TESTS 10/9/2001

KOOGLER & ASSOCIATES
ENVIRONMENTAL SERVICES
4014 NW THIRTEENTH STREET
GAINESVILLE, FLORIDA 32609
352/377-5822 ▪ FAX/377-7158

KA 263-00-09

January 17, 2001

Mr. Al Linero
Florida Department of
Environmental Protection
2600 Blair Stone Road
Tallahassee, FL 32399-2400

Subject:: Air Emission Measurements Report
Miami Cement Plant
1200 NW 137th Avenue
Permit No. 0250014-002-AC

Dear Mr. Linero:

Enclosed is a copy of our report describing the results of particulate matter emissions measurements conducted September 29, 2000, at the subject facility. A copy of our report describing the results of sulfur dioxide, nitrogen oxides and carbon monoxide emission measurements conducted October 9, 2000, was hand delivered to you on January 16, 2001.

If you have any questions, please do not hesitate to contact me.

Very truly yours,

KOOGLER & ASSOCIATES

John B. Koogler, Ph.D., P.E.

JBK:wa
Enc.

C: Mr. Michael Vardeman, Rinker

TESTS
10/9/2001

SULFUR DIOXIDE, NITROGEN OXIDES AND CARBON MONOXIDE EMISSION MEASUREMENTS

KILN/RAW MILL/CLINKER COOLER

CSR RINKER MATERIALS CORPORATION
MIAMI, FLORIDA

PERMIT NO. 0250014-002-AC

TEST DATE: OCTOBER 9, 2000

RECEIVED
JAN 16 2001
BUREAU OF AIR REGULATION

KOOGLER & ASSOCIATES
ENVIRONMENTAL SERVICES
4014 NW THIRTEENTH STREET
GAINESVILLE, FLORIDA 32609
352/377-5822 • FAX 377-7158

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4014 N.W. 13TH STREET
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(352) 377-5822

KOOGLER & ASSOCIATES
ENVIRONMENTAL SERVICES

To the best of my knowledge, all applicable field and analytical procedures comply with the Florida Department of Environmental Protection requirements and all test data and plant operating data are true and correct.

John B. Koogler, Ph.D., P.E.

State of Florida
Registration No. 12925

12/14/00
Date

KOOGLER & ASSOCIATES

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KOOGLER & ASSOCIATES
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1.0 INTRODUCTION

CSR Rinker Materials Corporation owns and operates a preheater/precalciner Portland cement plant at 1200 NW 137th Avenue, Miami, Dade County, Florida. On October 9, 2000, Koogler & Associates Environmental Services of Gainesville, Florida, conducted sulfur dioxide, nitrogen oxides, and carbon monoxide emission measurements on the kiln/raw mill/cooler in accordance with EPA Methods 6C, 7E, and 10 (40 CFR 60, Appendix A). The purpose of the testing was to demonstrate initial compliance with the emission limiting standards set forth in Permit No. 0250014-002-AC.

Prior to the test date, the Metropolitan Dade County Environmental Resources Management in Miami, Florida, was notified of the scheduled initial air emission performance tests.

During the period of testing, the plant was operating normally at a preheater feed rate of 172.3 tons per hour and a clinker production rate of 103.4 tons per hour. The coal feed rate averaged 13.0 tons per hour which is equivalent to a heat input rate of about 325 MMBtu/hr. The permitted preheater feed rate and clinker production rates are 220 tons per hour and 137 tons per hour, respectively, on a 24-hour basis and limits the heat input rate to 437 MMBtu/hr. The sulfur dioxide emission rate averaged 2.85 pounds per hour, the nitrogen oxides emission rate

averaged 339.19 pounds per hour; and the carbon monoxide emission rate averaged 249.97 pounds per hour. The permit limits the sulfur dioxide emission rate to 228 pounds per hour, the nitrogen oxides emission rate to 497 pounds per hour, and the carbon monoxide emission rate to 311 pounds per hour at the tested operating rate.

Based upon the data presented herein, it can be concluded that during the period of testing on October 9, 2000, the kiln/raw mill/cooler were operating in compliance with the SO_2, NOx, and CO standards set forth in Permit 0250014-002-AC.

2.0 LOCATION OF SAMPLING PORTS

The locations of the sampling points are shown in Figure 1. Stack gas flow rate measurements were made through four sampling ports located 90 degrees to one another in the 136.5-inch diameter stack. The ports are located 203.5 feet (18.5 diameters) above the point where the stack gas enters the stack and 101.7 feet (9.3 diameters below the top of the stack. A total of 12 sampling points were used for the velocity and sampling traverses. The sampling points were located in accordance with criteria established by EPA Test Method 1 (40 CFR 60, Appendix A).

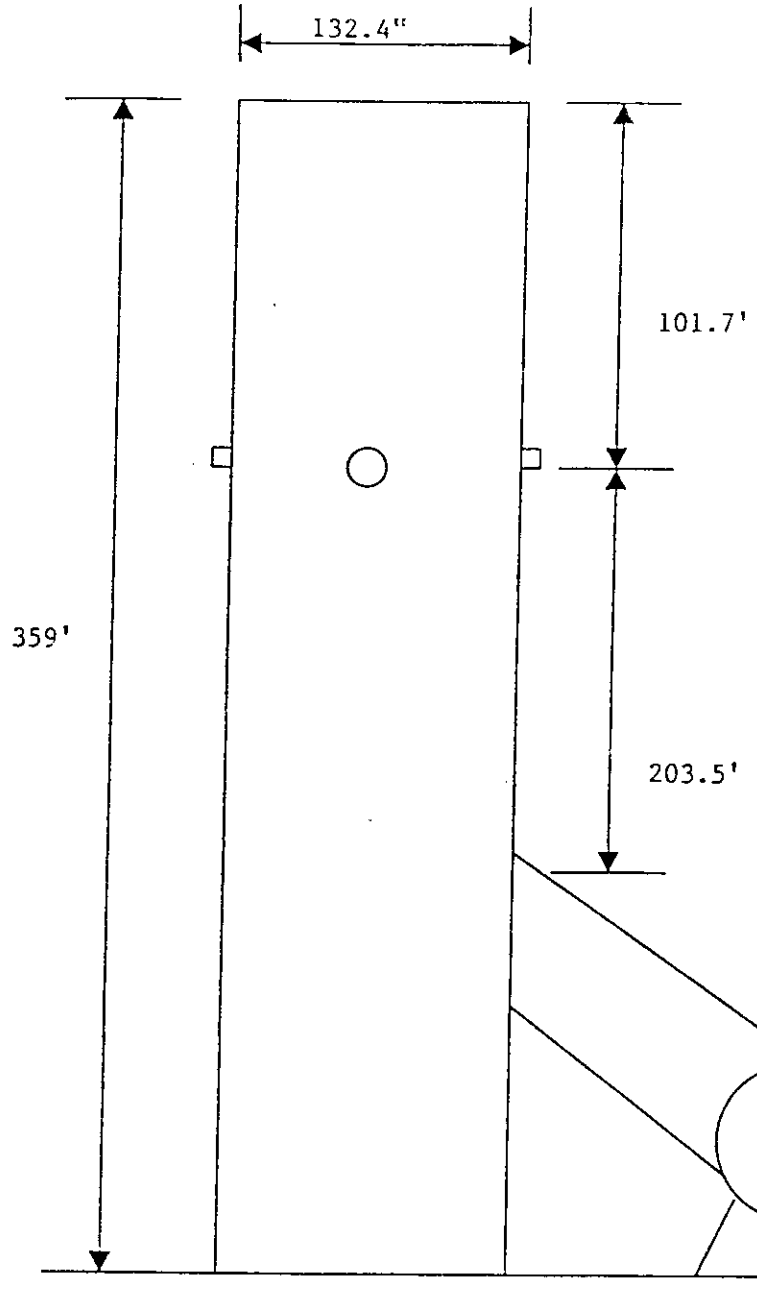
Samples for measurements of nitrogen oxides (Method 7E), carbon monoxide (Method 10) and sulfur dioxide (Method 6C) were collected from a single point near the center of the stack.

FIGURE 1

SAMPLING POINT LOCATIONS

CEMENT PLANT

CSR RINKER MATERIALS
MIAMI, FLORIDA



Traverse Points	Distance from Inside Stack Wall
1	6.01
2	19.9
3	40.4

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ENVIRONMENTAL SERVICES

3.0 FIELD AND ANALYTICAL PROCEDURES

The SO_2, NOx and CO emission measurements were made using EPA Methods 6C, 7E and 10, respectively. The sample of stack gas for the continuous analyzers was collected from a single point near the center of the stack and transported to a heated manifold through a heated teflon sample line. The sample gas stream was split with the fractions for NOx and SO_2 analyses passing through a cold trap to remove water vapor before the gas streams were introduced to the respective analyzers. The gas sample for carbon monoxide analysis was passed through as ascarite column to remove moisture and CO_2. Stack gas velocity measurements and stack gas moisture measurements were made in accordance with EPA Methods 2 and 4.

All EPA test methods are described in 40 CFR 60, Appendix A and have been adopted by reference by FDEP by Rule 62-297.401, F.A.C.

4.0 SUMMARY OF RESULTS

Results of the sulfur dioxide, nitrogen oxides and carbon monoxide emission measurements are summarized in Table 1. During the test period, the sulfur dioxide emission rate averaged 2.85 pounds per hour as measured by EPA Method 6C, the nitrogen oxides emission rate averaged 339.19 pounds per hour as measured by EPA Method 7E and the carbon monoxide emission rate averaged 249.97 pounds per hour as measured by EPA Method 10. The permit limits the sulfur dioxide emission rate to 0.7 pounds per MMBtu or to 228 pounds per hour at test conditions, the nitrogen oxides emission rate 1.53 pounds per MMBtu (497 pounds per hour) and carbon monoxide emission rate to 3.01 pounds per ton of clinker (311 pounds per hour).

Based upon the data presented herein, it can be concluded that during the period of testing on October 9, 2000, the kiln/raw mill/cooler were operating in compliance with the SO_2, NOx and CO standards set forth in Permit 0250014-002-AC.

Emission calculations, field and laboratory data sheets, plant information, equipment calibrations, and a list of project participants are included in the Appendix of this report.

TABLE 1

SUMMARY OF CO, SO2, AND NOX EMISSION MEASUREMENTS

CSR RINKER
KILN/RAW MILL/COOLER
OCTOBER 9, 2000

Run No.	CO		SO_2		NOx	
	ppm	lb/hr	ppm	lb/hr	ppm	lb/hr
1	302.36	253.99	1.83	1.66	249.24	336.45
2	321.73	273.53	2.48	3.34	236.24	320.52
3	263.16	222.39	2.92	3.54	274.20	360.59
Avg	295.75	249.97	2.41	2.85	253.23	339.19

Calculations: CO, SO_2, NOX

$$lb/hr = ft^3/min \times 60\ min/hr \times (conc.\ ppm) \times MW/385 \times 10^{-6}$$

Run	(dscfm)
1	190,765
2	194,765
3	190,613

APPENDIX

CALCULATIONS

Company: CSR Rinker | Location: Miami, FL
Source: Cement plant - Run 1 | Date: 10/9/00

vs =	51.34	FT/SEC	As =	95.61	ft^2
Q =	294518	acfm -	not corrected		
Q(stnd) =	190765	dscfm -	both temperature and moisture corrected		
Q(moist)=	255076	dcfm -	only moisture corrected		
Q(temp) =	221820	scfm -	only temperature corrected		

Moisture

Vm(Std) =	46.1097867	Bws =	0.0959763	| Lower Bws
Vw(Std) =	4.89528	Bws @sat =	1	| Value used
		Percent Moist =	9.5976347	

Emission Rates:	CO =	253.99	lb/hr	
	NOx =	336.45	lb/hr	as NO2
	SO2 =	1.66	lb/hr	
	THC =	0.00	as Propane	

EQUATIONS :

As = (PI*(Stack Dia/12)^2)/4 — Round Stacks

or

As = (Stack L/12)*(Stack W/12) — Square Stacks

Md = (.44*%CO2)+(.32*%O2)+(.28*(100-(%CO2+%O2)))

Ms = (Md*(1-%Moist))+(18*%Moist)

P(stack) = Pb+(Ps/13.6)

vs = (85.49)*(0.85)*(Sqrt.Dp)*(Sqrt[(T(s)+460)/(Ms*P(stack))])

Q = vs * As * 60

Q(stnd) = Q*(1-%Moist)*(528/(Ts+460))*(P(stack)/29.92)

Vm (Stnd) = 17.6471 * Vm * Y * ((Pb+(dH/13.6))/(Tm+460))

Vw (Stnd) = 0.0471 * Vlc

Bws = (Vw(Stnd) / (Vm(Stnd)+ Vw(Stnd))

Bws @ Sat = Vap. Pressure of H2O @ Dew Point Temp/Ps

CO (lb/hr) = ((PPM CO)*Q(stnd)*28.01*60)/(385*10^6)

NOx (lb/hr) = ((PPM NOx)*Q(stnd)*46.006*60)/(385*10^6)

SO2 (lb/hr) = ((PPM SO2)*Q(stnd)*64.0648*60)/(385*10^6)

THC (lb/hr) = ((PPM THC)*Q(temp)*44.0965*60)/(385*10^6)

Company: CSR Rinker
Cement plant - Run 1

Location: Miami, FL
Date: 10/9/00

12

Sqrt.Dp= 0.7800

T(s)= 246.00

Filename:
QuickFLOW
[Alt-C]
to clear input
range

Data Point	Stack Velocity Head	Stack Gas Temp.
1	0.66	246
2	0.64	246
3	0.45	246
4	0.70	246
5	0.67	246
6	0.51	246
7	0.69	246
8	0.66	246
9	0.50	246
10	0.69	246
11	0.66	246
12	0.51	246
13	0.00	0
14	0.00	0
15	0.00	0
16	0.00	0
17	0.00	0
18	0.00	0
19	0.00	0
20	0.00	0
21	0.00	0
22	0.00	0
23	0.00	0
24	0.00	0
25	0.00	0
26	0.00	0
27	0.00	0
28	0.00	0
29	0.00	0
30	0.00	0
31	0.00	0
32	0.00	0
33	0.00	0
34	0.00	0
35	0.00	0
36	0.00	0

Pb =	30.18	in Hg
Ps =	-0.66	in H2O
%O2 =	13.77	%
%CO2 =	5.93	%
%Moist =	14.00	%
Stack Dia=	132.4	in
or		
Stack L =		in
Stack W =		in
PPM CO =	305.01	ppm
PPM NOx =	245.99	ppm
PPM SO2 =	0.87	ppm
PPM THC =	0	ppm
Vm =	47.31	ft3
dH =	1.84	in H2O
Tm =	90	F
Y =	1.002	
Vlc =	104	ml

TEST START DATE: 10/9/2000
TEST START TIME: 10:13
TEST LOCATION: RINKER RUN 1
EMPLOYEE NAME: ---
EMPLOYEE NUMBER: ---
DEPARTMENT: ---
COMMENT FIELD 1: O2 SPAN = 25 %, SO2 SPAN = 100 PPM
COMMENT FIELD 2: NOX SPAN = 1000 PPM, CO SPAN = 1000 PPM
NUMERIC CODES: --- --- --- --- ---

METROSONICS dl-714 SN 1554 V2.3 07/91

CURRENT DATE: 10/09/00
CURRENT TIME: 11:43:37

TEST STARTING DATE: 1/ 1/86
TEST STARTING TIME: 0:37:41

ELAPSED TIME: 0 DAYS 2:46:28
SAMPLE RATE: 1/sec

TIME	AVG CH 1 % O2	AVG CH 2 PPM SO2	AVG CH 3 PPM NOX	AVG CH 4 PPM CO	
1/ 1/86					
0:37:41	20.56	2.59	0.00	6.73	
0:38:41	20.55	2.25	0.00	6.39	
0:39:41	20.54	2.23	0.00	6.06	
0:40:41	20.52	2.15	0.00	6.06	
0:41:41	20.52	1.62	0.00	6.06	
0:42:41	20.51	1.57	0.00	6.28	<<< ZERO AIR
0:43:41	20.50	1.16	0.00	6.51	
0:44:41	20.49	2.21	0.00	74.37	
0:45:41	20.48	45.04	310.23	509.70	
0:46:41	18.25	49.52	470.30	521.48	
0:47:41	4.86	49.46	470.85	521.14	<<< 45.49 PPM SO2, 473 PPM NOX
0:48:41	2.85	49.72	471.40	521.71	517 PPM CO
0:49:41	3.78	40.34	550.06	622.66	
0:50:41	3.54	41.22	919.69	858.10	
0:51:41	2.64	63.86	933.44	857.43	
0:52:41	2.54	73.77	931.24	852.50	
0:53:41	2.49	78.25	930.69	851.49	
0:54:41	2.46	89.77	930.69	852.94	
0:55:41	2.44	94.48	931.79	851.37	<<< 95.46 PPM SO2, 855 PPM CO
0:56:41	2.44	94.80	932.34	851.60	941 PPM NOX
0:57:41	2.48	95.81	932.34	705.66	
0:58:41	12.83	95.23	765.13	33.09	
0:59:41	19.88	79.23	7.70	11.67	
1: 0:41	20.32	51.81	4.95	10.88	

1: 1:41	20.38	4.03	3.85	10.88	
1: 2:41	20.40	2.30	3.30	10.32	
1: 3:41	20.44	2.17	3.30	10.10	
1: 4:41	20.49	2.37	2.75	9.98	
1: 5:41	20.52	2.50	2.75	9.09	
1: 6:41	20.53	5.90	1.65	9.42	<<< SYSTEM
1: 7:41	20.67	1.76	2.20	5.38	
1: 8:41	20.84	0.13	1.10	5.05	
1: 9:41	20.87	0.20	0.55	4.71	
1:10:41	20.88	0.02	0.55	4.60	<<< ZERO AIR
1:11:41	20.88	2.09	0.55	4.49	
1:12:41	20.88	1.67	0.55	41.28	
1:13:41	12.44	1.97	0.55	433.31	
1:14:41	7.05	2.39	0.55	426.47	
1:15:41	3.60	1.88	0.55	507.24	
1:16:41	2.67	2.11	0.55	508.36	
1:17:41	2.55	1.78	0.55	509.03	<<< 517 PPM CO
1:18:41	2.51	1.71	0.55	508.24	
1:19:41	2.73	1.33	1.10	217.39	
1:20:41	2.66	2.39	1.65	6.95	
1:21:41	2.45	2.07	1.10	4.71	
1:22:41	2.49	1.88	323.43	5.50	
1:23:41	2.60	22.67	475.80	4.60	
1:24:41	2.45	109.55	477.45	4.37	
1:25:41	2.43	INVALID	476.35	4.37	<<< 473 PPM NOX
1:26:41	2.45	INVALID	470.85	4.49	
1:27:41	2.47	114.54	72.06	4.49	
1:28:41	2.46	80.75	2.75	5.05	
1:29:41	2.37	49.81	2.20	4.71	<<< 45.49 PPM SO2
1:30:41	2.39	37.44	1.65	4.60	
1:31:41	2.39	30.42	1.65	4.60	
1:32:41	5.10	25.70	49.51	7.74	
1:33:41	16.10	20.20	247.52	227.71	
1:34:41	13.72	14.29	248.07	319.80	
1:35:41	13.41	10.66	257.98	293.66	
1:36:41	13.41	8.45	268.98	286.15	
1:37:41	13.34	6.64	266.78	276.95	
1:38:41	13.36	5.17	269.53	282.89	
1:39:41	13.41	4.34	275.58	283.12	
1:40:41	13.42	3.64	282.18	284.46	
1:41:41	13.40	2.80	285.48	270.33	
1:42:41	13.41	2.66	280.53	274.14	
1:43:41	13.43	1.95	282.18	269.66	
1:44:41	13.40	1.37	282.18	261.02	<<< STACK
1:45:41	13.38	1.21	276.68	277.51	
1:46:41	13.35	0.89	275.03	281.10	
1:47:41	13.36	0.74	274.48	278.30	
1:48:41	13.38	0.49	273.38	276.28	
1:49:41	13.36	0.49	271.73	282.45	
1:50:41	13.31	0.35	271.18	293.21	
1:51:41	13.29	-0.12	268.43	290.30	

1:52:41	13.30	0.22	266.78	280.31	
1:53:41	13.25	0.75	271.73	266.74	
1:54:41	13.24	3.08	287.68	268.98	<<< START RUN 1
1:55:41	13.25	2.78	283.83	262.59	
1:56:41	13.34	2.36	292.63	264.83	
1:57:41	13.39	2.49	297.58	268.98	
1:58:41	13.40	2.14	294.28	269.99	
1:59:41	13.35	2.21	291.53	277.85	
2: 0:41	13.36	2.22	281.63	279.98	
2: 1:41	13.37	1.97	275.03	282.89	
2: 2:41	13.33	2.06	268.43	286.15	
2: 3:41	13.31	2.09	261.28	298.26	
2: 4:41	13.31	1.86	270.63	287.94	
2: 5:41	13.26	1.78	267.88	284.46	
2: 6:41	13.21	1.66	267.88	286.15	
2: 7:41	13.19	1.63	273.38	287.16	
2: 8:41	13.19	1.93	268.43	295.91	
2: 9:41	13.16	1.73	261.28	299.16	
2:10:41	13.17	1.47	259.63	308.58	
2:11:41	13.17	1.54	260.73	303.76	
2:12:41	13.16	1.32	254.68	316.43	
2:13:41	13.16	1.16	245.87	332.81	
2:14:41	13.16	1.23	239.27	317.22	
2:15:41	13.17	1.33	241.47	321.03	
2:16:41	13.18	1.35	240.92	323.95	
2:17:41	13.22	1.35	233.22	325.41	
2:18:41	13.25	1.12	233.77	307.91	
2:19:41	13.28	1.76	238.72	287.38	
2:20:41	13.32	2.25	238.72	287.61	
2:21:41	13.30	2.53	244.77	291.08	
2:22:41	13.29	2.07	246.97	295.91	
2:23:41	13.31	2.39	242.57	301.51	
2:24:41	13.31	2.27	239.27	303.98	
2:25:41	13.30	2.05	237.62	313.18	
2:26:41	13.28	2.07	242.57	298.60	
2:27:41	13.27	1.88	248.07	293.33	
2:28:41	13.27	1.90	247.52	293.89	
2:29:41	13.28	2.20	245.87	294.78	
2:30:41	13.28	2.10	242.57	300.95	
2:31:41	13.30	1.93	242.02	311.83	
2:32:41	13.27	1.98	234.87	317.78	
2:33:41	13.25	1.77	239.82	306.23	
2:34:41	13.25	1.75	236.52	301.29	
2:35:41	13.22	1.46	233.77	316.99	
2:36:41	13.15	1.66	233.77	329.44	
2:37:41	13.15	1.52	234.32	326.30	
2:38:41	13.15	1.47	229.92	322.60	
2:39:41	13.17	1.52	228.27	323.16	
2:40:41	13.19	1.56	227.72	320.92	
2:41:41	13.26	1.65	228.82	324.40	
2:42:41	13.30	1.59	237.07	309.48	

2:43:41	13.32	1.68	242.57	304.66	
2:44:41	13.33	1.52	238.72	309.70	
2:45:41	13.37	1.29	231.57	304.21	
2:46:41	13.36	1.63	227.17	312.51	
2:47:41	13.39	1.25	232.67	301.40	
2:48:41	13.39	1.66	239.27	297.25	
2:49:41	13.36	1.79	236.52	307.68	
2:50:41	13.32	1.83	232.12	318.45	
2:51:41	13.33	1.99	232.12	316.66	
2:52:41	13.33	1.83	237.07	320.13	
2:53:41	13.30	1.89	239.82	314.86	
2:54:41	13.27	1.95	238.72	305.66	<<< END RUN 1
2:55:41	13.23	1.78	237.07	305.44	
2:56:41	13.22	1.86	240.92	313.07	
2:57:41	13.29	1.74	103.41	242.85	
2:58:41	17.49	1.41	4.95	20.30	
2:59:41	20.15	0.90	3.30	3.37	
3: 0:41	20.33	0.69	2.75	3.25	<<< ZERO AIR
3: 1:41	20.61	0.80	2.20	3.14	
3: 2:41	20.83	0.23	1.65	6.62	
3: 3:41	16.59	0.33	1.65	346.49	
3: 4:41	4.22	0.41	1.65	508.81	
3: 5:41	2.68	0.41	1.65	511.27	
3: 6:41	2.55	0.32	1.10	511.83	<<< 517 PPM CO
3: 7:41	2.47	0.09	1.10	511.39	
3: 8:41	2.38	-0.11	43.45	510.38	
3: 9:41	2.36	0.02	449.40	189.12	
3:10:41	2.28	0.07	478.55	4.60	
3:11:41	2.27	-0.25	478.55	3.03	<<< 473 PPM NOX
3:12:41	2.25	-0.20	479.65	2.80	
3:13:41	2.29	25.53	385.59	2.80	
3:14:41	6.75	47.41	29.15	6.28	
3:15:41	18.46	47.02	3.85	7.63	<<< 45.49 PPM CO
3:16:41	20.25	47.15	2.75	7.29	
3:17:41	20.44	40.87	2.20	7.52	
3:18:41	20.59	0.61	1.10	4.04	
3:19:41	20.78	1.32	1.10	3.03	
3:20:41	20.81	1.28	1.10	3.03	
3:21:41	20.83	1.22	99.01	36.34	
3:22:41	17.03	1.57	225.52	312.06	
3:23:41	13.70	1.54	227.72	324.96	
AVERAGE	13.27	1.83	249.24	302.36	

CO2 = 5.93 %

O2 = 11.77 %

CEM BIAS CORRECTION

ANALYZER RESPONSE		ZERO BIAS	SPAN GAS VALUE	SPAN GAS ANALYZER RESPONSE	CORRECTED EFFLUANT VALUE
302.36	CO	4.05	516.80	509.50	305.01
1.83	SO2	0.96	45.49	46.04	0.87
249.24	NOX	1.90	473.00	477.50	245.99

Company: CSR Rinker
Source: Cement plant - Run 2

Location: Miami, FL
Date: 10/9/00

vs =	51.23	FT/SEC	As =	95.61	ft^2
Q =	293889	acfm -	not corrected		
Q(stnd) =	194765	dscfm -	both temperature and moisture corrected		
Q(moist)=	260425	dcfm -	only moisture corrected		
Q(temp) =	221324	scfm -	only temperature corrected		

Moisture

Vm(Std) =	46.1097867	Bws =	0.0959763	| Lower Bws
Vw(Std) =	4.89528	Bws @sat =	1	| Value used
		Percent Moist =	9.5976347	

Emission Rates:	CO =	273.53	lb/hr	
	NOx =	320.52	lb/hr	as NO2
	SO2 =	3.34	lb/hr	
	THC =	0.00	as Propane	

EQUATIONS :

As = (PI*(Stack Dia/12)^2)/4 — Round Stacks

or

As = (Stack L/12)*(Stack W/12) — Square Stacks

Md = (.44*%CO2)+(.32*%O2)+(.28*(100-(%CO2+%O2)))

Ms = (Md*(1-%Moist))+(18*%Moist)

P(stack) = Pb+(Ps/13.6)

vs = (85.49)*(0.85)*(Sqrt.Dp)*(Sqrt[(T(s)+460)/(Ms*P(stack))])

Q = vs * As * 60

Q(stnd) = Q*(1-%Moist)*(528/(Ts+460))*(P(stack)/29.92)

Vm (Stnd) = 17.6471 * Vm * Y * ((Pb+(dH/13.6))/(Tm+460))

Vw (Stnd) = 0.0471 * Vlc

Bws = (Vw(Stnd) / (Vm(Stnd)+ Vw(Stnd))

Bws @ Sat = Vap. Pressure of H2O @ Dew Point Temp/Ps

CO (lb/hr) = ((PPM CO)*Q(stnd)*28.01*60)/(385*10^6)

NOx (lb/hr) = ((PPM NOx)*Q(stnd)*46.006*60)/(385*10^6)

SO2 (lb/hr) = ((PPM SO2)*Q(stnd)*64.0648*60)/(385*10^6)

THC (lb/hr) = ((PPM THC)*Q(temp)*44.0965*60)/(385*10^6)

Company: CSR Rinker
Cement plant - Run 2

Location: Miami, FL
Date: 10/9/00

12

Filename:
QuickFLOW
[Alt-C]
to clear input
range

Sqrt.Dp= 0.7796

T(s)= 246.00

Data Point	Stack Velocity Head	Stack Gas Temp.
1	0.71	246
2	0.62	246
3	0.48	246
4	0.70	246
5	0.66	246
6	0.52	246
7	0.68	246
8	0.67	246
9	0.53	246
10	0.69	246
11	0.59	246
12	0.48	246
13	0.00	0
14	0.00	0
15	0.00	0
16	0.00	0
17	0.00	0
18	0.00	0
19	0.00	0
20	0.00	0
21	0.00	0
22	0.00	0
23	0.00	0
24	0.00	0
25	0.00	0
26	0.00	0
27	0.00	0
28	0.00	0
29	0.00	0
30	0.00	0
31	0.00	0
32	0.00	0
33	0.00	0
34	0.00	0
35	0.00	0
36	0.00	0

Pb =	30.18	in Hg
Ps =	-0.7	in H2O
%O2 =	13	%
%CO2 =	5.18	%
%Moist =	12.00	%
Stack Dia=	132.4	in
or		
Stack L =		in
Stack W =		in
PPM CO =	321.73	ppm
PPM NOx =	229.53	ppm
PPM SO2 =	1.72	ppm
PPM THC =	0	ppm
Vm =	47.31	ft3
dH =	1.84	in H2O
Tm =	90	F
Y =	1.002	
Vlc =	104	ml

TEST START DATE: 10/9/2000
TEST START TIME: 11:48
TEST LOCATION: RINKER RUN 2
EMPLOYEE NAME: ---
EMPLOYEE NUMBER: ---
DEPARTMENT: ---
COMMENT FIELD 1: O2 SPAN = 25 %, SO2 SPAN = 100 PPM
COMMENT FIELD 2: NOX SPAN = 1000 PPM, CO SPAN = 1000 PPM
NUMERIC CODES: --- --- --- --- ---

METROSONICS dl-714 SN 1554 V2.3 07/91

CURRENT DATE: 10/09/00
CURRENT TIME: 13:20:19

TEST STARTING DATE: 10/ 9/ 0
TEST STARTING TIME: 11:47:12

ELAPSED TIME: 0 DAYS 1:32:23
SAMPLE RATE: 1/sec

TIME	AVG CH 1 % O2	AVG CH 2 PPM SO2	AVG CH 3 PPM NOX	AVG CH 4 PPM CO	
10/ 9/ 0					
11:47:12	13.47	1.73	212.32	347.95	
11:48:12	13.49	2.12	206.82	342.01	<<< START RUN 2
11:49:12	13.48	2.12	210.67	339.99	
11:50:12	13.53	2.11	214.52	355.58	
11:51:12	13.50	2.02	213.42	356.37	
11:52:12	13.45	2.06	207.37	347.84	
11:53:12	13.43	2.22	213.97	329.89	
11:54:12	13.48	2.35	214.52	314.97	
11:55:12	13.53	2.36	221.67	329.33	
11:56:12	13.49	2.46	220.02	331.91	
11:57:12	13.49	2.82	219.47	321.59	
11:58:12	13.48	2.83	212.87	336.06	
11:59:12	13.43	2.77	210.67	348.29	
12: 0:12	13.42	3.06	209.57	352.33	
12: 1:12	13.36	2.80	208.47	360.63	
12: 2:12	13.31	2.77	202.42	363.77	
12: 3:12	13.26	2.54	200.77	356.70	
12: 4:12	13.23	2.49	200.77	359.17	
12: 5:12	13.20	2.94	204.07	363.32	
12: 6:12	13.27	2.56	207.37	346.49	
12: 7:12	13.34	2.77	205.72	322.49	
12: 8:12	13.36	2.58	211.22	324.96	
12: 9:12	13.35	2.37	216.17	325.74	
12:10:12	13.39	2.56	230.47	315.65	

12:11:12	13.41	2.54	232.67	310.60	
12:12:12	13.43	2.40	243.12	312.96	
12:13:12	13.44	2.36	241.47	322.60	
12:14:12	13.45	2.59	249.18	321.14	
12:15:12	13.42	2.56	246.97	316.88	
12:16:12	13.42	2.43	244.22	308.69	
12:17:12	13.44	2.50	254.13	311.50	
12:18:12	13.42	2.46	260.18	304.32	
12:19:12	13.43	2.79	259.63	297.81	
12:20:12	13.44	2.71	260.73	295.23	
12:21:12	13.44	2.25	260.18	283.45	
12:22:12	13.43	2.49	256.88	285.81	
12:23:12	13.42	2.67	254.68	296.47	
12:24:12	13.37	2.41	252.48	309.37	
12:25:12	13.30	2.69	247.52	307.01	
12:26:12	13.25	2.88	255.23	312.51	
12:27:12	13.19	2.72	255.78	317.67	
12:28:12	13.17	2.53	253.58	313.07	
12:29:12	13.18	2.41	257.98	310.04	
12:30:12	13.23	2.44	271.18	305.78	
12:31:12	13.29	2.44	260.73	306.23	
12:32:12	13.33	2.35	253.58	303.65	
12:33:12	13.36	2.36	245.32	308.47	
12:34:12	13.40	2.53	252.48	306.90	
12:35:12	13.41	2.31	260.73	301.51	
12:36:12	13.41	2.48	253.58	289.18	
12:37:12	13.41	2.63	253.03	296.92	
12:38:12	13.38	2.42	233.22	305.22	
12:39:12	13.34	2.31	236.52	303.53	
12:40:12	13.34	2.40	237.07	295.34	
12:41:12	13.37	2.43	250.28	318.68	
12:42:12	13.31	2.36	247.52	321.14	
12:43:12	13.23	2.35	245.32	316.99	
12:44:12	13.19	2.26	256.33	325.18	
12:45:12	13.13	2.26	256.33	324.96	
12:46:12	13.09	2.31	254.68	337.86	
12:47:12	13.07	2.33	243.12	342.79	
12:48:12	13.06	2.19	250.28	333.26	<<< END RUN 2
12:49:12	13.10	2.25	248.63	329.11	
12:50:12	13.11	2.50	206.82	311.50	
12:51:12	14.90	1.80	14.85	101.85	
12:52:12	19.91	1.43	2.75	3.25	
12:53:12	20.60	1.19	1.65	2.36	
12:54:12	20.66	1.25	1.65	2.13	
12:55:12	20.68	1.14	1.10	2.36	<<< ZERO AIR
12:56:12	20.70	1.23	0.55	2.24	
12:57:12	20.71	1.01	0.55	2.24	
12:58:12	20.72	0.98	1.10	2.36	
12:59:12	20.73	1.11	1.10	2.36	
13: 0:12	19.95	0.96	1.10	164.78	
13: 1:12	7.34	0.93	1.10	498.04	

13: 2:12	2.80	0.73	0.55	509.59	
13: 3:12	2.49	1.13	0.55	508.92	
13: 4:12	2.44	1.01	0.55	508.36	<<< 517 PPM CO
13: 5:12	2.36	1.13	0.55	508.81	
13: 6:12	2.38	1.02	127.06	491.42	
13: 7:12	2.40	35.37	484.05	98.26	
13: 8:12	2.34	117.88	490.10	2.80	
13: 9:12	2.31	INVALID	487.90	2.36	<<< 473 PPM NOX
13:10:12	2.31	INVALID	486.25	2.13	
13:11:12	2.31	INVALID	352.04	2.13	
13:12:12	2.57	101.63	6.60	2.13	
13:13:12	2.32	68.88	2.75	2.36	
13:14:12	2.27	49.95	1.65	2.02	
13:15:12	2.26	42.18	1.65	2.02	<<< 45.49 PPM SO2
13:16:12	2.27	39.39	1.65	2.02	
13:17:12	2.23	38.51	1.65	2.24	
13:18:12	4.04	31.38	178.22	105.78	
13:19:12	11.47	19.56	254.68	306.34	
AVERAGE	13.36	2.48	236.24	321.73	

CO2 = 5.18 %

O2 = 13.00 %

CEM BIAS CORRECTION

ANALYZER RESPONSE		ZERO BIAS	SPAN GAS VALUE	SPAN GAS ANALYZER RESPONSE	CORRECTED EFFLUANT VALUE
321.73	CO	2.10	516.80	509.50	325.56
2.48	SO2	0.75	45.49	46.36	1.72
236.24	NOX	2.20	473.00	484.50	229.53

|::

Company: CSR Rinker — Location: Miami, FL
Source: Cement plant - Run 3 — Date: 10/9/00

vs =	51.08	FT/SEC	As =	95.61	ft^2
Q =	293048	acfm -	not corrected		
Q(stnd) =	190613	dscfm -	both temperature and moisture corrected		
Q(moist)=	253790	dcfm -	only moisture corrected		
Q(temp) =	221643	scfm -	only temperature corrected		

Moisture

Vm(Std) =	46.1097867	Bws =	0.0959763	| Lower Bws
Vw(Std) =	4.89528	Bws @sat =	1	| Value used
		Percent Moist =	9.5976347	

Emission Rates:	CO =	222.39	lb/hr	
	NOx =	360.59	lb/hr	as NO2
	SO2 =	3.54	lb/hr	
	THC =	0.00	as Propane	

EQUATIONS :

As = (PI*(Stack Dia/12)^2)/4 — Round Stacks

or

As = (Stack L/12)*(Stack W/12) — Square Stacks

Md = (.44*%CO2)+(.32*%O2)+(.28*(100-(%CO2+%O2)))

Ms = (Md*(1-%Moist))+(18*%Moist)

P(stack) = Pb+(Ps/13.6)

vs = (85.49)*(0.85)*(Sqrt.Dp)*(Sqrt[(T(s)+460)/(Ms*P(stack))])

Q = vs * As * 60

Q(stnd) = Q*(1-%Moist)*(528/(Ts+460))*(P(stack)/29.92)

Vm (Stnd) = 17.6471 * Vm * Y * ((Pb+(dH/13.6))/(Tm+460))

Vw (Stnd) = 0.0471 * Vlc

Bws = (Vw(Stnd) / (Vm(Stnd)+ Vw(Stnd))

Bws @ Sat = Vap. Pressure of H2O @ Dew Point Temp/Ps

CO (lb/hr) = ((PPM CO)*Q(stnd)*28.01*60)/(385*10^6)

NOx (lb/hr) = ((PPM NOx)*Q(stnd)*46.006*60)/(385*10^6)

SO2 (lb/hr) = ((PPM SO2)*Q(stnd)*64.0648*60)/(385*10^6)

THC (lb/hr) = ((PPM THC)*Q(temp)*44.0965*60)/(385*10^6)

Company: CSR Rinker
Cement plant - Run 3

Location: Miami, FL
Date: 10/9/00

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Sqrt.Dp= 0.7764

T(s)= 243.00

Filename:
QuickFLOW
[Alt-C]
to clear input
range

Data Point	Stack Velocity Head	Stack Gas Temp.
1	0.68	243
2	0.64	243
3	0.48	243
4	0.71	243
5	0.69	243
6	0.50	243
7	0.66	243
8	0.64	243
9	0.49	243
10	0.66	243
11	0.63	243
12	0.49	243
13	0.00	0
14	0.00	0
15	0.00	0
16	0.00	0
17	0.00	0
18	0.00	0
19	0.00	0
20	0.00	0
21	0.00	0
22	0.00	0
23	0.00	0
24	0.00	0
25	0.00	0
26	0.00	0
27	0.00	0
28	0.00	0
29	0.00	0
30	0.00	0
31	0.00	0
32	0.00	0
33	0.00	0
34	0.00	0
35	0.00	0
36	0.00	0

Pb =	30.18	in Hg
Ps =	-0.68	in H2O
%O2 =	13.27	%
%CO2 =	5.34	%
%Moist =	14.00	%
Stack Dia=	132.4	in
or		
Stack L =		in
Stack W =		in
PPM CO =	267.28	ppm
PPM NOx =	263.85	ppm
PPM SO2 =	1.86	ppm
PPM THC =	0	ppm
Vm =	47.31	ft3
dH =	1.84	in H2O
Tm =	90	F
Y =	1.002	
Vlc =	104	ml

TEST START DATE: 10/9/2000
TEST START TIME: 13:25
TEST LOCATION: RINKER RUN 3
EMPLOYEE NAME: ---
EMPLOYEE NUMBER: ---
DEPARTMENT: ---
COMMENT FIELD 1: O2 SPAN = 25 %, SO2 SPAN = 100 PPM
COMMENT FIELD 2: NOX SPAN = 1000 PPM, CO SPAN = 1000 PPM
NUMERIC CODES: --- --- --- --- ---

METROSONICS dl-714 SN 1554 V2.3 07/91

CURRENT DATE: 10/09/00
CURRENT TIME: 15:15:38

TEST STARTING DATE: 10/ 9/ 0
TEST STARTING TIME: 11:47:12

ELAPSED TIME: 0 DAYS 3:25:43
SAMPLE RATE: 1/sec

TIME	AVG CH 1 % O2	AVG CH 2 PPM SO2	AVG CH 3 PPM NOX	AVG CH 4 PPM CO	
10/ 9/ 0					
13:21:14	13.24	8.62	244.22	308.02	
13:22:14	13.32	6.49	266.78	295.34	
13:23:14	13.37	5.44	273.38	268.54	
13:24:14	13.39	4.56	272.83	264.72	
13:25:14	13.38	4.12	277.23	266.29	<<< START RUN 3
13:26:14	13.31	4.05	262.38	280.09	
13:27:14	13.30	3.79	265.68	277.85	
13:28:14	13.30	3.42	255.78	287.49	
13:29:14	13.25	3.24	253.03	294.00	
13:30:14	13.18	3.30	262.38	288.84	
13:31:14	13.15	3.15	264.58	289.18	
13:32:14	13.16	3.12	273.93	289.40	
13:33:14	13.15	3.02	265.68	283.68	
13:34:14	13.18	3.04	264.58	288.17	
13:35:14	13.23	3.01	268.98	282.45	
13:36:14	13.27	3.03	281.63	260.68	
13:37:14	13.29	2.82	287.68	261.58	
13:38:14	13.31	3.14	286.58	259.11	
13:39:14	13.36	2.89	277.78	260.80	
13:40:14	13.37	2.73	264.58	255.86	
13:41:14	13.39	2.78	264.03	264.61	
13:42:14	13.40	2.37	279.43	263.04	
13:43:14	13.40	2.58	279.98	267.86	
13:44:14	13.39	2.58	278.88	271.68	

13:45:14	13.45	2.79	275.03	263.60	
13:46:14	13.44	2.73	270.63	266.74	
13:47:14	13.41	2.79	270.08	259.67	
13:48:14	13.41	2.83	277.23	263.94	
13:49:14	13.42	2.95	263.48	277.17	
13:50:14	13.43	2.59	281.08	275.72	
13:51:14	13.39	2.78	289.33	262.82	
13:52:14	13.35	3.04	278.88	256.53	
13:53:14	13.39	2.68	271.73	268.20	
13:54:14	13.43	3.04	284.93	266.18	
13:55:14	13.42	3.00	289.33	254.29	
13:56:14	13.41	2.59	290.43	258.55	
13:57:14	13.42	3.03	281.08	258.44	
13:58:14	13.48	2.70	275.03	264.39	
13:59:14	13.46	2.91	275.03	256.98	
14: 0:14	13.47	3.09	271.73	260.24	
14: 1:14	13.47	2.70	282.73	258.10	
14: 2:14	13.46	2.82	288.78	251.71	
14: 3:14	13.48	2.71	288.78	248.46	
14: 4:14	13.43	3.11	277.78	254.85	
14: 5:14	13.41	2.74	276.13	251.26	
14: 6:14	13.41	2.90	277.23	254.40	
14: 7:14	13.40	2.72	266.78	262.48	
14: 8:14	13.39	2.56	260.73	262.70	
14: 9:14	13.38	2.82	259.63	271.12	
14:10:14	13.36	2.62	266.78	255.19	
14:11:14	13.38	2.90	271.73	257.88	
14:12:14	13.36	2.96	269.53	247.11	
14:13:14	13.38	2.63	273.93	248.91	
14:14:14	13.40	2.77	289.88	245.32	
14:15:14	13.44	3.05	282.73	240.27	
14:16:14	13.47	2.85	283.83	248.79	
14:17:14	13.46	2.78	279.98	250.59	
14:18:14	13.48	2.98	276.68	250.14	
14:19:14	13.47	2.73	275.58	254.63	
14:20:14	13.46	2.90	272.28	257.99	
14:21:14	13.48	2.80	270.08	260.24	
14:22:14	13.49	2.47	268.98	262.37	
14:23:14	13.49	2.79	273.93	252.61	
14:24:14	13.46	3.03	269.53	244.08	
14:25:14	13.46	2.95	262.38	255.30	<<< END RUN 3
14:26:14	13.49	2.77	266.23	250.81	
14:27:14	13.53	2.94	266.78	252.16	
14:28:14	13.50	2.79	260.73	263.49	
14:29:14	13.45	2.77	253.58	277.29	
14:30:14	13.69	2.81	72.06	193.27	
14:31:14	18.75	1.80	3.85	8.41	
14:32:14	20.53	1.64	2.20	2.02	
14:33:14	20.62	1.49	1.65	1.23	
14:34:14	20.64	1.28	1.65	1.35	<<< ZERO AIR
14:35:14	20.64	1.42	1.10	1.35	

14:36:14	20.64	1.14	1.10	1.57	
14:37:14	17.99	1.42	1.10	275.38	
14:38:14	4.82	1.28	1.10	504.99	
14:39:14	2.67	1.21	0.55	506.34	
14:40:14	2.53	1.31	1.10	507.35	
14:41:14	2.47	1.10	1.10	507.68	<<< 517 PPM CO
14:42:14	2.42	1.10	0.55	505.78	
14:43:14	2.56	1.22	1.10	352.10	
14:44:14	2.45	1.39	0.55	297.70	
14:45:14	2.31	1.18	1.10	298.04	<<< 309 PPM CO
14:46:14	2.36	1.42	0.55	297.59	
14:47:14	2.37	1.42	0.55	442.18	
14:48:14	2.50	1.38	0.55	828.15	
14:49:14	2.33	1.34	0.00	841.05	<<< 855 PPM CO
14:50:14	2.30	1.57	90.76	828.72	
14:51:14	2.45	51.85	482.95	201.46	
14:52:14	2.36	INVALID	489.00	2.13	
14:53:14	2.32	INVALID	486.80	1.57	<<< 473 PPM NOX
14:54:14	2.29	INVALID	485.70	1.68	
14:55:14	2.30	INVALID	665.57	1.68	
14:56:14	2.34	INVALID	952.15	1.91	
14:57:14	2.34	INVALID	950.50	1.91	<<< 941 PPM NOX
14:58:14	2.30	INVALID	948.29	1.23	
14:59:14	2.34	INVALID	650.72	1.46	
15: 0:14	2.81	117.58	7.70	1.79	
15: 1:14	2.37	93.11	2.75	1.68	
15: 2:14	2.27	69.55	1.65	1.57	
15: 3:14	2.29	59.49	0.55	1.79	
15: 4:14	2.27	54.25	0.55	1.46	
15: 5:14	2.30	50.24	0.55	1.46	
15: 6:14	2.27	48.25	0.55	1.57	
15: 7:14	2.27	47.65	0.55	1.46	
15: 8:14	2.18	47.36	0.55	1.46	<<< 45.49 PPM SO2
15: 9:14	2.26	53.65	0.55	1.57	
15:10:14	2.26	78.99	0.55	1.46	
15:11:14	2.25	93.20	0.55	1.12	
15:12:14	2.17	96.31	2.20	0.34	<<< 95.46 PPM SO2
15:13:14	0.26	93.90	8.25	0.45	
15:14:14	-0.25	82.22	8.25	0.45	
AVERAGE	13.38	2.92	274.20	263.16	

CO2 = 5.34 %

O2 = 13.27 %

CEM BIAS CORRECTION

ANALYZER RESPONSE		ZERO BIAS	SPAN GAS VALUE	SPAN GAS ANALYZER RESPONSE	CORRECTED EFFLUANT VALUE
263.16	CO	1.10	516.80	507.80	267.28
2.92	SO2	1.03	45.49	47.11	1.86
274.20	NOX	1.95	473.00	490.00	263.85

FIELD AND LABORATORY DATA SHEETS

KOOGLER & ASSOCIATES

ch 1 O2
ch 2 SO2
ch 3 NOX
ch 4 CO

Date:	10/9/00
Plant:	Rinker
Location:	Miami Florida
Source:	Cement Plant

RUN NO.	START TIME	END TIME	OST CO2 %	OST O2 %	CO ppm	SO2 ppm	NOx ppm	THC ppm	KA O2 %
1	10:13	11:13	5.93	13.77	302.36	1.83	249.24	✓	13.27
	~~211826~~ DSCFM	~~232355~~ SCFM			ppm corr 306.01	ppm corr 0.67	ppm corr 245.99	✓	✓
	202762	235770			LB/HR 266.05	LB/HR 1.74	LB/HR 352.43	✓	✓
2	11:48	12:48	5.13	13.0	321.73	2.48	236.24	✓	13.36
	207015 DSCFM	235244 SCFM			corr ppm 335.56	corr ppm 1.72	corr ppm 229.53	✓	✓
					LB/HR 290.73	LB/HR 3.55	LB/HR 340.68	✓	✓
3	13:25	14:25	5.34	13.27	263.16	2.92	274.2	✓	13.38
	202601 DSCFM	235583 SCFM			ppm corr 267.28	ppm corr 1.86	ppm corr 263.85	✓	✓
					LB/HR 236.38	LB/HR 3.76	LB/HR 383.27	✓	✓

Rinker Cement Plant
10/9/00

System Calibration Bias And Drift Data

Date of Final Value	Time of Final Value		Cal. Gas Value (ppm)	INITIAL VALUE System Calibration Response (ppm)	FINAL VALUES System Calibration Response (ppm)	Absolute Difference (ppm)	Difference (percent of span)
NOx Analyser							
		Zero gas	0	1.1			
		Upscale gas	473	477			
	11:19	Zero gas	0		2.7		
	11:30	Upscale gas	473		478		
	12:54	Zero gas	0		1.7		
	13:08	Upscale gas	473		491		
	14:33	Zero gas	0		2.2		
	14:52	Upscale gas	473		489		
SO2 Analyser							
		Zero gas	0	1.25			
		Upscale gas	45.49	44.98			
	11:19	Zero gas	0		0.67		
	11:34	Upscale gas	45.49		47.09		
	12:55	Zero gas	0		0.83		
	13:15	Upscale gas	45.49		45.62		
	14:33	Zero gas	0		1.23		
	15:06	Upscale gas	45.49		48.6		
CO Analyser							
		Zero gas	0	5.0			
		Upscale gas	516.8	509			
	11:19	Zero gas	0		3.1		
	11:24	Upscale gas	516.8		510		
	12:54	Zero gas	0		1.1		
	13:03	Upscale gas	516.8		509		
	14:33	Zero gas	0		1.1		
	14:39	Upscale gas	516.8		506.6		
THC Analyser							
		Zero gas					
		Upscale gas					
		Zero gas					
		Upscale gas					
		Zero gas					
		Upscale gas					
		Zero gas					
		Upscale gas					

EPA METHOD 3

PLANT : Rinker Cement Plant

DATE : 10/9/00

SOURCE : Cement Kiln

ORSAT ANALYSIS

ANALYSIS TOLERANCE
CO2 = 0.9 %
O2 = 0.7 %
CO = 1.2 %

RUN NO.	ANALYSIS NO.	OXYGEN PERCENT	OXYGEN AVERAGE	CARBON DIOXIDE PERCENT	CARBON DIOXIDE AVERAGE
1	1	13.8		6.0	
	2	13.7		5.9	
	3	13.8	13.77	5.9	5.93
2	1	12.9		5.0	
	2	13.1		5.2	
	3	13.0	13.0	5.2	5.13
3	1	13.3		5.3	
	2	13.3		5.3	
	3	13.2	13.27	5.4	5.34
4	1				
	2				
	3				
5	1				
	2				
	3				
6	1				
	2				
	3				
7	1				
	2				
	3				
8	1				
	2				
	3				
9	1				
	2				
	3				
10	1				
	2				
	3				

KOOGLER & ASSOCIATES
CEM RESPONSE TIME DETERMINATION

Date: 10/9/00 Location: Mount, Pa.

Source: Pinker, Cement Plant Pollutant: SO2

Monitor: SO2, W.R. 721AT Serial Number: 92-721AT2-7124-1

Low Range Concentration: 0 ppm

Mid Range Concentration: 45.49 ppm

High Range Concentration: 96 ppm

	UPSCALE TEST		DOWNSCALE TEST	
TEST RUN	LOW TO MID RANGE (minutes)	MID TO HIGH RANGE (minutes)	HIGH TO MID RANGE (minutes)	MID TO LOW RANGE (minutes)
1	1.95			1.86
2	1.99			1.92
3	1.97			1.89
AVERAGE	1.97			1.89
AVERAGE				

Signature: Stephen Ben

KOOGLER & ASSOCIATES
CEM RESPONSE TIME DETERMINATION

Date: 10/9/00 Location: Miami FL

Source: Rinker, Cement Plant Pollutant: NOx

Monitor: NOx, TECO 105 Serial Number: 105-33495-245

Low Range Concentration: 0 ppm

Mid Range Concentration: 473 ppm

High Range Concentration: 941 ppm

	UPSCALE TEST		DOWNSCALE TEST	
TEST RUN	LOW TO MID RANGE (minutes)	MID TO HIGH RANGE (minutes)	HIGH TO MID RANGE (minutes)	MID TO LOW RANGE (minutes)
1	0.90			0.91
2	0.85			0.88
3	0.91			0.89
AVERAGE	0.88			0.89
AVERAGE				

Signature: Ralph Bedi

KOOGLER & ASSOCIATES
CEM RESPONSE TIME DETERMINATION

Date: 10/9/00 Location: Miami

Source: Rinker, Cement Plant Pollutant: CO

Monitor: CO, TECO 48H Serial Number: 48H 31635-241

Low Range Concentration: 0 ppm

Mid Range Concentration: 516.8 ppm

High Range Concentration: 855 ppm

	UPSCALE TEST		DOWNSCALE TEST	
TEST RUN	LOW TO MID RANGE (minutes)	MID TO HIGH RANGE (minutes)	HIGH TO MID RANGE (minutes)	MID TO LOW RANGE (minutes)
1	1.8			1.6
2	1.7			1.6
3	1.7			1.65
AVERAGE	1.73			1.61
AVERAGE				

Signature: [signature]

KA.CEM

SOURCE: Rinker Cement plant	DATE: 10/9/00
MONITOR: NOx, IOS	LOCATION: Miami FL.
SERIAL NUMBER: 105-33495-245	SPAN: 1000 ppm

RUN NUMBER	CALIBRATION VALUE	MONITOR RESPONSE	DIFFERENCE		
			Zero/Low	Mid	High
1 - Zero	0	0.5	0.5		
2 - Mid	473	470.3		-2.7	
3 - High	941	932			-9
4 - Mid	473	487.9		14.9	
5 - Zero	0	1.10	1.10		
6 - High	941	—			—
7- Zero	0	1.65	1.65		
8 - Mid	473	486.8		13.8	
9 - High	941	954			13
		MEAN DIFFERENCE =	1.08	8.66	2
		CALIBRATION ERROR =	0.12 %	0.86 %	0.40 %

Calibration Error Determination

KIA C.E.M.

SOURCE: Rinker, Cement Plant	DATE: 10/9/00
MONITOR: SO2, W.R. 721AT	LOCATION: Miami FL
SERIAL NUMBER: 92-721AT2-7924-1	SPAN: 100ppm

RUN NUMBER	CALIBRATION VALUE	MONITOR RESPONSE	DIFFERENCE		
			Zero/Low	Mid	High
1 - Zero	0	1.8	1.8		
2 - Mid	45.49	44.35		-1.14	
3 - High	95.46	95.2			0.2
4 - Mid	45.49	42.18		-3.31	
5 - Zero	0	1.14	1.14		
6 - High	95.46	—			
7- Zero	0	1.28	1.28		
8 - Mid	45.49	47.36		+1.87	
9 - High	95.46	96.39			0.93
		MEAN DIFFERENCE =	1.41	-0.86	0.56
		CALIBRATION ERROR =	1.41 %	-0.86 %	0.56 %

Calibration Error Determination

SOURCE: Rinker Cement Plant	DATE: 10/9/00
MONITOR: CO, TECO 48H	LOCATION: Miami FL
SERIAL NUMBER: 48H-31635-241	SPAN: 1000ppm

RUN NUMBER	CALIBRATION VALUE	MONITOR RESPONSE	DIFFERENCE		
			Zero/Low	Mid	High
1 - Zero	0	6.1	6.1		
2 - Mid	516.8	521.3		4.5	
3 - High	855	857			2.0
4 - Mid	516.8	508.36		-8.44	
5 - Zero	0	2.36	2.36		
6 - High	855	840.4			-14.6
7- Zero	0	1.35	1.35		
8 - Mid	516.8	507.68		-9.12	
9 - High	855	841.05			-13.95
		MEAN DIFFERENCE =	3.27	-4.35	10.18
		CALIBRATION ERROR =	0.33 %	0.43 %	1.02 %

Calibration Error Determination

PRELIMINARY DATA SHEET

Plant CSR Rinker Stack Cement Kiln

Date 10/9/00

Stack Dimensions 136.5 Stack Area (ft.^{2})

Pitot Corr. factor 0.84

Sketch of Stack Cross-Section

DB °F WB °F DP °F

V.P. at DP "Hg Fract. D.A.

Density Factor Stack Pres.

Weather Broken

Temp 67 °F Pressure 30.18 "Hg

Wind Dir. N Vel. 12-15

Leak Check Good — Leak Check Good — Leak Check Good

Pitot Traverse

Point Number	Equal Area Radius	Distance From Stack Wall	Distance From End of Port	Run 1 ~~Port #1~~ Ts	Run 1 Velocity	Run 2 ~~Port #2~~ H	Run 2 Velocity	Run 3 ~~Port #3~~ H	Run 3 Velocity	Port #4 H	Port #4 Velocity
1-1				246	0.66	246	0.71	243	0.68		
2-2					0.64		0.62		0.64		
3-3					0.45		0.48		0.48		
1-4					0.70		0.70		0.71		
2-5					0.67		0.66		0.69		
3-6					0.51		0.52		0.50		
1-7					0.69		0.68		0.66		
2-8					0.66		0.67		0.64		
3-9					0.50		0.53		0.49		
10					0.69		0.69		0.66		
11					0.66		0.59		0.63		
12					0.51		0.48		0.49		
13											
14											
15											
16											
17					P_s = 0.66 "H_2O		P_s = 0.70		P_s = 0.68		
18											
19					T_{s_w} = 135 °F		T_{s_w} 123 °F		T_{s_w} 136		
20											
21											
22											
23											
24											

PLANT INFORMATION

KOOGLER & ASSOCIATES
ENVIRONMENTAL SERVICES

10/09/00

Clinker - 2,480.60
(103.4 tons P/hour)

Coal used - 311.50 (13.0 tph)

Kiln Feed used - 4,134.40 (172.3 tph)

Total Clinker + TPH
" Coal used
" Feed To Kiln

DEC 08 '00 03:35PM RINKER MATERIALS

CERTIFICATE OF ANALYSIS

KOOGLER & ASSOCIATES
ENVIRONMENTAL SERVICES

Airgas.

ASG-West Chicago

1250 W. Washington
West Chicago, IL 60185
Phone: (630) 231-9260
FAX: (630) 231-4071

Certificate of Analysis: E.P.A. Protocol Gas Mixture

Cylinder No :	CC91937	Order No.	GM 2000361
Cylinder Pressure:	2000 psig	Expiration Date:	5/17/02
Certification Date	5/17/00	Laboratory:	W. Chicago

Reference Standard Information:

Type	Component	Cyl. Number	Concentration
SRM 1694a	Sulfur Dioxide	CAL-010631	97.6 ppm

Instrumentation:

Instrument/Model/Serial No.	Analytical Principle
Nicolet/8220/AAB9400246	FTIR

Analytical Methodology does not require correction for analytical interferences.

Analytical Results:

1st Component: Sulfur Dioxide

1st Analysis Date:		5/10/00					
R	96.629	S	94.502	Z	-0.003	Conc	95.439 ppm
S	94.520	Z	0.012	R	96.583	Conc	95.457 ppm
Z	0.014	R	96.713	S	94.308	Conc	95.243 ppm
						AVG:	95.380 ppm

2nd Analysis Date:		5/17/00					
R	95.881	S	93.857	Z	-0.038	Conc	95.472 ppm
S	93.979	Z	-0.048	R	96.027	Conc	95.586 ppm
Z	-0.036	R	95.972	S	93.964	Conc	95.571 ppm
						AVG:	95.543 ppm

Certified Concentrations:

Component	Concentration	Accuracy	Procedure
Sulfur Dioxide	95.46 ppm	+/- 1%	G1
Nitrogen	Balance		

Certification performed in accordance with "EPA Traceability Protocol (Sept. 1997)" using the assay procedures listed.

Do not use cylinder below 150 psig.

Edward Johnson
Approved for Release

Airgas.

ASG-West Chicago

1250 W. Washington
West Chicago, IL 60185
Phone: (630) 231-9260
FAX: (630) 231-4071

Certificate of Analysis: E.P.A. Protocol Gas Mixture

Cylinder No :	CC108987	Order No.	GM 2000360
Cylinder Pressure:	2000 psig	Expiration Date:	5/17/02
Certification Date	5/17/00	Laboratory:	W. Chicago

Reference Standard Information:

Type	Component	Cyl. Number	Concentration
SRM 1693a	Sulfur Dioxide	CAL-010573	49.9 ppm

Instrumentation:

Instrument/Model/Serial No.	Analytical Principle
Nicolet/8220/AAB9400246	FTIR

Analytical Methodology does not require correction for analytical interferences.

Analytical Results:

1st Component: Sulfur Dioxide

1st Analysis Date:		5/10/00					
R	50.317	S	45.851	Z	-0.054	Conc	45.482 ppm
S	45.844	Z	-0.050	R	50.293	Conc	45.475 ppm
Z	-0.050	R	50.321	S	45.932	Conc	45.562 ppm
						AVG:	45.506 ppm

2nd Analysis Date:		5/17/00					
R	50.001	S	45.629	Z	-0.028	Conc	45.521 ppm
S	45.547	Z	-0.011	R	50.022	Conc	45.440 ppm
Z	-0.017	R	50.036	S	45.567	Conc	45.460 ppm
						AVG:	45.474 ppm

Certified Concentrations:

Component	Concentration	Accuracy	Procedure
Sulfur Dioxide	45.49 ppm	+/- 1%	G1
Nitrogen	Balance		

Certification performed in accordance with "EPA Traceability Protocol (Sept. 1997)" using the assay procedures listed.

Do not use cylinder below 150 psig.

Edward Johnson
Approved for Release

For Technical Information Call
1-800-752-1597

AIR PRODUCTS

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS STANDARD

PERFORMED ACCORDING TO EPA TRACEABILITY PROTOCOL FOR ASSAY AND CERTIFICATION OF GASEOUS CALIBRATION STANDARDS (PROCEDURE #G1)

Order No: 854-055359-1

Batch No: 59019

Cylinder Number: SG-9169105
Bar Code No: DNK967
Cylinder pressure*: 2000
Certification Date: 11-8-99
Expiration Date: 11/8/01

CERTIFIED CONCENTRATION		REFERENCE STANDARDS			ANALYTICAL INSTRUMENTATION			
Component	Certified Concentration	Cylinder Number	Standard Type	Standard Concentration	Instrument Make/Model	Serial Number	Last Calibration	Measurement Principle
ic Oxide	473 ± 4 ppm	CLM-09974	SRM-1686b	481.6 ppm	Nicolet 550	ACN-9402192	10-18-99	FTIR
fur Dioxde	652 ± 5 ppm	SX-37584	NTRM-81675	1478 ppm	Nicolet 550	ACN-9402192	10-18-99	FTIR

ogen Balance Gas

2 (Reference value only): <2 ppm

*STANDARD SHOULD NOT BE USED BELOW 150 PSIG

es:

t: John J Hudy

John J Hudy

Approved By: John Peters

John Peters

For Technical Information Call
1-800-752-1597

AIR PRODUCTS

Air Products and Chemicals, Inc. • 12722 S. Wentworth Avenue, Chicago, IL 60628

ISO CERTIFICATION: 9002

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS STANDARD

PERFORMED ACCORDING TO EPA TRACEABILITY PROTOCOL FOR ASSAY AND CERTIFICATION OF GASEOUS CALIBRATION STANDARDS (PROCEDURE #G1)

Customer:
AIR PRODUCTS & CHEMICALS, INC.
5837 W. 5TH STREET
JACKSONVILLE FL 32254-1509

Order No: 854-054693-01
Batch No: 861-56854
PO:
Release:

Cylinder No: SG9148860BAL
Bar Code No: DRD479
Cylinder Pressure*: 2000 psig
Certification Date: 05/10/1999
Expiration Date: 05/10/2001

CERTIFIED CONCENTRATION		REFERENCE STANDARDS			ANALYTICAL INSTRUMENTATION			
Component	Certified Concentration	Cylinder Number	Standard Type	Standard Concentration	Instrument Make/Model	Serial Number	Last Calibration	Measurement Principal
NITRIC OXIDE	941±4 PPM	SG9150562BAL	NTRM 81687X	844.0 PPM	THERMO ENVIRO	52829293	04/21/99	CHEMILUMINESCENCE
SULFUR DIOXIDE	1120±21 PPM	SG9128413BAL	NTRM 81664	2502 PPM	BOVAR 721M PHO	8327-3	04/12/99	NON DISPERSIVE ULTRAVIOLET

NO2 (Reference Value Only): 1.00 PPM

NITROGEN Balance Gas

* STANDARD SHOULD NOT BE USED BELOW 150 PSIG

Analyst: James Laas

Approved By: Richard Fry

(16921)

Airgas
Specialty Gases

5480 Hamilton Blvd.
Theodore, AL 36582

P.O. Box 190969
Mobile, AL 36619

Phone: (334) 653-2500
FAX: (334) 653-2530

Certificate of Analysis: E.P.A. Protocol Gas Mixture

Cylinder No :	CC19573	Order No.	400220
Cylinder Pressure:	2000 PSIG	Expiration Date:	6/30/03
Certification Date	6/30/00	Laboratory:	ASG-MOBILE

Reference Standard Information:

Type	Component	Cyl. Number	Concentration
NTRM81681	CARBON MONOXIDE	CC67933	1005PPM

Instrumentation:

Instrument/Model/Serial No.	Analytical Principle
SIEMENS ULTRAMAT 5E J9-661	NDIR

Analytical Methodology does not require correction for analytical interferences.

Certified Concentrations:

Component	Concentration	Accuracy	Procedure
CARBON MONOXIDE	516.8 PPM	+/-1%	G1
NITROGEN	Balance		

Analytical Results:

1st Component: CARBON MONOXIDE

1st Analysis Date:		6/23/00					
R	1005	S	516.0	Z	0.000	Conc	516.0
S	517.0	Z	0.000	R	1005	Conc	517.0
Z	0.000	R	1005	S	517.0	Conc	517.0
						AVG:	516.7

2nd Analysis Date:		6/30/00					
R	1004	S	516.0	Z	0.000	Conc	516.5
S	517.0	Z	0.000	R	1005	Conc	517.0
Z	0.000	R	1005	S	517.0	Conc	517.0
						AVG:	516.8

Certification performed in accordance with "EPA Traceability Protocol (Sept. 1997)" using the assay procedures listed.

Do not use cylinder below 150 psig.

Bridget H. Richardson
Approved for Release

Airgas
Specialty Gases
5480 Hamilton Blvd.
Theodore, AL 36582
P.O. Box 190969
Mobile, AL 36619
Phone: (334) 653-2500
FAX: (334) 653-2530

Certificate of Analysis: E.P.A. Protocol Gas Mixture

Cylinder No :	CC19513	Order No.	400220
Cylinder Pressure:	2000 PSIG	Expiration Date:	6/30/03
Certification Date	6/30/00	Laboratory:	ASG-MOBILE

Reference Standard Information:

Type	Component	Cyl. Number	Concentration
NTRM81681	CARBON MONOXIDE	CC67933	1005PPM

Instrumentation:

Instrument/Model/Serial No.	Analytical Principle
SIEMENS ULTRAMAT 5E J9-661	NDIR

Analytical Methodology does not require correction for analytical interferences.

Certified Concentrations:

Component	Concentration	Accuracy	Procedure
CARBON MONOXIDE	309.1 PPM	+/-1%	G1
NITROGEN	Balance		

Analytical Results:

1st Component: CARBON MONOXIDE

1st Analysis Date:		6/23/00					
R	1005	S	309.0	Z	0.000	Conc	309.0
S	309.0	Z	0.000	R	1005	Conc	309.0
Z	0.000	R	1005	S	309.0	Conc	309.0
						AVG:	309.0

2nd Analysis Date:		6/30/00					
R	1004	S	309.0	Z	0.000	Conc	309.3
S	309.0	Z	0.000	R	1005	Conc	309.0
Z	0.000	R	1005	S	309.0	Conc	309.0
						AVG:	309.1

Certification performed in accordance with "EPA Traceability Protocol (Sept. 1997)" using the assay procedures listed.

Do not use cylinder below 150 psig.

Brigid H. Richardson
Approved for Release

Airgas
Specialty Gases

5480 Hamilton Blvd.
Theodore, AL 36582

P.O. Box 190969
Mobile, AL 36619

Phone: (334) 653-2500
FAX: (334) 653-2530

Certificate of Analysis: E.P.A. Protocol Gas Mixture

Cylinder No :	CC19585	Order No.	400220
Cylinder Pressure:	2000 PSIG	Expiration Date:	6/30/03
Certification Date	6/30/00	Laboratory:	ASG-MOBILE

Reference Standard Information:

Type	Component	Cyl. Number	Concentration
NTRM81681	CARBON MONOXIDE	CC67933	1005PPM

Instrumentation:

Instrument/Model/Serial No.	Analytical Principle
SIEMENS ULTRAMAT 5E J9-661	NDIR

Analytical Methodology does not require correction for analytical interferences.

Certified Concentrations:

Component	Concentration	Accuracy	Procedure
CARBON MONOXIDE	855.2 PPM	+/-1%	G1
NITROGEN	Balance		

Analytical Results:

1st Component: CARBON MONOXIDE

1st Analysis Date: 6/23/00

R	1005	S	855.0	Z	0.000	Conc	855.0
S	855.0	Z	0.000	R	1005	Conc	855.0
Z	0.000	R	1005	S	855.0	Conc	855.0
						AVG:	855.0

2nd Analysis Date: 6/30/00

R	1004	S	855.0	Z	0.000	Conc	855.9
S	855.0	Z	0.000	R	1005	Conc	855.0
Z	0.000	R	1005	S	855.0	Conc	855.0
						AVG:	855.3

Certification performed in accordance with "EPA Traceability Protocol (Sept. 1997)" using the assay procedures listed.

Do not use cylinder below 150 psig.

Approved for Release

PROJECT PARTICIPANTS

KOOGLER & ASSOCIATES

PROJECT PARTICIPANTS

John B. Koogler, Ph.D., P.E.	Project Advisor
Stephen S. Bell	Field Test Crew
Glen A. Haven	Field Test Crew

KOOGLER & ASSOCIATES
ENVIRONMENTAL SERVICES

PARTICULATE MATTER EMISSION MEASUREMENTS AND VISIBLE EMISSIONS OBSERVATIONS

CEMENT KILN/RAW MILL/CLINKER COOLER

CSR RINKER MATERIALS CORPORATION
MIAMI, FLORIDA

AIRS I.D. NO. 0250014
PERMIT NO. 0250014-002-AC

SEPTEMBER 29, 2000

KOOGLER & ASSOCIATES
ENVIRONMENTAL SERVICES
4014 NW THIRTEENTH STREET
GAINESVILLE, FLORIDA 32609
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PARTICULATE MATTER EMISSION MEASUREMENTS AND VISIBLE EMISSIONS OBSERVATIONS

CEMENT KILN/RAW MILL/CLINKER COOLER

CSR RINKER MATERIALS CORPORATION
MIAMI, FLORIDA

AIRS I.D. NO. 0250014
PERMIT NO. 0250014-002-AC

SEPTEMBER 29, 2000

KOOGLER & ASSOCIATES
ENVIRONMENTAL SERVICES
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KOOGLER & ASSOCIATES
ENVIRONMENTAL SERVICES

To the best of my knowledge, all applicable field and analytical procedures comply with the Florida Department of Environmental Protection requirements and all test data and plant operating data are true and correct.

John B. Koogler, Ph.D., P.E.

State of Florida
Registration No. 12925

12/1/00
Date

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1.0 INTRODUCTION

CSR Rinker Materials Corporation owns and operates a preheater/precalciner Portland cement plant located at 1200 N.W. 137th Avenue, Miami, Dade County, Florida. On September 29, 2000, Koogler & Associates Environmental Services of Gainesville, Florida, conducted particulate matter (PM/PM10) emission measurements and visible emissions observations on the kiln/raw mill/cooler in accordance with EPA Methods 5 and 9 (40 CFR 60, Appendix A). The purpose of the testing was to satisfy the emission limiting requirements of Permit No. 0250014-005-AC.

Prior to the test date, the Metropolitan Dade Environmental Resources Management (DERM) was notified of the test schedule and testing methods.

During the test period, the kiln was operating at an average preheater feed rate of 200.6 tons per hour. The PM/PM10 stack gas concentration averaged 0.0012 grains per dry standard cubic foot. The corresponding PM/PM10 emission rate averaged 2.03 pounds per hour. The permit limits the preheater feed rate to 220 tons per hour and the emission rate of PM/PM10 to 44 pounds per hour; or to 0.2 pounds per ton of preheater feed.

Visible emissions observations were conducted for a 3-hour period. During the observation periods, no visible emissions were observed. The permit limits the opacity of emissions from the kiln/raw mill/cooler to 10 percent.

Based upon the data presented herein, it can be concluded that during the period of testing on September 29, 2000, the kiln/raw mill/cooler were operating in compliance with the PM/PM10 emissions limiting standard and the visible emissions standard set forth in Permit No. 0250014-002-AC.

2.0 LOCATION OF SAMPLING PORTS

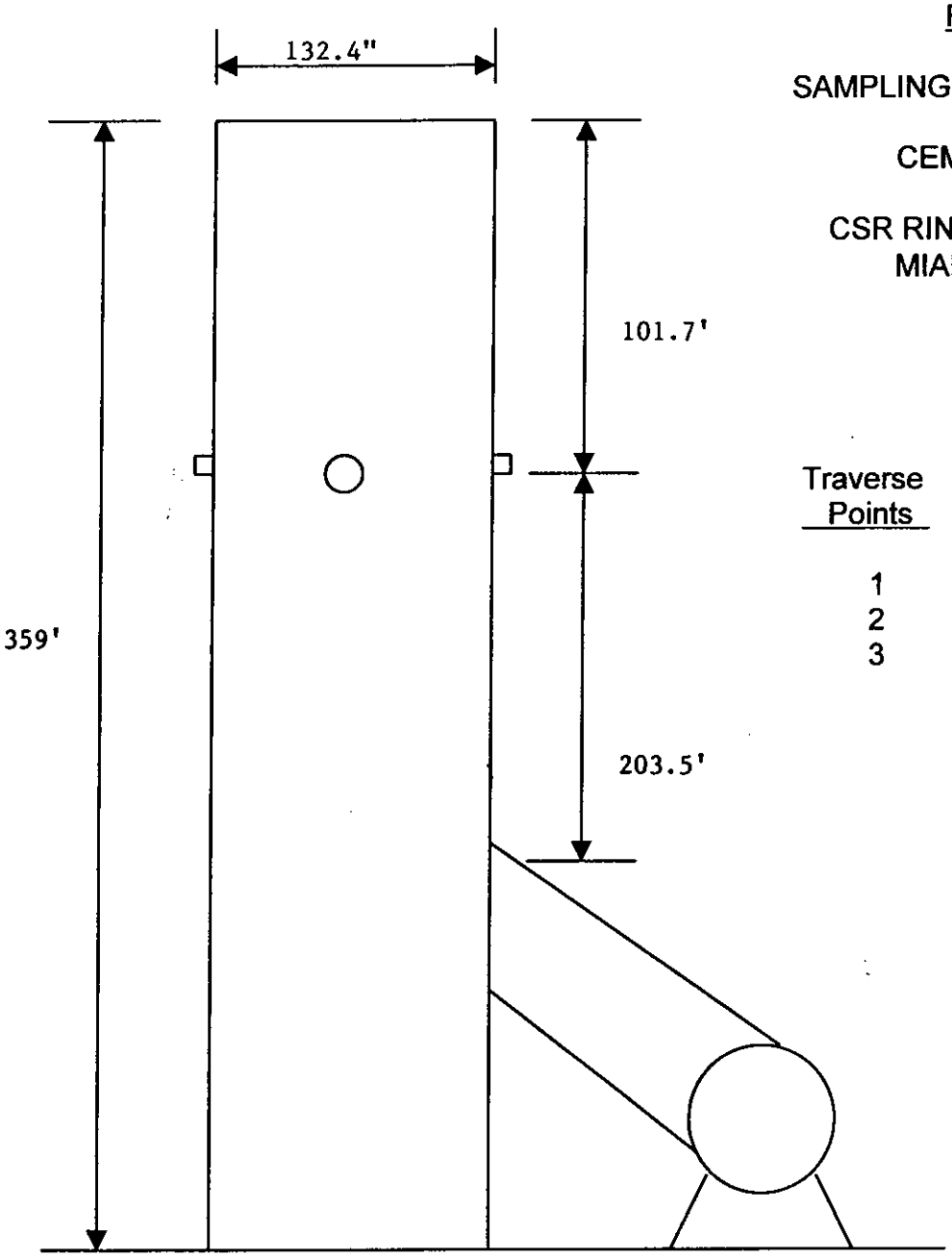
The locations of the sampling points are shown in Figure 1. Stack gas flow rate measurements and sample collection for PM/PM10 emission measurements were made through four sampling ports located 90 degrees to one another in the 136.5-inch diameter stack. The ports are located 203.5 feet (18.5 diameters) above the point where the stack gas enters the stack and 101.7 feet (9.3 diameters below the top of the stack. A total of 12 sampling points were used for the velocity and sampling traverses. The sampling points were located in accordance with criteria established by EPA Test Method 1 (40 CFR 60, Appendix A).

FIGURE 1

SAMPLING POINT LOCATIONS

CEMENT PLANT

CSR RINKER MATERIALS
MIAMI, FLORIDA



Traverse Points	Distance from Inside Stack Wall
1	6.01
2	19.9
3	40.4

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3.0 FIELD AND ANALYTICAL PROCEDURES

PM/PM10 emission measurements were made using EPA Method 5 as adopted by FDEP in Rule 62-297.401(5), F.A.C. All particulate matter collected by the test method was assumed to be PM10 particles. The heated filter holder was separated from the impingers with a flexible sample line as provided for in Rule 62.297.330(5), F.A.C. The sampling point locations for the EPA Method 5 test were established in accordance with EPA Method 1.

Stack gas velocity measurements and stack gas moisture measurements were made in conjunction with the EPA Method 5 tests in accordance with EPA Methods 2 and 4. Opacity observations were made in accordance with EPA Method 9. All EPA test methods are described in 40 CFR 60, Appendix A and have been adopted by reference by FDEP by Rule 62-297.401, F.A.C.

A schematic diagram of the sampling train used for the particulate matter emission measurement is shown in Figure 2.

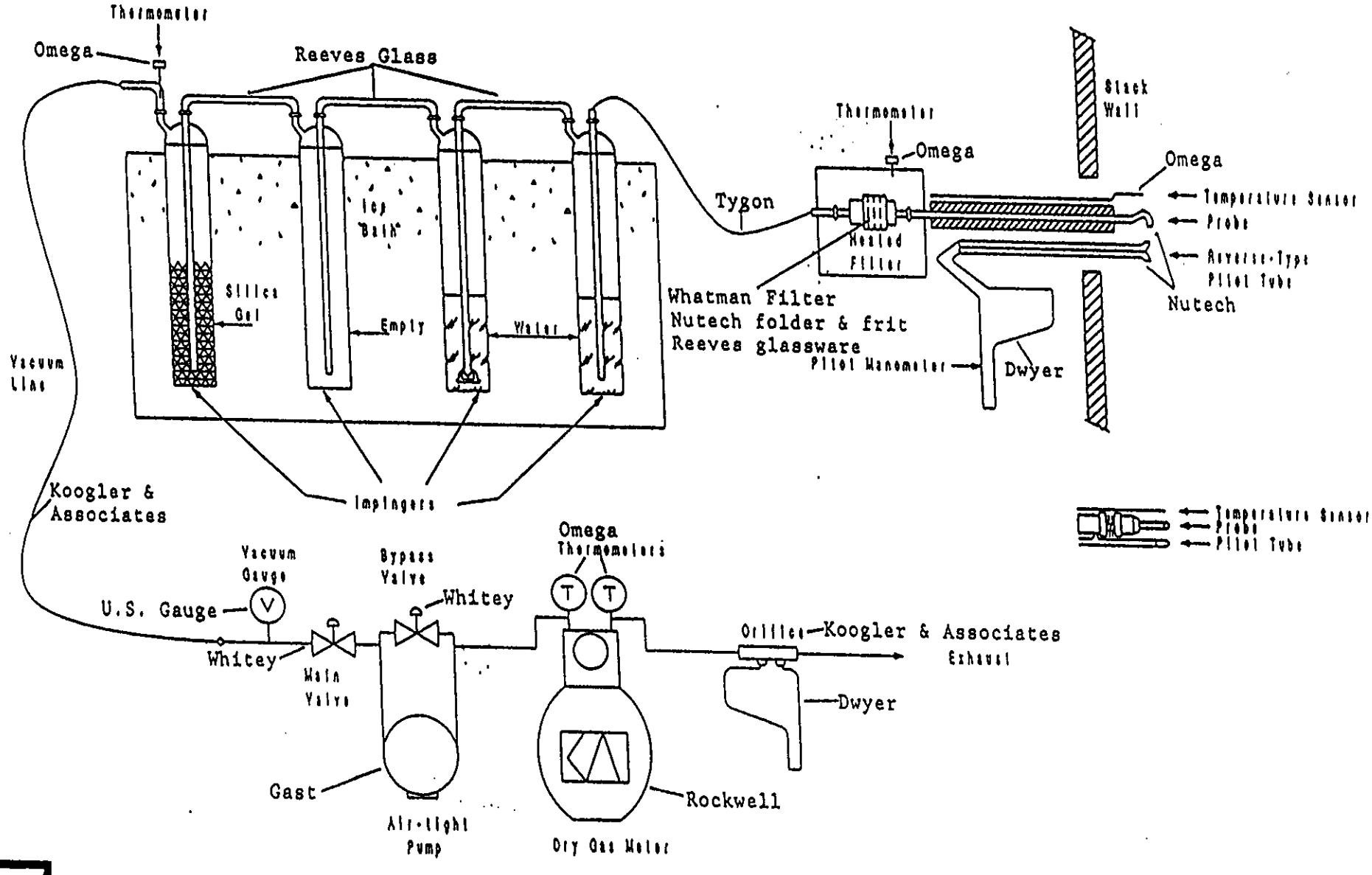

FIGURE 2

EPA METHOD 5 PARTICULATE MATTER SAMPLING TRAIN

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4.0 SUMMARY OF RESULTS

Results of the particulate matter emission measurements conducted on September 29, 2000, are summarized in Table 1. The PM/PM10 stack gas concentrations ranged from 0.0008 to 0.0020 grains per dry standard cubic foot and averaged 0.0012 grains per dry standard cubic foot. The corresponding PM/PM10 emission rate averaged 2.03 pounds per hour. The stack gas flow averaged 202,343 dscfm at a temperature of 291°F and a stack gas moisture of 12.1 percent.

Visible emissions observations were conducted for a 3-hour period. During the observation period, no visible emissions were observed. The permit limits the opacity of emissions from the kiln/raw mill/cooler to 10 percent.

Based upon the data presented herein, it can be concluded that during the period of testing on September 29, 2000, the kiln/raw mill/cooler were operating in compliance with the PM/PM10 emission limiting standard and the visible emissions standard set forth in Permit No. 0250014-002-AC.

Calculations, field and laboratory data sheets, plant information, equipment calibrations and a list of project participants are included in the Appendix of this report.

TABLE 1

SUMMARY OF SOURCE EMISSION TEST DATA

RINKER / MIAMI, FL.
CEMENT KILN
SEPT 29, 2000

Run No.	Process Weight Rate (Tons/hr)	Stack Gas Flow Rate (SCFMD)	Stack Gas Temperature (F)	Stack Gas Moisture (%)	Particulate Matter Conc. (gr/dscf)	Particulate Matter Emission Rate (Lbs/Hr)
1	200.6	188,560	249	14.7	0.0020	3.16
2	200.6	191,866	249	13.4	0.0008	1.30
3	200.6	226,605	376	8.2	0.0008	1.63
Average	200.6	202,343	291	12.1	0.0012	2.03

Allowable Particulate Matter Emission Rate = lbs/Hr

APPENDIX

CALCULATIONS
FIELD AND LABORATORY DATA SHEETS
PLANT INFORMATION
EQUIPMENT CALIBRATIONS
PROJECT PARTICIPANTS

CALCULATIONS

GENERAL DATA — DATA FILE NAME: PART9-29

Company	: RINKER / MIAMI, FL.				**********
Source/Unit	: CEMENT KILN				01:15 PM
Date	: SEPT 29, 2000	Cp	:	0.840	
Stack dia.	: 132.40 inch OR	Duct Length	:	0.00	inch
Oxygen Corr.	: 0.0 percent	Duct Width	:	0.00	inch
CO2 Corr.	: 0.0 percent	Std. Temp.	:	68	F

FUEL ANALYSIS DATA, (By F Factor or Fuel Use)

F Factor = F, Fuel Use = U	F	Process Wt.		
Hydrogen,wt% : 0.00	Run 1 :	200.6	Tons/hr	
Carbon, wt% : 0.00	Run 2 :	200.6		
Sulfur, wt% : 0.00	Run 3 :	200.6		
Nitrogen,wt% : 0.00				
Oxygen, wt% : 0.00				
Btu/lb : 0				

Type of Flow Meter : (1=Meter Box 2=Mass Flow Meter) 1

F-Factor : dscf/MMBtu;

FIELD DATA ------- METHOD 5	RUN 1	RUN 2	RUN 3
Meter Temp., Tm (F)	85	92	92
Stack Temp., Ts (F)	249	249	376
Sq.Rt. dP	0.80	0.80	0.98
dH (in. H2O)	1.54	1.52	2.01
Meter Vol.,Vm (ft3)	44.500	44.670	51.523
Meter Y	1.000	1.000	1.000
Bar. Press.,Pb (in.Hg.)	30.03	30.03	30.03
Vol. H2O, Vlc (ml)	159	142	94
Static Press.,Ps (in.H2O)	-0.90	-0.90	-0.90
Test Time (min.)	60.0	60.0	60.0
Nozzle Dia.,Dn (in.)	0.254	0.254	0.254
Oxygen, O2 (%)	14.0	13.5	15.5
Carbon Dioxide, CO2 (%)	15.5	14.2	12.5
Carbon Monoxide, CO (%)	0.0	0.0	0.0

Report Emission Criteria in ? 1 = lb/hr g = gr/dscf : L

Process Rate Units ? T = Ton/hr, L = Lbs/hr, C = Cans/min: T

Allowable Particulate Matter Emission Rate .....:

LABORATORY RESULTS	RUN 1	RUN 2	RUN 3	
GRAVIMETRIC ANALYSIS METHOD 5 :				
Front Half Wash (FHW)	0.00410	0.00210	0.00150	grams
Filterable Sample (MF)	0.00140	0.00010	0.00120	
Condensible Sample (BHW)	0.00000	0.00000	0.00000	

SOURCE TEST CALCULATIONS

PLANT : RINKER / MIAMI, FL.
CEMENT KILN

RUN NO.: 1
DATE : SEPT 29, 2000

STD.TEMP, Tstd	=	68 F	STATIC PRESS.,Ps	=	-0.90 in. H2O
METER TEMP, Tm	=	85 F	PITOT COFF., Cp	=	0.840
STACK TEMP, Ts	=	249.3 F	STACK I.D.	=	132.40 inch
AVG.VEL.HEAD,dP	=	0.637 in. H2O	DUCT LENGTH	=	inch
METER ORIFICE,dH=		1.54 in. H2O	DUCT WIDTH	=	inch
METER VOL., Vm	=	44.500 Cu.Ft.	STACK AREA, As	=	95.610 Sq.Ft.
METER COFF., Y	=	1.000	TEST TIME	=	60.00 min.
BAR. PRESS., Pb	=	30.03 in.Hg	NOZZLE DIA.	=	0.254 inch
COND.(Vlc)	=	159.0 ml	NOZZLE DIA., An	=	3.5E-04 Sq.Ft.

GAS ANALYSIS = 14.00 % O2 0.00 % CO
15.50 % CO2 70.50 % N2

****

Vm(std) = [(T(std) + 460) / 29.92] x Vm x Y x (Pb + (dH / 13.6)) / (Tm + 460).....	=	43.433	dscf
Vw(std) =(8.9148 x 10e-5) x (Tstd + 460) x Vlc	=	7.484	scf
Bws = Vw(std) / (Vm(std) + Vw(std)).....	=	0.147	Lower Bws value used.
Bws @ Saturated Conditions = Vapor Press. of H2O @ Dew Point Temp. / (Ps, in.Hg.)	=	1.000	
%EA =(%O2 - 0.5%CO)/(0.264%N2 - (%O2-0.5%CO)) x 100	=	303.56	
Md =(.44 x %CO2)+(.32 x %O2)+[.28 x (%N2 + %CO)]	=	31.04	
Ms = (Md x (1-Bws)) + (18.0 x Bws).....	=	29.12	
P(stack) = Pbar + (Ps / 13.6)	=	29.96	in. Hg
vs = 85.49 x CP x (Sq.Rt.dP) x [Sq.Rt.(Ts + 460) / (Ms x P(stack))]	=	51.69	ft/sec
Qs = vs x As x 60	=	296,499	acf/min
Qs(std) = Qs x (1-Bws)x((Tstd + 460)/(Ts + 460)) x (P(stack)/29.92)	=	188,560	dscf/min
I = (Ts+460) x [(0.002669 x Vlc) + (Vm(std) / (T(std) + 460) / 29.92] x 100 / [Time x P(stack) x An x vs x 60]	=	104.32	%

SOURCE TEST CALCULATIONS

PLANT : RINKER / MIAMI, FL.
CEMENT KILN

RUN NO.: 2
DATE : SEPT 29, 2000

STD.TEMP, Tstd	=	68 F	STATIC PRESS.,Ps	=	-0.90 in. H2O
METER TEMP, Tm	=	92.08 F	PITOT COFF., Cp	=	0.840
STACK TEMP, Ts	=	249.0 F	STACK I.D.	=	132.40 inch
AVG.VEL.HEAD,dP	=	0.640 in. H2O	DUCT LENGTH	=	inch
METER ORIFICE,dH	=	1.52 in. H2O	DUCT WIDTH	=	inch
METER VOL., Vm	=	44.670 Cu.Ft.	STACK AREA, As	=	95.610 Sq.Ft.
METER COFF., Y	=	1.000	TEST TIME	=	60.00 min.
BAR. PRESS., Pb	=	30.03 in.Hg	NOZZLE DIA.	=	0.254 inch
COND.(Vlc)	=	142.0 ml	NOZZLE DIA., An	=	3.5E-04 Sq.Ft.

GAS ANALYSIS = 13.50 % O2 0.00 % CO
14.20 % CO2 72.30 % N2

****

Vm(std) = [T(std) + 460 / 29.92] x Vm x Y x (Pb + (dH / 13.6)) / (Tm + 460).....	=	43.038	dscf
Vw(std) =(8.9148 x 10e-5) x (Tstd + 460) x Vlc	=	6.684	scf
Bws = Vw(std) / (Vm(std) + Vw(std)).....	=	0.134	Lower Bws value used.
Bws @ Saturated Conditions = Vapor Press. of H2O @ Dew Point Temp. / (Ps, in.Hg.)	=	1.000	
%EA =(%O2 - 0.5%CO)/(0.264%N2 - (%O2-0.5%CO)) x 100	=	241.62	
Md =(.44 x %CO2)+(.32 x %O2)+[.28 x (%N2 + %CO)]	=	30.81	
Ms = (Md x (1-Bws)) + (18.0 x Bws).....	=	29.09	
P(stack) = Pbar + (Ps / 13.6)	=	29.96	in. Hg
vs = 85.49 x CP x (Sq.Rt.dP) x [Sq.Rt.(Ts + 460) / (Ms x P(stack))]	=	51.81	ft/sec
Qs = vs x As x 60	=	297,215	acf/min
Qs(std) = Qs x (1-Bws)x((Tstd + 460)/(Ts + 460)) x (P(stack)/29.92)	=	191,866	dscf/min
I = (Ts+460) x [(0.002669 x Vlc) + (Vm(std) / (T(std) + 460) / 29.92] x 100 / [Time x P(stack) x An x vs x 60]	=	101.59	%

SOURCE TEST CALCULATIONS

PLANT : RINKER / MIAMI, FL.
CEMENT KILN

RUN NO.: 3
DATE : SEPT 29, 2000

STD.TEMP, Tstd	=	68 F	STATIC PRESS.,Ps	=	-0.90 in. H2O
METER TEMP, Tm	=	91.67 F	PITOT COFF., Cp	=	0.840
STACK TEMP, Ts	=	375.6 F	STACK I.D.	=	132.40 inch
AVG.VEL.HEAD,dP	=	0.951 in. H2O	DUCT LENGTH	=	inch
METER ORIFICE,dH	=	2.01 in. H2O	DUCT WIDTH	=	inch
METER VOL., Vm	=	51.523 Cu.Ft.	STACK AREA, As	=	95.610 Sq.Ft.
METER COFF., Y	=	1.000	TEST TIME	=	60.00 min.
BAR. PRESS., Pb	=	30.03 in.Hg	NOZZLE DIA.	=	0.254 inch
COND.(Vlc)	=	94.0 ml	NOZZLE DIA., An	=	3.5E-04 Sq.Ft.

GAS ANALYSIS = 15.50 % O2 0.00 % CO
12.50 % CO2 72.00 % N2

****

Vm(std) = [T(std) + 460 / 29.92] x Vm x Y x (Pb + (dH / 13.6)) / (Tm + 460).....	=	49.737	dscf
Vw(std) =(8.9148 x 10e-5) x (Tstd + 460) x Vlc	=	4.425	scf
Bws = Vw(std) / (Vm(std) + Vw(std)).....	=	0.082	Lower Bws value used.
Bws @ Saturated Conditions = Vapor Press. of H2O @ Dew Point Temp. / (Ps, in.Hg.)	=	1.000	
%EA =(%O2 - 0.5%CO)/(0.264%N2 - (%O2-0.5%CO)) x 100	=	441.85	
Md =(.44 x %CO2)+(.32 x %O2)+[.28 x (%N2 + %CO)]	=	30.62	
Ms = (Md x (1-Bws)) + (18.0 x Bws).....	=	29.59	
P(stack) = Pbar + (Ps / 13.6)	=	29.96	in. Hg
vs = 85.49 x CP x (Sq.Rt.dP) x [Sq.Rt.(Ts + 460) / (Ms x P(stack))]	=	67.97	ft/sec
Qs = vs x As x 60	=	389,943	acf/min
Qs(std) = Qs x (1-Bws)x((Tstd + 460)/(Ts + 460)) x (P(stack)/29.92)	=	226,605	dscf/min
I = (Ts+460) x [(0.002669 x Vlc) + (Vm(std) / (T(std) + 460) / 29.92] x 100 / [Time x P(stack) x An x vs x 60]	=	99.40	%

A. FIELD DATA SUMMARY

PLANT : RINKER / MIAMI, FL.
CEMENT KILN
DATE : SEPT 29, 2000

	RUN 1	RUN 2	RUN 3
Vlc = Vol water collected in train, ml	159.0	142.0	94.0
Vm = Sample gas vol, meter cond., acf	44.500	44.670	51.523
Y = Meter calibration factor	1.0000	1.0000	1.0000
Pbar = Barometric pressure, in. Hg	30.03	30.03	30.03
Pstatic = Stack static pressure, in. H2O	-0.90	-0.90	-0.90
dH = Avg meter pressure diff, in. H2O	1.54	1.52	2.01
Tm = Absolute meter temp., degrees R	545.0	552.1	551.7
Vm(std) = Sample gas vol, Std. cond., dscf	43.433	43.038	49.737
Bws = Water vapor in gas stream, fraction	0.147	0.134	0.082
MF = Moisture factor (1 - Bws)	0.853	0.866	0.918
CO2 = Carbon Dioxide, dry, volume %	15.50	14.20	12.50
O2 = Oxygen, dry, volume %	14.00	13.50	15.50
N2 = Nitrogen, dry volume %	70.50	72.30	72.00
Md = Molecular weight of stack gas, dry	31.04	30.81	30.62
Ms = Molecular weight of stack gas, wet	29.12	29.09	29.59
Cp = Pitot tube coefficient	0.84	0.84	0.84
Sq.Rt. dP = Avg. square root of each dP	0.7983	0.8000	0.9750
Ts = Absolute stack temp., degrees R	709.3	709.0	835.6
A = Area of stack, ft2	95.61	95.61	95.61
Qstd = Volumetric flowrate, dscfm	188,560	191,866	226,605
An = Nozzle area, ft2	3.52E-04	3.52E-04	3.52E-04
0 = Sample time, minutes	60.00	60.00	60.00
%I = Isokinetic variation, percent	104.32	101.59	99.40

B. PARTICULATE DATA SUMMARY

PLANT : RINKER / MIAMI, FL.
CEMENT KILN
DATE : SEPT 29, 2000

	RUN 1	RUN 2	RUN 3
Sample Weight (FHW + MF + BHW), mg	5.50	2.20	2.70
Meter Volume, standard cond., Vm(std)	43.433	43.038	49.737
Carbon Dioxide, percent	15.50	14.20	12.50
Oxygen, percent	14.00	13.50	15.50
Sample Concentration :			
gr/scf	0.0017	0.0007	0.0008
gr/dscf	0.0020	0.0008	0.0008
gr/dscf @ 0 % CO2	0.0015	0.0007	0.0008
gr/dscf @ 0 % O2	0.0059	0.0022	0.0032
ppm * MW (dry gas).....	107.5	43.4	46.1
ppm * MW @ 0% CO2	0.0	0.0	0.0
ppm * MW @ 0% O2	325.6	122.5	178.3

EMISSION RATE CALCULATIONS

PLANT :RINKER / MIAMI, FL.
CEMENT KILN

RUN NO.: 1
STANDARD TEMP. : 68 F DATE : SEPT 29, 2000

Front Half Wash (FHW)	0.00410 grams	Vm(std)	43.433 ft3
Mass Filter (MF)	0.00140 grams	Vw(std)	7.484 ft3
Back Half Wash (BHW)	0.00000 grams	Qs(std)	188,560 dscfm
Vm(std) SO2	dscf	Bws	0.147
CO2 CORR 0.0 %		CO2	15.50 %
O2 CORR. 0.0 %		O2	14.00 %

F-FACTOR

10E6 x [3.64(%H) + 1.53(%C) + 0.57(%S) + 0.14(%N) - 0.46(%O2)] / (Btu/lb) x [(Tstd + 460)/528] ..... dscf/MMBtu

FUEL USE

Use Rate (gal/ton) * Process Wt. (ton/hr) ..... gal/hr

Heat Input = (Process Weight (ton/hr) x Heating .... MMBtu/hr
Value (Btu/gal) x Fuel Use Rate (gal/ton) / 1E6

TOTAL PARTICULATE

15.432 x (FHW + MF + BHW) / [(Vm(std) + Vw(std)] ...	0.0017	gr/scf
15.432 x (FHW + MF + BHW) / (Vm(std)	0.0020	gr/dscf
gr/dscf x (12 / %CO2)	0.0015	@ 0% CO2
gr/dscf x [(20.9 - Oxygen corr.) / (20.9 - %O2)] ...	0.0059	@ 0% O2
0.00857 x Qs(std) x gr/dscf	3.16	lb/hr
F-Fac x 1.4286E-4 x [20.9 / (20.9-%O2)] x gr/dscf ..		lb/MMBtu
Particulate (lb/hr) / Heat Input (MMBtu/hr)		lb/MMBtu

TOTAL ACID MIST

[1.0811E-4 x (Vt - Vtb) x N x Vsol] / Vol(aloq)	lb Acid Mist
[Acid Mist (lb) / Vm std (ft^3)] x Qs std x 60 ...	lb/hr
[Acid Mist (lb) / Vm std (ft^3)] x F-Factor	lb/MMBtu

SULFUR DIOXIDE (SO2)

[7.061E-5 x (Vt - Vtb) x N x Vsol] / Vol(aloq)	lb SO2
[SO2 (lb) / Vm std (ft^3)] x Qs std (ft^3/min) x 60	lb/hr
[SO2 (lb) / Vm std (ft^3)] x F	lb/MMBtu
[Mass SO2 (lb) x 385 / 64E+6 (ft^3/lb)] / Vm (std)	ppm
ppm x 0.0 % Corr. / 15.5 % CO2 in Stack	ppm @ 0% CO2
ppm x (20.9% - 0.0% O2 Corr)/(20.9% - 14.0% O2 Stack	ppm @ 0% O2
SO2 (lb/hr / Heat Input)	lb/MMBtu

HYDROGEN CHLORIDE DATA SUMMARY

[Mass HCl(mg) x 385 x 1E6] / [453600 x 36.5 x Vm(std	ppm
ppm x 0.0 % Corr. / 15.5 % CO2 in Stack	ppm @ 0% CO2
ppm x (20.9% - 0.0% O2 Corr)/(20.9% - 15.5% O2 Stack	ppm @ 0% O2
[Mass HCl(mg) x 60 x Qs / (Vm(std) x 453,600)]...	lb/hr

EMISSION RATE CALCULATIONS

PLANT :RINKER / MIAMI, FL.
CEMENT KILN

RUN NO.: 2
STANDARD TEMP. : 68 F DATE : SEPT 29, 2000

Front Half Wash (FHW)	0.00210 grams	Vm(std)	43.038 ft3
Mass Filter (MF)	0.00010 grams	Vw(std)	6.684 ft3
Back Half Wash (BHW)	0.00000 grams	Qs(std)	191,866 dscfm
Vm(std) SO2	dscf	Bws	0.134
CO2 CORR 0.0 %		CO2	14.20 %
O2 CORR. 0.0 %		O2	13.50 %

F-FACTOR

10E6 x [3.64(%H) + 1.53(%C) + 0.57(%S) + 0.14(%N) - 0.46(%O2)] / (Btu/lb) x [(Tstd + 460)/528] ..... dscf/MMBtu

FUEL USE

Use Rate (gal/ton) * Process Wt. (ton/hr) ..... gal/hr
Heat Input = (Process Weight (ton/hr) x Heating .... MMBtu/hr
Value (Btu/gal) x Fuel Use Rate (gal/ton) / 1E6

TOTAL PARTICULATE

15.432 x (FHW + MF + BHW) / [(Vm(std) + Vw(std)] ...	0.0007	gr/scf
15.432 x (FHW + MF + BHW) / (Vm(std)	0.0008	gr/dscf
gr/dscf x (12 / %CO2)	0.0007	@ 0% CO2
gr/dscf x [(20.9 - Oxygen corr.) / (20.9 - %O2)] ...	0.0022	@ 0% O2
0.00857 x Qs(std) x gr/dscf	1.30	lb/hr
F-Fac x 1.4286E-4 x [20.9 / (20.9-%O2)] x gr/dscf ..		lb/MMBtu
Particulate (lb/hr) / Heat Input (MMBtu/hr)		lb/MMBtu

TOTAL ACID MIST

[1.0811E-4 x (Vt - Vtb) x N x Vsol] / Vol(aloq)	lb Acid Mist
[Acid Mist (lb) / Vm std (ft^3)] x Qs std x 60 ...	lb/hr
[Acid Mist (lb) / Vm std (ft^3)] x F-Factor	lb/MMBtu

SULFUR DIOXIDE (SO2)

[7.061E-5 x (Vt - Vtb) x N x Vsol] / Vol(aloq) .	lb SO2
[SO2 (lb) / Vm std (ft^3)] x Qs std (ft^3/min) x 60	lb/hr
[SO2 (lb) / Vm std (ft^3)] x F	lb/MMBtu
[Mass SO2 (lb) x 385 / 64E+6 (ft^3/lb)] / Vm (std)	ppm
ppm x 0.0 % Corr. / 15.5 % CO2 in Stack	ppm @ 0% CO2
ppm x (20.9% - 0.0% O2 Corr)/(20.9% - 15.5% O2 Stack	ppm @ 0% O2
SO2 (lb/hr / Heat Input)	lb/MMBtu

HYDROGEN CHLORIDE DATA SUMMARY

[Mass HCl(mg) x 385 x 1E6] / [453600 x 36.5 x Vm(std	ppm
ppm x 0.0 % Corr. / 14.2 % CO2 in Stack	ppm @ 0% CO2
ppm x (20.9% - 0.0% O2 Corr)/(20.9% - 14.2% O2 Stack	ppm @ 0% O2
[Mass HCl(mg) x 60 x Qs / (Vm(std) x 453,600)]...	lb/hr

EMISSION RATE CALCULATIONS

PLANT :RINKER / MIAMI, FL.
CEMENT KILN

RUN NO.: 3
STANDARD TEMP. : 68 F DATE : SEPT 29, 2000

Front Half Wash (FHW)	0.00150 grams	Vm(std)	49.737 ft3
Mass Filter (MF)	0.00120 grams	Vw(std)	4.425 ft3
Back Half Wash (BHW)	0.00000 grams	Qs(std)	226,605 dscfm
Vm(std) SO2	dscf	Bws	0.082
CO2 CORR 0.0 %		CO2	12.50 %
O2 CORR. 0.0 %		O2	15.50 %

F-FACTOR

10E6 x [3.64(%H) + 1.53(%C) + 0.57(%S) + 0.14(%N) - 0.46(%O2)] / (Btu/lb) x [(Tstd + 460)/528] ..... dscf/MMBtu

FUEL USE

Use Rate (gal/ton) * Process Wt. (ton/hr) ..... gal/hr
Heat Input = (Process Weight (ton/hr) x Heating .... MMBtu/hr
Value (Btu/gal) x Fuel Use Rate (gal/ton) / 1E6

TOTAL PARTICULATE

15.432 x (FHW + MF + BHW) / [(Vm(std) + Vw(std)] ...	0.0008	gr/scf
15.432 x (FHW + MF + BHW) / (Vm(std)	0.0008	gr/dscf
gr/dscf x (12 / %CO2)	0.0008	@ 0% CO2
gr/dscf x [(20.9 - Oxygen corr.) / (20.9 - %O2)] ...	0.0032	@ 0% O2
0.00857 x Qs(std) x gr/dscf	1.63	lb/hr
F-Fac x 1.4286E-4 x [20.9 / (20.9-%O2)] x gr/dscf ..		lb/MMBtu
Particulate (lb/hr) / Heat Input (MMBtu/hr)		lb/MMBtu

TOTAL ACID MIST

[1.0811E-4 x (Vt - Vtb) x N x Vsol] / Vol(aloq)	lb Acid Mist
[Acid Mist (lb) / Vm std (ft^3)] x Qs std x 60 ...	lb/hr
[Acid Mist (lb) / Vm std (ft^3)] x F-Factor	lb/MMBtu

SULFUR DIOXIDE (SO2)

[7.061E-5 x (Vt - Vtb) x N x Vsol] / Vol(aloq) .	lb SO2
[SO2 (lb) / Vm std (ft^3)] x Qs std (ft^3/min) x 60	lb/hr
[SO2 (lb) / Vm std (ft^3)] x F	lb/MMBtu
[Mass SO2 (lb) x 385 / 64E+6 (ft^3/lb)] / Vm (std)	ppm
ppm x 0.0 % Corr. / 15.5 % CO2 in Stack	ppm @ 0% CO2
ppm x (20.9% - 0.0% O2 Corr)/(20.9% - 15.5% O2 Stack	ppm @ 0% O2
SO2 (lb/hr / Heat Input)	lb/MMBtu

HYDROGEN CHLORIDE DATA SUMMARY

[Mass HCl(mg) x 385 x 1E6] / [453600 x 36.5 x Vm(std	ppm
ppm x 0.0 % Corr. / 12.5 % CO2 in Stack	ppm @ 0% CO2
ppm x (20.9% - 0.0% O2 Corr)/(20.9% - 12.5% O2 Stack	ppm @ 0% O2
[Mass HCl(mg) x 60 x Qs / (Vm(std) x 453,600)]...	lb/hr

KOOGLER AND ASSOCIATES, ENVIRONMENTAL SERVICES
SUMMARY OF VISIBLE EMISSIONS
FOR 60-MINUTES

PLANT : RINKER / MIAMI, FL.
SOURCE: CEMENT KILN
DATE : SEPT. 29, 2000
TIME : 08:23 TO 09:23

	SECONDS /	0	15	30	45
		OPACITY (%)			
MINUTES /	1	0	0	0	0
	2	0	0	0	0
	3	0	0	0	0
	4	0	0	0	0
	5	0	0	0	0
	6	0	0	0	0
	7	0	0	0	0
	8	0	0	0	0
	9	0	0	0	0
	10	0	0	0	0
	11	0	0	0	0
	12	0	0	0	0
	13	0	0	0	0
	14	0	0	0	0
	15	0	0	0	0
	16	0	0	0	0
	17	0	0	0	0
	18	0	0	0	0
	19	0	0	0	0
	20	0	0	0	0
	21	0	0	0	0
	22	0	0	0	0
	23	0	0	0	0
	24	0	0	0	0
	25	0	0	0	0
	26	0	0	0	0
	27	0	0	0	0
	28	0	0	0	0
	29	0	0	0	0
	30	0	0	0	0

KOOGLER AND ASSOCIATES, ENVIRONMENTAL SERVICES
SUMMARY OF VISIBLE EMISSIONS
FOR 60-MINUTES

PLANT : RINKER / MIAMI, FL.
SOURCE: CEMENT KILN
DATE : SEPT. 29, 2000
TIME : 08:23 TO 09:23

SECONDS /	0	15	30	45
		OPACITY (%)		
31	0	0	0	0
32	0	0	0	0
33	0	0	0	0
34	0	0	0	0
35	0	0	0	0
36	0	0	0	0
37	0	0	0	0
38	0	0	0	0
39	0	0	0	0
40	0	0	0	0
41	0	0	0	0
42	0	0	0	0
43	0	0	0	0
44	0	0	0	0
45	0	0	0	0
46	0	0	0	0
47	0	0	0	0
48	0	0	0	0
49	0	0	0	0
50	0	0	0	0
51	0	0	0	0
52	0	0	0	0
53	0	0	0	0
54	0	0	0	0
55	0	0	0	0
56	0	0	0	0
57	0	0	0	0
58	0	0	0	0
59	0	0	0	0
60	0	0	0	0

AVERAGE OPACITY: 0.0 %

MAXIMUM OPACITY: 0 %

KOOGLER AND ASSOCIATES, ENVIRONMENTAL SERVICES
SIX-MINUTE AVERAGES OF VISIBLE EMISSIONS
FOR 60-MINUTES

PLANT : RINKER / MIAMI, FL.
SOURCE: CEMENT KILN
DATE : SEPT. 29, 2000
TIME : 08:23 TO 09:23

MINUTES	--- SIX-MINUTE ROLLING AVERAGES --- OPACITY (%)			
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-
5	-	-	-	-
6	-	-	-	0.0
7	0.0	0.0	0.0	0.0
8	0.0	0.0	0.0	0.0
9	0.0	0.0	0.0	0.0
10	0.0	0.0	0.0	0.0
11	0.0	0.0	0.0	0.0
12	0.0	0.0	0.0	0.0
13	0.0	0.0	0.0	0.0
14	0.0	0.0	0.0	0.0
15	0.0	0.0	0.0	0.0
16	0.0	0.0	0.0	0.0
17	0.0	0.0	0.0	0.0
18	0.0	0.0	0.0	0.0
19	0.0	0.0	0.0	0.0
20	0.0	0.0	0.0	0.0
21	0.0	0.0	0.0	0.0
22	0.0	0.0	0.0	0.0
23	0.0	0.0	0.0	0.0
24	0.0	0.0	0.0	0.0
25	0.0	0.0	0.0	0.0
26	0.0	0.0	0.0	0.0
27	0.0	0.0	0.0	0.0
28	0.0	0.0	0.0	0.0
29	0.0	0.0	0.0	0.0
30	0.0	0.0	0.0	0.0

KOOGLER AND ASSOCIATES, ENVIRONMENTAL SERVICES
SIX-MINUTE AVERAGES OF VISIBLE EMISSIONS
FOR 60-MINUTES

PLANT : RINKER / MIAMI, FL.
SOURCE: CEMENT KILN
DATE : SEPT. 29, 2000
TIME : 08:23 TO 09:23

MINUTES	--- SIX-MINUTE ROLLING AVERAGES --- OPACITY (%)			
31	0.0	0.0	0.0	0.0
32	0.0	0.0	0.0	0.0
33	0.0	0.0	0.0	0.0
34	0.0	0.0	0.0	0.0
35	0.0	0.0	0.0	0.0
36	0.0	0.0	0.0	0.0
37	0.0	0.0	0.0	0.0
38	0.0	0.0	0.0	0.0
39	0.0	0.0	0.0	0.0
40	0.0	0.0	0.0	0.0
41	0.0	0.0	0.0	0.0
42	0.0	0.0	0.0	0.0
43	0.0	0.0	0.0	0.0
44	0.0	0.0	0.0	0.0
45	0.0	0.0	0.0	0.0
46	0.0	0.0	0.0	0.0
47	0.0	0.0	0.0	0.0
48	0.0	0.0	0.0	0.0
49	0.0	0.0	0.0	0.0
50	0.0	0.0	0.0	0.0
51	0.0	0.0	0.0	0.0
52	0.0	0.0	0.0	0.0
53	0.0	0.0	0.0	0.0
54	0.0	0.0	0.0	0.0
55	0.0	0.0	0.0	0.0
56	0.0	0.0	0.0	0.0
57	0.0	0.0	0.0	0.0
58	0.0	0.0	0.0	0.0
59	0.0	0.0	0.0	0.0
60	0.0	0.0	0.0	0.0

HIGHEST SIX-MINUTE ROLLING AVERAGE: 0.0 %

KOOGLER AND ASSOCIATES, ENVIRONMENTAL SERVICES
SUMMARY OF VISIBLE EMISSIONS
FOR 60-MINUTES

PLANT : RINKER / MIAMI, FL.
SOURCE: CEMENT KILN
DATE : SEPT. 29, 2000
TIME : 09:55 TO 10:55

MINUTES / SECONDS	0	15	30	45
	OPACITY (%)			
1	0	0	0	0
2	0	0	0	0
3	0	0	0	0
4	0	0	0	0
5	0	0	0	0
6	0	0	0	0
7	0	0	0	0
8	0	0	0	0
9	0	0	0	0
10	0	0	0	0
11	0	0	0	0
12	0	0	0	0
13	0	0	0	0
14	0	0	0	0
15	0	0	0	0
16	0	0	0	0
17	0	0	0	0
18	0	0	0	0
19	0	0	0	0
20	0	0	0	0
21	0	0	0	0
22	0	0	0	0
23	0	0	0	0
24	0	0	0	0
25	0	0	0	0
26	0	0	0	0
27	0	0	0	0
28	0	0	0	0
29	0	0	0	0
30	0	0	0	0

KOOGLER AND ASSOCIATES, ENVIRONMENTAL SERVICES
SUMMARY OF VISIBLE EMISSIONS
FOR 60-MINUTES

PLANT : RINKER / MIAMI, FL.
SOURCE: CEMENT KILN
DATE : SEPT. 29, 2000
TIME : 09:55 TO 10:55

SECONDS /	0	15	30	45
		OPACITY (%)		
31	0	0	0	0
32	0	0	0	0
33	0	0	0	0
34	0	0	0	0
35	0	0	0	0
36	0	0	0	0
37	0	0	0	0
38	0	0	0	0
39	0	0	0	0
40	0	0	0	0
41	0	0	0	0
42	0	0	0	0
43	0	0	0	0
44	0	0	0	0
45	0	0	0	0
46	0	0	0	0
47	0	0	0	0
48	0	0	0	0
49	0	0	0	0
50	0	0	0	0
51	0	0	0	0
52	0	0	0	0
53	0	0	0	0
54	0	0	0	0
55	0	0	0	0
56	0	0	0	0
57	0	0	0	0
58	0	0	0	0
59	0	0	0	0
60	0	0	0	0

AVERAGE OPACITY: 0.0 %

MAXIMUM OPACITY: 0 %

KOOGLER AND ASSOCIATES, ENVIRONMENTAL SERVICES
SIX-MINUTE AVERAGES OF VISIBLE EMISSIONS
FOR 60-MINUTES

PLANT : RINKER / MIAMI, FL.
SOURCE: CEMENT KILN
DATE : SEPT. 29, 2000
TIME : 09:55 TO 10:55

MINUTES	--- SIX-MINUTE ROLLING AVERAGES --- OPACITY (%)			
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-
5	-	-	-	-
6	-	-	-	0.0
7	0.0	0.0	0.0	0.0
8	0.0	0.0	0.0	0.0
9	0.0	0.0	0.0	0.0
10	0.0	0.0	0.0	0.0
11	0.0	0.0	0.0	0.0
12	0.0	0.0	0.0	0.0
13	0.0	0.0	0.0	0.0
14	0.0	0.0	0.0	0.0
15	0.0	0.0	0.0	0.0
16	0.0	0.0	0.0	0.0
17	0.0	0.0	0.0	0.0
18	0.0	0.0	0.0	0.0
19	0.0	0.0	0.0	0.0
20	0.0	0.0	0.0	0.0
21	0.0	0.0	0.0	0.0
22	0.0	0.0	0.0	0.0
23	0.0	0.0	0.0	0.0
24	0.0	0.0	0.0	0.0
25	0.0	0.0	0.0	0.0
26	0.0	0.0	0.0	0.0
27	0.0	0.0	0.0	0.0
28	0.0	0.0	0.0	0.0
29	0.0	0.0	0.0	0.0
30	0.0	0.0	0.0	0.0

KOOGLER AND ASSOCIATES, ENVIRONMENTAL SERVICES
SIX-MINUTE AVERAGES OF VISIBLE EMISSIONS
FOR 60-MINUTES

PLANT : RINKER / MIAMI, FL.
SOURCE: CEMENT KILN
DATE : SEPT. 29, 2000
TIME : 09:55 TO 10:55

MINUTES	--- SIX-MINUTE ROLLING AVERAGES --- OPACITY (%)			
31	0.0	0.0	0.0	0.0
32	0.0	0.0	0.0	0.0
33	0.0	0.0	0.0	0.0
34	0.0	0.0	0.0	0.0
35	0.0	0.0	0.0	0.0
36	0.0	0.0	0.0	0.0
37	0.0	0.0	0.0	0.0
38	0.0	0.0	0.0	0.0
39	0.0	0.0	0.0	0.0
40	0.0	0.0	0.0	0.0
41	0.0	0.0	0.0	0.0
42	0.0	0.0	0.0	0.0
43	0.0	0.0	0.0	0.0
44	0.0	0.0	0.0	0.0
45	0.0	0.0	0.0	0.0
46	0.0	0.0	0.0	0.0
47	0.0	0.0	0.0	0.0
48	0.0	0.0	0.0	0.0
49	0.0	0.0	0.0	0.0
50	0.0	0.0	0.0	0.0
51	0.0	0.0	0.0	0.0
52	0.0	0.0	0.0	0.0
53	0.0	0.0	0.0	0.0
54	0.0	0.0	0.0	0.0
55	0.0	0.0	0.0	0.0
56	0.0	0.0	0.0	0.0
57	0.0	0.0	0.0	0.0
58	0.0	0.0	0.0	0.0
59	0.0	0.0	0.0	0.0
60	0.0	0.0	0.0	0.0

HIGHEST SIX-MINUTE ROLLING AVERAGE: 0.0 %

KOOGLER AND ASSOCIATES, ENVIRONMENTAL SERVICES
SUMMARY OF VISIBLE EMISSIONS
FOR 60-MINUTES

PLANT : RINKER / MIAMI, FL.
SOURCE: CEMENT KILN
DATE : SEPT. 29, 2000
TIME : 11:26 TO 12:26

MINUTES / SECONDS	0	15	30	45
	OPACITY (%)			
1	0	0	0	0
2	0	0	0	0
3	0	0	0	0
4	0	0	0	0
5	0	0	0	0
6	0	0	0	0
7	0	0	0	0
8	0	0	0	0
9	0	0	0	0
10	0	0	0	0
11	0	0	0	0
12	0	0	0	0
13	0	0	0	0
14	0	0	0	0
15	0	0	0	0
16	0	0	0	0
17	0	0	0	0
18	0	0	0	0
19	0	0	0	0
20	0	0	0	0
21	0	0	0	0
22	0	0	0	0
23	0	0	0	0
24	0	0	0	0
25	0	0	0	0
26	0	0	0	0
27	0	0	0	0
28	0	0	0	0
29	0	0	0	0
30	0	0	0	0

KOOGLER AND ASSOCIATES, ENVIRONMENTAL SERVICES
SUMMARY OF VISIBLE EMISSIONS
FOR 60-MINUTES

PLANT : RINKER / MIAMI, FL.
SOURCE: CEMENT KILN
DATE : SEPT. 29, 2000
TIME : 11:26 TO 12:26

SECONDS /	0	15	30	45
		OPACITY (%)		
31	0	0	0	0
32	0	0	0	0
33	0	0	0	0
34	0	0	0	0
35	0	0	0	0
36	0	0	0	0
37	0	0	0	0
38	0	0	0	0
39	0	0	0	0
40	0	0	0	0
41	0	0	0	0
42	0	0	0	0
43	0	0	0	0
44	0	0	0	0
45	0	0	0	0
46	0	0	0	0
47	0	0	0	0
48	0	0	0	0
49	0	0	0	0
50	0	0	0	0
51	0	0	0	0
52	0	0	0	0
53	0	0	0	0
54	0	0	0	0
55	0	0	0	0
56	0	0	0	0
57	0	0	0	0
58	0	0	0	0
59	0	0	0	0
60	0	0	0	0

AVERAGE OPACITY: 0.0 %

MAXIMUM OPACITY: 0 %

KOOGLER AND ASSOCIATES, ENVIRONMENTAL SERVICES
SIX-MINUTE AVERAGES OF VISIBLE EMISSIONS
FOR 60-MINUTES

PLANT : RINKER / MIAMI, FL.
SOURCE: CEMENT KILN
DATE : SEPT. 29, 2000
TIME : 11:26 TO 12:26

MINUTES	--- SIX-MINUTE ROLLING AVERAGES --- OPACITY (%)			
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-
5	-	-	-	-
6	-	-	-	0.0
7	0.0	0.0	0.0	0.0
8	0.0	0.0	0.0	0.0
9	0.0	0.0	0.0	0.0
10	0.0	0.0	0.0	0.0
11	0.0	0.0	0.0	0.0
12	0.0	0.0	0.0	0.0
13	0.0	0.0	0.0	0.0
14	0.0	0.0	0.0	0.0
15	0.0	0.0	0.0	0.0
16	0.0	0.0	0.0	0.0
17	0.0	0.0	0.0	0.0
18	0.0	0.0	0.0	0.0
19	0.0	0.0	0.0	0.0
20	0.0	0.0	0.0	0.0
21	0.0	0.0	0.0	0.0
22	0.0	0.0	0.0	0.0
23	0.0	0.0	0.0	0.0
24	0.0	0.0	0.0	0.0
25	0.0	0.0	0.0	0.0
26	0.0	0.0	0.0	0.0
27	0.0	0.0	0.0	0.0
28	0.0	0.0	0.0	0.0
29	0.0	0.0	0.0	0.0
30	0.0	0.0	0.0	0.0

KOOGLER AND ASSOCIATES, ENVIRONMENTAL SERVICES
SIX-MINUTE AVERAGES OF VISIBLE EMISSIONS
FOR 60-MINUTES

PLANT : RINKER / MIAMI, FL.
SOURCE: CEMENT KILN
DATE : SEPT. 29, 2000
TIME : 11:26 TO 12:26

MINUTES	--- SIX-MINUTE ROLLING AVERAGES --- OPACITY (%)			
31	0.0	0.0	0.0	0.0
32	0.0	0.0	0.0	0.0
33	0.0	0.0	0.0	0.0
34	0.0	0.0	0.0	0.0
35	0.0	0.0	0.0	0.0
36	0.0	0.0	0.0	0.0
37	0.0	0.0	0.0	0.0
38	0.0	0.0	0.0	0.0
39	0.0	0.0	0.0	0.0
40	0.0	0.0	0.0	0.0
41	0.0	0.0	0.0	0.0
42	0.0	0.0	0.0	0.0
43	0.0	0.0	0.0	0.0
44	0.0	0.0	0.0	0.0
45	0.0	0.0	0.0	0.0
46	0.0	0.0	0.0	0.0
47	0.0	0.0	0.0	0.0
48	0.0	0.0	0.0	0.0
49	0.0	0.0	0.0	0.0
50	0.0	0.0	0.0	0.0
51	0.0	0.0	0.0	0.0
52	0.0	0.0	0.0	0.0
53	0.0	0.0	0.0	0.0
54	0.0	0.0	0.0	0.0
55	0.0	0.0	0.0	0.0
56	0.0	0.0	0.0	0.0
57	0.0	0.0	0.0	0.0
58	0.0	0.0	0.0	0.0
59	0.0	0.0	0.0	0.0
60	0.0	0.0	0.0	0.0

HIGHEST SIX-MINUTE ROLLING AVERAGE: 0.0 %

VISIBLE EMISSIONS EVALUATOR

This is to certify that

Glen Haven

met the specifications of Federal Reference Method 9 and qualified as a visible emissions evaluator. Maximum deviation on white and black smoke did not exceed 7.5% opacity and no single error exceeding 15% opacity was incurred during the certification test conducted by Eastern Technical Associates of Raleigh, North Carolina. This certificate is valid for six months from date of issue.

278546	*Jacksonville, Florida*	*June 7, 2000*
Certificate Number	Location	Date of Issue

President

Director of Training

FIELD AND LABORATORY DATA SHEETS

KOGGLER & ASSOCIATES
ENVIRONMENTAL SERVICES

Plant: Rinker - Miami
Sample Loc.: Cement Kiln
Control Type: Baghouse
Sample Type: Part
Date: 9-29-00 Run No.: 1
Time Start: 0823 Time End: 0928
Sample Time: 5 min/port 60 total min.
Dry Bulb: °F Wet Bulb: °F VP @ DP:
Bar. Pressure 30.03 "Hg Stack Press.: 29.96 "Hg Ps: -0.9 "H2O
Moisture: 12 % FDA: Gas Density Factor:
Temperature: 78 °F Wind Dir.: E Wind Speed: 2-4
Weather: Cloudy Thermocouple Readout: KA-2
Sample Box #: KA-2 Meter Box No.: KA-2
Meter Y: 1.000 @ Delta H: 1.52 Pitot Corr.: 0.84
Nozzle Diameter: 0.254 in. Probe Length: 6 ft
Probe Heater Setting: 2 Nomograph Cf: 2.4
Stack Dimensions : ~~136.5~~ 132.4 in
Stack Area: ~~100.6~~ 95.61 ft²
Effective Stack Area: ~~100.6~~ 95.61 ft²
Stack Height: ft

Stack Dimensions
Umbilical: 100'
Thermocouple
Probe No.: KA-38
Pitot Tube: KA-SSII

Material Processing Rate:
Final Gas Meter Reading: 1042.700 ft³
Initial Gas Meter Reading: 998.200 ft³
Total Metered Gas Volume: 44.500 ft³
Condensate Gain in Impingers: 150 mL
Weight Gain in Silica Gel: 9 g
Total Moisture Gain: 159 mL
Silica Gel Container No.: 39
Filter Number: 2610

Leak Check – Meter Box
Initial: 0.000 cfm @ 15 in. H2O
Final: 0.000 cfm @ 5 in. H2O
Leak Check – Pitot Tubes
Impact 3 "H2O for 15 sec: (Stable) Leak
Static 3 "H2O for 15 sec: (Stable) Leak

KOOGLER & ASSOCIATES

Test Conducted By: R Paul - L Bell
A Haven
Stack Test Observers: O2 % - 14.0
CO2 % - 15.5

Port and Traverse Point No.	Distance from Inside Stack Wall (in.)	Clock Time	Gas Meter Reading (ft³)	Stack Velocity Head ("H2O)	Meter Orifice Pressure Difference ("H2O) Calculated	Meter Orifice Pressure Difference ("H2O) Actual	Stack Gas Temperature (°F)	Sample Box Temperature (°F)	Last Impinger Temperature (°F)	Meter Temperature (°F)	Vacuum on Sample Train ("Hg)	Oxygen Meter Reading (% O2)
AVERAGE												
1-1	6.01		98.2	0.71	1.7	1.7	248	230	67	78	3	
2	19.9		1002.2	0.66	1.58	1.58	253	242	47	79	3	
3	40.4		5.8	0.52	1.25	1.25	248	253	47	80	3	
2-1			9.2	0.80	1.92	1.92	254	262	50	82	4	
2			13.4	0.66	1.58	1.58	253	245	48	84	3	
3			17.1	0.53	1.27	1.27	248	252	49	85	3	
3-1			20.5	0.76	1.82	1.82	251	260	52	87	4	
2			24.6	0.68	1.63	1.63	250	252	49	88	4	

Port and Traverse Point No.	Distance from Inside Stack Wall (in.)	Clock Time	Gas Meter Reading (ft^3)	Stack Velocity Head ("H2O)	Meter Orifice Pressure Difference ("H2O)		Stack Gas Temperature (°F)	Sample Box Temperature (°F)	Last Impinger Temperature (°F)	Meter Temperature (°F)	Vacuum on Sample Train ("Hg)	Oxygen Meter Reading (% O2)
					Calculated	Actual						
3-3			28.3	0.53	1.27	1.27	246	239	49	88	3	
4-1			31.7	0.69	1.66	1.66	249	242	53	90	3	
2			35.5	0.64	1.54	1.54	247	251	49	89	3	
3			39.3	0.51	1.22	1.22	244	248	50	90	3	

Plant: Rinker - Miami
Sample Loc.: Cement Kiln
Control Type: Baghouse
Sample Type: Dust
Date: 9-29-00 Run No.: 2
Time Start: 0955 Time End: 1100
Sample Time: 5 min/port 60 total min.
Dry Bulb: °F Wet Bulb: °F VP @ DP:
Bar. Pressure 30.03 "Hg Stack Press.: 29.96 "Hg Ps: -0.90 H20
Moisture: 14 % FDA: Gas Density Factor:
Temperature: 84 °F Wind Dir.: E Wind Speed: 5-10
Weather: Cloudy Thermocouple Readout: KA-2
Sample Box #: KA2 Meter Box No.: KA2
Meter Y: 1.000 @ Delta H: 1.52 Pitot Corr.: 0.84
Nozzle Diameter: 0.254 in. Probe Length: 6 ft
Probe Heater Setting: 2 Nomograph Cf: 2.36
Stack Dimensions : ~~136.5~~ 132.4 in
Stack Area: ~~101.6~~ 95.61 ft²
Effective Stack Area: ~~101.6~~ 95.61 ft²
Stack Height: ft

Stack Dimensions

Umbilical: 100'
Thermocouple
Probe No.: KA-38
Pitot Tube: KASS II

Material Processing Rate:
Final Gas Meter Reading: 87.670 ft³
Initial Gas Meter Reading: 43.000 ft³
Total Metered Gas Volume: 44.670 ft³
Condensate Gain in Impingers: 135 mL
Weight Gain in Silica Gel: 7 g
Total Moisture Gain: 142 mL
Silica Gel Container No.: 4
Filter Number: 2611

Leak Check – Meter Box
Initial: 0.000 cfm @ 15 in. H2O
Final: 0.001 cfm @ 6 in. H2O
Leak Check – Pitot Tubes
Impact 3 "H2O for 15 sec: (Stable,) Leak
Static 3 "H2O for 15 sec: (Stable,) Leak

KOOGLER & ASSOCIATES

Test Conducted By: R Paul - A Bell
New Haven
Stack Test Observers: O2 % - 13.5
CO2 % - 14.2

Port and Traverse Point No.	Distance from Inside Stack Wall (in.)	Clock Time	Gas Meter Reading (ft³)	Stack Velocity Head ("H2O)	Meter Orifice Pressure Difference ("H2O) Calculated	Meter Orifice Pressure Difference ("H2O) Actual	Stack Gas Temperature (°F)	Sample Box Temperature (°F)	Last Impinger Temperature (°F)	Meter Temperature (°F)	Vacuum on Sample Train ("Hg)	Oxygen Meter Reading (% O2)
AVERAGE												
1-1			43.0	0.68	1.6	1.6	243	233	67	89	4	
2			46.8	0.65	1.53	1.53	244	239	56	89	4	
3			50.5	0.51	1.2	1.2	242	248	47	90	3	
2-1			53.8	0.73	1.72	1.72	243	255	50	91	4	
2			57.8	0.64	1.51	1.51	246	260	48	92	4	
3			61.6	0.53	1.25	1.25	242	257	48	92	4	
3-1			65.0	0.69	1.63	1.63	246	266	50	93	4	
2			68.8	0.62	1.46	1.46	246	269	49	93	4	

Port and Traverse Point No.	Distance from Inside Stack Wall (in.)	Clock Time	Gas Meter Reading (ft³)	Stack Velocity Head ("H2O)	Meter Orifice Pressure Difference ("H2O)		Stack Gas Temperature (°F)	Sample Box Temperature (°F)	Last Impinger Temperature (°F)	Meter Temperature (°F)	Vacuum on Sample Train ("Hg)	Oxygen Meter Reading (% O2)
					Calculated	Actual						
3-3			72.5	0.55	1.3	1.3	241	266	51	94	4	
4-1			75.9	0.64	1.51	1.51	244	262	53	94	4	
2			79.6	0.81	1.91	1.91	249	252	51	94	5	
3			83.9	0.66	1.56	1.56	302	241	50	94	4	

Plant: Rinker - Miami
Sample Loc.: Cement Kiln
Control Type: Baghouse
Sample Type: Dust
Date: 9-29-00 Run No.: 3
Time Start: 1127 Time End: 1231
Sample Time: 5 min/port 60 total min.
Dry Bulb: °F Wet Bulb: °F VP @ DP:
Bar. Pressure 30.03 "Hg Stack Press.: 29.96 "Hg Ps: 0.90 "H2O
Moisture: 13 % FDA: Gas Density Factor:
Temperature: 85 °F Wind Dir.: E Wind Speed: 5-10
Weather: Rain Thermocouple Readout: KA-2
Sample Box #: KA-2 Meter Box No.: KA-2
Meter Y: 1.000 @ Delta H: 1.52 Pitot Corr.: 0.84
Nozzle Diameter: 0.254 in. Probe Length: 6 ft
Probe Heater Setting: 2 Nomograph Cf: 2.1
Stack Dimensions: ~~1 for 5~~ 132.4 in
Stack Area: ~~total~~ 95.61 ft²
Effective Stack Area: ~~total~~ 95.61 ft²
Stack Height: ft

Stack Dimensions

Umbilical: 100'
Thermocouple
Probe No.: KA-38
Pitot Tube: KA-5 II

Material Processing Rate:
Final Gas Meter Reading: 139.523 ft³
Initial Gas Meter Reading: 88.000 ft³
Total Metered Gas Volume: 51.523 ft³
Condensate Gain in Impingers: 85 mL
Weight Gain in Silica Gel: 9 g
Total Moisture Gain: 94 mL
Silica Gel Container No.: 10
Filter Number: 2612

Leak Check – Meter Box
Initial: 0.002 cfm @ 15 In. H2O
Final: 0.003 cfm @ 6 In. H2O
Leak Check – Pitot Tubes
Impact 3 "H2O for 15 sec: (Stable) Leak
Static 3 "H2O for 15 sec: (Stable) Leak

KOOGLER & ASSOCIATES

Test Conducted By: R Paul - A Bell
A Haven
Stack Test Observers: O2 % - 15.5
CO2 % - 12.5

Port and Traverse Point No.	Distance from Inside Stack Wall (in.)	Clock Time	Gas Meter Reading (ft³)	Stack Velocity Head ("H2O)	Meter Orifice Pressure Difference ("H2O) Calculated	Meter Orifice Pressure Difference ("H2O) Actual	Stack Gas Temperature (°F)	Sample Box Temperature (°F)	Last Impinger Temperature (°F)	Meter Temperature (°F)	Vacuum on Sample Train ("Hg)	Oxygen Meter Reading (% O2)
AVERAGE												
1-1			88.0	1.2	2.52	2.52	367	271	59	91	5	
2			92.8	0.94	1.97	1.97	366	236	47	90	5	
3			97.0	0.69	1.45	1.45	360	245	49	91	4	
2-1			100.7	1.1	2.31	2.31	379	271	52	92	5	
2			5.4	1.0	2.1	2.1	378	252	47	91	5	
3			9.8	0.81	1.7	1.7	375	235	47	93	4	
3-1			13.8	1.1	2.31	2.31	379	254	48	92	5	
2			18.4	0.95	2.0	2.0	380	240	49	92	5	

Port and Traverse Point No.	Distance from Inside Stack Wall (in.)	Clock Time	Gas Meter Reading (ft^3)	Stack Velocity Head ("H2O)	Meter Orifice Pressure Difference ("H2O)		Stack Gas Temperature (°F)	Sample Box Temperature (°F)	Last Impinger Temperature (°F)	Meter Temperature (°F)	Vacuum on Sample Train ("Hg)	Oxygen Meter Reading (% O2)
					Calculated	Actual						
3-1			22.6	0.85	1.79	1.79	375	230	51	92	5	
4-1			26.6	1.1	2.31	2.31	386	241	53	93	5	
2			31.2	0.98	2.06	2.06	386	231	49	92	5	
3			35.6	0.76	1.6	1.6	376	241	49	92	4	

SAMPLING RATE CALCULATIONS

Date 9-29-00

Plant Name Rinker

Location Miami

Source Cement Kiln

ΔH = Orifice Reading (Inches H_2O)
Dn = Nozzle Diameter (Inches)
ΔH@ = Meter Box Constant
Bw = Moisture Fraction
Tm = Meter Temperature (°F)
Ts = Stack Temperature (°F)
Ms = Wet Molecular Weight of Stack Gas (From Table)
ΔP = Pitot Reading (Inches H_2O)

TS-250

$$\left[\frac{Tm + 460}{Ms(Ts+460)} (1 - Bw)^2 \; \Delta H@ \; (Dn)^4 \; 17741\right] \; \Delta P = \Delta H$$

0.68
0.64
0.50

Moisture Fraction	Ms
0.0	29.0
0.05	28.5
0.10	27.9
0.15	27.4
0.20	26.8
0.25	26.2
0.30	25.7
0.35	25.2
0.40	24.6

543 / ~~760~~ 27.7 (710) 19667

554 / 27.5 (710) 19525

553 / 27.6 (810) 22356

	Run 1	Run 2	Run 3
$\frac{Tm + 460}{Ms\ (Ts + 460)}$ =	0.02761	0.02838	0.02476
× $(1 - Bw)^2$ =	0.7744	0.7396	0.7569
× ΔH@ =	1.52	1.52	
× $(Dn)^4$ =	0.00416	0.00416	
× 17741 =	17741	17741	
× ΔP =	2.4	2.36	2.1
	576.57		

KOOGLER & ASSOCIATES

CHAIN OF CUSTODY RECORD

Project Number 263-00-09

Project Name Rinker

Sample Location Miami, FL
Cement Kiln

Sample Identification	Remarks
1-RCM-P	Probe Wash Run 1
2-RCM-P	〃 〃 〃 2
3-RCM-P	〃 〃 〃 3
I	Filter Holder Run 1
II	〃 〃 〃 2
III	〃 〃 〃 3
39	Silica Gel Run 1
4	〃 〃 〃 2
10	〃 〃 〃 3

Sampled By: (Signature) R Paul Date: 9-29-00 Time: See data

Relinquished By: (Sign) _____ Date: _____ Time: _____

Received By: (Sign) _____ Date: _____ Time: _____

Relinquished By: (Sign) _____ Date: _____ Time: _____

Received By: (Sign) _____ Date: _____ Time: _____

Relinquished By: (Sign) _____ Date: _____ Time: _____

Received By Lab: (Sign) R Paul Date: 9-29-00 Time: 2050

Sample Shipped VIA: _____ UPS _____ Fed Express _____ Bus

Shipping Bill Number: _____

KOOGLER & ASSOCIATES

KOOGLER & ASSOCIATES
ENVIRONMENTAL SERVICES
4014 NW THIRTEENTH STREET
GAINESVILLE, FLORIDA 32609
904/377-5822 • FAX 377-7158

PARTICULATE LAB DATA SHEET

TEST DATE 9-29-00
PLANT NAME Reinbeu
SOURCE Cement Kiln

	Run 1	Run 2	Run 3	Blank
Container No.	102	KA18	51	801
Total Volume (ml)	125	125	125	150
Aliquot Evaporated (ml)	125	125	125	150
Final Weight (g)	115.9845	100.9090	115.8714	100.5159
Tare Weight (g)	115.9804	100.9069	115.8699	100.5153
Gross Weight Gained (g)	RP ~~115.9845~~ 0.0041	0.0021	0.0015	0.0006
Average Blank (g)				
Net Weight (g)	0.0041	0.0021	0.0015	
Aliquot Factor	x 1.0	x 1.0	x 1.0	x
Total Net Weight (mg)	4.1	2.1	1.5	
Container No.	1-1H	2-1H	3-1H	BL-2
Filter No.	2610	2611	2612	2563
Final Weight (g)	0.4177	0.4161	0.4176	0.4149
Tare Weight (g)	0.4163	0.4160	0.4164	0.4150
Gross Weight Gained (g)	0.0014	0.0001	0.0012	-0.0001
Average Blank (g)				
Total Net Weight (mg)	1.4	0.1	1.2	

Tare Balance Check

0.0	✓	10.0	✓
1.0	✓	50.0	✓
5.0	✓	100.0	✓

T/H 77-44

By R Paul
Date 10-1-00

Final Balance Check

0.0	✓	10.0	✓
1.0	✓	50.0	✓
5.0	✓	100.0	✓

T/H 75-44

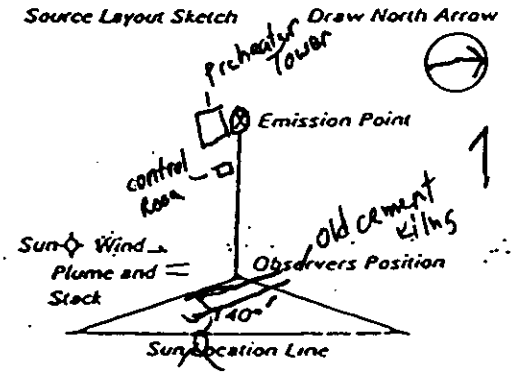
By R Paul
Date 10-2-00

ENVIRONMENTAL SERVICES
4011 NW THIRTEENTH STREET
GAINESVILLE, FLORIDA 32609
904/377-5822 - FAX 377-7158

CONTINUED ON VEO FORM NUMBER 1 of 3

SOURCE NAME	CSR Rinker Materials
ADDRESS	Dade County
CITY	Miami
STATE	FL
ZIP	
PHONE	
SOURCE ID NUMBER	
PROCESS EQUIPMENT	Cement Kiln
OPERATING MODE	200 TPH
CONTROL EQUIPMENT	Baghouse
OPERATING MODE	
DESCRIBE EMISSION POINT	START Large silver Stack STOP north of preheater/SAME
HEIGHT ABOVE GROUND LEVEL	START ≃325' STOP ≃325'
HEIGHT RELATIVE TO OBSERVER	START ≃325' STOP ≃325'
DISTANCE FROM OBSERVER	START 800' STOP 800'
DIRECTION FROM OBSERVER	START 276° W STOP 276° W
DESCRIBE EMISSIONS	START clear/none STOP same
EMISSION COLOR	START none STOP none
PLUME TYPE: CONTINUOUS ☒	FUGITIVE ☐ INTERMITTENT ☐
WATER DROPLETS PRESENT:	NO ☒ YES ☐
IF WATER DROPLET PLUME:	ATTACHED ☐ DETACHED ☐
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED	START Stack outlet STOP same
DESCRIBE BACKGROUND	START SKY STOP SKY
BACKGROUND COLOR	START Blue STOP Blue
SKY CONDITIONS	START Broken Scatt. STOP Scatt
WIND SPEED	START 1-4 STOP 1-4
WIND DIRECTION	START East STOP East
AMBIENT TEMP.	START 77 STOP 81
WET BULB TEMP.	75
RH percent	91%

Source Layout Sketch — Draw North Arrow



1 - main office

OBSERVATION DATE	START TIME	STOP TIME
9/29/00	08:23	09:23

SEC / MIN	0	15	30	45	SEC / MIN	0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

AVERAGE OPACITY FOR HIGHEST PERIOD	0 %
NUMBER OF READINGS ABOVE	10 % WERE 0
RANGE OF OPACITY READINGS	0 % MINIMUM — 0 % MAXIMUM
OBSERVER'S NAME (PRINT)	Glen A. Haven
OBSERVER'S SIGNATURE	Glen A. Haven
DATE	9/29/00
ORGANIZATION	K+A
CERTIFIED BY	ETA
DATE	6/00
VERIFIED BY	
DATE	

COMMENTS: VE test concurrent with particulate
Run #1 - ATS: 18°

I HAVE RECEIVED A COPY OF THESE OPACITY OBSERVATIONS
SIGNATURE
TITLE
DATE

ENVIRONMENTAL SERVICES
4011 NW THIRTEENTH STREET
GAINESVILLE, FLORIDA 32609
904/377-5822 - FAX 377-7158

CONTINUED ON VEO FORM NUMBER 2 of 3

SOURCE NAME CSR Rinker

ADDRESS

CITY Miami | STATE FL | ZIP

PHONE | SOURCE ID NUMBER

PROCESS EQUIPMENT Cement Kiln | OPERATING MODE 200 TPH

CONTROL EQUIPMENT Baghouse | OPERATING MODE

DESCRIBE EMISSION POINT START Round Silver Stack STOP North of preheater/SAME

HEIGHT ABOVE GROUND LEVEL START ≈325 STOP ≈325 | HEIGHT RELATIVE TO OBSERVER START 325' STOP 325'

DISTANCE FROM OBSERVER START ≈800' STOP ≈800' | DIRECTION FROM OBSERVER START 280° W STOP 280° W

DESCRIBE EMISSIONS START Clear/none STOP SAme

EMISSION COLOR START none STOP none | PLUME TYPE: CONTINUOUS ☒ FUGITIVE ☐ INTERMITTENT ☐

WATER DROPLETS PRESENT: NO ☒ YES ☐ | IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐

POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED START Stack outlet STOP SAme

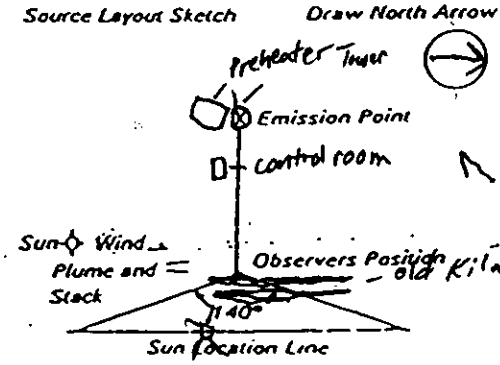
DESCRIBE BACKGROUND START SKY STOP SKY

BACKGROUND COLOR START Blue STOP Grey | SKY CONDITIONS START Scatt. STOP Broken

WIND SPEED START 1-5 STOP 1-5 | WIND DIRECTION START NE STOP East

AMBIENT TEMP. START 82 STOP 84 | WET BULB TEMP. 77 | RH percent 80%

Source Layout Sketch — Draw North Arrow



OBSERVATION DATE 9/29/00 | START TIME 09:55 | STOP TIME 10:55

MIN	SEC 0	15	30	45	MIN	SEC 0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

AVERAGE OPACITY FOR HIGHEST PERIOD 0 % | NUMBER OF READINGS ABOVE 10 % WERE 0

RANGE OF OPACITY READINGS 0 MINIMUM 0 MAXIMUM

OBSERVER'S NAME (PRINT) Gary A. Haven

OBSERVER'S SIGNATURE Gary A. Haven | DATE 9/29/00

ORGANIZATION K+A

CERTIFIED BY ETA | DATE 6/00

VERIFIED BY | DATE

COMMENTS Test concurrent w/PM test #2

ATS 18°

I HAVE RECEIVED A COPY OF THESE OPACITY OBSERVATIONS
SIGNATURE

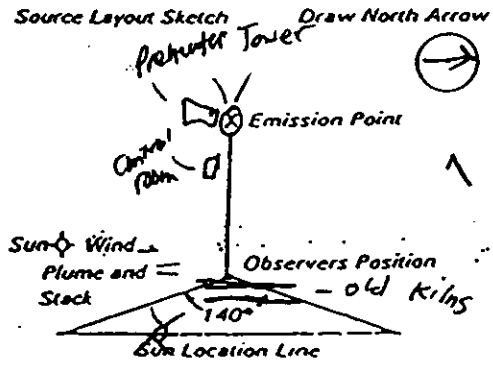
TITLE | DATE

ENVIRONMENTAL SERVICES
4011 NW THIRTEENTH STREET
GAINESVILLE, FLORIDA 32609
904/377-5822 - FAX 377-7158
KOGGER & ASSOCIATES

CONTINUED ON VEO FORM NUMBER 3 of 3

SOURCE NAME: CSR Rinker
ADDRESS:
CITY: Miami | STATE: FL | ZIP:
PHONE: | SOURCE ID NUMBER:
PROCESS EQUIPMENT: Cement Kiln | OPERATING MODE: 200 TPH
CONTROL EQUIPMENT: Baghouse | OPERATING MODE:
DESCRIBE EMISSION POINT: START Round silver Stack north of Preheater / STOP Same
HEIGHT ABOVE GROUND LEVEL: START ≥325' STOP ≥325' | HEIGHT RELATIVE TO OBSERVER: START ≥325' STOP ≥325'
DISTANCE FROM OBSERVER: START ≥800' STOP ≥800' | DIRECTION FROM OBSERVER: START 280°W STOP 280°W
DESCRIBE EMISSIONS: START Clear / none STOP Same
EMISSION COLOR: START none STOP none | PLUME TYPE: CONTINUOUS ☒ FUGITIVE ☐ INTERMITTENT ☐
WATER DROPLETS PRESENT: NO ☒ YES ☐ | IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED: START Stack outlet STOP Same
DESCRIBE BACKGROUND: START Sky STOP Sky
BACKGROUND COLOR: START Grey STOP | SKY CONDITIONS: START 0/overcast STOP
WIND SPEED: START 3-5 STOP | WIND DIRECTION: START East STOP
AMBIENT TEMP: START 80 STOP | WET BULB TEMP: 76 | RH percent: 84

Source Layout Sketch — Draw North Arrow



OBSERVATION DATE: 9/29/00 | START TIME: 11:26 | STOP TIME: 12:26

MIN \ SEC	0	15	30	45	MIN \ SEC	0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

AVERAGE OPACITY FOR HIGHEST PERIOD: 0 %
NUMBER OF READINGS ABOVE: 10 % WERE 0
RANGE OF OPACITY READINGS: 0 % MINIMUM 0 % MAXIMUM
OBSERVER'S NAME (PRINT): Glen A. Haven
OBSERVER'S SIGNATURE: Glen A. Haven | DATE: 9/29/00
ORGANIZATION: K+A
CERTIFIED BY: ETA | DATE: 6/00
VERIFIED BY: | DATE:

COMMENTS: VE Test Concurrent with PM run #3
AIS 18°

I HAVE RECEIVED A COPY OF THESE OPACITY OBSERVATIONS
SIGNATURE
TITLE | DATE

PLANT INFORMATION

KOOGLER & ASSOCIATES
ENVIRONMENTAL SERVICES

9/29/00 8am-1pm 1002 tons total (482,100 tons − 481,098 tons on the totalizer)
200.6 tons per hour

Kiln Log

AAS HWT AVG		kiln run time	kiln feed flow rate	kiln feed totalizer	precalciner run time	pulv. coal to kiln	oil to kiln	pulv. coal to calciner	Burning zone temperature	Cyclone 4 cone pressure	PRH Diverter gate position%	Id fan inlet temp	cyclone 1 meal temperature	cyclone 1 exit temp	cyclone 1 exit pressure	cyclone 2 meal temperature	cyclone 2 exit temp	cyclone 2 exit pressure	cyclone 2 cone pressure	cyclone 3 exit temp	cyclone 3 meal temperature	cyclone 3 exit pressure	cyclone 3 cone pressure	cyclone 4 exit temperature	cyclone 4 meal temperature to riser
[illegible]	[illegible]	1031.2	200.0	480,407	2,781	0.04	3.07	0.73	2130	-12.17	40	535	707	701	-25.07	1059	1,058	-18.85	#N/A	1,207	1,145	-15.30	-15.05	1,400	1,294
[illegible]	[illegible]	1032.2	200.0	480,607	2,782	0.55	0.06	1.85	2182	-11.82	40	601	701	701	-25.10	1054	1,061	-18.00	#N/A	1,204	1,144	-14.98	-15.57	1,400	1,283
[illegible]	[illegible]	1033.2	200.0	480,800	2,783	0.46	0.01	0.03	2182	-11.84	40	582	702	701	-25.19	1053	1,061	-17.67	#N/A	1,204	1,143	-14.90	-15.57	1,400	1,263
[illegible]	[illegible]	1034.2	200.0	481,080	2,784	0.64	0.00	0.21	2181	-11.63	40	582	703	700	-26.10	1058	1,063	-17.63	#N/A	1,206	1,144	-14.34	-15.50	1,400	1,274
[illegible]	[illegible]	1035.2	200.6	481,280	2,784	0.91	0.00	0.34	2121	-12.07	40	600	705	706	-26.40	1057	1,064	-18.11	#N/A	1,206	1,146	-14.67	-15.88	1,401	1,283
[illegible]	[illegible]	1036.2	200.6	481,400	2,786	0.40	0.00	0.07	2125	-12.37	40	601	707	706	-25.64	1058	1,066	-18.41	#N/A	1,207	1,147	-15.06	-16.02	1,401	1,207
[illegible]	[illegible]	1037.2	200.6	481,600	2,787	0.46	0.00	0.03	2090	-12.17	41	601	709	709	-25.86	1060	1,067	-18.21	#N/A	1,209	1,146	-15.82	-15.83	1,401	1,253
[illegible]	[illegible]	1038.2	200.8	481,900	2,788	0.41	0.00	0.02	2053	-12.12	40	601	709	709	-25.60	1060	1,067	-18.12	#N/A	1,209	1,146	-14.44	-15.60	1,402	1,170
[illegible]	[illegible]	1039.2	200.6	482,100	2,789	0.47	0.00	0.12	2071	-12.11	40	590	712	712	-26.71	1063	1,070	-17.01	#N/A	1,301	1,150	-15.50	-15.85	1,403	1,219
[illegible]	[illegible]	1040.2	200.8	482,300	2,790	0.00	0.00	0.00	2077	-11.96	40	590	716	716	-25.63	1067	1,073	-17.02	#N/A	1,303	1,151	-15.37	-15.73	1,402	1,224
[illegible]	[illegible]	1041.2	200.0	482,501	2,791	0.00	0.00	0.03	2051	-11.86	40	590	713	713	-25.70	1065	1,071	-17.07	#N/A	1,302	1,150	-15.22	-15.77	1,402	1,231
[illegible]	[illegible]	1042.2	200.0	482,701	2,792	0.00	0.00	0.00	2077	-11.56	40	590	706	705	-24.94	1050	1,067	-18.01	#N/A	1,299	1,149	-15.04	-15.40	1,401	1,266
[illegible]	[illegible]	1043.2	200.0	482,902	2,793	0.47	0.00	0.00	2073	-11.74	40	578	706	706	-26.33	1058	1,066	-18.25	#N/A	1,298	1,148	-15.31	-15.40	1,401	1,270
[illegible]	[illegible]	1044.2	201.2	483,103	2,794	0.46	0.00	0.00	2111	-11.78	40	603	703	703	-25.30	1064	1,063	-19.06	#N/A	1,296	1,144	-15.26	-15.52	1,401	1,258
[illegible]	[illegible]	1045.2	202.8	483,304	2,795	0.52	0.00	0.00	2000	-12.07	41	603	706	705	-25.64	1067	1,064	-19.54	#N/A	1,297	1,148	-15.80	-15.64	1,401	1,274
[illegible]	[illegible]	1046.2	205.5	483,506	2,796	0.52	0.00	0.03	1987	-12.74	40	603	708	707	-27.03	1060	1,066	-20.80	#N/A	1,298	1,148	-16.47	-16.63	1,402	1,279
[illegible]	[illegible]	1047.2	205.3	483,712	2,797	0.46	0.00	0.28	1938	-13.12	40	603	711	711	-27.79	1061	1,068	-21.00	#N/A	1,301	1,148	-16.83	-17.15	1,403	1,280
[illegible]	[illegible]	1048.2	205.3	483,917	2,798	0.46	0.00	0.47	1914	-13.22	40	588	717	716	-28.10	1066	1,073	-21.13	#N/A	1,300	1,148	-17.13	-17.32	1,404	1,290
[illegible]	[illegible]	1049.2	205.5	484,123	2,799	0.48	0.00	0.64	1948	-12.88	40	603	715	714	-27.76	1068	1,072	-20.70	#N/A	1,304	1,149	-16.78	-17.02	1,404	1,250
[illegible]	[illegible]	1050.2	203.4	484,329	2,800	0.46	0.00	0.42	2008	-13.01	40	603	718	717	-27.78	1067	1,073	-20.90	#N/A	1,308	1,150	-16.74	-17.04	1,405	1,254
[illegible]	[illegible]	1051.2	200.6	484,532	2,801	0.18	0.04	0.20	2017	-12.87	40	604	720	720	-27.57	1070	1,081	-20.18	#N/A	1,311	1,154	-16.58	-16.90	1,404	1,242
[illegible]	[illegible]	1052.2	200.6	484,733	2,802	1.02	17.14	0.30	2090	-12.67	40	588	725	724	-27.13	1074	1,079	-19.97	#N/A	1,309	1,155	-16.34	-16.63	1,401	1,219
[illegible]	[illegible]	1053.2	198.3	484,933	2,803	0.08	16.16	0.00	2080	-11.90	40	601	736	731	-24.71	1080	1,086	-18.09	#N/A	1,312	1,157	-14.71	-15.08	1,401	1,229
[illegible]	[illegible]	1054.2	199.4	485,120	2,804	0.08	15.00	0.00	2140	-10.88	40	601	729	732	-22.00	1082	1,080	-16.65	#N/A	1,314	1,158	-13.44	-13.84	1,401	1,231
[illegible]		1055.2		485,290	2,805																				
	AVERAGE	24.0	200.2	4,883	24.1	5.77	2.17	0.09	2088	-12.18	42	573	712	712	-25.94	1063	1,070	-18.64		1,301	1,140	-15.47	-15.88	1,402	1,253
	running average	24.0	200.2	4,883	24.1	5.78	2.21	0.07	2071	-12.18	42	573	712	712	-25.97	1063	1,070	-18.63		1,301	1,140	-15.44	-15.88	1,402	1,256

EQUIPMENT CALIBRATIONS

KOOGLER & ASSOCIATES
ENVIRONMENTAL SERVICES

NOZZLE CALIBRATION

DATE 9-29-00

PLANT NAME Rinker

LOCATION Miami

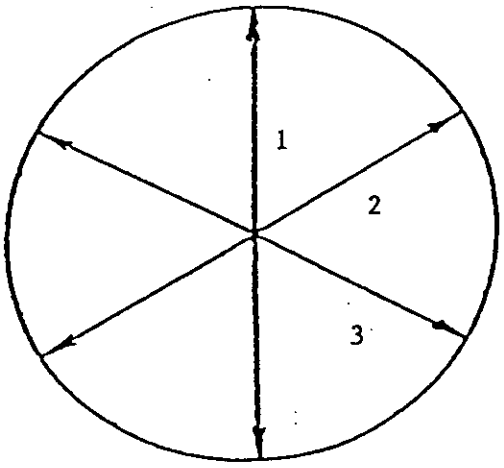
SOURCE Cement Kiln

Measurement No.	Inside Diameter (inches)
1	0.255
2	0.253
3	0.254

Average 0.254

Area of Nozzle 0.000359 ft^2

Calibrated by: R Paul



Nozzle X-Section

KOOGLER & ASSOCIATES

PITOT TUBE CALIBRATION MEASUREMENTS

PITOT TUBE IDENTIFICATION NO. SS III

DATE CALIBRATED 8-14-98

PITOT TUBE ASSEMBLY LEVEL ? X YES _____ NO

PITOT TUBE OPENINGS DAMAGED ? ____ YES (EXPLAIN BELOW) _____ NO

α_1= 3.0 ° (<10°) α_2= 3.0 ° (<10°)

β_1= 0.0 ° (<5°) β_2= 1.5 ° (<5°)

Y= 0.0 °, θ= 1.0 °, A= 0.970 IN. = (PA+PB)

Z = A SIN Y = 0.0 IN. (<0.125 IN.)

W = A SIN θ = 0.0169 IN. (<0.031 IN.)

P_A 0.501 IN. P_b 0.470 IN.

D_t 0.375 IN. (≥ 0.1875 IN. ≤ 0.3750 IN.)

COMMENTS: Pitot tubes looked OK day of test

CALIBRATION REQUIRED? _____ YES X NO

CALIBRATED BY: RPaul

PTCMFORM 1/8/87

KOOGLER Ka ASSOCIATES

POST TEST THERMOCOUPLE
CALIBRATION

DATE 9-29-00

PLANT NAME Rinker Cement

LOCATION Miami, Fl.

SOURCE Cement Kiln

Thermocouple Readout # KA2

Umbilical Cord # 100'

Switch Box # KA-2

Thermocouple # KA-38

Average Stack Temperature °F 291

*Observed Mercury in Glass (ASTM) °F 244

Observed Thermocouple Reading °F 246

Percent Difference $\frac{(\text{ASTM} + 460) - (\text{Thermo} + 460)}{(\text{ASTM} + 460)} \times 100 = 0.28\%$

Tolerance ≤ 1.5%

* Observed Temperature must be within ten percent of the average stack temperature.

RPaul
Signature

KOOGLER & ASSOCIATES, ENVIRONMENTAL SERVICES
ANNUAL THERMOCOUPLE CALIBRATION 12/27/99

KA70 RO/UMB		ICE (F)	ASTM (F)	AMB. (F)	ASTM (F)	212 (F)	ASTM (F)	400 (F)	ASTM (F)	KA70 RO/UMB	
KA1/100'	STACK	32	33	73	72	208	209	405	406	KA1/100'	STACK
	BOX	33	32	72	72	210	210	404	406		BOX
	IMP	32	32	73	73	211	212	400	401		IMP
KA2/200'	STACK	33	33	73	72	209	210	415	416	KA2/200'	STACK
	BOX	32	32	72	73	211	210	418	418		BOX
	IMP	32	33	71	72	212	212	409	410		IMP
KA3/25'	STACK	32	33	73	73	211	210	409	410	KA3/25'	STACK
SWBXKA3	BOX	33	32	72	73	215	215	415	416		BOX
	IMP	33	32	72	73	212	212	408	407		IMP
KA4/25'	STACK	32	32	73	74	205	205	420	420	KA4/25'	STACK
SWBXKA3	BOX	32	33	74	74	207	208	422	421		BOX
	IMP	32	33	72	73	211	212	425	425		IMP
KAK/200K	STACK	31	32	74	74	213	213	419	420	KAK/200K	STACK
KAK-38	BOX	32	32	72	73	215	216	422	422	KAK-38	BOX
SWBXKAK1	IMP	32	33	74	73	219	220	400	401		IMP
KA1/200'	STACK	33	33	73	73	211	210	422	422	KA1/200'	STACK
	BOX	33	33	73	72	214	214	419	418		BOX
	IMP	33	32	73	72	209	209	425	425		IMP
KA2/100'	STACK	33	33	73	72	209	210	422	423	KA2/100'	STACK
	BOX	33	32	73	74	212	211	425	425		BOX
	IMP	32	33	72	73	212	211	426	425		IMP

Signature _____

Date 12/27/99

KOOGLER & ASSOCIATES, ENVIRONMENTAL SERVICES
ANNUAL THERMOCOUPLE CALIBRATION 12/27/99

THERMOCOUPLE #	ICE (F)	ASTM (F)	AMB. (F)	ASTM (F)	212 (F)	ASTM (F)	400 (F)	ASTM (F)	THERMOCOUPLE #
KA-06	33	33	73	74	212	212	420	419	KA-06
KA-07	33	32	74	75	209	210	421	422	KA-07
KA-08	34	33	74	74	211	211	415	416	KA-08
KA-09	33	33	74	74	215	216	416	417	KA-09
KA-10	34	33	72	72	214	215	408	407	KA-10
KA-11	33	33	72	72	212	212	415	414	KA-11
KA-12	33	33	73	72	219	220	408	407	KA-12
KA-38	34	33	73	74	211	211	412	411	KA-38
KA-39	34	33	73	73	212	211	416	415	KA-39
KA-50	33	34	74	73	215	214	415	416	KA-50
KA-64	33	33	74	74	211	211	410	411	KA-64
KA-70	33	33	73	74	212	213	405	406	KA-70
KA-71	34	34	73	73	211	210	407	408	KA-71
KA-72	34	33	72	72	216	215	410	410	KA-72
KA-105	34	33	73	73	217	218	404	405	KA-105
KA-108	34	34	72	73	214	215	412	411	KA-108
KA-115	34	33	72	72	213	214	409	410	KA-115
KA-126	34	33	72	72	216	216	410	409	KA-126

THERMOCOUPLE #	ICE (F)	ASTM (F)	AMB. (F)	ASTM (F)	212 (F)	ASTM (F)	400 (F)	ASTM (F)	THERMOCOUPLE #
KAK-08	32	32	73	74	218	217	407	406	KAK-08
KAK-09	31	31	73	73	211	212	405	406	KAK-09
KAK-10	32	32	74	74	209	210	377	376	KAK-10
KAK-11	31	31	75	75	206	206	399	398	KAK-11
KAK-12	32	31	74	74	218	217	407	406	KAK-12
KAK-38	31	31	74	74	210	211	410	410	KAK-38
KAK-65	32	32	74	74	205	205	377	377	KAK-65
KAK-72	31	31	74	75	208	208	400	401	KAK-72
KAK-110	31	32	75	74	209	210	399	400	KAK-110
KAK-07	32	31	75	74	209	210	389	390	KAK-07

VOST SWITCH BOX	T.COUPLE				
CH#1	C-1	32	33	74	75
CH#2	C-1	33	32	74	74
CH#3	C-1	33	33	75	74

VOST SWITCH BOX					
CH#1	C-2	32	33	73	74
CH#2	C-2	33	33	74	75
CH#3	C-2	32	33	75	75

Signature Steve S-Bee

Date 12/27/99

KOOGLER & ASSOCIATES, ENVIRONMENTAL SERVICES
ANNUAL THERMOCOUPLE CALIBRATION 12/27/99

Range (ºC)	Measured Voltage (mV)	Measured Voltage (V)	Calc. Temp. (ºC)	Readout Temp. (ºC)	Percent Difference (%)
KAK-12	28.7	0.029	690	693	-0.45023
	37.4	0.037	902	900	0.217654
KAK-38	28.9	0.029	694	698	-0.51192
	37.2	0.037	897	900	-0.33898
KAK-72	28.5	0.029	685	687	-0.30387
	37.5	0.038	904	908	-0.39058
KAK-65	28.2	0.028	678	680	-0.32666
	37.8	0.038	912	910	0.218082
KA-110	29	0.029	694	699	-0.65592
	37	0.037	894	899	-0.50758

EQUATIONS :

T (calc.)=(0.226584602+(24152.109*V)+(67233.4248*V^2)+(2210340.682*V^3)
-(860963914.9*V^4)+(48350600000*V^5)-(1184520000000*V^6)
+(13869000000000*V^7)-(63370800000000*V^8))

Where :

V = Measured Voltage (Volts)
T(calc.) = Temperature calculated based on voltage

Signature 

Date 12/27/99

POST-TEST DRY GAS METER CALIBRATION FORM

COMPANY:	RINKER / MIAMI, FL.
SOURCE:	CEMENT KILN
DATE:	SEPT. 29 2000
PRETEST Y:	1.000
TEST METER NUMBER:	KA.1
METER BOX NUMBER:	KA.2
BAROMETRIC PRESSURE (Pb):	30.11
DELTA H (dH):	1.7

	TEST METER READING (ft^3)	DRY GAS READING (ft^3)	TIME (min) ⏥	VACUUM SETTING (in. Hg)
INITIAL	636.282	152.563		
FIRST	642.680	158.941	8	6
SECOND	650.692	166.969	10	6
THIRD	657.888	174.162	9	6

DELTA H	TEST METER Vt (ft^3)	DRY GAS Vd (ft^3)	TEST METER TEMP. Tt (|F)	DRY GAS TEMP. Td (|F)
1.7	6.398	6.378	78	85
PB	8.012	8.028	78	87
30.11	7.196	7.193	78	88

$$Yi = \frac{Vt * Pb * (Td + 460)}{Vd * (Pb + dH/13.6) * (Tt + 460)}$$

	Yi	
RUN 1 (Yi)=	1.011986	104990.8 / 103747.2
RUN 2 (Yi)=	1.010507	131959.0 / 130586.9
RUN 3 (Yi)=	1.014799	118736.0 / 117004.4
AVG. Y =	1.012431	

PRETEST Y =	1.000
AVG. DETA Y =	0.012431
DELTA Y LIMIT =	▪ 0.05
IS TEST WITHIN 5%?	YES

Vt = Gas volume passing through the test meter, ft^3
Vd = Gas volume passing through the dry gas meter, ft^3
Tt = Temperature of the gas in the test meter, |F
Tdi = Temperature of the inlet gas of the dry gas meter, |F
Tdo = Temperature of the outlet gas of the dry gas meter, |F
Td = Average temperature of the gas in the dry gas meter, the average of Tdi and Tdo, |F
dH = Pressure difference accross the orifice, in, H2O
Yi = Ratio of test meter to dry gas meter for each run
Y = Average ratio of accuracy of test meter to dry gas meter for all three runs, tolerance = pretest ▪ 0.05*Y
⏥ = Time of calibration run, min
Pb = Barometric pressure, in Hg.

DRY GAS METER AND ORIFICE CALIBRATION

CONTROL BOX NO. KA.2 BAROMETRIC PRESS. 30.03 IN. HG.

DATE AUGUST 25, 2000 PERFORMED BY ROC

	RUN 1	RUN 2	RUN 3	RUN 4	RUN 5
VACUUM ("Hg)	0.0	0.0	0.0	0.0	0.0
dHw ("H2O)	-0.22	-0.23	-0.24	-0.30	-0.32
dHd ("H2O)	0.50	1.00	1.50	2.50	3.50
INITIAL WTM	511.428	540.800	501.618	549.333	519.067
FINAL WTM	519.067	548.912	511.159	561.876	532.626
INITIAL DGM	29.303	59.064	19.500	67.710	36.982
FINAL DGM	36.982	67.289	29.040	80.382	50.782
TEMP. WTM (F)	76.00	76.00	76.00	76.00	76.00
TEMP. DGM (F)	82.00	80.00	79.50	80.00	94.00
TEST TIME (MIN.)	17.50	13.50	13.00	13.00	12.00
NET VOLUME WTM	7.639	8.112	9.541	12.543	13.559
NET VOLUME DGM	7.679	8.225	9.540	12.672	13.800
Y	1.005	0.992	1.004	0.992	1.008
dH@	1.468	1.555	1.565	1.508	1.501

AVERAGE Y = 1.000

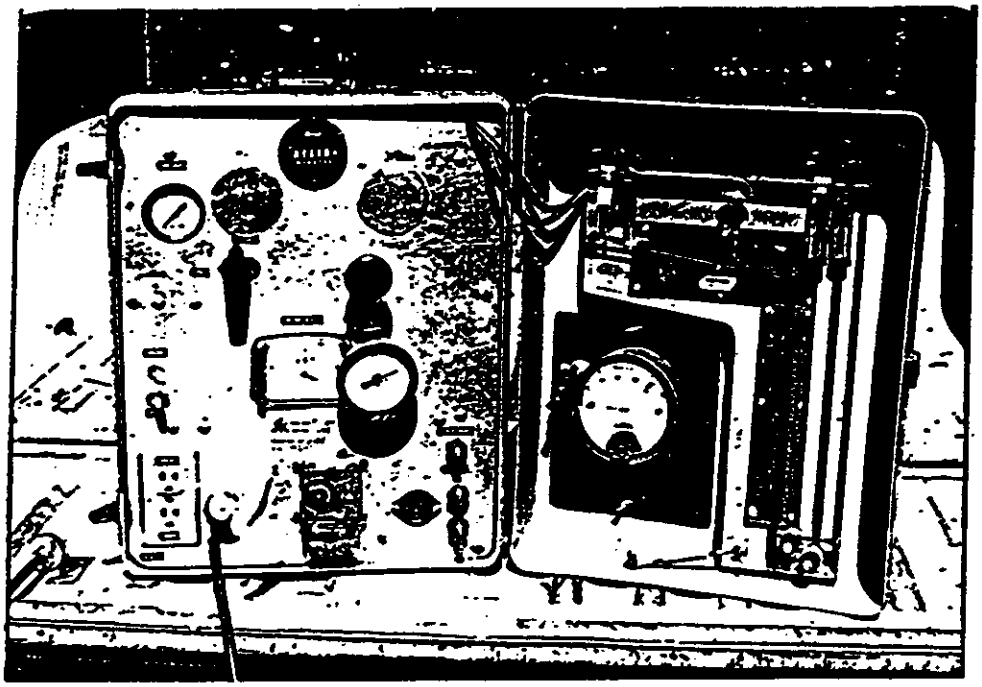
ACCEPTABLE Y RANGE = 0.980 TO 1.020 OK

AVERAGE dH@ = 1.520

Y = (Vw (Pb - (dHw / 13.6)) x (Td + 460)) / (Vd (Pb + (dHd / 13.6)) x (Tw + 460)

dH@ = 0.0317 x dHd / (Pb (Td + 460)) x ((Tw + 460) x time) / Vw)^2

SOURCE SAMPLING EQUIPMENT



METER BOX

Equipment used in Source Sampling is either manufactured by or assembled by Koogler & Associates. The guidelines followed are A.P.T.D. 0581, Details of Isokinetic Source Sampling Equipment and A.P.T.D. 0576, Maintenance, Calibration and Operation of Isokinetic Source Sampling Equipment.

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