Section 4

Test Data by Run

Monessen Defiant

EPA Weighted Average 227-5-39-3

i	Run #	Burn Rate	P_i	E_i	K_i
(1)	2	.69	.1442	1.06	.2724
(8)	3	2.78	.9796	2.04	.2244
(6)	5	1.44	.7166	1.65	.1550
(4)	8	.95	.3280	4.49	.3100
(3)	11	.89	.2908	5.91	.0556
(9)	12	2.81	.9802	6.49	.0204
(7)	14	1.51	.7558	0.75	.2630
(2)	15	.87	.2724	2.29	.1466
(5)	16	1.28	.6008	2.06	.3886

$K_1 = P_2 - P_0 = .2724 - 0 = .2724$

$K_2 = P_3 - P_1 = .2908 - .1442 = .1466$

$K_3 = P_4 - P_2 = .3280 - .2724 = .0556$

$K_4 = P_5 - P_3 = .6008 - .2908 = .3100$

$K_5 = P_6 - P_4 = .7166 - .3280 = .3886$

$K_6 = P_7 - P_5 = .7558 - .6008 = .1550$

$K_7 = P_8 - P_6 = .9796 - .7166 = .2630$

$K_8 = P_9 - P_7 = .9802 - .7558 = .2244$

$K_9 = P_{10} - P_8 = 1 - .9796 = .0204$

$$E_w = \frac{(1.06 \times .2724) + (2.04 \times .2244) + (1.65 \times .1550) + (4.49 \times .3100) + (4.49 \times .3100) + (5.91 \times .0556) + (6.49 \times .0204) + (0.75 \times .2630) + (2.29 \times .1466) + (2.06 \times .3886)}{.2724 + .2244 + .1550 + .3100 + .0556 + .0204 + .2630 + .1466 + .3886}$$

$\Rightarrow \frac{4.18864}{1.836} \Rightarrow$ **2.28 g/hr**

6/3/10

Checked by: 04/03/10

Run Summary

Run #	Date	Burn Rate Category	Status	Reason for Omission from Weighted Average
1	4/19/2010	Category 1	Unacceptable	Delta T
2	4/20/2010	Category 1	Acceptable	
3	4/21/2010	Category 4	Acceptable	
4	4/21/2010	Category 2	Unacceptable	Data discrepancy
5	4/22/2010	Category 3	Acceptable	
6	4/23/2010	Category 2	Unacceptable	Delta T
7	4/24/2010	Category 2	Unacceptable	Delta T
8	4/25/2010	Category 2	Acceptable	
9	4/26/2010	Fan Confirmation, Category 2	Unacceptable	Delta T
10	4/27/2010	Fan Confirmation, Category 2	Unacceptable	DGMs lost power
11	4/27/2010	Fan Confirmation, Category 2	Acceptable	
12	4/28/2010	Fan Confirmation, Category 4	Acceptable	
13	4/29/2010	Fan Confirmation, Category 1	Unacceptable	Fire went out
14	4/30/2010	Fan Confirmation, Category 3	Acceptable	
15	5/4/2010	Fan Confirmation, Category 1	Acceptable	
16	5/9/2010	Category 3	Acceptable	

Run 1

OMNI-Test Laboratories, Inc.

Wood Heater Test Data - EPA Method 5G

Manufacturer: Monessen
Model: Defiant 2N1 (NC)
Project No.: 227-S-39-3
Tracking No.: 1534
Run: 1
Test Date: 04/19/10-04/20/10

Burn Rate	0.66 kg/hr dry
Average Tunnel Temperature	88 degrees Fahrenheit
Average Gas Velocity in Dilution Tunnel - vs	13.0 feet/second
Average Gas Flow Rate in Dilution Tunnel - Qsd	8439.5 dscf/hour
Average Delta p	0.037 inches H20
Average Delta H	0.00 inches H20
Total Time of Test	810 minutes

	AVERAGE	SAMPLE TRAIN 1	SAMPLE TRAIN 2
Total Sample Volume - Vm	127.26 cubic feet	129.92 cubic feet	124.61 cubic feet
Average Gas Meter Temperature	78 degrees Fahrenheit	77 degrees Fahrenheit	78 degrees Fahrenheit
Total Sample Volume (Standard Conditions) - Vmstd	123.1 dscf	125.7 dscf	120.5 dscf
Total Particulates - mn		25.4 mg	29.8 mg
Particulate Concentration (dry-standard)	0.00022 grams/dscf	0.00020 grams/dscf	0.00025 grams/dscf
Particulate Emission Rate	1.90 grams/hour	1.71 grams/hour	2.09 grams/hour
Adjusted Emissions	3.09 grams/hour	2.84 grams/hour	3.35 grams/hour
Difference from Average		0.26 grams/hour	0.26 grams/hour
7.5% of the average emission rate	0.23		
Weighted Average Emission Rate Limit	4.10 grams/hour		
7.5% of the weighted average emission rate limit	0.31		

Results Are Acceptable

OMNI-Test Laboratories, Inc.

Wood Heater Test Data - EPA Method 5G

Run: 1

Manufacturer:	Monessen
Model:	Defiant 2NI (NC)
Tracking No.:	1534
Project No.:	227-S-39-3
Test Date:	04/19/10-04/20/10
Beginning Clock Time:	01:27
Recording Interval:	10 min.
Total Sampling Time:	810 min.

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	
Initial dP	0.028	0.038	0.040	0.034	0.026	0.038	0.038	0.036	"H2O
Initial Temp.	93	93	93	93	93	93	93	93	oF

OMNI Equipment Numbers:

PM Control Module:					
Dilution Tunnel MW(dry):	29.00	lb/lb-mole			
Dilution Tunnel MW(wet):	28.66	lb/lb-mole			
Dilution Tunnel H2O:	4.00	percent			
Dilution Tunnel Static:	-0.186	"H2O			
Pitot Tube Cp:	0.99				
Meter Box Y Factor:	0.994 (1)		0.996	(2)	
Barometric Pressure:	Begin	Middle	End	Average	
	29.60	29.62	29.62	29.61	"Hg

Signature/Date: 6/14/10

Tunnel Velocity:	13.04	ft/sec.
Intial Tunnel Flow:	135.9	scfm
Average Tunnel Flow:	140.7	scfm
Tunnel Area:	0.1963	ft2
Post-Test Leak Check (1):	0.001	cfm@"Hg
Post-Test Leak Check (2):	0.001	cfm@"Hg
Fuel Moisture (dry basis %):	20.35	
Total Particulate (1):	25.4	
Total Particulate (2):	29.8	

	Particulate Sampling Data														Fuel Weight, lb		Wood Heater Temperature Data, oF											Stack
Elapsed Time	Gas Meter Cubic Feet (1)	Gas Meter Cubic Feet (2)	Sample Rate, cfm (1)	Sample Rate, cfm (2)	Orifice dH (1)	Orifice dH (2)	Meter oF (1)	Meter oF (2)	Meter Vac. In. Hg. (1)	Meter Vac. In. Hg. (2)	Dilution Tunnel Temp.	Dilution Tunnel dP	Pro. Rate (10%) (1)	Pro. Rate (10%) (2)	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Catalyst Exit	Average Surface	Stack	Filter (1)	Filter (2)	Impinger exit (1)	Impinger exit (2)	Ambient	Draft In. H2O
0	433.516	873.615			0.00	0.00	78	79	1.5	3.5	93	0.035			23.6		410	256	280	271	275		298.4	292	75	74			75	0.050
10	435.033	875.233	0.15	0.16	0.00	0.00	78	78	1.5	3.5	93	0.037	95	106	23.0	-0.6	348	253	270	264	264		279.8	294	74	73			75	0.048
20	436.549	876.850	0.15	0.16	0.00	0.00	78	78	1.5	3.5	94	0.038	94	105	22.4	-0.6	298	244	274	240	240		259.2	326	73	73			75	0.049
30	438.066	878.468	0.15	0.16	0.00	0.00	77	78	1.5	3.5	95	0.038	94	105	21.8	-0.6	272	231	289	220	224		247.2	343	73	73			72	0.051
40	439.582	880.085	0.15	0.16	0.00	0.00	77	78	1.5	3.5	95	0.036	97	108	21.0	-0.8	256	226	299	211	217		241.8	356	73	73			76	0.050
50	441.099	881.703	0.15	0.16	0.00	0.00	77	78	1.5	3.5	96	0.038	94	105	20.2	-0.8	254	217	310	202	213		239.2	367	74	74			76	0.051
60	442.615	883.320	0.15	0.16	0.00	0.00	78	79	1.5	3.5	97	0.038	94	105	19.5	-0.75	263	211	321	198	211		240.8	380	74	74			74	0.050
70	444.225	884.870	0.16	0.15	0.00	0.00	77	79	1.5	3.5	98	0.039	99	99	18.6	-0.85	275	208	330	195	208		243.2	380	73	74			71	0.051
80	445.840	886.405	0.16	0.15	0.00	0.00	78	79	1.5	3.5	99	0.037	102	101	17.8	-0.85	293	200	334	195	212		246.8	388	74	74			75	0.052
90	447.449	887.936	0.16	0.15	0.00	0.00	77	79	1.5	3.5	98	0.038	100	99	16.8	-0.95	308	193	340	193	213		249.4	384	73	74			74	0.053
100	449.065	889.458	0.16	0.15	0.00	0.00	77	79	1.5	3.5	99	0.038	101	99	15.9	-0.95	327	191	342	193	217		254.0	390	73	74			73	0.052
110	450.675	890.988	0.16	0.15	0.00	0.00	77	79	1.5	3.5	102	0.039	99	98	15.0	-0.85	353	188	342	195	221		259.8	401	74	74			73	0.052
120	452.288	892.511	0.16	0.15	0.00	0.00	78	79	1.5	3.5	104	0.038	101	99	14.1	-0.95	375	189	355	199	227		269.0	410	74	75			71	0.055
130	453.895	894.036	0.16	0.15	0.00	0.00	78	79	1.5	3.5	102	0.038	100	99	13.2	-0.9	394	191	364	206	234		277.8	409	75	75			75	0.055
140	455.512	895.559	0.16	0.15	0.00	0.00	78	79	1.5	3.5	104	0.039	100	98	12.2	-1	410	195	368	212	245		286.0	420	75	76			75	0.055
150	457.128	897.087	0.16	0.15	0.00	0.00	78	79	1.5	3.5	105	0.038	101	100	11.1	-1.1	434	191	377	215	245		292.4	421	75	76			73	0.055
160	458.743	898.615	0.16	0.15	0.00	0.00	78	79	1.5	3.5	105	0.038	101	100	10.4	-0.7	447	193	373	223	256		298.4	421	75	76			74	0.054
170	460.363	900.146	0.16	0.15	0.00	0.00	78	79	1.5	3.5	104	0.038	101	100	9.6	-0.75	447	193	364	232	267		300.6	388	76	76			75	0.050
180	461.980	901.675	0.16	0.15	0.00	0.00	78	80	1.5	3.5	102	0.038	101	99	9.0	-0.65	443	192	339	237	276		297.4	365	76	77			76	0.050
190	463.600	903.205	0.16	0.15	0.00	0.00	78	80	1.5	3.5	101	0.040	98	97	8.3	-0.7	454	188	324	242	285		298.6	350	76	77			77	0.046
200	465.216	904.746	0.16	0.15	0.00	0.00	79	80	1.5	3.5	100	0.039	99	99	7.7	-0.55	459	191	299	244	288		296.2	320	76	77			77	0.044
210	466.841	906.290	0.16	0.15	0.00	0.00	79	80	1.5	3.5	98	0.038	101	100	7.3	-0.45	449	185	273	245	286		287.6	308	76	76			78	0.041
220	468.455	907.836	0.16	0.15	0.00	0.00	79	80	1.5	3.5	95	0.037	101	101	6.8	-0.45	432	187	252	248	280		279.8	284	76	76			78	0.040
230	470.071	909.374	0.16	0.15	0.00	0.00	79	80	1.5	3.5	92	0.038	100	99	6.4	-0.4	417	189	235	243	278		272.4	267	74	75			74	0.038
240	471.683	910.897	0.16	0.15	0.00	0.00	79	80	1.5	3.5	90	0.038	99	98	6.1	-0.3	404	185	213	241	269		262.4	250	73	74			74	0.036
250	473.294	912.437	0.16	0.15	0.00	0.00	78	79	1.5	3.5	88	0.038	99	99	5.9	-0.25	393	183	200	232	262		254.0	239	72	73			72	0.034
260	474.900	913.968	0.16	0.15	0.00	0.00	78	79	1.5	3.5	87	0.038	99	98	5.6	-0.25	383	180	188	234	257		248.4	227	72	73			75	0.031
270	476.515	915.498	0.16	0.15	0.00	0.00	78	79	1.5	3.5	85	0.038	99	98	5.5	-0.15	374	177	177	229	251		241.6	216	71	72			73	0.030
280	478.115	917.028	0.16	0.15	0.00	0.00	78	79	1.5	3.5	84	0.037	100	99	5.3	-0.15	363	175	170	224	242		234.8	207	71	72			74	0.028
290	479.731	918.558	0.16	0.15	0.00	0.00	78	79	1.5	3.5	84	0.039	98	97	5.2	-0.15	356	168	164	218	235		228.2	198	70	71			72	0.026
300	481.336	920.097	0.16	0.15	0.00	0.00	77	79	1.5	3.5	83	0.038	99	98	5.1	-0.1	343	163	157	217	228		221.6	189	70	71			74	0.025
310	483.015	921.700	0.17	0.16	0.00	0.00	77	78	1.5	3.5	82	0.039	102	101	5.0	-0.1	330	161	150	208	224		214.6	180	70	71			74	0.022
320	484.556	923.195	0.15	0.15	0.00	0.00	77	78	1.5	3.5	84	0.038	95	96	4.9	-0.05	318	161	143	206	214		208.4	171	70	71			73	0.021
330	486.170	924.731	0.16	0.15	0.00	0.00	77	78	1.5	3.5	80	0.037	100	99	4.9	-0.05	305	152	137	202	206		200.4	165	69	70			73	0.021
340	487.780	926.270	0.16	0.15	0.00	0.00	76	78	1.5	3.5	81	0.038	99	98	4.8	-0.05	295	150	135	195	202		195.4	158	69	71			73	0.020
350	489.390	927.810	0.16	0.15	0.00	0.00	76	78	1.5	3.5	83	0.038	99	99	4.8	-0.05	285	147	128	193	195		189.6	152	69	71			73	0.018
360	490.996	929.350	0.16	0.15	0.00	0.00	76	78	1.5	3.5	82	0.036	101	101	4.7	-0.05	277	146	126	189	191		185.8	148	70	71			73	0.018
370	492.611	930.890	0.16	0.15	0.00	0.00	76	77	1.5	3.5	83	0.038	99	99	4.7	-0.05	266	143	120	184	186		179.8	165	70	71			73	0.015
380	494.222	932.431	0.16	0.15	0.00	0.00	76	77	1.5	3.5	83	0.036	102	102	4.6	-0.1	256	139	133	180	184		178.4	141	70	71			73	0.015
390	495.820	933.940	0.16	0.15	0.00	0.00	76	77	1.5	3.5	83	0.036	101	100	4.5	-0.1	249	137	143	173	178		176.0	143	70	71			73	0.016
400	497.449	935.520	0.16	0.16	0.00	0.00	76	77	1.5	3.5	83	0.036	103	104	4.3	-0.15	251	137	152	171	174		177.0	154	70	71			73	0.016
410	499.068	937.067	0.16	0.15	0.00	0.00	76	77	1.5	3.5	83	0.037	101	101	4.2	-0.15	253	133	163	167	174		178.0	169	70	71			73	0.017
420	500.680	938.610	0.16	0.15	0.00	0.00	75	76	1.5	3.5	83	0.037	101	101	4.0	-0.2	263	132	173	166	175		181.8	179	70	71			72	0.019

OMNI-Test Laboratories, Inc.

Wood Heater Test Data - EPA Method 5G

Run: 1

Manufacturer: Monessen
Model: Defiant 2N1 (NC)
Tracking No.: 1534
Project No.: 227-S-39-3
Test Date: 04/19/10-04/20/10
Beginning Clock Time: 01:27
Recording Interval: 10 min.
Total Sampling Time: 810 min.

Velocity Traverse Data									
	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	
Initial dP	0.028	0.038	0.040	0.034	0.026	0.038	0.038	0.036	"H2O
Initial Temp.	93	93	93	93	93	93	93	93	oF

OMNI Equipment Numbers:

PM Control Module:
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.56 lb/lb-mole
Dilution Tunnel H2O: 4.00 percent
Dilution Tunnel Static: -0.136 "H2O
Pitot Tube Cp: 0.99
Meter Box Y Factor: 0.994 (1) 0.996 (2)
Barometric Pressure:

Begin	Middle	End	Average
29.60	29.62	29.62	29.61 "Hg

Signature/Date: 6/14/10

Tunnel Velocity: 13.04 ft/sec.
Intial Tunnel Flow: 135.9 scfm
Average Tunnel Flow 140.7 scfm
Tunnel Area: 0.1963 ft2
Post-Test Leak Check (1): 0.001 cfm@"Hg
Post-Test Leak Check (2): 0.001 cfm@"Hg
Fuel Moisture (dry basis %): 20.35
Total Particulate (1): 25.4
Total Particulate (2): 29.8

Elapsed Time	Particulate Sampling Data														Fuel Weight, lb		Wood Heater Temperature Data, oF										Stack
	Gas Meter Cubic Feet (1)	Gas Meter Cubic Feet (2)	Sample Rate, cfm (1)	Sample Rate, cfm (2)	Orifice dH (1)	Orifice dH (2)	Meter oF (1)	Meter oF (2)	Meter Vac. In. Hg. (1)	Meter Vac. In. Hg. (2)	Dilution Tunnel Temp.	Dilution Tunnel dP	Pro. Rate (10%) (1)	Pro. Rate (10%) (2)	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Catalyst Exit	Average Surface	Stack	Filter (1)	Filter (2)	Impinger exit (1)	Impinger exit (2)	Ambient	Draft In. H2O
430	502.291	940.142	0.16	0.15	0.00	0.00	75	76	1.5	3.5	83	0.037	101	100	3.8	-0.2	274	134	186	167	175		187.2	190	70	71			73	0.020
440	503.901	941.685	0.16	0.15	0.00	0.00	75	76	1.5	3.5	83	0.037	101	101	3.6	-0.2	287	132	194	169	179		192.2	194	70	71			73	0.020
450	505.518	943.222	0.16	0.15	0.00	0.00	75	76	1.5	3.5	83	0.037	101	100	3.4	-0.2	300	141	201	173	184		199.8	199	70	71			72	0.021
460	507.145	944.775	0.16	0.16	0.00	0.00	75	76	1.5	3.5	83	0.037	102	101	3.2	-0.15	308	144	183	177	185		199.4	194	70	71			72	0.021
470	508.743	946.292	0.16	0.15	0.00	0.00	75	76	1.5	3.5	82	0.036	101	100	3.1	-0.15	313	147	159	177	185		196.2	194	70	70			72	0.021
480	510.360	947.827	0.16	0.15	0.00	0.00	75	76	1.5	3.5	82	0.036	102	101	2.9	-0.15	317	144	152	178	185		195.2	189	70	70			71	0.021
490	511.978	949.368	0.16	0.15	0.00	0.00	74	76	1.5	3.5	82	0.035	104	103	2.8	-0.1	323	148	146	178	182		195.4	187	70	70			71	0.021
500	513.589	950.878	0.16	0.15	0.00	0.00	74	75	1.5	3.5	81	0.037	101	98	2.7	-0.15	327	148	144	178	184		196.2	184	69	70			71	0.020
510	515.200	952.406	0.16	0.15	0.00	0.00	74	75	1.5	3.5	82	0.036	102	101	2.5	-0.2	323	145	143	180	186		195.4	182	69	69			71	0.020
520	516.815	953.931	0.16	0.15	0.00	0.00	74	75	1.5	3.5	82	0.036	102	101	2.4	-0.1	320	143	143	180	186		194.4	180	69	69			71	0.020
530	518.429	955.461	0.16	0.15	0.00	0.00	74	75	1.5	3.5	82	0.035	104	103	2.2	-0.15	323	143	141	182	186		195.0	178	69	69			71	0.020
540	520.046	956.984	0.16	0.15	0.00	0.00	74	75	1.5	3.5	81	0.036	102	101	2.1	-0.15	321	146	139	182	186		194.8	176	69	69			71	0.020
550	521.651	958.509	0.16	0.15	0.00	0.00	73	75	1.5	3.5	81	0.034	105	104	1.9	-0.15	318	143	137	184	186		193.6	169	69	69			71	0.020
560	523.268	960.034	0.16	0.15	0.00	0.00	74	75	1.5	3.5	81	0.037	101	99	1.8	-0.15	316	143	135	184	184		192.4	167	69	69			71	0.019
570	524.880	961.570	0.16	0.15	0.00	0.00	74	75	1.5	3.5	81	0.036	102	101	1.7	-0.1	316	145	130	186	184		192.2	160	69	69			71	0.019
580	526.490	963.095	0.16	0.15	0.00	0.00	73	75	1.5	3.5	80	0.035	104	102	1.5	-0.15	316	141	132	186	182		191.4	156	69	69			68	0.018
590	528.110	964.645	0.16	0.15	0.00	0.00	74	75	1.5	3.5	81	0.035	104	104	1.5	-0.05	307	143	123	183	177		186.6	149	69	69			66	0.018
600	529.703	966.172	0.16	0.15	0.00	0.00	74	75	1.5	3.5	81	0.035	103	103	1.4	-0.1	296	143	141	186	179		189.0	147	70	70			66	0.017
610	531.301	967.712	0.16	0.15	0.00	0.00	74	75	1.5	3.5	82	0.036	101	102	1.3	-0.1	286	145	150	188	180		189.8	143	70	70			71	0.016
620	532.910	969.247	0.16	0.15	0.00	0.00	75	76	1.5	3.5	83	0.036	102	101	1.2	-0.05	279	148	152	191	182		190.4	141	71	71			75	0.016
630	534.515	970.773	0.16	0.15	0.00	0.00	75	76	1.5	3.5	83	0.036	102	101	1.1	-0.1	273	150	155	191	178		189.4	140	71	71			76	0.016
640	536.110	972.285	0.16	0.15	0.00	0.00	76	77	1.5	3.5	83	0.035	103	101	1.1	-0.05	270	154	156	190	177		189.4	137	72	72			77	0.015
650	537.714	973.808	0.16	0.15	0.00	0.00	77	78	1.5	3.5	82	0.036	101	100	1.0	-0.1	262	150	156	184	175		185.4	137	72	72			73	0.014
660	539.319	975.335	0.16	0.15	0.00	0.00	76	77	1.5	3.5	82	0.036	101	101	0.9	-0.05	259	147	154	184	173		183.4	132	72	72			77	0.014
670	540.931	976.859	0.16	0.15	0.00	0.00	77	78	1.5	3.5	82	0.036	102	100	0.8	-0.1	256	150	152	185	172		183.0	131	72	72			76	0.014
680	542.529	978.385	0.16	0.15	0.00	0.00	78	78	1.5	3.5	82	0.036	101	100	0.8	-0.05	249	148	152	189	172		182.0	131	73	73			75	0.014
690	544.141	979.908	0.16	0.15	0.00	0.00	78	79	1.5	3.5	82	0.035	103	102	0.7	-0.1	243	148	151	189	168		179.8	129	72	73			76	0.014
700	545.744	981.436	0.16	0.15	0.00	0.00	78	79	1.5	3.5	82	0.035	103	102	0.6	-0.05	239	148	153	187	166		178.6	131	73	73			76	0.014
710	547.355	982.960	0.16	0.15	0.00	0.00	79	79	1.5	3.5	83	0.035	103	102	0.6	-0.05	230	147	151	183	164		175.0	132	73	73			76	0.013
720	548.959	984.487	0.16	0.15	0.00	0.00	79	79	1.5	3.5	84	0.035	103	102	0.5	-0.05	229	149	151	175	164		173.6	132	73	73			77	0.013
730	550.575	986.020	0.16	0.15	0.00	0.00	79	79	1.5	3.5	84	0.035	104	103	0.5	-0.05	225	149	151	171	164		172.0	130	73	73			77	0.012
740	552.175	987.530	0.16	0.15	0.00	0.00	80	80	1.5	3.5	85	0.035	102	101	0.4	-0.05	223	150	150	167	167		171.4	129	73	74			80	0.012
750	553.780	989.060	0.16	0.15	0.00	0.00	80	80	1.5	3.5	86	0.035	103	102	0.3	-0.1	224	148	151	166	168		171.4	127	75	75			78	0.011
760	555.385	990.575	0.16	0.15	0.00	0.00	81	81	1.5	3.5	86	0.035	103	101	0.3	-0.05	224	147	147	162	172		170.4	123	75	76			78	0.011
770	556.987	992.097	0.16	0.15	0.00	0.00	81	82	1.5	3.5	87	0.035	103	102	0.2	-0.05	227	147	145	160	175		170.8	124	76	76			81	0.010
780	558.600	993.625	0.16	0.15	0.00	0.00	82	82	1.5	3.5	87	0.035	103	102	0.2	-0.05	225	143	146	161	180		171.0	120	77	76			82	0.010
790	560.202	995.154	0.16	0.15	0.00	0.00	82	82	1.5	3.5	87	0.035	102	102	0.1	-0.05	221	146	142	155	180		168.8	120	77	77			80	0.010
800	561.820	996.690	0.16	0.15	0.00	0.00	82	82	1.5	3.5	87	0.035	103	103	0.1	-0.05	220	144	140	155	185		168.8	119	77	77			81	0.010
810	563.431	998.221	0.16	0.15	0.00	0.00	82	82	1.5	3.5	87	0.035	103	102	0.0	-0.05	220	143	138	156	183		168.0	117	77	77			81	0.010
Avg/Total	129.915	124.606	0.16	0.15	0.00	0.00	77.02	78.02			87.79	0.037	100.78	100.77									130		72.16	72.61	#DIV/0!	#DIV/0!		0.027

PRINT

Final Laboratory Report - Method 5G Dual Train
Dilution Tunnel Particulate Calculations

Client Name: Monessen
Model: Defiant 2N1 (NC)
Project No.: 227-S-39-3
Tracking No.: 1534

Equipment Numbers:

Run #: 1
Train #: A
Date: 04/19/10

Sample Component	Reagent	Filter # or Probe #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	F533	141.3	117.0	24.3
B. Rear filter catch	Filter	F534	121.1	120.7	0.4
C. Probe catch	Probe	15	114335.2	114334.5	0.7

Total Particulate, mg :	25.4

Component	Equations:
A. Front filter catch	Final (mg) - Tare (mg) = Particulate, mg
B. Rear filter catch	Final (mg) - Tare (mg) = Particulate, mg
C. Probe catch	Final (mg) - Tare (mg) = Particulate, mg

Analyst: [signature] Date: 05/28/10

PRINT

Final Laboratory Report - Method 5G Dual Train
Dilution Tunnel Particulate Calculations

Client Name: Monessen
Model: Defiant 2N1 (NC)
Project No.: 227-S-39-3
Tracking No.: 1534

Equipment Numbers:

Run #: 1
Train #: B
Date: 04/19/10

Sample Component	Reagent	Filter # or Probe #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	F535	152.2	125.3	26.9
B. Rear filter catch	Filter	F536	118.7	117.8	0.9
C. Probe catch	Probe	28	114743.0	114741.0	2.0

Total Particulate, mg :	29.8

Component	Equations:
A. Front filter catch	Final (mg) - Tare (mg) = Particulate, mg
B. Rear filter catch	Final (mg) - Tare (mg) = Particulate, mg
C. Probe catch	Final (mg) - Tare (mg) = Particulate, mg

Analyst: [signature] Date: 05/28/10

STOVE TEMPERATURE TEST DATA - METHOD 5G

Client/Model: Monessen - Defiant ZN1(NC) Project #: 227-5-39-3 Tracking #: 1534

Date: 04/19/10 Test Crew: R Run #: 1

OMNI Equipment ID #:

Preburn X Coal Bed: 5.9 - 4.7 lbs Actual: 5.8 lbs

Test 1 Data: 0 = Range: Coal Bed:

Time	Fuel Weight	Delta Weight	Stack Draft	TEMPERATURES (oF) Ambient	Top	Bottom	Back	Left	Right	Flue	Catalyst
0	16.00	0	0.063	83	611	417	172	337	289	328	
10	14.6	-1.4	0.053	82	518	403	185	315	278	281	
20	13.4	1.2	0.045	82	433	361	202	301	269	269	
30	12.4	1.0	0.04	82	420	359	203	287	259	260	
40	11.75	0.65	0.04	82	410	347	206	275	254	256	
50	10.45	1.3	0.055	78	384	321	282	269	245	421	
60	9.10	1.35	0.058	78	388	306	356	267	241	442	
70	8.00	1.10	0.058	75	407	294	387	265	244	417	
80	7.30	0.7	0.054	75	415	290	362	265	254	373	
90	6.95	0.35	0.05	75	438	288	353	266	260	344	
00	6.35	0.6	0.05	72	432	290	326	270	274	48356	
10	5.90	0.45	0.048	74	414	256	280	271	275	292	
20											
30											
40											
50											
60											
70											
80											
90											
AVG											

Technician signature: Date: 05/14/10

A-10 OF A-155

FUEL DATA

Client: Monessen
Model: Defiant 2N1
Project #: ~~227-5-39-3~~ Tracking #: 1534
Date: 04/19/10 Test Crew: TC Run #: 1
OMNI Equipment ID #:
FUEL LOAD PREPARED BY: Cut, assembled by Ralph G – Measured / Moisture taken by TC
FUEL: DOUGLAS-FIR SPECIES, UNTREATED, AIR-DRIED, STANDARD GRADE OR BETTER, DIMENSIONAL LUMBER.

PRE-BURN FUEL

MOISTURE CONTENT (METER – – DRY BASIS)

CALIBRATION: Cal Value (1) = 12% Actual Reading 12.0
Cal Value (2) = 22% Actual Reading 22.3

Piece	Length	Readings			Type
1	2 ft 3 in	19.8	20.1	18.8	2x4
2	ft	20.2	19.2	19.3	2x4
3	ft				

Length of cut pieces: 8 inches Pre-Burn Fuel Average Moisture: 19.6

Time (clock): 10:30 Room Temperature (F): 80 Initials: TC

TEST FUEL

FUEL TYPE AND AMOUNT: 2 × 4 ____ 4 × 4 4
CALCULATED LOAD WEIGHT: 20.34 - 24.87 ACTUAL LOAD WEIGHT: ____ (2 × 4)
23.6 (4 × 4)
FUEL PIECE LENGTH: 21" 23.6 Total

MOISTURE CONTENT (METER – – DRY BASIS)

PIECE	READINGS			TYPE
1	19.6	20.4	18.6	4x4
2	20.1	23.1	21.9	4x4
3	21.1	20.4	18.6	4x4
4	19.8	20.8	19.8	4x4
5				
6				
7				
8				
9				
10				

OVERALL TEST FUEL LOAD MOISTURE AVERAGE: 20.35

Time (clock): 10:30 Room Temperature (F): 80 Initials: TC

Technician signature: [signature] Date: 04/19/10

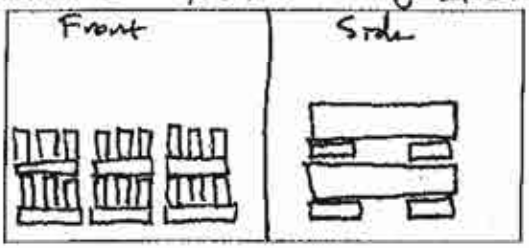
Run Notes

Client: Monessen
Model: Defiant 2N1 (NC)
Project #: 227-S-39-3
Tracking #: 1534
Run #: 1 Date: ~~03~~ TZ 04/19/10 04/19/10
Test Crew: TZ
OMNI Equipment ID #(s):

PREBURN

DESCRIBE OR SKETCH AIR OR THERMOMSTAT SETTINGS BELOW:
(SETTINGS MUST BE ACCURATE AND REPRODUCABLE)

PRIMARY: See test setting sketch



SECONDARY:

TERTIARY: N/A TZ 04/19/10

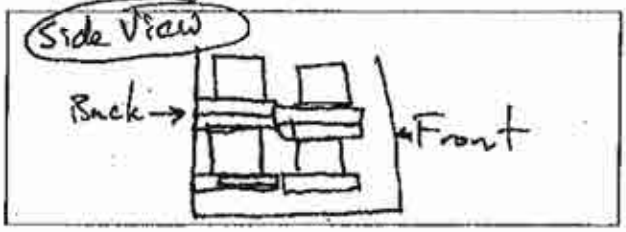
FAN: low

PREBURN SETTINGS AND ACTIVITIES

TIME	AIR (THERMO) CHANGES PRIMARY/SECONDARY/TERTIARY	FAN SETTING CHANGE	ADD FUEL + WT.	ADD FUEL - WT.	RAKE COAL	COMMENT
0	TZ 04/19/10 ~~Load = test setting~~					
40					X	
95					X	

TEST

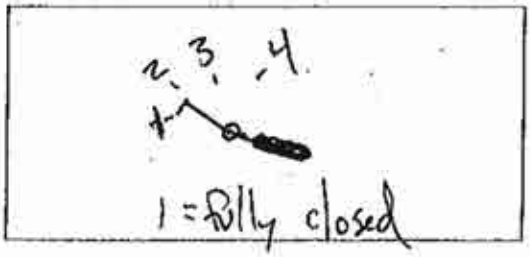
TEST FUEL CONFIGURATION SKETCH
(INDICATE VIEW ANGLE)



START UP PROCEDURES

BYPASS: Open 1 min
FUEL LOADING: 1 min
DOOR: 1 min
PRIMARY AIR: Test setting @ 0 min (no change)
OTHER: - Test fuel stirred @ 367 min after 10 min w/ <0.1 lb change

DESCRIBE OR SKETCH TEST SETTINGS BELOW:
(SETTINGS MUST BE ACCURATE AND REPRODUCIBLE)
PRIMARY:



SECONDARY:

TERTIARY: N/A

FAN: low

Technician signature: Date: 04/20/10

A-12 OF 1-155

OMNI-Test Laboratories, Inc.

Supplemental Data EPA 5G/5H

Client: Mouessen

Model: Defiant 2N1 (non-cat)

Project #: 227-5-39 Tracking #: 1534

Date: 04/19/10 Run #: 1 Booth: N/A

Test Crew: R Start Time: 1:27 PM (AM) Stop Time: 2:57 A.M 04/20/10

OMNI Equipment #(s): _____

Gas Analyzer Train Leak Check:

Stack: Dilution Tunnel (Method 5G Only):

Initial: _____ Initial: _____

Final: _____ Final: _____

Calibrations: Span Gas CO_2: _____ O_2: _____ CO: _____ CO_2(DT): _____

	N_2 Span	N_2 Span	N_2 Span	N_2 Span	N_2 Span	N_2 Span	N_2 Span
Time							
O_2		N/A					
CO_2							
CO							
CO_2 (DT)							

Stack Diameter (inches): 6

Air Velocity (ft/min): Initial: < 50 ft/min Final: < 50 ft/min

Scale Audit (lbs): Pretest: 10.00 lbs Post Test: 10.00

Induced Draft: 0 %Smoke Capture: 100

Pitot Tube Leak Test: Pre: 0.0 @ 3.0 Post: 0.0 @ 3.1

Flue Pipe Cleaned Prior to First Test in Series: Date: 04/18/10 Initials: TC

	Initial	Middle	Ending
Pb (in/Hg)	N/A 29.58 29.60	29.62	29.62
Room Temp (°F)	78.0	76.0	80

Technician signature: _____ Date: 04/20/10

4-13 OF 4-155

Run 2

OMNI-Test Laboratories, Inc.

Wood Heater Test Data - EPA Method 5G

Manufacturer: Monessen
Model: Defiant 2N1 (NC)
Project No.: 227-S-39-3
Tracking No.: 1534
Run: 2
Test Date: 04/20/10

Burn Rate	0.69 kg/hr dry
Average Tunnel Temperature	91 degrees Fahrenheit
Average Gas Velocity in Dilution Tunnel - vs	12.1 feet/second
Average Gas Flow Rate in Dilution Tunnel - Qsd	7792.2 dscf/hour
Average Delta p	0.032 inches H20
Average Delta H	0.00 inches H20
Total Time of Test	730 minutes

	AVERAGE	SAMPLE TRAIN 1	SAMPLE TRAIN 2
Total Sample Volume - Vm	113.61 cubic feet	117.31 cubic feet	109.91 cubic feet
Average Gas Meter Temperature	79 degrees Fahrenheit	78 degrees Fahrenheit	79 degrees Fahrenheit
Total Sample Volume (Standard Conditions) - Vmstd	109.5 dscf	113.1 dscf	105.9 dscf
Total Particulates - mn		7.2 mg	7.5 mg
Particulate Concentration (dry-standard)	0.00007 grams/dscf	0.00006 grams/dscf	0.00007 grams/dscf
Particulate Emission Rate	0.52 grams/hour	0.50 grams/hour	0.55 grams/hour
Adjusted Emissions	1.06 grams/hour	1.02 grams/hour	1.11 grams/hour
Difference from Average		0.05 grams/hour	0.05 grams/hour
7.5% of the average emission rate	0.08		
Weighted Average Emission Rate Limit	4.10 grams/hour		
7.5% of the weighted average emission rate limit	0.31		

Results Are Acceptable

OMNI-Test Laboratories, Inc.

Wood Heater Test Data - EPA Method 5G

Run: 2

Manufacturer: Monessen
Model: Defiant 2N1 (NC)
Tracking No.: 1534
Project No.: 227-S-39-3
Test Date: 20-Apr-10
Beginning Clock Time: 12:03
Recording Interval: 10 min.
Total Sampling Time: 730 min.

OMNI Equipment Numbers:

Velocity Traverse Data									
	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	
Initial dP	0.020	0.034	0.039	0.037	0.028	0.036	0.038	0.033	"H2O
Initial Temp.	94	94	94	94	94	94	94	94	oF

PM Control Module:
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.56 lb/lb-mole
Dilution Tunnel H2O: 4.00 percent
Dilution Tunnel Static: -0.130 "H2O
Pitot Tube Cp: 0.99
Meter Box Y Factor: 0.994 (1) 0.996 (2)

Barometric Pressure:	Begin	Middle	End	Average
	29.60	29.55	29.55	29.57 "Hg

Signature/Date: 6/4/10

Tunnel Velocity: 12.14 ft/sec.
Intial Tunnel Flow: 132.2 scfm
Average Tunnel Flow: 129.9 scfm
Tunnel Area: 0.1963 ft2
Post-Test Leak Check (1): 0.000@5 cfm@"Hg
Post-Test Leak Check (2): 0.000@9 cfm@"Hg
Fuel Moisture (dry basis %): 20.2
Total Particulate (1): 7.2
Total Particulate (2): 7.5

Elapsed Time	Particulate Sampling Data														Fuel Weight, lb		Wood Heater Temperature Data, oF											Stack
	Gas Meter Cubic Feet (1)	Gas Meter Cubic Feet (2)	Sample Rate, cfm (1)	Sample Rate, cfm (2)	Orifice dH (1)	Orifice dH (2)	Meter oF (1)	Meter oF (2)	Meter Vac. In. Hg. (1)	Meter Vac. In. Hg. (2)	Dilution Tunnel Temp.	Dilution Tunnel dP	Pro. Rate (10%) (1)	Pro. Rate (10%) (2)	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Catalyst Exit	Average Surface	Stack	Filter (1)	Filter (2)	Impinger exit (1)	Impinger exit (2)	Ambient	Draft In. H2O
0	563.496	998.312			0.00	0.00	78	79			94	0.033			22.2		409	246	266	266	268		291.0	318	74	75			75	0.052
10	565.150	999.885	0.17	0.16	0.00	0.00	78	79			98	0.033	102	103	21.8	-0.45	328	240	263	250	248		265.8	298	74	73			72	0.052
20	566.782	1001.435	0.16	0.15	0.00	0.00	78	78			94	0.033	100	102	21.3	-0.45	289	226	263	226	226		246.0	306	72	72			72	0.045
30	568.406	1002.955	0.16	0.15	0.00	0.00	78	78			94	0.034	98	98	20.8	-0.5	269	217	267	211	211		235.0	324	73	73			74	0.045
40	570.018	1004.466	0.16	0.15	0.00	0.00	78	79			95	0.034	98	98	20.3	-0.55	258	206	277	200	200		228.2	334	72	72			73	0.045
50	571.617	1005.962	0.16	0.15	0.00	0.00	78	79			96	0.034	97	97	19.6	-0.7	258	202	288	193	193		226.8	340	72	72			73	0.045
60	573.215	1007.462	0.16	0.15	0.00	0.00	77	79			96	0.035	96	96	19.0	-0.6	258	197	292	191	191		225.8	340	72	73			73	0.046
70	574.823	1008.979	0.16	0.15	0.00	0.00	77	79			97	0.034	98	98	18.2	-0.8	264	191	297	189	189		226.0	344	73	73			73	0.046
80	576.430	1010.495	0.16	0.15	0.00	0.00	78	79			98	0.033	99	100	17.5	-0.7	275	184	297	189	189		226.8	345	73	73			73	0.046
90	578.038	1012.000	0.16	0.15	0.00	0.00	78	79			98	0.034	98	98	16.7	-0.8	288	180	299	191	189		229.4	349	73	73			73	0.047
100	579.638	1013.515	0.16	0.15	0.00	0.00	78	79			98	0.034	97	98	15.9	-0.75	306	176	297	193	189		232.2	349	73	73			73	0.047
110	581.238	1015.023	0.16	0.15	0.00	0.00	78	79			98	0.034	97	98	15.1	-0.85	325	174	301	195	189		236.8	364	73	73			73	0.047
120	582.843	1016.530	0.16	0.15	0.00	0.00	78	79			101	0.033	99	99	14.1	-0.95	357	171	316	201	191		247.2	390	73	73			75	0.050
130	584.438	1018.040	0.16	0.15	0.00	0.00	78	79			99	0.032	100	101	13.2	-0.95	383	166	326	209	199		256.6	381	73	74			72	0.050
140	586.070	1019.570	0.16	0.15	0.00	0.00	77	79			100	0.035	98	98	12.2	-0.95	405	167	325	216	206		263.8	377	73	74			73	0.051
150	587.640	1021.058	0.16	0.15	0.00	0.00	78	79			101	0.033	97	98	11.4	-0.8	415	166	324	222	211		267.6	378	74	74			74	0.050
160	589.244	1022.565	0.16	0.15	0.00	0.00	78	79			101	0.034	98	98	10.5	-0.9	430	166	328	226	218		273.6	393	74	74			72	0.051
170	590.848	1024.073	0.16	0.15	0.00	0.00	78	79			102	0.033	99	100	9.7	-0.85	445	168	339	233	230		283.0	397	74	74			72	0.052
180	592.448	1025.582	0.16	0.15	0.00	0.00	78	79			102	0.032	101	101	8.8	-0.85	456	168	339	239	237		287.8	380	73	74			74	0.053
190	594.049	1027.081	0.16	0.15	0.00	0.00	77	79			100	0.032	101	100	7.7	-1.1	465	168	323	243	243		288.4	363	73	74			72	0.050
200	595.650	1028.581	0.16	0.15	0.00	0.00	78	79			98	0.031	102	102	7.3	-0.4	469	172	313	246	254		290.8	352	73	74			72	0.050
210	597.255	1030.086	0.16	0.15	0.00	0.00	78	79			98	0.033	99	99	6.7	-0.65	463	175	298	248	259		288.6	341	73	74			74	0.048
220	598.855	1031.592	0.16	0.15	0.00	0.00	77	79			95	0.031	102	102	6.0	-0.65	464	172	282	252	263		286.6	323	72	73			74	0.046
230	600.459	1033.098	0.16	0.15	0.00	0.00	77	79			92	0.032	100	100	5.6	-0.45	475	172	263	252	269		286.2	300	72	73			72	0.045
240	602.068	1034.603	0.16	0.15	0.00	0.00	77	79			90	0.030	103	103	5.1	-0.45	456	172	243	252	269		278.4	276	72	73			72	0.040
250	603.666	1036.108	0.16	0.15	0.00	0.00	77	79			90	0.030	103	103	4.9	-0.2	428	170	221	250	267		267.2	258	71	72			74	0.037
260	605.271	1037.615	0.16	0.15	0.00	0.00	78	79			88	0.033	98	98	4.8	-0.15	410	168	207	248	265		259.6	243	71	72			72	0.036
270	606.885	1039.140	0.16	0.15	0.00	0.00	78	79			87	0.030	103	104	4.6	-0.15	397	170	193	243	256		251.8	232	71	72			71	0.034
280	608.480	1040.631	0.16	0.15	0.00	0.00	77	79			87	0.030	102	102	4.5	-0.1	386	167	182	241	249		245.0	219	70	71			74	0.031
290	610.078	1042.129	0.16	0.15	0.00	0.00	77	79			84	0.030	102	102	4.4	-0.1	373	165	172	236	243		237.8	206	70	71			71	0.030
300	611.685	1043.633	0.16	0.15	0.00	0.00	77	78			84	0.030	103	103	4.3	-0.1	360	159	165	232	237		230.6	198	71	71			72	0.029
310	613.293	1045.145	0.16	0.15	0.00	0.00	77	78			83	0.030	103	103	4.2	-0.1	351	154	157	225	228		223.0	187	69	70			73	0.026
320	614.910	1046.648	0.16	0.15	0.00	0.00	77	78			83	0.031	102	101	4.2	-0.05	340	156	148	219	221		216.8	178	69	70			73	0.024
330	616.510	1048.160	0.16	0.15	0.00	0.00	77	78			86	0.031	101	102	4.1	-0.05	331	158	141	214	214		211.6	173	69	70			75	0.024
340	618.100	1049.650	0.16	0.15	0.00	0.00	77	79			87	0.030	102	102	4.0	-0.1	322	157	140	205	207		206.2	166	70	71			78	0.021
350	619.715	1051.155	0.16	0.15	0.00	0.00	78	79			88	0.030	103	103	4.0	-0.05	309	156	132	203	201		200.2	160	71	72			79	0.020
360	621.315	1052.655	0.16	0.15	0.00	0.00	78	79			88	0.031	101	101	3.9	-0.05	301	152	131	197	195		195.2	154	72	73			78	0.018
370	622.958	1054.165	0.16	0.15	0.00	0.00	78	79			88	0.031	104	102	3.9	0	291	151	127	191	189		189.8	151	72	73			78	0.018
380	624.515	1055.660	0.16	0.15	0.00	0.00	79	80			88	0.030	100	102	3.9	-0.05	283	145	123	188	183		184.4	145	72	74			79	0.017
390	626.128	1057.156	0.16	0.15	0.00	0.00	79	80			88	0.030	103	102	3.8	-0.05	274	143	119	182	179		179.4	141	73	74			79	0.016
400	627.736	1058.657	0.16	0.15	0.00	0.00	79	80			88	0.032	100	99	3.8	-0.05	266	141	118	178	173		175.2	137	74	74			79	0.015
410	629.340	1060.165	0.16	0.15	0.00	0.00	79	80			88	0.032	99	100	3.7	-0.05	249	139	120	180	171		171.8	139	74	75			77	0.015
420	630.952	1061.688	0.16	0.15	0.00	0.00	79	80			88	0.032	100	101	3.6	-0.1	238	135	133	180	167		170.6	137	74	74			77	0.015

OMNI-Test Laboratories, Inc.

Wood Heater Test Data - EPA Method 5G

Run: 2

Manufacturer: Monessen
Model: Defiant 2N1 (NC)
Tracking No.: 1534
Project No.: 227-S-39-3
Test Date: 20-Apr-10
Beginning Clock Time: 12:03
Recording Interval: 10 min.
Total Sampling Time: 730 min.

Velocity Traverse Data									
	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	
Initial dP	0.020	0.034	0.039	0.037	0.028	0.036	0.038	0.033	"H2O
Initial Temp.	94	94	94	94	94	94	94	94	oF

OMNI Equipment Numbers:

PM Control Module:
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.56 lb/lb-mole
Dilution Tunnel H2O: 4.00 percent
Dilution Tunnel Static: -0.130 "H2O
Pitot Tube Cp: 0.99
Meter Box Y Factor: 0.994 (1) 0.996 (2)
Barometric Pressure: Begin 29.60, Middle 29.55, End 29.55, Average 29.57 "Hg

Signature/Date: 6/4/10

Tunnel Velocity: 12.14 ft/sec.
Intial Tunnel Flow: 132.2 scfm
Average Tunnel Flow: 129.9 scfm
Tunnel Area: 0.1963 ft2
Post-Test Leak Check (1): 0.000@5 cfm@"Hg
Post-Test Leak Check (2): 0.000@9 cfm@"Hg
Fuel Moisture (dry basis %): 20.2
Total Particulate (1): 7.2
Total Particulate (2): 7.5

Elapsed Time	Particulate Sampling Data														Fuel Weight, lb		Wood Heater Temperature Data, oF											Stack
	Gas Meter Cubic Feet (1)	Gas Meter Cubic Feet (2)	Sample Rate, cfm (1)	Sample Rate, cfm (2)	Orifice dH (1)	Orifice dH (2)	Meter oF (1)	Meter oF (2)	Meter Vac. In. Hg. (1)	Meter Vac. In. Hg. (2)	Dilution Tunnel Temp.	Dilution Tunnel dP	Pro. Rate (10%) (1)	Pro. Rate (10%) (2)	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Catalyst Exit	Average Surface	Stack	Filter (1)	Filter (2)	Impinger exit (1)	Impinger exit (2)	Ambient	Draft In. H2O
430	632.555	1063.110	0.16	0.14	0.00	0.00	79	80			88	0.031	101	96	3.5	-0.1	236	135	146	178	165		172.0	137	74	74			78	0.015
440	634.163	1064.610	0.16	0.15	0.00	0.00	79	80			88	0.031	101	101	3.4	-0.15	240	131	150	176	163		172.0	146	74	74			78	0.015
450	635.770	1066.110	0.16	0.15	0.00	0.00	79	80			87	0.031	101	101	3.3	-0.1	247	128	156	178	161		174.0	156	74	74			77	0.015
460	637.380	1067.725	0.16	0.16	0.00	0.00	79	80			87	0.030	103	110	3.1	-0.2	257	128	167	178	160		178.0	169	74	74			77	0.016
470	638.985	1069.230	0.16	0.15	0.00	0.00	79	80			88	0.030	103	103	2.9	-0.2	272	128	177	180	162		183.8	177	74	75			77	0.017
480	640.600	1070.738	0.16	0.15	0.00	0.00	79	80			88	0.031	102	101	2.7	-0.15	283	128	186	184	165		189.2	184	75	75			77	0.018
490	642.205	1072.248	0.16	0.15	0.00	0.00	78	80			90	0.031	101	102	2.6	-0.15	294	128	197	188	166		194.6	188	75	75			77	0.019
500	643.845	1073.770	0.16	0.15	0.00	0.00	79	80			90	0.030	105	104	2.4	-0.2	305	130	201	192	169		199.4	192	76	76			77	0.019
510	645.420	1075.255	0.16	0.15	0.00	0.00	79	80			91	0.032	98	98	2.3	-0.1	309	132	177	195	171		196.8	192	76	77			77	0.020
520	647.036	1076.761	0.16	0.15	0.00	0.00	79	80			91	0.031	102	101	2.1	-0.15	320	133	165	195	173		197.2	190	77	77			77	0.020
530	648.638	1078.263	0.16	0.15	0.00	0.00	79	80			92	0.031	101	101	2.0	-0.15	325	135	159	197	176		198.4	193	77	77			78	0.020
540	650.252	1079.770	0.16	0.15	0.00	0.00	79	80			92	0.030	104	103	1.8	-0.15	325	139	156	195	178		198.6	188	78	78			77	0.019
550	651.871	1081.268	0.16	0.15	0.00	0.00	79	80			92	0.030	104	103	1.7	-0.1	325	137	152	197	180		198.2	182	78	78			76	0.020
560	653.475	1082.779	0.16	0.15	0.00	0.00	79	80			92	0.030	103	104	1.6	-0.15	327	138	148	198	180		198.2	176	78	78			78	0.019
570	655.078	1084.290	0.16	0.15	0.00	0.00	79	80			92	0.030	103	104	1.5	-0.1	329	137	142	197	180		197.0	172	78	78			76	0.019
580	656.690	1085.794	0.16	0.15	0.00	0.00	79	80			91	0.031	102	101	1.4	-0.1	334	137	139	195	182		197.4	167	78	78			78	0.018
590	658.300	1087.290	0.16	0.15	0.00	0.00	79	80			91	0.031	102	101	1.3	-0.1	329	135	137	195	182		195.6	163	78	78			77	0.018
600	659.910	1088.794	0.16	0.15	0.00	0.00	79	80			90	0.030	103	103	1.2	-0.1	327	137	135	193	184		195.2	159	78	78			75	0.017
610	661.520	1090.298	0.16	0.15	0.00	0.00	79	80			89	0.029	105	105	1.1	-0.1	323	137	129	189	182		192.0	154	78	78			75	0.017
620	663.130	1091.790	0.16	0.15	0.00	0.00	79	80			89	0.029	105	104	1.0	-0.1	314	135	126	186	182		188.6	152	78	78			75	0.017
630	664.740	1093.290	0.16	0.15	0.00	0.00	79	80			89	0.030	103	103	0.9	-0.1	307	132	128	184	180		186.2	149	77	78			75	0.017
640	666.348	1094.788	0.16	0.15	0.00	0.00	78	80			88	0.030	103	102	0.8	-0.05	300	132	143	184	184		188.6	149	77	78			75	0.016
650	667.960	1096.288	0.16	0.15	0.00	0.00	79	80			88	0.030	103	102	0.7	-0.1	294	132	151	181	188		189.2	149	77	77			74	0.016
660	669.565	1097.785	0.16	0.15	0.00	0.00	78	79			87	0.029	105	104	0.6	-0.1	289	132	155	179	192		189.4	149	77	77			76	0.016
670	671.176	1099.284	0.16	0.15	0.00	0.00	78	79			87	0.028	107	106	0.5	-0.1	289	132	157	174	192		188.8	146	77	77			74	0.016
680	672.782	1100.780	0.16	0.15	0.00	0.00	78	79			86	0.030	103	102	0.4	-0.1	282	129	157	172	194		186.8	146	77	77			76	0.016
690	674.395	1102.275	0.16	0.15	0.00	0.00	77	79			86	0.033	98	97	0.4	-0.05	275	129	159	169	193		185.0	146	76	76			75	0.016
700	676.000	1103.768	0.16	0.15	0.00	0.00	77	78			86	0.033	98	97	0.3	-0.1	273	133	159	172	196		186.6	144	77	77			80	0.015
710	677.620	1105.270	0.16	0.15	0.00	0.00	78	79			87	0.033	99	98	0.2	-0.1	263	140	160	172	198		186.6	142	77	77			83	0.015
720	679.200	1106.732	0.16	0.15	0.00	0.00	78	80			87	0.033	96	95	0.1	-0.05	259	143	158	171	203		186.8	141	78	78			83	0.015
730	680.809	1108.220	0.16	0.15	0.00	0.00	79	80			88	0.033	98	97	0.0	-0.1	253	141	156	165	206		184.2	139	77	78			84	0.015
Avg/Total	117.313	109.908	0.16	0.15	0.00	0.00	78.14	79.31			91.28	0.032	100.89	100.89									107		74.07	74.49	#DIV/0!	#DIV/0!		0.029

Final Laboratory Report - Method 5G Dual Train
Dilution Tunnel Particulate Calculations

Client Name: Monessen
Model: Defiant 2N1 (NC)
Project No.: 227-S-39-3
Tracking No.: 1534

Equipment Numbers:

Run #: 2
Train #: A
Date: 04/20/10

Sample Component	Reagent	Filter # or Probe #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	F537	126.8	120.4	6.4
B. Rear filter catch	Filter	F538	125.3	124.9	0.4
C. Probe catch	Probe	24	114123.9	114123.5	0.4

Total Particulate, mg :	7.2

Component	Equations:
A. Front filter catch	Final (mg) - Tare (mg) = Particulate, mg
B. Rear filter catch	Final (mg) - Tare (mg) = Particulate, mg
C. Probe catch	Final (mg) - Tare (mg) = Particulate, mg

Analyst: [signature] Date: 05/28/10

OMNI-Test Laboratories, Inc.

Final Laboratory Report - Method 5G Dual Train
Dilution Tunnel Particulate Calculations

Client Name: Monessen
Model: Defiant 2N1 (NC)
Project No.: 227-S-39-3
Tracking No.: 1534

Equipment Numbers:

Run #: 2
Train #: B
Date: 04/20/10

Sample Component	Reagent	Filter # or Probe #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	F539	122.9	116.8	6.1
B. Rear filter catch	Filter	F540	122.1	121.3	0.8
C. Probe catch	Probe	34	115865.5	115864.9	0.6

Total Particulate, mg :	7.5

Component	Equations:
A. Front filter catch	Final (mg) - Tare (mg) = Particulate, mg
B. Rear filter catch	Final (mg) - Tare (mg) = Particulate, mg
C. Probe catch	Final (mg) - Tare (mg) = Particulate, mg

Analyst: [signature] Date: 05/28/10

STOVE TEMPERATURE TEST DATA - METHOD 5G

Client/Model: Monessen / Defiant 2N1(NC) Project #: 227-S-39-3 Tracking #: 1534

Date: 04/20/10 Test Crew: TL Run #: TL 04/20/10 T2

OMNI Equipment ID #:

Preburn [X] Test [ ] Coal Bed: 4.44 - 5.55 lbs Data: 0 = Range: Actual: Coal Bed: 5.05

Time	Fuel Weight	Delta Weight	Stack Draft	TEMPERATURES (oF) Ambient	Top	Bottom	Back	Left	Right	Flue	Catalyst
0	16.00	Ø	0.055	77	795	369	191	264	293	388	
10	14.55	1.45	0.05	78	606	360	185	280	304	280	
20	13.50	1.05	0.04	79	496	344	182	273	292	251	
30	12.65	0.85	0.035	80	451	325	176	258	276	232	
40	11.20	1.45	0.052	81	406	304	235	254	261	400	
50	9.8	1.40	0.056	77	394	277	533	246	248	394	
60	8.80	1.0	0.055	77	400	263	365	244	246	424	
70	8.05	0.75	0.055	74	412	256	360	243	243	384	
80	7.70	0.35	0.050	73	420	258	333	249	247	344	
90	6.8	0.90	0.05	74	430	256	313	257	255	385	
00	6.40	0.4	0.05	74	423	250	321	261	265	350	
10	5.45	0.45	0.05	73	423	245	303	264	269	310	
20											
30											
40											
50											
60											
70											
80											
90											
AVG											

Technician signature: [signature] Date: 05/03/10

A-20 OF 4-155

FUEL DATA

Client: Monessen
Model: Defiant 2N1(NC)
Project #: 129.5-31.3 Tracking #: 1534
Date: 04/20/10 Test Crew: TR Run #: 2
OMNI Equipment ID #:
FUEL LOAD PREPARED BY: Ralph G. cut & prepped - TR measured dimensions & moist
FUEL: DOUGLAS-FIR SPECIES, UNTREATED, AIR-DRIED, STANDARD GRADE OR BETTER, DIMENSIONAL LUMBER.

PRE-BURN FUEL

MOISTURE CONTENT (METER -- DRY BASIS)

CALIBRATION: Cal Value (1) = 12% Actual Reading 12.0
Cal Value (2) = 22% Actual Reading 22.0

Piece	Length		Readings		Type
1	15 ft	19.3	18.6	19.5	2x4
2	15 ft	19.1	20.3	18.4	2x4
3	ft				

Length of cut pieces: 8 inches Pre-Burn Fuel Average Moisture: 19.2

Time (clock): 8:45 Room Temperature (F): 78 Initials: TR

TEST FUEL

FUEL TYPE AND AMOUNT: 2 × 4 4 × 4 4
CALCULATED LOAD WEIGHT: 22.75 +/- 10% ACTUAL LOAD WEIGHT: ~~2~~ N/A TR 04/20/10 (2 × 4)
22.20 (4 × 4)
22.20 Total
FUEL PIECE LENGTH: 21"

MOISTURE CONTENT (METER -- DRY BASIS)

PIECE	READINGS			TYPE
1	22.4	20.4	21.2	4x4
2	20.4	20.6	18.6	4x4
3	18.4	18.9	21.4	4x4
4	20.3	20.4	19.6	4x4
5				
6				
7				
8				
9				
10				

OVERALL TEST FUEL LOAD MOISTURE AVERAGE: 20.2

Time (clock): 0845 Room Temperature (F): 78 Initials: TR

Technician signature: [signature] Date: 05/03/10

Supplemental Data EPA 5G/5H

Client: Monessen

Model: Defiant 2N1 (NC)

Project #: 227-5-39-3 Tracking #: 1534

Date: 04/20/10 Run #: 2 Booth: N1A

Test Crew: TC Start Time: 12:03 (test) Stop Time: 12:13 (A.M, 04/21/10)

OMNI Equipment #(s): _____

~~Gas Analyzer Train Leak Check:~~

Stack: Dilution Tunnel ~~(Method 5G Only)~~:

Initial: _____ Initial: _____

Final: _____ Final: _____

Calibrations: Span Gas CO_2: _____ O_2: _____ CO: _____ CO_2(DT): _____

	N_2 Span	N_2 Span	N_2 Span	N_2 Span	N_2 Span	N_2 Span	N_2 Span
Time							
O_2		N/A					
CO_2							
CO							
~~CO_2 (DT)~~							

Stack Diameter (inches): 6

Air Velocity (ft/min): Initial: < 50 ft/min Final: < 50 ft/min

Scale Audit (lbs): Pretest: 10.00 Post Test: 10.00

Induced Draft: 0" WC %Smoke Capture: 100

Pitot Tube Leak Test: Pre: 0.0 @ 3.0 Post: 0.0 @ 3.0

Flue Pipe Cleaned Prior to First Test in Series: Date: 04/18/10 Initials: TC

	Initial	Middle	Ending
Pb (in/Hg)	29.60	29.55	29.525 cr
Room Temp (°F)	~~78~~ 75 cr	77	~~82~~ 84 cr

Technician signature: _____ Date: 04/20/10

Run 3

OMNI-Test Laboratories, Inc.

Wood Heater Test Data - EPA Method 5G

Manufacturer: Monessen
Model: Defiant 2N1 (NC)
Project No.: 227-S-39-3
Tracking No.: 1534
Run: 3
Test Date: 04/21/10

Burn Rate	2.78 kg/hr dry
Average Tunnel Temperature	134 degrees Fahrenheit
Average Gas Velocity in Dilution Tunnel - vs	14.7 feet/second
Average Gas Flow Rate in Dilution Tunnel - Qsd	8742.4 dscf/hour
Average Delta p	0.043 inches H20
Average Delta H	0.00 inches H20
Total Time of Test	190 minutes

	AVERAGE	SAMPLE TRAIN 1	SAMPLE TRAIN 2
Total Sample Volume - Vm	29.51 cubic feet	30.49 cubic feet	28.53 cubic feet
Average Gas Meter Temperature	80 degrees Fahrenheit	80 degrees Fahrenheit	81 degrees Fahrenheit
Total Sample Volume (Standard Conditions) - Vmstd	28.3 dscf	29.2 dscf	27.3 dscf
Total Particulates - mn		3.8 mg	3.6 mg
Particulate Concentration (dry-standard)	0.00013 grams/dscf	0.00013 grams/dscf	0.00013 grams/dscf
Particulate Emission Rate	1.14 grams/hour	1.14 grams/hour	1.15 grams/hour
Adjusted Emissions	2.04 grams/hour	2.03 grams/hour	2.05 grams/hour
Difference from Average		0.01 grams/hour	0.01 grams/hour
7.5% of the average emission rate	0.15		
Weighted Average Emission Rate Limit	4.10 grams/hour		
7.5% of the weighted average emission rate limit	0.31		

Results Are Acceptable

4 - 25 OF 4 - 156

OMNI-Test Laboratories, Inc.

Wood Heater Test Data - EPA Method 5G

Run: 3

Manufacturer: Monessen
Model: Defiant 2N1 (NC)
Tracking No.: 1534
Project No.: 227-S-39-3
Test Date: 21-Apr-10
Beginning Clock Time: 12:12
Recording Interval: 10 min.
Total Sampling Time: 190 min.

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	
Initial dP	0.030	0.038	0.040	0.038	0.020	0.038	0.040	0.038	"H2O
Initial Temp.	154	154	154	154	154	154	154	154	oF

OMNI Equipment Numbers:

PM Control Module:
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.56 lb/lb-mole
Dilution Tunnel H2O: 4.00 percent
Dilution Tunnel Static: -0.144 "H2O
Pitot Tube Cp: 0.99
Meter Box Y Factor: 0.994 (1) 0.996 (2)
Barometric Pressure: Begin 29.47, Middle 29.47, End 29.47, Average 29.47 "Hg

Signature/Date: 6/4/10

Tunnel Velocity: 14.72 ft/sec.
Intial Tunnel Flow: 129.3 scfm
Average Tunnel Flow: 145.7 scfm
Tunnel Area: 0.1963 ft2
Post-Test Leak Check (1): 0.000@5.0 cfm@"Hg
Post-Test Leak Check (2): 0.000@9.0 cfm@"Hg
Fuel Moisture (dry basis %): 21.25
Total Particulate (1): 3.8
Total Particulate (2): 3.6

Elapsed Time	Particulate Sampling Data														Fuel Weight, lb		Wood Heater Temperature Data, oF												Stack
	Gas Meter Cubic Feet (1)	Gas Meter Cubic Feet (2)	Sample Rate, cfm (1)	Sample Rate, cfm (2)	Orifice dH (1)	Orifice dH (2)	Meter oF (1)	Meter oF (2)	Meter Vac. In. Hg. (1)	Meter Vac. In. Hg. (2)	Dilution Tunnel Temp.	Dilution Tunnel dP	Pro. Rate (10%) (1)	Pro. Rate (10%) (2)	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Catalyst Exit	Average Surface	Stack	Filter (1)	Filter (2)	Impinger exit (1)	Impinger exit (2)	Ambient	Draft In. H2O
0	680.834	108.225			0.00	0.00	79	80			154	0.035			23.6		669	218	335	357	346		385.0	507	65	71			75	0.060
10	682.430	109.780	0.16	0.16	0.00	0.00	79	80			132	0.044	99	103	22.0	-1.55	539	216	327	312	314		341.6	524	65	71			73	0.068
20	684.065	111.298	0.16	0.15	0.00	0.00	79	80			140	0.045	101	100	19.9	-2.1	550	212	347	288	281		335.6	606	67	72			75	0.071
30	685.700	112.815	0.16	0.15	0.00	0.00	79	80			148	0.046	100	100	17.8	-2.1	571	206	370	301	264		342.4	633	68	74			73	0.074
40	687.300	114.310	0.16	0.15	0.00	0.00	79	80			148	0.046	98	98	15.4	-2.4	612	204	375	329	264		356.8	625	68	74			75	0.074
50	688.888	115.805	0.16	0.15	0.00	0.00	79	81			152	0.046	98	98	13.0	-2.45	661	197	377	351	267		370.6	653	69	75			73	0.074
60	690.480	117.290	0.16	0.15	0.00	0.00	80	81			155	0.046	98	98	10.7	-2.25	704	189	375	380	278		385.2	666	69	75			74	0.075
70	692.070	118.775	0.16	0.15	0.00	0.00	80	81			152	0.046	98	98	8.6	-2.1	708	195	371	399	291		392.8	642	68	75			74	0.075
80	693.673	120.269	0.16	0.15	0.00	0.00	80	81			148	0.046	98	98	6.8	-1.8	737	197	362	416	310		404.4	619	66	74			73	0.074
90	695.275	121.764	0.16	0.15	0.00	0.00	80	81			143	0.046	98	98	5.5	-1.3	755	192	352	424	311		406.8	583	66	74			74	0.072
100	696.880	123.265	0.16	0.15	0.00	0.00	80	82			137	0.045	99	98	4.3	-1.25	780	192	322	417	330		408.2	525	66	74			74	0.069
110	698.480	124.765	0.16	0.15	0.00	0.00	80	82			129	0.044	99	99	3.4	-0.9	764	188	278	404	350		396.8	495	68	73			75	0.064
120	700.090	126.260	0.16	0.15	0.00	0.00	80	82			125	0.040	104	103	2.6	-0.75	721	191	254	380	351		379.4	466	68	73			74	0.060
130	701.645	127.768	0.16	0.15	0.00	0.00	80	81			123	0.040	100	104	2.1	-0.5	677	190	239	359	352		363.4	456	70	73			75	0.059
140	703.200	129.260	0.16	0.15	0.00	0.00	80	81			120	0.040	100	102	1.7	-0.4	642	187	228	351	340		349.6	438	70	73			71	0.058
150	704.910	130.755	0.17	0.15	0.00	0.00	79	81			118	0.041	108	101	1.3	-0.45	619	193	219	334	332		339.4	425	70	73			74	0.057
160	706.515	132.260	0.16	0.15	0.00	0.00	80	81			116	0.041	101	102	0.8	-0.45	604	189	217	325	327		332.4	419	71	73			73	0.056
170	708.120	133.760	0.16	0.15	0.00	0.00	79	81			114	0.040	103	102	0.5	-0.35	595	188	206	314	327		326.0	412	71	72			73	0.055
180	709.730	135.260	0.16	0.15	0.00	0.00	79	81			113	0.040	103	102	0.1	-0.4	572	191	202	301	318		316.8	394	72	73			75	0.053
190	711.320	136.759	0.16	0.15	0.00	0.00	79	80			111	0.040	101	102	0.0	-0.05	574	191	189	301	318		314.6	386	70	71			73	0.053
Avg/Total	30.486	28.534	0.16	0.15	0.00	0.00	79.50	80.85			133.90	0.043	100.30	100.30									70		68.35	73.15	#DIV/0!	#DIV/0!		0.065

Final Laboratory Report - Method 5G Dual Train
Dilution Tunnel Particulate Calculations

Client Name: Monessen
Model: Defiant 2N1 (NC)
Project No.: 227-S-39-3
Tracking No.: 1534

Equipment Numbers:

Run #: 3
Train #: A
Date: 04/21/10

Sample Component	Reagent	Filter # or Probe #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	F541	118.7	116.5	2.2
B. Rear filter catch	Filter	F543	126.5	125.3	1.2
C. Probe catch	Probe	VC-2	76802.6	76802.2	0.4

Total Particulate, mg :	3.8

Component	Equations:
A. Front filter catch	Final (mg) - Tare (mg) = Particulate, mg
B. Rear filter catch	Final (mg) - Tare (mg) = Particulate, mg
C. Probe catch	Final (mg) - Tare (mg) = Particulate, mg

Analyst: [signature] Date: 05/28/10

Final Laboratory Report - Method 5G Dual Train
Dilution Tunnel Particulate Calculations

Client Name: Monessen
Model: Defiant 2N1 (NC)
Project No.: 227-S-39-3
Tracking No.: 1534

Equipment Numbers:

Run #: 3
Train #: B
Date: 04/21/10

Sample Component	Reagent	Filter # or Probe #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	F544	118.9	117.3	1.6
B. Rear filter catch	Filter	F545	121.3	120.7	0.6
C. Probe catch	Probe	VC-8	78261.0	78259.6	1.4

Total Particulate, mg :	3.6

Component	Equations:
A. Front filter catch	Final (mg) - Tare (mg) = Particulate, mg
B. Rear filter catch	Final (mg) - Tare (mg) = Particulate, mg
C. Probe catch	Final (mg) - Tare (mg) = Particulate, mg

Analyst: [signature] Date: 05/28/10

STOVE TEMPERATURE TEST DATA - METHOD 5G

Client/Model: Monessen / Defiant 2N1 (NC) Project #: 227-5.39-3 Tracking #: 1534

Date: 04/21/10 Test Crew: TC Run #: 3

OMNI Equipment ID #:

Preburn [ ]
Test [ ]

Coal Bed: 5.55 lbs
Data: 0 = Range: 4.71-5.89 lbs

Actual: Coal Bed: 5.6

Time	Fuel Weight	Delta Weight	Stack Draft	TEMPERATURES (oF) Ambient	Top	Bottom	Back	Left	Right	Flue	Catalyst
225 0	29.0	-8	0.045	71	498	297	139	242	260	301	
10	20.65	1.85	0.050	74	414	323	161	234	249	306	
20	18.25	2.40	0.053	74	415	341	207	207	226	389	
30	16.00	2.25	0.065	74	445	341	209	190	215	521	
40	14.30	1.70	0.07	74	517	341	267	190	222	596	
50	10.75	3.55	0.06	74	553	339	330	226	242	673	
60	8.3	2.45	0.079	73	571	355	357	283	255	650	
70	5.85	2.45	0.076	73	610	399	362	351	275	650	
+1486 80	4.10	1.75	0.062	73	642	384	334	375	317	451	
90	17.70	+13.60	0.065	74	514	332	287	324	302	475	
00	16.25	1.45	0.071	74	484	295	254	289	280	540	
10	14.35	1.90	0.070	74	493	274	289	269	272	560	
20	11.50	2.85	0.080	74	613	250	330	270	285	658	
30	8.70	2.80	0.078	75	669	235	359	315	300	645	
40	6.65	2.05	0.076	75	707	225	372	348	316	644	
Load 50	5.55	1.10	0.066	75	686	220	339	357	342	496	
60											
70											
80											
90											
AVG											

Technician signature: [signature] Date: 05/13/10

4-29 OF 4-156

FUEL DATA

Client: Monessen
Model: Defiant 2N1 (NC)
Project #: 127.53-T Tracking #: 1534
Date: 04/21/10 Test Crew: TC Run #: 3
OMNI Equipment ID #:
FUEL LOAD PREPARED BY: Ralph G. / TC Measured moisture & dimensions
FUEL: DOUGLAS-FIR SPECIES, UNTREATED/AIR-DRIED, STANDARD GRADE OR BETTER, DIMENSIONAL LUMBER.

PRE-BURN FUEL

MOISTURE CONTENT (METER – – DRY BASIS)

CALIBRATION: Cal Value (1) = 12% Actual Reading 12.0
Cal Value (2) = 22% Actual Reading 22.0

Piece	Length		Readings			Type
1	6 ft	19.2	20.4	18.3		2x4
2	7.3 ft	19.3	19.1	19.5		2x4
3	ft					

Length of cut pieces: ~~33x8~~ 20x8 inches TC-04/21/10 Pre-Burn Fuel Average Moisture: 19.3
Time (clock): 1015 Room Temperature (F): 74 Initials: TC

TEST FUEL

FUEL TYPE AND AMOUNT: 2 x 4 ____ 4 x 4 4
CALCULATED LOAD WEIGHT: 20.3 - 24.9 ACTUAL LOAD WEIGHT: ____ (2 x 4)
23.55 (4 x 4)
23.55 Total
FUEL PIECE LENGTH: 21"

MOISTURE CONTENT (METER – – DRY BASIS)

PIECE	READINGS			TYPE
1	20.0	20.4	22.4	4x4
2	20.2	20.0	24.2	4x4
3	24.7	17.4	18.6	4x4
4	24.0	22.3	20.2	4x4
5				
6				
7				
8				
9				
10				

OVERALL TEST FUEL LOAD MOISTURE AVERAGE: 21.25
Time (clock): 1015 Room Temperature (F): 74 Initials: TC

Technician signature: TC Date: 04/21/10

OMNI-Test Laboratories, Inc.

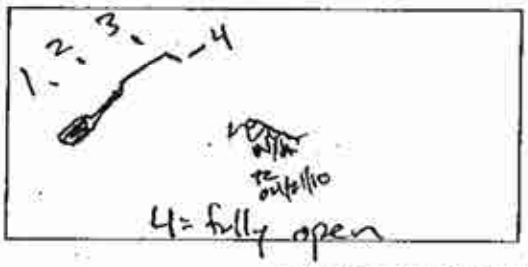
Run Notes

Client: Monessen
Model: Defiant 2N1 (NC)
Project #: ~~227-39-3~~ TC 04/21/10 227-S-39-3
Tracking #: 1534
Run #: 3 Date: 04/21/10
Test Crew: TC
OMNI Equipment ID #(s):

PREBURN

DESCRIBE OR SKETCH AIR OR THERMOMSTAT SETTINGS BELOW:
(SETTINGS MUST BE ACCURATE AND REPRODUCABLE)

PRIMARY:



SECONDARY:

TERTIARY: N/A TC 04/21/10

FAN: high

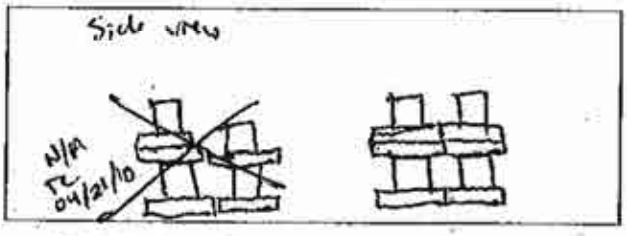
PREBURN SETTINGS AND ACTIVITIES

TIME	AIR (THERMO) CHANGES PRIMARY/SECONDARY/TERTIARY	FAN SETTING CHANGE	ADD FUEL + WT.	ADD FUEL - WT.	RAKE COAL	COMMENT
0	test setting					
45					X	
75					X	
80			14.8			
150	start test				X	

(need coal bed range)

TEST

TEST FUEL CONFIGURATION SKETCH
(INDICATE VIEW ANGLE)

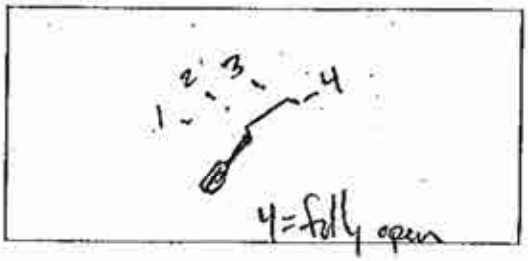


START UP PROCEDURES

BYPASS: Open 1 min
FUEL LOADING 1 min
DOOR: open 1 min
PRIMARY AIR: fully open

OTHER:

DESCRIBE OR SKETCH TEST SETTINGS BELOW:
(SETTINGS MUST BE ACCURATE AND REPRODUCIBLE)
PRIMARY:



SECONDARY:

TERTIARY:

FAN: high

Technician signature: Date: 05/13/10

4-31 OF 4-156

OMNI-Test Laboratories, Inc.

Supplemental Data EPA 5G/5H

Client: Monessen

Model: Defiant 2N1

Project #: 227.5.373 Tracking #: 1534

Date: 04/21/10 Run #: 3 Booth: N14

Test Crew: TR Start Time: ~~9:40~~ 12:12 Stop Time: 3:22

(Pre-burn) TR 05/13/10

OMNI Equipment #(s): _____

Gas Analyzer Train Leak Check:

~~Stack:~~ ~~Dilution Tunnel (Method 5G Only):~~

Initial: _____ Initial: _____

Final: _____ Final: _____

Calibrations: Span Gas CO_2: _____ O_2: _____ CO: _____ CO_2(DT): _____

	N_2 Span	N_2 Span	N_2 Span	N_2 Span	N_2 Span	N_2 Span	N_2 Span
Time		TR 04/21/10					
O_2							
CO_2							
CO							
CO_2 (DT)							

Stack Diameter (inches): 6

Air Velocity (ft/min): Initial: <50 Ft/min Final: <50 Ft/min

Scale Audit (lbs): Pretest: 10.00 Post Test: 10.00

Induced Draft: ✓ %Smoke Capture: 100

Pitot Tube Leak Test: Pre: 0.0 @ 3.0 Post: 0.0 @ 3.0

Flue Pipe Cleaned Prior to First Test in Series: Date: 04/18/10 Initials: TR

	Initial	Middle	Ending
Pb (in/Hg)	29.47	29.47	~~29.36~~ 29.47 cr
Room Temp (°F)	~~74~~ 75 cr	77	~~78~~ 77 cr

Technician signature: _____ Date: 05/13/10

4-32 OF 4-155

Run 4

Run 4 – Explanation of Invalidation

Upon reviewing the data from Run 4 the morning following the run, I noticed that the average tunnel flow throughout the run was 125.1 cu.ft./min, although the initial tunnel flow was 137.8 cu.ft./min. These tunnel flows were calculated using data collected with a microtector. The discrepancy in tunnel flow was a red flag, indicating a potential problem with the data. The tunnel has an automatic flow controller which adjusts a damper based on a reading by a digital pressure transducer, so seeing such a large drop in flow over the run was out of the ordinary. Upon investigation of the data, substantial disagreements were found between the data recorded from microtector readings and the data logged from the digital pressure transducer readings. Based upon this data discrepancy the run was thrown out because there was no way to verify which tunnel flow (as read by the microtector, or as logged by the transducer) was more accurate. In all other runs at the Monessen lab on this appliance no such issue was documented.

Tom Christensen

06/07/10

OMNI-Test Laboratories, Inc.

Wood Heater Test Data - EPA Method 5G

Manufacturer: Monessen
Model: Defiant 2N1 (NC)
Project No.: 227-S-39-3
Tracking No.: 1534
Run: 4
Test Date: 04/21/10

Burn Rate	1.22 kg/hr dry
Average Tunnel Temperature	92 degrees Fahrenheit
Average Gas Velocity in Dilution Tunnel - vs	11.8 feet/second
Average Gas Flow Rate in Dilution Tunnel - Qsd	7505.0 dscf/hour
Average Delta p	0.029 inches H20
Average Delta H	0.00 inches H20
Total Time of Test	410 minutes

	AVERAGE	SAMPLE TRAIN 1	SAMPLE TRAIN 2
Total Sample Volume - Vm	62.99 cubic feet	64.84 cubic feet	61.13 cubic feet
Average Gas Meter Temperature	74 degrees Fahrenheit	73 degrees Fahrenheit	75 degrees Fahrenheit
Total Sample Volume (Standard Conditions) - Vmstd	60.8 dscf	62.6 dscf	59.0 dscf
Total Particulates - mn		54.5 mg	52.2 mg
Particulate Concentration (dry-standard)	0.00088 grams/dscf	0.00087 grams/dscf	0.00088 grams/dscf
Particulate Emission Rate	6.59 grams/hour	6.53 grams/hour	6.64 grams/hour
Adjusted Emissions	8.70 grams/hour	8.64 grams/hour	8.76 grams/hour
Difference from Average		0.06 grams/hour	0.06 grams/hour
7.5% of the average emission rate	0.65		
Weighted Average Emission Rate Limit	4.10 grams/hour		
7.5% of the weighted average emission rate limit	0.31		

Results Are Acceptable

OMNI-Test Laboratories, Inc.

Wood Heater Test Data - EPA Method 5G

Run: 4

Manufacturer: Monessen
Model: Defiant 2N1 (NC)
Tracking No.: 1534
Project No.: 227-S-39-3
Test Date: 21-Apr-10
Beginning Clock Time: 18:36
Recording Interval: 10 min.
Total Sampling Time: 410 min.

Velocity Traverse Data									
	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	
Initial dP	0.025	0.039	0.043	0.040	0.032	0.040	0.042	0.037	"H2O
Initial Temp.	112	112	112	112	112	112	112	112	oF

OMNI Equipment Numbers:

PM Control Module:
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.56 lb/lb-mole
Dilution Tunnel H2O: 4.00 percent
Dilution Tunnel Static: -0.140 "H2O
Pitot Tube Cp: 0.99
Meter Box Y Factor: 0.994 (1) 0.996 (2)

Barometric Pressure:	Begin	Middle	End	Average
	29.37	29.36	29.36	29.36 "Hg

Signature/Date: 6/4/10

Tunnel Velocity: 11.80 ft/sec.
Intial Tunnel Flow: 137.7 scfm
Average Tunnel Flow: 125.1 scfm
Tunnel Area: 0.1963 ft2
Post-Test Leak Check (1): 0.000@5.0 cfm@"Hg
Post-Test Leak Check (2): 0.000@9.5 cfm@"Hg
Fuel Moisture (dry basis %): 20.2
Total Particulate (1): 54.5
Total Particulate (2): 52.2

Elapsed Time	Particulate Sampling Data														Fuel Weight, lb		Wood Heater Temperature Data, oF											Stack
	Gas Meter Cubic Feet (1)	Gas Meter Cubic Feet (2)	Sample Rate, cfm (1)	Sample Rate, cfm (2)	Orifice dH (1)	Orifice dH (2)	Meter oF (1)	Meter oF (2)	Meter Vac. In. Hg. (1)	Meter Vac. In. Hg. (2)	Dilution Tunnel Temp.	Dilution Tunnel dP	Pro. Rate (10%) (1)	Pro. Rate (10%) (2)	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Catalyst Exit	Average Surface	Stack	Filter (1)	Filter (2)	Impinger exit (1)	Impinger exit (2)	Ambient	Draft In. H2O
0	711.375	136.790			0.00	0.00	75	75			112	0.037			22.1		456	298	218	263	272		301.4	278	74	73			70	0.045
10	713.035	138.335	0.17	0.15	0.00	0.00	75	75			98	0.032	102	101	21.5	-0.6	359	283	216	238	246		268.4	348	74	72			73	0.045
20	714.670	139.865	0.16	0.15	0.00	0.00	74	75			99	0.032	100	100	20.7	-0.8	309	257	220	207	227		244.0	383	73	72			70	0.049
30	716.295	141.382	0.16	0.15	0.00	0.00	74	75			103	0.032	100	99	19.9	-0.8	291	239	243	191	213		235.4	441	73	72			72	0.054
40	717.905	142.881	0.16	0.15	0.00	0.00	74	75			110	0.032	100	99	18.7	-1.2	332	230	272	185	207		245.2	458	73	72			72	0.059
50	719.515	144.380	0.16	0.15	0.00	0.00	74	75			109	0.032	100	99	17.4	-1.3	364	217	290	178	214		252.6	462	74	73			69	0.061
60	721.115	145.870	0.16	0.15	0.00	0.00	74	75			112	0.033	98	97	16.2	-1.25	408	212	288	184	221		262.6	462	75	74			71	0.061
70	722.718	147.363	0.16	0.15	0.00	0.00	74	75			113	0.032	100	99	14.7	-1.45	455	208	301	182	234		276.0	503	76	74			71	0.063
80	724.320	148.855	0.16	0.15	0.00	0.00	74	76			115	0.032	100	99	13.4	-1.35	468	201	309	193	253		284.8	494	76	74			69	0.065
90	725.915	150.355	0.16	0.15	0.00	0.00	74	76			115	0.032	99	99	12.1	-1.25	473	195	310	202	271		290.2	492	76	75			71	0.063
100	727.525	151.855	0.16	0.15	0.00	0.00	74	76			113	0.031	102	100	11.0	-1.15	489	192	303	203	294		296.2	455	76	75			73	0.060
110	729.125	153.355	0.16	0.15	0.00	0.00	74	76			106	0.031	101	100	9.9	-1.05	496	195	271	206	307		295.0	396	75	74			71	0.058
120	730.730	154.855	0.16	0.15	0.00	0.00	74	76			102	0.031	100	99	9.0	-0.9	498	191	236	212	316		290.6	377	74	73			71	0.055
130	732.324	156.360	0.16	0.15	0.00	0.00	74	76			99	0.031	100	100	8.2	-0.85	492	188	216	214	316		285.2	362	74	73			69	0.053
140	733.925	157.860	0.16	0.15	0.00	0.00	74	76			96	0.030	101	101	7.5	-0.7	498	188	207	210	314		283.4	340	73	72			71	0.049
150	735.520	159.370	0.16	0.15	0.00	0.00	74	76			95	0.030	101	101	6.9	-0.6	494	186	192	216	309		279.4	318	72	71			71	0.043
160	737.115	160.875	0.16	0.15	0.00	0.00	74	75			92	0.029	102	102	6.3	-0.55	484	185	177	218	294		271.6	302	73	72			70	0.045
170	738.710	162.385	0.16	0.15	0.00	0.00	73	75			90	0.029	102	103	5.6	-0.7	467	177	168	216	283		262.2	287	73	72			70	0.040
180	740.278	163.870	0.16	0.15	0.00	0.00	73	75			89	0.028	102	103	5.2	-0.4	456	177	160	214	270		255.4	272	73	72			70	0.038
190	741.846	165.357	0.16	0.15	0.00	0.00	73	75			88	0.028	102	103	4.7	-0.55	445	183	147	211	257		248.6	261	73	72			70	0.035
200	743.414	166.844	0.16	0.15	0.00	0.00	73	75			87	0.029	100	101	4.3	-0.35	441	177	145	216	246		245.0	255	70	69			68	0.033
210	744.982	168.331	0.16	0.15	0.00	0.00	73	75			86	0.028	102	102	4.0	-0.3	441	168	140	213	237		239.8	246	70	69			70	0.034
220	746.550	169.820	0.16	0.15	0.00	0.00	73	75			86	0.028	102	103	3.6	-0.4	424	168	140	218	233		236.6	244	70	69			70	0.034
230	748.105	171.298	0.16	0.15	0.00	0.00	73	74			85	0.028	101	102	3.3	-0.35	404	172	181	239	252		249.6	243	70	69			69	0.033
240	749.670	172.785	0.16	0.15	0.00	0.00	73	74			85	0.029	100	101	3.0	-0.3	413	168	160	227	233		240.2	240	69	69			70	0.032
250	751.220	174.261	0.16	0.15	0.00	0.00	73	75			84	0.029	99	100	2.8	-0.2	410	161	159	235	235		240.0	233	69	69			70	0.031
260	752.780	175.740	0.16	0.15	0.00	0.00	73	75			83	0.029	99	100	2.5	-0.25	402	162	186	250	244		248.8	231	68	69			70	0.031
270	754.335	177.220	0.16	0.15	0.00	0.00	73	74			84	0.029	99	100	2.3	-0.2	397	159	194	250	245		249.0	226	68	68			70	0.030
280	755.900	178.705	0.16	0.15	0.00	0.00	73	74			83	0.029	100	100	2.1	-0.2	391	157	200	254	243		249.0	226	68	68			67	0.030
290	757.455	180.195	0.16	0.15	0.00	0.00	73	74			83	0.029	99	101	1.9	-0.2	380	161	204	256	241		248.4	223	68	68			69	0.030
300	759.020	181.690	0.16	0.15	0.00	0.00	72	73			83	0.029	100	101	1.8	-0.15	376	155	207	256	243		247.4	222	68	69			70	0.030
310	760.585	183.165	0.16	0.15	0.00	0.00	73	74			83	0.027	103	103	1.6	-0.2	367	153	202	259	237		243.6	220	68	68			70	0.030
320	762.148	184.643	0.16	0.15	0.00	0.00	72	73			83	0.027	103	104	1.4	-0.15	358	155	202	254	234		240.6	215	68	68			69	0.030
330	763.710	186.120	0.16	0.15	0.00	0.00	73	74			82	0.027	103	103	1.3	-0.15	347	154	199	251	227		235.6	215	68	68			69	0.029
340	765.270	187.595	0.16	0.15	0.00	0.00	72	74			82	0.028	101	101	1.1	-0.15	335	154	195	251	225		232.0	212	68	69			68	0.029
350	766.833	189.075	0.16	0.15	0.00	0.00	73	74			81	0.027	103	104	1.0	-0.15	325	156	197	249	212		227.8	208	68	68			69	0.028
360	768.398	190.543	0.16	0.15	0.00	0.00	73	74			80	0.027	103	103	0.8	-0.15	318	154	193	247	212		224.8	203	68	68			69	0.028
370	769.958	192.025	0.16	0.15	0.00	0.00	72	74			80	0.027	103	104	0.7	-0.1	313	149	188	238	210		219.6	199	67	68			70	0.027
380	771.520	193.500	0.16	0.15	0.00	0.00	73	74			80	0.027	103	103	0.6	-0.15	309	149	188	242	205		218.6	197	67	68			68	0.027
390	773.088	194.970	0.16	0.15	0.00	0.00	73	74			80	0.027	103	103	0.3	-0.25	322	151	183	244	196		219.2	205	67	68			68	0.026
400	774.648	196.448	0.16	0.15	0.00	0.00	72	74			80	0.027	103	103	0.1	-0.2	337	151	185	244	203		224.0	209	67	68			70	0.026
410	776.212	197.923	0.16	0.15	0.00	0.00	72	73			81	0.027	103	103	0.0	-0.1	341	151	185	235	209		224.2	213	68	68			68	0.026
Avg/Total	64.837	61.133	0.16	0.15	0.00	0.00	73.31	74.71			92.31	0.029	101.15	101.15									77		71.00	70.52	#DIV/0!	#DIV/0!		0.040

Final Laboratory Report - Method 5G Dual Train
Dilution Tunnel Particulate Calculations

Client Name: Monessen
Model: Defiant 2N1 (NC)
Project No.: 227-S-39-3
Tracking No.: 1534

Equipment Numbers:

Run #: 4
Train #: A
Date: 04/21/10

Sample Component	Reagent	Filter # or Probe #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	F546	175.0	125.1	49.9
B. Rear filter catch	Filter	F547	118.5	116.5	2.0
C. Probe catch	Probe	VC-3	84566.3	84563.7	2.6

Total Particulate, mg :	54.5

Component	Equations:
A. Front filter catch	Final (mg) - Tare (mg) = Particulate, mg
B. Rear filter catch	Final (mg) - Tare (mg) = Particulate, mg
C. Probe catch	Final (mg) - Tare (mg) = Particulate, mg

Analyst: [signature] Date: 05/28/10

Final Laboratory Report - Method 5G Dual Train
Dilution Tunnel Particulate Calculations

Client Name: Monessen
Model: Defiant 2N1 (NC)
Project No.: 227-S-39-3
Tracking No.: 1534

Equipment Numbers:

Run #: 4
Train #: B
Date: 04/21/10

Sample Component	Reagent	Filter # or Probe #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	F548	171.6	121.3	50.3
B. Rear filter catch	Filter	F549	128.1	126.3	1.8
C. Probe catch	Probe	VC-6	76256.7	76256.6	0.1

Total Particulate, mg :	52.2

Component	Equations:
A. Front filter catch	Final (mg) - Tare (mg) = Particulate, mg
B. Rear filter catch	Final (mg) - Tare (mg) = Particulate, mg
C. Probe catch	Final (mg) - Tare (mg) = Particulate, mg

Analyst: [signature] Date: 05/28/10

STOVE TEMPERATURE TEST DATA - METHOD 5G

Client/Model: Monessen / Defiant ZNI (IX) Project #: ~~T5~~ 04/21/10 227.5.39.3 Tracking #: 1534

Date: 04/21/10 Test Crew: TR Run #: 4

OMNI Equipment ID #:

Preburn ~~NA~~ Coal Bed: 4.4 - 5.5 Actual:
Test [ ] Data: 0 = Range: Coal Bed: 5.35

Time	Fuel Weight	Delta Weight	Stack Draft	TEMPERATURES (oF) Ambient	Top	Bottom	Back	Left	Right	Flue	Catalyst
0	15.54	0	0.065	74	807	443	143	307	231	485	
10	14.10	1.44	0.051	74	577	430	164	302	244	326	
20	12.65	1.45	0.048	71	481	412	167	277	236	306	
30	10.55	2.10	0.064	72	462	393	174	258	230	449	
40	8.35	2.20	0.067	71	438	358	266	256	234	501	
50	7.35	1.0	0.061	73	459	349	316	253	243	488	
60	6.45	0.9	0.062	71	479	338	291	267	252	~~465~~	
70	5.60	0.85	0.053	71	474	314	270	272	266	~~481~~ 381	
80	5.35	0.25	0.049	72	470	305	242	274	270	352	
90											
00											
10											
20											
30											
40											
50											
60											
70											
80											
90											
AVG											

Technician signature: [signature] Date: 05/14/10

FUEL DATA

Client: Monessen
Model: Defiant 2451 (NC)
Project #: 227-S398 Tracking #: 1534
Date: 04/21/10 Test Crew: TR Run #: 4
OMNI Equipment ID #:
FUEL LOAD PREPARED BY: Ralph G. - Moisture / Dimensions measured by TR
FUEL: DOUGLAS-FIR SPECIES, UNTREATED, AIR-DRIED, STANDARD GRADE OR BETTER, DIMENSIONAL LUMBER.

PRE-BURN FUEL

MOISTURE CONTENT (METER -- DRY BASIS)

CALIBRATION: Cal Value (1) = 12% Actual Reading 12.0
Cal Value (2) = 22% Actual Reading 22.0

Piece	Length		Readings		Type
1	11 ft	20.3	20.3	20.8	2x4
2	11 ft	21.2	20.8	19.3	2x4
3	ft				

Length of cut pieces: 33x8 inches Pre-Burn Fuel Average Moisture: 20.5

Time (clock): 4:20 Room Temperature (F): 74 Initials: TR

TEST FUEL

FUEL TYPE AND AMOUNT: 2 x 4 ____ 4 x 4 4 RDM 4/21/10
CALCULATED LOAD WEIGHT: 22.6 +/- 10% ACTUAL LOAD WEIGHT: 22.1 (2 x 4)
22.1 (4 x 4)
22.1 Total
FUEL PIECE LENGTH: 21"

MOISTURE CONTENT (METER -- DRY BASIS)

PIECE		READINGS			TYPE
1		20.2	20.3	18.8	4x4
2		20.2	20.2	18.5	4x4
3		20.9	20.2	18.6	4x4
4	TR 04/21/10	20.2	22.2	22.0	4x4
5					
6					
7					
8					
9					
10					

OVERALL TEST FUEL LOAD MOISTURE AVERAGE: 20.2

Time (clock): 5:10 Room Temperature (F): 76 Initials: TR

Technician signature: [signature] Date: 05/14/10

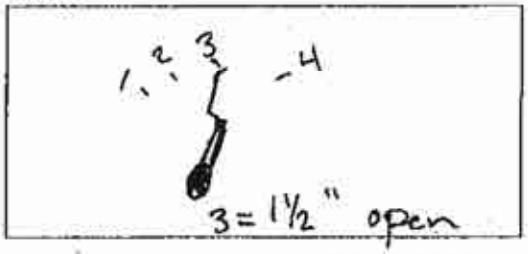
Run Notes

Client: Monessen
Model: Defiant 2N1 (NC)
Project #: ~~227-5-39.3~~ TR 04/21/10 227-5-39.3
Tracking #: 1534
Run #: 4 Date: 04/21/10
Test Crew: TR
OMNI Equipment ID #(s):

PREBURN

DESCRIBE OR SKETCH AIR OR THERMOMSTAT SETTINGS BELOW:
(SETTINGS MUST BE ACCURATE AND REPRODUCABLE)

PRIMARY:



SECONDARY:

TERTIARY:

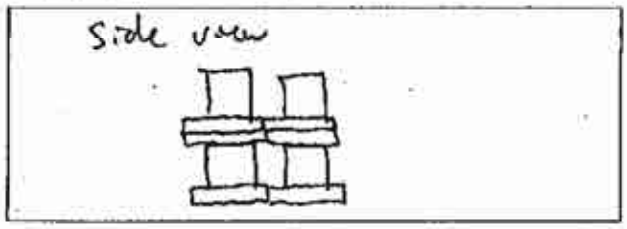
FAN: high

PREBURN SETTINGS AND ACTIVITIES

TIME	AIR (THERMO) CHANGES PRIMARY/SECONDARY/TERTIARY	FAN SETTING CHANGE	ADD FUEL + WT.	ADD FUEL - WT.	RAKE COAL	COMMENT
0	test setting					
25					X	
55				0.5 lbs	X	
70						
85	Start test				✓	

TEST

TEST FUEL CONFIGURATION SKETCH
(INDICATE VIEW ANGLE)

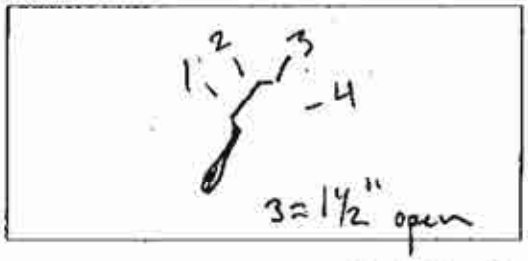


START UP PROCEDURES

BYPASS: 1 min
FUEL LOADING: 1 min
DOOR: 1 min
PRIMARY AIR: test setting @ 0 min

OTHER: /

DESCRIBE OR SKETCH TEST SETTINGS BELOW:
(SETTINGS MUST BE ACCURATE AND REPRODUCIBLE)
PRIMARY:



SECONDARY:

TERTIARY:

FAN: high

Technician signature: Date: 05/14/10

4-41 OF 4-155

Supplemental Data EPA 5G/5H

Client: Monessen

Model: Defiant 2N1 (NC)

Project #: 227.5.39.3 Tracking #: 1534

Date: 04/21/10 Run #: 4 Booth: VC-1A

Test Crew: TC Start Time: 4:09 Stop Time: 1:26 (A.M., 04/22/10)

OMNI Equipment #(s): _____

Gas Analyzer Train Leak Check:

Stack: Dilution Tunnel (Method 5G Only):

Initial: _____ Initial: _____

Final: _____ Final: _____

Calibrations: Span Gas CO_2: _____ O_2: _____ CO: _____ CO_2(DT): _____

	N_2 Span	N_2 Span	N_2 Span	N_2 Span	N_2 Span	N_2 Span	N_2 Span
Time							
O_2							
CO_2							
CO							
CO_2 (DT)							

Stack Diameter (inches): 6

Air Velocity (ft/min): Initial: <50 ft/min Final: <50 ft/min

Scale Audit (lbs): Pretest: 10.00 Post Test: 10.00

Induced Draft: 0 %Smoke Capture: 100

Pitot Tube Leak Test: Pre: 0.0 @3.0 Post: 0.0 @3.0

Flue Pipe Cleaned Prior to First Test in Series: Date: 04/18/10 Initials: TC

	Initial	Middle	Ending
Pb (in/Hg)	29.37	29.36	29.33
Room Temp (°F)	73	71	73.5

Technician signature: _____ Date: 05/14/10

Run 5

OMNI-Test Laboratories, Inc.

Wood Heater Test Data - EPA Method 5G

Manufacturer: Monessen
Model: Defiant 2N1 (NC)
Project No.: 227-S-39-3
Tracking No.: 1534
Run: 5
Test Date: 04/22/10

Burn Rate	1.44 kg/hr dry
Average Tunnel Temperature	101 degrees Fahrenheit
Average Gas Velocity in Dilution Tunnel - vs	13.3 feet/second
Average Gas Flow Rate in Dilution Tunnel - Qsd	8305.3 dscf/hour
Average Delta p	0.037 inches H20
Average Delta H	0.00 inches H20
Total Time of Test	350 minutes

	AVERAGE	SAMPLE TRAIN 1	SAMPLE TRAIN 2
Total Sample Volume - Vm	54.11 cubic feet	56.77 cubic feet	51.46 cubic feet
Average Gas Meter Temperature	76 degrees Fahrenheit	75 degrees Fahrenheit	76 degrees Fahrenheit
Total Sample Volume (Standard Conditions) - Vmstd	52.0 dscf	54.6 dscf	49.4 dscf
Total Particulates - mn		5.4 mg	5.7 mg
Particulate Concentration (dry-standard)	0.00011 grams/dscf	0.00010 grams/dscf	0.00012 grams/dscf
Particulate Emission Rate	0.89 grams/hour	0.82 grams/hour	0.96 grams/hour
Adjusted Emissions	1.65 grams/hour	1.55 grams/hour	1.76 grams/hour
Difference from Average		0.10 grams/hour	0.10 grams/hour
7.5% of the average emission rate	0.12		
Weighted Average Emission Rate Limit	4.10 grams/hour		
7.5% of the weighted average emission rate limit	0.31		
	Results Are Acceptable		

OMNI-Test Laboratories, Inc.

Wood Heater Test Data - EPA Method 5G

Run: 5

Manufacturer: Monessen
Model: Defiant 2N1 (NC)
Tracking No.: 1534
Project No.: 227-S-39-3
Test Date: 22-Apr-10
Beginning Clock Time: 12:50
Recording Interval: 10 min.
Total Sampling Time: 350 min.

Velocity Traverse Data									
	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	
Initial dP	0.028	0.039	0.040	0.035	0.025	0.037	0.041	0.037	"H2O
Initial Temp.	106	106	106	106	106	106	106	106	oF

OMNI Equipment Numbers:

PM Control Module:
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.56 lb/lb-mole
Dilution Tunnel H2O: 4.00 percent
Dilution Tunnel Static: -0.132 "H2O
Pitot Tube Cp: 0.99
Meter Box Y Factor: 0.994 (1) 0.996 (2)
Barometric Pressure: Begin 29.32, Middle 29.32, End 29.32, Average 29.32 "Hg

Signature/Date: 6/4/10

Tunnel Velocity: 13.27 ft/sec.
Intial Tunnel Flow: 134.6 scfm
Average Tunnel Flow: 138.4 scfm
Tunnel Area: 0.1963 ft2
Post-Test Leak Check (1): 0.001@5.0 cfm@"Hg
Post-Test Leak Check (2): 0.000@9.0 cfm@"Hg
Fuel Moisture (dry basis %): 19.95
Total Particulate (1): 5.4
Total Particulate (2): 5.7

Elapsed Time	Particulate Sampling Data														Fuel Weight, lb		Wood Heater Temperature Data, oF											Stack
	Gas Meter Cubic Feet (1)	Gas Meter Cubic Feet (2)	Sample Rate, cfm (1)	Sample Rate, cfm (2)	Orifice dH (1)	Orifice dH (2)	Meter oF (1)	Meter oF (2)	Meter Vac. In. Hg. (1)	Meter Vac. In. Hg. (2)	Dilution Tunnel Temp.	Dilution Tunnel dP	Pro. Rate (10%) (1)	Pro. Rate (10%) (2)	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Catalyst Exit	Average Surface	Stack	Filter (1)	Filter (2)	Impinger exit (1)	Impinger exit (2)	Ambient	Draft In. H2O
0	776.355	198.045			0.00	0.00	76	76			106	0.035			22.2		489	285	229	272	255		306.0	326	72	75			72	0.050
10	778.050	199.590	0.17	0.15	0.00	0.00	75	76			103	0.039	102	103	21.6	-0.65	372	270	228	241	235		269.2	380	72	72			72	0.051
20	779.700	201.085	0.17	0.15	0.00	0.00	75	76			107	0.038	101	101	20.6	-0.95	339	254	252	213	213		254.2	439	72	74			72	0.053
30	781.358	202.538	0.17	0.15	0.00	0.00	74	76			113	0.038	103	99	19.3	-1.35	378	239	291	202	204		262.8	480	74	74			72	0.057
40	782.965	204.025	0.16	0.15	0.00	0.00	75	76			115	0.038	99	102	17.9	-1.35	416	226	308	193	202		269.0	479	74	74			74	0.060
50	784.588	205.480	0.16	0.15	0.00	0.00	75	77			119	0.038	101	99	16.3	-1.6	458	215	317	193	206		277.8	510	76	76			72	0.064
60	786.200	206.945	0.16	0.15	0.00	0.00	76	76			122	0.040	98	98	14.7	-1.6	484	208	332	195	221		288.0	522	76	76			71	0.066
70	787.820	208.400	0.16	0.15	0.00	0.00	75	76			121	0.038	101	100	13.2	-1.55	494	202	336	200	234		293.2	516	76	76			71	0.066
80	789.430	209.865	0.16	0.15	0.00	0.00	75	77			120	0.038	100	100	11.7	-1.5	509	195	340	206	262		302.4	498	75	75			71	0.065
90	791.045	211.315	0.16	0.14	0.00	0.00	76	77			118	0.038	100	99	10.4	-1.25	546	195	325	210	279		311.0	487	75	75			73	0.064
100	792.658	212.792	0.16	0.15	0.00	0.00	76	77			115	0.037	101	102	9.4	-1.05	552	191	308	215	282		309.6	468	75	75			71	0.062
110	794.270	214.250	0.16	0.15	0.00	0.00	75	77			113	0.037	101	101	8.3	-1.1	563	189	295	219	288		310.8	453	75	75			73	0.060
120	795.880	215.708	0.16	0.15	0.00	0.00	76	77			112	0.038	99	99	7.4	-0.9	570	187	280	223	293		310.6	442	75	73			73	0.059
130	797.500	217.170	0.16	0.15	0.00	0.00	76	77			110	0.037	101	101	6.5	-0.85	572	187	271	226	295		310.2	432	74	76			72	0.058
140	799.110	218.635	0.16	0.15	0.00	0.00	76	78			107	0.037	100	100	5.8	-0.7	568	183	256	228	293		305.6	401	74	74			72	0.054
150	800.732	220.095	0.16	0.15	0.00	0.00	76	78			105	0.037	101	100	5.2	-0.6	523	181	241	230	293		293.6	395	74	74			72	0.053
160	802.350	221.568	0.16	0.15	0.00	0.00	76	78			103	0.037	100	100	4.7	-0.55	499	178	234	228	293		286.4	388	71	74			71	0.053
170	803.975	223.045	0.16	0.15	0.00	0.00	77	77			101	0.036	102	102	4.2	-0.5	488	178	228	230	293		283.4	375	73	73			71	0.052
180	805.585	224.505	0.16	0.15	0.00	0.00	76	77			99	0.037	99	99	3.8	-0.35	484	180	217	232	293		281.2	358	71	74			74	0.050
190	807.210	225.985	0.16	0.15	0.00	0.00	75	77			98	0.036	102	102	3.5	-0.35	479	178	208	232	293		278.0	340	71	71			71	0.050
200	808.825	227.445	0.16	0.15	0.00	0.00	76	77			95	0.036	101	100	3.2	-0.3	470	177	193	231	288		271.8	320	71	71			73	0.046
210	810.440	228.920	0.16	0.15	0.00	0.00	75	77			93	0.037	99	100	2.9	-0.25	457	179	182	231	279		265.6	307	71	71			71	0.045
220	812.070	230.400	0.16	0.15	0.00	0.00	75	76			92	0.035	103	103	2.7	-0.2	439	179	173	231	272		258.8	294	71	71			73	0.043
230	813.695	231.885	0.16	0.15	0.00	0.00	75	77			90	0.035	102	103	2.5	-0.2	430	177	162	226	263		251.6	283	68	70			72	0.041
240	815.312	233.347	0.16	0.15	0.00	0.00	75	76			90	0.036	100	100	2.3	-0.2	419	172	155	224	254		244.8	276	70	70			72	0.040
250	816.928	234.807	0.16	0.15	0.00	0.00	75	76			89	0.036	100	100	2.1	-0.2	412	172	155	228	243		242.0	271	69	69			71	0.040
260	818.551	236.281	0.16	0.15	0.00	0.00	75	76			88	0.036	101	101	1.9	-0.25	412	170	148	232	234		239.2	273	67	69			69	0.040
270	820.175	237.755	0.16	0.15	0.00	0.00	74	76			88	0.036	101	101	1.6	-0.25	412	167	146	234	228		237.4	269	67	69			71	0.039
280	821.785	239.215	0.16	0.15	0.00	0.00	74	76			88	0.037	99	99	1.4	-0.25	412	168	146	254	221		240.2	271	69	69			72	0.039
290	823.403	240.680	0.16	0.15	0.00	0.00	74	76			88	0.036	101	100	1.1	-0.25	415	168	148	276	215		244.4	269	69	69			74	0.037
300	825.035	242.155	0.16	0.15	0.00	0.00	74	76			87	0.036	101	101	0.9	-0.25	412	170	146	284	209		244.2	267	69	69			72	0.037
310	826.640	243.620	0.16	0.15	0.00	0.00	74	76			87	0.035	101	102	0.7	-0.2	408	167	142	284	204		241.0	267	69	69			71	0.036
320	828.263	245.089	0.16	0.15	0.00	0.00	74	76			87	0.035	102	102	0.5	-0.2	403	174	144	277	202		240.0	262	69	69			71	0.036
330	829.878	246.560	0.16	0.15	0.00	0.00	74	75			86	0.036	100	101	0.3	-0.2	399	170	144	271	198		236.4	258	69	71			69	0.036
340	831.500	248.030	0.16	0.15	0.00	0.00	74	75			86	0.035	102	102	0.1	-0.2	394	171	137	271	195		233.6	249	69	69			71	0.035
350	833.125	249.501	0.16	0.15	0.00	0.00	74	75			85	0.035	102	102	0.0	-0.05	394	167	135	262	191		229.8	247	67	71			71	0.035
Avg/Total	56.770	51.456	0.16	0.15	0.00	0.00	75.08	76.44			100.72	0.037	100.72	100.71									76		71.64	72.28	#DIV/0!	#DIV/0!		0.049

Final Laboratory Report - Method 5G Dual Train
Dilution Tunnel Particulate Calculations

Client Name: Monessen
Model: Defiant 2N1 (NC)
Project No.: 227-S-39-3
Tracking No.: 1534

Equipment Numbers:

Run #: 5
Train #: A
Date: 04/22/10

Sample Component	Reagent	Filter # or Probe #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	F550	120.8	116.3	4.5
B. Rear filter catch	Filter	F551	121.4	120.7	0.7
C. Probe catch	Probe	VC-4	79066.1	79065.9	0.2

Total Particulate, mg :	5.4

Component	Equations:
A. Front filter catch	Final (mg) - Tare (mg) = Particulate, mg
B. Rear filter catch	Final (mg) - Tare (mg) = Particulate, mg
C. Probe catch	Final (mg) - Tare (mg) = Particulate, mg

Analyst: [signature] Date: 05/28/10

Final Laboratory Report - Method 5G Dual Train
Dilution Tunnel Particulate Calculations

Client Name: Monessen
Model: Defiant 2N1 (NC)
Project No.: 227-S-39-3
Tracking No.: 1534

Equipment Numbers:

Run #: 5
Train #: B
Date: 04/22/10

Sample Component	Reagent	Filter # or Probe #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	F552	128.7	124.4	4.3
B. Rear filter catch	Filter	F553	120.2	119.7	0.5
C. Probe catch	Probe	VC-9	83354.0	83353.1	0.9

Total Particulate, mg :	5.7

Component	Equations:
A. Front filter catch	Final (mg) - Tare (mg) = Particulate, mg
B. Rear filter catch	Final (mg) - Tare (mg) = Particulate, mg
C. Probe catch	Final (mg) - Tare (mg) = Particulate, mg

Analyst: [signature] Date: 05/28/10

STOVE TEMPERATURE TEST DATA - METHOD 5G

Client/Model: Monessen / Defiant ZN1 (PC) Project #: 227-5-35-3 Tracking #: 1534

Date: 04/22/10 Test Crew: TR Run #: 5

OMNI Equipment ID #:

Preburn [X] Coal Bed:
Test [ ] Data: 0 = Range: 4.44 - 5.55 Actual: Coal Bed: 5.50

Time	Fuel Weight	Delta Weight	Stack Draft	TEMPERATURES (oF) Ambient	Top	Bottom	Back	Left	Right	Flue	Catalyst
0	~~13.3~~ 15.45	0	0.045	79	458	376	158	313	226	300	
10	13.85	1.60	0.048	78	535	386	150	353	236	317	
20	12.15	1.70	0.045	78	458	378	157	311	226	302	
30	~~7.8~~ 10.10	2.05	0.063	72	438	304	269	276	217	509	
40	8.16	1.94	0.065	72	447	319	207	280	218	478	
50	6.86	1.30	0.066	73	479	247	288	275	219	488	
60	6.31	0.55	0.057	71	485	286	273	275	230	414	
70	5.80	0.51	0.055	71	485	281	246	272	240	385	
80											
90											
00											
10											
20											
30											
40											
50											
60											
70											
80											
90											
AVG											

Technician signature: [signature] Date: 05/14/10

FUEL DATA

Client: Monessen
Model: Defiant 2N1 (NC)
Project #: 227-537 Tracking #: 1534
Date: 04/22/10 Test Crew: TR Run #: 5
OMNI Equipment ID #:
FUEL LOAD PREPARED BY: Ralph G. / Moisture/Dimensions measured by TR
FUEL: DOUGLAS-FIR SPECIES, UNTREATED, AIR-DRIED, STANDARD GRADE OR BETTER, DIMENSIONAL LUMBER.

PRE-BURN FUEL

MOISTURE CONTENT (METER – – DRY BASIS)

CALIBRATION: Cal Value (1) = 12% Actual Reading 12.0
Cal Value (2) = 22% Actual Reading 22.0

Piece	Length		Readings			Type
1	10 ~~20~~ ft 05/18/10	19.2	20.7	20.2		2x4
2	10 ft	18.1	20.8	19.6		2x4
3	ft					

Length of cut pieces: 30 x 8 inches Pre-Burn Fuel Average Moisture: 19.7

Time (clock): 10:50 Room Temperature (F): 74 Initials: TR

TEST FUEL

FUEL TYPE AND AMOUNT: 2 x 4 ____ 4 x 4 4
CALCULATED LOAD WEIGHT: 22.75 +/-10% ACTUAL LOAD WEIGHT: ____ (2 x 4)
22.2 (4 x 4)
FUEL PIECE LENGTH: 21" 22.2 Total

MOISTURE CONTENT (METER – – DRY BASIS)

PIECE	READINGS			TYPE
1	19.3	20.1	20.3	4x4
2	19.8	19.8	19.1	4x4
3	18.6	22.1	21.3	4x4
4	18.6	18.9	21.5	4x4
5				
6				
7				
8				
9				
10				

OVERALL TEST FUEL LOAD MOISTURE AVERAGE: 19.95

Time (clock): 10:56 Room Temperature (F): 74 Initials: TR

Technician signature: [signature] Date: 05/14/10

OMNI-Test Laboratories, Inc.

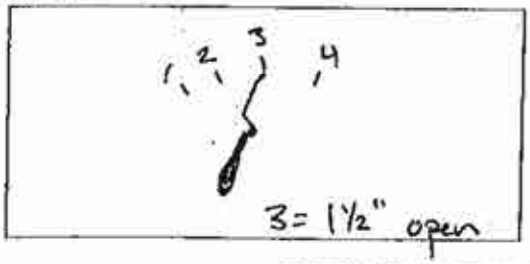
Run Notes

Client: Monessen
Model: Defiant 2N1 (NC)
Project #: 227-5-39-3
Tracking #: 1534
Run #: 5 Date: 04/22/10
Test Crew: TZ
OMNI Equipment ID #(s):

PREBURN

DESCRIBE OR SKETCH AIR OR THERMOMSTAT SETTINGS BELOW:
(SETTINGS MUST BE ACCURATE AND REPRODUCABLE)

PRIMARY:



SECONDARY:

TERTIARY:

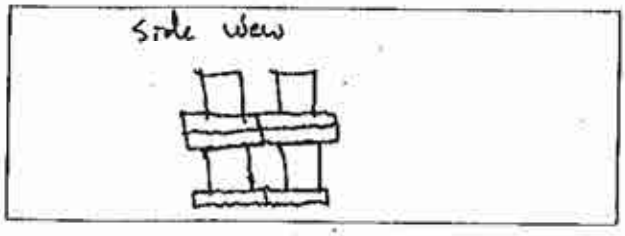
FAN: high

PREBURN SETTINGS AND ACTIVITIES

TIME	AIR (THERMO) CHANGES PRIMARY/SECONDARY/TERTIARY	FAN SETTING CHANGE	ADD FUEL + WT.	ADD FUEL - WT.	RAKE COAL	COMMENT
0	test setting					
15					x	
65	start test				x	

TEST

TEST FUEL CONFIGURATION SKETCH
(INDICATE VIEW ANGLE)

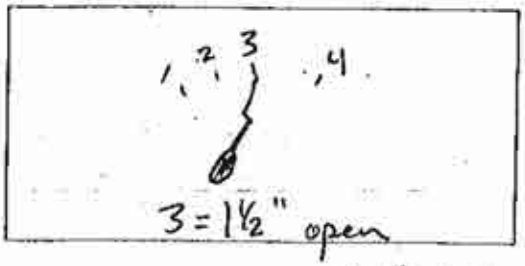


START UP PROCEDURES

BYPASS: 50 sec open
FUEL LOADING: 50 sec
DOOR: 50 sec open
PRIMARY AIR: test setting @ t=0

OTHER:

DESCRIBE OR SKETCH TEST SETTINGS BELOW:
(SETTINGS MUST BE ACCURATE AND REPRODUCIBLE)
PRIMARY:



SECONDARY:

TERTIARY:

FAN: high

Technician signature: Date: 05/14/10

4-50 OF 4-155

OMNI-Test Laboratories, Inc.

Supplemental Data EPA 5G/5H

Client: Monessen

Model: Defiant 2NI (NC)

Project #: 227-5-34-3 Tracking #: 1584

Date: 04/22/10 Run #: 5 Booth: N/A

Test Crew: TC Start Time: ~~10:50~~ 12:50 (Ending) TC 05/18/10 Stop Time: 6:40

OMNI Equipment #(s): _____

~~Gas Analyzer Train Leak Check:~~

Stack: ~~Dilution Tunnel (Method 5G Only):~~

Initial: _____ Initial: _____

Final: _____ Final: _____

Calibrations: Span Gas CO_2: _____ O_2: _____ CO: _____ CO_2(DT): _____

	N_2 Span	N_2 Span	N_2 Span	N_2 Span	N_2 Span	N_2 Span	N_2 Span
Time							
O_2							
CO_2							
CO							
CO_2 (DT)							

Stack Diameter (inches): 6

Air Velocity (ft/min): Initial: <50 ft/min Final: <50 ft/min

Scale Audit (lbs): Pretest: 10.00 Post Test: 10.00

Induced Draft: 0. %Smoke Capture: 100

Pitot Tube Leak Test: Pre: 0.0 @ 3.0 Post: 0.0 @ 3.0

Flue Pipe Cleaned Prior to First Test in Series: Date: 04/18/10 Initials: TC

	Initial	Middle	Ending
Pb (in/Hg)	29.32	29.31	29.32
Room Temp (°F)	~~75~~ 72	72	71

Technician signature: _____ Date: 05/14/10

Run 6

OMNI-Test Laboratories, Inc.

Wood Heater Test Data - EPA Method 5G

Manufacturer: Monessen
Model: Defiant 2N1 (NC)
Project No.: 227-S-39-3
Tracking No.: 1534
Run: 6
Test Date: 04/23/10

Burn Rate	0.88 kg/hr dry
Average Tunnel Temperature	88 degrees Fahrenheit
Average Gas Velocity in Dilution Tunnel - vs	12.8 feet/second
Average Gas Flow Rate in Dilution Tunnel - Qsd	8222.1 dscf/hour
Average Delta p	0.035 inches H20
Average Delta H	0.00 inches H20
Total Time of Test	580 minutes

	AVERAGE	SAMPLE TRAIN 1	SAMPLE TRAIN 2
Total Sample Volume - Vm	89.20 cubic feet	93.21 cubic feet	85.20 cubic feet
Average Gas Meter Temperature	75 degrees Fahrenheit	74 degrees Fahrenheit	76 degrees Fahrenheit
Total Sample Volume (Standard Conditions) - Vmstd	86.3 dscf	90.2 dscf	82.4 dscf
Total Particulates - mn		23.4 mg	22.8 mg
Particulate Concentration (dry-standard)	0.00027 grams/dscf	0.00026 grams/dscf	0.00028 grams/dscf
Particulate Emission Rate	2.20 grams/hour	2.13 grams/hour	2.28 grams/hour
Adjusted Emissions	3.51 grams/hour	3.41 grams/hour	3.60 grams/hour
Difference from Average		0.09 grams/hour	0.09 grams/hour
7.5% of the average emission rate	0.26		
Weighted Average Emission Rate Limit	4.10 grams/hour		
7.5% of the weighted average emission rate limit	0.31		
	Results Are Acceptable		

OMNI-Test Laboratories, Inc.

Wood Heater Test Data - EPA Method 5G

Run: 6

Manufacturer: Monessen
Model: Defiant 2N1 (NC)
Tracking No.: 1534
Project No.: 227-S-39-3
Test Date: 23-Apr-10
Beginning Clock Time: 10:49
Recording Interval: 10 min.
Total Sampling Time: 580 min.

Velocity Traverse Data									
	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	
Initial dP	0.022	0.036	0.040	0.037	0.025	0.038	0.038	0.036	"H2O
Initial Temp.	104	104	104	104	104	104	104	104	oF

OMNI Equipment Numbers:

PM Control Module:
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.56 lb/lb-mole
Dilution Tunnel H2O: 4.00 percent
Dilution Tunnel Static: -0.132 "H2O
Pitot Tube Cp: 0.99
Meter Box Y Factor: 0.994 (1) 0.996 (2)

Barometric Pressure:	Begin	Middle	End	Average
	29.47	29.47	29.47	29.47 "Hg

Signature/Date: 6/4/10

Tunnel Velocity:	12.77	ft/sec.
Intial Tunnel Flow:	132.5	scfm
Average Tunnel Flow	137.0	scfm
Tunnel Area:	0.1963	ft2
Post-Test Leak Check (1):	.001@5	cfm@"Hg
Post-Test Leak Check (2):	.001@9	cfm@"Hg
Fuel Moisture (dry basis %):		20.1
Total Particulate (1):		23.4
Total Particulate (2):		22.8

Elapsed Time	Particulate Sampling Data														Fuel Weight, lb		Wood Heater Temperature Data, oF											Stack
	Gas Meter Cubic Feet (1)	Gas Meter Cubic Feet (2)	Sample Rate, cfm (1)	Sample Rate, cfm (2)	Orifice dH (1)	Orifice dH (2)	Meter oF (1)	Meter oF (2)	Meter Vac. In. Hg. (1)	Meter Vac. In. Hg. (2)	Dilution Tunnel Temp.	Dilution Tunnel dP	Pro. Rate (10%) (1)	Pro. Rate (10%) (2)	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Catalyst Exit	Average Surface	Stack	Filter (1)	Filter (2)	Impinger exit (1)	Impinger exit (2)	Ambient	Draft In. H2O
0	833.180	249.545			0.00	0.00	76	77			104	0.034			22.4		455	288	286	292	305		325.2	294	73	86			73	0.040
10	834.855	251.085	0.17	0.15	0.00	0.00	76	76			94	0.037	102	103	22.1	-0.3	353	277	260	266	279		287.0	279	73	82			75	0.040
20	836.510	252.595	0.17	0.15	0.00	0.00	76	76			93	0.037	101	101	21.7	-0.45	298	261	255	240	251		261.0	309	73	81			73	0.049
30	838.145	254.090	0.16	0.15	0.00	0.00	75	76			97	0.036	102	102	21.0	-0.7	272	244	265	218	231		246.0	367	72	83			72	0.053
40	839.763	255.579	0.16	0.15	0.00	0.00	75	76			100	0.039	97	98	20.2	-0.75	271	230	291	206	217		243.0	388	71	82			69	0.054
50	841.380	257.050	0.16	0.15	0.00	0.00	75	76			102	0.039	97	97	19.2	-1	271	215	314	197	210		241.4	405	71	84			73	0.055
60	842.990	258.515	0.16	0.15	0.00	0.00	75	76			105	0.038	98	98	18.2	-1	281	208	323	193	214		243.8	414	71	81			73	0.056
70	844.615	259.980	0.16	0.15	0.00	0.00	75	77			105	0.040	97	95	17.2	-1	305	201	329	188	214		247.4	416	73	84			71	0.056
80	846.215	261.445	0.16	0.15	0.00	0.00	75	76			105	0.040	95	95	16.2	-1	342	188	329	190	223		254.4	422	73	85			73	0.060
90	847.825	262.910	0.16	0.15	0.00	0.00	75	76			109	0.039	97	97	15.0	-1.2	397	186	338	195	230		269.2	451	73	86			71	0.060
100	849.430	264.374	0.16	0.15	0.00	0.00	75	76			107	0.040	96	95	14.0	-1.05	431	182	348	201	242		280.8	433	73	83			73	0.059
110	851.043	265.848	0.16	0.15	0.00	0.00	75	77			106	0.038	98	98	12.9	-1.05	452	179	344	210	259		288.8	431	73	83			71	0.060
120	852.659	267.334	0.16	0.15	0.00	0.00	75	76			104	0.037	100	100	11.9	-1	485	179	337	214	274		297.8	400	72	83			72	0.058
130	854.275	268.820	0.16	0.15	0.00	0.00	75	76			101	0.035	102	103	11.1	-0.85	489	179	313	220	296		299.4	374	72	85			72	0.055
140	855.890	270.300	0.16	0.15	0.00	0.00	75	76			99	0.035	102	102	10.3	-0.75	483	179	296	227	307		298.4	355	72	83			72	0.052
150	857.525	271.795	0.16	0.15	0.00	0.00	75	76			95	0.036	102	102	9.7	-0.6	480	179	272	231	313		295.0	333	70	83			72	0.049
160	859.090	273.240	0.16	0.14	0.00	0.00	75	76			94	0.036	97	98	9.2	-0.5	463	179	256	233	313		288.8	322	70	83			72	0.045
170	860.703	274.718	0.16	0.15	0.00	0.00	75	76			93	0.035	101	102	8.7	-0.55	443	179	244	233	311		282.0	322	70	83			72	0.045
180	862.310	276.192	0.16	0.15	0.00	0.00	75	76			92	0.036	100	100	8.1	-0.6	434	177	248	230	302		278.2	319	70	83			72	0.045
190	863.923	277.661	0.16	0.15	0.00	0.00	75	76			92	0.034	103	103	7.5	-0.6	441	176	248	230	300		279.0	321	70	82			72	0.045
200	865.530	279.138	0.16	0.15	0.00	0.00	74	76			91	0.035	101	102	6.9	-0.55	441	177	248	231	293		278.0	309	70	83			72	0.045
210	867.140	280.613	0.16	0.15	0.00	0.00	74	76			90	0.036	100	100	6.4	-0.5	421	177	233	233	289		270.6	289	70	83			72	0.043
220	868.750	282.084	0.16	0.15	0.00	0.00	74	76			89	0.035	101	101	6.0	-0.4	410	176	219	230	282		263.4	271	67	82			72	0.041
230	870.350	283.555	0.16	0.15	0.00	0.00	74	76			88	0.034	102	102	5.7	-0.3	397	176	207	230	276		257.2	258	70	82			72	0.040
240	871.955	285.030	0.16	0.15	0.00	0.00	74	76			86	0.034	102	102	5.5	-0.25	386	174	196	228	265		249.8	248	67	80			72	0.035
250	873.560	286.500	0.16	0.15	0.00	0.00	74	76			84	0.033	103	103	5.2	-0.3	378	172	183	226	258		243.4	237	67	82			72	0.035
260	875.160	287.970	0.16	0.15	0.00	0.00	74	76			84	0.034	101	102	4.9	-0.25	369	170	176	224	245		236.8	230	67	82			72	0.034
270	876.761	289.441	0.16	0.15	0.00	0.00	75	76			84	0.035	100	100	4.7	-0.2	361	166	170	222	239		231.6	226	68	83			70	0.032
280	878.375	290.915	0.16	0.15	0.00	0.00	75	76			84	0.034	102	102	4.4	-0.3	351	165	167	221	232		227.2	228	67	82			71	0.032
290	879.965	292.365	0.16	0.14	0.00	0.00	75	76			84	0.035	99	99	4.1	-0.3	358	161	163	223	226		226.2	223	67	84			71	0.031
300	881.565	293.840	0.16	0.15	0.00	0.00	74	76			83	0.034	101	102	3.8	-0.3	356	159	159	228	221		224.6	223	67	82			71	0.031
310	883.160	295.288	0.16	0.14	0.00	0.00	74	76			82	0.034	101	100	3.6	-0.25	368	159	156	230	219		226.4	221	67	82			71	0.030
320	884.758	296.752	0.16	0.15	0.00	0.00	74	76			83	0.034	101	101	3.4	-0.2	370	161	154	227	225		227.4	221	67	79			71	0.030
330	886.355	298.215	0.16	0.15	0.00	0.00	74	76			83	0.034	101	101	3.2	-0.2	370	158	154	225	223		226.0	214	66	81			71	0.030
340	887.955	299.675	0.16	0.15	0.00	0.00	74	76			82	0.035	100	100	3.0	-0.15	366	156	152	221	225		224.0	212	66	79			71	0.030
350	889.560	301.160	0.16	0.15	0.00	0.00	74	76			82	0.034	102	103	2.9	-0.15	362	154	152	219	227		222.8	210	67	79			71	0.030
360	891.155	302.615	0.16	0.15	0.00	0.00	74	76			82	0.034	101	101	2.7	-0.15	359	158	145	218	227		221.4	208	66	81			71	0.030
370	892.750	304.075	0.16	0.15	0.00	0.00	74	76			82	0.036	98	98	2.6	-0.15	357	156	145	214	223		219.0	206	66	79			71	0.030
380	894.354	305.550	0.16	0.15	0.00	0.00	74	76			82	0.035	100	101	2.4	-0.15	353	158	143	212	223		217.8	205	66	79			71	0.029
390	895.957	307.015	0.16	0.15	0.00	0.00	74	76			81	0.033	103	103	2.3	-0.15	348	154	141	214	220		215.4	201	66	81			71	0.029
400	897.555	308.485	0.16	0.15	0.00	0.00	74	76			81	0.034	101	102	2.1	-0.15	344	156	139	207	218		212.8	201	66	79			71	0.028
410	899.155	309.945	0.16	0.15	0.00	0.00	74	76			81	0.033	103	102	2.0	-0.15	341	151	138	207	216		210.6	198	66	79			70	0.028
420	900.759	311.460	0.16	0.15	0.00	0.00	74	76			80	0.034	101	105	1.8	-0.15	335	155	136	205	214		209.0	192	66	81			70	0.027

OMNI-Test Laboratories, Inc.

Wood Heater Test Data - EPA Method 5G

Run: 6

Manufacturer: Monessen
Model: Defiant 2NI (NC)
Tracking No.: 1534
Project No.: 227-S-39-3
Test Date: 23-Apr-10
Beginning Clock Time: 10:49
Recording Interval: 10 min.
Total Sampling Time: 580 min.

Velocity Traverse Data									
	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	
Initial dP	0.022	0.036	0.040	0.037	0.025	0.038	0.038	0.036	"H2O
Initial Temp.	104	104	104	104	104	104	104	104	oF

OMNI Equipment Numbers:

PM Control Module:
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.56 lb/lb-mole
Dilution Tunnel H2O: 4.00 percent
Dilution Tunnel Static: -0.132 "H2O
Pitot Tube Cp: 0.99
Meter Box Y Factor: 0.994 (1) 0.996 (2)

Barometric Pressure:	Begin	Middle	End	Average
	29.47	29.47	29.47	29.47 "Hg

Signature/Date: 6/4/10

Tunnel Velocity: 12.77 ft/sec.
Intial Tunnel Flow: 132.5 scfm
Average Tunnel Flow: 137.0 scfm
Tunnel Area: 0.1963 ft2
Post-Test Leak Check (1): .001@5 cfm@"Hg
Post-Test Leak Check (2): .001@9 cfm@"Hg
Fuel Moisture (dry basis %): 20.1
Total Particulate (1): 23.4
Total Particulate (2): 22.8

Elapsed Time	Particulate Sampling Data														Fuel Weight, lb		Wood Heater Temperature Data, oF											Stack
	Gas Meter Cubic Feet (1)	Gas Meter Cubic Feet (2)	Sample Rate, cfm (1)	Sample Rate, cfm (2)	Orifice dH (1)	Orifice dH (2)	Meter oF (1)	Meter oF (2)	Meter Vac. In. Hg. (1)	Meter Vac. In. Hg. (2)	Dilution Tunnel Temp.	Dilution Tunnel dP	Pro. Rate (10%) (1)	Pro. Rate (10%) (2)	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Catalyst Exit	Average Surface	Stack	Filter (1)	Filter (2)	Impinger exit (1)	Impinger exit (2)	Ambient	Draft In. H2O
430	902.362	312.888	0.16	0.14	0.00	0.00	74	76			81	0.033	103	100	1.7	-0.15	328	153	134	200	211		205.2	190	66	78			70	0.027
440	903.965	314.315	0.16	0.14	0.00	0.00	74	76			81	0.033	103	100	1.6	-0.1	322	149	134	203	207		203.0	186	66	79			70	0.026
450	905.660	315.775	0.17	0.15	0.00	0.00	74	76			79	0.033	109	102	1.4	-0.15	319	149	129	200	207		200.8	181	65	78			70	0.026
460	907.213	317.238	0.16	0.15	0.00	0.00	74	75			79	0.033	99	103	1.2	-0.2	315	149	127	196	207		198.8	176	65	78			70	0.025
470	908.765	318.700	0.16	0.15	0.00	0.00	73	75			79	0.034	98	101	1.1	-0.1	315	151	140	198	213		203.4	177	66	78			70	0.025
480	910.375	320.160	0.16	0.15	0.00	0.00	73	75			79	0.034	102	101	1.0	-0.15	310	148	151	202	215		205.2	174	65	78			69	0.025
490	912.070	321.620	0.17	0.15	0.00	0.00	73	75			78	0.033	109	102	0.9	-0.1	308	148	161	200	215		206.4	172	65	78			69	0.025
500	913.585	323.190	0.15	0.16	0.00	0.00	73	74			78	0.032	99	112	0.8	-0.1	306	148	161	200	213		205.6	170	65	78			69	0.025
510	915.240	324.580	0.17	0.14	0.00	0.00	73	74			77	0.034	104	96	0.6	-0.15	301	145	163	199	206		202.8	167	64	77			71	0.023
520	916.770	325.995	0.15	0.14	0.00	0.00	73	74			77	0.034	97	98	0.5	-0.1	294	143	163	201	201		200.4	165	65	77			69	0.022
530	918.381	327.460	0.16	0.15	0.00	0.00	73	74			77	0.033	103	103	0.4	-0.1	286	141	163	197	201		197.6	160	64	77			69	0.021
540	919.985	328.971	0.16	0.15	0.00	0.00	73	74			77	0.033	103	106	0.4	-0.05	279	139	161	195	195		193.8	161	65	77			69	0.021
550	921.585	330.371	0.16	0.14	0.00	0.00	73	74			77	0.033	102	98	0.3	-0.1	277	141	158	193	195		192.8	158	66	77			71	0.021
560	923.185	331.840	0.16	0.15	0.00	0.00	73	74			78	0.033	103	103	0.2	-0.1	273	144	156	193	197		192.6	156	67	77			71	0.020
570	924.885	333.385	0.17	0.15	0.00	0.00	73	74			78	0.034	107	107	0.1	-0.1	266	145	154	190	195		190.0	154	66	77			71	0.020
580	926.385	334.744	0.15	0.14	0.00	0.00	73	74			78	0.034	95	94	0.0	-0.05	260	143	154	186	188		186.2	152	67	77			71	0.020
Avg/Total	93.205	85.199	0.16	0.15	0.00	0.00	74.24	75.68			87.76	0.035	100.81	100.81									139		68.20	80.85	#DIV/0!	#DIV/0!		0.037

Final Laboratory Report - Method 5G Dual Train
Dilution Tunnel Particulate Calculations

Client Name: Monessen
Model: Defiant 2N1 (NC)
Project No.: 227-S-39-3
Tracking No.: 1534

Equipment Numbers:

Run #: 6
Train #: A
Date: 04/23/10

Sample Component	Reagent	Filter # or Probe #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	F554	146.7	125.3	21.4
B. Rear filter catch	Filter	F555	117.4	116.3	1.1
C. Probe catch	Probe	VC-1	86785.7	86784.8	0.9

Total Particulate, mg :	23.4

Component	Equations:
A. Front filter catch	Final (mg) - Tare (mg) = Particulate, mg
B. Rear filter catch	Final (mg) - Tare (mg) = Particulate, mg
C. Probe catch	Final (mg) - Tare (mg) = Particulate, mg

Analyst: [signature] Date: 05/28/10

Final Laboratory Report - Method 5G Dual Train
Dilution Tunnel Particulate Calculations

Client Name: Monessen
Model: Defiant 2N1 (NC)
Project No.: 227-S-39-3
Tracking No.: 1534

Equipment Numbers:

Run #: 6
Train #: B
Date: 04/23/10

Sample Component	Reagent	Filter # or Probe #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	F556	141.8	121.2	20.6
B. Rear filter catch	Filter	F557	126.7	125.7	1.0
C. Probe catch	Probe	VC-5	76855.7	76854.5	1.2

Total Particulate, mg :	22.8

Component	Equations:
A. Front filter catch	Final (mg) - Tare (mg) = Particulate, mg
B. Rear filter catch	Final (mg) - Tare (mg) = Particulate, mg
C. Probe catch	Final (mg) - Tare (mg) = Particulate, mg

Analyst: [signature] Date: 05/28/10

STOVE TEMPERATURE TEST DATA - METHOD 5G

Client/Model: Monessen / Defiant 2NI (NC) Project #: 227.5-39-3 Tracking #: 1534

Date: 04/23/10 Test Crew: TR Run #: ~~0~~ 6 R 04/24/10

OMNI Equipment ID #:

Preburn [X] Test [ ] Coal Bed: 4.69 lbs Data: 0 = Range: 4.48 - 5.60 lbs Actual Coal Bed:

Time	Fuel Weight	Delta Weight	Stack Draft	TEMPERATURES (oF) Ambient	Top	Bottom	Back	Left	Right	Flue	Catalyst
0	16.0	0	0.063	73	722	385	171	259	257	431	
10	14.55	1.45	0.045	73	514	379	173	273	273	275	
20	13.75	0.80	0.039	74	432	360	176	262	262	245	
30	12.80	0.95	0.053	74	400	345	172	250	248	378	
40	10.95	1.85	0.063	74	365	309	261	241	239	458	
50	9.45	1.50	0.067	77	378	291	352	242	237	500	
60	8.05	1.40	0.064	75	429	282	397	249	243	488	
70	7.15	0.90	0.102	76	460	286	399	258	256	693	
80	5.80	1.35	0.06	74	478	284	406	276	282	439	
90	5.40	0.40	0.051	77	467	281	367	289	294	372	
00	5.20	0.20	0.045	77	468	283	325	290	301	320	
10											
20											
30											
40											
50											
60											
70											
80											
90											
AVG											

Technician signature: [signature] Date: 05/18/10

A-58 OF A-159

FUEL DATA

Client: Monessen
Model: Defiant 2NI (NC)
Project #: 227-5373 Tracking #: 1534
Date: 04/23/10 Test Crew: TR Run #: 6
OMNI Equipment ID #: MHS/109 (Monessen moisture meter)
FUEL LOAD PREPARED BY: Ralph G. - Moisture/Dimensions measured by TR
FUEL: DOUGLAS-FIR SPECIES, UNTREATED, AIR-DRIED, STANDARD GRADE OR BETTER, DIMENSIONAL LUMBER.

PRE-BURN FUEL

MOISTURE CONTENT (METER -- DRY BASIS)

CALIBRATION: Cal Value (1) = 12% Actual Reading 12.0
Cal Value (2) = 22% Actual Reading 22.0

Piece	Length		Readings			Type
1	9 ft	20.7	19.6	17.9		2x4
2	9 ft	22.5	22.1	20.3		2x4
3	ft					

Length of cut pieces: 27x8 inches Pre-Burn Fuel Average Moisture: 20.4

Time (clock): 8:30 Room Temperature (F): 74 Initials: TR

TEST FUEL

FUEL TYPE AND AMOUNT: 2 x 4 ____ 4 x 4 4
CALCULATED LOAD WEIGHT: 22.75 +/- 10% ACTUAL LOAD WEIGHT: ____ (2 x 4)
22.4 (4 x 4)
22.4 Total
FUEL PIECE LENGTH: 21"

MOISTURE CONTENT (METER -- DRY BASIS)

PIECE	READINGS			TYPE
1	18.6	19.7	20.2	4x4
2	18.6	19.3	20.5	4x4
3	20.1	20.3	23.3	4x4
4	20.3	21.1	19.0	4x4
5				
6				
7				
8				
9				
10				

OVERALL TEST FUEL LOAD MOISTURE AVERAGE: 20.1

Time (clock): 8:45 Room Temperature (F): 74 Initials: TR

Technician signature: [signature] Date: 05/18/10

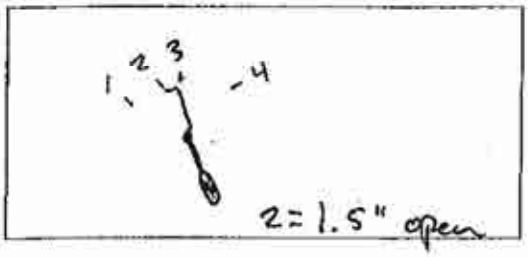
Run Notes

Client: Monessen
Model: Defiant 2NI (NC)
Project #: 227-5-34-3
Tracking #: 1534
Run #: 6 Date: 04/23/10
Test Crew: TR
OMNI Equipment ID #(s):

PREBURN

DESCRIBE OR SKETCH AIR OR THERMOMSTAT SETTINGS BELOW:
(SETTINGS MUST BE ACCURATE AND REPRODUCABLE)

PRIMARY:



SECONDARY:

TERTIARY:

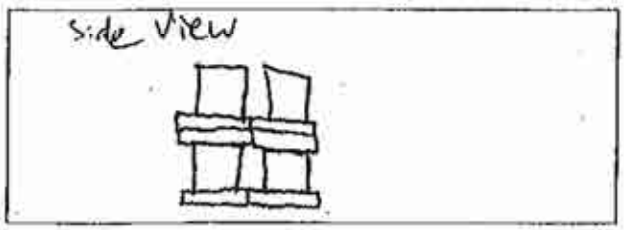
FAN: low

PREBURN SETTINGS AND ACTIVITIES

TIME	AIR (THERMO) CHANGES PRIMARY/SECONDARY/TERTIARY	FAN SETTING CHANGE	ADD FUEL + WT.	ADD FUEL - WT.	RAKE COAL	COMMENT
0	test setting					
45					X	
70 (60 04/23/10)					X	
106	Start test				X	

TEST

TEST FUEL CONFIGURATION SKETCH
(INDICATE VIEW ANGLE)

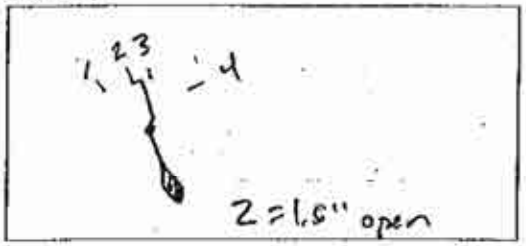


START UP PROCEDURES

BYPASS: 1 min
FUEL LOADING: 50 sec
DOOR: 1 min
PRIMARY AIR: test setting @ T=0

OTHER:

DESCRIBE OR SKETCH TEST SETTINGS BELOW:
(SETTINGS MUST BE ACCURATE AND REPRODUCIBLE)
PRIMARY:



SECONDARY:

TERTIARY:

FAN: low

Technician signature: Date: 05/18/10

4-60 OF 4-155

OMNI-Test Laboratories, Inc.

Supplemental Data EPA 5G/5H

Client: Monessen

Model: Defiant 2N1 (NC)

Project #: 227.5.34.3 Tracking #: 1534

Date: 04/23/10 Run #: 6 Booth: N/A

Test Crew: TC Start Time: 10:49 Stop Time: 8:29

OMNI Equipment #(s): _____

~~Gas Analyzer Train Leak Check:~~

Stack: Dilution Tunnel (Method 5G Only):

Initial: _____ Initial: _____

Final: _____ Final: _____

Calibrations: Span Gas CO_2: _____ O_2: _____ CO: _____ CO_2(DT): _____

	N_2 Span	N_2 Span	N_2 Span	N_2 Span	N_2 Span	N_2 Span	N_2 Span
Time							
O_2							
CO_2							
CO							
CO_2 (DT)							

Stack Diameter (inches): 6

Air Velocity (ft/min): Initial: <50 ft/min Final: <50 ft/min

Scale Audit (lbs): Pretest: 10.00 Post Test: 10.00

Induced Draft: 0.0 %Smoke Capture: 100

Pitot Tube Leak Test: Pre: 0.0@3.0 Post: 0.0@3.0

Flue Pipe Cleaned Prior to First Test in Series: Date: 04/18/10 Initials: TC

	Initial	Middle	Ending
Pb (in/Hg)	29.46	29.50	29.58
Room Temp (°F)	73	72	70

Technician signature: _____ Date: 05/18/10

4-61 OF 4-155

OMNI-Test Laboratories, Inc.

Wood Heater Test Data - EPA Method 5G

Manufacturer: Monessen
Model: Defiant 2N1
Project No.: 227-S-39-3
Tracking No.: 1534
Run: 7
Test Date: 04/24/10

Burn Rate	1.00 kg/hr dry
Average Tunnel Temperature	97 degrees Fahrenheit
Average Gas Velocity in Dilution Tunnel - vs	13.4 feet/second
Average Gas Flow Rate in Dilution Tunnel - Qsd	8532.1 dscf/hour
Average Delta p	0.038 inches H20
Average Delta H	0.00 inches H20
Total Time of Test	520 minutes

	AVERAGE	SAMPLE TRAIN 1	SAMPLE TRAIN 2
Total Sample Volume - Vm	79.61 cubic feet	83.87 cubic feet	75.35 cubic feet
Average Gas Meter Temperature	76 degrees Fahrenheit	76 degrees Fahrenheit	77 degrees Fahrenheit
Total Sample Volume (Standard Conditions) - Vmstd	77.3 dscf	81.4 dscf	73.1 dscf
Total Particulates - mn		5.3 mg	4.4 mg
Particulate Concentration (dry-standard)	0.00006 grams/dscf	0.00007 grams/dscf	0.00006 grams/dscf
Particulate Emission Rate	0.53 grams/hour	0.56 grams/hour	0.51 grams/hour
Adjusted Emissions	**1.08 grams/hour**	1.12 grams/hour	1.05 grams/hour
Difference from Average		0.04 grams/hour	0.04 grams/hour
7.5% of the average emission rate	0.08		
Weighted Average Emission Rate Limit	4.10 grams/hour		
7.5% of the weighted average emission rate limit	0.31		

Results Are Acceptable

OMNI-Test Laboratories, Inc.

Wood Heater Test Data - EPA Method 5G

Run: 7

Manufacturer: Monessen
Model: Defiant 2N1
Tracking No.: 1534
Project No.: 227-S-39-3
Test Date: 24-Apr-10
Beginning Clock Time: 08:53
Recording Interval: 10 min.
Total Sampling Time: 520 min.

OMNI Equipment Numbers:

Velocity Traverse Data									
	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	
Initial dP	0.028	0.042	0.044	0.039	0.027	0.042	0.044	0.042	"H2O
Initial Temp.	97	97	97	97	97	97	97	97	oF

PM Control Module:
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.56 lb/lb-mole
Dilution Tunnel H2O: 4.00 percent
Dilution Tunnel Static: -0.144 "H2O
Pitot Tube Cp: 0.99
Meter Box Y Factor: 0.994 (1) 0.996 (2)

Barometric Pressure:	Begin	Middle	End	Average
	29.76	29.6	29.58	29.65 "Hg

Signature/Date: 6/4/10

Tunnel Velocity: 13.38 ft/sec.
Intial Tunnel Flow: 142.5 scfm
Average Tunnel Flow: 142.2 scfm
Tunnel Area: 0.1963 ft2
Post-Test Leak Check (1): 0.0@5 cfm@"Hg
Post-Test Leak Check (2): 0.0@9 cfm@"Hg
Fuel Moisture (dry basis %): 19.27
Total Particulate (1): 5.3
Total Particulate (2): 4.4

Elapsed Time	Particulate Sampling Data														Fuel Weight, lb		Wood Heater Temperature Data, oF											Stack
	Gas Meter Cubic Feet (1)	Gas Meter Cubic Feet (2)	Sample Rate, cfm (1)	Sample Rate, cfm (2)	Orifice dH (1)	Orifice dH (2)	Meter oF (1)	Meter oF (2)	Meter Vac. In. Hg. (1)	Meter Vac. In. Hg. (2)	Dilution Tunnel Temp.	Dilution Tunnel dP	Pro. Rate (10%) (1)	Pro. Rate (10%) (2)	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Catalyst Exit	Average Surface	Stack	Filter (1)	Filter (2)	Impinger exit (1)	Impinger exit (2)	Ambient	Draft In. H2O
0	926.540	334.883			0.00	0.00	69	70			97	0.039			22.7		429	290	340	262	305		325.2	316	73	75			66	0.056
10	928.140	336.383	0.16	0.15	0.00	0.00	69	70			99	0.039	100	105	22.0	-0.75	344	277	336	247	281		297.0	357	71	73			66	0.057
20	929.792	337.860	0.17	0.15	0.00	0.00	69	70			100	0.038	105	104		-21.95	306	265	352	228	256		281.4	397	72	72			67	0.058
30	931.371	339.262	0.16	0.14	0.00	0.00	70	71			104	0.037	102	101	20.2	20.15	293	256	369	215	241		274.8	428	72	72			68	0.060
40	932.992	340.738	0.16	0.15	0.00	0.00	70	72			106	0.038	103	105	19.0	-1.15	307	246	383	210	233		275.8	448	72	72			68	0.060
50	934.600	342.182	0.16	0.14	0.00	0.00	71	72			110	0.038	103	103	17.8	-1.2	327	231	394	207	229		277.6	459	72	72			68	0.063
60	936.205	343.625	0.16	0.14	0.00	0.00	71	73			112	0.037	104	104	16.6	-1.25	351	223	403	208	227		282.4	466	73	73			69	0.065
70	937.815	344.880	0.16	0.13	0.00	0.00	71	73			113	0.038	103	89	15.3	-1.3	386	219	412	210	232		291.8	471	73	73			69	0.065
80	939.421	346.528	0.16	0.16	0.00	0.00	72	73			115	0.037	104	119	13.9	-1.4	443	215	417	219	239		306.6	477	74	74			72	0.067
90	941.034	347.983	0.16	0.15	0.00	0.00	72	74			115	0.038	103	103	12.5	-1.4	489	211	419	228	248		319.0	473	74	74			70	0.065
100	942.634	349.440	0.16	0.15	0.00	0.00	73	74			114	0.039	101	102	11.3	-1.2	513	205	416	240	257		326.2	466	75	75			71	0.066
110	944.240	350.898	0.16	0.15	0.00	0.00	73	74			113	0.039	101	102	10.1	-1.2	518	208	408	249	269		330.4	453	75	75			71	0.067
120	945.852	352.355	0.16	0.15	0.00	0.00	73	75			112	0.040	100	101	9.0	-1.05	503	204	395	256	275		326.6	442	75	75			71	0.063
130	947.463	353.820	0.16	0.15	0.00	0.00	73	75			111	0.038	102	104	7.9	-1.1	499	204	389	265	284		328.2	432	76	76			72	0.063
140	949.073	355.280	0.16	0.15	0.00	0.00	74	76			108	0.039	101	101	7.1	-0.85	510	205	371	272	291		329.8	402	74	74			72	0.059
150	950.682	356.736	0.16	0.15	0.00	0.00	74	76			105	0.038	102	102	6.4	-0.65	498	205	350	276	298		325.4	372	74	74			72	0.055
160	952.299	358.200	0.16	0.15	0.00	0.00	74	76			102	0.037	103	104	5.9	-0.55	494	201	322	277	298		318.4	350	75	73			71	0.053
170	953.907	359.658	0.16	0.15	0.00	0.00	74	76			100	0.036	104	105	5.4	-0.5	488	199	305	277	299		313.6	338	73	73			71	0.050
180	955.526	361.124	0.16	0.15	0.00	0.00	74	76			98	0.038	102	102	5.0	-0.35	479	197	288	275	299		307.6	327	73	71			71	0.050
190	957.145	362.593	0.16	0.15	0.00	0.00	74	76			96	0.037	103	104	4.7	-0.35	468	195	275	275	295		301.6	308	73	73			71	0.050
200	958.749	364.057	0.16	0.15	0.00	0.00	75	76			95	0.038	100	102	4.4	-0.25	453	195	256	271	288		292.6	288	73	71			71	0.045
210	960.373	365.519	0.16	0.15	0.00	0.00	74	76			93	0.037	103	103	4.2	-0.25	434	191	239	269	284		283.4	276	72	72			72	0.043
220	961.980	366.992	0.16	0.15	0.00	0.00	75	76			92	0.036	103	105	4.0	-0.2	412	189	223	265	278		273.4	260	71	71			71	0.040
230	963.608	368.439	0.16	0.14	0.00	0.00	75	76			91	0.038	101	100	3.8	-0.15	397	185	208	258	271		263.8	245	71	71			71	0.040
240	965.226	369.892	0.16	0.15	0.00	0.00	75	76			90	0.037	102	102	3.7	-0.15	386	183	200	254	263		257.2	237	72	72			72	0.035
250	966.843	371.353	0.16	0.15	0.00	0.00	74	76			90	0.036	104	104	3.5	-0.15	376	179	187	252	254		249.6	228	70	70			72	0.035
260	968.460	372.815	0.16	0.15	0.00	0.00	75	76			89	0.037	102	103	3.4	-0.15	367	176	179	248	245		243.0	224	70	72			72	0.035
270	970.081	374.279	0.16	0.15	0.00	0.00	75	76			89	0.037	102	103	3.3	-0.1	358	170	172	246	237		236.6	222	70	72			74	0.035
280	971.700	375.741	0.16	0.15	0.00	0.00	75	76			89	0.037	102	103	3.1	-0.15	352	168	170	246	231		233.4	218	70	72			74	0.033
290	973.317	377.204	0.16	0.15	0.00	0.00	75	76			88	0.038	100	101	3.0	-0.15	348	164	162	246	222		228.4	213	70	70			72	0.033
300	974.938	378.666	0.16	0.15	0.00	0.00	75	76			88	0.038	101	101	2.8	-0.15	341	164	158	248	216		225.4	211	70	70			74	0.030
310	976.551	380.130	0.16	0.15	0.00	0.00	75	76			88	0.037	102	103	2.7	-0.15	337	158	156	246	209		221.2	212	70	72			75	0.030
320	978.100	381.525	0.15	0.14	0.00	0.00	75	77			89	0.038	96	96	2.5	-0.15	335	162	154	240	207		219.6	210	70	70			77	0.030
330	979.703	382.961	0.16	0.14	0.00	0.00	76	77			90	0.037	101	101	2.4	-0.15	331	167	150	234	204		217.2	210	71	71			77	0.030
340	981.318	384.413	0.16	0.15	0.00	0.00	76	77			91	0.037	102	102	2.3	-0.1	343	168	151	235	200		219.4	209	72	74			78	0.030
350	982.939	385.852	0.16	0.14	0.00	0.00	77	78			91	0.038	101	99	2.1	-0.2	346	168	149	229	201		218.6	205	72	75			79	0.030
360	984.550	387.298	0.16	0.14	0.00	0.00	78	79			91	0.038	100	100	1.9	-0.15	349	169	148	229	201		219.2	201	73	75			79	0.030
370	986.158	388.731	0.16	0.14	0.00	0.00	78	79			91	0.037	101	100	1.8	-0.15	351	167	146	225	204		218.6	200	73	76			80	0.030
380	987.770	390.273	0.16	0.15	0.00	0.00	79	80			92	0.039	98	105	1.6	-0.15	356	168	146	224	207		220.2	194	74	76			80	0.028
390	989.390	391.619	0.16	0.13	0.00	0.00	79	80			92	0.037	102	94	1.5	-0.15	367	168	143	224	207		221.8	192	72	75			81	0.028
400	991.003	393.071	0.16	0.15	0.00	0.00	79	81			92	0.037	101	101	1.3	-0.15	377	169	141	225	210		224.4	188	73	77			81	0.027
410	992.626	394.500	0.16	0.14	0.00	0.00	80	81			92	0.039	99	97	1.2	-0.15	379	169	139	225	212		224.8	188	75	75			79	0.027
420	994.234	395.936	0.16	0.14	0.00	0.00	80	82			91	0.039	98	97	1.0	-0.15	373	171	137	223	212		223.2	184	73	75			82	0.025

OMNI-Test Laboratories, Inc.

Wood Heater Test Data - EPA Method 5G

Run: 7

Manufacturer:	Monessen	
Model:	Defiant 2N1	
Tracking No.:	1534	
Project No.:	227-S-39-3	
Test Date:	24-Apr-10	
Beginning Clock Time:	08:53	
Recording Interval:	10	min.
Total Sampling Time:	520	min.

Velocity Traverse Data									
	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	
Initial dP	0.028	0.042	0.044	0.039	0.027	0.042	0.044	0.042	"H2O
Initial Temp.	97	97	97	97	97	97	97	97	oF

OMNI Equipment Numbers:

PM Control Module:					
Dilution Tunnel MW(dry):	29.00	lb/lb-mole			
Dilution Tunnel MW(wet):	28.56	lb/lb-mole			
Dilution Tunnel H2O:	4.00	percent			
Dilution Tunnel Static:	-0.144	"H2O			
Pitot Tube Cp:	0.99				
Meter Box Y Factor:	0.994	(1)	0.996	(2)	
Barometric Pressure:	Begin	Middle	End	Average	
	29.76	29.6	29.58	29.65	"Hg

Signature/Date: 6/14/10

Tunnel Velocity:	13.38	ft/sec.
Intial Tunnel Flow:	142.5	scfm
Average Tunnel Flow:	142.2	scfm
Tunnel Area:	0.1963	ft2
Post-Test Leak Check (1):	0.0@5	cfm@"Hg
Post-Test Leak Check (2):	0.0@9	cfm@"Hg
Fuel Moisture (dry basis %):	19.27	
Total Particulate (1):	5.3	
Total Particulate (2):	4.4	

Elapsed Time	Particulate Sampling Data														Fuel Weight, lb		Wood Heater Temperature Data, oF										Stack
	Gas Meter Cubic Feet (1)	Gas Meter Cubic Feet (2)	Sample Rate, cfm (1)	Sample Rate, cfm (2)	Orifice dH (1)	Orifice dH (2)	Meter oF (1)	Meter oF (2)	Meter Vac. In. Hg. (1)	Meter Vac. In. Hg. (2)	Dilution Tunnel Temp.	Dilution Tunnel dP	Pro. Rate (10%) (1)	Pro. Rate (10%) (2)	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Catalyst Exit	Average Surface	Stack	Filter (1)	Filter (2)	Impinger exit (1)	Impinger exit (2)	Ambient	Draft In. H2O
430	995.857	397.378	0.16	0.14	0.00	0.00	81	82			91	0.039	99	98	0.9	-0.15	364	167	137	223	212		220.6	182	73	75			82	0.025
440	997.475	398.810	0.16	0.14	0.00	0.00	81	82			91	0.040	97	96	0.8	-0.1	352	168	138	220	213		218.2	179	74	76			81	0.025
450	999.089	400.243	0.16	0.14	0.00	0.00	81	82			91	0.040	97	96	0.7	-0.1	339	170	136	215	211		214.2	177	74	78			83	0.025
460	1000.713	401.678	0.16	0.14	0.00	0.00	81	83			90	0.040	97	96	0.6	-0.1	330	168	132	211	209		210.0	175	74	76			83	0.025
470	1002.330	403.118	0.16	0.14	0.00	0.00	82	83			90	0.040	97	96	0.5	-0.1	323	168	131	209	207		207.6	170	74	76			80	0.025
480	1003.953	404.555	0.16	0.14	0.00	0.00	82	83			90	0.040	97	96	0.4	-0.1	322	168	130	203	205		205.6	168	75	77			83	0.023
490	1005.561	405.995	0.16	0.14	0.00	0.00	82	83			90	0.039	97	97	0.3	-0.1	318	169	130	203	203		204.6	169	75	77			81	0.023
500	1007.188	407.430	0.16	0.14	0.00	0.00	82	83			90	0.038	100	98	0.2	-0.1	311	166	128	198	201		200.8	162	75	77			81	0.023
510	1008.812	408.867	0.16	0.14	0.00	0.00	82	83			90	0.039	98	97	0.1	-0.1	304	168	128	192	198		198.0	160	75	77			81	0.023
520	1010.413	410.228	0.16	0.14	0.00	0.00	82	83			89	0.039	97	92	0.0	-0.05	300	164	126	190	197		195.4	160	75	77			81	0.020
Avg/Total	83.873	75.345	0.16	0.14	0.00	0.00	75.68	77.02			96.53	0.038	100.79	100.81									130		72.83	73.75	#DIV/0!	#DIV/0!		0.041

PRINT

Final Laboratory Report - Method 5G Dual Train
Dilution Tunnel Particulate Calculations

Client Name:	Monessen	Equipment Numbers:	OMNI-00023	Run #:	7
Model:	Defiant 2N1		OMNI-00131	Train #:	A
Project No.:	227-S-39-3		OMNI-00342	Date:	04/24/10
Tracking No.:	1534		VC-1		

Sample Component	Reagent	Filter # or Probe #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	F558	120.4	116.6	3.8
B. Rear filter catch	Filter	F559	121.1	120.4	0.7
C. Probe catch	Probe	VC-7	86367.6	86366.8	0.8

Total Particulate, mg :	5.3

Component	Equations:
A. Front filter catch	Final (mg) - Tare (mg) = Particulate, mg
B. Rear filter catch	Final (mg) - Tare (mg) = Particulate, mg
C. Probe catch	Final (mg) - Tare (mg) = Particulate, mg

Analyst: _____ Date: 4/24/10

PRINT

Final Laboratory Report - Method 5G Dual Train
Dilution Tunnel Particulate Calculations

Client Name: Mouessen
Model: Defiant 2N1
Project No.: 227-S-39-3
Tracking No.: 1534

Equipment Numbers: OMNI-00023, OMNI-00131, OMNI-00342, VC-1

Run #: 7
Train #: B
Date: 04/24/10

Sample Component	Reagent	Filter # or Probe #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	F560	128.8	125.3	3.5
B. Rear filter catch	Filter	F561	117.0	116.4	0.6
C. Probe catch	Probe	VC-0	79819.1	79818.8	0.3

Total Particulate, mg :	4.4

Component	Equations:
A. Front filter catch	Final (mg) - Tare (mg) = Particulate, mg
B. Rear filter catch	Final (mg) - Tare (mg) = Particulate, mg
C. Probe catch	Final (mg) - Tare (mg) = Particulate, mg

Analyst: _____ Date: 6/2/10

Monessen Defiant 2N1
Run 7 - Category 2, Non-Cat
Pre-Burn Data

RecNum	TestTime	Scale(Kg)	Scale(lb)	ΔWeight(lb)	StkDraft	LabTemp	TopT	BotT	BackT	LftT	RhtT	StkTemps
0	0	0	0		0	61	0	0	0	0	0	0
10	10	6.33	13.95526	0	0.051	64	618	389	203	257	387	285
20	20	5.96	13.13955	0.81571037	0.045	62	515	364	191	253	344	253
30	30	5.74	12.65453	0.485016977	0.04	62	470	342	182	247	316	232
40	40	5.31	11.70655	0.947987727	0.054	64	412	320	186	238	297	310
50	50	4.85	10.69242	1.014126406	0.061	65	377	304	262	230	286	406
60	60	4.42	9.744432	0.947987727	0.062	65	375	293	321	225	282	419
70	70	3.83	8.443705	1.300727347	0.067	65	391	295	354	226	289	460
80	80	3.31	7.297301	1.146403763	0.066	66	400	285	402	231	293	456
90	90	3.02	6.65796	0.63934056	0.061	66	415	285	396	239	296	409
100	100	2.54	5.599741	1.058218859	0.055	66	429	285	364	253	303	361

FUEL DATA

Client: Manessen
Model: Defiant 2N1 (NC)
Project #: 227-S-10 Tracking #: ____
Date: 4/23/10 Test Crew: TC, JC Run #: 7
OMNI Equipment ID #: ____
FUEL LOAD PREPARED BY: Ralph ; Measured & moisture by TC & JC
FUEL: DOUGLAS-FIR SPECIES, UNTREATED, AIR-DRIED, STANDARD GRADE OR BETTER, DIMENSIONAL LUMBER.

PRE-BURN FUEL

MOISTURE CONTENT (METER -- DRY BASIS)

CALIBRATION: Cal Value (1) = 12% Actual Reading 12.0
Cal Value (2) = 22% Actual Reading 22.0

Piece	Length	Readings			Type
1	10 ft	20.3	20.9	20.2	2x4
2	10 ft	22.0	22.0	20.7	2x4
3	____ ft	____	____	____	____

Length of cut pieces: 30x8 inches Pre-Burn Fuel Average Moisture:

Time (clock): 6:15 Room Temperature (F): 70 Initials: JC

TEST FUEL

FUEL TYPE AND AMOUNT: 2 x 4 0 4 x 4 4
CALCULATED LOAD WEIGHT: ____ ACTUAL LOAD WEIGHT: 0 (2 x 4)
22.7 (4 x 4)
FUEL PIECE LENGTH: 21 inches 22.7 Total

MOISTURE CONTENT (METER -- DRY BASIS)

PIECE	READINGS			TYPE
1	18.3	19.5	19.1	4x4
2	19.1	19.5	20.7	4x4
3	19.1	19.3	19.1	
4	19.1	19.2	19.2	
5				
6				
7				
8				
9				
10				

OVERALL TEST FUEL LOAD MOISTURE AVERAGE: 19.27 %

Time (clock): 6:15 Room Temperature (F): 70 Initials: JC

Technician signature: [signature] Date: 4/24/10

4-69 OF 4-155

Run Notes

Client: Monessen
Model: Defiant 2W1
Project #: 227-S-39-3
Tracking #: 1534
Run #: 7 Date: 4/24/10
Test Crew: TC, JC
OMNI Equipment ID #(s):

PREBURN

DESCRIBE OR SKETCH AIR OR THERMOMSTAT SETTINGS BELOW:
(SETTINGS MUST BE ACCURATE AND REPRODUCABLE)

PRIMARY:

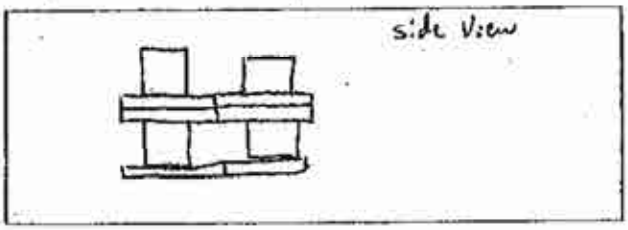
SECONDARY: N/A
TERTIARY:
FAN: low

PREBURN SETTINGS AND ACTIVITIES

TIME	AIR (THERMO) CHANGES PRIMARY/SECONDARY/TERTIARY	FAN SETTING CHANGE	ADD FUEL + WT.	ADD FUEL - WT.	RAKE COAL	COMMENT
0	Test Setting					
34					X	
66 min					X	
90 min				0.5lbs		
105	Fuel on, test start				X	

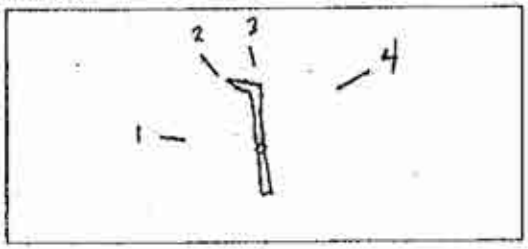
TEST

TEST FUEL CONFIGURATION SKETCH
(INDICATE VIEW ANGLE)



START UP PROCEDURES
BYPASS: 1 min
FUEL LOADING 1 min
DOOR: 1 min
PRIMARY AIR: Test setting @ 0 min (no change)
OTHER: N/A

DESCRIBE OR SKETCH TEST SETTINGS BELOW:
(SETTINGS MUST BE ACCURATE AND REPRODUCIBLE)
PRIMARY:



SECONDARY: N/A
TERTIARY:
FAN: low

Technician signature: Date: 4/24/10

4-70 OF 4-155

OMNI-Test Laboratories, Inc.

Supplemental Data EPA 5G/5H

Client: Homestead

Model: Defiant 2N1

Project #: 227-5-39-3 Tracking #: 1534

Date: 4/24/10 Run #: 7 (Gas rel) Booth: _____

Test Crew: TC, JC Start Time: 8:53 Stop Time: 5:37

OMNI Equipment #(s): _____

Gas Analyzer Train Leak Check:

Stack: - Dilution Tunnel (Method 5G Only):

Initial: _____ Initial: _____

Final: _____ Final: _____

Calibrations: Span Gas CO_2: _____ O_2: _____ CO: _____ CO_2(DT): _____

	N_2 Span	N_2 Span	N_2 Span	N_2 Span	N_2 Span	N_2 Span	N_2 Span
Time							
O_2							
CO_2							
CO							
CO_2 (DT)							

Stack Diameter (inches): 6

Air Velocity (fl/min): Initial: < 50 Final: < 50

Scale Audit (lbs): Pretest: 10.0 Post Test: 10.0

Induced Draft: 0 %Smoke Capture: 100 %

Pitot Tube Leak Test: Pre: 0.0 @ 3.1 in H_2O Post: 0.0 @ 3.0 in H_2O

Flue Pipe Cleaned Prior to First Test in Series: Date: 4/18/10 Initials: JC

	Initial	Middle	Ending
Pb (in/Hg)	29.76 in Hg	29.60	29.58
Room Temp (°F)	68 °F	76 °F	81 °F

Technician signature: _____ Date: 4/24/10

4-71 OF 4-155

Run 8

OMNI-Test Laboratories, Inc.

Wood Heater Test Data - EPA Method 5G

Manufacturer: Monessen
Model: Defiant 2N1
Project No.: 227-S-39-3
Tracking No.: 1534
Run: 8
Test Date: 04/25/10

Burn Rate	0.95 kg/hr dry
Average Tunnel Temperature	94 degrees Fahrenheit
Average Gas Velocity in Dilution Tunnel - vs	13.1 feet/second
Average Gas Flow Rate in Dilution Tunnel - Qsd	8221.0 dscf/hour
Average Delta p	0.036 inches H20
Average Delta H	0.00 inches H20
Total Time of Test	530 minutes

	AVERAGE	SAMPLE TRAIN 1	SAMPLE TRAIN 2
Total Sample Volume - Vm	80.57 cubic feet	84.30 cubic feet	76.84 cubic feet
Average Gas Meter Temperature	77 degrees Fahrenheit	76 degrees Fahrenheit	78 degrees Fahrenheit
Total Sample Volume (Standard Conditions) - Vmstd	76.8 dscf	80.4 dscf	73.3 dscf
Total Particulates - mn		27.9 mg	27.5 mg
Particulate Concentration (dry-standard)	0.00038 grams/dscf	0.00035 grams/dscf	0.00038 grams/dscf
Particulate Emission Rate	2.97 grams/hour	2.85 grams/hour	3.09 grams/hour
Adjusted Emissions	4.49 grams/hour	4.34 grams/hour	4.64 grams/hour
Difference from Average		0.15 grams/hour	0.15 grams/hour
7.5% of the average emission rate	0.34		
Weighted Average Emission Rate Limit	4.10 grams/hour		
7.5% of the weighted average emission rate limit	0.31		
	Results Are Acceptable		

OMNI-Test Laboratories, Inc.

Wood Heater Test Data - EPA Method 5G

Run: 8

Manufacturer: Monessen
Model: Defiant 2NI
Tracking No.: 1534
Project No.: 227-S-39-3
Test Date: 25-Apr-10
Beginning Clock Time: 10:27
Recording Interval: 10 min.
Total Sampling Time: 530 min.

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	
Initial dP	0.026	0.039	0.045	0.041	0.025	0.039	0.041	0.036	"H2O
Initial Temp.	101	101	101	101	101	101	101	101	oF

OMNI Equipment Numbers:

PM Control Module:
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.56 lb/lb-mole
Dilution Tunnel H2O: 4.00 percent
Dilution Tunnel Static: -0.136 "H2O
Pitot Tube Cp: 0.99
Meter Box Y Factor: 0.994 (1) 0.996 (2)

Barometric Pressure:	Begin	Middle	End	Average
	29.30	29.1	29.1	29.17 "Hg

Signature/Date: 6/4/10

Tunnel Velocity: 13.06 ft/sec.
Intial Tunnel Flow: 136.9 scfm
Average Tunnel Flow: 137.0 scfm
Tunnel Area: 0.1963 ft2
Post-Test Leak Check (1): 0.0@5 cfm@"Hg
Post-Test Leak Check (2): 0.0@9 cfm@"Hg
Fuel Moisture (dry basis %): 20.7
Total Particulate (1): 27.9
Total Particulate (2): 27.5

Elapsed Time	Particulate Sampling Data														Fuel Weight, lb		Wood Heater Temperature Data, oF											Stack
	Gas Meter Cubic Feet (1)	Gas Meter Cubic Feet (2)	Sample Rate, cfm (1)	Sample Rate, cfm (2)	Orifice dH (1)	Orifice dH (2)	Meter oF (1)	Meter oF (2)	Meter Vac. In. Hg. (1)	Meter Vac. In. Hg. (2)	Dilution Tunnel Temp.	Dilution Tunnel dP	Pro. Rate (10%) (1)	Pro. Rate (10%) (2)	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Catalyst Exit	Average Surface	Stack	Filter (1)	Filter (2)	Impinger exit (1)	Impinger exit (2)	Ambient	Draft In. H2O
0	10.629	410.446			0.00	0.00	72	72			101	0.036			22.3		438	273	318	262	299		318.0	331	69	69			71	0.045
10	12.332	411.985	0.17	0.15	0.00	0.00	72	73			97	0.036	109	108	21.6	-0.7	347	260	306	252	276		288.2	328	72	72			69	0.045
20	13.970	413.465	0.16	0.15	0.00	0.00	72	73			99	0.035	106	105	20.9	-0.7	302	250	312	232	250		269.2	360	72	72			72	0.050
30	15.568	414.923	0.16	0.15	0.00	0.00	72	74			102	0.036	102	102	20.0	-0.9	280	235	330	217	232		258.8	400	72	72			72	0.053
40	17.173	416.375	0.16	0.15	0.00	0.00	73	74			108	0.036	103	102	18.8	-1.2	293	226	356	211	224		262.0	443	72	74			72	0.058
50	18.761	417.833	0.16	0.15	0.00	0.00	73	74			109	0.037	101	102	17.7	-1.1	337	215	369	207	220		269.6	441	72	74			72	0.060
60	20.360	419.289	0.16	0.15	0.00	0.00	73	75			111	0.036	103	103	16.5	-1.2	372	207	374	209	220		276.4	448	72	74			72	0.060
70	21.951	420.747	0.16	0.15	0.00	0.00	73	75			111	0.036	103	103	15.3	-1.2	387	201	370	212	225		279.0	441	72	75			70	0.060
80	23.541	422.208	0.16	0.15	0.00	0.00	74	75			112	0.035	104	105	14.1	-1.15	403	197	368	216	236		284.0	444	73	75			73	0.060
90	25.137	423.668	0.16	0.15	0.00	0.00	74	76			114	0.036	103	103	12.7	-1.4	444	193	373	223	249		296.4	451	75	77			73	0.060
100	26.733	425.128	0.16	0.15	0.00	0.00	74	76			114	0.037	102	102	11.7	-1.05	470	193	366	230	264		304.6	449	75	77			71	0.060
110	28.322	426.591	0.16	0.15	0.00	0.00	74	76			112	0.035	104	105	10.7	-0.95	490	189	360	239	282		312.0	421	76	76			74	0.058
120	29.913	428.057	0.16	0.15	0.00	0.00	75	77			107	0.037	100	101	9.8	-0.9	501	191	341	248	297		315.6	371	76	76			74	0.055
130	31.510	429.516	0.16	0.15	0.00	0.00	75	77			104	0.035	103	103	9.1	-0.7	491	190	311	252	309		310.6	348	76	76			74	0.050
140	33.099	430.985	0.16	0.15	0.00	0.00	75	77			102	0.036	101	103	8.5	-0.65	481	188	285	257	316		305.4	329	75	77			73	0.048
150	34.692	432.438	0.16	0.15	0.00	0.00	76	77			100	0.036	101	101	7.9	-0.6	463	184	263	257	315		296.4	313	75	75			72	0.045
160	36.288	433.900	0.16	0.15	0.00	0.00	76	77			99	0.036	101	102	7.3	-0.55	455	184	247	255	314		291.0	307	75	75			75	0.045
170	37.875	435.370	0.16	0.15	0.00	0.00	76	78			99	0.035	102	104	6.9	-0.45	455	182	238	258	310		288.6	301	76	76			76	0.045
180	39.466	436.820	0.16	0.14	0.00	0.00	76	78			98	0.035	102	102	6.3	-0.55	451	182	232	262	305		286.4	286	75	73			73	0.043
190	41.057	438.277	0.16	0.15	0.00	0.00	76	78			97	0.035	102	103	5.9	-0.45	440	178	217	258	303		279.2	271	73	73			73	0.040
200	42.617	439.739	0.16	0.15	0.00	0.00	77	78			95	0.034	101	104	5.4	-0.45	441	181	207	256	298		276.6	259	74	74			76	0.035
210	44.218	441.266	0.16	0.15	0.00	0.00	77	78			94	0.036	101	106	5.1	-0.35	454	178	198	258	293		276.2	250	74	74			74	0.035
220	45.810	442.704	0.16	0.14	0.00	0.00	77	78			93	0.036	100	99	4.9	-0.2	458	175	187	259	285		272.8	237	74	72			76	0.035
230	47.389	444.047	0.16	0.13	0.00	0.00	77	78			92	0.036	99	93	4.6	-0.25	448	173	179	257	281		267.6	227	75	72			75	0.035
240	48.970	445.490	0.16	0.14	0.00	0.00	77	78			92	0.036	99	100	4.4	-0.2	434	170	172	254	272		260.4	218	74	72			76	0.033
250	50.553	446.940	0.16	0.14	0.00	0.00	77	79			91	0.036	99	100	4.2	-0.25	429	169	164	253	264		255.8	212	73	73			77	0.030
260	52.142	448.380	0.16	0.14	0.00	0.00	77	78			90	0.035	101	101	4.0	-0.2	425	167	160	251	255		251.6	208	73	73			77	0.030
270	53.724	449.826	0.16	0.14	0.00	0.00	77	79			90	0.037	98	98	3.8	-0.2	418	165	158	251	249		248.2	201	73	73			77	0.030
280	55.306	451.275	0.16	0.14	0.00	0.00	77	79			90	0.035	101	101	3.6	-0.15	404	164	151	246	244		241.8	196	72	72			77	0.028
290	56.887	452.723	0.16	0.14	0.00	0.00	78	79			89	0.036	99	100	3.4	-0.2	399	163	148	242	238		238.0	197	73	71			77	0.028
300	58.478	454.165	0.16	0.14	0.00	0.00	78	79			89	0.035	101	101	3.3	-0.15	399	158	148	238	234		235.4	193	73	73			77	0.028
310	60.063	455.607	0.16	0.14	0.00	0.00	78	79			89	0.036	99	99	3.1	-0.2	401	156	143	236	231		233.4	190	73	71			77	0.028
320	61.640	457.050	0.16	0.14	0.00	0.00	78	79			89	0.036	99	99	2.9	-0.2	396	156	143	234	229		231.6	191	73	73			77	0.025
330	63.227	458.499	0.16	0.14	0.00	0.00	78	79			89	0.036	99	100	2.7	-0.15	396	154	143	234	229		231.2	188	73	71			77	0.025
340	64.815	459.940	0.16	0.14	0.00	0.00	78	79			88	0.035	101	100	2.5	-0.2	394	154	137	231	227		228.6	184	71	73			77	0.025
350	66.400	461.382	0.16	0.14	0.00	0.00	78	79			88	0.034	102	102	2.4	-0.1	394	150	137	231	227		227.8	184	71	71			77	0.025
360	67.980	462.820	0.16	0.14	0.00	0.00	78	79			88	0.036	99	99	2.2	-0.2	392	150	135	227	221		225.0	180	73	71			77	0.025
370	69.563	464.262	0.16	0.14	0.00	0.00	78	79			88	0.036	99	99	2.1	-0.1	390	150	133	227	218		223.6	178	73	71			77	0.025
380	71.156	465.707	0.16	0.14	0.00	0.00	78	79			87	0.036	100	99	2.0	-0.15	383	148	133	227	216		221.4	175	71	73			75	0.025
390	72.740	467.150	0.16	0.14	0.00	0.00	78	79			87	0.036	99	99	1.8	-0.15	372	147	134	224	214		218.2	177	72	70			77	0.025
400	74.321	468.594	0.16	0.14	0.00	0.00	78	79			87	0.036	99	99	1.7	-0.15	365	147	147	224	222		221.0	177	72	70			75	0.025
410	75.905	470.035	0.16	0.14	0.00	0.00	77	79			86	0.036	99	99	1.5	-0.15	350	145	158	224	224		220.2	175	70	72			74	0.025
420	77.498	471.478	0.16	0.14	0.00	0.00	77	79			86	0.036	100	99	1.4	-0.1	346	145	168	226	222		221.4	175	72	72			76	0.025

OMNI-Test Laboratories, Inc.

Wood Heater Test Data - EPA Method 5G

Run: 8

Manufacturer: Monessen
Model: Defiant 2N1
Tracking No.: 1534
Project No.: 227-S-39-3
Test Date: 25-Apr-10
Beginning Clock Time: 10:27
Recording Interval: 10 min.
Total Sampling Time: 530 min.

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	
Initial dP	0.026	0.039	0.045	0.041	0.025	0.039	0.041	0.036	"H2O
Initial Temp.	101	101	101	101	101	101	101	101	oF

OMNI Equipment Numbers:

PM Control Module:
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.56 lb/lb-mole
Dilution Tunnel H2O: 4.00 percent
Dilution Tunnel Static: -0.136 "H2O
Pitot Tube Cp: 0.99
Meter Box Y Factor: 0.994 (1) 0.996 (2)

Barometric Pressure:	Begin	Middle	End	Average
	29.30	29.1	29.1	29.17 "Hg

Signature/Date: 6/14/10

Tunnel Velocity: 13.06 ft/sec.
Intial Tunnel Flow: 136.9 scfm
Average Tunnel Flow: 137.0 scfm
Tunnel Area: 0.1963 ft2
Post-Test Leak Check (1): 0.0@5 cfm@"Hg
Post-Test Leak Check (2): 0.0@9 cfm@"Hg
Fuel Moisture (dry basis %): 20.7
Total Particulate (1): 27.9
Total Particulate (2): 27.5

Elapsed Time	Particulate Sampling Data														Fuel Weight, lb		Wood Heater Temperature Data, oF											Stack
	Gas Meter Cubic Feet (1)	Gas Meter Cubic Feet (2)	Sample Rate, cfm (1)	Sample Rate, cfm (2)	Orifice dH (1)	Orifice dH (2)	Meter oF (1)	Meter oF (2)	Meter Vac. In. Hg. (1)	Meter Vac. In. Hg. (2)	Dilution Tunnel Temp.	Dilution Tunnel dP	Pro. Rate (10%) (1)	Pro. Rate (10%) (2)	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Catalyst Exit	Average Surface	Stack	Filter (1)	Filter (2)	Impinger exit (1)	Impinger exit (2)	Ambient	Draft In. H2O
430	79.080	472.910	0.16	0.14	0.00	0.00	77	79			86	0.037	98	97	1.3	-0.15	341	144	170	224	222		220.2	172	72	70			74	0.023
440	80.664	474.357	0.16	0.14	0.00	0.00	77	78			85	0.036	99	99	1.1	-0.15	343	142	172	224	220		220.2	172	72	72			74	0.023
450	82.255	475.790	0.16	0.14	0.00	0.00	77	78			85	0.034	102	101	1.0	-0.15	343	146	172	223	215		219.8	172	71	69			76	0.023
460	83.842	477.235	0.16	0.14	0.00	0.00	77	78			86	0.036	99	99	0.9	-0.1	340	148	172	226	215		220.2	172	71	71			76	0.023
470	85.425	478.670	0.16	0.14	0.00	0.00	77	78			86	0.036	99	99	0.7	-0.15	332	152	172	226	215		219.4	170	73	71			78	0.023
480	87.011	480.103	0.16	0.14	0.00	0.00	78	79			87	0.036	99	98	0.6	-0.15	328	155	174	224	213		218.8	170	72	72			78	0.023
490	88.593	481.535	0.16	0.14	0.00	0.00	78	79			86	0.036	99	98	0.4	-0.15	326	155	172	222	213		217.6	168	74	72			78	0.020
500	90.177	482.975	0.16	0.14	0.00	0.00	78	80			86	0.035	100	100	0.3	-0.1	322	160	175	218	211		217.2	166	74	72			79	0.020
510	91.755	484.411	0.16	0.14	0.00	0.00	79	80			86	0.036	98	98	0.2	-0.15	318	158	173	216	209		214.8	166	72	72			79	0.023
520	93.350	485.860	0.16	0.14	0.00	0.00	79	80			86	0.036	99	99	0.1	-0.1	315	160	171	214	209		213.8	164	75	72			79	0.020
530	94.929	487.290	0.16	0.14	0.00	0.00	79	80			86	0.035	100	99	0.0	-0.05	309	160	171	212	210		212.4	167	75	73			79	0.020
Avg/Total	84.300	76.843	0.16	0.14	0.00	0.00	76.30	77.63			94.41	0.036	100.78	100.78									106		73.07	72.80	#DIV/0!	#DIV/0!		0.036

PRINT

Final Laboratory Report - Method 5G Dual Train
Dilution Tunnel Particulate Calculations

Client Name: Monessen
Model: Defiant 2NI
Project No.: 227-S-39-3
Tracking No.: 1534

Equipment Numbers: OMNI-00023, OMNI-00131, OMNI-00342, VC-1

Run #: 8
Train #: A
Date: 04/25/10

Sample Component	Reagent	Filter # or Probe #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	F562	146.1	120.4	25.7
B. Rear filter catch	Filter	F563	126.0	124.9	1.1
C. Probe catch	Probe	VC-C	85527.3	85526.2	1.1

Total Particulate, mg :	27.9

Component	Equations:
A. Front filter catch	Final (mg) - Tare (mg) = Particulate, mg
B. Rear filter catch	Final (mg) - Tare (mg) = Particulate, mg
C. Probe catch	Final (mg) - Tare (mg) = Particulate, mg

Analyst: _____ Date: 4/2/10

PRINT

Final Laboratory Report - Method 5G Dual Train
Dilution Tunnel Particulate Calculations

Client Name: Monessen
Model: Defiant 2N1
Project No.: 227-S-39-3
Tracking No.: 1534

Equipment Numbers: OMNI-00023, OMNI-00131, OMNI-00342, VC-1

Run #: 8
Train #: B
Date: 04/25/10

Sample Component	Reagent	Filter # or Probe #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	F564	141.9	116.7	25.2
B. Rear filter catch	Filter	F565	120.8	119.6	1.2
C. Probe catch	Probe	VC-S	73572.5	73571.4	1.1

Total Particulate, mg :	27.5

Component	Equations:
A. Front filter catch	Final (mg) - Tare (mg) = Particulate, mg
B. Rear filter catch	Final (mg) - Tare (mg) = Particulate, mg
C. Probe catch	Final (mg) - Tare (mg) = Particulate, mg

Analyst: [signature] Date: 6/2/10

STOVE TEMPERATURE TEST DATA - METHOD 5G

Client/Model: Monessen / Defiant 2N1 Project #: 227-5-39-3 Tracking #: 1534

Date: 4/25/10 Test Crew: JC Run #: 8

OMNI Equipment ID #:

Preburn [X] Test [ ] Coal Bed: 5.236 lb Data: 0 = Range: 5.52 - 4.45 lb Actual: Coal Bed:

Time	Fuel(Kg) Weight	Delta Weight	Stack Draft	TEMPERATURES (oF) Ambient	Top	Bottom	Back	Left	Right	Flue	Catalyst
0	7.01	—	0	64							NA
10	6.39	0.62	0.055	68	575	415	211	252	467	322	
20	5.96	0.43	0.048	69	500	377	208	251	409	283	
30	5.67	0.29	0.044	69	464	340	199	249	371	260	
40	5.24	0.43	0.055	69	403	323	208	238	344	351	
50	4.76	0.48	0.060	69	380	300	276	232	317	406	
60	4.24	0.52	0.063	70	387	289	335	226	300	441	
70	3.61	0.63	0.066	70	415	289	376	228	296	426	
80	3.22	0.39	0.060	70	417	285	400	235	298	426	
90	3.02	0.20	0.054	71	429	281	375	249	301	377	
100 ~~00~~	2.59	0.43	0.052	71	440	279	340	253	301	362	
110 ~~10~~	2.47	0.12	0.053	71	438	271	320	262	299	334	
20											
30											
40											
50											
60											
70											
80											
90											
AVG											

Technician signature: Date: 5/6/10

4-78 OF 4-155

FUEL DATA

Client: Monessen
Model: ~~Defiant~~ 2N1
Project #: 227-S-10 Tracking #: 1534
Date: 4/25/10 Test Crew: JC Run #: 8
OMNI Equipment ID #: _____
FUEL LOAD PREPARED BY: Ralph ; Measured & moisture by Jeremy Clark
FUEL: DOUGLAS-FIR SPECIES, UNTREATED, AIR-DRIED, STANDARD GRADE OR BETTER, DIMENSIONAL LUMBER.

PRE-BURN FUEL

MOISTURE CONTENT (METER -- DRY BASIS)

CALIBRATION: Cal Value (1) = 12% Actual Reading 12.0%
Cal Value (2) = 22% Actual Reading 22.0%

Piece	Length				Type
1	14.3 ~~10~~ ft	20.6	22.6	18.1	2x4
2	14.3 ~~10~~ ft	19.3	20.0	22.6	2x4
3	____ ft				

Length of cut pieces: ~~3048~~ 43x8 inches Pre-Burn Fuel Average Moisture: 20.53 %

Time (clock): 7:50 Room Temperature (F): 70 °F Initials: JC

TEST FUEL

FUEL TYPE AND AMOUNT: 2 × 4 Ø 4 × 4 4
CALCULATED LOAD WEIGHT: _____ ACTUAL LOAD WEIGHT: Ø (2 × 4)
22.25 (4 × 4)
FUEL PIECE LENGTH: 21 inches 22.25 Total

MOISTURE CONTENT (METER -- DRY BASIS)

PIECE	READINGS			TYPE
1	21.3	22.0	22.0	4x4
2	18.9	21.3	18.5	4x4
3	22.4	18.3	21.0	4x4
4	21.6	22.0	19.3	4x4
5				
6				
7				
8				
9				
10				

OVERALL TEST FUEL LOAD MOISTURE AVERAGE: 20.7%

Time (clock): 7:30 Room Temperature (F): 70 °F Initials: JC

Technician signature: _____ Date: 4/25/10

4-79 OF 4-155

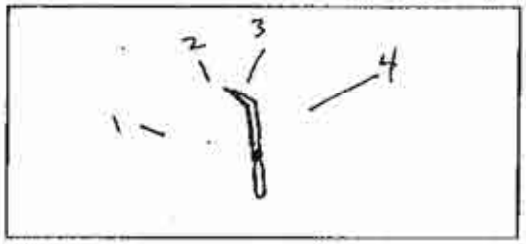
Run Notes

Client: Monessen
Model: Defiant 2N1
Project #: 227-5-34-3
Tracking #: 1534
Run #: 8 Date: 4/25/10
Test Crew: JC
OMNI Equipment ID #(s):

PREBURN

DESCRIBE OR SKETCH AIR OR THERMOMSTAT SETTINGS BELOW:
(SETTINGS MUST BE ACCURATE AND REPRODUCABLE)

PRIMARY:



SECONDARY: N/A

TERTIARY:

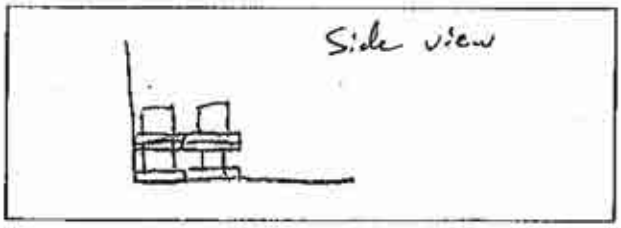
FAN: Low

PREBURN SETTINGS AND ACTIVITIES

TIME	AIR (THERMO) CHANGES PRIMARY/SECONDARY/TERTIARY	FAN SETTING CHANGE	ADD FUEL + WT.	ADD FUEL - WT.	RAKE COAL	COMMENT
0	Test Setting					
32					X	
67					X	
97				0.5 lb		
110	Fuel on, test start				X	

TEST

TEST FUEL CONFIGURATION SKETCH
(INDICATE VIEW ANGLE)

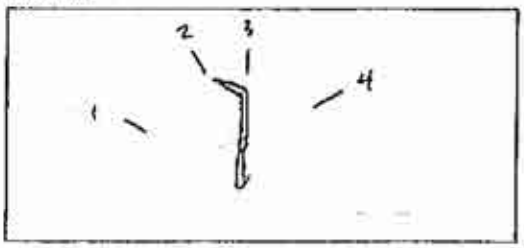


START UP PROCEDURES

BYPASS: 1 min 30 sec
FUEL LOADING 1 min 30 sec
DOOR: 1 min 30 sec
PRIMARY AIR: Test setting @ 0 min (no change)

OTHER: N/A

DESCRIBE OR SKETCH TEST SETTINGS BELOW:
(SETTINGS MUST BE ACCURATE AND REPRODUCIBLE)
PRIMARY:



SECONDARY: N/A

TERTIARY:

FAN: low

Technician signature: Date: 4/25/10

4-80 OF 4-155

Supplemental Data EPA 5G/5H

Client: Monessen

Model: Defiant 2N1

Project #: 227-5-34-3 Tracking #: 1534

Date: 4/25/10 Run #: 8 Booth: _____

Test Crew: JC Start Time: 10:27 Stop Time: 7:17

OMNI Equipment #(s): _____

Gas Analyzer Train Leak Check:

Stack: Initial: _____ Final: _____

Dilution Tunnel (Method 5G Only): Initial: _____ Final: _____

Calibrations: Span Gas CO_2: _____ O_2: _____ CO: _____ CO_2(DT): _____

	N_2 Span	N_2 Span	N_2 Span	N_2 Span	N_2 Span	N_2 Span	N_2 Span
Time							
O_2							
CO_2							
CO							
CO_2 (DT)							

Stack Diameter (inches): 6

Air Velocity (ft/min): Initial: <50 Final: <50

Scale Audit (lbs): Pretest: 10.0 Post Test: 10.0

Induced Draft: 0 %Smoke Capture: 100%

Pitot Tube Leak Test: Pre: 0.0 @ 3.0 in H_2O Post: 0.0 @ 3.1 in H_2O

Flue Pipe Cleaned Prior to First Test in Series: Date: 4/18/10 Initials: JC

	Initial	Middle	Ending
Pb (in/Hg)	29.30	29.10	29.10
Room Temp (°F)	79 °F	79 °F	79 °F

Technician signature: _____ Date: 4/25/10

Run 9

OMNI-Test Laboratories, Inc.

Wood Heater Test Data - EPA Method 5G

Run: 9

Manufacturer: Monessen
Model: Defiant 2N1
Tracking No.: 1534
Project No.: 227-S-39-3
Test Date: 26-Apr-10
Beginning Clock Time: 09:47
Recording Interval: 10 min.
Total Sampling Time: 580 min.

OMNI Equipment Numbers:

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	
Initial dP	0.028	0.041	0.042	0.039	0.025	0.040	0.045	0.039	"H2O
Initial Temp.	105	105	105	105	105	105	105	105	oF

PM Control Module:
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.56 lb/lb-mole
Dilution Tunnel H2O: 4.00 percent
Dilution Tunnel Static: -0.144 "H2O
Pitot Tube Cp: 0.99
Meter Box Y Factor: 0.994 (1) 0.996 (2)
Barometric Pressure: Begin 28.98, Middle 28.91, End 28.86, Average 28.92 "Hg

Signature/Date: 6/14/10

Tunnel Velocity: 13.41 ft/sec.
Intial Tunnel Flow: 137.6 scfm
Average Tunnel Flow: 139.5 scfm
Tunnel Area: 0.1963 ft2
Post-Test Leak Check (1): 0.0@5 cfm@"Hg
Post-Test Leak Check (2): 0.0@9 cfm@"Hg
Fuel Moisture (dry basis %): 19.8
Total Particulate (1): 25.6
Total Particulate (2): 24.4

Elapsed Time	Particulate Sampling Data														Fuel Weight, lb		Wood Heater Temperature Data, oF											Stack
	Gas Meter Cubic Feet (1)	Gas Meter Cubic Feet (2)	Sample Rate, cfm (1)	Sample Rate, cfm (2)	Orifice dH (1)	Orifice dH (2)	Meter oF (1)	Meter oF (2)	Meter Vac. In. Hg. (1)	Meter Vac. In. Hg. (2)	Dilution Tunnel Temp.	Dilution Tunnel dP	Pro. Rate (10%) (1)	Pro. Rate (10%) (2)	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Catalyst Exit	Average Surface	Stack	Filter (1)	Filter (2)	Impinger exit (1)	Impinger exit (2)	Ambient	Draft In. H2O
0	94.991	487.372			0.00	0.00	73	73			105	0.037			22.2		462	301	457	310	312		368.4	316	67	71			71	0.045
10	96.650	488.850	0.17	0.15	0.00	0.00	73	74			97	0.036	108	109	21.6	-0.6	360	290	436	288	293		333.4	319	71	73			71	0.045
20	98.292	490.300	0.16	0.14	0.00	0.00	73	74			98	0.037	105	106	21.0	-0.65	310	278	436	262	267		310.6	356	71	74			71	0.048
30	99.933	491.749	0.16	0.14	0.00	0.00	74	75			101	0.036	107	107	20.2	-0.8	289	267	450	244	248		299.6	398	72	74			72	0.050
40	101.573	493.198	0.16	0.14	0.00	0.00	74	75			105	0.036	107	107	19.2	-1	289	254	476	233	235		297.4	430	72	74			72	0.055
50	103.180	494.617	0.16	0.14	0.00	0.00	75	76			107	0.038	102	102	18.1	-1.1	309	244	496	227	231		301.4	437	75	75			75	0.058
60	104.786	496.040	0.16	0.14	0.00	0.00	75	76			108	0.037	103	104	17.0	-1.1	347	236	507	223	232		309.0	440	75	77			75	0.058
70	106.395	497.455	0.16	0.14	0.00	0.00	76	77			110	0.037	104	104	15.9	-1.1	377	228	514	223	236		315.6	443	76	78			76	0.058
80	107.995	498.875	0.16	0.14	0.00	0.00	76	77			110	0.038	102	103	14.8	-1.1	401	224	516	226	245		322.4	445	76	78			76	0.058
90	109.602	500.299	0.16	0.14	0.00	0.00	76	77			110	0.039	101	102	13.7	-1.05	424	218	517	231	259		329.8	441	76	78			76	0.058
100	111.208	501.722	0.16	0.14	0.00	0.00	77	78			111	0.038	102	103	12.7	-1	435	214	515	235	274		334.6	439	77	79			75	0.060
110	112.821	503.150	0.16	0.14	0.00	0.00	77	78			110	0.038	102	103	11.7	-1.05	446	210	515	240	290		340.2	433	77	79			75	0.060
120	114.422	504.570	0.16	0.14	0.00	0.00	77	79			109	0.039	100	101	10.8	-0.9	464	208	511	245	308		347.2	423	78	80			75	0.058
130	116.033	505.997	0.16	0.14	0.00	0.00	77	79			109	0.039	101	101	9.9	-0.9	475	206	507	249	321		351.6	416	78	78			76	0.058
140	117.634	507.415	0.16	0.14	0.00	0.00	78	79			106	0.038	101	102	9.1	-0.75	480	202	497	259	332		354.0	384	78	78			76	0.055
150	119.245	508.838	0.16	0.14	0.00	0.00	78	80			103	0.039	100	100	8.5	-0.6	484	205	469	263	339		352.0	346	76	79			76	0.050
160	120.851	510.248	0.16	0.14	0.00	0.00	78	80			101	0.037	102	102	8.0	-0.5	472	203	407	268	340		338.0	305	77	77			77	0.048
170	122.458	511.659	0.16	0.14	0.00	0.00	78	80			100	0.037	102	102	7.6	-0.45	438	199	362	262	331		318.4	281	75	75			77	0.048
180	124.067	513.084	0.16	0.14	0.00	0.00	78	80			98	0.037	102	103	7.1	-0.45	413	203	322	257	322		303.4	257	75	75			77	0.043
190	125.669	514.498	0.16	0.14	0.00	0.00	79	80			97	0.037	101	102	6.7	-0.4	404	201	291	252	309		291.4	237	74	74			76	0.043
200	127.276	515.923	0.16	0.14	0.00	0.00	78	80			95	0.037	102	102	6.3	-0.4	402	192	268	246	292		280.0	227	75	75			77	0.040
210	128.876	517.342	0.16	0.14	0.00	0.00	79	80			94	0.039	98	99	6.0	-0.35	392	188	251	242	275		269.6	216	73	75			77	0.038
220	130.482	518.761	0.16	0.14	0.00	0.00	79	80			93	0.039	99	99	5.7	-0.3	390	180	236	243	258		261.4	208	73	76			78	0.035
230	132.087	520.178	0.16	0.14	0.00	0.00	78	80			92	0.038	100	100	5.4	-0.3	478	203	437	266	342		345.2	327	77	77			77	0.035
240	133.671	521.593	0.16	0.14	0.00	0.00	78	80			92	0.037	100	101	5.2	-0.2	461	201	383	266	335		329.2	292	75	77			77	0.035
250	135.269	522.999	0.16	0.14	0.00	0.00	78	80			91	0.037	101	101	4.9	-0.25	422	201	342	259	327		310.2	266	75	75			75	0.030
260	136.860	524.400	0.16	0.14	0.00	0.00	79	80			91	0.037	100	100	4.8	-0.15	406	201	307	255	315		296.8	244	74	74			76	0.030
270	138.458	525.805	0.16	0.14	0.00	0.00	79	80			91	0.038	99	99	4.6	-0.2	402	198	278	250	300		285.6	231	74	74			76	0.030
280	140.052	527.204	0.16	0.14	0.00	0.00	79	80			91	0.037	100	100	4.4	-0.2	403	190	260	244	283		276.0	218	73	75			77	0.030
290	141.612	528.642	0.16	0.14	0.00	0.00	79	80			91	0.038	97	102	4.2	-0.15	384	185	243	243	267		264.4	213	74	76			78	0.028
300	143.240	530.005	0.16	0.14	0.00	0.00	79	80			90	0.038	101	96	4.0	-0.25	395	178	232	245	252		260.4	204	74	74			78	0.028
310	144.835	531.408	0.16	0.14	0.00	0.00	79	80			90	0.037	100	100	3.8	-0.15	408	176	228	247	247		261.2	200	74	74			78	0.025
320	146.422	532.803	0.16	0.14	0.00	0.00	79	80			89	0.037	100	100	3.7	-0.15	410	172	219	254	243		259.6	195	74	74			78	0.025
330	148.019	534.203	0.16	0.14	0.00	0.00	79	80			90	0.038	99	99	3.5	-0.15	379	165	213	251	238		249.2	193	71	73			78	0.025
340	149.618	535.607	0.16	0.14	0.00	0.00	79	80			89	0.037	101	100	3.4	-0.15	371	165	208	249	238		246.2	191	73	73			78	0.025
350	151.205	536.997	0.16	0.14	0.00	0.00	79	80			89	0.038	98	98	3.2	-0.15	366	165	204	240	240		243.0	186	73	73			77	0.025
360	152.803	538.443	0.16	0.14	0.00	0.00	79	80			88	0.037	100	103	3.1	-0.15	358	167	197	234	238		238.8	182	73	73			80	0.025
370	154.400	539.889	0.16	0.14	0.00	0.00	79	80			88	0.037	100	103	2.9	-0.15	349	166	193	228	234		234.0	181	72	74			80	0.025
380	155.992	541.191	0.16	0.13	0.00	0.00	79	80			88	0.037	100	93	2.8	-0.1	343	166	192	224	230		231.0	179	74	74			78	0.025
390	157.591	542.587	0.16	0.14	0.00	0.00	79	80			89	0.037	101	100	2.7	-0.15	334	163	187	219	224		225.4	174	72	74			78	0.025
400	159.184	543.990	0.16	0.14	0.00	0.00	79	80			89	0.038	99	99	2.5	-0.15	410	172	221	254	243		260.0	195	74	74			78	0.025
410	160.769	545.391	0.16	0.14	0.00	0.00	80	81			89	0.037	99	100	2.4	-0.15	386	167	215	254	238		252.0	195	73	73			78	0.025
420	162.367	546.779	0.16	0.14	0.00	0.00	80	81			89	0.037	100	99	2.3	-0.1	366	163	208	245	238		244.0	191	73	73			78	0.025

OMNI-Test Laboratories, Inc.

Wood Heater Test Data - EPA Method 5G

Run: 9

Manufacturer: Monessen
Model: Defiant 2N1
Tracking No.: 1534
Project No.: 227-S-39-3
Test Date: 26-Apr-10
Beginning Clock Time: 09:47
Recording Interval: 10 min.
Total Sampling Time: 580 min.

Velocity Traverse Data									
	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	
Initial dP	0.028	0.041	0.042	0.039	0.025	0.040	0.045	0.039	"H2O
Initial Temp.	105	105	105	105	105	105	105	105	oF

OMNI Equipment Numbers:

PM Control Module:
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.56 lb/lb-mole
Dilution Tunnel H2O: 4.00 percent
Dilution Tunnel Static: -0.144 "H2O
Pitot Tube Cp: 0.99
Meter Box Y Factor: 0.994 (1) 0.996 (2)

Barometric Pressure:	Begin	Middle	End	Average
	28.98	28.91	28.86	28.92 "Hg

Signature/Date: 6/4/10

Tunnel Velocity: 13.41 ft/sec.
Intial Tunnel Flow: 137.6 scfm
Average Tunnel Flow: 139.5 scfm
Tunnel Area: 0.1963 ft2
Post-Test Leak Check (1): 0.0@5 cfm@"Hg
Post-Test Leak Check (2): 0.0@9 cfm@"Hg
Fuel Moisture (dry basis %): 19.8
Total Particulate (1): 25.6
Total Particulate (2): 24.4

Elapsed Time	Particulate Sampling Data														Fuel Weight, lb		Wood Heater Temperature Data, oF												Stack
	Gas Meter Cubic Feet (1)	Gas Meter Cubic Feet (2)	Sample Rate, cfm (1)	Sample Rate, cfm (2)	Orifice dH (1)	Orifice dH (2)	Meter oF (1)	Meter oF (2)	Meter Vac. In. Hg. (1)	Meter Vac. In. Hg. (2)	Dilution Tunnel Temp.	Dilution Tunnel dP	Pro. Rate (10%) (1)	Pro. Rate (10%) (2)	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Catalyst Exit	Average Surface	Stack	Filter (1)	Filter (2)	Impinger exit (1)	Impinger exit (2)	Ambient	Draft In. H2O
430	163.956	548.172	0.16	0.14	0.00	0.00	80	81			89	0.037	100	99	2.1	-0.15	362	167	202	238	238		241.4	184	73	73			80	0.025
440	165.546	549.566	0.16	0.14	0.00	0.00	80	81			88	0.037	100	99	2.0	-0.1	356	167	195	232	238		237.6	180	73	73			80	0.025
450	167.145	550.968	0.16	0.14	0.00	0.00	80	82			88	0.037	100	100	1.9	-0.1	345	166	194	226	235		233.2	181	74	74			80	0.025
460	168.738	552.370	0.16	0.14	0.00	0.00	81	82			88	0.037	100	100	1.8	-0.15	339	166	192	222	228		229.4	179	74	74			80	0.025
470	170.325	553.760	0.16	0.14	0.00	0.00	80	82			88	0.037	100	99	1.7	-0.1	332	163	187	219	224		225.0	174	72	74			80	0.025
480	171.922	555.160	0.16	0.14	0.00	0.00	80	82			87	0.037	100	99	1.6	-0.1	328	163	185	217	219		222.4	174	74	74			80	0.020
490	173.515	556.557	0.16	0.14	0.00	0.00	80	82			87	0.037	100	99	1.4	-0.15	323	161	183	215	217		219.8	172	74	74			80	0.023
500	175.105	557.956	0.16	0.14	0.00	0.00	80	81			87	0.037	100	100	1.3	-0.1	323	161	180	215	215		218.8	169	71	73			78	0.020
510	176.704	559.361	0.16	0.14	0.00	0.00	80	81			87	0.037	100	100	1.2	-0.15	318	159	180	215	215		217.4	169	73	73			80	0.020
520	178.296	560.759	0.16	0.14	0.00	0.00	80	81			86	0.037	100	99	1.1	-0.1	299	161	178	210	210		211.6	184	73	73			78	0.020
530	179.885	562.160	0.16	0.14	0.00	0.00	80	81			86	0.037	99	100	0.9	-0.15	333	160	192	212	210		221.4	222	73	75			77	0.020
540	181.485	563.565	0.16	0.14	0.00	0.00	80	81			86	0.037	100	100	0.9	-0.05	323	161	183	215	217		219.8	172	72	74			78	0.020
550	183.076	564.956	0.16	0.14	0.00	0.00	80	81			86	0.038	98	98	0.7	-0.2	325	161	180	215	215		219.2	172	71	73			78	0.023
560	184.668	566.358	0.16	0.14	0.00	0.00	80	81			87	0.037	100	100	0.4	-0.3	314	158	178	212	214		215.2	167	73	73			77	0.023
570	186.263	567.754	0.16	0.14	0.00	0.00	80	81			88	0.038	99	98	0.1	-0.3	314	158	182	210	208		214.4	204	73	73			77	0.025
580	187.855	569.158	0.16	0.14	0.00	0.00	80	81			89	0.037	100	100	0.0	-0.05	335	160	201	214	214		224.8	229	73	75			77	0.025
Avg/Total	92.864	81.786	0.16	0.14	0.00	0.00	78.27	79.49			94.41	0.037	100.75	100.75									144		73.81	74.81	#DIV/0!	#DIV/0!		0.035

PRINT

Final Laboratory Report - Method 5G Dual Train
Dilution Tunnel Particulate Calculations

Client Name: Monessen
Model: Defiant 2N1
Project No.: 227-S-39-3
Tracking No.: 1534

Equipment Numbers: OMNI-00023, OMNI-00131, OMNI-00342, VC-1

Run #: 9
Train #: A
Date: 04/24/10

Sample Component	Reagent	Filter # or Probe #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	F566	148.8	125.6	23.2
B. Rear filter catch	Filter	F567	117.7	116.3	1.4
C. Probe catch	Probe	VC-L	77119.9	77118.9	1.0

Total Particulate, mg :	25.6

Component	Equations:
A. Front filter catch	Final (mg) - Tare (mg) = Particulate, mg
B. Rear filter catch	Final (mg) - Tare (mg) = Particulate, mg
C. Probe catch	Final (mg) - Tare (mg) = Particulate, mg

Analyst: [signature] Date: 4/2/10

PRINT

Final Laboratory Report - Method 5G Dual Train
Dilution Tunnel Particulate Calculations

Client Name: Monessen
Model: Defiant 2N1
Project No.: 227-S-39-3
Tracking No.: 1534

Equipment Numbers: OMNI-00023, OMNI-00131, OMNI-00342, VC-1

Run #: 9
Train #: B
Date: 04/24/10

Sample Component	Reagent	Filter # or Probe #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	F568	142.0	119.8	22.2
B. Rear filter catch	Filter	F569	127.4	125.9	1.5
C. Probe catch	Probe	VC-N	77897.4	77896.7	0.7

Total Particulate, mg :	24.4

Component	Equations:
A. Front filter catch	Final (mg) - Tare (mg) = Particulate, mg
B. Rear filter catch	Final (mg) - Tare (mg) = Particulate, mg
C. Probe catch	Final (mg) - Tare (mg) = Particulate, mg

Analyst: [signature] Date: 4/2/10

Monessen Defiant 2N1
Run 9 - Fan Confirmation, Category 2, Non-Cat
Pre-Burn Data

RecNum	TestTime	Scale (Kg)	Scale (lb)	ΔWeight (lb)	StkDraft	LabTemp	Top1	Bot1	Back1	Lft1	Rht1	StkTemp2
0	0	0	0.00	0	0	65	0	0	0	0	0	0
10	10	6.28	13.85	0	0.055	69	612	349	260	319	256	334
20	20	5.65	12.46	1.39	0.048	70	540	350	274	315	263	304
30	30	5.19	11.44	1.01	0.044	68	504	344	277	307	264	283
40	40	4.31	9.50	1.94	0.063	71	444	331	334	305	262	444
50	50	3.7	8.16	1.34	0.064	69	427	317	438	304	260	475
60	60	3.33	7.34	0.82	0.061	69	427	317	473	304	265	438
70	70	2.88	6.35	0.99	0.061	72	450	315	506	311	278	450
80	80	2.7	5.95	0.40	0.054	70	465	307	504	313	296	387
90	90	2.56	5.64	0.31	0.049	71	466	303	474	311	307	342

OMNI-Test Laboratories, Inc.

FUEL DATA

Client: Menesses
Model: Defiant 2N1
Project #: 227-5-34 Tracking #: 1534
Date: 4/26/10 Test Crew: JC Run #: 9
OMNI Equipment ID #:
FUEL LOAD PREPARED BY: Ralph ; Measured & moisture by JC
FUEL: DOUGLAS-FIR SPECIES, UNTREATED, AIR-DRIED, STANDARD GRADE OR BETTER, DIMENSIONAL LUMBER.

PRE-BURN FUEL

MOISTURE CONTENT (METER -- DRY BASIS)

CALIBRATION: Cal Value (1) = 12% Actual Reading 12.0 %
Cal Value (2) = 22% Actual Reading 22.0 %

Piece	Length	Readings			Type
1	15 ft	21.5	22.3	15.0	2x4
2	15 ft	22.6	16.0	20.7	2x4
3	ft				

371 lb Length of cut pieces: 45x8 inches Pre-Burn Fuel Average Moisture: 19.7 %

Time (clock): 7105 Room Temperature (F): 70 °F Initials: JC

TEST FUEL

FUEL TYPE AND AMOUNT: 2 × 4 Ø 4 × 4 4
CALCULATED LOAD WEIGHT: ACTUAL LOAD WEIGHT: Ø (2 × 4)
22.20 lb (4 × 4)
22.20 lb Total

FUEL PIECE LENGTH: 21 inches

MOISTURE CONTENT (METER -- DRY BASIS)

PIECE	READINGS			TYPE
1	20.5	21.6	20.4	4x4
2	20.2	19.6	20.2	4x4
3	19.2	19.3	19.3	4x4
4	20.5	19.0	18.9	4x4
5				
6				
7				
8				
9				
10				

OVERALL TEST FUEL LOAD MOISTURE AVERAGE: 19.8 %

Time (clock): 7115 Room Temperature (F): 70 °F Initials: JC

Technician signature: Date: 4/26/10

4-89 OF 4-155

OMNI-Test Laboratories, Inc.

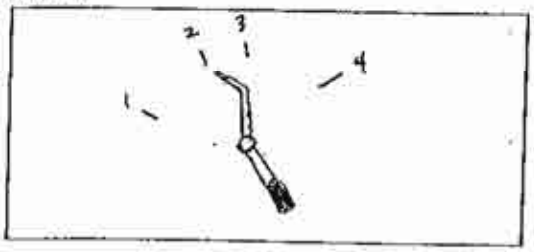
Run Notes

Client: Monessen
Model: Defiant 2N1
Project #: 227-5-31-3
Tracking #: 1534
Run #: 9 Date: 4/26/10
Test Crew: JC
OMNI Equipment ID #(s):

PREBURN

DESCRIBE OR SKETCH AIR OR THERMOMSTAT SETTINGS BELOW:
(SETTINGS MUST BE ACCURATE AND REPRODUCABLE)

PRIMARY:



SECONDARY:

TERTIARY: N/A

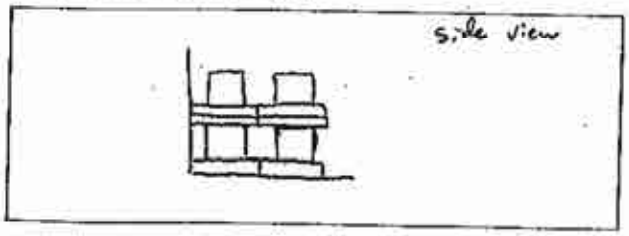
FAN: No/OFF

PREBURN SETTINGS AND ACTIVITIES

TIME	AIR (THERMO) CHANGES PRIMARY/SECONDARY/TERTIARY	FAN SETTING CHANGE	ADD FUEL +WT.	ADD FUEL -WT.	RAKE COAL	COMMENT
0	Test setting					
32					X	
62					X	
94	Fuel on, test start				X	

TEST

TEST FUEL CONFIGURATION SKETCH
(INDICATE VIEW ANGLE)

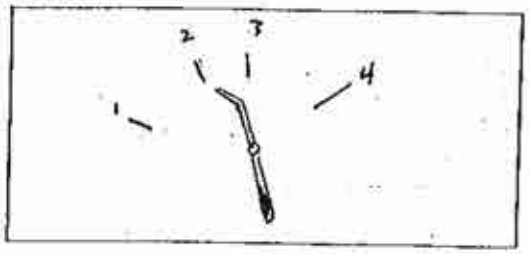


START UP PROCEDURES

BYPASS: 1 min, 10 sec
FUEL LOADING 1 min, 10 sec
DOOR: 1 min, 10 sec
PRIMARY AIR: Test setting @ 0min (no change)

OTHER: N/A

DESCRIBE OR SKETCH TEST SETTINGS BELOW:
(SETTINGS MUST BE ACCURATE AND REPRODUCIBLE)
PRIMARY:



SECONDARY:

TERTIARY: N/A

FAN: OFF

Technician signature: Date: 4/26/10

4-90 OF 4-155

OMNI-Test Laboratories, Inc.

Supplemental Data EPA 5G/5H

Client: Monessen

Model: Defiant 2N1

Project #: 227-5-79-3 Tracking #: 1534

Date: 4/26/10 Run #: 9 Booth: _____

Test Crew: JC Start Time: 7:47 AM Stop Time: ~~7:37~~ JC 7:27 PM

OMNI Equipment #(s): _____

Gas Analyzer Train Leak Check:

Stack: Initial: _____ Final: _____

~~Dilution Tunnel (Method 5G Only):~~ Initial: _____ Final: _____

Calibrations: Span Gas CO_2: _____ O_2: _____ CO: _____ CO_2(DT): _____

	N_2 Span	N_2 Span	N_2 Span	N_2 Span	N_2 Span	N_2 Span	N_2 Span
Time							
O_2							
CO_2							
CO							
CO_2 (DT)							

Stack Diameter (inches): 6

Air Velocity (ft/min): Initial: <50 Final: <50

Scale Audit (lbs): Pretest: 10.0 Post Test: 10.0

Induced Draft: 0 %Smoke Capture: 100%

Pitot Tube Leak Test: Pre: 0.0 @ 3.0 Post: 0.0 @ 3.0

Flue Pipe Cleaned Prior to First Test in Series: Date: 4/18/2010 Initials: JC

	Initial	Middle	Ending
Pb (in/Hg)	28.98	28.91	28.86
Room Temp (°F)	68 °F	80 °F	78 °F

Technician signature: _____ Date: 4/26/10

4-91 OF 4-155

Run 10

STOVE TEMPERATURE TEST DATA - METHOD 5G

Page ___ of ___

Client/Model: Monessen / Defiant 2N1 Project #: 227-5-39-3 Tracking #: 1534

Date: 4/27/10 Test Crew: JC Run #: 10

OMNI Equipment ID #:

Preburn Test [X] [ ] Coal Bed: Data: 0 = Range: 5.56 – 4.45 Actual: Coal Bed:

Time	Fuel Weight	Delta Weight	Stack Draft	TEMPERATURES (oF) Ambient	Top	Bottom	Back	Left	Right	Flue	Catalyst
0											
10											
20											
30											
40											
50											
60											
70											
80											
90											
00											
10											
20											
30											
40											
50											
60											
70											
80											
90											
AVG											

Technician signature: _____ Date: 4/27/10

A-93 OF 4-155

OMNI-Test Laboratories, Inc.

FUEL DATA

Client: Monaco
Model: Defiant 2N1
Project #: 227-5-39 Tracking #: 1534
Date: 4/22/10 Test Crew: JC Run #: 10
OMNI Equipment ID #:
FUEL LOAD PREPARED BY: Ralph ; measured & moisture by JC
FUEL: DOUGLAS-FIR SPECIES. UNTREATED, AIR-DRIED, STANDARD GRADE OR BETTER, DIMENSIONAL LUMBER.

PRE-BURN FUEL

MOISTURE CONTENT (METER – – DRY BASIS)

CALIBRATION: Cal Value (1) = 12% Actual Reading 12.0 %
Cal Value (2) = 22% Actual Reading 22.0 %

Piece	Length	Readings			Type
1	19 ft	19.1	33.6	18.1	2x4
2	19 ft	17.3	20.6	16.9	2x4
3	ft				

+3.0 lb

Length of cut pieces: 57 x 8 inches Pre-Burn Fuel Average Moisture: 20.9 %

Time (clock): 7:30 Room Temperature (F): 70 °F Initials: JC

TEST FUEL

FUEL TYPE AND AMOUNT: 2 × 4 Ø 4 × 4 4
CALCULATED LOAD WEIGHT: ACTUAL LOAD WEIGHT: Ø (2 × 4)
22.25 (4 × 4)
22.25 Total

FUEL PIECE LENGTH: 21 inches

MOISTURE CONTENT (METER – – DRY BASIS)

PIECE	READINGS			TYPE
1	20.7	21.5	22.0	4x4
2	20.2	19.8	20.5	4x4
3	20.8	21.8	22.3	4x4
4	21.2	21.5	21.0	4x4
5				
6				
7				
8				
9				
10				

OVERALL TEST FUEL LOAD MOISTURE AVERAGE: 21.1 %

Time (clock): 7:30 Room Temperature (F): 70 °F Initials: JC

Technician signature: Date: 4/27/10

OMNI-Test Laboratories, Inc.

Run Notes

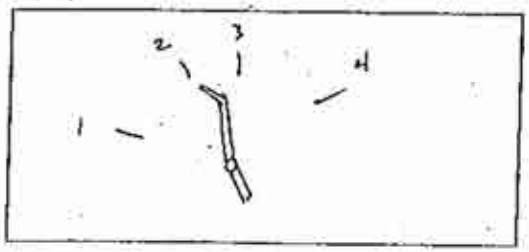
Scanned in AGMs file

Client: Monessen
Model: Defiant 2N1
Project #: 227-5-30-3
Tracking #: 1534
Run #: 10 Date: 4/27/10
Test Crew: JC
OMNI Equipment ID #(s):

PREBURN

DESCRIBE OR SKETCH AIR OR THERMOMSTAT SETTINGS BELOW:
(SETTINGS MUST BE ACCURATE AND REPRODUCABLE)

PRIMARY:



SECONDARY: N/A

TERTIARY:

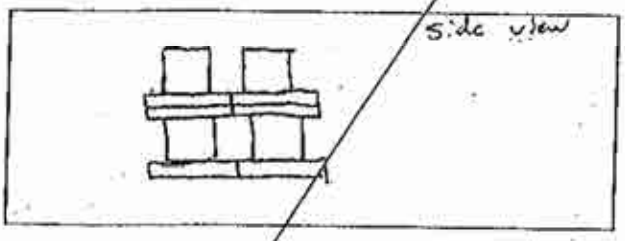
FAN: OFF

PREBURN SETTINGS AND ACTIVITIES

TIME	AIR (THERMO) CHANGES PRIMARY/SECONDARY/TERTIARY	FAN SETTING CHANGE	ADD FUEL + WT.	ADD FUEL - WT.	RAKE COAL	COMMENT
0	Test setting					
61 min					X	
94					X	
114				0.90 lbs	X	
124	Fuel on, test start				X	

TEST

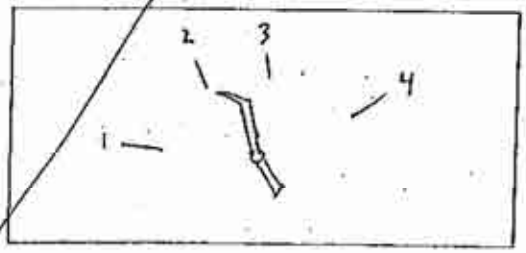
TEST FUEL CONFIGURATION SKETCH
(INDICATE VIEW ANGLE)



START UP PROCEDURES

BYPASS: 1 min, 15 sec
FUEL LOADING: 1 min
DOOR: 1 min, 15 sec
PRIMARY AIR: Test setting @ 0 min, no change
OTHER: N/A

DESCRIBE OR SKETCH TEST SETTINGS BELOW:
(SETTINGS MUST BE ACCURATE AND REPRODUCIBLE)
PRIMARY:



SECONDARY: N/A

TERTIARY:

FAN: OFF

Technician signature: Date: 4/27/10

4-95 OF 4-155

OMNI-Test Laboratories, Inc.

Supplemental Data EPA 5G/5H

Scrapped, DGMs filed JC

Client: Monessen

Model: Defiant 2N1

Project #: 227-5-39-3 Tracking #: 1534

Date: 4/27/10 Run #: 10 Booth: _____

Test Crew: JC Start Time: _____ Stop Time: _____

OMNI Equipment #(s): _____

Gas Analyzer Train Leak Check:

Stack: Dilution Tunnel (Method 5G Only):

Initial: _____ Initial: _____

Final: _____ Final: _____

Calibrations: Span Gas CO_2: _____ O_2: _____ CO: _____ CO_2(DT): _____

	N_2 Span	N_2 Span	N_2 Span	N_2 Span	N_2 Span	N_2 Span	N_2 Span
Time							
O_2							
CO_2							
CO							
CO_2 (DT)							

Stack Diameter (inches): 6

Air Velocity (ft/min): Initial: <50 Final: <50

Scale Audit (lbs): Pretest: 10.0 Post Test: _____

Induced Draft: 0 %Smoke Capture: 100%

Pitot Tube Leak Test: Pre: 0.0 @ 3.1 Post: 0.0 @ 3.0

Flue Pipe Cleaned Prior to First Test in Series: Date: 4/18/10 Initials: JC

	Initial	Middle	Ending
Pb (in/Hg)	28.86 in Hg		
Room Temp (°F)	074 °F		

Technician signature: _____ Date: 4/27/10

A-96 OF A-155

Run 11

OMNI-Test Laboratories, Inc.

Wood Heater Test Data - EPA Method 5G

Manufacturer: Monessen
Model: Defiant 2N1
Project No.: 227-S-39-3
Tracking No.: 1534
Run: 11
Test Date: 04/27/10

Burn Rate	0.89 kg/hr dry
Average Tunnel Temperature	90 degrees Fahrenheit
Average Gas Velocity in Dilution Tunnel - vs	13.6 feet/second
Average Gas Flow Rate in Dilution Tunnel - Qsd	8586.1 dscf/hour
Average Delta p	0.039 inches H20
Average Delta H	0.00 inches H20
Total Time of Test	570 minutes

	AVERAGE	SAMPLE TRAIN 1	SAMPLE TRAIN 2
Total Sample Volume - Vm	85.05 cubic feet	90.00 cubic feet	80.11 cubic feet
Average Gas Meter Temperature	75 degrees Fahrenheit	74 degrees Fahrenheit	75 degrees Fahrenheit
Total Sample Volume (Standard Conditions) - Vmstd	80.8 dscf	85.5 dscf	76.2 dscf
Total Particulates - mn		39.6 mg	38 mg
Particulate Concentration (dry-standard)	0.00048 grams/dscf	0.00046 grams/dscf	0.00050 grams/dscf
Particulate Emission Rate	4.13 grams/hour	3.98 grams/hour	4.28 grams/hour
Adjusted Emissions	5.91 grams/hour	5.73 grams/hour	6.09 grams/hour
Difference from Average		0.18 grams/hour	0.18 grams/hour
7.5% of the average emission rate	0.44		
Weighted Average Emission Rate Limit	4.10 grams/hour		
7.5% of the weighted average emission rate limit	0.31		

Results Are Acceptable

4-98 OF 4-155

OMNI-Test Laboratories, Inc.

Wood Heater Test Data - EPA Method 5G

Run: 11

Manufacturer:	Monessen	
Model:	Defiant 2N1	
Tracking No.:	1534	
Project No.:	227-S-39-3	
Test Date:	27-Apr-10	
Beginning Clock Time:	16:54	
Recording Interval:	10	min.
Total Sampling Time:	570	min.

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	
Initial dP	0.032	0.044	0.054	0.044	0.030	0.044	0.050	0.042	"H2O
Initial Temp.	91	91	91	91	91	91	91	91	oF

OMNI Equipment Numbers:

PM Control Module:					
Dilution Tunnel MW(dry):	29.00	lb/lb-mole			
Dilution Tunnel MW(wet):	28.56	lb/lb-mole			
Dilution Tunnel H2O:	4.00	percent			
Dilution Tunnel Static:	-0.166	"H2O			
Pitot Tube Cp:	0.99				
Meter Box Y Factor:	0.994	(1)	0.996	(2)	
Barometric Pressure:	Begin	Middle	End	Average	
	28.88	28.98	28.92	28.93	"Hg

Signature/Date: 6/4/10

Tunnel Velocity:	13.64	ft/sec.
Intial Tunnel Flow:	148.6	scfm
Average Tunnel Flow:	143.1	scfm
Tunnel Area:	0.1963	ft2
Post-Test Leak Check (1):	0.0@5	cfm@"Hg
Post-Test Leak Check (2):	0.0@9	cfm@"Hg
Fuel Moisture (dry basis %):	20.4	
Total Particulate (1):	39.6	
Total Particulate (2):	38.0	

Elapsed Time	Particulate Sampling Data														Fuel Weight, lb		Wood Heater Temperature Data, oF											Stack
	Gas Meter Cubic Feet (1)	Gas Meter Cubic Feet (2)	Sample Rate, cfm (1)	Sample Rate, cfm (2)	Orifice dH (1)	Orifice dH (2)	Meter oF (1)	Meter oF (2)	Meter Vac. In. Hg. (1)	Meter Vac. In. Hg. (2)	Dilution Tunnel Temp.	Dilution Tunnel dP	Pro. Rate (10%) (1)	Pro. Rate (10%) (2)	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Catalyst Exit	Average Surface	Stack	Filter (1)	Filter (2)	Impinger exit (1)	Impinger exit (2)	Ambient	Draft In. H2O
0	188.218	569.468			0.00	0.00	72	73			91	0.043			22.4		404	267	369	284	291		323.0	282	69	69			69	0.040
10	189.851	570.922	0.16	0.15	0.00	0.00	72	72			93	0.039	105	105	21.8	-0.6	324	256	360	265	271		295.2	321	70	72			70	0.045
20	191.488	572.362	0.16	0.14	0.00	0.00	73	73			96	0.039	105	104	21.1	-0.7	284	245	382	243	248		280.4	371	72	70			72	0.050
30	193.092	573.780	0.16	0.14	0.00	0.00	72	73			100	0.039	104	103	20.3	-0.85	276	231	417	226	231		276.2	415	72	72			72	0.055
40	194.690	575.193	0.16	0.14	0.00	0.00	72	73			106	0.039	104	103	19.2	-1.05	298	222	456	217	224		283.4	447	72	72			70	0.060
50	196.285	576.608	0.16	0.14	0.00	0.00	72	73			109	0.038	105	105	18.1	-1.15	330	211	482	213	222		291.6	458	72	72			72	0.060
60	197.864	578.015	0.16	0.14	0.00	0.00	73	74			110	0.039	103	103	16.9	-1.15	378	205	493	216	224		303.2	454	74	74			70	0.060
70	199.450	579.414	0.16	0.14	0.00	0.00	73	75			112	0.040	102	101	15.8	-1.15	411	201	495	220	231		311.6	461	74	74			72	0.060
80	201.029	580.820	0.16	0.14	0.00	0.00	74	74			112	0.040	102	102	14.6	-1.2	444	195	498	223	244		320.8	461	75	75			71	0.060
90	202.625	582.220	0.16	0.14	0.00	0.00	73	74			114	0.039	104	103	13.4	-1.15	487	195	507	231	259		335.8	474	75	75			73	0.063
100	204.207	583.633	0.16	0.14	0.00	0.00	74	75			111	0.039	103	103	12.3	-1.1	511	188	509	235	274		343.4	448	75	75			70	0.060
110	205.800	585.048	0.16	0.14	0.00	0.00	74	75			107	0.040	102	102	11.4	-0.95	504	188	494	242	292		344.0	416	75	75			71	0.060
120	207.383	586.457	0.16	0.14	0.00	0.00	74	75			103	0.039	102	102	10.6	-0.8	494	182	461	247	307		338.2	375	75	73			71	0.055
130	208.968	587.879	0.16	0.14	0.00	0.00	74	75			99	0.039	102	103	9.9	-0.7	479	184	425	249	321		331.6	342	73	73			71	0.050
140	210.552	589.299	0.16	0.14	0.00	0.00	74	75			96	0.041	99	100	9.3	-0.6	457	180	392	247	325		320.2	316	73	73			69	0.058
150	212.139	590.721	0.16	0.14	0.00	0.00	74	75			95	0.039	102	102	8.7	-0.55	444	180	364	249	329		313.2	301	73	73			71	0.045
160	213.725	592.143	0.16	0.14	0.00	0.00	74	75			93	0.040	100	101	8.2	-0.55	440	178	344	247	329		307.6	292	73	71			71	0.040
170	215.304	593.561	0.16	0.14	0.00	0.00	74	75			92	0.041	99	99	7.7	-0.45	429	178	329	245	327		301.6	286	71	71			69	0.043
180	216.885	594.982	0.16	0.14	0.00	0.00	74	75			91	0.041	99	99	7.3	-0.4	414	173	316	240	323		293.2	275	71	71			71	0.040
190	218.472	596.401	0.16	0.14	0.00	0.00	74	75			89	0.039	101	102	6.9	-0.4	405	174	305	238	318		288.0	269	71	71			71	0.040
200	220.049	597.820	0.16	0.14	0.00	0.00	74	75			89	0.039	101	102	6.6	-0.35	401	173	294	236	316		284.0	257	71	71			71	0.035
210	221.628	599.233	0.16	0.14	0.00	0.00	74	75			88	0.039	101	101	6.3	-0.3	388	169	281	231	307		275.2	251	71	69			71	0.035
220	223.205	600.650	0.16	0.14	0.00	0.00	74	74			87	0.039	100	101	5.9	-0.35	385	169	272	229	300		271.0	248	70	70			70	0.035
230	224.780	602.063	0.16	0.14	0.00	0.00	74	74			87	0.038	102	103	5.6	-0.3	381	171	268	229	294		268.6	251	71	68			73	0.035
240	226.359	603.475	0.16	0.14	0.00	0.00	74	74			87	0.038	102	102	5.3	-0.3	381	168	263	224	283		263.8	250	70	68			70	0.035
250	227.936	604.887	0.16	0.14	0.00	0.00	73	74			87	0.039	101	101	5.0	-0.3	381	166	261	224	276		261.6	255	70	70			70	0.035
260	229.512	606.298	0.16	0.14	0.00	0.00	73	74			86	0.039	100	101	4.7	-0.3	383	166	264	225	270		261.6	248	68	70			70	0.035
270	231.080	607.692	0.16	0.14	0.00	0.00	73	74			86	0.039	100	100	4.5	-0.25	392	164	261	225	266		261.6	244	68	68			70	0.035
280	232.658	609.087	0.16	0.14	0.00	0.00	73	74			85	0.039	101	100	4.2	-0.25	387	160	259	224	261		258.2	237	68	70			70	0.033
290	234.227	610.481	0.16	0.14	0.00	0.00	73	74			85	0.039	100	100	4.0	-0.2	376	162	252	229	255		254.8	231	70	70			70	0.030
300	235.808	611.875	0.16	0.14	0.00	0.00	73	74			85	0.039	101	100	3.8	-0.25	361	160	244	229	248		248.4	226	70	68			70	0.030
310	237.382	613.268	0.16	0.14	0.00	0.00	73	74			84	0.037	103	102	3.6	-0.2	354	159	237	231	244		245.0	220	68	68			70	0.030
320	238.955	614.660	0.16	0.14	0.00	0.00	73	74			84	0.038	101	101	3.4	-0.2	350	159	231	233	239		242.4	218	68	70			70	0.030
330	240.527	616.058	0.16	0.14	0.00	0.00	73	73			84	0.038	101	101	3.2	-0.15	345	159	224	233	237		239.6	213	70	68			70	0.030
340	242.098	617.446	0.16	0.14	0.00	0.00	73	73			85	0.039	100	99	3.0	-0.2	343	164	220	235	235		239.4	207	68	68			72	0.030
350	243.668	618.834	0.16	0.14	0.00	0.00	74	74			85	0.038	101	101	2.9	-0.15	348	166	216	235	235		240.0	203	68	70			72	0.028
360	245.238	620.226	0.16	0.14	0.00	0.00	74	74			85	0.037	102	102	2.7	-0.2	361	164	209	237	235		241.2	198	68	70			72	0.025
370	246.810	621.615	0.16	0.14	0.00	0.00	74	75			85	0.039	100	99	2.5	-0.15	366	167	208	236	238		243.0	201	71	71			73	0.025
380	248.380	623.005	0.16	0.14	0.00	0.00	75	75			85	0.039	100	99	2.4	-0.15	360	169	206	236	240		242.2	199	69	71			73	0.025
390	249.952	624.398	0.16	0.14	0.00	0.00	75	75			85	0.037	102	102	2.3	-0.1	355	169	202	232	243		240.2	195	69	71			73	0.025
400	251.517	625.800	0.16	0.14	0.00	0.00	75	75			84	0.038	101	101	2.1	-0.15	354	170	198	228	243		238.6	193	69	69			74	0.025
410	253.085	627.197	0.16	0.14	0.00	0.00	75	75			84	0.039	99	100	2.0	-0.1	354	172	198	226	243		238.6	189	69	69			74	0.025
420	254.655	628.593	0.16	0.14	0.00	0.00	76	76			83	0.039	99	99	1.9	-0.1	350	170	192	222	239		234.6	185	70	70			74	0.025

4-99 OF 4-15 RUN 5G

OMNI-Test Laboratories, Inc.

Wood Heater Test Data - EPA Method 5G

Run: 11

Manufacturer: Monessen
Model: Defiant 2N1
Tracking No.: 1534
Project No.: 227-S-39-3
Test Date: 27-Apr-10
Beginning Clock Time: 16:54
Recording Interval: 10 min.
Total Sampling Time: 570 min.

Velocity Traverse Data									
	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	
Initial dP	0.032	0.044	0.054	0.044	0.030	0.044	0.050	0.042	"H2O
Initial Temp.	91	91	91	91	91	91	91	91	oF

OMNI Equipment Numbers:

PM Control Module:
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.56 lb/lb-mole
Dilution Tunnel H2O: 4.00 percent
Dilution Tunnel Static: -0.166 "H2O
Pitot Tube Cp: 0.99
Meter Box Y Factor: 0.994 (1) 0.996 (2)
Barometric Pressure: Begin 28.88, Middle 28.98, End 28.92, Average 28.93 "Hg

Signature/Date: 6/14/10

Tunnel Velocity: 13.64 ft/sec.
Intial Tunnel Flow: 148.6 scfm
Average Tunnel Flow: 143.1 scfm
Tunnel Area: 0.1963 ft2
Post-Test Leak Check (1): 0.0@5 cfm@"Hg
Post-Test Leak Check (2): 0.0@9 cfm@"Hg
Fuel Moisture (dry basis %): 20.4
Total Particulate (1): 39.6
Total Particulate (2): 38.0

Elapsed Time	Particulate Sampling Data														Fuel Weight, lb		Wood Heater Temperature Data, oF											Stack
	Gas Meter Cubic Feet (1)	Gas Meter Cubic Feet (2)	Sample Rate, cfm (1)	Sample Rate, cfm (2)	Orifice dH (1)	Orifice dH (2)	Meter oF (1)	Meter oF (2)	Meter Vac. In. Hg. (1)	Meter Vac. In. Hg. (2)	Dilution Tunnel Temp.	Dilution Tunnel dP	Pro. Rate (10%) (1)	Pro. Rate (10%) (2)	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Catalyst Exit	Average Surface	Stack	Filter (1)	Filter (2)	Impinger exit (1)	Impinger exit (2)	Ambient	Draft In. H2O
430	256.227	629.990	0.16	0.14	0.00	0.00	76	76			83	0.039	99	99	1.8	-0.1	337	170	189	220	235		230.2	181	70	70			74	0.025
440	257.799	631.392	0.16	0.14	0.00	0.00	76	76			83	0.040	98	98	1.7	-0.15	326	166	185	216	231		224.8	179	70	70			74	0.025
450	259.373	632.788	0.16	0.14	0.00	0.00	76	76			83	0.039	100	99	1.6	-0.1	320	166	181	218	224		221.8	175	68	70			74	0.025
460	260.946	634.192	0.16	0.14	0.00	0.00	76	76			83	0.039	99	100	1.5	-0.1	316	166	179	218	218		219.4	171	70	70			75	0.023
470	262.516	635.591	0.16	0.14	0.00	0.00	76	76			83	0.039	99	99	1.4	-0.1	311	164	177	218	211		216.2	170	68	70			74	0.023
480	264.085	636.986	0.16	0.14	0.00	0.00	76	76			82	0.039	99	99	1.3	-0.1	305	164	175	218	207		213.8	167	68	71			75	0.023
490	265.655	638.383	0.16	0.14	0.00	0.00	76	76			82	0.039	99	99	1.2	-0.1	298	162	170	222	203		211.0	162	70	70			74	0.020
500	267.230	639.779	0.16	0.14	0.00	0.00	76	76			82	0.038	101	100	1.0	-0.2	313	162	171	242	201		217.8	162	70	70			75	0.020
510	268.802	641.180	0.16	0.14	0.00	0.00	76	76			82	0.039	99	99	0.8	-0.15	318	158	169	257	201		220.6	160	68	70			75	0.020
520	270.371	642.583	0.16	0.14	0.00	0.00	76	76			82	0.039	99	100	0.7	-0.1	316	158	169	266	199		221.6	160	68	70			75	0.020
530	271.940	643.982	0.16	0.14	0.00	0.00	77	76			82	0.039	99	99	0.6	-0.15	311	155	166	268	196		219.2	160	70	70			74	0.020
540	273.512	645.388	0.16	0.14	0.00	0.00	77	76			82	0.039	99	100	0.5	-0.1	305	156	164	270	194		217.8	158	71	71			75	0.020
550	275.078	646.782	0.16	0.14	0.00	0.00	76	77			82	0.039	99	99	0.4	-0.05	301	154	164	266	190		215.0	156	68	71			75	0.018
560	276.645	648.175	0.16	0.14	0.00	0.00	77	77			82	0.039	99	99	0.2	-0.2	285	151	164	259	186		209.0	164	70	70			75	0.020
570	278.213	649.574	0.16	0.14	0.00	0.00	77	76			83	0.039	99	99	0.0	-0.2	279	151	166	246	181		204.6	177	68	70			75	0.020
Avg/Total	89.995	80.106	0.16	0.14	0.00	0.00	74.28	74.74			90.00	0.039	100.85	100.85									118		70.45	70.71	#DIV/0!	#DIV/0!		0.035

PRINT

Final Laboratory Report - Method 5G Dual Train
Dilution Tunnel Particulate Calculations

Client Name: Monessen
Model: Defiant 2N1
Project No.: 227-S-39-3
Tracking No.: 1534

Equipment Numbers: OMNI-00023, OMNI-00131, OMNI-00342, VC-1

Run #: 11
Train #: A
Date: 04/27/10

Sample Component	Reagent	Filter # or Probe #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	F570	152.2	116.2	36.0
B. Rear filter catch	Filter	F571	122.8	120.9	1.9
C. Probe catch	Probe	VC-B	84218.8	84217.1	1.7

Total Particulate, mg :	39.6

Component	Equations:
A. Front filter catch	Final (mg) - Tare (mg) = Particulate, mg
B. Rear filter catch	Final (mg) - Tare (mg) = Particulate, mg
C. Probe catch	Final (mg) - Tare (mg) = Particulate, mg

Analyst: _____ Date: 6/2/10

PRINT

Final Laboratory Report - Method 5G Dual Train
Dilution Tunnel Particulate Calculations

Client Name: Monessen
Model: Defiant 2N1
Project No.: 227-S-39-3
Tracking No.: 1534

Equipment Numbers: OMNI-00023, OMNI-00131, OMNI-00342, VC-1

Run #: 11
Train #: B
Date: 04/27/10

Sample Component	Reagent	Filter # or Probe #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	F570	160.7	125.9	34.8
B. Rear filter catch	Filter	F571	118.1	116.6	1.5
C. Probe catch	Probe	VC-B	75950.5	75948.8	1.7

Total Particulate, mg :	38.0

Component	Equations:
A. Front filter catch	Final (mg) - Tare (mg) = Particulate, mg
B. Rear filter catch	Final (mg) - Tare (mg) = Particulate, mg
C. Probe catch	Final (mg) - Tare (mg) = Particulate, mg

Analyst: _____ Date: 6/2/10

STOVE TEMPERATURE TEST DATA - METHOD 5G

Page ___ of ___

Client/Model: Monessen / Defiant 2N1 Project #: 227-S-39-3 Tracking #: 1534

Date: 4/27/10 Test Crew: JC Run #: 11

OMNI Equipment ID #: _____

Preburn [X] Test [ ] Coal Bed: Data: 0 = Range: 5.60 - 4.48 Actual: Coal Bed:

Time	Fuel Weight	Delta Weight	Stack Draft	TEMPERATURES (oF) Ambient	Top	Bottom	Back	Left	Right	Flue	Catalyst
0	15.59	—		68							N/A
10	14.64	0.43	0.049	72	587	378	243	254	380	297	
20	13.85	0.32	0.044	72	493	348	259	255	363	270	
30	13.40	0.18	0.040	70	448	320	263	246	346	246	
40	13.05	0.13	0.038	70	426	302	259	237	330	233	
50	12.50	0.25	0.037	70	378	287	255	231	315	237	
60	11.84	0.28	0.036	70	343	271	252	224	302	235	
70	10.60	0.54	0.057	70	343	263	267	217	293	400	
80	9.39	0.50	0.062	69	338	256	386	215	291	458	
90	8.25	0.46	0.064	69	356	254	468	217	293	471	
100 80	7.45	0.32	0.060	69	382	260	496	225	295	425	
110 70	6.86	0.22	0.056	69	403	264	490	238	297	390	
120 20	6.39	0.18	0.052	69	416	273	466	251	297	355	
130 30	5.91	0.20	0.051	69	416	275	449	264	297	353	
140 40	5.71	0.09	0.048	69	412	271	430	275	295	330	
150 50	5.49	0.07	0.045	71	410	271	406	282	293	308	
160 60	5.36	0.06	0.043	71	406	267	380	284	290	270	
70											
80											
90											
AVG											

Technician signature: _____ Date: 5/6/10

4-103 OF 4-155

OMNI-Test Laboratories, Inc.

FUEL DATA

Client: Monessen
Model: Defiant 2N1
Project #: 227-5-3-fracking #: 1534
Date: 4/27/10 Test Crew: JC Run #: 11
OMNI Equipment ID #:
FUEL LOAD PREPARED BY: Ralph ; moisture measured by JC
FUEL: DOUGLAS-FIR SPECIES, UNTREATED, AIR-DRIED, STANDARD GRADE OR BETTER, DIMENSIONAL LUMBER.

PRE-BURN FUEL
MOISTURE CONTENT (METER -- DRY BASIS)

CALIBRATION: Cal Value (1) = 12% Actual Reading 12.0 %
Cal Value (2) = 22% Actual Reading 22.0 %

Piece	Length	Readings			Type
1	14.3 ft	22.6	22.7	21.1	2x4
2	14.3 ft	22.0	17.3	18.4	2x4
3	ft				

37.8

Length of cut pieces: 43x8 inches Pre-Burn Fuel Average Moisture: 20.7 %

Time (clock): 12:50 Room Temperature (F): 70°F Initials: JC

TEST FUEL

FUEL TYPE AND AMOUNT: 2 x 4 0 4 x 4 4
CALCULATED LOAD WEIGHT: ACTUAL LOAD WEIGHT: 0 (2 x 4)
22.40 lb (4 x 4)
FUEL PIECE LENGTH: 21 inches 2240 lb Total

MOISTURE CONTENT (METER -- DRY BASIS)

PIECE	READINGS			TYPE
1	22.6	20.2	19.5	4x4
2	20.1	21.0	20.0	4x4
3	19.6	19.7	20.1	4x4
4	20.4	20.8	21.3	4x4
5				
6				
7				
8				
9				
10				

OVERALL TEST FUEL LOAD MOISTURE AVERAGE: 20.4 %

Time (clock): 1:00 Room Temperature (F): 70°F Initials: JC

Technician signature: Date: 4/27/10

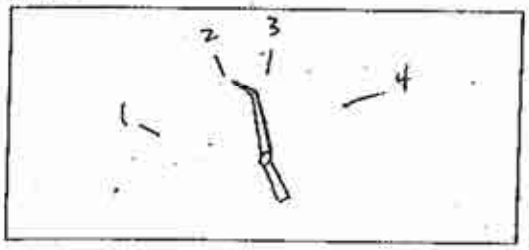
Run Notes

Client: Monessen
Model: Defiant 2N1
Project #: 227-S-39-7
Tracking #: 1534
Run #: 11 Date: 4/27/10
Test Crew: SC
OMNI Equipment ID #(s):

PREBURN

DESCRIBE OR SKETCH AIR OR THERMOMSTAT SETTINGS BELOW:
(SETTINGS MUST BE ACCURATE AND REPRODUCABLE)

PRIMARY:



SECONDARY: N/A

TERTIARY:

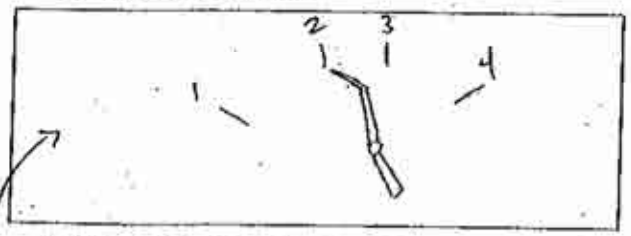
FAN: OFF

PREBURN SETTINGS AND ACTIVITIES

TIME	AIR (THERMO) CHANGES PRIMARY/SECONDARY/TERTIARY	FAN SETTING CHANGE	ADD FUEL + WT.	ADD FUEL - WT.	RAKE COAL	COMMENT
0	Test Setting					
45					X	
66					X	
124					X	
164	Test Fuel on				X	

TEST

TEST FUEL CONFIGURATION SKETCH
(INDICATE VIEW ANGLE)

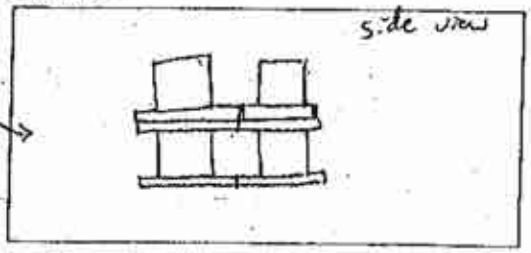


START UP PROCEDURES

BYPASS: 1 min, 15 sec
FUEL LOADING: 1 min
DOOR: 1 min, 15 sec
PRIMARY AIR: Test setting @ 0 min, no change

OTHER: N/A

DESCRIBE OR SKETCH TEST SETTINGS BELOW:
(SETTINGS MUST BE ACCURATE AND REPRODUCIBLE)
PRIMARY:



SECONDARY: N/A

TERTIARY:

FAN: OFF

Technician signature: Date: 4/27/10

4-105 OF 4-155

OMNI-Test Laboratories, Inc.

Supplemental Data EPA 5G/5H

Client: Monessen

Model: ~~227-5-34-3~~ JC Defiant 2N1

Project #: 227-534-3 Tracking #: 1534

Date: 4/27/10 Run #: 11 Booth: _____

Test Crew: JC Start Time: 4:54 PM Stop Time: 2:24 AM

OMNI Equipment #(s): _____

Gas Analyzer Train Leak Check:

Stack: Initial: _____ Final: _____

Dilution Tunnel (Method 5G Only): Initial: _____ Final: _____

Calibrations: Span Gas CO_2: _____ O_2: _____ CO: _____ CO_2(DT): _____

	N_2 Span	N_2 Span	N_2 Span	N_2 Span	N_2 Span	N_2 Span	N_2 Span
Time							
O_2							
CO_2							
CO							
CO_2 (DT)							

Stack Diameter (inches): 6

Air Velocity (ft/min): Initial: 450 Final: 450

Scale Audit (lbs): Pretest: 10.0 Post Test: _____

Induced Draft: 0 %Smoke Capture: 100%

Pitot Tube Leak Test: Pre: 0.0 @ 3.1 Post: 0.0 @ 3.0

Flue Pipe Cleaned Prior to First Test in Series: Date: 4/18/10 Initials: JC

	Initial	Middle	Ending
Pb (in/Hg)	28.88 in Hg	28.98 in Hg	28.92 in Hg
Room Temp (°F)	~~73~~ 69 °F	75 °F	~~76~~ 75 °F

Technician signature: _____ Date: 4/28/10

4-106 OF 4-155

Run 12

OMNI-Test Laboratories, Inc.

Wood Heater Test Data - EPA Method 5G

Manufacturer: Monessen
Model: Defiant 2N1
Project No.: 227-S-39-3
Tracking No.: 1534
Run: 12
Test Date: 04/28/10

Burn Rate	2.81 kg/hr dry
Average Tunnel Temperature	141 degrees Fahrenheit
Average Gas Velocity in Dilution Tunnel - vs	14.2 feet/second
Average Gas Flow Rate in Dilution Tunnel - Qsd	8221.7 dscf/hour
Average Delta p	0.039 inches H20
Average Delta H	0.00 inches H20
Total Time of Test	180 minutes

	AVERAGE	SAMPLE TRAIN 1	SAMPLE TRAIN 2
Total Sample Volume - Vm	27.04 cubic feet	28.31 cubic feet	25.78 cubic feet
Average Gas Meter Temperature	78 degrees Fahrenheit	78 degrees Fahrenheit	79 degrees Fahrenheit
Total Sample Volume (Standard Conditions) - Vmstd	25.6 dscf	26.8 dscf	24.4 dscf
Total Particulates - mn		14.6 mg	14.2 mg
Particulate Concentration (dry-standard)	0.00056 grams/dscf	0.00054 grams/dscf	0.00058 grams/dscf
Particulate Emission Rate	4.63 grams/hour	4.48 grams/hour	4.78 grams/hour
Adjusted Emissions	6.49 grams/hour	6.31 grams/hour	6.67 grams/hour
Difference from Average		0.18 grams/hour	0.18 grams/hour
7.5% of the average emission rate	0.49		
Weighted Average Emission Rate Limit	4.10 grams/hour		
7.5% of the weighted average emission rate limit	0.31		

Results Are Acceptable

OMNI-Test Laboratories, Inc.

Wood Heater Test Data - EPA Method 5G

Run: 12

Manufacturer: Monessen
Model: Defiant 2N1
Tracking No.: 1534
Project No.: 227-S-39-3
Test Date: 28-Apr-10
Beginning Clock Time: 12:39
Recording Interval: 10 min.
Total Sampling Time: 180 min.

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	
Initial dP	0.030	0.042	0.046	0.045	0.034	0.046	0.046	0.042	"H2O
Initial Temp.	124	124	124	124	124	124	124	124	oF

OMNI Equipment Numbers:

PM Control Module:
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.56 lb/lb-mole
Dilution Tunnel H2O: 4.00 percent
Dilution Tunnel Static: -0.64 "H2O
Pitot Tube Cp: 0.99
Meter Box Y Factor: 0.994 (1) 0.996 (2)
Barometric Pressure: Begin 28.95, Middle 29.04, End 29.1, Average 29.03 "Hg

Signature/Date: 6/14/10

Tunnel Velocity: 14.21 ft/sec.
Intial Tunnel Flow: 142.9 scfm
Average Tunnel Flow: 137.0 scfm
Tunnel Area: 0.1963 ft2
Post-Test Leak Check (1): 0.0@5 cfm@"Hg
Post-Test Leak Check (2): 0.0@9 cfm@"Hg
Fuel Moisture (dry basis %): 20.18
Total Particulate (1): 14.6
Total Particulate (2): 14.2

Elapsed Time	Particulate Sampling Data														Fuel Weight, lb		Wood Heater Temperature Data, oF											Stack
	Gas Meter Cubic Feet (1)	Gas Meter Cubic Feet (2)	Sample Rate, cfm (1)	Sample Rate, cfm (2)	Orifice dH (1)	Orifice dH (2)	Meter oF (1)	Meter oF (2)	Meter Vac. In. Hg. (1)	Meter Vac. In. Hg. (2)	Dilution Tunnel Temp.	Dilution Tunnel dP	Pro. Rate (10%) (1)	Pro. Rate (10%) (2)	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Catalyst Exit	Average Surface	Stack	Filter (1)	Filter (2)	Impinger exit (1)	Impinger exit (2)	Ambient	Draft In. H2O
0	278.253	649.603			0.00	0.00	74	75			124	0.041			22.4		616	318	400	366	409		421.8	398	79	81			73	0.060
10	279.897	651.095	0.16	0.15	0.00	0.00	75	75			129	0.040	103	103	20.9	-1.45	488	303	444	340	366		388.2	554	82	84			73	0.068
20	281.512	652.543	0.16	0.14	0.00	0.00	75	76			146	0.038	106	104	18.9	-2.05	533	286	518	312	345		398.8	638	86	86			71	0.073
30	283.087	653.967	0.16	0.14	0.00	0.00	75	77			155	0.038	104	103	16.5	-2.35	568	272	579	300	363		416.4	641	89	91			76	0.075
40	284.662	655.390	0.16	0.14	0.00	0.00	76	77			165	0.038	104	104	14.3	-2.25	613	259	605	298	413		437.6	679	91	93			74	0.080
50	286.218	656.800	0.16	0.14	0.00	0.00	77	78			168	0.041	99	99	11.8	-2.5	707	246	633	307	446		467.8	686	81	89			77	0.080
60	287.768	658.213	0.15	0.14	0.00	0.00	75	77			168	0.038	103	103	9.6	-2.2	724	240	646	323	435		473.6	682	77	84			75	0.080
70	289.325	659.632	0.16	0.14	0.00	0.00	77	79			160	0.038	103	103	7.8	-1.75	725	230	647	338	427		473.4	649	74	82			76	0.080
80	290.882	661.051	0.16	0.14	0.00	0.00	79	80			157	0.038	102	102	6.0	-1.8	742	228	641	354	434		479.8	636	72	80			76	0.080
90	292.446	662.483	0.16	0.14	0.00	0.00	79	80			150	0.039	101	101	4.7	-1.3	738	224	622	370	463		483.4	590	70	81			75	0.075
100	294.005	663.913	0.16	0.14	0.00	0.00	79	81			143	0.042	96	97	3.6	-1.15	770	223	582	396	463		486.8	539	69	79			75	0.070
110	295.564	665.331	0.16	0.14	0.00	0.00	79	81			137	0.042	96	95	2.7	-0.85	773	225	528	427	461		482.8	500	69	77			75	0.065
120	297.129	666.756	0.16	0.14	0.00	0.00	79	81			133	0.038	101	100	2.1	-0.65	739	225	483	446	459		470.4	472	69	75			75	0.065
130	298.697	668.187	0.16	0.14	0.00	0.00	79	81			129	0.038	100	101	1.6	-0.45	672	228	449	451	451		450.2	456	69	76			76	0.060
140	300.263	669.621	0.16	0.14	0.00	0.00	79	80			126	0.038	100	101	1.2	-0.4	636	230	421	447	434		433.6	436	69	76			74	0.060
150	301.831	671.052	0.16	0.14	0.00	0.00	79	81			123	0.039	99	99	0.8	-0.4	615	230	397	436	419		419.4	421	69	73			73	0.055
160	303.397	672.482	0.16	0.14	0.00	0.00	79	80			120	0.038	100	100	0.5	-0.35	602	230	379	427	412		410.0	410	71	76			73	0.055
170	304.997	673.946	0.16	0.15	0.00	0.00	79	80			119	0.038	102	102	0.1	-0.4	588	234	364	416	401		400.6	401	71	75			73	0.055
180	306.560	675.380	0.16	0.14	0.00	0.00	79	79			118	0.037	100	101	0.0	-0.05	580	236	353	405	392		393.2	390	73	75			75	0.055
Avg/Total	28.307	25.777	0.16	0.14	0.00	0.00	77.53	78.84			140.53	0.039	101.02	101.01									29		75.26	80.68	#DIV/0!	#DIV/0!		0.068

PRINT

Final Laboratory Report - Method 5G Dual Train
Dilution Tunnel Particulate Calculations

Client Name:	Monessen	Equipment Numbers:	OMNI-00023	Run #:	12
Model:	Defiant 2N1		OMNI-00131	Train #:	A
Project No.:	227-S-39-3		OMNI-00342	Date:	04/28/10
Tracking No.:	1534		VC-1		

Sample Component	Reagent	Filter # or Probe #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	F574	132.7	120.2	12.5
B. Rear filter catch	Filter	F575	126.8	125.3	1.5
C. Probe catch	Probe	22	114341.0	114340.4	0.6

Total Particulate, mg :	14.6

Component	Equations:
A. Front filter catch	Final (mg) - Tare (mg) = Particulate, mg
B. Rear filter catch	Final (mg) - Tare (mg) = Particulate, mg
C. Probe catch	Final (mg) - Tare (mg) = Particulate, mg

Analyst: _____ Date: 6/2/10

PRINT

Final Laboratory Report - Method 5G Dual Train
Dilution Tunnel Particulate Calculations

Client Name:	Monessen	Equipment Numbers:	OMNI-00023	Run #:	12
Model:	Defiant 2N1		OMNI-00131	Train #:	B
Project No.:	227-S-39-3		OMNI-00342	Date:	04/28/10
Tracking No.:	1534		VC-1		

Sample Component	Reagent	Filter # or Probe #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	F576	128.4	116.6	11.8
B. Rear filter catch	Filter	F577	122.2	120.8	1.4
C. Probe catch	Probe	38	114146.3	114145.3	1.0

Total Particulate, mg :	14.2

Component	Equations:
A. Front filter catch	Final (mg) - Tare (mg) = Particulate, mg
B. Rear filter catch	Final (mg) - Tare (mg) = Particulate, mg
C. Probe catch	Final (mg) - Tare (mg) = Particulate, mg

Analyst: _____ Date: 6/2/10

STOVE TEMPERATURE TEST DATA - METHOD 5G

Client/Model: Monessen/Defiant 2N1 Project #: 227-5-39-3 Tracking #: 1534

Date: 4/28/10 Test Crew: AC Run #: 12

OMNI Equipment ID #:

Preburn [X] Test [ ] Coal Bed: Data: 0 = Range: 5.58 - 4.47 Actual: Coal Bed:

Time	Fuel (lb) Weight	Delta Weight	Stack Draft	TEMPERATURES (oF) Ambient	Top	Bottom	Back	Left	Right	Flue	Catalyst
0	31.83			69							N/A
10	30.80	1.04	0.039	72	382	267	148	209	200	247	
20	29.26	1.54	0.039	72	352	280	164	200	196	243	
30	27.40	1.85	0.039	70	357	298	175	194	196	246	
40	24.49	2.91	0.077	72	493	324	181	194	213	526	
50	21.50	3.00	0.046	72	474	350	192	205	261	304	
60	19.29	2.20	0.045	72	439	372	209	214	281	305	
70	16.20	3.09	0.051	73	498	377	229	225	296	357	
80	13.10	3.11	0.060	73	544	371	253	243	358	712	
90	10.69	2.40	0.057	71	587	345	277	269	388	371	
100	8.80	1.90	0.052	74	594	330	295	291	399	382	
110	7.85	0.95	0.089	72	653	332	315	311	406	491	
120	5.64	2.20	0.064	72	637	322	389	342	405	504	
130											
140											
150											
160											
170											
180											
190											
AVG											

Technician signature: _____ Date: 5/6/10

4-112 OF 4-155

OMNI-Test Laboratories, Inc.

FUEL DATA

Client: Monessen
Model: Defiant 2N1
Project #: 127439-3 Tracking #: 1534
Date: 4/28/10 Test Crew: JC Run #: 12
OMNI Equipment ID #:
FUEL LOAD PREPARED BY: Ralph G; moisture & dimension check by JC
FUEL: DOUGLAS-FIR SPECIES, UNTREATED, AIR-DRIED, STANDARD GRADE OR BETTER, DIMENSIONAL LUMBER.

PRE-BURN FUEL

MOISTURE CONTENT (METER -- DRY BASIS)

CALIBRATION: Cal Value (1) = 12% Actual Reading 12.0%
Cal Value (2) = 22% Actual Reading 22.0%

Piece	Length	Readings			Type
1	14 ft	18.5	18.0	20.6	2x4
2	14 ft	18.8	25.1	18.7	2x4
3	ft				

35.2 lb

Length of cut pieces: 42x8 inches Pre-Burn Fuel Average Moisture: 19.95%

Time (clock): 9:25 Room Temperature (F): 70 °F Initials: AC

TEST FUEL

FUEL TYPE AND AMOUNT: 2 x 4 0 4 x 4 4
CALCULATED LOAD WEIGHT: ACTUAL LOAD WEIGHT: 0 (2 x 4)
22.35 (4 x 4)
FUEL PIECE LENGTH: 21 inches 22.35 Total

MOISTURE CONTENT (METER -- DRY BASIS)

PIECE	READINGS			TYPE
1	20.4	20.3	20.3	4x4
2	19.8	20.3	20.2	4x4
3	22.0	20.5	18.4	4x4
4	20.8	20.3	18.9	4x4
5				
6				
7				
8				
9				
10				

OVERALL TEST FUEL LOAD MOISTURE AVERAGE: 20.18%

Time (clock): 9:30 AM Room Temperature (F): 70°F Initials: JC

Technician signature: Date: 4/28/10

OMNI-Test Laboratories, Inc.

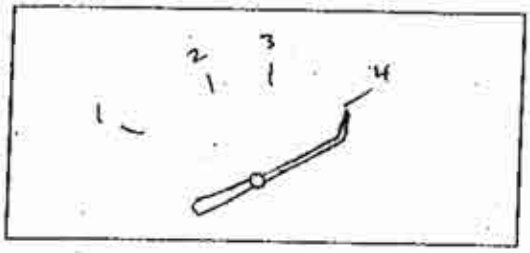
Run Notes

Client: Maverick
Model: Defiant 2NI
Project #: 227-5-39-3
Tracking #: 1534
Run #: 12 Date: 4/28/10
Test Crew: JC
OMNI Equipment ID #(s):

PREBURN

DESCRIBE OR SKETCH AIR OR THERMOMSTAT SETTINGS BELOW:
(SETTINGS MUST BE ACCURATE AND REPRODUCABLE)

PRIMARY:



SECONDARY: N/A

TERTIARY:

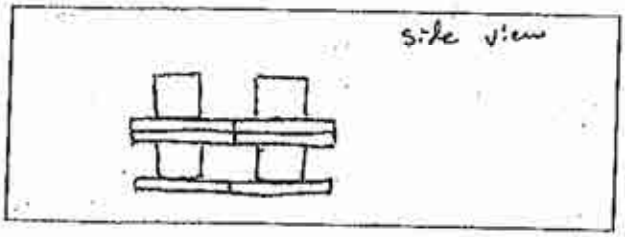
FAN: OFF

PREBURN SETTINGS AND ACTIVITIES

TIME	AIR (THERMO) CHANGES PRIMARY/SECONDARY/TERTIARY	FAN SETTING CHANGE	ADD FUEL + WT.	ADD FUEL - WT.	RAKE COAL	COMMENT
0	Test setting					
20 ~~21~~						
35					X	
65					X	
82	Test start				X	
	Test start, fuel on				X	

TEST

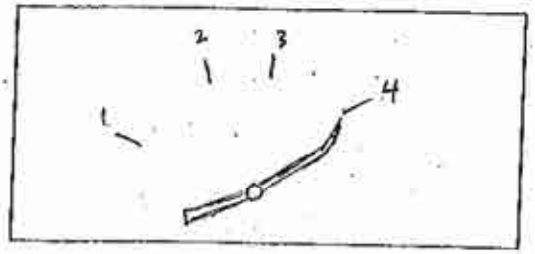
TEST FUEL CONFIGURATION SKETCH
(INDICATE VIEW ANGLE)



START UP PROCEDURES

BYPASS: 1 min
FUEL LOADING: 1 min
DOOR: 1 min
PRIMARY AIR: Test setting @ 0 min no change
OTHER:

DESCRIBE OR SKETCH TEST SETTINGS BELOW:
(SETTINGS MUST BE ACCURATE AND REPRODUCIBLE)
PRIMARY:



SECONDARY: N/A

TERTIARY:

FAN: OFF

Technician signature: Date: 4/28/10

Supplemental Data EPA 5G/5H

Client: Monessen

Model: Defiant 2N1

Project #: 227-5-39-5 Tracking #: 1534

Date: 4/28/10 Run #: 12 Booth: _____

Test Crew: JC Start Time: 12:39 Stop Time: 3:39

OMNI Equipment #(s): _____

Gas Analyzer Train Leak Check:

Stack: Dilution Tunnel (Method 5G Only):

Initial: _____ Initial: _____

Final: _____ Final: _____

Calibrations: Span Gas CO_2: _____ O_2: _____ CO: _____ CO_2(DT): _____

	N_2 Span	N_2 Span	N_2 Span	N_2 Span	N_2 Span	N_2 Span	N_2 Span
Time							
O_2							
CO_2							
CO							
CO_2 (DT)							

Stack Diameter (inches): 6

Air Velocity (ft/min): Initial: 450 Final: 450

Scale Audit (lbs): Pretest: 10.0 Post Test: 10.0

Induced Draft: 0 %Smoke Capture: 100 %

Pitot Tube Leak Test: Pre: 0.0 @ 30 Post: 0.0 @ 3.0

Flue Pipe Cleaned Prior to First Test in Series: Date: 4/28/10 Initials: JC

	Initial	Middle	Ending
Pb (in/Hg)	28.98 in Hg	29.04 in Hg	29.10 in Hg
Room Temp (°F)	~~74~~ 73 °F	80 °F	~~80~~ 75 °F

Technician signature: _____ Date: 4/28/10

Run 13

OMNI-Test Laboratories, Inc.

Wood Heater Test Data - EPA Method 5G

Manufacturer: Monessen
Model: Defiant 2N1
Project No.: 227-S-39-3
Tracking No.: 1534
Run: 13
Test Date: 04/29/10

Burn Rate	**0.64 kg/hr dry**
Average Tunnel Temperature	87 degrees Fahrenheit
Average Gas Velocity in Dilution Tunnel - vs	13.3 feet/second
Average Gas Flow Rate in Dilution Tunnel - Qsd	8528.0 dscf/hour
Average Delta p	0.038 inches H20
Average Delta H	0.00 inches H20
Total Time of Test	800 minutes

	AVERAGE	SAMPLE TRAIN 1	SAMPLE TRAIN 2
Total Sample Volume - Vm	117.53 cubic feet	125.05 cubic feet	110.02 cubic feet
Average Gas Meter Temperature	76 degrees Fahrenheit	76 degrees Fahrenheit	77 degrees Fahrenheit
Total Sample Volume (Standard Conditions) - Vmstd	112.8 dscf	120.0 dscf	105.6 dscf
Total Particulates - mn		28.8 mg	27.6 mg
Particulate Concentration (dry-standard)	0.00025 grams/dscf	0.00024 grams/dscf	0.00026 grams/dscf
Particulate Emission Rate	2.14 grams/hour	2.05 grams/hour	2.23 grams/hour
Adjusted Emissions	3.42 grams/hour	3.30 grams/hour	3.54 grams/hour
Difference from Average		0.12 grams/hour	0.12 grams/hour
7.5% of the average emission rate	0.26		
Weighted Average Emission Rate Limit	4.10 grams/hour		
7.5% of the weighted average emission rate limit	0.31		

Results Are Acceptable

OMNI-Test Laboratories, Inc.

Wood Heater Test Data - EPA Method 5G

Run: 13

Manufacturer:	Monessen
Model:	Defiant 2N1
Tracking No.:	1534
Project No.:	227-S-39-3
Test Date:	29-Apr-10
Beginning Clock Time:	12:10
Recording Interval:	10 min.
Total Sampling Time:	800 min.

Velocity Traverse Data									
	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	
Initial dP	0.032	0.041	0.044	0.043	0.029	0.040	0.043	0.041	"H2O
Initial Temp.	94	94	94	94	94	94	94	94	oF

OMNI Equipment Numbers: _____

PM Control Module:					
Dilution Tunnel MW(dry):	29.00	lb/lb-mole			
Dilution Tunnel MW(wet):	28.56	lb/lb-mole			
Dilution Tunnel H2O:	4.00	percent			
Dilution Tunnel Static:	-0.147	"H2O			
Pitot Tube Cp:	0.99				
Meter Box Y Factor:	0.994	(1)	0.996	(2)	
Barometric Pressure:	Begin	Middle	End	Average	
	29.29	29.3	29.33	29.31	"Hg

Signature/Date: 6/14/10

Tunnel Velocity:	13.31	ft/sec.
Intial Tunnel Flow:	143.4	scfm
Average Tunnel Flow:	142.1	scfm
Tunnel Area:	.0.1963	ft2
Post-Test Leak Check (1):	0.0@5	cfm@"Hg
Post-Test Leak Check (2):	0.0@9	cfm@"Hg
Fuel Moisture (dry basis %):	19.85	
Total Particulate (1):	28.8	
Total Particulate (2):	27.6	

Elapsed Time	Particulate Sampling Data														Fuel Weight, lb		Wood Heater Temperature Data, oF											Stack
	Gas Meter Cubic Feet (1)	Gas Meter Cubic Feet (2)	Sample Rate, cfm (1)	Sample Rate, cfm (2)	Orifice dH (1)	Orifice dH (2)	Meter oF (1)	Meter oF (2)	Meter Vac. In. Hg. (1)	Meter Vac. In. Hg. (2)	Dilution Tunnel Temp.	Dilution Tunnel dP	Pro. Rate (10%) (1)	Pro. Rate (10%) (2)	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Catalyst Exit	Average Surface	Stack	Filter (1)	Filter (2)	Impinger exit (1)	Impinger exit (2)	Ambient	Draft In. H2O
0	306.598	675.417			0.00	0.00	73	74			94	0.039			22.6		374	272	307	265	276		298.8	242	72	72			72	0.035
10	308.252	676.890	0.17	0.15	0.00	0.00	73	74			94	0.040	105	106	22.0	-0.55	304	257	315	246	254		275.2	309	72	70			72	0.040
20	309.865	678.323	0.16	0.14	0.00	0.00	73	74			97	0.038	105	106	21.4	-0.65	266	242	342	227	233		262.0	359	71	71			73	0.045
30	311.463	679.736	0.16	0.14	0.00	0.00	73	74			101	0.038	105	105	20.6	-0.8	255	229	388	214	218		260.8	394	73	71			73	0.050
40	313.051	681.147	0.16	0.14	0.00	0.00	74	75			109	0.039	103	104	19.7	-0.9	259	220	426	207	210		264.4	416	73	71			73	0.050
50	314.630	682.546	0.16	0.14	0.00	0.00	74	75			106	0.039	102	103	18.7	-1	276	214	459	205	205		271.8	428	72	72			72	0.053
60	316.206	683.950	0.16	0.14	0.00	0.00	74	75			107	0.039	102	103	17.6	-1.05	299	208	476	205	203		278.2	433	73	73			73	0.055
70	317.779	685.345	0.16	0.14	0.00	0.00	75	76			107	0.039	102	103	16.6	-1.05	323	206	483	203	206		284.2	427	75	73			73	0.055
80	319.357	686.748	0.16	0.14	0.00	0.00	75	76			107	0.039	102	103	15.6	-1	351	201	483	206	210		290.2	427	75	73			73	0.055
90	320.934	688.153	0.16	0.14	0.00	0.00	75	76			108	0.040	101	102	14.6	-1	388	202	486	210	215		300.2	429	75	73			73	0.055
100	322.509	689.556	0.16	0.14	0.00	0.00	75	76			109	0.039	102	103	13.6	-1	414	202	486	217	223		308.4	429	75	75			73	0.055
110	324.079	690.964	0.16	0.14	0.00	0.00	75	76			108	0.039	102	104	12.7	-0.9	438	200	479	221	230		313.6	410	76	74			74	0.055
120	325.651	692.370	0.16	0.14	0.00	0.00	76	77			107	0.040	100	102	11.9	-0.8	456	200	467	228	239		318.0	402	76	74			74	0.055
130	327.227	693.772	0.16	0.14	0.00	0.00	76	77			105	0.039	102	103	11.1	-0.8	473	200	449	235	248		321.0	371	76	74			74	0.055
140	328.803	695.178	0.16	0.14	0.00	0.00	76	77			103	0.039	101	103	10.3	-0.75	473	198	421	239	254		317.0	350	74	74			74	0.050
150	330.374	696.581	0.16	0.14	0.00	0.00	76	77			101	0.040	100	101	9.6	-0.7	460	198	395	243	261		311.4	337	74	74			74	0.050
160	331.942	697.985	0.16	0.14	0.00	0.00	76	77			99	0.039	101	102	9.0	-0.6	434	196	374	246	265		303.0	319	74	72			74	0.048
170	333.512	699.389	0.16	0.14	0.00	0.00	76	77			97	0.041	98	100	8.5	-0.5	413	194	357	244	270		295.6	304	74	72			74	0.045
180	335.075	700.790	0.16	0.14	0.00	0.00	76	77			96	0.039	100	102	8.0	-0.5	402	192	341	243	272		290.0	298	74	72			72	0.045
190	336.637	702.190	0.16	0.14	0.00	0.00	76	77			96	0.039	100	102	7.6	-0.4	393	189	328	241	274		285.0	291	72	72			72	0.043
200	338.204	703.598	0.16	0.14	0.00	0.00	76	77			95	0.038	101	104	7.2	-0.4	387	190	317	239	276		281.8	289	72	72			74	0.040
210	339.768	705.002	0.16	0.14	0.00	0.00	76	77			95	0.037	103	105	6.9	-0.35	380	190	309	237	276		278.4	280	72	72			74	0.040
220	341.327	706.404	0.16	0.14	0.00	0.00	76	77			93	0.039	99	102	6.6	-0.3	376	187	300	235	276		274.8	270	72	72			74	0.040
230	342.889	707.810	0.16	0.14	0.00	0.00	76	77			92	0.039	100	102	6.3	-0.3	369	185	289	233	278		270.8	257	72	72			72	0.040
240	344.449	709.208	0.16	0.14	0.00	0.00	76	77			90	0.039	99	101	6.0	-0.25	363	181	278	228	278		265.6	244	72	70			74	0.038
250	346.009	710.608	0.16	0.14	0.00	0.00	76	77			90	0.039	99	101	5.8	-0.25	358	178	265	226	278		261.0	237	69	69			74	0.035
260	347.573	711.992	0.16	0.14	0.00	0.00	76	77			89	0.039	99	100	5.6	-0.2	360	176	256	226	275		258.6	230	69	69			74	0.035
270	349.132	713.365	0.16	0.14	0.00	0.00	76	77			89	0.039	99	99	5.4	-0.15	369	180	247	226	276		259.6	221	69	69			76	0.030
280	350.684	714.737	0.16	0.14	0.00	0.00	76	77			89	0.039	99	99	5.3	-0.15	361	183	239	228	274		257.0	215	70	70			76	0.030
290	352.243	716.108	0.16	0.14	0.00	0.00	76	77			89	0.039	99	99	5.1	-0.15	356	183	232	226	267		252.8	211	70	70			76	0.030
300	353.793	717.481	0.16	0.14	0.00	0.00	77	77			88	0.039	98	99	5.0	-0.1	350	186	227	224	261		249.6	207	70	70			77	0.030
310	355.348	718.856	0.16	0.14	0.00	0.00	77	78			88	0.038	100	100	4.9	-0.1	346	186	220	222	259		246.6	201	70	70			77	0.030
320	356.903	720.231	0.16	0.14	0.00	0.00	77	78			88	0.038	100	100	4.8	-0.15	350	186	214	220	255		245.0	199	70	70			77	0.028
330	358.457	721.598	0.16	0.14	0.00	0.00	77	78			87	0.039	98	98	4.6	-0.15	353	184	214	221	251		244.6	197	71	71			77	0.028
340	360.010	722.966	0.16	0.14	0.00	0.00	78	78			87	0.038	99	100	4.5	-0.15	349	184	210	221	247		242.2	195	71	71			77	0.028
350	361.565	724.333	0.16	0.14	0.00	0.00	78	79			87	0.039	98	98	4.4	-0.1	344	184	206	221	240		239.0	193	69	71			77	0.028
360	363.122	725.705	0.16	0.14	0.00	0.00	78	78			87	0.039	98	99	4.2	-0.15	340	182	204	221	236		236.6	189	69	71			77	0.025
370	364.679	727.080	0.16	0.14	0.00	0.00	78	79			86	0.039	98	99	4.1	-0.1	336	182	202	221	234		235.0	187	69	71			78	0.025
380	366.230	728.447	0.16	0.14	0.00	0.00	78	78			86	0.038	99	100	4.0	-0.1	336	180	197	221	230		232.8	184	71	71			77	0.025
390	367.786	729.810	0.16	0.14	0.00	0.00	78	78			86	0.038	100	99	3.9	-0.15	331	178	195	219	227		230.0	180	69	71			75	0.025
400	369.342	731.178	0.16	0.14	0.00	0.00	78	79			85	0.039	98	98	3.8	-0.1	327	177	195	218	223		228.0	177	71	71			77	0.025
410	370.900	732.550	0.16	0.14	0.00	0.00	78	78			85	0.039	98	98	3.7	-0.1	322	175	190	216	220		224.6	173	68	70			75	0.025
420	372.459	733.921	0.16	0.14	0.00	0.00	78	78			84	0.039	98	98	3.6	-0.1	320	175	186	214	218		222.6	171	69	71			75	0.025

OMNI-Test Laboratories, Inc.

Wood Heater Test Data - EPA Method 5G

Run: 13

Manufacturer: Monessen
Model: Defiant 2N1
Tracking No.: 1534
Project No.: 227-S-39-3
Test Date: 29-Apr-10
Beginning Clock Time: 12:10
Recording Interval: 10 min.
Total Sampling Time: 800 min.

OMNI Equipment Numbers:

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	
Initial dP	0.032	0.041	0.044	0.043	0.029	0.040	0.043	0.041	"H2O
Initial Temp.	94	94	94	94	94	94	94	94	oF

PM Control Module:
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.56 lb/lb-mole
Dilution Tunnel H2O: 4.00 percent
Dilution Tunnel Static: -0.147 "H2O
Pitot Tube Cp: 0.99
Meter Box Y Factor: 0.994 (1) 0.996 (2)
Barometric Pressure: Begin 29.29, Middle 29.3, End 29.33, Average 29.31 "Hg

Signature/Date: 6/14/10

Tunnel Velocity: 13.31 ft/sec.
Intial Tunnel Flow: 143.4 scfm
Average Tunnel Flow: 142.1 scfm
Tunnel Area: 0.1963 ft2
Post-Test Leak Check (1): 0.0@5 cfm@"Hg
Post-Test Leak Check (2): 0.0@9 cfm@"Hg
Fuel Moisture (dry basis %): 19.85
Total Particulate (1): 28.8
Total Particulate (2): 27.6

Elapsed Time	Particulate Sampling Data														Fuel Weight, lb		Wood Heater Temperature Data, oF												Stack
	Gas Meter Cubic Feet (1)	Gas Meter Cubic Feet (2)	Sample Rate, cfm (1)	Sample Rate, cfm (2)	Orifice dH (1)	Orifice dH (2)	Meter oF (1)	Meter oF (2)	Meter Vac. In. Hg. (1)	Meter Vac. In. Hg. (2)	Dilution Tunnel Temp.	Dilution Tunnel dP	Pro. Rate (10%) (1)	Pro. Rate (10%) (2)	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Catalyst Exit	Average Surface	Stack	Filter (1)	Filter (2)	Impinger exit (1)	Impinger exit (2)	Ambient	Draft In. H2O
430	374.022	735.297	0.16	0.14	0.00	0.00	78	78			83	0.039	98	99	3.5	-0.05	313	173	184	214	214		219.6	166	68	70			75	0.023
440	375.575	736.673	0.16	0.14	0.00	0.00	78	78			83	0.038	99	100	3.4	-0.1	309	170	181	214	211		217.0	164	70	70			77	0.225
450	377.129	738.043	0.16	0.14	0.00	0.00	78	78			82	0.038	99	99	3.4	-0.05	302	168	179	211	209		213.8	162	68	70			74	0.023
460	378.686	739.415	0.16	0.14	0.00	0.00	77	78			82	0.038	99	99	3.3	-0.1	297	168	176	211	204		211.2	159	70	70			74	0.020
470	380.243	740.780	0.16	0.14	0.00	0.00	77	78			82	0.037	101	100	3.2	-0.1	293	168	172	209	202		208.8	155	70	68			74	0.020
480	381.803	742.157	0.16	0.14	0.00	0.00	77	78			81	0.038	100	100	3.1	-0.1	290	163	169	208	197		205.4	152	67	67			75	0.020
490	383.313	743.564	0.15	0.14	0.00	0.00	77	77			81	0.038	96	102	3.0	-0.05	290	163	167	206	197		204.6	150	67	67			75	0.020
500	384.920	744.881	0.16	0.13	0.00	0.00	77	77			80	0.038	102	96	2.9	-0.1	296	160	165	203	195		203.8	150	66	66			73	0.020
510	386.479	746.255	0.16	0.14	0.00	0.00	77	77			80	0.037	101	101	2.8	-0.1	297	158	165	199	197		203.2	148	67	67			73	0.020
520	388.020	747.637	0.15	0.14	0.00	0.00	77	77			80	0.036	101	103	2.7	-0.1	292	158	162	197	199		201.6	147	66	68			73	0.020
530	389.595	748.982	0.16	0.13	0.00	0.00	76	77			80	0.037	102	99	2.6	-0.1	289	158	160	192	201		200.0	147	68	68			73	0.020
540	391.151	750.349	0.16	0.14	0.00	0.00	76	77			80	0.037	101	100	2.6	-0.05	287	156	158	188	205		198.8	145	68	68			72	0.018
550	392.709	751.714	0.16	0.14	0.00	0.00	76	77			80	0.037	101	100	2.4	-0.15	276	155	157	185	207		196.0	142	68	68			72	0.018
560	394.269	753.073	0.16	0.14	0.00	0.00	76	77			79	0.036	102	101	2.4	0	270	153	155	181	211		194.0	140	68	68			74	0.015
570	395.824	754.429	0.16	0.14	0.00	0.00	76	77			79	0.037	101	100	2.3	-0.1	266	151	153	177	207		190.8	138	68	68			74	0.018
580	397.382	755.782	0.16	0.14	0.00	0.00	76	77			79	0.036	102	101	2.3	-0.05	263	151	151	173	201		187.8	136	68	68			75	0.018
590	398.939	757.135	0.16	0.14	0.00	0.00	76	77			78	0.036	102	101	2.2	-0.1	259	147	151	168	194		183.8	134	68	68			74	0.015
600	400.499	758.497	0.16	0.14	0.00	0.00	76	77			78	0.036	102	101	2.1	-0.05	259	140	149	164	188		180.0	134	68	68			72	0.015
610	402.063	759.844	0.16	0.13	0.00	0.00	76	77			78	0.037	101	99	2.0	-0.1	259	138	147	164	185		178.6	134	68	68			72	0.015
620	403.626	761.197	0.16	0.14	0.00	0.00	75	76			78	0.037	101	99	2.0	-0.05	263	138	147	164	181		178.6	134	68	68			72	0.015
630	405.185	762.555	0.16	0.14	0.00	0.00	75	75			78	0.038	100	99	1.9	-0.1	260	135	146	161	178		176.0	135	67	67			71	0.015
640	406.748	763.920	0.16	0.14	0.00	0.00	75	75			78	0.036	103	102	1.8	-0.1	258	135	144	161	176		174.8	135	67	67			71	0.015
650	408.309	765.261	0.16	0.13	0.00	0.00	75	75			78	0.036	102	100	1.7	-0.1	258	135	144	161	174		174.4	135	67	67			73	0.015
660	409.871	766.613	0.16	0.14	0.00	0.00	74	75			78	0.037	101	100	1.6	-0.1	260	139	143	163	173		175.6	135	69	67			73	0.015
670	411.428	767.975	0.16	0.14	0.00	0.00	74	75			78	0.036	102	102	1.5	-0.1	255	141	143	165	171		175.0	133	67	67			73	0.015
680	412.983	769.325	0.16	0.14	0.00	0.00	74	75			78	0.036	102	101	1.4	-0.1	253	141	143	165	169		174.2	130	69	66			73	0.015
690	414.539	770.668	0.16	0.13	0.00	0.00	75	75			78	0.036	102	100	1.3	-0.1	249	141	141	162	167		172.0	130	66	66			73	0.015
700	416.096	772.010	0.16	0.13	0.00	0.00	75	75			78	0.037	101	99	1.2	-0.1	247	141	139	163	167		171.4	128	67	67			73	0.015
710	417.650	773.346	0.16	0.13	0.00	0.00	75	75			78	0.035	103	101	1.1	-0.05	242	141	139	163	165		170.0	128	67	69			71	0.015
720	419.210	774.692	0.16	0.13	0.00	0.00	75	75			77	0.037	101	99	1.1	-0.05	236	141	139	161	161		167.6	126	67	69			73	0.015
730	420.759	776.032	0.15	0.13	0.00	0.00	75	75			77	0.036	102	100	1.0	-0.05	225	139	137	159	159		163.8	124	67	67			73	0.015
740	422.313	777.385	0.16	0.14	0.00	0.00	75	75			77	0.036	102	101	1.0	-0.05	216	139	137	156	156		160.8	122	67	67			73	0.015
750	423.867	778.733	0.16	0.13	0.00	0.00	75	75			77	0.035	103	102	0.9	-0.05	214	137	133	156	154		158.8	122	69	69			73	0.013
760	425.428	780.071	0.16	0.13	0.00	0.00	75	75			77	0.035	104	101	0.9	-0.05	210	137	133	154	152		157.2	120	67	69			73	0.013
770	426.988	781.418	0.16	0.13	0.00	0.00	75	75			77	0.035	104	102	0.8	-0.05	206	135	130	152	150		154.6	118	66	69			73	0.010
780	428.539	782.752	0.16	0.13	0.00	0.00	75	75			76	0.035	103	101	0.8	-0.05	201	135	131	150	148		153.0	116	69	69			73	0.010
790	430.095	784.095	0.16	0.13	0.00	0.00	75	75			76	0.035	103	101	0.8	0	197	135	129	146	146		150.6	114	69	69			73	0.010
800	431.648	785.435	0.16	0.13	0.00	0.00	75	75			76	0.035	103	101	0.8	0														0.010
Avg/Total	125.050	110.018	0.16	0.14	0.00	0.00	75.88	76.52			87.42	0.038	100.82	100.81									#DIV/0!							0.031

PRINT

Final Laboratory Report - Method 5G Dual Train
Dilution Tunnel Particulate Calculations

Client Name: Monessen
Model: Defiant 2N1
Project No.: 227-S-39-3
Tracking No.: 1534

Equipment Numbers: OMNI-00023, OMNI-00131, OMNI-00342, VC-1

Run #: 13
Train #: A
Date: 04/24/10

Sample Component	Reagent	Filter # or Probe #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	F578	151.5	125.2	26.3
B. Rear filter catch	Filter	F517	118.3	117.1	1.2
C. Probe catch	Probe	VC-Q	76940.4	76939.1	1.3

Total Particulate, mg :	28.8

Component	Equations:
A. Front filter catch	Final (mg) - Tare (mg) = Particulate, mg
B. Rear filter catch	Final (mg) - Tare (mg) = Particulate, mg
C. Probe catch	Final (mg) - Tare (mg) = Particulate, mg

Analyst: [signature] Date: 4/27/10

PRINT

Final Laboratory Report - Method 5G Dual Train
Dilution Tunnel Particulate Calculations

Client Name:	Monessen	Equipment Numbers:	OMNI-00023	Run #:	13
Model:	Defiant 2N1		OMNI-00131	Train #:	B
Project No.:	227-S-39-3		OMNI-00342	Date:	04/24/10
Tracking No.:	1534		VC-1		

Sample Component	Reagent	Filter # or Probe #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	F518	150.5	125.5	25.0
B. Rear filter catch	Filter	F519	122.1	120.8	1.3
C. Probe catch	Probe	VC-J	76841.5	76840.2	1.3

Total Particulate, mg :	27.6

Component	Equations:
A. Front filter catch	Final (mg) - Tare (mg) = Particulate, mg
B. Rear filter catch	Final (mg) - Tare (mg) = Particulate, mg
C. Probe catch	Final (mg) - Tare (mg) = Particulate, mg

Analyst: _____ Date: 4/24/10

FUEL DATA

Client: Manesren
Model: Defiant 2N1
Project #: 227-5-29-1 Tracking #: 1534
Date: 4/29/10 Test Crew: JC Run #: 13
OMNI Equipment ID #:
FUEL LOAD PREPARED BY: Ralph, moisture & dimensioned by JC
FUEL: DOUGLAS-FIR SPECIES, UNTREATED, AIR-DRIED, STANDARD GRADE OR BETTER, DIMENSIONAL LUMBER.

PRE-BURN FUEL

MOISTURE CONTENT (METER – – DRY BASIS)

CALIBRATION: Cal Value (1) = 12% Actual Reading 12.0
Cal Value (2) = 22% Actual Reading 22.0

Piece	Length	Readings			Type
1	13.7 ft	24.6	23.6	20.7	2x4
2	13.7 ft	23.3	20.1	25.4	2x4
3	____ ft				

Length of cut pieces: 41 x 8 inches Pre-Burn Fuel Average Moisture:

Time (clock): 8:15 Room Temperature (F): 70 °F Initials: JC

TEST FUEL

FUEL TYPE AND AMOUNT: 2 × 4 0 4 × 4 4
CALCULATED LOAD WEIGHT: ____ ACTUAL LOAD WEIGHT: 0 (2 × 4)
22.55 (4 × 4)
FUEL PIECE LENGTH: 21 inch 22.55 Total

MOISTURE CONTENT (METER – – DRY BASIS)

PIECE	READINGS			TYPE
1	20.2	20.6	20.3	4x4
2	20.6	18.9	19.2	4x4
3	19.9	18.9	20.5	4x4
4	19.1	20.6	19.4	4x4
5				
6				
7				
8				
9				
10				

OVERALL TEST FUEL LOAD MOISTURE AVERAGE: 19.85 %

Time (clock): 8:15 Room Temperature (F): 70°F Initials: JC

Technician signature: Date: 5/6/10

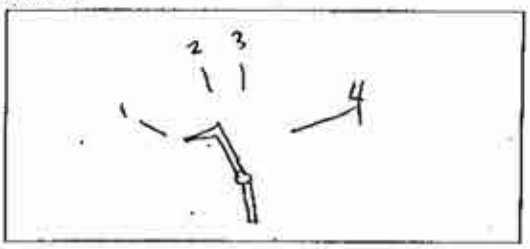
Run Notes

Client: Monessen
Model: Defiant 2N1
Project #: 227-5-39-1
Tracking #: 1534
Run #: 13 Date: 4/22/10
Test Crew: JC
OMNI Equipment ID #(s):

PREBURN

DESCRIBE OR SKETCH AIR OR THERMOMSTAT SETTINGS BELOW:
(SETTINGS MUST BE ACCURATE AND REPRODUCABLE)

PRIMARY:



SECONDARY: N/A

TERTIARY:

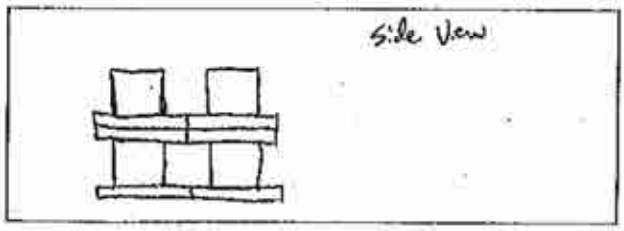
FAN: OFF

PREBURN SETTINGS AND ACTIVITIES

TIME	AIR (THERMO) CHANGES PRIMARY/SECONDARY/TERTIARY	FAN SETTING CHANGE	ADD FUEL + WT.	ADD FUEL - WT.	RAKE COAL	COMMENT
0	Test setting					
31					X	
62					X	
150					X	
165	Test start, Fuel on				X	

TEST

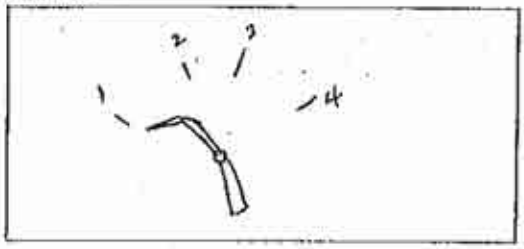
TEST FUEL CONFIGURATION SKETCH
(INDICATE VIEW ANGLE)



START UP PROCEDURES

BYPASS: 1 min, 3 sec
FUEL LOADING: 1 min, 0 sec
DOOR: 1 min 2 sec
PRIMARY AIR: Test setting @ 0min, no change
OTHER: N/A

DESCRIBE OR SKETCH TEST SETTINGS BELOW:
(SETTINGS MUST BE ACCURATE AND REPRODUCIBLE)
PRIMARY:



SECONDARY: N/A

TERTIARY:

FAN: OFF

Technician signature: Date: 4/22/10

4-124 OF 4-155

OMNI-Test Laboratories, Inc.

Supplemental Data EPA 5G/5H

Client: Monsanto

Model: ~~Defiant~~ 2N1

Project #: 227-5-34-3 Tracking #: 1534

Date: 4/29/10 Run #: 13 Booth: _____

Test Crew: JC Start Time: 12:10 PM Stop Time: 1:30 AM

OMNI Equipment #(s): _____

Gas Analyzer Train Leak Check:

Stack: Dilution Tunnel (Method 5G Only):

Initial: _____ Initial: _____

Final: _____ Final: _____

Calibrations: Span Gas CO_2: _____ O_2: _____ CO: _____ CO_2(DT): _____

	N_2 Span	N_2 Span	N_2 Span	N_2 Span	N_2 Span	N_2 Span	N_2 Span
Time							
O_2							
CO_2							
CO							
CO_2 (DT)							

Stack Diameter (inches): 6

Air Velocity (ft/min): Initial: <50 Final: <50

Scale Audit (lbs): Pretest: 10.0 Post Test: 10.0

Induced Draft: 0 %Smoke Capture: 100%

Pitot Tube Leak Test: Pre: 0.0 @ 3.0 Post: 0.0 @ 3.1

Flue Pipe Cleaned Prior to First Test in Series: Date: ~~4/28/10~~ 4/18/10 Initials: JC

	Initial	Middle	Ending
Pb (in/Hg)	29.29	29.30	29.33
Room Temp (°F)	75	79	75

Technician signature: _____ Date: 4/29/10

4-125 OF 4-155

Run 14

OMNI-Test Laboratories, Inc.

Wood Heater Test Data - EPA Method 5G

Manufacturer: Monessen
Model: Defiant 2N1
Project No.: 227-S-39-3
Tracking No.: 1534
Run: 14
Test Date: 04/30/10

Burn Rate	1.51 kg/hr dry
Average Tunnel Temperature	109 degrees Fahrenheit
Average Gas Velocity in Dilution Tunnel - vs	13.5 feet/second
Average Gas Flow Rate in Dilution Tunnel - Qsd	8360.6 dscf/hour
Average Delta p	0.038 inches H20
Average Delta H	0.00 inches H20
Total Time of Test	340 minutes

	AVERAGE	SAMPLE TRAIN 1	SAMPLE TRAIN 2
Total Sample Volume - Vm	50.85 cubic feet	53.86 cubic feet	47.84 cubic feet
Average Gas Meter Temperature	79 degrees Fahrenheit	79 degrees Fahrenheit	80 degrees Fahrenheit
Total Sample Volume (Standard Conditions) - Vmsld	48.6 dscf	51.5 dscf	45.7 dscf
Total Particulates - mn		2.1 mg	1.9 mg
Particulate Concentration (dry-standard)	0.00004 grams/dscf	0.00004 grams/dscf	0.00004 grams/dscf
Particulate Emission Rate	0.34 grams/hour	0.34 grams/hour	0.35 grams/hour
Adjusted Emissions	**0.75 grams/hour**	0.75 grams/hour	0.76 grams/hour
Difference from Average		0.01 grams/hour	0.01 grams/hour
7.5% of the average emission rate	0.06		
Weighted Average Emission Rate Limit	4.10 grams/hour		
7.5% of the weighted average emission rate limit	0.31		
	Results Are Acceptable		

OMNI-Test Laboratories, Inc.

Wood Heater Test Data - EPA Method 5G

Run: 14

Manufacturer:	Monessen	
Model:	Defiant 2N1	
Tracking No.:	1534	
Project No.:	227-S-39-3	
Test Date:	30-Apr-10	
Beginning Clock Time:	16:20	
Recording Interval:	10	min.
Total Sampling Time:	340	min.

Velocity Traverse Data									
	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	
Initial dP	0.031	0.042	0.047	0.042	0.032	0.044	0.045	0.042	"H2O
Initial Temp.	110	110	110	110	110	110	110	110	oF

OMNI Equipment Numbers:

Signature/Date: 4/6/10

PM Control Module:					
Dilution Tunnel MW(dry):	29.00	lb/lb-mole		Tunnel Velocity:	13.53 ft/sec.
Dilution Tunnel MW(wet):	28.56	lb/lb-mole		Intial Tunnel Flow:	144.1 scfm
Dilution Tunnel H2O:	4.00	percent		Average Tunnel Flow:	139.3 scfm
Dilution Tunnel Static:	-0.157	"H2O		Tunnel Area:	0.1963 ft2
Pitot Tube Cp:	0.99			Post-Test Leak Check (1):	0.0@5 cfm@"Hg
Meter Box Y Factor:	0.994	(1)	0.996 (2)	Post-Test Leak Check (2):	0.0@9 cfm@"Hg
Barometric Pressure:	Begin	Middle	End Average	Fuel Moisture (dry basis %):	19.87
	29.35	29.34	29.37 29.35 "Hg	Total Particulate (1):	2.1
				Total Particulate (2):	1.9

Elapsed Time	Particulate Sampling Data														Fuel Weight, lb		Wood Heater Temperature Data, oF											Stack
	Gas Meter Cubic Feet (1)	Gas Meter Cubic Feet (2)	Sample Rate, cfm (1)	Sample Rate, cfm (2)	Orifice dH (1)	Orifice dH (2)	Meter oF (1)	Meter oF (2)	Meter Vac. In. Hg. (1)	Meter Vac. In. Hg. (2)	Dilution Tunnel Temp.	Dilution Tunnel dP	Pro. Rate (10%) (1)	Pro. Rate (10%) (2)	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Catalyst Exit	Average Surface	Stack	Filter (1)	Filter (2)	Impinger exit (1)	Impinger exit (2)	Ambient	Draft In. H2O
0	431.685	785.450			0.00	0.00	79	79			110	0.041			22.7		456	222	345	326	306		331.0	304	70	72			76	0.040
10	433.183	786.903	0.15	0.15	0.00	0.00	78	79			107	0.038	95	104	21.7	-0.95	360	215	339	295	282		298.2	384	76	76			76	0.050
20	434.810	788.336	0.16	0.14	0.00	0.00	78	79			117	0.038	104	103	20.6	-1.15	365	211	382	267	258		296.6	473	78	78			78	0.060
30	436.409	789.753	0.16	0.14	0.00	0.00	78	79			121	0.038	102	102	19.3	-1.3	428	202	441	250	245		313.2	495	80	80			78	0.060
40	437.998	791.160	0.16	0.14	0.00	0.00	78	80			125	0.039	101	100	17.8	-1.5	487	197	479	242	238		328.6	509	79	79			75	0.063
50	439.586	792.567	0.16	0.14	0.00	0.00	79	80			129	0.039	101	101	16.2	-1.55	531	193	507	242	242		343.0	537	82	82			77	0.065
60	441.167	793.972	0.16	0.14	0.00	0.00	79	80			129	0.040	99	99	14.6	-1.6	535	191	524	247	260		351.4	537	82	82			75	0.065
70	442.746	795.374	0.16	0.14	0.00	0.00	79	80			132	0.040	99	99	13.0	-1.65	546	193	540	254	284		363.4	561	82	82			76	0.070
80	444.324	796.785	0.16	0.14	0.00	0.00	79	80			131	0.040	99	100	11.4	-1.55	567	191	554	260	316		377.6	552	84	84			75	0.070
90	445.906	798.229	0.16	0.14	0.00	0.00	79	81			127	0.040	99	102	10.1	-1.35	593	189	559	266	336		388.6	531	84	82			75	0.070
100	447.487	799.578	0.16	0.13	0.00	0.00	79	81			126	0.040	99	95	8.8	-1.25	606	188	552	273	347		393.2	516	84	84			75	0.070
110	449.068	800.979	0.16	0.14	0.00	0.00	79	81			123	0.038	101	101	7.7	-1.15	614	188	541	281	355		395.8	500	82	82			75	0.065
120	450.645	802.381	0.16	0.14	0.00	0.00	79	81			120	0.037	102	102	6.7	-0.95	608	189	527	288	362		394.8	477	82	82			75	0.065
130	452.226	803.783	0.16	0.14	0.00	0.00	79	81			118	0.039	100	99	5.9	-0.85	586	188	507	292	366		387.8	459	82	82			75	0.063
140	453.815	805.190	0.16	0.14	0.00	0.00	79	81			114	0.038	101	101	5.2	-0.65	578	189	486	299	369		384.2	434	80	82			76	0.060
150	455.400	806.598	0.16	0.14	0.00	0.00	79	81			111	0.038	101	100	4.8	-0.45	567	189	462	299	366		376.6	408	80	80			75	0.060
160	456.984	808.003	0.16	0.14	0.00	0.00	79	81			108	0.038	100	100	4.3	-0.5	561	188	438	301	362		370.0	390	79	82			75	0.055
170	458.564	809.409	0.16	0.14	0.00	0.00	79	80			106	0.038	100	100	3.9	-0.4	539	188	416	305	355		360.6	377	79	81			75	0.053
180	460.155	810.815	0.16	0.14	0.00	0.00	79	80			104	0.038	100	100	3.5	-0.35	524	188	396	309	348		353.0	359	77	79			75	0.050
190	461.739	812.220	0.16	0.14	0.00	0.00	78	80			103	0.038	100	100	3.2	-0.3	500	186	374	311	339		342.0	339	79	79			75	0.050
200	463.324	813.626	0.16	0.14	0.00	0.00	78	80			100	0.036	102	102	3.0	-0.25	478	184	353	309	331		331.0	322	77	79			75	0.050
210	464.917	815.036	0.16	0.14	0.00	0.00	78	79			99	0.036	103	103	2.7	-0.25	463	179	330	302	324		319.6	307	76	79			74	0.048
220	466.509	816.443	0.16	0.14	0.00	0.00	78	79			98	0.037	101	101	2.5	-0.2	450	179	313	300	317		311.8	298	76	78			74	0.045
230	468.093	817.849	0.16	0.14	0.00	0.00	78	79			97	0.036	102	102	2.3	-0.2	441	177	298	295	313		304.8	289	76	78			74	0.043
240	469.682	819.256	0.16	0.14	0.00	0.00	78	79			97	0.035	104	104	2.1	-0.2	438	183	284	295	310		302.0	284	76	80			78	0.043
250	471.270	820.655	0.16	0.14	0.00	0.00	78	79			97	0.038	100	99	1.9	-0.2	436	187	273	293	304		298.6	276	76	80			78	0.040
260	472.848	822.049	0.16	0.14	0.00	0.00	78	79			96	0.037	100	100	1.6	-0.3	451	187	265	291	304		299.6	267	76	80			78	0.038
270	474.483	823.456	0.16	0.14	0.00	0.00	78	79			96	0.037	104	101	1.4	-0.25	462	187	259	289	306		300.6	263	78	80			78	0.038
280	476.028	824.863	0.15	0.14	0.00	0.00	78	79			95	0.036	99	102	1.2	-0.2	464	189	252	289	306		300.0	263	78	80			76	0.038
290	477.613	826.265	0.16	0.14	0.00	0.00	79	80			95	0.036	102	101	1.0	-0.2	463	187	248	291	306		299.0	261	76	81			78	0.035
300	479.197	827.670	0.16	0.14	0.00	0.00	79	79			94	0.036	102	102	0.7	-0.25	460	189	243	291	304		297.4	256	76	80			76	0.038
310	480.785	829.071	0.16	0.14	0.00	0.00	79	80			94	0.036	102	101	0.5	-0.2	456	192	241	291	302		296.4	254	76	80			76	0.035
320	482.374	830.474	0.16	0.14	0.00	0.00	79	80			93	0.036	102	101	0.3	-0.2	447	192	237	291	300		293.4	252	76	81			76	0.038
330	483.963	831.877	0.16	0.14	0.00	0.00	79	80			93	0.036	102	101	0.1	-0.2	439	192	235	289	295		290.0	248	76	80			76	0.035
340	485.547	833.286	0.16	0.14	0.00	0.00	79	80			93	0.036	102	102	0.0	-0.1	425	191	230	286	291		284.6	243	76	80			76	0.035
Avg/Total	53.862	47.836	0.16	0.14	0.00	0.00	78.60	79.86			108.51	0.038	100.91	100.90									46		78.46	80.17	#DIV/0!	#DIV/0!		0.051

PRINT

Final Laboratory Report - Method 5G Dual Train
Dilution Tunnel Particulate Calculations

Client Name: Monessen
Model: Defiant 2N1
Project No.: 227-S-39-3
Tracking No.: 1534

Equipment Numbers: OMNI-00023, OMNI-00131, OMNI-00342, VC-1

Run #: 14
Train #: A
Date: 04/30/10

Sample Component	Reagent	Filter # or Probe #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	F520	118.3	116.4	1.9
B. Rear filter catch	Filter	F521	125.2	125.0	0.2
C. Probe catch	Probe	VC-H	69300.3	69300.3	0.0

Total Particulate, mg :	2.1

Component	Equations:
A. Front filter catch	Final (mg) - Tare (mg) = Particulate, mg
B. Rear filter catch	Final (mg) - Tare (mg) = Particulate, mg
C. Probe catch	Final (mg) - Tare (mg) = Particulate, mg

Analyst: _____ Date: 6/2/10

PRINT

Final Laboratory Report - Method 5G Dual Train
Dilution Tunnel Particulate Calculations

Client Name: Monessen
Model: Defiant 2N1
Project No.: 227-S-39-3
Tracking No.: 1534

Equipment Numbers: OMNI-00023, OMNI-00131, OMNI-00342, VC-1

Run #: 14
Train #: B
Date: 04/30/10

Sample Component	Reagent	Filter # or Probe #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	F522	122.4	121.0	1.4
B. Rear filter catch	Filter	F523	117.7	117.5	0.2
C. Probe catch	Probe	VC-1	77918.0	77917.7	0.3

Total Particulate, mg :	1.9

Component	Equations:
A. Front filter catch	Final (mg) - Tare (mg) = Particulate, mg
B. Rear filter catch	Final (mg) - Tare (mg) = Particulate, mg
C. Probe catch	Final (mg) - Tare (mg) = Particulate, mg

Analyst: [signature] Date: 4/2/10

STOVE TEMPERATURE TEST DATA - METHOD 5G

Client/Model: Monessen/Defiant 2N1 Project #: 227-S-39-3 Tracking #: 1534

Date: 4/30/10 Test Crew: dc Run #: 14

OMNI Equipment ID #:

Preburn [X] Test [ ] Coal Bed: Data: 0 = Range: 5.7 - 4.5 Actual: Coal Bed:

Time	Fuel Weight (lb)	Delta Weight	Stack Draft	TEMPERATURES (oF) Ambient	Top	Bottom	Back	Left	Right	Flue	Catalyst
0	16.56		0.066	74	434	332	499	254	315	501	N/A
10	15.39	1.17	0.065	74	371	345	512	263	317	490	
20	14.24	1.15	0.064	74	359	361	517	270	315	480	
30	12.54	1.70	0.068	74	389	365	534	280	313	517	
40	11.40	1.15	0.065	74	407	357	543	291	317	500	
50	10.25	1.15	0.065	75	429	357	548	301	318	494	
60	9.26	0.99	0.064	75	453	357	550	305	320	489	
70	8.25	1.01	0.064	76	471	364	550	314	325	492	
80	6.94	1.30	0.065	74	544	349	566	332	339	508	
90	6.35	0.60	0.059	76	540	337	553	343	348	452	
100 00	6.00	0.35	0.053	74	540	328	510	345	352	387	
110 10	5.75	0.24	0.049	75	535	322	457	344	350	348	
120 20	5.56	0.20	0.045	77	519	316	411	337	346	318	
130 30	5:36	0.20	0.042	77	504	309	376	333	339	303	
140 40	18.06	-12.70	0.044	76	425	299	351	319	323	297	
150 50	17.50	0.55	0.043	75	370	286	329	297	299	299	
160 60	16.84	0.66	0.043	77	351	271	314	286	281	303	
170 70	15.94	0.90	0.055	75	345	260	303	279	271	371	
180 80	14.55	1.39	0.059	76	347	247	349	280	264	455	
190 90	13.14	1.41	0.064	77	375	236	410	281	260	500	
AVG											

Technician signature: Date: 5/6/10

4-131 OF 4-155

STOVE TEMPERATURE TEST DATA - METHOD 5G

Client/Model: Monessen / Defiant 2NI Project #: 227-5-39-3 Tracking #: 1534

Date: 4/30/10 Test Crew: [illegible] Run #: 14

OMNI Equipment ID #:

Preburn [X] Test [ ] Coal Bed: Data: 0 = Range: Actual: Coal Bed:

Time	Fuel Weight	Delta Weight	Stack Draft	TEMPERATURES (oF) Ambient	Top	Bottom	Back	Left	Right	Flue	Catalyst
200 0	11.51	1.63	0.060	77	425	234	485	288	271	556	N/A
210 10	9.90	1.61	0.072	78	486	232	535	303	279	565	
220 20	8.49	1.41	0.070	78	596	230	559	321	291	553	
230 30	7.14	1.34	0.072	78	626	235	559	339	317	521	
240 40	6.70	0.44	0.057	76	564	237	523	348	328	426	
250 50	6.31	0.40	0.052	77	534	235	476	348	328	383	
260 60	6.11	0.20	0.048	77	504	231	430	344	320	350	
270 70	5.95	0.15	0.045	77	485	224	389	337	313	326	
280 80	5.75	0.20	0.043	76	471	222	361	328	309	311	
~~290 90~~											
00											
10											
20											
30											
40											
50											
60											
70											
80											
90											
AVG											

Technician signature: [signature] Date: 5/6/10

Monessen Defiant 2N1
Run 14 - Category 3 Fan Confirmation, Non-Cat
Pre-Burn Data

RecNum	Test Time	Scale (Kg)	Scale (lb)	Δ Weight (lb)	Stk Draft	Lab Temp	Top	Bot	Back	Hot	Rht T	Stk Temp
74	0	7.51	16.56		0.066	74	434	332	499	254	315	501
84	10	6.98	15.39	1.17	0.065	74	371	345	512	263	317	490
94	20	6.46	14.24	1.15	0.064	74	359	361	517	270	315	480
104	30	5.69	12.54	1.70	0.068	74	389	365	534	280	313	517
114	40	5.17	11.40	1.15	0.065	74	407	357	543	291	317	500
124	50	4.65	10.25	1.15	0.065	75	429	357	548	301	318	494
134	60	4.2	9.26	0.99	0.064	75	453	357	550	305	320	489
144	70	3.74	8.25	1.01	0.064	76	471	364	550	314	325	492
154	80	3.15	6.94	1.30	0.065	74	544	349	566	332	339	508
164	90	2.88	6.35	0.60	0.059	76	540	337	553	343	348	452
174	100	2.72	6.00	0.35	0.053	74	540	328	510	345	352	387
184	110	2.61	5.75	0.24	0.049	75	535	322	457	344	350	348
194	120	2.52	5.56	0.20	0.045	77	519	316	411	337	346	318
204	130	2.43	5.36	0.20	0.042	77	504	309	376	333	339	303
214	140	8.19	18.06	-12.70	0.044	76	425	299	351	319	323	297
224	150	7.94	17.50	0.55	0.043	75	370	286	329	297	299	299
234	160	7.64	16.84	0.66	0.043	77	351	271	314	286	281	303
244	170	7.23	15.94	0.90	0.055	75	345	260	303	279	271	371
254	180	6.6	14.55	1.39	0.059	76	347	247	349	280	264	455
264	190	5.96	13.14	1.41	0.064	77	375	236	410	281	260	500
274	200	5.22	11.51	1.63	0.06	77	425	234	485	288	271	556
284	210	4.49	9.90	1.61	0.072	78	486	232	535	303	279	565
294	220	3.85	8.49	1.41	0.07	78	596	230	559	321	291	553
304	230	3.24	7.14	1.34	0.072	78	626	235	559	339	317	521
314	240	3.04	6.70	0.44	0.057	76	564	237	523	348	328	426
324	250	2.86	6.31	0.40	0.052	77	534	235	476	348	328	383
334	260	2.77	6.11	0.20	0.048	77	504	231	430	344	320	350
344	270	2.7	5.95	0.15	0.045	77	485	224	389	337	313	326
354	280	2.61	5.75	0.20	0.043	76	471	222	361	328	309	311

Note: Pre-burn restarted at 74 minutes of recorded time.

Jeremy Clark 6/2/10

FUEL DATA

Client: Monessen
Model: Defiant 2N1
Project #: 227-NYS Tracking #: 1534
Date: 4/30/10 Test Crew: JC Run #: 14
OMNI Equipment ID #: MHS -109
FUEL LOAD PREPARED BY: Ralph ; dimensions & moisture by JC
FUEL: DOUGLAS-FIR SPECIES, UNTREATED, AIR-DRIED, STANDARD GRADE OR BETTER, DIMENSIONAL LUMBER.

PRE-BURN FUEL

MOISTURE CONTENT (METER -- DRY BASIS)

CALIBRATION: Cal Value (1) = 12% Actual Reading 12.0 %
Cal Value (2) = 22% Actual Reading 22.0 %

Piece	Length	Readings			Type
1	14.7 ft	18.5	25.6	19.9	2x4
2	14.7 ft	22.0	22.8	22.0	2x4
3	7.3 ft	23.0	24.4	23.0	2x4

Length of cut pieces: 44x8 inches + 11x8 Pre-Burn Fuel Average Moisture: ~~21.8 %~~ 22.1 % (weighted)

Time (clock): 9:30 Am Room Temperature (F): 70 °F Initials: JC

TEST FUEL

FUEL TYPE AND AMOUNT: 2 x 4 Ø 4 x 4 4
CALCULATED LOAD WEIGHT: ACTUAL LOAD WEIGHT: Ø (2 x 4)
22.65 (4 x 4)
FUEL PIECE LENGTH: 21 inches 22.65 Total

MOISTURE CONTENT (METER -- DRY BASIS)

PIECE	READINGS			TYPE
1	20.2	20.5	19.4	4x4
2	20.3	19.5	18.7	4x4
3	19.1	20.3	19.5	4x4
4	19.9	20.1	20.9	4x4
5				
6				
7				
8				
9				
10				

OVERALL TEST FUEL LOAD MOISTURE AVERAGE: 19.87 %

Time (clock): 9:30 AM Room Temperature (F): 70 °F Initials: JC

Technician signature: Date: 4/30/10

OMNI-Test Laboratories, Inc.

Run Notes

Client: Monessen
Model: Defiant 2N1
Project #: 227-S-39.3
Tracking #: 1534
Run #: 14 Date: 4/30/10
Test Crew: JC
OMNI Equipment ID #(s):

PREBURN

DESCRIBE OR SKETCH AIR OR THERMOMSTAT SETTINGS BELOW:
(SETTINGS MUST BE ACCURATE AND REPRODUCABLE)

PRIMARY:

SECONDARY: N/A

TERTIARY:

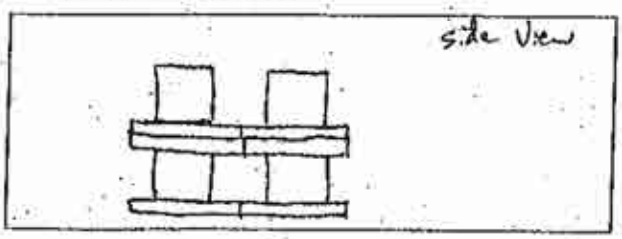
FAN: OFF

PREBURN SETTINGS AND ACTIVITIES

TIME	AIR (THERMO) CHANGES PRIMARY/SECONDARY/TERTIARY	FAN SETTING CHANGE	ADD FUEL + WT.	ADD FUEL - WT.	RAKE COAL	COMMENT
0	Test Setting					
22					X	
71					X	
131			13.26		X	
167					X	
225					X	
284	Test Fuel On				X	

TEST

TEST FUEL CONFIGURATION SKETCH
(INDICATE VIEW ANGLE)

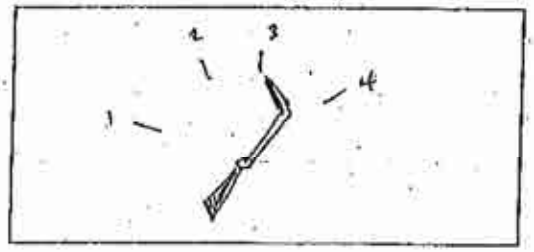


START UP PROCEDURES

BYPASS: 50 sec
FUEL LOADING 50 sec
DOOR: 50 sec
PRIMARY AIR: Test setting @ 0 min, no change.

OTHER: N/A

DESCRIBE OR SKETCH TEST SETTINGS BELOW:
(SETTINGS MUST BE ACCURATE AND REPRODUCIBLE)
PRIMARY:



SECONDARY: N/A

TERTIARY:

FAN: OFF

Technician signature: Date: 4/30/10

4-135 OF 4-155

OMNI-Test Laboratories, Inc.

Supplemental Data EPA 5G/5H

Client: Maiessen

Model: Defiant 2N1

Project #: 227-5-39-3 Tracking #: 1534

Date: 4/30/10 Run #: 14 Booth: _____

Test Crew: DC Start Time: 4:20 PM Stop Time: 10:00 PM

OMNI Equipment #(s): _____

Gas Analyzer Train Leak Check:

Stack: Dilution Tunnel (Method 5G Only):

Initial: _____ Initial: _____

Final: _____ Final: _____

Calibrations: Span Gas CO_2: _____ O_2: _____ CO: _____ CO_2(DT): _____

	N_2 Span	N_2 Span	N_2 Span	N_2 Span	N_2 Span	N_2 Span	N_2 Span
Time							
O_2							
CO_2							
CO							
CO_2 (DT)							

Stack Diameter (inches): 6

Air Velocity (ft/min): Initial: <50 Final: <50

Scale Audit (lbs): Pretest: 10.00 Post Test: 10.00

Induced Draft: 0 %Smoke Capture: 100 %

Pitot Tube Leak Test: Pre: 0.0 @ 3.0 Post: 0.0 @ 3.1

Flue Pipe Cleaned Prior to First Test in Series: Date: 4/18/10 Initials: DC

	Initial	Middle	Ending
Pb (in/Hg)	29.35	29.34	29.37
Room Temp (°F)	75 76	81	80 76

Technician signature: _____ Date: 4/30/10

4-136 OF 4-155

Run 15

OMNI-Test Laboratories, Inc.

Wood Heater Test Data - EPA Method 5G

Manufacturer: Monessen
Model: Defiant 2N1
Project No.: 237-S-39-3
Tracking No.: 1534
Run: 15
Test Date: 05/04/10

Burn Rate	0.87 kg/hr dry
Average Tunnel Temperature	91 degrees Fahrenheit
Average Gas Velocity in Dilution Tunnel - vs	13.8 feet/second
Average Gas Flow Rate in Dilution Tunnel - Qsd	8907.0 dscf/hour
Average Delta p	0.041 inches H20
Average Delta H	0.00 inches H20
Total Time of Test	580 minutes

	AVERAGE	SAMPLE TRAIN 1	SAMPLE TRAIN 2
Total Sample Volume - Vm	80.29 cubic feet	85.66 cubic feet	74.92 cubic feet
Average Gas Meter Temperature	76 degrees Fahrenheit	76 degrees Fahrenheit	76 degrees Fahrenheit
Total Sample Volume (Standard Conditions) - Vmstd	78.3 dscf	83.5 dscf	73.1 dscf
Total Particulates - mn		11.6 mg	11.5 mg
Particulate Concentration (dry-standard)	0.00015 grams/dscf	0.00014 grams/dscf	0.00016 grams/dscf
Particulate Emission Rate	1.32 grams/hour	1.24 grams/hour	1.40 grams/hour
Adjusted Emissions	2.29 grams/hour	2.17 grams/hour	2.41 grams/hour
Difference from Average		0.12 grams/hour	0.12 grams/hour
7.5% of the average emission rate	0.17		
Weighted Average Emission Rate Limit	4.10 grams/hour		
7.5% of the weighted average emission rate limit	0.31		

Results Are Acceptable

OMNI-Test Laboratories, Inc.

Wood Heater Test Data - EPA Method 5G

Run: 15

Manufacturer: Monessen
Model: Defiant 2N1
Tracking No.: 1534
Project No.: 237-S-39-3
Test Date: 04-May-10
Beginning Clock Time: 03:15
Recording Interval: 10 min.
Total Sampling Time: 580 min.

Velocity Traverse Data									
	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	
Initial dP	0.026	0.042	0.044	0.040	0.028	0.041	0.046	0.040	"H2O
Initial Temp.	101	101	101	101	101	101	101	101	oF

OMNI Equipment Numbers:

PM Control Module:
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.56 lb/lb-mole
Dilution Tunnel H2O: 4.00 percent
Dilution Tunnel Static: -0.140 "H2O
Pitot Tube Cp: 0.99
Meter Box Y Factor: 0.994 (1) 0.996 (2)

Barometric Pressure: Begin	Middle	End	Average
29.72	29.76	29.8	29.76 "Hg

Signature/Date: 6/14/10

Tunnel Velocity: 13.79 ft/sec.
Intial Tunnel Flow: 141.9 scfm
Average Tunnel Flow: 148.5 scfm
Tunnel Area: 0.1963 ft2
Post-Test Leak Check (1): 001 @ 4.5" cfm@"Hg
Post-Test Leak Check (2): 000 @ 7.5" cfm@"Hg
Fuel Moisture (dry basis %): 22.05
Total Particulate (1): 11.6
Total Particulate (2): 11.5

Elapsed Time	Particulate Sampling Data														Fuel Weight, lb		Wood Heater Temperature Data, oF												Stack
	Gas Meter Cubic Feet (1)	Gas Meter Cubic Feet (2)	Sample Rate, cfm (1)	Sample Rate, cfm (2)	Orifice dH (1)	Orifice dH (2)	Meter oF (1)	Meter oF (2)	Meter Vac. In. Hg. (1)	Meter Vac. In. Hg. (2)	Dilution Tunnel Temp.	Dilution Tunnel dP	Pro. Rate (10%) (1)	Pro. Rate (10%) (2)	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Catalyst Exit	Average Surface	Stack	Filter (1)	Filter (2)	Impinger exit (1)	Impinger exit (2)	Ambient	Draft In. H2O
0	486.291	833.975			0.00	0.00	76	74	-0.6	-2.6	101	0.038			22.5		417	237	334	282	295		313.0	304	72	72			76	0.040
10	487.850	835.330	0.16	0.14	0.00	0.00	76	74	-0.6	-2.6	95	0.040	108	108	21.7	-0.85	330	230	317	263	272		282.4	282	74	74			76	0.039
20	489.360	836.620	0.15	0.13	0.00	0.00	77	77	-0.6	-2.6	98	0.040	105	102	21.4	-0.25	285	222	322	237	248		262.8	346	75	75			77	0.045
30	490.850	837.910	0.15	0.13	0.00	0.00	77	77	-0.6	-2.6	100	0.042	101	100	20.6	-0.8	264	214	350	220	233		256.2	379	77	75			77	0.050
40	492.331	839.195	0.15	0.13	0.00	0.00	77	77	-0.6	-2.6	103	0.042	101	100	19.9	-0.7	262	206	388	208	221		257.0	407	75	75			77	0.050
50	493.817	840.460	0.15	0.13	0.00	0.00	77	77	-0.6	-2.6	105	0.042	101	98	19.0	-0.9	269	199	418	197	215		259.6	421	78	78			78	0.053
60	495.297	841.740	0.15	0.13	0.00	0.00	78	78	-0.6	-2.6	105	0.042	100	99	18.1	-0.9	299	193	436	193	210		266.2	410	77	77			75	0.055
70	496.769	843.020	0.15	0.13	0.00	0.00	77	79	-0.6	-2.6	107	0.042	100	99	17.1	-1	319	189	444	193	210		271.0	425	78	78			78	0.055
80	498.253	844.296	0.15	0.13	0.00	0.00	78	80	-0.6	-2.6	107	0.042	101	99	16.1	-1	349	184	449	195	215		278.4	423	78	78			75	0.055
90	499.720	845.580	0.15	0.13	0.00	0.00	78	80	-0.6	-2.6	107	0.044	97	97	15.2	-0.9	373	182	453	195	219		284.4	425	77	77			75	0.055
100	501.189	846.860	0.15	0.13	0.00	0.00	77	80	-0.6	-2.6	104	0.044	97	97	14.1	-1.1	392	180	455	199	225		290.2	429	77	77			73	0.055
110	502.661	848.142	0.15	0.13	0.00	0.00	77	77	-0.6	-2.6	104	0.042	100	100	13.3	-0.8	411	179	456	205	235		297.2	424	77	77			72	0.055
120	504.140	849.415	0.15	0.13	0.00	0.00	76	78	-0.6	-2.6	101	0.042	100	99	12.3	-1	412	176	454	206	243		298.2	423	76	76			72	0.055
130	505.618	850.720	0.15	0.13	0.00	0.00	76	78	-0.6	-2.6	101	0.044	98	99	11.4	-0.9	425	176	456	210	252		303.8	423	76	76			71	0.055
140	507.095	852.002	0.15	0.13	0.00	0.00	75	77	-0.6	-2.6	101	0.042	100	99	10.6	-0.8	440	174	451	215	264		308.8	403	75	75			71	0.055
150	508.560	853.290	0.15	0.13	0.00	0.00	77	77	-0.6	-2.6	100	0.042	99	100	9.7	-0.9	446	175	433	220	277		310.2	390	75	75			71	0.054
160	510.037	854.580	0.15	0.13	0.00	0.00	75	77	-0.6	-2.6	98	0.042	100	100	9.1	-0.6	442	177	422	227	288		311.2	383	75	75			71	0.054
170	511.522	855.875	0.15	0.13	0.00	0.00	74	77	-0.6	-2.6	98	0.042	101	100	8.4	-0.7	435	179	413	231	294		310.4	372	75	75			72	0.051
180	513.015	857.180	0.15	0.13	0.00	0.00	74	76	-0.6	-2.6	98	0.042	101	101	7.8	-0.6	435	181	402	233	300		310.2	367	74	72			70	0.051
190	514.493	858.460	0.15	0.13	0.00	0.00	74	76	-0.6	-2.6	98	0.040	103	102	7.2	-0.6	437	185	395	235	302		310.8	363	74	72			72	0.051
200	515.965	859.750	0.15	0.13	0.00	0.00	74	76	-0.6	-2.6	98	0.042	100	100	6.6	-0.6	435	188	389	237	304		310.6	359	74	74			72	0.050
210	517.440	861.031	0.15	0.13	0.00	0.00	76	76	-0.6	-2.6	95	0.042	100	99	6.2	-0.4	430	185	380	241	302		307.6	352	74	72			72	0.050
220	518.925	862.320	0.15	0.13	0.00	0.00	74	76	-0.6	-2.6	97	0.040	103	102	5.8	-0.4	423	185	373	239	300		304.0	350	74	72			72	0.048
230	520.401	863.605	0.15	0.13	0.00	0.00	74	76	-0.6	-2.6	95	0.040	102	102	5.5	-0.3	419	183	367	241	297		301.4	317	74	72			72	0.046
240	521.875	864.891	0.15	0.13	0.00	0.00	76	75	-0.6	-2.6	92	0.042	99	99	5.2	-0.3	406	184	347	241	293		294.2	301	71	71			71	0.045
250	523.355	866.190	0.15	0.13	0.00	0.00	73	75	-0.6	-2.6	90	0.042	100	100	4.9	-0.3	395	180	323	238	288		284.8	284	71	71			71	0.042
260	524.831	867.490	0.15	0.13	0.00	0.00	75	75	-0.6	-2.6	90	0.040	102	103	4.7	-0.2	384	180	303	238	284		277.8	269	71	71			71	0.040
270	526.305	868.775	0.15	0.13	0.00	0.00	73	75	-0.6	-2.6	88	0.042	99	99	4.5	-0.2	373	176	286	236	278		269.8	254	71	71			71	0.039
280	527.780	870.065	0.15	0.13	0.00	0.00	74	76	-0.6	-2.6	88	0.040	102	101	4.3	-0.2	367	183	271	237	273		266.2	241	72	72			74	0.036
290	529.255	871.348	0.15	0.13	0.00	0.00	76	76	-0.6	-2.6	86	0.042	99	98	4.2	-0.1	360	185	258	234	267		260.8	230	72	72			74	0.035
300	530.730	872.635	0.15	0.13	0.00	0.00	76	76	-0.6	-2.6	86	0.040	101	101	4.0	-0.2	354	185	248	233	261		256.2	226	72	72			74	0.034
310	532.198	873.920	0.15	0.13	0.00	0.00	76	76	-0.6	-2.6	87	0.040	101	101	3.9	-0.1	346	183	239	231	254		250.6	218	72	72			74	0.033
320	533.670	875.200	0.15	0.13	0.00	0.00	76	76	-0.6	-2.6	87	0.040	101	101	3.8	-0.1	337	179	230	226	246		243.6	211	72	72			74	0.030
330	535.150	876.485	0.15	0.13	0.00	0.00	76	76	-0.6	-2.6	85	0.040	101	101	3.7	-0.1	328	179	222	224	239		238.4	207	72	72			74	0.030
340	536.625	877.770	0.15	0.13	0.00	0.00	72	72	-0.6	-2.6	85	0.040	102	102	3.7	0	324	177	215	220	233		233.8	200	72	72			74	0.030
350	538.095	879.060	0.15	0.13	0.00	0.00	76	76	-0.6	-2.6	85	0.042	98	99	3.6	-0.1	313	172	209	220	228		228.4	198	72	72			74	0.029
360	539.570	880.352	0.15	0.13	0.00	0.00	76	76	-0.6	-2.6	85	0.042	99	99	3.3	-0.3	302	173	205	218	222		224.0	198	72	72			74	0.027
370	541.048	881.650	0.15	0.13	0.00	0.00	76	76	-0.6	-2.6	83	0.040	101	102	3.1	-0.2	302	170	205	216	216		221.8	203	72	70			74	0.026
380	542.520	882.950	0.15	0.13	0.00	0.00	76	76	-0.6	-2.6	85	0.040	101	102	2.9	-0.2	308	170	207	218	211		222.8	213	72	72			74	0.026
390	543.994	884.245	0.15	0.13	0.00	0.00	76	76	-0.6	-2.6	85	0.040	101	102	2.7	-0.2	322	173	214	218	209		227.2	218	72	72			74	0.026
400	545.472	885.550	0.15	0.13	0.00	0.00	76	76	-0.6	-2.6	85	0.040	101	102	2.5	-0.2	333	173	216	220	211		230.6	220	72	72			74	0.026
410	546.948	886.848	0.15	0.13	0.00	0.00	77	77	-0.6	-2.6	85	0.040	101	102	2.3	-0.2	339	177	220	222	216		234.8	220	72	72			74	0.027
420	548.430	888.162	0.15	0.13	0.00	0.00	76	76	-0.6	-2.6	85	0.042	99	101	2.2	-0.1	339	179	220	220	218		235.2	220	72	70			75	0.029

OMNI-Test Laboratories, Inc.

Wood Heater Test Data - EPA Method 5G

Run: 15

Manufacturer: Monessen
Model: Defiant 2N1
Tracking No.: 1534
Project No.: 237-S-39-3
Test Date: 04-May-10
Beginning Clock Time: 03:15
Recording Interval: 10 min.
Total Sampling Time: 580 min.

Velocity Traverse Data									
	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	
Initial dP	0.026	0.042	0.044	0.040	0.028	0.041	0.046	0.040	"H2O
Initial Temp.	101	101	101	101	101	101	101	101	oF

OMNI Equipment Numbers:

PM Control Module:
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.56 lb/lb-mole
Dilution Tunnel H2O: 4.00 percent
Dilution Tunnel Static: -0.140 "H2O
Pitot Tube Cp: 0.99
Meter Box Y Factor: 0.994 (1) 0.996 (2)

Barometric Pressure:	Begin	Middle	End	Average
	29.72	29.76	29.8	29.76 "Hg

Signature/Date: GR 5/4/10

Tunnel Velocity:	13.79	ft/sec.
Intial Tunnel Flow:	141.9	scfm
Average Tunnel Flow	148.5	scfm
Tunnel Area:	0.1963	ft2
Post-Test Leak Check (1):	001 @ 4.5"	cfm@"Hg
Post-Test Leak Check (2):	000 @ 7.5"	cfm@"Hg
Fuel Moisture (dry basis %):		22.05
Total Particulate (1):		11.6
Total Particulate (2):		11.5

Elapsed Time	Particulate Sampling Data														Fuel Weight, lb		Wood Heater Temperature Data, oF											Stack
	Gas Meter Cubic Feet (1)	Gas Meter Cubic Feet (2)	Sample Rate, cfm (1)	Sample Rate, cfm (2)	Orifice dH (1)	Orifice dH (2)	Meter oF (1)	Meter oF (2)	Meter Vac. In. Hg. (1)	Meter Vac. In. Hg. (2)	Dilution Tunnel Temp.	Dilution Tunnel dP	Pro. Rate (10%) (1)	Pro. Rate (10%) (2)	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Catalyst Exit	Average Surface	Stack	Filter (1)	Filter (2)	Impinger exit (1)	Impinger exit (2)	Ambient	Draft In. H2O
430	549.905	889.465	0.15	0.13	0.00	0.00	76	76	-0.6	-2.6	85	0.040	101	102	2.0	-0.2	339	181	220	220	220		236.0	220	72	72			74	0.029
440	551.382	890.765	0.15	0.13	0.00	0.00	76	76	-0.6	-2.6	85	0.042	99	100	1.9	-0.1	343	183	220	220	222		237.6	218	72	72			74	0.029
450	552.854	892.069	0.15	0.13	0.00	0.00	76	76	-0.6	-2.6	84	0.040	101	102	1.7	-0.2	343	185	220	222	224		238.8	218	72	72			74	0.028
460	554.330	893.375	0.15	0.13	0.00	0.00	76	76	-0.6	-2.6	85	0.040	101	102	1.6	-0.1	341	187	218	222	226		238.8	215	72	72			74	0.028
470	555.809	894.670	0.15	0.13	0.00	0.00	76	76	-0.6	-2.6	84	0.040	101	102	1.4	-0.2	348	187	218	220	228		240.2	215	72	72			74	0.028
480	557.285	895.975	0.15	0.13	0.00	0.00	76	76	-0.6	-2.6	84	0.040	101	102	1.3	-0.1	352	187	217	219	232		241.4	215	72	72			74	0.028
490	558.750	897.275	0.15	0.13	0.00	0.00	76	76	-0.6	-2.6	84	0.040	100	102	1.2	-0.1	354	187	217	217	232		241.4	211	72	72			74	0.028
500	560.228	898.575	0.15	0.13	0.00	0.00	76	76	-0.6	-2.6	84	0.038	103	104	1.0	-0.2	353	189	215	217	234		241.6	210	71	71			73	0.027
510	561.705	899.872	0.15	0.13	0.00	0.00	76	76	-0.6	-2.6	84	0.040	101	102	0.9	-0.1	358	189	215	215	236		242.6	206	71	71			74	0.027
520	563.185	901.175	0.15	0.13	0.00	0.00	75	75	-0.6	-2.6	84	0.040	102	102	0.7	-0.2	358	187	211	217	237		242.0	202	72	72			74	0.027
530	564.650	902.450	0.15	0.13	0.00	0.00	75	75	-0.6	-2.6	82	0.040	100	100	0.6	-0.1	358	189	209	215	237		241.6	198	72	72			72	0.026
540	566.135	903.799	0.15	0.13	0.00	0.00	75	75	-0.6	-2.6	82	0.040	102	106	0.4	-0.2	353	187	204	215	234		238.6	193	71	71			73	0.026
550	567.570	905.030	0.14	0.12	0.00	0.00	75	75	-0.6	-2.6	82	0.038	102	104	0.3	-0.1	347	187	200	215	232		236.2	187	71	69			73	0.026
560	569.033	906.325	0.15	0.13	0.00	0.00	75	75	-0.6	-2.6	82	0.040	98	96	0.2	-0.1	340	186	195	212	229		232.4	182	71	71			73	0.025
570	570.492	907.610	0.15	0.13	0.00	0.00	75	75	-0.6	-2.6	81	0.040	100	101	0.1	-0.1	340	184	190	212	227		230.6	180	69	69			73	0.025
580	571.955	908.895	0.15	0.13	0.00	0.00	75	75	-0.6	-2.6	79	0.040	100	100	0.0	-0.1	331	184	188	210	225		227.6	175	69	69			73	0.025
Avg/Total	85.664	74.920	0.15	0.13	0.00	0.00	75.68	76.20			91.34	0.041	100.73	100.72									85		73.15	72.85	#DIV/0!	#DIV/0!		0.038

Final Laboratory Report - Method 5G Dual Train
Dilution Tunnel Particulate Calculations

Client Name: Monessen
Model: Defiant
Project No.: 227-S-37-3
Tracking No.: 1534

Equipment Numbers:

Run #: 15
Train #: A
Date: 05/04/10

Sample Component	Reagent	Filter # or Probe #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	F524	135.9	125.4	10.5
B. Rear filter catch	Filter	F525	121.2	120.4	0.8
C. Probe catch	Probe	F	78331.2	78330.9	0.3

Total Particulate, mg :	11.6

Component	Equations:
A. Front filter catch	Final (mg) - Tare (mg) = Particulate, mg
B. Rear filter catch	Final (mg) - Tare (mg) = Particulate, mg
C. Probe catch	Final (mg) - Tare (mg) = Particulate, mg

Analyst: [signature] Date: 6/3/10

Final Laboratory Report - Method 5G Dual Train
Dilution Tunnel Particulate Calculations

Client Name: Monessen
Model: Defiant
Project No.: 227-S-37-3
Tracking No.: 1534

Equipment Numbers:

Run #: 15
Train #: B
Date: 05/04/10

Sample Component	Reagent	Filter # or Probe #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	F526	127.7	117.2	10.5
B. Rear filter catch	Filter	F527	126.6	125.8	0.8
C. Probe catch	Probe	A	76438.7	76438.5	0.2

Total Particulate, mg :	11.5

Component	Equations:
A. Front filter catch	Final (mg) - Tare (mg) = Particulate, mg
B. Rear filter catch	Final (mg) - Tare (mg) = Particulate, mg
C. Probe catch	Final (mg) - Tare (mg) = Particulate, mg

Analyst: [signature] Date: 6/3/10

OMNI Test Laboratories, Inc.

STOVE TEMPERATURE TEST DATA - METHOD 5G

Client/Model: Menessan Project #: 227-5-39-3 Tracking #: 1534

Date: 5/4/10 Test Crew: S. Bottan Run #: 15

OMNI Equipment ID #:

Preburn [X] Test [ ] Coal Bed: Data: 0 = Range: 4.5 - 5.6 lbs Actual: Coal Bed: 5.6 lbs

Time	Fuel Weight	Delta Weight	Stack Draft	TEMPERATURES (oF) Ambient	Top	Bottom	Back	Left	Right	Flue	Catalyst
12:15 0	16.6	–	-.055	73	433	247	481	260	268	388	–
10	16.0	0.6	-.050	71	381	244	446	251	272	345	–
20	15.5	0.5	-.050	71	357	244	413	240	266	337	–
30	14.7	0.8	-.050	71	348	242	383	229	261	320	–
40	14.2	0.5	-.050	71	344	240	359	225	261	309	–
50	13.1	0.9	-.050	70	335	235	350	218	261	361	–
60	12.2	0.9	-.050	70	317	231	361	216	261	376	–
70	11.2	1.0	-.050	72	319	228	389	213	261	408	–
80	10.4	0.8	-.050	72	332	226	415	213	263	413	–
90	9.4	1.0	-.050	72	352	232	449	219	274	441	–
100	8.7	0.7	-.050	70	376	232	471	224	278	417	–
110	7.7	1.0	-.055	72	404	239	467	230	286	391	–
120	6.9	0.8	-.050	71	432	245	477	247	301	456	–
130	6.4	0.5	-.060	71	432	243	488	258	306	408	–
140	6.2	0.2	-.050	74	443	245	465	269	310	360	–
150	5.9	0.3	-.045	74	456	244	430	276	309	328	–
160	5.8	0.1	-.045	75	442	240	394	281	305	303	–
170	5.7	0.1	-.040	75	429	236	362	284	297	284	–
3:15 180	5.6	0.1	-.040	76	419	234	336	284	295	293	–
90											
AVG											

Technician signature: [signature] Date: 5/4/10

A-183 OF A-155

FUEL DATA

Client: Monessen (vermont castings)
Model: Defiant 2N1
Project #: [illegible] Tracking #: 1534
Date: 5/4/10 Test Crew: S. Button Run #: 15
OMNI Equipment ID #:
FUEL LOAD PREPARED BY: S. Button
FUEL: DOUGLAS-FIR SPECIES, UNTREATED, AIR-DRIED, STANDARD GRADE OR BETTER, DIMENSIONAL LUMBER.

PRE-BURN FUEL

MOISTURE CONTENT (METER -- DRY BASIS)

CALIBRATION: Cal Value (1) = 12% Actual Reading 12%
Cal Value (2) = 22% Actual Reading 22%

Piece	Length	Readings			Type
1	15 ft	20.5	24.6	23.2	2x4
2	15 ft	21.3	24.5	23.4	2x4
3	~~8 ft~~	~~24.7~~	~~22.0~~	~~20.5~~	~~4x4~~ SB

Length of cut pieces: 44 pcs → 8" 2x4's inches ~~SB 4pcs → 20" 4x4's~~
Pre-Burn Fuel Average Moisture: 22.9%

Time (clock): 9:00 AM Room Temperature (F): 73.4 Initials: SB

TEST FUEL

FUEL TYPE AND AMOUNT: 2 × 4 ______ 4 × 4 4
CALCULATED LOAD WEIGHT: ______ ACTUAL LOAD WEIGHT: ______ (2 × 4)
22.5 (4 × 4)
FUEL PIECE LENGTH: 21" 22.5 Total

MOISTURE CONTENT (METER -- DRY BASIS)

PIECE	READINGS			TYPE
1	20.2	21.4	21.5	4x4
2	21.7	20.8	20.3	4x4
3	22.2	22.1	22.0	4x4
4	24.4	24.2	23.8	4x4
5				
6				
7				
8				
9				
10				

OVERALL TEST FUEL LOAD MOISTURE AVERAGE: 22.05%

Time (clock): 9:30 AM Room Temperature (F): 73.4 Initials: SB

Technician signature: [signature] Date: 5/4/10

OMNI-Test Laboratories, Inc.

Run Notes

Client: Manessen
Model: Defiant 2M
Project #: 227-5-39-3
Tracking #: 1534
Run #: 15 Date: 5/4/10
Test Crew: S. Button
OMNI Equipment ID #(s):

PREBURN

DESCRIBE OR SKETCH AIR OR THERMOMSTAT SETTINGS BELOW:
(SETTINGS MUST BE ACCURATE AND REPRODUCABLE)

PRIMARY:

Fully Closed

SECONDARY: Fixed

TERTIARY: N/A

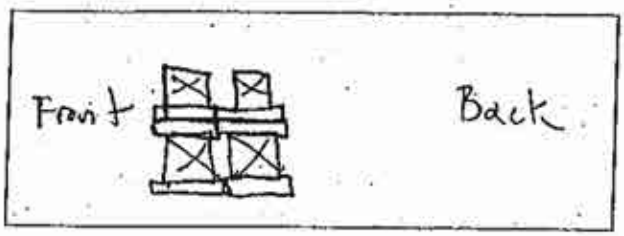
FAN: OFF

PREBURN SETTINGS AND ACTIVITIES

TIME	AIR (THERMO) CHANGES PRIMARY/SECONDARY/TERTIARY	FAN SETTING CHANGE	ADD FUEL + WT.	ADD FUEL - WT.	RAKE COAL	COMMENT
42 min	stirred coals					
89 min	stirred coals					

TEST

TEST FUEL CONFIGURATION SKETCH
(INDICATE VIEW ANGLE)



START UP PROCEDURES
BYPASS: Closed @ 1 min
FUEL LOADING Closed @ 1 min
DOOR:
PRIMARY AIR: Set @ 0 Sec.
OTHER: N/A

DESCRIBE OR SKETCH TEST SETTINGS BELOW:
(SETTINGS MUST BE ACCURATE AND REPRODUCIBLE)
PRIMARY:

Fully Closed

SECONDARY: Fixed

TERTIARY: N/A

FAN: OFF

*Repositioned test fuel @ 347 min.

Technician signature: Date: 5/4/10

4-145 OF 4-155

Supplemental Data EPA 5G/5H

Client: Monessen

Model: Defiant 2N1

Project #: 227-5-39-3 Tracking #: 1534

Date: 5/4/10 Run #: 15 Booth: on-site

Test Crew: S. Button Start Time: 3:15 PM Stop Time: 12:45 AM

OMNI Equipment #(s): _____

Gas Analyzer Train Leak Check:

Stack: Dilution Tunnel (Method 5G Only):

Initial: _____ Initial: _____

Final: _____ Final: _____

Calibrations: Span Gas CO_2: _____ O_2: _____ CO: _____ CO_2(DT): _____

	N_2 Span	N_2 Span	N_2 Span	N_2 Span	N_2 Span	N_2 Span	N_2 Span
Time							
O_2							
CO_2							
CO							
CO_2 (DT)							

Stack Diameter (inches): 6"

Air Velocity (ft/min): Initial: < 50 ft/min Final: < 50 ft/min

Scale Audit (lbs): Pretest: 10 lbs Post Test: 10 lbs

Induced Draft: ϕ %Smoke Capture: 100%

Pitot Tube Leak Test: Pre: ϕ Post: ϕ

Flue Pipe Cleaned Prior to First Test in Series: Date: 4/18/10 Initials: JB

	Initial	Middle	Ending
Pb (in/Hg)	29.72	29.76	29.80"
Room Temp (°F)	76°	74°	73°

Technician signature: _____ Date: 5/5/10

Run 16

OMNI-Test Laboratories, Inc.

Wood Heater Test Data - EPA Method 5G

Manufacturer: Monessen
Model: Defiant
Project No.: 227-S-37-3
Tracking No.: 1534
Run: 16
Test Date: 05/09/10

Burn Rate	1.28 kg/hr dry
Average Tunnel Temperature	97 degrees Fahrenheit
Average Gas Velocity in Dilution Tunnel - vs	14.1 feet/second
Average Gas Flow Rate in Dilution Tunnel - Qsd	9078.8 dscf/hour
Average Delta p	0.043 inches H20
Average Delta H	0.00 inches H20
Total Time of Test	400 minutes

	AVERAGE	SAMPLE TRAIN 1	SAMPLE TRAIN 2
Total Sample Volume - Vm	56.37 cubic feet	60.58 cubic feet	52.16 cubic feet
Average Gas Meter Temperature	75 degrees Fahrenheit	75 degrees Fahrenheit	76 degrees Fahrenheit
Total Sample Volume (Standard Conditions) - Vmstd	55.2 dscf	59.3 dscf	51.1 dscf
Total Particulates - mn		7.3 mg	6.8 mg
Particulate Concentration (dry-standard)	0.00013 grams/dscf	0.00012 grams/dscf	0.00013 grams/dscf
Particulate Emission Rate	1.16 grams/hour	1.12 grams/hour	1.21 grams/hour
Adjusted Emissions	2.06 grams/hour	2.00 grams/hour	2.13 grams/hour
Difference from Average		0.07 grams/hour	0.07 grams/hour
7.5% of the average emission rate	0.15		
Weighted Average Emission Rate Limit	4.10 grams/hour		
7.5% of the weighted average emission rate limit	0.31		

Results Are Acceptable

OMNI-Test Laboratories, Inc.

Wood Heater Test Data - EPA Method 5G

Run: 16

Manufacturer: Monessen
Model: Defiant
Tracking No.: 1534
Project No.: 227-S-37-3
Test Date: 09-May-10
Beginning Clock Time: 13:32
Recording Interval: 10 min.
Total Sampling Time: 400 min.

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	
Initial dP	0.026	0.042	0.044	0.042	0.026	0.040	0.044	0.038	"H2O
Initial Temp.	91	91	91	91	91	91	91	91	oF

OMNI Equipment Numbers:

PM Control Module:
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.56 lb/lb-mole
Dilution Tunnel H2O: 4.00 percent
Dilution Tunnel Static: -0.142 "H2O
Pitot Tube Cp: 0.99
Meter Box Y Factor: 0.994 (1) 0.996 (2)
Barometric Pressure: Begin 29.77, Middle 29.85, End 29.91, Average 29.84 "Hg

Signature/Date: 6/4/10

Tunnel Velocity: 14.15 ft/sec.
Intial Tunnel Flow: 142.2 scfm
Average Tunnel Flow: 151.3 scfm
Tunnel Area: 0.1963 ft2
Post-Test Leak Check (1): .001 @ -4 cfm@"Hg
Post-Test Leak Check (2): .002 @ -9 cfm@"Hg
Fuel Moisture (dry basis %): 20.45
Total Particulate (1): 7.3
Total Particulate (2): 6.8

Elapsed Time	Particulate Sampling Data														Fuel Weight, lb		Wood Heater Temperature Data, oF											Stack
	Gas Meter Cubic Feet (1)	Gas Meter Cubic Feet (2)	Sample Rate, cfm (1)	Sample Rate, cfm (2)	Orifice dH (1)	Orifice dH (2)	Meter oF (1)	Meter oF (2)	Meter Vac. In. Hg. (1)	Meter Vac. In. Hg. (2)	Dilution Tunnel Temp.	Dilution Tunnel dP	Pro. Rate (10%) (1)	Pro. Rate (10%) (2)	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Catalyst Exit	Average Surface	Stack	Filter (1)	Filter (2)	Impinger exit (1)	Impinger exit (2)	Ambient	Draft In. H2O
0	889.662	198.048			0.00	0.00	72	72	-0.5	-2.7	91	0.038			22.6		411	316	218	268	300		302.6	261	68	68			72	0.039
10	891.215	199.400	0.16	0.14	0.00	0.00	70	72	-0.5	-2.7	89	0.042	105	105	22.1	-0.5	324	303	216	248	272		272.6	274	68	68			72	0.039
20	892.760	200.730	0.15	0.13	0.00	0.00	72	72	-0.5	-2.7	89	0.042	104	104	21.6	-0.5	281	287	224	226	242		252.0	313	70	68			72	0.040
30	894.300	202.060	0.15	0.13	0.00	0.00	72	72	-0.5	-2.7	96	0.042	104	104	20.8	-0.8	257	272	244	214	218		241.0	374	71	68			71	0.046
40	895.805	203.360	0.15	0.13	0.00	0.00	73	73	-0.5	-2.7	101	0.042	102	102	19.8	-1	255	257	285	214	207		243.6	422	70	70			72	0.050
50	897.315	204.665	0.15	0.13	0.00	0.00	72	75	-0.5	-2.7	106	0.042	103	103	18.7	-1.1	270	244	325	214	201		250.8	442	71	71			73	0.059
60	898.830	205.970	0.15	0.13	0.00	0.00	73	75	-0.5	-2.7	109	0.044	101	101	17.5	-1.2	314	236	342	225	204		264.2	451	73	73			73	0.060
70	900.330	207.260	0.15	0.13	0.00	0.00	73	73	-0.5	-2.7	111	0.042	102	102	16.2	-1.3	366	229	349	229	208		276.2	457	73	73			73	0.060
80	901.840	208.585	0.15	0.13	0.00	0.00	75	75	-0.5	-2.7	113	0.044	101	103	15.0	-1.2	401	225	353	238	214		286.2	464	73	73			75	0.060
90	903.345	209.890	0.15	0.13	0.00	0.00	75	75	-0.5	-2.7	114	0.044	100	101	13.6	-1.4	442	221	362	251	225		300.2	468	75	73			73	0.061
100	904.850	211.200	0.15	0.13	0.00	0.00	74	76	-0.5	-2.7	116	0.044	101	101	12.3	-1.3	492	219	369	267	239		317.2	486	76	74			74	0.061
110	906.355	212.505	0.15	0.13	0.00	0.00	76	76	-0.5	-2.7	118	0.044	100	101	10.9	-1.4	512	219	384	278	250		328.6	493	76	74			76	0.065
120	907.865	213.810	0.15	0.13	0.00	0.00	74	76	-0.5	-2.7	119	0.044	101	101	9.6	-1.3	532	218	387	291	261		337.8	474	76	76			74	0.065
130	909.370	215.115	0.15	0.13	0.00	0.00	74	76	-0.5	-2.7	115	0.044	101	101	8.5	-1.1	551	220	391	300	272		346.8	454	77	74			77	0.061
140	910.875	216.400	0.15	0.13	0.00	0.00	77	77	-0.5	-2.7	113	0.044	100	99	7.4	-1.1	547	223	368	309	281		345.6	433	77	75			75	0.060
150	912.380	217.725	0.15	0.13	0.00	0.00	75	77	-0.5	-2.7	109	0.044	100	102	6.6	-0.8	547	220	346	320	285		343.6	416	75	75			75	0.059
160	913.890	219.030	0.15	0.13	0.00	0.00	75	77	-0.5	-2.7	107	0.042	102	102	5.9	-0.7	535	221	334	325	288		340.6	407	75	75			75	0.059
170	915.400	220.340	0.15	0.13	0.00	0.00	75	77	-0.5	-2.7	105	0.042	102	103	5.3	-0.6	524	221	316	327	288		335.2	394	75	75			75	0.055
180	916.915	221.640	0.15	0.13	0.00	0.00	75	80	-0.5	-2.7	101	0.044	100	99	4.8	-0.5	522	221	297	329	288		331.4	344	75	73			73	0.055
190	918.450	222.940	0.15	0.13	0.00	0.00	78	78	-0.5	-2.7	99	0.044	100	99	4.4	-0.4	503	219	271	319	286		319.6	325	75	73			75	0.050
200	919.940	224.235	0.15	0.13	0.00	0.00	78	76	-0.5	-2.7	97	0.044	97	99	4.1	-0.3	485	217	251	314	284		310.2	308	73	73			75	0.048
210	921.450	225.535	0.15	0.13	0.00	0.00	78	75	-0.5	-2.7	95	0.042	101	101	3.8	-0.3	472	214	234	308	282		302.0	295	73	71			75	0.045
220	922.960	226.840	0.15	0.13	0.00	0.00	75	78	-0.5	-2.7	92	0.044	99	99	3.6	-0.2	462	212	221	301	277		294.6	284	71	71			75	0.041
230	924.480	228.140	0.15	0.13	0.00	0.00	78	78	-0.5	-2.7	92	0.042	101	101	3.3	-0.3	453	212	212	292	275		288.8	277	71	71			75	0.040
240	925.990	229.440	0.15	0.13	0.00	0.00	77	77	-0.5	-2.7	90	0.044	98	98	3.1	-0.2	452	207	205	285	272		284.2	272	71	71			75	0.040
250	927.510	230.730	0.15	0.13	0.00	0.00	77	77	-0.5	-2.7	90	0.042	101	100	2.8	-0.3	444	210	201	283	268		281.2	266	71	71			73	0.040
260	929.020	232.020	0.15	0.13	0.00	0.00	77	77	-0.5	-2.7	89	0.042	100	100	2.6	-0.2	439	207	197	281	266		278.0	257	71	71			73	0.040
270	930.535	233.320	0.15	0.13	0.00	0.00	77	77	-0.5	-2.7	87	0.042	100	100	2.4	-0.2	425	206	191	277	264		272.6	253	71	71			73	0.039
280	932.050	234.620	0.15	0.13	0.00	0.00	77	77	-0.5	-2.7	90	0.042	101	101	2.2	-0.2	428	201	184	266	266		269.0	248	70	70			72	0.036
290	933.560	235.920	0.15	0.13	0.00	0.00	75	77	-0.5	-2.7	87	0.044	98	98	1.9	-0.3	426	201	179	259	261		265.2	246	70	70			72	0.036
300	935.075	237.220	0.15	0.13	0.00	0.00	77	77	-0.5	-2.7	88	0.044	98	98	1.8	-0.1	415	201	177	259	259		262.2	242	70	70			72	0.035
310	936.595	238.510	0.15	0.13	0.00	0.00	76	76	-0.5	-2.7	87	0.044	99	97	1.6	-0.2	404	200	174	256	256		258.0	237	70	70			72	0.035
320	938.110	239.810	0.15	0.13	0.00	0.00	74	76	-0.5	-2.7	85	0.042	101	100	1.4	-0.2	397	198	172	254	254		255.0	232	69	69			72	0.035
330	939.625	241.100	0.15	0.13	0.00	0.00	76	76	-0.5	-2.7	85	0.042	100	100	1.2	-0.2	396	196	168	250	254		252.8	228	70	70			74	0.035
340	941.120	242.410	0.15	0.13	0.00	0.00	76	76	-0.5	-2.7	84	0.042	99	101	1.0	-0.2	395	195	163	249	249		250.2	223	69	69			71	0.035
350	942.655	243.685	0.15	0.13	0.00	0.00	76	76	-0.5	-2.7	87	0.042	102	99	0.9	-0.1	389	196	159	250	245		247.8	221	69	69			72	0.032
360	944.175	244.985	0.15	0.13	0.00	0.00	75	75	-0.5	-2.7	84	0.044	99	98	0.7	-0.2	389	193	157	247	241		245.4	217	69	67			72	0.031
370	945.690	246.290	0.15	0.13	0.00	0.00	75	75	-0.5	-2.7	84	0.042	101	101	0.5	-0.2	405	190	154	253	244		249.2	210	69	69			73	0.030
380	947.200	247.590	0.15	0.13	0.00	0.00	75	75	-0.5	-2.7	82	0.042	100	100	0.3	-0.2	412	190	152	249	242		249.0	208	69	69			73	0.030
390	948.720	248.900	0.15	0.13	0.00	0.00	75	75	-0.5	-2.7	81	0.042	101	101	0.1	-0.2	411	190	149	246	244		248.0	205	66	68			71	0.030
400	950.242	250.205	0.15	0.13	0.00	0.00	75	75	-0.5	-2.7	81	0.042	101	100	0.0	-0.1	407	190	145	242	240		244.8	203	66	66			70	0.030
Avg/Total	60.580	52.157	0.15	0.13	0.00	0.00	75.10	75.73			96.54	0.043	100.63	100.63									58		71.63	71.10	#DIV/0!	#DIV/0!		0.046

OMNI-Test Laboratories, Inc.

Final Laboratory Report - Method 5G Dual Train
Dilution Tunnel Particulate Calculations

Client Name: Monessen
Model: Defiant
Project No.: 227-S-37-3
Tracking No.: 1534

Equipment Numbers:

Run #: 16
Train #: A
Date: 05/09/10

Sample Component	Reagent	Filter # or Probe #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	F596	125.2	119.3	5.9
B. Rear filter catch	Filter	F597	119.6	119.2	0.4
C. Probe catch	Probe	21	114386.9	114385.9	1.0

Total Particulate, mg :	7.3

Component	Equations:
A. Front filter catch	Final (mg) - Tare (mg) = Particulate, mg
B. Rear filter catch	Final (mg) - Tare (mg) = Particulate, mg
C. Probe catch	Final (mg) - Tare (mg) = Particulate, mg

Analyst: [signature] Date: 6/3/10

Final Laboratory Report - Method 5G Dual Train
Dilution Tunnel Particulate Calculations

Client Name: Monessen
Model: Defiant
Project No.: 227-S-37-3
Tracking No.: 1534

Equipment Numbers:

Run #: 16
Train #: B
Date: 05/09/10

Sample Component	Reagent	Filter # or Probe #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	F599	124.8	119.3	5.5
B. Rear filter catch	Filter	F600	120.2	119.8	0.4
C. Probe catch	Probe	3	116006.5	116005.6	0.9

Total Particulate, mg :	6.8

Component	Equations:
A. Front filter catch	Final (mg) - Tare (mg) = Particulate, mg
B. Rear filter catch	Final (mg) - Tare (mg) = Particulate, mg
C. Probe catch	Final (mg) - Tare (mg) = Particulate, mg

Analyst: [signature] Date: 6/3/10

STOVE TEMPERATURE TEST DATA - METHOD 5G

Page ___ of ___

Client/Model: Monessen Project #: 227-5-37-3 Tracking #: 1534

Date: 5/9/10 Test Crew: S. Baffen Run #: 16

OMNI Equipment ID #:

Preburn N/A
Test 1

Coal Bed:
Data: 0 = Range: 4.6 ~ 5.6 Actual: Coal Bed: 5.4

Time	Fuel Weight	Delta Weight	Stack Draft	TEMPERATURES (oF) Ambient	Top	Bottom	Back	Left	Right	Flue	Catalyst
0	16.7	—	.05	69	422	322	249	307	288	321	—
10	16.0	0.7	.05	70	359	315	271	292	281	305	—
20	15.5	0.5	.045	70	332	311	243	272	278	282	—
30	14.9	0.6	.042	70	313	307	226	255	270	287	—
40	14.2	0.7	.041	73	309	300	220	240	270	283	—
50	13.2	1.0	.049	71	314	299	227	229	272	313	—
60	12.5	0.7	.051	71	314	294	232	225	271	314	—
70	11.1	1.4	.056	71	329	292	241	227	277	412	—
80	10.1	1.0	.056	71	349	293	307	236	288	392	—
90	9.4	0.7	.056	71	360	293	314	243	295	406	—
00	8.5	0.9	.056	71	382	299	327	249	305	401	—
10	7.5	1.0	.060	72	417	320	347	261	317	408	—
20	6.9	0.6	.050	72	421	309	341	269	314	367	—
30	6.5	0.4	.050	72	428	314	311	276	319	303	—
40	6.3	0.2	.045	72	428	317	278	276	317	300	—
50	6.1	0.2	.045	72	424	317	248	274	311	285	—
60	5.6	0.5	.046	73	422	320	234	273	305	266	—
175	5.5	0.1	.039	73	418	316	223	268	301	262	—
80											
90											
AVG											

Technician signature: _____ Date: 5/9/10

FUEL DATA

Client: Monesson
Model: Defiant
Project #: 227-S-F3 Tracking #: 1534
Date: 5/9/10 Test Crew: S. Button Run #: 16
OMNI Equipment ID #:
FUEL LOAD PREPARED BY: S. Button
FUEL: DOUGLAS-FIR SPECIES, UNTREATED, AIR-DRIED, STANDARD GRADE OR BETTER, DIMENSIONAL LUMBER.

PRE-BURN FUEL

MOISTURE CONTENT (METER – – DRY BASIS)

CALIBRATION: Cal Value (1) = 12% Actual Reading 12%
Cal Value (2) = 22% Actual Reading 22%

Piece	Length	Readings			Type
1	10 ft	20.6	23.8	24.4	2x4
2	10 ft	20.8	20.4	23.8	2x4
3	10 ft	25.2	23.8	24.6	2x4

Length of cut pieces: 8" inches Pre-Burn Fuel Average Moisture: 23.1%

Time (clock): 8:15 AM Room Temperature (F): 70 Initials: SB

TEST FUEL

FUEL TYPE AND AMOUNT: 2 × 4 _____ 4 × 4 4
CALCULATED LOAD WEIGHT: _____ ACTUAL LOAD WEIGHT: _____ (2 × 4)
22.6 (4 × 4)
22.6 Total
FUEL PIECE LENGTH: 21"

MOISTURE CONTENT (METER – – DRY BASIS)

PIECE	READINGS			TYPE
1	18.9	19.7	20.4	4x4
2	20.1	20.3	20.9	4x4
3	20.6	20.5	20.8	4x4
4	21.1	21.1	22.0	4x4
5				
6				
7				
8				
9				
10				

OVERALL TEST FUEL LOAD MOISTURE AVERAGE: 20.43%

Time (clock): 9:00 AM Room Temperature (F): 70 Initials: SB

Technician signature: _____ Date: 5/9/10

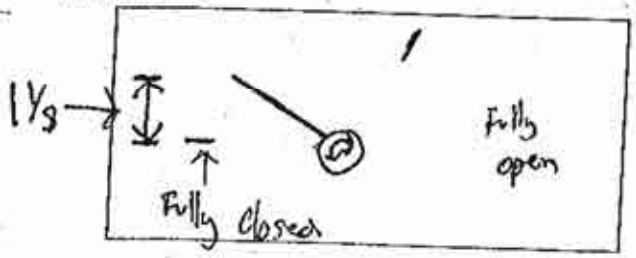
Run Notes

Client: Magnesium
Model: Defiant
Project #: 227-5-37-3
Tracking #: 1534
Run #: 16 Date: 5/9/10
Test Crew: S. Baffun
OMNI Equipment ID #(s):

PREBURN

DESCRIBE OR SKETCH AIR OR THERMOMSTAT SETTINGS BELOW:
(SETTINGS MUST BE ACCURATE AND REPRODUCABLE)

PRIMARY:



SECONDARY: Fixed

TERTIARY: N/A

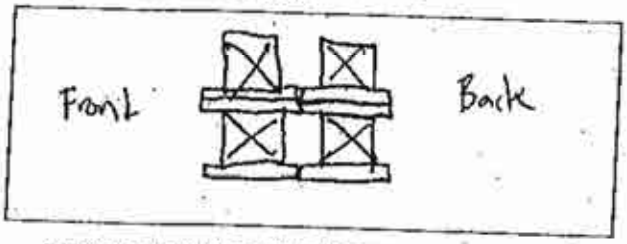
FAN: ON Low

PREBURN SETTINGS AND ACTIVITIES

TIME	AIR (THERMO) CHANGES PRIMARY/SECONDARY/TERTIARY	FAN SETTING CHANGE	ADD FUEL + WT.	ADD FUEL - WT.	RAKE COAL	COMMENT
40 min	Stirred coals					
60 mm	Stirred coals					
120 mm	Stirred coals					
150	Removed .3 lbs of coals					

TEST

TEST FUEL CONFIGURATION SKETCH
(INDICATE VIEW ANGLE)



START UP PROCEDURES

BYPASS: Closed @ 50 sec
FUEL LOADING DOOR: Closed @ 50 sec
PRIMARY AIR: Set @ 0 sec
OTHER: N/A

DESCRIBE OR SKETCH TEST SETTINGS BELOW:
(SETTINGS MUST BE ACCURATE AND REPRODUCIBLE)
PRIMARY:

Same as Above

SECONDARY: Fixed

TERTIARY: N/A

FAN: ON Low

Technician signature: [signature] Date: 5/9/10

OMNI-Test Laboratories, Inc.

Supplemental Data EPA 5G/5H

Client: Monessen

Model: Defiant

Project #: 227-5-57-3 Tracking #: 1534

Date: 5/9/10 Run #: 16 Booth: On-Site

Test Crew: S. Button Start Time: 1:32 PM Stop Time: 8:12 PM

OMNI Equipment #(s): _____

Gas Analyzer Train Leak Check:

Stack: Dilution Tunnel (Method 5G Only):

Initial: _____ Initial: _____

Final: _____ Final: _____

Calibrations: Span Gas CO_2: _____ O_2: _____ CO: _____ CO_2(DT): _____

	N_2 Span	N_2 Span	N_2 Span	N_2 Span	N_2 Span	N_2 Span	N_2 Span
Time							
O_2							
CO_2							
CO							
CO_2 (DT)							

Stack Diameter (inches): 6"

Air Velocity (ft/min): Initial: < 50 ft/min Final: < 50 ft/min

Scale Audit (lbs): Pretest: 10 lbs Post Test: 10 lbs

Induced Draft: Ø %Smoke Capture: 100%

Pitot Tube Leak Test: Pre: Ø Post: Ø

Flue Pipe Cleaned Prior to First Test in Series: Date: 5/5/10 Initials: SB

	Initial	Middle	Ending
Pb (in/Hg)	29.77"	29.85"	29.91"
Room Temp (°F)	~~73~~ 72 CT	73°	~~72~~ 70 CT

Technician signature: _____ Date: 5/9/10

4-155 OF 4-155

Section 5

Sampling Procedures and Test Results

INTRODUCTION

Monessen Hearth Systems retained *OMNI* to perform U.S. Environmental Protection Agency (EPA) certification testing on the Defiant wood stove. The Defiant wood stove is a non-catalytic, freestanding, radiant-type room heater. The firebox is constructed of cast iron. Usable firebox volume was measured to be 3.3 cubic feet and the stove is vented through a 5.375" x 10.188" oval diameter flue collar located at the top of the unit.

The testing was performed at Monessen's facility in Bethel, Vermont. The unit was observed to be in good condition, then assigned and labeled with *OMNI* ID #1534. *OMNI* representative Thomas Christensen conducted the certification testing and completed all testing by May 9, 2010. The EPA was notified of the testing dates in a letter dated April 15, 2010. A testing contract, including provisions for Random Compliance Audit (RCA) testing, has been signed by Doug Fongeallaz of Monessen Hearth Systems and is on file at *OMNI*'s testing facility.

The Defiant wood stove was tested in accordance with the U.S. EPA 40 CFR Part 60, Subpart AAA – Standard of Performance for Residential Wood Heaters (Appendix A, Methods 28 and 5G). Particulate emissions were measured using a Method 5G sampling train consisting of two filters (front and back). The weighted average emissions of the nine test runs included in the results indicate a particulate emission level of 2.3 grams per hour. The Run Summary sheet included in Section 4 details which runs were used in the weighted average emissions, which were fan confirmation runs, and which were unacceptable and why. Test runs were conducted in each of four burn rate categories (<0.80 kg/hr; 0.80-1.25 kg/hr, 1.25-1.90 kg/hr, and maximum). Emissions for each of their individual test runs did not exceed the cap. The Defiant results are within the emission limit of 7.5 grams per hour for non-catalytic affected facilities manufactured on or after July 1, 1990, or sold at retail on or after July 1, 1992.

The wood heater was sealed after completion of testing in compliance with the EPA regulation as follows:

- "DO NOT TAMPER" labels were placed on the door and on all other openings.
- Plastic material sealed with "DO NOT TAMPER" labels and tape was wrapped around the unit.
- The unit was sealed in a wood box constructed for the unit and secured with steel banding.
- "DO NOT TAMPER" labels were placed on all outer surfaces of the box.

This report is organized in accordance with the EPA-recommended outline and is summarized in the Table of Contents immediately preceding this report. The results in this report are limited to the item submitted.

Table 1.1 – Particulate Emissions

Run	Burn Rate (kg/hr dry)	Method 5G Emissions (g/hr)
2	0.69	1.06
3	2.78	2.04
5	1.44	1.65
8	0.95	4.49
11	0.89	5.91
12	2.81	6.49
14	1.51	0.75
15	0.87	2.29
16	1.28	2.06
Weighted particulate emission average of nine test runs: 2.3 grams per hour.		

Table 1.2 – Test Facility Conditions

Run	Room Temperature (°F)		Barometric Pressure (Hg)		Air Velocity (ft/min)	
	Before	After	Before	After	Before	After
2	75	84	29.60	29.55	<50	<50
3	75	73	29.47	29.47	<50	<50
5	72	71	29.32	29.32	<50	<50
8	71	79	29.30	29.10	<50	<50
11	69	75	28.88	28.92	<50	<50
12	73	75	28.95	29.10	<50	<50
14	76	76	29.35	29.37	<50	<50
15	76	73	29.72	29.80	<50	<50
16	72	70	29.77	29.91	<50	<50

Table 1.3.1 – Fuel Measurement and Crib Description Summary – PRETEST

Run	Pretest Fuel Weight (Starting weight in lbs)	Pretest Moisture (Dry basis - %)	Coal Bed Weight (lbs)
2	16.0	19.2	5.1
3	22.5	19.3	5.6
5	15.5	19.7	5.5
8	7.0	20.5	2.5
11	15.6	20.7	5.4
12	31.8	20.0	5.6
14	16.6	22.1	5.8
15	16.6	22.9	5.6
16	16.7	23.1	5.4

Table 1.3.2 – Fuel Measurement and Crib Description Summary – TEST

Run	Test Fuel Wet Basis (lbs)	Firebox Volume (ft^3)	Fuel Loading Density Wet Basis (lbs/ft^3)	Fuel Moisture Content Dry (%)	Piece Length (in)	2x4s Used	4x4s Used
2	22.2	3.3	6.73	20.2	21	0	4
3	23.6	3.3	7.15	21.3	21	0	4
5	22.2	3.3	6.73	20.0	21	0	4
8	22.3	3.3	6.76	20.7	21	0	4
11	22.4	3.3	6.79	20.4	21	0	4
12	22.4	3.3	6.79	20.2	21	0	4
14	22.7	3.3	6.88	19.9	21	0	4
15	22.5	3.3	6.82	22.1	21	0	4
16	22.6	3.3	6.85	20.5	21	0	4

Table 1.4 – Dilution Tunnel Gas Measurements and Sampling Data Summary

Run	Length of Test (min)	Average Dilution Tunnel Gas Measurements		
		Velocity (ft/sec)	Flow Rate (dscf/min)	Temperature (°F)
2	730	12.14	129.9	91.3
3	190	14.72	145.7	133.9
5	350	13.27	138.4	100.7
8	530	13.06	137.0	94.4
11	570	13.64	143.1	90.0
12	180	14.21	137.0	140.5
14	340	13.53	139.3	108.5
15	580	13.79	148.5	91.3
16	400	14.15	151.3	96.5

Table 1.5 - Heater Operation Data (Average Temperature Data)

Run	Beginning Surface Temperature Average[a]	Ending Surface Temperature Average[a]	Surface Delta T[b]
2	291.0	184.2	107
3	385.0	314.6	70
5	306.0	229.8	76
8	318.0	212.4	106
11	323.0	204.6	118
12	421.8	393.2	29
14	331.0	284.6	46
15	313.0	227.6	85
16	302.6	244.8	58

a. All temperatures are in degrees F.
b. Represents the difference between beginning and ending average surface temperatures.

Table 1.6 – Pretest Configuration

Run	Combustion Air (in)	Fuel Added	Fuel Removed	Time (min)
2	Fully Closed	16.0 lbs at start; no addition; coal bed 5.1 lbs	0.7	110
3	Fully Open	22.5 lbs at start; 14.8 lbs added; coal bed 5.6 lbs	0.0	150
5	Test Setting 3	15.5 lbs at start; no addition; coal bed 5.5 lbs	0.0	70
8	Test Setting 2	7.0 lbs at start; no addition; coal bed 2.5 lbs	0.5	110
11	Test Setting 2	15.6 lbs at start; no addition; coal bed 5.4 lbs	0.0	160
12	Test Setting 4	31.8 lbs at start; no addition; coal bed 5.6 lbs	0.0	120
14	Test Setting 3	16.6 lbs at start; 13.1 lbs added; coal bed 5.8 lbs	0.0	280
15	Fully Closed	16.6 lbs at start; no addition; coal bed 5.6 lbs	0.0	180
16	Dial Up 1-1/8" from Fully Closed	16.7 lbs at start; no addition; coal bed 5.4 lbs	0.0	175

Table 1.7 – Run Data

Run	Average Dry Burn Rate (kg/hr)	Initial (Induced) Draft (H_2O)	Primary Air Setting (in)	Run Time (min)	Average Draft (H_2O)
2	0.69	0	Fully Closed	730	-0.029
3	2.78	0	Fully Open	190	-0.065
5	1.44	0	Test Setting 3	350	-0.049
8	0.95	0	Test Setting 2	530	-0.036
11	0.89	0	Test Setting 2	570	-0.035
12	2.81	0	Test Setting 4	180	-0.068
14	1.51	0	Test Setting 3	340	-0.051
15	0.87	0	Fully Closed	580	-0.038
16	1.28	0	Dial Up 1-1/8" from Fully Closed	400	-0.046

Table 1.8 – Test Configurations

Run	Five-Minute Startup	Combustion Air
2	Bypass: Open for 1 minute. Fuel Loading: Completed by 1 minute. Door: Closed at 1 minute. Primary Air: Fully closed. Other: Test fuel poked at 406 minutes after 0.05 lb change over 10 minutes. Secondary: N/A. Tertiary: N/A. Fan: On low.	Fully Closed
3	Bypass: Open for 1 minute. Fuel Loading: Completed by 1 minute. Door: Closed at 1 minute. Primary Air: Fully Open. Other: N/A. Secondary: N/A. Tertiary: N/A. Fan: On high.	Fully Open
5	Bypass: Open for 50 seconds. Fuel Loading: Completed by 50 seconds. Door: Closed at 50 seconds. Primary Air: At test setting for duration of test. Other: N/A. Secondary: N/A. Tertiary: N/A. Fan: On high.	Test Setting 3
8	Bypass: Open for 90 seconds. Fuel Loading: Completed by 90 seconds. Door: Closed at 90 seconds. Primary Air: At test setting for duration of test. Other: N/A. Secondary: N/A. Tertiary: N/A. Fan: On low.	Test Setting 2
11	Bypass: Open for 75 seconds. Fuel Loading: Completed by 1 minute. Door: Closed at 75 seconds. Primary Air: At test setting for duration of test. Other: N/A. Secondary: N/A. Tertiary: N/A. Fan: Off.	Test Setting 2

Run	Five-Minute Startup	Combustion Air
12	Bypass: Open for 1 minute. Fuel Loading: Completed by 1 minute. Door: Closed at 1 minute. Primary Air: At test setting for duration of test. Other: N/A. Secondary: N/A. Tertiary: N/A. Fan: Off.	Test Setting 4
14	Bypass: Open for 50 seconds. Fuel Loading: Completed by 50 seconds. Door: Closed at 50 seconds. Primary Air: At test setting for duration of test. Other: N/A. Secondary: N/A. Tertiary: N/A. Fan: Off.	Test Setting 3
15	Bypass: Open for 1 minute. Fuel Loading: Completed by 1 minute. Door: Closed at 1 minute. Primary Air: At test setting for duration of test. Other: N/A. Secondary: Fixed. Tertiary: N/A. Fan: Off.	Fully Closed
16	Bypass: Open for 50 seconds. Fuel Loading: Completed by 50 seconds. Door: Closed at 50 seconds. Primary Air: At test setting for duration of test. Other: N/A. Secondary: Fixed. Tertiary: N/A. Fan: On low.	Dial Up 1-1/8" from Fully Closed

TEST RESULTS AND DISCUSSION

A total of 16 test runs were performed on the Defiant wood stove. Nine test runs were conducted in the following categories and included in the weighted average emission level results: one in the <0.80 kg/hr dry category; three in the 0.80 to 1.25 kg/hr dry category; three in the 1.25 to 1.90 kg/hr dry category; and two at maximum.

The weighted particulate emission level was measured to be **2.3 g/hr**.

The proportionality results for all 16 test runs were acceptable. Quality check results for each test run are presented in Section 2 of this report.