cfm

Inject SO₂ @ 100 cc/min.

Nozzle: Probe @ 3/8" od

Initial Volume: 1.500

ROTO PRESS: <u>.18</u>			SAMPLING RATIO: <u>.49</u>			: 1		BP: <u>29.93</u>		
MIN	TIME	METER READING	SAMPLE MDCF	STACK DSCFM	DELTA H	METER TEMP	SO2 PPM	ROTO TEMP	PUMP VACC	
0	1400	360.600	—	15.082	.15	90	225	90	2.0	
5	05	301.500	—	15.027	.15	92	225	92	2.0	
10	10	303.074	303.074	15.000	.15	93	225	93	2.0	
15	15	304.653	304.653	15.000	.15	93	225	93	2.0	
20	20	306.233	306.233	15.000	.15	93	225	93	2.0	
25	25	307.812	307.812	15.000	.15	93	225	93	2.0	
30	30	309.391	309.391	15.000	.15	93	225	93	2.0	
35	35	310.971	310.971	15.000	.15	93	225	93	2.0	
40	40	312.550	312.550	15.000	.15	93	225	93	2.0	
45	45	314.130	314.130	15.000	.15	93	225	93	2.0	
50	50	315.709	315.709	15.000	.15	93	225	93	2.0	
55	55	317.288	317.288	15.000	.15	93	225	93	2.0	
ROTO PRESS: <u>.18</u>			TOTALS: <u>180.109</u>			<u>1.80</u>	<u>1112</u>	BP: <u>29.85</u>		
60	1500	318.868	318.868	14.960	.15	93	225	93	2.0	
65	05	320.451	320.451	14.960	.15	93	225	93	2.0	
70	10	322.035	322.035	14.960	.15	93	225	93	2.0	
75	15	323.619	323.619	14.960	.15	93	225	93	2.0	
80	20	325.202	325.202	14.960	.15	93	225	93	2.0	
85	25	326.786	326.786	14.960	.15	93	225	93	2.0	
90	30	328.370	328.370	14.960	.15	93	225	93	2.0	
95	35	329.953	329.953	14.960	.15	93	225	93	2.0	
100	40	331.537	331.537	14.960	.15	93	225	93	2.0	
105	45	333.121	333.121	14.960	.15	93	225	93	2.0	
110	50	334.704	334.704	14.960	.15	93	225	93	2.0	
115	55	336.288	336.288	14.960	.15	93	225	93	2.0	
			TOTALS: <u>179.520</u>			<u>1.80</u>	<u>1116</u>	MAX VACC =		
TOTAL Cu Ft.			TOTALS: <u>359.629</u>			<u>3.60</u>	<u>2228</u>	AVG. BP:		

METER BOX DATA SHEET PAGE # 2

Page: 2 of 2
DATE: 10-8-2007

UNIT: Country Stoves Montage RUN: 3

Meter Box: SH Y Factor: .993

Leak checks: 15 " Hg @ 1000 cfm
15 " Hg @ 1000 cfm

Inject SO₂ @ 100 cc/min.

Nozzle: Probe @ 3/8" od

Initial Volume: 1,500

ROTO PRESS: <u>.18</u>			SAMPLING RATIO: <u>49</u>			: 1		BP: <u>29.85</u>	
MIN	TIME	METER READING	SAMPLE MDCF	STACK DSCFM	DELTA H	METER TEMP	SO2 PPM	ROTO TEMP	PUMP VACC
120	<u>1600</u>	<u>337.872</u>	<u>337.872</u>	<u>14.960</u>	<u>.15</u>	<u>93</u>	<u>225</u>	<u>93</u>	<u>2.0</u>
125									
130									
135									
140									
145									
150									
155									
160									
165									
170									
175									
ROTO PRESS:			TOTALS:			BP:			
180									
185									
190									
195									
200									
205									
210									
215									
220									
225									
230						<u>2321</u>			
235									
			TOTALS:	<u>374.589</u>	<u>3.75</u>	<u>93</u>	MAX VACC =		<u>2.0</u>
TOTAL Cu Ft			<u>37.872</u>	TOTALS:	<u>14.984</u>	<u>.150</u>	<u>552</u>	AVG. BP: <u>29.88</u>	

PARTICULATE CATCH / MOISTURE DATA SHEET # 3

UNIT: Montage RUN: 3 DATE: 10-8-07

SCALE CHECK	LEVEL	ZEROED
INITIAL:	✓	✓
FINAL:	✓	✓

SCALE	WEIGHT
295.0 g	295.0
590.0 g	590.0
885.0 g	885.0

	#1	#2	#3	#4
IMPINGER				
FINAL WT	637.2	587.8	484.3	849.8
INITIAL WT	613.7	586.2	483.8	841.6
NET WT GRAMS	23.5	1.6	.5	8.2

TOTAL CATCH: 33.8 GRAMS H₂O

FRONT HALF

FILTER #	123F	
FINAL WT g	16329	
INITIAL WT g	16061	
NET WT g	.0268	

BEAKER #	
DESC.	ACETONE
FINAL WT g	104.9238
INITIAL WT g	104.9162
NET WT g	.0076
VOL. DESC. ml	50

BACK HALF

FILTER #	123B	
FINAL WT g	.3647	
INITIAL WT g	.3642	
NET WT g	.0005	

BEAKER #	2	3	4	5	
DESC.	ACETONE	METHCHLOR	H ₂ O	H ₂ O	
FINAL WT g	106.2620	107.7781	108.7762	97.4375	
INITIAL WT g	106.2530	107.7760	108.7725	97.4348	
NET WT g	.0090	.0021	.0037	.0027	.0064
VOL. DESC ml	25	75	150	100	(250)

FILTER TARE WEIGHTS DATA SHEET #4-1

Into Dessicator : _____ Date : 4-22-07 Time : 1600 By : CP
 Manufacturer S & S Grade : # 25 Glass Front Size : 11 cm Lot No. : G11148458
 Back Size : 8.2 cm Lot No. : B1048950

	DATE: <u>5-9-07</u>	BY: <u>CP</u>	DATE: <u>5-13-07</u>	BY: <u>CP</u>	DATE: _____	BY: _____
FILTER #	FIRST WEIGHT	TIME	SECOND WEIGHT	TIME	THIRD WEIGHT	TIME
121F	.6114	1405	.6113	1635		
122F	.6098	1406	.6098	1636		
123F	.6061	1407	.6061	1637		
124F	.6073	1409	.6073	1638		
125F	.6062	1411	.6060	1640		
126F	.6097	1412	.6095	1641		
127F	.6195	1413	.6193	1642		
128F	.6210	1415	.6209	1643		
129F	.6183	1416	.6184	1644		
130F	.6208	1418	.6206	1645		

121B	.3638	1419	.3638	1646		
122B	.3636	1420	.3636	1647		
123B	.3642	1421	.3642	1648		
124B	.3638	1422	.3640	1649		
125B	.3584	1423	.3582	1650		
126B	.3629	1425	.3630	1651		
127B	.3617	1426	.3617	1652		
128B	.3631	1427	.3630	1653		
129B	.3611	1428	.3612	1655		
130B	.3621	1430	.3621	1656		

Checked by: CT Wadsworth Date: 5-14-07 Time: 1300

BALANCE ROOM ENVIRONMENTAL CONDITIONS

DATE	TIME	BY	WB	DB	% RH
5-9-07	1400	CP		78	46
5-13-07	1630	CP		76	45

BEAKER TARE WEIGHTS DATA SHEET #4-2

Into Dessicator: Date: 6-11-2007 Time: 1000 By: CP

BEAKER #	FIRST WEIGHT	TIME	SECOND WEIGHT	TIME	THIRD WEIGHT	TIME
1	104.9167	1045	104.9162	1052	✓	
2	106.2535	1046	106.2530	1053	✓	
3	107.7763	1047	107.7760	1054	✓	
4	108.7728	1048	108.7725	1055	✓	
5	97.4352	1049	97.4348	1056	✓	
6	91.2067	1050	91.2062	1058	✓	
7	97.1379	1051	97.1374	1059	✓	
8	108.6344	1052	108.6340	1100	✓	
9	108.0946	1053	108.0942	1101	✓	
10	105.7280	1054	105.7276	1102	✓	
11	104.7875	1056	104.7870	1104	✓	
12	98.2303	1057	98.2300	1105	✓	
13	104.1752	1058	104.1748	1106	✓	
14	97.9816	1059	97.9811	1107	✓	
15	104.7625	1100	104.7620	1108	✓	
16	95.7413	1101	95.7410	1110	✓	
17	104.5951	1102	104.5948	1111	✓	
18	108.8606	1103	108.8602	1112	✓	
19	106.5444	1104	106.5440	1113	✓	
20	108.5916	1105	108.5914	1114	✓	
21	108.2345	1106	108.2340	1115	✓	
22	105.9357	1107	105.9357	1116	✓	
23	104.5881	1108	104.5877	1117	✓	
24	106.4070	1109	106.4072	1118	✓	
25	99.6737	1110	99.6732	1119	✓	

BALANCE ROOM ENVIRONMENTAL CONDITIONS

DATE	TIME	BY	WB	DB	% RH	Checked by
6-19-07	1040	CP	S	78	46	C. Woodruff
6-20-07	1050	CP		75	45	Date: 6-30-07
						Time: 12:00

WOODSTOVE DATA SHEET # 4-3 : CONSTANT WEIGHTS

Page: 1 of

DATE: 10-8-07

RUN: 3

UNIT: Montage

Beaker #	Date	Time	By	Weight	Date	Time	By	Weight	Date	Time	By
1	10-9	1200	Cp	101.9242	10-10	1508	Cp	104.9238	10-11	1130	Cp
2	10-9	1200	Cp	106.2624	10-10	1509	Cp	106.2620	10-11	1131	Cp
3	10-9	1200	Cp	107.7794	10-10	1510	Cp	107.7778	10-11	1132	Cp
4	10-9	1200	Cp	108.7767	10-10	1511	Cp	108.7762	10-11	1134	Cp
5	10-9	1200	Cp	97.4386	10-10	1513	Cp	97.4375	10-11	1135	Cp

Filter #	Date	Time	By	Weight	Date	Time	By	Weight	Date	Time	By
123F	10-8	1730	Cp	1.7141	10-9	1145	Cp	1.6810	10-10	1505	Cp
				1.5551	10-12	1136	Cp	1.6374	10-13	1037	Cp
123B	10-8	1730	Cp	1.3649	10-9	1147	Cp	1.3647	10-10	1506	Cp

SCALE ROOM ENVIRONMENTAL CONDITIONS

Weighing Session	Date	Time	By	DB	%RH
1	10-9-07	1130	Cp	78	46
2	10-10-07	1500	Cp	74	44
3	10-11-07	1120	Cp	75	48
4	10-12-07	1130	Cp	72	45
5	10-13-07	1030	Cp	76	46

Weighing Session	Date	Time	By	DB	%RH
6	10-14-07	1400	Cp	78	46
7					
8					
9					
10					

SCALE QA SHEET

Dates: From 10-22-07 Through	Scale: Sartorius	Model: A 120 S	SN: 37010004
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[illegible]

WOODSTOVE DATA SHEET #4-4

SCALE QA SHEET

Dates: From 4-26-2007 Through 10-14-2007	Scale: Sartorius	Model: A 120 S	SN: 37010004
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100 g weight	10 g weight	1 g weight	100 mg weight	Tech	Date	Time	Dry Bulb	% RH
99.9997	10.0001	1.0001	.0999	CP	4-26	0815	73	47
100.0002	10.0001	1.0000	.0999	CP	4-27	1400	78	46
99.9999	10.0000	1.0000	.1000	CP	4-29	1100	74	44
100.0003	10.0001	.9999	.1000	CP	5-1	1000	71	45
100.0003	10.0001	.9999	.1000	CP	5-2	1530	76	45
100.0001	9.9999	1.0000	.1000	CP	5-9	1400	78	46
100.0001	10.0000	1.0000	.0998	CP	5-13	1630	76	45
100.0002	10.0001	1.0000	.1000	CP	5-18	1350	77	46
100.0003	10.0001	1.0000	.0998	CP	5-21	1300	72	46
99.9999	10.0001	1.0000	.1000	CP	5-22	1600	78	46
99.9999	10.0001	1.0000	.0996	CP	6-5	1530	74	44
100.0000	10.0001	.9998	.0999	CP	6-7	1030	70	48
100.0000	10.0001	1.0000	.1000	CP	6-8	1000	68	47
99.9998	10.0004	1.0000	.1000	CP	6-9	1300	78	40
99.9997	10.0000	1.0000	.1000	CP	6-10	1530	78	49
100.0003	10.0002	1.0000	.0998	CP	6-11	0900	72	46
99.9998	10.0000	.9999	.0998	CP	6-12	2100	78	40
99.9998	9.9998	1.0000	.0998	CP	6-13	1600	74	47
99.9999	9.9999	1.0000	.0999	CP	6-14	1630	77	49
99.9999	10.0000	1.0000	.1000	CP	6-15	1430	75	48
100.0001	10.0007	1.0001	.1000	CP	6-19	1040	78	46
100.0000	10.0001	.9999	.0997	CP	6-20	1050	75	48
99.9996	9.9998	.9999	.0998	CP	8-24	1830	74	48
100.0002	10.0002	1.0001	.0999	CP	8-31	1000	78	46
99.9999	10.0002	1.0001	.1000	CP	9-1	1130	77	46
99.9999	10.0001	.9999	.0999	CP	9-4	1100	78	43
99.9997	9.9999	.9998	.0998	CP	9-5	1000	78	46
100.0000	10.0000	.9999	.0999	CP	9-6	1500	78	46
99.9997	10.0000	1.0000	.1000	CP	9-7	1745	78	43
100.0001	10.0000	1.0000	.0997	CP	9-8	1500	78	46
100.0002	10.0000	.9999	.1000	CP	10-5	0930	75	48
100.0003	10.0003	1.0000	.0999	CP	10-6	1400	78	46
100.0001	10.0000	1.0000	.0999	CP	10-8	1000	75	44
100.0002	10.0001	1.0000	.0999	CP	10-9	1130	78	46
100.0001	10.0002	.9999	.0997	CP	10-10	1500	74	44
99.9999	10.0000	1.0001	.0999	CP	10-11	1120	75	48
100.0000	9.9999	.9999	.0998	CP	10-12	1130	72	48
100.0003	9.9999	1.0000	.1000	CP	10-13	1030	79	46
99.9999	10.0000	1.0000	.1000	CP	10-14	1400	78	46

WOODSTOVE DATA SHEET #4-4

SCALE QA SHEET

Dates: From	11-3-2009 Through 4-25-2007	Scale: Sartorius	Model: A 120 S	SN: 37010004
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100 g weight	10 g weight	1 g weight	100 mg weight	Tech	Date	Time	Dry Bulb	% RH
99.9997	10.0002	1.0003	.0998	CP	11-3	1645	78	43
100.0003	10.0002	1.0001	.0999	CP	11-4	1400	73	47
100.0002	9.9999	1.0002	.1000	CP	11-5	1145	75	48
100.0000	10.0000	1.0001	.0999	CP	11-7	1100	78	47
100.0004	10.0001	.9998	.0998	CP	11-8	1015	72	46
100.0001	10.0002	.9999	.0998	CP	11-12	1130	69	47
99.9998	10.0000	.9999	.0999	CP	11-13	1015	68	47
100.0001	9.9999	1.0000	.1001	CP	11-14	1615	78	46
100.0001	10.0000	.9999	.0999	CP	11-21	1020	72	49
100.0001	9.9996	1.0000	.0999	CP	11-28	1010	74	37
99.9999	9.9999	1.0001	.1001	CP	2-10-09	1500	77	40
100.0003	10.0000	.9999	.0999	CP	2-12	0945	75	41
100.0004	10.0000	.9999	.0999	CP	2-13	1030	76	45
100.0002	10.0001	.9999	.0999	CP	2-14	0930	74	47
99.9996	10.0000	.9999	.0998	CP	2-16	1030	75	48
99.9999	10.0000	.9999	.0998	CP	2-17	1400	78	46
100.0001	10.0003	1.0001	.1000	CP	2-19	1300	70	48
99.9998	10.0000	1.0000	.0999	CP	2-20	1000	73	47
100.0001	10.0001	.9999	.0999	CP	2-22	1000	69	44
100.0003	10.0002	.9999	.1000	CP	2-23	1000	71	45
100.0004	9.9999	.9999	.0998	CP	3-6	1730	77	49
100.0004	10.0000	.9998	.0999	CP	3-7	0740	77	42
99.9999	9.9997	.9999	.0999	CP	3-8	1900	74	47
100.0000	10.0000	1.0001	.0999	CP	3-9	0740	78	40
100.0002	10.0000	1.0000	.1001	CP	3-10	1310	78	46
99.9999	10.0001	1.0000	.0999	CP	3-13	1730	70	48
99.9998	9.9997	1.0000	.0999	CP	3-14	0900	77	42
100.0000	10.0000	.9999	.0999	CP	3-15	1030	68	43
100.0004	10.0003	1.0000	.1001	CP	3-16	0940	74	44
100.0003	10.0000	1.0001	.0999	CP	3-17	1715	77	49
100.0004	10.0001	1.0001	.1000	CP	3-18	1200	76	49
99.9998	10.0000	.9999	.0998	CP	3-20	1000	67	47
100.0000	10.0002	1.0000	.1000	CP	3-21	1330	76	45
100.0002	10.0002	1.0000	.0999	CP	3-23	1340	75	48
100.0002	10.0001	1.0000	.0997	CP	4-21	1100	74	44
100.0003	10.0003	.9998	.0998	CP	4-22	1100	75	45
100.0000	10.0001	1.0000	.0999	CP	4-23	0900	71	49
99.9999	10.0000	.9998	.1000	CP	4-24	1600	78	46
100.0000	10.0000	.9999	.1001	CP	4-25	1000	73	47

WOODSTOVE DATA SHEET #4-4

SCALE QA SHEET

Dates: From	6-1-2006 Through 11-1-2006	Scale: Sartorius	Model: A 120 S	SN: 37010004
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100 g weight	10 g weight	1 g weight	100 mg weight	Tech	Date	Time	Dry Bulb	% RH
100.0001	9.9999	1.0000	.0999	CP	6-1	1020	78	43
100.0002	10.0000	.9999	.0999	CP	6-2	1810	75	48
100.0002	10.0000	.9998	.1000	CP	6-5	1300	76	45
100.0002	10.0001	1.0000	.0999	CP	6-6	0900	76	46
99.9996	10.0001	1.0000	.0998	CP	6-7	1015	76	49
100.0000	10.0002	1.0000	.0998	CP	6-12	0915	77	46
99.9996	9.9999	1.0000	.0999	CP	6-13	1235	78	46
100.0003	9.9999	1.0001	.0999	CP	6-14	1230	76	49
100.0004	10.0001	1.0001	.1000	CP	6-15	0840	75	48
99.9999	10.0001	1.0002	.0998	CP	6-16	1020	77	48
99.9998	10.0001	1.0000	.0999	CP	7-29	1545	77	46
100.0000	10.0001	.9997	.0999	CP	7-30	1900	75	48
99.9997	10.0000	1.0000	.0999	CP	7-31	0830	77	42
99.9996	10.0002	1.0001	.0998	CP	8-1	1100	78	46
100.0000	10.0001	1.0000	.1000	CP	8-2	1800	77	49
99.9998	10.0001	1.0001	.0998	CP	8-3	1140	76	49
99.9998	10.0003	.9999	.0999	CP	8-4	2030	76	49
100.0000	10.0002	.9999	.0999	CP	8-5	1130	76	45
99.9999	10.0000	.9999	.0997	CP	8-16	1030	75	48
99.9996	9.9999	.9999	.0998	CP	8-17	1035	76	49
100.0002	10.0002	.9999	.0999	CP	8-18	1010	70	48
100.0000	10.0002	1.0000	.0998	CP	8-31	0850	73	47
99.9999	10.0002	.9999	.0998	CP	9-1	1015	78	46
100.0000	10.0000	1.0001	.1000	CP	10-6	1030	78	46
99.9998	10.0000	1.0002	.0999	CP	10-7	1150	77	49
100.0000	10.0002	1.0000	.0999	CP	10-8	1545	75	48
99.9998	10.0001	.9999	.1002	CP	10-9	0820	73	47
99.9997	10.0001	.9999	.0999	CP	10-10	1430	78	46
100.0001	10.0001	1.0001	.0998	CP	10-12	0900	70	48
100.0003	10.0001	1.0000	.0999	CP	10-13	1025	71	49
100.0003	9.9999	.9999	.0999	CP	10-14	0955	69	47
100.0004	10.0002	.9999	.1000	CP	10-15	1700	74	47
99.9998	10.0000	1.0000	.0999	CP	10-16	0915	73	47
99.9998	10.0001	.9999	.0998	CP	10-17	0930	70	48
99.9999	10.0002	1.0000	.0999	CP	10-18	1100	70	47
100.0001	10.0001	.9999	.0999	CP	10-27	0936	75	48
100.0004	9.9999	1.0000	.1000	CP	10-28	1820	73	47
100.0001	10.0002	.9999	.0998	CP	10-31	1230	73	47
99.9998	10.0001	.9999	.1000	CP	11-1	1600	76	38

WOODSTOVE DATA SHEET #4-4

SCALE QA SHEET

Dates: From 12-8-2005 Through 5-31-2006	Scale: Sartorius	Model: A 120 S	SN: 37010004
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100 g weight	10 g weight	1 g weight	100 mg weight	Tech	Date	Time	Dry Bulb	% RH
99.9996	9.9998	.9999	.0998	Ch	12-8	0900	67	38
100.0001	10.0001	1.0000	.0998	Ch	12-27	1500	77	49
100.0000	10.0002	1.0000	.0999	KV	12-28	1125	70	48
100.0004	10.0003	1.0000	.1000	KV	12-29	1000	74	44
99.9999	10.0002	1.0000	.0999	KV	12-30	1030	76	42
99.9998	10.0002	1.0000	.0999	KV	12-31	1200	76	45
100.0003	10.0001	.9999	.0998	KV	1-1	1345	75	44
100.0004	10.0001	.9997	.0999	Ch	1-2	1230	77	48
100.0003	10.0000	1.0001	.0999	Ch	1-4	1430	74	44
100.0003	9.9999	1.0000	.0999	Ch	1-5	1200	74	47
100.0002	9.9999	1.0000	.0999	Ch	1-6	1000	77	49
100.0000	10.0001	.9999	.0997	KV	1-8	1000	71	44
100.0002	10.0000	1.0000	.0999	Ch	1-9	1400	75	48
100.0000	10.0001	1.0000	.0999	Ch	1-12	1200	74	47
100.0001	10.0001	.9999	.0998	Ch	1-13	1500	73	49
99.9999	10.0003	.9998	.0998	Ch	1-15	1230	69	49
100.0003	10.0001	1.0001	.1000	Ch	1-16	1415	70	48
100.0003	10.0001	.9998	.0996	KV	1-24	1015	67	46
100.0003	10.0001	1.0000	.1000	KV	1-25	920	70	44
100.0001	10.0000	1.0000	.0999	Ch	2-2	530	74	48
100.0003	10.0002	.9999	.0998	KV	2-2	0930	75	48
100.0004	10.0002	.9999	.0999	KV	2-3	0900	74	47
100.0001	10.0002	1.0000	.1000	Ch	2-4	1100	77	42
100.0002	10.0000	1.0000	.1000	KV	2-6	1202	74	44
100.0000	10.0001	1.0000	.1000	KV	2-7	1119	73	43
99.9999	10.0001	1.0001	.0999	Ch	2-8	1135	75	41
100.0002	10.0001	.9999	.0999	KV	2-10	0930	72	42
100.0000	10.0000	.9999	.0999	Ch	2-13	0940	75	46
100.0001	10.0002	1.0000	.0999	KV	2-20	1200	71	44
100.0003	10.0001	.9999	.0999	Ch	3-1	1215	78	43
100.0004	10.0001	1.0000	.0999	Ch	3-2	1515	74	49
100.0001	10.0003	1.0001	.1001	KV	3-3	1100	74	44
100.0004	10.0002	1.0000	.0998	Ch	3-6	1300	75	48
100.0002	10.0001	1.0002	.0999	Ch	3-7	1905	75	48
100.0002	9.9999	.9999	.0999	Ch	5-24	1600	78	46
100.0004	10.0001	.9999	.0999	Ch	5-25	0830	76	45
100.0000	9.9999	.9997	.0999	Ch	5-26	0840	74	47
100.0003	9.9999	1.0000	.0998	Ch	5-30	1220	73	48
100.0002	10.0001	.9999	.1000	Ch	5-31	1015	78	46

WOODSTOVE DATA SHEET #4-4

SCALE QA SHEET

Dates: From 10-21-2005 Through 12-6-2005	Scale: Sartorius	Model: A 120 S	SN: 37010004
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100 g weight	10 g weight	1 g weight	100 mg weight	Tech	Date	Time	Dry Bulb	% RH
99.9996	9.9998	1.0000	.0999	Ch	10-21	0900	74	44
100.0000	10.0001	1.0000	.0999	Ch	10-22	1630	78	46
99.9998	10.0000	.9998	.0998	Ch	10-23	1130	74	49
99.9996	10.0000	.9998	.0997	KV	10-24	9:00	77	52
100.0000	10.0003	1.0000	.0999	KV	10-25	9:30	76	49
99.9999	10.0001	.9999	.0997	KV	10-26	9:50	70	48
99.9998	10.0000	.9999	.0998	KV	10-27	8:25	75	47
99.9996	10.0003	1.0001	.0999	KV	10-28	10:45	68	47
99.9999	10.0001	1.0000	.1000	Ch	10-29	1900	75	44
99.9998	10.0003	1.0000	.0999	Ch	10-30	1145	72	42
99.9999	10.0000	0.9998	.0998	KV	10-31	9:00	78	44
100.0001	10.0000	0.9997	.1000	KV	11-1	0850	75	42
99.9996	9.9998	.9998	.0996	KV	11-2	0915	72	49
99.9996	10.0000	1.0000	.0998	KV	11-3	1429	73	46
99.9997	10.0000	.9999	.0999	KV	11-4	1100	72	42
100.0002	10.0000	1.0001	.1000	Ch	11-5	1015	69	44
99.9998	10.0001	1.0000	.0999	KV	11-7	0930	75	41
99.9998	10.0000	.9998	.0999	KV	11-9	1111	70	48
100.0002	10.0001	.9999	.1000	KV	11-10	1040	73	47
99.9999	10.0001	.9999	.0998	Ch	11-12	1600	67	49
100.0001	10.0000	1.0000	.0999	Ch	11-13	1430	74	47
99.9999	10.0000	1.0000	.0999	Ch	11-15	1500	72	44
100.0002	10.0000	.9999	.0999	KV	11-16	0835	70	44
100.0005	10.0000	1.0000	.0999	Ch	11-17	0930	72	46
100.0004	10.0002	1.0001	.1000	Ch	11-18	1100	72	48
100.0003	10.0001	.9999	.0999	Ch	11-20	1100	68	47
100.0004	10.0002	1.0000	.1000	Ch	11-21	1200	74	44
100.0002	10.0002	.9999	.0998	Ch	11-22	1030	74	42
99.9999	10.0000	1.0000	.0999	Ch	11-25	1000	69	47
100.0002	10.0001	.9999	.0999	KV	11-26	1330	72	47
100.0000	10.0001	.9999	.0999	KV	11-27	1145	73	43
100.0001	10.0002	1.0000	.1000	Ch	11-28	1000	72	42
100.0004	10.0000	1.0000	.0998	Ch	11-29	0940	72	42
99.9999	10.0001	1.0001	.0999	KV	11-30	0930	70	44
100.0001	10.0001	1.0000	.0998	Ch	12-1	0900	70	41
100.0000	10.0000	.9999	.1000	Ch	12-2	1340	72	42
100.0000	10.0000	.9998	.0999	Ch	12-3	1400	68	43
99.9999	9.9998	.9999	.0996	Ch	12-5	1620	71	45
99.9997	10.0001	1.0000	.0999	Ch	12-6	1430	69	44

WOODSTOVE DATA SHEET #4-4

SCALE QA SHEET

Dates: From 07/15/05 Through 10-20-2005	Scale: Sartorius	Model: A 120 S	SN: 37010004
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100 g weight	10 g weight	1 g weight	100 mg weight	Tech	Date	Time	Dry Bulb	% RH
99.9998	9.9999	.9999	.09998	BL	07/15	2000	78	46
99.9997	9.9998	1.0000	.1000	BL	07/19	2250	78	46
100.0000	9.9999	.9999	.0999	BL	07/20	0740	78	46
100.0000	9.9999	1.0000	.1000	BL	07/21	2100	78	46
99.9998	9.9998	.9999	.1000	BL	07/24	2200	78	46
100.0001	10.0000	1.0000	.1000	BL	07/27	1515	78	49
99.9998	10.0000	.9998	.1000	BL	07/28	0600	78	49
99.9999	10.0001	1.0000	.1000	BL	07/29	1210	78	49
100.0000	10.0000	1.0001	.09998	CW	9-6	0930	74	48
100.0000	9.9998	.9998	.09996	CW	9-7	0955	72	47
99.9999	10.0000	1.0001	.1000	CW	9-8	1010	78	43
99.9999	10.0001	.9999	.0999	CW	9-9	0945	75	48
99.9996	9.9999	1.0000	.1000	CW	9-10	1130	75	48
99.9998	9.9999	1.0000	.0999	CW	9-11	1300	75	44
99.9997	10.0000	1.0000	.09998	CW	9-12	0920	74	48
99.9998	10.0001	.9999	.0999	CW	9-13	0945	74	47
99.9996	10.0001	.9999	.0999	CW	9-14	1400	77	46
99.9997	10.0001	1.0001	.0999	CW	9-15	0815	75	48
99.9996	10.0000	1.0000	.1000	CW	9-16	0955	76	49
99.9998	10.0001	.9999	.09998	CW	9-17	1200	76	48
99.9997	9.9998	.9999	.09998	CW	9-18	1430	73	47
100.0004	10.0002	1.0000	.09998	CW	9-19	0810	74	44
100.0000	10.0000	1.0000	.1000	CW	9-20	1910	77	49
100.0000	10.0000	1.0000	.09998	CW	9-21	1620	78	46
100.0000	10.0001	1.0000	.0999	CW	9-22	1420	76	49
100.0004	10.0003	1.0000	.09997	CW	9-23	1300	72	46
99.9998	10.0001	1.0000	.0999	CW	10-1	1830	74	47
100.0000	10.0000	1.0000	.0999	CW	10-2	1830	69	47
100.0001	10.0001	.9998	.0999	CW	10-5	0840	74	44
99.9998	10.0001	1.0000	.0999	CW	10-6	0930	77	47
99.9998	10.0002	.9999	.1000	CW	10-8	1340	75	45
100.0000	10.0002	.9999	.09997	CW	10-10	1330	76	48
99.9999	10.0000	1.0001	.1000	CW	10-11	1020	77	46
99.9998	10.0002	.9999	.1000	CW	10-12	1000	74	44
100.0001	10.0001	1.0000	.09997	CW	10-13	1020	70	48
99.9999	10.0000	1.0001	.0999	CW	10-14	1000	70	48
100.0000	10.0001	.9999	.0999	CW	10-15	1440	72	46
99.9997	9.9999	1.0000	.1000	CW	10-20	1000	77	49

1.25 TO 1.90

BLANK PROCESSING DATA SHEET # 5

UNIT: Montage RUN: 3 DATE: 10-8-07

BLANKS DONE: 10-11-2005

BEAKER	A	B	C
	200 ml ACETONE	75 ml DICHLOR	200 ml WATER
	FISHER OPTIMA LOT # 023283	FISHER OPTIMA LOT # 035941	DWNA, Inc Sparklettes Distilled
FINAL WEIGHT	108.9008	106.3077	106.9670
TARE WEIGHT	108.8995	106.3066	106.9645
NET WEIGHT	.0013	.0011	.0025

TARE BEAKERS INTO DESC: TIME: 1900 DATE: 10-2-2005

DATE: 10-5 BY: Op DATE: 10-6 BY: Op DATE: BY:

BEAKER	1 ST WT	TIME	2 ND WT	TIME	3 RD WT	TIME
A	108.8996	0912	108.8995	1001	✓	
B	106.3065	0913	106.3066	1002	✓	
C	106.9642	0914	106.9645	1003	✓	

FINAL BEAKERS INTO DESC: TIME: 1000 DATE: 10-8-05

DATE: 10-10 BY: Op DATE: 10-11 BY: Op DATE: BY:

BEAKER	1 ST WT	TIME	2 ND WT	TIME	3 RD WT	TIME
A	108.9010	1348	108.9008	1105	✓	
B	106.3076	1349	106.3077	1106	✓	
C	106.9675	1350	106.9670	1109	✓	

TARE QC

DATE	TIME	BY	WB	DB	%
10-5	0840	Op	✓	74	44
10-6	0930	Op	✓	77	47

FINAL QC

DATE	TIME	BY	WB	DB	%
10-10	1330	Op	✓	76	48
10-11	1020	Op	✓	77	46

NET PARTICULATE CATCH CALCULATION DATA SHEET #6

UNIT: Montana RUN: 3 DATE: 10-8-07

Blank Audit by C. W. Wright 10-14-2005

BLANK CALCULATIONS

Acetone: .0013 g ÷ 200 ml = .000007 g/ml
 Dichloromethane: .0011 g ÷ 75 ml = .000015 g/ml
 Distilled Water: .0025 g ÷ 200 ml = .000013 g/ml

FRONT HALF CATCH

FILTERS: .0268 g - 1 (# of Filters) .0000 g = .0268 g
Total Catch Blank Value / Filter
 BEAKERS: .0076 g - 50 ml Acetone .000007 g = .0072 g
Total Catch Blank Value / ml Acetone
 TOTAL FRONT HALF CATCH : .0340 g

BACK HALF CATCH

FILTERS: .0005 g - 1 (# of Filters) .0000 g = .0005 g
Total Catch Blank Value / Filter
 BEAKERS: .0090 g - 75 ml Acetone .000007 g = .0085 g
Total Catch Blank Value / ml Acetone
 Extract: .0021 g - 75 ml Dichloromethane .000015 g = .0010 g
Total Catch Blank Value / Dichloromethane
 Water: .0064 g - 250 ml Water .000013 g = .0031 g
Total Catch Blank Value / Water
 TOTAL BACK HALF CATCH : .0131 g

TOTAL CATCH: .0471 g

% FRONT HALF: 72.2 %

CALCULATIONS DATA SHEET # 7

UNIT: Country Stoves Montage RUN: _____ DATE: 10- 2007

$$1) Vm (std) = \frac{(37.872 Vm)(17.64)(.993 mcf) \left(24.88 \text{ " Hg} + \frac{.150 \text{ " H}_2\text{O}}{13.6} \right)}{(552 TmA)} = \frac{35.9226}{000.0000} \text{ dscf}$$

$$2) Vw (std) = (.04707) (33.8 \text{ ml H}_2\text{O}) = \frac{1.5910}{00.0000} \text{ scf}$$

$$3) Asw = \frac{(.15910 \text{ scf})}{(.15910 \text{ scf} + 35.9226 \text{ dscf})} = \frac{.0424}{.0000} \text{ Bws} \times 100 = \frac{4.2411}{00.0000} \% \text{ H}_2\text{O}$$

$$4) Cs = \frac{(.10471 \text{ g.})}{(35.9226 \text{ dscf})} (15.43) = \frac{.0202}{0.0000} \text{ gr / dscf}$$

$$5) \text{ Estimated g / hr} = \frac{(.10471 \text{ g.})}{(35.9226 \text{ dscf})} \left(\frac{14.984}{00.0000} \text{ dscfm} \right) (60) = \frac{1.1788}{00.0000} \text{ g / hr}$$

Vm =	total cubic feet pulled on meter box during test	(p. 2)	(000.000 Vm)
mcf =	meter correction factor (Y factor) of meter box used for test	(p. 2)	(0.000 mcf)
" Hg =	average barometric pressure during test	(p. 2)	(00.00 " Hg)
" H ₂ O =	average delta H for test	(p. 2)	(.000 " H ₂ O)
TmA =	average meter temperature for test in degrees Absolute	(p. 2)	(000 TmA)
ml H ₂ O =	total water caught during test	(p. 3)	(000.0 ml H ₂ O)
g. =	total particulate catch for test	(p. 6)	(00.0000 g.)
dscfm =	average stack flow during test	(p. 2)	(00.000 dscf)

TEST DATA SHEET # 8

UNIT: Country Stoves Montage RUN: 3 DATE: 10-8-2007

Test Chamber Air Velocity Start: 0 Stop: 0 Avg.: 0

Wet Bulb / Dry Bulb

Pre: WB: 61 DB: 79 = 33 % RH 1.2 % H₂O

Post: WB: 67 DB: 87 = 33 % RH 1.5 % H₂O

Average: 33 % RH 1.35 % H₂O

Empty Stove Weight (lbs): N/A w/ stack & oil seal: Wet: N/A Dry:

Kindling Weight (lbs): Paper: N/A Wood: N/A

Preburn Fuel Weight: N/A Total: N/A

Kindling & Preburn Fuel Weight (wood only) (lbs): Total: N/A

Coal Bed Wt Range (lbs): N/A - N/A Scale: N/A - N/A

Upper: .25 x fuel weight: Always round DOWN to nearest tenth

Lower: .20 x fuel weight: Always round UP to nearest tenth

Actual Coal Bed Weight: N/A

Maximum Coal Bed Removal (lbs): $(\frac{N/A}{\text{Upper}} + \frac{N/A}{\text{Lower}}) \div 2 \times .25 = \frac{N/A}{\text{round down to nearest tenth}}$

Test Fuel (.75" x 1.5" x 5" spacers) = N/A pcs

Dimensions	Length in inches	No. Pcs	Weight in lbs	% of Load
2" x 4"	<u> </u>	<u> </u>	<u> </u>	<u> </u>
4" x 4"	<u> </u>	<u> </u>	<u> </u>	<u> </u>

Test Fuel Weight: 7.3 lbs

Estimated Dry Burn Rate:

$$\frac{7.3 - (7.3 \times .07863)}{2.2046} \times \frac{60}{120} = 1.5254 \text{ kg/hr}$$

$$\text{Estimated BTU's/hr: } 19,140 \times \frac{78}{100} \times \frac{1.5254}{\text{DBR}} = 22,773.0 \text{ BTU's/hr}$$

EPA Default Efficiencies:

Non-cat: 63

Cat: 72

Pellet: 78

WOOD STOVE OPERATING DATA PAGE #9

Unit: Country Stoves Montage Run: 3 Date: 10-8-2007

FIRE STARTED: 1030

WARM UP AND PREBURN:

PRIMARY AIR: Set wide open for all warm-up / preburn fuel charges. Then set to #4 at start of preburn.

SECONDARY AIR: N/A CAT BYPASS: N/A

CHARCOAL BED PREPARATION:

Raked and leveled prior to each warm-up / preburn charge. At 1 1/2 min. prior to loading last fuel, raked and leveled. In stove N/A sec.

TEST:

DOOR wide open during loading N/A min. N/A sec.

PRIMARY AIR: Opened full for first N/A min., then set to run setting of #4.

SECONDARY AIR: N/A CAT BYPASS: N/A

FAN:

ON OFF during warm-up

ON OFF first ALL minutes of test

Fan speed set at Auto

ON OFF during preburn

ON OFF balance of test run

WOOD DATA: KINDLING: A mix of the grades listed below:

	SIZE	MILL	GRADE	SPECIES
PREBURN:	2x4	Manke/Tacoma	Std. or better	s. grn D fir
TEST:	2x4	Packwood	#2 or better	s. grn D fir
	4x4	Packwood	#2 or better	s. grn D fir

PELLET FUEL MANUFACTURER: Bear Mt Wood Products BRAND: Bear Mt Premium

All Grades WCLB rules:

WARM UP INFORMATION:

All pre-burn / warm up fuel pieces were either N/A or N/A inches.

1st warm up / pre-burn fuel charge (lbs.) added at

2nd warm up / pre-burn fuel charge (lbs.) added at

3rd warm up / pre-burn fuel charge (lbs.) added at

4th warm up / pre-burn fuel charge (lbs.) added at

5th warm up / pre-burn fuel charge (lbs.) added at

WOOD DENSITY DATA SHEET # 11

Unit: Country Store Montage Run: _____ Date: 10- -2007

Wood Piece : Nominal Dimensions : _____ x _____ x _____

Depth (D) : _____ cm

Width (W) : _____ cm

Length (L) : _____ cm

_____ cm Avg. Length = _____ cm

_____ cm

_____ cm

Volume : _____ cm³
(D x W x L)

Moisture : Room temperature : _____ °F Correction Factor: _____

	Uncorrected	Corrected
Top :		%
Bottom :		%
Side :		%

Uncorrected meter readings corrected
for temperature? Yes ☐ No ☐

Avg. % Dry Moisture : _____ Avg. % Wet Moisture : _____

% Moisture Dried Basis: _____
[1 - (Dry Wt. + Wet Wt.)] x 100

Scale : Leveled : In ☒ Out ☐ Zeroed : In ☒ Out ☐

Into dryer Date 10-4-07 Time 1115 Temp (°F) 227 Wet Weight : _____ g

Out of dryer 10-16-07 1155 236 Dry Weight : _____ g

Minimum time : 24 hrs. Minimum temp 100 °C (212 °F)

Density : N/A g ÷ N/A cm³ = N/A g / cm³
(dry weight) (volume)

Pellet Fuel Moisture Content Determination

Tare Beaker Weight : 103.9 g

Wet Weight : 265.6 g - 103.9 g = 161.7 g
(gross wet weight) (tare beaker weight) (net wet weight)

Dry Weight : 256.8 g - 103.9 g = 147.9 g
(gross dry weight) (tare beaker weight) (net dry weight)

% Moisture Dried Basis : 8.534 %
[1 - (Dry Wt. + Wet Wt.)] x 100

% Dried : 7.863

GAS DATA SHEET #12

DATE: 10-8-2007

WEIGHT: _____

RUN: 3

PAGE: 1 OF

UNIT: Country Stoves Montage

[illegible]

UNIT: Country Stores

RUN:

DATE: 0-0-2007 PAGE: 1

1 of 1

1 of 1

[illegible]

Temperature Data Sheet 14

Country Stoves-Montage

Time	Stack	Top	LT Side	Back	Rt Side	Bottom	Firebox	Sec/Cat	Ambient	Tube	Furn	Smpl Box	Chn 113	Smpl Out	C-Gas Box	C-Gas Out	SO2 Out
	Chn 103	Chn 104	Chn 105	Chn 106	Chn 107	Chn 108	Chn 109	Chn 110	Chn 111	Chn 112		Chn 113	Chn 114	Chn 115	Chn 116	Chn 117	
0	277	454	155	245	219	309	176	#####	76	1447		245	48	247	38	37	
5	277	449	153	241	216	306	176	#####	76	1433		245	45	247	38	37	
10	279	463	156	247	225	312	176	#####	76	1419		245	45	247	38	37	
15	278	464	156	247	225	313	177	#####	77	1408		245	45	247	38	37	
20	278	458	156	248	225	313	178	#####	77	1399		246	46	247	38	37	
25	278	457	156	248	225	312	178	#####	77	1392		247	46	248	38	38	
30	276	444	154	245	218	310	178	#####	77	1386		248	46	248	37	38	
35	279	455	153	244	219	310	175	#####	77	1381		247	46	248	37	38	
40	275	438	151	242	216	305	174	#####	77	1377		247	46	248	37	38	
45	280	455	151	244	219	308	173	#####	77	1373		247	46	248	37	38	
50	279	455	153	245	221	310	172	#####	76	1369		247	47	248	37	38	
55	277	445	151	244	218	309	171	#####	76	1367		247	48	246	37	38	
60	283	462	152	247	222	311	171	#####	75	1365		247	49	246	37	38	
65	283	463	153	247	222	312	172	#####	75	1363		247	49	245	37	38	
70	280	455	154	248	223	312	173	#####	75	1362		247	49	245	37	38	
75	278	447	153	245	219	310	172	#####	74	1360		247	49	245	36	37	
80	277	448	152	244	218	311	171	#####	74	1359		247	50	244	37	37	
85	279	448	149	242	215	305	169	#####	74	1358		247	50	244	36	37	
90	280	448	149	242	215	304	169	#####	74	1357		247	50	244	36	37	
95	279	455	152	246	221	311	170	#####	74	1357		247	51	244	36	37	
100	280	453	152	245	220	309	171	#####	74	1357		246	51	244	36	37	
105	281	458	153	247	221	310	171	#####	74	1356		244	51	244	36	37	
110	281	453	152	248	223	313	171	#####	74	1354		243	51	244	36	37	
115	281	451	150	245	218	310	171	#####	74	1353		242	52	244	36	37	
120	278	439	148	241	214	305	169	#####	74	1354		242	52	244	36	37	

TEMPERATURE DATA SHEET #14A

TEST TIME	120		
STACK AVG	279	TOP AVG	453
		LT SIDE AVG	153
BACK AVG	245	RT SIDE AVG	220
		BOTTOM AVG	310
FIREBOX AVG	173	SEC/CAT AVG #####	AMBIENT AVG
			75

END	269.4
START	276.3
	-6.9
	DELTA T

CIRCLE: LOSS / GAIN

ZERO / SPAN CHECK DATA SHEET #15-1

Date : 10-8-2007

Analyte : CO₂ (15-1)

Unit : Montage Run # : 3

Zero Cyl. # : 168TAC 3-A Conc. : 0.00 % CO₂ Cyl. Press. : 700 PSI

Certified by : AIR LIQUIDE Date : 04-19-04

Span Cyl. # : CC-41627 Conc. : 12.50 % CO₂ Cyl. Press. : 400 PSI

Certified by : AIR LIQUIDE Date : 11-1-05

Analyzer : Make : HORIBA Model : PIR-2000 SN : 407069
Range : 0 - 25.0 % CO₂ Analyzer Output : 0 - 1.0 v.
Flow : 1.5 SCFH Measured by : Rotameter

EPA Span Value = 25.0 % CO₂
EPA Control Limits = $\pm 2.5\%$ of 25.0 % CO₂ = $\pm 0.625\%$ CO₂
Method 28 A = $\pm .2\%$ of 25.0 % CO₂ = $\pm .05\%$ CO₂

PRE RUN Audit : by : Cpl. [Signature] Time : 1245 Temp : 70 °F

AUDIT RESULTS

Point #	Expected Response			Actual Response			± Conc. Difference	Δ %
	Meter	DVM	%	Meter	DVM	%		
ZERO	00.0	.000	00.0	00.3	.003	.123	.123	.493
SPAN	50.0	.500	12.50	49.9	.499	12.453	-.047	-.187

POST RUN Audit : by : Cpl. [Signature] Time : 1625 Temp : 74 °F

AUDIT RESULTS

Point #	Expected Response			Actual Response			± Conc. Difference	Δ %
	Meter	DVM	%	Meter	DVM	%		
ZERO	00.0	.000	00.0	00.1	.001	.074	.074	.294
SPAN	50.0	.500	12.50	49.6	.496	12.379	-.121	-.485

± Conc. Difference = Act % - Exp (Std) %
Zero % Difference = $\frac{\text{Act \% (ppm)} - \text{Exp \% (ppm)}}{\text{Full Scale Value}} \times 100$
Span % Difference = $\frac{\text{Act \% (ppm)} - \text{Exp \% (ppm)}}{\text{Full Scale Value}} \times 100$

ZERO / SPAN CHECK DATA SHEET #15-2

Date : 10-8-2007

Analyte : O₂ (15-2)

Unit : Montago

Run # : 3

Zero Cyl. # : 1168TAC 3A

Conc. : 0.00 % O₂

Cyl. Press. : 700 PSI

Certified by : AIR LIQUIDE

Date : 04-19-04

Span Cyl. # : CC-41627

Conc. : 12.50 % O₂

Cyl. Press. : 400 PSI

Certified by : AIR LIQUIDE

Date : 11-1-05

Analyzer : Make : TELEDYNE

Model : 320 A

SN : 37400

Range : 0 - 25.0 % O₂

Analyzer Output : 0 - 1.0 v.

Flow : 1.5 SCFH

Measured by : Rotameter

EPA Span Value = 25.0 % O₂

EPA Control Limits = $\pm 2.5\%$ of 25.0 % O₂ = $\pm 0.625 % O_2$

Method 28 A = $\pm .2 %$ of 25.0 % O₂ = $\pm .05 % O_2$

PRE RUN Audit : by : Cp Wadsworth Time : 1245 Temp : 70 °F

AUDIT RESULTS

Point #	Expected Response			Actual Response			± Conc. Difference	Δ %
	Meter	DVM	%	Meter	DVM	%		
ZERO	00.0	.000	00.0	00.1	.000	.005	.005	.022
SPAN	12.50	.500	12.50	12.5	.500	12.467	-.033	-.131

POST RUN Audit : by : Cp Wadsworth Time : 1625 Temp : 74 °F

AUDIT RESULTS

Point #	Expected Response			Actual Response			± Conc. Difference	Δ %
	Meter	DVM	%	Meter	DVM	%		
ZERO	00.0	.000	00.0	00.1	.001	.030	.030	.121
SPAN	12.50	.500	12.50	12.5	.501	12.492	-.008	-.032

± Conc. Difference = Act % - Exp (Std) %

Zero % Difference = $\frac{\text{Act \% (ppm)} - \text{Exp \% (ppm)}}{\text{Full Scale Value}} \times 100$

Span % Difference = $\frac{\text{Act \% (ppm)} - \text{Exp \% (ppm)}}{\text{Full Scale Value}} \times 100$

ZERO / SPAN CHECK DATA SHEET #15-3

Date: 10-8-2007

Analyte: CO (15-3)

Unit: Montage

Run #: 3

Zero Cyl. #: 168TAC 3-A Conc.: 0.00 % CO

Cyl. Press.: 700 PSI

Certified by: AIR LIQUIDE

Date: 04-19-04

Span Cyl. #: CC-41627 Conc.: 14.99 % CO

Cyl. Press.: 400 PSI

Certified by: AIR LIQUIDE

Date: 11-1-05

Analyzer: Make: HORIBA

Model: PIR-2000

SN: 408005

Range: 0 - 10.0 % CO

Analyzer Output: 0 - 1.0 v.

Flow: 1.5 SCFH

Measured by: Rotameter

EPA Span Value = 10.0 % CO

EPA Control Limits = $\pm 2.5\%$ of 10.0 % CO = $\pm 0.25\%$ CO

Method 28 A = $\pm .2\%$ of 10.0 % CO = $\pm .02\%$ CO

PRE RUN Audit by: Cp Wainwright Time: 1245 Temp: 70 °F

AUDIT RESULTS

Point #	Expected Response			Actual Response			± Conc. Difference	Δ %
	Meter	DVM	%	Meter	DVM	%		
ZERO	00.0	.000	00.0	00.0	.001	-.023	-.023	-.228
SPAN	49.9	.499	4.99	50.1	.501	5.004	.014	.140

POST RUN Audit by: Cp Wainwright Time: 1625 Temp: 74 °F

AUDIT RESULTS

Point #	Expected Response			Actual Response			± Conc. Difference	Δ %
	Meter	DVM	%	Meter	DVM	%		
ZERO	00.0	.000	00.0	00.0	.000	-.013	-.013	-.128
SPAN	49.9	.499	4.99	50.2	.502	5.014	.024	.240

± Conc. Difference = Act % - Exp (Std) %

Zero % Difference = $\frac{\text{Act \% (ppm)} - \text{Exp \% (ppm)}}{\text{Full Scale Value}} \times 100$

Span % Difference = $\frac{\text{Act \% (ppm)} - \text{Exp \% (ppm)}}{\text{Full Scale Value}} \times 100$

ZERO / SPAN CHECK DATA SHEET #15-4

Date : 10-8-2007 Analyte : SO₂ (15-4)
 Unit : montair Run # : 3
 Zero Cyl. # : 168TAC 3-A Conc. : 0.00 ppm SO₂ Cyl. Press. : 700 PSI
 Certified by : AIR LIQUIDE Date : 04-19-04
 Span Cyl. # : CC82089 Conc. : 1250 ppm SO₂ Cyl. Press. : 1900 PSI
 Certified by : AIR LIQUIDE Date : 01-3-2007
 Analyzer : Make : HORIBA Model : PIR-2000 SN : 403019
 Range : 0 - 2500 ppm SO₂ Analyzer Output : 0 - 1.0 v.
 Flow : 1.5 SCFH Measured by : Rotameter

EPA Span Value = 2500 ppm SO₂
 EPA Control Limits = $\pm 2.5\%$ of 2500 ppm SO₂ = ± 62.5 ppm SO₂

PRE RUN Audit : by Cp Wilmot Time : 1245 Temp : 70 °F

AUDIT RESULTS

Point #	Expected Response			Actual Response			± Conc. Difference	Δ %
	Meter	DVM	PPM	Meter	DVM	%		
ZERO	00.0	.000	00.0	00.1	.001	4.042	4.042	.162
SPAN	50.0	.500	1250	49.9	.499	1241.9	-8.100	-.324

POST RUN Audit : by Cp Wilmot Time : 1625 Temp : 74 °F

AUDIT RESULTS

Point #	Expected Response			Actual Response			± Conc. Difference	Δ %
	Meter	DVM	PPM	Meter	DVM	%		
ZERO	00.0	.000	00.0	00.0	.000	1.556	1.556	.062
SPAN	50.0	.500	1250	50.1	.501	1246.9	-3.100	-.124

$\pm \text{Conc. Difference} = \text{Act \%} - \text{Exp (Std) \%}$
 $\text{Zero \% Difference} = \frac{\text{Act \% (ppm)} - \text{Exp \% (ppm)}}{\text{Full Scale Value}} \times 100$
 $\text{Span \% Difference} = \frac{\text{Act \% (ppm)} - \text{Exp \% (ppm)}}{\text{Full Scale Value}} \times 100$

70

QUALITY CHECKS DATA SHEET # 16

UNIT Country Stoves Montage RUN: 3 DATE: 10-8-2007

Thermocouple Check:

T/C # 1	<u>—</u>	°F	T/C # 13	<u>64.8</u>	°F
T/C # 2	<u>—</u>	°F	T/C # 14	<u>63.8</u>	°F
T/C # 3	<u>250.4</u>	°F	T/C # 15	<u>63.7</u>	°F
T/C # 4	<u>390.2</u>	°F	T/C # 16	<u>62.9</u>	°F
T/C # 5	<u>123.5</u>	°F	T/C # 17	<u>66.2</u>	°F
T/C # 6	<u>199.6</u>	°F	T/C # 18	<u>72.8</u>	°F
T/C # 7	<u>179.9</u>	°F	T/C # 19	<u>75.4</u>	°F
T/C # 8	<u>274.3</u>	°F	T/C # 20	<u>—</u>	°F
T/C # 9	<u>—</u>	°F	T/C # 21	<u>—</u>	°F
T/C # 10	<u>—</u>	°F	T/C # 22	<u>—</u>	°F
T/C # 11	<u>59.6</u>	°F	T/C # 23	<u>—</u>	°F
T/C # 12	<u>64.2</u>	°F	T/C # 24	<u>—</u>	°F

Thermocouple Readout:

Pretest zero and span check and calibration

post test zero and span

% difference

ZERO -1.4 °F Adj. to 0.0 °F ZERO 0.2 °F Difference 0.100 %

SPAN 2000.0 °F Adj. to 2000.0 °F SPAN 2001.4 °F Difference 0.070 %

Thermocouple Readout Pretest Linearity Check:

0	= <u>0.0</u>	°F	200	= <u>200.4</u>	°F	400	= <u>400.1</u>	°F
600	= <u>599.9</u>	°F	800	= <u>799.9</u>	°F	1000	= <u>999.9</u>	°F
1200	= <u>1199.8</u>	°F	1400	= <u>1399.5</u>	°F	1600	= <u>1599.7</u>	°F
1800	= <u>1800.0</u>	°F	2000	= <u>2000.0</u>	°F			

Sample Train Leak Check

Pre ✓

Post ✓

C-gas Train Leak Check

Pre ✓

Post ✓

SO₂ Train Leak Check

Pre ✓

Post ✓

Static Gauge Zero Check

Pre ✓

Post ✓

Scale Check Pre: 325.4 - 315.4 = 10.0

Post: 317.4 - 307.4 = 10.0

Stack Cleaned Prior to Test Run: YES X NO —

Max DBR

TABLE 1 — RAW DATA

CLIENT : Country Stoves

TEST No. : 1

MODEL: Montage

DATE: 04-Oct-07

TIME (MIN.)	METER READING (C F)	DELTA H (IN. H2O)	METER TEMP. (DEG. F)	PERCENT CO (%)	PERCENT CO2 (%)	SO2 COCENTR. PPM
=====	=====	=====	=====	=====	=====	=====
0	221.000	0.150	94	0.00	8.60	300
5	222.500	0.150	96	0.00	7.50	300
10	224.089	0.150	97	0.00	7.50	300
15	225.683	0.150	99	0.00	7.80	300
20	227.289	0.150	101	0.00	7.50	300
25	228.907	0.150	101	0.00	7.80	300
30	230.524	0.150	102	0.00	7.50	300
35	232.147	0.150	102	0.00	7.30	300
40	233.771	0.150	102	0.00	7.40	300
45	235.394	0.150	102	0.00	6.50	300
50	237.017	0.150	102	0.00	8.50	300
55	238.641	0.150	102	0.00	7.90	300
60	240.264	0.150	102	0.00	7.30	300
65	241.896	0.150	102	0.00	6.60	300
70	243.528	0.150	102	0.00	6.50	300
75	245.160	0.150	102	0.00	7.50	300
80	246.792	0.150	102	0.00	8.10	300
85	248.424	0.150	102	0.00	8.50	300
90	250.056	0.150	102	0.00	7.90	300
95	251.688	0.150	102	0.00	6.90	300
100	253.320	0.150	102	0.00	8.10	300
105	254.952	0.150	102	0.00	6.80	300
110	256.584	0.155	102	0.00	6.80	300
115	258.216	0.150	102	0.00	6.90	300
120	259.848	0.150	102	0.00	7.50	300

TABLE 2—RAW DATA

CLIENT : Country Stoves

TEST No.

1

MODEL: Montage

DATE:

04-Oct-07

METER CAL.
FACTOR (Y) -----

0.993

Wt. WOOD
BURNED(LB) -----

11.8

Lbs

BAROMETRIC
PRESS.(Pb) -----

29.75 in Hg

WET,FUEL
MOISTURE % -----

7.863

%

LEAK RATE
POST (Lp) -----

0.000 cfm

Wt. PART.
COLLECTED -----

0.121

g

WATER
VOL. (V1c) -----

50.1 MI

METER
VOLUME Vm -----

11.032

mcf

TEST
TIME (MIN) -----

120 min

HC MOLE
FRACTION -----

0.0132

TABLE 3 —FIELD DATA AVERAGES

CLIENT : Country Stoves

TEST No. 1

MODEL: Montage

DATE: 04-Oct-07

AVG DELTA H	-----	0.15 in H2O	AVG PRCNT CO	-----	0.00	%
AVG METER TEMP. Tm	-----	101 deg F	AVG PRCNT CO2	-----	7.49	%
AVG PPM SO2	-----	300 PPM	AVG BAL CO2/CO	-----	ERR	%

TABLE 4 ---- CALCULATIONS

CLIENT : Country Stoves

TEST No. 1

MODEL: Montage

DATE: 04-Oct-07

STD SAMPLE			STACK GAS		
VOL. Vm(std) d) ----	10.26 dscf		FLOW Qsd ----	1008.491	dscf/Hr
				16.81	& dscf/min
VOL. WATER			PARTICULATE		
VAPOR Vw(s td) ----	2.358 scf		CONCTRT. C s ----	0.0118	g/dscf
PRCNT			PARTC.EMISS.		
MSTR Bws ----	18.69 %		RATE E ----	11.90	g/Hr
BURN			MOLES OF GAS		
RATE BR ----	2.47 Kg/Hr		PER Lb WOOD Nt ----	0.48	Lb-mole/Lb
CO EMISSION			PART.EMISS.		
RATE ----	0.00 g/Hr		RATE ----	4.82	g/Kgdry
	&				fuel
	0.00 g/Kgdry				
	fuel				

TABLE 5 ---- PROPORTIONAL RATE VARIATION

CLIENT : Country Stoves

TEST No. : 1

MODEL: Montage

DATE: 04-Oct-07

TIME INTERVAL Ti	PPM * Vm	PROPRTN. RATE VAR. PR	PROPRTN RATE VAR. AVERAGE
=====	=====	=====	=====
5	422.9	94	100
10	446.8	99	
15	447.0	99	
20	448.8	99	
25	451.3	100	
30	450.6	100	
35	451.9	100	
40	452.2	100	
45	451.9	100	
50	451.9	100	
55	452.2	100	
60	451.9	100	
65	454.4	101	
70	454.4	101	
75	454.4	101	
80	454.4	101	
85	454.4	101	
90	454.4	101	
95	454.4	101	
100	454.4	101	
105	454.4	101	
110	454.4	101	
115	454.4	101	
120	454.4	101	
125			

COMPUTER INPUT DATA SHEET #1

Client: Country Stores
 Address: 1502 14th Street Northwest
Auburn, WA 98071-0959 11.9
 Phone: 253-735-1100 Fax: 253-931-1271
 Run No.: 1 Date of Test: 10-4-2007 Burn Rate: 2.47
 Model No.: Montage Pellet stove ☐ min ☐ min-1.25 ☐ fan
 Stove Type: ☐ Cat ☐ Non Cat ☒ Pellet ☐ 1.25-1.9 ☒ max ☐ insert

Dry Gas Meter Y Factor: 993 Post Leak Rate: 0.000 cfm Time: 120 min.
 (0.000) (Data Sheet #2) (0.000) (Data Sheet #2) (000) (Data Sheet #2)
 Dry Gas Meter Volume: 38.848 cf
 (00.000) (Data Sheet #2)

Stack Flow: 11.032 dscfm Δ H: 150 in. H₂O
 (00.000) (Data Sheet #2) (0.000) (Data Sheet #2)

Maximum Vac.: 2.0 Barometric Pressure: 29.75 in. Hg
 (0.0) (Data Sheet #2) (00.00) (Data Sheet #2)

H₂O Captured: 50.1 g
 (00.0) (Data Sheet #3)

Front Half Catch % Of Total: 75.5 % Total Particulate Catch: 1210 g
 (00.0) (Data Sheet #6) (0.0000) (Data Sheet #6)

Flue Gas Moisture: 6.1319 %
 (00.000) (Data Sheet #7)

Particulate Emission: 0.0513 gr/dscf
 (0.0000) (Data Sheet #7)

Relative Humidity: 34 % RH Ambient Moisture: 1.75 % H₂O
 (00.0) (Data Sheet #8) (0.00) (Data Sheet #8)

Preburn Fuel Wt.: 5.8 lbs. Coal Bed Wt.: N/A lbs. Test Fuel Wt.: 11.8 lbs.
 (00.0) (Data Sheet #8) (00.0) (Data sheet #8) (00.0) (Data sheet #8)

Heat Output (EPA Default): 36815.4 BTU/hr
 (00,000.0) (Data Sheet #8)

Kindling Fuel % Moisture (wet): N/A % Pretest Fuel % Moisture (wet): N/A %
 (00.000) (Data Sheet #10) (00.000) (Data Sheet #10)

Test Fuel % Moisture (dry): 8.534 % Test Fuel % Moisture (wet): 7.863 %
 (00.000) (Data Sheet #10 [wood stove] or #11 [pellet stove])

Fuel Higher Heating Value (dry): _____ BTU/lb.
 (0000) (Data Sheet #11)

Stack Static Pressure: -0.050 in. H₂O
 (+/- .000) (Data Sheet #12)

Average Ambient Temperature: 80 °F Stove Temperature Change: -560 °F
 (00) (Data Sheet #14) (+/- 000.0) (Data Sheet #14)

Test START 1300 meter Temp 561
 END 1500 75
 75

METER BOX DATA SHEET PAGE # 2

Page: 1 of 2

UNIT: Country Stores Montpelier RUN: 1 DATE: 10-4-2007

Meter Box: SH Y Factor: .993

Leak checks: 15 " Hg @ .001 cfm _____ " Hg @ _____ cfm

15 " Hg @ .000 cfm _____ " Hg @ _____ cfm

Inject SO₂ @ 100 cc/min. Nozzle: Probe @ 3/8" od Initial Volume: 1.500

ROTO PRESS: <u>.18</u>			SAMPLING RATIO: <u>36</u> : 1			BP: <u>29.86</u>			
MIN	TIME	METER READING	SAMPLE MDCF	STACK DSCFM	DELTA H	METER TEMP	SO2 PPM	ROTO TEMP	PUMP VACC
0	1300	221.000	—	11.203	.15	94	300	94	2.0
5	05	222.500	—	11.163	.15	96	300	96	2.0
10	10	224.089	224.089	11.143	.15	97	300	97	2.0
15	15	225.683	225.683	11.103	.15	99	300	99	2.0
20	20	227.289	227.289	11.064	.15	101	300	101	2.0
25	25	228.907	228.907	11.064	.15	101	300	101	2.0
30	30	230.524	230.524	11.044	.15	102	300	102	2.0
35	35	232.147	232.147	11.044	.15	102	300	102	2.0
40	40	233.771	233.771	11.044	.15	102	300	102	2.0
45	45	235.394	235.394	11.044	.15	102	300	102	2.0
50	50	237.017	237.017	11.044	.15	102	300	102	2.0
55	55	238.641	238.641	11.044	.15	102	300	102	2.0
ROTO PRESS: <u>.18</u>			TOTALS:	133.004	1.80	1200	BP: <u>29.70</u>		
60	1400	240.264	240.264	10.985	.15	102	300	102	2.0
65	05	241.896	241.896	10.985	.15	102	300	102	2.0
70	10	243.528	243.528	10.985	.15	102	300	102	2.0
75	15	245.160	245.160	10.985	.15	102	300	102	2.0
80	20	246.792	246.792	10.985	.15	102	300	102	2.0
85	25	248.424	248.424	10.985	.15	102	300	102	2.0
90	30	250.056	250.056	10.985	.15	102	300	102	2.0
95	35	251.688	251.688	10.985	.15	102	300	102	2.0
100	40	253.320	253.320	10.985	.15	102	300	102	2.0
105	45	254.952	254.952	10.985	.15	102	300	102	2.0
110	50	256.584	256.584	10.985	.15	102	300	102	2.0
115	55	258.216	258.216	10.985	.15	102	300	102	2.0
			TOTALS:	131.820	1.80	1224	MAX VACC =		
TOTAL Cu Ft.			TOTALS:	264.824	3.60	2424	AVG. BP:		

METER BOX DATA SHEET PAGE # 2

Page: 2 of 2

UNIT: Country Stoves Montage RUN: 1

DATE: 10-4-2007

Meter Box: SH Y Factor: .993

Leak checks: 15 " Hg @ 1001 cfm _____ " Hg @ _____ cfm

15 " Hg @ 1000 cfm _____ " Hg @ _____ cfm

Inject SO₂ @ 100 cc/min.

Nozzle: Probe @ 3/8" od

Initial Volume: 1,500

ROTO PRESS: <u>.18</u>			SAMPLING RATIO: <u>36</u> : <u>1</u>			BP: <u>29.70</u>			
MIN	TIME	METER READING	SAMPLE MDCF	STACK DSCFM	DELTA H	METER TEMP	SO2 PPM	ROTO TEMP	PUMP VACC
120	<u>1500</u>	<u>259.848</u>	<u>259.848</u>	<u>10.985</u>	<u>.15</u>	<u>102</u>	<u>300</u>	<u>102</u>	<u>2.0</u>
125									
130									
135									
140									
145									
150									
155									
160									
165									
170									
175									
ROTO PRESS:			TOTALS:			BP.:			
180									
185									
190									
195									
200									
205									
210									
215									
220									
225									
230						<u>2524</u>			
235				<u>275.809</u>					
			TOTALS:			<u>3.75</u>	<u>101</u>	MAX VACC = <u>2.0</u>	
TOTAL Cu Ft			TOTALS:			<u>11.032</u>	<u>.15</u>	AVG. BP: <u>29.75</u>	

PARTICULATE CATCH / MOISTURE DATA SHEET # 3

UNIT: County Stores RUN: 1 DATE: 10-8-2007

SCALE CHECK	LEVEL	ZEROED
INITIAL :	✓	✓
FINAL :	✓	✓

SCALE	WEIGHT
295.0 g	295.0
590.0 g	590.0
885.0 g	885.0

IMPINGER	#1	#2	#3	#4
FINAL WT	618.1	598.0	484.7	835.1
INITIAL WT	579.8	545.3	483.5	827.2
NET WT GRAMS	38.3	2.7	1.2	7.9

TOTAL CATCH : 50.1 GRAMS H₂O

FRONT HALF

FILTER #	121F	
FINAL WT g	.6930	
INITIAL WT g	.6113	
NET WT g	.0817	

BEAKER #	191
DESC.	ACETONE
FINAL WT g	104.5348
INITIAL WT g	104.5247
NET WT g	.0101
VOL. DESC. ml	50

BACK HALF

FILTER #	121B	
FINAL WT g	.3665	
INITIAL WT g	.3638	
NET WT g	.0027	

BEAKER #	192	193	194	195	
DESC.	ACETONE	METHCHLOR	H ₂ O	H ₂ O	
FINAL WT g	103.4800	101.9890	103.9931	105.4694	
INITIAL WT g	103.4598	101.9848	103.9900	105.4655	
NET WT g	.0202	.0042	.0031	.0039	.0070
VOL. DESC ml	75	75	100	125	225

FILTER TARE WEIGHTS DATA SHEET #4-1

Into Dessicator : Date : 4-22-07 Time : 1600 By : CP
 Manufacturer S & S Grade : # 25 Glass Front Size : 11 cm Lot No. : G11148458
 Back Size : 8.2 cm Lot No. : B1048950

FILTER #	DATE: <u>5-9-07</u>	BY: <u>CP</u>	DATE: <u>5-13-07</u>	BY: <u>CP</u>	DATE: _____	BY: _____
	FIRST WEIGHT	TIME	SECOND WEIGHT	TIME	THIRD WEIGHT	TIME
121F	.6114	1405	.6113	1635		
122F	.6098	1406	.6098	1636		
123F	.6061	1407	.6061	1637		
124F	.6073	1409	.6073	1638		
125F	.6062	1411	.6060	1640		
126F	.6097	1412	.6095	1641		
127F	.6195	1413	.6193	1642		
128F	.6210	1415	.6209	1643		
129F	.6183	1416	.6184	1644		
130F	.6208	1418	.6206	1645		

121B	.3638	1419	.3638	1646		
122B	.3636	1420	.3636	1647		
123B	.3642	1421	.3642	1648		
124B	.3638	1422	.3640	1649		
125B	.3584	1423	.3582	1650		
126B	.3629	1425	.3630	1651		
127B	.3617	1426	.3617	1652		
128B	.3631	1427	.3630	1653		
129B	.3611	1428	.3612	1655		
130B	.3621	1430	.3621	1656		

Checked by: CTWadsworth Date: 5-14-07 Time: 1300

BALANCE ROOM ENVIRONMENTAL CONDITIONS

DATE	TIME	BY	WB	DB	% RH
5-9-07	1400	CP	S	78	4L
5-13-07	1630	CP	S	76	45

BEAKER TARE WEIGHTS DATA SHEET #4-2

Into Dessicator: Date: 5-10-2007 Time: 1400 By: CP

BEAKER #	FIRST WEIGHT	TIME	SECOND WEIGHT	TIME	THIRD WEIGHT	TIME	
176	105.2114	1355	105.2100	1307	105.2101	1607	1
177	105.0963	1356	105.0945	1308	105.0948	1608	3
178	104.0238	1357	104.0215	1309	104.0220	1609	5
179	104.0027	1358	104.0010	1310	104.0014	1610	4
180	104.1460	1400	104.1383	1311	104.1388	1611	5
181	103.8771	1401	103.8752	1312	103.8757	1612	5
182	103.1332	1402	103.1318	1313	103.1323	1613	5
183	103.8068	1403	103.8055	1314	103.8056	1614	1
184	104.1707	1404	104.1702	1315			5
185	104.6370	1405	104.6365	1317			5
186	106.0943	1407	106.0938	1319			5
187	105.5787	1408	105.5779	1320	105.5778	1618	1
188	104.8069	1409	104.8058	1321	104.8063	1620	5
189	103.2082	1410	103.2072	1322	103.2068	1621	4
190	103.8514	1411	103.8496	1323	103.8501	1622	5
191	104.5254	1412	104.5242	1325	104.5247	1623	5
192	103.4505	1413	103.4593	1326	103.4598	1624	5
193	101.9855	1414	101.9845	1327	101.9848	1625	3
194	103.9905	1415	103.9897	1328	103.9900	1627	3
195	105.4665	1416	105.4650	1329	105.4655	1628	5
196	104.8902	1417	104.8892	1330	104.8895	1630	3
197	104.9695	1418	104.9682	1331	104.9687	1631	5
198	104.5915	1419	104.5901	1333	104.5905	1632	4
199	106.2472	1420	106.2461	1334	106.2462	1633	1
200	104.7548	1420	104.7535	1335	104.7539	1635	4

BALANCE ROOM ENVIRONMENTAL CONDITIONS

DATE	TIME	BY	WB	DB	% RH	Checked by
5-18-07	1350	CP		77	46	C. W. Wainwright
5-21-07	1300	CP		72	46	Date: 5-23-2007
5-22-07	1600	CP		78	46	Time: 1307

WOODSTOVE DATA SHEET # 4-3 : CONSTANT WEIGHTS

UNIT: *montana* RUN: *1* DATE: *10-4-07* Page: *1* of *1*

Beaker #	Date	Time	By	Weight	Date	Time	By	Weight	Date	Time	By
191	10-5	1200	CP	104.5353	10-6	1410	CP	104.5348	10-8	1011	CP
192	10-5	1200	CP	103.4805	10-6	1411	CP	103.4800	10-8	1012	CP
193	10-5	1200	CP	101.9892	10-6	1412	CP	101.9890	10-8	1013	CP
194	10-5	1200	CP	103.9936	10-6	1413	CP	103.9931	10-8	1014	CP
195	10-5	1200	CP	105.4698	10-6	1414	CP	105.4694	10-8	1016	CP

Filter #	Date	Time	By	Weight	Date	Time	By	Weight	Date	Time	By
121F	10-4	1700	CP	18866	10-5	0935	CP	17502	10-6	1400	CP
				16930	10-9	1134	CP				
121B	10-4	1700	CP	13665	10-5	0936	CP	13663	10-6	1405	CP

SCALE ROOM ENVIRONMENTAL CONDITIONS

Weighing Session	Date	Time	By	DB	%RH
1	10-5	0930	CP	75	46
2	10-6-07	1400	CP	75	46
3	10-8-07	1000	CP	75	44
4	10-9-07	1130	CP	75	46
5					

Weighing Session	Date	Time	By	DB	%RH
6					
7					
8					
9					
10					

WOODSTOVE DATA SHEET #4-4

SCALE QA SHEET

Dates: From 4-26-2007 Through 10-14-2007	Scale: Sartorius	Model: A 120 S	SN: 37010004
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100 g weight	10 g weight	1 g weight	100 mg weight	Tech	Date	Time	Dry Bulb	% RH
99.9997	10.0001	1.0001	.0999	CP	4-26	0815	73	47
100.0002	10.0001	1.0000	.0999	CP	4-27	1400	78	46
99.9999	10.0000	1.0000	.1000	CP	4-29	1100	74	44
100.0003	10.0001	.9999	.1000	CP	5-1	1000	71	45
100.0003	10.0001	.9999	.1000	CP	5-2	1530	76	45
100.0001	9.9999	1.0000	.1000	CP	5-9	1400	78	46
100.0001	10.0000	1.0000	.0998	CP	5-13	1630	76	45
100.0002	10.0001	1.0000	.1000	CP	5-18	1350	77	46
100.0003	10.0001	1.0000	.0998	CP	5-21	1300	72	46
99.9999	10.0001	1.0000	.1000	CP	5-22	1100	78	46
99.9999	10.0001	1.0000	.0996	CP	6-5	1530	74	44
100.0000	10.0001	.9998	.0999	CP	6-7	1030	70	48
100.0000	10.0001	1.0000	.1000	CP	6-8	1000	68	47
99.9998	10.0004	1.0000	.1000	CP	6-9	1300	78	40
99.9997	10.0000	1.0000	.1000	CP	6-10	1530	78	49
100.0003	10.0002	1.0000	.0998	CP	6-11	0900	72	46
99.9998	10.0000	.9999	.0998	CP	6-12	2100	78	40
99.9998	9.9998	1.0000	.0998	CP	6-13	1600	74	47
99.9999	9.9999	1.0000	.0999	CP	6-14	1630	77	49
99.9999	10.0000	1.0000	.1000	CP	6-15	1430	75	48
100.0001	10.0007	1.0001	.1000	CP	6-19	1040	78	46
100.0000	10.0001	.9999	.0997	CP	6-20	1050	75	48
99.9996	9.9998	.9999	.0998	CP	8-24	1830	74	48
100.0002	10.0002	1.0001	.0999	CP	8-31	1000	78	46
99.9999	10.0002	1.0001	.1000	CP	9-1	1130	77	46
99.9999	10.0001	.9999	.0999	CP	9-4	1100	78	43
99.9997	9.9999	.9998	.0998	CP	9-5	1000	78	46
100.0000	10.0000	.9999	.0999	CP	9-6	1300	78	46
99.9997	10.0000	1.0000	.1000	CP	9-7	1745	78	43
100.0001	10.0000	1.0000	.0997	CP	9-8	1500	78	46
100.0002	10.0000	.9999	.1000	CP	10-5	0930	75	48
100.0003	10.0003	1.0000	.0999	CP	10-6	1400	78	46
100.0001	10.0000	1.0000	.0999	CP	10-8	1000	75	44
100.0002	10.0001	1.0000	.0999	CP	10-9	1130	78	46
100.0001	10.0002	.9999	.0997	CP	10-10	1500	74	44
99.9999	10.0000	1.0001	.0999	CP	10-11	1120	75	48
100.0000	9.9999	.9999	.0998	CP	10-12	1130	72	48
100.0003	9.9999	1.0000	.1000	CP	10-13	1030	78	46
99.9999	10.0000	1.0000	.1000	CP	10-14	1400	78	46

WOODSTOVE DATA SHEET #4-4

SCALE QA SHEET

Dates: From 11-3-2009 Through 4-25-2007	Scale: Sartorius	Model: A 120 S	SN: 37010004
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100 g weight	10 g weight	1 g weight	100 mg weight	Tech	Date	Time	Dry Bulb	% RH
99.9997	10.0002	1.0003	.0998	Ch	11-3	1645	78	43
100.0003	10.0002	1.0001	.0999	Ch	11-4	1400	73	47
100.0002	9.9999	1.0002	.1000	Ch	11-5	1145	75	48
100.0000	10.0000	1.0001	.0999	Ch	11-7	1100	78	47
100.0004	10.0001	.9998	.0998	Ch	11-8	1015	72	46
100.0001	10.0002	.9999	.0998	Ch	11-12	1130	69	47
99.9998	10.0000	.9999	.0999	Ch	11-13	1015	68	47
100.0001	9.9999	1.0000	.1001	Ch	11-14	1115	78	46
100.0001	10.0006	.9999	.0999	Ch	11-21	1020	72	49
100.0001	9.9996	1.0000	.0999	Ch	11-28	1010	74	37
99.9999	9.9999	1.0001	.1001	Ch	2-10-09	1500	77	40
100.0003	10.0000	.9999	.0999	Ch	2-12	0945	75	41
100.0004	10.0000	.9999	.0999	Ch	2-13	1030	76	45
100.0002	10.0001	.9999	.0999	Ch	2-14	0930	74	47
99.9996	10.0000	.9999	.0998	Ch	2-16	1030	75	48
99.9999	10.0000	.9999	.0998	Ch	2-17	1400	78	46
100.0001	10.0003	1.0001	.1000	Ch	2-19	1300	70	48
99.9998	10.0000	1.0000	.0999	Ch	2-20	1000	73	47
100.0001	10.0001	.9999	.0999	Ch	2-22	1000	69	44
100.0003	10.0002	.9999	.1000	Ch	2-23	1000	71	45
100.0004	9.9999	.9999	.0998	Ch	3-6	1730	77	49
100.0004	10.0006	.9998	.0999	Ch	3-7	0740	77	42
99.9998	9.9997	.9999	.0999	Ch	3-8	1900	74	47
100.0000	10.0000	1.0001	.0999	Ch	3-9	0740	78	40
100.0002	10.0000	1.0000	.1001	Ch	3-10	1310	78	46
99.9999	10.0001	1.0000	.0999	Ch	3-13	1730	70	48
99.9998	9.9997	1.0000	.0999	Ch	3-14	0900	77	42
100.0000	10.0000	.9999	.0999	Ch	3-15	1030	68	43
100.0004	10.0003	1.0000	.1001	Ch	3-16	0940	74	44
100.0003	10.0000	1.0001	.0999	Ch	3-17	1715	77	49
100.0004	10.0001	1.0001	.1000	Ch	3-18	1200	76	49
99.9998	10.0006	.9999	.0998	Ch	3-20	1000	67	47
100.0000	10.0002	1.0000	.1000	Ch	3-21	1330	76	48
100.0002	10.0002	1.0000	.0999	Ch	3-23	1340	75	48
100.0002	10.0001	1.0000	.0997	Ch	4-21	1100	74	44
100.0003	10.0003	.9998	.0998	Ch	4-22	1100	75	48
100.0000	10.0001	1.0000	.0999	Ch	4-23	0900	71	49
99.9999	10.0000	.9998	.1000	Ch	4-24	1000	78	46
100.0000	10.0000	.9999	.1001	Ch	4-25	1000	73	47

WOODSTOVE DATA SHEET #4-4

SCALE QA SHEET

Dates: From	6-1-2006 Through 11-1-2006	Scale: Sartorius	Model: A 120 S	SN: 37010004
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100 g weight	10 g weight	1 g weight	100 mg weight	Tech	Date	Time	Dry Bulb	% RH
100.0001	9.9999	1.0000	.0999	CP	6-1	1020	78	43
100.0002	10.0000	.9999	.0999	CP	6-2	1810	75	48
100.0002	10.0000	.9998	.1000	CP	6-5	1300	76	45
100.0002	10.0001	1.0000	.0999	CP	6-6	0900	76	46
99.9996	10.0001	1.0000	.0998	CP	6-7	1015	76	49
100.0000	10.0002	1.0000	.0998	CP	6-12	0915	77	46
99.9996	9.9999	1.0000	.0999	CP	6-13	1235	78	46
100.0003	9.9999	1.0001	.0999	CP	6-14	1230	76	49
100.0004	10.0001	1.0001	.1000	CP	6-15	0840	75	48
99.9999	10.0001	1.0002	.0998	CP	6-16	1020	77	48
99.9998	10.0001	1.0000	.0999	CP	7-29	1545	77	46
100.0000	10.0001	.9997	.0999	CP	7-30	1900	75	48
99.9997	10.0000	1.0000	.0999	CP	7-31	0830	77	42
99.9996	10.0002	1.0001	.0998	CP	8-1	1100	78	46
100.0000	10.0001	1.0000	.1000	CP	8-2	1800	77	49
99.9998	10.0001	1.0001	.0998	CP	8-3	1140	76	49
99.9998	10.0003	.9999	.0999	CP	8-4	2030	76	49
100.0000	10.0002	.9999	.0999	CP	8-5	1130	76	45
99.9999	10.0000	.9999	.0997	CP	8-16	1030	75	48
99.9996	9.9999	.9999	.0998	CP	8-17	1035	76	49
100.0002	10.0002	.9999	.0999	CP	8-18	1010	70	48
100.0000	10.0002	1.0000	.0998	CP	8-31	0850	73	47
99.9999	10.0002	.9999	.0998	CP	9-1	1015	78	46
100.0000	10.0000	1.0001	.1000	CP	10-6	1030	78	46
99.9998	10.0000	1.0002	.0999	CP	10-7	1150	77	49
100.0000	10.0002	1.0000	.0999	CP	10-8	1545	75	48
99.9998	10.0001	.9999	.1002	CP	10-9	0820	73	47
99.9997	10.0001	.9999	.0999	CP	10-10	1430	78	46
100.0001	10.0001	1.0001	.0998	CP	10-12	0900	70	48
100.0003	10.0001	1.0000	.0999	CP	10-13	1025	71	49
100.0003	9.9999	.9999	.0999	CP	10-14	0955	69	47
100.0004	10.0002	.9999	.1000	CP	10-15	1700	74	47
99.9998	10.0000	1.0000	.0999	CP	10-16	0915	73	47
99.9998	10.0001	.9999	.0998	KV	10-17	0930	70	48
99.9999	10.0002	1.0000	.0999	KV	10-18	1100	70	47
100.0001	10.0001	.9999	.0999	KV	10-27	0936	75	48
100.0004	9.9999	1.0000	.1000	CP	10-28	1810	73	47
100.0001	10.0002	.9999	.0998	CP	10-31	1230	73	47
99.9998	10.0001	.9999	.1000	CP	11-1	1600	76	38

WOODSTOVE DATA SHEET #4-4

SCALE QA SHEET

Dates: From 12-8-2005 Through 5-31-2006	Scale: Sartorius	Model: A 120 S	SN: 37010004
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100 g weight	10 g weight	1 g weight	100 mg weight	Tech	Date	Time	Dry Bulb	% RH
99.9996	9.9998	.9999	.0998	CP	12-8	0900	67	38
100.0001	10.0001	1.0000	.0998	CP	12-27	1500	77	49
100.0000	10.0002	1.0000	.0999	KV	12-28	1125	70	48
100.0004	10.0003	1.0000	.1000	KV	12-29	1000	74	44
99.9999	10.0002	1.0000	.0999	KV	12-30	1030	76	42
99.9998	10.0002	1.0000	.0999	KV	12-31	1200	76	45
100.0003	10.0001	.9999	.0998	KV	1-1	1345	75	44
100.0004	10.0001	.9997	.0999	CP	1-2	1230	77	48
100.0003	10.0000	1.0001	.0999	CP	1-4	1430	74	44
100.0003	9.9999	1.0000	.0999	CP	1-5	1700	74	47
100.0002	9.9999	1.0000	.0999	CP	1-6	1000	77	49
100.0000	10.0001	.9999	.0997	KV	1-8	1000	71	41
100.0002	10.0000	1.0000	.0999	CP	1-9	1400	75	48
100.0000	10.0001	1.0000	.0999	CP	1-12	1200	74	47
100.0001	10.0001	.9999	.0998	CP	1-13	1500	73	49
99.9999	10.0003	.9998	.0998	CP	1-15	1230	69	49
100.0003	10.0001	1.0001	.1000	CP	1-16	1415	70	48
100.0003	10.0001	.9998	.0996	KV	1-24	1015	67	46
100.0003	10.0001	1.0000	.1000	KV	1-25	920	70	44
100.0001	10.0000	1.0000	.0999	CP	2-2	530	74	48
100.0003	10.0002	.9999	.0998	KV	2-2	0930	75	48
100.0004	10.0002	.9999	.0999	KV	2-3	0900	74	47
100.0001	10.0002	1.0000	.1000	CP	2-4	1100	77	42
100.0002	10.0000	1.0000	.1000	KV	2-6	1202	74	44
100.0000	10.0001	1.0000	.1000	KV	2-7	1119	73	43
99.9999	10.0001	1.0001	.0999	CP	2-8	1135	75	41
100.0002	10.0001	.9999	.0999	KV	2-10	0930	72	42
100.0000	10.0000	.9999	.0999	CP	2-13	0940	75	46
100.0001	10.0002	1.0000	.0999	KV	2-20	1200	71	44
100.0003	10.0001	.9999	.0999	CP	3-1	1215	78	43
100.0004	10.0001	1.0000	.0999	CP	3-2	1515	74	49
100.0001	10.0003	1.0001	.1001	KV	3-3	1100	74	44
100.0004	10.0002	1.0000	.0998	CP	3-6	1300	75	48
100.0002	10.0001	1.0002	.0999	CP	3-7	1405	75	48
100.0002	9.9999	.9999	.0999	CP	5-24	1600	78	46
100.0004	10.0001	.9999	.0999	CP	5-25	0830	76	45
100.0000	9.9999	.9997	.0999	CP	5-26	0840	74	47
100.0003	9.9999	1.0000	.0998	CP	5-30	1220	73	48
100.0002	10.0001	.9999	.1000	CP	5-31	1015	78	46

WOODSTOVE DATA SHEET #4-4

SCALE QA SHEET

Dates: From 10-21-2005 Through 12-6-2005	Scale: Sartorius	Model: A 120 S	SN: 37010004
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100 g weight	10 g weight	1 g weight	100 mg weight	Tech	Date	Time	Dry Bulb	% RH
99.9996	9.9999	1.0000	.0999	CP	10-21	0900	74	44
100.0000	10.0001	1.0000	.0999	CP	10-22	1130	78	46
99.9998	10.0000	.9998	.0998	CP	10-23	1130	74	49
99.9996	10.0000	.9998	.0997	KV	10-24	9:00	77	52
100.0000	10.0003	1.0000	.0999	KV	10-25	9:30	76	49
99.9999	10.0001	.9999	.0997	KV	10-26	9:50	70	48
99.9998	10.0000	.9999	.0998	KV	10-27	8:25	75	47
99.9996	10.0003	1.0001	.0999	KV	10-28	10:45	68	47
99.9999	10.0001	1.0000	.1000	CP	10-29	1400	75	44
99.9998	10.0003	1.0000	.0999	CP	10-30	1145	72	42
99.9999	10.0000	0.9998	.0998	KV	10-31	9:00	78	44
100.0001	10.0000	0.9997	.1000	KV	11-1	0850	75	42
99.9996	9.9998	.9998	.0996	KV	11-2	0915	72	49
99.9996	10.0000	1.0000	.0998	KV	11-3	1429	73	46
99.9997	10.0000	.9999	.0999	KV	11-4	1100	72	42
100.0002	10.0000	1.0001	.1000	CP	11-5	1015	69	44
99.9998	10.0001	1.0000	.0999	KV	11-7	0930	75	41
99.9998	10.0000	.9998	.0999	KV	11-9	1111	70	48
100.0002	10.0001	.9999	.1000	KV	11-10	1040	73	47
99.9999	10.0001	.9999	.0998	CP	11-12	1600	67	49
100.0001	10.0000	1.0000	.0999	CP	11-13	1430	74	47
99.9999	10.0000	1.0000	.0999	CP	11-15	1500	72	44
100.0002	10.0000	.9999	.0999	KV	11-16	0835	70	44
100.0005	10.0000	1.0000	.0999	CP	11-17	0930	72	46
100.0004	10.0002	1.0001	.1000	CP	11-18	1600	72	48
100.0003	10.0001	.9999	.0999	CP	11-20	1100	68	47
100.0004	10.0002	1.0000	.1000	CP	11-21	1200	74	44
100.0002	10.0002	.9999	.0998	CP	11-22	1030	74	42
99.9999	10.0000	1.0000	.0999	CP	11-25	1000	69	47
100.0002	10.0001	.9999	.0999	KV	11-26	1330	72	47
100.0000	10.0001	.9999	.0999	KV	11-27	1145	73	43
100.0001	10.0002	1.0000	.1000	CP	11-28	1000	72	42
100.0004	10.0000	1.0000	.0998	Chp	11-29	0940	72	42
99.9999	10.0001	1.0001	.0999	KV	11-30	0930	70	44
100.0001	10.0001	1.0000	.0998	CP	12-1	0900	70	41
100.0000	10.0000	.9999	.1000	CP	12-2	1340	72	42
100.0000	10.0000	.9998	.0999	CP	12-3	1400	68	43
99.9999	9.9998	.9999	.0996	CP	12-5	1620	71	45
99.9997	10.0001	1.0000	.0999	CP	12-6	1430	69	44

WOODSTOVE DATA SHEET #4-4

SCALE QA SHEET

Dates: From	07/15/05 Through 10-20-2005	Scale: Sartorius	Model: A 120 S	SN: 37010004
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100 g weight	10 g weight	1 g weight	100 mg weight	Tech	Date	Time	Dry Bulb	% RH
99.9998	9.9999	.9999	.0998	BL	07/15	2000	78	46
99.9997	9.9998	1.0000	.1000	BL	07/19	2250	78	46
100.0000	9.9999	.9999	.0999	BL	07/20	0740	78	46
100.0000	9.9999	1.0000	.1000	BL	07/21	2100	78	46
99.9998	9.9998	.9999	.1000	BL	07/24	2200	78	46
100.0001	10.0000	1.0000	.1000	BL	07/27	1515	78	49
99.9998	10.0000	.9998	.1000	BL	07/28	0600	78	49
99.9999	10.0001	1.0000	.1000	BL	07/29	1210	78	49
100.0000	10.0000	1.0001	.0998	CW	9-6	0930	74	48
100.0000	9.9998	.9998	.0996	CW	9-7	0955	72	47
99.9999	10.0000	1.0001	.1000	CW	9-8	1010	78	43
99.9999	10.0001	.9999	.0999	CW	9-9	0945	75	48
99.9996	9.9999	1.0000	.1000	CW	9-10	1630	75	48
99.9994	9.9999	1.0000	.0999	CW	9-11	1300	75	44
99.9997	10.0000	1.0000	.0998	CW	9-12	0920	74	48
99.9998	10.0001	.9999	.0999	CW	9-13	0945	74	47
99.9996	10.0001	.9999	.0999	CW	9-14	1400	77	46
99.9997	10.0001	1.0001	.0999	CW	9-15	0815	75	48
99.9996	10.0000	1.0000	.1000	CW	9-16	0955	76	49
99.9998	10.0001	.9999	.0998	CW	9-17	1200	76	45
99.9997	9.9998	.9999	.0998	CW	9-18	1430	73	47
100.0004	10.0002	1.0000	.0998	CW	9-19	0810	74	44
100.0000	10.0000	1.0000	.1000	CW	9-20	1910	77	49
100.0000	10.0000	1.0000	.0998	CW	9-21	1620	78	46
100.0000	10.0001	1.0000	.0999	CW	9-22	1420	76	49
100.0004	10.0003	1.0000	.0997	CW	9-23	1300	72	46
99.9998	10.0001	1.0000	.0999	CW	10-1	1830	74	47
100.0000	10.0000	1.0000	.0999	CW	10-2	1830	69	47
100.0001	10.0001	.9998	.0999	CW	10-5	0840	74	47
99.9998	10.0001	1.0000	.0999	CW	10-6	0930	77	47
99.9998	10.0002	.9999	.1000	CW	10-8	1340	75	45
100.0000	10.0002	.9999	.0997	CW	10-10	1330	76	48
99.9999	10.0000	1.0001	.1000	CW	10-11	1020	77	46
99.9998	10.0002	.9999	.1000	CW	10-12	1000	74	44
100.0001	10.0001	1.0000	.0997	CW	10-13	1020	70	48
99.9999	10.0000	1.0001	.0999	CW	10-14	1000	70	48
100.0000	10.0001	.9999	.0999	CW	10-15	1440	72	46
99.9997	9.9999	1.0000	.1000	CW	10-20	1000	77	49

BLANK PROCESSING DATA SHEET # 5

UNIT: Montage RUN: 1 DATE: 10-4-07

BLANKS DONE: 10-11-2005

BEAKER	A	B	C
	200 ml ACETONE	75 ml DICHLOR	200 ml WATER
	FISHER OPTIMA LOT # 023283	FISHER OPTIMA LOT # 035941	DWNA, Inc Sparklettes Distilled
FINAL WEIGHT	108.9008	106.3077	106.9670
TARE WEIGHT	108.8995	106.3066	106.9645
NET WEIGHT	.0013	.0011	.0025

TARE BEAKERS INTO DESC: TIME: 1900 DATE: 10-2-2005

DATE: 10-5 BY: CP DATE: 10-6 BY: CP DATE: BY:

BEAKER	1 ST WT	TIME	2 ND WT	TIME	3 RD WT	TIME
A	108.8996	0912	108.8995	1001	✓	
B	106.3065	0913	106.3066	1002	✓	
C	106.9642	0914	106.9645	1003	✓	

FINAL BEAKERS INTO DESC: TIME: 1000 DATE: 10-8-05

DATE: 10-10 BY: CP DATE: 10-11 BY: CP DATE: BY:

BEAKER	1 ST WT	TIME	2 ND WT	TIME	3 RD WT	TIME
A	108.9010	1348	108.9008	1105	✓	
B	106.3076	1349	106.3077	1106	✓	
C	106.9675	1350	106.9670	1109	✓	

TARE QC

DATE	TIME	BY	WB	DB	%
10-5	0840	CP	5	74	44
10-6	0930	CP	5	77	47

FINAL QC

DATE	TIME	BY	WB	DB	%
10-10	1330	CP	5	76	48
10-11	1020	CP	5	77	46

NET PARTICULATE CATCH CALCULATION DATA SHEET #6

UNIT: Montage RUN: 1 DATE: 10-4-07

Blank Audit by C. Wainwright 10-14-2005

BLANK CALCULATIONS

Acetone: .0013 g ÷ 200 ml = .000007 g/ml
 Dichloromethane: .0011 g ÷ 75 ml = .000015 g/ml
 Distilled Water: .0025 g ÷ 200 ml = .000013 g/ml

FRONT HALF CATCH

FILTERS: .0817 g - 1 (# of Filters) (.0000 g) Blank Value / Filter = .0817 g
 Total Catch
 BEAKERS: .0101 g - 50 ml Acetone .000007 g) = .0097 g
 Total Catch Blank Value / ml Acetone
 TOTAL FRONT HALF CATCH : .0914 g

BACK HALF CATCH

FILTERS: .0027 g - 1 (# of Filters) (.0000 g) Blank Value / Filter = .0027 g
 Total Catch
 BEAKERS: Acetone: .0202 g - 75 ml Acetone .000007 g) = .0197 g
 Total Catch Blank Value / ml Acetone
 Extract: .0042 g - 75 ml Dichloromethane .000015 g) = .0031 g
 Total Catch Blank Value / Dichloromethane
 Water: .0070 g - 225 ml Water .000013 g) = .0041 g
 Total Catch Blank Value / Water
 TOTAL BACK HALF CATCH : .0296 g

TOTAL CATCH : .1210 g

% FRONT HALF : 75.5 %

CALCULATIONS DATA SHEET # 7

UNIT: Country Stores Montage RUN: _____ DATE: 10-2007

$$1) Vm (std) = \frac{(38.848 Vm) (17.64) (.993 mcf) \left(29.75 \text{ " Hg} + \frac{.15 \text{ " H}_2\text{O}}{13.6} \right)}{(.561 TmA)} = \frac{36.0995}{000.0000} \text{ dscf}$$

$$2) Vw (std) = (.04707) (\underline{50.1} \text{ ml H}_2\text{O}) = \frac{2.3582}{00.0000} \text{ scf}$$

$$3) Asw = \frac{(.23582 \text{ scf})}{(\underline{2.3582} \text{ scf} + \underline{36.0995} \text{ dscf})} = \frac{.0613}{.0000} \text{ Bws} \times 100 = \frac{6.1319}{00.0000} \% \text{ H}_2\text{O}$$

$$4) Cs = \frac{(.1210 \text{ g.})}{(\underline{36.0995} \text{ dscf})} (15.43) = \frac{.0513}{0.0000} \text{ gr / dscf}$$

$$5) \text{ Estimated g / hr} = \frac{(.1210 \text{ g.})}{(\underline{36.0995} \text{ dscf})} \left(\frac{11.632}{00.0000} \text{ dscfm} \right) (60) = \frac{\text{g}}{00.0000} \text{ / hr}$$

Vm =	total cubic feet pulled on meter box during test	(p. 2)	(000.000 Vm)
mcf =	meter correction factor (Y factor) of meter box used for test	(p. 2)	(0.000 mcf)
" Hg =	average barometric pressure during test	(p. 2)	(00.00 " Hg)
" H ₂ O =	average delta H for test	(p. 2)	(.000 " H ₂ O)
TmA =	average meter temperature for test in degrees Absolute	(p. 2)	(000 TmA)
ml H ₂ O =	total water caught during test	(p. 3)	(000.0 ml H ₂ O)
g =	total particulate catch for test	(p. 6)	(00.0000 g.)
dscfm =	average stack flow during test	(p. 2)	(00.000 dscf)

TEST DATA SHEET # 8

UNIT: Country Stoves Montage RUN: 1 DATE: 10-4-2007

Test Chamber Air Velocity Start: 0 Stop: 0 Avg.: 0

Wet Bulb / Dry Bulb

Pre: WB: 69 DB: 90 = 32 % RH 1.6 % H₂O

Post: WB: 74 DB: 94 = 36 % RH 1.9 % H₂O

Average: 34 % RH 1.75 % H₂O

Empty Stove Weight (lbs): N/A w/ stack & oil seal: Wet: N/A Dry: 316.7

Kindling Weight (lbs): Paper: N/A Wood: N/A

Preburn Fuel Weight: N/A Total: N/A

Kindling & Preburn Fuel Weight (wood only) (lbs): Total: N/A

Coal Bed Wt Range (lbs): N/A - N/A Scale: N/A - N/A

Upper: .25 x fuel weight: Always round DOWN to nearest tenth

Lower: .20 x fuel weight: Always round UP to nearest tenth

Actual Coal Bed Weight: N/A

Maximum Coal Bed Removal (lbs): $(\frac{N/A}{\text{Upper}} + \frac{N/A}{\text{Lower}}) \div 2 \times .25 = \frac{N/A}{\text{round down to nearest tenth}}$

Test Fuel

(.75" x 1.5" x 5" spacers) = N/A pcs

Dimensions	Length in inches	No. Pcs	Weight in lbs	% of Load
2" x 4"	—	—	—	—
4" x 4"	—	—	—	—

Test Fuel Weight: 11.8 lbs

Estimated Dry Burn Rate:

$$\frac{11.8 - (11.8 \times .07863)}{2.2046} \times \frac{60}{120} = 2.466 \text{ kg/hr}$$

$$\text{Estimated BTU's/hr: } 19,140 \times \frac{78}{100} \times \frac{2.466}{\text{DBR}} = 36815.4 \text{ BTU's/hr}$$

EPA Default Efficiencies:

Non-cat: 63

Cat: 72

Pellet: 78

WOOD STOVE OPERATING DATA PAGE #9

Unit: Country Stoves Montage Run: 1 Date: 10-4-2007

FIRE STARTED: 1000

WARM UP AND PREBURN:

PRIMARY AIR: Set wide open for all warm-up / preburn fuel charges. Then set to maximum at start of preburn.

SECONDARY AIR: N/A CAT BYPASS: N/A

CHARCOAL BED PREPARATION:

Raked and leveled prior to each warm-up / preburn charge. At 1 1/2 min. prior to loading last fuel, raked and leveled. In stove N/A sec.

TEST:

DOOR wide open during loading N/A min. N/A sec.

PRIMARY AIR: Opened full for first N/A min., then set to run setting of maximum

SECONDARY AIR: N/A CAT BYPASS: N/A

FAN:

☒ OFF during warm-up

☒ OFF during preburn

☒ OFF first ALL minutes of test

☒ OFF balance of test run

Fan speed set at Auto

WOOD DATA:

KINDLING: A mix of the grades listed below:

	SIZE	MILL	GRADE	SPECIES
PREBURN:	2x4	Manke/Tacoma	Std. or better	s. grn D fir
TEST:	2x4	Packwood	#2 or better	s. grn D fir
	4x4	Packwood	#2 or better	s. grn D fir

PELLET FUEL MANUFACTURER: Bear Mountain Forest BRAND: Bear Mountain Premium
All Grades WCLB rules: Products

WARM UP INFORMATION:

All pre-burn / warm up fuel pieces were either N/A or N/A inches.

1st warm up / pre-burn fuel charge (lbs.) added at

2nd warm up / pre-burn fuel charge (lbs.) added at

3rd warm up / pre-burn fuel charge (lbs.) added at

4th warm up / pre-burn fuel charge (lbs.) added at

5th warm up / pre-burn fuel charge (lbs.) added at

WOOD DENSITY DATA SHEET # 11

Unit: Country Store Montage Run: _____ Date: 10-2007

Wood Piece : Nominal Dimensions : _____ x _____ x _____

Depth (D) : _____ cm

Width (W) : _____ cm

Length (L) : _____ cm

_____ cm Avg. Length = _____ cm

_____ cm

_____ cm

Volume : _____ cm³
(D x W x L)

Moisture : Room temperature : _____ °F Correction Factor: _____

	Uncorrected	Corrected
Top :		%
Bottom :		%
Side :		%

Uncorrected meter readings corrected
for temperature? Yes ☐ No ☐

Avg. % Dry Moisture : _____ Avg. % Wet Moisture : _____

% Moisture Dried Basis: _____ %
[1 - (Dry Wt. + Wet Wt.)] x 100

Scale : Leveled : In ☒ Out ☐ Zeroed : In ☒ Out ☐

Into dryer Date 10-4-07 Time 1115 Temp (°F) 227 Wet Weight : _____ g

Out of dryer 10-11-07 1155 236 Dry Weight : _____ g

Minimum time : 24 hrs. Minimum temp 100 °C (212 °F)

Density : N/A g ÷ N/A cm³ = N/A g / cm³
(dry weight) (volume)

Pellet Fuel Moisture Content Determination

Tare Beaker Weight : 103.9 g

Wet Weight : 265.6 g - 103.9 g = 161.7 g
(gross wet weight) (tare beaker weight) (net wet weight)

Dry Weight : 256.8 g - 103.9 g = 152.9 g
(gross dry weight) (tare beaker weight) (net dry weight)

% Moisture Dried Basis : 8.534 %
[1 - (Dry Wt. + Wet Wt.)] x 100

% Dried : 7.863

GAS DATA SHEET #12

WEIGHT: _____

DATE: 10-4-2007

UNIT: Country Stoves Montage

RUN: 1

PAGE: 1 OF 1

TIME	SCALE	FUEL	DROP	V.	CO ₂	V.	O ₂	V.	CO	STATIC	SO ₂ PPM
0	309.3	11.8	—	.345	8.6	.485	12.1	.000	Ø	-.050	300
5	308.7	11.2	.6	.301	7.5	.529	13.2	.001	Ø	-.050	300
10	308.1	10.6	.6	.300	7.5	.530	13.2	.000	Ø	-.050	300
15	307.6	10.1	.5	.310	7.8	.523	13.1	.000	Ø	-.050	300
20	307.1	9.6	.5	.300	7.5	.530	13.2	.000	Ø	-.050	300
25	306.7	9.2	.4	.310	7.8	.524	13.1	.000	Ø	-.050	300
30	306.2	8.7	.5	.301	7.5	.529	13.2	.000	Ø	-.050	300
35	305.7	8.2	.5	.293	7.3	.537	13.4	.000	Ø	-.050	300
40	305.2	7.7	.5	.248	7.4	.541	13.5	.000	Ø	-.050	300
45	304.7	7.2	.5	.260	6.5	.574	14.3	.000	Ø	-.050	300
50	304.1	6.6	.6	.338	8.5	.491	12.3	.000	Ø	-.050	300
55	303.8	6.3	.3	.315	7.9	.514	12.8	.000	Ø	-.050	300
SUBTOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	-.600	*****
60	303.2	5.7	.6	.290	7.3	.539	13.4	.000	Ø	-.050	300
65	302.6	5.1	.6	.265	6.6	.568	14.2	.000	Ø	-.050	300
70	302.2	4.7	.4	.261	6.5	.575	14.3	.000	Ø	-.050	300
75	301.8	4.3	.4	.301	7.5	.530	13.2	.000	Ø	-.050	300
80	301.3	3.8	.5	.325	8.1	.504	12.6	.000	Ø	-.050	300
85	300.8	3.3	.5	.337	8.5	.493	12.3	.000	Ø	-.050	300
90	300.3	2.8	.5	.317	7.9	.516	12.9	.000	Ø	-.050	300
95	299.8	2.3	.5	.274	6.9	.553	13.8	.000	Ø	-.050	300
100	299.3	1.8	.5	.324	8.1	.505	12.6	.000	Ø	-.050	300
105	298.8	1.3	.5	.271	6.8	.562	14.0	.000	Ø	-.050	300
110	298.4	.9	.4	.271	6.8	.561	14.0	.000	Ø	-.050	300
115	297.9	.4	.5	.274	6.9	.553	13.8	.000	Ø	-.050	300
SUBTOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	-.600	*****
120	297.5	Ø	.4	.300	7.5	.530	13.2	.000	Ø	-.050	300
125											
130											
135											
140											
145											
150											
155											
160											
165											
170											
175											
SUBTOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****		*****
TOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****		*****

(-1.250)

(-.050)

UNIT Country Stores

PREBURN DATA SHEET #13

RUN:

DATE: 0-4-2007 PAGE: 1

of T

of

[illegible]

Country Stoves-Montage

Temperature Data Sheet 14

Run 1
10/4/07

Time	Stack	Top	LT Side	Back	Rt Side	Bottom	Firebox	Sec/Cat	Ambient	Tube	Furn	Smpl Box	Smpl Out	C-Gas Box	C-Gas Out	SO2 Out
*****	Chn 103	Chn 104	Chn 105	Chn 106	Chn 107	Chn 108	Chn 109	Chn 110	Chn 111	Chn 112	Chn 113	Chn 114	Chn 115	Chn 116	Chn 117	
0	345	675	239	336	364	505	255	#####	75	1269	241	47	242	40	35	
5	348	666	241	340	369	518	258	#####	77	1275	244	40	242	39	36	
10	347	675	243	341	371	516	259	#####	78	1288	246	40	242	39	36	
15	348	686	246	345	375	519	262	#####	78	1294	248	40	242	39	36	
20	348	682	250	347	377	524	265	#####	79	1301	248	40	243	39	36	
25	349	685	249	346	373	518	267	#####	80	1309	240	40	244	38	36	
30	349	687	249	347	376	524	266	#####	80	1311	233	40	244	38	36	
35	352	694	250	349	381	527	268	#####	81	1312	238	41	247	38	37	
40	355	696	249	351	381	529	269	#####	81	1280	241	41	249	38	37	
45	356	696	249	353	384	528	269	#####	82	1315	242	42	242	38	37	
50	356	683	248	352	380	529	261	#####	81	1318	243	42	238	38	37	
55	357	694	252	353	385	528	258	#####	80	1321	244	42	236	38	37	
60	359	712	254	355	388	533	260	#####	80	1322	245	43	235	37	37	
65	358	691	252	356	383	535	263	#####	80	1323	245	43	234	37	37	
70	356	677	244	348	374	522	257	#####	81	1324	246	43	233	37	37	
75	358	693	247	349	375	522	255	#####	81	1325	246	44	232	37	37	
80	358	681	242	348	367	522	259	#####	81	1326	246	44	231	37	37	
85	358	687	243	348	371	525	258	#####	80	1327	247	44	231	37	37	
90	360	703	252	352	381	531	260	#####	81	1329	247	45	230	37	36	
95	361	697	251	354	379	532	263	#####	80	1330	247	45	244	36	36	
100	361	702	250	355	380	535	264	#####	81	1331	244	45	230	36	36	
105	361	688	246	353	376	536	264	#####	81	1332	242	46	230	36	36	
110	361	685	243	350	372	528	259	#####	81	1333	240	46	230	36	36	
115	358	667	239	344	361	515	256	#####	81	1335	241	46	231	35	36	
120	331	540	210	316	308	465	242	#####	81	1339	243	46	231	35	36	

TEMPERATURE DATA SHEET #14A

TEST TIME	120		
STACK AVG	354	TOP AVG	682
		LT SIDE AVG	246
BACK AVG	348	RT SIDE AVG	373
		BOTTOM AVG	523
FIREBOX AVG	261	SEC/CAT AVG #####	AMBIENT AVG
			80

END	368.0
START	424.0
	-56.0

DELTA T

CIRCLE: LOSS / GAIN

ZERO / SPAN CHECK DATA SHEET #15-1

Date: 10-4-2007 Analyte: CO₂ (15-1)
 Unit: Montage Run #: 1
 Zero Cyl. #: 168TAC 3-A Conc.: 0.00 % CO₂ Cyl. Press.: 710 PSI
 Certified by: AIR LIQUIDE Date: 04-19-04
 Span Cyl. #: CC-41627 Conc.: 12.50 % CO₂ Cyl. Press.: 415 PSI
 Certified by: AIR LIQUIDE Date: 11-1-05
 Analyzer: Make: HORIBA Model: PIR-2000 SN: 407069
 Range: 0 - 25.0 % CO₂ Analyzer Output: 0 - 1.0 v.
 Flow: 1.5 SCFH Measured by: Rotameter

EPA Span Value = 25.0 % CO₂
 EPA Control Limits = ± 2.5% of 25.0 % CO₂ = ± 0.625 % CO₂
 Method 28 A = ± .2 % of 25.0 % CO₂ = ± .05 % CO₂

PRE RUN Audit: by: Cpl. [Signature] Time: 1150 Temp: 70 °F

AUDIT RESULTS

Point #	Expected Response			Actual Response			± Conc. Difference	Δ %
	Meter	DVM	%	Meter	DVM	%		
ZERO	00.0	.000	00.0	00.0	.000	.049	.049	.195
SPAN	50.0	.500	12.50	50.0	.500	12.478	-.022	-.087

POST RUN Audit: by: Cpl. [Signature] Time: 1525 Temp: 80 °F

AUDIT RESULTS

Point #	Expected Response			Actual Response			± Conc. Difference	Δ %
	Meter	DVM	%	Meter	DVM	%		
ZERO	00.0	.000	00.0	00.0	.001	.024	.024	.095
SPAN	50.0	.500	12.50	49.8	.498	12.428	-.072	-.286

± Conc. Difference = Act % - Exp (Std) %
 Zero % Difference = $\frac{\text{Act \% (ppm)} - \text{Exp \% (ppm)}}{\text{Full Scale Value}} \times 100$
 Span % Difference = $\frac{\text{Act \% (ppm)} - \text{Exp \% (ppm)}}{\text{Full Scale Value}} \times 100$

ZERO / SPAN CHECK DATA SHEET #15-2

Date : 10-2007

Analyte : O₂ (15-2)

Unit : montaq

Run # : 1

Zero Cyl. # : 168TAC 3A Conc. : 0.00 % O₂

Cyl. Press. : 710 PSI

Certified by : AIR LIQUIDE

Date : 04-19-04

Span Cyl. # : CC-41627 Conc. : 12.50 % O₂

Cyl. Press. : 415 PSI

Certified by : AIR LIQUIDE

Date : 11-1-05

Analyzer : Make : TELEDYNE Model : 320 A

SN : 37400

Range : 0 - 25.0 % O₂

Analyzer Output : 0 - 1.0 v.

Flow : 1.5 SCFH

Measured by : Rotameter

EPA Span Value = 25.0 % O₂

EPA Control Limits = $\pm 2.5\%$ of 25.0 % O₂ = $\pm 0.625 % O_2$

Method 28 A = $\pm .2 %$ of 25.0 % O₂ = $\pm .05 % O_2$

PRE RUN Audit : by : Cpl Wadsworth Time : 1150 Temp : 70 °F

AUDIT RESULTS

Point #	Expected Response			Actual Response			± Conc. Difference	Δ %
	Meter	DVM	%	Meter	DVM	%		
ZERO	00.0	.000	00.0	00.0	.000	.005	.005	.022
SPAN	12.50	.500	12.50	50.0	.500	12.462	-.033	-.131

POST RUN Audit : by : Cpl Wadsworth Time : 1525 Temp : 80 °F

AUDIT RESULTS

Point #	Expected Response			Actual Response			± Conc. Difference	Δ %
	Meter	DVM	%	Meter	DVM	%		
ZERO	00.0	.000	00.0	00.1	.002	.055	.055	.221
SPAN	12.50	.500	12.50	12.5	.502	12.517	.017	.068

± Conc. Difference = Act % - Exp (Std) %

Zero % Difference = $\frac{\text{Act \% (ppm)} - \text{Exp \% (ppm)}}{\text{Full Scale Value}} \times 100$

Span % Difference = $\frac{\text{Act \% (ppm)} - \text{Exp \% (ppm)}}{\text{Full Scale Value}} \times 100$

ZERO / SPAN CHECK DATA SHEET #15-3

Date : 10-4-2007

Analyte : CO (15-3)

Unit : Montag

Run # : 1

Zero Cyl. # : 168TAC 3-A Conc. : 0.00 % CO Cyl. Press. : 710 PSI

Certified by : AIR LIQUIDE

Date : 04-19-04

Span Cyl. # : CC-41627 Conc. : 4.99 % CO Cyl. Press. : 415 PSI

Certified by : AIR LIQUIDE

Date : 11-1-05

Analyzer : Make : HORIBA

Model : PIR-2000

SN : 408005

Range : 0 - 10.0 % CO

Analyzer Output : 0 - 1.0 v.

Flow : 1.5 SCFH

Measured by : Rotameter

EPA Span Value = 10.0 % CO

EPA Control Limits = $\pm 2.5\%$ of 10.0 % CO = $\pm 0.25\%$ CO

Method 28 A = $\pm .2\%$ of 10.0 % CO = $\pm .02\%$ CO

PRE RUN Audit : by Cp Wadsworth Time : 1150 Temp : 70 °F

AUDIT RESULTS

Point #	Expected Response			Actual Response			± Conc. Difference	Δ %
	Meter	DVM	%	Meter	DVM	%		
ZERO	00.0	.000	00.0	00.0	.000	- .013	- .013	- .128
SPAN	49.9	.499	4.99	49.9	.499	4.984	- .006	- .060

POST RUN Audit : by Cp Wadsworth Time : 1525 Temp : 80 °F

AUDIT RESULTS

Point #	Expected Response			Actual Response			± Conc. Difference	Δ %
	Meter	DVM	%	Meter	DVM	%		
ZERO	00.0	.000	00.0	00.0	.000	- .013	- .013	- .128
SPAN	49.9	.499	4.99	50.0	.500	4.994	.004	.040

± Conc. Difference = Act % - Exp (Std) %

Zero % Difference = $\frac{\text{Act \% (ppm)} - \text{Exp \% (ppm)}}{\text{Full Scale Value}} \times 100$

Span % Difference = $\frac{\text{Act \% (ppm)} - \text{Exp \% (ppm)}}{\text{Full Scale Value}} \times 100$

ZERO / SPAN CHECK DATA SHEET #15-4

Date : 10-4-2007

Analyte : SO₂ (15-4)

Unit : montague Run # : 1

Zero Cyl. # : 168TAC 3-A Conc. : 0.00 ppm SO₂ Cyl. Press. : 710 PSI

Certified by : AIR LIQUIDE Date : 04-19-04

Span Cyl. # : CC82089 Conc. : 1250 ppm SO₂ Cyl. Press. : 1910 PSI

Certified by : AIR LIQUIDE Date : 01-3-2007

Analyzer : Make : HORIBA Model : PIR-2000 SN : 403019
 Range : 0 - 2500 ppm SO₂ Analyzer Output : 0 - 1.0 v.
 Flow : 1.5 SCFH Measured by : Rotameter

EPA Span Value = 2500 ppm SO₂
 EPA Control Limits = $\pm 2.5\%$ of 2500 ppm SO₂ = ± 62.5 ppm SO₂

PRE RUN Audit : by Op W. [Signature] Time : 1150 Temp : 70 °F

AUDIT RESULTS

Point #	Expected Response			Actual Response			± Conc. Difference	Δ %
	Meter	DVM	PPM	Meter	DVM	%		
ZERO	00.0	.000	00.0	00.0	.000	1.556	1.556	.062
SPAN	50.0	.500	1250	50.0	.500	1244.4	-5.600	-.224

POST RUN Audit : by Op W. [Signature] Time : 1525 Temp : 80 °F

AUDIT RESULTS

Point #	Expected Response			Actual Response			± Conc. Difference	Δ %
	Meter	DVM	PPM	Meter	DVM	%		
ZERO	00.0	.000	00.0	00.3	.003	9.014	9.014	.361
SPAN	50.0	.500	1250	50.2	.502	1249.4	-.600	-.024

± Conc. Difference = Act % - Exp (Std) %
 Zero % Difference = $\frac{\text{Act \% (ppm)} - \text{Exp \% (ppm)}}{\text{Full Scale Value}} \times 100$
 Span % Difference = $\frac{\text{Act \% (ppm)} - \text{Exp \% (ppm)}}{\text{Full Scale Value}} \times 100$

QUALITY CHECKS DATA SHEET # 16

UNIT Country Stores Montage RUN: 1 DATE: 10-4-2007

Thermocouple Check:

T/C # 1	<u>—</u>	°F		T/C # 13	<u>76.4</u>	°F
T/C # 2	<u>—</u>	°F	H	T/C # 14	<u>79.4</u>	°F
T/C # 3	<u>291</u>	°F	0	T/C # 15	<u>79.7</u>	°F
T/C # 4	<u>543</u>	°F	1	T/C # 16	<u>62.4</u>	°F
T/C # 5	<u>186</u>	°F	S	T/C # 17	<u>72.0</u>	°F
T/C # 6	<u>287</u>	°F	T	T/C # 18	<u>88.2</u>	°F
T/C # 7	<u>284</u>	°F	A	T/C # 19	<u>87.1</u>	°F
T/C # 8	<u>401</u>	°F	R	T/C # 20	<u>—</u>	°F
T/C # 9	<u>—</u>	°F	T	T/C # 21	<u>—</u>	°F
T/C # 10	<u>—</u>	°F		T/C # 22	<u>—</u>	°F
T/C # 11	<u>65.7</u>	°F		T/C # 23	<u>—</u>	°F
T/C # 12	<u>70.4</u>	°F		T/C # 24	<u>—</u>	°F

Thermocouple Readout:

Pretest zero and span check and calibration

post test zero and span

% difference

ZERO 2.1 °F Adj. to 0.0 °F

ZERO 8 °F Difference 0.40 %

SPAN 1995.6 °F Adj. to 2000.0 °F

SPAN 1999.7 °F Difference 0.15 %

Thermocouple Readout Pretest Linearity Check:

0	= <u>0.0</u> °F	200	= <u>200.2</u> °F	400	= <u>399.8</u> °F
600	= <u>600.0</u> °F	800	= <u>799.6</u> °F	1000	= <u>999.7</u> °F
1200	= <u>1199.7</u> °F	1400	= <u>1399.4</u> °F	1600	= <u>1599.1</u> °F
1800	= <u>1799.4</u> °F	2000	= <u>2000.0</u> °F		

Sample Train Leak Check

Pre ✓

Post ✓

C-gas Train Leak Check

Pre X

Post ✓

SO₂ Train Leak Check

Pre X

Post ✓

Static Gauge Zero Check

Pre X

Post ✓

Scale Check Pre: 320.0 - 310.0 = 10.0

Post: 307.6 - 297.6 = 10.0

Stack Cleaned Prior to Test Run: YES X NO —

Calibration Data

INSPECTION CERTIFICATE

**Phillips
Morris
Scale
Company**

Partners in Weighing Systems

934 Elliott Avenue W.
Seattle, WA 98119
Ph#(206)284-6090
Fax#(206)282-6612

CUSTOMER: LOKEE TESTING

ADDRESS: 13235 Prairie Circle

Sumner WA 98390

TECHNICIAN: Patrick McLellan

AUTHORIZATION

SIGNATURE: _____

DATE OF INSPECTION:

11-26-02

NEXT INSPECTION DUE:

5-03

CERTIFICATION TYPE

☒ STANDARD

☐ ISO 9000

☐ MIL STD-45662

EQUIPMENT TESTED

INDICATOR

BASE

OPTIONS INSTALLED

MAKE Wrightronix

MODEL WE-110

SR# 16409

CLASS III

CAP. 1000 lbs

PRINTER _____

SCORE BOARD _____

COMPUTER _____

OTHER _____

PRE-TEST

POST-TEST

MANUFACTURER TOLERANCE

Ø

Ø

499.9

998.7

1000.0

CORNER TEST

P ☒ F _____

SHIFT TEST

P ☒ F _____

STATIC TEST

2 MIN. ☒ 5 MIN. _____

WEIGHT KIT# _____

NIST# _____

SERIAL NUMBERS OF WEIGHTS USED (OR COPY OF CERTIFICATE)

T23-13

T23-14

ANY CHANGES TO DOCUMENT OR SCALE NOT AUTHORIZED BY
PHILLIPS & MORRIS SCALE COMPANY VOIDS THIS CERTIFICATE.



METROLOGY LABORATORY

Receipt Date: January 29, 2002
Test Date: February 13, 2002
Report Date: February 13, 2002

State Test Number: L2017-1
Group ID: SHOP
Due Date: February 13, 2004

CALIBRATION REPORT

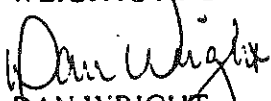
Phillips Morris Scale Company
934 Elliott Ave. W
Seattle, WA 98119-3608
Contact: Todd Mackie
Phone: 206-284-6090
PO Number: 2-2-009237
SOP: 8

Item(s) Submitted: See Table Below
Specification: NIST HB 105-1, Class F
Condition: Good
Temperature: 21.0 °C
Pressure: 762.0 mmHg
Humidity: 35 % RH
Technician ID: DW

Description	Value / Range	Qty	Material	Manufacture	Serial Number
Test Weight	1000 lb	5	Cast Iron	Rice Lake	OFT0, OFT1, OFT2, OFSY, OFSZ
Test Weight	500 lb	12	Cast Iron	Rice Lake	T23-13 to T23-16, T23-20, T23-24, T23-26, T23-28 to T23-32
Test Weight	50 lb	30	Cast Iron	Rice Lake	877B, N1039, N1041, T23- 1 to T23-10, T23-19 to T23-28, WA171-0, WA1712-0 to WA172-2, WA173-2, WA237, X694
Test Weight	25 lb	2	Cast Iron	Rice Lake	WA238, T23-11
Weight Set, 7 pc	10 lb - 8 oz	1	Stainless Steel	Rice Lake	WA177-7
Weight Set, 12 pc	5 kg - 200 g	1	Stainless Steel	Rice Lake	SK

The item(s) listed above have been found and/or left within the stated tolerances for the specification stated above, except as noted. The item(s) listed above have been compared to the Standards of the State of Washington, which are currently in control. These standards values are traceable to the National Institute of Standards and Technology (NIST) through NIST Test Numbers 822/264514-01 and Minnesota Metrology Laboratory Report Number 307 430. Calibration processes were monitored and found to be in control. The expanded uncertainty ($k=2$) for each item listed in this report is less than 1/3 of the appropriate tolerance. Results apply to items identified in this report only. This report may not be reproduced, except in full, unless permission for the publication of an abstract is obtained in writing from the calibrating organization issuing this report.

LABORATORY SERVICES DIVISION
WEIGHTS AND MEASURES PROGRAM


DAN WRIGHT
STATE METROLOGIST

NVLAP

NVLAP LAB CODE 200446

MAR 08 2002

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W98MR42-01, 11/98



QUALITY CONTROL SERVICES

LABORATORY AND METROLOGY EQUIPMENT: SALES AND SERVICE

2340 S.E. 11th Avenue • Portland, Oregon 97214

P.O. Box 14831 • Portland, Oregon 97293 • (503) 236-2712 • FAX: (503) 235-2535

Lokee Testing Labs
13235 Prairie Circle East
Sumner, WA. 98390
Chip Wadington

Report Number: EESPC37010004070514

CERTIFICATE OF CALIBRATION WITH DATA

INSTRUMENT INFORMATION

Item	Make	Model	Serial Number	Customer ID	Location
Balance	Sartorius	A120S	37010004	N/A	Lab
Units	Readability	SOP Used	Cal. Date	Last Cal.	Cal. Due
Grams	0.0001	QC004	05/14/2007	12/08/2006	11/2007

FUNCTIONAL CHECKS

ECCENTRICITY:	LINEARITY:	REPEATABILITY:
Test Wt: Tol:	Test Wt: Tol:	Test Wt: Tol:
100 0.0003	50x2 0.0004	100 0.0001
AS FOUND:	AS FOUND:	AS FOUND:
Pass: ☒ Fail: ☐	Pass: ☒ Fail: ☐	Pass: ☒ Fail: ☐
AS LEFT:	AS LEFT:	AS LEFT:
Pass: ☒ Fail: ☐	Pass: ☒ Fail: ☐	Pass: ☒ Fail: ☐

CALIBRATION DATA

Standards	As Found	As Left
100	100.0008	100.0001
70	70.0005	70.0001
50	50.0004	50.0001
20	20.0001	20.0000
10	10.0001	10.0001
5	5.0000	5.0000

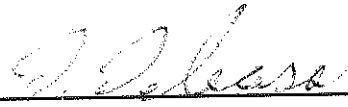
CALIBRATION STANDARDS

Item	Make	Model	Serial Number	Cal. Date	Cal. Due	Traceable ID#
Weight Set	R.L./Troemner	1MG-25KG	A45	06/14/2006	09/2007	822/272027-5

Comments / Info Concerning This Calibration:

Permanent Information Concerning This Instrument:

Technician: D.Deleasa

Signature: 

THIS CERTIFICATE SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN APPROVAL OF QUALITY CONTROL SERVICES, INC.
INSTRUMENT(S) LISTED ABOVE WERE CALIBRATED USING STANDARDS TRACEABLE TO THE NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (N.I.S.T.).

Form Number: BA02

Customer Code: EESPC

Rev. Date: 6/5/2006



QUALITY CONTROL SERVICES

LABORATORY AND METROLOGY EQUIPMENT: SALES AND SERVICE

2340 S.E. 11th Avenue • Portland, Oregon 97214

P.O. Box 14831 • Portland, Oregon 97293 • (503) 236-2712 • FAX: (503) 235-2535

Lokee Testing Labs
13235 Prairie Circle East
Sumner, WA. 98390
Chip Wadington

Report Number: EESPC37010004061208

CERTIFICATE OF CALIBRATION WITH DATA

INSTRUMENT INFORMATION

Item	Make	Model	Serial Number	Customer ID	Location
Balance	Sartorius	A120S	37010004	N/A	Lab
Units	Readability	SOP Used	Cal. Date	Last Cal.	Cal. Due
Grams	0.0001	QC004	12/08/2006	05/05/2006	06/2007

FUNCTIONAL CHECKS

ECCENTRICITY: Test Wt: Tol: 100 0.0003	LINEARITY: Test Wt: Tol: 50x2 0.0004	REPEATABILITY: Test Wt: Tol: 100 0.0001
AS FOUND: Pass: ☒ Fail: ☐	AS FOUND: Pass: ☒ Fail: ☐	AS FOUND: Pass: ☒ Fail: ☐
AS LEFT: Pass: ☒ Fail: ☐	AS LEFT: Pass: ☒ Fail: ☐	AS LEFT: Pass: ☒ Fail: ☐

CALIBRATION DATA

Standards	As Found	As Left
100	100.0010	100.0001
70	70.0007	70.0001
50	50.0005	50.0001
20	20.0002	20.0000
10	10.0001	10.0001
5	5.0001	5.0000

CALIBRATION STANDARDS

Item	Make	Model	Serial Number	Cal. Date	Cal. Due	Traceable ID#
Weight Set	R.L./Troemner	1MG-25KG	A45	04/14/2006	07/2007	822/272027-5

Comments / Info Concerning This Calibration:

Permanent Information Concerning This Instrument:

Technician: D.Deleasa

Signature: 

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Form Number: BA02

Customer Code: EESPC

Rev. Date: 6/5/2006



QUALITY CONTROL SERVICES

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Lokee Testing Labs
13235 Prairie Circle East
Sumner, WA. 98390
Chip Wadington

Report Number: EESPC37010004060505

CERTIFICATE OF CALIBRATION WITH DATA

INSTRUMENT INFORMATION

Item	Make	Model	Serial Number	Customer ID	Location
Balance	Sartorius	A120S	37010004	N/A	Lab
Units	Readability	SOP Used	Cal. Date	Last Cal.	Cal. Due
Grams	0.0001	QC004	05/05/2006	12/05/2005	11/2006

FUNCTIONAL CHECKS

ECCENTRICITY:	LINEARITY:	REPEATABILITY:
Test Wt: Tol:	Test Wt: Tol:	Test Wt: Tol:
100 0.0003	50x2 0.0004	100 0.0001
AS FOUND:	AS FOUND:	AS FOUND:
Pass: ☒ Fail: ☐	Pass: ☒ Fail: ☐	Pass: ☒ Fail: ☐
AS LEFT:	AS LEFT:	AS LEFT:
Pass: ☒ Fail: ☐	Pass: ☒ Fail: ☐	Pass: ☒ Fail: ☐

CALIBRATION DATA

Standards	As Found	As Left
100	100.0002	100.0001
70	70.0002	70.0001
50	50.0001	50.0001
20	20.0001	20.0000
10	10.0001	10.0001
5	5.0001	5.0000

CALIBRATION STANDARDS

Item	Make	Model	Serial Number	Cal. Date	Cal. Due	Traceable ID#
Weight Set	R.L./Troemner	1MG-25KG	A45	04/01/2006	07/2007	822/268710-03

Comments / Info Concerning This Calibration:

Permanent Information Concerning This Instrument:

Technician: D.Deleasa

Signature: 

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Form Number: BA02

Customer Code: EESPC

Rev. Date: 3/10/2005



QUALITY CONTROL SERVICES

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Lokee Testing Labs
13235 Prairie Circle East
Sumner, WA. 98390
Chip Wadington

Report Number: EESPC37010004051205

CERTIFICATE OF CALIBRATION WITH DATA

INSTRUMENT INFORMATION

Item	Make	Model	Serial Number	Customer ID	Location
Balance	Sartorius	A120S	37010004	N/A	Lab
Units	Readability	SOP Used	Cal. Date	Last Cal.	Cal. Due
Grams	0.0001	QC004	12/05/2005	05/11/2005	06/2006

FUNCTIONAL CHECKS

ECCENTRICITY:	LINEARITY:	REPEATABILITY:
Test Wt: Tol:	Test Wt: Tol:	Test Wt: Tol:
100 0.0003	50x2 0.0004	100 0.0001
AS FOUND:	AS FOUND:	AS FOUND:
Pass: ☒ Fail: ☐	Pass: ☒ Fail: ☐	Pass: ☒ Fail: ☐
AS LEFT:	AS LEFT:	AS LEFT:
Pass: ☒ Fail: ☐	Pass: ☒ Fail: ☐	Pass: ☒ Fail: ☐

CALIBRATION DATA

Standards	As Found	As Left
100	100.0002	100.0000
70	70.0001	70.0000
50	50.0001	50.0000
20	20.0000	20.0000
10	10.0000	10.0000
5	5.0000	5.0000

CALIBRATION STANDARDS

Item	Make	Model	Serial Number	Cal. Date	Cal. Due	Traceable ID#
Weight Set	R.L./Troemner	1MG-25KG	A45	12/20/2004	12/2005	822/268710-03

Comments / Info Concerning This Calibration:

Permanent Information Concerning This Instrument:

Technician: D.Deleasa

Signature: 

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Form Number: BA02

Customer Code: EESPC

Rev. Date: 3/10/2005



QUALITY CONTROL SERVICES

LABORATORY AND METROLOGY EQUIPMENT: SALES AND SERVICE

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Lokee Testing Labs
13235 Prairie Circle East
Sumner, WA. 98390
Chip Wadington

Report Number: EESPC37010004050511

CERTIFICATE OF CALIBRATION WITH DATA

INSTRUMENT INFORMATION

Item	Make	Model	Serial Number	Customer ID	Location
Balance	Sartorius	A120S	37010004	N/A	Lab
Units	Readability	SOP Used	Cal. Date	Last Cal.	Cal. Due
Grams	0.0001	QC004	05/11/2005	11/05/2004	11/2005

FUNCTIONAL CHECKS

ECCENTRICITY:	LINEARITY:	REPEATABILITY:
Test Wt: Tol:	Test Wt: Tol:	Test Wt: Tol:
100 0.0003	50x2 0.0004	100 0.0001
AS FOUND:	AS FOUND:	AS FOUND:
Pass: ☒ Fail: ☐	Pass: ☒ Fail: ☐	Pass: ☒ Fail: ☐
AS LEFT:	AS LEFT:	AS LEFT:
Pass: ☒ Fail: ☐	Pass: ☒ Fail: ☐	Pass: ☒ Fail: ☐

CALIBRATION DATA

Standards	As Found	As Left
100	100.0004	100.0000
70	70.0003	70.0000
50	50.0002	50.0000
20	20.0001	20.0000
10	10.0001	10.0000
5	5.0000	5.0000

CALIBRATION STANDARDS

Item	Make	Model	Serial Number	Cal. Date	Cal. Due	Traceable ID#
Weight Set	R.L./Troemner	1MG-25KG	A45	12/20/2004	12/2005	822/268710-03

Comments / Info Concerning This Calibration:

Permanent Information Concerning This Instrument:

Technician: D.Deleasa

Signature: 

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Form Number: BA02

Customer Code: EESPC

Rev. Date: 3/10/2005

Thermocouple Calibration Record Semi-Annual

Thermocouples Check against

Reference Thermometer

serial number 9123454

Ice Water Bath

32°

Boiling Water

212°

Room Temperature

71

Barometric Pressure

30.04

DATE: 5-4-2007

TC	Location	Ice Bath Temp	Boiling Water Temp
1	Wet Bulb	32°	212.0
2	Dry Bulb	32°	212.0
3	Stack	32.2	211.0
4	Stove Top	31.7	210.7
5	Left Side	32.6	211.1
6	Back	32.3	210.8
7	Right Side	32.0	210.5
8	Bottom	31.9	212.1
9	Firebox	31.8	211.7
10	Secondary/Cat	32.3	211.0
11	Ambient	32.5	210.8
12	Tube Furnace	31.3	212.0
13	Sample Box	32.2	212.1
14	Impinger Out	32.1	212.0
15	C. Gas Box	32.4	211.3
16	C. Gas Out	32.0	211.2
17	SO2 Out	32.1	211.7
18	Upper Ambient	32.3	210.9
19			
20			
21			
22			
23	Calibrator	32.0	212.0
24	Oven	31.9	210.4

Thermocouple Readout Semi-Annual Calibration Data Sheet

Date: 5-4-2007
 Ambient Temperature: 70
 Technician: CPW

Thermocouple Number: T/C Readout
 Barometric Pressure: 30.04
 Reference: Mercury in glass
FISHER #9123454
 Other: OMEGA CL-300

Reference Point No. ^a	Source ^b	Reference Thermometer Temperature °F	Thermocouple Potentiometer Temperature °F	Difference (%) ^c
32	Ice Water	32.0	32.0	0
212	Boiling Water	212.0	212.0	0
250	Omega	250.0	249.9	.040
300	Omega	300.0	299.9	.033
400	Omega	400.0	399.8	.050
500	Omega	500.0	499.7	.060
600	Omega	600.0	599.7	.050
700	Omega	700.0	699.8	.029
800	Omega	800.0	799.8	.025
900	Omega	900.0	899.7	.033
1000	Omega	1000.0	999.8	.020
1200	Omega	1200.0	1199.8	.017
1400	Omega	1400.0	1399.7	.021
1600	Omega	1600.0	1599.6	.025
1800	Omega	1800.0	1799.6	.022
2000	Omega	2000.0	2000.0	0

^a Every 50°F for each reference point

^b Type of Calibration System Used

^c
$$\frac{(\text{reference temperature}) - (\text{thermocouple temperature})}{\text{reference temperature}} \times 100$$

TRACEABILITY DOCUMENTATION Semi-Annual

S02 INJECTION ROTAMETER, DRY GAS METER AND SLING PSYCHROMETER
THERMOMETERS IN LAB. CHECKED AGAINST FISHER SN 9123454 (NIST).

DATE: 5-4-2007

SO² INJECTION ROTAMETER
9123454

FISHER SN

NIST Traceable

Actual	°C = °F	°F
0.0	32.0	32.0
22.0	71.6	71.6
37.4	99.3	99.3
50.6	123.1	123.0

DRY GAS METER THERMOCOUPLES

Actual	°C = °F	5H in	5H out	KK
0.0	32.0	32.0	32.0	32.0
22.0	71.6	71.7	71.7	71.6
36.6	97.9	98.3	98.1	98.1
44.9	112.8	112.4	112.7	112.8

SLING PSYCHROMETER

Actual	°C = °F	Wet Bulb	Dry Bulb
0.0	32.0	32.0	32.0
21.9	71.4	71.4	71.4
36.0	96.8	96.8	96.8
44.4	111.9	112.0	112.0

Conversions =

$$^{\circ}\text{F} = (^{\circ}\text{C} \times 1.8) + 32$$

$$^{\circ}\text{C} = (^{\circ}\text{F} - 32) \div 1.8$$

VANEOMETER CALIBRATION

LoKee Testing Lab uses a Dwyer Model #480 Vaneometer to measure test chamber air velocity. The manufacturer's specifications for accuracy are $\pm 5.0\%$ to 100 FPM and $\pm 10\%$ from FPM to top of scale. LoKee Testing Lab insures that the instrument is level and clean prior to taking each reading. According to EPA personnel (Westlin, RTP) no further calibration of the instrument is necessary.

DRAFT GAUGE CALIBRATION

LoKee Testing Lab uses a Dwyer model 115-AV 0-0.25" inclined water manometer (readability resolution $\pm 0.001"$ of water) to measure the static pressure in the stack. Once leveled and zeroed as per the manufacturer's written operating instructions, the Dwyer manometer is a primary standard and requires no additional calibration.

The manometer is leveled and zeroed at the start of each test run, checked as necessary during the run to verify the settings have not changed and again at the end of each test run. The results of each check are recorded on Data Sheet #16 in each test run.

BAROMETER CALIBRATION

LoKee Testing Lab uses a Princo Model 469 NOVA Mercury Barometer to measure barometric pressure. When installed and maintained as per the manufacturer's written operating instruction, the Princo Model 469 Mercury Barometer is a primary standard and needs no further calibration.

MOISTURE METER CALIBRATION

The Delmhorst Model RC-1C, SN 16152 Moisture Meter is calibrated each time the meter is used by adjusting the zero and span calibration. The potentiometers of each calibration point (X = zero, Y = span) are adjusted until the meter is calibrated correctly. The meter is then checked against a calibration block (Delmhorst Model MCS-1, moisture content standard at 12.0% and 22.0%) in its normal operating range of 11-25%.

LoKee Testing Lab also has a second moisture meter, Delmhorst Model G-30, SN 2477 to use as a backup.

POST TEST METER BOX AUDIT DATA SHEET # 32

UNIT: Montage DATE: 10-19-07

TEST DATA

RUN #	1	2	3	4	5	6	7	8	9	10
AVG. ΔH	.150	.140	.150	.150						
MAX VAC	2.0	2.0	2.0	2.0						
Avg. Test Series ΔH	.148				in H ₂ O		Test Series Max Vac: 2.0 in Hg			
Audit Dry Gas Meter	K2				Correction (Y) Factor		1.019 (mcf)			
Test Dry Gas Meter	H				Correction (Y) Factor		.993 (mcf)			

AUDIT DATA

		Audit #1	Audit #2	Audit #3
BP		29.74	29.74	29.74
VAC		2.0	2.0	2.0
AUDIT METER :				
VOL.	Final	826.966	831.850	842.258
(Vw)	Initial	822.000	826.966	831.850
	Vol.	4.966	4.884	10.408
TEMP (°F)	Initial	84	90	94
(Tw)	Mid	87	92	97
	Final	90	94	100
(°F / °A)	Avg.	547	552	551
ΔH	Initial	.148	.148	.148
	Mid	.148	.148	.148
	Final	.148	.148	.148
	Avg.	.148	.148	.148

DRY GAS METER :

		Audit #1	Audit #2	Audit #3
VOL.	Final	381.800	387.000	398.200
(Vd)	Initial	376.500	381.800	387.000
	Vol.	5.300	5.200	11.200
TEMP (°F)	Initial	80	88	91
(Tm)	Mid	84	89	94
	Final	88	91	97
(°F / °A)	Avg.	544	549	551

$$Y = \frac{(V_w)(mcf)(BP)(T_m)}{(V_d) \left(BP + \frac{DH}{13.6} \right) (T_w)}$$

$$Y \text{ Factor } \% \text{ Diff.} = \frac{\text{Act} - \text{Exp}}{\text{Exp}} \times 100$$

NOTE : mcf = meter correction (Y) factor for Dry Gas Meter used as a transfer standard

RUN 1

$$Y = \frac{(4966)(1.019)(29.74)(544)}{(5,300) \left(29.74 + \frac{.148}{13.6} \right) (547)} = \frac{81869.24}{86250.78} = .949$$

$$\Delta \% = \frac{(.949 - .997)}{.997} \times 100 = -4.814 \%$$

RUN 2

$$Y = \frac{(4,884)(1.019)(29.74)(549)}{(5,200) \left(29.74 + \frac{.148}{13.6} \right) (552)} = \frac{81257.44}{85396.93} = .952$$

$$\Delta \% = \frac{(.952 - .997)}{.997} \times 100 = -4.514 \%$$

RUN 3

$$Y = \frac{(10,408)(1.019)(29.74)(554)}{(11,200) \left(29.74 + \frac{.148}{13.6} \right) (557)} = \frac{174739.25}{182283.66} = .959$$

$$\Delta \% = \frac{(.959 - .997)}{.997} \times 100 = -3.811 \%$$

NOTE : The Y factor % difference must be $< \pm 5.0 \%$ to be acceptable

INTERPOLATED Y FACTOR

$$\frac{.1}{(A)} \text{ inch H}_2\text{O } \Delta H = \frac{1.002}{(C)}$$

Calculated calibration Y factor from calibrations

$$\frac{.2}{(B)} \text{ inch H}_2\text{O } \Delta H = \frac{.992}{(D)}$$

Calculated calibration Y factor from calibrations

$$\frac{.2}{(B)} - \frac{.1}{(A)} = \frac{.1}{(D)} \times 100 = \frac{10}{(E)}$$

$$\frac{.992}{(D)} - \frac{1.002}{(C)} = \frac{-.010}{(E)} + \frac{10}{(F)}$$

$$\frac{.148}{\text{Avg } \Delta H} - \frac{.1}{(A)} = \frac{.048}{(G)} \times 100 = \frac{4.8}{(G)}$$

$$\left[\frac{-.0010}{(F)} \times \frac{4.8}{(G)} \right] + \frac{1.002}{(C)} = \frac{.997}{\text{Interpolated Y factor}}$$

Volume Metering System Leak Check : 0.00 inch H₂O in one minute

DRY GAS METER CALIBRATION

DATE: 5-11-2007 DRY GAS METER: H BOX: 5

BAROMETRIC PRESSURE <u>30.00</u> in. Hg.			Wet Test Meter Correction Factor Y= <u>1.003</u>					
Orifice Manometer Setting, ΔH , in. H ₂ O			.1	.2	.3	.5	.75	1.0
Gas Volume Wet Test Meter Vw ft ³	Final	<u>398.009</u>	<u>463.087</u>	<u>408.220</u>	<u>413.242</u>	<u>418.249</u>	<u>423.262</u>	
	Initial	<u>392.900</u>	<u>398.009</u>	<u>403.087</u>	<u>408.220</u>	<u>413.242</u>	<u>418.249</u>	
	Vw ft ³	<u>5.109</u>	<u>5.078</u>	<u>5.055</u>	<u>5.022</u>	<u>5.007</u>	<u>5.013</u>	
Gas Volume Dry Test Meter Vd ft ³	Final	<u>519.000</u>	<u>524.000</u>	<u>529.000</u>	<u>534.000</u>	<u>539.000</u>	<u>544.000</u>	
	Initial	<u>514.000</u>	<u>519.000</u>	<u>524.000</u>	<u>529.000</u>	<u>534.000</u>	<u>539.000</u>	
	Vd ft ³	<u>5.000</u>	<u>5.000</u>	<u>5.000</u>	<u>5.000</u>	<u>5.000</u>	<u>5.000</u>	
Wet Test Meter Temperature tw	Initial	<u>80</u>	<u>82</u>	<u>84</u>	<u>86</u>	<u>86</u>	<u>86</u>	
	Middle	<u>81</u>	<u>83</u>	<u>85</u>	<u>86</u>	<u>86</u>	<u>86</u>	
	Final	<u>82</u>	<u>84</u>	<u>86</u>	<u>86</u>	<u>86</u>	<u>86</u>	
	Average	<u>541</u>	<u>543</u>	<u>545</u>	<u>546</u>	<u>546</u>	<u>546</u>	
Dry Test Meter Temperature tm	Initial	<u>67</u>	<u>71</u>	<u>73</u>	<u>75</u>	<u>76</u>	<u>80</u>	
	Middle	<u>69</u>	<u>72</u>	<u>74</u>	<u>76</u>	<u>78</u>	<u>81</u>	
	Final	<u>71</u>	<u>73</u>	<u>75</u>	<u>77</u>	<u>80</u>	<u>81</u>	
	Average	<u>69</u> <u>(529)</u>	<u>(532)</u>	<u>534</u>	<u>536</u>	<u>538</u>	<u>541</u>	
Y = $\frac{(W_{mcf})(V_w)(P_b)(t_m)}{V_d \left(P_b + \frac{\Delta H}{13.6} \right) (t_w)}$		<u>81323.1</u>	<u>80829.6</u>	<u>81224.0</u>	<u>80996.0</u>	<u>81055.4</u>	<u>81605.1</u>	
		<u>81169.9</u>	<u>81489.9</u>	<u>81810.1</u>	<u>82000.4</u>	<u>82050.6</u>	<u>82100.7</u>	
		<u>(1.062)</u>	<u>(.992)</u>	<u>(.993)</u>	<u>(.988)</u>	<u>(.988)</u>	<u>(.994)</u>	

Average Y= .993

Altan Dan
212 N. Woodbrook Lane
Palatine, IL 60067

METER BOX CALIBRATION

Date : 8/24/2007
 Calibrated By : JG
 Dry Gas Meterbox ID : Lokee

Barometric Pressure, Pb = 27.42 in. Hg
 Vacuum = 0 in. Hg

Orifice Manometer
 Setting, Delta H
 in. H2O

0.1	0.2	0.3	0.5	0.75	1
-----	-----	-----	-----	------	---

Gas Volume Wet Test Meter
 Vw, cu. ft.

1	1	1	2.003	3.002	4.003
---	---	---	-------	-------	-------

Gas Volume Dry Gas Meter

M Final	387.481	397.924	408.43	418.834	429.056	439.171
M Initial	377.481	387.914	398.422	408.879	419.155	429.321
Vd, cu. ft.	0.966	0.958	0.952	1.909	2.881	3.945

Wet Test Meter

tw	Deg F	87	84	82	82	82	84
tw	Deg A	547	544	542	542	542	544

Dry Gas Meter

Outlet, tmo	1	85	74	68	68	80	80
2)		85	74	68	76	80	80
3)		89	74	68	76	80	80

Dry Gas Meter

Inlet, tmi	1	87	83	80	81	82	85
2)		88	83	80	82	82	86
3)		88	85	83	82	82	86

Mean tm, Deg F

Mean tm, Deg F	87	78.8	74.5	77.5	81	82.8
Mean tm, Deg A	547	538.8	534.5	537.5	541	542.8

Time, Minutes

Time, Minutes	5.85	3.74	2.96	4.6	5.82	6.78
---------------	------	------	------	-----	------	------

Results :

Y =	0.997	0.997	1.035	1.039	1.038	1.01
	0.022	0.022	-0.016	-0.02	-0.019	0.009
Delta H @	1.8	1.78	1.67	1.67	1.77	1.81
	-0.05	-0.03	0.08	0.08	-0.02	-0.06

Averages :

Y =	1.019
Delta H =	1.75

K2

WET TEST METER CALIBRATION LOG

Wet Test Meter Serial Number AA 455 Date 10-7-2006

Range of Wet Test Meter Flow Rate 0 - 0.25

Volume of Test Flask V_s 37.850

Satisfactory Leak Check? Yes

Ambient Temperature of Equilibrate Liquid in Wet Test Meter and Reservoir 70

TEST #	MANOMETER READING, a mm H ₂ O	FINAL VOLUME (V _f), l	INITIAL VOLUME (V _i), l	TOTAL VOLUME (V _m), b l	FLASK VOLUME (V _s), l	PERCENT ERROR, c %
1	∅	3.0	∅ ^{All} reset	3.0	3.001	- .033
2	∅	3.0	∅	3.0	3.003	- .100
3	∅	3.0	∅	3.0	3.001	- .033

a - Must be less than 10 mm H₂O (0.4 ' H₂O)

Calculations:

b - $V_m - V_f - V_i$

c - % error = $\frac{100 (V_m - V_s)}{V_s} = \underline{- .055} \quad (\pm 1 \%)$

SO₂ ROTAMETER CALIBRATION

Last Cal. : 11-6-2006 By : CP Date : 5-9-2007 By : CP

Manufacturer : SKC-WEST

SKC ACCUFLOW Digital Flow Calibrator: Model 712

SN : 311325

Barometric Pressure : 30.10 " Hg Temperature : 70

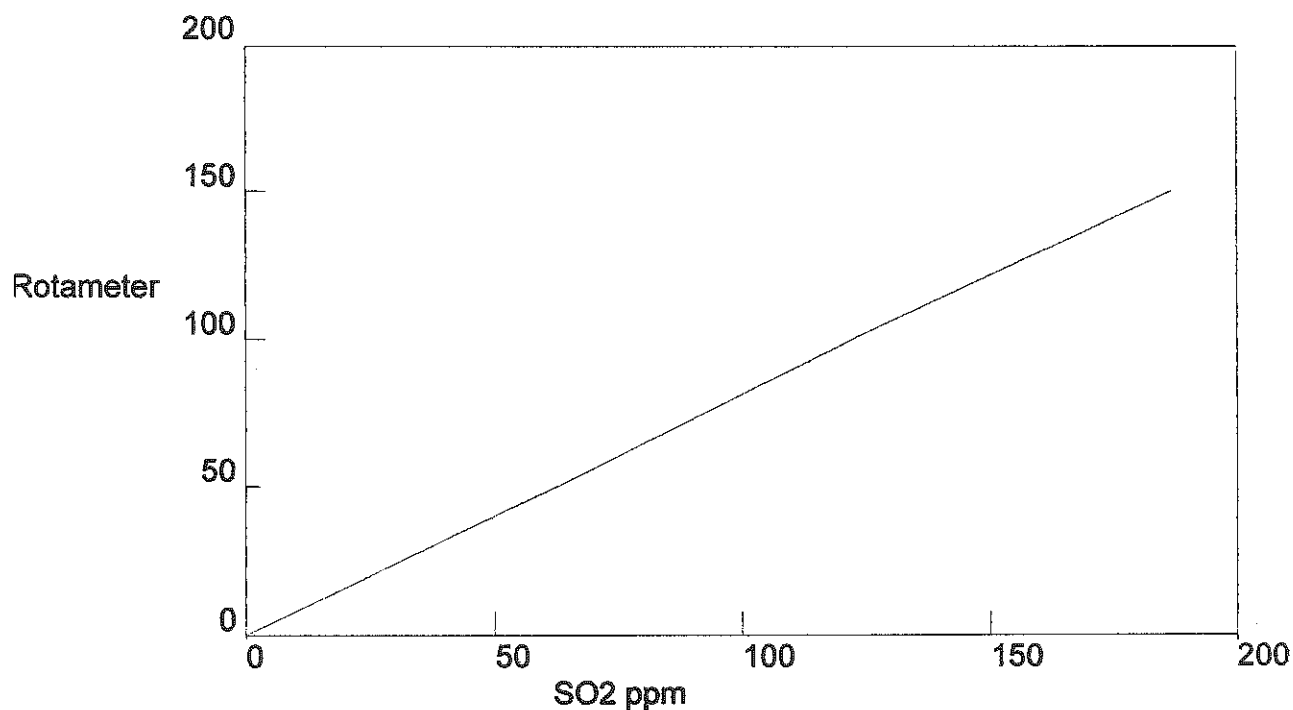
RUN #	50 CC/MINUTE	100 CC/MINUTE	150 CC/MINUTE
	DIGITAL VOLUME	DIGITAL VOLUME	DIGITAL VOLUME
1	54.3	118.9	170.7
2	55.6	119.6	169.9
3	55.2	119.1	171.0
4	54.4	120.8	171.3
5	54.6	120.1	169.4
6	55.0	120.3	170.5
7	55.1	118.8	170.1
8	57.2	119.3	170.8
9	55.9	119.8	170.3
10	54.8	120.3	169.4
AVERAGE	55.21 cc/min	119.70 cc/min	170.34 cc/min

SETTING	cc/min
0	0.0
50	55.2
100	119.7
150	170.3

Rotometer setting for 100 cc/minute based on regression with this data.

100 CC / MINUTE = 88.08

SO2 Rotameter
05/09/07



Regression Output:

Constant	-0.01
Std Err of Y Est	4.0126051388
R Squared	0.9980585369
No. of Observations	4
Degrees of Freedom	2
X Coefficient(s)	1.1508
Std Err of Coef.	0.0358898314

TRACER GAS TRAIN RESPONSE TIME

DATE: 5-9-2007

Elapsed Time	SO ₂ Conc. (v.)	SO ₂ Conc. (v.)	SO ₂ Conc. (v.)
00 sec	.502	.500	.500
15	.362	.370	.358
30	.260	.245	.239
45	.115	.110	.102
60	.060	.063	.057
75	.045	.042	.038
90	.031	.029	.025
105	.011	.009	.008
120	.007	.006	.004
135	.003	.002	.001
150	.001	.001	.000
165			
180			
Initial Response	10	9	8
95 % Response	27	26	25
Flow Rate	1.5	1.5	1.5

CEM GAS TRAIN RESPONSE TIME

Elapsed Time	CO ₂ Conc. (v.)	CO ₂ Conc. (v.)	CO ₂ Conc. (v.)	O ₂ Conc. (v.)	O ₂ Conc. (v.)	O ₂ Conc. (v.)	CO Conc. (v.)	CO Conc. (v.)	CO Conc. (v.)
00 sec	.500	.501	.501	.002	.001	.002	.500	.500	.500
15	.490	.482	.484	.387	.402	.399	.207	.211	.217
30	.381	.363	.366	.701	.744	.738	.051	.049	.052
45	.151	.122	.126	.787	.809	.785	.015	.011	.012
60	.089	.092	.098	.817	.822	.820	.008	.003	.003
75	.057	.059	.061	.821	.822	.823	.001	.000	.000
90	.041	.042	.046	.827	.827	.830	.000		
105	.023	.024	.024	.829	.829				
120	.011	.012	.010						
135	.007	.008	.006						
150	.004	.003	.002						
165	.001	.000	.001						
180	.000		.000						
Initial Response	14	13	13	9	9	9	5	5	5
95 % Response	100	100	100	45	42	46	40	40	40
Flow Rate	1.5	1.5	1.5	15	1.5	1.5	1.5	1.5	1.5

ORSAT ANALYSIS DATA SHEET

DATE: 5-9-2009

Gas	1	2	3	AVE	CONC	TANK ID
CO ₂	0	0	0	0	N ₂	168TAC-3-A
O ₂	0	0	0	0	N ₂	
CO	0	0	0	0	N ₂	
CO ₂					12.5	CL-41627 VALUES VALID UNTIL
O ₂					12.5	
CO					4.99	10-2010
CO ₂					21.1	CA06641 VALUES VALID UNTIL
O ₂					20.9	
CO					8.63	4-2012
CO ₂					6.22	CL-12731 VALUES VALID UNTIL
O ₂					6.25	
CO					1.98	3-4 2006
CO ₂						
O ₂						
CO						

CO₂ ANALYZER MULTIPOINT CALIBRATION REPORT FORM

Date: 10-4-07
 Analyzer: Make: HORIBA Model: PIR 2000 SN: 407069
 Calibration by: [Signature]
 Cal Gas Flow: 1.5 SCFH Measured by: Rotameter
 BP: 29.90 Instrument ID: PRINCO
 Temp: 65 Instrument ID: TR

Cylinders:

1. # 168TAC 3-A Concentration: 00.00 % CO₂ Cyl. Press.: 710 PSI
 Certified by: AIR LIQUIDE Date: 04-19-04
2. # CC-41627 Concentration: 12.50 % CO₂ Cyl. Press.: 415 PSI
 Certified by: AIR LIQUIDE Date: 11-1-05
3. # CA06641 Concentration: 21.1 % CO₂ Cyl. Press.: 1600 PSI
 Certified by: AIR LIQUIDE Date: 1-5-2007
4. # CC-12731 Concentration: 6.22 % CO₂ Cyl. Press.: 1350 PSI
 Certified by: AIR LIQUIDE Date: 03-13-03

Analyzer: Calibrated Range: 0-25.0 %
 Flow: 1.5 SCFH

Output: 0-1.0 V.
 Measured by: Rotameter

Calibration Results

Point #	CYL #	% CO ₂	EXPECTED		ACTUAL		ADJ.	
			METER	DVM	METER	DVM	METER	DVM
1	1	0.00	00.0	.000	0.00	.004	00.0	.000
2	2	12.50	60.0	.500	51.6	.516	50.0	.500
3	3	21.1	84.4	.844	84.8	.848		
4	4	6.22	24.9	.249	24.6	.246		
5	1	0.00	00.0	.000	00.0	.000		

.5 = 12.478

CO₂ Linear Regression Results:

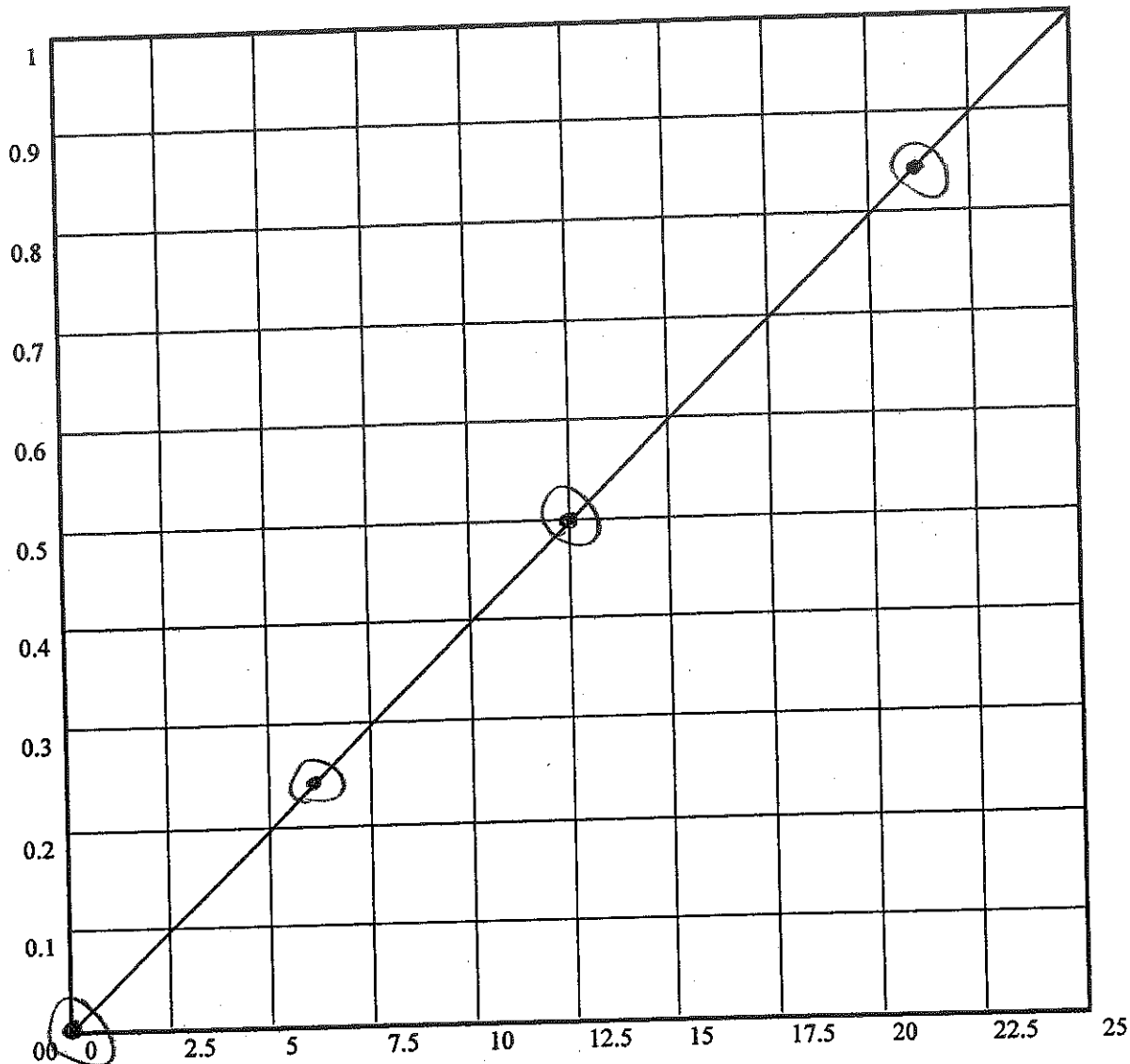
$$Y = MX + B$$

$$\text{Slope (M)} = \underline{-0.0019479}$$

$$\text{Y Intercept (B)} = \underline{0.0402258}$$

$$\text{Correlation Coefficient (r)} = \underline{0.9999860}$$

$$r^2 = \underline{0.9999720}$$

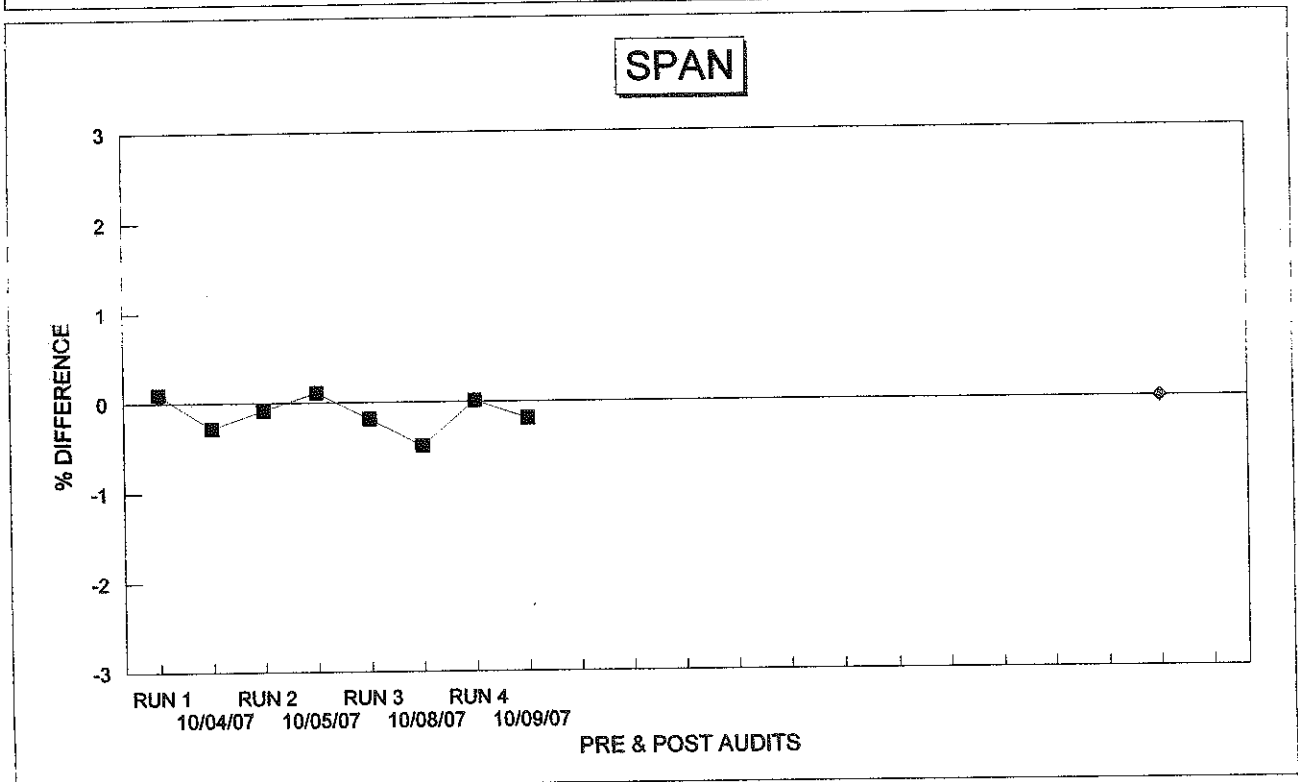
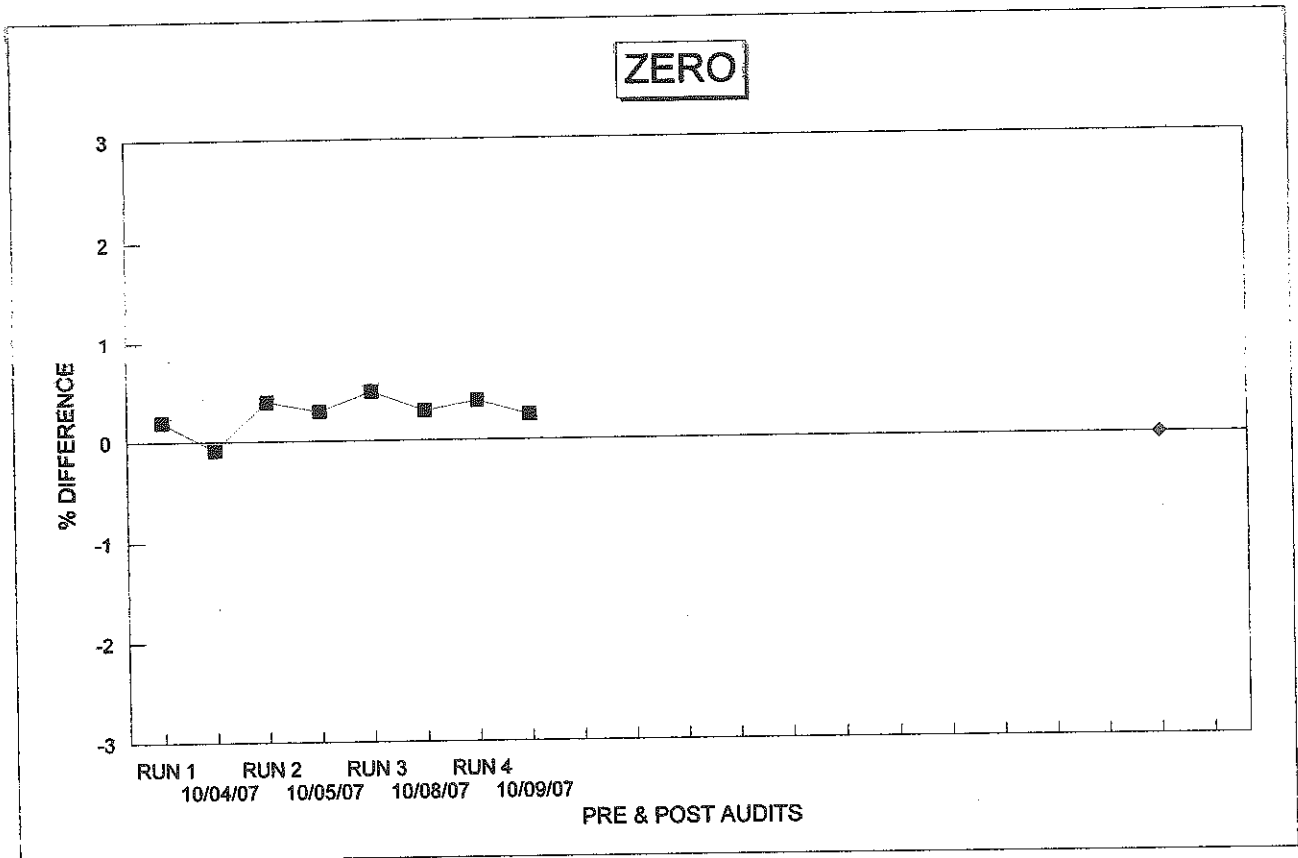


EPA Span Value = $\pm 2.0\%$ of $25\% \text{ CO}_2 = \pm .5\%$

Cal Volts = Cal Volt Conc - Std Conc = $\pm$ Conc Diff = $\pm \Delta\%$

$$\text{HIGH VOLTS} \quad \underline{.848} = \underline{21.2} - \underline{21.1} = \underline{.100} = \underline{.400}$$

$$\text{LOW VOLTS} \quad \underline{.246} = \underline{6.15} - \underline{6.22} = \underline{-.070} = \underline{-.280}$$



O₂ ANALYZER MULTIPOINT CALIBRATION REPORT FORM

Date: 10-4-07
 Analyzer: Make: TELEDYNE Model: 320A SN: 37400
 Calibration by: [Signature]
 Cal Gas Flow: 1.5 SCFH Measured by: Rotameter
 BP: 29.90 Instrument ID: PRINCO
 Temp: 65 Instrument ID: TR

Cylinders:

1. # 168TAC 3-A Concentration: 00.00 % O₂ Cyl. Press.: 710 PSI
 Certified by: AIR LIQUIDE Date: 04-19-04
2. # CC-41627 Concentration: 12.50 % O₂ Cyl. Press.: 415 PSI
 Certified by: AIR LIQUIDE Date: 11-1-05
3. # CA06641 Concentration: 20.9 % O₂ Cyl. Press.: 1600 PSI
 Certified by: AIR LIQUIDE Date: 1-5-2007
4. # CC-12731 Concentration: 6.25 % O₂ Cyl. Press.: 1350 PSI
 Certified by: AIR LIQUIDE Date: 03-13-03

Analyzer: Calibrated Range: 0-25.0 %
 Flow: 1.5 SCFH

Output: 0-1.0 V.
 Measured by: Rotameter

Calibration Results

Point #	CYL #	% O ₂	EXPECTED		ACTUAL		ADJ.	
			METER	DVM	METER	DVM	METER	DVM
1	1	0.00	00.0	.000	00.1	.000	00.0	.000
2	2	12.50	12.50	.500	12.3	.494	12.5	.500
3	3	20.9	20.9	.836	21.0	.839		
4	4	6.25	6.25	.250	6.3	.251		
5	1	0.00	00.0	.000	00.0	.000		

$.5 = 12.467$

O₂ Linear Regression Results:

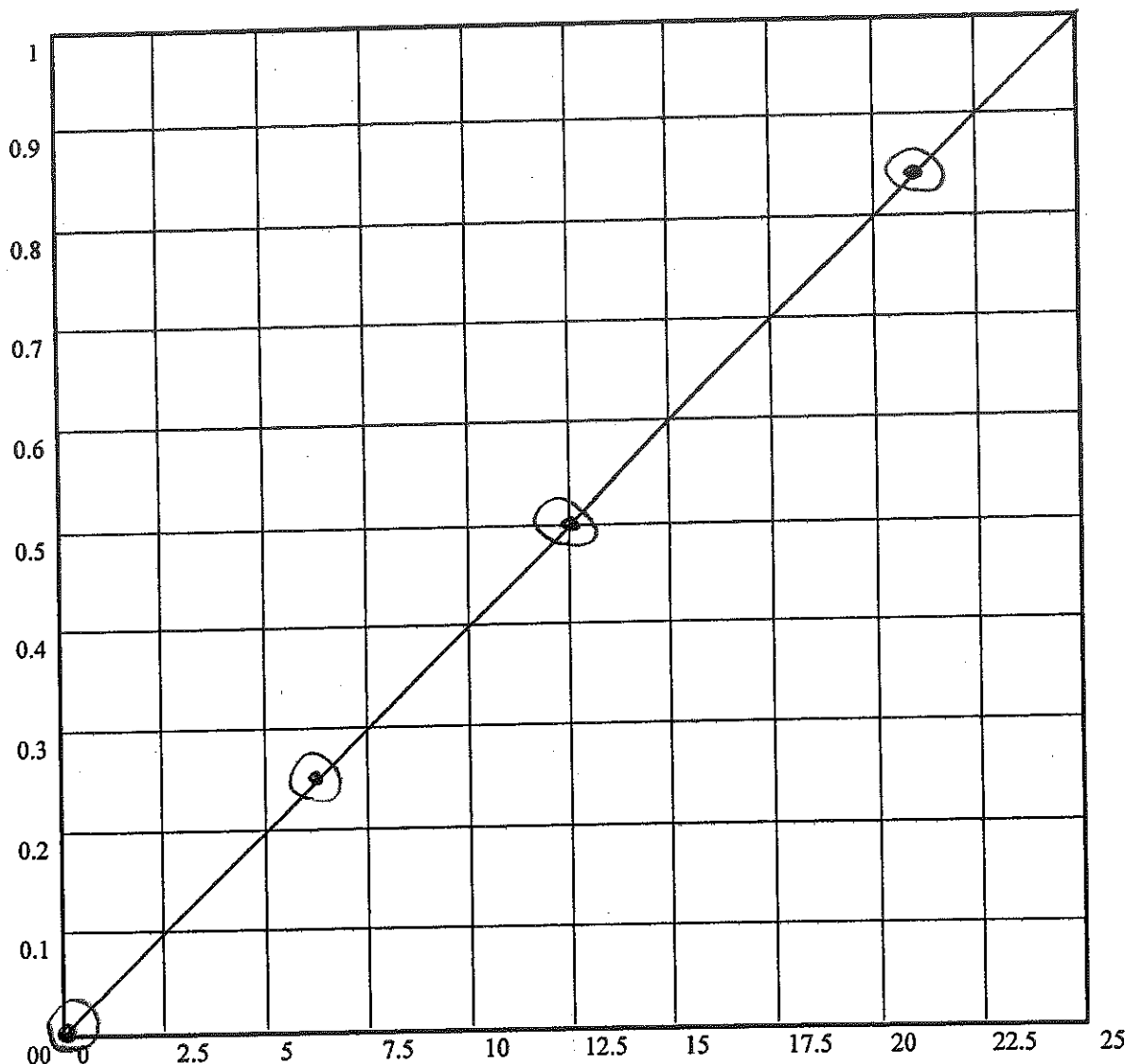
$$Y = MX + B$$

$$\text{Slope (M)} = \underline{-0.0002147}$$

$$\text{Y Intercept (B)} = \underline{0.0401225}$$

$$\text{Correlation Coefficient (r)} = \underline{0.9999969}$$

$$r^2 = \underline{0.9999937}$$

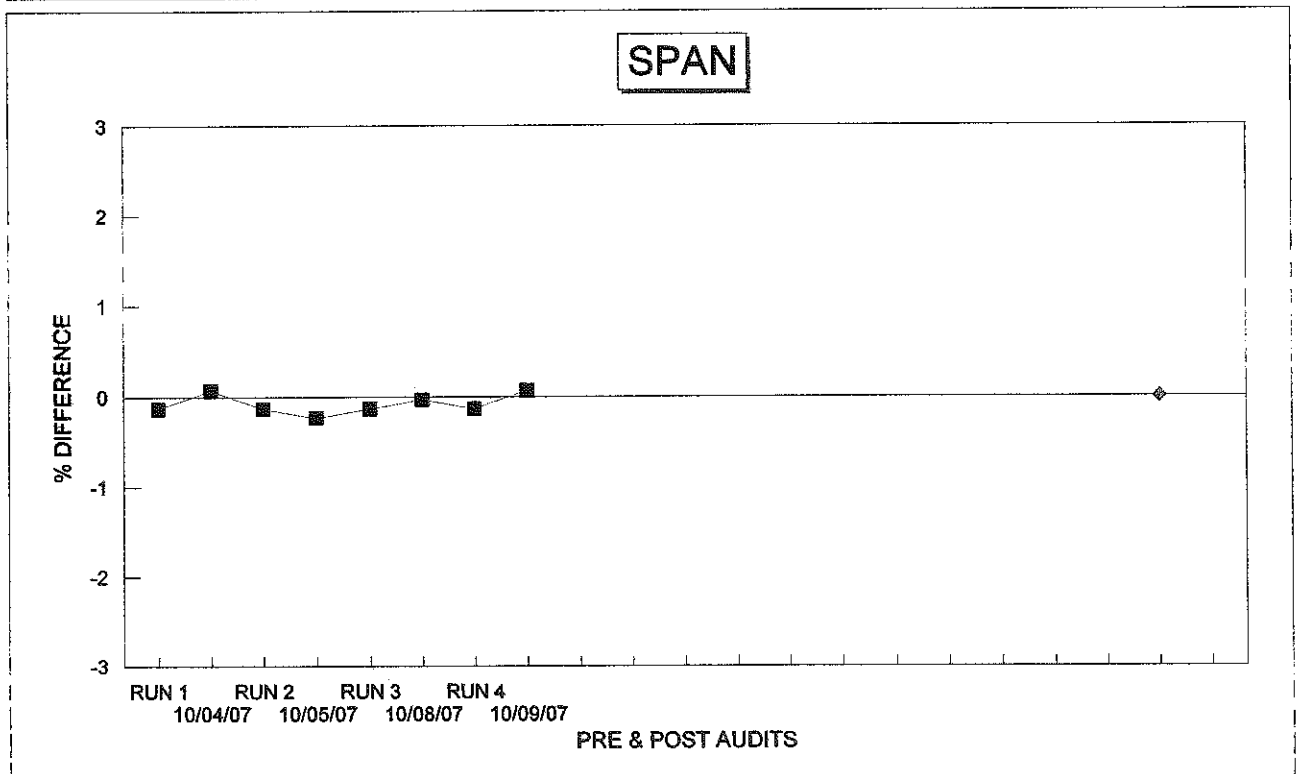
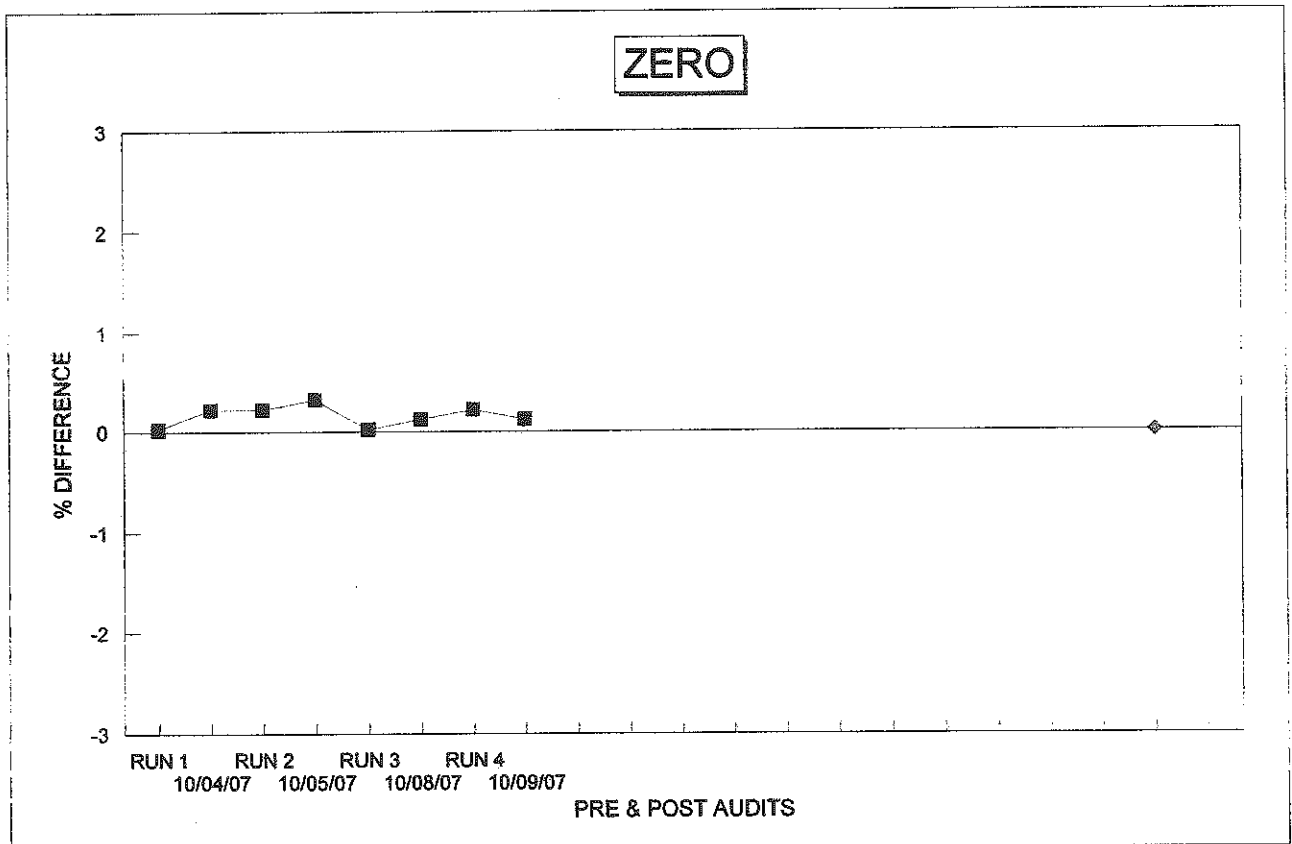


EPA Span Value = $\pm 2.0\%$ of $25\% \text{ O}_2 = \pm .5\%$

Cal Volts = Cal Volt Conc - Std Conc = $\pm$ Conc Diff = $\pm \Delta\%$

$$\text{HIGH VOLTS} \quad \underline{.839} = \underline{20.975} - \underline{20.9} = \underline{.075} = \underline{.300}$$

$$\text{LOW VOLTS} \quad \underline{.251} = \underline{6.275} - \underline{6.25} = \underline{.025} = \underline{.100}$$



CO ANALYZER MULTIPOINT CALIBRATION REPORT FORM

Date: 10-4-07

Analyzer: Make: HORIBA Model: PIR 2000 SN: 408005

Calibration by: Op 12-10-07

Cal Gas Flow: 1.5 SCFH

Measured by: Rotameter

BP: 29.96

Instrument ID: PRINCO

Temp: 65

Instrument ID: TR

Cylinders:

1. # 168TAC 3A Concentration: 00.00 % CO Cyl. Press.: 710 PSI

Certified by: AIR LIQUIDE Date: 04-19-04

2. # CC-41627 Concentration: 4.99 % CO Cyl. Press.: 415 PSI

Certified by: AIR LIQUIDE Date: 11-1-05

3. # CA06641 Concentration: 8.63 % CO Cyl. Press.: 1610 PSI

Certified by: AIR LIQUIDE Date: 1-5-2007

4. # CC-12731 Concentration: 1.98 % CO Cyl. Press.: 1350 PSI

Certified by: AIR LIQUIDE Date: 03-13-03

Analyzer: Calibrated Range: 0-10.0 %
Flow: 1.5 SCFH

Output: 0-1.0 V.
Measured by: Rotameter

Calibration Results

Point #	CYL. #	% CO	EXPECTED		ACTUAL		ADJ.	
			METER	DVM	METER	DVM	METER	DVM
1	1	0.00	00.0	.000	00.0	.000	00.0	.000
2	2	4.99	49.9	.499	49.0	.490	49.9	.499
3	3	8.63	86.3	.863	86.3	.863		
4	4	1.98	19.8	.198	20.1	.201		
5	1	0.00	00.0	.000	00.0	.000		

.5 = 4.994

CO Linear Regression Results:

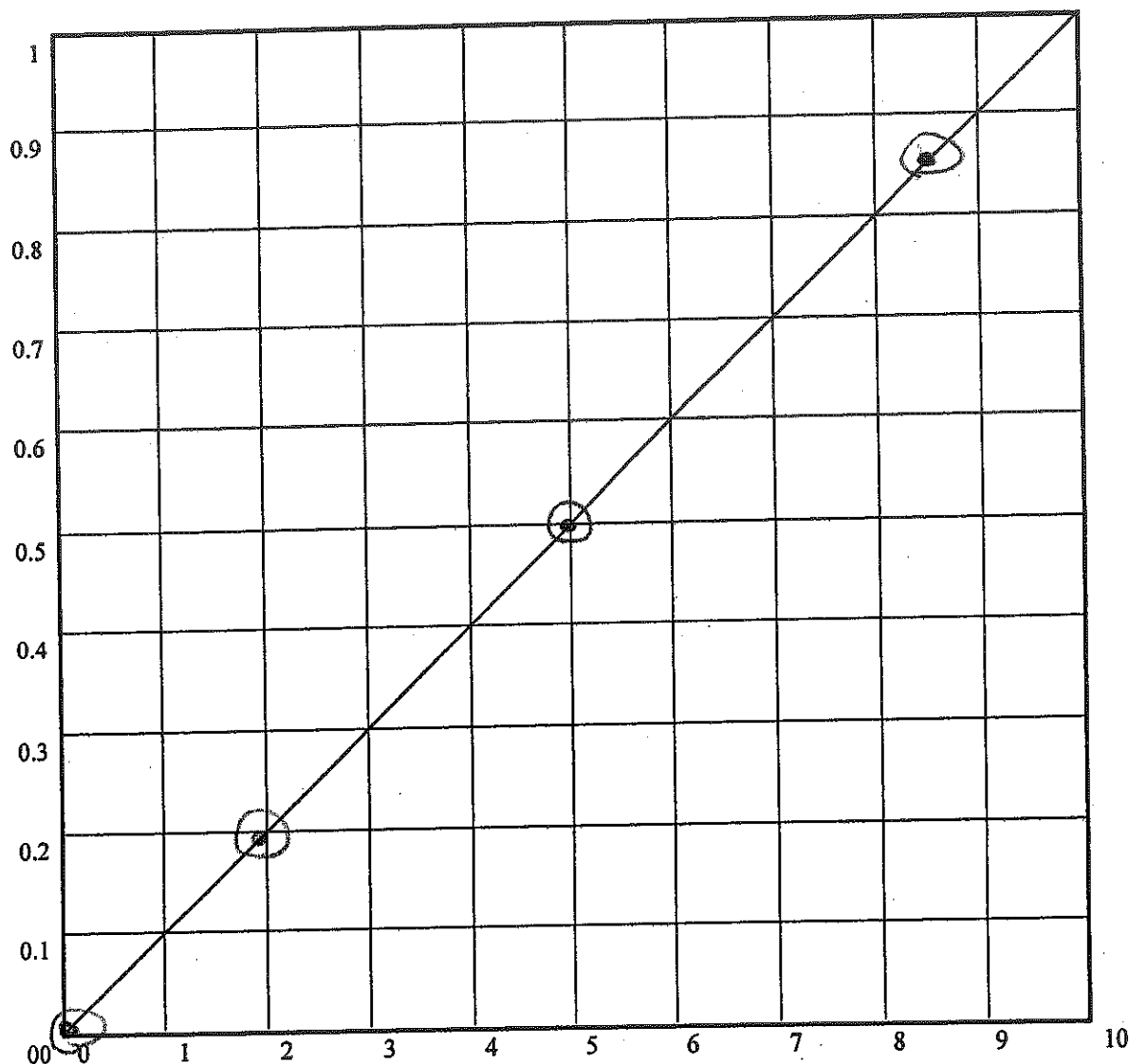
$$Y = MX + B$$

$$\text{Slope (M)} = \underline{.0012791}$$

$$\text{Y Intercept (B)} = \underline{.0998643}$$

$$\text{Correlation Coefficient (r)} = \underline{.9999930}$$

$$r^2 = \underline{.9999859}$$



$$\text{EPA Span Value} = \pm 2.0\% \text{ of } 10\% \text{ CO} = \pm .2\%$$

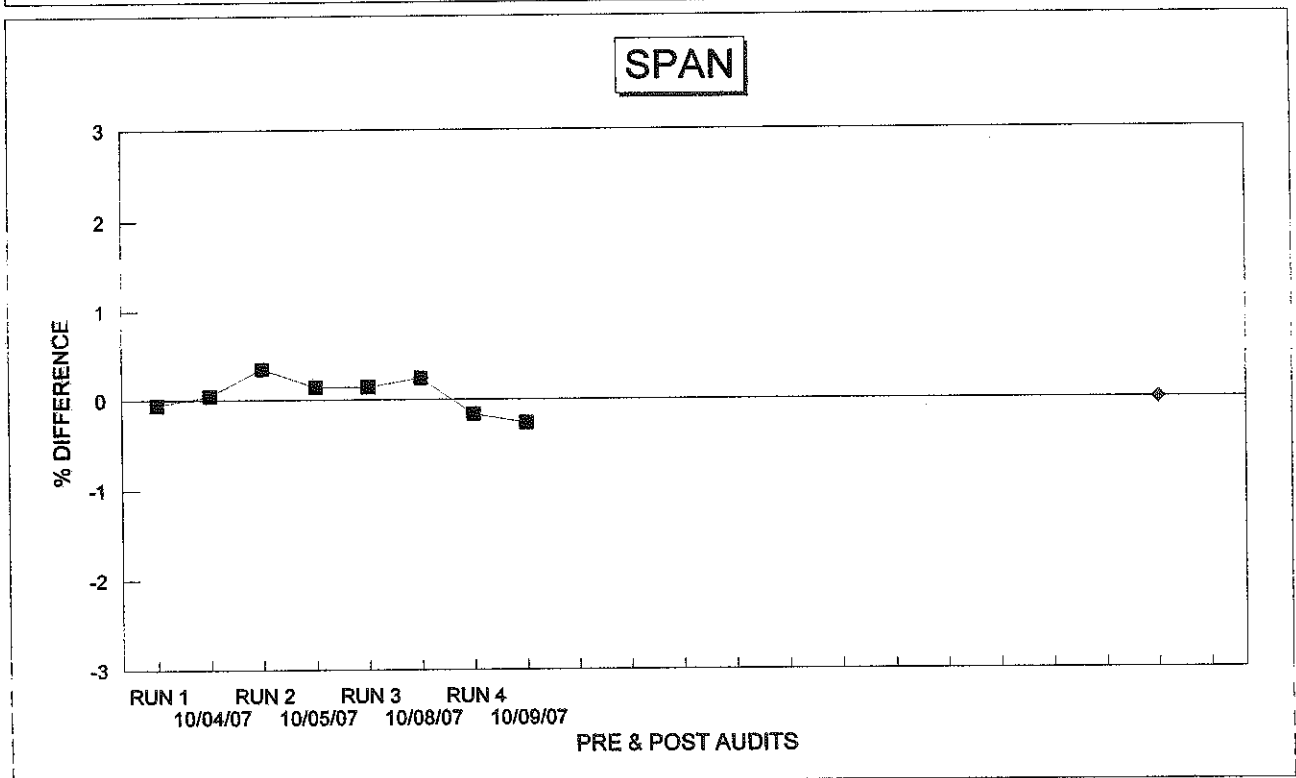
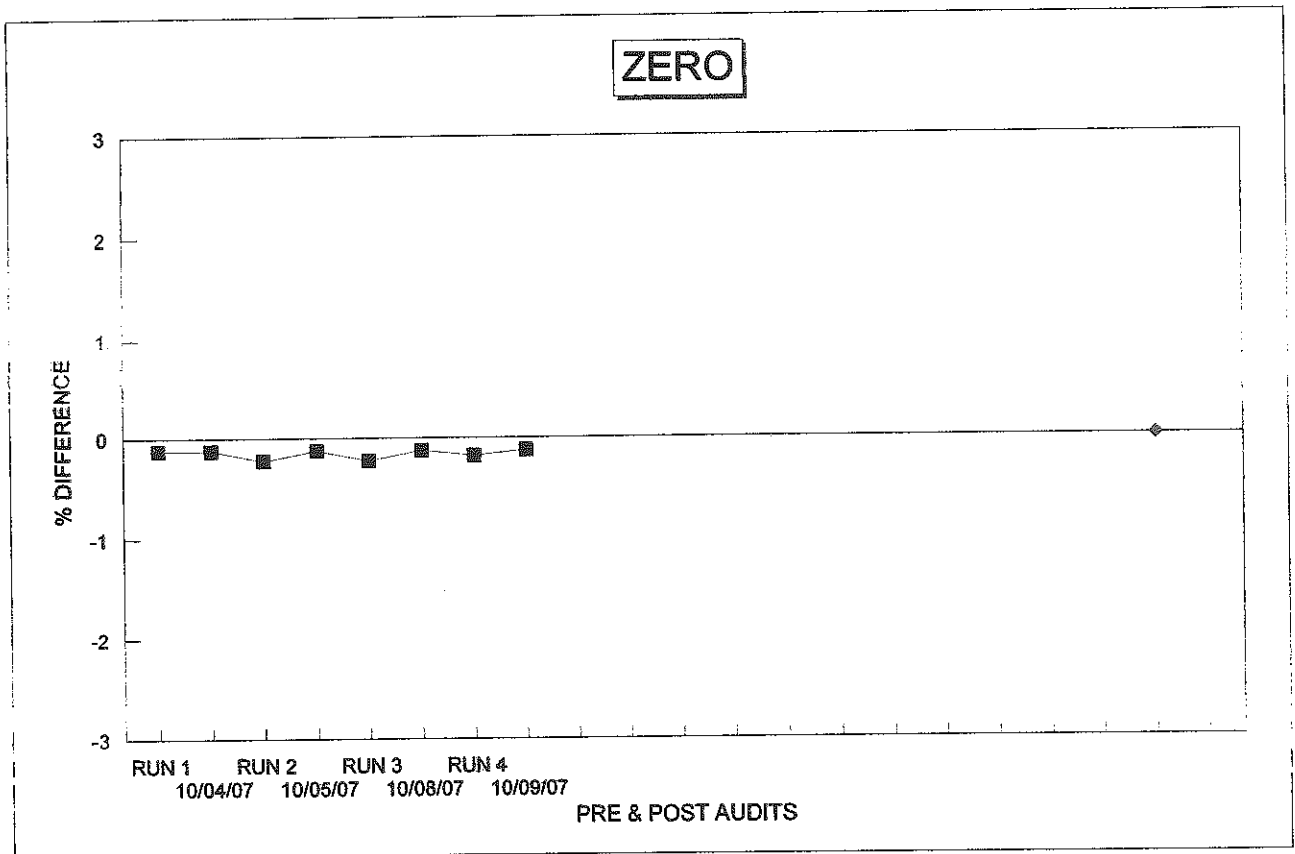
$$\text{Cal Volts} = \text{Cal Volt Conc} - \text{Std Conc} = \pm \text{Conc Diff} = \pm \Delta\%$$

HIGH
VOLTS

$$\underline{.863} = \underline{8.63} - \underline{8.63} = \underline{0} = \underline{0}$$

LOW
VOLTS

$$\underline{.201} = \underline{2.01} - \underline{1.98} = \underline{.030} = \underline{.300}$$



SO₂ ANALYZER MULTIPOINT CALIBRATION REPORT FORM

Date: 10-4-07
 Analyzer: Make: HORIBA Model: PIR 2000 SN: 403019
 Calibration by: Cp Warkentin
 Cal Gas Flow: 1.5 SCFH Measured by: Rotameter
 BP: 29.90 Instrument ID: PRINCO
 Temp: 65 Instrument ID: TR

Cylinders:

1. # 168TAC 3A Concentration: 00.00 % SO₂ Cyl. Press.: 710 PSI
 Certified by: AIR LIQUIDE Date: 04-19-04
2. # CC82089 Concentration: 1250 % SO₂ Cyl. Press.: 1910 PSI
 Certified by: AIR LIQUIDE Date: 1-3-2007
3. # ALMO 49127 Concentration: 1770 % SO₂ Cyl. Press.: 800 PSI
 Certified by: SCOTT SPECIALTY GASES Date: 05-15-97
4. # ALMO 52285 Concentration: 506 % SO₂ Cyl. Press.: 700 PSI
 Certified by: SCOTT SPECIALTY GASES Date: 05-15-97

Analyzer: Calibrated Range: 0-2500 PPM
 Flow: 1.5 SCFH

Output: 0-1.0 V.
 Measured by: Rotameter

Calibration Results

Point #	CYL. #	PPM SO ₂	EXPECTED		ACTUAL		ADJ.	
			METER	DVM	METER	DVM	METER	DVM
1	1	0.00	00.0	.000	06.0	.060	00.0	.000
2	2	1250	50.0	.500	43.8	.438	50.0	.500
3	3	1770	70.8	.708	71.3	.713		
4	4	506	20.2	.202	20.3	.203		
5	1	0.00	00.0	.000	00.0	.000		

.5 = 1244.475

SO₂ Linear Regression Results:

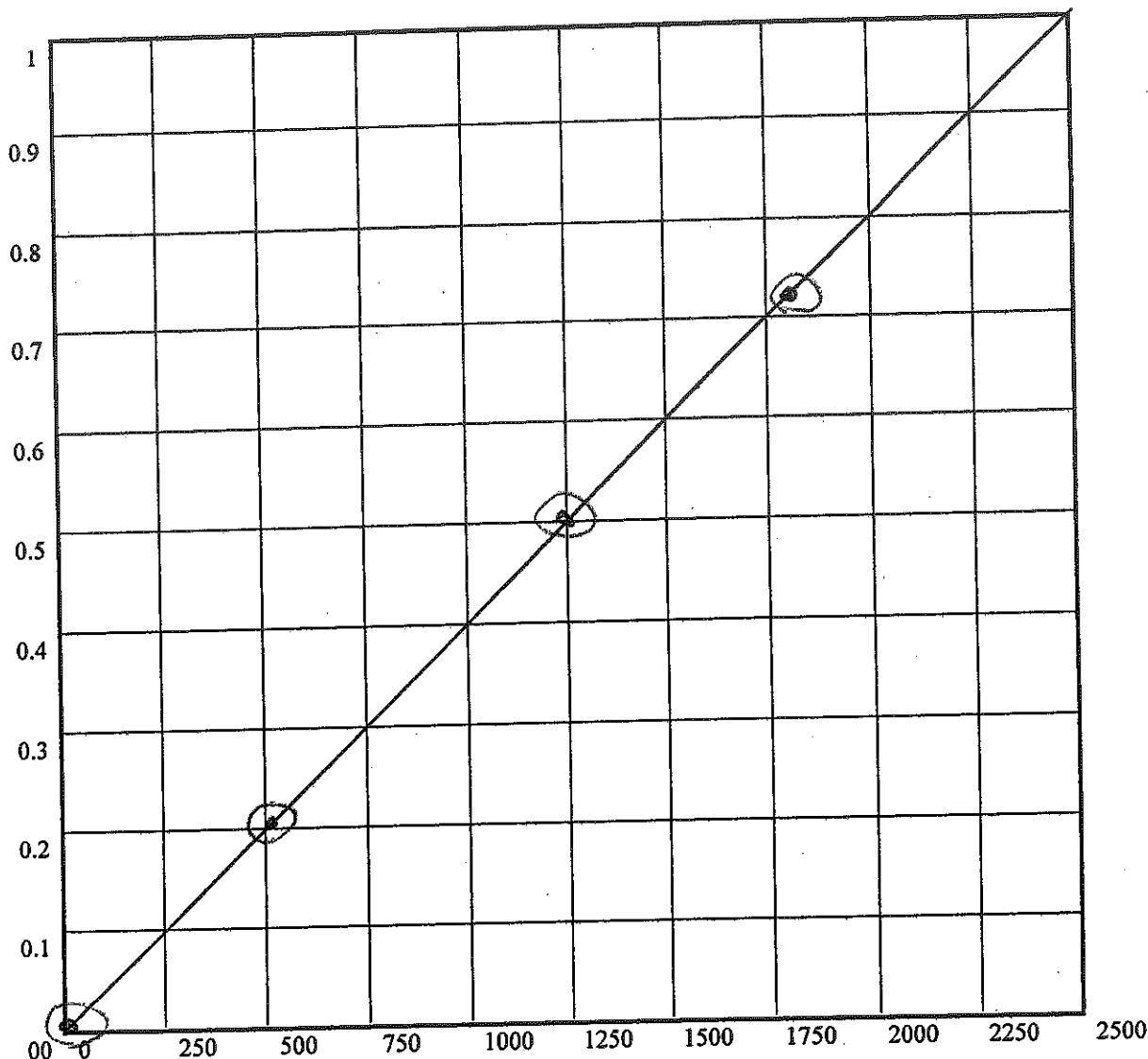
$$Y = MX + B$$

$$\text{Slope (M)} = \underline{-0.0006168}$$

$$\text{Y Intercept (B)} = \underline{0.0004023}$$

$$\text{Correlation Coefficient (r)} = \underline{0.99999868}$$

$$r^2 = \underline{0.99999736}$$



EPA Span Value = $\pm 2.0\%$ of 2500 PPM SO₂ = ± 50 PPM

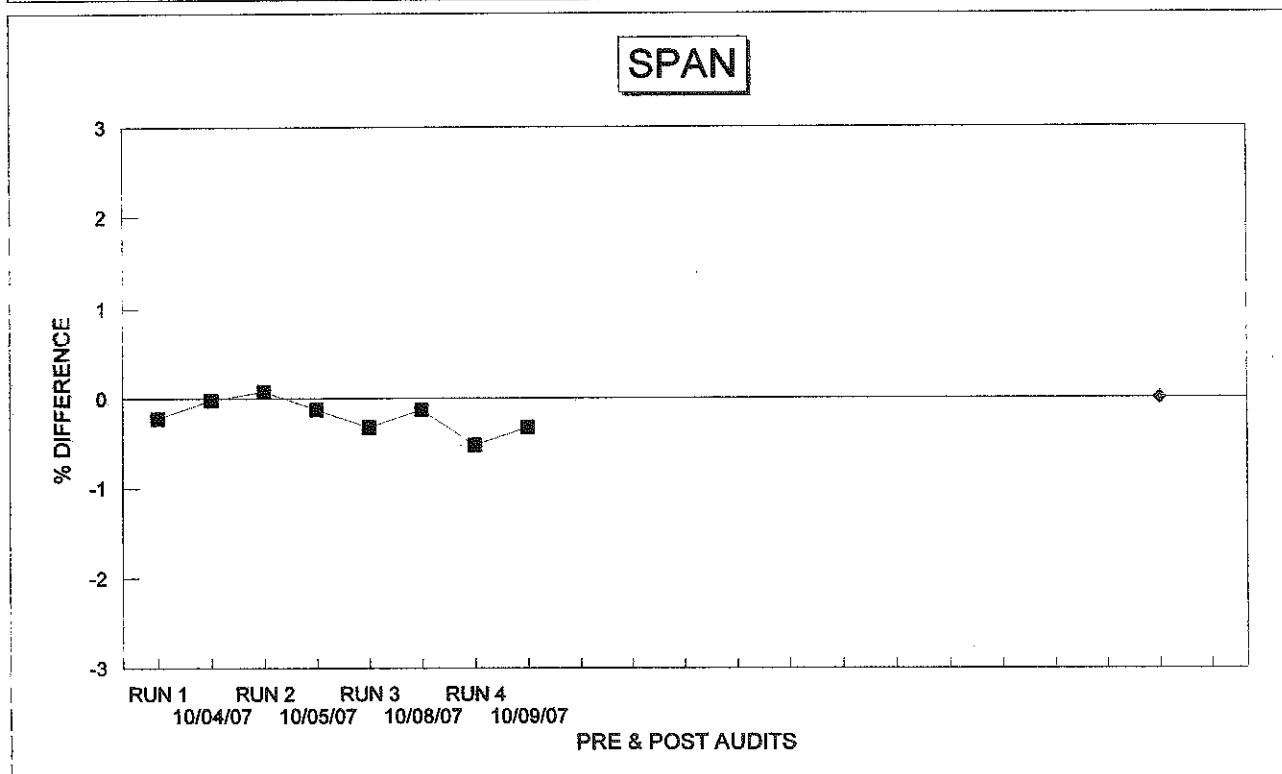
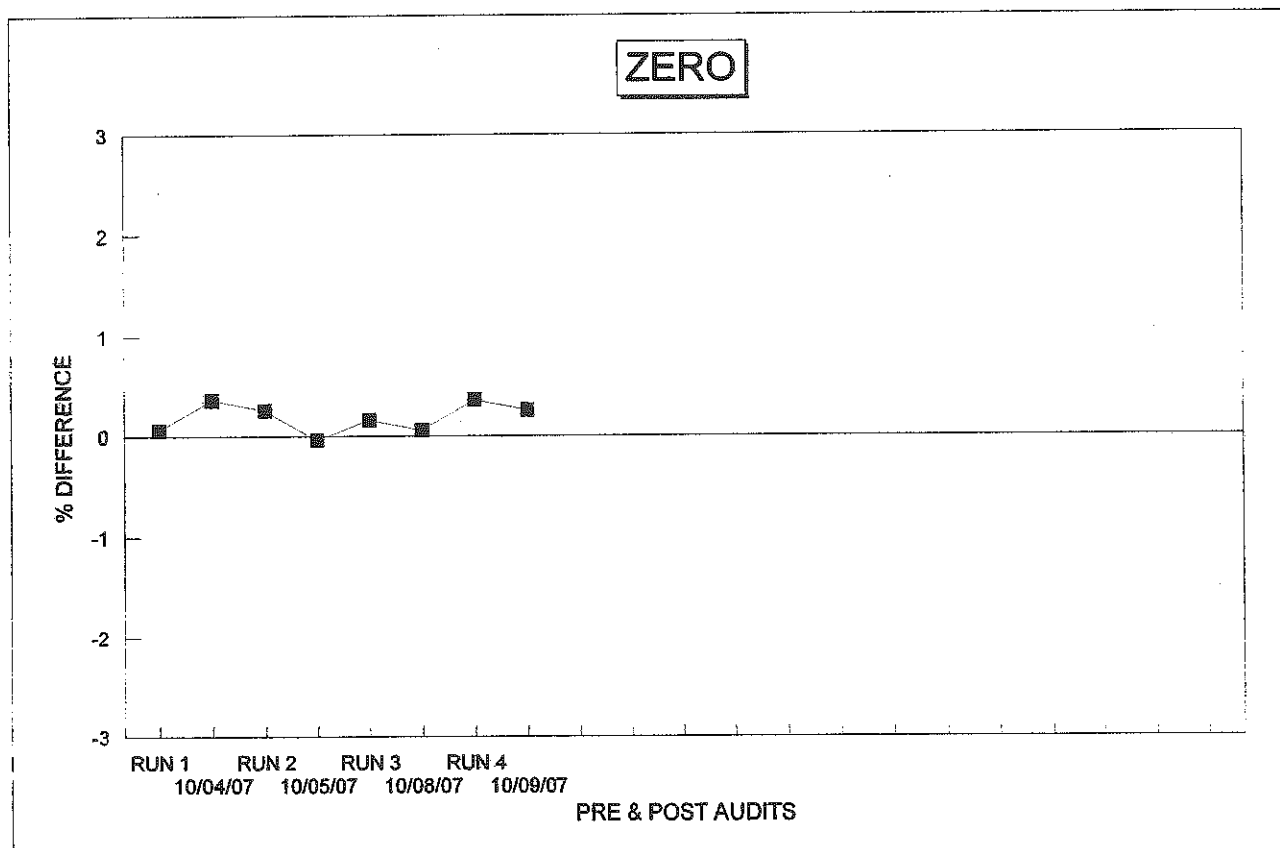
Cal Volts = Cal Volt Conc - Std Conc = $\pm$ Conc Diff = $\pm \Delta\%$

HIGH
VOLTS

$$\underline{0.713} = \underline{1782.5} - \underline{1770} = \underline{12.500} = \underline{0.500}$$

LOW
VOLTS

$$\underline{0.203} = \underline{507.5} - \underline{500} = \underline{7.500} = \underline{0.060}$$



AIR LIQUIDE

GASES FOR RESEARCH AND DEVELOPMENT

CYL # CC-12731 CGA 590

PRES 1665 VOL 130c.f

TEST # 07263 DATE 03-13-03

Analytical Method GC/Paramagnetic

	Requested	Analyzed
Hydrogen		
Nitrogen	Bal.	Bal.
Argon		
Air		
Carbon Monoxide	2%	1.98%
Methane		
Oxygen	6.25%	6.25%
Helium		
Carbon Dioxide	6.25%	6.22%

MEMBERS

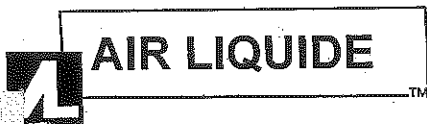
LOW spin

AIR LIQUIDE

**1451 THORNE RD.
TACOMA, WA 98421
TEL: (253) 383-3637**

THE ONLY LIABILITY OF THIS COMPANY FOR GAS WHICH FAILS TO COMPLY WITH THE ANALYSIS SHALL BE REPLACEMENT THEREOF BY THE COMPANY WITHOUT EXTRA COST.

**DO NOT REMOVE
THIS TAG**



CERTIFICATE OF ANALYSIS

Customer : Pacific Rim Oxygen Service

P.O. Number : 200159

Document # : 23639406-1A

Mix/Lot # : SFS103795

Item Number : SFS103795

Valid Until : 4 January, 2012

Specification : CUSTOM CERTIFIED

Phase : GAS

Cyl. Size : 30AL Valve: CGA 590

Pressure : 1667

Volume : 120 SCF

Cylinder Number: **CAO6641**

Component	Requested Concentrations MOLE	Actual Concentration MOLE	% Analytical Uncertainty	Equipment Used		
				Scale	Analyt. Inst.	Calibration Standard
NITROGEN	Balance	Balance		2		
CARBON MONOXIDE	8.6 %	8.63 %		2	4620	PQ
OXYGEN	21 %	20.9 %		2	4620	TB
CARBON DIOXIDE	21 %	21.1 %		2	4620	PD
7001-30AL						

This mixture was certified by analysis using one or more calibration standards prepared with scales certified against weights traceable to N.I.S.T.

Comments:

Dewpoint calculated to 40° F, unless otherwise stated. Improper storage or use may affect the accuracy of this standard.
Reported impurities are approximate and should not be used for calibration purposes.

Prepared by

Date: 5-Jan-2007

8832 Dice Road -- Santa Fe Springs, CA 90670

Phone (562) 945-1383 Fax (562) 696-7903

ISO: 9001-2000

GRD-1

 **AIR LIQUIDE**
GASES FOR RESEARCH AND DEVELOPMENTCYL # CC-41627 CGA 590PRES 160 VOL 150 SCFTEST # 30505 DATE 11-01-05Analytical Method GC/paramagnetic

	Requested	Analyzed
Hydrogen		
Nitrogen	<u>Bal.</u>	<u>Pml.</u>
Argon		
Air		
Carbon Monoxide	<u>5%</u>	<u>4.99%</u>
Methane		
Oxygen	<u>12.5%</u>	<u>12.5%</u>
Helium		
Carbon Dioxide	<u>12.5%</u>	<u>12.5%</u>


 SIGNED

 **AIR LIQUIDE**

 1451 THORNE RD.
 TACOMA, WA. 98421
 TEL: (253) 383-3637

THE ONLY LIABILITY OF THIS
 COMPANY FOR GAS WHICH FAILS TO
 COMPLY WITH THE ANALYSIS SHALL
 BE REPLACEMENT THEREOF BY THE
 COMPANY WITHOUT EXTRA COST.

**DO NOT REMOVE
 THIS TAG**



Scott Specialty Gases

500 WEAVER PARK RD, LONGMONT, CO 80501

Phone: 303-442-4700

Fax: 303-772-7673

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

Customer
ENERGY & ENV MEASUREMENT

Assay Laboratory

Project No.: 08-34135-001

P.O. No.: VERBAL

C/O ED WADINGTON
3730 N. PELLEGRINO DR.
TUCSON, AZ 85749

SCOTT SPECIALTY GASES
500 WEAVER PARK RD
LONGMONT, CO 80501

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure #G1; September, 1993.

Cylinder Number: ALM052285

Certification Date: 4/21/97

Exp. Date: 4/21/2000

Cylinder Pressure*:** 1996 PSIG

COMPONENT

**CERTIFIED
CONCENTRATION**

ANALYTICAL ACCURACY*

SULFUR DIOXIDE *

506 PPM

+/- 1% NIST Traceable

NITROGEN

BALANCE

Do not use when cylinder pressure is below 150 psig.

Analytical accuracy is inclusive of usual known error sources which at least include precision of the measurement processes.

Product certified as +/- 1% analytical accuracy is directly traceable to NIST standards.

This Protocol has been certified using corrected NIST SO2 standard values, per EPA guidance dated 7/24/86 and will not correlate with Uncorrected Protocols.

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 1661	9/27/98	ALM059505	488.5 PPM	SO2/N2

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#

LAST DATE CALIBRATED

ANALYTICAL PRINCIPLE

FTIR System/8220/AA89400251

03/20/97

Scott Enhanced FTIR

ANALYZER READINGS

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

First Triad Analysis

Second Triad Analysis

Calibration Curve

SULFUR DIOXIDE *

Date: 04/14/97 Response Unit: PPM
Z1 = 0.3847 R1 = 487.72 T1 = 505.77
Z2 = 488.75 R2 = 1.8201 T2 = 505.88
Z3 = 1.8428 R3 = 505.78 R3 = 488.85
Avg. Concentration: 505.8 PPM

Date: 04/21/97 Response Unit: PPM
Z1 = 0.3241 R1 = 488.28 T1 = 505.43
Z2 = 488.53 R2 = 1.8098 T2 = 505.75
Z3 = 0.6340 T3 = 505.74 R3 = 488.68
Avg. Concentration: 505.8 PPM

Concentration = A + Bx + Cx² + Dx³ + Ex⁴
r = 0.999950
Constant: A = 0.000000
B = 1.000000 C = 0.000000
D = 0.000000 E = 0.000000

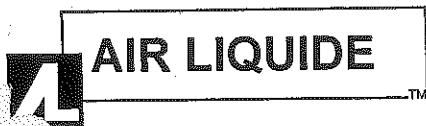
Special Notes:

ANALYST:

Devon VonFeldt

SO2 concentration analysis
05/10/07

Vm(std)	1.500		
mcf	1.004	dscf=	1.500
Hg	30.01		
DH	0.12		
temp	68	528	ppm = 498
ml BA ++	174		
Normality	0.0101	Run1	498
		Run 2	518
		Run3	498
Tank I.D. #	ALMO52285	avg.	505



CERTIFICATE OF ANALYSIS

Customer : Pacific Rim Oxygen Service Inc

P.O. Number : 200160

Document # : 23540983-1A

Mix/Lot # : SFS103340

Item Number : SFS103340

Valid Until : 2 January, 2010

Specification : CUSTOM CERTIFIED

Phase : GAS

Cyl. Size : 30AL

Valve : CGA 660

Pressure : 2000

Volume : 144 SCF

Cylinder Number: **CC82089**

Component	Requested Concentrations MOLE	Actual Concentration MOLE	% Analytical Uncertainty	Equipment Used		
				Scale	Analyt. Inst.	Calibration Standard
NITROGEN	Balance	Balance		4		
SULFUR DIOXIDE 6154-30AL	1250 PPM	1250 PPM	+/- 2%	4	4503	GL

This mixture was certified by analysis using one or more calibration standards prepared with scales certified against weights traceable to N.I.S.T.

Comments:

Dewpoint calculated to 40° F, unless otherwise stated. Improper storage or use may affect the accuracy of this standard.
Reported impurities are approximate and should not be used for calibration purposes.

Prepared by _____ Date: 3-Jan-2007

8832 Dice Road -- Santa Fe Springs, CA 90670

Phone (562) 945-1383 Fax (562) 696-7903

ISO: 9001-2000



Scott Specialty Gases

500 WEAVER PARK RD, LONGMONT, CO 80501

Phone: 303-442-4700

Fax: 303-772-7673

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer

ENERGY & ENV MEASUREMENT

C/O ED WADINGTON
3730 N. PELLEGRINO DR.
TUCSON, AZ 85749

Assay Laboratory

SCOTT SPECIALTY GASES
500 WEAVER PARK RD
LONGMONT, CO 80501

Project No.: 08-34135-003

P.O. No.: VERBAL

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure #G1; September, 1993.

Cylinder Number: ALM049127

Certification Date: 4/21/97

Exp. Date: 4/21/2000

Cylinder Pressure***: 1860 PSIG

COMPONENT

SULFUR DIOXIDE *
NITROGEN

CERTIFIED CONCENTRATION

1,770 PPM
BALANCE

ANALYTICAL ACCURACY**
+/- 1% NIST TRACEABLE

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

** Analytical accuracy is inclusive of usual known error sources which at least include precision of the measurement processes.

Product certified as +/- 1% analytical accuracy is directly traceable to NIST standards.

* This Protocol has been certified using corrected NIST SO2 standard values, per EPA guidance dated 7/24/96 and will not correlate with uncorrected Protocols.

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM-R-1698	7/03/98	ALM057797	3131. PPM	SULFUR DIOXIDE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#

FTIR System/8220/AAB9400251

LAST DATE CALIBRATED

03/20/97

ANALYTICAL PRINCIPLE

Scott Enhanced FTIR

ANALYZER READINGS

First Triad Analysis

(Z = Zero Gas

R = Reference Gas

T = Test Gas

r = Correlation Coefficient)

Second Triad Analysis

Calibration Curve

SULFUR DIOXIDE *

Date: 04/14/97	Response Unit: PPM		
Z1 = 0.7210	R1 = 3127.7	T1 = 1767.1	
R2 = 3131.7	Z2 = 4.6770	T2 = 1768.1	
Z3 = 4.6770	T3 = 1768.1	R3 = 3133.7	
Avg. Concentration: 1768. PPM			

Date: 04/21/97	Response Unit: PPM		
Z1 = 0.4020	R1 = 3125.8	T1 = 1770.2	
R2 = 3132.3	Z2 = 6.6540	T2 = 1769.3	
Z3 = 4.9410	T3 = 1770.9	R3 = 3134.9	
Avg. Concentration: 1770. PPM			

Concentration = A + Bx + Cx2 + Dx3 + Ex4	
r = 0.999990	1696
Constants:	A = 0.00000
B = 1.00000	C = 0.00000
D = 0.00000	E = 0.00000

Special Notes:

ANALYST:

Devon Von Feldt
DEVON VONFELDT

SO2 concentration analysis
05/10/07

Vm(std) 1.500
mcf 1.004
Hg 30.11
DH 0.12
temp 68
ml BA ++ **621**
Normality 0.0101

528

dscf=

1.500

ppm =

1778

Run1 1758
Run 2 1770

Run3 1778

avg.

1769

Tank I.D. # ALMO49127

Certificate of Analysis

ANALYTICAL CONTROL LABORATORY ANALYSIS METHYLENE CHLORIDE - OPTIMA

Catalog No. D151
Lot No. 035941

July 23, 2003

This is to certify that this lot was tested and found to comply with the specifications for this product.
The following are the actual analytical results obtained:

TESTS

Assay
Color
Description
Free Halogens
Identification
Fluorescence Background (as Quinine Sulfate)
Certified for EPA Test #1625
Pesticide Residue Analysis (as Heptachlor Epoxide)
Density (g/ml) at 25°C
Optical Absorbance At 254 nm
 At 240 nm
 At 233 nm
Refractive Index at 25°C
Residue after Evaporation
Titratable Acid
Preservative (Amylene)
Water (H₂O)

ACTUAL ANALYSIS

99.9%
5 APHA
Clear, Colorless Liquid
Pass Test
Pass Test
Not more than 1 ppb
Pass Test
Not more than 10ng/l
1.317
0.002
0.10
0.54
1.4209
0.4 ppm
0.00004 Meq/g.
64 ppm
0.008%



Chemical Division
1 Reagent Lane
Fair Lawn, N.J. 07410
201-796-7100

Approved By: _____

Edgar E. Hess

Edgar E Hess
Q.C. Laboratory Manager

Certificate of Analysis

ANALYTICAL CONTROL LABORATORY ANALYSIS ACETONE - OPTIMA

Catalog No. A929

June 4, 2002

Lot No. 023283

This is to certify that this lot was tested and found to comply with the specifications for this product.
The following are the actual analytical results obtained:

TESTS

Assay
Color
Description
Identification
Fluorescence Background (as Quinine Sulfate)
Pesticide Residue Analysis
 (As Heptachlor Epoxide)
Substances Reducing Permanganate
Solubility in Water
Aldehyde (as HCHO)
Density (g/ml) @ 25 Degrees C
Methanol (CH₃OH)
Isopropyl Alcohol ((CH₃)₂CHOH)
Optical Absorbance At 400 - 350 nm
 At 350 nm
 At 340 nm
 At 330 nm
Refractive Index at 25°C
Residue after Evaporation
Titratable Acid
Titratable Base
Water (H₂O)

ACTUAL ANALYSIS

99.6%
5 APHA
Clear, Colorless Liquid
Pass Test
Not More Than 1 ppb
Not More Than 10 ng/L

Pass Test
Pass Test
0.0005%
0.7849
0.03%
0.01%
0.001
0.004
0.05
0.67
1.3566
0.4 ppm
0.0003 Meq/g
<0.0001 Meq/g
0.3%

Approved By: Robert Dowd

Robert Dowd
Q.C. Laboratory Manager



Chemical Division
1 Reagent Lane
Fair Lawn, N.J. 07410
201-796-7100

KEITHLEY

Keithley Instruments, Inc.
28775 Aurora Road
Cleveland, Ohio 44139
(440) 248-0400
Telefax: (440) 248-6168

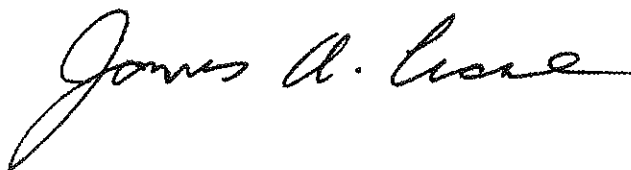
Certificate of Calibration

Model 2700 Serial No 0872585 Date 13 Mar 2002

This notification serves to certify that the unit described above has been inspected and tested in accordance with specifications published by Keithley Instruments, Inc.

The accuracy and calibration of this instrument are traceable through reference standards that are compared, at planned intervals, to national standards maintained by the National Institute of Standards and Technology (NIST), by comparison to natural physical constants or self-calibrating ratio type measurements.

The measurement standards which support this calibration are calibrated on a schedule to maintain required accuracy level.



James A. Crane
Metrology Services

Appendix A

EXAMPLE CALIBRATION/DATA FLOW

All individual test run raw data sheets are organized in a manner that would allow a data reviewer to follow the data as it is being calculated in a step by step fashion. In many cases, the equations used to calculate a specific required data are given on the raw data sheets themselves.

For example, the particulate emission rate in g/dscf is calculated on Data Sheet #7. However, the data used to derive this data begins on Data Sheet #2 (Meterbox Data Sheet) where the meter volume (cubic feet), average meter temperature ($^{\circ}\text{F}$), average ΔH (in. H_2O), and average Barometric pressure (in. Hg) are recorded and averaged. Each of the averages for these parameters are used in equation 1 on P. 7 where the volume (MCF) is converted to dscf.

The moisture catch total (g. H_2O) on the Particulate Catch/Moisture Data sheet (p. 3) is transferred to P. 7 and the percent stack moisture is calculated in equations 2 and 3.

The gross and net gravimetric (g) particulate catches are determined and calculated on PP. 3-6. Pages 4-1, 4-2 and 4-3 show the initial (tare) constant weights for filters (p. 4-1) and beakers (p. 4-2) and the final constant weights (p. 4-3) for those filters and beakers used for each run. Final and tare weight data is transferred to P. 3 and the gross gravimetric (g) catch for each filter and beaker is calculated. On P. 5 the gravimetric catch for each blank is calculated. The gross gravimetric catch for each filter and beaker is transferred to P. 6 and the net gravimetric catch (g) is calculated, as well as front half and back half catch totals. The net gravimetric catch (g) is transferred to P. 7 and the grain loading/dscf is calculated in equation 4.

Some data sheet specific information is listed below on a page by page basis.

P. 8 The % ambient moisture is determined by interpolating from psychrometric charts which are contained in the State of Oregon Department of Environmental Quality's "Standard Method for Measuring the Emissions and Efficiencies of Woodstoves".

 The % relative humidity is determined from the wet bulb/dry bulb temperature readings using the tables found in Section 3.1.2.4 of the State of Montana Air Quality Bureau's Quality Assurance Manual.

P. 10 The uncorrected moisture meter readings are corrected for pin insulation and may or may not be corrected for ambient (wood) temperatures. All corrections are based upon the correction equations or tables supplied by the moisture meter manufacturer. (These are standard, known corrections.)

P. 11 The moisture meter readings are corrected as discussed above.

P. 12

The gas concentrations shown for each gas monitored (CO_2 , O_2 , CO and SO_2) are determined by converting the analyzer's voltage output recorded on P. 12 to the concentration shown using the analyzer's current calibration curve. The SO_2 concentration is determined using the manufacturer's calibration curve and the current calibration curve.

The cal. W/B (calculated wet bulb) temperature is obtained by first determining the % moisture in the extracted flue gas stream using the temperature data from thermocouples 1 (Wet Bulb) and 2 (Dry Bulb). Then based upon the stack temperature (thermocouple 3) and the % moisture in the extracted gas stream, a calculated wet bulb temperature is determined. All data is derived from the psychrometric tables found in the State of Oregon's "Standard Method for Measuring the Emissions and Efficiencies of Woodstoves".

The following pages contain the equations used to generate the data on Tables 3-5 on the computer printouts:

Dry Gas Volume (standard):

$$V_{m(\text{std})} = \frac{V_m * 17.65 * \text{mcf} * \left(P_{\text{bar}} + \frac{\Delta H}{13.6} \right)}{T_m}$$

Volume of Water:

$$V_{w(\text{std})} = (0.04707)(\text{ml H}_2\text{O})$$

Moisture Content:

$$B_{ws} = \left(\frac{V_w}{V_w + V_{m(\text{std})}} \right) * 100$$

Dry Burn Rate:

$$Br = \left(\frac{W_{wt} - (W_{wt} * \% \text{H}_2\text{O})}{2.2046} \right) * \frac{60}{\theta}$$

Carbon Balance (N_t):

$$N_t = \frac{K_3 N_c}{(Y_{CO_2} + Y_{CO} + Y_{HC})}$$

Stack Flow Rate (Q_{sd}):

$$Q_{sd} = K_4 N_t Br$$

Particulate Concentration (C_s):

$$C_s = \frac{M_n}{V_{m(std)}}$$

Particulate Emission Rate (E):

$$E = C_s Q_{sd}$$

Proportional Rate Variation (Pr):

$$Pr = \left(\frac{\theta S_i * V_{mi(std)}}{10 \sum_{i=1}^n [S_i * V_{mi(std)}]} \right) * 100$$

Where:

- Br = dry wood burn rate, kg/hr.
- B_{ws} = Water vapor in the gas stream, proportion by volume.
- c_s = Concentration of particulate matter in stack gas, dry basis, corrected to standard conditions, g/dscm (g/dscf).
- E = Particulate Emission Rate, g/hr.
- ΔH = Average pressure differential across the orifice meter (see Figure 5-2), mm H₂O (in. H₂O).
- K₃ = 1.0 lb/lb (English)
1000 g/kg (metric)
- K₄ = 0.02406 dsm³/g-mole(metric)
384.8 dscf/lb-mole (English)

m_n =	Total amount of particulate matter collected, mg.
mcf =	Dry gas meter correction factor.
N_c =	Gram atoms of carbon/gram of dry fuel (lb/lb), equal to 0.0425.
N_t =	Total dry moles of exhaust gas/Kg of dry wood burned.
P_r =	Percent of proportional sampling rate.
P_{bar} =	Barometric pressure at the sampling site, mm Hg (in. Hg).
Q_{sd} =	Total gas flow rate, dscf/hr.
S_i =	Concentration measured at the SO_2 analyzer for the "i th " 5 minute interval, ppm.
S_1 =	Concentration measured at the SO_2 analyzer for the first 5 minute interval, ppm
T_m =	Absolute average DGM temperature (see Figure 5-2), °K (°R).
T_{std} =	Standard absolute temperature, 293°K (528°R).
V_m =	Volume of gas sample as measured by dry gas meter, dcm (dcf).
$V_{m(std)}$ =	Volume of gas sample measured by the dry gas meter, corrected to standard conditions, dscm (dscf).
$V_{w(std)}$ =	Volume of water vapor in the gas sample, corrected to standard conditions, scm (scf).
W_{wt} =	Wet wood weight.
Y =	Dry gas meter calibration factor.
Y_{CO} =	Measured mole fraction of CO (dry).
Y_{CO2} =	Measured mole fraction of CO_2 (dry).
Y_{HC} =	Assumed mole fraction of HC (dry); =0.0088 for catalytic woodheaters =0.0132 for noncatalytic woodheaters =0.0080 for pellet fired woodheaters
θ =	Total sampling time, min.
13.6 =	Specific gravity of mercury.
60 =	Sec/min.
100 =	Conversion to percent.

M5H PARTICULATE SAMPLING TRAIN

1. Probe
3/8" seamless SS-20" long. Outlet end of probe is attached to a SS outlet fitting with a Sweglock SS union. The probe is unheated except for the portion that is in the stack and the heated filter box. The probe is sealed to the stack with a washer.
2. Filter Holder
A 3" or 4" standard M5 filter holder. A SS filter support with gasket.
3. Filters
3" or 4" fiber glass (#25 glass) manufactured by Schleicher and Schuell.
4. Front Half Filter Heater
A box containing a fan for air circulation and a cone heater. The temperature in the box is monitored with a type K thermocouple and adjusted with a voltage regulator to maintain a temperature below 248 °F.
5. Desiccant
Indicating silica gel, 6-20 mesh. The silica gel is changed as needed.
6. Filter (Back Half) Holder
Same as front half 3" or 4" filter.
7. Impinger Gas
Type K thermocouple threaded into the exit "arm" of the impinger. Ice is added to the cooler whenever necessary to maintain an exit gas temperature less than 68 °F.
8. Meterbox
RAC Stack Sampler modified by EEMC
Ranges: 0-1.0" inclined water manometer
0-10.0" vertical water manometer
Accuracy: Dry gas Meter 0-999.999 cu ft $\pm 1.0\%$
Temperatures are monitored using two type K thermocouples.

Map B

SAMPLING PROCEDURES AND INSTALLATION DESCRIPTION

This section is broken into two major parts. The first contains a brief description of the sampling and procedures used by LoKee Testing Laboratory when performing a test using EPA Methods 28, 28A and 5H. The second section contains a complete listing of all equipment in each of the major sampling trains and a diagram of each major train.

LoKee Testing Laboratory uses EPA M5H for the particulate sampling procedure and collects the required data so that efficiency of a unit can be calculated using the Oregon Method.

TEST FACILITY AND WOOD HEATER EQUIPMENT LIST

1. Flue Pipe

The diameter of the 24 gauge black steel flue pipe used for each stove varies with the size of the stove's flue collar, e.g., 6" flue pipe is used with a 6" flue collar. The joint at the flue collar is sealed with mortar. The pipe is attached to the stove at the flue collar with three sheet metal screws. All sampling ports are sized for the sampling probes and sealed using washers.

2. Insulated Flue Pipe

The diameter of the insulated flue pipe matches the diameter of the flue collar on the stove. The 6", 7" and 8" pipe meet the requirements of UL 103 HT. The SO₂ injection loop port is sealed with high temperature silicone sealant.

3. Liquid Seal

The liquid (oil) seal used by LoKee varies in size with the flue pipe. The seals are made of 12 gauge steel. The liquid sealant is mineral oil. The cooler consists of 3/8" copper tubing which is coiled in the bottom of the lower half of the seal. Ambient air is pumped through this line when necessary to cool the seal.

4. Supports

The lower half of the seal and the 24 gauge steel black flue pipe is supported by the stove. The upper half of the seal and the insulated flue pipe are hung from wooden supports.

5. Platform Scale

Platform (30" X 30" deck)

Manufacturer: Weightronics

Model: platform: DS-014/SN 4479 readout: W1-110/SN 016409

Type: Electronic

Range: 0-1000 lb.

Capacity: 1000 lb.
Resolution: ± 0.1 lb.
Accuracy: $\pm 0.1\%$

6. Fuel Balance Scale

LoKee uses the platform scale listed above to weigh the fuel charges.

7. Fuel Storage Area

LoKee stores the fuel in a humidity and temperature regulated room.

8. Moisture Meter

LoKee has two moisture meters which it uses to determine wood moisture levels.

The primary meter is:

Manufacturer: Delmhorst Instrument Co.
Model: RC-1C/SN 16152 with 26-E probe and #496 insulated pins.
Type: Electrical Resistance
Resolution: $\pm 0.1\%$ moisture
Ranges: 6-11%, 11-25%, 25-80%
Accuracy: Moisture Content Accuracy
6-12% $\pm 0.5\%$
12-20% $\pm 1.0\%$
20%-saturation point $\pm 2.0\%$

Type of Calibration: The RC-1C is equipped with two potentiometers (Zero and Span) which are checked and adjusted on a daily basis. The unit is also checked with a calibration block.

Electrode and Pin Type: 26-E probe and #496 insulated pins

The backup moisture meter:

Manufacturer: Delmhorst Instrument Co.
Model: G-30SN/2477 with 26-E probe and #496 insulated pins
Type: Electrical Resistance
Resolution: $\pm 0.1\%$ moisture
Accuracy: Moisture Content Accuracy
6-12% $\pm 0.5\%$
12-20% $\pm 1.0\%$
20%-saturation point $\pm 2.0\%$

Type of Calibration: Calibration is accomplished with an internal calibration point and a potentiometer. The calibration can also be checked against a calibration block.

Description of Operation: The pins are pounded into the wood to be sampled. The meter reading is recorded on Data Sheet #10 (Wood Moisture) or Data Sheet #11 (Density Determination). This is the uncorrected reading which is then corrected for pin insulation and, as needed, temperature using the correction tables for each parameter supplied by the manufacturer.

9. Temperature Monitors

The temperatures are monitored with Type K thermocouples. Each thermocouple's calibration is checked prior to use.

The thermocouple readout is an Omega Model 410B-K/SN 05/4475, with a range of -58 °F to 1999 °F (type K) and an accuracy of ± 0.9 °C, which can be read at ± 0.1 °F. EEMC reads and rounds to 1.0 °F. The single channel readout is interfaced with a manually operated selector switch that allows 24 channels to be monitored with the same readout. The thermocouples are attached to the test unit with sheet metal screws. The thermocouples monitoring internal stove temperature are sealed at the point of entry with sealant.

10. Draft Gauge

Manufacturer:	Dwyer
Model:	
Type:	Inclined Water Manometer
Range:	0-0.25" water
Resolution:	0.001" water
Accuracy:	± 0.001 " water (readability)

11. Anemometer

Manufacturer:	Dwyer
Model:	480 Vaneometer/SN S 222 D
Range:	0-400 FPM
Accuracy:	$\pm 5\%$ of full scale from 0-1 FPM

12. Humidity Gauge

Manufacturer:	Bacharach
Model:	SAC
Type:	Sling Psychrometer
Range:	Wet Bulb: 30-110 °F
Dry Bulb:	30-110 °F
Resolution:	± 1 °F
Accuracy:	± 1 °F

13. Barometer

Manufacturer:	Princo Instruments, Inc.
Model:	NOVA 469

Type:	Mercury Barometer
Range:	20-32" Hg
Resolution:	0.01" Hg
Accuracy:	±0.01" when calibrated and installed as per the manufacturer's written operating instructions.

Equation 6.3.1a of the "Standard Methods for Measuring the Emissions and Efficiencies of Residential Wood Stoves" and equation #1 are programmed into a Hewlett Packard 15C calculator which first calculates stack gas flow rate and then the ΔH . The stack gas flow rate and ΔH are both recorded on Data sheet #2. The ΔH is used to set the flow rate through the dry gas meter at 5 minute intervals during the test.

In order to successfully maintain the correct sampling ratio, the following data is recorded on Data Sheet #2 (Meter Box Data Sheet): temperature ($^{\circ}\text{F}$) at the SO_2 injection rotameter (Tr), pressure (inches H_2O) at the SO_2 injection rotameter (Pr), SO_2 injection rate (cc/min), barometric pressure (BP) (inches Hg), stack gas SO_2 concentration (ppm SO_2), sampling ratio (Sr), and the average dry gas meter temperature ($^{\circ}\text{F}$). This data is entered into the HP15C, which is used to first calculate a stack gas flow rate (dscf) and then a ΔH for every sampling interval. The flow rate through the dry gas meter is adjusted and maintained by maintaining the appropriate ΔH .

CEM MONITORS

1. Calibration Gases

LoKee uses vendor certified ($\pm 2.0\%$) calibration gases for each CEM. The concentrations purchased coincide with ranges specified in M5H. Upon receipt of the cylinder, the concentrations are verified with Method 3 (ORSAT) analysis.

2. Flow Regulators

LoKee uses a variety of standard gas flow regulators to meter the flow of calibration gases from the cylinders.

3. Point of Injection

Calibration gases are injected directly into the end of the probe. The line carrying the calibration gases from the cylinders is connected to the probe with a short piece of rubber tubing.

4. Sample Gas Conditioning System

The combustion gas is conditioned with a train that is a duplicate of a M5H train. It contains the following components:

SS probe

Glass 4" M5H filter and holder in a heated box

4 1000 ml glass impingers
Glass 4" M5H filter and holder
Indicating silica gel
Type K thermocouple to monitor exit gas temperature
Thomas pump

5. Filters

The filters used are the same as EPA M5H filters.

6. Manifold and Exhaust

The gas stream is delivered to each analyzer through a manifold and flowmeter with the excess gases being routed to an exhaust.

7. CO Analyzer

Horiba PIR 2000/SN 408005

Nondispersive infrared (NDIR)

The gas stream flow is controlled by a SS flowmeter downstream of the analyzer. The calibrated range used is 0-10.0% by volume. The resolution is 0.01% CO. The manufacturer's specification given for linearity is $\pm 1.0\%$.

8. CO₂ Analyzer

Horiba PIR 2000/SN 407069

The CO₂ analyzer is also a NDIR and is operated in exactly the same manner as the CO analyzer. The range of the CO₂ analyzer is 0-25.0% CO₂.

COMBUSTION GAS ANALYZER TRAIN OPERATING INSTRUCTIONS

A. Pretest Preparation, Checks and Audit Procedures

1. Clean the probe with acetone and a brush. Seal the end of the probe for a leak check.
2. Remove the filter holder from the sample box and change the filter.
3. Empty water from all the impingers in the train. Clean all impingers and fill the first 2 with 100 ml of water.
4. Remove the second filter holder from the train and change the filter.
5. Visually check the indicating silica gel in the fourth impinger. If it is visibly impacted by water, replace the silica gel with dry silica gel.
6. Turn on the pump and perform a leak check on the entire train. This is done by placing the exhaust line in water. A successful leak check is accomplished when no bubbles are detected.
7. Slowly release the plug from the probe to prevent any back flushing.
8. Turn off the pump.

9. Turn on the heat in the sample box. Adjust Variac voltage controller so that temperature in the sample box does not exceed 248 °F.
10. Open the bypass valve on the pump.
11. Connect the probe to the zero/span gas delivery line.
12. Turn on the zero gas and adjust the flow rate to 1.5 SCFH.
13. Wait until the zero gas has completely flushed the train and a stable reading is obtained.
14. Record the zero gas readings of the DVM on Data Sheets #15.
15. Turn off the zero gas at the cylinder.
16. Disconnect the zero/span gas delivery line from the zero gas cylinder.
17. Connect the zero/span gas delivery line to the span gas source for each analyzer.
18. Turn on the span gas and adjust the flow rate to 1.5 SCFH. Wait until a stable reading is obtained on each analyzer. Repeat until all three analyzers are spanned properly.
19. Record the span gas readings of the DVM. Record the analyzer's output and all other pertinent information Data Sheets #15.
20. Turn off the span gas at the cylinder.
21. Disconnect the probe from the zero/span gas delivery line.
22. Insert the probe in the stack.
23. Close the bypass valve on the pumps.
24. Approximately 15-20 minutes before the actual start of the test, turn on the pump and adjust the flow through each analyzer until the flow rate is 1.5 SCFH.

B. Operation During Testing

1. Monitor the flow rate to the analyzers periodically to maintain a flow rate of 1.5 SCFH. Make any necessary adjustments.
2. Record data as follows:
 - a. At the start of each 5 minute data cycle, record the scale weight, wet bulb/dry bulb, stack gas temperature and static pressure on Data Sheet #12 (Gas Data).
 - b. Record the combustion gas (CO₂, O₂ and CO) analyzer data and the SO₂ analyzer data on Data Sheet #12.
 - c. Record the remainder of the temperature data.

C. Post Test Checks and Audit Procedures

1. Remove the probe from the stack. (Be careful when handling the probe as it can be quite hot.)
2. Seal the end of the probe.
3. Perform a leak check on the entire train.
4. Slowly release the plug from the end of the probe to prevent any back flushing.
5. Turn off the pump.

6. Open the bypass valve on the pump.
7. Connect the probe to the zero/span gas delivery line.
8. Turn on the zero gas and adjust the flow rate through each analyzer to 1.5 SCFH.
9. Wait until the zero gas has completely flushed the train and a stable reading is obtained from each analyzer.
10. Record the zero gas reading. Record each analyzer's output and all other pertinent information on Data Sheets #15.
11. Turn off the zero gas at the cylinder.
12. Disconnect the zero/span gas delivery line from the zero gas cylinder.
13. Connect the zero/span gas delivery line to the span gas source for each analyzer.
14. Turn on the span gas and adjust until the flow rate through each analyzer to 1.5 SCFH. Wait until the span gas has completely flushed the train and a stable reading is obtained on each analyzer.
15. Record the span gas reading. Record each analyzer's output and all other pertinent information on Data Sheets #15.
16. Turn off the span gas at the cylinder.
17. Disconnect the probe from the zero/span gas delivery line.

D. Determination of the Combustion Gas Train's Response Time

1. The response time of the combustion gas analyzer train is to be determined using the following procedures. It is best to determine the combustion gas analyzer train response time during the "charcoal phase" of a test burn so that CO levels are relatively stable.
 - a. Leak check the combustion gas (CEM) analyzer train.
 - b. Zero the CO analyzer using ambient air.
 - c. Calibrate the CO analyzer.
 - d. Insert the probe for the combustion gas analyzer train in the stack.
 - e. Sample flue gas until a stable reading is obtained.
 - f. Remove the probe from the stack, note the exact CO concentration as measured on the DVM and start a stop watch at the exact time of removal.
 - g. Observe the stop watch and DVM. Record the length of time to initial response, i.e., when the CO levels begin to decline.
 - h. Continue observing the stop watch and DVM. Record the time when the analyzer's output equals zero (0.000 v).
 - i. Repeat steps d-h 2 or 3 times to verify results.

E. Calibration and Audit Procedures for the Combustion Gas Analyzers

1. Calibrate by presenting zero and span gases to each analyzer at the probe and through the entire sampling train. (See Sections 6.7.2 and 6.9 [M5H].) Record the responses on the appropriate calibration forms.
2. Immediately prior to and after each test run, present the zero and span gases to the analyzers through the entire sampling train as is discussed in section C. Record each analyzer's response on Data Sheets #15.
3. Calculate the $\pm$ concentration difference and the actual percent difference as follows using the zero and span gas values obtained in #2 above. All calculations are to be based upon the actual gas concentrations involved.

$$\pm \text{ Concentration Difference} = \text{Actual Conc (\%)} - \text{Std Conc (\%)}$$

$$\text{Zero \% Difference} = \frac{\text{Act Conc (\% or ppm)} - \text{Std Conc (\% or ppm)}}{\text{Full Scale Value (\% or ppm)}} * 100$$

$$\text{Span Act \% Difference} = \frac{\text{Act Response (\% or ppm)} - \text{Exp Response (\% or ppm)}}{\text{Full Scale Value (\% or ppm)}} * 100$$

Then refer to Section 4.2 and 4.3 (M5H) to determine whether the audits are acceptable or not.

TRACER GAS (SO₂) EQUIPMENT

1. SO₂ Injection Probe

A circular SS loop about 4" in diameter is positioned in the center of the stack. The loop extends outside the stack and is connected to the line leading from the SO₂ injection rotameter with Sweglock fittings. The loop is inserted in the stack at 9.5 $\pm$ 0.5 ft above the top of the scale.

2. Rotameter

A rotameter that has been calibrated with a bubble tube. The rotameter is all glass, stainless steel and Teflon. The rotameter has a flow control mechanism which is set to the calibrated flow.

3. Temperature

The temperature at the injection rotameter is measured with a type K thermocouple.

4. Injection Gas

Pure SO₂, 99.999% pure, released from the cylinder through a SS regulator and shut off valve.

5. Calibration Gases
LoKee uses vendor certified calibration gases with traceability established in accordance with EPA Protocol #1 as specified in Section 3.3.1 and verified using EPA Method 6.
6. Sample Probe
3/8" SS tubing inserted at 13.5 $\pm$ 0.5 feet above the platform scale. No obstructions are in the stack between the injection and sample probes.
7. Combustor
Lindberg tube furnace, Model 55035/SN 800125, range 0-2000 °F. The temperature in the tube furnace is monitored with a type K thermocouple and controlled with a Variac voltage regulator. Power adjustments are made as necessary to maintain temperature at 1425 °F $\pm$ 25 °F.
8. Sample Condenser
The sample condenser consists of 3 modified M5 impingers immersed in a freezer.
A filter assembly
The exit gas temperature is monitored with a type K thermocouple.
9. Filter
A standard EPA M5H 3" or 4" filter.
10. SO₂ Analyzer
Horiba, PIR 2000/SN 403019
Nondispersive infrared (NDIR)
The analyzer is operated as per the manufacturer's instructions at a flow rate of 1.5 SCFH. The calibration range is 0-2500 ppm SO₂ at a resolution of $\pm$ 25.0 ppm. The manufacturer's specification for linearity is $\pm$ 1.0%. The voltage response is displayed on a DVM which is converted to ppm using the manufacturer's calibration curves.
11. Flow Control
Flow through the tracer gas sampling train is controlled by a SS flowmeter.

TRACER GAS TRAIN OPERATING INSTRUCTIONS

A. Pretest Preparation and Checks and Audit Procedures

1. Clean the probe with a brush. After cleaning, seal the end of the probe.
Note: Do Not Use Acetone Or Other Organic Solvents To Clean The Probe Immediately Prior To Running A Test Or Conducting A Leak Check.
2. Turn on the tube furnace in order to insure that the unit is at the correct operating temperature (1425 °F) at the start of the test.
3. Remove all water and clean the impingers.
4. Change the filter.

5. Turn on the pump.
6. Perform a leak check on the entire tracer gas train. This is done by placing the SO₂ exhaust line in water. A successful leak check is accomplished when no bubbles are detected.
7. Slowly remove the plug from the end of the probe to prevent any back flushing.
8. Turn off the pump.
9. Bypass the pump.
10. Connect the probe to the zero/span delivery gas line.
11. Connect the zero/span gas delivery line to the zero gas cylinder and turn on the zero gas and adjust the flow until the flow rate through the SO₂ analyzer is 1.5 SCFH.
12. Wait until the zero gas has completely flushed the train.
13. Record the zero gas reading. Record the SO₂ analyzer's DVM output on Data Sheets #15.
14. Turn off zero gas at the cylinder.
15. Disconnect the zero/span gas delivery line from the zero gas cylinder.
16. Connect the zero/span gas delivery line to the span gas cylinder.
17. Turn on the span gas and adjust the flow until the flow rate through the SO₂ analyzer is 1.5 SCFH. Wait until the span gas has completely flushed the train and a stable reading is obtained on the analyzer.
18. Record the span gas reading. Record the analyzer's output and all other pertinent information on Data Sheets #15.
19. Turn off the span gas at the cylinder.
20. Disconnect the zero/span gas delivery line from the probe.
21. Insert the probe in the stack.
22. Close the bypass on the pump.
23. Approximately 15 to 20 minutes before the actual start of the test, turn on the SO₂ injection train and the pump for the tracer gas train.

B. Operation

1. Turn on the tube furnace to insure furnace is at approximately 1425 °F when the test begins.
2. Approximately 15-20 minutes before the actual start of the test, turn on the cylinder of pure SO₂.
3. Using the rotameter's current calibration, adjust the SO₂ flow rate to the calibrated level.
4. Turn on the pump in the tracer gas train. Adjust the flow rate through the SO₂ analyzer so that it remains at 1.5 SCFH.

5. Monitor the SO₂ concentrations in the stack and stack gas flow rates in order to establish a sampling ratio for the test and a correct ΔH at the start of the test.
6. At the start of the test and every 5 minutes thereafter, record the SO₂ analyzer output in volts and the stack gas SO₂ concentration in order to calculate the stack gas flow rate and determine the correct ΔH for the meter box.

Also monitor and record the temperature at the Rotameter (Tr), pressure at the Rotameter (Pr), barometric pressure (BP) SO₂ injection rate (cc/min) and static pressure on Data Sheets #2 and #12.

C. Post Test Checks and Audit (Zero/Span) Procedures

1. Remove the probe from the stack. (Be careful when removing the probe from the stack as it can be quite hot.)
2. Plug the end of the probe.
3. Perform a leak check.
4. Slowly remove the plug from the end of the probe to prevent any back flushing.
5. Turn off the pump.
6. Bypass the pump.
7. Connect the probe to the zero/span gas delivery line.
8. Connect the zero/span gas delivery line to the zero gas cylinder. Turn on and adjust until the flow rate through the SO₂ analyzer is 1.5 SCFH.
9. Wait until the zero gas has completely flushed the train.
10. Record the zero gas reading. Record the SO₂ analyzer's DVM output on Data Sheet #15.
11. Turn off zero gas at the cylinder.
12. Disconnect the zero/span gas delivery line from the zero gas cylinder.
13. Connect the zero/span gas delivery line to the span gas cylinder.
14. Turn on the span gas and adjust the flow until the flow rate through the SO₂ analyzer is 1.5 SCFH. Wait until the span gas has completely flushed the train and a stable reading is obtained.
15. Record the span gas reading. Record the analyzer's output and all other pertinent information on Data Sheet #15.
16. Turn off the span gas at the cylinder.
17. Disconnect the zero/span gas delivery line from the probe.

D. Determination of Tracer Gas Train's Response Time

1. Zero and calibrate the SO₂ analyzer.
2. Prepare and leak check the tracer gas train as per A above.
3. Insert the probe in the stack which contains flue gas and SO₂ concentrations in the ranges normally encountered during wood stove testing.

4. Sample flue gas with SO₂ concentrations until a stable reading is obtained. It is best to determine the tracer gas train's response time during the "charcoal phase" of a test burn so that the SO₂ concentrations are as stable as possible.
 5. Remove the probe from the stack, noting the exact SO₂ concentration as measured by the DVM and starting a stop watch at the exact time of removal.
 6. Observe the stop watch and DVM. Record the length of time to the initial response, i.e., when the SO₂ levels begin to decline.
 7. Continue observing the stop watch and DVM. Record the time when the SO₂ analyzer's output equals zero (0.000 v.).
 8. Repeat steps 3-7 two or three times to verify results.
- E. Calibration and Audit Procedures for the Tracer Gas (SO₂) Analyzer
1. Calibrate by presenting zero and span gases to the analyzer at the probe and through the entire sampling train. Record the responses on the appropriate calibration form.
 2. Immediately prior to and after each test run, present the zero and span gases to the analyzer through the entire sampling train as is discussed in Sections A and C. Record the analyzer's response on Data Sheet #15.
 3. Calculate the $\pm$ concentration differences and actual percent difference as follows using values obtained in #2 above as the expected response. All calculations are to be based upon the actual gas concentration involved.

$$\pm \text{Concentration Difference} = \text{Actual Conc (\%)} - \text{Std Conc (\%)}$$

$$\text{Zero \% Difference} = \frac{\text{Act Conc (\% or ppm)} - \text{Std Conc (\% or ppm)}}{\text{Full Scale Value (\% or ppm)}} * 100$$

$$\text{Span Act \% Difference} = \frac{\text{Act Response (\% or ppm)} - \text{Exp Response (\% or ppm)}}{\text{Full Scale Value (\% or ppm)}} * 100$$

Then refer to Section 4.2 and 4.3 (M5H) to determine whether the audits are acceptable or not.

TEMPERATURE SENSING OPERATING INSTRUCTIONS

- A. Operate the thermocouple readout selector switch and record the temperature for each thermocouple. All the temperature in the test facility should be approximately the same. Repair as necessary.

- B. Check the operation and output of the thermocouple readout using the Omega NBS Traceable Thermocouple Simulator. The simulator is hooked up to thermocouple readout #23. Check the readout over its full range at 200 °F intervals. Record the data on Data Sheet #16.
- C. One hour before the actual test start record stove temperatures (thermocouple readout #'s 4, 5, 6, 7 and 8), firebox (readout #9), post catalytic combustor or secondary burn chamber (readout #10), and room temperature (readout #11). Record the temperatures every 5 minutes until the start of the test on Data Sheet #13 (Preburn).
- D. During the test record the temperatures every 5 minutes for each of the thermocouples on Data Sheets #12 and 14.

FUEL PREPARATION

- A. No more than 4 hours prior to use, obtain 3 moisture readings from each piece of wood. Record all moisture readings on Data Sheet #10.
- B. Obtain kindling by finely splitting pieces that otherwise cannot be used as test fuel. Weigh the kindling and record the weight on Data Sheet #8.
- C. Obtain the pretest fuel by using 2 x 4's. The length of the pretest fuel can be no less than 1/3 the length of the test fuel. Weigh the pretest fuel prior to its being loaded in the stove. Record weights on Data Sheets #8 and #9.
- D. Obtain the test fuel by cutting dimensional lumber (either 2 x 4's or 4 x 4's) so that the length is 5/6's the length of the longest usable dimension of the firebox. Use the mix of 2 x 4's and 4 x 4's specified in Section 4.3 M28. The test fuel shall be essentially free of knots, sap seams or rotten areas.
- E. The spacers shall measure 1 x 5 x 1" (nominally). The spacers shall be free of knots, sap seams or rotten areas. Nail the spacers to the 2 x 4's and 4 x 4's as described in the regulations.
- F. Take a photograph of the assembled fuel charge at a 90° angle from the photograph that will be taken when the fuel charge is loaded in the stove.

WOOD DENSITY DETERMINATION

- A. When cutting the test fuel, cut a representative piece of 2 x 4 or 4 x 4 that is approximately 3 to 5-inches in length.
- B. Take a moisture reading from the top, bottom and side of the piece. Record readings on Data Sheet #11. Determine the % moisture on a wet and dry basis.
- C. Weight the piece on a balance.
- D. Take measurements of width, depth and length at the four corners with a micrometer. Determine the volume of the piece. (Length x width x depth = Volume in cubic centimeters)
- E. Dry the piece in an oven at 95-100 °C for a minimum of 24 hours.
- F. Reweigh the piece on the balance.

- G. Calculate % moisture on a dried basis.

$$\% \text{ moisture (dry basis)} = 1 - \frac{\text{dried weight}}{\text{wet weight}} * 100$$

- H. Calculate the density.

$$\text{Density (g / cc)} = \frac{\text{dried weight (g)}}{\text{volume (cc)}}$$

BTU'S/LB DETERMINATION

- A. When cutting the test fuel (only the test fuel, not the kindling, pretest fuel or spacers), collect a sawdust sample. Place in a clearly marked plastic bag.
- B. Forward sample to a commercial laboratory for BTU contents analysis.

STOVE PREPARATION

- A. Clean the stove.
- B. Weigh the stove, record the weight on Data Sheet #8.
- C. Add approximately 0.3 lb. of wadded newspaper to the stove. Record weight of newspaper on Data Sheet #8. Add 4-8 lb. of kindling to the stove, and record the weight of the kindling on Data Sheet #8.
- D. Light the paper and kindling, leaving the stove's air draft control(s) wide open and the door cracked until well ignited.
- E. Close door.
- F. When between 50% - 75% of the weight of the kindling has been burned add the first pretest fuel charge.
- G. Continue to add pretest fuel until the stove has thoroughly warmed up. As necessary, rake the coal bed prior to adding additional pretest fuel charges.
- H. Remove all material from the firebox after two or more hours of burning on high. Obtain the dry empty stove weight and record on Data Sheet #8.
- I. Set the stove's air draft control(s) at the desired setting a minimum of 1 hour before the test run is to begin.
- J. As necessary set the heat exchange blower(s) at the specified setting a minimum of one hour before the test is to begin.

- K. Record the stove surface temperatures, firebox and post catalytic or secondary burn temperatures and scale weigh for a minimum of one hour before the test run begins. As necessary add fuel, rake the coal bed, level the coal bed and/or remove coals during the first 45 minutes of the hour immediately preceding the start of the test. Record all information concerning raking, fuel additions, etc. on Data Sheet #13.
- L. If necessary, sometime during the last 15 minutes before the start of the test, open the door and brake up all large pieces and then rake and level the pretest fuel in the stove. At this time, level the coal bed as necessary to accommodate loading the fuel charge into the stove. Close the door. Total time door can be open during the last 15 minutes is 1 minute. No further manipulation of the stove is allowed during the 15 minutes immediately preceding the start of the test.
- M. When the weight of the coal bed equals 20-25% of the weight of the test fuel charge, load the test fuel. Take a photograph of the fuel load in the stove immediately after loading the fuel. Leave the door open as per the manufacturer's instruction, but no longer than 5 minutes.
- N. Document all stove operating data from ignition through loading and test start up on Data Sheet #9.

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