TABLE 1 ----- RAW DATA

CLIENT : New Buck TEST No. : 2

MODEL: 91NC DATE:

TIME (MIN.)	METER READING (C F)	DELTA H (IN. H2O)	METER TEMP. (DEG. F)	PERCENT CO (%)	PERCENT CO2 (%)	SO2 COCENTR. PPM
0	447.500	0.150	89	1.46	5.00	550
5	449.000	0.410	89	0.44	7.10	325
10	451.642	0.180	89	0.62	2.20	500
15	453.361	0.220	89	0.50	2.70	450
20	455.271	0.180	89	0.49	2.90	500
25	456.990	0.220	89	0.35	5.10	450
30	458.900	0.180	89	0.45	4.10	400
35	460.619	0.220	89	0.42	3.10	450
40	462.529	0.270	89	0.22	5.20	400
45	464.677	0.270	89	0.15	5.20	400
50	466.825	0.270	89	0.25	7.50	400
55	468.973	0.270	89	0.27	7.30	400
60	471.121	0.270	90	0.27	7.80	400
65	473.277	0.270	90	0.23	7.30	400
70	475.433	0.270	90	0.30	7.90	400
75	477.589	0.270	90	0.37	7.50	400
80	479.745	0.270	90	0.28	8.40	400
85	481.901	0.270	91	0.31	8.60	400
90	484.064	0.270	91	0.32	8.90	400
95	486.228	0.270	91	0.33	8.60	400
100	488.392	0.270	91	0.28	7.90	400
105	490.555	0.240	93	0.53	7.00	425
110	492.607	0.240	93	0.64	6.80	425
115	494.659	0.240	93	0.58	6.10	425
120	496.710	0.240	93	0.61	5.80	425
125	498.762	0.240	93	0.44	6.00	425
130	500.813	0.270	93	0.37	6.80	400
135	502.993	0.270	93	0.36	6.50	400
140	505.172	0.240	93	0.42	5.70	425
145	507.224	0.210	93	0.63	5.30	450
150	509.162	0.190	93	0.85	4.80	475
155	510.998	0.210	93	0.86	4.30	450
160	512.935	0.190	94	0.99	4.50	475
165	514.778	0.210	94	0.71	4.40	450
170	516.723	0.190	94	0.93	4.10	475
175	518.566	0.210	94	0.93	4.80	450

180	520.511	0.240	94	0.68	4.30	425
185	522.570	0.240	94	0.66	4.00	425
190	524.629	0.240	94	0.70	4.70	425
195	526.688	0.240	94	0.77	4.80	425
200	528.747	0.240	94	0.85	4.00	425
205	530.806	0.240	94	1.08	4.60	425
210	532.865	0.240	94	1.15	4.10	425
215	534.924	0.240	94	1.30	4.50	425
220	536.983	0.240	94	1.41	4.60	425
225	539.041	0.240	94	1.53	4.50	425
230	541.100	0.240	94	1.64	4.40	425
235	543.159	0.240	94	1.58	4.40	425
240	545.218	0.230	94	1.18	4.40	425
245	547.285	0.230	94	1.23	4.30	425
250	549.352	0.230	94	1.35	4.10	425
255	551.419	0.230	94	1.44	4.40	425
260	553.485	0.230	94	1.50	4.20	425
265	555.552	0.230	94	1.63	3.90	425
270	557.619	0.230	94	1.62	3.90	425
275	559.685	0.230	94	1.73	3.80	425
280	561.752	0.210	94	1.46	4.00	450
285	563.704	0.190	94	1.42	4.00	475
290	565.554	0.190	94	1.46	3.80	475
295	567.403	0.210	94	1.38	3.90	450
300	569.355	0.190	94	1.22	3.90	475
305	571.202	0.190	94	1.29	3.70	475
310	573.048	0.190	94	1.28	3.80	475
315	574.894	0.190	94	1.28	3.90	475
320	576.741	0.190	94	1.11	4.80	475
325	578.587	0.190	94	1.36	5.00	475
330	580.434	0.190	94	1.40	5.00	475
335	582.280	0.190	94	1.39	5.00	475
340	584.126	0.190	94	0.92	5.30	475
345	585.973	0.190	94	0.94	5.20	475
350	587.819	0.190	94	1.03	5.20	475
355	589.666	0.190	94	1.10	4.90	475
360	591.512	0.190	94	1.04	4.90	475
365	593.358	0.190	94	1.14	4.80	475
370	595.205	0.190	94	1.24	4.60	475
375	597.051	0.190	94	1.16	4.50	475

TABLE 2---RAW DATA

CLIENT : New Buck TEST No. 2

MODEL: 91NC DATE:

METER CAL. FACTOR (Y) -------	0.901		Wt. WOOD BURNED(LB) -------	20.5	Lbs
BAROMETRIC PRESS.(Pb) -------	29.83	in Hg	WET,FUEL MOISTURE % -------	16.33	%
LEAK RATE POST (Lp) -------	0.000	cfm	Wt. PART. COLLECTED -------	0.7203	g
WATER VOL. (V1c) -------	200.1	Ml	METER VOLUME Vm -------	149.551	mcf
TEST TIME (MIN) -------	375	min	HC MOLE FRACTION -------	0.0132	

TABLE 3 -----FIELD DATA AVERAGES

CLIENT : New Buck TEST No. 2

MODEL: 91NC DATE:

****

AVG DELTA H	-------	0.23	in H2O	AVG PRCNT CO	-------	0.89	%
AVG METER TEMP. Tm	-------	93	deg F	AVG PRCNT CO2	-------	5.12	%
AVG PPM SO2	-------	439	PPM	AVG BAL CO2/CO	-------	5.74	%

TABLE 4 ---- CALCULATIONS

CLIENT : New Buck TEST No. 2

MODEL: 91NC DATE:

****

STD SAMPLE VOL. Vm(std) d) ------	128.44 dscf	STACK GAS FLOW Qsd -------	611.433	dscf/Hr	
			10.19	& dscf/min	
VOL. WATER VAPOR Vw(s td) -----	9.419 scf	PARTICULATE CONCTRT. C s ------	0.0056	g/dscf	
PRCNT MSTR Bws -------	6.83 %	PARTC.EMISS. RATE E -------	3.43	g/Hr	
BURN RATE BR -------	1.25 Kg/Hr	MOLES OF GAS PER Lb WOOD Nt ----	0.58	Lb-mole/Lb	
CO EMISSION RATE -------	182.69 g/Hr & 146.74 g/Kgdry fuel	PART.EMISS. RATE ------	2.75	g/Kgdry fuel	

TABLE 5 ---- PROPORTIONAL RATE VARIATION

CLIENT : New Buck TEST No. : 2

MODEL: 91NC DATE:

TIME INTEVAL Ti	PPM * Vm	PROPRTN. RATE VAR. PR	PROPRTN RATE VAR. AVERAGE
5	713.1	96	100
10	742.7	100	
15	743.0	100	
20	743.1	100	
25	743.0	100	
30	743.1	100	
35	594.4	80	
40	743.1	100	
45	742.9	100	
50	742.9	100	
55	742.9	100	
60	742.2	99	
65	744.3	100	
70	744.3	100	
75	744.3	100	
80	744.3	100	
85	743.6	100	
90	745.4	100	
95	745.7	100	
100	745.7	100	
105	744.0	100	
110	748.5	100	
115	748.5	100	
120	748.2	100	
125	748.5	100	
130	748.2	100	
135	748.5	100	
140	748.2	100	
145	748.5	100	
150	748.5	100	
155	748.5	100	
160	747.4	100	
165	750.0	101	
170	749.8	100	
175	750.0	101	
180	749.8	100	

185	749.7	100
190	749.7	100
195	749.7	100
200	749.7	100
205	749.7	100
210	749.7	100
215	749.7	100
220	749.7	100
225	749.4	100
230	749.7	100
235	749.7	100
240	749.7	100
245	752.6	101
250	752.6	101
255	752.6	101
260	752.3	101
265	752.6	101
270	752.6	101
275	752.3	101
280	752.6	101
285	752.5	101
290	752.8	101
295	752.4	101
300	752.5	101
305	751.6	101
310	751.2	101
315	751.2	101
320	751.6	101
325	751.2	101
330	751.6	101
335	751.2	101
340	751.2	101
345	751.6	101
350	751.2	101
355	751.6	101
360	751.2	101
365	751.2	101
370	751.6	101
375	751.2	101

COMPUTER INPUT DATA SHEET #1

Client: New Buck Corp

Address: P.O. Box 69
Spruce Pine, NC 28777

Phone: 888-622-7868 Fax: 828-765-0462

Run No.: 2 Date of Test: 2-1-2010 Burn Rate: 1.245

Model No.: 91 NC ☐ min ☒ min-1.25 ☐ fan

Stove Type: ☐ Cat ☒ Non Cat ☐ Pellet ☐ 1.25-1.9 ☐ max ☐ Insert

Dry Gas Meter Y Factor: .901 (0.000) (Data Sheet #2)
Post Leak Rate: 0.000 cfm (.000) (Data Sheet #2)
Time: 375 min. (000) (Data Sheet #2)

Dry Gas Meter Volume: 149.551 cf (00.000) (Data Sheet #2)

Stack Flow: 7.698 dscfm (00.000) (Data Sheet #2)
Δ H: .23 in. H_2O (.000) (Data Sheet #2)

Maximum Vac.: 3.0 (0.0) (Data Sheet #2)
Barometric Pressure: 29.83 in. Hg (00.00) (Data Sheet #2)

H_2O Captured: 200.1 g (00.0) (Data Sheet #3)

Front Half Catch % Of Total: 22.4 % (00.0) (Data Sheet #6)
Total Particulate Catch: .7203 g (0.0000) (Data Sheet #6)

Flue Gas Moisture: 6.8281 % (00.000) (Data Sheet #7)

Particulate Emission: .0865 gr/dscf (0.0000) (Data Sheet #7)

Relative Humidity: 30.5 % RH (00.0) (Data Sheet #8)
Ambient Moisture: 1.15 % H_2O (0.00) (Data Sheet #8)

Preburn Fuel Wt.: 47.8 lbs. (00.0) (Data Sheet #8)
Coal Bed Wt.: 4.1 lbs. (00.0) (Data sheet #8)
Test Fuel Wt.: 20.5 lbs. (00.0) (Data sheet #8)

Heat Output (EPA Default): 15012.5 BTU/hr (00,000.0) (Data Sheet #8)

Kindling Fuel % Moisture (wet): 13.370 % (00.000) (Data Sheet #10)
Pretest Fuel % Moisture (wet): 16.084 % (00.000) (Data Sheet #10)

Test Fuel % Moisture (dry): 19.517 % (00.000) (Data Sheet #10 [wood stove] or #11 [pellet stove])
Test Fuel % Moisture (wet): 16.330 %

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

Stack Static Pressure: -.041 in. H_2O (+/- .000) (Data Sheet #12)

Average Ambient Temperature: 75 °F (00) (Data Sheet #14)
Stove Temperature Change: -66.5 °F (+/- 000.0) (Data Sheet #14)

Test start = 1000
End = 1615

meter Temp = 553

METER BOX DATA SHEET PAGE # 2

Page: 1 of 4

UNIT: Buck 91 NC RUN: 2 DATE: 2-1-2010

Meter Box: SH Y Factor: .901

Leak checks: 15 " Hg @ 0.000 cfm _____ " Hg @ _____ cfm

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

Inject SO^2 @ 100 cc/min. Nozzle: Probe @ 3/8 " od Initial Volume: 1.500

ROTO: PRESS: .18 SAMPLING RATIO: 20.5 : 1 BP: 29.86

MIN	TIME	METER READING	SAMPLE MDCF	STACK DSCFM	DELTA H	METER TEMP	SO2 PPM	ROTO TEMP	PUMP VACC
0	1000	447.500	——	6.167	.15	89	550	89	2.0
5	05	449.000		10.436	.41	89	325	89	3.0
10	10	451.642	451.642	6.783	.18	89	500	89	2.0
15	15	453.361	453.361	7.537	.22	89	450	89	2.0
20	20	455.271	455.271	6.783	.18	89	500	89	2.0
25	25	456.990	456.990	7.537	.22	89	450	89	2.0
30	30	458.900	458.900	6.783	.18	89	500	89	2.0
35	35	460.619	460.619	7.537	.22	89	450	89	2.0
40	40	462.529	462.529	8.479	.27	89	400	89	2.0
45	45	464.677	464.677	8.479	.27	89	400	89	2.0
50	50	466.825	466.825	8.479	.27	89	400	89	2.0
55	55	468.973	468.973	8.479	.27	89	400	89	2.0
ROTO PRESS:		.18	TOTALS:	93.479	2.84	1068	BP.: 29.86		
60	1100	471.121	471.121	8.464	.27	90	400	90	2.0
65	05	473.277	473.277	8.464	.27	90	400	90	2.0
70	10	475.433	475.433	8.464	.27	90	400	90	2.0
75	15	477.589	477.589	8.464	.27	90	400	90	2.0
80	20	479.745	479.745	8.464	.27	90	400	90	2.0
85	25	481.901	481.901	8.448	.27	91	400	91	2.0
90	30	484.064	484.064	8.448	.27	91	400	91	2.0
95	35	486.228	486.228	8.448	.27	91	400	91	2.0
100	40	488.392	488.392	8.448	.27	91	400	91	2.0
105	45	490.555	490.555	7.923	.24	93	425	93	2.0
110	50	492.607	492.607	7.923	.24	93	425	93	2.0
115	55	494.659	494.659	7.923	.24	93	425	93	2.0
			TOTALS:	99.881	3.15	1093	MAX VACC =		
TOTAL Cu Ft.			TOTALS:	193.360	5.99	2161	AVG. BP:		

METER BOX DATA SHEET PAGE # 2

Page: 2 of 4

UNIT: Buck 91 NC RUN: 2 DATE: 2 - 1 - 2010

Meter Box: SH Y Factor: .901

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

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

Inject SO^2 @ 100 cc/min. Nozzle : Probe @ 3/8 " od Initial Volume: 1.500

ROTO: PRESS: .18			SAMPLING RATIO: 20.5 : 1				BP: 29.86		
MIN	TIME	METER READING	SAMPLE MDCF	STACK DSCFM	DELTA H	METER TEMP	SO2 PPM	ROTO TEMP	PUMP VACC
120	1200	496.710	496.710	7.923	.24	93	425	93	2.0
125	05	498.762	498.762	7.923	.24	93	425	93	2.0
130	10	500.813	500.813	8.418	.27	93	400	93	2.0
135	15	502.993	502.993	8.418	.27	93	400	93	2.0
140	20	505.172	505.172	7.923	.24	93	425	93	2.0
145	25	507.224	507.224	7.482	.21	93	450	93	2.0
150	30	509.162	509.162	7.089	.19	93	475	93	2.0
155	35	510.998	510.998	7.482	.21	93	450	93	2.0
160	40	512.935	512.935	7.076	.19	94	475	94	2.0
165	45	514.778	514.778	7.469	.21	94	450	94	2.0
170	50	516.723	516.723	7.076	.19	94	475	94	2.0
175	55	518.566	518.566	7.469	.21	94	450	94	2.0
ROTO PRESS: .18			TOTALS:	91.748°	2.67°	1120°	BP.: 29.86		
180	1300	520.511	520.511	7.908	.24	94	425	94	2.0
185	05	522.570	522.570	7.908	.24	94	425	94	2.0
190	10	524.629	524.629	7.908	.24	94	425	94	2.0
195	15	526.688	526.688	7.908	.24	94	425	94	2.0
200	20	528.747	528.747	7.908	.24	94	425	94	2.0
205	25	530.806	530.806	7.908	.24	94	425	94	2.0
210	30	532.865	532.865	7.908	.24	94	425	94	2.0
215	35	534.924	534.924	7.908	.24	94	425	94	2.0
220	40	536.983	536.983	7.908	.24	94	425	94	2.0
225	45	539.041	539.041	7.908	.24	94	425	94	2.0
230	50	541.100	541.100	7.908	.24	94	425	94	2.0
235	55	543.159	543.159	7.908	.24	94	425	94	2.0
			TOTALS:	94.896°	2.88°	1128°	MAX VACC =		
TOTAL Cu Ft.			TOTALS:	186.644	5.55°	2248°	AVG. BP:		

METER BOX DATA SHEET PAGE # 2

Page: 3 of 4

UNIT: Buck 91 INC RUN: 2 DATE: 2-1-2010

Meter Box: 5H Y Factor: .901

Leak checks: 15 " Hg @ 1.000 cfm _____ " Hg @ _____ cfm

15 " Hg @ 2.000 cfm _____ " Hg @ _____ cfm

Inject SO^2 @ 100 cc/min. Nozzle: Probe @ 3/8 " od Initial Volume: 1.500

ROTO: PRESS: .18			SAMPLING RATIO: 20.5 : 1				BP: 29.75		
MIN	TIME	METER READING	SAMPLE MDCF	STACK DSCFM	DELTA H	METER TEMP	SO2 PPM	ROTO TEMP	PUMP VACC
240	1400	545.218	545.218	7.879	.23	94	425	94	2.0
245	05	547.285	547.285	7.879	.23	94	425	94	2.0
250	10	549.352	549.352	7.879	.23	94	425	94	2.0
255	15	551.419	551.419	7.879	.23	94	425	94	2.0
260	20	553.485	553.485	7.879	.23	94	425	94	2.0
265	25	555.552	555.552	7.879	.23	94	425	94	2.0
270	30	557.619	557.619	7.879	.23	94	425	94	2.0
275	35	559.685	559.685	7.879	.23	94	425	94	2.0
280	40	561.752	561.752	7.441	.21	94	450	94	2.0
285	45	563.704	563.704	7.050	.19	94	475	94	2.0
290	50	565.554	565.554	7.050	.19	94	475	94	2.0
295	55	567.403	567.403	7.441	.21	94	450	94	2.0
ROTO PRESS: .18			TOTALS:	92.014	2.64	1128	BP.: 29.80		
300	1500	569.355	569.355	7.062	.19	94	475	94	2.0
305	05	571.202	571.202	7.062	.19	94	475	94	2.0
310	10	573.048	573.048	7.062	.19	94	475	94	2.0
315	15	574.894	574.894	7.062	.19	94	475	94	2.0
320	20	576.741	576.741	7.062	.19	94	475	94	2.0
325	25	578.587	578.587	7.062	.19	94	475	94	2.0
330	30	580.434	580.434	7.062	.19	94	475	94	2.0
335	35	582.280	582.280	7.062	.19	94	475	94	2.0
340	40	584.126	584.126	7.062	.19	94	475	94	2.0
345	45	585.973	585.973	7.062	.19	94	475	94	2.0
350	50	587.819	587.819	7.062	.19	94	475	94	2.0
355	55	589.666	589.666	7.062	.19	94	475	94	2.0
			TOTALS:	84.744	2.28	1128	MAX VACC =		
TOTAL Cu Ft.			TOTALS:	176.758	4.92	2256	AVG. BP:		

METER BOX DATA SHEET PAGE # 2

Page: 4 of 4

UNIT: Buck 91 NC RUN: 2 DATE: 2-1-2010

Meter Box: 5H Y Factor: .901

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

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

Inject SO^2 @ 100 cc/min. Nozzle:Probe @ 3/8 " od Initial Volume: 1.500

ROTO: PRESS: .18 SAMPLING RATIO: 20.5 : 1 BP: 29.80

MIN	TIME	METER READING	SAMPLE MDCF	STACK DSCFM	DELTA H	METER TEMP	SO2 PPM	ROTO TEMP	PUMP VACC
360	1600	591.512	591.512	7.062	.19	94	475	94	2.0
365	05	593.358	593.358	7.062	.19	94	475	94	20
370	10	595.205	595.205	7.062	.19	94	475	94	20
375	15	597.051	597.051	7.062	.19	94	475	94	20
380	20			(28.248)	(1760)	(376)			
385									
390									
395									
400									
405									
410									
415									
ROTO PRESS:			TOTALS:				BP.:		
420									
425									
430									
435									
440									
445									
450									
455									
460									
465									
470						704			
475				585.610	17.22				
			TOTALS:			93	MAX VACC =		3.0
TOTAL Cu Ft.		149.551	TOTALS:	7,698	.23	553	AVG. BP:		29.83

PARTICULATE CATCH / MOISTURE DATA SHEET # 3

UNIT : Buck 91 NC RUN : 2 DATE : 2-1-10

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	765.7	590.6	487.0	910.0
INITIAL WT	610.0	580.0	483.7	879.5
NET WT GRAMS	155.7	10.6	3.3	30.5

TOTAL CATCH : 200.1 GRAMS H_2O

FRONT HALF

FILTER #	179F	
FINAL WT g	.7455	
INITIAL WT g	.6569	
NET WT g	.0886	

BEAKER #	41
DESC.	ACETONE
FINAL WT g	105.5593
INITIAL WT g	105.4859
NET WT g	.0734
VOL. DESC. ml	75

BACK HALF

FILTER #	179B	
FINAL WT g	.4825	
INITIAL WT g	.3621	
NET WT g	.1204	

BEAKER #	42	43	44	45	
DESC.	ACETONE	METHCHLOR	H_2O	H_2O	
FINAL WT g	104.8340	107.4034	107.9172	95.0395	
INITIAL WT g	104.6680	107.3537	107.7897	94.9353	
NET WT g	.1660	.0497	.1275	.1042	(.2317)
VOL. DESC ml	125	75	200	170	370

FILTER TARE WEIGHTS DATA SHEET #4-1

Into Dessicator : Date : 9-5-2008 Time : 1100 By : [illegible]

Manufacturer S & S Grade : # 25 Glass Front Size : 11 cm Lot No. : 413903

Back Size: 8.2 cm Lot No. :

	DATE: 9-8-2008	BY: AV	DATE: 9-9-2008	BY: AV	DATE:	BY:
FILTER #	FIRST WEIGHT	TIME	SECOND WEIGHT	TIME	THIRD WEIGHT	TIME
171F	0.6555	1015	0.6556	1042	✓	
172F	0.6527	1016	0.6528	1043	✓	
173F	0.6540	1017	0.6539	1044	✓	
174F	0.6560	1018	0.6557	1045	✓	
175F	0.6615	1019	0.6614	1046	✓	
176F	0.6597	1020	0.6597	1047	✓	
177F	0.6630	1021	0.6628	1048	✓	
178F	0.6605	1022	0.6606	1049	✓	
179F	0.6570	1023	0.6569	1050	✓	
180F	0.6569	1024	0.6568	1051	✓	
171B	0.3610	1025	0.3609	1052	✓	
172B	0.3624	1026	0.3621	1053	✓	
173B	0.3632	1027	0.3630	1054	✓	
174B	0.3628	1028	0.3627	1055	✓	
175B	0.3611	1029	0.3609	1056	✓	
176B	0.3644	1030	0.3643	1057	✓	
177B	0.3625	1031	0.3622	1058	✓	
178B	0.3699	1032	0.3697	1059	✓	
179B	0.3625	1033	0.3621	1100	✓	
180B	0.3614	1034	0.3616	1101	✓	

Checked by: C. Wedington Date: 9-10-08 Time: 1057

BALANCE ROOM ENVIRONMENTAL CONDITIONS

DATE	TIME	BY	WB	DB	% RH
9-8-08	0930	[illegible]	S	77	49
9-9-08	1000	[illegible]		74	48

BEAKER TARE WEIGHTS DATA SHEET #4-2

Into Dessicator: Date : 9-23-2008 Time : 1030 By : AV

BEAKER #	DATE: 9-25-2008 FIRST WEIGHT	BY: AV TIME	DATE: 9-26-08 SECOND WEIGHT	BY: AV TIME	DATE: 9-29-08 THIRD WEIGHT	BY: TIME
26	101.0352	0945	101.0355	0930	✓	
27	106.3746	0946	106.3749	0931	✓	
28	105.7466	0947	105.7468	0932	✓	
29	104.4535	0948	104.4530	0933	✓	
30	107.3581	0949	107.3579	0934	✓	
31	95.5473	0950	95.5468	0935	✓	
32	107.8637	0951	107.8634	0936	✓	
33	101.1710	0952	101.1707	0937	✓	
34	106.4622	0953	106.4619	0938	✓	
35	96.5574	0954	96.5572	0939	✓	
36	94.4553	0955	94.4548	0940	✓	
37	106.5990	0956	106.5991	0941	✓	
38	96.2484	0957	96.2487	0942	96.2482	1000 ✓
39	97.1354	0958	97.1349	0943	✓	
40	106.4674	0959	106.4672	0944	✓	
41	105.4858	1000	105.4859	0945	✓	
42	104.6688	1001	104.6675	0946	104.6680	1001 ✓
43	107.3542	1002	107.3537	0947	✓	
44	107.7903	1003	107.7893	0948	107.7897	1002 ✓
45	94.9358	1004	94.9353	0949	✓	
46	106.0465	1005	106.0460	0950	✓	
47	107.0358	1006	107.0357	0951	✓	
48	97.7473	1007	97.7476	0952	✓	
49	108.3554	1008	108.3555	0953	✓	
50	96.5304	1009	96.5306	0954	✓	

BALANCE ROOM ENVIRONMENTAL CONDITIONS

DATE	TIME	BY	WB	DB	% RH	
9-25-08	0930	CM		78	46	Checked by :
9-26-08	0920	CM		78	46	Date :
9-29-08	0955	AV		78	46	Time :

WOODSTOVE DATA SHEET # 4-3 : CONSTANT WEIGHTS

UNIT : Rock 9 : NC **RUN :** 2 **DATE :** 2-1-10 **Page :** 1 **of**

Beaker #	Date	Time	By	Weight	Date	Time	By	Weight	Date	Time	By	Weight	Date	Time	By
41	2-2	1100	CP	105.5598	2-4	1020	CP	105.5593	2-5	1022	CP				
42	2-2	1100	CP	104.8845	2-4	1021	CP	104.8340	2-5	1023	CP				
43	2-2	1100	CP	107.4063	2-4	1022	CP	107.4039	2-5	1024	CP	107.4034	2-7	1410	CP
44	2-2	1100	CP	107.9190	2-4	1023	CP	107.9175	2-5	1025	CP	107.9172	2-7	1411	CP
45	2-2	1100	CP	95.0400	2-4	1024	CP	95.0395	2-5	1026	CP				

Filter #	Date	Time	By	Weight	Date	Time	By	Weight	Date	Time	By	Weight	Date	Time	By
179F	2-1	1800	CP	.7518	2-2	1115	CP	.7478	2-4	1026	CP	.7460	2-5	1020	CP
				.7455	2-7	1405	CP								
179B	2-1	1800	CP	.4883	2-2	1116	CP	.4854	2-4	1024	CP	.4830	2-5	1021	CP
				.4825	2-7	1406	CP								

SCALE ROOM ENVIRONMENTAL CONDITIONS

Weighing Session	Date	Time	By	DB	%RH
1	2-2-10	1100	CP	72	46
2	2-4-10	1015	CP	75	41
3	2-5-10	1015	CP	78	43
4	2-7-10	1400	CP	70	44
5					

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

.1075
.1070

.12
.10

WOODSTOVE DATA SHEET #4-4

SCALE QA SHEET

Dates: From 2-26-2010 Through	Scale: Sartorius	Model: A 120 S	SN: 37010004

100 g weight	10 g weight	1 g weight	100 mg weight	Tech	Date	Time	Dry Bulb	% RH
100.0001	10.0004	.9999	.0999	CP	2-26-10	0840	72	46
100.0001	9.9999	.9999	.0999	CP	2-27-10	1045	72	46
100.0000	10.0000	1.0000	.0999	CP	2-28	1100	70	48
100.0000	10.0000	1.0000	.0999	CP	3-1	0900	66	49
100.0000	10.0002	.9998	.1002	CP	3-5	1200	70	48
100.0001	9.9999	.9999	.0998	CP	3-7	1330	68	47
100.0000	9.9999	.9999	.0999	CP	3-9	1130	70	41
100.0000	10.0001	1.0000	.0999	CP	3-10	1200	70	44
100.0000	10.0001	.9999	.0999	CP	3-11	0900	66	49

WOODSTOVE DATA SHEET #4-4

SCALE QA SHEET

Dates: From 5-10-2009 Through 2-25-2010	Scale: Sartorius	Model: A 120 S	SN: 37010004

100 g weight	10 g weight	1 g weight	100 mg weight	Tech	Date	Time	Dry Bulb	% RH
100.0001	10.0002	1.0000	.0999	CP	5-10	1545	74	44
100.0001	10.0001	.9999	.0999	CP	6-19	1110	70	48
100.0001	10.0000	.9998	.0998	CP	6-22	0930	74	44
100.0001	10.0000	.9999	.0999	CP	6-24	1610	78	46
100.0001	10.0000	1.0000	.0999	CP	6-25	1000	78	46
100.0001	10.0001	1.0001	.0999	CP	6-26	0900	73	47
99.9998	10.0000	1.0001	.1000	CP	6-27	1300	76	45
100.0000	10.0002	1.0000	.0999	CP	6-28	1400	78	43
100.0000	10.0000	1.0000	.0999	CP	6-29	1130	74	47
100.0000	10.0000	1.0000	.0999	CP	7-1	1230	70	48
100.0000	9.9998	1.0000	.0998	CP	8-7	1310	75	48
99.9998	10.0000	1.0000	.0999	CP	8-8	1600	77	46
100.0000	10.0000	1.0000	.0999	CP	8-9	1720	78	46
100.0002	9.9999	1.0000	.0998	CP	8-10	0900	78	46
100.0000	10.0001	1.0001	.0998	CP	8-11	1126	78	46
100.0003	10.0001	1.0001	.1000	CP	8-12	0960	78	46
100.0000	10.0000	1.0001	.1000	CP	8-14	1630	78	46
100.0000	10.0000	1.0001	.0999	CP	8-19	0900	74	47
100.0002	10.0001	1.0000	.1000	CP	8-24	0900	72	42
100.0000	9.9999	.9999	.0999	CP	8-25	0900	70	48
100.0000	10.0000	1.0000	.0999	CP	8-26	1340	77	46
100.0003	10.0000	.9999	.1000	CP	9-5	1120	77	49
100.0000	10.0001	1.0000	.0999	CP	9-8	1410	78	41
100.0000	10.0001	1.0001	.0998	CP	9-11	1050	78	43
100.0000	10.0000	1.0000	.0999	CP	9-12	1220	78	46
100.0000	10.0001	1.0000	.0999	CP	9-13	1430	78	46
100.0000	10.0001	.9999	.1000	CP	9-14	1100	75	48
100.0000	10.0000	.9999	.0999	CP	1-29	1400	74	44
100.0000	10.0001	1.0000	.1000	CP	1-30	1800	78	46
100.0000	10.0001	1.0001	.1000	CP	2-1	0700	62	49
100.0000	9.9999	1.0001	.1000	CP	2-2	1100	72	46
100.0000	9.9997	1.0001	.1000	CP	2-4	1015	75	41
100.0000	10.0000	1.0000	.0998	CP	2-5	1015	78	43
100.0000	10.0001	1.0000	.1000	CP	2-7	1400	70	44
100.0002	10.0001	1.0000	.0999	CP	2-8	1200	78	46
100.0000	10.0000	1.0000	.1000	CP	2-9	1030	78	40
100.0000	10.0000	1.0000	.0999	CP	2-23	1830	77	49
100.0000	10.0001	1.0000	.0999	CP	2-24	0820	69	49
100.0000	10.0002	1.0000	.0999	CP	2-25	0940	69	47

WOODSTOVE DATA SHEET #4-4

SCALE QA SHEET

Dates: From 8-27-2008 Through 5-9-2009	Scale: Sartorius	Model: A 120 S	SN: 37010004

100 g weight	10 g weight	1 g weight	100 mg weight	Tech	Date	Time	Dry Bulb	% RH
99.9999	10.0000	1.0000	.0999	CP	8-27	0900	78	46
100.0001	10.0000	1.0000	.0999	CP	8-28	0930	78	46
100.0001	10.0001	1.0001	.0997	CP	8-29	1300	78	46
100.0000	10.0000	1.0000	.1000	CP	8-30	1030	78	46
100.0001	10.0003	1.0001	.0999	CP	8-31	1015	76	49
100.0000	10.0001	1.0000	.0997	CP	9-1	1100	74	44
100.0000	10.0001	.9999	.1000	CP	9-2	0845	75	48
99.9999	10.0000	.9999	.0998	CP	9-4	1000	77	47
99.9999	10.0002	1.0001	.0999	CP	9-8	0930	77	49
99.9999	9.9999	.9998	.0998	CP	9-9	1000	74	48
99.9997	9.9997	1.0000	.0999	CP	9-11	1500	76	45
100.0000	9.9997	.9999	.0999	CP	9-17	0930	77	49
100.0000	10.0000	1.0000	.0999	CP	9-18	0900	78	46
100.0000	10.0000	.9999	.0999	CP	9-19	0915	78	49
100.0000	10.0001	.9999	.0999	CP	9-22	1030	77	46
100.0000	10.0001	1.0000	.0998	CP	9-24	1330	78	49
100.0001	10.0001	1.0000	.0999	CP	9-25	0930	78	46
100.0000	9.9999	1.0001	.0998	CP	9-26	0920	78	46
100.0001	9.9999	1.0001	.0999	AV	9-29	0955	78	46
100.0000	10.0001	1.0000	.0998	CP	10-2	0945	75	44
100.0000	10.0000	1.0000	.0999	CP	10-3	0930	78	46
100.0000	9.9999	1.0000	.0999	CP	10-4	1530	78	46
100.0000	9.9999	.9999	.0999	CP	10-6	0930	77	49
100.0000	10.0001	1.0002	.1000	CP	10-7	1700	78	49
100.0000	10.0000	1.0000	.0999	CP	10-8	1000	78	49
99.9999	10.0000	1.0001	.0999	CP	10-9	1030	78	43
100.0000	9.9999	1.0001	.1000	CP	10-10	0930	78	40
100.0000	9.9998	.9999	.0997	CP	10-11	1430	74	47
100.0000	10.0001	1.0000	.1000	CP	10-13	0940	78	46
100.0000	10.0000	.9999	.0999	CP	10-14	2030	77	49
100.0000	10.0002	1.0000	.1000	CP	10-16	1220	78	43
100.0000	9.9999	1.0000	.0999	CP	10-18	1130	74	47
99.9998	10.0000	.9999	.0999	CP	5-3	1200	78	43
100.0000	10.0001	1.0000	.0999	CP	5-4	1000	72	42
100.0000	10.0001	1.0000	.0997	CP	5-5	1000	76	45
99.9998	10.0000	1.0000	.0999	CP	5-6	1100	77	49
100.0000	10.0001	1.0001	.1000	CP	5-7	1600	77	42
100.0000	10.0001	1.0000	.0999	CP	5-8	1600	76	45
100.0000	10.0003	1.0000	.1000	CP	5-9	1300	76	38

WOODSTOVE DATA SHEET #4-4

SCALE QA SHEET

Dates: From 10-22-07 Through 8-26-2008	Scale: Sartorius	Model: A 120 S	SN: 37010004

100 g weight	10 g weight	1 g weight	100 mg weight	Tech	Date	Time	Dry Bulb	% RH
100.0006	10.0001	1.0000	.0998	CP	10-22	1630	78	46
99.9999	10.0001	1.0000	.1001	CP	10-23	1000	74	44
100.0002	10.0002	1.0002	.0999	CP	10-24	1400	73	47
100.0002	10.0000	1.0001	.0998	CP	10-26	1700	74	40
100.0003	10.0001	1.0001	.0999	CP	10-27	0820	78	40
99.9999	10.0000	.9999	.0997	CP	10-28	1210	78	40
100.0000	9.9999	.9999	.0999	CP	10-29	1700	76	42
99.9998	9.9999	.9999	.1000	CP	10-30	1600	78	43
99.9997	10.0000	.9999	.0999	CP	11-16	1500	68	47
100.0001	10.0002	1.0000	.0999	CP	11-19	1730	73	40
100.0000	10.0002	.9999	.0999	CP	11-20	1100	69	44
99.9998	9.9999	.9999	.0998	CP	1-18-08	1230	76	45
100.0002	10.0002	.9999	.0999	CP	1-21-08	1430	65	48
99.9999	10.0002	1.0001	.0999	CP	1-22-08	1200	68	47
100.0002	9.9999	.9999	.0998	CP	1-23-08	1400	74	47
99.9999	10.0000	1.0002	.1000	CP	1-31-08	1900	74	44
100.0000	10.0003	1.0000	.0996	CP	2-1-08	1530	76	45
99.9997	9.9999	.9999	.0999	CP	2-16-08	1700	68	47
100.0001	10.0002	1.0000	.1000	CP	2-18-08	1400	72	46
99.9999	10.0001	.9999	.0998	CP	2-22-08	1800	68	47
99.9999	10.0001	1.0000	.0999	CP	2-23-08	1800	78	43
100.0000	10.0000	1.0000	.0999	CP	5-8-08	1030	78	43
100.0001	10.0001	1.0000	.0999	CP	5-9-08	0930	69	47
100.0000	10.0001	.9999	.0999	CP	5-10-08	1330	74	47
99.9998	9.9999	1.0000	.0998	CP	5-11-08	0900	74	44
100.0003	10.0001	.9999	.0998	CP	5-12	1400	70	48
99.9999	10.0001	1.0000	.1000	CP	5-13	1000	77	42
99.9999	9.9997	1.0000	.1000	CP	5-14	1230	77	42
99.9999	10.0001	.9999	.1000	CP	6-5-08	1430	72	46
100.0001	10.0000	1.0000	.0999	CP	6-9-08	1400	74	44
99.9999	9.9999	1.0000	.0999	CP	6-9-08	1800	73	47
100.0001	10.0001	.9999	.0998	CP	8-11-08	0930	77	42
100.0003	10.0000	1.0001	.0999	CP	8-12-08	1011	78	43
100.0000	10.0001	1.0000	.0999	CP	8-13-08	0950	76	49
100.0002	10.0000	1.0000	.0998	CP	8-18-08	0930	74	44
100.0001	9.9999	1.0000	.0998	CP	8-20-08	1110	76	45
100.0000	9.9999	.9999	.0998	CP	8-21-08	0915	75	48
100.0002	10.0000	1.0000	.1002	CP	8-22-08	0910	75	45
100.0000	10.0001	1.0001	.0999	CP	8-26-08	0900	78	43

BLANK PROCESSING DATA SHEET # 5

UNIT: Buck 91 NC RUN: 2 DATE: 2-1-10

BLANKS DONE: 10-30-2007

BEAKER	A	B	C
	200 ml ACETONE	75 ml DICHLOR	200 ml WATER
	FISHER OPTIMA LOT #023283	FISHER OPTIMA LOT #03 5941	DWNA Inc Sparklette Distilled
FINAL WEIGHT	108.9009	106.3077	106.9680
TARE WEIGHT	108.8995	106.3063	106.9644
NET WEIGHT	.0014	.0014	.0036

TARE BEAKERS INTO DESC : TIME: 1700 DATE: 10-20-07

DATE: 10-22 BY: CP DATE: 10-23 BY CP DATE: BY:

BEAKER	1 ST WT	TIME	2 ND WT	TIME	3 RD WT	TIME
A	108.8994	1700	108.8995	1027		
B	106.3060	1701	106.3063	1028		
C	106.9639	1702	106.9644	1029		

FINAL BEAKERS INTO DESC : TIME: 1040 DATE: 10-27-07

DATE: 10-29 BY CP DATE: 10-30 BY CP DATE: BY:

BEAKER	1 ST WT	TIME	2 ND WT	TIME	3 RD WT	TIME
A	108.9011	1721	108.9009	1619		
B	106.3074	1722	106.3077	1621		
C	106.9678	1723	106.9680	1622		

TARE QC

DATE	TIME	BY	WB	DB	%
10-22	1630	CP	S	78	46
10-23	1000	CP		74	44

FINAL QC

DATE	TIME	BY	WB	DB	%
10-29	1700	CP	S	76	42
10-30	1600	CP		78	43

NET PARTICULATE CATCH CALCULATION DATA SHEET #6

UNIT: Buck 91 NC RUN: 2 DATE: 2-1-10

BLANK CALCULATIONS

Acetone: .0014 g ÷ 200 ml = .000007 g/ml

Dicholoromethane: .0014 g ÷ 75 ml = .000019 g/ml

Distilled Water: .0036 g ÷ 200 ml = .000018 g/ml

FRONT HALF CATCH

FILTERS: .0886 (Total Catch) g - 1 (# of Filters) (.0000 g) (Blank Value / Filter) = .0886 g

BEAKERS: .0734 (Total Catch) g - 75 (ml Acetone) (.000007 g) (Blank Value / ml Acetone) = .0729 g

.0005

TOTAL FRONT HALF CATCH : .1615 g

BACK HALF CATCH

FILTERS: .1204 (Total Catch) g - 1 (# of Filters) (.0000 g) (Blank Value / Filter) = .1204 g

BEAKERS:

Acetone: .1660 (Total Catch) g - 125 (ml Acetone) (.000007 g) (Blank Value / ml Acetone) = .1651 g

.0009

Extract: .0497 (Total Catch) g - 75 (ml Dichloromethane) (.000019 g) (Blank Value / Dichloromethane) = .0483 g

(.0014)

Water: .2317 (Total Catch) g - 320 (ml Water) (.000018 g) (Blank Value / Water) = .2250 g

.0067

TOTAL BACK HALF CATCH : .5588 g

TOTAL CATCH : .7203 g

% FRONT HALF : 22.4 %

CALCULATIONS DATA SHEET # 7

UNIT: Buck 91 NC RUN: 2 DATE: 2 - 1 - 2010

1) $Vm(std) = \dfrac{(149.551\ Vm)(17.64)(.94\ mcf)\left(29.83"\ Hg + \frac{1.23"\ H_2O}{13.6}\right)}{(552\ TmA)} = \underset{000.0000}{128.5207}$ dscf

2) $Vw(std) = (.04707)(200.1\ ml\ H_2O) = \underset{00.0000}{9.4187}$ scf

3) $Asw = \dfrac{(9.4187\ scf)}{(9.4187\ scf + 128.5207\ dscf)} = \underset{.0000}{.0683}$ Bws × 100 = $\underset{00.0000}{6.8281}$ % H_2O

4) $Cs = \dfrac{(.7203\ g.)}{(128.5207\ dscf)}(15.43) = \underset{0.0000}{.0865}$ gr / dscf

5) Estimated g / hr $= \dfrac{(.7203\ g.)}{(128.5207\ dscf)}\left(\underset{00.0000}{7.698}\ dscfm\right)(60) = \underset{00.0000}{2.5886}$ 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_2O =	average delta H for test	(p. 2)	(.000 " H_2O)
TmA =	average meter temperature for test in degrees Absolute	(p. 2)	(000 TmA)
ml H_2O =	total water caught during test	(p. 3)	(000.0 ml H_2O)
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: Buck 91 NC RUN: 2 DATE: 2-1-2010

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

Wet Bulb / Dry Bulb

Pre : WB: 65 DB: 85 = 32 % RH 1.3 % H_2O

Post : WB: 60 DB: 80 = 29 % RH 1.0 % H_2O

Average: 30.5 % RH 1.15 % H_2O

Empty Stove Weight (lbs): N/A w/ stack & oil seal : Wet: — Dry: 0.0

Kindling Weight (lbs): Paper: .1 Wood: 2.6

Preburn Fuel Weight: 21.4 + 23.8 Total: 45.2

Kindling & Preburn Fuel Weight (wood only) (lbs): **Total**: 47.8

Coal Bed Wt Range (lbs): 5.1 - 4.1 **Scale**: 5.1 - 4.1

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**: 4.1

Maximum Coal Bed Removal (lbs): ((5.1 (Upper) + 4.1 (Lower)) ÷ 2) .25 = 1.1 (round down to nearest tenth)

Test Fuel (.75" x 1.5" x 5" spacers) = 18 pcs

Dimensions	Length in inches	No. Pcs	Weight in lbs	% of Load
2" x 4"	—	—	—	—
4" x 4"	14	6	20.5	100.0

Test Fuel Weight: 20.5 lbs

Estimated Dry Burn Rate:

$$\frac{20.5 - (20.5 \times .16330)}{2.2046} \times \frac{60}{\frac{375}{\text{TIME}}} = 1.245 \text{ kg / hr}$$

Estimated BTU's/hr: 19,140 x $\frac{63}{100}$ x $\frac{1.245}{\text{DBR}}$ = 15012.5 BTU's/hr

EPA Default Efficiencies: Non-cat: 63 Cat: 72 Pellet: 78

WOOD STOVE OPERATING DATA PAGE #9

Unit : Buck 91 NC Run : 2 Date : 2-1-2010

FIRE STARTED: 0559

WARM UP AND PREBURN:

PRIMARY AIR : Set wide open for all warm-up / preburn fuel charges. Then set to 1/8" 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 ½ min. prior to loading last fuel, raked and leveled. In stove 30 sec.

TEST:

DOOR wide open during loading 0 min. 40 sec.

PRIMARY AIR : Opened full for first 5 min., then set to run setting of 1/8".

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

FAN:

ON / (OFF) during warm-up (ON) / OFF during preburn

ON / (OFF) first 30 minutes of test (ON) / OFF balance of test run

Fan speed set at Low

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 : N/A BRAND : N/A

All Grades WCLB rules:

WARM UP INFORMATION:

All pre-burn / warm up fuel pieces were either 16 or — inches.

1st warm up / pre-burn fuel charge (21.4 lbs.) added at 0608

2nd warm up / pre-burn fuel charge (23.0 lbs.) added at 0735

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 _____

TEST DATA SHEET #10

Unit : Buck 91 NC Run : 2 Date : 2-1-2010

Room Temperature : 72 °F Temperature Correction Set? : (Yes) No

Calibration Check: 12.0% + or – 0.2%? (Yes) No

Time Test Fuel moisture reading taken : 0815

pc # 1	Dimen. 2"×4"×8'	Use K	TOP	BOTTOM	SIDE	Avg Corrected
2			16.5	14.7	15.1	15.433
3						
4	2"×4"×8'	P	20.6	21.3	21.2	21.0
5	2"×4"×8'	P	18.1	18.1	18.0	18.0
6	2"×4"×8'	P	19.0	18.2	18.3	18.5
7	2"×4"×8'	P				(57.5)
8	2"×4"×8'	P				
9						
10						
11						
12	4×4×14"	T	18.0	17.9	18.4	18.1
13	"	T	20.0	19.7	19.6	19.8
14	"	T	20.8	20.6	20.6	20.7
15	"	T	19.6	19.6	19.5	19.6
16	"	T	20.6	20.8	20.3	20.6
17	"	T	18.5	18.1	18.4	18.3
18						(117.1)
19						
20	Spacers	T	21.7	20.3	20.4	20.8

Key for Use : K = Kindling P = Pretest Fuel T = Test Fuel

	KINDLING	PRETEST FUEL	TEST FUEL
Dry Moisture % :	15.433 %	19.167 %	19.517 %
Wet Moisture % :	13.370 %	16.084 %	16.330 %

To obtain Wet from Dry : $\frac{100 \times \%\ \text{Dry Reading}}{100 + \%\text{Dry Reading}}$ = % Moisture, Wet Basis

Acceptable Ranges : 16 - 20 % wet: 19 - 25 % dry (17.5 - 22.5 on Meter Uncor. reading) at 70°

GAS DATA SHEET #12

WEIGHT: 4.1 DATE: 2-1-2

UNIT: Buck 91 NC RUN: 2 PAGE: 1 OF 3

Fan ?

TIME	SCALE	FUEL	DROP	V.	CO_2	V.	O_2	V.	CO	STATIC	SO_2PF
0 1000	24.6	20.5	—	.263	5.0	.571	14.3	.144	1.46	.032	550
5 05	23.8	19.7	.8	.284	7.1	.527	13.2	.042	.44	.070	.325
10 10	23.7	19.6	.1	.092	2.2	.714	17.9	.060	.62	.046	.500
15 15	23.5	19.4	.2	.112	2.7	.702	17.6	.048	.50	.043	.450
20 20	23.1	19.0	.4	.120	2.9	.694	17.4	.047	.49	.044	.500
25 25	22.8	18.7	.3	.206	5.1	.611	15.3	.033	.35	.047	.450
30 1030	22.3	18.2	.4	.168	4.1	.647	16.2	.043	.45	.045	.500
35 35	22.0	17.9	.3	.127	3.1	.686	17.2	.040	.42	.047	.450
40 40	21.2	17.1	.8	.211	5.2	.611	15.3	.020	.22	.053	.400
45 45	20.4	16.3	.8	.210	5.2	.615	15.4	.013	.15	.060	.400
50 50	19.6	15.5	.8	.300	7.5	.519	13.0	.023	.25	.061	.400
55 55	18.9	14.8	.7	.294	7.3	.527	13.2	.025	.27	.061	.400
SUBTOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	.609	*****
60 1100	18.2	14.1	.7	.315	7.8	.507	12.7	.025	.27	.062	.400
65 05	17.6	13.5	.6	.295	7.3	.527	13.2	.021	.23	.057	.400
70 10	17.0	12.9	.6	.318	7.9	.503	12.6	.028	.30	.058	.400
75 15	16.4	12.3	.6	.303	7.5	.515	12.9	.035	.37	.060	.400
80 20	15.8	11.7	.6	.336	8.4	.483	12.1	.026	.28	.061	.400
85 25	15.2	11.1	.6	.346	8.6	.471	11.8	.029	.31	.058	.400
90 1130	14.6	10.5	.6	.358	8.9	.459	11.5	.030	.32	.057	.400
95 35	14.0	9.9	.6	.344	8.6	.471	11.8	.031	.33	.056	.400
100 40	13.4	9.3	.6	.316	7.9	.503	12.6	.026	.28	.055	.400
105 45	12.8	8.7	.6	.283	7.0	.527	13.2	.051	.53	.054	.425
110 50	12.3	8.2	.5	.274	6.8	.531	13.3	.062	.64	.054	.425
115 55	11.9	7.8	.4	.244	6.1	.563	14.1	.056	.58	.054	.425
SUBTOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	.686	*****
120 1200	11.4	7.3	.5	.234	5.8	.571	14.3	.059	.61	.053	.425
125 05	10.8	6.7	.6	.242	6.0	.571	14.3	.042	.44	.052	.425
130 10	10.4	6.3	.4	.273	6.8	.543	13.6	.035	.37	.053	.400
135 15	9.9	5.8	.5	.261	6.5	.555	13.9	.034	.36	.053	.400
140 20	9.5	5.4	.4	.229	5.7	.583	14.6	.040	.42	.051	.425
145 25	9.1	5.0	.4	.212	5.3	.591	14.8	.061	.63	.051	.450
150 1230	8.8	4.7	.3	.192	4.8	.603	15.1	.083	.85	.048	.475
155 35	8.5	4.4	.3	.176	4.3	.623	15.6	.083	.85	.047	.450
160 40	8.3	4.2	.2	.184	4.5	.611	15.3	.097	.99	.045	.475
165 45	8.1	4.0	.2	.180	4.4	.623	15.6	.069	.71	.046	.450
170 50	7.8	3.7	.3	.168	4.1	.627	15.7	.091	.93	.045	.475
175 55	7.6	3.5	.2	.194	4.8	.599	15.0	.091	.93	.043	.450
SUBTOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	.587	*****
TOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	1.882	*****

GAS DATA SHEET #12

WEIGHT: 4.1 DATE: 2-1-2010

UNIT: Buck 91 NC RUN: 2 PAGE: 2 OF 3

TIME	SCALE	FUEL	DROP	V.	CO_2	V.	O_2	V.	CO	STATIC	SO_2PPM
180 1300	7.5	3.4	.1	.175	4.3	.631	15.8	.0616	.68	.041	.425
185 05	7.4	3.3	.1	.163	4.0	.643	16.1	.064	.66	.040	.425
190 10	7.3	3.2	.1	.189	4.7	.615	15.4	.068	.70	.039	.425
195 15	7.2	3.1	.1	.197	4.8	.607	15.2	.075	.77	.038	.425
200 20	7.1	3.0	.1	.163	4.0	.635	15.9	.083	.85	.037	.425
205 25	7.0	2.9	.1	.187	4.6	.603	15.1	.106	1.08	.036	.425
210 1330	6.9	2.8	.1	.166	4.1	.619	15.5	.113	1.15	.036	.425
215 35	6.8	2.7	.1	.183	4.5	.599	15.0	.128	1.30	.035	.425
220 40	6.7	2.6	.1	.187	4.6	.597	14.7	.139	1.41	.035	.425
225 45	6.5	2.4	.2	.184	4.5	.587	14.7	.151	1.53	.034	.425
230 50	6.4	2.3	.1	.177	4.4	.587	14.7	.162	1.64	.034	.425
235 55	6.3	2.2	.1	.178	4.4	.591	14.8	.156	1.58	.034	.425
SUBTOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	.439	*****
240 1400	6.2	2.1	.1	.179	4.4	.607	15.2	.116	1.18	.033	.425
245 05	6.1	2.0	.1	.174	4.3	.607	15.2	.121	1.23	.033	.425
250 10	6.1	2.0	.0	.165	4.1	.611	15.3	.133	1.35	.032	.425
255 15	6.0	1.9	.1	.178	4.4	.595	14.9	.142	1.44	.031	.425
260 20	5.9	1.8	.1	.170	4.2	.603	15.1	.148	1.50	.031	.425
265 25	5.8	1.7	.1	.158	3.9	.607	15.2	.161	1.63	.030	.425
270 1430	5.7	1.6	.1	.157	3.9	.607	15.2	.160	1.62	.030	.425
275 35	5.6	1.5	.1	.153	3.8	.607	15.2	.171	1.73	.031	.425
280 40	5.6	1.5	.0	.164	4.0	.611	15.3	.144	1.46	.030	.450
285 45	5.5	1.4	.1	.161	4.0	.611	15.3	.140	1.42	.030	.475
290 50	5.4	1.3	.1	.156	3.8	.619	15.5	.144	1.46	.029	.475
295 55	5.3	1.2	.1	.157	3.9	.619	15.5	.136	1.38	.029	.450
SUBTOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	.369	*****
300 1500	5.2	1.1	.1	.158	3.9	.623	15.6	.120	1.22	.030	.475
305 05	5.2	1.1	0	.150	3.7	.627	15.7	.127	1.29	.029	475
310 10	5.1	1.0	.1	.154	3.8	.623	15.6	.126	1.28	.029	475
315 15	5.0	.9	.1	.156	3.9	.623	15.6	.122	1.28	.029	475
320 20	4.9	.8	.1	.192	4.8	.595	14.9	.109	1.11	.028	475
325 25	4.9	.8	0	.202	5.0	.580	14.5	.134	1.36	.028	475
330 1530	4.8	.7	.1	.202	5.0	.581	14.5	.138	1.40	.028	475
335 35	4.7	.6	.1	.202	5.0	.582	14.5	.137	1.39	.028	475
340 40	4.6	.5	.1	.210	5.3	.584	14.6	.090	.92	.028	475
345 45	4.6	.5	0	.206	5.2	.585	14.7	.092	.94	.028	475
350 50	4.5	.4	.1	.206	5.2	.578	14.5	.101	1.03	.028	475
355 55	4.4	.3	.1	.197	4.9	.591	14.8	.108	1.10	.028	475
SUBTOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	.341	*****
TOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	1.149	*****

GAS DATA SHEET #12

WEIGHT: 4.1 DATE: 2-1-2010

UNIT: Buck 91 NC RUN: 2 PAGE: 3 OF 3

TIME	SCALE	FUEL	DROP	V.	CO_2	V.	O_2	V.	CO	STATIC	SO_2PPM
300 16:00	4.3	.2	.1	.195	4.9	.589	14.3	.102	1.04	-.028	475
305 05	4.3	.2	0	.191	4.8	.594	14.9	.112	1.14	-.028	475
310 10	4.2	.1	.1	.183	4.6	.594	14.9	.122	1.24	-.028	473
* 315 15	4.1	0	.1	.181	4.5	.604	15.1	.114	1.16	-.028	475
320 20											
325 25										-.112	
330 11:35											
335 35											
340 40											
345 45											
350 50											
355 55											
SUBTOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****		*****
420											
425											
430											
435											
440											
445											
450											
455											
460											
465											
470											
475											
SUBTOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****		*****
480											
485											
490											
495											
500											
505											
510											
515											
520											
525											
530											
535											
SUBTOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	-3.143	*****
TOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	-.041	*****

PREBURN DATA SHEET #:

UNIT: Buck 91 NC RUN: 2 DATE: 2-1-2016 PAGE: 1 of 1

TIME	SCALE	DROP	STACK	TOP	LF SIDE	BACK	RT SIDE	BOTTOM	FIREBOX	SEC/CAT	AMBIENT	STATIC	COMMENTS
0 0830	6.5	—	578	920	544	453	560	485			80	-.074	PREBURN START: @ 1.4 UP
5 35	6.1	.4	350	825	553	445	564	507			78	-.056	COAL BED SCALE RANGE:
10 40	5.8	.3	323	764	547	411	550	501			79	-.053	5.1 → 4.1
15 45	5.5	.3	306	721	526	370	530	486			79	-.049	PRIMARY AIR: 1/8"
20 50	5.3	.2	272	664	506	342	509	466			77	-.045	SECONDARY AIR: N/A
25 55	5.1	.2	247	550	487	322	488	449			78	-.040	FAN: LOW
30 0845	5.0	.1	233	487	464	306	468	435			78	-.039	PUMPS ON AT:
35 05	4.9	.1	230	453	452	299	451	416			76	-.039	CHECK WB/DB: N/A
40 10	4.8	.1	223	422	435	289	435	405			76	-.038	
45 15	4.7	.1	225	396	421	281	418	393			75	-.036	
50 20	4.6	.1	209	379	408	275	404	381			74	-.035	369
55 25	4.5	.1	205	366	398	269	393	371			74	-.035	
*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	
0 0930	4.5	.0	201	353	390	262	383	359			73	-.034	
5 35	4.4	.1	198	346	384	256	375	351			73	-.033	≈ 342
10 40	4.4	.0	195	336	374	253	367	340			72	-.032	
15 45	4.3	.1	193	330	369	249	361	332			73	-.033	
20 50	4.2	.1	189	325	362	246	357	323			72	-.032	
25 55	4.2	.0	188	319	357	239	350	313			72	-.031	322
30 1000	4.1	.1	200	305	352	230	346	303			72	-.032	315
35 1005													309
100 10													
105 15													
110 20													
115 25													

Buck Stoves-Model 91NC

Temperatue Data Sheet 14

Run 2
2/1/2010

Time *********	Stack Chn 103	Top Chn 104	LT Side Chn 105	Back Chn 106	Rt Side Chn 107	Bottom Chn 108	Firebox Chn 109	Sec/Cat Chn 110	Ambient Chn 111	Tube Furn Chn 112	Smpl Box Chn 113	Smpl Out Chn 114	C-Gas Box Chn 115	C-Gas Out Chn 116	SO2 Out Chn 117
0	201	305	352	230	346	303	######	######	77	1399	239	58	235	37	35
5	574	415	362	271	330	323	######	######	72	1398	239	44	235	37	35
10	241	428	362	275	324	325	######	######	71	1397	240	43	235	37	35
15	221	392	358	272	316	326	######	######	70	1397	240	43	236	37	35
20	230	446	354	269	309	325	######	######	70	1394	241	44	236	37	36
25	236	452	351	266	303	322	######	######	70	1392	241	44	235	38	36
30	248	483	351	265	299	319	######	######	69	1391	241	45	235	38	36
35	245	431	341	244	299	308	######	######	70	1390	242	45	235	38	36
40	344	544	333	220	301	285	######	######	71	1388	242	46	234	38	36
45	367	628	336	212	304	277	######	######	72	1387	243	47	234	38	35
50	357	635	342	211	308	272	######	######	73	1385	243	47	234	38	35
55	369	631	348	212	313	268	######	######	72	1384	244	47	233	39	35
60	368	648	355	212	319	266	######	######	73	1385	244	47	233	39	35
65	347	641	360	211	323	263	######	######	72	1384	244	48	233	39	34
70	339	633	359	208	325	263	######	######	73	1384	245	48	232	39	34
75	347	646	358	206	325	262	######	######	74	1385	245	49	232	39	34
80	345	656	361	208	327	262	######	######	74	1385	246	49	232	39	34
85	340	644	362	210	329	261	######	######	74	1384	246	49	232	39	34
90	343	645	364	211	333	263	######	######	74	1386	246	46	231	38	34
95	342	646	368	215	338	264	######	######	75	1387	247	46	231	38	34
100	340	640	374	220	343	263	######	######	76	1390	247	47	231	38	34
105	326	606	376	224	348	263	######	######	74	1392	247	47	231	38	34
110	319	568	378	227	352	262	######	######	76	1391	248	48	231	38	34
115	314	549	377	227	354	262	######	######	76	1392	248	48	230	38	34
120	309	536	378	230	357	262	######	######	76	1393	248	49	230	37	34
125	317	541	379	233	361	261	######	######	76	1393	247	49	230	37	34
130	326	565	382	235	366	259	######	######	76	1392	246	49	230	37	34
135	319	575	385	239	372	258	######	######	76	1393	246	50	230	37	34
140	310	563	388	245	378	258	######	######	77	1393	246	50	229	37	34
145	297	539	390	249	383	258	######	######	77	1393	246	51	228	37	34
150	277	510	391	254	387	257	######	######	77	1395	245	51	228	37	34
155	271	486	390	258	387	257	######	######	76	1395	245	52	228	38	34
160	260	463	389	259	388	256	######	######	77	1396	244	53	228	38	35
165	258	453	387	259	384	255	######	######	77	1396	244	53	228	38	35
170	248	445	385	259	381	256	######	######	76	1397	244	53	228	38	35

175	239	429	383	256	379	257	######	######	76	1398	244	53	228	38	35
180	231	414	380	255	377	259	######	######	76	1399	243	53	228	37	35
185	226	402	377	254	374	263	######	######	77	1399	243	53	228	38	35
190	222	391	373	252	372	265	######	######	76	1399	243	54	228	38	35
195	219	384	369	251	372	265	######	######	76	1400	242	54	228	38	35
200	216	377	366	249	371	265	######	######	77	1400	243	55	228	38	36
205	214	369	362	249	369	265	######	######	76	1401	243	55	228	38	36
210	211	363	359	247	367	264	######	######	77	1401	242	55	228	38	36
215	209	358	356	244	365	264	######	######	76	1400	243	56	228	37	36
220	207	353	351	242	362	263	######	######	76	1400	243	56	228	37	35
225	205	348	348	241	360	263	######	######	77	1401	243	56	229	37	35
230	204	343	344	239	358	261	######	######	76	1401	243	57	229	37	35
235	202	340	341	239	356	259	######	######	75	1401	243	57	229	37	35
240	198	332	338	235	353	257	######	######	76	1401	243	49	229	37	35
245	195	326	334	233	349	256	######	######	76	1402	243	44	230	37	35
250	193	320	330	232	346	252	######	######	75	1402	242	43	229	37	35
255	191	315	327	230	342	251	######	######	76	1402	242	43	229	36	34
260	188	310	325	228	339	249	######	######	76	1403	242	44	230	36	35
265	186	305	322	226	335	246	######	######	75	1404	242	44	229	36	34
270	185	302	319	225	332	243	######	######	76	1403	242	44	229	36	34
275	184	299	316	220	328	239	######	######	75	1402	242	44	229	36	34
280	183	294	313	218	326	235	######	######	75	1402	241	45	229	36	34
285	180	290	308	215	324	231	######	######	76	1402	241	45	229	36	34
290	178	285	304	212	322	227	######	######	75	1403	242	45	229	35	34
295	176	281	299	213	320	222	######	######	75	1402	241	45	228	35	34
300	175	276	296	212	318	218	######	######	75	1402	241	46	229	35	34
305	174	273	294	211	315	215	######	######	75	1402	241	46	228	35	34
310	173	270	290	211	313	212	######	######	74	1402	241	46	228	35	34
315	173	268	288	211	311	208	######	######	74	1402	241	47	228	35	34
320	172	267	287	212	309	205	######	######	74	1402	241	47	228	34	34
325	172	266	286	213	307	202	######	######	74	1400	240	47	228	34	34
330	172	264	284	214	304	199	######	######	74	1399	240	47	228	34	34
335	171	264	283	215	303	197	######	######	74	1397	240	48	228	34	34
340	172	264	281	213	300	195	######	######	74	1397	240	48	229	34	34
345	171	264	280	213	297	193	######	######	74	1396	239	48	230	34	34
350	171	264	279	213	295	190	######	######	73	1395	239	48	230	34	34
355	170	263	277	213	295	189	######	######	74	1394	239	48	231	34	33

Buck Stoves-Model 91NC

Temperatue Data Sheet 14

Run 2
2/1/2010

360	170	261	276	210	291	188	######	######	73	1394	239	49	232	33	33
365	169	259	275	210	289	187	######	######	73	1394	239	49	232	33	33
370	164	257	274	208	287	185	######	######	74	1393	239	49	232	33	33
375	161	253	273	207	286	184	######	######	74	1393	239	49	232	33	33

TEMPERATURE DATA SHEET #14A

		TEST TIME	375		
STACK AVG	246	TOP AVG	418	LT SIDE AVG	341
BACK AVG	231	RT SIDE AVG	336	BOTTOM AVG	252
FIREBOX AVG	########	SEC/CAT AVG	########	AMBIENT AVG	75

END	240.6
START	307.1
	-66.5 DELTA T

CIRCLE: **LOSS / GAIN**

ZERO / SPAN CHECK DATA SHEET #15-1

Date : 2 - 1 - 2010 Analyte : CO_2 (15-1)

Unit : Buck 91 NC Run # : 2

Zero Cyl. # : 168TAC 3-A Conc. : 0.00 % CO_2 Cyl. Press. : 400 PSI

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

Span Cyl. # : 487905 Conc. : 12.20 % CO_2 Cyl. Press. : 1460 PSI

Certified by : AIR LIQUIDE Date : 11-1-07

Analyzer : Make : HORIBA Model : PIR-2000 SN : 407069

Range : 0 - 25.0 % CO_2 Analyzer Output : 0 - 1.0 v.

Flow : 1.5 SCFH Measured by : Rotameter

EPA Span Value = 25.0 % CO_2

EPA Control Limits = ± 2.5% of 25.0 % CO_2 = ± 0.625 % CO_2

Method 28 A = ± .2 % of 25.0 % CO_2 = ± .05 % CO_2

PRE RUN Audit : by : Cp Wadmore Time : 0830 Temp : 78 ° F

AUDIT RESULTS

Point #	Expected Response			Actual Response			± Conc. Difference	Δ %
	Meter	DVM	%	Meter	DVM	%		
ZERO	00.0	.000	00.0	00.0	.000	00.0	-.023	-.023
SPAN	48.8	.488	12.20	48.5	.488	12.235	.035	.139

POST RUN Audit : by : Cp Wadmore Time : 1645 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	.002	.002	.009
SPAN	48.8	.488	12.20	48.5	.485	12.159	-.041	-.162

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

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

Span % Difference = $\frac{\text{Act \% (ppm) - Exp \% (ppm)}}{\text{Full Scale Value}}$ X100

ZERO / SPAN CHECK DATA SHEET #15-2

Date : 2-1-2010 Analyte : O_2 (15-2)

Unit : Buck 91NC Run # : 2

Zero Cyl. # : 1168TAC 3A Conc. : 0.00 % O_2 Cyl. Press. : 400 PSI

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

Span Cyl. # : 487905 Conc. : 12.60 % O_2 Cyl. Press. : 1460 PSI

Certified by : AIR LIQUIDE Date : 11-1-07

Analyzer : Make : TELEDYNE Model : 320 A SN : 37400

Range : 0 - 25.0 % O_2 Analyzer Output : 0 - 1.0 v.

Flow : 1.5 SCFH Measured by : Rotameter

EPA Span Value = 25.0 % O_2

EPA Control Limits = ± 2.5% of 25.0 % O_2 = ± 0.625 % O_2

Method 28 A = ± .2 % of 25.0 % O_2 = ± .05 % O_2

PRE RUN Audit : by : [signature] Time : 0830 Temp : 78 ° F

AUDIT RESULTS

Point #	Expected Response			Actual Response			± Conc. Difference	Δ %
	Meter	DVM	%	Meter	DVM	%		
ZERO	00.0	.000	00.0	00.1	.000	-.025	-.025	-.102
SPAN	12.60	.504	12.6	12.6	.504	12.623	.023	.091

POST RUN Audit : by : [signature] Time : 1645 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	.000	-.025	-.025	-.102
SPAN	12.60	.504	12.6	12.6	.505	12.648	.048	.191

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

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

Span % Difference = $\frac{\text{Act \% (ppm) - Exp \% (ppm)}}{\text{Full Scale Value}}$ X100

ZERO / SPAN CHECK DATA SHEET #15-3

Date : 2 - 1 - 2010 Analyte : CO (15-3)

Unit : Buck 91 NC Run # : 2

Zero Cyl. # : 168TAC 3-A Conc. : 0.00 % CO Cyl. Press. : 400 PSI

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

Span Cyl. # : CA487905 Conc. : 4.90 % CO Cyl. Press. : 1460 PSI

Certified by : AIR LIQUIDE Date : 11-1-07

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 = ± 2.5% of 10.0 % CO = ± 0. 25 % CO

Method 28 A = ± .2 % of 10.0 % CO = ± .02 % CO

PRE RUN Audit : by Cp Watkins Time : 0830 Temp : 78 ° F

AUDIT RESULTS

Point #	Expected Response			Actual Response			± Conc. Difference	Δ %
	Meter	DVM	%	Meter	DVM	%		
ZERO	00.0	.000	00.0	00.0	.000	.017	.017	.170
SPAN	49.0	.490	4.90	49.0	.490	4.908	.008	.081

POST RUN Audit : by : Cp Watkins Time : 1645 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	.017	.017	.170
SPAN	49.0	.490	4.90	49.1	.491	4.918	.018	.181

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

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

Span % Difference = $\frac{\text{Act \% (ppm) - Exp \% (ppm)}}{\text{Full Scale Value}}$ X100

ZERO / SPAN CHECK DATA SHEET #15-4

Date : 2-1-2010 Analyte : SO_2 (15-4)

Unit : Buck 91M Run # : 2

Zero Cyl. # : 168TAC3-A Conc. : 0.00 ppm SO_2 Cyl. Press. : 400 PSI

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

Span Cyl. # : CC82089 Conc. : 1250 ppm SO_2 Cyl. Press. : 1650 PSI

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

Analyzer : Make : HORIBA Model : PIR-2000 SN : 403019

Range : 0 - 2500 ppm SO_2 Analyzer Output : 0 - 1.0 v.

Flow : 1.5 SCFH Measured by : Rotameter

EPA Span Value = 2500 ppm SO_2

EPA Control Limits = ± 2.5% of 2500 ppm SO_2 = ± 62.5 ppm SO_2

PRE RUN Audit : by : [signature] Time : 0830 Temp : 78 ° 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	-.651	.651	-.026
SPAN	50.0	.500	1250	50.0	.500	1252.2	2.200	.088

POST RUN Audit : by : [signature] Time : 1645 Temp : 74 ° F

AUDIT RESULTS

Point #	Expected Response			Actual Response			± Conc. Difference	Δ %
	Meter	DVM	PPM	Meter	DVM	%		
ZERO	00.0	.000	00.0	00.2	.002	4.360	4.360	.174
SPAN	50.0	.500	1250	50.3	.503	1259.7	9.700	.388

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

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

Span % Difference = $\frac{\text{Act \% (ppm) - Exp \% (ppm)}}{\text{Full Scale Value}}$ X100

QUALITY CHECKS DATA SHEET # 16

UNIT : Buck 91 NC RUN : 2 DATE : 2-1-2010

Thermocouple Check:

T/C # 1	— °F	T/C # 13	62.7 °F
T/C # 2	— °F	T/C # 14	61.5 °F
T/C # 3	62.9 °F	T/C # 15	63.2 °F
T/C # 4	59.0 °F	T/C # 16	44.8 °F
T/C # 5	58.3 °F	T/C # 17	51.9 °F
T/C # 6	58.4 °F	T/C # 18	65.4 °F
T/C # 7	58.3 °F	T/C # 19	— °F
T/C # 8	57.8 °F	T/C # 20	— °F
T/C # 9	— °F	T/C # 21	— °F
T/C # 10	— °F	T/C # 22	— °F
T/C # 11	57.2 °F	T/C # 23	— °F
T/C # 12	65.8 °F	T/C # 24	— °F

Thermocouple Readout:

Pretest zero and span check and calibration — post test zero and span — % difference

ZERO .6 °F Adj. to 0.0 °F ZERO -.1 °F Difference .005 %

SPAN 2000.6 °F Adj. to 2000.0 °F SPAN 2000.7 °F Difference .035 %

Thermocouple Readout Pretest Linearity Check:

0	= 0.0 °F	200	= 200.2 °F	400	= 400.0 °F
600	= 599.9 °F	800	= 799.8 °F	1000	= 999.8 °F
1200	= 1199.8 °F	1400	= 1399.5 °F	1600	= 1599.5 °F
1800	= 1799.8 °F	2000	= 2000.0 °F		

Sample Train Leak Check	Pre ✓	Post ✓
C-gas Train Leak Check	Pre ✓	Post ✓
SO_2 Train Leak Check	Pre ✓	Post ✓
Static Gauge Zero Check	Pre ✓	Post ✓

Scale Check Pre : 16.0 − 6.0 = 10.0

Post : 14.0 − 4.0 = 10.0

Stack Cleaned Prior to Test Run : YES ____ NO X

TABLE 1 ---- RAW DATA

CLIENT : New Buck TEST No. : 3

MODEL: 91NC DATE:

TIME (MIN.)	METER READING (C F)	DELTA H (IN. H2O)	METER TEMP. (DEG. F)	PERCENT CO (%)	PERCENT CO2 (%)	SO2 COCENTR. PPM
0	597.500	0.150	91	0.95	4.60	400
5	599.000	0.310	91	0.32	7.20	275
10	601.292	0.130	91	0.48	2.50	425
15	602.777	0.120	91	0.57	2.60	450
20	604.179	0.120	91	0.46	5.30	450
25	605.581	0.120	91	0.45	4.10	450
30	606.984	0.150	91	0.42	4.30	400
35	608.561	0.150	91	0.56	10.70	400
40	610.138	0.150	91	0.36	10.40	400
45	611.716	0.170	91	0.26	10.00	375
50	613.398	0.170	91	0.24	9.50	375
55	615.080	0.170	91	0.27	9.30	375
60	616.762	0.170	91	0.27	9.00	375
65	618.445	0.150	91	0.35	9.10	400
70	620.022	0.150	91	0.32	8.30	400
75	621.599	0.170	91	0.24	8.00	375
80	623.281	0.170	91	0.23	8.10	375
85	624.964	0.170	92	0.15	8.50	375
90	626.652	0.170	92	0.16	8.80	375
95	628.340	0.150	93	0.20	8.70	400
100	629.929	0.150	93	0.31	8.60	400
105	631.518	0.150	93	0.30	8.70	400
110	633.107	0.150	93	0.29	8.80	400
115	634.695	0.150	93	0.32	8.40	400
120	636.284	0.150	94	0.26	8.30	400
125	637.879	0.150	94	0.27	7.50	400
130	639.473	0.120	94	0.61	6.50	450
135	640.891	0.120	94	0.68	6.20	450
140	642.308	0.120	94	0.66	5.70	450
145	643.726	0.120	94	0.68	5.70	450
150	645.143	0.120	94	0.92	5.10	450
155	646.561	0.120	94	0.92	5.50	450
160	647.978	0.120	94	0.96	5.40	450
165	649.396	0.120	94	0.98	5.30	450
170	650.814	0.120	94	1.10	5.30	450
175	652.231	0.120	94	1.26	5.30	450

180	653.649	0.110	94	1.36	5.30	450
185	655.070	0.100	94	1.67	4.80	475
190	656.416	0.110	94	1.23	4.90	450
195	657.837	0.110	94	1.29	4.50	450
200	659.258	0.130	94	1.25	4.40	425
205	660.762	0.130	94	1.36	4.50	425
210	662.267	0.110	94	1.60	4.10	450
215	663.687	0.130	94	1.56	3.90	425
220	665.192	0.130	94	1.48	3.80	425
225	666.696	0.130	94	1.20	4.10	425
230	668.201	0.130	94	1.40	3.70	425
235	669.705	0.130	94	1.42	3.50	425
240	671.209	0.130	94	1.58	3.30	425
245	672.714	0.130	94	1.20	3.60	425
250	674.218	0.130	94	1.19	3.60	425
255	675.723	0.130	94	1.22	3.50	425
260	677.227	0.130	94	1.12	3.60	425
265	678.731	0.130	94	1.08	4.20	425
270	680.236	0.130	94	1.12	4.30	425
275	681.740	0.130	94	1.09	4.30	425
280	683.245	0.130	94	1.17	4.00	425
285	684.749	0.130	94	1.11	3.90	425
290	686.253	0.130	94	1.00	3.90	425
295	687.758	0.130	94	1.04	3.80	425
300	689.262	0.130	94	1.11	3.60	425
305	690.767	0.130	94	1.19	3.50	425
310	692.271	0.130	94	1.16	3.50	425
315	693.775	0.130	94	0.93	3.50	425
320	695.280	0.130	94	1.04	3.40	425
325	696.784	0.130	94	1.05	3.40	425
330	698.289	0.130	94	1.19	3.10	425
335						

TABLE 2---RAW DATA

CLIENT : New Buck TEST No. 3

MODEL: 91NC DATE:

METER CAL. FACTOR (Y) -------	0.901	Wt. WOOD BURNED(LB) -------	20.9	Lbs
BAROMETRIC PRESS.(Pb) -------	29.67 in Hg	WET,FUEL MOISTURE % -------	16.4	%
LEAK RATE POST (Lp) -------	0.010 cfm	Wt. PART. COLLECTED ------	0.4081	g
WATER VOL. (V1c) -------	114.7 Ml	METER VOLUME Vm -------	100.789	mcf
TEST TIME (MIN) -------	330 min	HC MOLE FRACTION ------	0.0132	

TABLE 3 ----FIELD DATA AVERAGES

CLIENT : New Buck TEST No. 3

MODEL: 91NC DATE:

****

AVG DELTA H	------	0.14	in H2O	AVG PRCNT CO	-------	0.84	%
AVG METER TEMP. Tm	-------	93	deg F	AVG PRCNT CO2	-------	5.62	%
AVG PPM SO2	-------	419	PPM	AVG BAL CO2/CO	-------	6.71	%

TABLE 4 ----- CALCULATIONS

CLIENT : New Buck TEST No. 3

MODEL: 91NC DATE:

STD SAMPLE VOL. Vm(std) d) -----	86.01	dscf	STACK GAS FLOW Qsd -------	666.959 11.12	dscf/Hr & dscf/min
VOL. WATER VAPOR Vw(s td) -----	5.399	scf	PARTICULATE CONCTRT. C s -----	0.0047	g/dscf
PRCNT MSTR Bws -------	5.91	%	PARTC.EMISS. RATE E -------	3.17	g/Hr
BURN RATE BR -------	1.44	Kg/Hr	MOLES OF GAS PER Lb WOOD Nt ----	0.55	Lb-mole/Lb
CO EMISSION RATE -------	187.32 129.99	g/Hr & g/Kgdry fuel	PART.EMISS. RATE ------	2.20	g/Kgdry fuel

TABLE 5 ----- PROPORTIONAL RATE VARIATION

CLIENT : New Buck TEST No. : 3

MODEL: 91NC DATE:

TIME INTEVAL Ti	PPM * Vm	PROPRTN. RATE VAR. PR	PROPRTN RATE VAR. AVERAGE
5	514.0	95	100
10	540.2	100	
15	540.6	100	
20	540.4	100	
25	540.4	100	
30	540.8	100	
35	540.4	100	
40	540.4	100	
45	540.7	100	
50	540.4	100	
55	540.4	100	
60	540.4	100	
65	540.7	100	
70	540.4	100	
75	540.4	100	
80	540.4	100	
85	540.2	100	
90	541.3	100	
95	540.8	100	
100	542.5	100	
105	542.5	100	
110	542.5	100	
115	542.2	100	
120	542.0	100	
125	543.6	100	
130	543.2	100	
135	543.6	100	
140	543.2	100	
145	543.6	100	
150	543.2	100	
155	543.6	100	
160	543.2	100	
165	543.6	100	
170	543.6	100	
175	543.2	100	
180	543.6	100	

185	544.8	100
190	544.7	100
195	544.8	100
200	544.8	100
205	544.6	100
210	544.9	100
215	544.4	100
220	544.9	100
225	544.6	100
230	544.9	100
235	544.6	100
240	544.6	100
245	544.9	100
250	544.6	100
255	544.9	100
260	544.6	100
265	544.6	100
270	544.9	100
275	544.6	100
280	544.9	100
285	544.6	100
290	544.6	100
295	544.9	100
300	544.6	100
305	544.9	100
310	544.6	100
315	544.6	100
320	544.9	100
325	544.6	100
330	544.9	100

COMPUTER INPUT DATA SHEET #1

3,1
1,44

Client: New Buck Corp

Address: P.O. Box 69
Spruce Pine, NC 28777

Phone: 888-622-7868 Fax: 828-765-0462

Run No.: 3 Date of Test: 2-3-2010 Burn Rate: 1.441

Model No.: 91 NC ☐ min ☐ min-1.25 ☐ fan

Stove Type: ☐ Cat ☒ Non Cat ☐ Pellet ☒ 1.25-1.9 ☐ max ☐ insert

Dry Gas Meter Y Factor: .901 (0.000) (Data Sheet #2) Post Leak Rate: .010 cfm (.000) (Data Sheet #2) Time: 330 min. (000) (Data Sheet #2)

Dry Gas Meter Volume: 100.789 cf (00.000) (Data Sheet #2)

Stack Flow: 8.032 dscfm (00.000) (Data Sheet #2) Δ H: .138 in. H_2O (.000) (Data Sheet #2)

Maximum Vac.: 3.0 (0.0) (Data Sheet #2) Barometric Pressure: 29.67 in. Hg (00.00) (Data Sheet #2)

H_2O Captured: 114.7 g (00.0) (Data Sheet #3)

Front Half Catch % Of Total: 39.8 % (00.0) (Data Sheet #6) Total Particulate Catch: 1.4081 g (0.0000) (Data Sheet #6)

Flue Gas Moisture: 5.150 % (00.000) (Data Sheet #7)

Particulate Emission: .0732 gr/dscf (0.0000) (Data Sheet #7)

Relative Humidity: 33.0 % RH (00.0) (Data Sheet #8) Ambient Moisture: 1.4 % H_2O (0.00) (Data Sheet #8)

Preburn Fuel Wt.: 53.4 lbs. (00.0) (Data Sheet #8) Coal Bed Wt.: 4.3 lbs. (00.0) (Data sheet #8) Test Fuel Wt.: 20.9 lbs. (00.0) (Data sheet #8)

Heat Output (EPA Default): 17375.9 BTU/hr (00,000.0) (Data Sheet #8)

Kindling Fuel % Moisture (wet): 13.094 % (00.000) (Data Sheet #10) Pretest Fuel % Moisture (wet): 15.872 % (00.000) (Data Sheet #10)

Test Fuel % Moisture (dry): 19.617 % Test Fuel % Moisture (wet): 16.400 % (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: -.044 in. H_2O (+/- .000) (Data Sheet #12)

Average Ambient Temperature: 74 °F (00) (Data Sheet #14) Stove Temperature Change: -60.4 °F (+/- 000.0) (Data Sheet #14)

Test start = 1040
End = 1610

meter Temp = 553

METER BOX DATA SHEET PAGE # 2

Page: 1 of 3

UNIT: Buck 91 NC RUN: 3 DATE: 2-3-2010

Meter Box: 5H Y Factor: .901

Leak checks: 15 " Hg @ .011 cfm _____ " Hg @ _____ cfm

15 " Hg @ .010 cfm _____ " Hg @ _____ cfm

Inject SO^2 @ 100 cc/min. Nozzle: Probe @ 3/8 " od Initial Volume: 1.500

ROTO: PRESS: .18 SAMPLING RATIO: 27.5 : 1 BP: 29.70

MIN	TIME	METER READING	SAMPLE MDCF	STACK DSCFM	DELTA H	METER TEMP	SO2 PPM	ROTO TEMP	PUMP VACC
0	1040	597.500	———	8,403	.15	91	400	91	2.0
5	45	599.000	———	12.223	.31	91	275	91	3.0
10	50	601.292	601.292	7.909	.13	91	425	91	2.0
15	55	602.777	602.777	7.469	.12	91	450	91	2.0
20	1100	604.179	604.179	7.469	.12	91	450	91	2.0
25	05	605.581	605.581	7.469	.12	92	450	91	2.0
30	10	606.984	606.984	8.403	.15	91	400	91	2.0
35	15	608.561	608.561	8.403	.15	91	400	91	2.0
40	20	610.138	610.138	8.403	.15	91	400	91	2.0
45	25	611.716	611.716	8.963	.17	91	375	91	2.0
50	30	613.398	613.398	8.963	.17	91	375	91	2.0
55	35	615.080	615.080	8.963	.17	91	375	91	2.0
ROTO PRESS:		.18	TOTALS:	103.040	1.91	1092	BP.: 29.70		
60	1140	616.762	616.762	8.963	.17	91	375	91	2.0
65	45	618.445	618.445	8.403	.15	91	400	91	2.0
70	50	620.022	620.022	8.403	.15	91	400	91	2.0
75	55	621.599	621.599	8.963	.17	91	375	91	2.0
80	1200	623.281	623.281	8.963	.17	91	375	91	2.0
85	05	624.964	624.964	8.947	.17	92	375	92	2.0
90	10	626.652	626.652	8.947	.17	92	375	92	2.0
95	15	628.340	628.340	8.373	.15	93	400	93	2.0
100	20	629.929	629.929	8.373	.15	93	400	93	2.0
105	25	631.518	631.518	8.373	.15	93	400	93	2.0
110	30	633.107	633.107	8.373	.15	93	400	93	2.0
115	35	634.695	634.695	8.373	.15	93	400	93	2.0
			TOTALS:	103.454	1.90	1104	MAX VACC =		
TOTAL Cu Ft.			TOTALS:	206.494	3.81	2196	AVG. BP:		

METER BOX DATA SHEET PAGE # 2

Page: 2 of 3

UNIT: Buck 91 NC RUN: 3 DATE: 2-3-2010

Meter Box: 5H Y Factor: .901

Leak checks: 15 " Hg @ .011 cfm _____ " Hg @ _____ cfm

15 " Hg @ .010 cfm _____ " Hg @ _____ cfm

Inject SO^2 @ 100 cc/min. Nozzle : Probe @ 3/8 " od Initial Volume: 1.500

ROTO: PRESS: .18 SAMPLING RATIO: 27.5 : 1 BP: 29.70

MIN	TIME	METER READING	SAMPLE MDCF	STACK DSCFM	DELTA H	METER TEMP	SO2 PPM	ROTO TEMP	PUMP VACC
120	1240	636.284	636.284	8.358	.15	94	400	94	2.0
125	45	637.879	637.879	8.358	.15	94	400	94	2.0
130	50	639.473	639.473	7.429	.12	94	450	94	2.0
135	55	640.891	640.891	7.429	.12	94	450	94	2.0
140	1300	642.308	642.308	7.429	.12	94	450	94	2.0
145	05	643.726	643.726	7.429	.12	94	450	94	2.0
150	10	645.143	645.143	7.429	.12	94	450	94	2.0
155	15	646.561	646.561	7.429	.12	94	450	94	2.0
160	20	647.978	647.978	7.429	.12	94	450	94	2.0
165	25	649.396	649.396	7.429	.12	94	450	94	2.0
170	30	650.814	650.814	7.429	.12	94	450	94	2.0
175	35	652.231	652.231	7.429	.12	94	450	94	2.0
ROTO PRESS:		.18	TOTALS:	91.006	1.50	1128	BP.: 29.63		
180	1340	653.649	653.649	7.411	.11	94	450	94	2.0
185	45	655.070	655.070	7.021	.10	94	475	94	2.0
190	50	656.416	656.416	7.411	.11	94	450	94	2.0
195	55	657.837	657.837	7.411	.11	94	450	94	2.0
200	1400	659.258	659.258	7.847	.13	94	425	94	2.0
205	05	660.762	660.762	7.847	.13	94	425	94	2.0
210	10	662.267	662.267	7.411	.11	94	450	94	2.0
215	15	663.687	663.687	7.847	.13	94	425	94	2.0
220	20	665.192	665.192	7.847	.13	94	425	94	2.0
225	25	666.696	666.696	7.847	.13	94	425	94	2.0
230	30	668.201	668.201	7.847	.13	94	425	94	2.0
235	35	669.705	669.705	7.847	.13	94	425	94	2.0
			TOTALS:	91.594	1.45	1128	MAX VACC =		
TOTAL Cu Ft			TOTALS:	182.600	2.95	2256	AVG. BP:		

METER BOX DATA SHEET PAGE # 2

Page: 3 of 3

UNIT: Buck 91 NL RUN: 3 DATE: 2-3-2010

Meter Box: 5H Y Factor: .901

Leak checks: 15 " Hg @ .011 cfm _____ " Hg @ _____ cfm

15 " Hg @ .010 cfm _____ " Hg @ _____ cfm

Inject SO^2 @ 100 cc/min. Nozzle: Probe @ 3/8 " od Initial Volume: 1.500

ROTO: PRESS: .18 SAMPLING RATIO: 27.5 : 1 BP: 29.63

MIN	TIME	METER READING	SAMPLE MDCF	STACK DSCFM	DELTA H	METER TEMP	SO2 PPM	ROTO TEMP	PUMP VACC
240	1440	671.209	671.209	7.847	.13	94	425	94	2.0
245	45	672.714	672.714	7.847	.13	94	425	94	2.0
250	50	674.218	674.218	7.847	.13	94	425	94	2.0
255	55	675.723	675.723	7.847	.13	94	425	94	2.0
260	1500	677.229	677.227	7.847	.13	94	425	94	2.0
265	05	678.731	678.731	7.847	.13	94	425	94	2.0
270	10	680.236	680.236	7.847	.13	94	425	94	2.0
275	15	681.740	681.740	7.847	.13	94	425	94	2.0
280	20	683.245	683.245	7.847	.13	94	425	94	2.0
285	25	684.749	684.749	7.847	.13	94	425	94	2.0
290	30	686.253	686.253	7.847	.13	94	425	94	2.0
295	35	687.758	687.758	7.847	.13	94	425	94	2.0
ROTO PRESS: .18			TOTALS:	94.164	1.56	1128	BP.: 29.63		
300	1540	689.262	689.262	7.847	.13	94	425	94	2.0
305	45	690.767	690.767	7.847	.13	94	425	94	2.0
310	50	692.271	692.271	7.847	.13	94	425	94	2.0
315	55	693.775	693.775	7.847	.13	94	425	94	2.0
320	1600	695.280	695.280	7.847	.13	94	425	94	2.0
325	05	696.784	696.784	7.847	.13	94	425	94	2.0
330	10	698.289	698.289	7.847	.13	94	425	94	2.0
335	15			54.929	.910	658			2.0
340	20								2.0
345	25			149.093	2.47	1786			2.0
350									2.0
355				538 187		6238			
			TOTALS:		9.23	93	MAX VACC =		3.0
TOTAL Cu Ft.		100,789	TOTALS:	8,032	.138	553	AVG. BP: 29.67		

17799

PARTICULATE CATCH / MOISTURE DATA SHEET # 3

UNIT : Buck 91 NC RUN : 3 DATE : 2-3-10

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	699.5	584.2	485.5	925.6
INITIAL WT	606.5	579.0	485.0	909.6
NET WT GRAMS	93.0	5.2	.5	16.0

TOTAL CATCH : 114.7 GRAMS H_2O

FRONT HALF

FILTER #	186F	
FINAL WT g	.7616	
INITIAL WT g	.6568	
NET WT g	.1048	

BEAKER #	46
DESC.	ACETONE
FINAL WT g	106.1042
INITIAL WT g	106.0460
NET WT g	.0582
VOL. DESC. ml	75

BACK HALF

FILTER #	186B	
FINAL WT g	.4010	
INITIAL WT g	.3616	
NET WT g	.0394	

BEAKER #	47	48	49	50	
DESC.	ACETONE	METHCHLOR	H_2O	H_2O	
FINAL WT g	107.1390	97.7582	108.4064	96.5795	
INITIAL WT g	107.0357	97.7476	108.3555	96.5306	
NET WT g	.1033	.0106	.0509	.0489	(.0998)
VOL. DESC ml	100	75	150	150	(300)

FILTER TARE WEIGHTS DATA SHEET #4-1

Into Dessicator : Date : 9-5-2008 Time : 1100 By : [illegible]

Manufacturer S & S Grade : # 25 Glass Front Size : 11 cm Lot No. : 413903

Back Size: 8.2 cm Lot No. :

	DATE: 9-8-2008	BY: AV	DATE: 9-9-2008	BY: AV	DATE:	BY:
FILTER #	FIRST WEIGHT	TIME	SECOND WEIGHT	TIME	THIRD WEIGHT	TIME
171F	0.6555	1015	0.6556	1042	✓	
172F	0.6527	1016	0.6528	1043	✓	
173F	0.6540	1017	0.6539	1044	✓	
174F	0.6560	1018	0.6557	1045	✓	
175F	0.6615	1019	0.6614	1046	✓	
176F	0.6597	1020	0.6597	1047	✓	
177F	0.6630	1021	0.6628	1048	✓	
178F	0.6605	1022	0.6606	1049	✓	
179F	0.6570	1023	0.6569	1050	✓	
180F	0.6569	1024	0.6568	1051	✓	
171B	0.3610	1025	0.3609	1052	✓	
172B	0.3624	1026	0.3621	1053	✓	
173B	0.3632	1027	0.3630	1054	✓	
174B	0.3628	1028	0.3627	1055	✓	
175B	0.3611	1029	0.3609	1056	✓	
176B	0.3644	1030	0.3643	1057	✓	
177B	0.3625	1031	0.3622	1058	✓	
178B	0.3699	1032	0.3697	1059	✓	
179B	0.3625	1033	0.3621	1100	✓	
180B	0.3614	1034	0.3616	1101	✓	

Checked by: C. Wedington Date: 9-10-08 Time: 1057

BALANCE ROOM ENVIRONMENTAL CONDITIONS

DATE	TIME	BY	WB	DB	% RH
9-8-08	0930	[illegible]	S	77	49
9-9-08	1000	[illegible]	S	74	46

BEAKER TARE WEIGHTS DATA SHEET #4-2

Into Dessicator: Date : 9-23-2008 Time : 1030 By : AV

BEAKER #	DATE: 9-25-2008 BY: AV FIRST WEIGHT	TIME	DATE: 9-26-08 BY: AV SECOND WEIGHT	TIME	DATE: 9-29-08 BY: THIRD WEIGHT	TIME
26	101.0352	0945	101.0355	0930	✓	
27	106.3746	0946	106.3749	0931	✓	
28	105.7466	0947	105.7468	0932	✓	
29	104.4535	0948	104.4530	0933	✓	
30	107.3581	0949	107.3579	0934	✓	
31	95.5473	0950	95.5468	0935	✓	
32	107.8637	0951	107.8634	0936	✓	
33	101.1710	0952	101.1707	0937	✓	
34	106.4622	0953	106.4619	0938	✓	
35	96.5574	0954	96.5572	0939	✓	
36	94.4553	0955	94.4548	0940	✓	
37	106.5990	0956	106.5991	0941	✓	
38	96.2484	0957	96.2487	0942	96.2482	1000 ✓
39	97.1354	0958	97.1349	0943	✓	
40	106.4674	0959	106.4672	0944	✓	
41	105.4858	1000	105.4859	0945	✓	
42	104.6688	1001	104.6675	0946	104.6680	1001 ✓
43	107.3542	1002	107.3537	0947	✓	
44	107.7903	1003	107.7893	0948	107.7897	1002 ✓
45	94.9358	1004	94.9353	0949	✓	
46	106.0465	1005	106.0460	0950	✓	
47	107.0358	1006	107.0357	0951	✓	
48	97.7473	1007	97.7476	0952	✓	
49	108.3554	1008	108.3555	0953	✓	
50	96.5304	1009	96.5306	0954	✓	

BALANCE ROOM ENVIRONMENTAL CONDITIONS

DATE	TIME	BY	WB	DB	% RH
9-25-08	0930	CM		78	46
9-26-08	0920	CM		76	46
9-29-08	0955	AV		78	46

Checked by: C. Washington
Date: 9-29-08
Time: 1315

WOODSTOVE DATA SHEET # 4-3 : CONSTANT WEIGHTS

UNIT : Buck 91 NC RUN : 3 DATE : 2-3-10 Page : 1 of

Beaker #	Date	Time	By	Weight	Date	Time	By	Weight	Date	Time	By	Weight	Date	Time	By
46	2-4	0900	CP	106.1047	2-5	1030	CP	106.1042	2-7	1414	CP	*			
47	2-4	0900	CP	107.1388	2-5	1031	CP	107.1390	2-7	1415	CP	*			
48	2-4	0900	CP	97.7583	2-5	1032	CP	97.7582	2-7	1416	CP	*			
49	2-4	0900	CP	108.4068	2-5	1033	CP	108.4064	2-7	1417	CP	*			
50	2-4	0900	CP	96.5794	2-5	1034	CP	96.5795	2-7	1418	CP	*			

Filter #	Date	Time	By	Weight	Date	Time	By	Weight	Date	Time	By	Weight	Date	Time	By
180F	2-3	1700	CP	.8890	2-4	1030	CP	.8235	2-5	1036	CP	.7921	2-7	1412	CP
				.7616 *	2-8	1205	CP								
180B	2-3	1700	CP	.4046	2-4	1031	CP	.4015	2-5	1037	CP	.4010 *	2-7	1415	CP

SCALE ROOM ENVIRONMENTAL CONDITIONS

Weighing Session	Date	Time	By	DB	%RH
1	2-4-10	1015	CP	75	41
2	2-5-10	1015	CP	78	43
3	2-7-10	1400	CP	70	44
4	2-8-10	1200	CP	78	46
5					

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

WOODSTOVE DATA SHEET #4-4

SCALE QA SHEET

Dates: From 2-26-2010 Through	Scale: Sartorius	Model: A 120 S	SN: 37010004

100 g weight	10 g weight	1 g weight	100 mg weight	Tech	Date	Time	Dry Bulb	% RH
100.0001	10.0004	.9999	.0999	CD	2-26-10	0840	72	46
100.0001	9.9999	.9999	.0999	CJ	2-27-10	1045	72	46
100.0000	10.0000	1.0000	.0999	CJ	2-28	1100	70	48
100.0000	10.0000	1.0000	.0999	CJ	3-1	0900	66	49
100.0000	10.0002	.9998	.1002	CJ	3-5	1200	70	48
100.0001	9.9999	.9999	.0998	CJ	3-7	1330	68	47
100.0000	9.9999	.9999	.0999	CJ	3-9	1130	70	41
100.0000	10.0001	1.0000	.0999	CJ	3-10	1200	70	44
100.0000	10.0001	.9999	.0999	CJ	3-11	0900	66	49

WOODSTOVE DATA SHEET #4-4

SCALE QA SHEET

Dates: From 5-10-2009 Through 2-25-2010	Scale: Sartorius	Model: A 120 S	SN: 37010004

100 g weight	10 g weight	1 g weight	100 mg weight	Tech	Date	Time	Dry Bulb	% RH
100.0001	10.0002	1.0000	.0999	CP	5-10	1545	74	44
100.0001	10.0001	.9999	.0999	CP	6-19	1110	70	48
100.0001	10.0000	.9998	.0998	CP	6-22	0930	74	44
100.0001	10.0000	.9999	.0999	CP	6-24	1610	78	46
100.0001	10.0000	1.0000	.0999	CP	6-25	1000	78	46
100.0001	10.0001	1.0001	.0999	CP	6-26	0900	73	47
99.9998	10.0000	1.0001	.1000	CP	6-27	1300	76	45
100.0000	10.0002	1.0000	.0999	CP	6-28	1400	78	43
100.0000	10.0000	1.0000	.0999	CP	6-29	1130	74	47
100.0000	10.0000	1.0000	.0999	CP	7-1	1230	70	48
100.0000	9.9998	1.0000	.0998	CP	8-7	1310	75	48
99.9998	10.0000	1.0000	.0999	CP	8-8	1400	77	46
100.0000	10.0000	1.0000	.0999	CP	8-9	1720	78	46
100.0002	9.9999	1.0000	.0998	CP	8-10	0900	78	46
100.0000	10.0001	1.0001	.0998	CP	8-11	1126	78	46
100.0003	10.0001	1.0001	.1000	CP	8-12	0910	78	46
100.0000	10.0000	1.0001	.1000	CP	8-14	1630	78	46
100.0000	10.0000	1.0001	.0999	CP	8-19	0900	74	47
100.0002	10.0001	1.0000	.1000	CP	8-24	0900	72	42
100.0000	9.9999	.9999	.0999	CP	8-25	0900	70	48
100.0000	10.0000	1.0000	.0999	CP	8-26	1340	77	46
100.0003	10.0000	.9999	.1000	CP	9-5	1120	77	49
100.0000	10.0001	1.0000	.0999	CP	9-8	1410	78	41
100.0000	10.0001	1.0001	.0998	CP	9-11	1050	78	43
100.0000	10.0000	1.0000	.0999	CP	9-12	1220	78	46
100.0000	10.0001	1.0000	.0999	CP	9-13	1430	78	46
100.0000	10.0001	.9999	.1000	CP	9-14	1100	75	48
100.0000	10.0000	.9999	.0999	CP	1-29	1400	74	44
100.0000	10.0001	1.0000	.1000	CP	1-30	1800	78	46
100.0000	10.0001	1.0001	.1000	CP	2-1	0700	66	49
100.0000	9.9999	1.0001	.1000	CP	2-2	1100	72	46
100.0000	9.9997	1.0001	.1000	CP	2-4	1015	75	41
100.0000	10.0000	1.0000	.0998	CP	2-5	1015	78	43
100.0000	10.0001	1.0000	.1000	CP	2-7	1400	70	44
100.0002	10.0001	1.0000	.0999	CP	2-8	1200	78	46
100.0000	10.0000	1.0000	.1000	CP	2-9	1030	78	40
100.0000	10.0000	1.0000	.0999	CP	2-23	1830	77	49
100.0000	10.0001	1.0000	.0999	CP	2-24	0820	69	49
100.0000	10.0002	1.0000	.0999	CP	2-25	0940	69	47

WOODSTOVE DATA SHEET #4-4

SCALE QA SHEET

Dates: From 8-27-2008 Through 5-9-2009	Scale: Sartorius	Model: A 120 S	SN: 37010004

100 g weight	10 g weight	1 g weight	100 mg weight	Tech	Date	Time	Dry Bulb	% RH
99.9999	10.0000	1.0000	.0999	CK	8-27	0900	78	46
100.0001	10.0000	1.0000	.0999	CK	8-28	0930	78	46
100.0001	10.0001	1.0001	.0997	CK	8-29	1300	78	46
100.0000	10.0000	1.0000	.1000	CK	8-30	1030	78	46
100.0001	10.0003	1.0001	.0999	CK	8-31	1015	76	49
100.0000	10.0001	1.0000	.0997	CK	9-1	1100	74	44
100.0000	10.0001	.9999	.1000	CK	9-2	0845	75	48
99.9999	10.0000	.9999	.0998	CK	9-4	1000	77	47
99.9999	10.0002	1.0001	.0999	CK	9-8	0930	77	49
99.9999	9.9999	.9998	.0998	CK	9-9	1000	74	48
99.9997	9.9997	1.0000	.0999	CK	9-11	1500	76	45
100.0000	9.9997	.9999	.0999	CK	9-17	0930	77	49
100.0000	10.0000	1.0000	.0999	CK	9-18	0900	78	46
100.0000	10.0000	.9999	.0999	CK	9-19	0915	78	49
100.0000	10.0000	.9999	.0999	CK	9-22	1030	77	46
100.0000	10.0001	1.0000	.0998	CK	9-24	1330	78	49
100.0001	10.0001	1.0000	.0999	CK	9-25	0920	78	46
100.0000	9.9999	1.0001	.0998	CK	9-26	0920	78	46
100.0001	9.9999	1.0001	.0999	AV	9.29	0955	78	46
100.0000	10.0001	1.0000	.0998	CK	10-2	0945	75	44
100.0000	10.0000	1.0000	.0999	CK	10-3	0930	78	46
100.0000	9.9999	1.0000	.0999	CK	10-4	1530	78	46
100.0000	9.9999	.9999	.0999	CK	10-6	0930	77	49
100.0000	10.0001	1.0002	.1000	CK	10-7	1700	78	49
100.0000	10.0000	1.0000	.0999	CK	10-8	1000	78	49
99.9999	10.0000	1.0001	.0999	CK	10-9	1030	78	43
100.0000	9.9999	1.0001	.1000	CK	10-10	0930	78	40
100.0000	9.9998	.9999	.0997	CK	10-11	1430	74	47
100.0000	10.0001	1.0000	.1000	CK	10-13	0940	78	46
100.0000	10.0000	.9999	.0999	CK	10-14	2030	77	49
100.0000	10.0002	1.0000	.1000	CK	10-16	1220	78	43
100.0000	9.9999	1.0000	.0999	CK	10-15	1130	74	47
99.9998	10.0000	.9999	.0999	CK	5-3	1700	78	43
100.0000	10.0001	1.0000	.0999	CK	5-4	1000	72	47
100.0000	10.0001	1.0000	.0997	CK	5-5	1000	76	45
99.9998	10.0000	1.0000	.0999	CK	5-6	1100	77	49
100.0000	10.0001	1.0001	.1000	CK	5-7	1600	77	42
100.0000	10.0001	1.0000	.0999	CK	5-8	1600	76	45
100.0000	10.0003	1.0000	.1000	CK	5-9	1300	76	38

WOODSTOVE DATA SHEET #4-4

SCALE QA SHEET

Dates: From 10-22-07 Through 8-26-2008	Scale: Sartorius	Model: A 120 S	SN: 37010004

100 g weight	10 g weight	1 g weight	100 mg weight	Tech	Date	Time	Dry Bulb	% RH
100.0006	10.0001	1.0000	.0998	CP	10-22	1630	78	46
99.9999	10.0001	1.0000	.1001	CP	10-23	1000	74	44
100.0002	10.0002	1.0002	.0999	CP	10-24	1400	73	47
100.0002	10.0000	1.0001	.0998	CP	10-26	1700	74	40
100.0003	10.0001	1.0001	.0999	CP	10-27	0820	78	40
99.9999	10.0000	.9999	.0997	CP	10-28	1200	78	40
100.0000	9.9999	.9999	.0999	CP	10-29	1700	76	42
99.9998	9.9999	.9999	.1000	CP	10-30	1600	78	43
99.9997	10.0000	.9999	.0999	CP	11-16	1500	68	47
100.0001	10.0002	1.0000	.0999	CP	11-19	1730	73	40
100.0000	10.0002	.9999	.0999	CP	11-20	1100	69	44
99.9998	9.9999	.9999	.0998	CP	1-18-08	1230	76	45
100.0002	10.0002	.9999	.0999	CP	1-21-08	1430	65	48
99.9999	10.0002	1.0001	.0999	CP	1-22-08	1200	68	47
100.0002	9.9999	.9999	.0998	CP	1-23-08	1400	74	47
99.9999	10.0000	1.0002	.1000	CP	1-31-08	1900	74	44
100.0000	10.0003	1.0000	.0996	CP	2-1-08	1530	76	45
99.9997	9.9999	.9999	.0999	CP	2-16-08	1700	68	47
100.0001	10.0002	1.0000	.1000	CP	2-19-08	1400	72	46
99.9999	10.0001	.9999	.0998	CP	2-22-08	1800	68	47
99.9999	10.0001	1.0000	.0999	CP	2-24-08	1800	78	43
100.0000	10.0000	1.0000	.0999	CP	5-8-08	1020	78	43
100.0001	10.0001	1.0000	.0999	CP	5-9-08	0930	69	47
100.0000	10.0001	.9999	.0999	CP	5-10-08	1330	74	47
99.9998	9.9999	1.0000	.0998	CP	5-11-08	0900	74	44
100.0003	10.0001	.9999	.0998	CP	5-12	1400	70	48
99.9999	10.0001	1.0000	.1000	CP	5-13	1000	77	42
99.9999	9.9997	1.0000	.1000	CP	5-14	1230	77	42
99.9999	10.0001	.9999	.1000	CP	6-5-08	1430	72	46
100.0001	10.0000	1.0000	.0999	CP	6-9-08	1400	74	44
99.9999	9.9999	1.0000	.0999	CP	6-9-08	1800	73	47
100.0001	10.0001	.9999	.0998	CP	8-11-08	0930	77	42
100.0003	10.0000	1.0001	.0999	CP	8-12-08	1011	78	43
100.0000	10.0001	1.0000	.0999	CP	8-13-08	0950	76	49
100.0002	10.0000	1.0000	.0998	CP	8-18-08	0930	74	44
100.0001	9.9999	1.0000	.0998	CP	8-20-08	1110	76	45
100.0000	9.9999	.9999	.0998	CP	8-21-08	0915	75	48
100.0002	10.0000	1.0000	.1002	CP	8-22-08	0910	75	45
100.0000	10.0001	1.0001	.0999	CP	8-26-08	0900	78	43

2 58

BLANK PROCESSING DATA SHEET # 5

UNIT : Buck 91 NC RUN : 3 DATE : 2-3-10

BLANKS DONE : 10-30-2007

BEAKER	A	B	C
	200 ml ACETONE	75 ml DICHLOR	200 ml WATER
	FISHER OPTIMA LOT #023283	FISHER OPTIMA LOT #035941	DWNA Inc Sparklette Distilled
FINAL WEIGHT	108.9009	106.3077	106.9680
TARE WEIGHT	108.8995	106.3063	106.9644
NET WEIGHT	.0014	.0014	.0036

TARE BEAKERS INTO DESC : TIME : 1700 DATE : 10-20-07

DATE : 10-22 BY : CP DATE : 10-23 BY CP DATE : BY :

BEAKER	1 ST WT	TIME	2 ND WT	TIME	3 RD WT	TIME
A	108.8994	1700	108.8995	1027		
B	106.3060	1701	106.3063	1028		
C	106.9639	1702	106.9644	1029		

FINAL BEAKERS INTO DESC : TIME : 1040 DATE : 10-27-07

DATE : 10-29 BY : CP DATE : 10-30 BY CP DATE : BY :

BEAKER	1 ST WT	TIME	2 ND WT	TIME	3 RD WT	TIME
A	108.9011	1721	108.9009	1619		
B	106.3074	1722	106.3077	1621		
C	106.9678	1723	106.9680	1622		

TARE QC

DATE	TIME	BY	WB	DB	%
10-22	1630	CP		78	46
10-23	1000	CP		74	44

FINAL QC

DATE	TIME	BY	WB	DB	%
10-29	1700	CP		76	42
10-30	1600	CP		78	43

NET PARTICULATE CATCH CALCULATION DATA SHEET #6

UNIT: Buck 91 NC RUN: 3 DATE: 2-3-10

BLANK CALCULATIONS

Acetone :	.0014	g ÷ 200	ml =	.000007	g/ml
Dicholoromethane :	.0014	g ÷ 75	ml =	.000019	g/ml
Distilled Water :	.0036	g ÷ 200	ml =	.000018	g/ml

FRONT HALF CATCH

FILTERS : .1048 (Total Catch) g - 1 (# of Filters) (.0000 g (Blank Value / Filter)) = .1048 g

BEAKERS : .0582 (Total Catch) g - 75 (ml Acetone) (.000007 g (Blank Value / ml Acetone)) = .0577 g

.0005

TOTAL FRONT HALF CATCH : .1625 g

BACK HALF CATCH

FILTERS : .0394 (Total Catch) g - 1 (# of Filters) (.0000 g (Blank Value / Filter)) = .0394 g

BEAKERS :

Acetone : .1033 (Total Catch) g - 100 (ml Acetone) (.000007 g (Blank Value / ml Acetone)) = .1026 g

.0007

Extract : .0106 (Total Catch) g - 75 (ml Dichloromethane) (.000019 g (Blank Value / Dichloromethane)) = .0092 g

(.0014)

Water : .0998 (Total Catch) g - 300 (ml Water) (.000018 g (Blank Value / Water)) = .0944 g

.0054

TOTAL BACK HALF CATCH : .2456 g

TOTAL CATCH : .4081 g

% FRONT HALF : 39.8 %

CALCULATIONS DATA SHEET # 7

UNIT: Buck 91 NC RUN: 3 DATE: 2 - 3 - 2010

1) Vm (std) = $\dfrac{(100{,}789\ \text{Vm})(17.64)(.901\ \text{mcf})\left(29.67\text{" Hg} + \frac{.138\text{" } H_2O}{13.6}\right)}{(.553\ \text{TmA})}$ = $\underset{000.0000}{85.9760}$ dscf

2) Vw (std) = (.04707) (114.7 ml H_2O) = $\underset{00.0000}{4.6683}$ scf

3) Asw = $\dfrac{(4.6683\ \text{scf})}{(4.6683\ \text{scf} + 85.9760\ \text{dscf})}$ = $\underset{.0000}{.0515}$ Bws × 100 = $\underset{00.0000}{5.1501}$ % H_2O

4) Cs = $\dfrac{(.4081\ \text{g.})}{(85.9760\ \text{dscf})}$ (15.43) = $\underset{0.0000}{.0732}$ gr / dscf

5) Estimated g / hr = $\dfrac{(.4081\ \text{g.})}{(85.9760\ \text{dscf})}$ ($\underset{00.0000}{8.132}$ dscfm) (60) = $\underset{00.0000}{2.3160}$ 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_2O =	average delta H for test	(p. 2)	(.000 " H_2O)
TmA =	average meter temperature for test in degrees Absolute	(p. 2)	(000 TmA)
ml H_2O =	total water caught during test	(p. 3)	(000.0 ml H_2O)
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: Buck 91 NC RUN: 3 DATE: 2-3-2010

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

Wet Bulb / Dry Bulb

Pre : WB: 68 DB: 93 = 26 % RH 1.4 % H_2O

Post : WB: 65 DB: 82 = 40 % RH 1.4 % H_2O

Average: 33 % RH 1.4 % H_2O

Empty Stove Weight (lbs): N/A w/ stack & oil seal : Wet: — Dry: 0.0

Kindling Weight (lbs): Paper: .1 Wood: 1.6

Preburn Fuel Weight: 25.3 + 26.5 Total: 51.8

Kindling & Preburn Fuel Weight (wood only) (lbs): **Total**: 53.4

Coal Bed Wt Range (lbs): 5.2 - 4.2 **Scale**: 5.2 - 4.2

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**: 43

Maximum Coal Bed Removal (lbs): ((5.2 (Upper) + 4.2 (Lower)) ÷ 2) .25 = 1.1 (round down to nearest tenth)

Test Fuel (.75" x 1.5" x 5" spacers) = 18 pcs

Dimensions	Length in inches	No. Pcs	Weight in lbs	% of Load
2" x 4"	—	—	—	—
4" x 4"	14	6	20.9	100.0

Test Fuel Weight: 20.9 lbs

Estimated Dry Burn Rate:

$$\frac{20.9 - (20.9 \times .16400)}{2.2046} \times \frac{60}{\frac{330}{\text{TIME}}} = 1.441 \text{ kg / hr}$$

Estimated BTU's/hr: $19{,}140 \times \frac{63}{100} \times \frac{1.441}{\text{DBR}} = 17375.9$ BTU's/hr

EPA Default Efficiencies: Non-cat: 63 Cat: 72 Pellet: 78

250

375

WOOD STOVE OPERATING DATA PAGE #9

Unit : Buck 91 NC Run : 3 Date : 2-3-2010

FIRE STARTED: 0635

WARM UP AND PREBURN:

PRIMARY AIR : Set wide open for all warm-up / preburn fuel charges. Then set to 1/4" 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 ½ min. prior to loading last fuel, raked and leveled. In stove 30 sec.

TEST:

DOOR wide open during loading Ø min. 50 sec.

PRIMARY AIR : Opened full for first 5 min., then set to run setting of 1/4".

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

FAN:

ON / (OFF) during warm-up (ON) / OFF during preburn

ON / (OFF) first 30 minutes of test (ON) / OFF balance of test run

Fan speed set at Low

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 : N/A BRAND : N/A

All Grades WCLB rules:

WARM UP INFORMATION:

All pre-burn / warm up fuel pieces were either 16 or — inches.

1st warm up / pre-burn fuel charge (25.3 lbs.) added at 0643

2nd warm up / pre-burn fuel charge (26.5 lbs.) added at 0753

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 _____

TEST DATA SHEET #10

Unit : Buck 91 NC Run : 3 Date : 2-3-2010

Room Temperature : 74 °F Temperature Correction Set? (Yes) No

Calibration Check: 12.0% + or – 0.2%? (Yes) No

Time Test Fuel moisture reading taken : 0840

pc #	Dimen.	Use	TOP	BOTTOM	SIDE	Avg Corrected
1	2"×4"×8'	K	16.7	14.2	14.3	15.067
2						
3						
4	2"×4"×8'	P	20.9	20.0	20.1	20.3
5	2"×4"×8'	P	18.0	17.9	18.0	18.0
6	2"×4"×8'	P	18.3	18.4	18.3	18.3
7	2"×4"×8'	P				56.6
8	2"×4"×8'	P				
9						
10						
11						
12	4x4x14"	T	20.8	20.3	20.4	20.5
13	"	T	20.4	20.4	20.4	20.4
14	"	T	19.3	19.6	19.4	19.4
15	"	T	21.1	21.0	21.6	21.2
16	"	T	18.1	18.1	18.2	18.1
17	"	T	18.1	18.1	18.1	18.1
18						117
19						
20	Spacers	T	20.7	20.6	19.9	20.4

Key for Use : K = Kindling P = Pretest Fuel T = Test Fuel

	KINDLING	PRETEST FUEL	TEST FUEL
Dry Moisture % :	15.067 %	18.867 %	19.617 %
Wet Moisture % :	13.094 %	15.872 %	16.400 %

To obtain Wet from Dry : $\frac{100 \times \%\ \text{Dry Reading}}{100 + \%\text{Dry Reading}}$ = % Moisture, Wet Basis

Acceptable Ranges : 16 - 20 % wet: 19 - 25 % dry (17.5 - 22.5 on Meter Uncor. reading) at 70°

GAS DATA SHEET #12

WEIGHT: 4.3 DATE: 2-3-2

UNIT: Buck 91 NC RUN: 3 PAGE: 1 OF 2

Fan ?

TIME	SCALE	FUEL	DROP	V.	CO_2	V.	O_2	V.	CO	STATIC	SO_2 PPM
0 1040	25.2	20.9	—	.187	4.6	.607	15.2	.093	.95	.035	.400
5 45	24.4	20.1	.8	.288	7.2	.527	13.2	.030	.32	.072	.275
10 50	24.3	20.0	.1	.101	2.5	.698	17.5	.046	.49	.046	.425
15 55	24.1	19.8	.2	.106	2.6	.702	17.6	.055	.57	.041	.450
20 1100	23.8	19.5	.3	.213	5.3	.599	15.0	.044	.46	.044	.450
25 05	23.4	19.1	.4	.168	4.1	.647	16.2	.043	.45	.043	.450
30 10	23.0	18.7	.4	.175	4.3	.639	16.0	.040	.42	.045	.400
35 15	22.1	17.8	.9	.427	10.7	.380	9.5	.054	.56	.059	.400
40 20	21.1	16.8	1.0	.416	10.4	.399	10.0	.034	.36	.060	.400
45 25	20.1	15.8	1.0	.401	10.0	.419	10.5	.024	.26	.065	.375
50 1130	19.2	14.9	.9	.380	9.5	.439	11.0	.022	.24	.064	.375
53 35	18.4	14.1	.8	.375	9.3	.447	11.2	.025	.27	.063	.375
SUBTOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	.637	*****
60 40	17.6	13.3	.8	.361	9.0	.459	11.5	.025	.27	.062	.375
65 45	16.8	12.5	.8	.366	9.1	.451	11.3	.033	.35	.061	.400
70 50	16.1	11.8	.7	.333	8.3	.483	12.1	.030	.32	.060	.400
75 55	15.5	11.2	.6	.323	8.0	.499	12.5	.022	.24	.059	.375
80 1200	15.0	10.7	.5	.326	8.1	.495	12.4	.021	.23	.058	.375
85 05	14.4	10.1	.6	.340	8.5	.483	12.1	.013	.15	.056	.375
90 10	13.8	9.5	.6	.352	9.8	.471	11.8	.014	.16	.055	.375
95 15	13.2	8.9	.6	.350	8.7	.475	11.9	.018	.20	.056	.400
100 20	12.6	8.3	.6	.345	8.6	.471	11.8	.029	.31	.055	.400
105 25	12.1	7.8	.5	.350	8.7	.471	11.8	.028	.30	.056	.400
110 1230	11.5	7.2	.6	.355	8.8	.467	11.7	.027	.29	.055	.400
115 35	11.0	6.7	.5	.336	8.4	.479	12.0	.030	.32	.054	.400
SUBTOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	.687	*****
120 40	10.6	6.3	.4	.333	8.3	.487	12.2	.024	.26	.053	.400
125 45	10.2	5.9	.4	.300	7.5	.519	13.0	.025	.27	.051	.400
130 50	9.8	5.5	.4	.261	6.5	.543	13.6	.059	.61	.050	.450
135 55	9.5	5.2	.3	.250	6.2	.555	13.9	.066	.68	.048	.450
140 1300	9.3	5.0	.2	.229	5.7	.575	14.4	.064	.66	.045	.450
145 05	9.1	4.8	.2	.231	5.7	.575	14.4	.066	.68	.044	.450
150 10	8.9	4.6	.2	.206	5.1	.587	14.7	.090	.92	.043	.450
155 15	8.7	4.4	.2	.221	5.5	.571	14.3	.090	.92	.041	.450
160 20	8.5	4.2	.2	.218	5.4	.575	14.4	.094	.96	.040	.450
165 25	8.3	4.0	.2	.213	5.3	.579	14.5	.096	.98	.040	.450
170 1330	8.1	3.8	.2	.212	5.3	.575	14.4	.108	1.10	.040	.450
175 35	7.9	3.6	.2	.212	5.3	.567	14.2	.124	1.26	.039	.450
SUBTOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	.534	*****
TOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	1.858	*****

GAS DATA SHEET #12

WEIGHT: 4.3 DATE: 2-3-2010

UNIT: BUCK 91 NC RUN: 3 PAGE: 2 OF 2

TIME	SCALE	FUEL	DROP	V.	CO_2	V.	O_2	V.	CO	STATIC	SO_2PPM
180 40	7.7	3.4	.2	.212	5.3	.563	14.1	.134	1.36	.038	.450
185 45	7.5	3.2	.2	.192	4.8	.571	14.3	.165	1.67	.036	.475
190 50	7.3	3.0	.2	.199	4.9	.583	14.6	.121	1.23	.038	.450
195 55	7.2	2.9	.1	.182	4.5	.599	15.0	.127	1.29	.040	.450
200 1400	7.0	2.7	.2	.178	4.4	.603	15.1	.123	1.25	.040	.425
205 05	6.9	2.6	.1	.181	4.5	.595	14.9	.134	1.36	.039	.425
210 10	6.8	2.5	.1	.165	4.1	.603	15.1	.158	1.60	.040	.450
215 15	6.7	2.4	.1	.159	3.9	.611	15.3	.154	1.56	.038	.425
220 20	6.6	2.3	.1	.153	3.8	.619	15.5	.146	1.48	.037	.425
225 25	6.5	2.2	.1	.165	4.1	.619	15.5	.118	1.20	.037	.425
230 1430	6.4	2.1	.1	.152	3.7	.627	15.7	.138	1.40	.036	.425
235 35	6.3	2.0	.1	.143	3.5	.631	15.8	.140	1.42	.035	.425
SUBTOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	.454	*****
240 40	6.2	1.9	.1	.136	3.3	.635	15.9	.156	1.58	.035	.425
245 45	6.1	1.8	.1	.147	3.6	.639	16.0	.118	1.20	.034	.425
250 50	6.0	1.7	.1	.146	3.6	.639	16.0	.117	1.19	.034	.425
255 55	5.9	1.6	.1	.143	3.5	.639	16.0	.120	1.22	.034	.425
260 1500	5.8	1.5	.1	.147	3.6	.639	16.0	.110	1.12	.033	.425
265 05	5.7	1.4	.1	.168	4.2	.615	15.4	.106	1.08	.034	425
270 10	5.6	1.3	.1	.173	4.3	.613	15.4	.110	1.12	.034	425
275 15	5.5	1.2	.1	.171	4.3	.616	15.4	.107	1.09	.034	425
280 20	5.4	1.1	.1	.159	4.0	.624	15.6	.115	1.17	.034	425
285 25	5.2	.9	.2	.157	3.9	.626	15.7	.109	1.11	.034	425
290 1530	5.1	.8	.1	.157	3.9	.631	15.8	.098	1.00	.034	425
295 35	5.0	.7	.1	.151	3.8	.632	15.8	.104	1.06	.034	425
SUBTOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	.408	*****
300 40	4.9	.6	.1	.145	3.6	.637	16.0	.109	1.11	.034	425
305 45	4.8	.5	.1	.140	3.5	.643	16.1	.117	1.19	.034	425
310 50	4.7	.4	.1	.140	3.5	.644	16.1	.115	1.16	.039	475
315 55	4.6	.3	.1	.141	3.5	.653	16.4	.091	.93	.034	475
320 1600	4.5	.2	.1	.137	3.4	.648	16.2	.102	1.04	.033	475
325 05	4.4	.1	.1	.135	3.4	.654	16.4	.103	1.05	.033	475
330 10	4.3	.0	.1	.124	3.1	.653	16.4	.117	1.19	.033	475
335 15										.235	
340 20											
345 25											
350 30										1097	
355 35											
SUBTOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	2.955	
TOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	.047	*****

UNIT: DUKE 91 NC

PREBURN DATA SHEET

RUN: 3 DATE: 2-3-2010 PAGE: 1 of

TIME	SCALE	DROP	STACK	TOP	LF SIDE	BACK	RT SIDE	BOTTOM	FIREBOX	SEC/CAT	AMBIENT	STATIC	COMMENTS
0 0845	7.6	—	552	364	646	561	636	523			86	-.070	PREBURN START: @ 2.4 UP
5 50	6.9	.7	416	745	640	505	629	530			83	-.060	COAL BED SCALE RANGE:
10 55	6.6	.3	370	728	624	464	613	522			86	-.056	5.2 → 4.2
15 0900	6.3	.3	335	640	591	408	577	502			84	-.051	PRIMARY AIR: 1/4
20 05	6.0	.3	326	619	574	388	562	444			82	-.051	SECONDARY AIR: N/A
25 10	5.9	.1	310	582	554	370	542	480			83	-.049	FAN: LOW
30 15	5.7	.2	290	534	631	351	519	464			81	-.046	PUMPS ON AT:
35 20	5.6	.1	288	504	515	341	504	454			81	-.045	CHECK WB/DB: N/A
40 25	5.5	.1	272	476	498	330	488	445			80	-.043	
45 30	5.4	.1	261	450	483	321	474	435			80	-.041	
50 35	5.3	.1	254	428	469	313	459	426			79	-.040	433
53 40	5.3	.0	246	406	455	303	442	415			69	-.036	
*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	
60 0945	5.2	.1	242	394	446	297	432	400			67	-.040	404
65 50	5.2	.0	236	380	437	290	419	391			66	-.039	
70 55	5.0	.2	232	371	430	282	408	390			72	-.041	394
75 1000	4.9	.1	230	363	424	277	399	386			72	-.039	383
80 05	4.9	.0	226	353	417	272	390	376			72	-.038	
85 10	4.8	.1	225	346	411	267	382	368			72	-.037	361
90 15	4.7	.1	223	340	403	364	374	360			72	-.036	354
95 20	4.6	.1	223	334	397	261	366	351			73	-.035	
100 25	4.5	.1	223	331	394	258	363	346			72	-.035	342
105 1030	4.4	.1	220	327	391	253	356	340			73	-.035	
110 35	4.4	.0	219	321	385	250	352	333			73	-.034	332
115 40	4.3	.1	222	315	383	249	346	329			73	-.035	328
120 45													327
125 50													

Buck Stoves-Model 91NC

Temperature Data Sheet 14

Run 3
2/3/2010

Time ********	Stack Chn 103	Top Chn 104	LT Side Chn 105	Back Chn 106	Rt Side Chn 107	Bottom Chn 108	Firebox Chn 109	Sec/Cat Chn 110	Ambient Chn 111	Tube Furn Chn 112	Smpl Box Chn 113	Smpl Out Chn 114	C-Gas Box Chn 115	C-Gas Out Chn 116	SO2 Out Chn 117
0	222	315	383	249	346	329	######	######	73	1413	229	57	232	33	32
5	570	415	400	282	332	359	######	######	71	1411	229	41	232	33	32
10	244	426	395	283	323	362	######	######	70	1410	229	41	233	33	32
15	208	390	386	279	313	360	######	######	71	1409	229	41	232	33	32
20	229	423	375	274	303	357	######	######	71	1406	228	42	231	34	33
25	228	431	368	270	296	351	######	######	70	1403	228	42	229	34	33
30	243	435	363	268	291	345	######	######	70	1400	228	42	228	34	33
35	382	496	345	226	293	312	######	######	71	1396	228	42	228	34	33
40	421	628	349	224	301	301	######	######	73	1394	228	42	231	34	34
45	413	662	358	229	314	295	######	######	73	1393	229	43	234	34	34
50	412	678	367	231	325	291	######	######	73	1394	230	44	235	34	34
55	408	668	374	236	336	288	######	######	74	1396	231	45	237	34	34
60	401	655	382	239	345	286	######	######	75	1397	231	45	237	35	34
65	388	646	388	244	353	285	######	######	76	1400	232	46	238	35	34
70	363	635	392	244	360	285	######	######	77	1401	233	46	238	35	34
75	351	625	393	241	365	284	######	######	77	1402	233	47	239	35	35
80	345	613	393	238	367	282	######	######	77	1404	234	47	239	35	35
85	343	611	392	237	369	279	######	######	77	1404	234	48	240	35	35
90	348	615	394	238	371	278	######	######	77	1404	234	48	240	35	35
95	350	615	397	243	375	276	######	######	78	1405	235	43	240	35	35
100	348	606	401	250	382	273	######	######	78	1405	235	42	240	35	36
105	341	591	404	259	391	273	######	######	77	1406	235	42	240	35	36
110	338	590	408	266	398	272	######	######	78	1407	235	42	241	36	36
115	330	585	411	271	405	271	######	######	77	1408	236	42	241	36	36
120	322	579	413	274	411	268	######	######	76	1408	236	42	240	36	36
125	308	573	416	277	414	268	######	######	76	1408	236	43	240	36	37
130	292	535	416	276	414	269	######	######	76	1408	235	43	240	36	37
135	278	505	415	274	412	270	######	######	76	1408	235	43	240	36	37
140	266	477	410	271	408	271	######	######	75	1409	235	43	239	37	37
145	257	458	403	265	403	272	######	######	75	1411	235	44	239	37	37
150	247	440	396	259	397	273	######	######	75	1412	235	45	239	37	37
155	249	429	390	252	390	274	######	######	74	1413	235	45	238	37	37
160	244	421	383	245	384	274	######	######	73	1414	235	46	237	37	37
165	237	412	376	239	377	277	######	######	73	1414	234	46	237	37	37
170	231	402	370	237	372	280	######	######	73	1414	234	47	236	37	37

175	228	392	364	234	367	280	######	######	73	1415	234	47	235	37	37
180	225	383	358	233	363	282	######	######	72	1416	234	47	235	37	38
185	217	372	353	230	359	280	######	######	73	1417	234	47	235	36	38
190	231	363	348	229	356	280	######	######	75	1419	234	48	235	36	38
195	239	360	345	227	351	280	######	######	75	1422	234	48	234	36	38
200	238	355	340	226	347	281	######	######	75	1423	234	48	234	36	38
205	237	352	336	222	343	283	######	######	75	1424	235	49	234	36	38
210	231	347	332	222	338	284	######	######	75	1425	235	49	234	36	38
215	224	338	329	221	334	286	######	######	75	1426	234	49	233	36	38
220	221	330	327	221	329	287	######	######	75	1426	234	48	233	36	38
225	224	328	323	219	324	289	######	######	75	1428	234	48	233	35	39
230	220	325	320	217	318	289	######	######	75	1429	234	49	233	35	39
235	215	318	318	215	314	290	######	######	75	1429	234	49	232	35	39
240	210	311	314	214	309	288	######	######	75	1429	234	49	232	35	39
245	211	308	313	212	303	287	######	######	75	1430	234	49	231	35	39
250	208	304	308	210	299	281	######	######	72	1430	234	49	231	35	39
255	206	300	306	208	294	281	######	######	75	1431	233	49	231	35	38
260	206	297	303	207	289	280	######	######	74	1432	234	50	231	34	38
265	208	293	302	208	286	279	######	######	74	1432	233	50	230	34	38
270	208	294	300	209	285	278	######	######	74	1432	233	50	230	34	38
275	206	295	299	210	283	277	######	######	73	1431	233	50	229	34	37
280	205	295	298	210	284	276	######	######	73	1430	233	50	229	34	37
285	206	295	298	209	286	276	######	######	72	1429	232	50	229	34	37
290	205	293	297	209	286	274	######	######	73	1429	232	50	229	34	37
295	202	291	297	210	286	274	######	######	73	1428	232	51	228	34	37
300	200	287	296	209	285	273	######	######	72	1428	232	51	229	34	36
305	199	284	297	207	284	272	######	######	73	1427	231	51	228	34	36
310	197	280	295	206	282	271	######	######	73	1427	231	51	228	34	36
315	195	277	295	207	281	269	######	######	73	1426	231	51	228	34	36
320	195	274	293	204	279	268	######	######	72	1425	231	51	228	34	36
325	194	272	291	204	277	267	######	######	72	1423	231	51	228	34	36
330	191	268	290	201	277	266	######	######	73	1422	231	51	228	34	35

TEMPERATURE DATA SHEET #14A

		TEST TIME	330		
STACK AVG	268	TOP AVG	428	LT SIDE AVG	354
BACK AVG	235	RT SIDE AVG	336	BOTTOM AVG	287
FIREBOX AVG	########	SEC/CAT AVG	########	AMBIENT AVG	74

END	260.5
START	324.5
	-64.0 DELTA T

CIRCLE: **LOSS / GAIN**

ZERO / SPAN CHECK DATA SHEET #15-1

Date : 2-3-2010 Analyte : CO_2 (15-1)

Unit : Buck 91 NC Run # : 3

Zero Cyl. # : 168TAC 3-A Conc. : 0.00 % CO_2 Cyl. Press. : 400 PSI

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

Span Cyl. # : 487905 Conc. : 12.20 % CO_2 Cyl. Press. : 1460 PSI

Certified by : AIR LIQUIDE Date : 11-1-07

Analyzer : Make : HORIBA Model : PIR-2000 SN : 407069

Range : 0 - 25.0 % CO_2 Analyzer Output : 0 - 1.0 v.

Flow : 1.5 SCFH Measured by : Rotameter

EPA Span Value = 25.0 % CO_2

EPA Control Limits = ± 2.5% of 25.0 % CO_2 = ± 0.625 % CO_2

Method 28 A = ± .2 % of 25.0 % CO_2 = ± .05 % CO_2

PRE RUN Audit : by : Cp Wadmore Time : 0845 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	-.023	-.023	-.091
SPAN	48.8	.488	12.20	48.8	.486	12.235	.035	.139

POST RUN Audit : by : Cp Wadmore Time : 1630 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	-.023	-.023	-.091
SPAN	48.8	.488	12.20	48.4	.484	12.134	-.066	-.263

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

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

Span % Difference = $\frac{\text{Act \% (ppm) - Exp \% (ppm)}}{\text{Full Scale Value}}$ X100

ZERO / SPAN CHECK DATA SHEET #15-2

Date: 2-3-2010 Analyte: O_2 (15-2)

Unit: Buck 910NC Run #: 3

Zero Cyl. #: 168TAC 3A Conc.: 0.00 % O_2 Cyl. Press.: 400 PSI

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

Span Cyl. #: 487905 Conc.: 12.60 % O_2 Cyl. Press.: 1460 PSI

Certified by: AIR LIQUIDE Date: 11-1-07

Analyzer: Make: TELEDYNE Model: 320 A SN: 37400

Range: 0 - 25.0 % O_2 Analyzer Output: 0 - 1.0 v.

Flow: 1.5 SCFH Measured by: Rotameter

EPA Span Value = 25.0 % O_2

EPA Control Limits = ± 2.5% of 25.0 % O_2 = ± 0.625 % O_2

Method 28 A = ± .2 % of 25.0 % O_2 = ± .05 % O_2

PRE RUN Audit: by: [signature] Time: 0845 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	.000	-.025	-.025	-.102
SPAN	12.60	.504	12.6	12.6	.504	12.623	.023	.091

POST RUN Audit: by: [signature] Time: 1630 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	-.025	-.025	-.102
SPAN	12.60	.504	12.6	12.6	.503	12.598	-.062	-.009

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

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

Span % Difference = $\frac{\text{Act \% (ppm) - Exp \% (ppm)}}{\text{Full Scale Value}}$ X100

ZERO / SPAN CHECK DATA SHEET #15-3

Date : 2-3-2010 Analyte : CO (15-3)

Unit : Buck 91 NC Run # : 3

Zero Cyl. # : 168TAC 3-A Conc. : 0.00 % CO Cyl. Press. : 400 PSI

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

Span Cyl. # : CA87905 Conc. : 4.90 % CO Cyl. Press. : 1460 PSI

Certified by : AIR LIQUIDE Date : 11-1-07

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 = ± 2.5% of 10.0 % CO = ± 0.25 % CO

Method 28 A = ± .2 % of 10.0 % CO = ± .02 % CO

PRE RUN Audit : by CP Wadsworth Time : 0845 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	,017	,017	,170
SPAN	49.0	.490	4.90	49.0	,490	4.908	,008	,081

POST RUN Audit : by : CP Wadsworth Time : 1630 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	,017	,017	,170
SPAN	49.0	.490	4.90	48.9	,489	4,898	-,002	-,019

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

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

Span % Difference = $\frac{\text{Act \% (ppm) - Exp \% (ppm)}}{\text{Full Scale Value}}$ X100

ZERO / SPAN CHECK DATA SHEET #15-4

Date: 2-3-2010 Analyte: SO_2 (15-4)

Unit: Buck 91NC Run #: 3

Zero Cyl. #: 168TAC 3-A Conc.: 0.00 ppm SO_2 Cyl. Press.: 400 PSI

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

Span Cyl. #: CC82089 Conc.: 1250 ppm SO_2 Cyl. Press.: 1650 PSI

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

Analyzer: Make: HORIBA Model: PIR-2000 SN: 403019

Range: 0 - 2500 ppm SO_2 Analyzer Output: 0 - 1.0 v.

Flow: 1.5 SCFH Measured by: Rotameter

EPA Span Value = 2500 ppm SO_2

EPA Control Limits = ± 2.5% of 2500 ppm SO_2 = ± 62.5 ppm SO_2

PRE RUN Audit: by: [signature] Time: 0845 Temp: 80 °F

AUDIT RESULTS

Point #	Expected Response			Actual Response			± Conc. Difference	Δ %
	Meter	DVM	PPM	Meter	DVM	%		
ZERO	00.0	.000	00.0	00.0	.000	-.651	-.650	-.026
SPAN	50.0	.500	1250	50.0	.500	1252.2	2.200	.088

POST RUN Audit: by: [signature] Time: 1630 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	-.002	-5.663	-5.663	-.227
SPAN	50.0	.500	1250	50.1	.501	1254.7	4.700	.188

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

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

Span % Difference = $\frac{\text{Act \% (ppm) - Exp \% (ppm)}}{\text{Full Scale Value}}$ X100

QUALITY CHECKS DATA SHEET # 16

UNIT: Buck 91 NC RUN: 3 DATE: 2-3-2010

Thermocouple Check:

T/C # 1	— °F	T/C # 13	61.6 °F
T/C # 2	— °F	T/C # 14	61.9 °F
T/C # 3	61.6 °F	T/C # 15	61.9 °F
T/C # 4	56.7 °F	T/C # 16	48.8 °F
T/C # 5	56.0 °F	T/C # 17	56.2 °F
T/C # 6	56.0 °F	T/C # 18	64.6 °F
T/C # 7	56.1 °F	T/C # 19	— °F
T/C # 8	55.7 °F	T/C # 20	— °F
T/C # 9	— °F	T/C # 21	— °F
T/C # 10	— °F	T/C # 22	— °F
T/C # 11	55.4 °F	T/C # 23	— °F
T/C # 12	65.2 °F	T/C # 24	— °F

Thermocouple Readout:

Pretest zero and span check and calibration

ZERO 0.0 °F Adj. to 0.0 °F

SPAN 2000.0 °F Adj. to 2000.0 °F

post test zero and span

ZERO 0.0 °F Difference 0 % (% difference)

SPAN 2001.1 °F Difference .055 %

Thermocouple Readout Pretest Linearity Check:

0	= 0.0 °F	200	= 200.6 °F	400	= 400.0 °F
600	= 600.0 °F	800	= 799.9 °F	1000	= 999.9 °F
1200	= 1199.8 °F	1400	= 1399.6 °F	1600	= 1599.6 °F
1800	= 1799.9 °F	2000	= 2000.0 °F		

Sample Train Leak Check	Pre ✓	Post ✓
C-gas Train Leak Check	Pre ✓	Post ✓
SO_2 Train Leak Check	Pre ✓	Post ✓
Static Gauge Zero Check	Pre ✓	Post ✓

Scale Check Pre: 14.5 − 4.5 = 10.0

Post: 14.3 − 4.3 = 10.0

Stack Cleaned Prior to Test Run: YES ____ NO X

TABLE 1 ----- RAW DATA

CLIENT : New Buck TEST No. : 4

MODEL: 91NC DATE:

TIME (MIN.)	METER READING (C F)	DELTA H (IN. H2O)	METER TEMP. (DEG. F)	PERCENT CO (%)	PERCENT CO2 (%)	SO2 COCENTR. PPM
0	699.000	0.150	92	0.31	6.90	350
5	700.500	0.130	93	0.43	5.00	375
10	701.986	0.130	93	0.50	4.40	375
15	703.473	0.170	93	0.23	10.00	325
20	705.187	0.170	93	0.23	11.40	325
25	706.902	0.130	93	0.44	13.60	375
30	708.388	0.150	93	0.37	15.20	350
35	709.980	0.130	94	0.51	13.50	375
40	711.472	0.110	94	0.84	15.60	400
45	712.871	0.130	94	0.50	14.50	375
50	714.362	0.150	94	0.28	11.30	350
55	715.960	0.200	94	0.14	9.10	300
60	717.824	0.240	95	0.13	8.00	275
65	719.870	0.240	95	0.13	8.40	275
70	721.916	0.240	95	0.19	7.70	275
75	723.962	0.240	95	0.20	7.50	275
80	726.008	0.240	95	0.27	6.80	275
85	728.054	0.200	95	0.46	5.00	300
90	729.929	0.200	95	0.55	5.10	300
95	731.805	0.200	95	0.69	4.60	300
100	733.681	0.170	95	0.72	4.30	325
105	735.413	0.200	95	0.75	4.10	300
110	737.288	0.170	95	0.73	4.50	325
115	739.020	0.170	95	0.66	4.90	325
120	740.752	0.200	95	0.52	5.30	300
125	742.628	0.240	95	0.43	5.60	275
130	744.674	0.240	95	0.40	5.40	275
135	746.719	0.290	95	0.36	5.30	250
140	748.969	0.240	95	0.50	4.70	275
145	751.015	0.290	95	0.62	4.40	250
150	753.265	0.290	95	0.71	4.00	250
155	755.515	0.290	95	0.70	3.70	250
160						
165						

TABLE 2---RAW DATA

CLIENT : New Buck TEST No. 4

MODEL: 91NC DATE:

****

				c	
METER CAL. FACTOR (Y) -------	0.901		Wt. WOOD BURNED(LB) -------	21.8	Lbs
BAROMETRIC PRESS.(Pb) -------	29.53	in Hg	WET,FUEL MOISTURE % -------	17.253	%
LEAK RATE POST (Lp) -------	0.000	cfm	Wt. PART. COLLECTED -------	0.4063	g
WATER VOL. (V1c) -------	80.3	Ml	METER VOLUME Vm -------	56.515	mcf
TEST TIME (MIN) -------	155	min	HC MOLE FRACTION -------	0.0132	

TABLE 3 -----FIELD DATA AVERAGES

CLIENT : New Buck TEST No. 4

MODEL: 91NC DATE:

****

AVG DELTA H	-------	0.20	in H2O	AVG PRCNT CO	-------	0.45	%
AVG METER TEMP. Tm	-------	94	deg F	AVG PRCNT CO2	-------	7.49	%
AVG PPM SO2	-------	311	PPM	AVG BAL CO2/CO	-------	16.54	%

TABLE 4 ---- CALCULATIONS

CLIENT : New Buck TEST No. 4

MODEL: 91NC DATE:

STD SAMPLE VOL. Vm(std) d) ------	47.90	dscf	STACK GAS FLOW Qsd -------	1231.036	dscf/Hr
				20.52	& dscf/min
VOL. WATER VAPOR Vw(s td) -----	3.780	scf	PARTICULATE CONCTRT. C s ------	0.0085	g/dscf
PRCNT MSTR Bws -------	7.31	%	PARTC.EMISS. RATE E -------	10.44	g/Hr
BURN RATE BR -------	3.17	Kg/Hr	MOLES OF GAS PER Lb WOOD Nt ----	0.46	Lb-mole/Lb
CO EMISSION RATE -------	186.80	g/Hr	PART.EMISS. RATE ------	3.30	g/Kgdry fuel
	& 58.98	g/Kgdry fuel			

TABLE 5 ---- PROPORTIONAL RATE VARIATION

CLIENT : New Buck TEST No. : 4

MODEL: 91NC DATE:

TIME INTEVAL Ti	PPM * Vm	PROPRTN. RATE VAR. PR	PROPRTN RATE VAR. AVERAGE
5	446.4	94	100
10	473.4	100	
15	473.7	100	
20	473.2	100	
25	473.5	100	
30	473.4	100	
35	472.9	100	
40	474.4	100	
45	474.5	100	
50	474.1	100	
55	474.3	100	
60	473.8	100	
65	476.4	100	
70	476.4	100	
75	476.4	100	
80	476.4	100	
85	476.4	100	
90	476.2	100	
95	476.4	100	
100	476.4	100	
105	476.5	100	
110	476.2	100	
115	476.5	100	
120	476.5	100	
125	476.4	100	
130	476.4	100	
135	476.1	100	
140	476.3	100	
145	476.4	100	
150	476.3	100	
155	476.3	100	
160			

COMPUTER INPUT DATA SHEET #1

Client: New Buck Corp

Address: P.O. Box 69
Spruce Pine, NC 28777

Phone: 888-622-7868 Fax: 828-765-0462

Run No.: 4 Date of Test: 2-4-2010 Burn Rate: 3.167

Model No.: 91 NC ☐ min ☐ min-1.25 ☐ fan

Stove Type: ☐ Cat ☒ Non Cat ☐ Pellet ☐ 1.25-1.9 ☒ max ☐ insert

Dry Gas Meter Y Factor: .901 (0.000) (Data Sheet #2) Post Leak Rate: 0.000 cfm (.000) (Data Sheet #2) Time: 155 min. (000) (Data Sheet #2)

Dry Gas Meter Volume: 56.515 cf (00.000) (Data Sheet #2)

Stack Flow: 10.884 dscfm (00.000) (Data Sheet #2) Δ H: .198 in. H_2O (.000) (Data Sheet #2)

Maximum Vac.: 2.0 (0.0) (Data Sheet #2) Barometric Pressure: 29.53 in. Hg (00.00) (Data Sheet #2)

H_2O Captured: 80.3 g (00.0) (Data Sheet #3)

Front Half Catch % Of Total: 35.9 % (00.0) (Data Sheet #6) Total Particulate Catch: .4063 g (0.0000) (Data Sheet #6)

Flue Gas Moisture: 7.3134 % (00.000) (Data Sheet #7)

Particulate Emission: .1309 gr/dscf (0.0000) (Data Sheet #7)

Relative Humidity: 30.0 % RH (00.0) (Data Sheet #8) Ambient Moisture: 1.6 % H_2O (0.00) (Data Sheet #8)

Preburn Fuel Wt.: 65.1 lbs. (00.0) (Data Sheet #8) Coal Bed Wt.: 5.2 lbs. (00.0) (Data sheet #8) Test Fuel Wt.: 21.8 lbs. (00.0) (Data sheet #8)

Heat Output (EPA Default): 38188.3 BTU/hr (00,000.0) (Data Sheet #8)

Kindling Fuel % Moisture (wet): 13.094 % (00.000) (Data Sheet #10) Pretest Fuel % Moisture (wet): 16.713 % (00.000) (Data Sheet #10)

Test Fuel % Moisture (dry): 20.850 % Test Fuel % Moisture (wet): 17.253 % (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: -.066 in. H_2O (+/- .000) (Data Sheet #12)

Average Ambient Temperature: 83 °F (00) (Data Sheet #14) Stove Temperature Change: -158.3 °F (+/- 000.0) (Data Sheet #14)

Test start = 1245
End = 1520

meter Temp = 554

METER BOX DATA SHEET PAGE # 2

Page: 1 of 2

UNIT: Buck 91 NC RUN: 4 DATE: 2 - 4 -2010

Meter Box: 5H Y Factor: 1.901

Leak checks: 15 " Hg @ 1,000 cfm _____ " Hg @ _____ cfm

15 " Hg @ 1,000 cfm _____ " Hg @ _____ cfm

Inject SO^2 @ 100 cc/min. Nozzle: Probe @ 3/8 " od Initial Volume: 1.500

ROTO: PRESS: .18			SAMPLING RATIO: 31. : 1				BP: 29.58		
MIN	TIME	METER READING	SAMPLE MDCF	STACK DSCFM	DELTA H	METER TEMP	SO2 PPM	ROTO TEMP	PUMP VACC
0	1245	699.000	———	9,547	.15	92	350	92	2.0
5	50	700.500		8.895	.13	93	375	93	2.0
10	55	701.986	701.984	8.895	.13	93	375	93	2.0
15	1300	703.473	703.473	10.263	.17	93	325	93	2.0
20	05	705.187	705.187	10.263	.17	93	325	93	2.0
25	10	706.902	706.902	8.895	.13	93	375	93	2.0
30	15	708.388	708.388	9.530	.15	93	350	93	2.0
35	20	709.980	709.980	8.879	.13	94	375	94	2.0
40	25	711.472	711.472	8.324	.11	94	400	94	2.0
45	30	712.871	712.871	8.879	.13	94	375	94	2.0
50	35	714.362	714.362	9.513	.15	94	350	94	2.0
55	40	715.960	715.960	11.098	.20	94	300	94	2.0
ROTO PRESS: .18			TOTALS:	112.981	1.75	1120	BP.: 29.50		
60	1345	717.824	717.824	12.053	.24	95	275	95	2.0
65	50	719.870	719.870	12.053	.24	95	275	95	2.0
70	55	721.916	721.916	12053	.24	95	275	95	2.0
75	1400	723.962	723.962	12.053	.24	95	275	95	2.0
80	05	726.008	726.008	12.053	.24	95	275	95	2.0
85	10	728.054	728.054	11.048	.20	95	300	95	2.0
90	15	729.929	729.929	11.048	.20	95	300	95	2.0
95	20	731.805	731.805	11.048	.20	95	300	95	2.0
100	25	733.681	733.681	10.199	.17	95	325	95	2.0
105	30	735.413	735.413	11.048	.20	95	300	95	2.0
110	35	737.288	737.288	10.199	.17	95	325	95	2.0
115	40	739.020	739.020	10.199	.17	95	325	95	2.0
			TOTALS:	135.054	2.51	1140	MAX VACC =		
TOTAL Cu Ft.			TOTALS:	248.035	4.26	2260	AVG. BP:		

METER BOX DATA SHEET PAGE # 2

Page: 2 of 2

UNIT: Buck 91 NC RUN: 4 DATE: 2-4-2010

Meter Box: 5H Y Factor: .901

Leak checks: 15 " Hg @ 1.000 cfm _____ " Hg @ _____ cfm

15 " Hg @ 1.000 cfm _____ " Hg @ _____ cfm

Inject SO^2 @ 100 cc/min. Nozzle : Probe @ 3/8 " od Initial Volume: 1.500

ROTO: PRESS: .18 SAMPLING RATIO: 31 : 1 BP: 29.50

MIN	TIME	METER READING	SAMPLE MDCF	STACK DSCFM	DELTA H	METER TEMP	SO2 PPM	ROTO TEMP	PUMP VACC
120	1445	740.752	740.752	11.048	.20	95	300	95	2.0
125	50	742.628	742.628	12.053	.24	95	275	95	2.0
130	55	744.674	744.674	12.053	.24	95	275	95	2.0
135	1500	746.719	746.719	13.258	.29	95	250	95	2.0
140	05	748.969	748.969	12.053	.24	95	275	95	2.0
145	10	751.015	751.015	13.258	.29	95	250	95	2.0
150	15	753.265	753.265	13.258	.29	95	250	95	2.0
155	20	755.515	755.515	13.258	.29	95	250	95	2.0
160				100.239	2.08	760			
165									
170									
175									
ROTO PRESS:			TOTALS:				BP.:		
180									
185									
190									
195									
200									
205									
210									
215									
220									
225									
230									
235				348.274	6.34	3020			
			TOTALS:			94	MAX VACC =		2.0
TOTAL Cu Ft		56.515	TOTALS:	10,884	.198	554	AVG. BP:		29.53

-.32

PARTICULATE CATCH / MOISTURE DATA SHEET # 3

UNIT : BCL91 NC RUN : 4 DATE : 2-4-10

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	680.7	579.6	484.0	932.6
INITIAL WT	612.0	575.8	483.5	925.3
NET WT GRAMS	68.7	3.8	.5	7.3

TOTAL CATCH : 80.3 GRAMS H_2O

FRONT HALF

FILTER #	181F	
FINAL WT g	.7440	
INITIAL WT g	.6596	
NET WT g	.0844	

BEAKER #	57
DESC.	ACETONE
FINAL WT g	104.9340
INITIAL WT g	104.8720
NET WT g	.0620
VOL. DESC. ml	75

BACK HALF

FILTER #	181B	
FINAL WT g	.4363	
INITIAL WT g	.3598	
NET WT g	.0765	

BEAKER #	52	53	54	55	
DESC.	ACETONE	METHCHLOR	H_2O	H_2O	
FINAL WT g	107.5865	105.7470	107.3535	93.5230	
INITIAL WT g	107.4956	105.7333	107.3041	93.4863	
NET WT g	.0909	.0137	.0494	.0367	(.0861)
VOL. DESC ml	100	75	150	+ 110 =	(260)

FILTER TARE WEIGHTS DATA SHEET #4-1

Into Dessicator : Date : 8-12-09 Time : 1205 By : AV

Manufacturer S & S Grade : # 25 Glass Front Size : 11 cm Lot No. :

Back Size: 8.2 cm Lot No. :

	DATE: 8-14-09	BY: AV	DATE: 8-19-09	BY: AV	DATE:	BY:
FILTER #	FIRST WEIGHT	TIME	SECOND WEIGHT	TIME	THIRD WEIGHT	TIME
181F	0.6576	0920	0.6576	09:00		
182F	0.6612	0921	0.6612	0901		
183F	0.6645	0922	0.6645	0902		
184F	0.6636	0923	0.6633	0903		
185F	0.6659	0924	0.6659	0904		
186F	0.6654	0925	0.6654	0905		
187F	0.6647	0926	0.6649	0906		
188F	0.6649	0927	0.6647	0907		
189F	0.6615	0928	0.6613	0908		
190F	0.6648	0929	0.6646	0909		
181B	0.3598	0930	0.3598	0910		
182B	0.3601	0931	0.3602	0911		
183B	0.3609	0932	0.3609	0912		
184B	0.3630	0933	0.3633	0913		
185B	0.3662	0934	0.3664	0914		
186F	0.3625	0935	0.3625	0915		
187B	0.3611	0936	0.3612	0916		
188B	0.3612	0937	0.3611	0917		
189B	0.3636	0938	0.3637	0918		
190B	0.3608	0939	0.3608	0919		

Checked by: Date: Time:

BALANCE ROOM ENVIRONMENTAL CONDITIONS

DATE	TIME	BY	WB	DB	% RH
8-14-09	1630	GB		78	46
8-19-09	0900	GB		79	47

BEAKER TARE WEIGHTS DATA SHEET #4-2

Into Dessicator: Date : 6-11-2009 Time : 1000 By : CP

	DATE: 6-19-09	BY: AV	DATE: 6-22-09	BY: AV	DATE:	BY:
BEAKER #	FIRST WEIGHT	TIME	SECOND WEIGHT	TIME	THIRD WEIGHT	TIME
51	104.8716	1114	104.8720	1009	✓	
52	107.4952	1116	107.4956	1010	✓	
53	105.7328	1118	105.7333	1011	✓	
54	107.3037	1120	107.3041	1012	✓	
55	93.4858	1122	93.4863	1013	✓	
56	106.8596	1124	106.8601	1014	✓	
57	97.4077	1126	97.4079	1015	✓	
58	96.8890	1128	96.8891	1016	✓	
59	105.3503	1130	105.3504	1017	✓	
60	98.1986	1132	98.1989	1018	✓	
61	99.3470	1134	99.3473	1019	✓	
62	97.8635	1136	97.8635	1020	✓	
63	93.2132	1138	93.2135	1021	✓	
64	104.7867	1140	104.7867	1022	✓	
65	98.4413	1142	98.4412	1023	✓	
66	96.5077	1144	96.5074	1024	✓	
67	106.2219	1146	106.2224	1025	✓	
68	94.1551	1148	94.1550	1026	✓	
69	108.9913	1150	108.9917	1027	✓	
70	107.4778	1152	107.4782	1028	✓	
71	104.1509	1154	104.1513	1029	✓	
72	103.8268	1156	103.8269	1030	✓	
73	104.3542	1158	104.3543	1031	✓	
74	107.5075	1200	107.5078	1032	✓	
75	96.4667	1202	96.4664	1033	✓	

BALANCE ROOM ENVIRONMENTAL CONDITIONS

DATE	TIME	BY	WB	DB	% RH
6-9-09	1110	CW	-	70	48
6-22-09	0930	CW	-	74	44
		CW	-		

Checked by : C Washington
Date : 6-23-09
Time : 0950

WOODSTOVE DATA SHEET # 4-3 : CONSTANT WEIGHTS

UNIT : Buck 91 NC RUN : 4 DATE : 2-4-10 Page : 1 of

Beaker #	Date	Time	By	Weight	Date	Time	By	Weight	Date	Time	By	Weight	Date	Time	By
51	2-5	1100	CP	104.9336	2-7	1422	CP	104.9340	2-8	1208	CP	*			
52	2-5	1100	CP	107.5861	2-7	1423	CP	107.5865	2-8	1210	CP	*			
53	2-5	1100	CP	105.7465	2-7	1424	CP	105.7470	2-8	1211	CP	*			
54	2-5	1030	CP	107.3531	2-7	1425	CP	107.3535	2-8	1212	CP	*			
55	2-5	1030	CP	93.5226	2-7	1426	CP	93.5230	2-8	1213	CP	*			

Filter #	Date	Time	By	Weight	Date	Time	By	Weight	Date	Time	By	Weight	Date	Time	By
181F	2-4	1700	CP	.7445	2-5	1045	CP	.7440	2-7	1420	CP	*			
181B	2-4	1700	CP	.4389	2-5	1046	CP	.4365	2-7	1421	CP	.4363	2-8	1207	CP *

SCALE ROOM ENVIRONMENTAL CONDITIONS

Weighing Session	Date	Time	By	DB	%RH
1	2-5-10	1015	CP	78	43
2	2-7-10	1400	CP	70	44
3	2-8-10	1205	CP	78	46
4					
5					

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

WOODSTOVE DATA SHEET #4-4

SCALE QA SHEET

Dates: From 2-26-2010 Through	Scale: Sartorius	Model: A 120 S	SN: 37010004

100 g weight	10 g weight	1 g weight	100 mg weight	Tech	Date	Time	Dry Bulb	% RH
100.0001	10.0004	.9999	.0999	CP	2-26-10	0840	72	46
100.0001	9.9999	.9999	.0999	CP	2-27-10	1045	72	46
100.0000	10.0000	1.0000	.0999	CP	2-28	1100	70	48
100.0000	10.0000	1.0000	.0999	CP	3-1	0900	66	49
100.0000	10.0002	.9998	.1002	CP	3-5	1200	70	48
100.0001	9.9999	.9999	.0998	CP	3-7	1330	68	47
100.0000	9.9999	.9999	.0999	CP	3-9	1130	70	41
100.0000	10.0001	1.0000	.0999	CP	3-10	1200	70	44
100.0000	10.0001	.9999	.0999	CP	3-11	0900	66	49

WOODSTOVE DATA SHEET #4-4

SCALE QA SHEET

Dates: From 5-10-2009 Through 2-25-2010	Scale: Sartorius	Model: A 120 S	SN: 37010004

100 g weight	10 g weight	1 g weight	100 mg weight	Tech	Date	Time	Dry Bulb	% RH
100.0001	10.0002	1.0000	.0999	CP	5-10	1545	74	44
100.0001	10.0001	.9999	.0999	CP	6-19	1110	70	48
100.0001	10.0000	.9998	.0998	CP	6-22	0930	74	44
100.0001	10.0000	.9999	.0999	CP	6-24	1610	78	46
100.0001	10.0000	1.0000	.0999	CP	6-25	1000	78	46
100.0001	10.0001	1.0001	.0999	CP	6-26	0900	73	47
99.9998	10.0000	1.0001	.1000	CP	6-27	1300	76	45
100.0000	10.0002	1.0000	.0999	CP	6-28	1400	78	43
100.0000	10.0000	1.0000	.0999	CP	6-29	1130	74	47
100.0000	10.0000	1.0000	.0999	CP	7-1	1230	70	48
100.0000	9.9998	1.0000	.0998	CP	8-7	1310	75	48
99.9998	10.0000	1.0000	.0999	CP	8-8	1600	77	46
100.0000	10.0000	1.0000	.0999	CP	8-9	1720	78	46
100.0002	9.9999	1.0000	.0998	CP	8-10	0900	78	46
100.0000	10.0001	1.0001	.0998	CP	8-11	1126	78	46
100.0003	10.0001	1.0001	.1000	CP	8-12	0910	78	46
100.0000	10.0000	1.0001	.1000	CP	8-14	1630	78	46
100.0000	10.0000	1.0001	.0999	CP	8-19	0900	74	47
100.0002	10.0001	1.0000	.1000	CP	8-24	0900	72	42
100.0000	9.9999	.9999	.0999	CP	8-25	0900	70	48
100.0000	10.0000	1.0000	.0999	CP	8-26	1340	77	46
100.0003	10.0002	.9999	.1000	CP	9-5	1120	77	49
100.0000	10.0001	1.0000	.0999	CP	9-8	1410	78	41
100.0000	10.0001	1.0001	.0998	CP	9-11	1050	78	43
100.0000	10.0000	1.0000	.0999	CP	9-12	1220	78	46
100.0000	10.0001	1.0000	.0999	CP	9-13	1430	78	46
100.0000	10.0001	.9999	.1000	CP	9-14	1100	75	48
100.0000	10.0000	.9999	.0999	CP	1-29	1400	74	44
100.0000	10.0001	1.0000	.1000	CP	1-30	1800	78	46
100.0000	10.0001	1.0001	.1000	CP	2-1	0700	62	49
100.0000	9.9999	1.0001	.1000	CP	2-2	1100	72	46
100.0000	9.9997	1.0001	.1000	CP	2-4	1015	75	41
100.0000	10.0000	1.0000	.0998	CP	2-5	1015	78	43
100.0000	10.0001	1.0000	.1000	CP	2-7	1400	70	44
100.0002	10.0001	1.0000	.0999	CP	2-8	1200	78	46
100.0000	10.0000	1.0000	.1000	CP	2-9	1030	78	40
100.0000	10.0000	1.0000	.0999	CP	2-23	1830	77	49
100.0000	10.0001	1.0000	.0999	CP	2-24	0820	69	49
100.0000	10.0002	1.0000	.0999	CP	2-25	0940	69	47

WOODSTOVE DATA SHEET #4-4

SCALE QA SHEET

Dates: From 8-27-2008 Through 5-9-2009	Scale: Sartorius	Model: A 120 S	SN: 37010004

100 g weight	10 g weight	1 g weight	100 mg weight	Tech	Date	Time	Dry Bulb	% RH
99.9999	10.0000	1.0000	.0999	CK	8-27	0900	78	46
100.0001	10.0000	1.0000	.0999	CK	8-28	0930	78	46
100.0001	10.0001	1.0001	.0997	CK	8-29	1300	78	46
100.0000	10.0000	1.0000	.1000	CK	8-30	1030	78	46
100.0001	10.0003	1.0001	.0999	CK	8-31	1015	76	49
100.0000	10.0001	1.0000	.0997	CK	9-1	1100	74	44
100.0000	10.0001	.9999	.1000	CK	9-2	0845	75	48
99.9999	10.0000	.9999	.0998	CK	9-4	1000	77	47
99.9999	10.0002	1.0001	.0999	CK	9-8	0930	77	49
99.9999	9.9999	.9998	.0998	CK	9-9	1000	74	48
99.9997	9.9997	1.0000	.0999	CK	9-11	1500	76	45
100.0000	9.9997	.9999	.0999	CK	9-17	0930	77	49
100.0000	10.0000	1.0000	.0999	CK	9-18	0900	78	46
100.0000	10.0000	.9999	.0999	CK	9-19	0915	78	49
100.0000	10.0000	.9999	.0999	CK	9-22	1030	77	46
100.0000	10.0001	1.0000	.0998	CK	9-24	1330	78	49
100.0001	10.0001	1.0000	.0999	CK	9-25	0930	78	46
100.0000	9.9999	1.0001	.0998	CK	9-26	0920	78	46
100.0001	9.9999	1.0001	.0999	AV	9-29	0955	78	46
100.0000	10.0001	1.0000	.0998	CK	10-2	0945	75	44
100.0000	10.0000	1.0000	.0999	CK	10-3	0930	78	46
100.0000	9.9999	1.0000	.0999	CK	10-4	1530	78	46
100.0000	9.9999	.9999	.0999	CK	10-6	0930	77	49
100.0000	10.0001	1.0002	.1000	CK	10-7	1700	78	49
100.0000	10.0000	1.0000	.0999	CK	10-8	1000	78	49
99.9999	10.0000	1.0001	.0999	CK	10-9	1030	78	43
100.0000	9.9999	1.0001	.1000	CK	10-10	0930	78	40
100.0000	9.9998	.9999	.0997	CK	10-11	1930	74	47
100.0000	10.0001	1.0000	.1000	CK	10-13	0940	78	46
100.0000	10.0002	.9999	.0999	CK	10-14	2030	77	49
100.0000	10.0002	1.0000	.1000	CK	10-16	1220	78	43
100.0000	9.9999	1.0000	.0999	CK	10-18	1130	74	47
99.9998	10.0000	.9999	.0999	CK	5-3	1200	78	43
100.0000	10.0001	1.0000	.0999	CK	5-4	1000	72	47
100.0000	10.0001	1.0000	.0997	CK	5-5	1000	76	45
99.9998	10.0000	1.0000	.0999	CK	5-6	1100	77	49
100.0000	10.0001	1.0001	.1000	CK	5-7	1600	77	42
100.0000	10.0001	1.0000	.0999	CK	5-8	1600	76	45
100.0000	10.0003	1.0000	.1000	CK	5-9	1300	76	38

WOODSTOVE DATA SHEET #4-4

SCALE QA SHEET

Dates: From 10-22-07 Through 8-26-2008	Scale: Sartorius	Model: A 120 S	SN: 37010004

100 g weight	10 g weight	1 g weight	100 mg weight	Tech	Date	Time	Dry Bulb	% RH
100.0006	10.0001	1.0000	.0998	CP	10-22	1630	78	46
99.9999	10.0001	1.0000	.1001	CP	10-23	1000	74	44
100.0002	10.0002	1.0002	.0999	CP	10-24	1400	73	47
100.0002	10.0000	1.0001	.0998	CP	10-26	1700	74	40
100.0003	10.0001	1.0001	.0999	CP	10-27	0820	78	40
99.9999	10.0000	.9999	.0997	CP	10-28	1200	78	40
100.0000	9.9999	.9999	.0999	CP	10-29	1700	76	42
99.9998	9.9999	.9999	.1000	CP	10-30	1600	78	43
99.9997	10.0000	.9999	.0999	CP	11-16	1500	68	47
100.0001	10.0002	1.0000	.0999	CP	11-19	1730	73	40
100.0000	10.0002	.9999	.0999	CP	11-20	1600	69	44
99.9998	9.9999	.9999	.0998	CP	1-18-08	1230	76	45
100.0002	10.0002	.9999	.0999	CP	1-21-08	1430	65	48
99.9999	10.0002	1.0001	.0999	CP	1-22-08	1200	68	47
100.0002	9.9999	.9999	.0998	CP	1-23-08	1400	74	47
99.9999	10.0000	1.0002	.1000	CP	1-31-08	1900	74	44
100.0000	10.0003	1.0000	.0996	CP	2-1-08	1530	76	45
99.9997	9.9999	.9999	.0999	CP	2-16-08	1700	68	47
100.0001	10.0002	1.0000	.1000	CP	2-18-08	1400	72	46
99.9999	10.0001	.9999	.0998	CP	2-22-08	1800	68	47
99.9999	10.0001	1.0000	.0999	CP	2-23-08	1800	78	43
100.0000	10.0000	1.0000	.0999	CP	5-8-08	1020	78	43
100.0001	10.0001	1.0000	.0999	CP	5-9-08	0930	69	47
100.0000	10.0001	.9999	.0999	CP	5-10-08	1330	74	47
99.9998	9.9999	1.0000	.0998	CP	5-11-08	0900	74	44
100.0003	10.0001	.9999	.0998	CP	5-12	1400	70	48
99.9999	10.0001	1.0000	.1000	CP	5-13	1000	77	42
99.9999	9.9997	1.0000	.1000	CP	5-14	1230	77	42
99.9999	10.0001	.9999	.1000	CP	6-5-08	1430	72	46
100.0001	10.0000	1.0000	.0999	CP	6-9-08	1400	74	44
99.9999	9.9999	1.0000	.0999	CP	6-9-08	1800	73	47
100.0001	10.0001	.9999	.0998	CP	8-11-08	0930	77	42
100.0003	10.0000	1.0001	.0999	CP	8-12-08	1011	78	43
100.0000	10.0001	1.0000	.0999	CP	8-13-08	0950	76	49
100.0002	10.0000	1.0000	.0998	CP	8-18-08	0930	74	44
100.0001	9.9999	1.0000	.0998	CP	8-20-08	1110	76	45
100.0000	9.9999	.9999	.0998	CP	8-21-08	0915	75	48
100.0002	10.0000	1.0000	.1002	CP	8-22-08	0910	75	45
100.0000	10.0001	1.0001	.0999	CP	8-26-08	0900	78	43

BLANK PROCESSING DATA SHEET # 5

UNIT: Buck 91 NC RUN: 4 DATE: 2-4-10

BLANKS DONE: 10-30-2007

BEAKER	A	B	C
	200 ml ACETONE	75 ml DICHLOR	200 ml WATER
	FISHER OPTIMA LOT #023283	FISHER OPTIMA LOT #03 5941	DWNA Inc sparklettes Distilled
FINAL WEIGHT	108.9009	106.3077	106.9680
TARE WEIGHT	108.8995	106.3063	106.9644
NET WEIGHT	.0014	.0014	.0036

TARE BEAKERS INTO DESC : TIME: 1700 DATE: 10-20-07

DATE: 1022 BY: Cp DATE: 1023 BY Cp DATE: BY:

BEAKER	1 ST WT	TIME	2 ND WT	TIME	3 RD WT	TIME
A	108.8994	1700	108.8995	1027		
B	106.3060	1701	106.3063	1028		
C	106.9639	1702	106.9644	1029		

FINAL BEAKERS INTO DESC : TIME: 1040 DATE: 10-27-07

DATE: 1029 BY Cp DATE: 1030 BY Cp DATE: BY:

BEAKER	1 ST WT	TIME	2 ND WT	TIME	3 RD WT	TIME
A	108.9011	1721	108.9009	1619		
B	106.3074	1722	106.3077	1621		
C	106.9678	1723	106.9680	1622		

TARE QC

DATE	TIME	BY	WB	DB	%
10-22	1630	Cp		78	46
10-23	1000	Cp		74	44

FINAL QC

DATE	TIME	BY	WB	DB	%
10-29	1700	Cp		76	42
10-30	1600	Cp		78	43

NET PARTICULATE CATCH CALCULATION DATA SHEET #6

UNIT: Buck 91 NC RUN: 4 DATE: 2-4-10

BLANK CALCULATIONS

Acetone: .0014 g + 200 ml = .000007 g/ml

Dicholoromethane: .0014 g + 75 ml = .000019 g/ml

Distilled Water: .0036 g + 200 ml = .000018 g/ml

FRONT HALF CATCH

FILTERS: .0844 (Total Catch) g - 1 (# of Filters) (.0000 g (Blank Value / Filter)) = .0844 g

BEAKERS: .0620 (Total Catch) g - 75 (ml Acetone) (.000007 g (Blank Value / ml Acetone)) = .0615 g

TOTAL FRONT HALF CATCH : .1459 g

BACK HALF CATCH

FILTERS: .0765 (Total Catch) g - 1 (# of Filters) (.0000 g (Blank Value / Filter)) = .0765 g

BEAKERS:

Acetone: .0909 (Total Catch) g - 100 (ml Acetone) (.000007 g (Blank Value / ml Acetone)) = .0902 g

Extract: .0137 (Total Catch) g - 75 (ml Dichloromethane) (.000019 g (Blank Value / Dichloromethane)) = .0123 g

Water: .0861 (Total Catch) g - 260 (ml Water) (.000018 g (Blank Value / Water)) = .0814 g

TOTAL BACK HALF CATCH : .2604 g

TOTAL CATCH : .4063 g

% FRONT HALF : 35.9 %

CALCULATIONS DATA SHEET # 7

UNIT : Buck 91 NC RUN : 4 DATE : 2 - 4 - 2010

1) Vm (std) = $\dfrac{(56.515\ \text{Vm})(17.64)(.901\ \text{mcf})\left(29.53\text{" Hg} + \dfrac{.198\text{" } H_2O}{13.6}\right)}{(554\ \text{TmA})} = \dfrac{47.9021}{000.0000}$ dscf

2) Vw (std) = (.04707) (80.3 ml H_2O) = $\dfrac{3.7797}{00.0000}$ scf

3) Asw = $\dfrac{(3.7797\ \text{scf})}{(3.7797\ \text{scf} + 47.9021\ \text{dscf})} = \dfrac{.0731}{.0000}$ Bws × 100 = $\dfrac{7.3134}{00.0000}$ % H_2O

4) Cs = $\dfrac{(.4063\ \text{g.})}{(47.9021\ \text{dscf})}$ (15.43) = $\dfrac{.1309}{0.0000}$ gr / dscf

5) Estimated g / hr = $\dfrac{(.4063\ \text{g.})}{(47.9021\ \text{dscf})}$ ($\dfrac{10.884}{00.0000}$ dscfm) (60) = $\dfrac{5.5390}{00.0000}$ 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_2O =	average delta H for test	(p. 2)	(.000 " H_2O)
TmA =	average meter temperature for test in degrees Absolute	(p. 2)	(000 TmA)
ml H_2O =	total water caught during test	(p. 3)	(000.0 ml H_2O)
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 : Buck 91 NC RUN : 4 DATE : 2-4-2010

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

Wet Bulb / Dry Bulb

Pre : WB : 68 DB : 94 = 24.0 % RH 1.5 % H_2O

Post : WB : 70 DB : 90 = 36.0 % RH 1.7 % H_2O

Average : 30.0 % RH 1.6 % H_2O

Empty Stove Weight (lbs) : N/A w/ stack & oil seal : Wet : — Dry : 0.0

Kindling Weight (lbs) : Paper : 1.1 Wood : 1.6

Preburn Fuel Weight : 22.4 + 24.1 + 17.0 Total : 63.5

Kindling & Preburn Fuel Weight (wood only) (lbs) : **Total** : 65.1

Coal Bed Wt Range (lbs) : 5.4 - 4.4 **Scale** : 5.4 - 4.4

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** : 5.2

Maximum Coal Bed Removal (lbs) : ((5.4 (Upper) + 4.4 (Lower)) ÷ 2) .25 = 1.2 (round down to nearest tenth)

Test Fuel (.75" x 1.5" x 5" spacers) = 18 pcs

Dimensions	Length in inches	No. Pcs	Weight in lbs	% of Load
2" x 4"	—	—	—	—
4" x 4"	14	6	21.8	100.0

Test Fuel Weight : 21.8 lbs

Estimated Dry Burn Rate :

$$\frac{21.8 - (21.8 \times .17253)}{2.2046} \times \frac{60}{\underset{\text{TIME}}{155}} = 3.167 \text{ kg / hr}$$

Estimated BTU's/hr : 19,140 x $\frac{63}{100}$ x $\frac{3.167}{\text{DBR}}$ = 38188.3 BTU's/hr

EPA Default Efficiencies : Non-cat : 63 Cat : 72 Pellet : 78

WOOD STOVE OPERATING DATA PAGE #9

Unit : Buck 91 NC Run : 4 Date : 2-4-2010

FIRE STARTED: 0915

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 ½ min. prior to loading last fuel, raked and leveled. In stove 20 sec.

TEST:

DOOR wide open during loading 0 min. 35 sec.

PRIMARY AIR : Opened full for first 5 min., then set to run setting of maximum

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 HIGH

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 : N/A BRAND : N/A

All Grades WCLB rules:

WARM UP INFORMATION:

All pre-burn / warm up fuel pieces were either 16 or — inches.

1st warm up / pre-burn fuel charge (22.4 lbs.) added at 0925

2nd warm up / pre-burn fuel charge (24.1 lbs.) added at 1045

3rd warm up / pre-burn fuel charge (17.0 lbs.) added at 1140

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

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

TEST DATA SHEET #10

Unit : Buck 91 NC Run : 4 Date : 2-4-2010

Room Temperature : 64 °F Temperature Correction Set? (Yes) No

Calibration Check: 12.0% + or – 0.2%? (Yes) No

Time Test Fuel moisture reading taken : 1035

pc #	Dimen.	Use	TOP	BOTTOM	SIDE	Avg Corrected
1	2"×4"×8'	K	14.2	15.7	15.3	15.067
2						
3						
4	2"×4"×8'	P	22.6	23.5	23.4	23.2
5	2"×4"×8'	P	19.8	18.2	18.5	18.8
6	2"×4"×8'	P	18.6	17.9	18.1	18.2
7	2"×4"×8'	P				(60.2)
8	2"×4"×8'	P				
9						
10						
11						
12	4×4×14"	T	18.3	17.8	18.3	18.1
13	"	T	19.2	20.9	18.8	19.6
14	"	T	18.7	20.5	19.2	19.5
15	"	T	23.5	22.0	23.0	22.8
16	"	T	23.4	24.0	22.0	23.1
17	"	T	22.7	22.3	21.0	22.0
18						(125.1)
19						
20	Spacers	T	18.1	18.9	18.5	18.5

Key for Use : K = Kindling P = Pretest Fuel T = Test Fuel

	KINDLING	PRETEST FUEL	TEST FUEL
Dry Moisture % :	15.067 %	20.067 %	20.850 %
Wet Moisture % :	13.094 %	16.713 %	17.253 %

To obtain Wet from Dry : $\frac{100 \times \%\text{ Dry Reading}}{100 + \%\text{Dry Reading}}$ = % Moisture, Wet Basis

Acceptable Ranges : 16 - 20 % wet: 19 - 25 % dry (17.5 - 22.5 on Meter Uncor. reading) at 70°

GAS DATA SHEET #12

WEIGHT: 5.2 DATE: 2-4-2010

UNIT: Buck 91 NC RUN: 4 PAGE: 1 OF

TIME	SCALE	FUEL	DROP	V.	CO_2	V.	O_2	V.	CO	STATIC	SO_2PPM
0 1245	27.0	21.8	—	.299	6.9	.539	13.5	.029	.31	.063	.350
5 50	26.7	21.5	.3	.200	5.0	.529	15.3	.041	.43	.060	.375
10 55	26.2	21.0	.5	.179	4.4	.635	15.9	.048	.50	.061	.375
15 1400	25.2	20.0	1.0	.401	10.0	.419	10.5	.021	.23	.072	.325
20 05	23.8	18.6	1.4	.458	11.4	.366	9.17	.021	.23	.077	.325
25 10	21.0	15.8	2.8	.543	13.6	.270	6.76	.042	.44	.080	.375
Fan? 30 15	19.6	14.4	1.4	.610	15.2	.209	5.23	.035	.37	.083	.350
35 20	19.2	14.0	.4	.539	13.5	.272	6.79	.049	.51	.082	.375
40 25	18.0	12.8	1.2	.625	15.6	.175	4.36	.082	.84	.081	.400
45 1330	16.4	11.2	1.6	.581	14.5	.232	5.80	.048	.50	.080	.375
50 35	14.2	9.0	2.2	.453	11.3	.368	9.22	.026	.28	.078	.350
53 40	13.1	7.9	1.1	.365	9.1	.499	11.5	.012	.14	.074	.300
SUBTOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	.891	*****
60 45	12.3	7.1	.8	.321	8.0	.503	12.6	.011	.13	.073	.275
65 50	11.6	6.4	.7	.339	8.4	.487	12.2	.011	.13	.071	.275
70 55	10.9	5.7	.7	.309	7.7	.515	12.9	.017	.19	.070	.275
75 1400	10.3	5.1	.6	.302	7.5	.523	13.1	.018	.20	.070	.275
80 05	9.7	4.5	.6	.274	6.8	.547	13.7	.025	.27	.069	.275
85 10	9.2	4.0	.5	.203	5.0	.611	15.3	.044	.46	.065	.300
90 15	8.8	3.6	.4	.204	5.1	.603	15.1	.053	.55	.064	.300
95 20	8.5	3.3	.3	.184	4.6	.619	15.5	.067	.69	.060	.300
100 25	8.3	3.1	.2	.175	4.3	.627	15.7	.070	.72	.055	.325
105 1430	8.0	2.8	.3	.165	4.1	.635	15.9	.073	.75	.057	.300
110 35	7.7	2.5	.3	.184	4.5	.619	15.5	.071	.73	.055	.325
115 40	7.4	2.2	.3	.196	4.9	.607	15.2	.064	.66	.054	.325
SUBTOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	.763	*****
120 45	6.9	1.7	.5	.212	5.3	.595	14.9	.050	.52	.057	.300
125 50	6.6	1.4	.3	.225	5.6	.587	14.7	.041	.43	.058	.275
130 55	6.3	1.1	.3	.216	5.4	.599	15.0	.038	.40	.059	.275
135 1500	5.9	.7	.4	.214	5.3	.619	15.5	.034	.36	.058	.250
140 05	5.7	.5	.2	.190	4.7	.623	15.6	.048	.50	.056	.275
145 10	5.5	.3	.2	.177	4.4	.627	15.7	.060	.62	.055	.250
150 15	5.3	.1	.2	.163	4.0	.639	16.0	.069	.71	.054	.250
155 20	5.2	.0	.1	.150	3.7	.655	16.4	.068	.70	.051	.250
160 25										.448	
165 30											
170 35											
175 40											
SUBTOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	.448	*****
TOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	2.107	*****

-.066

PREBURN DATA SHEET #12

UNIT: DUCK 91 NC RUN: 4 DATE: 2-4-2010 PAGE: 1 of

TIME	SCALE	DROP	STACK	TOP	LF SIDE	BACK	RT SIDE	BOTTOM	FIREBOX	SEC/CAT	AMBIENT	STATIC	COMMENTS
0 1140	21.6	—	507	731	592	482	602	515			84	.075	PREBURN START: # UP
5 45	19.4	2.2	697	673	551	372	586	452			94	.077	COAL BED SCALE RANGE:
10 50	15.5	3.9	728	720	523	338	563	426			95	.080	5.4 → 4.4
15 55	13.0	2.5	733	738	511	340	554	414			97	.081	PRIMARY AIR: MAX
20 1200	12.1	1.9	741	742	509	354	552	401			93	.081	SECONDARY AIR: N/A
25 05	11.7	1.4	718	734	513	363	557	394			94	.080	FAN: High
30 10	10.2	1.5	674	713	522	389	564	391			96	.079	PUMPS ON AT:
35 15	8.3	1.9	646	684	534	408	574	388			93	.076	CHECK WB/DB: N/A
40 20	7.3	1.0	617	656	543	423	581	388			93	.075	
45 25	6.7	.6	570	621	551	434	597	388			95	.073	
50 30	6.1	.6	532	595	550	417	602	387			93	.070	
55 35	5.8	.3	483	555	536	395	592	387			94	.068	
*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	
60 40	5.5	.3	458	514	518	371	578	389			94	.065	
65 45	5.2	.3	426	484	504	364	569	390			94	.063	
70 50													
75 55													
80 1300													

Buck Stoves-Model 91NC | Temperatue Data Sheet 14 | Run 4
2/4/2010

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	426	484	504	364	569	390	######	######	89	1563	248	59	244	30	30
5	383	424	474	304	534	379	######	######	89	1549	248	43	245	31	30
10	381	390	442	254	497	365	######	######	89	1535	248	43	245	32	31
15	544	427	415	226	465	348	######	######	88	1523	248	43	245	33	31
20	647	516	392	220	444	334	######	######	88	1513	248	43	246	34	32
25	695	593	386	222	429	322	######	######	87	1506	247	44	246	35	33
30	734	638	393	234	428	314	######	######	87	1505	247	45	245	36	34
35	695	641	407	242	438	309	######	######	87	1504	248	46	245	37	35
40	736	652	426	252	450	306	######	######	87	1503	248	47	245	37	36
45	692	653	445	267	465	307	######	######	88	1501	248	47	244	38	37
50	634	628	461	280	481	310	######	######	88	1502	248	48	243	38	37
55	577	597	468	276	492	313	######	######	89	1503	247	48	243	38	38
60	544	551	464	273	492	314	######	######	88	1503	247	49	242	38	38
65	541	539	452	263	485	315	######	######	88	1504	246	48	240	38	38
70	519	528	442	257	478	319	######	######	87	1506	246	48	237	38	38
75	503	519	431	257	471	321	######	######	84	1507	246	48	239	38	37
80	487	499	424	255	464	320	######	######	83	1508	246	48	239	37	37
85	435	459	419	254	455	320	######	######	80	1510	245	48	238	37	37
90	407	419	409	248	441	317	######	######	80	1510	245	49	235	37	37
95	381	390	399	245	432	314	######	######	79	1510	245	49	233	36	36
100	364	362	387	239	421	304	######	######	81	1510	245	49	231	36	36
105	349	342	379	227	408	300	######	######	76	1509	244	50	235	35	36
110	343	326	368	217	395	291	######	######	74	1509	244	50	237	35	35
115	351	322	362	222	388	288	######	######	80	1509	244	50	239	35	35
120	363	324	359	227	383	279	######	######	80	1508	243	50	242	35	35
125	376	330	356	238	385	273	######	######	82	1506	243	50	243	35	35
130	381	335	359	244	392	268	######	######	80	1505	243	50	244	35	35
135	380	333	360	245	398	262	######	######	78	1504	243	50	245	34	35
140	359	329	363	248	405	258	######	######	78	1503	242	50	246	34	34
145	345	319	362	248	405	252	######	######	79	1503	242	50	247	34	34
150	333	308	360	240	404	246	######	######	77	1503	242	49	247	34	34
155	322	295	355	232	398	239	######	######	76	1502	241	49	248	34	34
160															

TEMPERATURE DATA SHEET #14A

		TEST TIME	155		
STACK AVG	476	TOP AVG	452	LT SIDE AVG	407
BACK AVG	251	RT SIDE AVG	443	BOTTOM AVG	306
FIREBOX AVG	########	SEC/CAT AVG	########	AMBIENT AVG	83

END	303.7	
START	462.0	
	-158.3	DELTA T

CIRCLE: **LOSS / GAIN**

ZERO / SPAN CHECK DATA SHEET #15-1

Date : 2-4-2010 Analyte : CO_2 (15-1)

Unit : Buck 91 NC Run # : 4

Zero Cyl. # : 168TAC 3-A Conc. : 0.00 % CO_2 Cyl. Press. : 400 PSI

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

Span Cyl. # : 487905 Conc. : 12.20 % CO_2 Cyl. Press. : 1450 PSI

Certified by : AIR LIQUIDE Date : 11-1-07

Analyzer : Make : HORIBA Model : PIR-2000 SN : 407069

Range : 0 - 25.0 % CO_2 Analyzer Output : 0 - 1.0 v.

Flow : 1.5 SCFH Measured by : Rotameter

EPA Span Value = 25.0 % CO_2

EPA Control Limits = ± 2.5% of 25.0 % CO_2 = ± 0.625 % CO_2

Method 28 A = ± .2 % of 25.0 % CO_2 = ± .05 % CO_2

PRE RUN Audit : by : Cp Wadmyl Time : 1045 Temp : 73 °F

AUDIT RESULTS

Point #	Expected Response			Actual Response			± Conc. Difference	Δ %
	Meter	DVM	%	Meter	DVM	%		
ZERO	00.0	.000	00.0	00.0	.000	-.023	-.023	-.091
SPAN	48.8	.488	12.20	48.8	.488	12.235	.035	.139

POST RUN Audit : by : Cp Wadmyl Time : 1630 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	-.002	-.073	-.073	-.292
SPAN	48.8	.488	12.20	48.6	.486	12.185	-.015	-.062

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

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

Span % Difference = $\frac{\text{Act \% (ppm) - Exp \% (ppm)}}{\text{Full Scale Value}}$ X100

ZERO / SPAN CHECK DATA SHEET #15-2

Date : 2-4-2010 Analyte : O_2 (15-2)

Unit : Buck 91NC Run # : 4

Zero Cyl. # : 168TAC 3A Conc. : 0.00 % O_2 Cyl. Press. : 400 PSI

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

Span Cyl. # : 487905 Conc. : 12.60 % O_2 Cyl. Press. : 1450 PSI

Certified by : AIR LIQUIDE Date : 11-1-07

Analyzer : Make : TELEDYNE Model : 320 A SN : 37400

Range : 0 - 25.0 % O_2 Analyzer Output : 0 - 1.0 v.

Flow : 1.5 SCFH Measured by : Rotameter

EPA Span Value = 25.0 % O_2

EPA Control Limits = ± 2.5% of 25.0 % O_2 = ± 0.625 % O_2

Method 28 A = ± .2 % of 25.0 % O_2 = ± .05 % O_2

PRE RUN Audit : by : CP Watts Time : 1045 Temp : 73 ° F

AUDIT RESULTS

Point #	Expected Response			Actual Response			± Conc. Difference	Δ %
	Meter	DVM	%	Meter	DVM	%		
ZERO	00.0	.000	00.0	00.1	.000	-.025	-.025	-.102
SPAN	12.60	.504	12.6	12.6	.504	12.623	.023	.091

POST RUN Audit : by : CP Watts Time : 1230 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	.000	-.025	-.025	-.102
SPAN	12.60	.504	12.6	12.6	.505	12.648	.048	.191

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

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

Span % Difference = $\frac{\text{Act \% (ppm) - Exp \% (ppm)}}{\text{Full Scale Value}}$ X100

ZERO / SPAN CHECK DATA SHEET #15-3

Date : 2-4-2010 Analyte : CO (15-3)

Unit : Buck 91 NC Run # : 4

Zero Cyl. # : 168TAC 3-A Conc. : 0.00 % CO Cyl. Press. : 400 PSI

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

Span Cyl. # : 1487905 Conc. : 4.90 % CO Cyl. Press. : 1450 PSI

Certified by : AIR LIQUIDE Date : 11-1-07

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 = ± 2.5% of 10.0 % CO = ± 0.25 % CO

Method 28 A = ± .2 % of 10.0 % CO = ± .02 % CO

PRE RUN Audit : by : [signature] Time : 1045 Temp : 73 ° F

AUDIT RESULTS

Point #	Expected Response			Actual Response			± Conc. Difference	Δ %
	Meter	DVM	%	Meter	DVM	%		
ZERO	00.0	.000	00.0	00.0	.000	.017	.017	.170
SPAN	49.0	.490	4.90	49.0	.490	4.908	-.008	.081

POST RUN Audit : by : [signature] Time : 1630 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	.017	.017	.170
SPAN	49.0	.490	4.90	49.0	.490	4.908	-.008	.081

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

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

Span % Difference = $\frac{\text{Act \% (ppm) - Exp \% (ppm)}}{\text{Full Scale Value}}$ X100

ZERO / SPAN CHECK DATA SHEET #15-4

Date : 2-4-2010 Analyte : SO_2 (15-4)

Unit : Buck 91NL Run # : 4

Zero Cyl. # : 168TAC 3-A Conc. : 0.00 ppm SO_2 Cyl. Press. : 400 PSI

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

Span Cyl. # : CC82089 Conc. : 1250 ppm SO_2 Cyl. Press. : 1650 PSI

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

Analyzer : Make : HORIBA Model : PIR-2000 SN : 403019

Range : 0 - 2500 ppm SO_2 Analyzer Output : 0 - 1.0 v.

Flow : 1.5 SCFH Measured by : Rotameter

EPA Span Value = 2500 ppm SO_2

EPA Control Limits = ± 2.5% of 2500 ppm SO_2 = ± 62.5 ppm SO_2

PRE RUN Audit : by : CP Wardlaw Time : 1045 Temp : 73 ° 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	-.651	-.651	-.026
SPAN	50.0	.500	1250	50.0	.500	1252.2	2.200	.088

POST RUN Audit : by : CP Wardlaw Time : 1630 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	4.360	4.360	.174
SPAN	50.0	.500	1250	50.4	.504	1267.3	12.300	.492

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

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

Span % Difference = $\frac{\text{Act \% (ppm) - Exp \% (ppm)}}{\text{Full Scale Value}}$ X100

QUALITY CHECKS DATA SHEET # 16

UNIT : Buck 91 NC RUN : 4 DATE : 2 - 4 - 2010

Thermocouple Check:

T/C # 1	— °F	T/C # 13	61.5 °F
T/C # 2	— °F	T/C # 14	60.2 °F
T/C # 3	60.8 °F	T/C # 15	62.0 °F
T/C # 4	57.5 °F	T/C # 16	51.6 °F
T/C # 5	57.3 °F	T/C # 17	54.3 °F
T/C # 6	57.2 °F	T/C # 18	63.4 °F
T/C # 7	57.0 °F	T/C # 19	— °F
T/C # 8	56.8 °F	T/C # 20	— °F
T/C # 9	— °F	T/C # 21	— °F
T/C # 10	— °F	T/C # 22	— °F
T/C # 11	55.0 °F	T/C # 23	— °F
T/C # 12	66.8 °F	T/C # 24	— °F

Thermocouple Readout:

Pretest zero and span check and calibration — post test zero and span — % difference

ZERO .2 °F Adj. to 0.0 °F ZERO _____ °F Difference _____ %

SPAN 2000.0 °F Adj. to 2000.0 °F SPAN _____ °F Difference _____ %

Thermocouple Readout Pretest Linearity Check:

0	= 0.0 °F	200	= 200.1 °F	400	= 399.9 °F
600	= 599.9 °F	800	= 799.8 °F	1000	= 999.9 °F
1200	= 1199.8 °F	1400	= 1399.6 °F	1600	= 1599.8 °F
1800	= 1800.0 °F	2000	= 2000.0 °F		

Sample Train Leak Check	Pre ✓	Post ✓
C-gas Train Leak Check	Pre ✓	Post ✓
SO_2 Train Leak Check	Pre ✓	Post ✓
Static Gauge Zero Check	Pre ✓	Post ✓

Scale Check Pre : 16.1 − 6.1 = 10.0

Post : 15.0 − 5.0 = 10.0

Stack Cleaned Prior to Test Run : YES _____ NO X

UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
WOODSTOVE CERTIFICATION PROGRAM
RANDOM COMPLIANCE AUDIT CONTRACT

Section 40 CFR, Section 60.533(g) requires that the Manufacturer of each woodheater receiving a 1990 certification from the United States Environmental Protection Agency (EPA) and the testing laboratory performing the tests used for certification purposes enter into a Random Compliance Audit (RCA) contract. This contract is designed to fulfill the requirements set forth in 40 CFR, Section 60.533(g).

Therefore, **Buck Stove Corporation**
Of **Spruce Pine, NC**
(hereinafter referred to as the Manufacturer) and LoKee Testing Laboratory of Bonney Lake, Washington agree to the following:

1. The Manufacturer agrees to pay for all testing required to satisfy an RCA.

   A. This includes (typically) additional fees for units equipped with an optional heat exchange blower(fan), for a fan confirmation test.

   B. For units tested using a secondary air adjustment, the test fees may include an additional amount for a secondary air adjustment validation test.

2. If the RCA audit is conducted at LoKee, the Manufacturer is responsible for funding a basic four run test series plus a fan confirmation test and/or a secondary air adjustment validation test when necessary, at the rate specified by EPA, i.e., the ". . .reasonable fee. . . " established by EPA. LoKee is not responsible for funding any extra runs or portions of extra runs required because of missed burn rates, fires going out, missed test parameters, e.g., exceeding the stove surface temperature change requirement (ΔT) of $\pm 125°F$, etc. Any additional test runs or portions of extra runs shall also be paid for by the Manufacturer. If the test is conducted at LoKee, the charges for any additional runs or portions of runs shall be based upon LoKee's fee schedule that is current at the time the RCA testing is done. If the test is conducted at a second lab, the financial responsibility for any all testing is solely that of the Manufacturer as well.

3. If the RCA audit test results indicate that an additional run or runs are required in order for a unit to pass the audit, these additional test runs shall be paid for by the Manufacturer. It is also agreed that EPA shall determine if and when these runs can be done. If the RCA audit test is conducted at LoKee, the charges for any additional runs or portions of extra runs shall be based upon LoKee's fee schedule that is current at the time the RCA audit test is conducted. If the RCA audit test is

conducted at a second laboratory, the financial responsibility for all test runs or portions of extra runs is solely that of the Manufacturer.

4. If the RCA test is conducted at LoKee, LoKee will charge an amount equal to the total allowable amount for the RCA test, i.e., the ". . . reasonable fee. . . " established by EPA.

5. If the RCA test is to be conducted at a second laboratory, LoKee will not be responsible for any testing fees or charges accrued by the Manufacturer while testing at the second laboratory.

6. This agreement acknowledges review of this document and upon signing by the Manufacturer and LoKee establishes a contract between the Manufacturer and LoKee.

7. Amending of the contract may be necessary to comply with any additional Applicability Determinations made by EPA that deal with Random Compliance Audits. This provision allows such amendments.

This contract is for the: 94NC

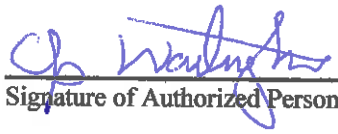
Buck Stove Corporation	**LoKee Testing Laboratory**
Manufacturer	
	
Signature of Authorized Person	Signature of Authorized Person
	Chip Wadington
Printed Name of Authorized Person	Printed Name of Authorized Preson
	Owner
Title	Title
	May 30, 2010
Date	Date

TABLE 1 ----- RAW DATA

CLIENT : New Buck TEST No. : 6

MODEL: 91NC DATE: 08-Mar-2010

TIME (MIN.)	METER READING (C F)	DELTA H (IN. H2O)	METER TEMP. (DEG. F)	PERCENT CO (%)	PERCENT CO2 (%)	SO2 COCENTR. PPM
0	309.500	0.150	92	0.47	5.10	300
5	311.000	0.180	92	0.25	8.30	275
10	312.705	0.150	92	0.23	12.60	300
15	314.268	0.110	92	0.20	12.40	350
20	315.607	0.150	92	0.15	12.00	300
25	317.172	0.150	92	0.13	10.90	300
30	318.735	0.150	92	0.35	6.90	300
35	320.299	0.150	92	0.13	10.20	300
40	321.862	0.220	92	0.32	14.50	250
45	323.737	0.150	92	0.32	12.70	300
50	325.301	0.220	92	0.15	10.40	250
55	327.176	0.270	92	0.17	8.60	225
60	329.259	0.340	91	0.20	8.10	200
65	331.589	0.340	91	0.18	7.50	200
70	333.918	0.340	91	0.14	7.60	200
75	336.248	0.220	91	0.17	7.40	250
80	338.113	0.220	91	0.24	6.80	250
85	339.978	0.220	91	0.21	6.50	250
90	341.842	0.220	91	0.32	6.10	250
95	343.707	0.220	91	0.32	5.30	250
100	345.572	0.220	91	0.38	5.10	250
105	347.437	0.220	91	0.39	5.20	250
110	349.302	0.220	91	0.35	5.10	250
115	351.166	0.220	91	0.29	5.30	250
120	353.031	0.270	91	0.29	5.10	225
125	355.103	0.270	91	0.24	5.40	225
130	357.174	0.270	91	0.30	4.90	225
135	359.246	0.270	91	0.32	4.30	225
140	361.317	0.270	91	0.46	3.60	225
145						

TABLE 2—RAW DATA

CLIENT : New Buck TEST No. 6

MODEL: 91NC DATE: 08-Mar-2010

METER CAL. FACTOR (Y) -------	0.901		Wt. WOOD BURNED(LB) -------	21.9	Lbs
BAROMETRIC PRESS.(Pb) -------	30.06	in Hg	WET,FUEL MOISTURE % -------	17.91	%
LEAK RATE POST (Lp) -------	0.000	cfm	Wt. PART. COLLECTED -------	0.1328	g
WATER VOL. (V1c) -------	58	Ml	METER VOLUME Vm -------	51.817	mcf
TEST TIME (MIN) -------	140	min	HC MOLE FRACTION -------	0.0132	

TABLE 3 -----FIELD DATA AVERAGES

CLIENT : New Buck TEST No. 6

MODEL: 91NC DATE: 08-Mar-2010

****

AVG DELTA H	-------	0.22	in H2O	AVG PRCNT CO	-------	0.26	%
AVG METER TEMP. Tm	-------	91	deg F	AVG PRCNT CO2	-------	7.72	%
AVG PPM SO2	-------	256	PPM	AVG BAL CO2/CO	-------	29.19	%

TABLE 4 ---- CALCULATIONS

CLIENT : New Buck TEST No. 6

MODEL: 91NC DATE: 08-Mar-2010

****

STD SAMPLE VOL. Vm(std) d) ------	44.95	dscf	STACK GAS FLOW Qsd -------	1352.941	dscf/Hr
				22.55	& dscf/min
VOL. WATER VAPOR Vw(s td) -----	2.730	scf	PARTICULATE CONCTRT. C s ------	0.0030	g/dscf
PRCNT MSTR Bws -------	5.73	%	PARTC.EMISS. RATE E -------	4.00	g/Hr
BURN RATE BR -------	3.50	Kg/Hr	MOLES OF GAS PER Lb WOOD Nt ----	0.46	Lb-mole/Lb
CO EMISSION RATE -------	119.83	g/Hr	PART.EMISS. RATE ------	1.14	g/Kgdry fuel
	34.29	& g/Kgdry fuel			

TABLE 5 ----- PROPORTIONAL RATE VARIATION

CLIENT : New Buck TEST No. : 6

MODEL: 91NC DATE: 08-Mar-2010

TIME INTEVAL Ti	PPM * Vm	PROPRTN. RATE VAR. PR		PROPRTN RATE VAR. AVERAGE	
5	389.8	96		100	
10	406.2	100			
15	406.2	100			
20	405.9	100			
25	406.8	100			
30	406.2	100			
35	406.5	100			
40	406.2	100			
45	406.2	100			
50	406.5	100			
55	406.2	100			
60	406.5	100			
65	404.6	100			
70	404.5	100			
75	404.6	100			
80	404.7	100			
85	404.7	100			
90	404.5	100			
95	404.7	100			
100	404.7	100			
105	404.7	100			
110	404.7	100			
115	404.5	100			
120	404.7	100			
125	404.7	100			
130	404.5	100			
135	404.7	100			
140	404.5	100			
145					
150					

COMPUTER INPUT DATA SHEET #1

Client: New Buck Corporation

Address: P.O. Box 69

Spruce Pine, NC 28777

Phone: 888-622-7868 Fax:

Run No.: 6 Date of Test: 3-8-2010 Burn Rate: 3.495

Model No.: 91NC ☐ min ☐ min-1.25 ☐ fan

Stove Type: ☐ Cat ☒ Non Cat ☐ Pellet ☐ 1.25-1.9 ☒ max ☐ insert

Dry Gas Meter Y Factor: .901 (0.000) (Data Sheet #2) Post Leak Rate: 0.000 cfm (.000) (Data Sheet #2) Time: 140 min. (000) (Data Sheet #2)

Dry Gas Meter Volume: 51.817 cf (00.000) (Data Sheet #2)

Stack Flow: 13.120 dscfm (00.000) (Data Sheet #2) Δ H: .221 in. H_2O (.000) (Data Sheet #2)

Maximum Vac.: 2.0 (0.0) (Data Sheet #2) Barometric Pressure: 30.06 in. Hg (00.00) (Data Sheet #2)

H_2O Captured: 58.0 g (00.0) (Data Sheet #3)

Front Half Catch % Of Total: 35.0 % (00.0) (Data Sheet #6) Total Particulate Catch: .1328 g (0.0000) (Data Sheet #6)

Flue Gas Moisture: 5.7254 % (00.000) (Data Sheet #7)

Particulate Emission: .0456 gr/dscf (0.0000) (Data Sheet #7)

Relative Humidity: 31.0 % RH (00.0) (Data Sheet #8) Ambient Moisture: .95 % H_2O (0.00) (Data Sheet #8)

Preburn Fuel Wt.: 65.2 lbs. (00.0) (Data Sheet #8) Coal Bed Wt.: 5.1 lbs. (00.0) (Data sheet #8) Test Fuel Wt.: 21.9 lbs. (00.0) (Data sheet #8)

Heat Output (EPA Default): 42143.4 BTU/hr (00,000.0) (Data Sheet #8)

Kindling Fuel % Moisture (wet): 11.032 % (00.000) (Data Sheet #10) Pretest Fuel % Moisture (wet): 17.492 % (00.000) (Data Sheet #10)

Test Fuel % Moisture (dry): 21.817 % (00.000) (Data Sheet #10 [wood stove] or #11 [pellet stove]) Test Fuel % Moisture (wet): 17.910 %

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

Stack Static Pressure: -.063 in. H_2O (+/- .000) (Data Sheet #12)

Average Ambient Temperature: 77 °F (00) (Data Sheet #14) Stove Temperature Change: -94.1 °F (+/- 000.0) (Data Sheet #14)

Test start 1135

End 1355

meter temp 551

METER BOX DATA SHEET PAGE # 2

Page: 1 of 2

UNIT: 91 NL RUN: 6 DATE: 3-8-2010

Meter Box: 5H Y Factor: .901

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

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

Inject SO^2 @ 100 cc/min. Nozzle: Probe @ 3/8 " od Initial Volume: 1.500

ROTO: PRESS: .18 SAMPLING RATIO: 37 : 1 BP: 30.02

MIN	TIME	METER READING	SAMPLE MDCF	STACK DSCFM	DELTA H	METER TEMP	SO2 PPM	ROTO TEMP	PUMP VACC
0	1135	309.500	——	11.304	.15	92	300	92	2.0
5	40	311.000	——	12.332	.18	92	275	92	2.0
10	45	312.705	312.705	11.304	.15	92	300	92	2.0
15	50	314.268	314.268	9.689	.11	92	350	92	2.0
20	55	315.609	315.609	11.304	.15	92	300	92	2.0
25	1200	317.172	317.172	11.304	.15	92	300	92	2.0
30	05	318.735	318.735	11.304	.15	92	300	92	2.0
35	10	320.299	320.299	11.304	.15	92	300	92	2.0
40	15	321.862	321.862	13.565	.22	92	250	92	2.0
45	20	323.737	323.737	11.304	.15	92	300	92	2.0
50	25	325.301	325.301	13.565	.22	92	250	92	2.0
55	30	327.176	327.176	15.072	.27	92	225	92	2.0
ROTO PRESS: .18			TOTALS:	143.351°	2.05°	1104°	BP.: 30.08		
60	1235	329.259	329.259	17.021	.34	91	200	91	2.0
65	40	331.589	331.589	17.021	.34	91	200	91	2.0
70	45	333.918	333.918	17.021	.34	91	200	91	2.0
75	50	336.248	336.248	13.617	.22	91	250	91	2.0
80	55	338.113	338.113	13.617	.22	91	250	91	2.0
85	1300	339.978	339.978	13.617	.22	91	250	91	2.0
90	05	341.842	341.842	13.617	.22	91	250	91	2.0
95	10	343.707	343.707	13.617	.22	91	250	91	2.0
100	15	345.572	345.572	13.617	.22	91	250	91	2.0
105	20	347.437	347.437	13.617	.22	91	250	91	2.0
110	25	349.302	349.302	13.617	.22	91	250	91	2.0
115	30	351.166	351.166	13.617	.22	91	250	91	2.0
			TOTALS:	173.466°	3.00°	1092°	MAX VACC =		
TOTAL Cu Ft			TOTALS:	316.967°	5.05°	2196°	AVG. BP:		

METER BOX DATA SHEET PAGE # 2

Page: 2 of 2

UNIT: 91 NC RUN: 6 DATE: 3-8-2010

Meter Box: 511 Y Factor: .904

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

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

Inject SO^2 @ 100 cc/min. Nozzle : Probe @ 3/8 " od Initial Volume: 1.500

ROTO: PRESS: .18 SAMPLING RATIO: 37 : 1 BP: 30.08

MIN	TIME	METER READING	SAMPLE MDCF	STACK DSCFM	DELTA H	METER TEMP	SO2 PPM	ROTO TEMP	PUMP VACC
120	1335	353.031	353.031	15,130	.27	91	225	91	2.0
125	40	355.103	355.103	15,130	.27	91	225	91	2.0
130	45	357.174	357.174	15,130	.27	91	225	91	2.0
135	50	359.246	359.246	15,130	.27	91	225	91	2.0
140	55	361.317	361.317	15,130	.27	91	225	91	2.0
145	1400			76,650	1.35	445			
150	05								
155									
160									
165									
170									
175									

2.0 2.0

ROTO PRESS: TOTALS: BP.:

180									
185									
190									
195									
200									
205									
210									
215									
220									
225									
230									
235				393.617	6.40	2451			
		TOTALS:				91	MAX VACC =		2.0
TOTAL Cu Ft	51.817	TOTALS:		13.120	.221	+460	AVG. BP:		30.06

(551)

PARTICULATE CATCH / MOISTURE DATA SHEET # 3

UNIT : 91NC RUN : 6 DATE : 3-8-2010

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	675.2	592.6	484.7	891.5
INITIAL WT	622.4	589.8	483.8	890.0
NET WT GRAMS	52.8	2.8	.9	1.5

TOTAL CATCH : 58.0 GRAMS H_2O

FRONT HALF

FILTER #	1895	
FINAL WT g	.6785	
INITIAL WT g	.6613	
NET WT g	.0172	

BEAKER #	91
DESC.	ACETONE
FINAL WT g	95.0794
INITIAL WT g	95.0496
NET WT g	.0298
VOL. DESC. ml	75

BACK HALF

FILTER #	1896	
FINAL WT g	.3653	
INITIAL WT g	.3637	
NET WT g	.0016	

.1370

BEAKER #	92	93	94	95	
DESC.	ACETONE	METHCHLOR	H_2O	H_2O	
FINAL WT g	96.7162	107.8864	106.3914	107.4351	
INITIAL WT g	96.6789	107.8839	106.3639	107.4098	
NET WT g	.0373	.0025	.0275	.0253	(.0528)
VOL. DESC ml	150	75	150 +	150 =	(300)

FILTER TARE WEIGHTS DATA SHEET #4-1

Into Dessicator : Date : 8-12-09 Time : 1205 By : AV

Manufacturer S & S Grade : # 25 Glass Front Size : 11 cm Lot No. :

Back Size: 8.2 cm Lot No. :

	DATE: 8-14-09	BY: AV	DATE: 8-19-09	BY: AV	DATE:	BY:
FILTER #	FIRST WEIGHT	TIME	SECOND WEIGHT	TIME	THIRD WEIGHT	TIME
181F	0.6576	0920	0.6576	09:00		
182F	0.6612	0921	0.6612	0901		
183F	0.6645	0922	0.6645	0902		
184F	0.6636	0923	0.6633	0903		
185F	0.6659	0924	0.6659	0904		
186F	0.6654	0925	0.6654	0905		
187F	0.6647	0926	0.6649	0906		
188F	0.6649	0927	0.6647	0907		
189F	0.6615	0928	0.6613	0908	← R-6	
190F	0.6648	0929	0.6646	0909		

181B	0.3598	0930	0.3598	0910		
182B	0.3601	0931	0.3602	0911		
183B	0.3609	0932	0.3609	0912		
184B	0.3630	0933	0.3633	0913		
185B	0.3662	0934	0.3664	0914		
186F	0.3625	0935	0.3625	0915		
187B	0.3611	0936	0.3612	0916		
188B	0.3612	0937	0.3611	0917		
189B	0.3636	0938	0.3637	0918	← R-6	
190B	0.3608	0939	0.3608	0919		

Checked by: Date: Time:

BALANCE ROOM ENVIRONMENTAL CONDITIONS

DATE	TIME	BY	WB	DB	% RH
8-14-09	1630	CB		78	46
8-19-09	0900	CB		74	47

BEAKER TARE WEIGHTS DATA SHEET #4-2

Into Dessicator: Date : 6-22-09 Time : 1000 By : AV

	DATE: 6-26-09	BY: AV	DATE: 6-29-09	BY: AV	DATE:	BY:
BEAKER #	FIRST WEIGHT	TIME	SECOND WEIGHT	TIME	THIRD WEIGHT	TIME
76	103.8024	0937	103.8029	1140		
77	107.3857	0938	107.3862	1142		
78	94.4941	0939	94.4942	1143		
79	97.6157	0940	97.6162	1144		
80	109.1244	0941	109.1249	1145		
81	101.4634	0942	101.4639	1146		
82	97.4748	0943	97.4753	1147		
83	98.3264	0944	98.3269	1148		
84	105.5523	0945	105.5528	1149		
85	97.9919	0946	97.9924	1150		
86	104.7436	0947	104.7441	1151		
87	105.9179	0948	105.9184	1152		
88	100.0025	0949	100.0030	1153		
89	120.6715	0950	120.6720	1154		
90	106.4042	0951	106.4047	1155		
91	95.0491	0952	95.0496	1156		
92	96.6785	0953	96.6789	1157		
93	107.8834	0954	107.8839	1158	R-6	
94	106.3634	0955	106.3639	1159		
95	107.4093	0956	107.4098	1200		
96	103.9815	0957	103.9820	1201		
97	99.9840	0958	99.9845	1202		
98	105.0240	0959	105.0245	1203		
99	104.9356	1000	104.9361	1204		
100	106.7415	1001	106.7420	1205		

BALANCE ROOM ENVIRONMENTAL CONDITIONS

DATE	TIME	BY	WB	DB	% RH	
6-26-09	0900	CW	-	73	47	Checked by :
6-29-09	1130	CW	-	74	47	Date :
		CW	-			Time :

WOODSTOVE DATA SHEET # 4-3 : CONSTANT WEIGHTS

UNIT : 91NC RUN : 6 DATE : 3-8 10 Page : 1 of 1

Beaker #	Date	Time	By	Weight	Date	Time	By	Weight	Date	Time	By	Weight	Date	Time	By
91	3-9	1400	CP	95.0796	3-10	1207	CP	95.0794	3-11	0905	CP				
92	3-9	1400	CP	96.7158	3-10	1208	CP	96.7162	3-11	0910	CP				
93	3-9	1400	CP	107.8862	3-10	1209	CP	107.8864	3-11	0911	CP				
94	3-9	1400	CP	106.3913	3-10	1210	CP	106.3914	3-11	0912	CP				
95	3-9	1400	CP	107.4353	3-10	1211	CP	107.4351	3-11	0913	CP				

Filter #	Date	Time	By	Weight	Date	Time	By	Weight	Date	Time	By	Weight	Date	Time	By
181F	3-8	1430	CP	.6783	3-9	1133	CP	.6785	3-10	1205	CP				
189B	3-8	1430	CP	.3653	3-9	1134	CP	.3653	3-10	1206	CP				

SCALE ROOM ENVIRONMENTAL CONDITIONS

Weighing Session	Date	Time	By	DB	%RH
1	3-9-10	1130	CP	70	41
2	3-10-10	1200	CP	70	44
3	3-11-10	0906	CP	66	49
4					
5					

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

WOODSTOVE DATA SHEET #4-4

SCALE QA SHEET

Dates: From 2-26-2010 Through	Scale: Sartorius	Model: A 120 S	SN: 37010004

100 g weight	10 g weight	1 g weight	100 mg weight	Tech	Date	Time	Dry Bulb	% RH
100.0001	10.0004	.9999	.0999	CP	2-26-10	0840	72	46
100.0001	9.9999	.9999	.0999	CP	2-27-10	1045	72	46
100.0000	10.0000	1.0000	.0999	CP	2-28	1100	70	48
100.0000	10.0000	1.0000	.0999	CP	3-1	0900	66	49
100.0000	10.0002	.9998	.1002	CP	3-5	1200	70	48
100.0001	9.9999	.9999	.0998	CP	3-7	1330	68	47
100.0000	9.9999	.9999	.0999	CP	3-9	1130	70	41
100.0000	10.0001	1.0000	.0999	CP	3-10	1200	70	44
100.0000	10.0001	.9999	.0999	CP	3-11	0900	66	49

WOODSTOVE DATA SHEET #4-4

SCALE QA SHEET

Dates: From 5-10-2009 Through 2-25-2010	Scale: Sartorius	Model: A 120 S	SN: 37010004

100 g weight	10 g weight	1 g weight	100 mg weight	Tech	Date	Time	Dry Bulb	% RH
100.0001	10.0002	1.0000	.0999	CP	5-10	1545	74	44
100.0001	10.0001	.9999	.0999	CP	6-19	1110	70	48
100.0001	10.0000	.9998	.0998	CP	6-22	0930	74	44
100.0001	10.0000	.9999	.0999	CP	6-24	1610	78	46
100.0001	10.0000	1.0000	.0999	CP	6-25	1000	78	46
100.0001	10.0001	1.0001	.0999	CP	6-26	0900	73	47
99.9998	10.0000	1.0001	.1000	CP	6-27	1300	76	45
100.0000	10.0002	1.0000	.0999	CP	6-28	1400	78	43
100.0000	10.0000	1.0000	.0999	CP	6-29	1130	74	47
100.0000	10.0000	1.0000	.0999	CP	7-1	1230	70	48
100.0000	9.9998	1.0000	.0998	CP	8-7	1310	75	48
99.9998	10.0000	1.0000	.0999	CP	8-8	1600	77	46
100.0000	10.0000	1.0000	.0999	CP	8-9	1720	78	46
100.0002	9.9999	1.0000	.0998	CP	8-10	0900	78	46
100.0000	10.0001	1.0001	.0998	CP	8-11	1126	78	46
100.0003	10.0001	1.0001	.1000	CP	8-12	0960	78	46
100.0000	10.0000	1.0001	.1000	CP	8-14	1630	78	46
100.0000	10.0000	1.0001	.0999	CP	8-19	0900	74	47
100.0002	10.0001	1.0000	.1000	CP	8-24	0900	72	42
100.0000	9.9999	.9999	.0999	CP	8-25	0900	70	48
100.0000	10.0000	1.0000	.0999	CP	8-26	1340	77	46
100.0003	10.0002	.9999	.1000	CP	9-5	1120	77	49
100.0000	10.0001	1.0000	.0999	CP	9-8	1410	78	41
100.0000	10.0001	1.0001	.0998	CP	9-11	1050	78	43
100.0000	10.0000	1.0000	.0999	CP	9-12	1220	78	46
100.0000	10.0001	1.0000	.0999	CP	9-13	1430	78	46
100.0000	10.0001	.9999	.1000	CP	9-14	1100	75	48
100.0000	10.0000	.9999	.0999	CP	1-29	1400	74	44
100.0000	10.0001	1.0000	.1000	CP	1-30	1800	78	46
100.0000	10.0001	1.0001	.1000	CP	2-1	0700	U	49
100.0000	9.9999	1.0001	.1000	CP	2-2	1100	72	46
100.0000	9.9997	1.0001	.1000	CP	2-4	1015	75	41
100.0000	10.0000	1.0000	.0998	CP	2-5	1015	78	43
100.0000	10.0001	1.0000	.1000	CP	2-7	1400	70	44
100.0002	10.0001	1.0000	.0999	CP	2-8	1200	78	46
100.0000	10.0000	1.0000	.1000	CP	2-9	1030	78	40
100.0000	10.0000	1.0000	.0999	CP	2-23	1830	77	49
100.0000	10.0001	1.0000	.0999	CP	2-24	0820	69	49
100.0000	10.0002	1.0000	.0999	CP	2-25	0940	69	47

WOODSTOVE DATA SHEET #4-4

SCALE QA SHEET

Dates: From 8-27-2008 Through 5-9-2009	Scale: Sartorius	Model: A 120 S	SN: 37010004

100 g weight	10 g weight	1 g weight	100 mg weight	Tech	Date	Time	Dry Bulb	% RH
99.9999	10.0000	1.0000	.0999	CK	8-27	0900	78	46
100.0001	10.0000	1.0000	.0999	CK	8-28	0930	78	46
100.0001	10.0001	1.0001	.0997	CK	8-29	1300	78	46
100.0000	10.0000	1.0000	.1000	CK	8-30	1030	78	46
100.0001	10.0003	1.0001	.0999	CK	8-31	1015	76	49
100.0000	10.0001	1.0000	.0997	CK	9-1	1100	74	44
100.0000	10.0001	.9999	.1000	CK	9-2	0845	75	48
99.9999	10.0000	.9999	.0998	CK	9-4	1000	77	47
99.9999	10.0002	1.0001	.0999	CK	9-8	0930	77	49
99.9999	9.9999	.9998	.0998	CK	9-9	1000	74	48
99.9997	9.9997	1.0000	.0999	CK	9-11	1500	76	45
100.0000	9.9997	.9999	.0999	CK	9-17	0930	77	49
100.0000	10.0000	1.0000	.0999	CK	9-18	0900	78	46
100.0000	10.0000	.9999	.0999	CK	9-19	0915	78	49
100.0000	10.0001	.9999	.0999	CK	9-22	1030	77	46
100.0000	10.0001	1.0000	.0998	CK	9-24	1330	78	49
100.0001	10.0001	1.0000	.0999	CK	9-25	0920	78	46
100.0000	9.9999	1.0001	.0998	CK	9-26	0920	78	46
100.0001	9.9999	1.0001	.0999	AV	9-29	0955	78	46
100.0000	10.0001	1.0000	.0998	CK	10-2	0945	75	44
100.0000	10.0000	1.0000	.0999	CK	10-3	0930	78	46
100.0000	9.9999	1.0000	.0999	CK	10-4	1530	78	46
100.0000	9.9999	.9999	.0999	CK	10-6	0930	77	49
100.0000	10.0001	1.0002	.1000	CK	10-7	1700	78	49
100.0000	10.0000	1.0000	.0999	CK	10-8	1000	78	49
99.9999	10.0000	1.0001	.0999	CK	10-9	1030	78	43
100.0000	9.9999	1.0001	.1000	CK	10-10	0930	78	40
100.0000	9.9998	.9999	.0997	CK	10-11	1430	74	47
100.0000	10.0001	1.0000	.1000	CK	10-13	0940	78	46
100.0000	10.0000	.9999	.0999	CK	10-14	2030	77	49
100.0000	10.0002	1.0000	.1000	CK	10-16	1220	78	43
100.0000	9.9999	1.0000	.0999	CK	10-16	1130	74	47
99.9998	10.0000	.9999	.0999	CK	5-3	1200	78	43
100.0000	10.0001	1.0000	.0999	CK	5-4	1000	72	47
100.0000	10.0001	1.0000	.0997	CK	5-5	1000	76	45
99.9998	10.0000	1.0000	.0999	CK	5-6	1100	77	49
100.0000	10.0001	1.0001	.1000	CK	5-7	1600	77	42
100.0000	10.0001	1.0000	.0999	CK	5-8	1600	76	45
100.0000	10.0003	1.0000	.1000	CK	5-9	1300	76	38

WOODSTOVE DATA SHEET #4-4

SCALE QA SHEET

Dates: From 10-22-07 Through 8-26-2008	Scale: Sartorius	Model: A 120 S	SN: 37010004

100 g weight	10 g weight	1 g weight	100 mg weight	Tech	Date	Time	Dry Bulb	% RH
100.0006	10.0001	1.0000	.0998	CP	10-22	1630	78	46
99.9999	10.0001	1.0000	.1001	CP	10-23	1000	74	44
100.0002	10.0002	1.0002	.0999	CP	10-24	1400	73	47
100.0002	10.0000	1.0001	.0998	CP	10-26	1700	74	40
100.0003	10.0001	1.0001	.0999	CP	10-27	0820	78	40
99.9999	10.0000	.9999	.0997	CP	10-28	1200	78	40
100.0000	9.9999	.9999	.0999	CP	10-29	1700	76	42
99.9998	9.9999	.9999	.1000	CP	10-30	1600	78	43
99.9997	10.0000	.9999	.0999	CP	11-16	1500	68	47
100.0001	10.0002	1.0000	.0999	CP	11-19	1730	73	40
100.0000	10.0002	.9999	.0999	CP	11-20	1100	69	44
99.9998	9.9999	.9999	.0998	CP	1-18-08	1230	76	45
100.0002	10.0002	.9999	.0999	CP	1-21-08	1430	65	48
99.9999	10.0002	1.0001	.0999	CP	1-22-08	1200	68	47
100.0002	9.9999	.9999	.0998	CP	1-23-08	1400	74	47
99.9999	10.0000	1.0002	.1000	CP	1-31-08	1900	74	44
100.0000	10.0003	1.0000	.0996	CP	2-1-08	1530	76	45
99.9997	9.9999	.9999	.0999	CP	2-16-08	1700	68	47
100.0001	10.0002	1.0000	.1000	CP	2-19-08	1400	72	46
99.9999	10.0001	.9999	.0998	CP	2-22-08	1800	68	47
99.9999	10.0001	1.0000	.0999	CP	2-23-08	1800	78	43
100.0000	10.0000	1.0000	.0999	CP	5-8-08	1020	78	43
100.0001	10.0001	1.0000	.0999	CP	5-9-08	0930	69	47
100.0000	10.0001	.9999	.0999	CP	5-10-08	1330	74	47
99.9998	9.9999	1.0000	.0998	CP	5-11-08	0900	74	44
100.0003	10.0001	.9999	.0998	CP	5-12	1400	70	48
99.9999	10.0001	1.0000	.1000	CP	5-13	1000	77	42
99.9999	9.9997	1.0000	.1000	CP	5-14	1230	77	42
99.9999	10.0001	.9999	.1000	CP	6-5-08	1430	72	46
100.0001	10.0000	1.0000	.0999	CP	6-9-08	1400	74	44
99.9999	9.9999	1.0000	.0999	CP	6-9-08	1800	73	47
100.0001	10.0001	.9999	.0998	CP	8-11-08	0930	77	42
100.0003	10.0000	1.0001	.0999	CP	8-12-08	1011	78	43
100.0000	10.0001	1.0000	.0999	CP	8-13-08	0950	76	49
100.0002	10.0000	1.0000	.0998	CP	8-18-08	0930	74	44
100.0001	9.9999	1.0000	.0998	CP	8-20-08	1110	76	45
100.0000	9.9999	.9999	.0998	CP	8-21-08	0915	75	48
100.0002	10.0000	1.0000	.1002	CP	8-22-08	0910	75	45
100.0000	10.0001	1.0001	.0999	CP	8-26-08	0900	78	43

BLANK PROCESSING DATA SHEET # 5

UNIT: 91NC RUN: 6 DATE: 3-8-2010

BLANKS DONE: 10-30-2007

BEAKER	A	B	C
	200 ml ACETONE	75 ml DICHLOR	200 ml WATER
	FISHER OPTIMA LOT #023283	FISHER OPTIMA LOT #035941	DW NA Inc Sparklettes Distilled
FINAL WEIGHT	108.9009	106.3077	106.9680
TARE WEIGHT	108.8995	106.3063	106.9644
NET WEIGHT	.0014	.0014	.0036

TARE BEAKERS INTO DESC : TIME: 1700 DATE: 10-20-07

DATE: 1022 BY: CP DATE: 1023 BY CP DATE: BY:

BEAKER	1 ST WT	TIME	2 ND WT	TIME	3 RD WT	TIME
A	108.8994	1700	108.8995	1027		
B	106.3060	1701	106.3063	1028		
C	106.9639	1702	106.9644	1029		

FINAL BEAKERS INTO DESC : TIME: 1040 DATE: 10-27-07

DATE: 1029 BY: CP DATE: 1030 BY CP DATE: BY:

BEAKER	1 ST WT	TIME	2 ND WT	TIME	3 RD WT	TIME
A	108.9011	1721	108.9009	1619		
B	106.3074	1722	106.3077	1621		
C	106.9678	1723	106.9680	1622		

TARE QC

DATE	TIME	BY	WB	DB	%
10-22	1630	CP		78	46
10-23	1000	CP		74	44

FINAL QC

DATE	TIME	BY	WB	DB	%
10-29	1700	CP		76	42
10-30	1600	CP		78	43

NET PARTICULATE CATCH CALCULATION DATA SHEET #6

UNIT: 91NC RUN: 6 DATE: 3-8-2010

BLANK CALCULATIONS

Acetone: .0014 g + 200 ml = .000007 g/ml

Dicholoromethane: .0014 g + 75 ml = .000019 g/ml

Distilled Water: .0036 g + 200 ml = .000018 g/ml

FRONT HALF CATCH

FILTERS: .0172 (Total Catch) g - 1 (# of Filters) (.0000 g (Blank Value / Filter)) = .0172 g

BEAKERS: .0298 (Total Catch) g - 75 (ml Acetone) (.0005 .000007 g (Blank Value / ml Acetone)) = .0293 g

TOTAL FRONT HALF CATCH : .0465 g

BACK HALF CATCH

FILTERS: .0016 (Total Catch) g - 1 (# of Filters) (.0000 g (Blank Value / Filter)) = .0016 g

BEAKERS:

Acetone: .0373 (Total Catch) g - 150 (ml Acetone) (.0011 .000007 g (Blank Value / ml Acetone)) = .0362 g

Extract: .0025 (Total Catch) g - 75 (ml Dichloromethane) (.0014 .000019 g (Blank Value / Dichloromethane)) = .0011 g

Water: .0528 (Total Catch) g - 300 (ml Water) (.0054 .000018 g (Blank Value / Water)) = .0474 g

TOTAL BACK HALF CATCH: .0863 g

TOTAL CATCH: .1328 g

% FRONT HALF: 35.0 %

CALCULATIONS DATA SHEET # 7

UNIT : 91 NC RUN : 6 DATE : 3-8-2016

1) Vm (std) = $\dfrac{(51.817 \text{ Vm})(17.64)(.901 \text{ mcf})\left(30.06\text{" Hg} + \dfrac{.1221\text{" } H_2O}{13.6}\right)}{(551 \text{ TmA})} = \dfrac{44.9539}{000.0000}$ dscf

2) Vw (std) = (.04707) (58.0 ml H_2O) = $\dfrac{2.7301}{00.0000}$ scf

3) Asw = $\dfrac{(2.7301 \text{ scf})}{(44.9539 \text{ scf} + 2.7301 \text{ dscf})} = \dfrac{.0573}{.0000}$ Bws × 100 = $\dfrac{5.7254}{00.0000}$ % H_2O

4) Cs = $\dfrac{(.1328 \text{ g.})}{(44.9539 \text{ dscf})}$ (15.43) = $\dfrac{.0456}{0.0000}$ gr / dscf

5) Estimated g / hr = $\dfrac{(.1328 \text{ g.})}{(44.9539 \text{ dscf})}$ ($\dfrac{13.120}{00.0000}$ dscfm) (60) = $\dfrac{2.3255}{00.0000}$ 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_2O =	average delta H for test	(p. 2)	(.000 " H_2O)
TmA =	average meter temperature for test in degrees Absolute	(p. 2)	(000 TmA)
ml H_2O =	total water caught during test	(p. 3)	(000.0 ml H_2O)
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 : 91NC RUN : 6 DATE : 3-8-2010

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

Wet Bulb / Dry Bulb

Pre : WB : 62 DB : 85 = 26 % RH 1.0 % H_2O

Post : WB : 55 DB : 70 = 36 % RH .9 % H_2O

Average : 31 % RH .95 % H_2O

Empty Stove Weight (lbs) : — w/ stack & oil seal : Wet : — Dry : 588.2

Kindling Weight (lbs) : Paper : 1.1 Wood : 1.9

Preburn Fuel Weight : 25.5 + 20.6 + 17.2 Total : 63.3

Kindling & Preburn Fuel Weight (wood only) (lbs) : **Total** : 65.2

Coal Bed Wt Range (lbs) : 5.4 - 4.4 **Scale** : 593.6 - 592.6

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

Lower : .20 × fuel weight : Always round UP to nearest tenth **Actual Coal Bed Weight** : 5.1

Maximum Coal Bed Removal (lbs) : ((5.4 (Upper) + 4.4 (Lower)) ÷ 2) .25 = 1.2 (round down to nearest tenth)

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

Dimensions	Length in inches	No. Pcs	Weight in lbs	% of Load
2" × 4"	—	—	—	—
4" × 4"	14	6	21.9	100.0

Test Fuel Weight : 21.9 lbs

Estimated Dry Burn Rate : .82090

$$\frac{21.9 - (21.9 \times .17910)}{2.2046} \times \frac{60}{\frac{140}{\text{TIME}}} = 3,495 \text{ kg / hr}$$

Estimated BTU's/hr : 19,140 × $\frac{63}{100}$ × $\frac{3,495}{\text{DBR}}$ = 42143.4 BTU's/hr

EPA Default Efficiencies : Non-cat : 63 Cat : 72 Pellet : 78

WOOD STOVE OPERATING DATA PAGE #9

Unit : 91 NC Run : 6 Date : 3-8-2016

FIRE STARTED: 0745

WARM UP AND PREBURN:

PRIMARY AIR : Set wide open for all warm-up / preburn fuel charges. Then set to MAX 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 ½ min. prior to loading last fuel, raked and leveled. In stove 20 sec.

TEST:

DOOR wide open during loading 0 min. 40 sec.

PRIMARY AIR : Opened full for first 5 min., then set to run setting of MAX.

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 High

(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 : N/A BRAND : N/A

All Grades WCLB rules:

WARM UP INFORMATION:

All pre-burn / warm up fuel pieces were either 16 or — inches.

1st warm up / pre-burn fuel charge (25.5 lbs.) added at 0755

2nd warm up / pre-burn fuel charge (20.6 lbs.) added at 0920

3rd warm up / pre-burn fuel charge (17.2 lbs.) added at 1020

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

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

TEST DATA SHEET #10

Unit : 91 NC Run : 6 Date : 3-8-2010

Room Temperature : 71 °F Temperature Correction Set? (Yes) No

Calibration Check: 12.0% + or – 0.2%? (Yes) No

Time Test Fuel moisture reading taken : 0945

pc #	Dimen.	Use	TOP	BOTTOM	SIDE	Avg Corrected
1	2"×4"×8'	K	12.1	12.5	12.5	12.4
2						
3						
4	2"×4"×8'	P	22.3	23.0	22.6	22.6
5	2"×4"×8'	P	19.9	20.6	20.9	20.5
6	2"×4"×8'	P	20.4	21.3	21.2	21.1
7	2"×4"×8'	P	18.9	21.6	21.4	20.6
8	2"×4"×8'	P				(84.8)
9						
10						
11						
12	4×4×14"	T	22.1	20.5	19.1	20.6
13	"	T	22.1	21.3	19.7	21.0
14	"	T	23.5	22.0	21.4	22.3
15	"	T	23.1	21.1	21.0	21.7
16	"	T	23.2	23.4	21.2	22.6
17	"	T	22.4	23.7	21.9	22.7
18						130.9
19						
20	Spacers	T	22.9	23.1	23.0	23.000

Key for Use : K = Kindling P = Pretest Fuel T = Test Fuel

	KINDLING	PRETEST FUEL	TEST FUEL
Dry Moisture % :	12.400 %	21.200 %	21.817 %
Wet Moisture % :	11.032 %	17.492 %	17.910 %

To obtain Wet from Dry : $\frac{100 \times \%\ \text{Dry Reading}}{100 + \%\text{Dry Reading}}$ = % Moisture, Wet Basis

Acceptable Ranges : 16 - 20 % wet: 19 - 25 % dry (17.5 - 22.5 on Meter Uncor. reading) at 70°

GAS DATA SHEET #12

WEIGHT: 5933 DATE: 3-8-2010

UNIT: Buck 91 NC RUN: 6 PAGE: 1 OF 1

TIME	SCALE	FUEL	DROP	V.	CO_2	V.	O_2	V.	CO	STATIC	SO_2PPM
0 1135	615.2	21.9	—	.205	5.1	.607	15.2	.045	.47	-055	.300
5 40	614.5	21.2	.7	.332	8.3	.487	12.2	.023	.25	-065	.275
10 45	612.3	19.0	2.2	.504	12.6	.316	7.9	.021	.23	-074	.300
15 50	610.8	17.5	1.5	.497	12.4	.328	8.2	.018	.20	-076	.350
20 55	609.3	16.0	1.5	.480	12.0	.344	8.6	.013	.15	-075	.300
25 1200	608.3	15.0	1.0	.436	10.9	.388	9.7	.011	.13	-071	.300
30 05	607.2	13.9	1.1	.276	6.9	.539	13.5	.033	.35	-061	.300
35 10	606.1	12.8	1.1	.410	10.2	.415	10.4	.011	.13	-071	.300
40 15	604.7	11.4	1.4	.580	14.5	.236	5.9	.030	.32	-076	.250
45 20	603.1	9.8	1.6	.508	12.7	.308	7.7	.030	.32	-074	.300
50 25	602.0	8.7	1.1	.415	10.4	.407	10.2	.013	.15	-071	.250
55 30	600.9	7.6	1.1	.347	8.6	.479	12.0	.015	.17	-068	.225
SUBTOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	.937	*****
60 35	600.0	6.7	.9	.324	8.1	.499	12.5	.018	.20	-065	.200
65 40	599.4	6.1	.6	.300	7.5	.523	13.1	.0116	.18	-064	.200
70 45	598.7	5.4	.7	.307	7.6	.519	13.0	.012	.14	-063	.200
75 50	598.1	4.8	.6	.298	7.4	.527	13.2	.016	.17	-064	.250
80 55	597.5	4.2	.6	.275	6.8	.547	13.7	.022	.24	-063	.250
85 1300	597.0	3.7	.5	.261	6.5	.559	14.0	.019	.21	-062	.250
90 05	596.6	3.3	.4	.247	6.1	.571	14.3	.030	.32	-059	.250
95 10	596.2	2.9	.4	.213	5.3	.603	15.1	.030	.32	-056	.250
100 15	595.8	2.5	.4	.205	5.1	.611	15.3	.036	.38	-055	.250
105 20	595.4	2.1	.4	.210	5.2	.607	15.2	.037	.39	-054	.250
110 25	595.1	1.8	.3	.206	5.1	.611	15.3	.033	.35	-053	.250
115 1330	594.8	1.5	.3	.215	5.3	.607	15.2	.027	.29	-055	.250
SUBTOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	.713	*****
120 35	594.4	1.1	.4	.206	5.1	.615	15.4	.026	.29	-056	.225
125 40	594.0	.7	.4	.216	5.4	.603	15.1	.022	.24	-055	.225
130 45	593.7	.4	.3	.197	4.9	.623	15.6	.028	.30	-054	.225
135 50	593.4	.1	.3	.175	4.3	.643	16.1	.030	.32	-054	.225
140 55	593.3	.0	.1	.148	3.6	.6666	16.7	.044	.46	-053	.225
145 1400											
150 05											
155 10											
160 15											
165 20											
170 25											
15 1430											
SUBTOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	.272	*****
TOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	1.922	*****

Fan?

÷29

0.063

PREBURN DATA SHEET #13

UNIT: Quick 91 NC RUN: C DATE: 3-8-2010 PAGE: 1 of 1

TIME	SCALE	DROP	STACK	TOP	LF SIDE	BACK	RT SIDE	BOTTOM	FIREBOX	SEC/CAT	AMBIENT	STATIC	COMMENTS
0 / 1025	609.4	—	479	563	573	454	526	445			79	.066	PREBURN START: @ 15.8 UP
5 / 30	606.5	2.9	747	656	548	345	492	406			88	.076	COAL BED SCALE RANGE:
10 / 35	603.7	2.8	813	719	535	326	483	395			89	.077	593.6 → 592.6
15 / 40	601.7	2.0	814	755	526	337	485	388			93	.079	PRIMARY AIR: MAX
20 / 45	599.8	1.9	788	761	526	343	487	386			91	.075	SECONDARY AIR: N/A
25 / 50	598.0	1.8	709	749	529	356	500	386			92	.074	FAN: High
30 / 55	596.6	1.4	681	744	531	363	504	386			93	.074	PUMPS ON AT: ✓
35 / 100	595.3	1.3	670	679	554	390	513	389			93	.069	CHECK WB/DB: N/A
40 / 05	594.6	.7	577	640	561	398	512	390			91	.067	
45 / 10	594.2	.4	543	595	561	391	510	388			90	.065	485
50 / 15	593.9	.3	489	526	551	362	491	380			87	.062	
55 / 20	593.7	.2	456	465	530	330	478	374			87	.058	435
*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	
60 / 25	593.5	.2	434	427	507	314	472	367			87	.058	
65 / 30	593.4	.1	402	393	485	297	461	359			85	.055	417
70 / 35	593.3	.1	367	406	470	322	450	363			85	.055	399
75 / 40													
80 / 45													
85 / 50													
90 / 55													
95 / 200													
100 / 05													

Buck 91 NC

Temperature Data Sheet 14

Run 6
3/8/2010

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	367	406	470	322	450	363	######	######	75	1415	241	59	236	33	33
5	531	393	438	252	429	347	######	######	80	1408	241	43	235	34	34
10	647	525	413	223	406	332	######	######	78	1401	241	43	240	36	35
15	676	563	404	217	387	321	######	######	77	1396	242	43	238	37	35
20	652	575	401	218	376	312	######	######	78	1395	243	43	239	38	37
25	614	562	400	224	384	306	######	######	79	1398	245	43	241	38	37
30	455	465	396	219	386	302	######	######	77	1403	245	44	240	38	37
35	591	483	383	208	384	297	######	######	77	1407	246	44	240	37	37
40	681	571	386	218	378	291	######	######	78	1413	246	44	238	37	37
45	634	594	401	235	396	289	######	######	77	1417	247	44	241	37	38
50	579	561	414	247	410	289	######	######	78	1422	248	45	242	37	38
55	542	519	416	251	416	288	######	######	78	1429	248	45	242	37	38
60	521	486	415	250	416	288	######	######	79	1436	248	45	242	37	38
65	506	467	412	243	413	287	######	######	79	1444	248	45	241	36	37
70	495	447	406	243	410	286	######	######	77	1452	248	44	240	36	37
75	485	438	403	244	403	285	######	######	77	1456	248	44	240	35	37
80	470	425	404	249	409	285	######	######	76	1459	248	44	239	35	37
85	454	405	408	256	406	284	######	######	75	1462	247	44	238	34	36
90	428	380	408	257	404	282	######	######	74	1466	247	44	237	34	36
95	411	365	405	255	396	281	######	######	76	1470	246	44	237	33	36
100	397	351	400	254	396	280	######	######	78	1474	246	44	236	33	36
105	394	341	395	251	397	277	######	######	80	1478	245	45	237	33	35
110	392	334	390	250	396	274	######	######	81	1482	244	45	238	32	35
115	393	327	387	246	398	268	######	######	75	1486	244	45	237	32	35
120	388	321	385	243	396	263	######	######	75	1490	243	45	237	32	34
125	392	320	383	245	399	257	######	######	74	1493	243	45	236	32	34
130	384	315	382	254	397	253	######	######	75	1496	242	45	235	32	34
135	369	307	378	250	394	248	######	######	75	1499	242	44	234	32	34
140	348	298	367	244	389	243	######	######	73	1502	241	44	233	31	33

TEMPERATURE DATA SHEET #14A

		TEST TIME	140		
STACK AVG	489	TOP AVG	432	LT SIDE AVG	402
BACK AVG	244	RT SIDE AVG	401	BOTTOM AVG	289
FIREBOX AVG	########	SEC/CAT AVG	########	AMBIENT AVG	77

END	308.0	
START	402.1	
	-94.1	DELTA T

CIRCLE: LOSS / GAIN

ZERO / SPAN CHECK DATA SHEET #15-1

Date : 3-8-2010 Analyte : CO_2 (15-1)

Unit : 91NC Run # : 6

Zero Cyl. # : 168TAC 3-A Conc. : 0.00 % CO_2 Cyl. Press. : 400 PSI

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

Span Cyl. # : 487905 Conc. : 12.20 % CO_2 Cyl. Press. : 1440 PSI

Certified by : AIR LIQUIDE Date : 11-1-07

Analyzer : Make : HORIBA Model : PIR-2000 SN : 407069

Range : 0 - 25.0 % CO_2 Analyzer Output : 0 - 1.0 v.

Flow : 1.5 SCFH Measured by : Rotameter

EPA Span Value = 25.0 % CO_2

EPA Control Limits = ± 2.5% of 25.0 % CO_2 = ± 0.625 % CO_2

Method 28 A = ± .2 % of 25.0 % CO_2 = ± .05 % CO_2

PRE RUN Audit : by : [signature] Time : 1000 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	-.023	-.023	-.091
SPAN	48.8	.488	12.20	48.8	.488	12.235	.035	.139

POST RUN Audit : by : [signature] Time : 1420 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	.027	.027	.110
SPAN	48.8	.488	12.20	48.6	.486	12.185	-.015	-.062

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

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

Span % Difference = $\frac{\text{Act \% (ppm) - Exp \% (ppm)}}{\text{Full Scale Value}}$ X100

ZERO / SPAN CHECK DATA SHEET #15-2

Date : 3-8-2010 Analyte : O_2 (15-2)

Unit : 91 NC Run # : 6

Zero Cyl. # : 168TAC 3A Conc. : 0.00 % O_2 Cyl. Press. : 400 PSI

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

Span Cyl. # : 487905 Conc. : 12.60 % O_2 Cyl. Press. : 1440 PSI

Certified by : AIR LIQUIDE Date : 11-1-07

Analyzer : Make : TELEDYNE Model : 320 A SN : 37400

Range : 0 - 25.0 % O_2 Analyzer Output : 0 - 1.0 v.

Flow : 1.5 SCFH Measured by : Rotameter

EPA Span Value = 25.0 % O_2

EPA Control Limits = ± 2.5% of 25.0 % O_2 = ± 0.625 % O_2

Method 28 A = ± .2 % of 25.0 % O_2 = ± .05 % O_2

PRE RUN Audit : by : CP Workman Time : 1000 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	-.025	-.025	-.102
SPAN	12.60	.504	12.6	12.6	.504	12.623	.023	.091

POST RUN Audit : by : CP Workman Time : 1420 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	.025	.025	.099
SPAN	12.60	.504	12.6	12.4	.506	12.673	.073	.292

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

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

Span % Difference = $\frac{\text{Act \% (ppm) - Exp \% (ppm)}}{\text{Full Scale Value}}$ X100

ZERO / SPAN CHECK DATA SHEET #15-3

Date : 3-8-2010 Analyte : CO (15-3)

Unit : 91NC Run # : 6

Zero Cyl. # : 168TAC 3-A Conc. : 0.00 % CO Cyl. Press. : 400 PSI

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

Span Cyl. # : CC487905 Conc. : 4.90 % CO Cyl. Press. : 1440 PSI

Certified by : AIR LIQUIDE Date : 11-1-07

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 = ± 2.5% of 10.0 % CO = ± 0. 25 % CO

Method 28 A = ± .2 % of 10.0 % CO = ± .02 % CO

PRE RUN Audit : by : [signature] Time : 1000 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	.017	.017	.170
SPAN	49.0	.490	4.90	49.0	.490	4.908	.008	.081

POST RUN Audit : by : [signature] Time : 1420 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	.000	.017	.017	.170
SPAN	49.0	.490	4.90	49.1	.491	4.918	.018	.181

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

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

Span % Difference = $\frac{\text{Act \% (ppm) - Exp \% (ppm)}}{\text{Full Scale Value}}$ X100

ZERO / SPAN CHECK DATA SHEET #15-4

Date : 3-8-2010 Analyte : SO_2 (15-4)

Unit : 91NC Run # : 6

Zero Cyl. # : 168TAC 3-A Conc. : 0.00 ppm SO_2 Cyl. Press. : 400 PSI

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

Span Cyl. # : CC82089 Conc. : 1250 ppm SO_2 Cyl. Press. : 1650 PSI

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

Analyzer : Make : HORIBA Model : PIR-2000 SN : 403019

Range : 0 - 2500 ppm SO_2 Analyzer Output : 0 - 1.0 v.

Flow : 1.5 SCFH Measured by : Rotameter

EPA Span Value = 2500 ppm SO_2

EPA Control Limits = ± 2.5% of 2500 ppm SO_2 = ± 62.5 ppm SO_2

PRE RUN Audit : by : Cp Whitmyer Time : 1000 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	-.651	-.651	-.026
SPAN	50.0	.500	1250	50.0	.500	1252	2.232	.089

POST RUN Audit : by : Cp Whitmyer Time : 1420 Temp : 67 ° F

AUDIT RESULTS

Point #	Expected Response			Actual Response			± Conc. Difference	Δ %
	Meter	DVM	PPM	Meter	DVM	%		
ZERO	00.0	.000	00.0	00.1	.001	1.855	1.855	.074
SPAN	50.0	.500	1250	50.3	.503	1259.7	9.700	.388

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

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

Span % Difference = $\frac{\text{Act \% (ppm) - Exp \% (ppm)}}{\text{Full Scale Value}}$ X100

QUALITY CHECKS DATA SHEET # 16

UNIT: 9/NE RUN: 6 DATE: 3-8-2016

Thermocouple Check:

T/C # 1	— °F	T/C # 13	56.8 °F
T/C # 2	— °F	T/C # 14	54.8 °F
T/C # 3	55.9 °F	T/C # 15	55.8 °F
T/C # 4	50.0 °F	T/C # 16	54.2 °F
T/C # 5	49.0 °F	T/C # 17	53.0 °F
T/C # 6	49.2 °F	T/C # 18	54.8 °F
T/C # 7	49.2 °F	T/C # 19	— °F
T/C # 8	49.2 °F	T/C # 20	— °F
T/C # 9	— °F	T/C # 21	— °F
T/C # 10	— °F	T/C # 22	— °F
T/C # 11	50.5 °F	T/C # 23	— °F
T/C # 12	54.5 °F	T/C # 24	— °F

Thermocouple Readout:

Pretest zero and span check and calibration — post test zero and span — % difference

ZERO .4 °F Adj. to 0.0 °F ZERO 0.0 °F Difference 0 %

SPAN 1998.9 °F Adj. to 2000.0 °F SPAN 2001.4 °F Difference .070 %

Thermocouple Readout Pretest Linearity Check:

0	= 0.0 °F	200	= 200.2 °F	400	= 400.0 °F
600	= 599.9 °F	800	= 799.8 °F	1000	= 999.8 °F
1200	= 1199.8 °F	1400	= 1399.4 °F	1600	= 1599.5 °F
1800	= 1799.8 °F	2000	= 2000.0 °F		

Sample Train Leak Check	Pre ✓	Post ✓
C-gas Train Leak Check	Pre ✓	Post ✓
SO_2 Train Leak Check	Pre ✓	Post ✓
Static Gauge Zero Check	Pre ✓	Post ✓

Scale Check Pre: 603.5 − 593.5 = 10.0

Post: 603.2 − 593.2 = 10.0

Stack Cleaned Prior to Test Run: YES ____ NO X

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 Prarie 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

Make: Weightronix
Model: WI-110
SR#: 16409
Class: III
Cap.: 1000 lbs

Base

_____

Options Installed

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.

WASHINGTON STATE DEPARTMENT OF AGRICULTURE

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, T23-2 T23-24, T23-26, T23-28 T23-32
Test Weight	50 lb	30	Cast Iron	Rice Lake	877B, N1039, N1041, T2 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 LAB CODE 200446-

MAR 0 8 2002

W98MR42-01, 11/98

2747 29th Avenue Southwest ▼ Tumwater, Washington 98512 ▼ (360) 753-5042 ▼ (360) 586-4728 fax

Established 1974

QUALITY CONTROL SERVICES

LABORATORY EQUIPMENT • SALES • SERVICE • CALIBRATION • REPAIRS
2340 SE 11TH Ave. Portland, Oregon 97214 • Box 14831 Portland, Oregon 97293
(503) 236-2712 • FAX (503) 235-2535 • www.qc-services.com

Lokee Testing Labs
13235 Prairie Circle East
Sumner, WA 98390

Report Number: LOKT0137010004091203

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**	**Cal Date**	**Last Cal Date**	**Cal Due Date**
g	0.0001	QC012	12/3/09	6/12/09	6/2010

FUNCTIONAL CHECKS

ECCENTRICITY	LINEARITY	REPEATABILITY
Test Wt: 100 Tol: 0.0003	Test Wt: 50x2 Tol: 0.0004	Test Wt: 100 Tol: 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

Standard	As-Found	As-Left
100	100.0002	99.9998
70	70.0001	69.9999
50	50.0001	49.9999
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 Date	NIST ID
Weight Set	R.L./Troemner	1MG-25KG	A45	10/12/09	10/2010	822/274334-07

Permanent Information Concerning this Equipment:

Comments/Info Concerning this Calibration:

Technician: D. Deleasa **Signature:** D. Deleasa

THIS CERTIFICATE SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE APPROVAL OF QUALITY CONTROL SERVICES, INC.

Instruments listed above were calibrated using standards traceable to the National Institute of Standards and Technology (NIST). Calibration data reflect results at the time and location of calibration. Calibration data should be reviewed to insure that the instrument is performing to its required accuracy. Calibrations comply with ISO/IEC 17025 and ANSI/Z540-1-1994 quality standards.

Established 1974

QUALITY CONTROL SERVICES

LABORATORY EQUIPMENT • SALES • SERVICE • CALIBRATION • REPAIRS
2340 SE 11TH Ave. Portland, Oregon 97214 • Box 14831 Portland, Oregon 97293
(503) 236-2712 • FAX (503) 235-2535 • www.qc-services.com

Lokee Testing Labs
13235 Prairie Circle East
Sumner, WA 98390

Report Number: LOKT0137010004090612

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**	**Cal Date**	**Last Cal Date**	**Cal Due Date**
g	0.0001	QC012	6/12/09	11/18/08	12/2009

FUNCTIONAL CHECKS

ECCENTRICITY	LINEARITY	REPEATABILITY
Test Wt: 100	Test Wt: 50x2	Test Wt: 100
Tol: 0.0003	Tol: 0.0004	Tol: 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

Standard	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 Date	NIST ID
Weight Set	R.L./Troemner	1MG-25KG	A45	10/6/08	10/2009	822/274334-07

Permanent Information Concerning this Equipment:

Comments/Info Concerning this Calibration:

Technician: D. Deleasa

Signature: D. Deleasa

THIS CERTIFICATE SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE APPROVAL OF QUALITY CONTROL SERVICES, INC.

Instruments listed above were calibrated using standards traceable to the National Institute of Standards and Technology (NIST). Calibration data reflect results at the time and location of calibration. Calibration data should be reviewed to insure that the instrument is performing to its required accuracy. Calibrations comply with ISO/IEC 17025 and ANSI/Z540-1-1994 quality standards.

Established 1974

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

Report Number: LOKT0137010004081118

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**	**Cal Date**	**Last Cal Date**	**Cal Due Date**
g	0.0001	QC012	11/18/08	5/5/08	11/2009

FUNCTIONAL CHECKS

ECCENTRICITY	LINEARITY	REPEATABILITY
Test Wt: 100 Tol: 0.0003	Test Wt: 50x2 Tol: 0.0004	Test Wt: 100 Tol: 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

Standard	As-Found	As-Left
100	100.0002	100.0001
70	70.0001	70.0001
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 Date	NIST ID
Weight Set	R.L./Troemner	1MG-25KG	A45	10/6/08	10/2009	822/274334-07

Permanent Information Concerning this Equipment:

Comments/Info Concerning this Calibration:

Technician: D. Deleasa **Signature:** D. Deleasa

THIS CERTIFICATE SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE APPROVAL OF QUALITY CONTROL SERVICES, INC.

Instruments listed above were calibrated using standards traceable to the National Institute of Standards and Technology (NIST). Calibration data reflect results at the time and location of calibration. Calibration data should be reviewed to insure that the instrument is performing to its required accuracy. Calibrations comply with ISO/IEC 17025 and ANSI/Z540-1-1994 quality standards.

Established 1974

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

Report Number: LOKT0137010004080505

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**	**Cal Date**	**Last Cal Date**	**Cal Due Date**
g	0.0001	QC012	5/5/08	11/27/07	11/2008

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

Standard	As-Found	As-Left
100	100.0002	100.0001
70	70.0002	70.0001
50	50.0001	50.0001
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 Date	NIST ID
Weight Set	R.L./Troemner	1MG-25KG	A45	5/7/07	8/2008	822/274334-07

Permanent Information Concerning this Equipment:

Comments/Info Concerning this Calibration:

Technician: D. Deleasa

Signature: D. Deleasa

THIS CERTIFICATE SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE APPROVAL OF QUALITY CONTROL SERVICES, INC.

Instruments listed above were calibrated using standards traceable to the National Institute of Standards and Technology (NIST). Calibration data reflect results at the time and location of calibration. Calibration data should be reviewed to insure that the instrument is performing to its required accuracy. Calibrations comply with ISO/IEC 17025 and ANSI/Z540-1-1994 quality standards.

Established 1974

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: EESPC37010004071127

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	11/27/2007	05/14/2007	05/2008

FUNCTIONAL CHECKS

ECCENTRICITY: Test Wt: 100 Tol: 0.0003	LINEARITY: Test Wt: 50x2 Tol: 0.0004	REPEATABILITY: Test Wt: 100 Tol: 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	100.0006	100.0002
70	70.0004	70.0001
50	50.0003	50.0001
20	20.0000	20.0000
10	10.0000	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	05/07/2007	08/2008	822/274334-07

Comments / Info Concerning This Calibration:

Permanent Information Concerning This Instrument:

Technician: D.Deleasa

Signature: D. Deleasa

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.).

Established 1974

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: 100 Tol: 0.0003	Test Wt: 50x2 Tol: 0.0004	Test Wt: 100 Tol: 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	100.0008	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: D. Deleasa

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.).

Thermocouple Calibration Record Semi-Annual

Thermocouples Check against
Reference Thermometer serial number 9123454
Ice Water Bath 32.0
Boiling Water 212.0
Room Temperature 68
Barometric Pressure 29.97
DATE: 12-7-2009

TC	Location	Ice Bath Temp	Boiling Water Temp
1	Wet Bulb	32.0	212.0
2	Dry Bulb	32.0	212.0
3	Stack	32.3	210.9
4	Stove Top	32.0	211.7
5	Left Side	32.4	211.2
6	Back	32.2	212.4
7	Right Side	32.2	211.9
8	Bottom	32.3	211.8
9	Firebox	32.0	212.0
10	Secondary/Cat	32.5	210.8
11	Ambient	31.6	216.9
12	Tube Furnace	32.1	212.1
13	Sample Box	32.2	211.5
14	Impinger Out	32.2	212.4
15	C. Gas Box	32.6	211.8
16	C. Gas Out	32.3	212.0
17	SO2 Out	32.4	211.2
18	Upper Ambient	32.1	211.7
19			
20			
21			
22			
23	Calibrator	32.0	212.0
24	Oven	32.0	212.0

Thermocouple Readout Semi-Annual Calibration Data Sheet

Date: 12-7-2009
Ambient Temperature: 68
Technician: C.W.

Thermocouple Number: T/C Readout
Barometric Pressure: 29.97
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	.04
300	Omega	300.0	299.8	.067
400	Omega	400.0	399.8	.05
500	Omega	500.0	499.7	.06
600	Omega	600.0	599.7	.05
700	Omega	700.0	699.7	.043
800	Omega	800.0	799.7	.038
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	1399.8	.014
1600	Omega	1600.0	1599.9	.006
1800	Omega	1800.0	1799.9	.006
2000	Omega	2000.0	2000.0	0

[a] Every 50°F for each reference point
[b] Type of Calibration System Used
[c] $\frac{\text{(reference temperature) - (thermocouple temperature)}}{\text{reference temperature}} * 100$

TRACEABILITY DOCUMENTATION Semi-Annual

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

DATE: 12-7-2009

SO^2 INJECTION ROTAMETER FISHER SN 9123454

NIST Traceable

Actual	°C = °F	°F
0.0	32.0	32.0
20.3	68.5	68.6
36.0	96.8	96.8
48.7	119.7	119.7

DRY GAS METER THERMOCOUPLES

Actual	°C = °F	5H in	5H out	KK
0.0	32.0	32.0	32.0	32.0
20.2	68.4	68.5	68.5	68.4
35.5	95.9	96.1	95.9	95.9
47.3	117.1	117.2	117.0	117.0

SLING PSYCHROMETER

Actual	°C = °F	Wet Bulb	Dry Bulb
0.0	32.0	32.0	32.0
20.2	68.4	68.4	68.4
35.0	95.0	95.0	95.0
46.8	116.2	116.2	116.2

Conversions = °F = (°C × 1.8) + 32 °C = (°F-32)÷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 ± 5.0% to 100 FPM and ± 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 ± 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: Buck Stoves 91NC DATE: 3-10-2010

TEST DATA

RUN #	1	2	3	4	5	6	7	8	9	10
AVG. ΔH	.166	.23	.138	.198	X	.221				
MAX VAC	2.0	3.0	3.0	2.0	X	2.0				

Avg. Test Series Δ H: .191 in H_2O 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: .901 (mcf)

AUDIT DATA

		Audit # 1	Audit #2	Audit #3
BP		30.10	30.10	30.10
VAC		3.0	3.0	3.0
AUDIT METER :				
VOL.	Final	88.925	93.368	99.676
(Vw)	Initial	84.563	88.925	93.368
	Vol.	4.387	4.418	6.308
TEMP (°F)	Initial	74	78	82
(Tw)	Mid	76	80	85
	Final	78	82	88
(°F / °A)	**Avg.**	536	540	545
Δ H	Initial	.191	.191	.191
	Mid	.191	.191	.191
	Final	.191	.191	.191
	Avg.	.191	.191	.191
DRY GAS METER :				
VOL.	Final	372.000	377.000	384.000
(Vd)	Initial	367.000	372.000	377.000
	Vol.	5.000	5.000	7.000
TEMP (°F)	Initial	74	76	77
(Tm)	Mid	75	77	78
	Final	76	77	79
(°F / °A)	**Avg.**	535	537	538

$$Y = \frac{(Vw)(mcf)(BP)(Tm)}{(Vd)\left(BP + \frac{DH}{13.6}\right)(Tw)} \qquad \text{Y Factor \% Diff.} = \frac{\text{Act} - \text{Exp}}{\text{Exp}} \times 100$$

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

RUN 1

$$Y = \frac{(4.387)(1.019)(30.10)(535)}{(5.000)\left(30.10 + \frac{.191}{13.6}\right)(536)} = \frac{71988.3}{84431.8} = .853$$

$$\Delta\% = \frac{(.853 - .894)}{.894} \times 100 = -4.586\ \%$$

RUN 2

$$Y = \frac{(4.418)(1.019)(30.10)(537)}{(5.000)\left(30.10 + \frac{.191}{13.6}\right)(540)} = \frac{72768.0}{85061.9} = .855$$

$$\Delta\% = \frac{(.855 - .894)}{.894} \times 100 = -4.362\ \%$$

RUN 3

$$Y = \frac{(6.308)(1.019)(30.10)(538)}{(7.000)\left(30.10 + \frac{.191}{13.6}\right)(545)} = \frac{104091.4}{120,189.3} = .866$$

$$\Delta\% = \frac{(.866 - .894)}{.894} \times 100 = -3.132\ \%$$

NOTE : The Y factor % difference must be < ± 5.0 % to be acceptable

INTERPOLATED Y FACTOR

$\frac{.1}{(A)}$ inch H_2O $\Delta H = \frac{.886}{(C)}$ Calculated calibration Y factor from calibrations

$\frac{.2}{(B)}$ inch H_2O $\Delta H = \frac{.895}{(D)}$ Calculated calibration Y factor from calibrations

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

$\frac{.895}{(D)} - \frac{.886}{(C)} = .009 \div \frac{10}{(E)} \quad \frac{.0009}{(F)}$

$\frac{.191}{\text{Avg}\,\Delta H} - \frac{.1}{(A)} = .091 \times 100 = \frac{9.1}{(G)}$

$\left[\frac{.0009}{(F)} \times \frac{9.1}{(G)}\right] + \frac{.886}{(C)} = \frac{.894}{\text{Interpolated Y factor}}$

Volume Metering System Leak Check : 0.000 inch H_2O in one minute

DRY GAS METER CALIBRATION

DATE : 12-5-2009 DRY GAS METER : H BOX : 5

BAROMETRIC PRESSURE 30.10 in. Hg.				Wet Test Meter Correction Factor Y= 1.019			
Orifice Manometer Setting, ΔH, in. H_2O		.1	.2	.3	.5	.75	1.0
Gas Volume Wet Test Meter Vw ft^3	Final	34.867	40.250	44.950	49.670	54.237	58.800
	Initial	30.000	34.867	40.250	44.950	49.670	54.237
	Vw ft^3	4.867	5.383	4.700	4.720	4.567	4.563
Gas Volume Dry Test Meter Vd ft^3	Final	257.500	263.500	268.700	273.900	278.900	283.900
	Initial	252.000	257.500	263.500	268.700	273.900	278.900
	Vw ft^3	5.500	6.000	5.200	5.200	5.000	5.000
Wet Test Meter Temperature tw	Initial	66	72	76	79	79	79
	Middle	69	74	78	79	79	79
	Final	72	76	79	79	79	79
	Average	69 529	74 534	78 538	79 539	79	79
Dry Test Meter Temperature tm	Initial	58	62	64	67	68	69
	Middle	60	63	65	68	69	70
	Final	62	64	67	68	69	71
	Average	60 520	63 523	65 525	68 528	69 529	70 530
$Y = \frac{(W_{mcf})(Vw)(Pb)(tm)}{Vd\left(Pb + \frac{\Delta H}{13.6}\right)(tw)}$		77625.67 / 87597.34 .886	86350.88 / 96487.52 .895	75682.91 / 84269.47 .898	76439.28 / 84467.32 .905	74101.56 / 81268.12 .912	74176.62 / 81317.66 .912

Average Y= .901

METER BOX CALIBRATION

Date : 03/17/09
Calibrated By : JG
Dry Gas Meterbox ID : K2

Barometric Pressure, Pb = 27.41 in. Hg
Vacuum = 0.0 in. Hg

Orifice Manometer Setting, Delta H in. H20		0.10	0.20	0.30	0.50	0.75	1.00
Gas Volume Wet Test Meter							
Vw, cu. ft.		10.000	10.000	10.000	10.000	10.000	10.000
Gas Volume Dry Gas Meter							
M Final		618.957	628.899	638.844	648.802	658.778	668.741
M Initial		609.000	618.957	628.899	638.844	648.802	658.778
Vd, cu. ft.		9.957	9.942	9.945	9.958	9.976	9.963
Wet Test Meter							
tw Deg F		77	75	75	75	76	76
tw Deg A		537	535	535	535	536	536
Dry Gas Meter Outlet, tmo	1)	76	78	79	79	80	80
	2)	77	78	79	80	80	81
	3)	78	79	79	80	80	81
Dry Gas Meter Inlet tmi	1)	78	79	79	80	80	81
	2)	78	79	80	80	80	81
	3)	78	79	80	80	81	81
Mean tm, Deg F		78	79	79	80	80	81
Mean tm, Deg A		538	539	539	540	540	541

Results :

Y =		1.006	1.012	1.013	1.012	1.008	1.010

Averages :

Y =		**1.010**

WET TEST METER CALIBRATION LOG

Wet Test Meter Serial Number AA 455 Date 3-17-2009

Range of Wet Test Meter Flow Rate 0 - 0.25

Volume of Test Flask Vs 37.850

Satisfactory Leak Check? Yes

Ambient Temperature of Equilibrate Liquid in Wet Test Meter and Reservoir 79

TEST #	MANOMETER READING, *a* mm H_2O	FINAL VOLUME (Vf), l	INITIAL VOLUME (Vi), l	TOTAL VOLUME (Vm), *b* l	FLASK VOLUME (Vs), l	PERCENT ERROR, *c* %
1	Ø	3.0	Ø ALL RESET	3.0	3.001	-.033
2	Ø	3.0	Ø	3.0	3.001	-.033
3	Ø	3.0	Ø	3.0	3.002	-.067

a - Must be less than 10 mm H_2O (0.4 ' H_2O)

Calculations:

b - Vm - Vf - Vi

c - % error = $\frac{100\,(V_m - V_s)}{V_s}$ = _____ (± 1 %)

SO_2 ROTAMETER CALIBRATION

Last Cal. : 5-1-2009 By : GW Date : 12-7-2009 By : GW

Manufacturer : SKC-WEST
SKC ACCUFLOW Digital Flow Calibrator: Model 712 SN : 311325

Barometric Pressure : 29.96 " Hg Temperature : 69

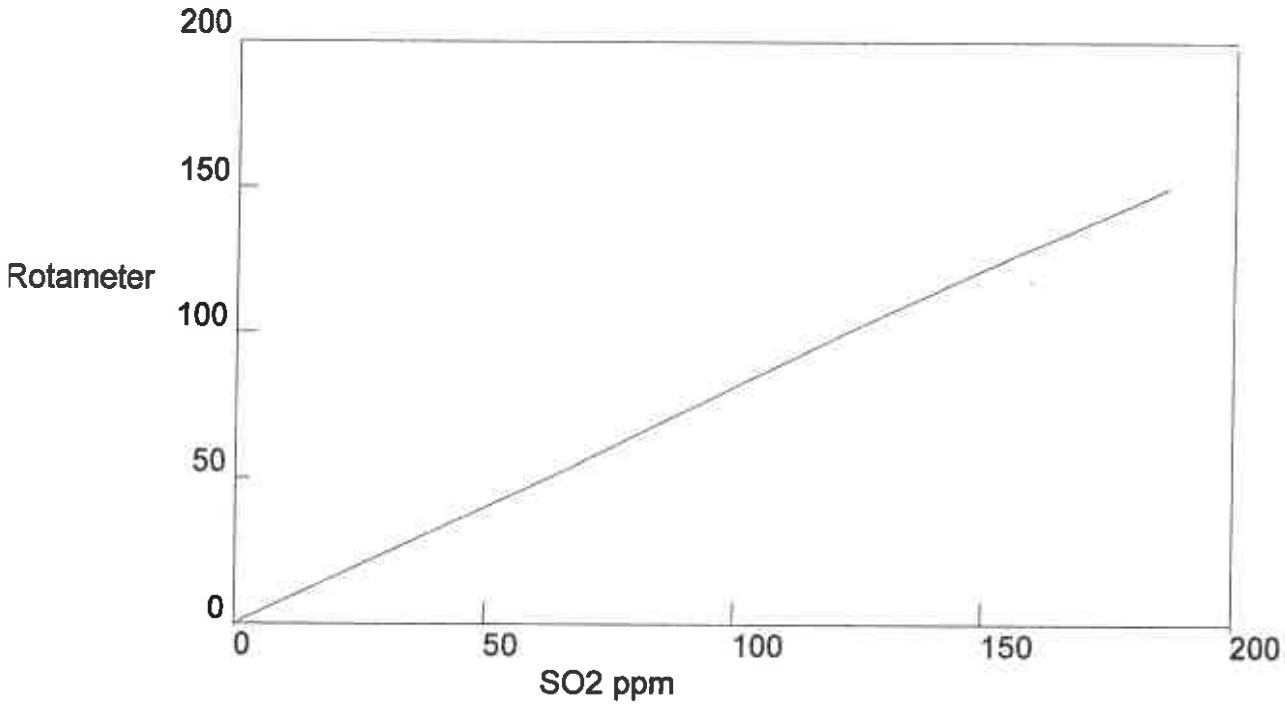
RUN #	50 CC/MINUTE DIGICAL VOLUME	100 CC/MINUTE DIGICAL VOLUME	150 CC/MINUTE DIGICAL VOLUME
1	55.0	122.1	170.1
2	55.3	121.0	172.0
3	54.9	121.5	171.6
4	54.6	120.6	171.4
5	55.2	122.3	171.9
6	55.0	121.6	172.3
7	54.9	121.2	170.9
8	55.6	121.7	176.0
9	53.8	121.0	171.8
10	54.5	122.1	172.0
AVERAGE	54.9 cc/min	121.5 cc/min	171.5 cc/min

SETTING	cc/min
0	0.0
50	54.9
100	121.5
150	171.5

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

100 CC / MINUTE = 86.2

SO2 Rotameter
12/07/09



Regression Output:

Constant	-0.19
Std Err of Y Est	4.7982809422
R Squared	0.9972801387
No. of Observations	4
Degrees of Freedom	2
X Coefficient(s)	1.1622
Std Err of Coef.	0.0429171294

range-analyze-regression

0	0
50	54.9
100	121.5
150	171.5

TRACER GAS TRAIN RESPONSE TIME

DATE : 12-7-2009

Elapsed Time	SO_2 Conc. (v.)	SO_2 Conc. (v.)	SO_2 Conc. (v.)
00 sec	,490	,488	,490
15	,401	,400	,405
30	,191	,200	,195
45	,085	,081	,081
60	,025	,020	,020
75	,011	,008	,009
90	,004	,001	,002
105	,000	,000	,000
120			
135			
150			
165			
180			
Initial Response	10	10	10
95 % Response	60	55	55
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	,488	,485	,487	,002	,001	,002	,490	,490	,491
15	,488	,486	,487	,444	,429	,432	,201	,195	,195
30	,421	,411	,417	,715	,725	,722	,065	,060	,062
45	,160	,170	,170	,795	,801	,802	,009	,008	,009
60	,090	,087	,081	,809	,812	,813	,001	,001	,002
75	,044	,042	,047	,820	,822	,825	Ø	Ø	Ø
90	,022	,026	,023	,828	,829	,830			
105	,018	,016	,016						
120	,007	,009	,009						
135	,004	,005	,005						
150	,001	,002	,002						
165	Ø	,001	,001						
180		Ø	Ø						
Initial Response	20	20	20	5	5	5	5	5	5
95 % Response	85	90	85	40	40	40	40	40	40
Flow Rate	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5

ORSAT ANALYSIS DATA SHEET DATE : 12-7-2009

Gas	1	2	3	AVE	CONC	TANK ID
CO_2	∅	∅	∅	∅	∅	168TAC 3A
O_2	∅	∅	∅	∅	∅	
CO	∅	∅	∅	∅	∅	
CO_2					12.2	487905
O_2					12.6	NEW 11-01-07
CO					4.90	Exp. 10-31-2012
CO_2					21.1	CA 06641
O_2					20.9	
CO					8.63	Exp 4-5-2012
CO_2	6.2	6.2	6.2	6.2	6.22	CC-12730
O_2	6.3	6.3	6.2	6.27	6.25	
CO	2.0	2.0	2.0	2.0	1.98	
CO_2						
O_2						
CO						

CO_2 ANALYZER
MULTIPOINT CALIBRATION REPORT FORM

Date: 1-27-2010

Analyzer: Make: HORIBA Model: PIR 2000 SN: 407069

Calibration by: Chi Wantong

Cal Gas Flow: 1.5 SCFH Measured by: Rotameter

BP: 30.10 Instrument ID: PRINCO

Temp: 52 Instrument ID: TR

Cylinders:

1. # 168TAC 3-A Concentration: 00.00 % CO_2 Cyl. Press.: 400 PSI
   Certified by: AIR LIQUIDE Date: 04-19-04
2. # 487905 Concentration: 12.20 % CO_2 Cyl. Press.: 1460 PSI
   Certified by: AIR LIQUIDE Date: 11-1-07
3. # CA06641 Concentration: 21.1 % CO_2 Cyl. Press.: 1460 PSI
   Certified by: AIR LIQUIDE Date: 1-5-2007
4. # CC-12731 Concentration: 6.22 % CO_2 Cyl. Press.: 1100 PSI
   Certified by: AIR LIQUIDE Date: 03-13-03

Analyzer: **Calibrated Range:** 0-25.0 % **Output:** 0-1.0 V.
Flow: 1.5 SCFH **Measured by:** Rotameter

Calibration Results

Point #	CYL. #	% CO2	EXPECTED METER	EXPECTED DVM	ACTUAL METER	ACTUAL DVM	ADJ. METER	ADJ. DVM
1	1	0.00	00.0	.000	00.0	.000	00.0	.000
2	2	12.20	48.8	.488	47.4	.474	48.8	.488
3	3	21.1	84.4	.844	84.0	.840		
4	4	6.22	24.9	.249	24.9	.249		
5	1	0.00	00.0	.000	00.0	.000		

.5 = 12.536

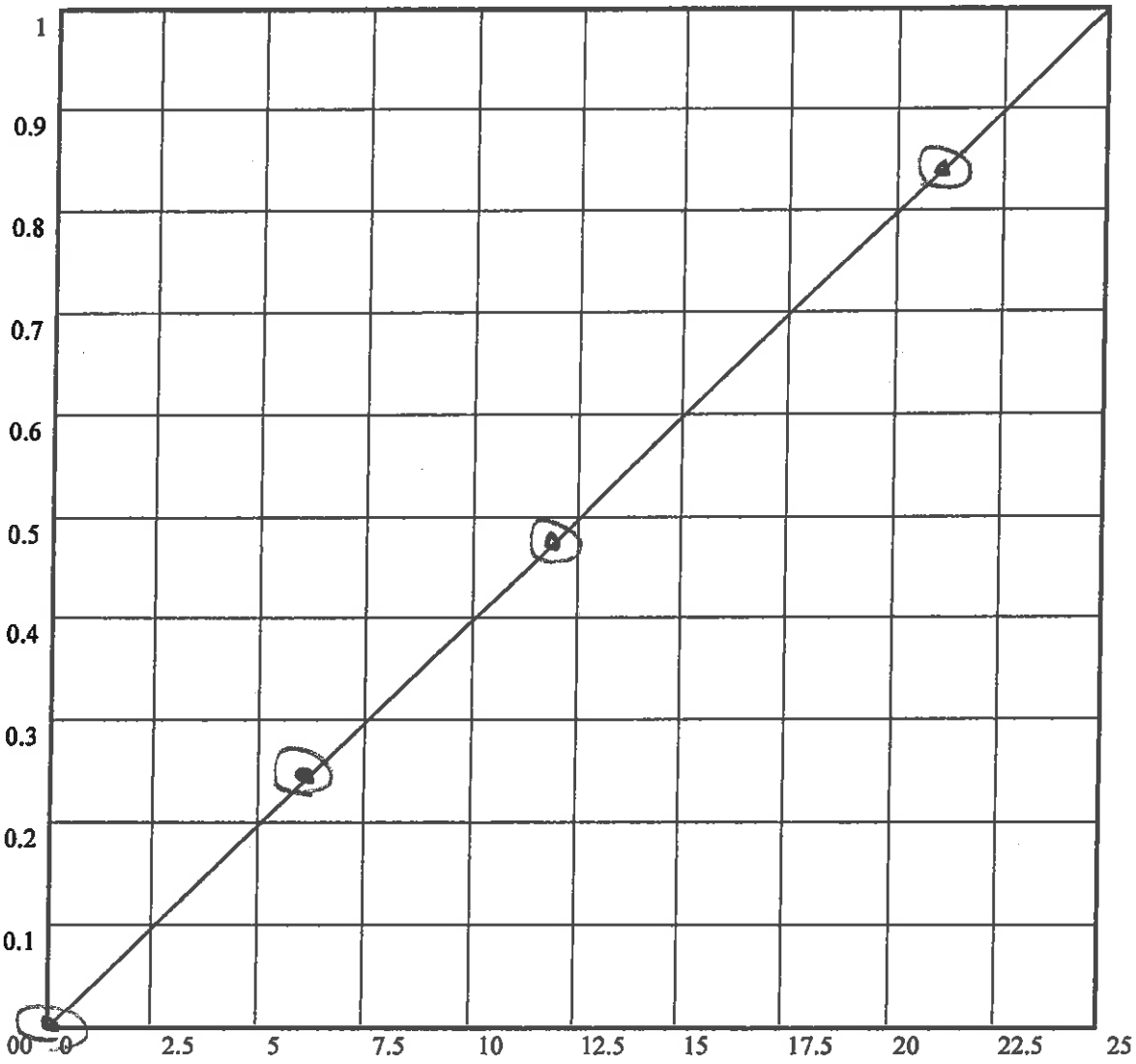
CO_2 Linear Regression Results:

Y = MX +B
Slope (M) = .0009100

Y Intercept (B) = .0398117

Correlation Coefficient (r) = .9999950

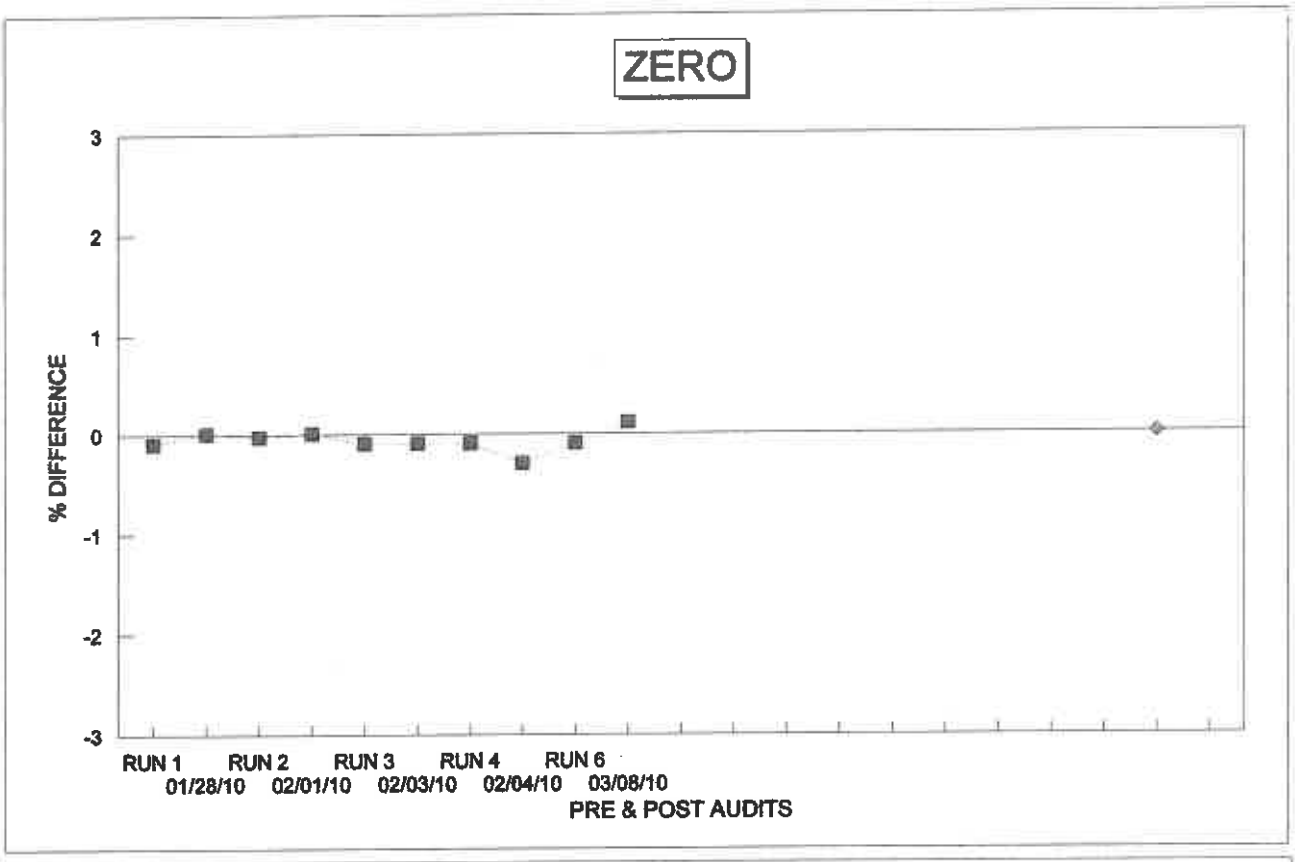
r^2 = .9999900

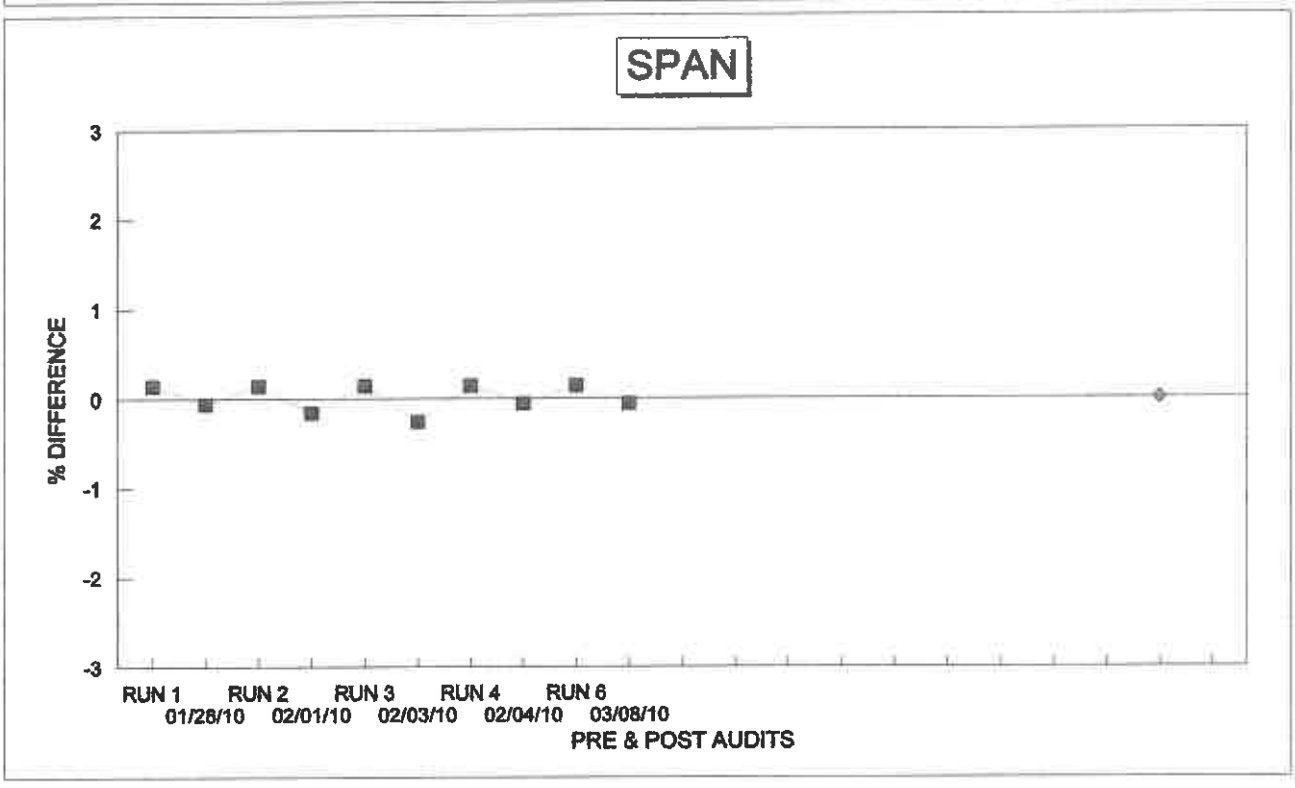


EPA Span Value = ± 2.0% of 25% CO_2 = ± .5%

Cal Volts = Cal Volt Conc - Std Conc = ± Conc Diff = ± Δ %

HIGH VOLTS	.841	= 21.03 - 21.1	= -.07	=	-.280
LOW VOLTS	.249	= 6.23 - 6.22	= .010	=	.040


ZERO
3
2
1
0
-1
-2
-3
% DIFFERENCE
RUN 1 01/28/10
RUN 2 02/01/10
RUN 3 02/03/10
RUN 4 02/04/10
RUN 6 03/08/10
PRE & POST AUDITS


SPAN
3
2
1
0
-1
-2
-3
% DIFFERENCE
RUN 1 01/28/10
RUN 2 02/01/10
RUN 3 02/03/10
RUN 4 02/04/10
RUN 6 03/08/10
PRE & POST AUDITS

O_2 ANALYZER
MULTIPOINT CALIBRATION REPORT FORM

Date: 1-27-2010

Analyzer: Make: TELEDYNE Model: 320A SN: 37400

Calibration by: Op Writing

Cal Gas Flow: 1.5 SCFH Measured by: Rotameter

BP: 30.10 Instrument ID: PRINCO

Temp: 52 Instrument ID: TR

Cylinders:

1. # 168TAC 3-A Concentration: 00.00 % O_2 Cyl. Press.: 400 PSI
   Certified by: AIR LIQUIDE Date: 04-19-04
2. # 487905 Concentration: 12.0 % O_2 Cyl. Press.: 1460 PSI
   Certified by: AIR LIQUIDE Date: 11-1-07
3. # CA0066641 Concentration: 20.9 % O_2 Cyl. Press.: 1460 PSI
   Certified by: AIR LIQUIDE Date: 1-5-2007
4. # CC-12731 Concentration: 6.25 % O_2 Cyl. Press.: 1100 PSI
   Certified by: AIR LIQUIDE Date: 03-13-03

Analyzer: **Calibrated Range:** 0-25.0 % **Output:** 0-1.0 V.
Flow: 1.5 SCFH **Measured by:** Rotameter

Calibration Results

Point #	CYL. #	% O2	EXPECTED METER	EXPECTED DVM	ACTUAL METER	ACTUAL DVM	ADJ. METER	ADJ. DVM
1	1	0.00	00.0	.000	00.1	.000	00.1	.000
2	2	12.60	12.60	.504	12.5	.540	12.6	.504
3	3	20.9	20.9	.836	20.8	.833		
4	4	6.25	6.25	.250	6.3	.251		
5	1	0.00	00.0	.000	00.1	.000		

.5 = 12.522

O_2 Linear Regression Results:

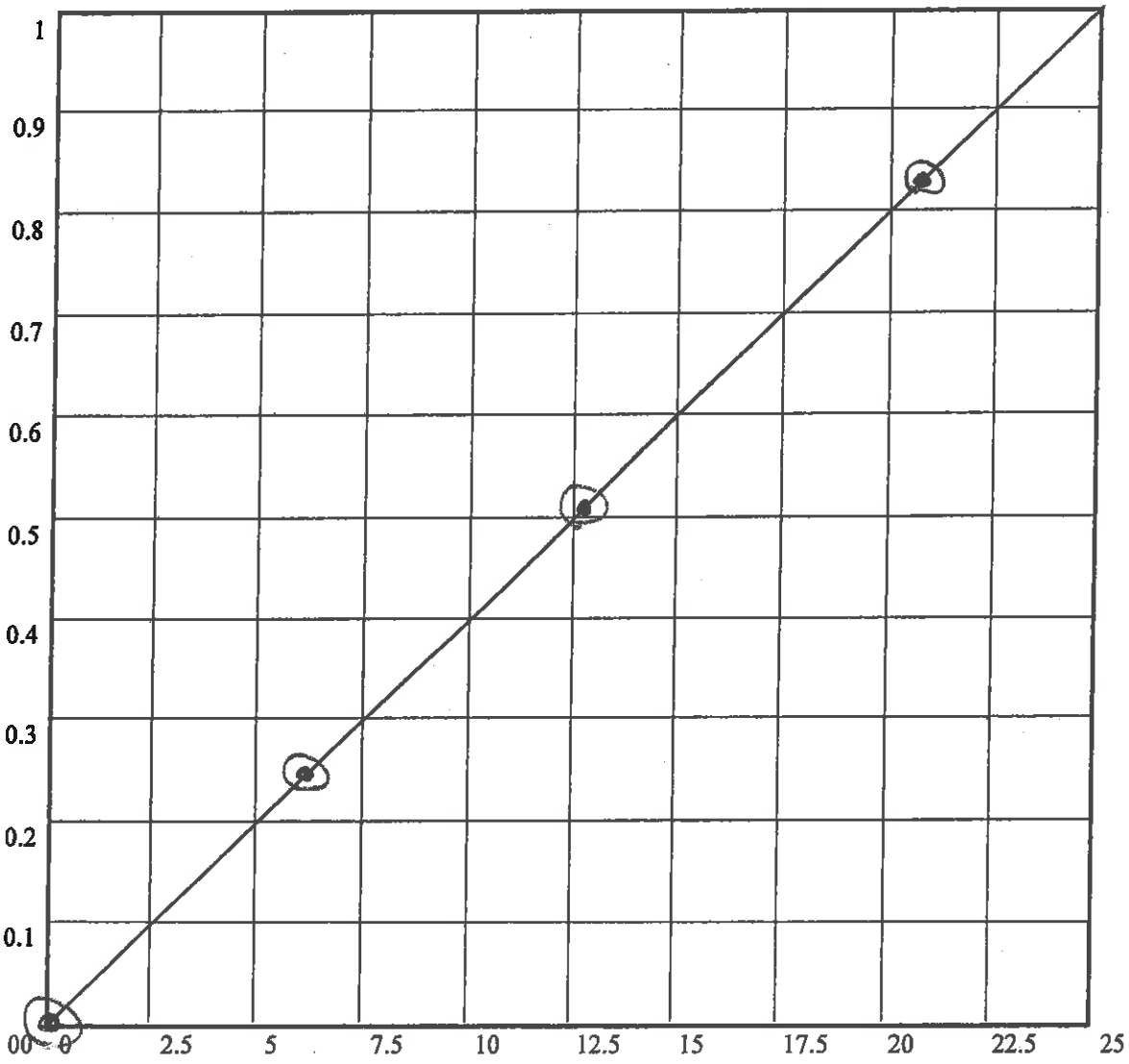
Y = MX +B

Slope (M) = .0010169

Y Intercept (B) = .0398474

Correlation Coefficient (r) = .9999955

r^2 = .9999910

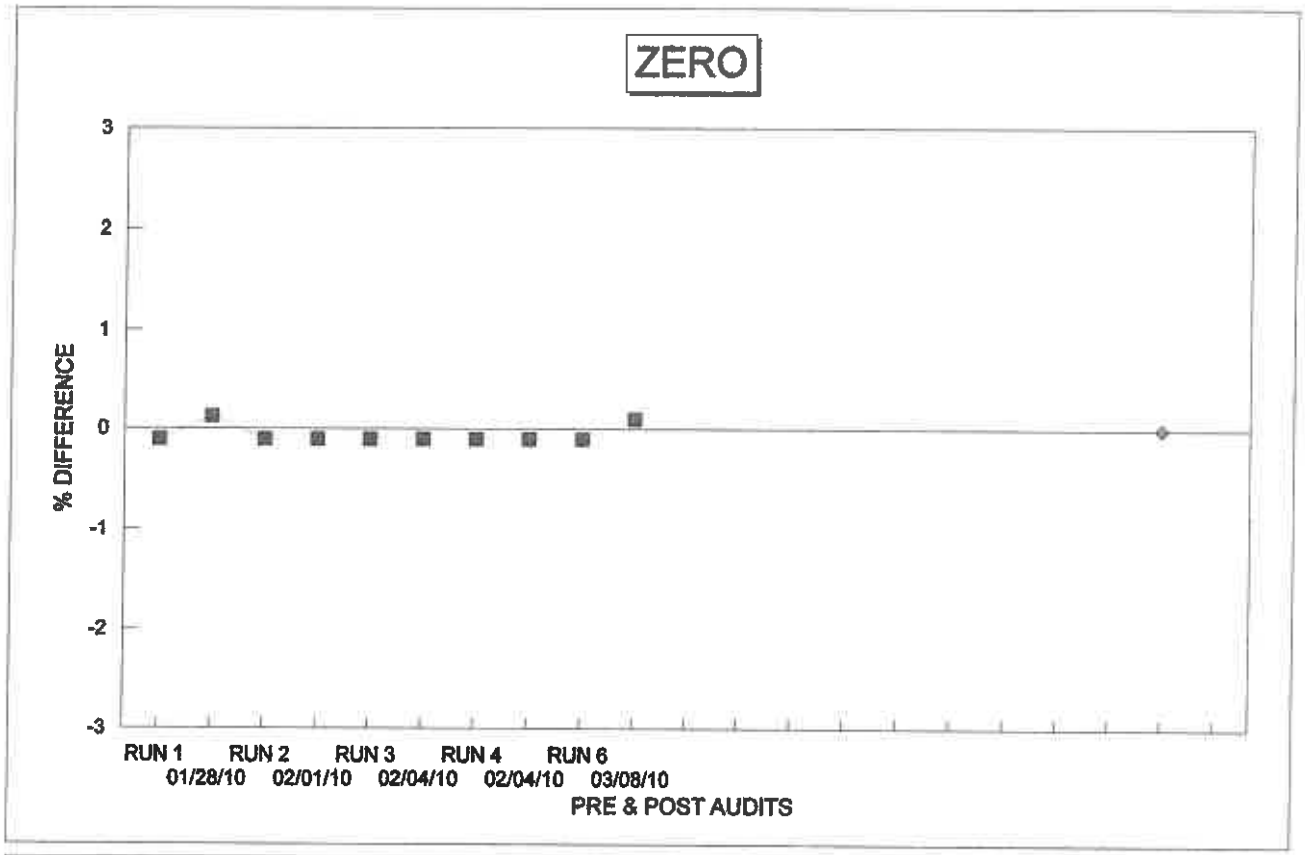


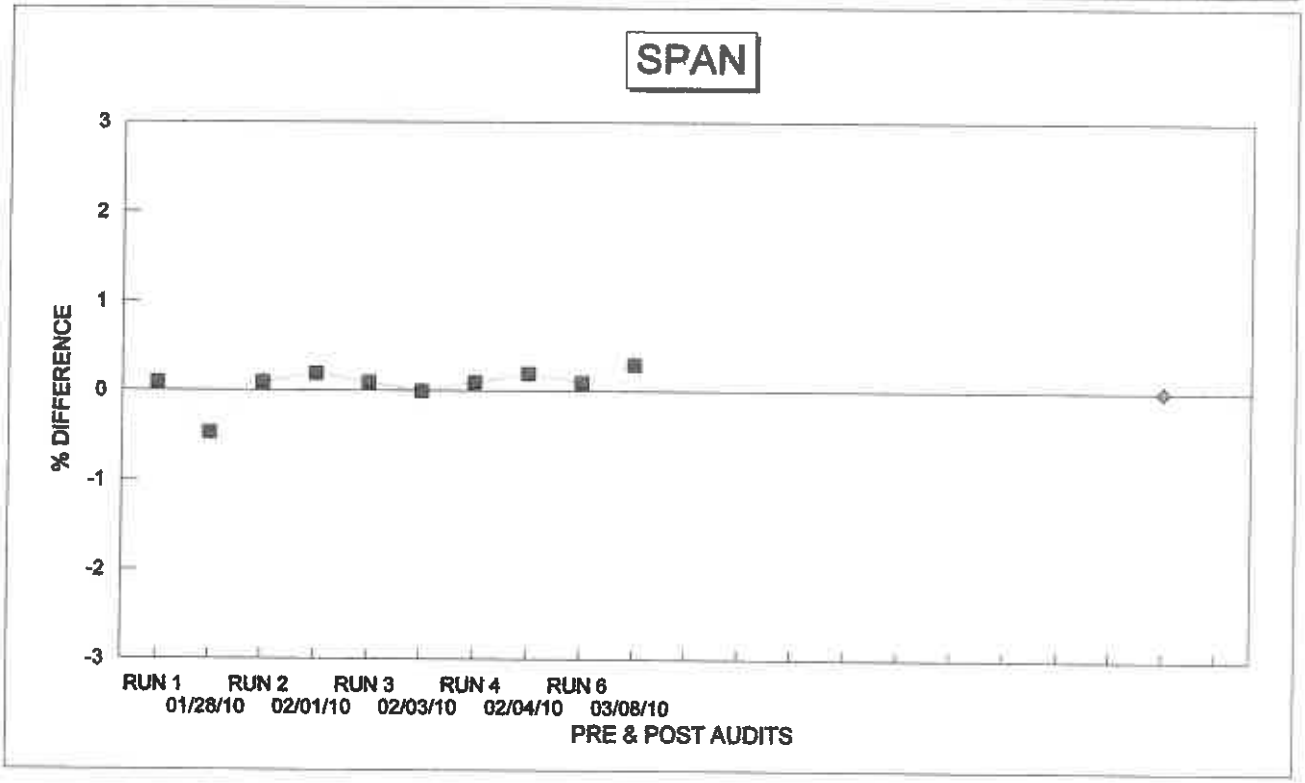
EPA Span Value = ± 2.0% of 25% O_2 = ± .5%

Cal Volts = Cal Volt Conc - Std Conc = ± Conc Diff = ± Δ %

HIGH VOLTS .833 = 20.83 - 20.90 = -.07 = -.280

LOW VOLTS .251 = 6.28 - 6.25 = .030 = .120


ZERO
3
2
1
0
-1
-2
-3
% DIFFERENCE
RUN 1 01/28/10
RUN 2 02/01/10
RUN 3 02/04/10
RUN 4 02/04/10
RUN 6 03/08/10
PRE & POST AUDITS


SPAN
3
2
1
0
-1
-2
-3
% DIFFERENCE
RUN 1 01/28/10
RUN 2 02/01/10
RUN 3 02/03/10
RUN 4 02/04/10
RUN 6 03/08/10
PRE & POST AUDITS

CO ANALYZER
MULTIPOINT CALIBRATION REPORT FORM

Date: 1-27-2010

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

Calibration by: Op Workmanship

Cal Gas Flow: 1.5 SCFH Measured by: Rotameter

BP: 30.10 Instrument ID: PRINCO

Temp: 52 Instrument ID: TR

Cylinders:

1. # 168TAC 3-A Concentration: 00.00 % **CO** Cyl. Press.: 400 PSI
   Certified by: AIR LIQUIDE Date: 04-19-04
2. # 487905 Concentration: 4.90 % **CO** Cyl. Press.: 1460 PSI
   Certified by: AIR LIQUIDE Date: 11-1-09
3. # CA06641 Concentration: 8.63 % **CO** Cyl. Press.: 1460 PSI
   Certified by: AIR LIQUIDE Date: 1-5-2007
4. # CC-12731 Concentration: 1.98 % **CO** Cyl. Press.: 1100 PSI
   Certified by: AIR LIQUIDE Date: 03-13-03

Analyzer: **Calibrated Range:** 0-10.0 % **Output:** 0-1.0 V.
Flow: 1.5 SCFH **Measured by:** Rotameter

Calibration Results

Point #	CYL. #	% CO	EXPECTED METER	EXPECTED DVM	ACTUAL METER	ACTUAL DVM	ADJ. METER	ADJ. DVM
1	1	0.00	00.0	.000	00.0	.000	00.0	.000
2	2	4.90	49.0	.490	48.2	.482	49.0	.490
3	3	8.63	86.3	.863	86.3	.863		
4	4	1.98	19.8	.198	19.4	.194		
5	1	0.00	00.0	.000	00.0	.000		

.5 = 5.00%

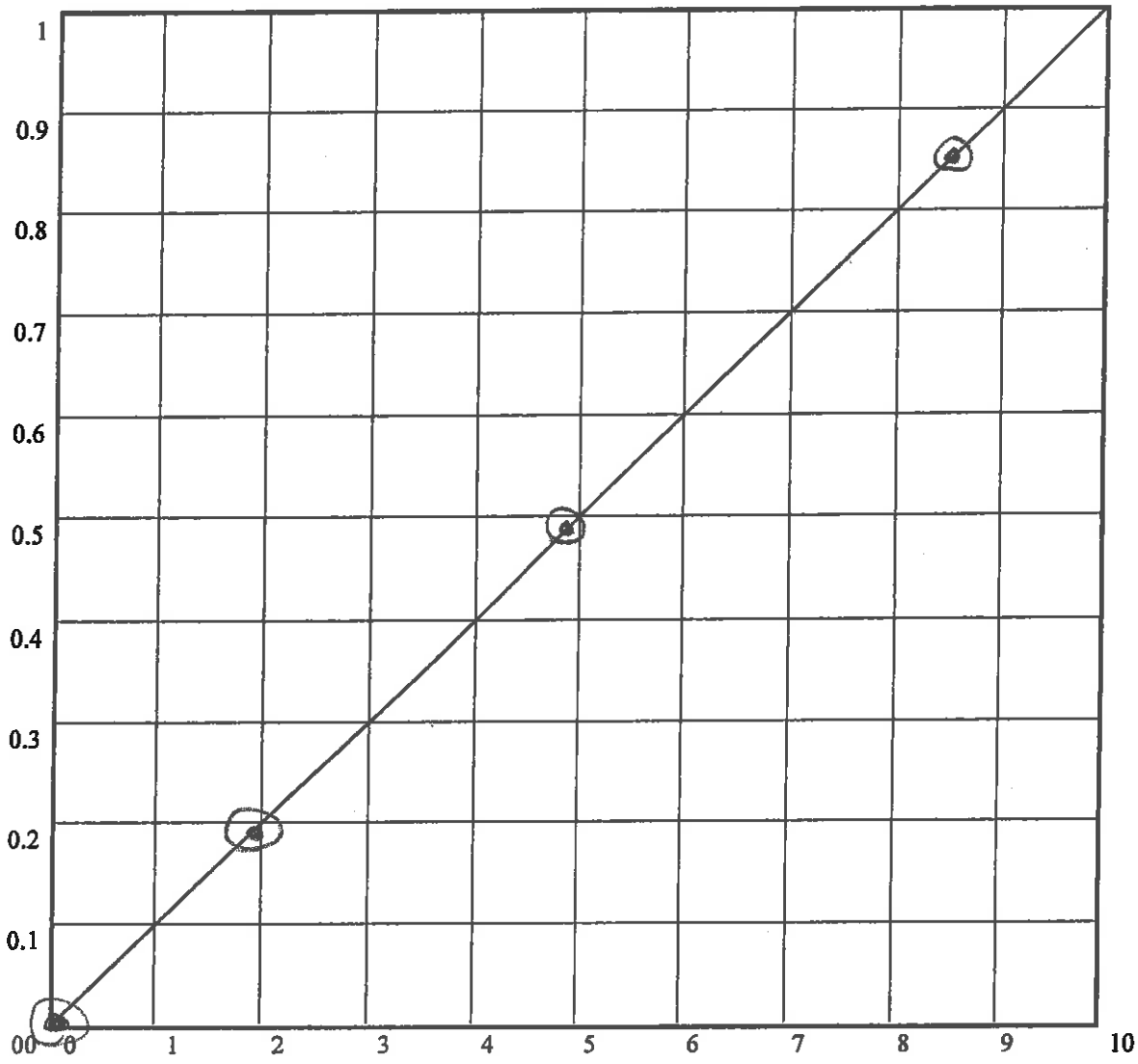
CO Linear Regression Results:

Y = MX +B
Slope (M) = -.0016963

Y Intercept (B) = .1001796

Correlation Coefficient (r) = .9999875

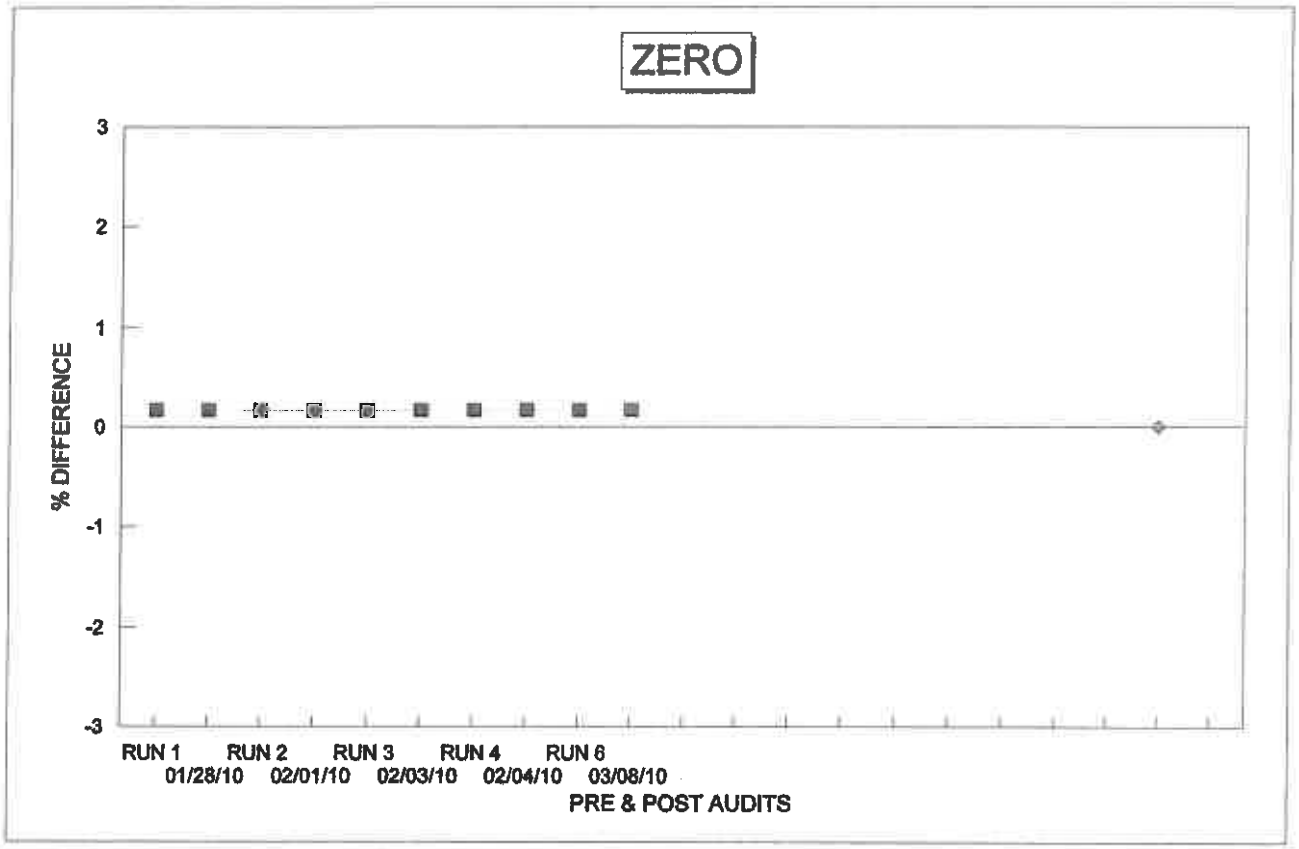
r^2 = .9999749

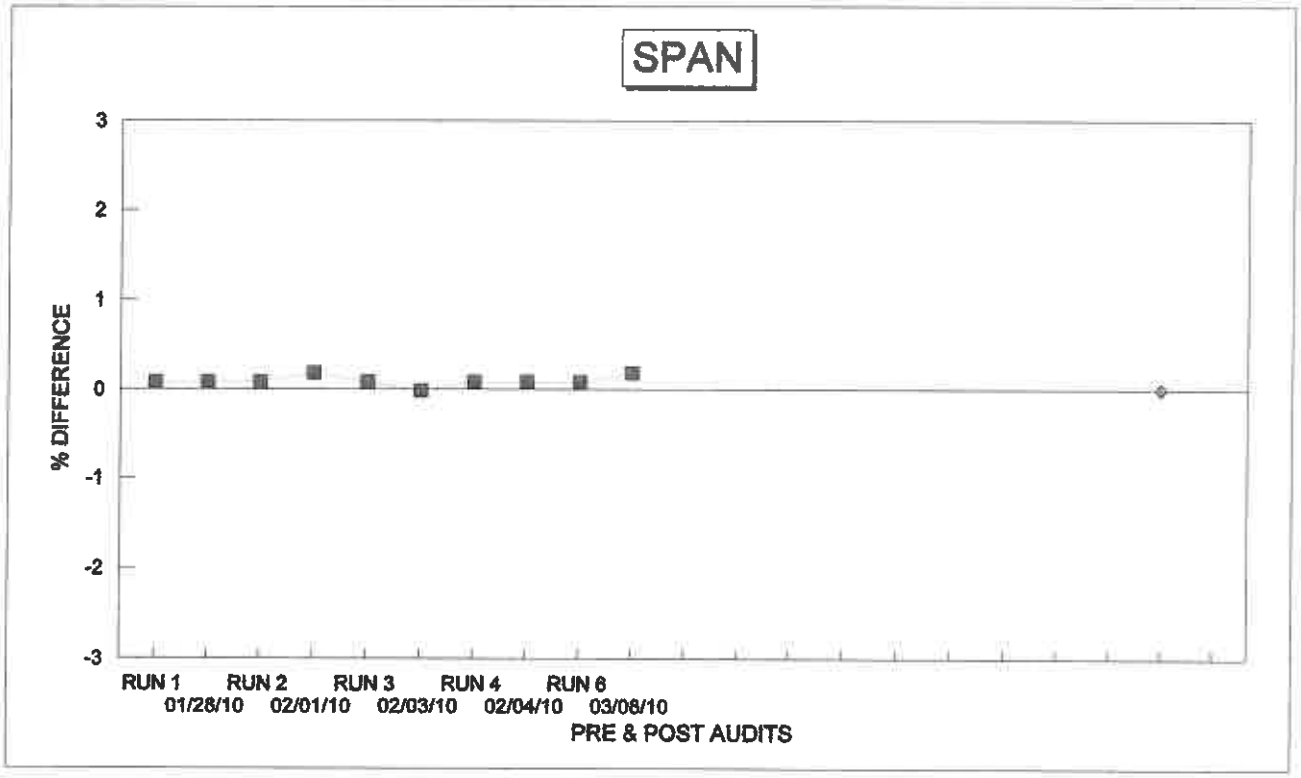


EPA Span Value = ± 2.0% of 10% CO = ± .2%

Cal Volts = Cal Volt Conc - Std Conc = ± Conc Diff = ± Δ %

HIGH VOLTS	.863	= 8.63	- 8.63	= ϕ	=	ϕ
LOW VOLTS	.194	= 1.94	- 1.98	= -.040	=	-.40


ZERO
3
2
1
0
-1
-2
-3
% DIFFERENCE
RUN 1 01/28/10
RUN 2 02/01/10
RUN 3 02/03/10
RUN 4 02/04/10
RUN 6 03/08/10
PRE & POST AUDITS


SPAN
3
2
1
0
-1
-2
-3
% DIFFERENCE
RUN 1 01/28/10
RUN 2 02/01/10
RUN 3 02/03/10
RUN 4 02/04/10
RUN 6 03/08/10
PRE & POST AUDITS

SO_2 ANALYZER
MULTIPOINT CALIBRATION REPORT FORM

Date: 1-27-2010

Analyzer: Make: HORIBA Model: PIR 2000 SN: 403019

Calibration by: Cp Hutchings

Cal Gas Flow: 1.5 SCFH Measured by: Rotameter

BP: 30.10 Instrument ID: PRINCO

Temp: 52 Instrument ID: TR

Cylinders:

1. # 168TAC 3A Concentration: 00.00 % SO_2 Cyl. Press.: 400 PSI
   Certified by: AIR LIQUIDE Date: 04-19-04
2. # CC82089 Concentration: 1250 % SO_2 Cyl. Press.: 1650 PSI
   Certified by: AIR LIQUIDE Date: 1-3-2007
3. # ALM0 44124 Concentration: 1770 % SO_2 Cyl. Press.: 720 PSI
   Certified by: SCOTT SPECIALTY GASES Date: 05-15-97
4. # ALM0 52285 Concentration: 506 % SO_2 Cyl. Press.: 860 PSI
   Certified by: SCOTT SPECIALTY GASES Date: 05-15-97

Analyzer: **Calibrated Range:** 0-2500 PPM **Output:** 0-1.0 V.
Flow: 1.5 SCFH **Measured by:** Rotameter

Calibration Results

Point #	CYL. #	PPM SO2	EXPECTED METER	EXPECTED DVM	ACTUAL METER	ACTUAL DVM	ADJ. METER	ADJ. DVM
1	1	0.00	00.0	.000	00.0	.000	00.0	.000
2	2	1250	50.0	.500	50.0	.500	50.0	.500
3	3	1770	70.8	.708	70.6	.706		
4	4	506	20.2	.202	20.2	.202		
5	1	0.00	00.0	.000	00.0	.000		

.5 = 1252.232

SO_2 Linear Regression Results:

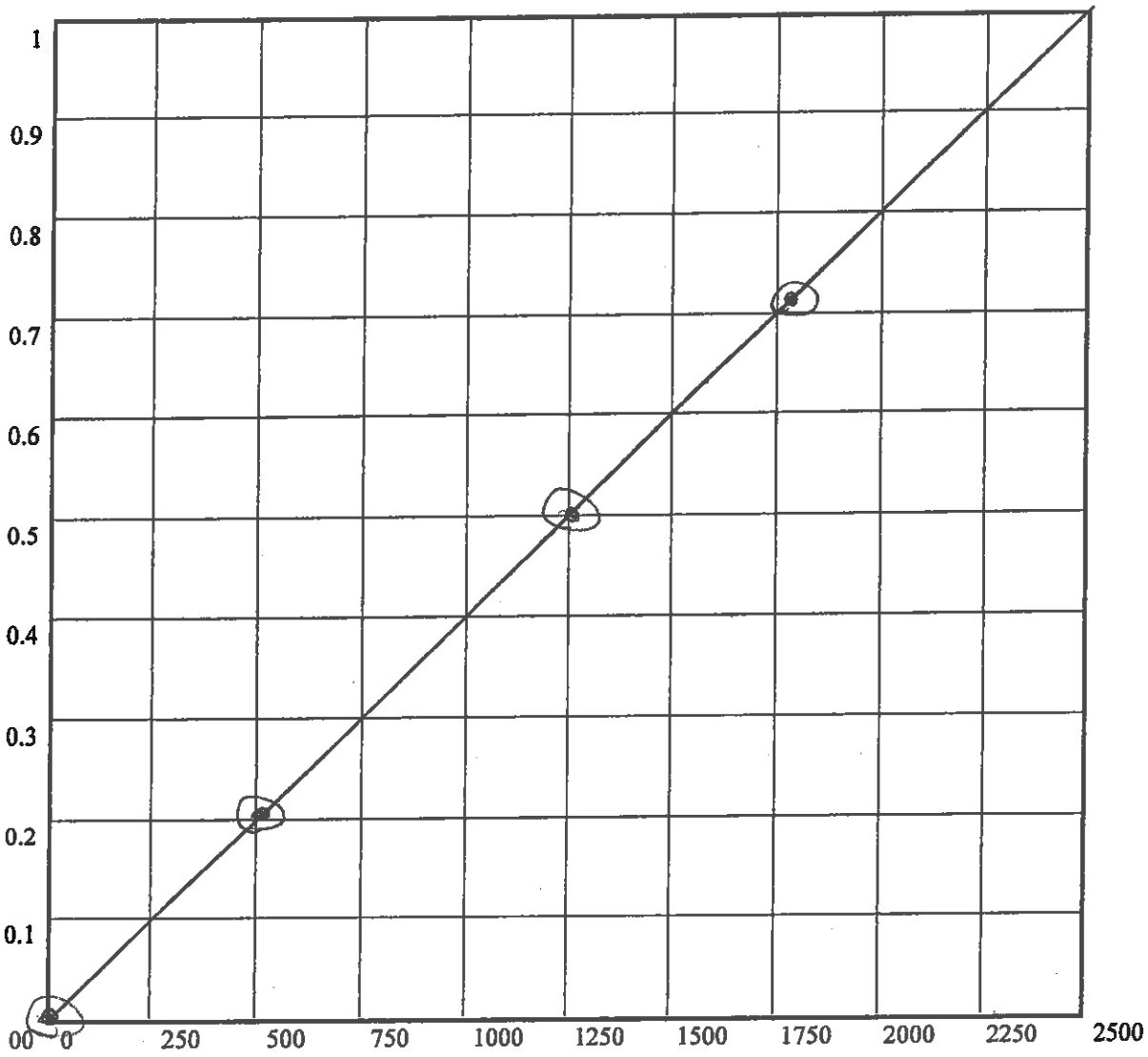
Y = MX +B

Slope (M) = .0001780

Y Intercept (B) = .0003991

Correlation Coefficient (r) = .9999978

r^2 = .9999956

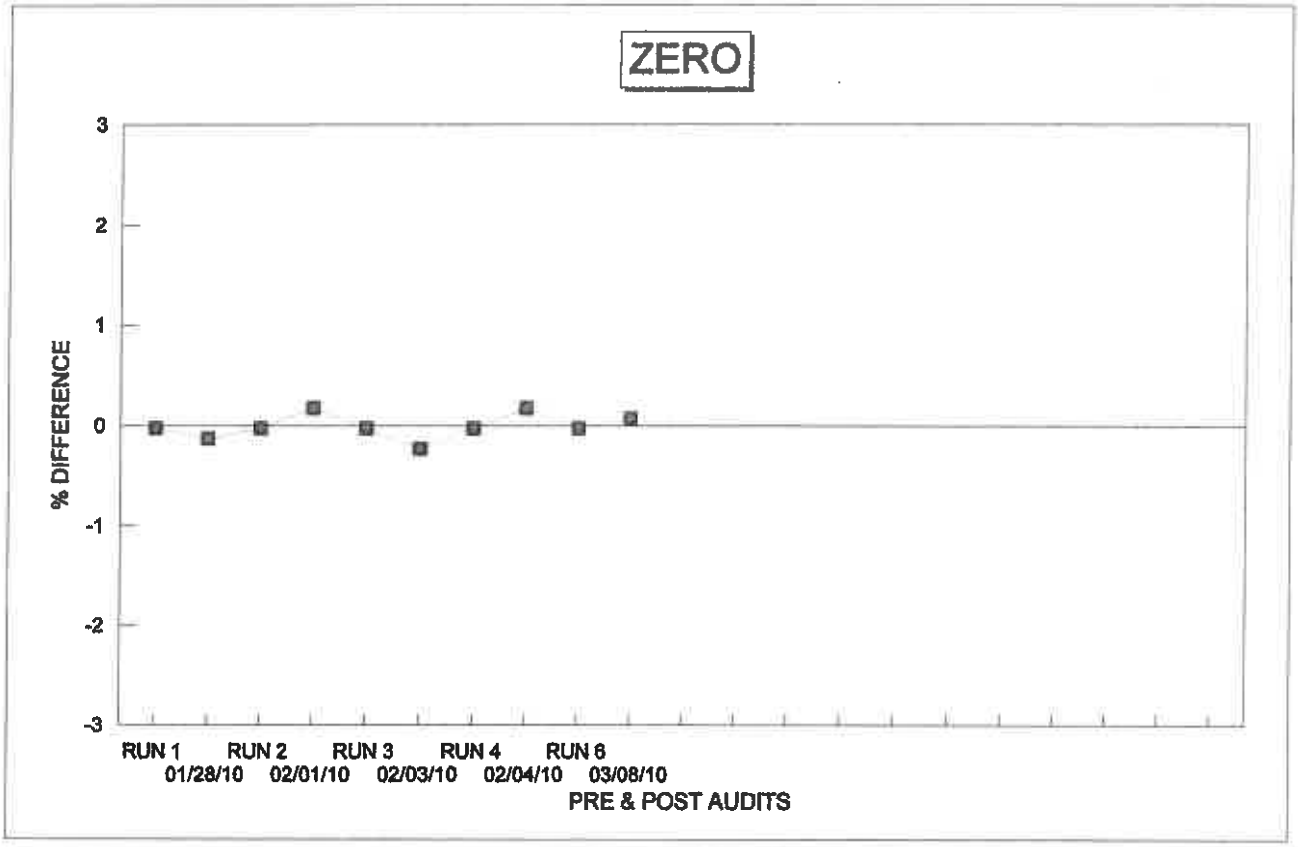


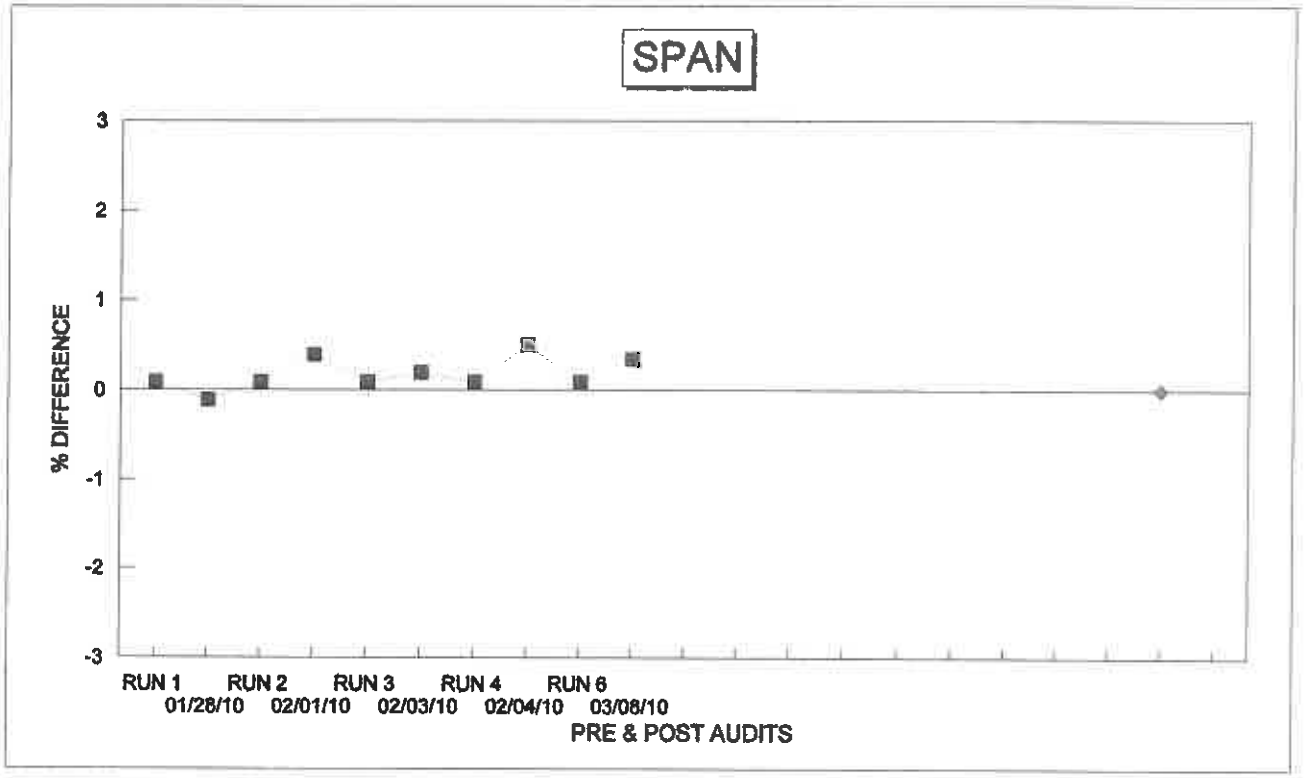
EPA Span Value = ± 2.0% of 2500 PPM SO_2 = ± 50 PPM

Cal Volts = Cal Volt Conc - Std Conc = ± Conc Diff = ± Δ %

HIGH VOLTS .706 = 1765.0 - 1770.0 = -5.00 = -.200

LOW VOLTS .202 = 5050 - 506.0 = -1.00 = -.040


ZERO
3
2
1
0
-1
-2
-3
% DIFFERENCE
RUN 1
01/28/10
RUN 2
02/01/10
RUN 3
02/03/10
RUN 4
02/04/10
RUN 6
03/08/10
PRE & POST AUDITS


SPAN
3
2
1
0
-1
-2
-3
% DIFFERENCE
RUN 1
01/28/10
RUN 2
02/01/10
RUN 3
02/03/10
RUN 4
02/04/10
RUN 6
03/08/10
PRE & POST AUDITS

LOW SPAN

AIR LIQUIDE

GASES FOR RESEARCH AND DEVELOPMENT

CYL # CC-12731 CGA 590

PRES 1665 VOL 130 c.f

TEST # 07203 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%

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

AIR LIQUIDE™

CERTIFICATE OF ANALYSIS

Customer : Pacifice 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

A-L WELDING PRODUCTS

A Division of Pacific Rim Oxygen Services, Inc.
15700 Nelson Road South • Tukwila, Washington 98188
Telephone (425) 228-2218 • Fax (425) 228-2397

Certificate of Analysis

Customer: AL Welding Products
Product: 5% CO, 12.5% CO2, 12.5% O2, balance Nitrogen
Grade: Certified Standard
Cylinder Number: 487905
Product Code: 2505COOXCDNTHC
Lot Number: K3171302

11-01-07

CGA 590
Pressure: 1650 psig
Contents: 175 ft^3

Mixture Analysis

Component	Specification	Concentration	Analytical Method
Oxygen	12.5%	12.6%	MTIGC-TCD
CO2	12.5%	12.2%	Varian
CO	5.0%	4.9%	MTIGC-TCD
Nitrogen	Balance	Balance	MTI GC-TCD

I certify the above referenced cylinder was analyzed and found to contain the listed concentrations.

Thomas M Chesser, Chemist

11-01-07
Date

Scott Specialty Gases

500 WEAVER PARK RD,LONGMONT,CO 80501 Phone: 303-442-4700 Fax: 303-772-7673

CERTIFICATE OF ANALYSIS: Interference-Free™ Multi-Component 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.: 08-34136-001
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: 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 7/24/96 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/5220/AAB9400251	03/20/97	Scott Enhanced FTIR

ANALYZER READINGS

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

SULFUR DIOXIDE *

First Triad Analysis

Date: 04/14/97 Response Unit: PPM

Z1 = 0.3947	R1 = 487.72	T1 = 505.77
R2 = 488.78	Z2 = 1.8201	T2 = 505.89
Z3 = 1.8428	T3 = 505.78	R3 = 488.95
Avg. Concentration:	505.8	PPM

Second Triad Analysis

Date: 04/21/97 Response Unit: PPM

Z1 = 0.3241	R1 = 488.29	T1 = 505.43
R2 = 488.53	Z2 = 1.8099	T2 = 505.75
Z3 = 0.8340	T3 = 505.74	R3 = 488.88
Avg. Concentration:	505.8	PPM

Calibration Curve

Concentration = A + B1 + C1² + D1³ + E1⁴

r = 0.999990	
Constants:	A = 0.000000
B = 1.000000	C = 0.000000
D = 0.000000	E = 0.000000

Special Notes:

ANALYST: Devon VonFeldt
Devon VonFeldt

SO2 concentration analysis
12/06/09

Vm(std)	1.500			
mcf	1.004		dscf=	1.500
Hg	30.00			
DH	0.12			
temp	66	526	ppm =	515
ml BA ++	180			
Normality	0.0101			

Run1	513
Run 2	493
Run3	515
avg.	507

Tank I.D. # ALMO52285

AIR LIQUIDE™

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	1250 PPM	1250 PPM	+/- 2%	4	4503	GL
6154-30AL						

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: 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	CERTIFIED CONCENTRATION	ANALYTICAL ACCURACY**
SULFUR DIOXIDE *	1,770 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 7/24/96 and will not correlate with uncorrected Protocols.

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM-R-1696	7/03/98	ALM057797	3131. PPM	SULFUR DIOXIDE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	LAST DATE CALIBRATED	ANALYTICAL PRINCIPLE
FTIR System/6220/AAB9400251	03/20/97	Scott Enhanced FTIR

ANALYZER READINGS

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

SULFUR DIOXIDE *

First Triad Analysis

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 = 4.8770	T3 = 1768.1	R3 = 3133.7
Avg. Concentration:	1768.	PPM

Second Triad Analysis

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

Calibration Curve

Concentration = A + Bx + Cx2 + Dx3 + Ex4	
r = 0.999980	1696
Constants:	A = 0.00000
B = 1.00000	C = 0.00000
D = 0.00000	E = 0.00000

Special Notes:

ANALYST: Devon VonFeldt
DEVON VONFELDT

SO2 concentration analysis
12/06/09

Vm(std)	1.500			
mcf	1.004		dscf=	1.500
Hg	30.00			
DH	0.12			
temp	66	526	ppm =	1770
ml BA ++	618			
Normality	0.0101			

Run1	1778
Run 2	1755
Run3	1770
avg.	1768

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		ACTUAL ANALYSIS
Assay		99.9%
Color		5 APHA
Description		Clear, Colorless Liquid
Free Halogens		Pass Test
Identification		Pass Test
Fluorescence Background (as Quinine Sulfate)		Not more than 1 ppb
Certified for EPA Test #1625		Pass Test
Pesticide Residue Analysis (as Heptachlor Epoxide)		Not more than 10ng/l
Density (g/ml) at 25°C		1.317
Optical Absorbance	At 254 nm	0.002
	At 240 nm	0.10
	At 233 nm	0.54
Refractive Index at 25°C		1.4209
Residue after Evaporation		0.4 ppm
Titratable Acid		0.00004 Meq/g.
Preservative (Amylene)		64 ppm
Water (H_2O)		0.008%

Fisher Scientific

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
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		ACTUAL ANALYSIS
Assay		99.9%
Color		5 APHA
Description		Clear, Colorless Liquid
Free Halogens		Pass Test
Identification		Pass Test
Fluorescence Background (as Quinine Sulfate)		Not more than 1 ppb
Certified for EPA Test #1625		Pass Test
Pesticide Residue Analysis (as Heptachlor Epoxide)		Not more than 10ng/l
Density (g/ml) at 25°C		1.317
Optical Absorbance	At 254 nm	0.002
	At 240 nm	0.10
	At 233 nm	0.54
Refractive Index at 25°C		1.4209
Residue after Evaporation		0.4 ppm
Titratable Acid		0.00004 Meq/g.
Preservative (Amylene)		64 ppm
Water (H_2O)		0.008%

Fisher Scientific
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

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

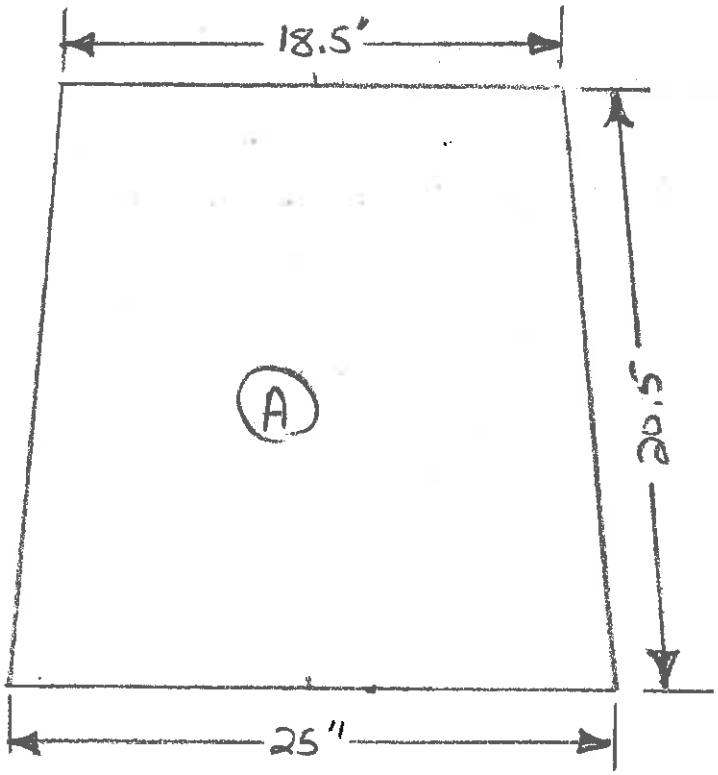
This notification serves to certify that the unit described above has been inspected and tested in accordance with specifications published by Keithley Instruments, Inc.

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

Firebox Volume and Fuel Load Calculations for the Buck Stoves 91NC



Avg Height = 11.75"

$$\text{(A)} = \left(\frac{18.25 + 25}{2}\right) \times 20.375 \times 11.75 = 5177.160 \text{ in}^3$$

$$= 2.996 \text{ ft}^3$$

Fuel Load

Low	Ideal	High
18.9 ←	20.972	→ 23.0

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 (°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):

$$V_{m(std)} = \frac{V_m * 17.65 * mcf * \left(P_{bar} + \frac{\Delta H}{13.6} \right)}{T_m}$$

Volume of Water:

$$V_{w(std)} = (0.04707)(ml\ H_2O)$$

Moisture Content:

$$B_{ws} = \left(\frac{V_w}{V_w + V_{m(std)}} \right) * 100$$

Dry Burn Rate:

$$Br = \left(\frac{Wwt - (Wwt * \%\ H_2O)}{2.2046} \right) * \frac{60}{\theta}$$

Carbon Balance (N_t):

$$Nt = \frac{K_3 Nc}{(YCO_2 + YCO + YHC)}$$

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 H_20 (in. H_20).

K_3 = 1.0 lb/lb (English)
1000 g/kg (metric)

K_4 = 0.02406 dsm^3/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.

Pbar = 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 ±1.0%

   Temperatures are monitored using two type K thermocouples.

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 SO_2 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:	±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:	±0.1% moisture	
Ranges:	6-11%, 11-25%, 25-80%	
Accuracy:	Moisture	Content Accuracy
	6-12%	±0.5%
	12-20%	±1.0%
	20%-saturation point	±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:	±0.1% moisture	
Accuracy:	Moisture	Content Accuracy
	6-12%	±0.5%
	12-20%	±1.0%
	20%-saturation point	±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:	±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 (°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 (°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 (±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 ±1.0%.

8. CO_2 Analyzer

Horiba PIR 2000/SN 407069

The CO_2 analyzer is also a NDIR and is operated in exactly the same manner as the CO analyzer. The range of the CO_2 analyzer is 0-25.0% CO_2.

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 (CO_2, O_2 and CO) analyzer data and the SO_2 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 ± 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 (SO_2) EQUIPMENT

1. SO_2 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 SO_2 injection rotameter with Sweglock fittings. The loop is inserted in the stack at 9.5 ±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 SO_2, 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 ±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 ±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. SO_2 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 SO_2 at a resolution of ±25.0 ppm. The manufacturer's specification for linearity is ±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 SO_2 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 SO_2 analyzer is 1.5 SCFH.
12. Wait until the zero gas has completely flushed the train.
13. Record the zero gas reading. Record the SO_2 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 SO_2 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 SO_2 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 SO_2.
3. Using the rotameter's current calibration, adjust the SO_2 flow rate to the calibrated level.
4. Turn on the pump in the tracer gas train. Adjust the flow rate through the SO_2 analyzer so that it remains at 1.5 SCFH.

5. Monitor the SO_2 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 SO_2 analyzer output in volts and the stack gas SO_2 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) SO_2 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 SO_2 analyzer is 1.5 SCFH.
9. Wait until the zero gas has completely flushed the train.
10. Record the zero gas reading. Record the SO_2 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 SO_2 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 SO_2 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 SO_2 concentrations in the ranges normally encountered during wood stove testing.

4. Sample flue gas with SO_2 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 SO_2 concentrations are as stable as possible.
5. Remove the probe from the stack, noting the exact SO_2 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 SO_2 levels begin to decline.
7. Continue observing the stop watch and DVM. Record the time when the SO_2 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 (SO_2) 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 ± 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.

LOKEE TESTING Laboratory
13235 Prairie Circle East. Bonney Lake, WA 98391
Telephone: 360-897-9685

May 14, 2007

Jerry Glenn
New Buck Corporation
1265 Bakersfield Highway
P.O. Box 69
Spruce Pine, NC 28777

Jerry:

Enclosed please find one copy of the woodheater quality assurance report for the:

Model 261

If you have any further questions concerning this or any other related matter please feel free to call at anytime.

Sincerely,

Chip Wadington
Owner

LOKEE TESTING Laboratory

United States
Environmental Protection Agency
Wood Heater Certification Test Report

Buck Stoves Corp.

Model 261

Volume 1 of 1

13235 PRAIRIE CIRCLE EAST, BONNEY LAKE, WA98391-7250
TELEPHONE: 360-897-9685

United States
Environmental Protection Agency
Wood Heater Certification Test Report

New Buck Corporation
1265 Bakersfield Highway
P.O. Box 69
Spruce Pine, NC 28777

MODEL 261

Volume 1

Report By:

Chip Wadington

CONFIDENTIAL

RELEASED ONLY BY
AUTHORIZED PERSONNEL

May 14, 2007

TABLE OF CONTENTS

	Page(s)	Section(s)
Introduction		
Title Page		i
Table of Contents		ii
Test Report (Data) Page Number Index		iii-iv
Individual Test Run Page Number Index		v
Test Series Information and Discussion		vi
Stove Storage Information		vii
Stack Measurements and Sampling Port Locations		viii
Stove / Catalysts Aging Data		ix
Scheduling Information		varies
Summary and Discussion of Results		
Emission Test Summary	Data Summary	1
Emission Graph		1
Data Summary		2, 3
Individual Test Runs (Raw Data)		
See Introduction, Individual Test Run Page Index for a complete, sequential list of data and data sequence in the individual test runs	<0.80 kg/hr	varies
	0.8 - 1.25 kg/hr	varies
	1.25 - 1.90 kg/hr	varies
	>1.90 kg/hr	varies
	Fan Confirmation (if necessary)	varies
	Insert Confirmation (if necessary)	varies
Calibration Data See Test Report (data) Page Number Index, Item 14, for a complete, sequential listing of the data in this section.	Cal Data	varies
Stove Q C		
Stove Q C Firebox Volume Dimensions Manufacturer's Drawings	Stove Q C	varies
Manual		
Manufacturer's Written Test Instructions (if provided) Manufacturer's Operation Manual	Manual	varies
Appendices:		
A: - Example Calculations	Appendix A	varies
B: - Installation Description and Operating Instructions	Appendix B	varies
Efficiencies A. Data Summary B. Individual Run Data	Efficiencies	varies
Photos		
Photos of wood loads in and out of the test unit.	Photograph Pages	varies

PAGE NUMBER INDEX

	SECTION	LOCATION
1. Summary of Burn Rate and Emission Rate Results	Data Summary	Page 1
2. Summary Table of Other Data	Data Summary	Pages 2 & 3
3. Wood Heater Description	Stove QC	Page 1
4. Manufacturer's Testing Wood Heater Instructions	Operators Manual	Page 1
5. Test Chamber Installation Description	Introduction	Page 9
6. Wood Heater/Catalyst Aging Documentation	Introduction	Page 10
7. Wood Heater Dimensions and Usable Firebox Volume	Stove QC	
8. Pretest Burn Procedures	Individual Test Runs	Data Sheet # 9
9. Pretest Facility Measurements	Individual Test Runs	Data Sheets # 8, 16
10. Test Fuel Measurements		
A. Load Weight.	Individual Test Runs	Data Sheet # 8
B. Load Moisture	Individual Test Runs	Data Sheet # 10
C. Wood Density	Individual Test Runs	Data Sheet # 11
11. Test Fuel Crib Description		
A. Photographs	Photograph Pages	
B. Wood Type	Individual Test Runs	Data Sheet # 9
12. Test Run Heater Operation and Air Supply Settings	Individual Test Runs	Data Sheets # 9 & 13
13. Detailed Description of Sampling Systems and Locations		
A. Method 5H	Appendix B	
B. Proportional Gas Flow Rate System	Appendix B	
C. Stack Gas Flow Rate Measurement System	Appendix B	
14. Calibrations		
A. Platform Scale		
1. Initial	Cal Data	Page 1
2. Semi-Annual	Cal Data	Pages 2-4
3. Pre and Post Test	Individual Test Runs	Data Sheet # 16
B. Analytical Balance		
1. Initial	Cal Data	Pages 5-8
2. Semi Annual	Cal Data	Pages 9 & 10
3. Pre and Post Weighing Check	Individual Test Runs	Data Sheet # 3
C. Temperature		
1. Thermocouples	Cal Data	Page 11
2. Thermocouple Readout		
a. Semi Annual	Cal Data	Page 12
b. Daily Check	Individual Test Runs	Data Sheet # 16
3. Dry Gas Meter	Cal Data	Page 13
4. Tracer Gas Meter	Cal Data	Page 13
D. Anemometer		
1. Initial	Cal Data	Page 14
2. Semi Annual	Cal Data	Page 14
E. Barometer	Cal Data	Page 14
F. Draft Gauge	Cal Data	Page 14
G. Humidity Gauge Calibration (Sling Psychrometer)	Cal Data	Page 13
H. Dry Gas Meter		
1. Semi Annual	Cal Data	Page 15

2. Post Certification Test	Cal Data	Pages 16 & 17
3. Transfer Standard Calibration	Cal Data	Pages 18-23
4. Wet Test Meter Calibration	Cal Data	Page 24
I. Tracer Gas Rotameter	Cal Data	Pages 25-26
J. Combustion Gas (CO_2, O_2, CO) Train Response Check	Cal Data	Page 27
K. Tracer Gas (SO_2) Train Response Check	Cal Data	Page 27
L. CO Analyzer		
1. Calibration	Cal Data	Pages 28 & 29
2. Zero/Span Control Chart	Cal Data	Page 30
3. Pre and Post Test Zero/Span	Individual Test Runs	Data Sheet # 15-3
M. CO_2 Analyzer		
1. Calibration	Cal Data	Pages 31 & 32
2. Zero/Span Control Chart	Cal Data	Page 33
3. Pre and Post Test Zero/Span	Individual Test Runs	Data Sheet # 15-1
N. O_2 Analyzer (Optional)		
1. Calibration	Cal Data	Pages 34 & 35
2. Zero/Span Control Chart	Cal Data	Page 36
3. Pre and Post Test Zero/Span	Individual Test Runs	Data Sheet # 15-2
O. SO_2 Analyzer		
1. Calibration	Cal Data	Pages 37 & 38
2. Zero/Span Control Chart	Cal Data	Page 39
3. Pre and Post Test Zero/Span	Individual Test Runs	Data Sheet # 15-4
P. Calibration Gas Certificates of Analysis		
1. Pre and Post Test Zero/Span Audits	Individual Test Runs	Data Sheets #15-1 - 15-4
2. Method 3 Verification of Analysis (CO_2, O_2, CO, N_2)	Cal Data	Varies
3. Method 6 Verification of Analysis (SO_2, N_2)	Cal Data	Varies
15. Quality Checks		
A. Leak Checks		
1. Particulate Sampling Train	Individual Test Runs	Data Sheet #2
2. SO_2 Injection System	Individual Test Runs	Data Sheet #16
3. Combustion Gas (CO_2, O_2, CO) (CEM) Train	Individual Test Runs	Data Sheet #16
4. Tracer Gas (SO_2) Train	Individual Test Runs	Data Sheet #16
B. Proportional Checks	Individual Test Runs	Table 5-Computer Printout
16. Sample Calculations		
A. Weighted Average Emission Rate	Data Summary	Weighted Average Calc Sheet
B. Dry Burn Rate	Individual Test Runs	Data Sheet # 8
C. [Vm] - [Vm (std)]	Individual Test Runs	Data Sheet # 7 (Particulate Calc Sheet)
D. Total Gas Flow Rate (Qsd)	Individual Test Runs	Table 4-Computer Printout
E. Proportionality Rate (PR)	Individual Test Runs	Table 5-Computer Printout
F. Particulate Emission Rate	Individual Test Runs	Table 4-Computer Printout
17. Raw Test Data	Individual Test Runs	Data Sheets # 1-16
18. Analytical Data		
A. Filter and Beaker Tares	Individual Test Runs	Data Sheets # 4-1, 4-2
B. Solvent Blanks	Individual Test Runs	Data Sheet # 5
C. Particulate Catches		
1. Gross	Individual Test Runs	Data Sheet # 3
2. Blanks	Individual Test Runs	Data Sheets # 5 & 6
3. Net	Individual Test Runs	Data Sheet # 6
4. Gr/dscf	Individual Test Runs	Data Sheet # 7
D. Constant Weight Weighing	Individual Test Runs	Data Sheet # 4-3

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
Table 4	Calculations
Table 5	Proportional Rate Variation

B. Raw Data Sheets

		No. of Pages
Data Sheet # 1	Computer Input Data	1
Data Sheet # 2	Meter box Data Sheets	variable
Data Sheet # 3	Particulate Catch/Moisture Data Sheet	1
Data Sheet #4-1	Filter Tare Weights	variable
4-2	Beaker Tare Weights	variable
4-3	Constant Weights	variable
4-4	Scale QA Checks	variable
Data Sheet # 5	Blank Processing Data Sheet	1
Data Sheet # 6	Net Particulate Catch Calc Sheet	1
Data Sheet # 7	Particulate Calc Sheet	1
Data Sheet # 8	Miscellaneous Test Data	1
Data Sheet # 9	Stove Operating Data	1
Data Sheet # 10	Fuel Moisture	1
Data Sheet # 11	Wood Density	1
Data Sheet # 12	Burn Rate And Flue Gas Data	variable
Data Sheet # 13	Pre Burn Data	variable
Data Sheet # 14	Temperature Data	variable
Data Sheet # 15-1	CO_2 Pre/Post test Zero/Span Audits	1
# 15-2	O_2 Pre/Post test Zero/Span Audits	1
# 15-3	CO Pre/Post test Zero/Span Audits	1
# 15-4	SO_2 Pre/Post test Zero/Span Audits	1
Data Sheet # 16	Quality Checks	1

TEST SERIES INFORMATION

Unit name and model number: Model 261

Type of unit: Wood Heater

Manufacturer: New Buck Corporation
Address: 1265 Bakersfield Highway
P.O. Box 69
Spruce Pine, NC 28777

Contact: Jerry Glenn
Phone Number: 888-622-7868
Fax Number: 828-765-0462

Observers: None

Date Received: 10/23/2006 **Aged:**1/10-11/2007 **Tested:** 2/9-16/2007

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

Test Location: 13235 Prairie Circle East
Sumner, WA 98390-7250
Test Site Elevation: 500 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 or waivers allowing testing to proceed without the 30 day notification.

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.

>>WARNING<< >>WARNING<<
THIS IS A
SEALED E.P.A. TEST STOVE
DO NOT OPEN OR TAMPER WITH THE SEALS
AND PACKAGING ON THIS STOVE
TO DO SO WILL VOID THE CERTIFICATION OF THIS STOVE
>>WARNING<< >>WARNING<<

NEW BUCK CORPORATION
MODEL 261

AGING DATA SHEET

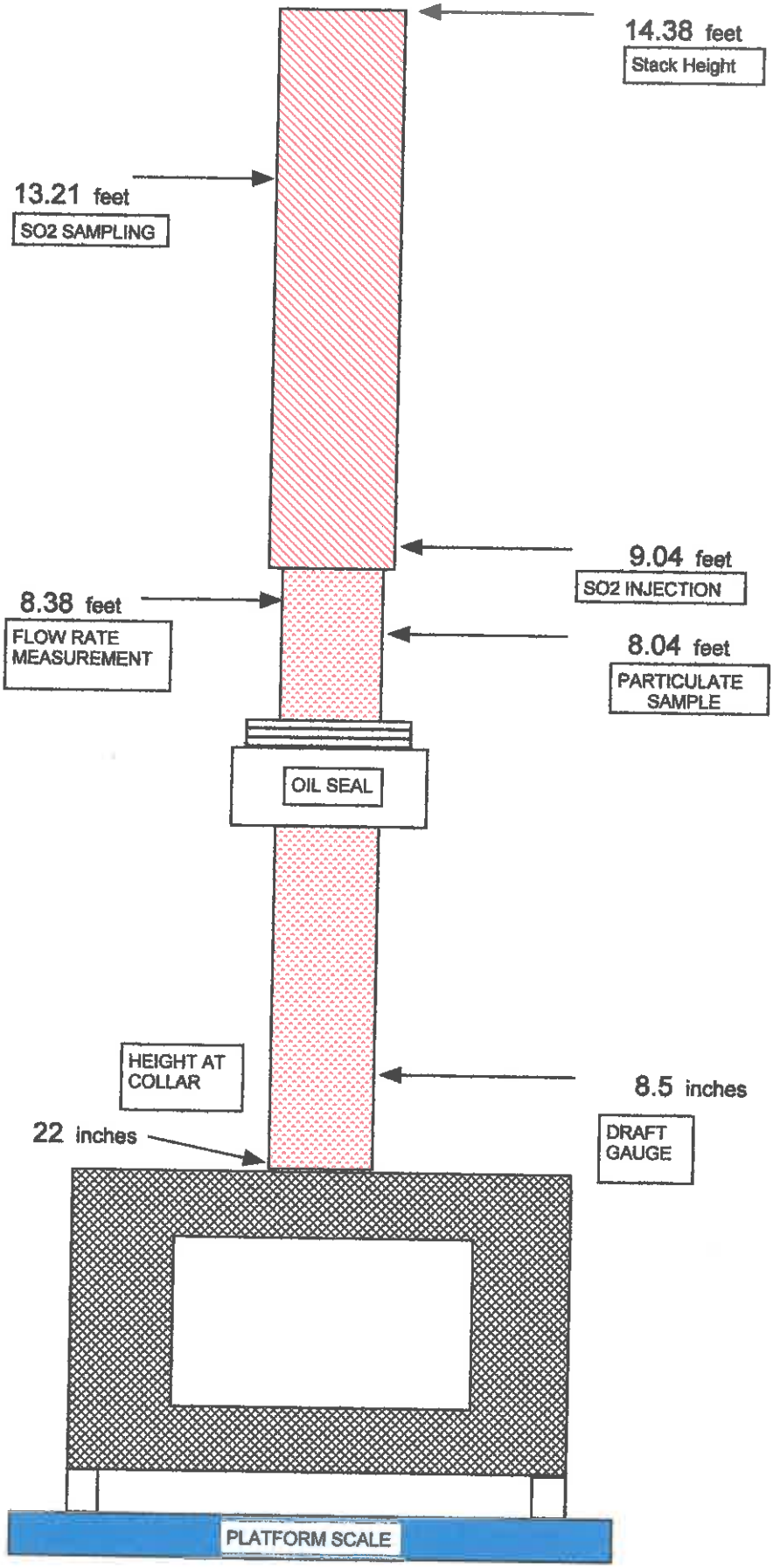
UNIT : Buck DATE: 1-10-07

Hr #	DATE	TIME	TEMP Top 1	TEMP Right 2
1	1-10-07	1100	435	444
2	"	1200	440	540
3	"	1300	381	514
4	"	1400	213	433
5	"	1500	276	372
6	"	1600	364	411
7	1-11-07	1100	378	434
8	"	1200	631	554
9	"	1300	348	439
10	"	1400	266	294
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:

Model: Buck Model 261 **Date:** 02/09/07



LOKEE TESTING Laboratory
13235 Prairie Circle East, Bonney Lake, WA 98391
Telephone: 360-897-9685

February 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:

New Buck Corporation:
Model 261

If you have any questions please feel free to call.

Sincerely,

Chip Wadington
Owner

LOKEE TESTING Laboratory
13235 Prairie Circle East, Bonney Lake, WA 98391
Telephone: 360-897-9685

February 6, 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 February 6, 2007 at 13:05 am 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:

New Buck Corporation :
Model 261

If you have any questions please feel free to call.

Sincerely,

Chip Wadington
Owner

LOKEE TESTING Laboratory
13235 PRAIRIE CIRCLE EAST. BONNEY LAKE, WA 98391
TELEPHONE: 360-897-9685

May 14, 2007

Irvin Keefer
Office of Compliance, Manufacturing,
Energy, and Transportation Division (2223-A)
USEPA
401 M Street, S.W.
Washington, D.C. 20460

Mr. Keefer

Here is a document for your records stating that all the test runs were not run on consecutive workdays during the testing of the New Buck- Model 261. This is due to not having the personnel to run consecutive daily tests. The day after run 3 was used to catch up and prepare for run 4.

If you have any questions please feel free to call.

Thankyou

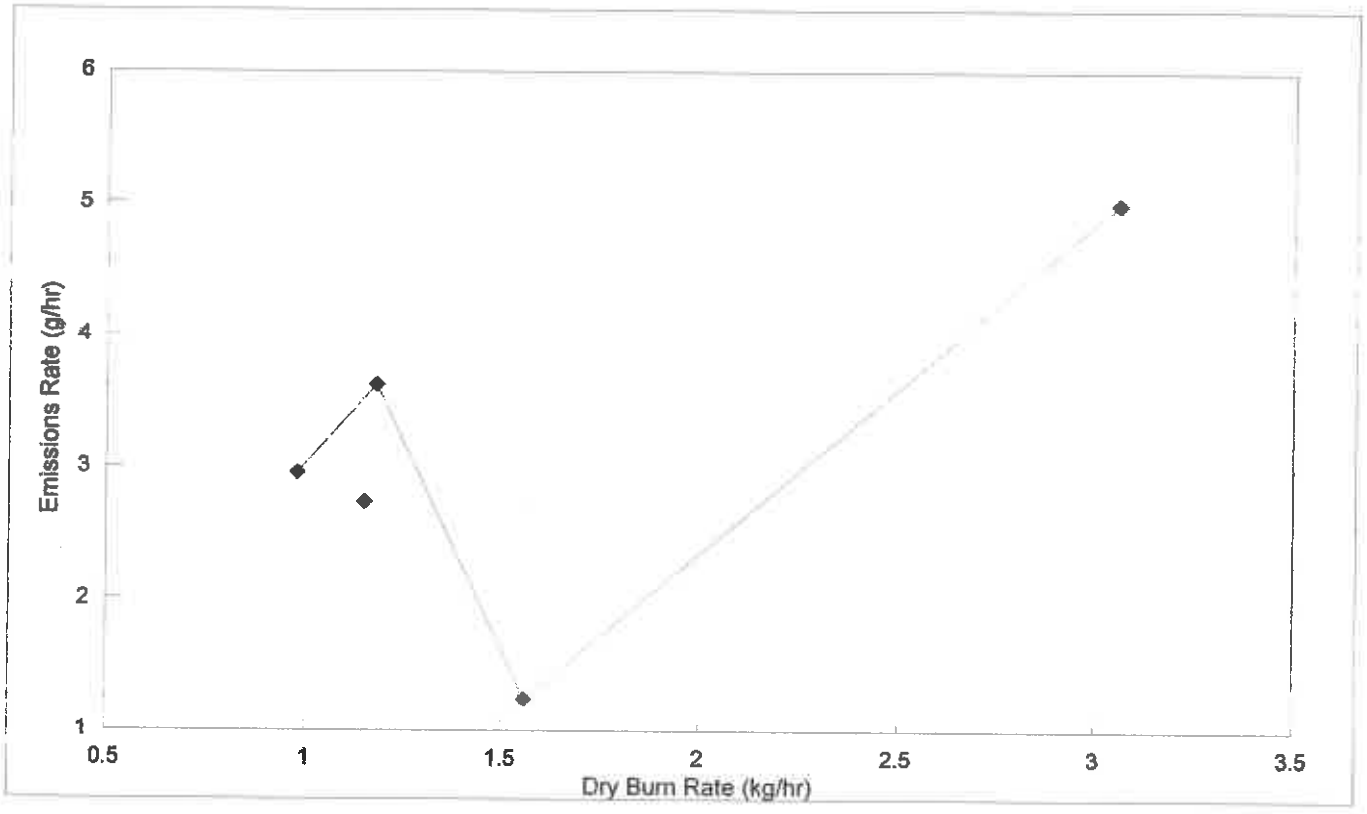
Chip Wadington

Wood Heater Emission Test Summary

Laboratory/Wood Heater Information

Stove Manufacturer:	New Buck
Model Identification:	Model 261
Stove Type> 1=cat, 2=noncat, 3=pellet:	2
Laboratory Name:	LoKee Testing
Laboratory Contact:	CHIP WADINGTON
Telephone no.:	360-897-9685
Test Dates:	2/9-16/2007
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) 2.92
1	0.98	2.96	11817	
2	1.18	3.62	14229	
3	1.56	1.24	18811	
5	3.06	5.00	36898	
4	1.15	2.73	13867	



Unit:New Buck Model 261

DATA SUMMARY

	RUN #	1	2	3	5	4(fan)			
Particulate Emissions:									
Concentration:	grains/dscf:	.117	.1159	.0329	.0724	.0879			
Emissions Rate	grams/hr:	2.96	3.62	1.24	5.00	2.73			
Emissions Factor	grams/kg:	3.01	3.06	.79	1.64	2.38			
Front Half Catch	% of total	44	46.2	48.1	55.4	64.6			
Total Mass Captured	total catch:	.8863	.7134	.1772	.1822	.5955			
Heat Output (EPA Default):	BTU/hr	11853.2	14240.7	18810.8	36874.0	13866.9			
Fuel Burn Rates:									
Average kg/hr (dry)	Kg/hr	.98	1.18	1.56	3.06	1.15			
Fuel Moisture Content:									
Kindling (wet basis)	%	14.457	13.043	13.42	13.793	12.816			
Pretest Fuel (wet basis)	%	17.729	16.597	16.458	16.632	1+6.295			
Test Fuel (wet basis)	%	16.500	16.819	16.541	16.888	16.54			
Air to Fuel Ratio		-	-	-	-	-			
Average Stack Gas									
Avg CO_2	%	6.50	6.63	7.8	8.7	6.45			
Avg O_2	%	-	-	-	-	-			
Avg CO	%	1.21	.88	.56	.31	.85			
Avg Moisture	%	5.68	6.00	6.85	9.19	4.6			
Avg Stack Gas Emissions:									
CO	g/Kg	161.44	120.68	69.4	35.82	118.36			
	g/hr	158.69	142.53	108.12	109.54	135.99			

Unit: New Buck Model 261

	RUN #	1	2	3	5	4(fan)			
Avg Stack Gas Flow Rate									
EPA CMB	dscfm	6.54	8.03	9.67	17.78	8.00			
Tracer Gas	dscfm	6.341	7.446	10.210	12.954	7.737			
Draft (static)	in H_2O	-.022	-.032	-.038	-.04	-.033			
Proportionality Average	%	100	100	100	100	100	100	100	100
Average Temperatures									
Stack Gas	°F	193	216	280	444	227			
Firebox	°F	-	-	-	-	-			
Secondary	°F	-	-	-	-	-			
Catalytic Combustor	°F	-	-	-	-	-			
Top	°F	211	239	300	409	347			
Left Side	°F	325	344	410	517	373			
Back	°F	192	202	237	268	332			
Right Side	°F	312	341	405	524	358			
Bottom	°F	185	198	223	252	241			
Temperature Change	°F	-86.5	-81.8	-98.3	-96.6	-97.1			
Test Chamber Enviroment									
Average Barometer	in. Hg	30.01	30.00	30.16	30.34	30.18			
Average Temperature	°F	74	76	76	73	71			
Ambient Moisture	% H_2O	1.4	1.4	1.4	1.2	1.5			
Relative Humidity	%RH	37	39	33	40	49			
Air Velocity	m/sec	0	0	0	0	0	0	0	0
Fuel Weight and Burn Time									
Density (dry basis)	gm/cm^3	-	-	-	-	-			
Coal Bed Weight	lbs	4.3	4.1	4	4.2	4.1			
Pre Test Fuel (inc kindling)	lbs	62.9	61.4	56.3	47.6	63.2			
Test Fuel	lbs	17.3	16.7	16.8	16.9	16.7			
Burn Time	min	400	320	245	125	330			

1.00 TABLE 1 ---- RAW DATA

CLIENT : New Buck TEST No. : 1

MODEL: 261 DATE: 09-Feb-07

TIME (MIN.)	METER READING (C F)	DELTA H (IN. H2O)	METER TEMP. (DEG. F)	PERCENT CO (%)	PERCENT CO2 (%)	SO2 COCENTR. PPM
0	664.000	0.150	88	1.46	4.30	525
5	665.500	0.330	88	0.34	5.80	350
10	667.826	0.120	88	0.60	2.80	575
15	669.243	0.110	88	0.74	2.60	600
20	670.601	0.110	88	0.66	4.40	600
25	671.960	0.110	88	0.70	4.00	600
30	673.318	0.120	88	0.94	3.60	575
35	674.735	0.160	88	0.56	7.80	500
40	676.365	0.160	88	0.84	7.20	500
45	677.994	0.160	88	1.24	12.80	500
50	679.624	0.200	88	0.55	8.90	450
55	681.434	0.180	89	0.60	9.00	475
60	683.155	0.180	90	0.56	8.10	475
65	684.883	0.150	90	1.13	8.40	525
70	686.446	0.150	90	1.67	13.20	525
75	688.009	0.180	90	0.71	12.10	475
80	689.737	0.160	90	1.33	12.40	500
85	691.378	0.150	90	1.49	10.90	525
90	692.942	0.180	90	0.74	10.10	475
95	694.669	0.180	89	0.68	9.90	475
100	696.391	0.180	89	0.61	9.70	475
105	698.112	0.200	89	0.59	10.30	450
110	699.929	0.200	89	0.46	11.80	450
115	701.746	0.200	89	0.33	11.80	450
120	703.563	0.230	88	0.29	11.10	425
125	705.479	0.200	88	0.30	10.30	450
130	707.289	0.180	88	0.50	9.60	475
135	709.004	0.180	88	0.50	9.20	475
140	710.719	0.180	88	0.46	9.30	475
145	712.434	0.180	87	0.40	8.90	475
150	714.143	0.160	87	0.62	8.20	500
155	715.767	0.150	87	0.61	7.70	525
160	717.313	0.140	87	0.91	6.60	550
165	718.789	0.150	87	0.84	6.40	525
170	720.336	0.150	87	0.90	6.40	525
175	721.882	0.160	87	0.94	6.40	500

180	723.505	0.150	87	0.98	6.40	525
185	725.053	0.150	88	1.06	6.30	525
190	726.606	0.150	88	1.08	6.30	525
195	728.159	0.150	88	1.12	6.20	525
200	729.712	0.150	88	1.19	6.20	525
205	731.265	0.150	88	1.19	6.00	525
210	732.818	0.150	88	1.17	6.00	525
215	734.371	0.150	88	1.07	5.90	525
220	735.924	0.150	88	1.21	5.80	525
225	737.477	0.150	88	1.33	5.80	525
230	739.030	0.150	88	1.50	5.80	525
235	740.583	0.130	88	1.61	5.70	550
240	742.065	0.130	88	1.81	5.50	550
245	743.548	0.120	88	1.80	5.40	575
250	744.966	0.120	88	1.97	5.40	575
255	746.384	0.120	88	1.79	5.20	575
260	747.802	0.120	88	1.86	5.20	575
265	749.221	0.120	88	1.84	5.20	575
270	750.639	0.120	88	1.92	5.30	575
275	752.057	0.120	88	1.88	5.30	575
280	753.475	0.120	88	1.95	5.20	575
285	754.893	0.120	88	2.00	4.90	575
290	756.311	0.110	88	1.86	5.00	600
295	757.671	0.110	88	1.88	5.00	600
300	759.030	0.110	88	1.83	5.00	600
305	760.389	0.110	88	1.87	4.90	600
310	761.748	0.110	88	1.85	5.00	600
315	763.107	0.110	88	1.78	4.90	600
320	764.466	0.110	88	1.79	4.80	600
325	765.826	0.110	88	1.57	4.70	600
330	767.185	0.110	88	1.53	4.60	600
335	768.544	0.110	88	1.53	4.60	600
340	769.903	0.100	88	1.68	4.60	625
345	771.208	0.100	88	1.62	4.50	625
350	772.513	0.100	88	1.72	4.30	625
355	773.818	0.100	88	1.72	4.10	625
360	775.122	0.100	88	1.57	4.10	625
365	776.428	0.100	88	1.95	3.90	625
370	777.733	0.100	88	0.20	3.90	625
375	779.038	0.100	88	1.92	3.90	625
380	780.343	0.100	88	1.87	3.80	650
385	781.598	0.100	88	1.66	3.60	650
390	782.853	0.100	88	1.56	3.50	650
395	784.108	0.100	88	1.42	3.40	650
400	785.363	0.100	88	1.36	3.40	650

TABLE 2---RAW DATA

CLIENT : New Buck TEST No. 1

MODEL: 261 DATE: 09-Feb-07

METER CAL. FACTOR (Y) -------	0.997		Wt. WOOD BURNED(LB) -------	17.3	Lbs
BAROMETRIC PRESS.(Pb) -------	30.01	in Hg	WET,FUEL MOISTURE % -------	16.5	%
LEAK RATE POST (Lp) -------	0.007	cfm	Wt. PART. COLLECTED -------	0.8836	g
WATER VOL. (V1c) -------	149.6	Ml	METER VOLUME Vm -------	121.363	mcf
TEST TIME (MIN) -------	400	min	HC MOLE FRACTION -------	0.0132	

TABLE 3 ---FIELD DATA AVERAGES

CLIENT : New Buck TEST No. 1

MODEL: 261 DATE: 09-Feb-07

AVG DELTA H	-------	0.14	in H2O	AVG PRCNT CO	-------	1.21	%
AVG METER TEMP. Tm	-------	88	deg F	AVG PRCNT CO2	-------	6.50	%
AVG PPM SO2	-------	546	PPM	AVG BAL CO2/CO	-------	5.38	%

TABLE 4 —— CALCULATIONS

CLIENT : New Buck TEST No. 1

MODEL: 261 DATE: 09-Feb-07

STD SAMPLE VOL. Vm(std) d) ------	116.96	dscf	STACK GAS FLOW Qsd -------	392.198	dscf/Hr
				6.54	& dscf/min
VOL. WATER VAPOR Vw(s td) -----	7.042	scf	PARTICULATE CONCTRT. C s ------	0.0076	g/dscf
PRCNT MSTR Bws ———	5.68	%	PARTC.EMISS. RATE E -------	2.96	g/Hr
BURN RATE BR ———	0.98	Kg/Hr	MOLES OF GAS PER Lb WOOD Nt ——	0.47	Lb-mole/Lb
CO EMISSION RATE ———	158.69	g/Hr	PART.EMISS. RATE ———	3.01	g/Kgdry fuel
	161.44	& g/Kgdry fuel			

TABLE 5 —— PROPORTIONAL RATE VARIATION

CLIENT : New Buck TEST No. : 1

MODEL: 261 DATE: 09-Feb-07

TIME INTEVAL Ti	PPM * Vm	PROPRTN. RATE VAR. PR	PROPRTN RATE VAR. AVERAGE
5	759.2	97	100
10	785.2	100	
15	785.4	100	
20	785.4	100	
25	786.0	100	
30	785.4	100	
35	785.4	100	
40	785.7	100	
45	785.2	100	
50	785.7	100	
55	784.6	100	
60	786.0	100	
65	788.4	100	
70	788.2	100	
75	788.2	100	
80	788.4	100	
85	788.1	100	
90	788.7	100	
95	788.7	100	
100	787.1	100	
105	786.7	100	
110	786.9	100	
115	786.9	100	
120	787.6	100	
125	785.2	100	
130	785.3	100	
135	785.4	100	
140	785.4	100	
145	786.1	100	
150	784.1	100	
155	784.2	100	
160	783.9	100	
165	784.0	100	
170	784.4	100	
175	783.9	100	
180	783.7	100	

185	784.2	100
190	786.0	100
195	786.0	100
200	786.0	100
205	786.0	100
210	786.0	100
215	786.0	100
220	786.0	100
225	786.0	100
230	786.0	100
235	786.0	100
240	785.7	100
245	786.3	100
250	786.0	100
255	786.0	100
260	786.0	100
265	786.5	100
270	786.0	100
275	786.0	100
280	786.0	100
285	786.0	100
290	786.0	100
295	786.6	100
300	786.0	100
305	786.0	100
310	786.0	100
315	786.0	100
320	786.0	100
325	786.6	100
330	786.0	100
335	786.0	100
340	786.0	100
345	786.2	100
350	786.2	100
355	786.2	100
360	785.6	100
365	786.8	100
370	786.2	100
375	786.2	100
380	786.2	100
385	786.3	100
390	786.3	100
395	786.3	100
400	786.3	100

2.4%
.98

COMPUTER INPUT DATA SHEET #1

Client: Buck Stoves

Address: P.O. Box 69

Spruce Pine, NC 28777

Phone: 888-622-7868 Fax: 828-765-0462

Run No.: 1 Date of Test: 2-9-2007 Burn Rate: .983

Model No.: 261 ☒ min ☐ min-1.25 ☐ fan

Stove Type: ☐ Cat ☒ Non Cat ☐ Pellet ☐ 1.25-1.9 ☐ max ☐ insert

Dry Gas Meter Y Factor: .997 (0.000) (Data Sheet #2) Post Leak Rate: .007 cfm (.000) (Data Sheet #2) Time: 400 min. (000) (Data Sheet #2)

Dry Gas Meter Volume: 121.363 cf (00.000) (Data Sheet #2)

Stack Flow: 6.341 dscfm (00.000) (Data Sheet #2) Δ H: .142 in. H_2O (.000) (Data Sheet #2)

Maximum Vac.: 2.0 (0.0) (Data Sheet #2) Barometric Pressure: 30.01 in. Hg (00.00) (Data Sheet #2)

H_2O Captured: 149.6 g (00.0) (Data Sheet #3)

Front Half Catch % Of Total: 44.0 % (00.0) (Data Sheet #6) Total Particulate Catch: .8863 g (0.0000) (Data Sheet #6)

Flue Gas Moisture: 5.6802 % (00.000) (Data Sheet #7)

Particulate Emission: .1170 gr/dscf (0.0000) (Data Sheet #7)

Relative Humidity: 37 % RH (00.0) (Data Sheet #8) Ambient Moisture: 1.4 % H_2O (0.00) (Data Sheet #8)

Preburn Fuel Wt.: 62.9 lbs. (00.0) (Data Sheet #8) Coal Bed Wt.: 4.3 lbs. (00.0) (Data sheet #8) Test Fuel Wt.: 17.3 lbs. (00.0) (Data sheet #8)

Heat Output (EPA Default): 11853.2 BTU/hr (00,000.0) (Data Sheet #8)

Kindling Fuel % Moisture (wet): 14.457 % (00.000) (Data Sheet #10) Pretest Fuel % Moisture (wet): 17.729 % (00.000) (Data Sheet #10)

Test Fuel % Moisture (dry): 19.760 % (00.000) (Data Sheet #10 [wood stove] or #11 [pellet stove]) Test Fuel % Moisture (wet): 16.500 %

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

Stack Static Pressure: -.022 in. H_2O (+/- .000) (Data Sheet #12)

Average Ambient Temperature: 74 °F (00) (Data Sheet #14) Stove Temperature Change: -86.5 °F (+/- 000.0) (Data Sheet #14)

Test start = 1450
End = 2130

meter Temp = 548

METER BOX DATA SHEET PAGE # 2

Page: 1 of 4

UNIT: Buck 261 RUN: 1 DATE: 2-9-2007

Meter Box: 5H Y Factor: .947

Leak checks: .15 " Hg @ .010 cfm _____ " Hg @ _____ cfm

.15 " Hg @ .007 cfm _____ " Hg @ _____ cfm

Inject SO^2 @ 100 cc/min. Nozzle: Probe @ 3/8 " od Initial Volume: 1.500

ROTO: PRESS: .22 SAMPLING RATIO: 21.5 : 1 BP: 30.02

MIN	TIME	METER READING	SAMPLE MDCF	STACK DSCFM	DELTA H	METER TEMP	SO2 PPM	ROTO TEMP	PUMP VACC
0	1450	664.000	—	6.507	.15	88	525	88	1.0
5	55	665.500	—	9.761	.33	88	350	88	2.0
10	1500	667.826	667.826	5.942	.12	88	575	88	2.0
15	05	669.243	669.243	5.694	.11	88	600	88	2.0
20	10	670.601	670.601	5.694	.11	88	600	88	2.0
25	15	671.960	671.960	5.694	.11	88	600	88	2.0
30	20	673.318	673.318	5.942	.12	88	575	88	2.0
35	25	674.735	674.735	6.833	.16	88	500	88	2.0
40	30	676.365	676.365	6.833	.16	88	500	88	2.0
45	35	677.994	677.994	6.833	.16	88	500	88	2.0
50	40	679.624	679.624	7.592	.20	88	450	88	2.0
55	45	681.434	681.434	7.179	.18	89	475	89	2.0
ROTO PRESS: .22			TOTALS:	80.504	1.91	1057	BP.: 30.02		
60	1550	683.155	683.155	7.166	.18	90	475	90	2.0
65	55	684.883	684.883	6.481	.15	90	525	90	2.0
70	1600	686.446	686.446	6.484	.13	90	525	90	2.0
75	05	688.009	688.009	7.166	.18	90	475	90	2.0
80	10	689.737	689.737	6.808	.16	90	500	90	2.0
85	15	691.378	691.378	6.484	.15	90	525	90	2.0
90	20	692.942	692.942	7.166	.18	90	475	90	2.0
95	25	694.669	694.669	7.179	.18	89	475	89	2.0
100	30	696.391	696.391	7.179	.18	89	475	89	2.0
105	35	698.112	698.112	7.578	.20	89	450	89	2.0
110	40	699.929	699.929	7.578	.20	89	450	89	2.0
115	45	701.746	701.746	7.578	.20	89	450	89	2.0
			TOTALS:	84.850	2.11	1075	MAX VACC =		
TOTAL Cu Ft.			TOTALS:	165.354	4.02	2132	AVG. BP:		

METER BOX DATA SHEET PAGE # 2

Page: 2 of 4

UNIT: Buck 261 RUN: 1 DATE: 2-9-2007

Meter Box: 5H Y Factor: .997

Leak checks: 15 " Hg @ .010 cfm _____ " Hg @ _____ cfm

15 " Hg @ .007 cfm _____ " Hg @ _____ cfm

Inject SO^2 @ 100 cc/min. Nozzle : Probe @ 3/8 " od Initial Volume: 1.500

ROTO: PRESS: .22 SAMPLING RATIO: 21.5 : 1 BP: 30.02

MIN	TIME	METER READING	SAMPLE MDCF	STACK DSCFM	DELTA H	METER TEMP	SO2 PPM	ROTO TEMP	PUMP VACC
120	1650	703.563	703.563	8.039	.23	88	425	88	20
125	55	705.479	705.479	7.592	.20	88	450	88	20
130	1700	707.289	707.289	7.192	.18	88	475	88	20
135	05	709.004	709.004	7.192	.18	88	475	88	2.0
140	10	710.719	710.719	7.192	.18	88	475	88	2.0
145	15	712.434	712.434	7.206	.18	87	475	87	2.0
150	20	714.143	714.143	6.845	.16	87	500	87	2.0
155	25	715.767	715.767	6.519	.15	87	525	87	2.0
160	30	717.313	717.313	6.223	.14	87	550	87	20
165	35	718.789	718.789	6.519	.15	87	525	87	2.0
170	40	720.336	720.336	6.519	.15	87	525	87	2.0
175	45	721.882	721.882	6.845	.16	87	500	87	2.0
ROTO PRESS: .22			TOTALS:	83.883	2.06	1049	BP.: 30.00		
180	1750	723.505	723.505	6.515	.15	87	525	87	2.0
185	55	725.053	725.053	6.515	.15	88	525	88	2.0
190	1800	726.606	726.606	6.515	.15	88	525	88	2.0
195	05	728.159	728.159	6.515	.15	88	525	88	2.0
200	10	729.712	729.712	6.515	.15	88	525	88	2.0
205	15	731.265	731.265	6.515	.15	88	525	88	2.0
210	20	732.818	732.818	6.515	.15	88	525	88	2.0
215	25	734.371	734.371	6.515	.15	88	525	88	2.0
220	30	735.924	735.924	6.515	.15	88	525	88	2.0
225	35	737.477	737.477	6.515	.15	88	525	88	2.0
230	40	739.030	739.030	6.515	.15	88	525	88	20
235	45	740.583	740.583	6.207	.13	88	550	88	2.0
			TOTALS:	77.872	1.78	1055	MAX VACC =		
TOTAL Cu Ft			TOTALS:	161.755	3.84	2104	AVG. BP:		

METER BOX DATA SHEET PAGE # 2

Page: 3 of 4

UNIT: Buck 261 RUN: 1 DATE: 2-9-2007

Meter Box: 5H Y Factor: .997

Leak checks: 15 " Hg @ .010 cfm _____ " Hg @ _____ cfm

15 " Hg @ .007 cfm _____ " Hg @ _____ cfm

Inject SO^2 @ 100 cc/min. Nozzle: Probe @ 3/8 " od Initial Volume: 1,500

ROTO: PRESS: .22			SAMPLING RATIO: 21.5 : 1				BP: 30.00		
MIN	TIME	METER READING	SAMPLE MDCF	STACK DSCFM	DELTA H	METER TEMP	SO2 PPM	ROTO TEMP	PUMP VACC
240	1850	742.065	742.065	6,207	.13	88	550	88	2.0
245	55	743.548	743.548	5,938	.12	88	575	88	2.0
250	1900	744.966	744.966	5,938	.12	88	575	88	2.0
255	05	746.384	746.384	5,938	.12	88	575	88	2.0
260	10	747.802	747.802	5,938	.12	88	575	88	2.0
265	15	749.221	749.221	5,938	.12	88	575	88	2.0
270	20	750.639	750.639	5,938	.12	88	575	88	2.0
275	25	752.057	752.057	5,938	.12	88	575	88	2.0
280	30	753.475	753.475	5,938	.12	88	575	88	20
285	35	754.893	754.893	5,938	.12	88	575	88	2.0
290	40	756.311	756.311	5,690	.11	88	600	88	2.0
295	45	757.671	757.671	5,690	.11	88	600	88	2.0
ROTO PRESS: .22			TOTALS:	71,029	1.43	1056	BP.: 30.00		
300	1950	759.030	759.030	5,690	.11	88	600	88	2.0
305	55	760.389	760.389	5,690	.11	88	600	88	2.0
310	2000	761.748	761.748	5,690	.11	88	600	88	2.0
315	05	763.107	763.107	5,690	.11	88	600	88	2.0
320	10	764.466	764.466	5,690	.11	88	600	88	2.0
325	15	765.826	765.826	5,690	.11	88	600	88	2.0
330	20	767.185	767.185	5,690	.11	88	600	88	2.0
335	25	768.544	768.544	5,690	.11	88	600	88	2.0
340	30	769.903	769.903	5,463	.10	88	625	88	2.0
345	35	771.208	771.208	5,463	.10	88	625	88	2.0
350	40	772.513	772.513	5,463	.10	88	625	88	2.0
355	45	773.818	773.818	5,463	.10	88	625	88	2.0
			TOTALS:	67,372	1.28	1056	MAX VACC =		
TOTAL Cu Ft.			TOTALS:	138,401	2.71	2112	AVG. BP:		

METER BOX DATA SHEET PAGE # 2

Page: 4 of 4

UNIT: Buck 261 RUN: 1 DATE: 2-9-2007

Meter Box: SH Y Factor: .997

Leak checks: 15 " Hg @ .010 cfm _____ " Hg @ _____ cfm

15 " Hg @ .007 cfm _____ " Hg @ _____ cfm

Inject SO^2 @ 100 cc/min. Nozzle: Probe @ 3/8 " od Initial Volume: 1.500

ROTO: PRESS: .22 SAMPLING RATIO: 21.5 : 1 BP: 30.00

MIN	TIME	METER READING	SAMPLE MDCF	STACK DSCFM	DELTA H	METER TEMP	SO2 PPM	ROTO TEMP	PUMP VACC
360	2050	775.122	775.122	5.463	.10	88	625	88	2.0
365	55	776.428	776.428	5.463	.10	86	625	86	2.0
370	2100	777.733	777.733	5.463	.10	88	625	88	2.0
375	05	779.038	779.038	5.463	.10	88	625	88	2.0
380	10	780.343	780.343	5.252	.10	88	650	88	2.0
385	15	781.598	781.598	5.252	.10	88	650	88	2.0
390	20	782.853	782.853	5.252	.10	86	650	88	2.0
395	25	784.108	784.108	5.252	.10	88	650	88	2.0
400	30	785.363	785.363	5.252	.10	88	650	88	2.0
ROTO PRESS:			TOTALS:	48.112	.90	792	BP.:		
			÷81						
						7140			
				513.622	11.47	88			
			TOTALS:				MAX VACC =		2.0
TOTAL Cu Ft.		121.363	TOTALS:	6.341	.142	548	AVG. BP:		30.01

PARTICULATE CATCH / MOISTURE DATA SHEET # 3

UNIT : Buck 261 RUN : 1 DATE : 2-9-07

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	728.7	599.8	487.0	881.6
INITIAL WT	616.1	589.0	483.8	858.6
NET WT GRAMS	112.6	10.8	3.2	23.0

TOTAL CATCH : 149.6 GRAMS H_2O

FRONT HALF

FILTER #	95F	
FINAL WT g	.9694	
INITIAL WT g	.6766	
NET WT g	.2928	

BEAKER #	66
DESC.	ACETONE
FINAL WT g	96.6082
INITIAL WT g	96.5103
NET WT g	.0979
VOL. DESC. ml	100

BACK HALF

FILTER #	95B	
FINAL WT g	.4221	
INITIAL WT g	.3345	
NET WT g	.0876	

BEAKER #	67	68	69	70	
DESC.	ACETONE	METHCHLOR	H_2O	H_2O	
FINAL WT g	106.4130	94.2566	109.0438	107.5585	
INITIAL WT g	106.2242	94.1575	108.9939	107.4810	
NET WT g	.1888	.0991	.0499	.0775	.1274
VOL. DESC ml	150	75	150	190	(340)

FILTER TARE WEIGHTS DATA SHEET #4-1

Into Dessicator : Date : 1-20-06 Time : 1030 By : KV

Manufacturer S & S Grade : # 25 Glass Front Size : 11 cm Lot No. : ZB921

Back Size: 8.2 cm Lot No. : B1044632

	DATE: 1-24-06	BY: KV	DATE: 1-25-06	BY: KV	DATE:	BY:
FILTER #	FIRST WEIGHT	TIME	SECOND WEIGHT	TIME	THIRD WEIGHT	TIME
91 F	.6700	1035	.6698	0947	✓	
92 F	.6711	1035	.6709	0947	✓	
93 F	.6825	1036	.6824	0948	✓	
94 F	.6734	1036	.6734	0948	✓	
95 F	.6767	1037	.6766	0949	✓	
96 F	.6800	1038	.6801	0950	✓	
97 F	.6694	1038	.6693	0950	✓	
98 F	.6672	1039	.6672	0951	✓	
99 F	.6872	1040	.6872	0951	✓	
100 F	.6707	1040	.6705	0952	✓	
91 B	.3367	1030	.3368	0941	✓	
92 B	.3380	1030	.3380	0941	✓	
93 B	.3375	1031	.3376	0942	✓	
94 B	.3384	1031	.3381	0942	✓	
95 B	.3344	1032	.3345	0943	✓	
96 B	.3387	1032	.3388	0943	✓	
97 B	.3393	1033	.3393	0944	✓	
98 B	.3382	1033	.3382	0944	✓	
99 B	.3397	1034	.3398	0945	✓	
100 B	.3398	1034	.3400	0945	✓	

Checked by: CWallington Date: 1-25-2006 Time: 1115

BALANCE ROOM ENVIRONMENTAL CONDITIONS

DATE	TIME	BY	WB	DB	% RH
1-24-06	1029	KV	58	69	48
1-25-06	0940	KV	60	73	47

BEAKER TARE WEIGHTS DATA SHEET #4-2

Into Dessicator: Date : 2-13-06 Time : 1415 By : KV

	DATE: 3-3-06	BY: KV	DATE: 3-6-06	BY: Clp	DATE:	BY:
BEAKER #	FIRST WEIGHT	TIME	SECOND WEIGHT	TIME	THIRD WEIGHT	TIME
51	104.8758	1116	104.8740	1314	104.8735	1409
52	107.4982	1117	107.4973	1315	107.4970	1910
53	105.7352	1118	105.7347	1316		
54	107.3065	1118	107.3064	1317		
55	93.4886	1119	93.4874	1318	93.4870	1911
56	106.8604	1120	106.8608	1320		
57	97.4106	1120	97.4102	1321		
58	96.8913	1121	96.8916	1323		
59	105.3518	1122	105.3513	1323		
60	98.1992	1122	98.1995	1324		
61	99.3500	1123	99.3491	1325	99.3487	1915
62	97.8660	1124	97.8665	1326		
63	93.2159	1124	93.2154	1327		
64	104.7890	1125	104.7876	1328	104.7872	1916
65	98.4433	1125	98.4429	1329		
66	96.5099	1126	96.5107	1330	96.5103	1917
67	106.2246	1127	106.2242	1331		
68	94.1587	1128	94.1577	1332	94.1575	1920
69	108.9944	1129	108.9939	1333		
70	107.4800	1129	107.4812	1334	107.4810	1921
71	104.1529	1130	104.1524	1336		
72	103.8297	1130	103.8293	1337		
73	104.3562	1131	104.3558	1338		
74	107.5086	1132	107.5084	1339		
75	96.4680	1134	96.4679	1340		

BALANCE ROOM ENVIRONMENTAL CONDITIONS

DATE	TIME	BY	WB	DB	% RH
3-3-06	1115	KV	61	74	47
3-6-06	1300	Clp	62	75	48
3-7-06	1905	Clp	62	75	48

Checked by : KV
Date : 3-8-06
Time : 0830

WOODSTOVE DATA SHEET # 4-3 : CONSTANT WEIGHTS

UNIT : Buck 261 **RUN :** 1 **DATE :** 2-9-07 **Page :** 1 **of**

Beaker #	Date	Time	By	Weight	Date	Time	By	Weight	Date	Time	By	Weight	Date	Time	By
66	2-10	1500	CP	96.6087	2-12	0952	CP	96.6082	2-13	1044	CP				
67	2-10	1500	CP	106.4135	2-12	0953	CP	106.4130	2-13	1045	CP				
68	2-10	1500	CP	94.2647	2-12	0951	CP	94.2609	2-13	1046	CP	94.2595	2-14	0943	CP
				94.2562	2-16	1036	CP	94.2566	2-17	1405	CP				
69	2-10	1500	CP	109.0443	2-12	0955	CP	109.0438	2-13	1047	CP				
70	2-10	1500	CP	107.5593	2-12	0957	CP	107.5581	2-13	1048	CP	107.5585	2-14	0942	CP

Filter #	Date	Time	By	Weight	Date	Time	By	Weight	Date	Time	By	Weight	Date	Time	By
95F	2-9	1015	CP	.9694	2-10	1502	CP	.9694	2-12	0950	CP				
95B	2-9	1015	CP	.4358	2-10	1503	CP	.4308	2-12	0951	CP	.4278	2-13	1043	CP
				.4247	2-14	0940	CP	.4225	2-16	1035	CP	.4221	2-17	1407	CP

SCALE ROOM ENVIRONMENTAL CONDITIONS

Weighing Session	Date	Time	By	DB	%RH
1	2-10	1500	CP	77	40
2	2-12	0945	CP	75	41
3	2-13	1030	CP	76	45
4	2-14	0930	CP	74	47
5	2-16	1030	CP	75	48

Weighing Session	Date	Time	By	DB	%RH
6	2-17	1400	CP	78	46
7					
8					
9					
10					

WOODSTOVE DATA SHEET #4-4

SCALE QA SHEET

Dates: From 11-3-2009 Through	Scale: Sartorius	Model: A 120 S	SN: 37010004

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	1115	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

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

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	KW	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		10-16	0915	73	47
99.9998	10.0001	.9999	.0998	KW	10-17	0930	70	48
99.9999	10.0002	1.0000	.0999	KW	10-18	1100	70	47
100.0001	10.0001	.9999	.0999	KW	10-27	0936	75	48
100.0004	9.9999	1.0000	.1000	CP	10-28	1800	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

100 g weight	10 g weight	1 g weight	100 mg weight	Tech	Date	Time	Dry Bulb	% RH
99.9996	9.9998	.9999	.0998	Clp	12-8	0900	67	38
100.0001	10.0001	1.0000	.0998	Clp	1227	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	1.0006	.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	Clp	1-2	1230	77	48
100.0003	10.0000	1.0001	.0999	Clp	1-4	1430	74	44
100.0003	9.9999	1.0000	.0999	Clp	1-5	1206	74	47
100.0002	9.9999	1.0000	.0999	Clp	1-6	1000	77	49
100.0000	10.0001	.9999	.0997	KV	1-8	1000	71	41
100.0002	10.0000	1.0000	.0999	Clp	1-9	1400	75	48
100.0000	10.0001	1.0000	.0999	Clp	1-12	1200	74	47
100.0001	10.0001	.9999	.0998	Clp	1-13	1500	73	49
99.9999	10.0003	.9998	.0998	Clp	1-15	1230	69	49
100.0003	10.0001	1.0001	.1000	Clp	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	Clp	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	Clp	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	Clp	2-8	1135	75	41
100.0002	10.0001	.9999	.0999	KV	2-10	0930	72	42
100.0000	10.0000	.9999	.0999	Clp	2-13	0940	75	46
100.0001	10.0002	1.0000	.0999	KV	2-20	1200	71	44
100.0003	10.0001	.9999	.0999	Clp	3-1	1215	78	43
100.0004	10.0001	1.0000	.0999	Clp	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	Clp	3-6	1300	75	48
100.0002	10.0001	1.0002	.0999	Clp	3-7	1905	75	48
100.0002	9.9999	.9999	.0999	Clp	5-24	1600	78	46
100.0004	10.0001	.9999	.0999	Clp	5-25	0830	76	45
100.0000	9.9999	.9997	.0999	Clp	5-26	0840	74	47
100.0003	9.9999	1.0000	.0998	Clp	5-30	1220	73	48
100.0002	10.0001	.9999	.1000	Clp	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

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	Clp	10-21	0900	74	44
100.0000	10.0001	1.0000	.0999	Clp	10-22	1130	78	46
99.9998	10.0000	.9998	.0998	Clp	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	Clp	10-29	1900	75	44
99.9998	10.0003	1.0000	.0999	Clp	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	Clp	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	Clp	11-12	1600	67	49
100.0001	10.0000	1.0000	.0999	Clp	11-13	1430	74	47
99.9999	10.0000	1.0000	.0999	Clp	11-15	1500	72	44
100.0002	10.0000	.9999	.0999	KV	11-16	0815	70	44
100.0005	10.0000	1.0000	.0999	Clp	11-17	0930	72	46
100.0004	10.0002	1.0001	.1000	Clp	11-18	1600	72	48
100.0003	10.0001	.9999	.0999	Clp	11-20	1100	68	47
100.0004	10.0002	1.0000	.1000	Clp	11-21	1200	74	44
100.0002	10.0002	.9999	.0998	Clp	11-22	1030	74	42
99.9999	10.0000	1.0001	.0999	Clp	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	Clp	11-28	1000	72	42
100.0004	10.0000	1.0000	.0998	Clp	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	Clp	12-1	0900	70	41
100.0000	10.0000	.9999	.1000	Clp	12-2	1340	72	42
100.0000	10.0000	.9998	.0999	Clp	12-3	1400	68	43
99.9999	9.9998	.9999	.0996	Clp	12-5	1620	71	45
99.9997	10.0001	1.0000	.0994	Clp	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

100 g weight	10 g weight	1 g weight	100 mg weight	Tech	Date	Time	Dry Bulb	% RH
99.9998	9.9994	.9999	.0998	[illegible]	07/15	2000	78	46
99.9997	9.9998	1.0000	.1000	[illegible]	07/19	1250	78	46
100.0000	9.9999	.9999	.0999	[illegible]	07/20	0740	78	46
100.0000	9.9999	1.0000	.1000	[illegible]	07/21	2100	78	46
99.9998	9.9998	.9999	.1000	[illegible]	07/24	2200	78	46
100.0001	10.0000	1.0000	.1000	[illegible]	07/27	1515	78	49
99.9998	10.0000	.9998	.1000	[illegible]	07/28	0600	78	49
99.9999	10.0001	1.0000	.1000	[illegible]	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
99.9998	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
99.9999	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 : Buck 261 RUN : 1 DATE : 2-9-2007

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		74	44
10-6	0930	CP		77	47

FINAL QC

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

NET PARTICULATE CATCH CALCULATION DATA SHEET #6

UNIT: Buck 261 RUN: 1 DATE: 2-9-2007

Blank Audit by C Chastington 10-14-2005

BLANK CALCULATIONS

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

FRONT HALF CATCH

FILTERS : .2928 (Total Catch) g - 1 (# of Filters) (.0000 g) (Blank Value / Filter) = .2928 g

BEAKERS : .0979 (Total Catch) g - 100 (ml Acetone) (.00007 .000007 g) (Blank Value / ml Acetone) = .0972 g

TOTAL FRONT HALF CATCH : .3900 g

BACK HALF CATCH

FILTERS : .0876 (Total Catch) g - 1 (# of Filters) (.0000 g) (Blank Value / Filter) = .0876 g

BEAKERS :

Acetone : .1888 (Total Catch) g - 150 (ml Acetone) (.0011 .00000 7 g) (Blank Value / ml Acetone) = .1877 g

Extract : .0991 (Total Catch) g - 75 (ml Dichloromethane) (.0011 .000015 g) (Blank Value / Dichloromethane) = .0980 g

Water : .1274 (Total Catch) g - 340 (ml Water) (.0044 .000013 g) (Blank Value / Water) = .1230 g

TOTAL BACK HALF CATCH : .4963 g

TOTAL CATCH : .8863 g

% FRONT HALF : 44.0 %

CALCULATIONS DATA SHEET # 7

UNIT: Buck 261 RUN: 1 DATE: 2-9-2007

1) $Vm(std) = \dfrac{(121.363\ Vm)(17.64)(.997\ mcf)\left(30.01\ "Hg + \frac{.142"\ H_2O}{13.6}\right)}{(548\ TmA)} = \dfrac{116.9275}{000.0000}$ dscf

2) $Vw(std) = (.04707)(149.6\ ml\ H_2O) = \dfrac{7.0417}{00.0000}$ scf

3) $Asw = \dfrac{(7.0417\ scf)}{(7.0417\ scf + 116.9275\ dscf)} = \dfrac{.0568}{.0000}$ Bws × 100 = $\dfrac{5.6802}{00.0000}$ % H_2O

4) $Cs = \dfrac{(.8863\ g.)}{(116.9275\ dscf)}(15.43) = \dfrac{.1170}{0.0000}$ gr / dscf

5) Estimated g / hr = $\dfrac{(.8863\ g.)}{(116.9275\ dscf)}\left(\dfrac{6.341}{00.0000}\ dscfm\right)(60) = \dfrac{2.8839}{00.0000}$ 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_2O =	average delta H for test	(p. 2)	(.000 " H_2O)
TmA =	average meter temperature for test in degrees Absolute	(p. 2)	(000 TmA)
ml H_2O =	total water caught during test	(p. 3)	(000.0 ml H_2O)
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 : Buck 261 RUN : 1 DATE : 2-9-2007

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

Wet Bulb / Dry Bulb

Pre : WB : 64 DB : 81 = 38 % RH 1.4 % H_2O

Post : WB : 64 DB : 82 = 36 % RH 1.4 % H_2O

Average : 37 % RH 1.4 % H_2O

Empty Stove Weight (lbs) : N/A w/ stack & oil seal : Wet : N/A Dry : 517.3

Kindling Weight (lbs) : Paper : .1 Wood : 2.9

Preburn Fuel Weight : 23.8 + 17.3 + 16.6 + 2.3 Total : 60.0

Kindling & Preburn Fuel Weight (wood only) (lbs) : **Total** : 62.9

Coal Bed Wt Range (lbs) : 4.3 - 3.5 **Scale** : 521.6 - 520.8

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

Lower : .20 × fuel weight : Always round UP to nearest tenth **Actual Coal Bed Weight** : 4.3

Maximum Coal Bed Removal (lbs) : ((4.3 (Upper) + 3.5 (Lower)) ÷ 2) .25 = .9 (round down to nearest tenth)

Test Fuel (.75" × 1.5" × 5" spacers) = 16 pcs

Dimensions	Length in inches	No. Pcs	Weight in lbs	% of Load
2" × 4"	18	3	7.4	42.8
4" × 4"	18	2	9.9	57.2

Test Fuel Weight : 17.3 lbs

Estimated Dry Burn Rate :

$$\frac{17.3 - (17.3 \times .16500)}{2.2046} \times \frac{60}{\frac{400}{\text{TIME}}} = .983 \text{ kg / hr}$$

Estimated BTU's/hr : 19,140 × $\frac{63}{100}$ × $\frac{.983}{\text{DBR}}$ = 11853.2 BTU's/hr

EPA Default Efficiencies : (Non-cat : 63) Cat : 72 Pellet : 78

395 = .99

WOOD STOVE OPERATING DATA PAGE #9

Unit : Buck 261 Run : 1 Date : 2-9-2007

FIRE STARTED: 0845

WARM UP AND PREBURN:

PRIMARY AIR : Set wide open for all warm-up / preburn fuel charges. Then set to 6 11/16" 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 25 sec.

TEST:

DOOR wide open during loading Ø min. 45 sec.

PRIMARY AIR : Opened full for first 5 min., then set to run setting of 6 11/16'.

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

FAN:

ON / (OFF) during warm-up (ON) / OFF during preburn

ON / (OFF) first 30 minutes of test (ON) / OFF balance of test run

Fan speed set at High

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 : N/A BRAND : N/A

All Grades WCLB rules:

WARM UP INFORMATION:

All pre-burn / warm up fuel pieces were either 16 or 16 inches.

1st warm up / pre-burn fuel charge (23.8 lbs.) added at 0900

2nd warm up / pre-burn fuel charge (17.3 lbs.) added at 1115

3rd warm up / pre-burn fuel charge (16.6 lbs.) added at 1225

4th warm up / pre-burn fuel charge (2.3 lbs.) added at 1340

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

TEST DATA SHEET #10

Unit : Buck 261 Run : 1 Date : 2-9-2007

Room Temperature : 71 °F Temperature Correction Set?: (YES) NO

Calibration Check : 12.0% + or- 0.2%? (YES) NO

Time Test Fuel moisture reading taken : 1230

pc #	Dimen.	Use	TOP	BOTTOM	SIDE	Average
1	2"×4"×8'	K	16.6	17.2	17.0	16.9
2						
3						
4	2"×4"×8'	P	22.5	22.7	23.1	22.8
5	2"×4"×8'	P	21.6	21.3	22.7	21.9
6	2"×4"×8'	P	19.1	18.8	19.0	19.0
7	2"×4"×8'	P	22.8	22.7	22.1	22.5
8	2"×4"×8'	P				(86.2)
9						
10						
11	2x4x18	T	18.8	19.0	19.0	19.0
12	"	T	17.9	21.1	22.0	20.3
13	"	T	19.0	17.3	19.2	18.5
14	4x4x18	T	22.7	22.0	21.5	22.0
15	"	T	18.9	19.0	19.0	19.0
16						(98.8)
17						
18						
19						
20	Spacers	T	22.5	22.1	20.9	15.8

Key for Use : K = Kindling P = Pretest Fuel T = Test Fuel

	KINDLING	PRETEST FUEL	TEST FUEL
Dry Moisture % :	16.900 %	21.350 %	19.760 %
Wet Moisture % :	14.457 %	17.729 %	16.500 %

To obtain Wet from Dry : $\frac{100 \times \%\ \text{Dry Reading}}{100 + \%\text{Dry Reading}}$ = % Moisture, Wet Basis

Acceptable Ranges : 16 - 20 % wet: 19 - 25 % dry with meter corrected for temperature.

GAS DATA SHEET #12

WEIGHT: 521.5 DATE: 2-9-2007

UNIT: Buck 261 RUN: 1 PAGE: 1 OF 3

TIME	SCALE	FUEL	DROP	V.	CO_2	V.	O_2	V.	CO	STATIC	SO_2PPM
0 1450	538.8	17.3	—	.169	4.3	.600	15.0	.146	1.46	-.026	525
5 55	538.4	16.9	.4	.229	5.8	.587	14.7	.0341	.34	-.032	350
10 1500	538.3	16.8	.1	.112	2.8	.690	17.3	.060	.60	-.026	575
15 05	538.2	16.7	.1	.103	2.6	.696	17.4	.074	.74	-.025	600
20 10	538.0	16.5	.2	.173	4.4	.628	15.7	.066	.66	-.025	600
25 15	537.7	16.2	.3	.160	4.0	.639	16.0	.070	.70	-.025	600
30 20	537.5	16.0	.2	.142	3.6	.649	16.3	.094	.94	-.026	575
35 25	537.0	15.5	.5	.310	7.8	.497	12.4	.056	.56	-.026	500
40 30	536.4	14.9	.6	.286	7.2	.509	12.8	.084	.84	-.026	500
43 35	535.6	14.1	.8	.512	12.8	.310	7.8	.124	1.24	-.026	500
50 40	535.0	13.5	.6	.356	8.9	.475	11.9	.055	.55	-.025	450
53 45	534.3	12.8	.7	.358	9.0	.487	12.2	.060	.60	-.025	475
SUBTOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	-.313	*****
60 1550	533.8	12.3	.5	.326	8.1	.525	13.1	.056	.56	-.024	475
65 55	533.1	11.6	.7	.492	8.4	.335	12.3	.113	1.13	-.024	525
70 1600	532.5	11.0	.6	.527	13.2	.277	6.9	.167	1.67	-.024	525
75 05	531.9	10.4	.6	.482	12.1	.359	9.0	.071	.71	-.024	475
80 10	531.3	9.8	.6	.495	12.4	323	8.1	.133	1.33	-.024	500
85 15	530.7	9.2	.6	.433	10.9	.376	9.4	.149	1.49	-.023	525
90 20	530.2	8.7	.5	.401	10.1	.438	11.0	.074	.74	-.023	475
95 25	529.6	8.1	.6	.396	9.9	.448	11.2	.068	.68	-.022	475
100 30	529.1	7.6	.5	.385	9.7	.459	11.5	.061	.61	-.023	475
103 35	528.6	7.1	.5	.410	10.3	.436	10.9	.059	.59	-.023	450
110 40	528.1	6.6	.5	.469	11.8	.381	9.5	.046	.46	-.023	450
115 45	527.6	6.1	.5	.470	11.8	.386	9.7	.033	.33	-.023	450
SUBTOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	-.280	*****
120 1650	527.1	5.6	.5	.443	11.1	.376	9.4	.029	.29	-.023	425
125 55	526.6	5.1	.5	.411	10.3	.407	10.2	.030	.30	-.023	450
130 1700	526.2	4.7	.4	.381	9.6	.427	10.7	.050	.50	-.023	475
135 05	525.9	4.4	.3	.367	9.2	.443	11.1	.050	.50	-.023	475
140 10	525.6	4.1	.3	.369	9.3	.439	11.0	.046	.46	-.023	475
145 15	525.3	3.8	.3	.354	8.9	.455	11.4	.040	.40	-.023	475
150 20	524.8	3.3	.5	.325	8.2	.478	11.0	.062	.62	-.023	500
155 25	524.7	3.2	.1	.305	7.7	.499	12.5	.061	.61	-.023	525
160 30	524.5	3.0	.2	.264	6.6	.531	13.3	.091	.91	-.023	550
165 35	524.4	2.9	.1	.256	6.4	.539	13.5	.084	.84	-.023	525
170 40	524.3	2.8	.1	.255	6.4	.539	13.5	.090	.90	-.023	525
175 45	524.3	2.8	0	.253	6.4	.540	13.5	.094	.94	-.023	500
SUBTOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	-.274	*****
TOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	-.869	*****

Fan ?

GAS DATA SHEET #12

WEIGHT: 521.5 DATE: 2-9-2007

UNIT: Buck 261 RUN: PAGE: 2 OF 3

TIME	SCALE	FUEL	DROP	V.	CO_2	V.	O_2	V.	CO	STATIC	SO_2PPM
180 1750	524.3	2.8	0	.254	6.4	.535	13.4	.098	.98	-.023	525
185 55	524.2	2.7	.1	.250	6.3	.536	13.4	.106	1.06	-.023	525
190 1800	524.1	2.6	.1	.249	6.3	.536	13.4	.108	1.08	-.023	525
195 05	524.0	2.5	.1	.245	6.2	.538	13.5	.112	1.12	-.024	525
200 10	524.0	2.5	0	.243	6.2	.535	13.4	.119	1.19	-.024	525
205 15	523.9	2.4	.1	.238	6.0	.539	13.5	.119	1.19	-.024	525
210 20	523.8	2.3	.1	.239	6.0	.541	13.5	.117	1.17	-.024	525
215 25	523.7	2.2	.1	.234	5.9	.551	13.8	.107	1.07	-.024	525
220 30	523.6	2.1	.1	.232	5.8	.547	13.7	.121	1.21	-.024	525
225 35	523.5	2.0	.1	.230	5.8	.543	13.6	.133	1.33	-.024	525
230 40	523.5	2.0	0	.232	5.8	.535	13.4	.150	1.50	-.024	525
235 45	523.4	1.9	.1	.226	5.7	.539	13.5	.161	1.61	-.024	550
SUBTOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	-.285	*****
240 50	523.3	1.8	.1	.217	5.5	.539	13.5	.181	1.81	-.024	550
245 55	523.2	1.7	.1	.215	5.4	.540	13.5	.181	1.80	-.024	575
250 1900	523.1	1.6	.1	.214	5.4	.531	13.3	.197	1.97	-.024	575
255 05	523.0	1.5	.1	.207	5.2	.546	13.7	.179	1.79	-.023	575
260 10	523.0	1.5	0	.207	5.2	.545	13.7	.186	1.86	-.022	575
265 15	522.9	1.4	.1	.208	5.2	.546	13.7	.184	1.84	-.022	575
270 20	522.8	1.3	.1	.210	5.3	.539	13.5	.192	1.92	-.021	575
275 25	522.8	1.3	0	.211	5.3	.543	13.6	.188	1.88	-.021	575
280 30	522.7	1.2	.1	.208	5.2	.545	13.6	.195	1.95	-.021	575
285 35	522.6	1.1	.1	.197	4.9	.551	13.8	.200	2.00	-.020	575
290 40	522.5	1.0	.1	.198	5.0	.550	13.8	.186	1.86	-.020	600
295 45	522.5	1.0	0	.200	5.0	.551	13.8	.188	1.88	-.021	600
SUBTOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	-.263	*****
300 50	522.4	.9	.1	.198	5.0	.555	13.9	.183	1.83	-.020	600
305 55	522.4	.9	0	.194	4.9	.560	14.0	.187	1.87	-.020	600
310 2000	522.3	.8	.1	.198	5.0	.556	13.9	.185	1.85	-.020	600
315 05	522.3	.8	0	.195	4.9	.563	14.1	.178	1.78	-.020	600
320 10	522.2	.7	.1	.193	4.8	.567	14.2	.179	1.79	-.020	600
325 15	522.2	.7	0	.186	4.7	.579	14.5	.157	1.57	-.020	600
330 20	522.1	.6	.1	.184	4.6	.578	14.5	.153	1.53	-.019	600
335 25	522.1	.6	0	.184	4.6	.579	14.5	.153	1.53	-.019	600
340 30	522.0	.5	.1	.181	4.6	.576	14.5	.168	1.68	-.019	625
345 35	522.0	.5	0	.178	4.5	.583	14.6	.162	1.62	-.019	625
350 40	521.9	.4	.1	.169	4.3	.587	14.7	.172	1.72	-.019	625
355 45	521.9	.4	0	.164	4.1	.595	14.9	.172	1.72	-.019	
SUBTOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	-.234	*****
TOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	-.782	*****

GAS DATA SHEET #12

WEIGHT: 521.5 DATE: 2-9-2007

UNIT: Buck 261 RUN: 1 PAGE: 3 OF 3

TIME	SCALE	FUEL	DROP	V.	CO_2	V.	O_2	V.	CO	STATIC	SO_2PPM
360 0850	521.9	.4	0	.163	4.1	.603	15.1	.157	1.57	-.018	625
345 55	521.8	.3	.1	.155	3.9	.595	14.9	.195	1.95	-.018	625
320 2100	521.8	.3	0	.156	3.9	.591	14.8	.200	2.00	-.018	625
315 05	521.7	.2	.1	.154	3.9	.598	15.0	.192	1.92	-.018	625
360 10	521.7	.2	0	.151	3.8	.603	15.1	.187	1.87	-.018	650
305 15	521.6	.1	.1	.144	3.6	.615	15.4	.166	1.66	-.018	650
340 20	521.6	.1	0	.139	3.5	.623	15.6	.156	1.56	-.018	650
395 25	521.6	.1	0	.133	3.4	.635	15.9	.142	1.42	-.018	650
400 30	521.5	0	.1	.131	3.4	.639	16.0	.136	1.36	-.018	650
SUBTOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	-.162	*****
SUBTOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****		*****
										-.1813	
SUBTOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****		*****
TOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	-.022	*****

181

at 521.6 and 3 blocks 2.3 35

PREBURN DATA SHEET #13

UNIT: Buck 261 RUN: 1 DATE: 2-9-2007 PAGE: 1 of

TIME	SCALE	DROP	STACK	TOP	LF SIDE	BACK	RT SIDE	BOTTOM	FIREBOX	SEC/CAT	AMBIENT	STATIC	COMMENTS
0 1340	523.9	—	433	551	580	493	542	356			73	-.045	PREBURN START: # 2.3 UP
5	523.6	.3	298	443	545	360	518	372			76	-.040	COAL BED SCALE RANGE:
10 50	523.3	.3	272	394	520	325	499	352			76	-.039	521.6 → 520.8
15	523.2	.1	255	357	493	299	477	329			76	-.037	PRIMARY AIR: 6 11/16
20 1400	523.0	.2	239	318	467	278	456	307			76	-.035	SECONDARY AIR: N/A
25	522.8	.2	234	298	445	265	441	292			74	-.035	FAN: High
30 10	522.6	.2	232	286	435	257	432	282			75	-.035	PUMPS ON AT:
35	522.2	.4	239	285	429	253	425	275			76	-.036	CHECK WB/DB:
40 20	522.1	.1	240	297	424	248	420	265			76	-.035	
45	522.1	ϕ	212	271	410	242	409	266			75	-.030	
521.7 50 30	522.1	ϕ	198	247	392	234	394	255			75	-.029	-.4 lb.
55	521.7	ϕ	197	230	375	225	381	249			75	-.028	
*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	
60 1440	521.7	ϕ	187	215	362	220	369	246			76	-.026	
65 45	521.6	.1	180	204	348	213	356	242			75	-.026	
70 50	521.6	ϕ	181	193	336	206	344	236			74	-.026	
75													
80													

New Buck Model 261

Temperature Data Sheet #14

2/9/2007
Run 1

Time ********	Stack Chn 103	Top Chn 104	LT Side Chn 105	Back Chn 106	Rt Side Chn 107	Bottom Chn 108	Firebox Chn 109	Sec/Cat Chn 110	Ambient Chn 111	Tube Furn Chn 112	Smpl Box Chn 113	Smpl Out Chn 114	C-Gas Box Chn 115	C-Gas Out Chn 116	SO2 Out Chn 117
0	181	193	336	206	344	236	######	######	74	1510	248	49	236	36	36
5	231	217	317	255	324	232	######	######	73	1505	247	44	236	36	36
10	183	223	298	251	306	234	######	######	72	1500	245	42	236	36	36
15	163	215	281	246	290	239	######	######	73	1495	243	44	235	36	36
20	172	211	267	241	277	237	######	######	73	1490	242	45	235	36	36
25	164	209	255	235	269	233	######	######	72	1485	241	46	234	36	36
30	164	209	245	229	261	230	######	######	72	1482	240	46	234	36	37
35	198	196	237	173	258	227	######	######	74	1479	239	46	233	36	37
40	235	227	237	158	261	215	######	######	74	1477	238	46	233	36	37
45	284	247	238	151	268	207	######	######	74	1475	238	46	233	36	37
50	287	285	254	153	282	202	######	######	74	1475	238	46	234	36	37
55	272	298	270	155	296	200	######	######	74	1475	237	46	235	36	37
60	252	286	273	152	300	197	######	######	74	1474	237	46	235	37	37
65	293	300	284	150	307	192	######	######	72	1472	237	47	235	37	37
70	322	325	307	160	324	189	######	######	72	1472	237	47	235	37	37
75	301	325	329	169	341	188	######	######	72	1472	238	47	236	37	37
80	295	333	346	174	354	188	######	######	71	1473	237	47	237	37	37
85	274	324	359	179	365	188	######	######	71	1474	237	47	237	37	37
90	271	312	369	181	371	187	######	######	71	1474	237	47	237	37	38
95	264	305	378	184	374	185	######	######	70	1474	237	47	237	37	38
100	259	298	384	187	375	184	######	######	70	1475	236	47	237	37	38
105	269	307	392	189	376	182	######	######	70	1476	236	47	237	37	38
110	284	316	397	192	372	182	######	######	70	1478	235	48	236	37	38
115	288	328	406	195	371	183	######	######	69	1478	235	48	236	37	38
120	283	330	417	199	374	184	######	######	69	1479	235	48	236	37	38
125	276	327	424	203	375	185	######	######	69	1479	234	48	236	37	38
130	268	320	426	205	378	186	######	######	69	1479	234	47	236	37	38
135	255	305	427	207	383	186	######	######	68	1479	234	47	236	37	38
140	249	295	426	210	387	188	######	######	68	1481	235	48	236	37	38
145	243	286	425	212	391	188	######	######	68	1483	235	48	236	37	39
150	231	269	423	219	395	191	######	######	71	1485	235	48	236	37	39
155	219	255	418	222	396	195	######	######	73	1486	235	48	237	37	39
160	208	242	411	222	393	198	######	######	74	1486	235	48	236	37	39
165	200	228	402	219	386	199	######	######	75	1487	235	49	237	37	39
170	193	218	395	218	379	200	######	######	75	1488	235	49	236	37	39

Temperature Data Sheet #14

2/9/2007
Run 1

175	188	209	387	217	373	201	######	######	76	1487	235	49	236	38	39
180	185	202	381	216	367	201	######	######	76	1487	234	49	236	38	39
185	182	198	376	216	362	201	######	######	76	1488	234	49	236	37	39
190	180	194	371	215	358	200	######	######	77	1489	234	50	236	38	39
195	179	190	367	213	354	200	######	######	76	1490	234	50	235	38	39
200	177	187	362	212	350	197	######	######	74	1491	233	50	234	38	39
205	176	184	359	210	347	195	######	######	74	1491	233	50	233	38	39
210	174	184	357	209	344	193	######	######	74	1491	232	50	233	38	39
215	172	180	353	208	340	192	######	######	73	1491	232	50	232	38	39
220	171	177	350	206	336	190	######	######	73	1491	232	50	232	38	39
225	170	176	347	205	332	189	######	######	73	1490	232	50	231	38	39
230	169	175	343	201	328	187	######	######	71	1490	231	50	230	38	39
235	168	174	338	199	326	185	######	######	70	1491	231	50	230	38	39
240	166	172	334	196	322	182	######	######	70	1492	231	50	229	39	39
245	161	171	332	197	318	182	######	######	71	1492	231	50	229	39	39
250	159	168	328	196	314	181	######	######	70	1492	231	50	229	39	39
255	158	167	326	197	310	180	######	######	72	1492	231	51	229	39	39
260	157	167	323	197	305	179	######	######	73	1491	231	51	229	38	38
265	156	165	321	195	302	177	######	######	74	1491	231	51	230	38	38
270	155	164	320	195	299	176	######	######	75	1492	232	51	230	38	38
275	155	164	319	194	296	174	######	######	75	1492	232	51	231	38	38
280	154	164	317	193	293	173	######	######	76	1493	232	51	231	37	37
285	153	163	315	192	290	171	######	######	76	1494	232	52	232	37	37
290	152	162	310	190	286	170	######	######	76	1495	232	52	232	37	37
295	151	161	306	189	283	169	######	######	76	1496	232	52	232	37	37
300	150	160	303	188	281	167	######	######	76	1498	232	52	232	36	37
305	149	158	300	186	278	166	######	######	77	1499	233	52	233	36	36
310	149	157	297	185	275	165	######	######	77	1501	234	53	233	36	36
315	148	157	295	184	272	164	######	######	77	1502	233	53	233	36	36
320	147	156	293	183	269	163	######	######	77	1503	234	53	233	35	36
325	146	155	291	182	266	162	######	######	78	1505	234	53	234	35	36
330	146	154	287	180	263	161	######	######	78	1506	234	53	234	35	35
335	144	152	284	179	259	161	######	######	78	1507	235	53	234	35	35
340	144	152	282	178	256	160	######	######	78	1508	235	54	234	35	35
345	143	150	279	176	253	159	######	######	78	1507	235	56	234	34	35
350	141	149	275	175	249	158	######	######	78	1507	236	56	233	34	35
355	140	147	271	172	245	157	######	######	77	1507	236	56	233	34	34

New Buck Model 261

Temperature Data Sheet #14

2/9/2007
Run 1

360	139	145	266	170	242	156	######	######	78	1507	236	57	233	34	34
365	138	144	262	168	238	155	######	######	78	1508	236	57	233	33	34
370	137	142	258	166	236	154	######	######	77	1509	236	55	233	33	34
375	136	142	254	164	234	153	######	######	77	1510	236	54	233	33	34
380	135	141	250	162	231	152	######	######	77	1508	235	54	232	33	33
385	134	138	246	161	228	151	######	######	77	1507	235	54	232	33	33
390	133	138	242	159	225	151	######	######	77	1505	235	54	231	32	33
395	131	135	237	156	222	149	######	######	76	1504	235	54	231	32	33
400	129	133	233	153	217	146	######	######	75	1503	234	54	230	32	33

New Buck Model 261

2/9/2007
Run 1

TEMPERATURE DATA SHEET #14A

		TEST TIME	400		
STACK AVG	193	TOP AVG	211	LT SIDE AVG	325
BACK AVG	192	RT SIDE AVG	312	BOTTOM AVG	185
FIREBOX AVG	########	SEC/CAT AVG	########	AMBIENT AVG	74

END	176.5
START	263.0
	-86.5 DELTA T

CIRCLE: LOSS / GAIN

ZERO / SPAN CHECK DATA SHEET #15-1

Date : 2-9-2007 Analyte : CO_2 (15-1)

Unit : Buck 261 Run # : 1

Zero Cyl. # : 168TAC 3-A Conc. : 0.00 % CO_2 Cyl. Press. : 900 PSI

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

Span Cyl. # : CC-411627 Conc. : 12.50 % CO_2 Cyl. Press. : 650 PSI

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

Analyzer : Make : HORIBA Model : PIR-2000 SN : 407069

Range : 0 - 25.0 % CO_2 Analyzer Output : 0 - 1.0 v.

Flow : 1.5 SCFH Measured by : Rotameter

EPA Span Value = 25.0 % CO_2

EPA Control Limits = ± 2.5% of 25.0 % CO_2 = ± 0.625 % CO_2

Method 28 A = ± .2 % of 25.0 % CO_2 = ± .05 % CO_2

PRE RUN Audit : by : Chp Wadsworth Time : 1300 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	.049	.049	.194
SPAN	50.0	.500	12.50	50.0	.500	12.525	.025	.101

POST RUN Audit : by : Chp Wadsworth Time : 2140 Temp : 71 °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	.194
SPAN	50.0	.500	12.50	49.8	.498	12.475	-.025	-.099

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

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

Span % Difference = $\frac{\text{Act \% (ppm) - Exp \% (ppm)}}{\text{Full Scale Value}}$ X100

ZERO / SPAN CHECK DATA SHEET #15-2

Date : 2-9-2007 Analyte : O_2 (15-2)

Unit : Book 26) Run # : 1

Zero Cyl. # : 168TAC 3A Conc. : 0.00 % O_2 Cyl. Press. : 900 PSI

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

Span Cyl. # : CC-41627 Conc. : 12.50 % O_2 Cyl. Press. : 650 PSI

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

Analyzer : Make : TELEDYNE Model : 320 A SN : 37400

Range : 0 - 25.0 % O_2 Analyzer Output : 0 - 1.0 v.

Flow : 1.5 SCFH Measured by : Rotameter

EPA Span Value = 25.0 % O_2

EPA Control Limits = ± 2.5% of 25.0 % O_2 = ± 0.625 % O_2

Method 28 A = ± .2 % of 25.0 % O_2 = ± .05 % O_2

PRE RUN Audit : by : Chp Wellington Time : 1300 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	-.025	-.025	-.102
SPAN	12.50	.500	12.50	12.5	.500	12.522	.022	.090

POST RUN Audit : by : Chp Wellington Time : 2140 Temp : 71 ° F

AUDIT RESULTS

Point #	Expected Response			Actual Response			± Conc. Difference	Δ %
	Meter	DVM	%	Meter	DVM	%		
ZERO	00.0	.000	00.0	00.0	.001	-.0004	-.0004	-.0015
SPAN	12.50	.500	12.50	12.5	.499	12.497	-.003	-.010

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

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

Span % Difference = $\frac{\text{Act \% (ppm) - Exp \% (ppm)}}{\text{Full Scale Value}}$ X100

ZERO / SPAN CHECK DATA SHEET #15-3

Date : 2-9-2007 Analyte : CO (15-3)

Unit : Rack 26) Run # : 1

Zero Cyl. # : 168TAC 3-A Conc. : 0.00 % CO Cyl. Press. : 900 PSI

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

Span Cyl. # : CC-41627 Conc. : 4.99 % CO Cyl. Press. : 650 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 = ± 2.5% of 10.0 % CO = ± 0.25 % CO

Method 28 A = ± .2 % of 10.0 % CO = ± .02 % CO

PRE RUN Audit : by : Chp Wadsworth Time : 1300 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	.004	.004	.037
SPAN	49.9	.499	4.99	49.9	.499	4.983	-.007	-.074

POST RUN Audit : by : Chp Wadsworth Time : 2140 Temp : 71 °F

AUDIT RESULTS

Point #	Expected Response			Actual Response			± Conc. Difference	Δ %
	Meter	DVM	%	Meter	DVM	%		
ZERO	00.0	.000	00.0	00.0	.000	.004	.004	.037
SPAN	49.9	.499	4.99	50.0	.500	4.993	.003	.024

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

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

Span % Difference = $\frac{\text{Act \% (ppm) - Exp \% (ppm)}}{\text{Full Scale Value}}$ X100

ZERO / SPAN CHECK DATA SHEET #15-4

Date : 2-9-2007 Analyte : SO_2 (15-4)

Unit : BULK 261 Run # : 1

Zero Cyl. # : 168TAC 3-A Conc. : 0.00 ppm SO_2 Cyl. Press. : 900 PSI

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

Span Cyl. # : CC82089 Conc. : 1250 ppm SO_2 Cyl. Press. : 2000 PSI

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

Analyzer : Make : HORIBA Model : PIR-2000 SN : 403019

Range : 0 - 2500 ppm SO_2 Analyzer Output : 0 - 1.0 v.

Flow : 1.5 SCFH Measured by : Rotameter

EPA Span Value = 2500 ppm SO_2

EPA Control Limits = ± 2.5% of 2500 ppm SO_2 = ± 62.5 ppm SO_2

PRE RUN Audit : by : Cp Workman Time : 1304 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	2.586	2.586	.103
SPAN	50.0	.500	1250	50.0	.500	1251.0	1.000	.040

POST RUN Audit : by : Cp Workman Time : 2140 Temp : 71 ° 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	.089	.089	.004
SPAN	50.0	.500	1250	50.1	.501	1253.5	3.500	.140

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

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

Span % Difference = $\frac{\text{Act \% (ppm) - Exp \% (ppm)}}{\text{Full Scale Value}}$ X100

QUALITY CHECKS DATA SHEET # 16

UNIT : Buck 261 RUN : 1 DATE 2-9-2007

Thermocouple Check:

T/C # 1	— °F	T/C # 13	58.5 °F
T/C # 2	— °F	T/C # 14	58.5 °F
T/C # 3	58.5 °F	T/C # 15	58.4 °F
T/C # 4	54.5 °F	T/C # 16	58.7 °F
T/C # 5	54.0 °F	T/C # 17	62.2 °F
T/C # 6	54.0 °F	T/C # 18	59.8 °F
T/C # 7	53.6 °F	T/C # 19	55.6 °F
T/C # 8	53.6 °F	T/C # 20	— °F
T/C # 9	— °F	T/C # 21	— °F
T/C # 10	— °F	T/C # 22	— °F
T/C # 11	52.4 °F	T/C # 23	— °F
T/C # 12	61.4 °F	T/C # 24	— °F

Thermocouple Readout:

Pretest zero and span check and calibration

ZERO 1.6 °F Adj. to 0.0 °F

SPAN 1999.2 °F Adj. to 2000.0 °F

post test zero and span

ZERO 1.2 °F Difference .060 %

SPAN 2000.4 °F Difference .020 %

Thermocouple Readout Pretest Linearity Check:

0	= 0.0 °F	200	= 200.2 °F	400	= 399.9 °F
600	= 599.8 °F	800	= 799.6 °F	1000	= 999.7 °F
1200	= 1199.6 °F	1400	= 1399.4 °F	1600	= 1599.4 °F
1800	= 1799.8 °F	2000	= 2000.0 °F		

Sample Train Leak Check	Pre ✓	Post ✓
C-gas Train Leak Check	Pre ✓	Post X
SO_2 Train Leak Check	Pre ✓	Post ✓
Static Gauge Zero Check	Pre ✓	Post ✓

Scale Check Pre : 532.3 − 522.3 = 10.0

Post : 531.5 − 521.5 = 10.0

Stack Cleaned Prior to Test Run : YES X NO ____

TABLE 1 —— RAW DATA

CLIENT : New Buck TEST No. : 2

MODEL: 261 DATE: 12-Feb-07

TIME (MIN.)	METER READING (C F)	DELTA H (IN. H2O)	METER TEMP. (DEG. F)	PERCENT CO (%)	PERCENT CO2 (%)	SO2 COCENTR. PPM
0	788.500	0.150	89	0.97	5.10	450
5	790.000	0.330	89	0.14	8.20	300
10	792.330	0.170	89	0.55	2.60	425
15	793.976	0.130	89	0.62	3.90	475
20	795.449	0.130	89	0.79	5.50	475
25	796.922	0.150	89	1.18	9.70	450
30	798.477	0.150	89	0.54	9.60	450
35	800.032	0.170	89	0.55	8.50	425
40	801.678	0.130	89	1.09	12.30	475
45	803.151	0.170	89	1.01	12.30	425
50	804.797	0.150	89	0.88	12.10	450
55	806.352	0.170	89	0.40	11.40	425
60	807.998	0.190	89	0.32	12.40	400
65	809.747	0.190	89	0.43	12.60	400
70	811.496	0.190	90	0.37	12.40	400
75	813.251	0.190	90	0.25	10.80	400
80	815.006	0.170	90	0.47	9.50	425
85	816.658	0.170	90	0.53	9.30	425
90	818.311	0.170	90	0.54	9.70	425
95	819.963	0.170	90	0.52	9.60	425
100	821.615	0.150	91	0.49	9.50	450
105	823.181	0.150	91	0.49	9.20	450
110	824.747	0.150	91	0.55	9.50	450
115	826.313	0.150	91	0.47	9.30	450
120	827.879	0.150	92	0.44	8.60	450
125	829.452	0.150	92	0.38	8.30	450
130	831.025	0.150	92	0.39	8.20	450
135	832.598	0.150	92	0.49	7.30	450
140	834.171	0.150	92	1.01	6.20	450
145	835.744	0.150	92	0.99	5.80	450
150	837.317	0.150	92	0.97	5.80	450
155	838.890	0.150	92	0.92	6.00	450
160	840.463	0.150	92	0.84	6.20	450
165	842.035	0.150	92	0.90	6.00	450
170	843.608	0.150	92	1.04	5.80	450
175	845.181	0.150	92	1.04	6.00	450

180	846.754	0.150	92	1.06	5.90	450
185	848.328	0.150	92	1.12	5.80	450
190	849.902	0.150	92	1.11	5.40	450
195	851.476	0.150	92	1.14	4.70	450
200	853.050	0.150	92	1.19	4.50	450
205	854.624	0.150	92	1.24	4.50	450
210	856.198	0.130	92	1.22	4.60	475
215	857.689	0.130	92	1.28	4.60	475
220	859.180	0.130	92	1.20	4.60	475
225	860.672	0.130	92	1.27	5.00	475
230	862.163	0.130	92	1.33	4.70	475
235	863.654	0.130	92	1.35	4.50	475
240	865.145	0.130	92	1.30	4.60	475
245	866.637	0.150	92	1.29	4.50	450
250	868.210	0.130	92	1.20	4.50	475
255	869.702	0.120	92	1.12	4.60	500
260	871.118	0.120	92	1.00	4.10	500
265	872.535	0.120	92	1.07	3.80	500
270	873.952	0.120	92	1.13	3.70	500
275	875.369	0.120	92	1.32	3.60	500
280	876.786	0.120	92	1.06	3.70	500
285	878.202	0.110	92	1.03	3.70	525
290	879.552	0.110	92	0.98	3.80	525
295	880.901	0.110	92	1.01	3.80	525
300	882.250	0.110	92	1.04	3.70	525
305	883.598	0.110	92	1.09	3.80	525
310	884.945	0.110	92	1.16	3.90	525
315	886.293	0.110	92	1.21	3.60	525
320	887.641	0.110	92	1.36	3.50	525
325						

TABLE 2---RAW DATA

CLIENT : New Buck TEST No. 2

MODEL: 261 DATE: 12-Feb-07

METER CAL. FACTOR (Y) -------	0.997		Wt. WOOD BURNED(LB) -------	16.7	Lbs
BAROMETRIC PRESS.(Pb) -------	30	in Hg	WET,FUEL MOISTURE % -------	16.819	%
LEAK RATE POST (Lp) -------	0.005	cfm	Wt. PART. COLLECTED -------	0.7134	g
WATER VOL. (V1c) -------	128.9	Ml	METER VOLUME Vm -------	99.141	mcf
TEST TIME (MIN) -------	320	min	HC MOLE FRACTION -------	0.0132	

TABLE 3 ----FIELD DATA AVERAGES

CLIENT : New Buck TEST No. 2

MODEL: 261 DATE: 12-Feb-07

AVG DELTA H	-------	0.15	in H2O	AVG PRCNT CO	-------	0.88	%
AVG METER TEMP. Tm	-------	91	deg F	AVG PRCNT CO2	-------	6.63	%
AVG PPM SO2	-------	460	PPM	AVG BAL CO2/CO	------	7.50	%

TABLE 4 —— CALCULATIONS

CLIENT : New Buck TEST No. 2

MODEL: 261 DATE: 12-Feb-07

STD SAMPLE VOL. Vm(std) d) ------	95.00	dscf	STACK GAS FLOW Qsd -------	481.617	dscf/Hr &
				8.03	dscf/min
VOL. WATER VAPOR Vw(s td) ——	6.067	scf	PARTICULATE CONCTRT. C s ------	0.0075	g/dscf
PRCNT MSTR Bws ———	6.00	%	PARTC.EMISS. RATE E -------	3.62	g/Hr
BURN RATE BR ———	1.18	Kg/Hr	MOLES OF GAS PER Lb WOOD Nt ——	0.48	Lb-mole/Lb
CO EMISSION RATE ———	142.53	g/Hr &	PART.EMISS. RATE ------	3.06	g/Kgdry fuel
	120.68	g/Kgdry fuel			

TABLE 5 —— PROPORTIONAL RATE VARIATION

CLIENT : New Buck TEST No. : 2

MODEL: 261 DATE: 12-Feb-07

TIME INTEVAL Ti	PPM * Vm	PROPRTN. RATE VAR. PR		PROPRTN RATE VAR. AVERAGE	
5	649.3	96		100	
10	672.7	100			
15	673.0	100			
20	673.0	100			
25	673.0	100			
30	673.1	100			
35	673.1	100			
40	673.0	100			
45	673.0	100			
50	673.0	100			
55	673.1	100			
60	673.0	100			
65	673.0	100			
70	672.4	100			
75	674.1	100			
80	674.1	100			
85	674.2	100			
90	674.6	100			
95	674.2	100			
100	673.6	100			
105	675.4	100			
110	675.4	100			
115	675.4	100			
120	674.8	100			
125	677.2	100			
130	677.2	100			
135	677.2	100			
140	677.2	100			
145	677.2	100			
150	677.2	100			
155	677.2	100			
160	677.2	100			
165	676.8	100			
170	677.2	100			
175	677.2	100			
180	677.2	100			

185	677.6	100
190	677.6	100
195	677.6	100
200	677.6	100
205	677.6	100
210	677.6	100
215	677.5	100
220	677.5	100
225	678.0	100
230	677.5	100
235	677.5	100
240	677.5	100
245	678.0	100
250	677.2	100
255	678.0	100
260	677.3	100
265	677.8	100
270	677.8	100
275	677.8	100
280	677.8	100
285	677.3	100
290	678.0	100
295	677.5	100
300	677.5	100
305	677.0	100
310	676.5	100
315	677.0	100
320	677.0	100

3
1.18

COMPUTER INPUT DATA SHEET #1

Client: Buck Stoves

Address: P.O. Box 69

Spruce Pine, NC 28777

Phone: 888-622-7868 Fax: 828-765-0462

Run No.: 2 Date of Test: 2-12-2007 Burn Rate: 1.181

Model No.: 261 ☐ min ☒ min-1.25 ☐ fan

Stove Type: ☐ Cat ☒ Non Cat ☐ Pellet ☐ 1.25-1.9 ☐ max ☐ insert

Dry Gas Meter Y Factor: .997 (0.000) (Data Sheet #2)

Post Leak Rate: .005 cfm (.000) (Data Sheet #2)

Time: 320 min. (000) (Data Sheet #2)

Dry Gas Meter Volume: 99.141 cf (00.000) (Data Sheet #2)

Stack Flow: 7.446 dscfm (00.000) (Data Sheet #2)

Δ H: .147 in. H_2O (.000) (Data Sheet #2)

Maximum Vac.: 3.0 (0.0) (Data Sheet #2)

Barometric Pressure: 30.0 in. Hg (00.00) (Data Sheet #2)

H_2O Captured: 128.9 g (00.0) (Data Sheet #3)

Front Half Catch % Of Total: 46.2 % (00.0) (Data Sheet #6)

Total Particulate Catch: .7134 g (0.0000) (Data Sheet #6)

Flue Gas Moisture: 6.0052 % (00.000) (Data Sheet #7)

Particulate Emission: .1159 gr/dscf (0.0000) (Data Sheet #7)

Relative Humidity: 39 % RH (00.0) (Data Sheet #8)

Ambient Moisture: 1.4 % H_2O (0.00) (Data Sheet #8)

Preburn Fuel Wt.: 61.4 lbs. (00.0) (Data Sheet #8)

Coal Bed Wt.: 4.1 lbs. (00.0) (Data sheet #8)

Test Fuel Wt.: 16.7 lbs. (00.0) (Data sheet #8)

Heat Output (EPA Default): 14240.7 BTU/hr (00,000.0) (Data Sheet #8)

Kindling Fuel % Moisture (wet): 13.043 % (00.000) (Data Sheet #10)

Pretest Fuel % Moisture (wet): 16.597 % (00.000) (Data Sheet #10)

Test Fuel % Moisture (dry): 20.220 % (00.000) (Data Sheet #10 [wood stove] or #11 [pellet stove])

Test Fuel % Moisture (wet): 16.819 %

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

Stack Static Pressure: -.032 in. H_2O (+/- .000) (Data Sheet #12)

Average Ambient Temperature: 76 °F (00) (Data Sheet #14)

Stove Temperature Change: -81.8 °F (+/- 000.0) (Data Sheet #14)

Test start = 1405

End = 1925

meter Temp = 551

METER BOX DATA SHEET PAGE # 2

Page: 1 of _____

UNIT: Buck 261 RUN: 2 DATE: 2-12-2007

Meter Box: 5H Y Factor: .997

Leak checks: 15 " Hg @ .003 cfm _____ " Hg @ _____ cfm

15 " Hg @ .005 cfm _____ " Hg @ _____ cfm

Inject SO^2 @ 100 cc/min. Nozzle: Probe @ 3/8 " od Initial Volume: 1.500

ROTO: PRESS: .20			SAMPLING RATIO: 25 : 1				BP: 30.02		
MIN	TIME	METER READING	SAMPLE MDCF	STACK DSCFM	DELTA H	METER TEMP	SO2 PPM	ROTO TEMP	PUMP VACC
0	1405	788.500	———	7.578	.15	89	450	89	1.0
5	10	790.000	———	11.367	.33	89	300	89	3.0
10	15	792.330	792.330	8.023	.17	89	425	89	1.0
15	20	793.976	793.976	7.179	.13	89	475	89	1.0
20	25	795.449	795.449	7.179	.13	89	475	89	2.0
25	30	796.922	796.922	7.578	.15	89	450	89	2.0
30	35	798.477	798.477	7.578	.15	89	450	89	2.0
35	40	800.032	800.032	8.023	.17	89	425	89	2.0
40	45	801.678	801.678	7.179	.13	89	475	89	2.0
45	50	803.151	803.151	8.023	.17	89	425	89	2.0
50	55	804.797	804.797	7.578	.15	89	450	89	2.0
55	1500	806.352	806.352	8.023	.17	89	425	89	2.0
ROTO PRESS: .20			TOTALS:	95.308	2.00	1068	BP.: 30.02		
60	1505	807.998	807.998	8.525	.19	89	400	89	2.0
65	10	809.747	809.747	8.525	.19	89	400	89	2.0
70	15	811.496	811.496	8.509	.19	90	400	90	2.0
75	20	813.251	813.251	8.509	.19	90	400	90	2.0
80	25	815.006	815.006	8.009	.17	90	425	90	2.0
85	30	816.658	816.658	8.009	.17	90	425	90	2.0
90	35	818.311	818.311	8.009	.17	90	425	90	2.0
95	40	819.963	819.963	8.009	.17	90	425	90	2.0
100	45	821.615	821.615	7.550	.15	91	450	91	2.0
105	50	823.181	823.181	7.550	.15	91	450	91	2.0
110	55	824.747	824.747	7.550	.15	91	450	91	2.0
115	1600	826.313	826.313	7.550	.15	91	450	91	2.0
			TOTALS:	96.304	2.04	1082	MAX VACC =		
TOTAL Cu Ft.			TOTALS:	191.612	4.04	2150	AVG. BP:		

METER BOX DATA SHEET PAGE # 2

Page: 2 of _____

UNIT: Buck 261 RUN: 2 DATE: 2-12-2007

Meter Box: SH Y Factor: .997

Leak checks: 15 " Hg @ .003 cfm _____ " Hg @ _____ cfm

15 " Hg @ .005 cfm _____ " Hg @ _____ cfm

Inject SO^2 @ 100 cc/min. Nozzle : Probe @ 3/8 " od Initial Volume: 1.500

ROTO: PRESS: .120			SAMPLING RATIO: 25 : 1				BP: 30.00		
MIN	TIME	METER READING	SAMPLE MDCF	STACK DSCFM	DELTA H	METER TEMP	SO2 PPM	ROTO TEMP	PUMP VACC
120	1605	827.879	827.879	7.532	.15	92	450	92	2.0
125	10	829.452	829.452	7.532	.15	92	450	92	2.0
130	15	831.025	831.025	7.532	.15	92	450	92	2.0
135	20	832.598	832.598	7.532	.15	92	450	92	2.0
140	25	834.171	834.171	7.532	.15	92	450	92	2.0
145	30	835.744	835.744	7.532	.15	92	450	92	2.0
150	35	837.317	837.317	7.532	.15	92	450	92	2.0
155	40	838.890	838.890	7.532	.15	92	450	92	2.0
160	45	840.463	840.463	7.532	.15	92	450	92	2.0
165	50	842.035	842.035	7.532	.15	92	450	92	2.0
170	55	843.608	843.608	7.532	.15	92	450	92	2.0
175	1700	845.181	845.181	7.532	.15	92	450	92	2.0
ROTO PRESS: .120			TOTALS:	90.384	1.80	1104	BP.: 29.98		
180	1705	846.754	846.754	7.527	.15	92	450	92	2.0
185	10	848.328	848.328	7.527	.15	92	450	92	2.0
190	15	849.902	849.902	7.527	.15	92	450	92	2.0
195	20	851.476	851.476	7.527	.15	92	450	92	2.0
200	25	853.050	853.050	7.527	.15	92	450	92	2.0
205	30	854.624	854.624	7.527	.15	92	450	92	2.0
210	35	856.198	856.198	7.130	.13	92	475	92	2.0
215	40	857.689	857.689	7.130	.13	92	475	92	2.0
220	45	859.180	859.180	7.130	.13	92	475	92	2.0
225	50	860.672	860.672	7.130	.13	92	475	92	2.0
230	55	862.163	862.163	7.130	.13	92	475	92	2.0
235	1800	863.654	863.654	7.130	.13	92	475	92	2.0
			TOTALS:	87.942	1.68	1104	MAX VACC =		
TOTAL Cu Ft			TOTALS:	178.326	3.48	2208	AVG. BP:		

METER BOX DATA SHEET PAGE # 2

Page: 3 of 3

UNIT: Buck 261 RUN: 2 DATE: 2-12-2007

Meter Box: 5H Y Factor: .997

Leak checks: 15 " Hg @ .003 cfm _____ " Hg @ _____ cfm

15 " Hg @ .005 cfm _____ " Hg @ _____ cfm

Inject SO^2 @ 100 cc/min. Nozzle: Probe @ 3/8 " od Initial Volume: 1.500

ROTO: PRESS: .20 SAMPLING RATIO: 25 : 1 BP: 29.98

MIN	TIME	METER READING	SAMPLE MDCF	STACK DSCFM	DELTA H	METER TEMP	SO2 PPM	ROTO TEMP	PUMP VACC
240	1855	865.145	865.145	7.130	.13	92	475	92	2.0
245	10	866.637	866.637	7.527	.15	92	450	92	2.0
250	15	868.210	868.210	7.130	.13	92	475	92	2.0
255	20	869.702	869.702	6.774	.12	92	500	92	2.0
260	25	871.118	871.118	6.774	.12	92	500	92	2.0
265	30	872.535	872.535	6.774	.12	92	500	92	2.0
270	35	873.952	873.952	6.774	.12	92	500	92	2.0
275	40	875.369	875.369	6.774	.12	92	500	92	2.0
280	45	876.786	876.786	6.774	.12	92	500	92	2.0
285	50	878.202	878.202	6.451	.11	92	525	92	2.0
290	55	879.552	879.552	6.451	.11	92	525	92	2.0
295	1900	880.901	880.901	6.451	.11	92	525	92	2.0
ROTO PRESS: .20			TOTALS:	81.784	1.46	1104	BP.: 30.02		
300	1905	882.250	882.250	6.460	.11	92	525	92	2.0
305	10	883.598	883.598	6.460	.11	92	525	92	2.0
310	15	884.945	884.945	6.460	.11	92	525	92	2.0
315	20	886.293	886.293	6.460	.11	92	525	92	2.0
320	25	887.641	887.641	6.460	.11	92	525	92	2.0
325	30								2.0
330				32.300	.55	460			
335				114.084	2.01	1564			
340									
345						5922			
350									
355				484.022		91			
			TOTALS:		9.53		MAX VACC =		3.0
TOTAL Cu Ft.		99.141	TOTALS:	7.446	.147	551	AVG. BP:		30.00

÷6

PARTICULATE CATCH / MOISTURE DATA SHEET # 3

UNIT : Buck 261 RUN : 2 DATE : 2-12-2007

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	712.2	587.1	486.1	899.4
INITIAL WT	609.7	580.6	484.0	881.6
NET WT GRAMS	102.5	6.5	2.1	17.8

TOTAL CATCH : 128.9 GRAMS H_2O

FRONT HALF

FILTER #	96F	
FINAL WT g	.9230	
INITIAL WT g	.6801	
NET WT g	.2429	

BEAKER #	71
DESC.	ACETONE
FINAL WT g	104.2395
INITIAL WT g	104.1524
NET WT g	.0871
VOL. DESC. ml	80

BACK HALF

FILTER #	96B	
FINAL WT g	.3714	
INITIAL WT g	.3388	
NET WT g	.0326	

BEAKER #	72	73	74	75	
DESC.	ACETONE	METHCHLOR	H_2O	H_2O	
FINAL WT g	104.0160	104.4372	107.5500	96.5155	
INITIAL WT g	103.8293	104.3558	107.3084	96.4679	
NET WT g	.1867	.0814	.0416	.0476	.0892
VOL. DESC ml	130	75	150	150	300

FILTER TARE WEIGHTS DATA SHEET #4-1

Into Dessicator : Date : 1-20-06 Time : 1030 By : KV

Manufacturer S & S Grade : # 25 Glass Front Size : 11 cm Lot No. : ZB921

Back Size: 8.2 cm Lot No. : B1044632

	DATE: 1-24-06	BY: KV	DATE: 1-25-06	BY: KV	DATE:	BY:
FILTER #	FIRST WEIGHT	TIME	SECOND WEIGHT	TIME	THIRD WEIGHT	TIME
91 F	.6700	1035	.6698	0947	✓	
92 F	.6711	1035	.6709	0947	✓	
93 F	.6825	1036	.6824	0948	✓	
94 F	.6734	1036	.6734	0948	✓	
95 F	.6767	1037	.6766	0949	✓	
96 F	.6800	1038	.6801	0950	✓	
97 F	.6694	1038	.6693	0950	✓	
98 F	.6672	1039	.6672	0951	✓	
99 F	.6872	1040	.6872	0951	✓	
100 F	.6707	1040	.6705	0952	✓	
91 B	.3367	1030	.3368	0941	✓	
92 B	.3380	1030	.3380	0941	✓	
93 B	.3375	1031	.3376	0942	✓	
94 B	.3384	1031	.3381	0942	✓	
95 B	.3344	1032	.3345	0943	✓	
96 B	.3387	1032	.3388	0943	✓	
97 B	.3393	1033	.3393	0944	✓	
98 B	.3382	1033	.3382	0944	✓	
99 B	.3397	1034	.3398	0945	✓	
100 B	.3398	1034	.3400	0945	✓	

Checked by: C Wallington Date: 1-25-2006 Time: 1115

BALANCE ROOM ENVIRONMENTAL CONDITIONS

DATE	TIME	BY	WB	DB	% RH
1-24-06	1029	KV	58	69	48
1-25-06	0940	KV	60	73	47

BEAKER TARE WEIGHTS DATA SHEET #4-2

Into Dessicator: Date : 2-13-06 Time : 1415 By : KV

	DATE: 3-3-06	BY: KV	DATE: 3-6-06	BY: Clp	DATE:	BY:
BEAKER #	FIRST WEIGHT	TIME	SECOND WEIGHT	TIME	THIRD WEIGHT	TIME
51	104.8758	1116	104.8740	1314	104.8735	1409
52	107.4982	1117	107.4973	1315	107.4970	1910
53	105.7352	1118	105.7347	1316		
54	107.3065	1118	107.3064	1317		
55	93.4886	1119	93.4874	1318	93.4870	1911
56	106.8604	1120	106.8608	1320		
57	97.4106	1120	97.4102	1321		
58	96.8913	1121	96.8916	1323		
59	105.3518	1122	105.3513	1323		
60	98.1992	1122	98.1995	1324		
61	99.3500	1123	99.3491	1325	99.3487	1915
62	97.8660	1124	97.8665	1326		
63	93.2159	1124	93.2154	1327		
64	104.7890	1125	104.7876	1328	104.7872	1916
65	98.4433	1125	98.4429	1329		
66	96.5099	1126	96.5107	1330	96.5103	1917
67	106.2246	1127	106.2242	1331		
68	94.1587	1128	94.1577	1332	94.1575	1920
69	108.9944	1129	108.9939	1333		
70	107.4800	1129	107.4812	1334	107.4810	1921
71	104.1529	1130	104.1524	1336		
72	103.8297	1130	103.8293	1337		
73	104.3562	1131	104.3558	1338		
74	107.5086	1132	107.5084	1339		
75	96.4680	1134	96.4679	1340		

BALANCE ROOM ENVIRONMENTAL CONDITIONS

DATE	TIME	BY	WB	DB	% RH
3-3-06	1115	KV	61	74	47
3-6-06	1300	Clp	62	75	48
3-7-06	1905	Clp	62	75	48

Checked by : KV
Date : 3-21-06
Time : 0830

WOODSTOVE DATA SHEET # 4-3 : CONSTANT WEIGHTS

UNIT : Buck 261 RUN : 2 DATE : 2-12-2007 Page : 1 of

Beaker #	Date	Time	By	Weight	Date	Time	By	Weight	Date	Time	By	Weight	Date	Time	By
71	2-13	1000	CP	104.2391	2-16	1042	CP	104.2395	2-17	1409	CP				
72	2-13	1800	CP	104.0155	2-16	1043	CP	104.0160	2-17	1410	CP				
73	2-13	1000	CP	104.4376	2-16	1044	CP	104.4372	2-17	1412	CP				
74	2-13	1000	CP	102.5497	2-16	1045	CP	102.5500	2-17	1413	CP				
75	2-13	1000	CP	96.5153	2-16	1046	CP	96.5155	2-17	1414	CP				

Filter #	Date	Time	By	Weight	Date	Time	By	Weight	Date	Time	By	Weight	Date	Time	By
96F	2-12	2000	CP	.9227	2-13	1042	CP	.9230	2-14	0935	CP				
96B	2-12	2000	CP	.3764	2-13	1041	CP	.3739	2-14	0939	CP	.3719	2-16	1040	CP
			CP	.3714	2-17	1408	CP								

SCALE ROOM ENVIRONMENTAL CONDITIONS

Weighing Session	Date	Time	By	DB	%RH
1	2-13	1030	CP	76	45
2	2-14	0930	CP	74	47
3	2-16	1030	CP	75	48
4	2-17	1400	CP	78	46
5					

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

WOODSTOVE DATA SHEET #4-4

SCALE QA SHEET

Dates: From 11-3-2009 Through	Scale: Sartorius	Model: A 120 S	SN: 37010004

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

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

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	HU	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	P	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	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

100 g weight	10 g weight	1 g weight	100 mg weight	Tech	Date	Time	Dry Bulb	% RH
99.9996	9.9998	.9999	.0998	Clp	12-8	0900	67	38
100.0001	10.0001	1.0000	.0998	Clp	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	1.0006	.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	Clp	1-2	1230	77	48
100.0003	10.0000	1.0001	.0999	Clp	1-4	1430	74	44
100.0003	9.9999	1.0000	.0999	Clp	1-5	1206	74	47
100.0002	9.9999	1.0000	.0999	Clp	1-6	1000	77	49
100.0000	10.0001	.9999	.0997	KV	1-8	1000	71	41
100.0002	10.0000	1.0000	.0999	Clp	1-9	1400	75	48
100.0000	10.0001	1.0000	.0999	Clp	1-12	1200	74	47
100.0001	10.0001	.9999	.0998	Clp	1-13	1500	73	49
99.9999	10.0003	.9998	.0998	Clp	1-15	1230	69	49
100.0003	10.0001	1.0001	.1000	Clp	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	Clp	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	Clp	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	Clp	2-8	1135	75	41
100.0002	10.0001	.9999	.0999	KV	2-10	0930	72	42
100.0000	10.0000	.9999	.0999	Clp	2-13	0940	75	46
100.0001	10.0002	1.0000	.0999	KV	2-20	1200	71	44
100.0003	10.0001	.9999	.0999	Clp	3-1	1215	78	43
100.0004	10.0001	1.0000	.0999	Clp	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	Clp	3-6	1300	75	48
100.0002	10.0001	1.0002	.0999	Clp	3-7	1905	75	48
100.0002	9.9999	.9999	.0999	Clp	5-24	1600	78	46
100.0004	10.0001	.9999	.0999	Clp	5-25	0830	76	45
100.0000	9.9999	.9997	.0999	Clp	5-26	0840	74	47
100.0003	9.9999	1.0000	.0998	Clp	5-30	1220	73	48
100.0002	10.0001	.9999	.1000	Clp	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

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	Clp	10-21	0900	74	44
100.0000	10.0001	1.0000	.0999	Clp	10-22	1630	78	46
99.9998	10.0000	.9998	.0998	Clp	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	Clp	10-29	1900	75	44
99.9998	10.0003	1.0000	.0999	Clp	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	Clp	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	Clp	11-12	1600	67	49
100.0001	10.0000	1.0000	.0999	Clp	11-13	1430	74	47
99.9999	10.0000	1.0000	.0999	Clp	11-15	1500	72	44
100.0002	10.0000	.9999	.0999	KV	11-16	0815	70	44
100.0005	10.0000	1.0000	.0999	Clp	11-17	0930	72	46
100.0004	10.0002	1.0001	.1000	Clp	11-18	1600	72	48
100.0003	10.0001	.9999	.0999	Clp	11-20	1100	68	47
100.0004	10.0002	1.0000	.1000	Clp	11-21	1200	74	44
100.0002	10.0002	.9999	.0998	Clp	11-22	1030	74	42
99.9999	10.0000	1.0000	.0999	Clp	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	Clp	11-28	1000	72	42
100.0004	10.0000	1.0000	.0998	Clp	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	Clp	12-1	0900	70	41
100.0000	10.0000	.9999	.1000	Clp	12-2	1340	72	42
100.0000	10.0000	.9998	.0999	Clp	12-3	1400	68	43
99.9999	9.9998	.9999	.0996	Clp	12-5	1620	71	45
99.9997	10.0001	1.0000	.0999	Clp	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

100 g weight	10 g weight	1 g weight	100 mg weight	Tech	Date	Time	Dry Bulb	% RH
99.9998	9.9999	.9999	.0998	[illegible]	07/15	2000	78	46
99.9997	9.9998	1.0000	.1000	[illegible]	07/19	2250	78	46
100.0000	9.9999	.9999	.0999	[illegible]	07/20	0740	78	46
100.0000	9.9999	1.0000	.1000	[illegible]	07/21	2100	78	46
99.9998	9.9998	.9999	.1000	[illegible]	07/24	2200	78	46
100.0001	10.0000	1.0000	.1000	[illegible]	07/27	1515	78	49
99.9998	10.0000	.9998	.1000	[illegible]	07/28	0600	78	49
99.9999	10.0001	1.0000	.1000	[illegible]	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
99.9998	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	44
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: Buck 261 RUN: 2 DATE: 2-12-2007

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		74	44
10-6	0930	CP		77	47

FINAL QC

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

NET PARTICULATE CATCH CALCULATION DATA SHEET #6

UNIT : Buck 261 RUN : 2 DATE : 2-12-2007

Blank Audit by C Armstrong 10-14-2005

BLANK CALCULATIONS

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

FRONT HALF CATCH

FILTERS : .2429 (Total Catch) g - 1 (# of Filters) (.0000 g) (Blank Value / Filter) = .2429 g

BEAKERS : .0871 (Total Catch) g - 80 (ml Acetone) (.000007 g) (Blank Value / ml Acetone) = .0865 g

.0006

TOTAL FRONT HALF CATCH : .3294 g

BACK HALF CATCH

FILTERS : .0326 (Total Catch) g - 1 (# of Filters) (.0000 g) (Blank Value / Filter) = .0326 g

BEAKERS :

Acetone : .1867 (Total Catch) g - 130 (ml Acetone) (.000007 g) (Blank Value / ml Acetone) = .1858 g

.0009

Extract : .0814 (Total Catch) g - 75 (ml Dichloromethane) (.000015 g) (Blank Value / Dichloromethane) = .0803 g

.0011

Water : .0892 (Total Catch) g - 300 (ml Water) (.000013 g) (Blank Value / Water) = .0853 g

.0039

TOTAL BACK HALF CATCH : .3840 g

TOTAL CATCH : .7134 g

% FRONT HALF : 46.2 %

CALCULATIONS DATA SHEET # 7

UNIT : Buck 261 RUN : 2 DATE : 2-12-2007

1) Vm (std) = $\dfrac{(99.141 \text{ Vm})(17.64)(.997 \text{ mcf})\left(30.00 \text{ " Hg} + \dfrac{.147 \text{" } H_2O}{13.6}\right)}{(551 \text{ TmA})} = \dfrac{94.9671}{000.0000}$ dscf

2) Vw (std) = (.04707) (128.9 ml H_2O) = $\dfrac{6.0673}{00.0000}$ scf

3) Asw = $\dfrac{(6.0673 \text{ scf})}{(6.0673 \text{ scf} + 94.9671 \text{ dscf})} = \dfrac{.0601}{.0000}$ Bws × 100 = $\dfrac{6.0052}{00.0000}$ % H_2O

4) Cs = $\dfrac{(.7134 \text{ g.})}{(94.9671 \text{ dscf})}$ (15.43) = $\dfrac{.1159}{0.0000}$ gr / dscf

5) Estimated g / hr = $\dfrac{(.7134 \text{ g.})}{(94.9671 \text{ dscf})}$ ($\dfrac{7.446}{00.0000}$ dscfm) (60) = $\dfrac{3.3561}{00.0000}$ 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_2O =	average delta H for test	(p. 2)	(.000 " H_2O)
TmA =	average meter temperature for test in degrees Absolute	(p. 2)	(000 TmA)
ml H_2O =	total water caught during test	(p. 3)	(000.0 ml H_2O)
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 : Buck 261 RUN : 2 DATE : 2-12-2007

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

Wet Bulb / Dry Bulb

Pre : WB : 62 DB : 77 = 42 % RH 1.4 % H_2O

Post : WB : 63 DB : 81 = 36 % RH 1.4 % H_2O

Average : 39 % RH 1.4 % H_2O

Empty Stove Weight (lbs) : N/A w/ stack & oil seal : Wet : N/A Dry : 517.3

Kindling Weight (lbs) : Paper : 1.1 Wood : 26

Preburn Fuel Weight : 21 + 18.4 + 16.9 + 2.5 Total : 58.8

Kindling & Preburn Fuel Weight (wood only) (lbs) : **Total** : 61.4

Coal Bed Wt Range (lbs) : 4.1 - 3.4 **Scale** : 521.4 - 520.7

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

Lower : .20 × fuel weight : Always round UP to nearest tenth **Actual Coal Bed Weight** : 4.1

Maximum Coal Bed Removal (lbs) : ((4.1 (Upper) + 3.4 (Lower)) ÷ 2) .25 = .9 (round down to nearest tenth)

Test Fuel (.75" × 1.5" × 5" spacers) = 16 pcs

Dimensions	Length in inches	No. Pcs	Weight in lbs	% of Load
2" × 4"	18	3	7.2	43.1
4" × 4"	18	2	9.5	56.9

Test Fuel Weight : 16.7 lbs

Estimated Dry Burn Rate : 2.809

$$\frac{16.7 - (16.7 \times .16819)}{2.2046} \times \frac{60}{\underset{\text{TIME}}{320}} = 1.181 \text{ kg / hr}$$

Estimated BTU's/hr : 19,140 × $\frac{63}{100}$ × $\frac{1.181}{\text{DBR}}$ = 14240.7 BTU's/hr

EPA Default Efficiencies : Non-cat : 63 Cat : 72 Pellet : 78

WOOD STOVE OPERATING DATA PAGE #9

Unit : Buck 261 Run : 2 Date : 2-12-2007

FIRE STARTED: 0830

WARM UP AND PREBURN:

PRIMARY AIR : Set wide open for all warm-up / preburn fuel charges. Then set to 6 5/8" 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 25 sec.

TEST:

DOOR wide open during loading 0 min. 40 sec.

PRIMARY AIR : Opened full for first 5 min., then set to run setting of 6 5/8".

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

FAN:

ON / (OFF) during warm-up (ON) / OFF during preburn

ON / (OFF) first 30 minutes of test (ON) / OFF balance of test run

Fan speed set at High

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 : N/A BRAND : N/A

All Grades WCLB rules:

WARM UP INFORMATION:

All pre-burn / warm up fuel pieces were either 16 or 16 inches.

1st warm up / pre-burn fuel charge (21.0 lbs.) added at 0843

2nd warm up / pre-burn fuel charge (18.4 lbs.) added at 1000

3rd warm up / pre-burn fuel charge (16.9 lbs.) added at 1110

4th warm up / pre-burn fuel charge (2.5 lbs.) added at 1300

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

TEST DATA SHEET #10

Unit : Buck 261 Run : 2 Date : 2-12-2007

Room Temperature : 70 °F Temperature Correction Set?: (YES) NO

Calibration Check : 12.0% + or- 0.2%? (YES) NO

Time Test Fuel moisture reading taken : 1115

pc #	Dimen. 2"×4"×8'	Use K	TOP	BOTTOM	SIDE	Average
1			15.6	14.2	15.1	15.0
2						
3						
4	2"×4"×8'	P	18.5	17.9	18.2	18.2
5	2"×4"×8'	P	21.6	23.0	22.0	22.2
6	2"×4"×8'	P	19.4	19.5	19.0	19.3
7	2"×4"×8'	P				(59.7)
8	2"×4"×8'	P				
9						
10						
11	2x4x18	T	19.4	19.4	18.9	19.2
12	"	T	18.7	17.3	18.5	18.1
13	"	T	23.7	20.7	22.0	22.1
14	4x4x18	T	21.4	20.6	19.5	20.5
15	"	T	20.7	22.0	21.0	21.2
16						(101.1)
17						
18						
19						
20	Spacers	T	23.7	23.6	23.3	

Key for Use : K = Kindling P = Pretest Fuel T = Test Fuel

	KINDLING	PRETEST FUEL	TEST FUEL
Dry Moisture % :	15.000 %	19.900 %	20.220 %
Wet Moisture % :	13.043 %	16.597 %	16.819 %

To obtain Wet from Dry : $\frac{100 \times \%\ \text{Dry Reading}}{100 + \%\text{Dry Reading}}$ = % Moisture, Wet Basis

Acceptable Ranges : 16 - 20 % wet: 19 - 25 % dry with meter corrected for temperature.

GAS DATA SHEET #12

WEIGHT: 521.4 DATE: 2-12-20

UNIT: Buck 261 RUN: 2 PAGE: 1 OF 2

TIME	SCALE	FUEL	DROP	V.	CO_2	V.	O_2	V.	CO	STATIC	SO_2PI
0 1400	538.1	16.7	—	.203	5.1	.588	14.7	.097	.97	-.030	450
5 10	537.6	16.2	.5	.328	8.2	.496	12.4	.014	.14	-.042	300
10 15	537.21	16.0	.2	.164	2.6	.702	17.6	.055	.55	-.031	425
15 20	537.1	15.7	.3	.153	3.9	.651	16.3	.062	.62	-.031	475
20 25	536.6	15.2	.5	.219	5.5	.575	14.4	.079	.79	-.034	475
25 30	536.1	14.7	.5	.385	9.7	.397	9.9	.118	1.18	-.041	450
Fan ? 30 35	535.4	14.0	.7	.382	9.6	.423	10.6	.054	.54	-.043	450
35 40	534.7	13.3	.7	.337	8.5	.463	11.6	.055	.55	-.043	425
40 45	533.8	12.4	.9	.492	12.3	.296	7.4	.109	1.09	-.045	475
45 50	533.1	11.7	.7	.505	12.3	.297	7.4	.101	1.01	-.045	425
50 55	532.2	10.8	.9	.482	12.1	.312	7.8	.088	.88	-.046	450
55 1500	531.4	10.0	.8	.454	11.4	.360	9.0	.040	.40	-.046	425
SUBTOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	-.477	*****
60 1505	530.8	9.4	.6	.496	12.4	.320	8.0	.032	.32	-.046	400
65 10	530.0	8.6	.8	.504	12.6	.309	7.7	.043	.43	-.047	400
70 15	529.4	8.0	.6	.494	12.4	.322	8.1	.037	.37	-.046	400
75 20	528.8	7.4	.6	.431	10.8	.388	9.7	.025	.25	-.044	400
80 25	528.3	6.9	.5	.377	9.5	.431	10.8	.047	.47	-.043	425
85 30	527.9	6.5	.4	.371	9.3	.435	10.9	.053	.53	-.041	425
90	527.4	6.0	.5	.386	9.7	.422	10.6	.054	.54	-.041	425
95 40	526.9	5.5	.5	.382	9.6	.427	10.7	.052	.52	-.041	425
100	526.5	5.1	.4	.379	9.5	.432	10.8	.049	.49	-.041	425
105 50	526.1	4.7	.4	.367	9.2	.444	11.1	.049	.49	-.038	450
110	525.7	4.3	.4	.380	9.5	.429	10.7	.056	.55	-.038	450
115 1600	525.4	4.0	.3	.370	9.3	.441	11.0	.047	.47	-.038	450
SUBTOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	-.504	*****
120 1605	525.1	3.7	.3	.344	8.6	.470	11.8	.044	.44	-.035	450
125 10	524.8	3.4	.3	.332	8.3	.484	12.1	.038	.38	-.035	450
130 15	524.6	3.2	.2	.326	8.2	.488	12.2	.039	.39	-.035	450
135 20	524.4	3.0	.2	.292	7.3	.519	13.0	.049	.49	-.032	450
140	524.2	2.8	.2	.246	6.2	.543	13.6	.101	1.01	-.032	450
145 30	524.1	2.7	.1	.230	5.8	.559	14.0	.099	.99	-.029	450
150	524.0	2.6	.1	.229	5.8	.560	14.0	.097	.97	-.029	450
155 40	523.8	2.4	.2	.239	6.0	.554	13.8	.092	.92	-.029	450
160	523.7	2.3	.1	.248	6.2	.549	13.8	084	.84	-.029	450
165 50	523.6	2.2	.1	.239	6.0	.555	13.9	.090	.90	-.028	450
170	523.5	2.1	.1	.233	5.8	.557	14.0	.104	1.04	-.028	450
175 1700	523.5	2.1	0	.237	6.0	.549	13.8	.104	1.04	-.028	450
SUBTOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	-.369	*****
TOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	-1.350	*****

GAS DATA SHEET #12

WEIGHT: 521.4 DATE: 2-12-200

UNIT: Buck 261 RUN: 2 PAGE: 2 OF 2

TIME	SCALE	FUEL	DROP	V.	CO_2	V.	O_2	V.	CO	STATIC	SO_2PPM
180 1705	523.3	1.9	.2	.234	5.9	.552	13.8	.106	1.06	-.028	450
185 10	523.3	1.9	0	.229	5.8	.564	13.9	.112	1.12	-.028	450
190 15	523.2	1.8	.1	.214	5.4	.570	14.3	.111	1.11	-.029	450
195 20	523.1	1.7	.1	.185	4.7	.597	15.0	.114	1.14	-.026	450
200 25	523.0	1.6	.1	.178	4.5	.603	15.1	.119	1.19	-.026	450
205 30	522.9	1.5	.1	.179	4.5	.601	15.1	.124	1.24	-.026	460
210 35	522.9	1.5	0	.181	4.6	.598	15.0	.122	1.22	-.026	475
215 40	522.8	1.4	.1	.181	4.6	.596	14.9	.128	1.28	-.026	475
220 45	522.7	1.3	.1	.182	4.6	.599	15.0	.120	1.20	-.025	475
225 50	522.7	1.3	0	.182	5.0	.580	14.5	.127	1.27	-.025	475
230 55	522.6	1.2	.1	.185	4.7	.590	14.8	.133	1.33	-.025	475
235 1800	522.5	1.1	.1	.180	4.5	.597	15.0	.135	1.35	-.025	475
SUBTOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	-.314	*****
240 05	522.4	1.0	.1	.184	4.6	.595	15.0	.130	1.30	-.025	475
245 10	522.4	1.0	0	.179	4.5	.599	15.0	.129	1.29	-.025	460
250 15	522.3	.9	.1	.180	4.5	.603	15.1	.120	1.20	-.025	475
255 20	522.2	.8	.1	.182	4.6	.602	15.1	.112	1.12	-.025	500
260 25	522.1	.7	.1	.161	4.1	.627	15.7	.100	1.00	-.025	500
265 30	522.1	.7	0	.149	3.8	.636	15.9	.107	1.07	-.025	500
270 35	522.0	.6	1	.147	3.7	.637	16.0	.113	1.13	-.025	500
275 40	522.0	.6	0	.144	3.6	.634	16.0	.132	1.32	-.025	500
280 45	521.9	.5	.1	.145	3.7	.640	16.0	.106	1.06	-.025	500
285 50	521.9	.5	0	.146	3.7	.641	16.1	.103	1.03	-.025	525
290 55	521.8	.4	.1	.149	3.8	.640	16.0	.098	.98	-.025	525
295 1900	521.7	.3	.1	.149	3.8	.638	16.0	.101	1.01	-.025	525
SUBTOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	-.300	*****
★ 300 5	521.7	.3	0	.148	3.7	.641	16.1	.104	1.04	-.025	525
305 10	521.6	.2	.1	.150	3.8	.635	15.9	.109	1.09	-.025	525
310 15	521.6	.2	0	.153	3.9	.628	15.7	.116	1.16	-.025	525
315 20	521.5	.1	.1	.143	3.6	.638	16.0	.121	1.21	-.025	525
320 25	521.4	.0	.1	.140	3.5	.639	15.9	.136	1.36	-.025	525
325											
330											
335											.165
340											
345											
350											
355											
SUBTOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	-.125	*****
TOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	-.739	*****

-2.089

-.037

Add 6 lbs (2.5) = 1.4

UNIT: Buck 261

PREBURN DATA SHEET #13

RUN: 2 DATE: 2-12-2007 PAGE: 1 of

TIME	SCALE	DROP	STACK	TOP	LF SIDE	BACK	RT SIDE	BOTTOM	FIREBOX	SEC/CAT	AMBIENT	STATIC	COMMENTS
0 1300	523.9	—	337	338	496	310	497	317			75	-.040	PREBURN START: # 2.5 UP
5	523.8	.1	248	302	468	274	471	303			76	-.034	COAL BED SCALE RANGE:
10 10	523.7	.1	222	269	438	254	442	296			76	-.031	521.4 → 520.7
15	523.7	0	209	248	414	241	420	286			76	-.030	PRIMARY AIR: 1 5/8
20 20	523.5	.2	206	228	390	227	394	276			76	-.030	SECONDARY AIR: N/A
25	523.2	.3	204	220	374	220	378	267			75	-.030	FAN: High
30 30	522.9	.3	222	224	362	212	367	259			75	-.033	PUMPS ON AT:
35	522.7	.2	220	222	361	210	364	253			75	-.033	CHECK WB/DB:
40 40	522.5	.2	217	220	359	209	366	247			75	-.033	
45	522.1	.4	249	245	364	208	360	242			76	-.039	
50 50	521.9	.2	266	276	369	208	362	237			75	-.040	
55	521.7	.2	232	265	373	209	363	234			76	-.034	
*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	
60 1400	521.6	.1	211	240	366	208	358	233			76	-.031	
65 05	521.4	.2	207	223	357	205	352	233			77	-.030	
70													
75													
80													

New Buck Model 261

Temperature Data Sheet #14

2/12/2007
Run 2

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	207	223	357	205	352	233	######	######	77	1454	226	58	239	36	37
5	301	266	334	254	331	236	######	######	75	1464	226	42	241	36	37
10	227	281	315	247	315	243	######	######	75	1472	227	41	241	36	37
15	202	267	297	242	299	250	######	######	74	1478	227	42	242	36	37
20	220	281	286	236	289	248	######	######	73	1484	228	43	243	36	37
25	248	304	279	231	282	244	######	######	73	1489	228	43	243	36	37
30	280	357	282	228	285	241	######	######	73	1493	229	43	244	36	37
35	285	394	294	189	294	238	######	######	73	1498	229	43	245	36	37
40	308	351	313	184	305	229	######	######	75	1503	230	44	246	36	37
45	320	357	333	182	321	217	######	######	76	1505	230	45	246	37	37
50	320	360	353	185	343	209	######	######	76	1510	231	45	246	37	37
55	316	365	369	189	359	205	######	######	77	1514	232	45	246	37	37
60	324	369	379	192	368	201	######	######	77	1518	232	46	246	37	38
65	327	371	387	196	376	199	######	######	77	1521	232	47	246	37	38
70	326	374	398	200	383	198	######	######	78	1526	234	47	245	38	38
75	310	364	410	204	390	198	######	######	78	1530	234	47	245	38	38
80	294	357	413	207	398	198	######	######	79	1532	234	47	245	38	38
85	284	344	411	209	402	199	######	######	79	1534	235	48	245	38	38
90	279	333	414	212	406	200	######	######	79	1536	234	48	244	38	38
95	274	325	420	214	412	200	######	######	79	1538	235	49	244	38	38
100	270	317	422	217	417	201	######	######	79	1539	234	49	244	38	38
105	264	312	422	220	420	202	######	######	80	1540	235	49	244	38	38
110	264	309	419	222	423	202	######	######	79	1541	235	50	244	38	38
115	263	310	419	225	427	203	######	######	80	1541	235	50	243	38	38
120	251	295	418	227	429	204	######	######	80	1542	235	51	243	38	38
125	243	285	417	229	430	204	######	######	80	1544	235	51	243	38	38
130	237	274	413	231	431	205	######	######	80	1545	235	52	243	38	38
135	232	265	412	233	429	205	######	######	80	1545	234	52	243	38	38
140	221	251	407	234	424	205	######	######	80	1547	234	52	243	38	38
145	212	240	400	230	411	206	######	######	80	1550	234	52	243	37	38
150	206	227	394	228	399	206	######	######	79	1553	234	52	243	37	38
155	202	219	389	227	390	206	######	######	79	1552	233	52	243	37	38
160	200	214	386	226	385	205	######	######	79	1552	233	52	243	37	38
165	198	209	382	225	382	204	######	######	79	1551	233	52	243	36	38
170	195	205	378	223	378	203	######	######	79	1549	232	52	244	36	38

New Buck Model 261

Temperature Data Sheet #14

2/12/2007
Run 2

175	193	200	373	222	374	202	######	######	79	1548	231	52	244	36	38
180	192	199	369	220	372	201	######	######	78	1547	232	52	244	36	37
185	190	196	365	219	368	201	######	######	78	1546	231	53	243	36	37
190	187	193	360	218	366	200	######	######	77	1545	230	53	243	35	37
195	183	189	353	214	362	199	######	######	78	1546	231	53	243	35	36
200	179	187	346	209	353	198	######	######	78	1546	230	53	243	35	36
205	176	182	340	205	345	197	######	######	77	1546	230	53	243	35	36
210	174	178	332	200	338	195	######	######	77	1545	229	54	242	34	36
215	172	175	327	196	332	193	######	######	76	1543	228	54	242	34	35
220	171	173	322	193	326	191	######	######	76	1543	228	55	241	34	35
225	169	171	319	190	320	190	######	######	76	1543	228	56	241	34	35
230	168	169	313	188	315	188	######	######	76	1543	228	56	241	34	35
235	167	167	310	186	312	186	######	######	76	1542	227	56	240	33	35
240	166	165	308	183	308	184	######	######	75	1542	227	56	240	33	34
245	165	164	305	180	304	182	######	######	73	1542	226	56	239	33	34
250	165	163	300	178	298	180	######	######	73	1542	226	47	239	33	34
255	163	162	295	178	296	179	######	######	74	1541	226	45	238	32	34
260	161	160	292	178	291	178	######	######	74	1541	225	45	238	32	33
265	158	157	287	175	286	177	######	######	74	1541	225	45	237	32	33
270	156	156	282	172	279	177	######	######	73	1542	225	45	237	32	33
275	154	152	278	170	273	176	######	######	74	1542	225	46	236	32	33
280	151	150	275	168	268	174	######	######	73	1543	225	46	236	31	33
285	149	148	271	167	263	171	######	######	73	1542	225	45	236	31	32
290	148	145	269	166	259	169	######	######	73	1540	225	45	235	31	32
295	147	145	268	165	255	166	######	######	73	1541	225	45	235	31	32
300	146	143	270	164	250	164	######	######	73	1539	225	45	234	31	32
305	145	142	269	162	247	161	######	######	72	1538	225	46	234	30	31
310	145	140	269	160	243	159	######	######	72	1537	225	46	233	30	31
315	144	140	271	159	240	157	######	######	72	1536	225	46	233	30	31
320	144	139	272	158	236	155	######	######	72	1537	225	49	233	30	31

New Buck Model 261

2/12/2007
Run 2

TEMPERATURE DATA SHEET #14A

		TEST TIME	320		
STACK AVG	216	TOP AVG	239	LT SIDE AVG	344
BACK AVG	202	RT SIDE AVG	341	BOTTOM AVG	198
FIREBOX AVG	########	SEC/CAT AVG	########	AMBIENT AVG	76

END	192.1	
START	273.9	
	-81.8	DELTA T

CIRCLE: LOSS / GAIN

ZERO / SPAN CHECK DATA SHEET #15-1

Date : 2-12-2007 Analyte : CO_2 (15-1)

Unit : Buck 261 Run # : 2

Zero Cyl. # : 168TAC 3-A Conc. : 0.00 % CO_2 Cyl. Press. : 950 PSI

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

Span Cyl. # : CC-41627 Conc. : 12.50 % CO_2 Cyl. Press. : 620 PSI

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

Analyzer : Make : HORIBA Model : PIR-2000 SN : 407069

Range : 0 - 25.0 % CO_2 Analyzer Output : 0 - 1.0 v.

Flow : 1.5 SCFH Measured by : Rotameter

EPA Span Value = 25.0 % CO_2

EPA Control Limits = ± 2.5% of 25.0 % CO_2 = ± 0.625 % CO_2

Method 28 A = ± .2 % of 25.0 % CO_2 = ± .05 % CO_2

PRE RUN Audit : by : Chp Wadsworth Time : 1230 Temp : 79 °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	50.1	.501	12.550	.050	.200

POST RUN Audit : by : Chp Wadsworth Time : 1940 Temp : 71 °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	.194
SPAN	50.0	.500	12.50	49.8	.498	12.475	-.025	-.099

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

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

Span % Difference = $\frac{\text{Act \% (ppm) - Exp \% (ppm)}}{\text{Full Scale Value}}$ X100

ZERO / SPAN CHECK DATA SHEET #15-2

Date : 2-12-2007 Analyte : O_2 (15-2)

Unit : Book 26) Run # : 2

Zero Cyl. # : 168TAC 3A Conc. : 0.00 % O_2 Cyl. Press. : 950 PSI

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

Span Cyl. # : CC-41627 Conc. : 12.50 % O_2 Cyl. Press. : 620 PSI

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

Analyzer : Make : TELEDYNE Model : 320 A SN : 37400

Range : 0 - 25.0 % O_2 Analyzer Output : 0 - 1.0 v.

Flow : 1.5 SCFH Measured by : Rotameter

EPA Span Value = 25.0 % O_2

EPA Control Limits = ± 2.5% of 25.0 % O_2 = ± 0.625 % O_2

Method 28 A = ± .2 % of 25.0 % O_2 = ± .05 % O_2

PRE RUN Audit : by : Chp Wellington Time : 1230 Temp : 79 ° F

AUDIT RESULTS

Point #	Expected Response			Actual Response			± Conc. Difference	Δ %
	Meter	DVM	%	Meter	DVM	%		
ZERO	00.0	.000	00.0	00.0	.000	-.025	-.025	-.102
SPAN	12.50	.500	12.50	12.5	.500	12.522	.022	.090

POST RUN Audit : by : Chp Wellington Time : 1940 Temp : 71 ° F

AUDIT RESULTS

Point #	Expected Response			Actual Response			± Conc. Difference	Δ %
	Meter	DVM	%	Meter	DVM	%		
ZERO	00.0	.000	00.0	00.0	.001	-.0004	-.0004	-.002
SPAN	12.50	.500	12.50	12.5	.501	12.548	.048	.190

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

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

Span % Difference = $\frac{\text{Act \% (ppm) - Exp \% (ppm)}}{\text{Full Scale Value}}$ X100

ZERO / SPAN CHECK DATA SHEET #15-3

Date : 2-12-2007 Analyte : CO (15-3)

Unit : Rack 26) Run # : 2

Zero Cyl. # : 168TAC 3-A Conc. : 0.00 % CO Cyl. Press. : 950 PS

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

Span Cyl. # : CC-41627 Conc. : 4.99 % CO Cyl. Press. : 620 PS

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 = ± 2.5% of 10.0 % CO = ± 0. 25 % CO

Method 28 A = ± .2 % of 10.0 % CO = ± .02 % CO

PRE RUN Audit : by : Chp Weatherly Time : 1230 Temp : 79 ° F

AUDIT RESULTS

Point #	Expected Response			Actual Response			± Conc. Difference	Δ %
	Meter	DVM	%	Meter	DVM	%		
ZERO	00.0	.000	00.0	00.0	.000	.004	.004	.037
SPAN	49.9	.499	4.99	49.9	.499	4.983	-.007	-.074

POST RUN Audit : by : Chp Weatherly Time : 1940 Temp : 71 ° F

AUDIT RESULTS

Point #	Expected Response			Actual Response			± Conc. Difference	Δ %
	Meter	DVM	%	Meter	DVM	%		
ZERO	00.0	.000	00.0	00.0	.000	.001	.001	.037
SPAN	49.9	.499	4.99	50.0	.500	4.993	.003	.026

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

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

Span % Difference = $\frac{\text{Act \% (ppm) - Exp \% (ppm)}}{\text{Full Scale Value}}$ X100

ZERO / SPAN CHECK DATA SHEET #15-4

Date : 2-12-2007 Analyte : SO_2 (15-4)

Unit : Buck 261 Run # : 2

Zero Cyl. # : 168TAC 3-A Conc. : 0.00 ppm SO_2 Cyl. Press. : 950 PSI

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

Span Cyl. # : CC82089 Conc. : 1250 ppm SO_2 Cyl. Press. : 2000 PSI

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

Analyzer : Make : HORIBA Model : PIR-2000 SN : 403019

Range : 0 - 2500 ppm SO_2 Analyzer Output : 0 - 1.0 v.

Flow : 1.5 SCFH Measured by : Rotameter

EPA Span Value = 2500 ppm SO_2

EPA Control Limits = ± 2.5% of 2500 ppm SO_2 = ± 62.5 ppm SO_2

PRE RUN Audit : by : C. Wentworth Time : 1230 Temp : 79 ° 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	10.077	10.077	.403
SPAN	50.0	.500	1250	49.9	.499	1248.5	-1.500	-.060

POST RUN Audit : by : C. Wentworth Time : 1940 Temp : 71 ° 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	5.083	5.083	.203
SPAN	50.0	.500	1250	50.2	.502	1256.0	6.000	.240

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

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

Span % Difference = $\frac{\text{Act \% (ppm) - Exp \% (ppm)}}{\text{Full Scale Value}}$ X100

QUALITY CHECKS DATA SHEET # 16

UNIT : Buck 261 RUN : 2 DATE 2-12-2007

Thermocouple Check:

T/C # 1	— °F	T/C # 13	67.6 °F
T/C # 2	— °F	T/C # 14	67.6 °F
T/C # 3	65.8 °F	T/C # 15	67.0 °F
T/C # 4	59.7 °F	T/C # 16	54.4 °F
T/C # 5	58.0 °F	T/C # 17	60.1 °F
T/C # 6	57.6 °F	T/C # 18	70.1 °F
T/C # 7	57.8 °F	T/C # 19	62.0 °F
T/C # 8	57.3 °F	T/C # 20	— °F
T/C # 9	— °F	T/C # 21	— °F
T/C # 10	— °F	T/C # 22	— °F
T/C # 11	57.2 °F	T/C # 23	°F
T/C # 12	72.6 °F	T/C # 24	— °F

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 1999.6 °F Adj. to 2000.0 °F SPAN 1999.7 °F Difference .002 %

Thermocouple Readout Pretest Linearity Check:

0	= 0.0 °F	200	= 200.2 °F	400	= 400.0 °F
600	= 599.9 °F	800	= 799.7 °F	1000	= 999.8 °F
1200	= 1199.8 °F	1400	= 1399.4 °F	1600	= 1599.6 °F
1800	= 1799.9 °F	2000	= 2000.0 °F		

Sample Train Leak Check	Pre ✓	Post ✓
C-gas Train Leak Check	Pre ✓	Post ✓
SO_2 Train Leak Check	Pre ✓	Post ✓
Static Gauge Zero Check	Pre ✓	Post ✓

Scale Check Pre : 531.6 − 521.6 = 10.0

Post : 531.2 − 521.2 = 10.0

Stack Cleaned Prior to Test Run : YES ____ NO X

TABLE 1 ---- RAW DATA

CLIENT : New Buck TEST No. : 3

MODEL: 261 DATE: 13-Feb-07

TIME (MIN.)	METER READING (C F)	DELTA H (IN. H2O)	METER TEMP. (DEG. F)	PERCENT CO (%)	PERCENT CO2 (%)	SO2 COCENTR. PPM
0	888.500	0.150	94	0.89	6.20	375
5	890.000	0.270	94	0.20	10.00	275
10	892.128	0.170	94	0.35	8.40	350
15	893.800	0.190	94	0.37	8.00	325
20	895.601	0.170	94	0.38	13.10	350
25	897.274	0.190	94	0.40	13.70	325
30	899.075	0.190	94	0.35	14.10	325
35	900.876	0.170	94	0.53	14.30	350
40	902.548	0.190	94	0.32	14.20	325
45	904.349	0.190	94	0.25	14.20	325
50	906.150	0.230	94	0.12	12.90	300
55	908.101	0.230	94	0.10	12.50	300
60	910.052	0.230	95	0.09	12.90	300
65	912.009	0.230	95	0.08	12.50	300
70	913.967	0.230	95	0.06	12.30	300
75	915.925	0.230	95	0.08	11.60	300
80	917.883	0.230	95	0.08	11.10	300
85	919.840	0.230	95	0.15	9.70	300
90	921.798	0.230	95	0.09	9.50	300
95	923.756	0.230	95	0.18	8.50	300
100	925.714	0.230	95	0.19	8.40	300
105	927.671	0.230	95	0.21	8.20	300
110	929.629	0.190	95	0.29	6.70	325
115	931.437	0.170	95	0.76	5.40	350
120	933.115	0.170	95	0.62	5.70	350
125	934.796	0.170	95	0.56	6.00	350
130	936.478	0.170	95	0.63	5.90	350
135	938.159	0.190	95	0.65	5.90	325
140	939.970	0.190	95	0.64	5.90	325
145	941.780	0.190	95	0.71	5.80	325
150	943.591	0.190	95	0.77	5.80	325
155	945.401	0.170	95	0.76	5.90	350
160	947.083	0.170	95	0.79	5.60	350
165	948.764	0.170	95	0.82	5.30	350
170	950.445	0.170	95	0.91	5.40	350
175	952.127	0.170	95	0.96	5.40	350

180	953.808	0.170	95	1.00	5.40	350
185	955.487	0.170	95	0.90	5.50	350
190	957.166	0.170	95	0.93	5.20	350
195	958.845	0.170	95	0.99	5.10	350
200	960.524	0.170	95	1.02	4.90	350
205	962.204	0.170	95	0.93	4.80	350
210	963.883	0.170	95	0.84	4.10	350
215	965.562	0.170	95	0.86	4.00	350
220	967.241	0.170	95	0.77	4.00	350
225	968.920	0.170	95	0.81	4.00	350
230	970.599	0.150	95	0.88	4.00	375
235	972.166	0.150	95	0.88	3.90	375
240	973.734	0.150	95	0.85	4.10	375
245	975.301	0.150	95	0.83	3.90	375
250						

TABLE 2---RAW DATA

CLIENT : New Buck TEST No. 3

MODEL: 261 DATE: 13-Feb-07

METER CAL. FACTOR (Y) -------	0.997		Wt. WOOD BURNED(LB) -------	16.8	Lbs
BAROMETRIC PRESS.(Pb) -------	30.16	in Hg	WET,FUEL MOISTURE % -------	16.541	%
LEAK RATE POST (Lp) -------	0.002	cfm	Wt. PART. COLLECTED -------	0.1772	g
WATER VOL. (V1c) -------	129.8	Ml	METER VOLUME Vm -------	86.801	mcf
TEST TIME (MIN) -------	245	min	HC MOLE FRACTION -------	0.0132	

TABLE 3 ----FIELD DATA AVERAGES

CLIENT : New Buck TEST No. 3

MODEL: 261 DATE: 13-Feb-07

AVG DELTA H	-------	0.19	in H2O	AVG PRCNT CO	-------	0.56	%
AVG METER TEMP. Tm	-------	95	deg F	AVG PRCNT CO2	-------	7.80	%
AVG PPM SO2	-------	334	PPM	AVG BAL CO2/CO	-------	14.01	%

TABLE 4 ---- CALCULATIONS

CLIENT : New Buck TEST No. 3

MODEL: 261 DATE: 13-Feb-07

STD SAMPLE VOL. Vm(std) d) ------	83.08	dscf	STACK GAS FLOW Qsd -------	580.084 & 9.67	dscf/Hr & dscf/min
VOL. WATER VAPOR Vw(s td) -----	6.110	scf	PARTICULATE CONCTRT. C s -----	0.0021	g/dscf
PRCNT MSTR Bws ------	6.85	%	PARTC.EMISS. RATE E ------	1.24	g/Hr
BURN RATE BR ------	1.56	Kg/Hr	MOLES OF GAS PER Lb WOOD Nt ----	0.44	Lb-mole/Lb
CO EMISSION RATE ------	108.12 & 69.40	g/Hr & g/Kgdry fuel	PART.EMISS. RATE ------	0.79	g/Kgdry fuel

TABLE 5 ----- PROPORTIONAL RATE VARIATION

CLIENT : New Buck TEST No. : 3

MODEL: 261 DATE: 13-Feb-07

TIME INTEVAL Ti	PPM * Vm	PROPRTN. RATE VAR. PR	PROPRTN RATE VAR. AVERAGE
5	539.1	96	100
10	561.0	100	
15	560.8	100	
20	561.0	100	
25	561.2	100	
30	561.0	100	
35	561.0	100	
40	560.8	100	
45	561.0	100	
50	561.0	100	
55	561.0	100	
60	560.5	100	
65	561.7	100	
70	562.0	100	
75	562.0	100	
80	562.0	100	
85	561.7	100	
90	562.0	100	
95	562.0	100	
100	562.0	100	
105	561.7	100	
110	562.0	100	
115	562.2	100	
120	561.8	100	
125	562.9	100	
130	563.2	100	
135	562.9	100	
140	563.1	100	
145	562.8	100	
150	563.1	100	
155	562.8	100	
160	563.2	100	
165	562.9	100	
170	562.9	100	
175	563.2	100	
180	562.9	100	

185	562.2	100
190	562.2	100
195	562.2	100
200	562.2	100
205	562.5	100
210	562.2	100
215	562.2	100
220	562.2	100
225	562.2	100
230	562.2	100
235	562.1	100
240	562.5	100
245	562.1	100

COMPUTER INPUT DATA SHEET #1

1st

Client: Buck Stoves

Address: P.O. Box 69

Spruce Pine, NC 28777

Phone: 888-622-7868 Fax: 828-765-0462

Run No.: 3 Date of Test: 2-13-2007 Burn Rate: 1.56

Model No.: 261 ☐ min ☐ min-1.25 ☐ fan

Stove Type: ☐ Cat ☒ Non Cat ☐ Pellet ☒ 1.25-1.9 ☐ max ☐ insert

Dry Gas Meter Y Factor: .997 (0.000) (Data Sheet #2) Post Leak Rate: .002 cfm (.000) (Data Sheet #2) Time: 245 min. (000) (Data Sheet #2)

Dry Gas Meter Volume: 86.801 cf (00.000) (Data Sheet #2)

Stack Flow: 10,210 dscfm (00.000) (Data Sheet #2) Δ H: .188 in. H_2 (.000) (Data Sheet #2)

Maximum Vac.: 3.0 (0.0) (Data Sheet #2) Barometric Pressure: 30.16 in. Hg (00.00) (Data Sheet #2)

H_2O Captured: 129.8 g (00.0) (Data Sheet #3)

Front Half Catch % Of Total: 48.1 % (00.0) (Data Sheet #6) Total Particulate Catch: .1772 g (0.0000) (Data Sheet #6)

Flue Gas Moisture: 6.8567 % (00.000) (Data Sheet #7)

Particulate Emission: .0329 gr/dscf (0.0000) (Data Sheet #7)

Relative Humidity: 33 % RH (00.0) (Data Sheet #8) Ambient Moisture: 1.4 % H_2O (0.00) (Data Sheet #8)

Preburn Fuel Wt.: 56.3 lbs. (00.0) (Data Sheet #8) Coal Bed Wt.: 4.0 lbs. (00.0) (Data sheet #8) Test Fuel Wt.: 16.8 lbs. (00.0) (Data sheet #8)

Heat Output (EPA Default): 18810.8 BTU/hr (00,000.0) (Data Sheet #8)

Kindling Fuel % Moisture (wet): 13.420 % (00.000) (Data Sheet #10) Pretest Fuel % Moisture (wet): 16.458 % (00.000) (Data Sheet #10)

Test Fuel % Moisture (dry): 19.820 % (00.000) (Data Sheet #10 [wood stove] or #11 [pellet stove]) Test Fuel % Moisture (wet): 16.541 %

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

Stack Static Pressure: -.038 in. H_2O (+/- .000) (Data Sheet #12)

Average Ambient Temperature: 76 °F (00) (Data Sheet #14) Stove Temperature Change: -98.3 °F (+/- 000.0) (Data Sheet #14)

Test start = 1335

End = 1740

meter Temp = 555

METER BOX DATA SHEET PAGE # 2

Page: 1 of 3

UNIT: Buck 261 RUN: 3 DATE: 2-13-2007

Meter Box: 5H Y Factor: .997

Leak checks: 15 " Hg @ 1066 cfm _____ " Hg @ _____ cfm

15 " Hg @ 1002 cfm _____ " Hg @ _____ cfm

Inject SO^2 @ 100 cc/min. Nozzle: Probe @ 3/8 " od Initial Volume: 1.500

ROTO: PRESS: .20			SAMPLING RATIO: 30 : 1				BP: 30.17		
MIN	TIME	METER READING	SAMPLE MDCF	STACK DSCFM	DELTA H	METER TEMP	SO2 PPM	ROTO TEMP	PUMP VACC
0	1335	888.500	——	9.056	.15	94	375	94	1.0
5	40	890.000	——	12.349	.27	94	375	94	3.0
10	45	892.128	892.128	9.703	.17	94	350	94	1.0
15	50	893.800	893.800	10.449	.19	94	325	94	2.0
20	55	895.601	895.601	9.703	.17	94	350	94	2.0
25	1400	897.274	897.274	10.449	.19	94	325	94	2.0
30	05	899.075	899.075	10.449	.19	94	325	94	2.0
35	10	900.876	900.876	9.703	.17	94	350	94	2.0
40	15	902.548	902.548	10.449	.19	94	325	94	2.0
45	20	904.349	904.349	10.449	.19	94	325	94	2.0
50	25	906.150	906.150	11.320	.23	94	300	94	2.0
55	30	908.101	908.101	11.320	.23	94	300	94	2.0
ROTO PRESS: .20			TOTALS:	125.399	2.34	1128	BP.: 30.17		
60	1435	910.052	910.052	11.300	.23	95	300	95	2.0
65	40	912.009	912.009	11.300	.23	95	300	95	2.0
70	45	913.967	913.967	11.300	.23	95	300	95	2.0
75	50	915.925	915.925	11.300	.23	95	300	95	2.0
80	55	917.883	917.883	11.300	.23	95	300	95	2.0
85	1500	919.840	919.840	11.300	.23	95	300	95	2.0
90	05	921.798	921.798	11.300	.23	95	300	95	2.0
95	10	923.756	923.756	11.300	.23	95	300	95	2.0
100	15	925.714	925.714	11.300	.23	95	300	95	2.0
105	20	927.671	927.671	11.300	.23	95	300	95	2.0
110	25	929.629	929.629	10.431	.19	95	325	95	2.0
115	30	931.437	931.437	9.686	.17	95	350	95	2.0
			TOTALS:	133.117	2.46	1140	MAX VACC =		
TOTAL Cu Ft.			TOTALS:	258.516	5.00	2268	AVG. BP:		

METER BOX DATA SHEET PAGE # 2

Page: 2 of 3

UNIT: Buck 261 RUN: 3 DATE: 2-13-2007

Meter Box: 5H Y Factor: .997

Leak checks: 15 " Hg @ 1.000 cfm _____ " Hg @ _____ cfm

15 " Hg @ 1.002 cfm _____ " Hg @ _____ cfm

Inject SO^2 @ 100 cc/min. Nozzle : Probe @ 3/8 " od Initial Volume: 1.500

ROTO: PRESS: .20			SAMPLING RATIO: 30			: 1	BP: 30.12		
MIN	TIME	METER READING	SAMPLE MDCF	STACK DSCFM	DELTA H	METER TEMP	SO2 PPM	ROTO TEMP	PUMP VACC
120	1535	933.115	933.115	9.670	.17	95	350	95	2.0
125	40	934.796	934.796	9.670	.17	95	350	95	2.0
130	45	936.478	936.478	9.670	.17	95	350	95	2.0
135	50	938.159	938.159	10.413	.19	95	325	95	2.0
140	55	939.970	939.970	10.413	.19	95	325	95	2.0
145	1600	941.780	941.780	10.413	.19	95	325	95	2.0
150	05	943.591	943.591	10.413	.19	95	325	95	2.0
155	10	945.401	945.401	9.670	.17	95	350	95	2.0
160	15	947.083	947.083	9.670	.17	95	350	95	2.0
165	20	948.764	948.764	9.670	.17	95	350	95	2.0
170	25	950.445	950.445	9.670	.17	95	350	95	2.0
175	30	952.127	952.127	9.670	.17	95	350	95	2.0
ROTO PRESS: .20			TOTALS:	119.012	2.12	1140	BP.: 30.16		
180	1635	953.808	953.808	9.682	.17	95	350	95	2.0
185	40	955.487	955.487	9.682	.17	95	350	95	2.0
190	45	957.166	957.166	9.682	.17	95	350	95	2.0
195	50	958.845	958.845	9.682	.17	95	350	95	2.0
200	55	960.524	960.524	9.682	.17	95	350	95	2.0
205	1700	962.204	962.204	9.682	.17	95	350	95	2.0
210	05	963.883	963.883	9.682	.17	95	350	95	2.0
215	10	965.562	965.562	9.682	.17	95	350	95	2.0
220	15	967.241	967.241	9.682	.17	95	350	95	2.0
225	20	968.920	968.920	9.682	.17	95	350	95	2.0
230	25	970.599	970.599	9.037	.15	95	375	95	2.0
235	30	972.166	972.166	9.037	.15	95	375	95	2.0
			TOTALS:	114.894	2.00	1140	MAX VACC =		
TOTAL Cu Ft.			TOTALS:	233.906	4.12	2280	AVG. BP:		

METER BOX DATA SHEET PAGE # 2

Page: 3 of 3

UNIT: Buck 2W RUN: 3 DATE: 2-13-2007

Meter Box: 514 Y Factor: .997

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

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

Inject SO^2 @ 100 cc/min. Nozzle: Probe @ 3/8 " od Initial Volume: 1.500

ROTO: PRESS: .20			SAMPLING RATIO: 30 : 1				BP: 30.16		
MIN	TIME	METER READING	SAMPLE MDCF	STACK DSCFM	DELTA H	METER TEMP	SO2 PPM	ROTO TEMP	PUMP VACC
240	1735	973.734	973.734	9.037	.15	95	375	95	2.0
245	40	975.301	975.301	9.037	.15	95	375	95	2.0
250									
255				18.074	.30	190			
260									
265									
270									
275									
280									
285									
290									
295									
ROTO PRESS:			TOTALS:				BP.:		
300									
305									
310									
315									
320									
325									
330									
335									
340									
345				510.496	9.42	4738			
350									
355									
			TOTALS:			95	MAX VACC =		3.0
TOTAL Cu Ft.		86.801	TOTALS:	10.210	.188	555	AVG. BP:		30.16

PARTICULATE CATCH / MOISTURE DATA SHEET # 3

UNIT : Buck 263 RUN : 3 DATE : 2-13-07

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	700.0	583.7	486.1	918.6
INITIAL WT	597.7	578.0	484.1	898.8
NET WT GRAMS	102.3	5.7	2.0	19.8

TOTAL CATCH : 129.8 GRAMS H_2O

FRONT HALF

FILTER #	97F	
FINAL WT g	.7319	
INITIAL WT g	.6693	
NET WT g	.0626	

BEAKER #	76
DESC.	ACETONE
FINAL WT g	103.8270
INITIAL WT g	103.8038
NET WT g	.0232
VOL. DESC. ml	75

BACK HALF

FILTER #	97B	
FINAL WT g	.3502	
INITIAL WT g	.3393	
NET WT g	.0109	

BEAKER #	77	78	79	81	
DESC.	ACETONE	METHCHLOR	H_2O	H_2O	
FINAL WT g	107.4252	94.5132	97.6400	109.1420	
INITIAL WT g	107.3886	94.4967	97.6208	109.1275	
NET WT g	.0366	.0165	.0192	.0145	(.0337)
VOL. DESC ml	150	75	150	130	(280)

FILTER TARE WEIGHTS DATA SHEET #4-1

Into Dessicator : Date : 1-20-06 Time : 1030 By : KV

Manufacturer S & S Grade : # 25 Glass Front Size : 11 cm Lot No. : ZB921

Back Size: 8.2 cm Lot No. : B1044632

	DATE: 1-24-06	BY: KV	DATE: 1-25-06	BY: KV	DATE:	BY:
FILTER #	FIRST WEIGHT	TIME	SECOND WEIGHT	TIME	THIRD WEIGHT	TIME
91 F	.6700	1035	.6698	0947	✓	
92 F	.6711	1035	.6709	0947	✓	
93 F	.6825	1036	.6824	0948	✓	
94 F	.6734	1036	.6734	0948	✓	
95 F	.6767	1037	.6766	0949	✓	
96 F	.6800	1038	.6801	0950	✓	
97 F	.6694	1038	.6693	0950	✓	
98 F	.6672	1039	.6672	0951	✓	
99 F	.6872	1040	.6872	0951	✓	
100 F	.6707	1040	.6705	0952	✓	
91 B	.3367	1030	.3368	0941	✓	
92 B	.3380	1030	.3380	0941	✓	
93 B	.3375	1031	.3376	0942	✓	
94 B	.3384	1031	.3381	0942	✓	
95 B	.3344	1032	.3345	0943	✓	
96 B	.3387	1032	.3388	0943	✓	
97 B	.3393	1033	.3393	0944	✓	
98 B	.3382	1033	.3382	0944	✓	
99 B	.3397	1034	.3398	0945	✓	
100 B	.3398	1034	.3400	0945	✓	

Checked by: C Waltington Date: 1-25-2006 Time: 1115

BALANCE ROOM ENVIRONMENTAL CONDITIONS

DATE	TIME	BY	WB	DB	% RH
1-24-06	1029	KV	58	69	48
1-25-06	0940	KV	60	73	47

BEAKER TARE WEIGHTS DATA SHEET #4-2

Into Dessicator: Date : 8-1-2006 Time : 1200 By : Clp W.

BEAKER #	DATE: 8-16-2006 BY: CW FIRST WEIGHT	TIME	DATE: 8-17-06 BY: CW SECOND WEIGHT	TIME	DATE: 8-18 BY: CW THIRD WEIGHT	TIME
76	103.8077	1040	103.8042	1043	103.8038	10:18
77	107.3913	1042	107.3884	1044	107.3886	10:20
78	94.4984	1043	94.4966	10:52	94.4967	10:22
79	97.6229	1045	97.6211	10:54	97.6208	10:28
80	109.1296	1046	109.1280	10:57	106.1275	10:31
81	101.4674	1047	101.4646	10:58	101.4647	10:33
82	97.4798	1048	97.4778	11:00	97.4781	10:36
83	98.3310	1050	98.3285	11:02	98.3290	10:40
84	105.5561	1051	105.5554	11:05	105.5550	10:45
85	97.9961	1053	97.9960	11:07	—	
86	104.7469	1055	104.7463	11:08	104.7458	10:48
87	105.9205	1056	105.9204	11:11	—	
88	100.0069	1057	100.0071	11:12	—	
89	120.6761	1100	120.6748	11:13	120.6745	10:52
90	106.4080	1101	106.4062	11:15	106.4061	10:55
91	95.0519	1103	95.0496	11:16	95.0488	10:57
92	96.6811	1105	96.6790	11:18	96.6790	10:59
93	107.7863	1106	107.8833	11:20	107.8838	11:00
94	106.3700	1108	106.3672	11:21	106.3676	11:01
95	107.4071	1110	107.4096	1050	107.4092	11:03
96	103.9810	1112	103.9815	1049	—	
97	99.9827	1114	99.9844	1048	99.9847	11:04
98	105.0236	1115	105.0245	1047	105.0248	11:05
99	104.9337	1116	104.9347	1046	104.9352	11.06
100	106.7411	1118	106.7411	1045	—	

BALANCE ROOM ENVIRONMENTAL CONDITIONS

DATE	TIME	BY	WB	DB	% RH
8-16	1030	CW		75	48
8-17	1035	CW		76	49
8-18	1010	CW		70	48

Checked by : C. Waldinger

Date : 8-21-06

Time : 1020

WOODSTOVE DATA SHEET # 4-3 : CONSTANT WEIGHTS

UNIT : Buck 261 RUN : 3 DATE : 2-13-07 Page : 1 of

Beaker #	Date	Time	By	Weight	Date	Time	By	Weight	Date	Time	By	Weight	Date	Time	By
76	2-14	1400	CP	103.8266	2-16	1053	CP	103.8270	2-17	1420	CP				
77	2-14	1400	CP	107.4248	2-16	1054	CP	107.4252	2-17	1421	CP				
78	2-14	1400	CP	94.5128	2-16	1055	CP	94.5132	2-17	1422	CP				
79	2-14	1400	CP	97.6399	2-16	1056	CP	97.6400	2-17	1423	CP				
80	2-14	1400	CP	109.1415	2-16	1057	CP	109.1420	2-17	1425	CP				

Filter #	Date	Time	By	Weight	Date	Time	By	Weight	Date	Time	By	Weight	Date	Time	By
97A	2-13	1520	CP	.7324	2-14	0935	CP	.7319	2-16	1050	CP				
97B	2-13	1920	CP	.3507	2-14	0936	CP	.3502	2-16	1051	CP				

SCALE ROOM ENVIRONMENTAL CONDITIONS

Weighing Session	Date	Time	By	DB	%RH
1	2-14	0930	CP	74	47
2	2-16	1030	CP	75	46
3	2-17	1400	CP	78	46
4					
5					

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

WOODSTOVE DATA SHEET #4-4

SCALE QA SHEET

Dates: From 11-3-2009 Through	Scale: Sartorius	Model: A 120 S	SN: 37010004

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	10.0000	.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

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

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	HU	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	0956	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

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	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	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	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

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	Clp	10-21	0900	74	44
100.0000	10.0001	1.0000	.0999	Clp	10-22	1630	78	46
99.9998	10.0000	.9998	.0998	Clp	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	Clp	10-29	1900	75	44
99.9998	10.0003	1.0000	.0999	Clp	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	Clp	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	Clp	11-12	1600	67	49
100.0001	10.0000	1.0000	.0999	Clp	11-13	1430	74	47
99.9999	10.0000	1.0000	.0999	Clp	11-15	1500	72	44
100.0002	10.0000	.9999	.0999	KV	11-16	0835	70	44
100.0005	10.0000	1.0000	.0999	Clp	11-17	0930	72	46
100.0004	10.0002	1.0001	.1000	Clp	11-18	1600	72	48
100.0003	10.0001	.9999	.0999	Clp	11-20	1100	68	47
100.0004	10.0002	1.0000	.1000	Clp	11-21	1200	74	44
100.0002	10.0002	.9999	.0998	Clp	11-22	1030	74	42
99.9999	10.0000	1.0000	.0999	Clp	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	Clp	11-28	1000	72	42
100.0004	10.0000	1.0000	.0998	Clp	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	Clp	12-1	0900	70	41
100.0000	10.0000	.9999	.1000	Clp	12-2	1340	72	42
100.0000	10.0000	.9998	.0999	Clp	12-3	1400	68	43
99.9999	9.9998	.9999	.0996	Clp	12-5	1620	71	45
99.9997	10.0001	1.0000	.0999	Clp	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

100 g weight	10 g weight	1 g weight	100 mg weight	Tech	Date	Time	Dry Bulb	% RH
99.9998	9.9994	.9999	.0998	[illegible]	07/15	2000	78	46
99.9997	9.9998	1.0000	.1000	[illegible]	07/19	2250	78	46
100.0000	9.9994	.9997	.0999	[illegible]	07/20	0740	78	46
100.0000	9.9999	1.0000	.1000	[illegible]	07/21	2100	78	46
99.9998	9.9998	.9999	.1000	[illegible]	07/24	2200	78	46
100.0001	10.0000	1.0000	.1000	[illegible]	07/27	1515	78	49
99.9998	10.0000	.9998	.1000	[illegible]	07/28	0600	78	49
99.9999	10.0001	1.0000	.1000	[illegible]	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
99.9998	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	44
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	1310	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: Buck 261 RUN: 3 DATE: 2-13-2007

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		74	44
10-6	0930	CP		77	47

FINAL QC

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

NET PARTICULATE CATCH CALCULATION DATA SHEET #6

UNIT : Buck 261 RUN : 3 DATE : 2-13-2007

Blank Audit by C Chastington 10-14-2005

BLANK CALCULATIONS

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

FRONT HALF CATCH

FILTERS : .0626 (Total Catch) g - 1 (# of Filters) (.0000 g) (Blank Value / Filter) = .0626 g

BEAKERS : .0232 (Total Catch) g - 75 (ml Acetone) (.000007 g) (Blank Value / ml Acetone) = .0227 g

.0005

TOTAL FRONT HALF CATCH : .0853 g

BACK HALF CATCH

FILTERS : .0109 (Total Catch) g - 1 (# of Filters) (.0000 g) (Blank Value / Filter) = .0109 g

BEAKERS :

Acetone : .03666 (Total Catch) g - 150 (ml Acetone) (.000007 g) (Blank Value / ml Acetone) = .0355 g

.0011

Extract : .0165 (Total Catch) g - 75 (ml Dichloromethane) (.000015 g) (Blank Value / Dichloromethane) = .0154 g

.0011

Water : .0337 (Total Catch) g - 280 (ml Water) (.000013 g) (Blank Value / Water) = .0301 g

.0036

TOTAL BACK HALF CATCH : .0919 g

TOTAL CATCH : .1772 g

% FRONT HALF : 48.1 %

CALCULATIONS DATA SHEET # 7

UNIT : Buck 261 RUN : 3 DATE : 2-13-2007

1) $Vm(std) = \dfrac{(86.801\ Vm)(17.64)(.997\ mcf)\left(30.16"\ Hg + \frac{.188"\ H_2O}{13.6}\right)}{(555\ TmA)} = \dfrac{82.9957}{000.0000}$ dscf

2) $Vw(std) = (.04707)(129.8\ ml\ H_2O) = \dfrac{6.1097}{00.0000}$ scf

3) $Asw = \dfrac{(6.1097\ scf)}{(6.1097\ scf + 82.9957\ dscf)} = \dfrac{.0686}{.0000}$ Bws × 100 = $\dfrac{6.8567}{00.0000}$ % H_2O

4) $Cs = \dfrac{(.1772\ g.)}{(82.9957\ dscf)}(15.43) = \dfrac{.0329}{0.0000}$ gr / dscf

5) Estimated g / hr = $\dfrac{(.1772\ g.)}{(82.9957\ dscf)}\left(\dfrac{10.210}{00.0000}\ dscfm\right)(60) = \dfrac{1.3079}{00.0000}$ 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_2O =	average delta H for test	(p. 2)	(.000 " H_2O)
TmA =	average meter temperature for test in degrees Absolute	(p. 2)	(000 TmA)
ml H_2O =	total water caught during test	(p. 3)	(000.0 ml H_2O)
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 : Buck 261 RUN : 3 DATE : 2-13-2007

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

Wet Bulb / Dry Bulb

Pre : WB : 67 DB : 86 = 36 % RH 15 % H_2O

Post : WB : 64 DB : 85 = 30 % RH 1.3 % H_2O

Average : 33 % RH 1.4 % H_2O

Empty Stove Weight (lbs) : N/A w/ stack & oil seal : Wet : N/A Dry : 517.3

Kindling Weight (lbs) : Paper : 1 Wood : 4.4

Preburn Fuel Weight : 18.4 + 15.8 + 15 + 2.7 Total : 51.9

Kindling & Preburn Fuel Weight (wood only) (lbs) : **Total** : 56.3

Coal Bed Wt Range (lbs) : 4.2 - 3.4 **Scale** : 524.5 - 520.7

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

Lower : .20 × fuel weight : Always round UP to nearest tenth **Actual Coal Bed Weight** : 4.0

Maximum Coal Bed Removal (lbs) : ((4.2 (Upper) + 3.4 (Lower)) ÷ 2) .25 = .9 (round down to nearest tenth)

Test Fuel (.75" × 1.5" × 5" spacers) = 16 pcs

Dimensions	Length in inches	No. Pcs	Weight in lbs	% of Load
2" × 4"	18	3	7.6	45.2
4" × 4"	18	2	9.2	54.8

Test Fuel Weight : 16.8 lbs

Estimated Dry Burn Rate : 2.779

$$\frac{16.8 - (16.8 \times .1654)}{2.2046} \times \frac{60}{\frac{245}{\text{TIME}}} = 1.56 \text{ kg / hr}$$

Estimated BTU's/hr : 19,140 × $\frac{63}{100}$ × $\frac{1.56}{\text{DBR}}$ = 18810.8 BTU's/hr

EPA Default Efficiencies : Non-cat : 63 Cat : 72 Pellet : 78

WOOD STOVE OPERATING DATA PAGE #9

Unit : Buck 261 Run : 3 Date : 2-13-2007

FIRE STARTED: 0900

WARM UP AND PREBURN:

PRIMARY AIR : Set wide open for all warm-up / preburn fuel charges. Then set to 6 3/8" 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 ½ min. prior to loading last fuel, raked and leveled. In stove 20 sec.

TEST:

DOOR wide open during loading Ø min. 40 sec.

PRIMARY AIR : Opened full for first 5 min., then set to run setting of 6 3/8".

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

FAN:

ON / OFF during warm-up

ON / OFF first 30 minutes of test

Fan speed set at High

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 : N/A BRAND : N/A

All Grades WCLB rules:

WARM UP INFORMATION:

All pre-burn / warm up fuel pieces were either 16 or 16 inches.

1st warm up / pre-burn fuel charge (18.4 lbs.) added at 0915

2nd warm up / pre-burn fuel charge (15.8 lbs.) added at 1030

3rd warm up / pre-burn fuel charge (15.0 lbs.) added at 1125

4th warm up / pre-burn fuel charge (2.7 lbs.) added at 1235

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

TEST DATA SHEET #10

Unit : Buck 261 Run : 3 Date : 2-13-2007

Room Temperature : 72 °F Temperature Correction Set?: (YES) NO

Calibration Check : 12.0% + or- 0.2%? (YES) NO

Time Test Fuel moisture reading taken : 1135

pc #	Dimen.	Use	TOP	BOTTOM	SIDE	Average
1	2"×4"×8'	K	15.3	15.7	15.4	15.5
2						
3						
4	2"×4"×8'	P	23.1	23.5	23.2	23.3
5	2"×4"×8'	P	18.1	18.7	18.5	18.4
6	2"×4"×8'	P	19.5	18.3	18.6	18.8
7	2"×4"×8'	P	17.9	18.6	18.5	18.3
8	2"×4"×8'	P				78.8
9						
10						
11	2x4x18	T	19.5	20.2	19.0	19.5
12	"	T	19.5	18.2	18.9	18.9
13	"	T	20.1	20.1	19.4	19.8
14	4x4x18	T	20.3	19.5	20.5	20.1
15	"	T	21.4	20.5	20.5	20.8
16						99.1
17						
18						
19						
20	Spacers	T	20.7	19.9	20.0	20.200

Key for Use : K = Kindling P = Pretest Fuel T = Test Fuel

	KINDLING	PRETEST FUEL	TEST FUEL
Dry Moisture % :	15.500 %	19.700 %	19.820 %
Wet Moisture % :	13.420 %	16.458 %	16.541 %

To obtain Wet from Dry : $\frac{100 \times \%\text{ Dry Reading}}{100 + \%\text{Dry Reading}}$ = % Moisture, Wet Basis

Acceptable Ranges : 16 - 20 % wet: 19 - 25 % dry with meter corrected for temperature.

GAS DATA SHEET #12

WEIGHT: 521.3 DATE: 2-13-20

UNIT: Buck 261 RUN: 3 PAGE: 1 OF 2

TIME	SCALE	FUEL	DROP	V.	CO_2	V.	O_2	V.	CO	STATIC	SO_2PF
0 1335	538.1	16.8	—	.245	6.2	.547	13.7	.089	.89	-.035	375
5 40	537.4	16.1	.7	.399	10.0	.419	10.5	.020	.20	-.037	275
10 45	536.8	15.5	.6	.335	8.4	.478	12.0	.035	.35	-.047	350
15 50	536.0	14.7	.8	.317	8.0	.491	12.3	.037	.37	-.045	325
20 55	535.1	13.8	.9	.523	13.1	.292	7.3	.038	.38	-.049	350
25 1400	534.2	12.9	.9	.549	13.7	.264	6.6	.040	.40	-.051	325
30 05	533.2	11.9	1.0	.564	14.1	.252	6.3	.035	.35	-.051	325
35 10	532.2	10.9	1.0	.573	14.3	.236	5.9	.053	.53	-.051	350
40 15	531.2	9.9	1.0	.568	14.2	.248	6.2	.032	.32	-.051	325
45 20	530.4	9.1	.8	.569	14.2	.252	6.3	.025	.25	-.050	325
50 25	529.5	8.2	.9	.515	12.9	.308	7.7	.012	.12	-.049	300
55 30	528.7	7.4	.8	.498	12.5	.328	8.2	.010	.10	-.049	300
SUBTOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	-.565	*****
60 1435	528.2	6.9	.5	.515	12.9	.312	7.8	.009	.09	-.048	300
65 40	527.5	6.2	.7	.500	12.5	.328	8.2	.008	.08	-.048	300
70 45	527.0	5.7	.5	.490	12.3	.336	8.4	.006	.06	-.047	300
75 50	526.4	5.1	.6	.462	11.6	.364	9.1	.008	.08	-.046	300
80 55	526.0	4.7	.4	.441	11.1	.386	9.7	.008	.08	-.046	300
85 1500	525.5	4.2	.5	.387	9.7	.435	10.9	.015	.15	-.045	300
90 05	525.2	3.9	.3	.378	9.5	.447	11.2	.009	.09	-.045	300
95 10	524.9	3.6	.3	.340	8.5	.482	12.1	.018	.18	-.043	300
100 15	524.7	3.4	.2	.334	8.4	.488	12.2	.019	.19	-.042	300
105 20	524.3	3.1	.3	.327	8.2	.494	12.4	.021	.21	-.041	300
110 25	524.1	2.9	.2	.268	6.7	.549	13.8	.029	.29	-.040	325
115 30	524.1	2.8	.1	.214	5.4	.583	14.6	.076	.76	-.037	350
SUBTOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	-.528	*****
120 1535	523.9	2.6	.2	.226	5.7	.575	14.4	.062	.62	-.036	350
125 40	523.8	2.5	.1	.237	6.0	.567	14.2	.056	.52	-.035	350
130 45	523.7	2.4	.1	.233	5.9	.570	14.3	.063	.63	-.036	350
135 50	523.5	2.2	.2	.234	5.9	.569	14.3	.065	.65	-.034	325
140 55	523.4	2.1	.1	.234	5.9	.570	14.3	.064	.64	-.034	325
145 1600	523.2	1.9	.2	.229	5.8	.570	14.3	.071	.71	-.034	325
150 05	523.1	1.8	.1	.230	5.8	.568	14.2	.077	.77	-.034	325
155 10	523.0	1.7	.1	.236	5.9	.564	14.1	.076	.76	-.031	350
160 15	522.9	1.6	.1	.221	5.6	.575	14.4	.079	.79	-.032	350
165 20	522.8	1.5	.1	.220	5.3	.586	14.7	.082	.82	-.031	350
170 25	522.7	1.4	.1	.213	5.4	.578	14.5	.091	.91	-.030	350
175 30	522.6	1.3	.1	.213	5.4	.576	14.4	.096	.96	-.030	350
SUBTOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	-.400	*****
TOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	-1.493	*****

Fan ? x

GAS DATA SHEET #12

WEIGHT: 521.3 DATE: 2-13-2007

UNIT: Buck 261 RUN: 3 PAGE: 2 OF 2

TIME	SCALE	FUEL	DROP	V.	CO_2	V.	O_2	V.	CO	STATIC	SO_2PPM
180 1635	522.4	1.1	.2	.216	5.4	.575	14.4	.100	1.00	-.030	350
185 40	522.3	1.0	.1	.219	5.5	.575	14.4	.090	.90	-.030	350
190 45	522.2	.9	.1	.205	5.2	.586	14.7	.093	.93	-.030	350
195 50	522.1	.8	.1	.201	5.1	.587	14.7	.099	.99	-.030	350
200 55	522.0	.7	.1	.196	4.9	.634	15.9	.102	1.02	-.030	350
205 1700	521.9	.6	.1	.190	4.8	.602	15.1	.093	.93	-.030	350
210 05	521.8	.5	.1	.162	4.1	.633	15.9	.084	.84	-.030	350
215 10	521.7	.4	.1	.159	4.0	.636	15.9	.086	.86	-.030	350
220 15	521.7	.4	0	.159	4.0	.640	16.0	.077	.77	-.030	350
225 20	521.6	.3	.1	.157	4.0	.638	16.0	.081	.81	-.030	350
230 25	521.5	.2	.1	.157	4.0	.635	16.0	.088	.88	-.030	375
235 30	521.4	.1	.1	.155	3.9	.639	16.0	.088	.88	-.030	375
SUBTOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	-.360	*****
240 35	521.4	.1	0	.163	4.1	.633	15.9	.085	.85	-.030	375
245 40	521.3	0	.1	.154	3.9	.641	16.1	.083	.83	-.030	375
250											
255											
210											
215											
270											
275											
280											
285											
290											
295											
SUBTOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	-.060	*****
300											
305											
310											
315											
320											
325											
330											
335											
340											
345											
350											
355											
SUBTOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	-.420	*****
TOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	-1.913	*****

÷50

-.038

at ~ 521.5 when ble... (...05)

PREBURN DATA SHEET #13

UNIT: Buck 261 RUN: 3 DATE: 2-13-2007 PAGE: 1 of

TIME	SCALE	DROP	STACK	TOP	LF SIDE	BACK	RT SIDE	BOTTOM	FIREBOX	SEC/CAT	AMBIENT	STATIC	COMMENTS
0 1235	524.2	—	402	442	566	401	546	358			78	-.042	PREBURN START: # 217 UP
5 40	523.7	.5	400	446	560	374	538	363			82	-.044	COAL BED SCALE RANGE:
10 45	523.3	.4	393	426	553	341	531	339			83	-.043	521.5 → 520.7
15 50	522.8	.5	379	398	541	316	520	318			82	-.043	PRIMARY AIR: 1 3/8
20 55	522.4	.4	380	386	526	303	507	304			82	-.042	SECONDARY AIR: N/A
25 1300	522.1	.3	390	388	519	296	501	298			82	-.043	FAN: High
30 05	521.8	.3	373	387	517	292	498	292			82	-.042	PUMPS ON AT: 1305
35 10	521.6	.2	310	361	503	286	488	288			83	-.040	CHECK WB/DB:
40 15	521.6	0	288	326	487	278	476	285			81	-.037	
45 20	521.6	0	267	303	468	267	459	279			79	-.036	
50 25	521.5	.1	256	287	455	261	451	275			81	-.035	
55 30	521.4	.1	250	268	442	256	441	273			81	-.035	
*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	
60 1335	521.3	.1	248	253	429	250	431	271			82	-.035	
65													
70													
75													
80													

New Buck- Model 261

Temperature Data Sheet #14

RUN 3
2/13/07

********	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	248	253	429	250	431	271	######	######	82	1409	231	51	241	33	33
5	416	340	405	306	406	267	######	######	78	1394	231	46	241	34	33
10	337	378	385	300	391	277	######	######	77	1383	232	46	242	34	34
15	338	419	377	296	382	277	######	######	76	1372	233	46	243	35	34
20	360	445	372	297	380	274	######	######	76	1364	233	47	245	35	34
25	402	502	382	306	392	271	######	######	76	1357	234	47	246	35	34
30	414	542	400	317	408	270	######	######	77	1351	235	48	247	35	34
35	418	488	419	259	424	269	######	######	79	1347	236	48	248	35	34
40	414	476	438	244	440	257	######	######	81	1344	237	49	248	35	34
45	414	473	456	241	449	250	######	######	81	1341	238	50	248	35	34
50	400	463	470	240	457	247	######	######	82	1339	238	50	248	35	35
55	385	443	481	240	464	245	######	######	82	1338	239	51	248	35	35
60	379	431	492	242	468	243	######	######	81	1337	240	51	248	36	35
65	373	418	502	245	476	242	######	######	83	1336	241	52	247	36	35
70	364	408	509	249	483	239	######	######	82	1336	241	52	247	36	35
75	358	408	512	249	487	236	######	######	79	1336	241	51	246	36	35
80	349	396	510	249	494	231	######	######	77	1336	241	50	245	36	35
85	335	386	504	250	498	228	######	######	77	1337	241	50	244	36	35
90	328	375	491	249	494	226	######	######	76	1338	240	51	243	36	35
95	312	358	483	248	489	226	######	######	75	1340	240	51	243	36	35
100	303	337	477	250	482	226	######	######	75	1340	239	51	242	36	35
105	296	329	472	252	478	224	######	######	75	1339	239	52	240	36	36
110	283	312	465	252	475	224	######	######	75	1338	238	52	239	36	36
115	263	293	453	248	461	226	######	######	74	1339	237	52	238	36	36
120	252	272	437	237	443	227	######	######	74	1339	237	52	237	36	36
125	244	257	426	232	427	226	######	######	74	1339	236	52	236	36	36
130	238	243	418	227	415	222	######	######	74	1339	235	52	235	36	36
135	234	238	411	227	405	221	######	######	75	1338	235	52	234	36	37
140	230	231	405	227	397	219	######	######	75	1337	234	52	233	36	37
145	227	224	399	225	390	218	######	######	75	1336	234	52	232	36	37
150	224	221	393	223	383	218	######	######	75	1335	233	52	231	35	37
155	222	216	388	221	380	215	######	######	75	1332	232	53	230	35	37
160	219	211	385	221	375	213	######	######	75	1330	232	53	229	35	37
165	216	208	381	220	371	210	######	######	75	1328	231	53	228	35	37
170	214	205	379	219	368	206	######	######	75	1327	231	53	228	35	37
175	213	204	375	219	366	203	######	######	75	1326	230	54	227	35	37

New Buck- Model 261

Temperature Data Sheet #14

RUN 3
2/13/07

180	213	202	372	217	364	201	######	######	74	1324	230	54	226	35	38
185	212	200	370	216	362	199	######	######	74	1323	229	54	226	35	38
190	211	198	368	214	361	197	######	######	74	1321	229	54	225	35	38
195	209	197	365	213	358	194	######	######	74	1320	229	54	224	35	38
200	207	194	362	212	354	192	######	######	74	1319	228	54	224	35	38
205	205	193	358	210	351	189	######	######	74	1318	228	54	223	35	38
210	200	190	351	209	346	187	######	######	74	1317	227	54	223	35	38
215	195	185	341	204	339	186	######	######	73	1315	227	54	222	35	38
220	192	183	333	201	332	183	######	######	73	1314	226	55	223	35	38
225	189	178	325	198	325	181	######	######	73	1311	225	56	224	35	38
230	186	173	319	197	321	179	######	######	75	1310	224	56	225	35	38
235	183	170	315	195	314	178	######	######	75	1308	224	56	226	35	38
240	182	169	310	193	309	176	######	######	76	1306	224	57	227	35	38
245	179	167	306	192	305	174	######	######	76	1306	224	57	228	35	38

New Buck- Model 261

RUN 3
2/13/07

TEMPERATURE DATA SHEET #14A

		TEST TIME	245		
STACK AVG	280	TOP AVG	300	LT SIDE AVG	410
BACK AVG	237	RT SIDE AVG	405	BOTTOM AVG	223
FIREBOX AVG	########	SEC/CAT AVG	########	AMBIENT AVG	76

END	228.7	
START	327.0	
	-98.3	DELTA T

CIRCLE: LOSS / GAIN

ZERO / SPAN CHECK DATA SHEET #15-1

Date : 2-13-2007 Analyte : CO_2 (15-1)

Unit : Buck 261 Run # : 3

Zero Cyl. # : 168TAC 3-A Conc. : 0.00 % CO_2 Cyl. Press. : 950 PSI

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

Span Cyl. # : CC-41627 Conc. : 12.50 % CO_2 Cyl. Press. : 610 PSI

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

Analyzer : Make : HORIBA Model : PIR-2000 SN : 407069

Range : 0 - 25.0 % CO_2 Analyzer Output : 0 - 1.0 v.

Flow : 1.5 SCFH Measured by : Rotameter

EPA Span Value = 25.0 % CO_2

EPA Control Limits = ± 2.5% of 25.0 % CO_2 = ± 0.625 % CO_2

Method 28 A = ± .2 % of 25.0 % CO_2 = ± .05 % CO_2

PRE RUN Audit : by : Chp Wadsworth Time : 1200 Temp : 73 ° 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	.194
SPAN	50.0	.500	12.50	49.8	.498	12.475	-.025	-.099

POST RUN Audit : by : Chp Wadsworth Time : 1800 Temp : 71 ° 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	.194
SPAN	50.0	.500	12.50	49.9	.499	12.500	.000	.001

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

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

Span % Difference = $\frac{\text{Act \% (ppm) - Exp \% (ppm)}}{\text{Full Scale Value}}$ X100

ZERO / SPAN CHECK DATA SHEET #15-2

Date : 2-13-2007 Analyte : O_2 (15-2)

Unit : Book 26) Run # : 3

Zero Cyl. # : 168TAC 3A Conc. : 0.00 % O_2 Cyl. Press. : 950 PSI

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

Span Cyl. # : CC-41627 Conc. : 12.50 % O_2 Cyl. Press. : 610 PSI

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

Analyzer : Make : TELEDYNE Model : 320 A SN : 37400

Range : 0 - 25.0 % O_2 Analyzer Output : 0 - 1.0 v.

Flow : 1.5 SCFH Measured by : Rotameter

EPA Span Value = 25.0 % O_2

EPA Control Limits = ± 2.5% of 25.0 % O_2 = ± 0.625 % O_2

Method 28 A = ± .2 % of 25.0 % O_2 = ± .05 % O_2

PRE RUN Audit : by : Chp Wadsworth Time : 1200 Temp : 73 ° F

AUDIT RESULTS

Point #	Expected Response			Actual Response			± Conc. Difference	Δ %
	Meter	DVM	%	Meter	DVM	%		
ZERO	00.0	.000	00.0	00.0	.001	-.0004	-.0004	-.015
SPAN	12.50	.500	12.50	12.5	.500	12.522	.022	.090

POST RUN Audit : by : Chp Wadsworth Time : 1800 Temp : 71 ° F

AUDIT RESULTS

Point #	Expected Response			Actual Response			± Conc. Difference	Δ %
	Meter	DVM	%	Meter	DVM	%		
ZERO	00.0	.000	00.0	00.0	.002	.025	.025	.099
SPAN	12.50	.500	12.50	12.5	.501	12.548	.048	.190

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

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

Span % Difference = $\frac{\text{Act \% (ppm) - Exp \% (ppm)}}{\text{Full Scale Value}}$ X100

ZERO / SPAN CHECK DATA SHEET #15-3

Date : 2-13-2007 Analyte : CO (15-3)

Unit : Rack 26) Run # : 3

Zero Cyl. # : 168TAC 3-A Conc. : 0.00 % CO Cyl. Press. : 950 PSI

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

Span Cyl. # : CC-41627 Conc. : 4.99 % CO Cyl. Press. : 610 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 = ± 2.5% of 10.0 % CO = ± 0. 25 % CO

Method 28 A = ± .2 % of 10.0 % CO = ± .02 % CO

PRE RUN Audit : by : Chp Wadsworth Time : 1200 Temp : 73 ° F

AUDIT RESULTS

Point #	Expected Response			Actual Response			± Conc. Difference	Δ %
	Meter	DVM	%	Meter	DVM	%		
ZERO	00.0	.000	00.0	00.0	.000	.004	.004	.037
SPAN	49.9	.499	4.99	50.1	.501	5.003	.013	.125

POST RUN Audit : by : Chp Wadsworth Time : 1800 Temp : 71 ° F

AUDIT RESULTS

Point #	Expected Response			Actual Response			± Conc. Difference	Δ %
	Meter	DVM	%	Meter	DVM	%		
ZERO	00.0	.000	00.0	00.0	.000	.004	.004	.037
SPAN	49.9	.499	4.99	50.3	.503	5.022	.032	.325

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

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

Span % Difference = $\frac{\text{Act \% (ppm) - Exp \% (ppm)}}{\text{Full Scale Value}}$ X100

ZERO / SPAN CHECK DATA SHEET #15-4

Date : 2-13-2007 Analyte : SO_2 (15-4)

Unit : Buck 261 Run # : 3

Zero Cyl. # : 168TAC 3-A Conc. : 0.00 ppm SO_2 Cyl. Press. : 950 PSI

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

Span Cyl. # : CC82089 Conc. : 1250 ppm SO_2 Cyl. Press. : 2000 PSI

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

Analyzer : Make : HORIBA Model : PIR-2000 SN : 403019

Range : 0 - 2500 ppm SO_2 Analyzer Output : 0 - 1.0 v.

Flow : 1.5 SCFH Measured by : Rotameter

EPA Span Value = 2500 ppm SO_2

EPA Control Limits = ± 2.5% of 2500 ppm SO_2 = ± 62.5 ppm SO_2

PRE RUN Audit : by : C. Walmsley Time : 1700 Temp : 73 ° 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	10.077	10.077	.403
SPAN	50.0	.500	1250	50.1	.501	1253.5	3.50	.140

POST RUN Audit : by : C. Walmsley Time : 1800 Temp : 71 ° 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	10.077	10.077	.403
SPAN	50.0	.500	1250	49.9	.499	1248.5	-1.50	-.060

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

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

Span % Difference = $\frac{\text{Act \% (ppm) - Exp \% (ppm)}}{\text{Full Scale Value}}$ X100

QUALITY CHECKS DATA SHEET # 16

UNIT : Buck 261 RUN : 3 DATE 2-13-2007

Thermocouple Check:

T/C # 1	— °F	T/C # 13	64.5 °F
T/C # 2	— °F	T/C # 14	62.6 °F
T/C # 3	63.4 °F	T/C # 15	65.2 °F
T/C # 4	60.3 °F	T/C # 16	50.2 °F
T/C # 5	60.4 °F	T/C # 17	50.9 °F
T/C # 6	61.3 °F	T/C # 18	66.8 °F
T/C # 7	60.2 °F	T/C # 19	60.2 °F
T/C # 8	59.4 °F	T/C # 20	— °F
T/C # 9	— °F	T/C # 21	— °F
T/C # 10	— °F	T/C # 22	— °F
T/C # 11	56.4 °F	T/C # 23	— °F
T/C # 12	71.1 °F	T/C # 24	— °F

Thermocouple Readout:

Pretest zero and span check and calibration — post test zero and span — % difference

ZERO 0.0 °F Adj. to 0.0 °F ZERO .2 °F Difference .010 %

SPAN 1999.1 °F Adj. to 2000.0 °F SPAN 1999.7 °F Difference -.015 %

Thermocouple Readout Pretest Linearity Check:

0	= 0.0 °F	200	= 200.4 °F	400	= 400.0 °F
600	= 599.9 °F	800	= 799.7 °F	1000	= 999.8 °F
1200	= 1199.7 °F	1400	= 1399.4 °F	1600	= 1599.5 °F
1800	= 1799.7 °F	2000	= 2000.0 °F		

Sample Train Leak Check	Pre ✓	Post ✓
C-gas Train Leak Check	Pre ✓	Post ✓
SO_2 Train Leak Check	Pre ✓	Post ✓
Static Gauge Zero Check	Pre ✓	Post ✓

Scale Check Pre : 531.5 − 521.5 = 10.0

Post : 531.3 − 521.3 = 10.0

Stack Cleaned Prior to Test Run : YES ____ NO X

TABLE 1 —— RAW DATA

CLIENT : New Buck TEST No. : 5

MODEL: 261 DATE: 16-Feb-07

TIME (MIN.)	METER READING (C F)	DELTA H (IN. H2O)	METER TEMP. (DEG. F)	PERCENT CO (%)	PERCENT CO2 (%)	SO2 COCENTR. PPM
0	142.000	0.150	92	0.26	7.40	275
5	143.500	0.150	92	0.54	12.50	275
10	145.045	0.090	92	0.51	13.60	350
15	146.259	0.090	92	0.65	14.30	350
20	147.473	0.090	92	0.65	14.20	350
25	148.687	0.150	93	0.18	14.40	275
30	150.238	0.150	93	0.14	13.60	275
35	151.788	0.150	93	0.10	13.60	275
40	153.338	0.180	93	0.07	11.90	250
45	155.043	0.180	93	0.03	10.90	250
50	156.749	0.180	93	0.04	8.90	250
55	158.454	0.180	93	0.11	7.90	250
60	160.159	0.180	93	0.13	7.40	250
65	161.867	0.180	93	0.16	7.30	250
70	163.576	0.180	93	0.17	7.30	250
75	165.284	0.180	93	0.18	7.40	250
80	166.993	0.180	93	0.23	6.40	250
85	168.702	0.180	93	0.35	6.10	250
90	170.410	0.150	93	0.47	5.10	275
95	171.964	0.180	93	0.42	5.60	250
100	173.672	0.180	93	0.35	5.60	250
105	175.381	0.180	93	0.34	5.80	250
110	177.089	0.180	93	0.41	5.00	250
115	178.798	0.180	93	0.49	4.70	250
120	180.507	0.180	93	0.47	4.70	250
125	182.215	0.180	93	0.52	4.50	250

TABLE 2---RAW DATA

CLIENT : New Buck TEST No. 5

MODEL: 261 DATE: 16-Feb-07

METER CAL. FACTOR (Y) -------	0.997		Wt. WOOD BURNED(LB) -------	16.9	Lbs
BAROMETRIC PRESS.(Pb) -------	30.34	in Hg	WET,FUEL MOISTURE % -------	16.888	%
LEAK RATE POST (Lp) -------	0.000	cfm	Wt. PART. COLLECTED ------	0.1822	g
WATER VOL. (V1c) -------	83.5	Ml	METER VOLUME Vm -------	40.215	mcf
TEST TIME (MIN) -------	125	min	HC MOLE FRACTION -------	0.0132	

TABLE 3 ----FIELD DATA AVERAGES

CLIENT : New Buck TEST No. 5

MODEL: 261 DATE: 16-Feb-07

AVG DELTA H	-------	0.16	in H2O	AVG PRCNT CO	------	0.31	%
AVG METER TEMP. Tm	-------	93	deg F	AVG PRCNT CO2	-------	8.70	%
AVG PPM SO2	-------	267	PPM	AVG BAL CO2/CO	-------	28.37	%

TABLE 4 ---- CALCULATIONS

CLIENT : New Buck TEST No. 5

MODEL: 261 DATE: 16-Feb-07

STD SAMPLE VOL. Vm(std) d) ------	38.85	dscf	STACK GAS FLOW Qsd -------	1067.089 & 17.78	dscf/Hr & dscf/min
VOL. WATER VAPOR Vw(s td) ----	3.930	scf	PARTICULATE CONCTRT. C s -----	0.0047	g/dscf
PRCNT MSTR Bws ------	9.19	%	PARTC.EMISS. RATE E ------	5.00	g/Hr
BURN RATE BR -------	3.06	Kg/Hr	MOLES OF GAS PER Lb WOOD Nt ---	0.41	Lb-mole/Lb
CO EMISSION RATE ------	109.54 & 35.82	g/Hr & g/Kgdry fuel	PART.EMISS. RATE -----	1.64	g/Kgdry fuel

TABLE 5 —— PROPORTIONAL RATE VARIATION

CLIENT : New Buck TEST No. : 5

MODEL: 261 DATE: 16-Feb-07

TIME INTEVAL Ti	PPM * Vm	PROPRTN. RATE VAR. PR	PROPRTN RATE VAR. AVERAGE
5	399.1	97	100
10	411.1	100	
15	411.1	100	
20	411.1	100	
25	410.7	100	
30	411.9	100	
35	411.7	100	
40	411.7	100	
45	411.7	100	
50	411.9	100	
55	411.7	100	
60	411.7	100	
65	412.4	100	
70	412.7	100	
75	412.4	100	
80	412.7	100	
85	412.7	100	
90	412.4	100	
95	412.7	100	
100	412.4	100	
105	412.7	100	
110	412.4	100	
115	412.7	100	
120	412.7	100	
125	412.4	100	
130			

COMPUTER INPUT DATA SHEET #1

3.06

Client: Buck Stoves

Address: P.O. Box 69

Spruce Pine, NC 28777

Phone: 888-622-7868 Fax: 828-765-0462

Run No.: 5 Date of Test: 2-16-2007 Burn Rate: 3.058

Model No.: 261 ☐ min ☐ min-1.25 ☐ fan

Stove Type: ☐ Cat ☒ Non Cat ☐ Pellet ☐ 1.25-1.9 ☒ max ☐ insert

Dry Gas Meter Y Factor: .997 (0.000) (Data Sheet #2) Post Leak Rate: .000 cfm (.000) (Data Sheet #2) Time: 125 min. (000) (Data Sheet #2)

Dry Gas Meter Volume: 40.215 cf (00.000) (Data Sheet #2)

Stack Flow: 12.954 dscfm (00.000) (Data Sheet #2) Δ H: .163 in. H_2C (.000) (Data Sheet #2)

Maximum Vac.: 2.0 (0.0) (Data Sheet #2) Barometric Pressure: 30.34 in. Hg (00.00) (Data Sheet #2)

H_2O Captured: 83.5 g (00.0) (Data Sheet #3)

Front Half Catch % Of Total: 55.4 % (00.0) (Data Sheet #6) Total Particulate Catch: .1822 g (0.0000) (Data Sheet #6)

Flue Gas Moisture: 9.1939 % (00.000) (Data Sheet #7)

Particulate Emission: .0724 gr/dscf (0.0000) (Data Sheet #7)

Relative Humidity: 40 % RH (00.0) (Data Sheet #8) Ambient Moisture: 1.2 % H_2O (0.00) (Data Sheet #8)

Preburn Fuel Wt.: 47.6 lbs. (00.0) (Data Sheet #8) Coal Bed Wt.: 4.2 lbs. (00.0) (Data sheet #8) Test Fuel Wt.: 16.9 lbs. (00.0) (Data sheet #8)

Heat Output (EPA Default): 36874.0 BTU/hr (00,000.0) (Data Sheet #8)

Kindling Fuel % Moisture (wet): 13.793 % (00.000) (Data Sheet #10) Pretest Fuel % Moisture (wet): 16.630 % (00.000) (Data Sheet #10)

Test Fuel % Moisture (dry): 20.330 % (00.000) (Data Sheet #10 [wood stove] or #11 [pellet stove]) Test Fuel % Moisture (wet): 16.288 %

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

Stack Static Pressure: -.040 in. H_2O (+/- .000) (Data Sheet #12)

Average Ambient Temperature: 73 °F (00) (Data Sheet #14) Stove Temperature Change: -96.6 °F (+/- 000.0) (Data Sheet #14)

Test start = 1530

End = 1735

meter Temp = 553

37 @ 05

METER BOX DATA SHEET PAGE # 2

Page: 1 of 2

UNIT: Buck 261 RUN: 5 DATE: 2-16-2007

Meter Box: 5H Y Factor: .997

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

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

Inject SO^2 @ 100 cc/min. Nozzle: Probe @ 3/8 " od Initial Volume: 1.500

ROTO: PRESS: .20 SAMPLING RATIO: 41 : 1 BP: 30.38

MIN	TIME	METER READING	SAMPLE MDCF	STACK DSCFM	DELTA H	METER TEMP	SO2 PPM	ROTO TEMP	PUMP VACC
0	1530	142.000	——	12.480	.15	92	275	92	2.0
5	35	143.500	——	12.480	.15	92	275	92	2.0
10	40	145.045	145.045	9.806	.09	92	350	92	2.0
15	45	146.259	146.259	9.806	.09	92	350	92	2.0
20	50	147.473	147.473	9.806	.09	92	350	92	2.0
25	55	148.687	148.687	12.458	.15	93	275	93	2.0
30	1600	150.238	150.238	12.458	.15	93	275	93	2.0
35	05	151.788	151.788	12.458	.15	93	275	93	2.0
40	10	153.338	153.338	13.704	.18	93	250	93	2.0
45	15	155.043	155.043	13.704	.18	93	250	93	2.0
50	20	156.749	156.749	13.704	.18	93	250	93	2.0
55	25	158.454	158.454	13.704	.18	93	250	93	2.0
ROTO PRESS: .20			TOTALS:	146.568	1.74	1111	BP.: 30.32		
60	1630	160.159	160.159	13.677	.18	93	250	93	2.0
65	35	161.867	161.867	13.677	.18	93	250	93	2.0
70	40	163.576	163.576	13.677	.18	93	250	93	2.0
75	45	165.284	165.284	13.677	.18	93	250	93	2.0
80	50	166.993	166.993	13.677	.18	93	250	93	2.0
85	55	168.702	168.702	13.677	.18	93	250	93	2.0
90	1700	170.410	170.410	12.433	.15	93	275	93	2.0
95	05	171.964	171.964	13.677	.18	93	250	93	2.0
100	10	173.672	173.672	13.677	.18	93	250	93	2.0
105	15	175.381	175.381	13.677	.18	93	250	93	2.0
110	20	177.089	177.089	13.677	.18	93	250	93	2.0
115	25	178.798	178.798	13.677	.18	93	250	93	2.0
			TOTALS:	162.880	2.13	1116	MAX VACC =		
TOTAL Cu Ft.			TOTALS:	309.448	3.87	2227	AVG. BP:		

METER BOX DATA SHEET PAGE # 2

Page: 2 of 2

UNIT: Buck 261 RUN: 5 DATE: 2-16-2007

Meter Box: 5H Y Factor: .997

Leak checks: 15 " Hg @ 1,000 cfm _____ " Hg @ _____ cfm

15 " Hg @ 1,000 cfm _____ " Hg @ _____ cfm

Inject SO^2 @ 100 cc/min. Nozzle : Probe @ 3/8 " od Initial Volume: 1,500

ROTO: PRESS: .20 SAMPLING RATIO: 41 : 1 BP: 30.32

MIN	TIME	METER READING	SAMPLE MDCF	STACK DSCFM	DELTA H	METER TEMP	SO2 PPM	ROTO TEMP	PUMP VACC
120	1730	180.507	180.507	13.677	.18	93	250	93	2.0
125	35	182.215	182.215	13.677	.18	93	250	93	2.0
130									
135				27.354	.36	186			
140									
145									
150									
155									
160									
165									
170									
175									
ROTO PRESS:			TOTALS:				BP.:		
180									
185									
190									
195									
200									
205									
210									
215									
220									
225									
230						2413			
235				336.802	4.23				
			TOTALS:			93	MAX VACC =		2.0
TOTAL Cu Ft.		40.215	TOTALS:	12.954	.163	553	AVG. BP:		30.34

PARTICULATE CATCH / MOISTURE DATA SHEET # 3

UNIT : Buck 261 RUN : 5 DATE : 2-16-07

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	671.6	573.2	485.1	937.5
INITIAL WT	600.1	520.1	483.8	929.9
NET WT GRAMS	71.5	3.1	1.3	7.6

TOTAL CATCH : 83.5 GRAMS H_2O

FRONT HALF

FILTER #	49F	
FINAL WT g	.7608	
INITIAL WT g	.6872	
NET WT g	.0736	

BEAKER #	86
DESC.	ACETONE
FINAL WT g	104.7736
INITIAL WT g	104.7458
NET WT g	.0278
VOL. DESC. ml	75

BACK HALF

FILTER #	99B	
FINAL WT g	.3384	
INITIAL WT g	.3398	
NET WT g	.0	

BEAKER #	87	88	89	90	
DESC.	ACETONE	METHCHLOR	H_2O	H_2O	
FINAL WT g	105.9779	100.0245	120.6815	106.4110	
INITIAL WT g	105.9204	100.0071	120.6745	106.4061	
NET WT g	.0575	.0174	.0070	.0049	(.0119)
VOL. DESC ml	150	75	150	100	(250)

FILTER TARE WEIGHTS DATA SHEET #4-1

Into Dessicator : Date : 1-20-06 Time : 1030 By : KV

Manufacturer S & S Grade : # 25 Glass Front Size : 11 cm Lot No. : ZB921

Back Size: 8.2 cm Lot No. : B1044632

	DATE: 1-24-06	BY: KV	DATE: 1-25-06	BY: KV	DATE:	BY:
FILTER #	FIRST WEIGHT	TIME	SECOND WEIGHT	TIME	THIRD WEIGHT	TIME
91 F	.6700	1035	.6698	0947	✓	
92 F	.6711	1035	.6709	0947	✓	
93 F	.6825	1036	.6824	0948	✓	
94 F	.6734	1036	.6734	0948	✓	
95 F	.6767	1037	.6766	0949	✓	
96 F	.6800	1038	.6801	0950	✓	
97 F	.6694	1038	.6693	0950	✓	
98 F	.6672	1039	.6672	0951	✓	
99 F	.6872	1040	.6872	0951	✓	
100 F	.6707	1040	.6705	0952	✓	
91 B	.3367	1030	.3368	0941	✓	
92 B	.3380	1030	.3380	0941	✓	
93 B	.3375	1031	.3376	0942	✓	
94 B	.3384	1031	.3381	0942	✓	
95 B	.3344	1032	.3345	0943	✓	
96 B	.3387	1032	.3388	0943	✓	
97 B	.3393	1033	.3393	0944	✓	
98 B	.3382	1033	.3382	0944	✓	
99 B	.3397	1034	.3398	0945	✓	
100 B	.3398	1034	.3400	0945	✓	

Checked by: C Wellington Date: 1-25-2006 Time: 1115

BALANCE ROOM ENVIRONMENTAL CONDITIONS

DATE	TIME	BY	WB	DB	% RH
1-24-06	1029	KV	58	69	48
1-25-06	0940	KV	60	73	47

BEAKER TARE WEIGHTS DATA SHEET #4-2

Into Dessicator: Date : 8-1-2006 Time : 1200 By : Chp W,

	DATE: 8-16-2006	BY: CW	DATE: 8-17-06	BY: CW	DATE: 8-18	BY: CW
BEAKER #	FIRST WEIGHT	TIME	SECOND WEIGHT	TIME	THIRD WEIGHT	TIME
76	103.8077	1040	103.8042	1043	103.8038	10:18
77	107.3913	1042	107.3884	1044	107.3886	10:20
78	94.4984	1043	94.4966	10:52	94.4967	10:22
79	97.6229	1045	97.6211	10:54	97.6208	10:28
80	109.1296	1046	109.1280	10:57	106.1275	10:31
81	101.4674	1047	101.4646	10:58	101.4647	10:33
82	97.4798	1048	97.4778	11:00	97.4781	10:36
83	98.3310	1050	98.3285	11:02	98.3290	10:40
84	105.5561	1051	105.5554	11:05	105.5550	10:45
85	97.9961	1053	97.9960	11:07	—	
86	104.7469	1055	104.7463	11:08	104.7458	10:48
87	105.9205	1056	105.9204	11:11	—	
88	100.0069	1057	100.0071	11:12	—	
89	120.6761	1100	120.6748	11:13	120.6745	10:52
90	106.4080	1101	106.4062	11:15	106.4061	10:55
91	95.0519	1103	95.0496	11:16	95.0488	10:57
92	96.6811	1105	96.6790	11:18	96.6790	10:59
93	107.7863	1106	107.8833	11:20	107.8838	11:00
94	106.3700	1108	106.3672	11:21	106.3676	11:01
95	107.4071	1110	107.4096	1050	107.4092	11:03
96	103.9810	1112	103.9815	1049	—	
97	99.9827	1114	99.9844	1048	99.9847	11:04
98	105.0236	1115	105.0245	1047	105.0248	11:05
99	104.9337	1116	104.9347	1046	104.9352	11.06
100	106.7411	1118	106.7411	1045	—	

BALANCE ROOM ENVIRONMENTAL CONDITIONS

DATE	TIME	BY	WB	DB	% RH
8-16	1030	CW		75	48
8-17	1035	CW		76	49
8-18	1010	CW		70	48

Checked by : C. Wadington

Date : 8-21-06

Time : 1020

WOODSTOVE DATA SHEET # 4-3 : CONSTANT WEIGHTS

UNIT : Buck 261 RUN : 5 DATE : 2-16-07 Page : 1 of

Beaker #	Date	Time	By	Weight	Date	Time	By	Weight	Date	Time	By	Weight	Date	Time	By
86	2-17	1415	CP	104.7757	2-19	1307	CP	104.7736	2-20	1008	CP	104.7736	2-22	1007	CP
87	2-17	1415	CP	105.9805	2-19	1308	CP	105.9784	2-20	1009	CP	105.9779	2-22	1008	CP
88	2-17	1415	CP	100.0275	2-19	1310	CP	100.0240	2-20	1010	CP	100.0250	2-22	1010	CP
				100.0245	2-23	1007	CP								
89	2-17	1415	CP	120.6838	2-19	1311	CP	120.6817	2-20	1012	CP	120.6815	2-22	1011	CP
90	2-17	1415	CP	106.4133	2-19	1312	CP	106.4115	2-20	1013	CP	106.4110	2-22	1012	CP

Filter #	Date	Time	By	Weight	Date	Time	By	Weight	Date	Time	By	Weight	Date	Time	By
91C	2-16	1845	CP	.7610	2-17	1445	CP	.7608	2-19	1305	CP				
91B	2-16	1845	CP	.3588	2-17	1446	CP	.3584	2-19	1306	CP				

SCALE ROOM ENVIRONMENTAL CONDITIONS

Weighing Session	Date	Time	By	DB	%RH
1	2-17	1400	CP	78	46
2	2-19	1300	CP	70	48
3	2-20	1000	CP	73	47
4	2-22	1000	CP	69	44
5	2-23	1000	CP	71	45

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

WOODSTOVE DATA SHEET #4-4

SCALE QA SHEET

Dates: From 11-3-2009 Through	Scale: Sartorius	Model: A 120 S	SN: 37010004

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	45
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

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

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	KW	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	1300	74	47
99.9998	10.0000	1.0000	.0999	P	10-16	0915	73	47
99.9998	10.0001	.9999	.0998	KW	10-17	0930	70	48
99.9999	10.0002	1.0000	.0999	KW	10-18	1100	70	47
100.0001	10.0001	.9999	.0999	KW	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

100 g weight	10 g weight	1 g weight	100 mg weight	Tech	Date	Time	Dry Bulb	% RH
99.9996	9.9998	.9999	.0998	Clp	12-8	0900	67	38
100.0001	10.0001	1.0000	.0998	Clp	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	Clp	1-2	1230	77	48
100.0003	10.0000	1.0001	.0999	Clp	1-4	1430	74	44
100.0003	9.9999	1.0000	.0999	Clp	1-5	1200	74	47
100.0002	9.9999	1.0000	.0999	Clp	1-6	1000	77	49
100.0000	10.0001	.9999	.0997	KV	1-8	1000	71	41
100.0002	10.0000	1.0000	.0999	Clp	1-9	1400	75	48
100.0000	10.0001	1.0000	.0999	Clp	1-12	1200	74	47
100.0001	10.0001	.9999	.0998	Clp	1-13	1500	73	49
99.9999	10.0003	.9998	.0998	Clp	1-15	1230	69	49
100.0003	10.0001	1.0001	.1000	Clp	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	Clp	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	Clp	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	Clp	2-8	1135	75	41
100.0002	10.0001	.9999	.0999	KV	2-10	0930	72	42
100.0000	10.0000	.9999	.0999	Clp	2-13	0940	75	46
100.0001	10.0002	1.0000	.0999	KV	2-20	1200	71	44
100.0003	10.0001	.9999	.0999	Clp	3-1	1215	78	43
100.0004	10.0001	1.0000	.0999	Clp	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	Clp	3-6	1300	75	48
100.0002	10.0001	1.0002	.0999	Clp	3-7	1905	75	48
100.0002	9.9999	.9999	.0999	Clp	5-24	1600	78	46
100.0004	10.0001	.9999	.0999	Clp	5-25	0830	76	45
100.0000	9.9999	.9997	.0999	Clp	5-26	0840	74	47
100.0003	9.9999	1.0000	.0998	Clp	5-30	1220	73	48
100.0002	10.0001	.9999	.1000	Clp	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

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	Clp	10-21	0900	74	44
100.0000	10.0001	1.0000	.0999	Clp	10-22	1630	78	46
99.9998	10.0000	.9998	.0998	Clp	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	Clp	10-29	1900	75	44
99.9998	10.0003	1.0000	.0999	Clp	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	10.0006	1.0001	.1000	Clp	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	Clp	11-12	1600	67	49
100.0001	10.0000	1.0000	.0999	Clp	11-13	1430	74	47
99.9999	10.0000	1.0000	.0999	Clp	11-15	1500	72	44
100.0002	10.0000	.9999	.0999	KV	11-16	0815	70	44
100.0005	10.0000	1.0000	.0999	Clp	11-17	0930	72	46
100.0004	10.0002	1.0001	.1000	Clp	11-18	1600	72	48
100.0003	10.0001	.9999	.0999	Clp	11-20	1100	68	47
100.0004	10.0002	1.0000	.1000	Clp	11-21	1200	74	44
100.0002	10.0002	.9999	.0998	Clp	11-22	1030	74	42
99.9999	10.0000	1.0000	.0999	Clp	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	Clp	11-28	1000	72	42
100.0004	10.0000	1.0000	.0998	Clp	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	Clp	12-1	0900	70	41
100.0000	10.0000	.9999	.1000	Clp	12-2	1340	72	42
100.0000	10.0000	.9998	.0999	Clp	12-3	1400	68	43
99.9999	9.9998	.9999	.0996	Clp	12-5	1620	71	45
99.9997	10.0001	1.0000	.0994	Clp	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

100 g weight	10 g weight	1 g weight	100 mg weight	Tech	Date	Time	Dry Bulb	% RH
99.9998	9.9998	.9999	.0998	[illegible]	07/15	2020	78	46
99.9997	9.9998	1.0000	.1000	[illegible]	07/19	2250	78	46
100.0000	9.9999	.9999	.0999	[illegible]	07/20	0740	78	46
100.0000	9.9999	1.0000	.1000	[illegible]	07/21	2100	78	46
99.9998	9.9998	.9999	.1000	[illegible]	07/24	2200	78	46
100.0001	10.0000	1.0000	.1000	[illegible]	07/27	1515	78	49
99.9998	10.0000	.9998	.1000	[illegible]	07/28	0600	78	49
99.9999	10.0001	1.0000	.1000	[illegible]	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
99.9998	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
99.9994	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	.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 : Buck 261 RUN : 5 DATE : 2-16-2007

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		74	44
10-6	0930	CP		77	47

FINAL QC

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

NET PARTICULATE CATCH CALCULATION DATA SHEET #6

UNIT: Buck 261 RUN: 5 DATE: 2-16-2007

Blank Audit by C Washington 10-14-2005

BLANK CALCULATIONS

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

FRONT HALF CATCH

FILTERS : .0736 (Total Catch) g - 1 (# of Filters) (.0000 g) (Blank Value / Filter) = .0736 g

BEAKERS : .0278 (Total Catch) g - 75 (ml Acetone) (.000007 g) (Blank Value / ml Acetone) = .0273 g

.0005

TOTAL FRONT HALF CATCH : .1009 g

BACK HALF CATCH

FILTERS : Ø (Total Catch) g - 1 (# of Filters) (.0000 g) (Blank Value / Filter) = Ø g

BEAKERS :

Acetone : .0575 (Total Catch) g - 150 (ml Acetone) (.000007 g) (Blank Value / ml Acetone) = .0564 g

.0011

Extract : .0174 (Total Catch) g - 75 (ml Dichloromethane) (.000015 g) (Blank Value / Dichloromethane) = .0163 g

.0011

Water : .0119 (Total Catch) g - 250 (ml Water) (.000013 g) (Blank Value / Water) = .0086 g

.0033

TOTAL BACK HALF CATCH : .0813 g

TOTAL CATCH : .1822 g

% FRONT HALF : 55.4 %

CALCULATIONS DATA SHEET # 7

UNIT : Buck 261 RUN : 5 DATE : 2-16-2007

1) Vm (std) = $\dfrac{(40.215 \text{ Vm})(17.64)(.997 \text{ mcf})\left(30.34 \text{ " Hg} + \dfrac{.163 \text{" } H_2O}{13.6}\right)}{(553 \text{ TmA})} = \dfrac{38.8189}{000.0000}$ dscf

2) Vw (std) = (.04707) (83.5 ml H_2O) = $\dfrac{3.9303}{00.0000}$ scf

3) Asw = $\dfrac{(3.9303 \text{ scf})}{(3.9303 \text{ scf} + 38.8189 \text{ dscf})} = \dfrac{.0919}{.0000}$ Bws × 100 = $\dfrac{9.1939}{00.0000}$ % H_2O

4) Cs = $\dfrac{(.1822 \text{ g.})}{(38.8189 \text{ dscf})}$ (15.43) = $\dfrac{.0724}{0.0000}$ gr / dscf

5) Estimated g / hr = $\dfrac{(.1822 \text{ g.})}{(38.8189 \text{ dscf})}$ ($\dfrac{12.954}{00.0000}$ dscfm) (60) = $\dfrac{3.6480}{00.0000}$ 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_2O =	average delta H for test	(p. 2)	(.000 " H_2O)
TmA =	average meter temperature for test in degrees Absolute	(p. 2)	(000 TmA)
ml H_2O =	total water caught during test	(p. 3)	(000.0 ml H_2O)
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: Buck 261 RUN: 5 DATE: 2-16-2007

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

Wet Bulb / Dry Bulb

Pre: WB: 65 DB: 83 = 36 % RH 1.4 % H_2O

Post: WB: 59 DB: 72 = 46 % RH 1.2 % H_2O

Average: 40 % RH 1.2 % H_2O

Empty Stove Weight (lbs): N/A w/ stack & oil seal: Wet: N/A Dry: 517.5

Kindling Weight (lbs): Paper: .1 Wood: 2.9

Preburn Fuel Weight: 15.8 + 16.2 + 12.7 Total: 44.7

Kindling & Preburn Fuel Weight (wood only) (lbs): **Total:** 47.60

Coal Bed Wt Range (lbs): 4.2 - 3.4 **Scale:** 521.7 - 520.9

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

Lower: .20 × fuel weight: Always round UP to nearest tenth **Actual Coal Bed Weight:** 4.2

Maximum Coal Bed Removal (lbs): ((4.2 (Upper) + 3.4 (Lower)) ÷ 2) .25 = .9 (round down to nearest tenth)

Test Fuel (.75" × 1.5" × 5" spacers) = 16 pcs

Dimensions	Length in inches	No. Pcs	Weight in lbs	% of Load
2" × 4"	18	3	6.7	39.6
4" × 4"	18	2	10.2	60.4

Test Fuel Weight: 16.9 lbs

Estimated Dry Burn Rate: 2.854

$$\frac{16.9 - (16.9 \times .16888)}{2.2046} \times \frac{60}{\frac{125}{\text{TIME}}} = 3.058 \text{ kg / hr}$$

Estimated BTU's/hr: 19,140 × $\frac{63}{100}$ × $\frac{3.058}{\text{DBR}}$ = 36874.0 BTU's/hr

EPA Default Efficiencies: Non-cat: 63 Cat: 72 Pellet: 78

WOOD STOVE OPERATING DATA PAGE #9

Unit : Buck 261 Run : 5 Date : 2-16-2007

FIRE STARTED: 1200

WARM UP AND PREBURN:

PRIMARY AIR : Set wide open for all warm-up / preburn fuel charges. Then set to wide open 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 30 sec.

TEST:

DOOR wide open during loading 0 min. 45 sec.

PRIMARY AIR : Opened full for first 5 min., then set to run setting of wide open

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 High

(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 : N/A BRAND : N/A

All Grades WCLB rules:

WARM UP INFORMATION:

All pre-burn / warm up fuel pieces were either 16 or 16 inches.

1st warm up / pre-burn fuel charge (15.8 lbs.) added at 1220

2nd warm up / pre-burn fuel charge (16.2 lbs.) added at 1320

3rd warm up / pre-burn fuel charge (12.7 lbs.) added at 1430

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

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

TEST DATA SHEET #10

Unit : Buck 261 Run : 5 Date : 2-16-2007

Room Temperature : 68 °F Temperature Correction Set?: (YES) NO

Calibration Check : 12.0% + or- 0.2%? (YES) NO

Time Test Fuel moisture reading taken : 1305

pc # 1	Dimen. 2"×4"×8'	Use K	TOP 16.5	BOTTOM 15.4	SIDE 16.1	Average 16.0
2						
3						
4	2"×4"×8'	P	23.7	23.2	22.4	23.1
5	2"×4"×8'	P	18.6	18.9	18.0	18.5
6	2"×4"×8'	P	17.9	18.7	18.9	18.5
7	2"×4"×8'	P	19.1	20.7	19.3	19.7
8	2"×4"×8'	P				(79.8)
9						
10						
11	2x4x18	T	18.8	19.1	18.4	18.8
12	"	T	19.7	19.1	18.4	19.1
13	"	T	22.2	22.9	22.4	22.5
14	4x4x18	T	23.1	21.9	22.6	22.5
15	"	T	18.7	18.8	18.7	18.7
16						(101.6)
17						
18						
19						
20	Spacers	T	19.5	19.4	19.4	19.4

Key for Use : K = Kindling P = Pretest Fuel T = Test Fuel

	KINDLING	PRETEST FUEL	TEST FUEL
Dry Moisture % :	16.000 %	19.950 %	20.320 %
Wet Moisture % :	13.793 %	16.632 %	16.888 %

To obtain Wet from Dry : $\frac{100 \times \%\ \text{Dry Reading}}{100 + \%\text{Dry Reading}}$ = % Moisture, Wet Basis

Acceptable Ranges : 16 - 20 % wet: 19 - 25 % dry with meter corrected for temperature.

GAS DATA SHEET #12

WEIGHT: 521.2 DATE: 2-16-200

UNIT: Buck 261 RUN: 5 PAGE: 1 OF

TIME	SCALE	FUEL	DROP	V.	CO_2	V.	O_2	V.	CO	STATIC	SO_2PF
0 1530	538.1	16.9	—	.298	7.4	.519	13.0	.026	.26	-.043	275
5 35	537.1	15.9	1.0	.500	12.5	.304	7.6	.054	.54	-.045	275
10 40	535.3	14.1	1.8	.543	13.6	.264	6.6	.051	.51	-.046	350
15 45	533.7	12.5	1.6	.572	14.3	.228	5.7	.065	.65	-.046	350
20 50	532.0	10.8	1.7	.559	14.2	.238	6.0	.065	.65	-.045	350
25 55	530.16	9.4	1.4	.575	14.4	.249	6.2	.018	.18	-.045	275
Fan? 30 1600	529.4	8.2	1.2	.544	13.6	.282	7.1	.014	.14	-.045	275
35 05	528.4	7.2	1.0	.544	13.6	.284	7.1	.010	.10	-.045	275
40 10	527.1	5.9	1.3	.476	11.9	.353	8.8	.007	.07	-.045	250
45 15	526.3	5.1	.8	.435	10.9	.394	9.9	.003	.03	-.049	250
50 20	525.6	4.4	.7	.354	8.9	.474	11.9	.004	.04	-.044	250
53 25	525.0	3.8	.6	.314	7.9	.511	12.8	.011	.11	-.044	250
SUBTOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	-.537	*****
60 1630	524.5	3.3	.5	.295	7.4	.530	13.3	.013	.13	-.043	250
65 35	524.2	3.0	.3	.292	7.3	.533	13.3	.016	.16	-.043	250
70 40	523.7	2.5	.5	.290	7.3	.532	13.3	.017	.17	-.043	250
75 45	523.3	2.1	.4	.296	7.4	.496	12.4	.018	.18	-.041	250
80 50	522.8	1.6	.5	.256	6.4	.566	14.2	.023	.23	-.040	250
85 55	522.6	1.4	.2	.241	6.1	.573	14.4	.035	.35	-.040	250
90 1700	522.3	1.1	.3	.203	5.1	.608	15.2	.047	.47	-.040	275
95 05	522.2	1.0	.1	.221	5.6	.590	14.8	.042	.42	-.040	250
100 10	522.0	.8	.2	.222	5.6	.593	14.9	.035	.35	-.039	250
105 15	521.8	.6	.2	.231	5.8	.585	14.7	.031	.34	-.036	250
110 20	521.6	.4	.2	.197	5.0	.614	15.4	.041	.41	-.036	250
115 25	521.5	.3	.1	.187	4.7	.623	15.6	.049	.49	-.035	250
SUBTOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	-.474	*****
120 30	521.3	.1	.2	.188	4.7	.624	15.6	.047	.47	-.035	250
125 35	521.2	0	.1	.179	4.5	.630	15.8	.052	.52	-.035	250
130											
135											
140											
145											
150											
155											
160											
165											
170											
175											
SUBTOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****		
TOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	-.070	*****
										1.081	*****

÷ 26

.040

UNIT: Buck 261

PREBURN DATA SHEET #13

RUN: 5 DATE: 2-16-2007 PAGE: 1 of

TIME	SCALE	DROP	STACK	TOP	LF SIDE	BACK	RT SIDE	BOTTOM	FIREBOX	SEC/CAT	AMBIENT	STATIC	COMMENTS
0 1400	533.4	—	396	393	516	297	529	317			72	-.037	PREBURN START: # UP
5 35	532.3	1.1	514	414	491	277	513	305			71	-.046	COAL BED SCALE RANGE:
10 40	530.7	1.6	599	462	484	269	511	296			73	-.047	521.7 → 520.9
15 45	528.9	1.8	630	503	500	282	517	293			71	-.049	PRIMARY AIR: wide open
20 50	526.7	2.2	619	537	522	304	545	291			74	-.049	SECONDARY AIR: N/A
25 55	525.4	1.3	616	554	536	303	564	290			69	-.049	FAN: High
30 1500	524.0	1.4	595	567	566	304	584	292			76	-.049	PUMPS ON AT: 1500
35 05	523.0	1.0	565	560	579	309	594	293			76	-.049	CHECK WB/DB:
40 10	522.4	.6	526	523	589	317	606	296			78	-.047	
45 15	522.0	.4	475	491	596	316	584	299			75	-.046	
50 20	521.7	.3	441	453	578	311	570	293			76	-.045	
55 25	521.5	.2	411	417	567	308	558	289			75	-.044	
*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	
60 1534	521.2	.3	387	381	553	303	547	287			78	-.043	
65													
70													
75													
80													

New Buck-Model 261

Temperature Data Sheet #14

Run 5
2/16/07

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	387	381	553	303	546	287	######	######	78	1468	229	49	235	38	39
5	521	416	514	283	516	285	######	######	75	1444	233	42	235	38	39
10	572	479	493	253	507	272	######	######	75	1431	238	41	235	38	38
15	596	510	498	244	520	267	######	######	74	1422	243	43	235	38	38
20	594	546	511	247	538	266	######	######	76	1416	245	43	235	38	38
25	591	563	526	255	552	267	######	######	77	1410	244	44	234	38	38
30	579	568	548	259	560	268	######	######	73	1406	241	43	233	37	38
35	582	555	570	265	574	267	######	######	72	1401	238	44	233	37	37
40	556	551	581	272	586	265	######	######	73	1399	237	45	234	37	37
45	534	534	588	278	587	263	######	######	72	1397	240	45	234	37	37
50	495	501	581	281	581	263	######	######	72	1395	243	45	234	37	37
55	463	466	570	281	566	262	######	######	72	1393	240	46	233	37	37
60	440	433	558	279	554	260	######	######	71	1390	240	46	232	37	37
65	425	408	546	276	543	256	######	######	71	1387	241	46	231	37	36
70	415	389	535	275	537	251	######	######	70	1384	241	47	230	37	36
75	411	376	526	274	534	248	######	######	70	1382	242	47	229	37	36
80	394	367	515	277	528	245	######	######	72	1379	246	47	231	37	36
85	377	344	502	272	520	244	######	######	73	1377	240	47	232	36	36
90	355	320	488	266	507	242	######	######	73	1376	237	47	232	36	36
95	343	305	477	262	492	238	######	######	73	1375	233	47	232	36	35
100	336	294	472	265	485	233	######	######	73	1373	231	47	232	36	35
105	333	284	469	268	478	228	######	######	72	1371	229	47	232	36	35
110	323	275	464	266	472	223	######	######	71	1370	226	47	232	36	35
115	314	266	456	259	462	218	######	######	72	1370	225	47	232	36	35
120	308	258	448	251	450	214	######	######	71	1369	225	47	231	36	35
125	300	248	441	247	441	210	######	######	71	1369	225	47	231	36	35

Run 5
2/16/07

TEMPERATURE DATA SHEET #14

		TEST TIME	125		
STACK AVG	444	TOP AVG	409	LT SIDE AVG	517
BACK AVG	268	RT SIDE AVG	524	BOTTOM AVG	252
FIREBOX AVG	########	SEC/CAT AVG	########	AMBIENT AVG	73

END	317.4	
START	414.0	
	-96.6	DELTA T

CIRCLE: LOSS / GAIN

ZERO / SPAN CHECK DATA SHEET #15-1

Date : 2-16-2007 Analyte : CO_2 (15-1)

Unit : Buck 261 Run # : 5

Zero Cyl. # : 168TAC 3-A Conc. : 0.00 % CO_2 Cyl. Press. : 900 PSI

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

Span Cyl. # : CC-41627 Conc. : 12.50 % CO_2 Cyl. Press. : 600 PSI

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

Analyzer : Make : HORIBA Model : PIR-2000 SN : 407069

Range : 0 - 25.0 % CO_2 Analyzer Output : 0 - 1.0 v.

Flow : 1.5 SCFH Measured by : Rotameter

EPA Span Value = 25.0 % CO_2

EPA Control Limits = ± 2.5% of 25.0 % CO_2 = ± 0.625 % CO_2

Method 28 A = ± .2 % of 25.0 % CO_2 = ± .05 % CO_2

PRE RUN Audit : by : Chp Wetmore Time : 1415 Temp : 73 ° 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	49.7	.497	12.450	-.050	-.199

POST RUN Audit : by : Chp Wetmore Time : 1750 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	.194
SPAN	50.0	.500	12.50	50.0	.500	12.525	.025	.101

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

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

Span % Difference = $\frac{\text{Act \% (ppm) - Exp \% (ppm)}}{\text{Full Scale Value}}$ X100

ZERO / SPAN CHECK DATA SHEET #15-2

Date : 2-14-2007 Analyte : O_2 (15-2)

Unit : Book 261 Run # : 5

Zero Cyl. # : 168TAC 3A Conc. : 0.00 % O_2 Cyl. Press. : 900 PS

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

Span Cyl. # : CC-41627 Conc. : 12.50 % O_2 Cyl. Press. : 600 PS

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

Analyzer : Make : TELEDYNE Model : 320 A SN : 37400

Range : 0 - 25.0 % O_2 Analyzer Output : 0 - 1.0 v.

Flow : 1.5 SCFH Measured by : Rotameter

EPA Span Value = 25.0 % O_2

EPA Control Limits = ± 2.5% of 25.0 % O_2 = ± 0.625 % O_2

Method 28 A = ± .2 % of 25.0 % O_2 = ± .05 % O_2

PRE RUN Audit : by : Chp Wadsworth Time : 1415 Temp : 73 °F

AUDIT RESULTS

Point #	Expected Response			Actual Response			± Conc. Difference	Δ %
	Meter	DVM	%	Meter	DVM	%		
ZERO	00.0	.000	00.0	00.0	.002	.025	.025	.099
SPAN	12.50	.500	1250	12.5	.500	12.522	.022	.090

POST RUN Audit : by : Chp Wadsworth Time : 1750 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	-.0004	-.0004	-.002
SPAN	12.50	.500	12.50	12.5	.502	12.573	.073	.291

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

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

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

ZERO / SPAN CHECK DATA SHEET #15-3

Date : 2-16-2007 Analyte : CO (15-3)

Unit : Bock 26) Run # : 5

Zero Cyl. # : 168TAC 3-A Conc. : 0.00 % CO Cyl. Press. : 900 PS

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

Span Cyl. # : CC-41627 Conc. : 4.99 % CO Cyl. Press. : 600 PS

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 = ± 2.5% of 10.0 % CO = ± 0. 25 % CO

Method 28 A = ± .2 % of 10.0 % CO = ± .02 % CO

PRE RUN Audit : by : Chp Watling Time : 1415 Temp : 73 ° F

AUDIT RESULTS

Point #	Expected Response			Actual Response			± Conc. Difference	Δ %
	Meter	DVM	%	Meter	DVM	%		
ZERO	00.0	.000	00.0	00.0	.000	.004	.004	.037
SPAN	49.9	.499	4.99	50.3	.503	5.022	.032	.325

POST RUN Audit : by : Chp Watling Time : 1750 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	.004	.004	.037
SPAN	49.9	.499	4.99	50.0	.500	4.993	.003	.026

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

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

Span % Difference = $\frac{\text{Act \% (ppm) - Exp \% (ppm)}}{\text{Full Scale Value}}$ X100

ZERO / SPAN CHECK DATA SHEET #15-4

Date : 2-16-2007 Analyte : SO_2 (15-4)

Unit : Buck 261 Run # : 5

Zero Cyl. # : 168TAC 3-A Conc. : 0.00 ppm SO_2 Cyl. Press. : 900 PSI

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

Span Cyl. # : CC82089 Conc. : 1250 ppm SO_2 Cyl. Press. : 2000 PSI

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

Analyzer : Make : HORIBA Model : PIR-2000 SN : 403019

Range : 0 - 2500 ppm SO_2 Analyzer Output : 0 - 1.0 v.

Flow : 1.5 SCFH Measured by : Rotameter

EPA Span Value = 2500 ppm SO_2

EPA Control Limits = ± 2.5% of 2500 ppm SO_2 = ± 62.5 ppm SO_2

PRE RUN Audit : by : [signature] Time : 1415 Temp : 73 °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	5.083	5.083	.203
SPAN	50.0	.500	1250	50.3	.503	1258.5	8.500	.340

POST RUN Audit : by : [signature] Time : 1750 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	5083	5.083	.203
SPAN	50.0	.500	1250	50.4	.504	1261.0	16.000	.440

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

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

Span % Difference = $\frac{\text{Act \% (ppm) - Exp \% (ppm)}}{\text{Full Scale Value}}$ X100

QUALITY CHECKS DATA SHEET # 16

UNIT : Buck 261 RUN : 5 DATE 2-16-2007

Thermocouple Check:

T/C # 1	— °F	T/C # 13	70.4 °F
T/C # 2	— °F	T/C # 14	69.8 °F
T/C # 3	68.2 °F	T/C # 15	70.7 °F
T/C # 4	64.4 °F	T/C # 16	57.4 °F
T/C # 5	63.9 °F	T/C # 17	63.5 °F
T/C # 6	64.2 °F	T/C # 18	73.1 °F
T/C # 7	63.7 °F	T/C # 19	65.4 °F
T/C # 8	63.1 °F	T/C # 20	— °F
T/C # 9	— °F	T/C # 21	— °F
T/C # 10	— °F	T/C # 22	— °F
T/C # 11	60.6 °F	T/C # 23	°F
T/C # 12	77.9 °F	T/C # 24	— °F

Thermocouple Readout:

Pretest zero and span check and calibration

ZERO 1.0 °F Adj. to 0.0 °F

SPAN 1998.8 °F Adj. to 2000.0 °F

post test zero and span

ZERO .1 °F Difference .005 % (% difference)

SPAN 1999.8 °F Difference .010 %

Thermocouple Readout Pretest Linearity Check:

0	= 0.0 °F	200	= 200.4 °F	400	= 400.0 °F
600	= 599.8 °F	800	= 799.7 °F	1000	= 999.8 °F
1200	= 1199.7 °F	1400	= 1399.5 °F	1600	= 1599.6 °F
1800	= 1799.8 °F	2000	= 2000.0 °F		

Sample Train Leak Check	Pre ✓	Post ✓
C-gas Train Leak Check	Pre ✓	Post ✓
SO_2 Train Leak Check	Pre ✓	Post ✓
Static Gauge Zero Check	Pre ✓	Post ✓

Scale Check Pre : 532.1 − 522.1 = 10.0

Post : 530.9 − 520.9 = 10.0

Stack Cleaned Prior to Test Run : YES ____ NO X

TABLE 1 ----- RAW DATA

CLIENT : New Buck TEST No. : 4

MODEL: 2261 DATE: 15-Feb-07

TIME (MIN.)	METER READING (C F)	DELTA H (IN. H2O)	METER TEMP. (DEG. F)	PERCENT CO (%)	PERCENT CO2 (%)	SO2 COCENTR. PPM
0	0.000	0.150	80	0.86	5.20	475
5	1.500	0.460	80	0.23	10.80	275
10	4.126	0.190	80	0.43	2.20	425
15	5.828	0.170	81	0.47	2.50	450
20	7.441	0.170	81	0.53	2.80	450
25	9.054	0.170	81	0.56	3.70	450
30	10.667	0.170	81	0.73	6.50	450
35	12.280	0.170	81	0.60	5.70	450
40	13.893	0.220	81	0.42	5.70	400
45	15.708	0.220	81	0.51	12.40	400
50	17.522	0.240	81	0.21	9.80	375
55	19.457	0.240	81	0.73	13.00	375
60	21.392	0.150	81	1.55	13.00	475
65	22.921	0.150	81	0.98	13.00	475
70	24.449	0.190	81	0.64	12.60	425
75	26.157	0.220	81	0.34	12.20	400
80	27.971	0.240	81	0.24	10.20	375
85	29.906	0.240	81	0.27	9.50	375
90	31.841	0.220	81	0.57	8.20	400
95	33.656	0.190	81	0.56	7.60	425
100	35.363	0.190	81	0.71	7.60	425
105	37.071	0.190	81	0.62	7.80	425
110	38.779	0.190	81	0.63	8.10	425
115	40.487	0.190	81	0.69	7.80	425
120	42.195	0.190	81	0.75	7.80	425
125	43.903	0.170	81	0.63	8.30	450
130	45.516	0.170	81	0.67	8.50	450
135	47.129	0.190	81	0.42	9.10	425
140	48.837	0.190	81	0.42	8.40	425
145	50.545	0.190	81	0.46	7.20	425
150	52.252	0.170	81	0.80	5.70	450
155	53.866	0.140	81	1.37	5.00	500
160	55.318	0.140	81	1.35	5.00	500
165	56.770	0.140	81	1.35	5.10	500
170	58.222	0.150	81	1.27	5.20	475
175	59.750	0.150	81	1.38	5.20	475

180	61.278	0.150	81	1.06	5.20	475
185	62.804	0.150	81	0.85	5.30	475
190	64.330	0.150	81	0.89	5.30	475
195	65.856	0.150	81	0.85	5.30	475
200	67.382	0.150	81	0.85	5.30	475
205	68.908	0.150	81	0.87	5.30	475
210	70.433	0.150	81	0.93	5.30	475
215	71.959	0.140	81	0.92	5.30	500
220	73.409	0.140	81	0.99	5.30	500
225	74.859	0.140	81	1.01	5.30	500
230	76.308	0.140	81	1.06	5.30	500
235	77.758	0.140	81	1.14	5.20	500
240	79.207	0.140	81	1.11	4.80	500
245	80.656	0.150	81	1.14	4.80	475
250	82.181	0.140	81	1.21	4.70	500
255	83.630	0.150	81	1.22	4.70	475
260	85.154	0.150	81	1.19	4.70	475
265	86.679	0.150	81	1.12	4.80	475
270	88.204	0.150	81	1.10	4.90	475
275	89.729	0.150	81	1.04	5.00	475
280	91.254	0.150	81	0.94	5.30	475
285	92.779	0.150	81	0.95	5.30	475
290	94.303	0.150	81	0.90	5.20	475
295	95.828	0.150	81	0.96	5.00	475
300	97.353	0.150	81	0.92	4.60	475
305	98.878	0.150	81	1.02	4.40	475
310	100.403	0.150	81	1.03	4.40	475
315	101.928	0.150	81	1.05	4.50	475
320	103.452	0.150	81	1.01	4.60	475
325	104.977	0.150	81	1.09	4.60	475
330	106.502	0.150	81	1.30	4.30	475
335						

TABLE 2---RAW DATA

CLIENT : New Buck TEST No. 4

MODEL: 2261 DATE: 15-Feb-07

METER CAL. FACTOR (Y) -------	0.997		Wt. WOOD BURNED(LB) -------	16.7	Lbs
BAROMETRIC PRESS.(Pb) -------	30.18	in Hg	WET,FUEL MOISTURE % -------	16.541	%
LEAK RATE POST (Lp) ------	0.000	cfm	Wt. PART. COLLECTED -------	0.5955	g
WATER VOL. (V1c) -------	107.2	Ml	METER VOLUME Vm -------	106.502	mcf
TEST TIME (MIN) -------	330	min	HC MOLE FRACTION -------	0.0132	

TABLE 3 -----FIELD DATA AVERAGES

CLIENT : New Buck TEST No. 4

MODEL: 2261 DATE: 15-Feb-07

AVG DELTA H	-------	0.17	in H2O	AVG PRCNT CO	-------	0.85	%
AVG METER TEMP. Tm	-------	81	deg F	AVG PRCNT CO2	-------	6.45	%
AVG PPM SO2	-------	454	PPM	AVG BAL CO2/CO	-------	7.63	%

TABLE 4 ---- CALCULATIONS

CLIENT : New Buck TEST No. 4

MODEL: 2261 DATE: 15-Feb-07

STD SAMPLE VOL. Vm(std) d) ------	104.60	dscf	STACK GAS FLOW Qsd -------	480.171	dscf/Hr
				&	
				8.00	dscf/min
VOL. WATER VAPOR Vw(s td) -----	5.046	scf	PARTICULATE CONCTRT. C s -----	0.0057	g/dscf
PRCNT MSTR Bws -------	4.60	%	PARTC.EMISS. RATE E -------	2.73	g/Hr
BURN RATE BR -------	1.15	Kg/Hr	MOLES OF GAS PER Lb WOOD Nt ----	0.49	Lb-mole/Lb
CO EMISSION RATE ------	135.99	g/Hr	PART.EMISS. RATE ------	2.38	g/Kgdry fuel
	&				
	118.36	g/Kgdry fuel			

TABLE 5 —— PROPORTIONAL RATE VARIATION

CLIENT : New Buck TEST No. : 4

MODEL: 2261 DATE: 15-Feb-07

TIME INTEVAL Ti	PPM * Vm	PROPRTN. RATE VAR. PR	PROPRTN RATE VAR. AVERAGE
5	701.0	98	100
10	711.0	100	
15	711.1	100	
20	712.8	100	
25	712.8	100	
30	712.8	100	
35	712.8	100	
40	712.8	100	
45	713.1	100	
50	712.7	100	
55	712.7	100	
60	712.7	100	
65	713.2	100	
70	712.8	100	
75	712.9	100	
80	712.7	100	
85	712.7	100	
90	712.7	100	
95	713.1	100	
100	712.5	100	
105	712.9	100	
110	712.9	100	
115	712.9	100	
120	712.9	100	
125	712.9	100	
130	712.8	100	
135	712.8	100	
140	712.9	100	
145	712.9	100	
150	712.5	100	
155	713.3	100	
160	712.9	100	
165	712.9	100	
170	712.9	100	
175	712.8	100	
180	712.8	100	

185	711.8	100
190	711.8	100
195	711.8	100
200	711.8	100
205	711.8	100
210	711.4	100
215	711.8	100
220	711.9	100
225	711.9	100
230	711.5	100
235	711.9	100
240	711.5	100
245	711.5	100
250	711.4	100
255	711.5	100
260	710.9	100
265	711.4	100
270	711.4	100
275	711.4	100
280	711.4	100
285	711.4	100
290	710.9	100
295	711.4	100
300	711.4	100
305	711.4	100
310	711.4	100
315	711.4	100
320	710.9	100
325	711.4	100
330	711.4	100

COMPUTER INPUT DATA SHEET #1

Client: Buck Stoves

Address: P.O. Box 69

Spruce Pine, NC 28777

Phone: 888-622-7868 Fax: 828-765-0462

Run No.: 4 Date of Test: 2-15-2007 Burn Rate: 1.15

Model No.: 261 ☐ min ☐ min-1.25 ☒ fan

Stove Type: ☐ Cat ☒ Non Cat ☐ Pellet ☐ 1.25-1.9 ☐ max ☐ insert

Dry Gas Meter Y Factor: .997 (0.000) (Data Sheet #2)

Post Leak Rate: 0.000 cfm (.000) (Data Sheet #2)

Time: 330 min. (000) (Data Sheet #2)

Dry Gas Meter Volume: 106.502 cf (00.000) (Data Sheet #2)

Stack Flow: 7.737 dscfm (00.000) (Data Sheet #2)

Δ H: .172 in. H_2O (.000) (Data Sheet #2)

Maximum Vac.: 2.0 (0.0) (Data Sheet #2)

Barometric Pressure: 30.16 in. Hg (00.00) (Data Sheet #2)

H_2O Captured: 107.2 g (00.0) (Data Sheet #3)

Front Half Catch % Of Total: 64.6 % (00.0) (Data Sheet #6)

Total Particulate Catch: .5955 g (0.0000) (Data Sheet #6)

Flue Gas Moisture: 4.6048 % (00.000) (Data Sheet #7)

Particulate Emission: .0879 gr/dsc (0.0000) (Data Sheet #7)

Relative Humidity: 49 % RH (00.0) (Data Sheet #8)

Ambient Moisture: 1.5 % H_2O (0.00) (Data Sheet #8)

Preburn Fuel Wt.: 163.2 lbs. (00.0) (Data Sheet #8)

Coal Bed Wt.: 4.1 lbs. (00.0) (Data sheet #8)

Test Fuel Wt.: 16.7 lbs. (00.0) (Data sheet #8)

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

Kindling Fuel % Moisture (wet): 12816 % (00.000) (Data Sheet #10)

Pretest Fuel % Moisture (wet): 16.295 % (00.000) (Data Sheet #10)

Test Fuel % Moisture (dry): 19.820 % (00.000) (Data Sheet #10 [wood stove] or #11 [pellet stove])

Test Fuel % Moisture (wet): 16.540 %

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

Stack Static Pressure: -.033 in. H_2O (+/- .000) (Data Sheet #12)

Average Ambient Temperature: 71 °F (00) (Data Sheet #14)

Stove Temperature Change: -97.1 °F (+/- 000.0) (Data Sheet #14)

Test start = 1340

End = 1910

meter Temp = 54

23

METER BOX DATA SHEET PAGE # 2

Page: 1 of 3

UNIT: Buck 261 RUN: 4 DATE: 2-15-2007

Meter Box: 5H Y Factor: .997

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

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

Inject SO^2 @ 100 cc/min. Nozzle: Probe @ 3/8 " od Initial Volume: 1.500

ROTO: PRESS: .20 SAMPLING RATIO: 24 : 1 BP: 30.15

MIN	TIME	METER READING	SAMPLE MDCF	STACK DSCFM	DELTA H	METER TEMP	SO2 PPM	ROTO TEMP	PUMP VACC
0	1340	0.000	———	7.330	.15	80	475	80	1.0
5	45	1.500	———	12.661	.46	80	275	80	2.0
10	50	4.126	4.126	8.193	.19	80	425	80	1.0
15	55	5.828	5.828	7.723	.17	81	450	81	2.0
20	1400	7.441	7.441	7.723	.17	81	450	81	2.0
25	05	9.054	9.054	7.723	.17	81	450	81	2.0
30	10	10.667	10.667	7.723	.17	81	450	81	2.0
35	15	12.280	12.280	7.723	.17	81	450	81	2.0
40	20	13.893	13.893	8.688	.22	81	400	81	2.0
45	25	15.708	15.708	8.688	.22	81	400	81	2.0
50	30	17.522	17.522	9.268	.24	81	375	81	2.0
55	35	19.457	19.457	9.268	.24	81	375	81	2.0
ROTO PRESS: .20			TOTALS:	102.711	2.57	969	BP.: 30.15		
60	1440	21.392	21.392	7.317	.15	81	425	81	2.0
65	45	22.921	22.921	7.317	.15	81	475	81	2.0
70	50	24.449	24.449	8.177	.19	81	425	81	2.0
75	55	26.157	26.157	8.688	.22	81	400	81	2.0
80	1500	27.971	27.971	9.268	.24	81	375	81	2.0
85	05	29.906	29.906	9.268	.24	81	375	81	2.0
90	10	31.841	31.841	8.688	.22	81	400	81	2.0
95	15	33.656	33.656	8.177	.19	81	425	81	2.0
100	20	35.363	35.363	8.177	.19	81	425	81	2.0
105	25	37.071	37.071	8.177	.19	81	425	81	2.0
110	30	38.779	38.779	8.177	.19	81	425	81	2.0
115	35	90.487	90.487	8.177	.19	81	425	81	2.0
			TOTALS:	99.608	2.36	972	MAX VACC =		
TOTAL Cu Ft.			TOTALS:	202.319	4.93	1941	AVG. BP:		

METER BOX DATA SHEET PAGE # 2

Page: 2 of 3

UNIT: Buck 261 RUN: 4 DATE: 2-15-2007

Meter Box: SH Y Factor: .997

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

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

Inject SO^2 @ 100 cc/min. Nozzle : Probe @ 3/8 " od Initial Volume: 1.500

ROTO: PRESS: .20			SAMPLING RATIO: 24 : 1				BP: 30.15		
MIN	TIME	METER READING	SAMPLE MDCF	STACK DSCFM	DELTA H	METER TEMP	SO2 PPM	ROTO TEMP	PUMP VACC
120	1540	42.195	42.195	8.177	.19	81	425	81	2.0
125	45	43.903	43.903	7.723	.17	81	450	81	2.0
130	50	45.516	45.516	7.723	.17	81	450	81	2.0
135	55	47.129	47.129	8.177	.19	81	425	81	2.0
140	1600	48.837	48.837	8.177	.19	81	425	81	2.0
145	05	50.545	50.545	8.177	.19	81	425	81	2.0
150	10	52.252	52.252	7.723	.17	81	450	81	2.0
155	15	53.866	53.866	6.951	.14	81	500	81	2.0
160	20	55.318	55.318	6.951	.14	81	500	81	2.0
165	25	56.770	56.770	6.951	.14	81	500	81	2.0
170	30	58.222	58.222	7.317	.15	81	475	81	2.0
175	35	59.750	59.750	7.317	.15	81	475	81	2.0
ROTO PRESS: .20			TOTALS:	91.367	1.99	972	BP.: 30.20		
180	1640	61.278	61.278	7.329	.15	81	475	81	2.0
185	45	62.804	62.804	7.329	.15	81	475	81	2.0
190	50	64.330	64.330	7.329	.15	81	475	81	2.0
195	55	65.856	65.856	7.329	.15	81	475	81	2.0
200	1700	67.382	67.382	7.329	.15	81	475	81	2.0
205	05	68.908	68.908	7.329	.15	81	475	81	2.0
210	10	70.433	70.433	7.329	.15	81	475	81	2.0
215	15	71.959	71.959	6.962	.14	81	500	81	2.0
220	20	73.409	73.404	6.962	.14	81	500	81	2.0
225	25	74.859	74.859	6.962	.14	81	500	81	2.0
230	30	76.308	76.308	6.962	.14	81	500	81	2.0
235	35	77.758	77.758	6.962	.14	81	500	81	2.0
			TOTALS:	86.113	1.75	972	MAX VACC =		
TOTAL Cu Ft.			TOTALS:	177.477	3.74	1944	AVG. BP:		

METER BOX DATA SHEET PAGE # 2

Page: 3 of 3

UNIT: Buck 261 RUN: 4 DATE: 2-15-2007

Meter Box: 5H Y Factor: _____

Leak checks: 15 " Hg @ 1,000 cfm _____ " Hg @ _____ cfm

15 " Hg @ 1,000 cfm _____ " Hg @ _____ cfm

Inject SO^2 @ 100 cc/min. Nozzle: Probe @ 3/8 " od Initial Volume: 1,500

ROTO: PRESS: ,20 SAMPLING RATIO: 24 : 1 BP: 30.22

MIN	TIME	METER READING	SAMPLE MDCF	STACK DSCFM	DELTA H	METER TEMP	SO2 PPM	ROTO TEMP	PUMP VACC
240	1740	79.207	79.207	6.967	.14	81	500	81	2.0
245	45	80.656	80.656	7.334	.15	81	475	81	2.0
250	50	82.181	82.181	6.967	.14	81	500	81	2.0
255	55	83.630	83.630	7.334	.15	81	475	81	2.0
260	1800	85.154	85.154	7.334	.15	81	475	81	2.0
265	05	86.679	86.679	7.334	.15	81	475	81	2.0
270	10	88.204	88.204	7.334	.15	81	475	81	2.0
275	15	89.729	89.729	7.334	.15	81	475	81	2.0
280	20	91.254	91.254	7.334	.15	81	475	81	2.0
285	25	92.779	92.779	7.334	.15	81	475	81	2.0
290	30	94.303	94.303	7.334	.15	81	475	81	2.0
295	35	95.828	95.828	7.334	.15	81	475	81	2.0
ROTO PRESS:		,20	TOTALS:	87.274	1.78	972	BP.:	30.22	
300	1840	97.353	97.353	7.334	.15	81	475	81	2.0
305	45	98.878	98.878	7.334	.15	81	475	81	2.0
310	50	100.403	100.403	7.334	.15	81	475	81	2.0
315	55	101.928	101.928	7.334	.15	81	475	81	2.0
320	1900	103.452	103.452	7.334	.15	81	475	81	2.0
325	05	104.977	104.977	7.334	.15	81	475	81	2.0
330	10	106.502	106.502	7.334	.15	81	475	81	2.0
335	15					567			
340	20			51.338	1.05	1539			
345					2.83				
350						5424			
355				518.408	11.50				
			TOTALS:			81	MAX VACC =		2.0
TOTAL Cu Ft.		106.502	TOTALS:	7.737	.172	541	AVG. BP:	30.18	

* ÷6

PARTICULATE CATCH / MOISTURE DATA SHEET # 3

UNIT : Buck 2&1 RUN : 4 DATE : 2-15-07

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	686.0	582.8	485.5	930.1
INITIAL WT	595.5	578.9	484.0	918.8
NET WT GRAMS	90.5	3.9	1.5	11.3

TOTAL CATCH : 107.2 GRAMS H_2O

FRONT HALF

FILTER #	98F	
FINAL WT g	.8671	
INITIAL WT g	.6672	
NET WT g	.1999	

BEAKER #	81
DESC.	ACETONE
FINAL WT g	101.6498
INITIAL WT g	101.4647
NET WT g	.1851
VOL. DESC. ml	90

BACK HALF

FILTER #	98B	
FINAL WT g	.3691	
INITIAL WT g	.3382	
NET WT g	.0309	

BEAKER #	82	83	84	85	
DESC.	ACETONE	METHCHLOR	H_2O	H_2O	
FINAL WT g	97.5440	98.3950	105.5770	98.0280	
INITIAL WT g	97.4781	98.3290	105.5550	97.9960	
NET WT g	.0659	.0660	.0220	.0320	.0540
VOL. DESC ml	100	75	150	150	300

FILTER TARE WEIGHTS DATA SHEET #4-1

Into Dessicator : Date : 1-20-06 Time : 1030 By : KV

Manufacturer S & S Grade : # 25 Glass Front Size : 11 cm Lot No. : ZB921

Back Size: 8.2 cm Lot No. : B1044632

	DATE: 1-24-06	BY: KV	DATE: 1-25-06	BY: KV	DATE:	BY:
FILTER #	FIRST WEIGHT	TIME	SECOND WEIGHT	TIME	THIRD WEIGHT	TIME
91 F	.6700	1035	.6698	0947	✓	
92 F	.6711	1035	.6709	0947	✓	
93 F	.6825	1036	.6824	0948	✓	
94 F	.6734	1036	.6734	0948	✓	
95 F	.6767	1037	.6766	0949	✓	
96 F	.6800	1038	.6801	0950	✓	
97 F	.6694	1038	.6693	0950	✓	
98 F	.6672	1039	.6672	0951	✓	
99 F	.6872	1040	.6872	0951	✓	
100 F	.6707	1040	.6705	0952	✓	
91 B	.3367	1030	.3368	0941	✓	
92 B	.3380	1030	.3380	0941	✓	
93 B	.3375	1031	.3376	0942	✓	
94 B	.3384	1031	.3381	0942	✓	
95 B	.3344	1032	.3345	0943	✓	
96 B	.3387	1032	.3388	0943	✓	
97 B	.3393	1033	.3393	0944	✓	
98 B	.3382	1033	.3382	0944	✓	
99 B	.3397	1034	.3398	0945	✓	
100 B	.3398	1034	.3400	0945	✓	

Checked by: C Watlington Date: 1-25-2006 Time: 1115

BALANCE ROOM ENVIRONMENTAL CONDITIONS

DATE	TIME	BY	WB	DB	% RH
1-24-06	1029	KV	58	69	48
1-25-06	0940	KV	60	73	47

BEAKER TARE WEIGHTS DATA SHEET #4-2

Into Dessicator: Date : 8-1-2006 Time : 1200 By : Clp W,

	DATE: 8-16-2006	BY: CW	DATE: 8-17-06	BY: CW	DATE: 8-18	BY: CW
BEAKER #	FIRST WEIGHT	TIME	SECOND WEIGHT	TIME	THIRD WEIGHT	TIME
76	103.8077	1040	103.8042	1043	103.8038	10:18
77	107.3913	1042	107.3884	1044	107.3886	10:20
78	94.4984	1043	94.4966	10:52	94.4967	10:22
79	97.6229	1045	97.6211	10:54	97.6208	10:28
80	109.1296	1046	109.1280	10:57	101.1275	10:31
81	101.4674	1047	101.4646	10:58	101.4647	10:33
82	97.4798	1048	97.4778	11:00	97.4781	10:36
83	98.3310	1050	98.3285	11:02	98.3290	10:40
84	105.5561	1051	105.5554	11:05	105.5550	10:45
85	97.9961	1053	97.9960	11:07	—	
86	104.7469	1055	104.7463	11:09	104.7458	10:48
87	105.9205	1056	105.9204	11:11	—	
88	100.0069	1057	100.0071	11:12	—	
89	120.6761	1100	120.6748	11:13	120.6745	10:52
90	106.4080	1101	106.4062	11:15	106.4061	10:55
91	95.0519	1103	95.0496	11:16	95.0488	10:57
92	96.6811	1105	96.6790	11:18	96.6790	10:59
93	107.7863	1106	107.8833	11:20	107.8838	11:00
94	106.3700	1108	106.3672	11:21	106.3676	11:01
95	107.4071	1110	107.4096	1050	107.4092	11:03
96	103.9810	1112	103.9815	1049	—	
97	99.9827	1114	99.9844	1048	99.9847	11:04
98	105.0236	1115	105.0245	1047	105.0248	11:05
99	104.9337	1116	104.9347	1046	104.9352	11:06
100	106.7411	1118	106.7411	1045	—	

BALANCE ROOM ENVIRONMENTAL CONDITIONS

DATE	TIME	BY	WB	DB	% RH
8-16	1030	CW		75	48
8-17	1035	CW		76	49
8-18	1010	CW		70	48

Checked by : C. Waddington

Date : 8-21-06

Time : 1020

WOODSTOVE DATA SHEET # 4-3 : CONSTANT WEIGHTS

UNIT : Buck ZL1 RUN : 4 DATE : 2-15-07 Page : 1 of

Beaker #	Date	Time	By	Weight	Date	Time	By	Weight	Date	Time	By	Weight	Date	Time	By
81	2-16	1050	CP	101.6494	2-17	1430	CP	101.6498	2-19	1315	CP				
82	2-16	1056	CP	97.5439	2-17	1431	CP	97.5440	2-19	1316	CP				
83	2-16	1050	CP	98.4059	2-17	1433	CP	98.4041	2-19	1317	CP	98.3997	2-20	1005	CP
				98.3954	2-22	1005	CP	98.3950	2-23	1005	CP				
84	2-16	1050	CP	105.5768	2-17	1434	CP	105.5770	2-19	1318	CP				
85	2-16	1050	CP	98.0277	2-17	1435	CP	98.0280	2-19	1320	CP				

Filter #	Date	Time	By	Weight	Date	Time	By	Weight	Date	Time	By	Weight	Date	Time	By
98F	2-15	2000	CP	.8675	2-16	1100	CP	.8671	2-17	1437	CP				
98D	2-15	2000	CP	.3689	2-16	1101	CP	.3691	2-17	1438	CP				

SCALE ROOM ENVIRONMENTAL CONDITIONS

Weighing Session	Date	Time	By	DB	%RH
1	2-16	1030	CP	75	46
2	2-17	1400	CP	78	46
3	2-19	1300	CP	70	48
4	2-20	1000	CP	73	47
5	2-22	1000	CP	69	44

Weighing Session	Date	Time	By	DB	%RH
6	2-23	1000	CP	71	45
7					
8					
9					
10					

WOODSTOVE DATA SHEET #4-4

SCALE QA SHEET

Dates: From 11-3-2009 Through	Scale: Sartorius	Model: A 120 S	SN: 37010004

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	1115	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

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

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	KW	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	KW	10-17	0930	70	48
99.9999	10.0002	1.0000	.0999	KW	10-18	1100	70	47
100.0001	10.0001	.9999	.0999	KW	10-27	0936	75	48
100.0004	9.9999	1.0000	.1000	CP	10-28	1800	73	47
100.0001	10.0002	.9999	.0998	CP	10-31	1730	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

100 g weight	10 g weight	1 g weight	100 mg weight	Tech	Date	Time	Dry Bulb	% RH
99.9996	9.9998	.9999	.0998	Clp	12-8	0900	67	38
100.0001	10.0001	1.0000	.0998	Clp	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	Clp	1-2	1230	77	48
100.0003	10.0000	1.0001	.0999	Clp	1-4	1430	74	44
100.0003	9.9999	1.0000	.0999	Clp	1-5	1206	74	47
100.0002	9.9999	1.0000	.0999	Clp	1-6	1000	77	49
100.0000	10.0001	.9999	.0997	KV	1-8	1000	71	41
100.0002	10.0000	1.0000	.0999	Clp	1-9	1400	75	48
100.0000	10.0001	1.0000	.0999	Clp	1-12	1200	74	47
100.0001	10.0001	.9999	.0998	Clp	1-13	1500	73	49
99.9999	10.0003	.9998	.0998	Clp	1-15	1230	69	49
100.0003	10.0001	1.0001	.1000	Clp	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	Clp	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	Clp	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	Clp	2-8	1135	75	41
100.0002	10.0001	.9999	.0999	KV	2-10	0930	72	42
100.0000	10.0000	.9999	.0999	Clp	2-13	0940	75	46
100.0001	10.0002	1.0000	.0999	KV	2-20	1200	71	44
100.0003	10.0001	.9999	.0999	Clp	3-1	1215	78	43
100.0004	10.0001	1.0000	.0999	Clp	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	Clp	3-6	1300	75	48
100.0002	10.0001	1.0002	.0999	Clp	3-7	1905	75	48
100.0002	9.9999	.9999	.0999	Clp	5-24	1600	78	46
100.0004	10.0001	.9999	.0999	Clp	5-25	0830	76	45
100.0000	9.9999	.9997	.0999	Clp	5-26	0840	74	47
100.0003	9.9999	1.0000	.0998	Clp	5-30	1220	73	48
100.0002	10.0001	.9999	.1000	Clp	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

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	Clp	10-21	0900	74	44
100.0000	10.0001	1.0000	.0999	Clp	10-22	1130	78	46
99.9998	10.0000	.9998	.0998	Clp	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	Clp	10-29	1900	75	44
99.9998	10.0003	1.0000	.0999	Clp	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	Clp	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	Clp	11-12	1600	67	49
100.0001	10.0000	1.0000	.0999	Clp	11-13	1430	74	47
99.9999	10.0000	1.0000	.0999	Clp	11-15	1500	72	44
100.0002	10.0000	.9999	.0999	KV	11-16	0915	70	44
100.0005	10.0000	1.0000	.0999	Clp	11-17	0930	72	46
100.0004	10.0002	1.0001	.1000	Clp	11-18	1600	72	48
100.0003	10.0001	.9999	.0999	Clp	11-20	1100	68	47
100.0004	10.0002	1.0000	.1000	Clp	11-21	1200	74	44
100.0002	10.0002	.9999	.0998	Clp	11-22	1030	74	42
99.9999	10.0000	1.0000	.0999	Clp	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	Clp	11-28	1000	72	42
100.0004	10.0000	1.0000	.0998	Clp	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	Clp	12-1	0900	70	41
100.0000	10.0000	.9999	.1000	Clp	12-2	1340	72	42
100.0000	10.0000	.9998	.0999	Clp	12-3	1400	68	43
99.9999	9.9998	.9999	.0996	Clp	12-5	1620	71	45
99.9997	10.0001	1.0000	.0994	Clp	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

100 g weight	10 g weight	1 g weight	100 mg weight	Tech	Date	Time	Dry Bulb	% RH
99.9998	9.9999	.9999	.0998	[illegible]	07/15	2020	78	46
99.9997	9.9998	1.0000	.1000	[illegible]	07/19	2250	78	46
100.0000	9.9999	.9999	.0999	[illegible]	07/20	0740	78	46
100.0000	9.9999	1.0000	.1000	[illegible]	07/21	2100	78	46
99.9998	9.9998	.9999	.1000	[illegible]	07/24	2200	78	46
100.0001	10.0000	1.0000	.1000	[illegible]	07/27	1515	78	49
99.9998	10.0002	.9998	.1000	[illegible]	07/28	0600	78	49
99.9999	10.0001	1.0000	.1000	[illegible]	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
99.9998	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	44
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	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	.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 : Buck 261 RUN : 4 DATE : 2-15-2007

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		77	47
		CP			

FINAL QC

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

NET PARTICULATE CATCH CALCULATION DATA SHEET #6

UNIT : Buck 261 RUN : 4 DATE : 2-15-2007

Blank Audit by C Winchester 10-14-2005

BLANK CALCULATIONS

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

FRONT HALF CATCH

FILTERS : .1999 (Total Catch) g - 1 (# of Filters) (.0000 g) (Blank Value / Filter) = .1999 g

BEAKERS : .1851 (Total Catch) g - 90 (ml Acetone) (.000007 g) (Blank Value / ml Acetone) = .1845 g

.0006

TOTAL FRONT HALF CATCH : .3844 g

BACK HALF CATCH

FILTERS : .0309 (Total Catch) g - 1 (# of Filters) (.0000 g) (Blank Value / Filter) = .0309 g

BEAKERS :

.0007

Acetone : .0659 (Total Catch) g - 100 (ml Acetone) (.000007 g) (Blank Value / ml Acetone) = .0652 g

.0011

Extract : .0660 (Total Catch) g - 75 (ml Dichloromethane) (.000015 g) (Blank Value / Dichloromethane) = .0649 g

.0039

Water : .0540 (Total Catch) g - 300 (ml Water) (.000013 g) (Blank Value / Water) = .0501 g

TOTAL BACK HALF CATCH : .2111 g

TOTAL CATCH : .5955 g

% FRONT HALF : 64.6 %

CALCULATIONS DATA SHEET # 7

UNIT : Buck 261 RUN : 4 DATE : 2-15-2007

1) $Vm(std) = \dfrac{(106.502\ Vm)(17.64)(.997\ mcf)\left(30.18"\ Hg + \frac{.172"\ H_2O}{13.6}\right)}{(541\ TmA)} = \dfrac{104.5335}{000.0000}$ dscf

2) $Vw(std) = (.04707)(107.2\ ml\ H_2O) = \dfrac{5.0459}{00.0000}$ scf

3) $Asw = \dfrac{(5.0459\ scf)}{(5.0459\ scf + 104.5335\ dscf)} = \dfrac{.0460}{.0000}$ Bws × 100 = $\dfrac{4.6048}{00.0000}$ % H_2O

4) $Cs = \dfrac{(.5955\ g.)}{(104.5335\ dscf)}(15.43) = \dfrac{.0879}{0.0000}$ gr / dscf

5) Estimated g / hr = $\dfrac{(.5955\ g.)}{(104.5335\ dscf)}\left(\dfrac{7.737}{00.0000}\ dscfm\right)(60) = \dfrac{2.6445}{00.0000}$ 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_2O =	average delta H for test	(p. 2)	(.000 " H_2O)
TmA =	average meter temperature for test in degrees Absolute	(p. 2)	(000 TmA)
ml H_2O =	total water caught during test	(p. 3)	(000.0 ml H_2O)
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 : Buck 261 RUN : 4 DATE : 2-15-2007

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

Wet Bulb / Dry Bulb

Pre : WB : 63 DB : 75 = 52 % RH 1.5 % H_2O

Post : WB : 65 DB : 80 = 46 % RH 1.5 % H_2O

Average : 49 % RH 1.5 % H_2O

Empty Stove Weight (lbs) : N/A w/ stack & oil seal : Wet : N/A Dry : 517.3

Kindling Weight (lbs) : Paper : .1 Wood : 3.2

Preburn Fuel Weight : 20.5 + 17.8 + 19 + 2.7 Total : 60

Kindling & Preburn Fuel Weight (wood only) (lbs) : **Total** : 63.2

Coal Bed Wt Range (lbs) : 4.1 - 3.4 **Scale** : 521.4 - 520.7

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** : 4.1

Maximum Coal Bed Removal (lbs) : ((4.1 (Upper) + 3.4 (Lower)) ÷ 2) .25 = .9 (round down to nearest tenth)

Test Fuel (.75" x 1.5" x 5" spacers) = 16 pcs

Dimensions	Length in inches	No. Pcs	Weight in lbs	% of Load
2" x 4"	18	3	7.2	43.1
4" x 4"	18	2	9.5	56.9

Test Fuel Weight : 16.7 lbs

Estimated Dry Burn Rate : 2.762

$$\frac{16.7 - (16.7 \times .1654)}{2.2046} \times \frac{60}{\frac{330}{\text{TIME}}} = 1.15 \text{ DBR kg / hr}$$

Estimated BTU's/hr : 19,140 x $\frac{63}{100}$ x $\frac{1.15}{\text{DBR}}$ = 1808.73 BTU's/hr

EPA Default Efficiencies : Non-cat : 63 Cat : 72 Pellet : 78

305 = 1.24

WOOD STOVE OPERATING DATA PAGE #9

Unit : Buck 261 Run : 4 Date : 2-15-2007

FIRE STARTED: 0810

WARM UP AND PREBURN:

PRIMARY AIR : Set wide open for all warm-up / preburn fuel charges. Then set to 6 11/16 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 25 sec.

TEST:

DOOR wide open during loading 0 min. 45 sec.

PRIMARY AIR : Opened full for first 5 min., then set to run setting of 6 11/16.

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 OFF

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 : N/A BRAND : N/A

All Grades WCLB rules:

WARM UP INFORMATION:

All pre-burn / warm up fuel pieces were either 16 or 16 inches.

1st warm up / pre-burn fuel charge (20.5 lbs.) added at 0827

2nd warm up / pre-burn fuel charge (17.8 lbs.) added at 1014

3rd warm up / pre-burn fuel charge (19.0 lbs.) added at 1120

4th warm up / pre-burn fuel charge (2.7 lbs.) added at 1240

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

TEST DATA SHEET #10

Unit : Buck 261 Run : 4 Date : 2-15-2007

Room Temperature : 74 °F Temperature Correction Set?: (YES) NO

Calibration Check : 12.0% + or- 0.2%? (YES) NO

Time Test Fuel moisture reading taken : 1200

pc #	Dimen.	Use	TOP	BOTTOM	SIDE	Average
1	2"×4"×8'	K	14.3	15.1	14.7	14.7
2						
3						
4	2"×4"×8'	P	17.9	18.4	18.6	18.3
5	2"×4"×8'	P	19.0	17.9	18.4	18.4
6	2"×4"×8'	P	21.9	21.1	22.0	21.7
7	2"×4"×8'	P				(58.4)
8	2"×4"×8'	P				
9						
10						
11	2x4x18	T	20.4	18.3	18.5	19.1
12	"	T	19.6	20.8	21.1	20.5
13	"	T	20.2	20.7	18.0	19.6
14	4x4x18	T	19.0	18.8	20.2	19.3
15	"	T	20.4	20.5	21.0	20.6
16						(99.1)
17						
18						
19						
20	Spacers	T	18.3	18.7	18.5	18.5

Key for Use : K = Kindling P = Pretest Fuel T = Test Fuel

	KINDLING	PRETEST FUEL	TEST FUEL
Dry Moisture % :	14.700 %	19.467 %	19.820 %
Wet Moisture % :	12.816 %	16.295 %	16.541 %

To obtain Wet from Dry : $\frac{100 \times \%\ \text{Dry Reading}}{100 + \%\text{Dry Reading}}$ = % Moisture, Wet Basis

Acceptable Ranges : 16 - 20 % wet: 19 - 25 % dry with meter corrected for temperature.

GAS DATA SHEET #12

WEIGHT: 521.4 DATE: 2-15-200

UNIT: Buck 261 RUN: 4 PAGE: 1 OF 2

TIME	SCALE	FUEL	DROP	V.	CO_2	V.	O_2	V.	CO	STATIC	SO_2PP
0 1340	538.1	16.7	—	.206	5.2	.587	14.7	.086	.86	-.032	375
5 45	537.4	16.0	.7	.430	10.8	.388	9.7	.023	.23	-.046	275
10 50	537.0	15.6	.4	.088	2.2	.721	18.1	.043	.43	-.034	425
15 55	536.8	15.4	.2	.097	2.5	.711	17.8	.047	.47	-.032	450
20 1400	536.6	15.2	.2	.112	2.8	.696	17.4	.053	.53	-.032	450
25 05	536.3	14.9	.3	.148	3.7	.657	16.5	.056	.56	-.032	450
30 10	535.8	14.4	.5	.258	6.5	.539	13.5	.073	.73	-.034	450
35 15	535.5	14.1	.3	.225	5.7	.576	14.4	.060	.60	-.035	450
40 20	535.0	13.6	.5	.328	5.7	.584	14.6	.042	.42	-.039	400
43 25	534.3	12.9	.7	.493	12.4	.316	7.9	.051	.51	-.044	400
50 30	533.7	12.3	.6	.391	9.8	.427	10.7	.021	.21	-.044	375
53 35	533.0	11.6	.7	.517	13.0	.285	7.1	.073	.73	-.044	375
SUBTOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	-.448	*****
60 1440	532.2	10.8	.8	.517	13.0	.248	6.2	.155	1.55	-.045	475
65 45	531.4	10.0	.8	.516	13.0	.272	6.8	.098	.98	-.046	475
70 50	530.6	9.2	.8	.503	12.6	.291	7.3	.064	.64	-.046	425
75 55	529.9	8.5	.7	.487	12.2	.330	8.2	.034	.34	-.046	400
80 1500	529.3	7.9	.6	.408	10.2	.409	10.3	.024	.24	-.045	375
85 05	528.9	7.5	.4	.379	9.5	.434	11.0	.027	.27	-.044	375
90 10	528.4	7.0	.5	.326	8.2	.480	12.0	.057	.57	-.042	400
95 15	528.1	6.7	.3	.304	7.6	.503	12.6	.056	.56	-.040	425
100 20	527.8	6.4	.3	.303	7.6	.495	12.4	.071	.71	-.039	425
105 25	527.5	6.1	.3	.312	7.8	.487	12.2	.062	.62	-.039	425
110 30	527.0	5.6	.5	.323	8.1	.479	12.0	.063	.63	-.039	425
115 35	526.7	5.3	.3	.316	7.8	.487	12.2	.069	.69	-.039	425
SUBTOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	-.510	*****
120 1540	526.4	5.0	.3	.318	7.8	.483	12.1	.075	.75	-.038	425
125 45	526.1	4.7	.3	.331	8.3	.471	11.8	.063	.63	-.037	450
130 50	525.8	4.4	.3	.340	8.5	.462	11.6	.067	.67	-.037	450
135 55	525.5	4.1	.3	.361	9.1	.449	11.2	.042	.42	-.039	425
140 1600	525.2	3.8	.3	.334	8.4	.475	11.9	.042	.42	-.038	425
145 05	525.0	3.6	.2	.288	7.2	.520	13.0	.046	.46	-.036	425
150 10	524.8	3.4	.2	.228	5.7	.567	14.2	.080	.80	-.035	450
155 15	524.6	3.2	.2	.197	5.0	.576	14.4	.137	1.37	-.036	500
160 20	524.5	3.1	.1	.199	5.0	.577	14.5	.135	1.35	-.035	500
165 25	524.4	3.0	.1	.204	5.1	.573	14.4	.135	1.35	-.032	500
170 30	524.3	2.9	.1	.207	5.2	.572	14.3	.127	1.27	-.031	475
175 35	524.2	2.8	.1	.207	5.2	.568	14.2	.138	1.38	-.037	475
SUBTOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	-.425	*****
TOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	1.383	*****

OFF Fan? Yes

GAS DATA SHEET #12

WEIGHT: 521.4 DATE: 2-15-2007

UNIT: Buick 2601 RUN: 4 PAGE: 2 OF 2

TIME	SCALE	FUEL	DROP	V.	CO_2	V.	O_2	V.	CO	STATIC	SO_2PPM
180 1640	524.1	2.7	.1	.208	5.2	.580	14.5	.106	1.06	-.031	475
185 45	524.0	2.6	.1	.210	5.3	.585	14.6	.085	.85	-.029	475
190 50	523.9	2.5	.1	.210	5.3	.583	14.6	.089	.89	-.028	475
195 55	523.8	2.4	.1	.210	5.3	.585	14.7	.085	.85	-.026	475
200 1700	523.7	2.3	.1	.212	5.3	.585	14.7	.085	.85	-.026	475
205 05	523.6	2.2	.1	.210	5.3	.583	14.6	.089	.89	-.028	475
210 10	523.5	2.1	.1	.209	5.3	.582	14.6	.093	.93	-.028	475
215 15	523.4	2.0	.1	.212	5.3	.582	14.6	.092	.92	-.028	500
220 20	523.3	1.9	.1	.209	5.3	.579	14.5	.097	.97	-.029	500
225 25	523.2	1.8	.1	.212	5.3	.578	14.5	.101	1.01	-.029	500
230 30	523.1	1.7	.1	.210	5.3	.576	14.4	.106	1.06	-.028	500
235 35	523.0	1.6	.1	.206	5.2	.577	14.5	.114	1.14	-.028	500
SUBTOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	-.342	*****
240 40	522.9	1.5	.1	.191	4.8	.594	14.9	.111	1.11	-.028	500
245 45	522.8	1.4	.1	.192	4.8	.593	14.9	.114	1.14	-.028	475
250 50	522.7	1.3	.1	.188	4.7	.594	14.9	.121	1.21	-.028	500
255 55	522.6	1.2	.1	.187	4.7	.594	14.9	.122	1.22	-.026	475
260 1800	522.6	1.2	0	.188	4.7	.595	14.9	.119	1.19	-.026	475
265 05	522.5	1.1	.1	.189	4.8	.593	14.9	.115	1.15	-.026	475
270 10	522.4	1.0	.1	.194	4.9	.591	14.8	.110	1.10	-.026	475
275 15	522.3	.9	.1	.197	5.0	.598	14.8	.104	1.04	-.027	475
280 20	522.2	.8	.1	.209	5.3	.581	14.6	.094	.94	-.027	475
285 25	522.1	.7	.1	.211	5.3	.581	14.6	.093	.93	-.027	475
290 30	522.0	.6	.1	.208	5.2	.587	14.7	.090	.90	-.027	475
295 35	521.9	.5	.1	.198	5.0	.592	14.8	.096	.96	-.027	475
SUBTOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	-.323	*****
300 40	521.8	.4	.1	.183	4.6	.610	15.3	.092	.92	-.027	475
305 45	521.8	.4	0	.176	4.4	.614	15.4	.102	1.02	-.027	475
310 50	521.7	.3	.1	.175	4.4	.613	15.4	.103	1.03	-.021	475
315 55	521.6	.2	.1	.177	4.5	.609	15.3	.105	1.05	-.021	475
320 1900	521.6	.2	0	.181	4.6	.606	15.2	.101	1.01	-.028	475
325 05	521.5	.1	.1	.184	4.6	.607	15.2	.109	1.09	-.028	475
330 10	521.4	0	.1	.170	4.3	.607	15.2	.130	1.30	-.032	475
335											
340										-.192	
345										-.857	
350											
355											
SUBTOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****		*****
TOTAL	*****	*****	*****	*****	*****	*****	*****	*****	*****	-2.240	*****

-.033 ÷67

521.4 and 520.7

PREBURN DATA SHEET #13

UNIT: Buck 261 RUN: 4 DATE: 2-15-2007 PAGE: 1 of

TIME	SCALE	DROP	STACK	TOP	LF SIDE	BACK	RT SIDE	BOTTOM	FIREBOX	SEC/CAT	AMBIENT	STATIC	COMMENTS
0 1240	524.1	—	388	516	594	547	584	362			73	-.045	PREBURN START: # 2.7 UP
5 45	523.9	.2	320	507	582	526	573	382			71	-.045	COAL BED SCALE RANGE:
10 50	523.6	.3	295	495	553	496	544	375			72	-.043	521.4 → 520.7
15 55	523.2	.4	286	484	540	485	529	369			71	-.042	PRIMARY AIR: 6"/16
20 1300	522.9	.3	279	474	524	472	513	360			70	-.041	SECONDARY AIR: N/A
25 05	522.6	.3	281	472	510	459	495	351			69	-.042	FAN: OFF
30 10	522.3	.3	288	486	502	451	486	342			71	-.041	PUMPS ON AT: 1310
35 15	521.9	.4	295	493	500	445	480	336			72	-.041	CHECK WB/DB:
40 20	521.7	.2	262	470	484	437	470	329			72	-.037	
45 25	521.6	.1	244	438	476	430	459	327			72	-.035	
50 30	521.6	0	233	417	459	420	444	324			71	-.035	
55 35	521.5	.1	222	382	445	410	432	320			71	-.032	
*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	
60 1340	521.4	.1	226	361	433	404	422	315			71	-.032	
65													
70													
75													
80													

New Buck Model 261

Temperature Data Sheet #14

Run 4
2/15/07

********	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	226	361	433	404	422	315	######	######	71	1441	235	58	231	39	39
5	408	398	409	388	401	289	######	######	69	1422	235	42	232	39	39
10	251	380	388	364	382	292	######	######	69	1409	235	40	234	39	39
15	214	340	366	346	363	290	######	######	70	1397	235	40	234	38	39
20	199	313	346	330	344	281	######	######	69	1387	235	39	234	38	39
25	196	298	330	316	329	272	######	######	69	1376	236	38	234	38	39
30	217	307	322	303	315	269	######	######	69	1367	236	38	234	38	39
35	220	314	315	292	305	262	######	######	69	1358	236	38	234	38	38
40	242	337	310	283	298	256	######	######	69	1350	236	38	235	38	38
45	285	386	322	278	300	250	######	######	68	1342	236	38	235	38	38
50	293	425	332	276	310	245	######	######	68	1336	237	39	236	38	38
55	309	452	348	279	316	240	######	######	68	1330	237	39	237	38	37
60	319	477	363	297	331	238	######	######	68	1326	237	39	238	38	37
65	328	504	382	313	350	236	######	######	68	1324	237	39	239	37	37
70	327	523	401	325	364	236	######	######	69	1320	237	39	240	37	37
75	326	535	417	335	376	236	######	######	69	1318	238	39	241	37	37
80	316	532	429	344	385	236	######	######	69	1318	238	39	242	37	36
85	303	517	436	349	390	235	######	######	69	1316	238	39	242	37	36
90	287	498	441	354	393	236	######	######	69	1316	238	39	242	37	36
95	272	480	436	356	394	236	######	######	69	1316	238	40	243	37	36
100	265	465	425	354	391	236	######	######	69	1317	238	40	243	38	36
105	261	453	416	349	390	235	######	######	69	1317	238	40	243	38	36
110	260	449	411	345	389	237	######	######	69	1316	238	40	242	38	36
115	257	441	407	342	387	237	######	######	69	1317	238	40	242	38	36
120	254	436	406	341	387	238	######	######	69	1317	238	41	242	38	36
125	251	427	406	342	389	239	######	######	70	1316	238	41	242	38	35
130	251	422	406	344	395	238	######	######	69	1316	238	41	241	38	35
135	258	425	407	346	402	241	######	######	69	1316	238	41	241	38	35
140	256	425	406	349	408	242	######	######	69	1315	227	41	241	38	35
145	244	410	406	354	411	244	######	######	69	1316	237	41	241	38	35
150	233	394	405	359	411	246	######	######	69	1315	237	41	240	38	35
155	219	373	401	354	400	251	######	######	69	1314	237	41	239	38	35
160	212	357	393	345	389	254	######	######	69	1314	236	41	239	39	35
165	207	342	386	338	379	256	######	######	69	1314	236	42	239	39	35
170	203	330	381	334	372	253	######	######	68	1314	236	42	238	39	35
175	200	317	377	331	364	254	######	######	71	1313	235	42	237	39	35

New Buck Model 261 | Temperature Data Sheet #14 | Run 4 2/15/07

180	197	310	373	329	359	255	######	######	72	1311	235	42	237	39	35
185	194	301	370	330	355	253	######	######	73	1310	235	42	237	39	34
190	192	294	369	331	352	251	######	######	73	1309	236	42	236	39	34
195	190	291	367	331	351	249	######	######	73	1308	236	42	235	38	34
200	189	285	366	332	349	247	######	######	74	1306	236	42	235	38	34
205	188	282	365	332	347	245	######	######	73	1304	236	42	234	38	34
210	188	280	363	332	346	243	######	######	73	1303	235	42	234	38	34
215	193	277	362	331	344	241	######	######	73	1303	235	43	234	38	34
220	194	277	363	331	344	239	######	######	73	1302	236	43	234	38	34
225	195	277	362	331	345	238	######	######	73	1303	236	43	234	37	34
230	195	278	362	331	344	237	######	######	74	1303	236	43	234	37	34
235	194	275	362	331	344	235	######	######	73	1302	236	43	234	37	34
240	193	275	361	330	345	234	######	######	73	1301	236	43	233	37	34
245	191	274	359	329	344	232	######	######	74	1301	236	43	233	37	33
250	190	270	358	328	343	230	######	######	74	1301	236	43	233	37	33
255	189	267	356	328	341	228	######	######	73	1301	236	44	233	37	33
260	188	266	356	327	340	226	######	######	74	1300	236	44	233	37	33
265	188	264	354	326	338	225	######	######	74	1301	236	37	233	37	33
270	187	262	353	325	339	223	######	######	74	1302	236	37	233	36	33
275	187	262	351	325	341	221	######	######	73	1302	236	37	233	36	33
280	188	260	351	325	343	220	######	######	73	1302	237	36	233	36	33
285	189	262	351	325	348	219	######	######	73	1302	237	36	233	36	33
290	190	262	353	325	351	217	######	######	73	1303	237	36	232	36	33
295	189	263	352	328	352	215	######	######	74	1302	237	37	232	36	33
300	188	262	351	328	349	213	######	######	74	1302	236	37	232	36	33
305	186	262	350	327	345	211	######	######	73	1302	236	37	232	35	33
310	185	260	347	326	342	208	######	######	74	1303	236	37	232	35	33
315	184	258	345	324	338	207	######	######	74	1302	236	37	232	35	33
320	184	256	344	323	335	206	######	######	73	1304	236	38	232	35	33
325	184	256	343	322	333	204	######	######	74	1305	236	38	233	35	33
330	183	254	343	319	331	202	######	######	73	1307	236	38	233	35	33

TEMPERATURE DATA SHEET #14A

		TEST TIME	330		
STACK AVG	227	TOP AVG	347	LT SIDE AVG	373
BACK AVG	332	RT SIDE AVG	358	BOTTOM AVG	241
FIREBOX AVG	########	SEC/CAT AVG	########	AMBIENT AVG	71

END	289.9	
START	387.0	
	-97.1	DELTA T

CIRCLE: LOSS / GAIN

ZERO / SPAN CHECK DATA SHEET #15-1

Date: 2-15-2007 Analyte: CO_2 (15-1)

Unit: Buck 261 Run #: 4

Zero Cyl. #: 168TAC 3-A Conc.: 0.00 % CO_2 Cyl. Press.: 930 PSI

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

Span Cyl. #: CC-41627 Conc.: 12.50 % CO_2 Cyl. Press.: 640 PSI

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

Analyzer: Make: HORIBA Model: PIR-2000 SN: 407069

Range: 0 - 25.0 % CO_2 Analyzer Output: 0 - 1.0 v.

Flow: 1.5 SCFH Measured by: Rotameter

EPA Span Value = 25.0 % CO_2

EPA Control Limits = ± 2.5% of 25.0 % CO_2 = ± 0.625 % CO_2

Method 28 A = ± .2 % of 25.0 % CO_2 = ± .05 % CO_2

PRE RUN Audit: by: Chp Wadsworth Time: 1230 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	.296
SPAN	50.0	.500	12.50	50.0	.500	12.525	.025	.101

POST RUN Audit: by: Chp Wadsworth Time: 1920 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	.194
SPAN	50.0	.500	12.50	50.1	.501	12.550	.050	.200

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

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

Span % Difference = $\frac{\text{Act \% (ppm) - Exp \% (ppm)}}{\text{Full Scale Value}}$ X100

ZERO / SPAN CHECK DATA SHEET #15-2

Date : 2-15-2007 Analyte : O_2 (15-2)

Unit : Book 261 Run # : 4

Zero Cyl. # : 168TAC 3A Conc. : 0.00 % O_2 Cyl. Press. : 930 PSI

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

Span Cyl. # : CC-41627 Conc. : 12.50 % O_2 Cyl. Press. : 640 PSI

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

Analyzer : Make : TELEDYNE Model : 320 A SN : 37400

Range : 0 - 25.0 % O_2 Analyzer Output : 0 - 1.0 v.

Flow : 1.5 SCFH Measured by : Rotameter

EPA Span Value = 25.0 % O_2

EPA Control Limits = ± 2.5% of 25.0 % O_2 = ± 0.625 % O_2

Method 28 A = ± .2 % of 25.0 % O_2 = ± .05 % O_2

PRE RUN Audit : by : Chp Wadsworth Time : 1230 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	-.025	-.025	-.102
SPAN	12.50	.500	12.50	12.5	.500	12.522	.022	.090

POST RUN Audit : by : Chp Wadsworth Time : 1920 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	-.0004	-.0004	-.002
SPAN	12.50	.500	12.50	12.5	.502	12.573	.073	.291

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

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

Span % Difference = $\frac{\text{Act \% (ppm) - Exp \% (ppm)}}{\text{Full Scale Value}}$ X100

ZERO / SPAN CHECK DATA SHEET #15-3

Date : 2-15-2007 Analyte : CO (15-3)

Unit : Bock 26) Run # : 4

Zero Cyl. # : 168TAC 3-A Conc. : 0.00 % CO Cyl. Press. : 930 PSI

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

Span Cyl. # : CC-41627 Conc. : 4.99 % CO Cyl. Press. : 640 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 = ± 2.5% of 10.0 % CO = ± 0. 25 % CO

Method 28 A = ± .2 % of 10.0 % CO = ± .02 % CO

PRE RUN Audit : by : Chp Wadsworth Time : 1230 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	.004	.004	.037
SPAN	49.9	.499	4.99	49.8	.498	4.973	-.017	-.174

POST RUN Audit : by : Chp Wadsworth Time : 1920 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	.004	.004	.037
SPAN	49.9	.499	4.99	49.9	.499	4.983	-.007	-.074

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

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

Span % Difference = $\frac{\text{Act \% (ppm) - Exp \% (ppm)}}{\text{Full Scale Value}}$ X100

ZERO / SPAN CHECK DATA SHEET #15-4

Date : 2-15-2007 Analyte : SO_2 (15-4)

Unit : Buck 261 Run # : 4

Zero Cyl. # : 168TAC 3-A Conc. : 0.00 ppm SO_2 Cyl. Press. : 930 PSI

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

Span Cyl. # : CC82089 Conc. : 1250 ppm SO_2 Cyl. Press. : 2000 PSI

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

Analyzer : Make : HORIBA Model : PIR-2000 SN : 403019

Range : 0 - 2500 ppm SO_2 Analyzer Output : 0 - 1.0 v.

Flow : 1.5 SCFH Measured by : Rotameter

EPA Span Value = 2500 ppm SO_2

EPA Control Limits = ± 2.5% of 2500 ppm SO_2 = ± 62.5 ppm SO_2

PRE RUN Audit : by : [signature] Time : 1230 Temp : 72 °F

AUDIT RESULTS

Point #	Expected Response			Actual Response			± Conc. Difference	Δ %
	Meter	DVM	PPM	Meter	DVM	%		
ZERO	00.0	.000	00.0	00.4	.004	12.573	12.573	.503
SPAN	50.0	.500	1250	50.3	.503	1258.5	8.500	.340

POST RUN Audit : by : [signature] Time : 1920 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	5.083	5.083	.203
SPAN	50.0	.500	1250	50.1	.501	1253.5	3.500	.140

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

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

Span % Difference = $\frac{\text{Act \% (ppm) - Exp \% (ppm)}}{\text{Full Scale Value}}$ X100

QUALITY CHECKS DATA SHEET # 16

UNIT : Buck 261 RUN : 4 DATE 2-15-2007

Thermocouple Check:

T/C # 1	— °F	T/C # 13	59.2 °F
T/C # 2	— °F	T/C # 14	58.9 °F
T/C # 3	60.2 °F	T/C # 15	59.0 °F
T/C # 4	54.1 °F	T/C # 16	51.4 °F
T/C # 5	53.4 °F	T/C # 17	56.2 °F
T/C # 6	53.4 °F	T/C # 18	64.0 °F
T/C # 7	53.4 °F	T/C # 19	56.2 °F
T/C # 8	53.1 °F	T/C # 20	— °F
T/C # 9	— °F	T/C # 21	— °F
T/C # 10	— °F	T/C # 22	— °F
T/C # 11	52.5 °F	T/C # 23	°F
T/C # 12	62.4 °F	T/C # 24	— °F

Thermocouple Readout:

Pretest zero and span check and calibration — post test zero and span — % difference

ZERO -.5 °F Adj. to 0.0 °F — ZERO 0.0 °F — Difference 0 %

SPAN 1999.3 °F Adj. to 2000.0 °F — SPAN 1999.9 °F — Difference .005 %

Thermocouple Readout Pretest Linearity Check:

0	= 0.0 °F	200	= 200.2 °F	400	= 399.9 °F
600	= 599.9 °F	800	= 799.8 °F	1000	= 999.8 °F
1200	= 1199.8 °F	1400	= 1399.6 °F	1600	= 1599.7 °F
1800	= 1800.0 °F	2000	= 2000.0 °F		

Sample Train Leak Check	Pre ✓	Post ✓
C-gas Train Leak Check	Pre ✓	Post ✓
SO_2 Train Leak Check	Pre ✓	Post ✓
Static Gauge Zero Check	Pre ✓	Post ✓

Scale Check Pre : 534.4 − 524.4 = 10.0

Post : 534.0 − 524.0 = 10.0

Stack Cleaned Prior to Test Run : YES ____ NO X

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 McClellan

Authorization Signature: _____

Date of Inspection: 11-26-02
Next Inspection Due: 5-03

Certification Type
- ✓ Standard
- __ ISO 9000
- __ MIL STD-45662

Equipment Tested

Indicator

Make: weightronix
Model: WI-110
SR#: 16409
Class: III
Cap.: 1000 lbs

Base

Options Installed

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.

WASHINGTON STATE DEPARTMENT OF **AGRICULTURE**

METROLOGY LABORATORY

Receipt Date:	January 29, 2002	State Test Number:	L2017-1
Test Date:	February 13, 2002	Group ID:	SHOP
Report Date:	February 13, 2002	Due Date:	February 13, 2004

CALIBRATION REPORT

Phillips Morris Scale Company		Item(s) Submitted:	See Table Below
934 Elliott Ave. W		Specification:	NIST HB 105-1, Class F
Seattle, WA 98119-3608		Condition:	Good
Contact:	Todd Mackie	Temperature:	21.0 °C
Phone:	206-284-6090	Pressure:	762.0 mmHg
PO Number:	2-2-009237	Humidity:	35 % RH
SOP:	8	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 T23-24, T23-26, T23-2 T23-32
Test Weight	50 lb	30	Cast Iron	Rice Lake	877B, N1039, N1041, 1 to T23-10, T23-19 to T23-28, WA171-0, WA1712-0 to WA172- WA173-2, WA237, X6
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 currently in control. These standards values are traceable to the National Institute of Standards and Technology (N 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 li 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 wri from the calibrating organization issuing this report.

LABORATORY SERVICES DIVISION
WEIGHTS AND MEASURES PROGRAM

Dan Wright

DAN WRIGHT
STATE METROLOGIST

MAR 0 8 2002

NVLA

NVLAP LAB CODE 200

W98MR42-01, 11/98

Pag

Established 1974

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: 100 Tol: 0.0003	LINEARITY: Test Wt: 50x2 Tol: 0.0004	REPEATABILITY: Test Wt: 100 Tol: 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: D. Deleasa

THIS CERTIFICATE SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN APPROVAL OF QUALITY CONTROL SERVICES, INC.

Established 1974

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: 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: 100 Tol: 0.0003	Test Wt: 50x2 Tol: 0.0004	Test Wt: 100 Tol: 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	100.0002	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

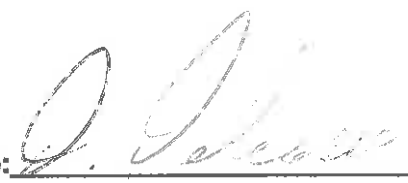
CALIBRATION STANDARDS

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: 

THIS CERTIFICATE SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN APPROVAL OF QUALITY CONTROL SERVICES, INC.

Established 1974

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: 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: 100 Tol: 0.0003	Test Wt: 50x2 Tol: 0.0004	Test Wt: 100 Tol: 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	100.0002	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: D. Deleasa

THIS CERTIFICATE SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN APPROVAL OF QUALITY CONTROL SERVICES, INC.

Established 1974

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: 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: 100 Tol: 0.0003	Test Wt: 50x2 Tol: 0.0004	Test Wt: 100 Tol: 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	100.0004	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: D. Deleasa

THIS CERTIFICATE SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN APPROVAL OF QUALITY CONTROL SERVICES, INC.

Thermocouple Calibration Record Semi-Annual

Thermocouples Check against
Reference Thermometer serial number 9123454
Ice Water Bath 32°
Boiling Water 212°
Room Temperature 68
Barometric Pressure 30.08
DATE: 11-6-2006

TC	Location	Ice Bath Temp	Boiling Water Temp
1	Wet Bulb	32.0	212.0
2	Dry Bulb	32.0	212.0
3	Stack	32.1	211.1
4	Stove Top	32.6	211.4
5	Left Side	32.3	210.9
6	Back	32.4	211.7
7	Right Side	32.4	212.0
8	Bottom	32.4	211.2
9	Firebox	32.1	211
10	Secondary/Cat	32.3	211.8
11	Ambient	32.0	211.7
12	Tube Furnace	31.7	210.6
13	Sample Box	32.3	211.4
14	Impinger Out	32.1	211.3
15	C. Gas Box	32.3	211.1
16	C. Gas Out	32.0	211.5
17	SO2 Out	32.5	212.0
18	Upper Ambient	32.1	211.3
19			
20			
21			
22			
23	Calibrator	32.0	212.0
24	Oven	32.2	211.5

Thermocouple Readout Semi-Annual Calibration Data Sheet

Date: 1-6-2007
Ambient Temperature: 65
Technician: CW.

Thermocouple Number: T/C Readout
Barometric Pressure: 30.01
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	ϕ
212	Boiling Water	212.0	212.0	ϕ
250	Omega	250.0	249.9	.040
300	Omega	300.0	299.7	.100
400	Omega	400.0	399.8	.050
500	Omega	500.0	499.8	.040
600	Omega	600.0	599.7	.050
700	Omega	700.0	699.8	.029
800	Omega	800.0	799.7	.038
900	Omega	900.0	899.8	.022
1000	Omega	1000.0	999.7	.030
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	1899.7	.017
2000	Omega	2000.0	2000.0	ϕ

[a] Every 50°F for each reference point
[b] Type of Calibration System Used
[c] $\frac{\text{(reference temperature) - (thermocouple temperature)}}{\text{reference temperature}} * 100$

TRACEABILITY DOCUMENTATION Semi-Annual

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

DATE: 11-6-2007

SO^2 INJECTION ROTAMETER FISHER SN 9123454

NIST Traceable

Actual	°C = °F	°F
0.0	32.0	32.0
25.7	78.3	78.1
37.0	98.6	98.5
45.6	114.1	114.2

DRY GAS METER THERMOCOUPLES

Actual	°C = °F	5H in	5H out	KK
0.0	32.0	32.0	32.0	32.0
24.0	75.2	75.0	75.1	75.0
35.8	96.4	96.3	96.4	96.5
43.6	110.5	110.3	110.4	110.3

SLING PSYCHROMETER

Actual	°C = °F	Wet Bulb	Dry Bulb
0.0	32.0	32.0	32.0
21.6	70.9	70.8	70.8
32.2	90.0	90.0	90.0
39.8	103.6	103.6	103.6

Conversions = °F = (°C × 1.8) + 32 °C = (°F-32)÷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 ± 5.0% to 100 FPM and ± 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 ± 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: New Buck Model 261 DATE: 2-22-2007

TEST DATA

RUN #	1	2	3	4	5	6	7	8	9	10
AVG. ΔH	.142	.147	.186	.170	.163					
MAX VAC	2.0	3.0	3.0	2.0	2.0					

Avg. Test Series Δ H: .162 in H_2O Test Series Max Vac: 3.0 in Hg

Audit Dry Gas Meter: K2 Correction (Y) Factor: 1.003 (mcf)

Test Dry Gas Meter: H Correction (Y) Factor: .997 (mcf)

AUDIT DATA

		Audit # 1	Audit #2	Audit #3
BP		29.62	29.62	29.62
VAC		3.0	3.0	3.0
AUDIT METER :				
VOL.	Final	12.537	17.590	22.650
(Vw)	Initial	7.500	12.537	17.590
	Vol.	5.037	5.053	5.060
TEMP (°F)	Initial	100	98	98
(Tw)	Mid	99	98	98
	Final	98	98	98
(°F / °A)	**Avg.**	559	556	(558)
Δ H	Initial	.162	.162	.162
	Mid	.162	.162	.162
	Final	.162	.162	.162
	Avg.	(.162)	(.162)	(.162)
DRY GAS METER :				
VOL.	Final	187.500	192.500	197.500
(Vd)	Initial	182.500	187.500	192.500
	Vol.	5.000	5.000	5.000
TEMP (°F)	Initial	88	83	86
(Tm)	Mid	85	85	86
	Final	83	86	85
(°F / °A)	**Avg.**	85 (545)	85 (545)	86 (546)

$$Y = \frac{(Vw)(mcf)(BP)(Tm)}{(Vd)\left(BP + \frac{DH}{13.6}\right)(Tw)}$$

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

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

RUN 1

$$Y = \frac{(5.037)(1.003)(29.62)(545)}{(5.000)\left(29.62 + \frac{.162}{13.6}\right)(559)} = \frac{81555.7}{82821.2} = .985$$

$$\Delta\% = \frac{(.985 - .992)}{.992} \times 100 = -.706\ \%$$

RUN 2

$$Y = \frac{(5.053)(1.003)(29.62)(545)}{(5.000)\left(29.62 + \frac{.162}{13.6}\right)(558)} = \frac{81814.8}{82673.0} = .990$$

$$\Delta\% = \frac{(.990 - .992)}{.992} \times 100 = -.240\ \%$$

RUN 3

$$Y = \frac{(5.062)(1.003)(29.62)(546)}{(5.000)\left(29.62 + \frac{.162}{13.6}\right)(558)} = \frac{82078.5}{82673.0} = .993$$

$$\Delta\% = \frac{(.993 - .992)}{.992} \times 100 = .101\ \%$$

NOTE : The Y factor % difference must be < ± 5.0 % to be acceptable

INTERPOLATED Y FACTOR

$\underset{(A)}{.1}$ inch H_2O ΔH = $\underset{(C)}{.990}$ Calculated calibration Y factor from calibrations

$\underset{(B)}{.2}$ inch H_2O ΔH = $\underset{(D)}{.994}$ Calculated calibration Y factor from calibrations

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

$\underset{(D)}{.994} - \underset{(C)}{.990} = .004 \div \underset{(E)}{10} = \underset{(F)}{.0004}$

$\underset{\text{Avg } \Delta H}{.162} - \underset{(A)}{.1} = .062 \times 100 = \underset{(G)}{6.2}$

$\left[\underset{(F)}{.0004} \times \underset{(G)}{6.2}\right] + \underset{(C)}{.990} = \underset{\text{Interpolated Y factor}}{.992}$

Volume Metering System Leak Check : 0.000 inch H_2O in one minute

DRY GAS METER CALIBRATION

DATE: 11-5-2006 DRY GAS METER: H BOX: 5

BAROMETRIC PRESSURE 30.07 in. Hg.				Wet Test Meter Correction Factor Y= 1.003			
Orifice Manometer Setting, ΔH, in. H_2O		.1	.2	.3	.5	.75	1.0
Gas Volume Wet Test Meter Vw ft^3	Final	971.980	978.218	985.475	996.176	1001.240	1007.475
	Initial	965.000	971.980	978.218	985.475	996.176	1001.240
	Vw ft^3	6.980	6.238	7.257	10.701	5.064	6.075
Gas Volume Dry Test Meter Vd ft^3	Final	628.300	634.500	641.700	652.300	657.300	663.400
	Initial	621.310	628.300	634.500	641.700	652.300	657.300
	Vw ft^3	6.990	6.200	7.200	10.600	5.000	6.100
Wet Test Meter Temperature tw	Initial	90	100	98	100	104	104
	Middle	95	99	99	102	104	104
	Final	100	98	100	104	104	104
	Average	95 555	559	559	562	564	564
Dry Test Meter Temperature tm	Initial	87	91	91	94	102	101
	Middle	89	91	93	98	101	100
	Final	91	91	94	102	101	100
	Average	89 549	551	553	558	561	560
$Y = \frac{(W_{mcf})(Vw)(Pb)(tm)}{Vd\left(Pb + \frac{\Delta H}{13.6}\right)(tw)}$		115574.53 / 116683.59 = .990	103649.80 / 104267.57 = .994	121036.57 / 121111.52 = .999	180091.38 / 179352.02 = 1.004	85529.53 / 84952.92 = 1.007	102605.03 / 103705.80 = .989

Average Y= .997

METER BOX CALIBRATION

Date : 11/10/05
Calibrated By : J.C.
Dry Gas Meterbox ID : K2

Barometric Pressure, Pb = 28.37 in. Hg
Vacuum = 0.0 in. Hg

Orifice Manometer Setting, Delta H in. H20		0.10	0.10	0.10	0.10	0.10	0.10
Gas Volume Wet Test Meter Vw, cu. ft.		5.000	5.000	5.000	5.000	5.000	5.000
Gas Volume Dry Gas Meter							
M Final		455.032	460.080	465.135	470.200	475.266	480.333
M Initial		450.000	455.032	460.080	465.135	470.200	475.266
Vd, cu. ft.		5.032	5.048	5.055	5.065	5.066	5.067
Wet Test Meter							
tw Deg F		78	78	78	78	78	78
tw Deg A		538	538	538	538	538	538
Dry Gas Meter Outlet, tmo	**1)**	80	83	84	85	85	86
	2)	82	84	84	85	86	86
	3)	84	85	85	86	86	87
Dry Gas Meter Inlet tmi	**1)**	81	84	85	86	87	88
	2)	82	85	86	87	87	88
	3)	84	86	86	87	87	88
Mean tm, Deg F		82	85	85	86	86	87
Mean tm, Deg A		542	545	545	546	546	547
Results :	**Y =**	1.001	1.002	1.002	1.002	1.002	1.003
Averages :	**Y =**	**1.002**					

Avg = 1.003

METER BOX CALIBRATION

Date : 11/10/05
Calibrated By : J.C.
Dry Gas Meterbox ID : K2

Barometric Pressure, Pb = 28.37 in. Hg
Vacuum = 0.0 in. Hg

Orifice Manometer Setting, Delta H in. H20		0.20	0.20	0.20	0.20	0.20	0.20
Gas Volume Wet Test Meter Vw, cu. ft.		5.000	5.000	5.000	5.000	5.000	5.000
Gas Volume Dry Gas Meter							
M Final		485.422	490.521	495.618	500.720	505.829	510.935
M Initial		480.333	485.422	490.521	495.618	500.720	505.829
Vd, cu. ft.		5.089	5.099	5.097	5.102	5.109	5.106
Wet Test Meter							
tw Deg F		78	78	78	78	78	78
tw Deg A		538	538	538	538	538	538
Dry Gas Meter Outlet, tmo	**1)**	88	89	89	89	90	90
	2)	88	89	89	89	90	90
	3)	89	89	89	90	90	90
Dry Gas Meter Inlet tmi	**1)**	89	90	90	91	92	92
	2)	90	91	91	92	92	92
	3)	90	91	92	92	93	92
Mean tm, Deg F		89	90	90	91	91	91
Mean tm, Deg A		549	550	550	551	551	551
Results :	**Y =**	1.002	1.002	1.002	1.002	1.002	1.002
Averages :	**Y =**	**1.002**					

METER BOX CALIBRATION

Date : 11/10/05
Calibrated By : J.C.
Dry Gas Meterbox ID : K2

Barometric Pressure, Pb = 28.37 in. Hg
Vacuum = 0.0 in. Hg

Orifice Manometer Setting, Delta H in. H20		0.30	0.30	0.30	0.30	0.30	0.30
Gas Volume Wet Test Meter Vw, cu. ft.		5.000	5.000	5.000	5.000	5.000	5.000
Gas Volume Dry Gas Meter							
M Final		516.042	521.144	526.255	531.375	536.501	541.628
M Initial		510.935	516.042	521.144	526.255	531.375	536.501
Vd, cu. ft.		5.107	5.102	5.111	5.120	5.126	5.127
Wet Test Meter							
tw Deg F		78	78	78	78	78	78
tw Deg A		538	538	538	538	538	538
Dry Gas Meter Outlet, tmo	1)	90	90	91	92	92	93
	2)	90	91	91	92	92	93
	3)	91	91	91	92	93	93
Dry Gas Meter Inlet tmi	1)	90	92	92	93	94	95
	2)	91	92	93	94	95	96
	3)	92	92	93	94	96	96
Mean tm, Deg F		91	91	92	93	94	94
Mean tm, Deg A		551	551	552	553	554	554
Results :	**Y =**	1.002	1.003	1.003	1.003	1.003	1.004
Averages :	**Y =**	**1.003**					

METER BOX CALIBRATION

Date : 11/10/05
Calibrated By : J.C.
Dry Gas Meterbox ID : K2

Barometric Pressure, Pb = 28.37 in. Hg
Vacuum = 0.0 in. Hg

Orifice Manometer Setting, Delta H in. H20		0.50	0.50	0.50	0.50	0.50	0.50
Gas Volume Wet Test Meter Vw, cu. ft.		5.000	5.000	5.000	5.000	5.000	5.000
Gas Volume Dry Gas Meter							
M Final		546.755	551.874	557.001	562.132	567.276	572.421
M Initial		541.628	546.755	551.874	557.001	562.132	567.276
Vd, cu. ft.		5.127	5.119	5.127	5.131	5.144	5.145
Wet Test Meter							
tw Deg F		78	79	79	79	79	79
tw Deg A		538	539	539	539	539	539
Dry Gas Meter Outlet, tmo	**1)**	93	93	94	95	96	96
	2)	93	94	95	96	96	97
	3)	94	94	95	96	96	97
Dry Gas Meter Inlet tmi	**1)**	93	94	95	96	97	97
	2)	94	95	96	97	98	98
	3)	95	96	98	98	99	100
Mean tm, Deg F		94	94	96	96	97	98
Mean tm, Deg A		554	554	556	556	557	558
Results :	**Y =**	1.003	1.003	1.004	1.004	1.003	1.004
Averages :	**Y =**	**1.004**					

METER BOX CALIBRATION

Date : 11/10/05
Calibrated By : J.C.
Dry Gas Meterbox ID : K2

Barometric Pressure, Pb = 28.37 in. Hg
Vacuum = 0.0 in. Hg

Orifice Manometer Setting, Delta H in. H20		0.75	0.75	0.75	0.75	0.75	0.75
Gas Volume Wet Test Meter Vw, cu. ft.		5.000	5.000	5.000	5.000	5.000	5.000
Gas Volume Dry Gas Meter							
M Final		577.560	582.704	587.855	593.017	598.174	603.330
M Initial		572.421	577.560	582.704	587.855	593.017	598.174
Vd, cu. ft.		5.139	5.144	5.151	5.162	5.157	5.156
Wet Test Meter							
tw Deg F		79	79	79	79	80	80
tw Deg A		539	539	539	539	540	540
Dry Gas Meter Outlet, tmo	**1)**	95	96	97	99	99	100
	2)	95	96	98	99	99	99
	3)	96	97	98	100	100	100
Dry Gas Meter Inlet tmi	**1)**	95	97	99	100	101	101
	2)	97	98	100	100	101	101
	3)	100	100	100	101	102	101
Mean tm, Deg F		96	97	99	100	100	100
Mean tm, Deg A		556	557	559	560	560	560
Results :	**Y =**	1.002	1.003	1.004	1.004	1.004	1.004
Averages :	**Y =**	**1.004**					

METER BOX CALIBRATION

Date : 11/10/05
Calibrated By : J.C.
Dry Gas Meterbox ID : K2

Barometric Pressure, Pb = 28.37 in. Hg
Vacuum = 0.0 in. Hg

Orifice Manometer Setting, Delta H in. H20		1.00	1.00	1.00	1.00	1.00	1.00
Gas Volume Wet Test Meter Vw, cu. ft.		5.000	5.000	5.000	5.000	5.000	5.000
Gas Volume Dry Gas Meter							
M Final		608.466	613.628	618.799	623.973	629.155	634.343
M Initial		603.330	608.466	613.628	618.799	623.973	629.155
Vd, cu. ft.		5.136	5.162	5.171	5.174	5.182	5.188
Wet Test Meter							
tw Deg F		80	80	80	80	80	80
tw Deg A		540	540	540	540	540	540
Dry Gas Meter Outlet, tmo	**1)**	98	99	101	102	102	102
	2)	99	101	102	102	102	103
	3)	101	102	102	102	103	103
Dry Gas Meter Inlet tmi	**1)**	95	99	102	103	104	105
	2)	97	101	102	103	104	106
	3)	101	102	103	104	105	106
Mean tm, Deg F		99	101	102	103	103	104
Mean tm, Deg A		559	561	562	563	563	564
Results :	**Y =**	1.005	1.003	1.004	1.004	1.004	1.004
Averages :	**Y =**	**1.004**					

WET TEST METER CALIBRATION LOG

Wet Test Meter Serial Number AA 455 Date 9-17-2005

Range of Wet Test Meter Flow Rate 0 - 0.25

Volume of Test Flask Vs 37.850

Satisfactory Leak Check? Yes

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

TEST #	MANOMETER READING, *a* mm H_2O	FINAL VOLUME (Vf), l	INITIAL VOLUME (Vi), l	TOTAL VOLUME (Vm), *b* l	FLASK VOLUME (Vs), l	PERCENT ERROR, *c* %
1	Ø	3.0	Ø All reset	3.0	3.001	-.033
2	Ø	3.0	Ø	3.0	3.003	-.100
3	Ø	3.0	Ø	3.0	3.001	-.033

a - Must be less than 10 mm H_2O (0.4 ' H_2O)

Calculations:

b - Vm - Vf - Vi

c - % error = $\frac{100\,(V_m - V_s)}{V_s}$ = -.055 (± 1 %)

SO_2 ROTAMETER CALIBRATION

Last Cal. : 5-16-2006 By : Clp Date : 11-6-2006 By : Clp

Manufacturer : SKC-WEST
SKC ACCUFLOW Digital Flow Calibrator: Model 712 SN : 311325

Barometric Pressure : 30.02 " Hg Temperature : 70

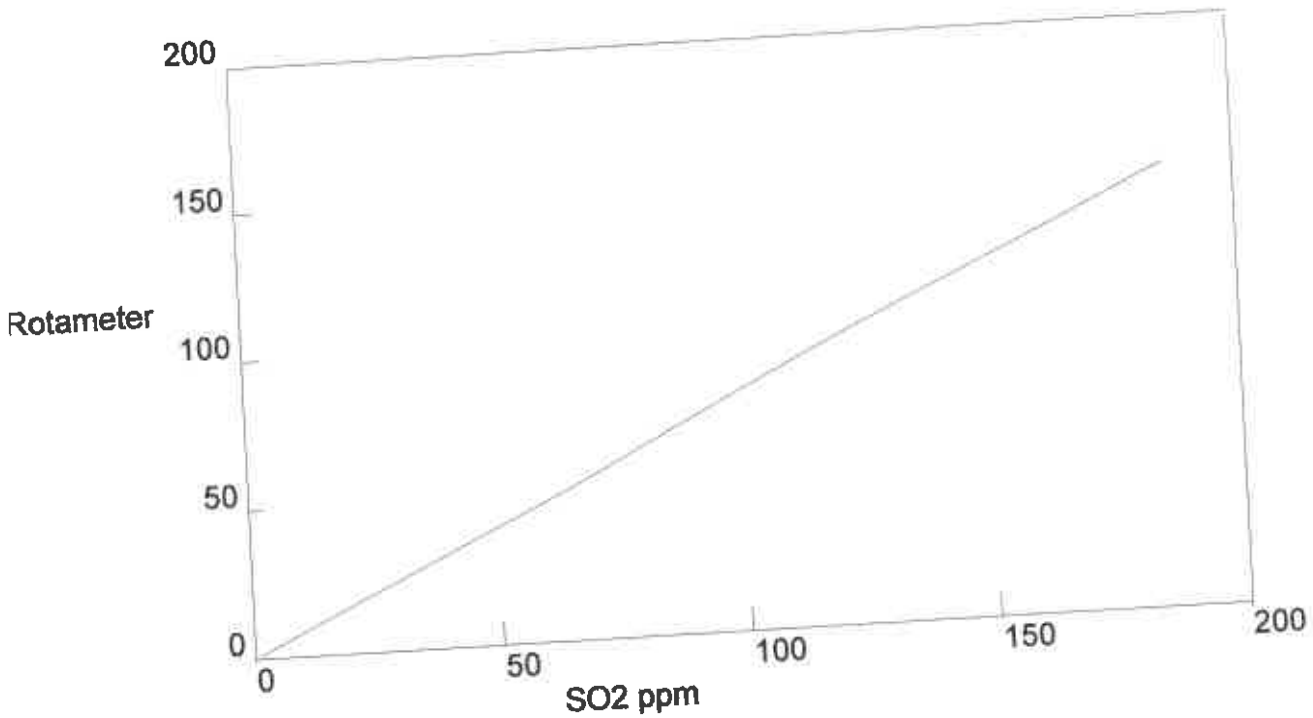
RUN #	50 CC/MINUTE DIGICAL VOLUME	100 CC/MINUTE DIGICAL VOLUME	150 CC/MINUTE DIGICAL VOLUME
1	55.9	119.9	172.7
2	56.0	120.7	173.4
3	55.7	120.3	173.0
4	55.9	120.6	172.9
5	55.8	121.0	173.9
6	56.2	119.9	173.5
7	56.0	121.2	173.0
8	55.8	120.8	172.9
9	56.6	120.6	173.2
10	55.9	120.4	173.3
AVERAGE	55.88 cc/min	120.54 cc/min	173.2 cc/min

SETTING	cc/min
0	0.0
50	55.9
100	120.5
150	173.2

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

100 CC / MINUTE = 85.8

SO2 Rotameter
11/06/06



Regression Output:

Constant	-0.23
Std Err of Y Est	3.4480429232
R Squared	0.9986085184
No. of Observations	4
Degrees of Freedom	2
X Coefficient(s)	1.1684
Std Err of Coef.	0.0308402335

TRACER GAS TRAIN RESPONSE TIME

DATE: 11-6-07

Elapsed Time	SO_2 Conc. (v.)	SO_2 Conc. (v.)	SO_2 Conc. (v.)
00 sec	.515	.515	.516
15	.351	.350	.355
30	.226	.221	.220
45	.107	.110	.105
60	.062	.060	.068
75	.046	.045	.040
90	.028	.025	.026
105	.009	.014	.010
120	.005	.009	.005
135	.002	.007	.002
150	.001	.003	.001
165		.002	
180			
Initial Response	9	10	9
95 % Response	95	90	95
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	.511	.508	.509	.504	.501	.501	.500	.501	.501
15	.496	.495	.495	.579	.583	.585	.241	.235	.238
30	.375	.366	.370	.672	.675	.670	.050	.042	.043
45	.140	.130	.138	.791	.798	.785	.017	.011	.012
60	.068	.070	.070	.814	.818	.805	.007	.003	.003
75	.040	.041	.042	.820	.822	.818	.001	.000	.000
90	.027	.030	.028	.823	.824	.821			
105	.015	.015	.016	.826	.826	.823			
120	.007	.007	.009	.827	.828	.828			
135	.004	.003	.004	.830	.830	.829			
150	.001	.000	.001						
165	.000		.000						
180									
Initial Response	14	14	14	10	10	10	4	4	4
95 % Response	95	97	96	70	65	75	36	36	36
Flow Rate	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5

ORSAT ANALYSIS DATA SHEET

DATE : 11-6-2006

Gas	1	2	3	AVE	CONC	TANK ID
CO_2	0	0	0	0	N_2	168TAG-3-A
O_2	0	0	0	0	N_2	
CO	0	0	0	0	N_2	
CO_2					12.5	CC-41627 VALUES
O_2					12.5	VALID UNTIL
CO					4.99	10-2010
CO_2					21.1	CA06641 VALUES
O_2					20.9	VALID UNTIL
CO					8.63	1-4-2012
CO_2					6.22	CC-12731 VALUES
O_2					6.25	VALID UNTIL
CO					1.98	3-4-2008
CO_2						
O_2						
CO						

LOW SPAN

AIR LIQUIDE

GASES FOR RESEARCH AND DEVELOPMENT

CYL # CC-12731 CGA 590

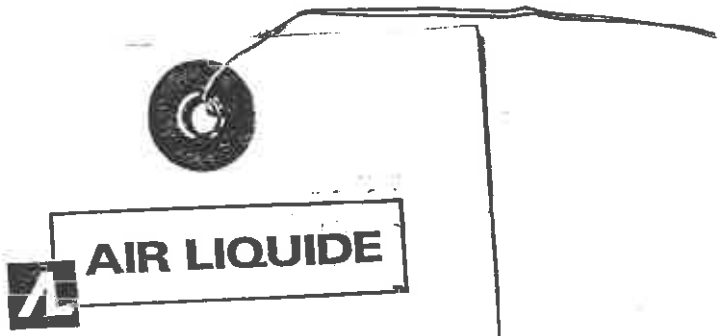
PRES 1665 VOL 130c.f

TEST # 07203 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%

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

AIR LIQUIDE™

CERTIFICATE OF ANALYSIS

Customer : Pacifice 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
Pressure : 1667
Volume : 120 SCF
Valve : CGA 590

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 DEVELOPMENT

CYL # CC-41627 CGA 590

PRES 1660 VOL 150 SCF

TEST # 30505 DATE 11-01-05

Analytical Method GC/paramagnetic

	Requested	Analyzed
Hydrogen		
Nitrogen	Bal.	Bal.
Argon		
Air		
Carbon Monoxide	5%	4.99%
Methane		
Oxygen	12.5%	12.5%
Helium		
Carbon Dioxide	12.5%	12.5%

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™ Multi-Component 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.: 08-34135-001
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: 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 7/24/96 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/6220/AAB9400251	03/20/97	Scott Enhanced FTIR

ANALYZER READINGS

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

SULFUR DIOXIDE *

First Triad Analysis			Second Triad Analysis			Calibration Curve
Date: 04/14/97	Response Unit: PPM		Date: 04/21/97	Response Unit: PPM		Concentration = A + Bx + Cx2 + Dx3 + Ex4
Z1 = 0.3847	R1 = 487.72	T1 = 508.77	Z1 = 0.3241	R1 = 488.29	T1 = 506.43	r = 0.999990
R2 = 488.79	Z2 = 1.8201	T2 = 505.89	R2 = 488.53	Z2 = 1.8096	T2 = 505.75	Constants: A = 0.000000
Z3 = 1.8425	T3 = 506.76	R3 = 488.95	Z3 = 0.8340	T3 = 505.74	R3 = 488.69	B = 1.000000 C = 0.000000
Avg. Concentration:	505.8	PPM	Avg. Concentration:	505.8	PPM	D = 0.000000 E = 0.000000

Special Notes:

ANALYST: Devon VonFeldt
Devon VonFeldt

SO2 concentration analysis
11/07/06

Vm(std)	1.500		dscf=	1.500
mcf	1.004			
Hg	30.11			
DH	0.12			
temp	71	531	ppm =	501
ml BA ++	175			
Normality	0.0101			

Run1	495
Run 2	518
Run3	501
avg.	505

Tank I.D. # ALMO52285

AIR LIQUIDE™

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	1250 PPM	1250 PPM	+/- 2%	4	4503	GL
6154-30AL						

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: 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	CERTIFIED CONCENTRATION		ANALYTICAL ACCURACY**
SULFUR DIOXIDE *	1,770	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 7/24/96 and will not correlate with uncorrected Protocols

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM-R-1696	7/03/98	ALM057797	3131. PPM	SULFUR DIOXIDE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	LAST DATE CALIBRATED	ANALYTICAL PRINCIPLE
FTIR System/6220/AAB9400251	03/20/97	Scott Enhanced FTIR

ANALYZER READINGS

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

SULFUR DIOXIDE *

First Triad Analysis

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

Second Triad Analysis

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 = 3134.8
Avg. Concentration:	1770.	PPM

Calibration Curve

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 VonFeldt
DEVON VONFELDT

SO2 concentration analysis
11/07/06

Vm(std)	1.500			
mcf	1.004		dscf=	1.500
Hg	30.11			
DH	0.12			
temp	71	531	ppm =	1764
ml BA ++	616			
Normality	0.0101			

Run1	1761
Run 2	1778
Run3	1764
avg.	1768

Tank I.D. # ALMO49127

CO_2 ANALYZER
MULTIPOINT CALIBRATION REPORT FORM

Date: 2-9-2007

Analyzer: Make: HORIBA Model: PIR 2000 SN: 407069

Calibration by: CP Wittmark

Cal Gas Flow: 1.5 SCFH

Measured by: Rotameter

BP: 30.05

Instrument ID: PRINCO

Temp: 62

Instrument ID: TR

Cylinders:

1. # 168TAC 3-A Concentration: 00.00 % CO_2 Cyl. Press.: 900 PSI
   Certified by: AIR LIQUIDE Date: 04-19-04
2. # CC-41627 Concentration: 12.50 % CO_2 Cyl. Press.: 650 PSI
   Certified by: AIR LIQUIDE Date: 11-1-05
3. # CA06641 Concentration: 21.1 % CO_2 Cyl. Press.: 1140 PSI
   Certified by: AIR LIQUIDE Date: 1-5-2007
4. # CC-12731 Concentration: 6.22 % CO_2 Cyl. Press.: 1300 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. #	% CO2	EXPECTED METER	EXPECTED DVM	ACTUAL METER	ACTUAL DVM	ADJ. METER	ADJ. DVM
1	1	0.00	00.0	.000	00.0	.000	00.0	.000
2	2	12.50	60.0	.500	50.8	.508	50.0	.500
3	3	21.1	84.4	.844	84.4	.844		
4	4	6.22	24.9	.249	24.4	.244		
5	1	0.00	00.0	.000	00.0	.000		

.5 = 12.525

CO_2 Linear Regression Results:

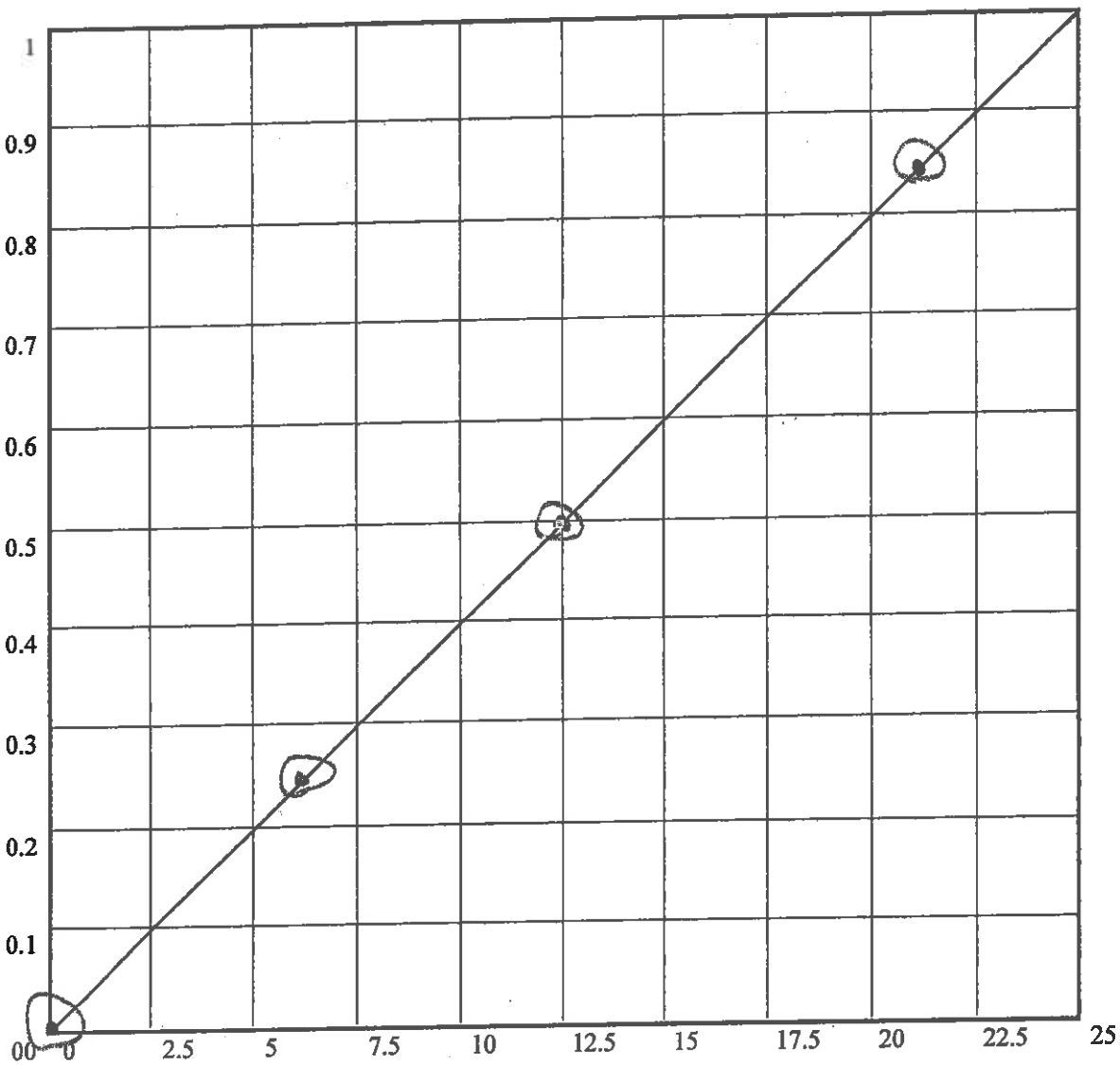
Y = MX +B

Slope (M) = -.0019322

Y Intercept (B) = .0400736

Correlation Coefficient(r) = .9999796

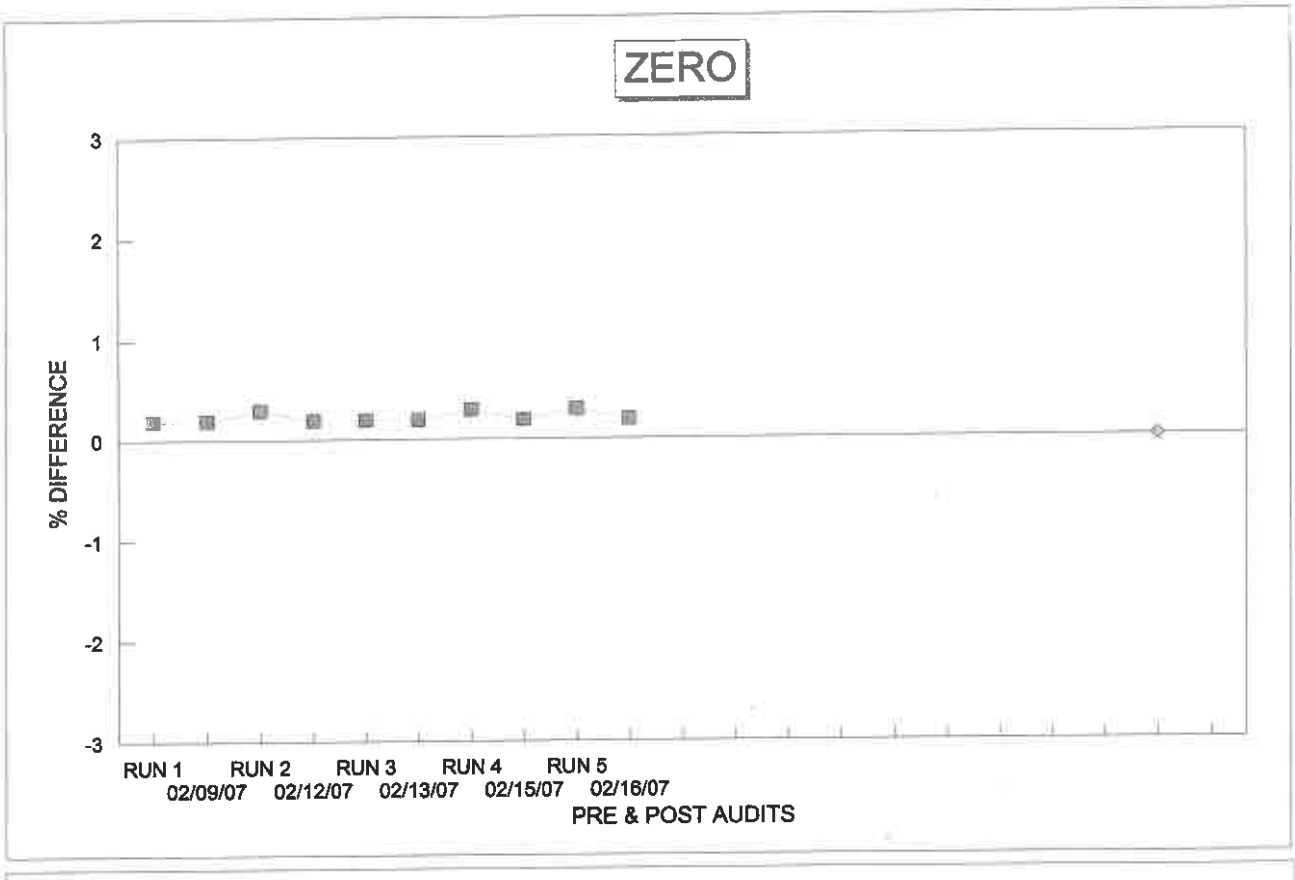
r^2 = .9999592

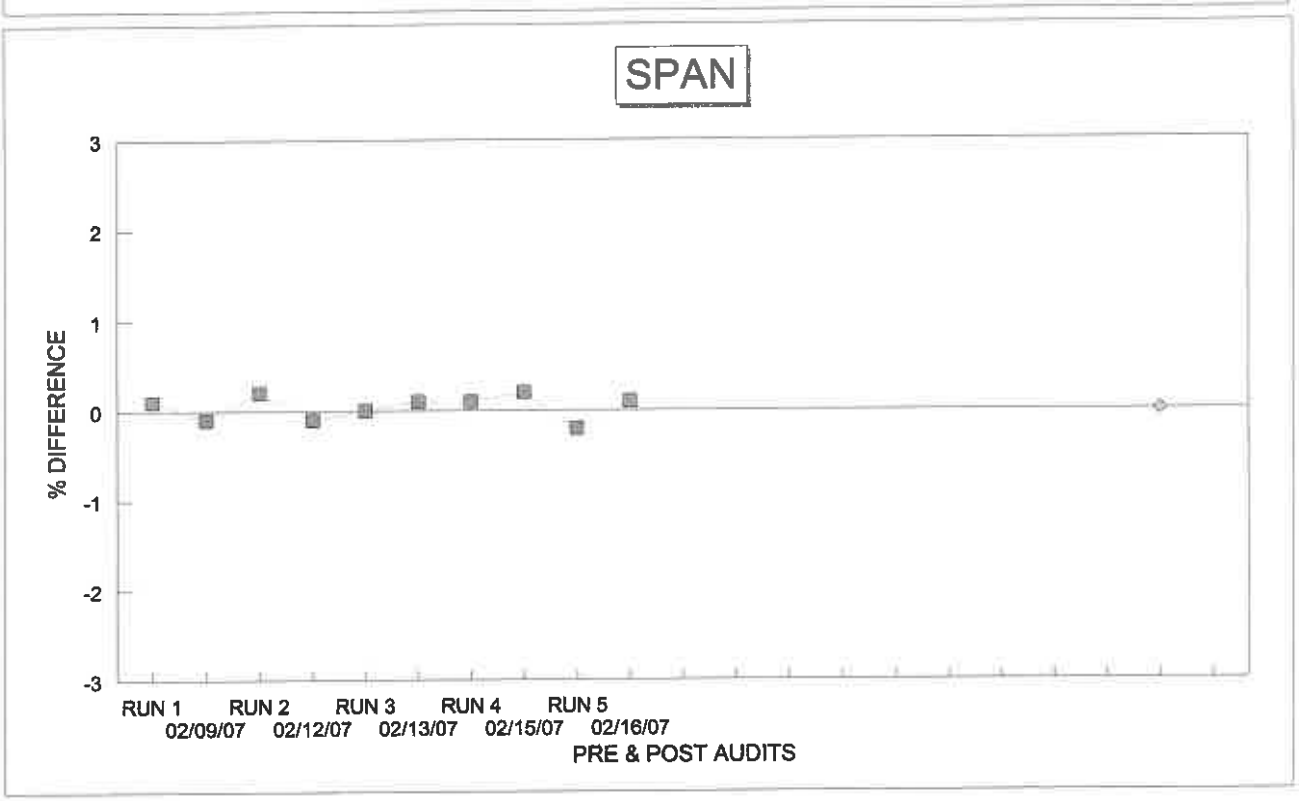


EPA Span Value = ± 2.0% of 25% CO_2 = ± .5%

Cal Volts = Cal Volt Conc - Std Conc = ± Conc Diff = ± Δ %

HIGH VOLTS	.844	=	21.0	-	21.1	=	ϕ	= ϕ
LOW VOLTS	.244	=	6.10	-	6.22	=	-.120	= -.480


ZERO
3
2
1
0
-1
-2
-3
% DIFFERENCE
RUN 1 02/09/07
RUN 2 02/12/07
RUN 3 02/13/07
RUN 4 02/15/07
RUN 5 02/16/07
PRE & POST AUDITS


SPAN
3
2
1
0
-1
-2
-3
% DIFFERENCE
RUN 1 02/09/07
RUN 2 02/12/07
RUN 3 02/13/07
RUN 4 02/15/07
RUN 5 02/16/07
PRE & POST AUDITS

O_2 ANALYZER
MULTIPOINT CALIBRATION REPORT FORM

Date: 2-9-2007

Analyzer: Make: TELEDYNE Model: 320A SN: 37400

Calibration by: Cp Weldings

Cal Gas Flow: 1.5 SCFH

Measured by: Rotameter

BP: 30.05

Instrument ID: PRINCO

Temp: 62

Instrument ID: TR

Cylinders:

1. # 168TAC 3-A Concentration: 00.00 % O_2 Cyl. Press.: 900 PSI
   Certified by: AIR LIQUIDE Date: 04-19-04
2. # CC-41627 Concentration: 12.50 % O_2 Cyl. Press.: 650 PSI
   Certified by: AIR LIQUIDE Date: 11-1-05
3. # CA06641 Concentration: 20.9 % O_2 Cyl. Press.: 1140 PSI
   Certified by: AIR LIQUIDE Date: 1-5-2007
4. # CC-12731 Concentration: 6.25 % O_2 Cyl. Press.: 1300 PSI
   Certified by: AIR LIQUIDE Date: 03-13-03

Analyzer: **Calibrated Range:** 0-25.0 % **Output:** 0-1.0 V.
Flow: 1.5 SCFH **Measured by:** Rotameter

Calibration Results

Point #	CYL. #	% O2	EXPECTED METER	EXPECTED DVM	ACTUAL METER	ACTUAL DVM	ADJ. METER	ADJ. DVM
1	1	0.00	00.0	.000	00.0	.000	00.0	.000
2	2	12.50	12.50	.500	12.5	.500	12.5	.500
3	3	20.9	20.9	.836	20.8	.833		
4	4	6.25	6.25	.250	6.3	.251		
5	1	0.00	00.0	.000	00.0	.000		

.5 = 12.522

O_2 Linear Regression Results:

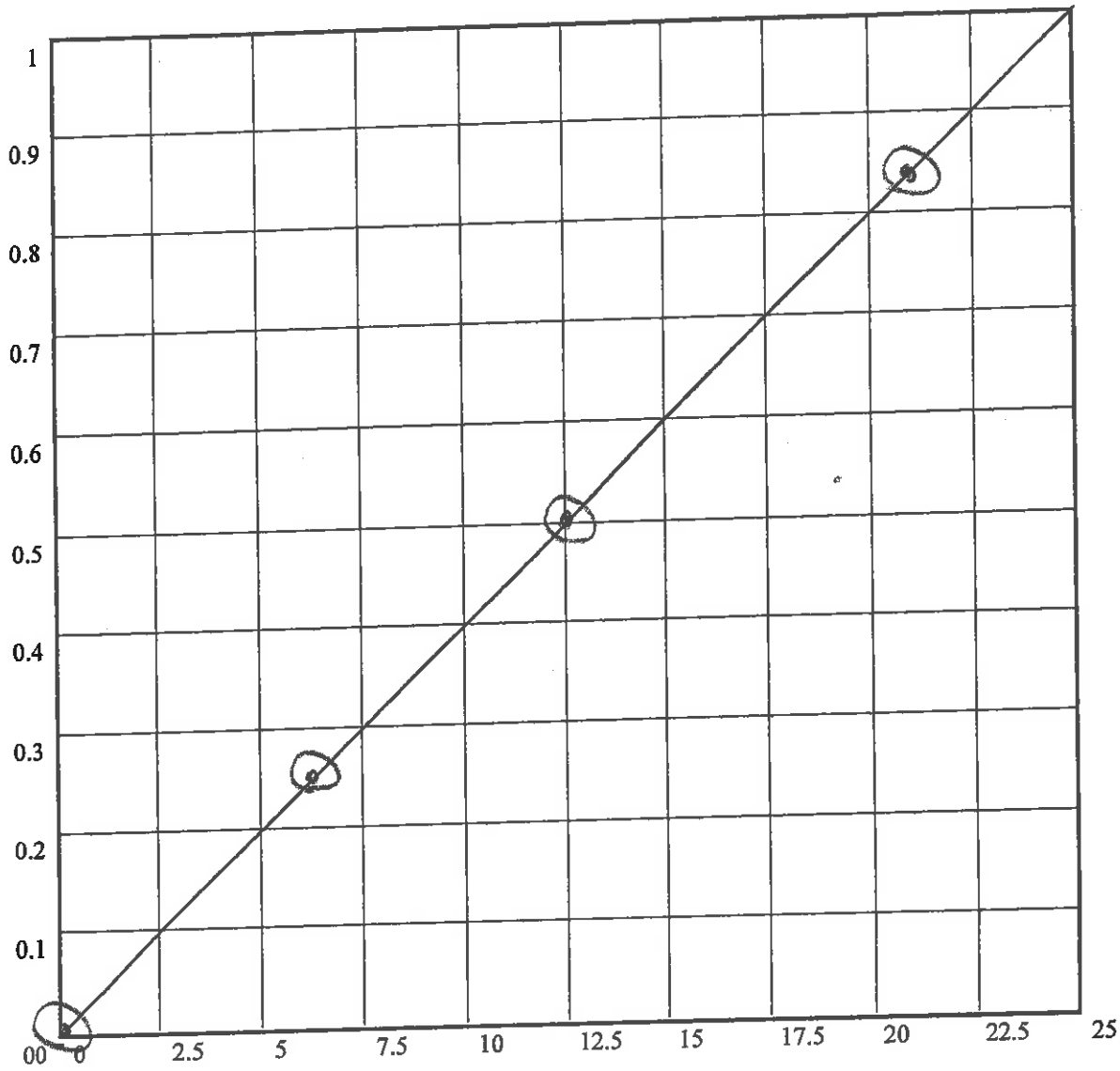
Y = MX +B

Slope (M) = .0010184

Y Intercept (B) = .0398468

Correlation Coefficient(r) = .9999955

r^2 = .9999911

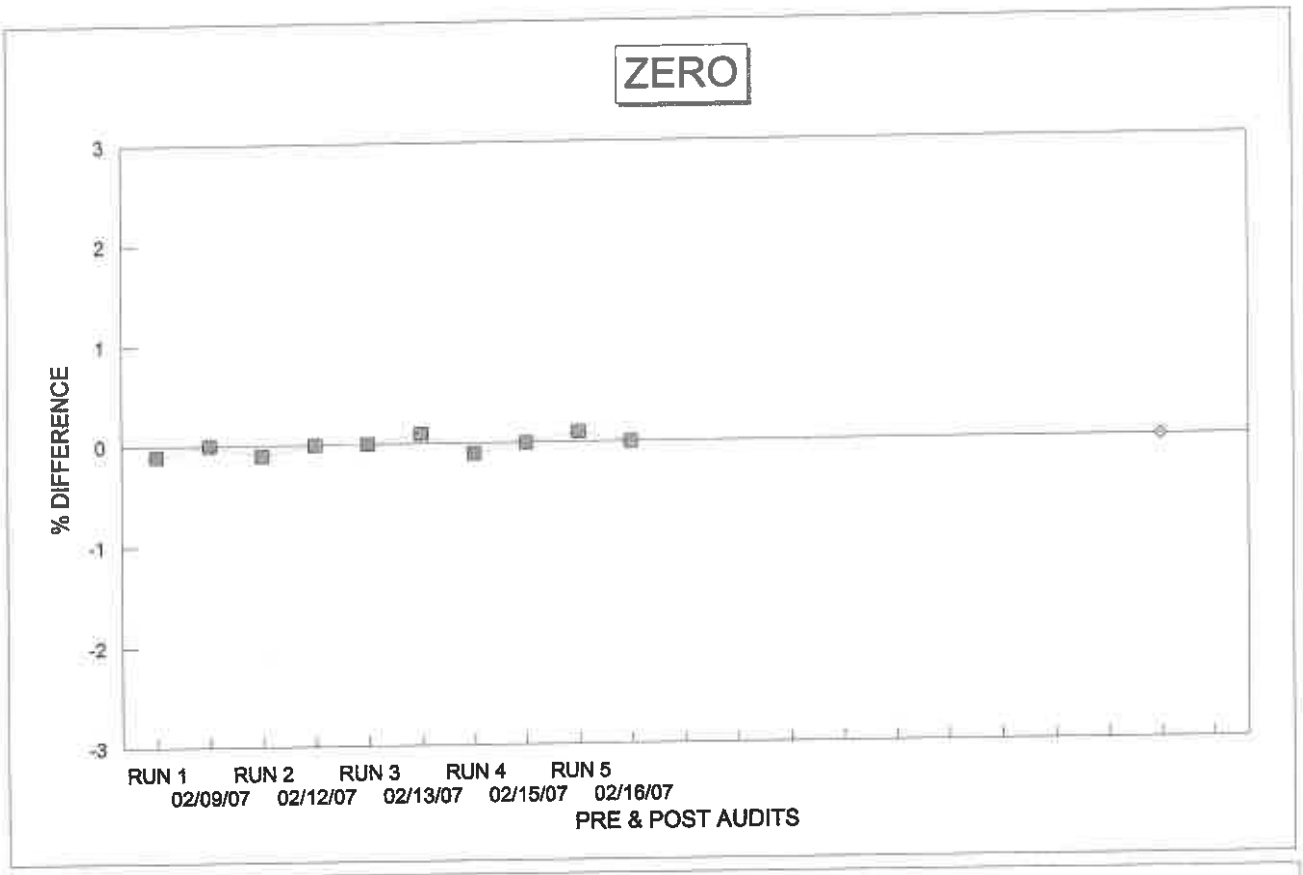


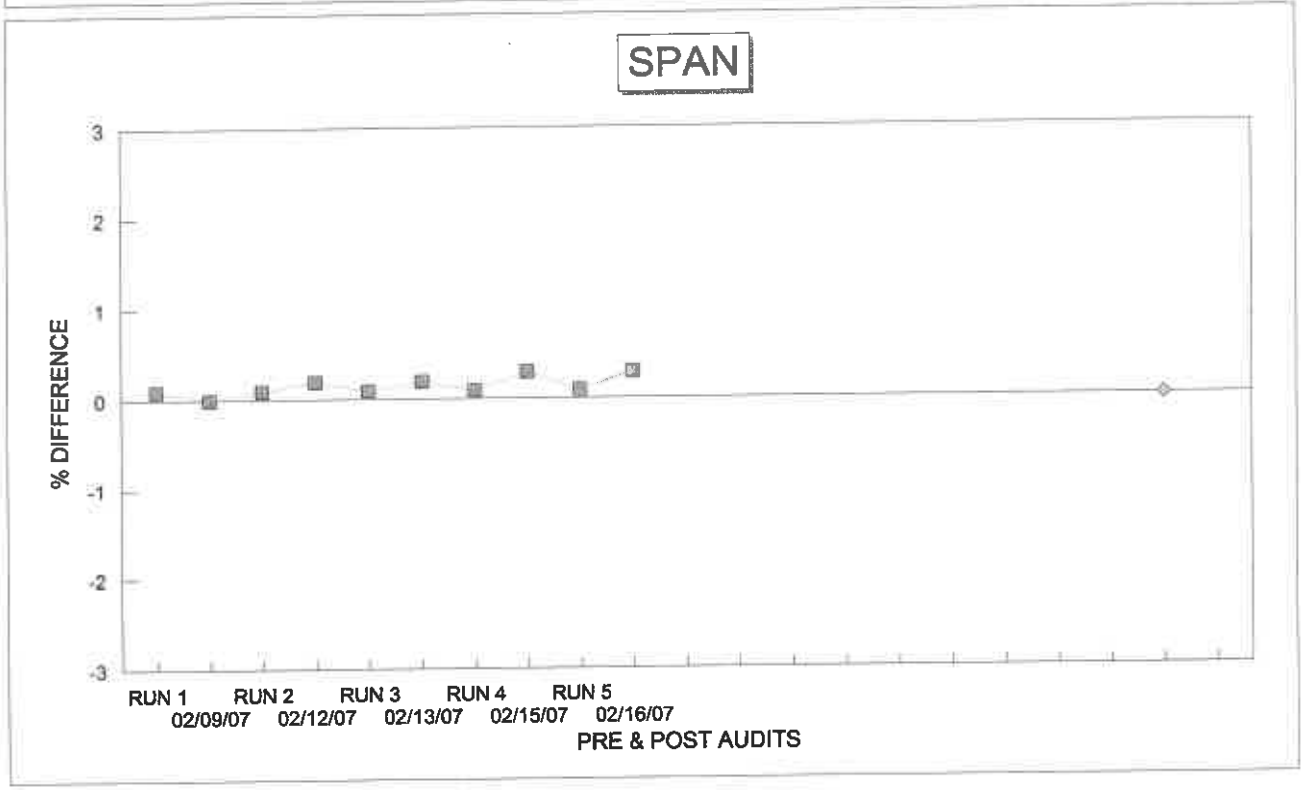
EPA Span Value = ± 2.0% of 25% O_2 = ± .5%

Cal Volts = Cal Volt Conc - Std Conc = ± Conc Diff = ± Δ %

HIGH VOLTS .839 = 20.83 - 20.9 = -.070 = -.280

LOW VOLTS .251 = 6.28 - 6.25 = .030 = .120


ZERO
3
2
1
0
-1
-2
-3
% DIFFERENCE
RUN 1
02/09/07
RUN 2
02/12/07
RUN 3
02/13/07
RUN 4
02/15/07
RUN 5
02/16/07
PRE & POST AUDITS


SPAN
3
2
1
0
-1
-2
-3
% DIFFERENCE
RUN 1
02/09/07
RUN 2
02/12/07
RUN 3
02/13/07
RUN 4
02/15/07
RUN 5
02/16/07
PRE & POST AUDITS

CO ANALYZER
MULTIPOINT CALIBRATION REPORT FORM

Date: 2-9-2007

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

Calibration by: [signature]

Cal Gas Flow: 1.5 SCFH

Measured by: Rotameter

BP: 30.05

Instrument ID: PRINCO

Temp: 62

Instrument ID: TR

Cylinders:

1. # 168TAC 3-A Concentration: 00.00 % CO Cyl. Press.: 900 PSI
   Certified by: AIR LIQUIDE Date: 04-19-04
2. # CC-41627 Concentration: 4.99 % CO Cyl. Press.: 650 PSI
   Certified by: AIR LIQUIDE Date: 11-1-05
3. # CA06641 Concentration: 8.63 % CO Cyl. Press.: 1140 PSI
   Certified by: AIR LIQUIDE Date: 1-5-2007
4. # CC-12731 Concentration: 1.98 % CO Cyl. Press.: 1300 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 METER	EXPECTED DVM	ACTUAL METER	ACTUAL DVM	ADJ. METER	ADJ. DVM
1	1	0.00	00.0	.000	00.0	.000	00.0	.000
2	2	4.99	49.9	.499	49.7	.497	4.99	.499
3	3	8.63	86.3	.863	86.5	.865		
4	4	1.98	19.8	.198	19.8	.198		
5	1	0.00	00.0	.000	00.0	.000		

.5 = 4.993

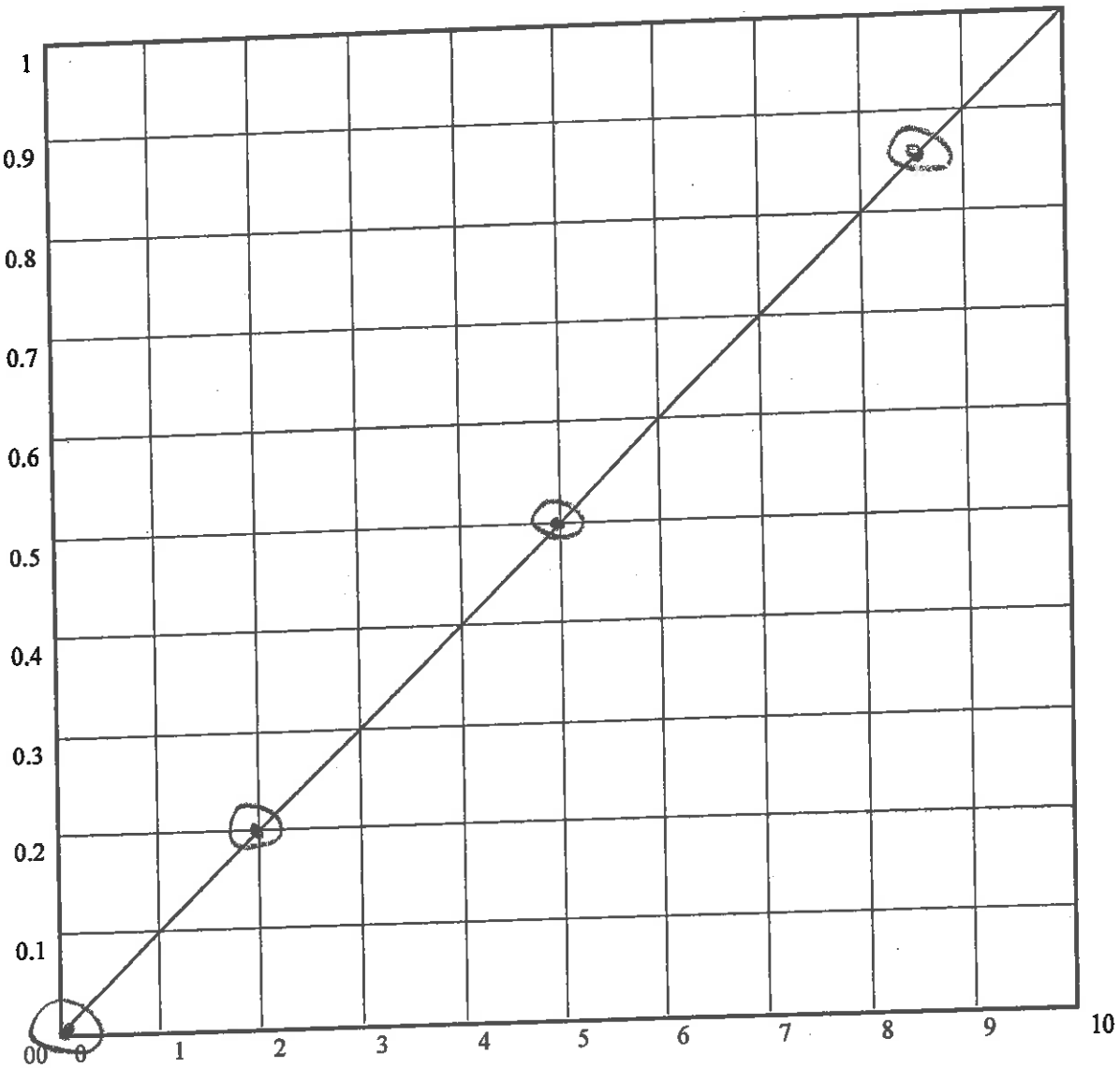
CO Linear Regression Results:

Y = MX +B
Slope (M) = -.0003690

Y Intercept (B) = .1002228

Correlation Coefficient (r) = .9999990

r^2 = .9999979



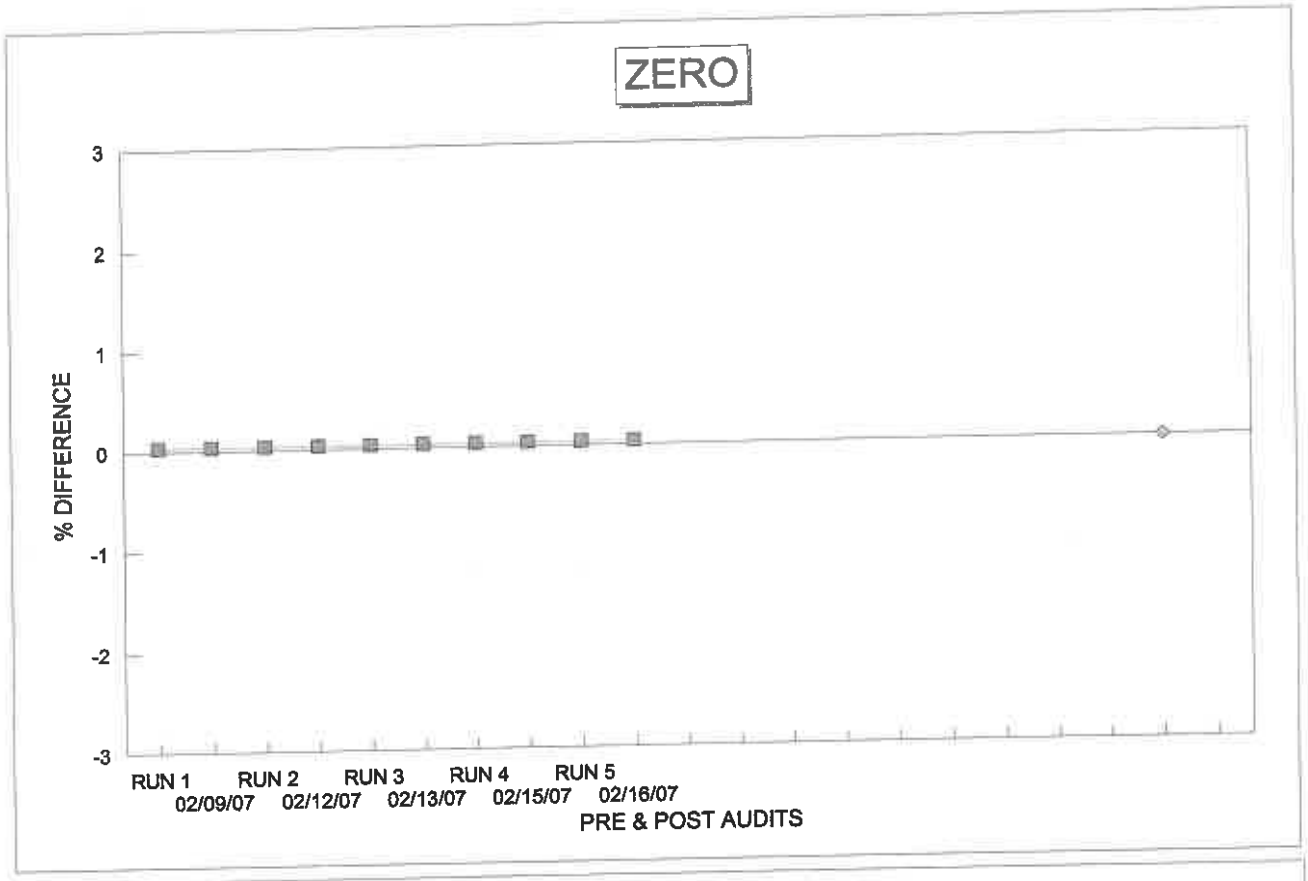
EPA Span Value = ± 2.0% of 10% CO = ± .2%

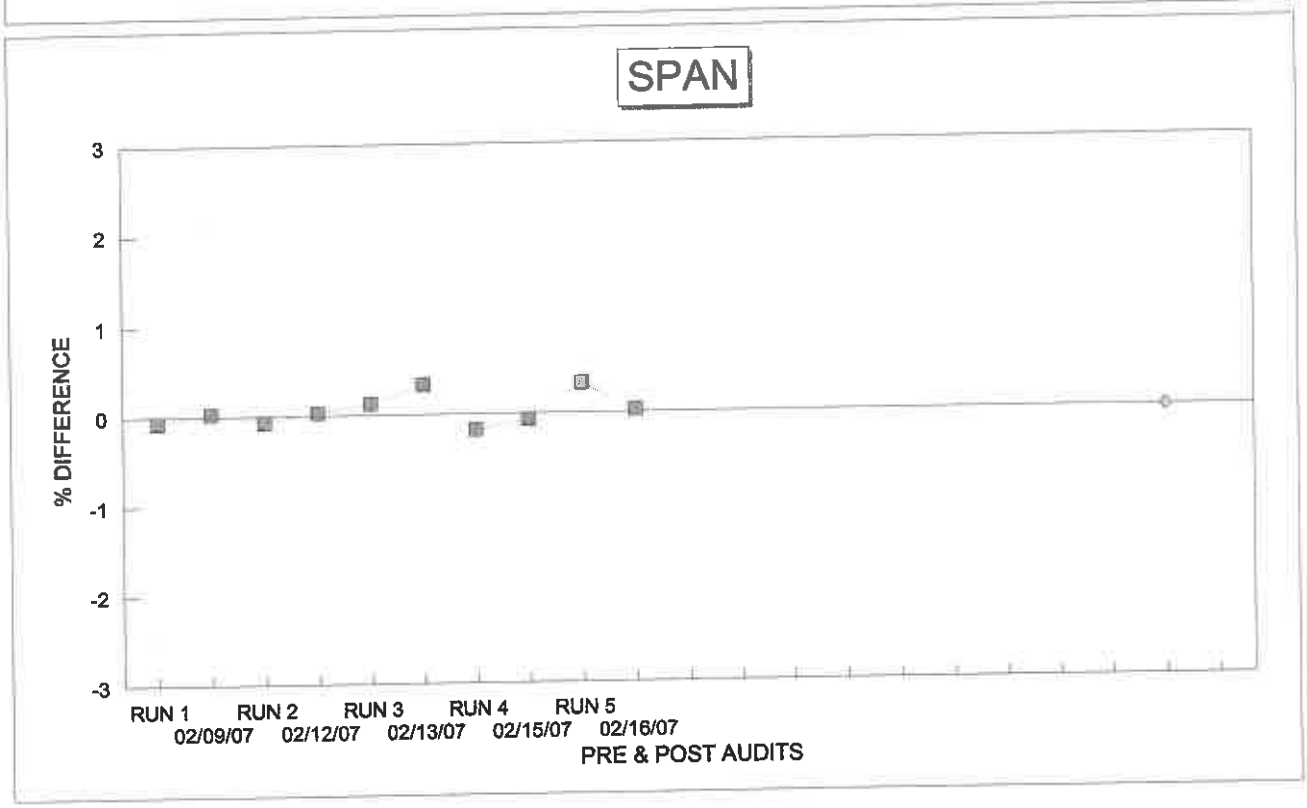
Cal Volts = Cal Volt Conc - Std Conc = ± Conc Diff = ± Δ %

HIGH VOLTS	.865	= 8.65 - 8.63	= .020	= .200	
LOW VOLTS	.198	= 1.98 - 1.98	= ϕ	= ϕ	

CO

Model 261


ZERO
3
2
1
0
-1
-2
-3
% DIFFERENCE
RUN 1
02/09/07
RUN 2
02/12/07
RUN 3
02/13/07
RUN 4
02/15/07
RUN 5
02/16/07
PRE & POST AUDITS


SPAN
3
2
1
0
-1
-2
-3
% DIFFERENCE
RUN 1
02/09/07
RUN 2
02/12/07
RUN 3
02/13/07
RUN 4
02/15/07
RUN 5
02/16/07
PRE & POST AUDITS

SO_2 ANALYZER
MULTIPOINT CALIBRATION REPORT FORM

Date: 2-9-2007

Analyzer: Make: HORIBA Model: PIR 2000 SN: 403019

Calibration by: CP Worley Jr.

Cal Gas Flow: 1.5 SCFH

Measured by: Rotameter

BP: 30.05

Instrument ID: PRINCO

Temp: 62

Instrument ID: TR

Cylinders:

1. # 168TAC 3A Concentration: 00.00 % SO_2 Cyl. Press.: 900 PSI
   Certified by: AIR LIQUIDE Date: 04-19-04
2. # CC82089 Concentration: 1250 % SO_2 Cyl. Press.: 2000 PSI
   Certified by: AIR LIQUIDE Date: 1-3-2007
3. # ALM0 49127 Concentration: 1770 % SO_2 Cyl. Press.: 780 PSI
   Certified by: SCOTT SPECIALTY GASES Date: 05-15-97
4. # ALM0 62285 Concentration: 506 % SO_2 Cyl. Press.: 690 PSI
   Certified by: SCOTT SPECIALTY GASES Date: 05-15-97

Analyzer: **Calibrated Range:** 0-2500 PPM **Output:** 0-1.0 V.
Flow: 1.5 SCFH **Measured by:** Rotameter

Calibration Results

Point #	CYL. #	PPM SO2	EXPECTED METER	EXPECTED DVM	ACTUAL METER	ACTUAL DVM	ADJ. METER	ADJ. DVM
1	1	0.00	00.0	.000	00.0	.000	00.0	.000
2	2	1250	50.0	.500	51.3	.513	50.0	.500
3	3	1770	70.8	.708	70.8	.708		
4	4	506	20.2	.202	20.0	.200		
5	1	0.00	00.0	.000	00.0	.000		

.5 = 125 1,043

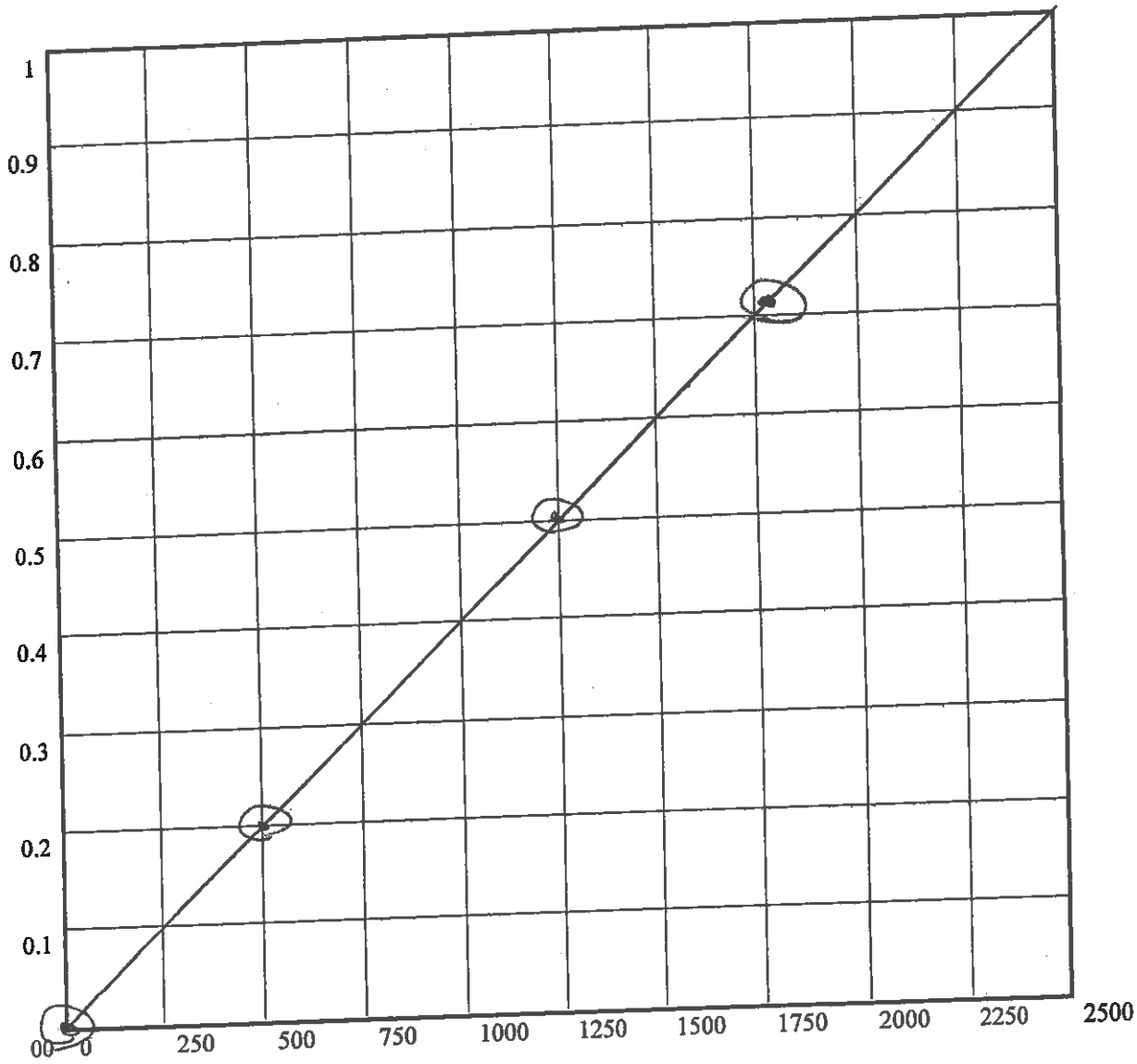
SO_2 Linear Regression Results:

Y = MX +B
Slope (M) = -.0010310

Y Intercept (B) = .0004005

Correlation Coefficient (r) = .9999934

r^2 = .9999869



EPA Span Value = ± 2.0% of 2500 PPM SO_2 = ± 50 PPM

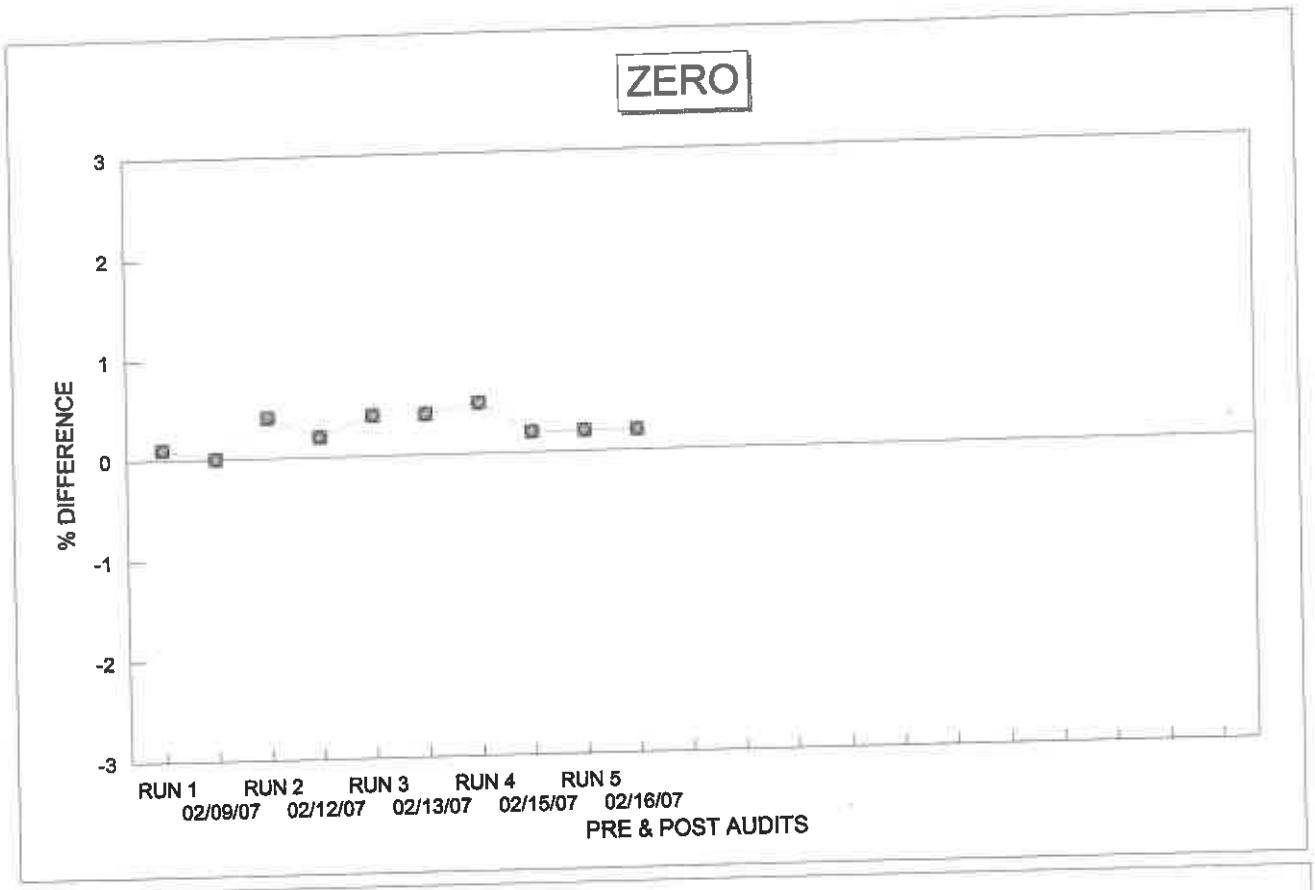
Cal Volts = Cal Volt Conc - Std Conc = ± Conc Diff = ± Δ %

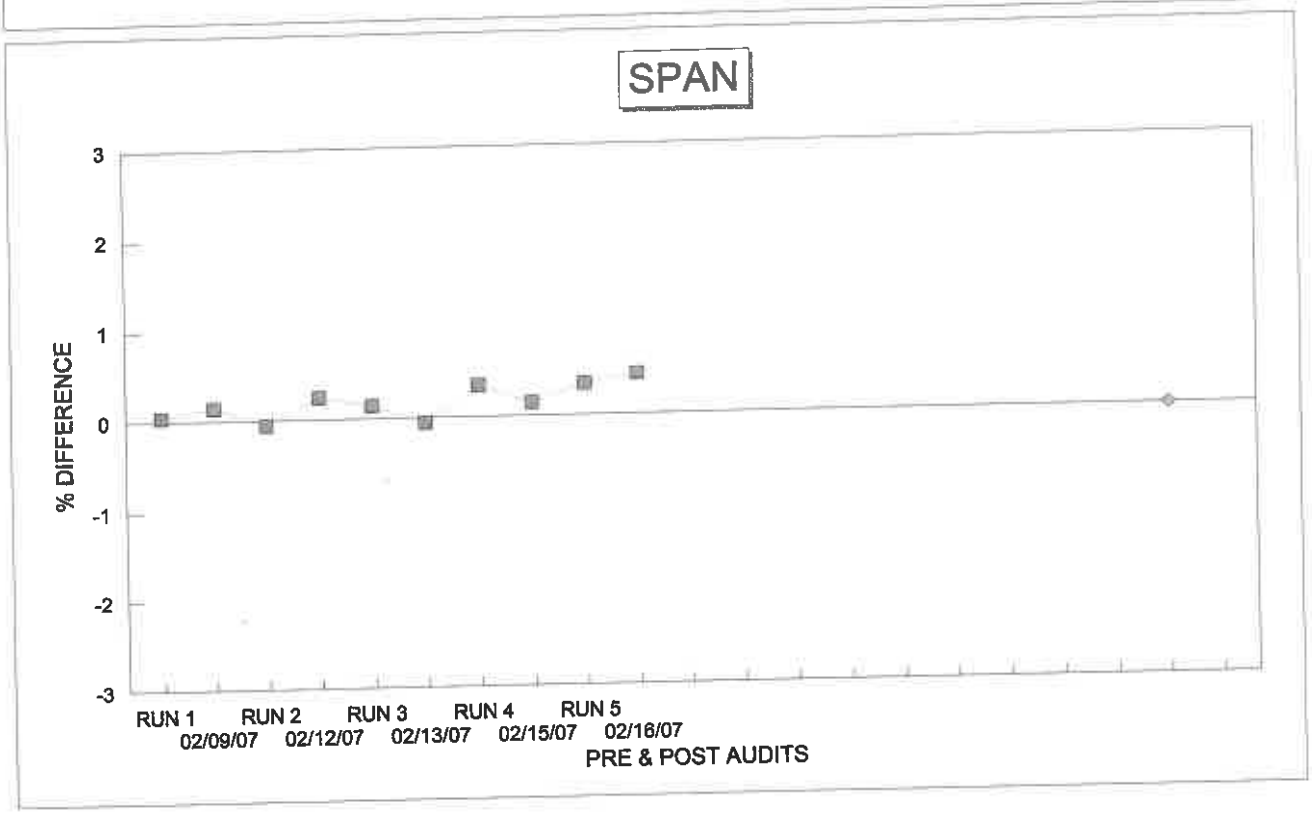
HIGH VOLTS .709 = 1770.0 - 1770.0 = ϕ = ϕ

LOW VOLTS .200 = 500.0 - 506.0 = -6.000 = -.240

SO2

Model 261





Certificate of Analysis

ANALYTICAL CONTROL LABORATORY ANALYSIS
METHYLENE CHLORIDE - OPTIMA

July 23, 2003

Catalog No. D151
Lot No. 035941

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	ACTUAL ANALYSIS
Assay	99.9%
Color	5 APHA
Description	Clear, Colorless Liquid
Free Halogens	Pass Test
Identification	Pass Test
Fluorescence Background (as Quinine Sulfate)	Not more than 1 ppb
Certified for EPA Test #1625	Pass Test
Pesticide Residue Analysis (as Heptachlor Epoxide)	Not more than 10ng/l
Density (g/ml) at 25°C	1.317
Optical Absorbance At 254 nm	0.002
At 240 nm	0.10
At 233 nm	0.54
Refractive Index at 25°C	1.4209
Residue after Evaporation	0.4 ppm
Titratable Acid	0.00004 Meq/g.
Preservative (Amylene)	64 ppm
Water (H_2O)	0.008%

Fisher Scientific
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

June 4, 2002

Catalog No. A929

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	ACTUAL ANALYSIS
Assay	99.6%
Color	5 APHA
Description	Clear, Colorless Liquid
Identification	Pass Test
Fluorescence Background (as Quinine Sulfate)	Not More Than 1 ppb
Pesticide Residue Analysis (As Heptachlor Epoxide)	Not More Than 10 ng/L
Substances Reducing Permanganate	Pass Test
Solubility in Water	Pass Test
Aldehyde (as HCHO)	0.0005%
Density (g/ml) @ 25 Degrees C	0.7849
Methanol (CH3OH)	0.03%
Isopropyl Alcohol ((CH3)2CHOH)	0.01%
Optical Absorbance At 400 - 350 nm	0.001
At 350 nm	0.004
At 340 nm	0.05
At 330 nm	0.67
Refractive Index at 25°C	1.3566
Residue after Evaporation	0.4 ppm
Titratable Acid	0.0003 Meq/g
Titratable Base	<0.0001 Meq/g
Water (H_2O)	0.3%

Approved By: Robert Dowd

Robert Dowd
Q.C. Laboratory Manager

Fisher Scientific
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

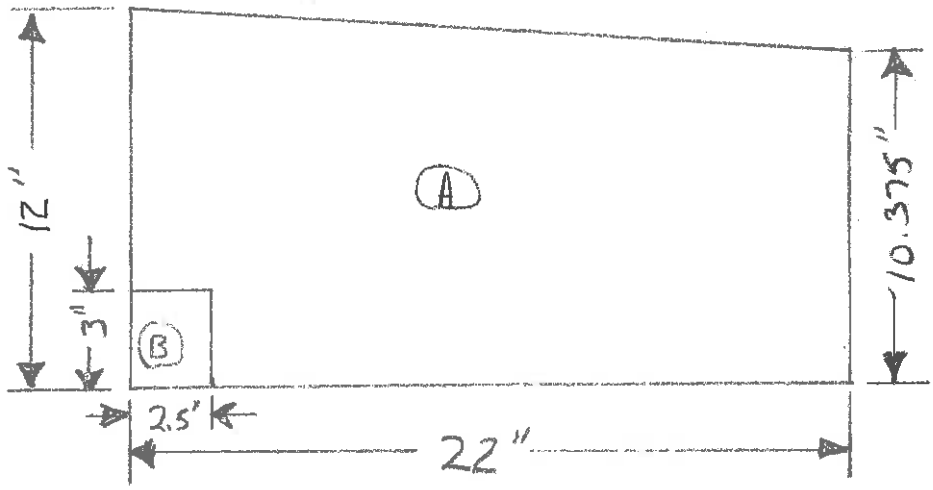
This notification serves to certify that the unit described above has been inspected and tested in accordance with specifications published by Keithley Instruments, Inc.

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

Firebox Volume and Fuel Load Calculations for the New Buck Model 261



UNIT 18.5" WIDE

$$A = \left(\frac{12" + 10.375"}{2"}\right) \times 18.5" \times 22" = 4553.516$$

$$B = 3" \times 2.5" \times 22" = -\ 165.000$$

$$4388.516\ in^3$$

$$= 2.540\ ft^3$$

Fuel Load Range

Low	Ideal	High
16.1	17.78	19.5

February– Monday 5-2007

From: Jerry Glenn
New Buck Corporation
P.O. Box 69
Spruce Pine, NC 28777
(828) 765-7303
newbuckcad@yahoo.com

To: LOKEE TESTING LABORATORY
13235 PRAIRIE CIRCLE EST
BONNIE LAKE, WA. 98391
% CHIP WADING TON

Subject:

MODEL 261
AIR CONTROL AND FAN SPEED SETTING

BURN RATE	LOW	MED-LOW	MED-HIGH	HIGH
AIR SETTINGS	5/16"	3/8"	5/8"	WIDE OPEN
FAN SETTING	ON AT 30min.	ON AT 30min.	ON AT 30min.	ON HIGH ENTIRE TEST

If you have any questions please call or E-mail me.

Thank You,
Jerry Glenn

Manufacturer will provide the owners manual separately.

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 (°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):

$$V_{m(std)} = \frac{V_m * 17.65 * mcf * \left(P_{bar} + \frac{\Delta H}{13.6} \right)}{T_m}$$

Volume of Water:

$$V_{w(std)} = (0.04707)(ml\ H_2O)$$

Moisture Content:

$$B_{ws} = \left(\frac{V_w}{V_w + V_{m(std)}} \right) * 100$$

Dry Burn Rate:

$$Br = \left(\frac{Wwt - (Wwt * \%\ H_2O)}{2.2046} \right) * \frac{60}{\theta}$$

Carbon Balance (N_t):

$$Nt = \frac{K_3 Nc}{(YCO_2 + YCO + YHC)}$$

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 H_20 (in. H_20).
K_3 =	1.0 lb/lb (English) 1000 g/kg (metric)
K_4 =	0.02406 dsm^3/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.

Pbar = 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 ±1.0%

   Temperatures are monitored using two type K thermocouples.

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 SO_2 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:	±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:	±0.1% moisture
Ranges:	6-11%, 11-25%, 25-80%

Accuracy:	Moisture	Content Accuracy
	6-12%	±0.5%
	12-20%	±1.0%
	20%-saturation point	±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:	±0.1% moisture

Accuracy:	Moisture	Content Accuracy
	6-12%	±0.5%
	12-20%	±1.0%
	20%-saturation point	±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:	±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 (°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 (°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 (±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 ±1.0%.

8. CO_2 Analyzer

Horiba PIR 2000/SN 407069

The CO_2 analyzer is also a NDIR and is operated in exactly the same manner as the CO analyzer. The range of the CO_2 analyzer is 0-25.0% CO_2.

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 (CO_2, O_2 and CO) analyzer data and the SO_2 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 ± 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 (SO_2) EQUIPMENT

1. SO_2 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 SO_2 injection rotameter with Sweglock fittings. The loop is inserted in the stack at 9.5 ±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 SO_2, 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 ±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 ±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. SO_2 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 SO_2 at a resolution of ±25.0 ppm. The manufacturer's specification for linearity is ±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 SO_2 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 SO_2 analyzer is 1.5 SCFH.
12. Wait until the zero gas has completely flushed the train.
13. Record the zero gas reading. Record the SO_2 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 SO_2 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 SO_2 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 SO_2.
3. Using the rotameter's current calibration, adjust the SO_2 flow rate to the calibrated level.
4. Turn on the pump in the tracer gas train. Adjust the flow rate through the SO_2 analyzer so that it remains at 1.5 SCFH.

5. Monitor the SO_2 concentrations in the stack and st... establish a sampling ratio for the test and a correct ΔH a... At the start of the test and every 5 minutes thereafter, re... volts and the stack gas SO_2 concentration in order to ... and determine the correct ΔH for the meter box.

6. Also monitor and record the temperature at the R... Rotameter (Pr), barometric pressure (BP) SO_2 injection ... 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 re... 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 pr...
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 ... until the flow rate through the SO_2 analyzer is 1.5 SCFH.
9. Wait until the zero gas has completely flushed the train.
10. Record the zero gas reading. Record the SO_2 analyzer's ...
11. Turn off zero gas at the cylinder.
12. Disconnect the zero/span gas delivery line from the zero ...
13. Connect the zero/span gas delivery line to the span gas ...
14. Turn on the span gas and adjust the flow until the flow ... 1.5 SCFH. Wait until the span gas has completely flushed the train ... is obtained.
15. Record the span gas reading. Record the analyzer's ... 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 SO_2 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 SO_2 concentrations in t... ranges normally encountered during wood stove testing.

4. Sample flue gas with SO_2 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 SO_2 concentrations are as stable as possible.
5. Remove the probe from the stack, noting the exact SO_2 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 SO_2 levels begin to decline.
7. Continue observing the stop watch and DVM. Record the time when the SO_2 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 (SO_2) 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 ± 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.