AP42 Section:	11.20
Reference:	16
Title:	Stack Test Report No. 85-7, Lehigh Lightweight Aggregate Plant, Dryer-Kiln No. 1, Woodsboro, Maryland, Division Of Stationary Source Enforcement, Maryland Department Of Health And Mental Hygiene, Baltimore, MD, May 1985.

AP-42 Section 11.20
Reference 16
Report Sect. 4
Reference 16

DATA

(CO2 : C (HYRR)

REF 4-17

Stack Test Report No. 85-7

Lehigh Portland Cement Co.
Lightweight Aggregate Plant/Dryer-Kiln No. 1
Woodsboro, Frederick Co.
April, 1985

Division of Stationary Source Enforcement
Air Management Administration
Office of Environmental Programs
Department of Health and Mental Hygiene
State of Maryland

Douglas E. Frantz

Submitted by Douglas E. Frantz

Ronald E. Lipinski

Approved by Ronald E. Lipinski

ABSTRACT

Introduction:

Dryer-Kiln no. 1 at the Woodsboro plant is identical to the no. 2 line, which was tested in January of this year.

The Woodsboro plant of the Lehigh Portland Cement Company produces lightweight aggregate from the shale quarried on site. The shale is crushed and sized, then fed to a rotary dryer to preheat the material and drive off moisture. After being screened to remove fines, the shale is fed to the kiln where it is heated to 2100°F, using No. 2 oil at an average rate of 14 gallons per hour and coal at an average rate of 3,060 lbs. per hour. Expansion of the shale takes place in the kiln.

Emissions from this process are controlled by an electrostatic precipitator.

Particulate emission standards for this process are given in COMAR 10.18.06.03B. The maximim emission rate (lb/hr.) allowed is determined by the table contained in that regulation or, if process weight exceeds 60,000 lb/hr, the equation $E=55-.OP^{0.11-40}$. When process weight exceeds 60,000 lbs/hr., the emission rate may exceed that given by the above formula, if the particulate concentration is below .05 gr/scfd.

Process weight includes the dryer feed plus the weight of coal used.

Procedure:

Method 1005, as contained in AMA Technical Memorandum 83-05, was followed during the testing. Oxygen and carbon dioxide levels for molecular weight determinations were measured using Fyrite equipment.

Results:

Process weight during the test was determined to be 29.53 tons per hour, based on a dryer feed rate of 28 tons per hour and the average coal feed rate of 3,060 lbs/hr. Interpolating from Table 1 in COMAR 10.18.06, the allowed emission rate is 39.46 lbs/hr. The average emission rate during the three tests was 15.5 lbs/hr., indicating compliance with Maryland regulations.

A summary of the test results is given in table 1-1. Raw data are contained in the appendix.

Table 1-1. Summary of Particulate Sampling Results For:
85-7 Lehigh Portland Cement, Woodsboro - Dryer/Kiln No. 1

Run ID	Process weight (tons/hr)	Allowed Emission Rate (lbs/hr)	Average Stack Gas Data					Concentration* (grains/scfd)	Emission Rate* (lbs/hr)	Opacity (%)
			flow rate (scfm dry)	temp (°F)	% O_2	% CO_2	% H_2O			
4/29/85	29.53 2nd shale	39.46	17650	424	12.1	8.2	7.3	0.125	18.3	-
4/30/85	29.53	39.46	17180	424	12.8	7.4	7.7	0.112	16.4	7.0
5/2/85	29.53	39.46	17580	416	12.3	7.8	7.5	0.078	11.8	10.6
Average			17,470		12.4			0.105	15.5	

*based on front half catch

APPENDIX:

Nomenclature
Calculated Results
Data Summaries
Laboratory Analyses
Primary Data
Calibration Data
Preliminary Stack Test Survey

MARYLAND STATE

Air Management Administration

STACK SAMPLING NOMENCLATURE

A_s	:	cross sectional area of stack at sample site, (ft^2)
B_w	:	mole fraction moisture in stack gas, (dimensionless)
C_d	:	concentration of front half catch, (grains/scfd)
C_{d12}	:	concentration at 12% CO2, front half catch, (grains/scfd)
C_{d50}	:	concentration at 50% EA, front half catch, (grains/scfd)
C_m	:	dry gas meter correction factor, (dimensionless)
C_p	:	pitot tube coefficient, (dimensionless)
C_t	:	concentration of total catch, (grains/scfd)
C_{t12}	:	concentration at 12%, CO2, total catch, (grains/scfd)
C_{t50}	:	concentration at 50% EA, total catch, (grains/scfd)
D_n	:	diameter of sampling nozzle inlet, (in)
EA	:	percent excess air in stack gas, (%)
E_d	:	emission rate, front half, (lbs/hr)
E_t	:	emission rate, total, (lbs/hr)
$\Delta H@$	:	orifice meter pressure differential that provides a flow rate of .75 ft^3/min at 70°F and 29.92 in. Hg, (in. H_2O)
ΔH_{avg}	:	average orifice pressure differential, (in. H_2O)
I	:	percent isokinetic, (%)
M_d	:	molecular weight of stack gas, dry basis, (lb/lb mole)
M_w	:	molecular weight of stack gas, wet basis, (lb/lb mole)
N_{ti}	:	normality of titrant for SO_x sample, (g-eq/l)
P_{bar}	:	barometric pressure, (in. Hg)
Psavg	:	average absolute stack pressure, (in. Hg)

NOMENCLATURE

ΔP	:	velocity pressure differential, (in. H_2O)
Q_{alq}	:	volume of SO_x sample aliquot titrated, (ml)
Q_m	:	net dry sample gas volume, (acfd)
Qmstd	:	standard dry gas sample volume, (scfd)
Q_s	:	actual stack gas volumetric flow rate, dry basis, (asfm dry)
Q_{soln}	:	total volume of SO_x sample solution, (ml)
Q_{sstd}	:	standard stack gas volumetric flow rate, dry basis, (scfm dry)
Q_{ti}	:	volume of titrant required to neutralize SO_x sample aliquot, (ml)
Q_{tib}	:	volume of titrant requiued to neutralize blank solution, (ml)
Q_{tstd}	:	total standard sample volume, (scf)
Q_w	:	total volume of water collected, (ml)
Q_{wstd}	:	standard vapor volume of water collected, (scf)
T_{mavg}	:	average dry gas meter temperature, (^oF)
T_{savg}	:	average stack temperature, (^oF)
V_s	:	average velocity of stack gas at sample site, (ft/sec)
W_d	:	front half particulate catch, (mg)
W_t	:	total particulate catch, (mg)
θ	:	sampling time, (min.)

MARYLAND STATE
AIR MANAGEMENT ADMINISTRATION

PARTICULATE STACK SAMPLING CALCULATED RESULTS

Plant Lehigh Cement/Woodsboro

Source No. 1 Precipitator

RUN ID	4/29/85	4/30/85	5/2/85		
1. Q_{mstd}	59.873	58.101	60.757		
2. Q_{wstd}	4.731	4.832	4.943		
3. Q_{tstd}	64.605	62.933	65.70		
4. B_w mole frac	0.073	0.077	0.075		
5. M_d	29.796	29.696	29.74		
6. M_w	28.932	28.798	28.857		
7. EA	*	*	*		
8. V_s	34.25	33.45	33.97		
9. Q_s actual dry	29179	28385	28876		
10. Q_{sstd} std dry	17646	17175	17575		
11. C_d	0.1208	0.1116	0.0783		
12. C_t	0.1252	0.116	0.088		
13. C_{d12}	*	*	*		
14. C_{t12}	*	*	*		
15. C_{d50}	*	*	*		
16. C_{t50}	*	*	*		
17. E_d	18.27	16.42	11.80		
18. E_t	18.93	17.07	13.26		
19. I	102.0	101.7	103.9		
actual wet	31,477 acfm	30,753 acfm	31,217 acfm		avg = 31,149

*Not Applicable

MARYLAND STATE
AIR MANAGEMENT ADMINISTRATION

PARTICULATE STACK SAMPLING DATA SUMMARY

Plant Lehigh Cement/Woodsboro

Source No. 1 Precipitator

RUN ID	4/29/85	4/30/85	5/2/85		
1. C_p	0.84	0.84	0.84		
2. Q_m	61.159	60.29	60.348		
3. T_{mavg}	88.8	97.8	72.0		
4. P_{bar}	29.83	29.85	29.74		
5. ΔH_{avg}	1.424	1.364	1.393		
6. Q_w	98.6	100.7	103.0		
7. W_d	468.7	420.0	308.3		
8. W_t	485.6	436.6	346.5		
9. $\%CO_2$	8.2	7.4	7.8		
10. $\%O_2$	12.1	12.8	12.3		
11. T_{savg}	424.1	424.2	415.8		
12. $(\Delta P)^{\frac{1}{2}}_{avg}$	0.471	0.459	0.468		
13. P_{savg}	29.79	29.81	29.70		
14. A_s	15.32	15.32	15.32		
15. D_n	0.312	0.312	0.312		
16. θ	96.0	96.0	96.0		

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MARYLAND STATE
BUREAU OF AIR QUALITY & NOISE CONTROL
AND BUREAU OF LABORATORIES

PARTICULATE STACK SAMPLING LABORATORY RESULTS

Plant Lehigh Cement/Woodsboro Completed 5/8/85

Facility Tested No. 1 Precipitator By Gary M. Benning

Test Date 4/29/85

Run ID — #

WEIGHT OF PARTICULATE COLLECTED

Container		Final Weight (grams)	Initial Weight (grams)	Weight Gain (mg)
Probe	41	149.7459	149.6484	97.5
Filter	B	135.7734 134.9679	.8055 .5183	287.2
Cyclone	40	146.8041	146.7201	84.0
			Subtotal, (mg)	468.7
Water Soluble	42	151.8325	151.8258	6.7
Organics	43	140.6664	140.6598	6.6
Acetone Wash	44	138.9717	138.9681	3.6
			Subtotal, (mg)	16.9
Total Weight of Particulate Collected, (mg)				485.6

	Sulfate	Acidity
Probe	_____ mg.	_____ meq. N_aOH
Filter	_____ mg.	_____ meq. N_aOH

VOLUME OF MOISTURE COLLECTED

		Final Volume (ml)	Initial Volume (ml)	Volumetric Gain (ml)
Impingers		284.0	200.0	84.0
Silica Gel	45	361.0	346.4	14.6
			Total Gain, (ml)	98.6

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MARYLAND STATE
BUREAU OF AIR QUALITY & NOISE CONTROL
AND BUREAU OF LABORATORIES

PARTICULATE STACK SAMPLING LABORATORY RESULTS

Plant Lehigh Cement / Woodsboro Completed 5/8/85

Facility Tested No. 1 Precipitator By Gary M. Browning

Test Date 4/30/85

Run ID — #

WEIGHT OF PARTICULATE COLLECTED

Container		Final Weight (grams)	Initial Weight (grams)	Weight Gain (mg)
Probe	50	146.5328	146.4475	85.3
Filter	F	134.9501 134.1318	.8183 .5198	298.5
Cyclone	51	151.8003	151.7641	36.2
			Subtotal, (mg)	420.0
Water Soluble	52	147.3407	147.3331	7.6
Organics	53	135.3304	135.3248	5.6
Acetone Wash	54	145.0862	145.0828	3.4
			Subtotal, (mg)	16.6

Total Weight of Particulate Collected, (mg) 436.6

	Sulfate	Acidity
Probe	____ mg.	____ meq. N_aOH
Filter	____ mg.	____ meq. N_aOH

VOLUME OF MOISTURE COLLECTED

		Final Volume (ml)	Initial Volume (ml)	Volumetric Gain (ml)
Impingers		285.0	200.0	85.0
Silica Gel	55	367.4	351.7	15.7
			Total Gain, (ml)	100.7

Export

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MARYLAND STATE
BUREAU OF AIR QUALITY & NOISE CONTROL
AND BUREAU OF LABORATORIES

PARTICULATE STACK SAMPLING LABORATORY RESULTS

Plant Lehigh Cement / Woodsboro Completed 5/8/85

Facility Tested No. 1 Precipitator By Gary M. Browning

Test Date 5/2/85

Run ID — #

WEIGHT OF PARTICULATE COLLECTED

Container		Final Weight (grams)	Initial Weight (grams)	Weight Gain (mg)
Probe	60	146.5594	146.4991	60.3
Filter	A	155.5989 154.8475	.7514 .5237	227.7
Cyclone	61	152.1176	152.0973	20.3
			Subtotal, (mg)	308.3
Water Soluble	62	147.7531	147.7427	10.4
Organics	63	145.6211	145.5955	25.6
Acetone Wash	64	135.0942	135.0920	2.2
			Subtotal, (mg)	38.2

Total Weight of Particulate Collected, (mg) 346.5

	Sulfate	Acidity
Probe	_____ mg.	_____ meq. N_aOH
Filter	_____ mg.	_____ meq. N_aOH

VOLUME OF MOISTURE COLLECTED

		Final Volume (ml)	Initial Volume (ml)	Volumetric Gain (ml)
Impingers		288.0	200.0	88.0
Silica Gel	65	380.6	365.6	15.0
			Total Gain, (ml)	103.0

LEAK CHECKS
.49
.30
.19 @15"HG.

PRE: Post: .046 .045/.001

pt. no.	TIME (min)	DRY GAS METER Volume (acfd)	Temp (°F) in ①	Temp (°F) out ②	VELOCITY HEAD ΔP (in. H_2O)	VELOCITY HEAD $(\Delta P)^{1/2}$ (in. $H_2O)^{1/2}$	ORIFICE DIFFERENTIAL (IN H_2O) actual	ORIFICE DIFFERENTIAL (IN H_2O) desired	PUMP VAC. "Hg.	TEMPERATURES °F stack ③	TEMPERATURES °F probe N/A	TEMPERATURES °F oven ④
1	0	620.000	71	70	.316	.10		.62	2 1/2	414		258
2	4	622.63	75	71	.300	.09		.56	2 1/2	414		270
3	8	624.30	78	72	.300	.09		.56	2 1/2	414		273
4	12	625.95	82	73	.316	.10		.62	2 1/2	414		275
5	16	627.67	85	75	.316	.10		.62	2 1/2	418		225
6	20	629.41	88	76	.374	.14		.87	3	422		255
7	24	631.49	91	77	.529	.28		1.70	4	428		269
8	28	634.25	95	77	.600	.36		2.15	5	429		273
9	32	636.90	98	77	.616	.38		2.30	5	429		275
10	36	640.10	101	77	.616	.38		2.30	5	428		225
11	40	643.26	103	77	.608	.37		2.25	5	427		257
12	44	646.51	105	78	.592	.35		2.10	5	427		272
1	48	649.71	94	77	.316	.10		.62	2 1/2	420		232
2	52	651.44	95	79	.447	.20		1.20	3 1/2	420		225
3	56	653.63	97	79	.480	.23		1.40	4	420		232
4	60	656.19	100	80	.583	.34		2.05	5	420		255
5	64	659.05	104	84	.583	.34		2.05	5	425		256
6	68	662.18	108	86	.529	.28		1.70	4 1/2	427		268
7	72	665.18	110	88	.412	.17		1.05	4	429		265
8	76	667.82	110	90	.424	.18		1.10	4	430		275
9	80	670.29	111	91	.469	.22		1.30	4	431		225
10	84	672.88	111	92	.510	.26		1.55	4	431		256
11	88	675.50	112	91	.539	.29		1.75	4 1/2	431		259
12	92	678.28	112	90	.539	.29		1.75	4 1/2	431		250
	96	681.214			11.314							
f		61.214	2336	1927				34.17		579		
c.			88.8			0.471		1.424		424.1		

OFFICE OF ENVIRONMENTAL PROGRAMS
AIR MANAGEMENT ADMINISTRATION
STACK SAMPLING DATA

Plant LEHIGH CEMENT
Source No. 1 KILN
Run ID 29APR85 Operators DR, FS
Start 1413 Finish 1558
Sampling for: PARTICULATE
Pitobe ID 5-1 Cp 1.84
Meter Box GR Gn _____ H@ .84
DGM ID 593235 C Factor 1.0
Filter ID .5183 Noz. ID .312
Baro.(in. Hg.) _____
Ambient °F 69
Psavg: (in. H_2O) -0.41
(in. Hg) -0.04
Avg. % CO_2 _____ % O_2 _____
Leak Rate (acfm) Pre .19 @15"Hg.
Post .001 @5"Hg.
Duct Dimensions 53"
Area 15.32 ft^2
Diameters Upstream 3
Diameters Downstream 8
Assumed H_2O (%) _____

96.5

										AVG
O_2	13.5	12.5	11.75	12.0	11.75	12.0	12.0	11.0	12.1
CO_2	7.0	8.0	7.5	7.0	9.0	8.75	8.5	9.5	8.2

65.25

TES Mr. CORRECTION
FACTOR 0.9991
CORRECTED MR. VOL. 61.159
IMH 1636

Rd. pt. .305 @ meter temp. 90
Ps/Pm 1.0 Ts = 410 D_N .312

Pre .056 .040 .016

Post .093 .075 .018

pt. no.	TIME (min)	DRY GAS METER Volume (acfd)	Temp (°F) in ①	Temp (°F) out ②	VELOCITY HEAD ΔP (in. H_2O)	VELOCITY HEAD $(\Delta P)^{1/2}$ $(in.H_2O)^{1/2}$	ORIFICE DIFFERENTIAL (IN H_2O) actual	ORIFICE DIFFERENTIAL (IN H_2O) desired	PUMP VAC. "Hg.	TEMPERATURES °F stack ③	TEMPERATURES °F probe N/A	TEMPERATURES °F oven ④
1	0	690.000	84	77	.412	.17		1.05	3½	416		247
2	4	692.32	86	78	.539	.29		1.75	5	416		248
3	8	695.06	91	81	.557	.31		1.95	5½	416		241
4	12	697.99	95	82	.574	.33		2.00	6	425		247
5	16	701.01	100	86	.574	.33		2.00	6	427		251
6	20	704.10	103	87	.510	.26		1.55	5	429		252
7	24	707.02	105	90	.374	.14		.87	3	429		258
8	28	709.42	105	91	.387	.15		.92	3	429		260
9	32	711.60	105	92	.447	.20		1.20	4	429		262
10	36	714.00	107	92	.498	.24		1.45	4½	429		261
11	40	716.62	108	93	.529	.28		1.70	5	429		265
12	44	719.48	110	94	.557	.31		1.95	6	428		266
1	48	722.51	99	90	.283	.08		.50	2	416		252
2	52	724.10	99	92	.300	.09		.56	2	416		260
3	56	725.77	102	94	.300	.09		.56	2	416		265
4	60	727.46	103	95	.283	.08		.50	2	416		271
5	64	729.07	105	97	.300	.09		.56	2	420		271
6	68	730.70	105	95	.361	.13		.81	2½	422		273
7	72	732.62	107	96	.49	.24		1.45	4½	428		239
8	76	735.11	110	98	.539	.29		1.75	5½	430		256
9	80	737.89	113	100	.548	.30		1.80	5½	430		250
10	84	740.88	116	100	.557	.31		1.95	6	429		234
11	88	744.00	117	99	.557	.31		1.95	6	428		250
12	92	747.29	118	100	.557	.31		1.95	6	427		254
	96	750.344			11.025							
T		60.344	2493	2199				32.73		580		
G.			97.8			0.459		1.364		424.2		

OFFICE OF ENVIRONMENTAL PROGRAMS
AIR MANAGEMENT ADMINISTRATION
STACK SAMPLING DATA

Plant LEHIGH CEMENT
Source NO.1 KILN
Run ID 30 APR 85 Operators DR, FS
Start 1119 Finish 1305
Sampling for: Particulate
Pitobe ID 5-1 Cp 1.84
Meter Box GR Cm ____ H@ .84
DGM ID 593235 C Factor 1.0
Filter ID .5198 Noz. ID .312
Baro.(in. Hg.) ____
Ambient °F 78
Psavg: (in. H_2O) -.43
(in. Hg) -0.04
Avg. % CO_2 ____ % O_2 ____
Leak Rate (acfm) Pre .016 @15"Hg.
Post .018 @6"Hg.
Duct Dimensions 53"
Area 15.32 ft^2
Diameters Upstream 3
Diameters Downstream 8
Assumed H_2O (%) ____

77.0 AVG

DYES MR CORRECTION FACTOR 0.9991
CORRECTED MR VOL, 60.290

O_2	12.5	13.25	12.5	12.5	13.25	13.0	12.8
CO_2	7.75	5.5	7.5	8.0	7.75	8.0	7.4

44.5

DMH 1630

.030
.025

	TIME (min)	DRY GAS METER Volume (acfd)	Temp (°F) in ①	Temp (°F) out ②	VELOCITY HEAD ΔP (in. H_2O)	VELOCITY HEAD $(\Delta P)^{1/2}$ (in. H_2O)$^{1/2}$	ORIFICE DIFFERENTIAL (IN H_2O) actual	ORIFICE DIFFERENTIAL (IN H_2O) desired	PUMP VAC. "Hg.	TEMPERATURES °F stack ③	TEMPERATURES °F probe N/A	TEMPERATURES °F oven ④
	0	760.000	60	59	.300	.09		.56	2	408		238
	4	761.63	62	59	.283	.08		.50	2	408		248
	8	763.22	65	60	.300	.09		.56	2	408		257
	12	764.82	68	60	.300	.09		.56	2	408		262
	16	766.50	71	63	.316	.10		.62	2	408		268
	20	768.20	75	64	.361	.13		.81	2 ½	411		270
	24	770.09	76	63	.510	.26		1.55	3 ½	418		275
	28	772.14	79	64	.539	.29		1.75	4	419		276
	32	775.30	83	65	.566	.32		1.95	4	419		225
	36	778.49	87	65	.566	.32		1.95	4	419		263
	40	781.50	88	66	.574	.33		2.00	4	419		271
	44	784.53	90	67	.574	.33		2.00	4	418		274
	48	787.65	76	64	.436	.19		1.15	3	415		236
	52	790.13	78	64	.510	.26		1.55	3	415		232
	56	792.74	81	64	.574	.33		2.00	4	415		244
	60	795.12	86	64	.574	.33		2.00	4	415		241
	64	798.88	88	65	.574	.33		2.00	4	417		238
	69	801.98	90	65	.510	.26		1.55	4	420		244
	72	804.89	89	66	.400	.16		.98	3	421		249
	76	807.44	89	66	.412	.17		1.05	3	421		258
	80	809.74	88	66	.458	.21		1.25	3	421		258
	84	812.18	87	65	.490	.24		1.45	3 ½	419		225
	88	814.60	86	63	.539	.29		1.75	4	418		225
	92	817.43	86	61	.557	.31		1.90	4	418		225
	96	820.402			11.223							
		60,402	1928	1528				33.44		378		
			72.0			0.468		1.393		415.8		

OFFICE OF ENVIRONMENTAL PROGRAMS
AIR MANAGEMENT ADMINISTRATION
STACK SAMPLING DATA

Plant Lehigh Cement
Source No 1 Kiln
Run ID 2 MAY 85 Operators DR, RS
Start 1225 Finish 1414
Sampling for: Particulate
Pitobe ID 5-1 Cp 1.84
Meter Box GR Cm _____ H@ .84
DGM ID 593235 C Factor 1.0
Filter ID .5237 Noz. ID .312
Baro.(in. Hg.) _____
Ambient °F 57
Psavg: (in. H_2O) -.54
(in. Hg) -0.04
Avg. % CO_2 _____ % O_2 _____
Leak Rate (acfm) Pre .018 @15"Hg.
Post .005 @4"Hg.
Duct Dimensions 53"
Area 15.32 ft^2
Diameters Upstream 3
Diameters Downstream 8
Assumed H_2O (%) _____

								AVG
O_2	12.25	12.0	12.5	12.5	12.75	11.75	73.75	12.3
CO_2	7.75	7.75	7.5	8.0	7.5	8.25	46.75	7.8

ES MR. CORRECTION FACTOR 0.9991
ORRECTED MR. VOL. 60.348

MH 1630

Lehigh-Woodsboro

Precipitator Readings - Kiln #1

date/time	Inlet field			Outlet field		
	AC volts	AC amps	DC mA	AC volts	AC amps	DC mA
4/29/85 1413-1558	160	28	132	207	32	159
4/30/85 1119-1305	155	27	127	215	31	153
5/2/85 1225-1414	177	24	110	225	32	160

Figures above are the averages of readings taken every 15 minutes during the tests.

MARYLAND STATE DEPARTMENT OF HEALTH AND MENTAL HYGIENE
OFFICE OF ENVIRONMENTAL PROGRAMS
Air Management Administration
O'Conor Building
201 W. Preston Street
Baltimore, Maryland 21201

REPORT OF OBSERVATION OF VISIBLE EMISSIONS

Date 4/30/85

Time At Start Of Observation 11:00 A.M.

Premise Name Lehigh Portland Cement

Address Woodsboro County Carroll to Frederick Co

Type of Installation Cement Plant Color of Plume Grey

Point of Discharge ESP Stacks #1 Steam Plume ☐ None ☐ Attached ☐ Detached

Point of Observation From Wilhide along Hoffman Schoolhouse Rd.

Sky Conditions Clear/Blue Ambient Temperature 70°F

Wind Direction Out of S/SW Wind Speed Out of S/SW at 5-10 mph

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

Remarks: Sun located directly to rear of pt. of observation. Treeline and telephone pole used as a background. (Plume was read at pt. where it first left stack - to avoid blending with plume from #2 stack)

Name of Observer [signature]

DHMH 1041
AMA-10 Revised 10-1-81

MARYLAND STATE DEPARTMENT OF HEALTH AND MENTAL HYGIENE
OFFICE OF ENVIRONMENTAL PROGRAMS
Air Management Administration
O'Conor Building
201 W. Preston Street
Baltimore, Maryland 21201

REPORT OF OBSERVATION OF VISIBLE EMISSIONS

Date 5/2/85

Time At Start Of Observation 12:31pm

Premise Name Lehigh Portland Cement

Address (Woodsboro) County Frederick Co.

Type of Installation Cement Plant Color of Plume grey

Point of Discharge #1 stack Steam Plume ☐ None ☐ Attached ☐ Detached

Point of Observation Hillside (East of Plant)

Sky Conditions Overcast Ambient Temperature 70°F

Wind Direction Out of N.NE Wind Speed 5mph

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

Remarks: Sun obscured by cloud cover. Tree line was used as a background.
(Stack test in progress during emission recordings)

Name of Observer Hal Jansen

DHMH 1041
AMA-19 Revised 10-1-81

DRAFT/WP
d3006-4/971130
03/30/92 1

REF. 16(AP-42)
REF. 4-16

Emission Test Report
Review Checklist

Reviewer: R. MARINSHAW
Review Date: 11/18/92

A. Background Information

1. Facility name: LEHIGH PORTLAND CEMENT CO.
   Location: WOODSBORO, MD
2. Source category: LIGHTWEIGHT AGGREGATE
3. Test date: 4/29 - 5/2/1985
4. Test sponsor: PLANT
5. Testing contractor: STATE OF MARYLAND
6. Purpose of test: COMPLIANCE
7. Pollutants measured

   (PM) PM-10 CO SO_2 NO_x VOC Pb (CO_2)

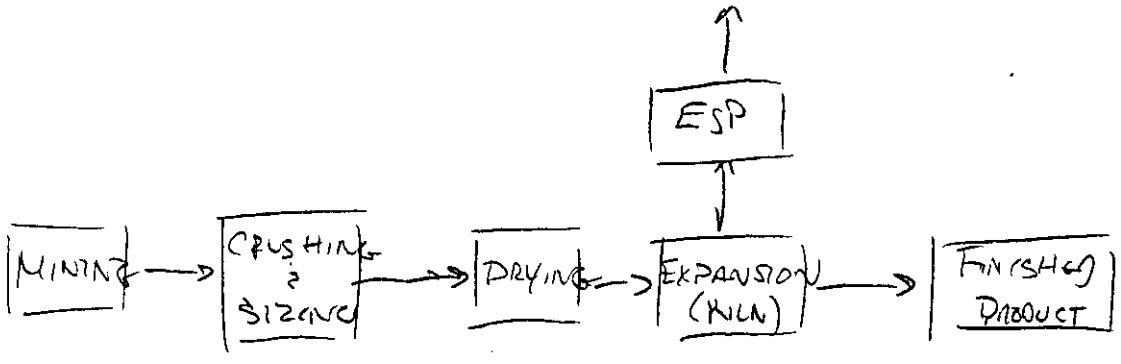
   Others (list):
8. Process overview: On an attached page provide a block diagram of the unit operations and associated air pollution control systems at the facility. Identify process tested with letters from the beginning of the alphabet (A, B, C, etc.) and APC systems with letters from end of alphabet (V, W, X, etc.). Also identify test locations with Arabic numerals (1,2,3, ...). Using the ID symbols from that sketch complete the table below that identifies processes or unit operations tested.

Test ID	Process	Process ID	Emissions tested		APCD (controlled emissions only)
			Uncontrolled	Controlled	
1	KILN/DRYER No. 1			✓	ESP

B. Process Information

1. Provide a brief narrative description of the process. With as much detail as possible, (e.g., if a furnace or conveyor system is used, identify the type of unit) describe the equipment used for those operations tested. (Note: If process description provided in test report is adequate, attach copy or reproduce here.)

The Woodsboro plant of the Lehigh Portland Cement Company produces lightweight aggregate from the shale quarried on site. The shale is crushed and sized, then fed to a rotary dryer to preheat the material and drive off moisture. After being screened to remove fines, the shale is fed to the kiln where it is heated to 2100°F, using No. 2 oil at an average rate of 14 gallons per hour and coal at an average rate of 3,060 lbs. per hour. Expansion of the shale takes place in the kiln.



2. For each process tested list feedstock materials and products. Indicate if activity factors are for feed (F) rate or product (P) rate.

Process ID	Feedstock materials	Products	Basis for activity factor	F/P
1	SHALE, NO 2 OIL, COAL	LWA	SHALE	F

Basis for data: ABSTRACT
(Indicate page/table Nos. in test report)

3. For each process or operation tested and each test run note process capacity and operating rate during test.

Process ID	Capacity	Units	Test run	Process rate	Units
1			1	28 (SHALE)	TONS/HR
			2	28 "	"
			3	28 "	"
			4		
			1	1.53 (COAL)	"
			2	" "	"
			3	" "	"
			4		
			1	NA (NO.2 OIL	GAL/HR
			2	"	"
			3	"	"
			4		
			1		
			2		
			3		
			4		

Basis for data: ABSTRACT

C. Air Pollution Control Systems Tested

1. For each air pollution control system pollution control system identified in A.8, note the following

ID	Type of APCD	Manufacturer	Model No.
2	ESP		

Note: Be as specific as possible in identifying APCD. For example, indicate "pulse jet fabric filter" rather than simply "fabric filter."

2. For each system identified above, provide a narrative description. For fugitive systems describe capture techniques as well as the removal techniques (use a separate page if necessary)

3. Using the attached parameter list for guidance complete the table below. (Use additional pages as needed.)

APCD ID	Parameter	Units	Readings			
			Run 1	Run 2	Run 3	Run 4
Z	INLET FIELD					
Type of APCD:	VOLTAGE	V	160	145	177	
	CURRENT AC	A	28	27	24	
ESP	CURRENT DC	mA	132	127	110	
	OUTLET					
	VOLTAGE	V	207	215	225	
	CURRENT (AC)	A	32	31	32	
	CURRENT (DC)	mA	150	153	160	
Type of APCD:						
Type of APCD:						

D. Sampling and Analysis Methods

1. Complete the following table

Test location	Pollutant	S & A method	Reference/ conditional method	Deviations noted
1	PM	MARYLAND 1005	Y/(N)	Y/(N)
	CO_2	FYRITE	Y/(N)	Y/(N)
			Y/N	Y/N
			Y/N	Y/N
			Y/N	Y/N
			Y/N	Y/N
			Y/N	Y/N
			Y/N	Y/N
			Y/N	Y/N
			Y/N	Y/N
			Y/N	Y/N
			Y/N	Y/N
			Y/N	Y/N
			Y/N	Y/N
			Y/N	Y/N
			Y/N	Y/N
			Y/N	Y/N
			Y/N	Y/N
			Y/N	Y/N
			Y/N	Y/N
			Y/N	Y/N
			Y/N	Y/N
			Y/N	Y/N
			Y/N	Y/N
			Y/N	Y/N

2. If a method used was not a reference or conditional method, provide a narrative discussion including any data manipulation needed to make results correspond to reference or conditional method results.

PM: SAME AS METHOD 5 EXCEPT MINIMUM 50 ft^3 TOTAL SAMPLE VOLUME AND 3 MINUTES SAMPLING TIME PER TRAVERSE POINT REQUIRED

3. Describe any deviations identified above.

NONE

E. Emission Data Documentation

1. Tabulate the following stack gas data from the test report. (Use additional pages as needed.)

Test ID	Parameter	Units	Values reported			
			Run 1	Run 2	Run 3	Run 4
	Stack temperature	°F	424	429	416	
	Moisture	%	7.3	7.7	7.5	
	Oxygen	%	12.1	12.8	12.3	
	Volumetric flow, actual					
	Volumetric flow, standard	DSCFM	17650	17180	17580	
	Percent isokinetic	%	102	101.7	103.2	
	Pollutant concentration:					
	PM (FILT.)	gr/SCFD	0.125	0.112	0.078	
	PM (COND INORG.)	"				
	CO_2	%	8.2	7.4	7.8	
	Stack temperature					
	Moisture					
	Oxygen					
	Volumetric flow, actual					
	Volumetric flow, standard					
	Percent isokinetic					
	Pollutant concentration:					
	Stack temperature					
	Moisture					
	Oxygen					
	Volumetric flow, actual					
	Volumetric flow, standard					
	Percent isokinetic					
	Pollutant concentration:					

2. Tabulate pollutant mass flux rates

Test ID	Pollutant	Units	Mass flux rates Run 1	Run 2	Run 3	Run 4
1	PM (FILT)	lbs/hr	18.3	16.4	11.8	
	PM (COND. INOR	〃	0.66	0.65	1.46	
	CO_2	〃	9978	8764	9453	

3. Present example emission factor calculations below.

PM (FILTERABLE)

18.3/28 = 0.65

16.4/28 = 0.59

11.8/28 = 0.42

AVERAGE: 0.55

PM (CONDENSIBLE INORGANIC)

0.66/28 = 0.024

0.65/28 = 0.023

1.46/28 = 0.052

AVERAGE: 0.033

CO_2

9978/28 = 356

8764/28 = 313

9453/28 = 338

AVERAGE: 336

4. Tabulate emission factors

Process	Pollutant	Units	Average emission factor	
			Uncontrolled	Controlled
1	PM (Filt)	lbs/ton		0.55
	PM cond inor. (I)	"		0.033
	CO_2	"	340	

ATTACHMENT A
APCD PARAMETERS

Type of APCD	Parameters
Fabric filter	Cleaning mechanism Bag type Cleaning frequency Air to cloth ratio (A/C) Pressure drop Inlet temperature
ESP	Type (wet or dry) Number of fields Rapping cycle (if dry) Specific Collection Area (SCA) Particulate resistivity (if known) Spark rate Current and power levels
Venturi (or other high energy) scrubber	Pressure drop Liquid/gas (L/G) ratio Mist eliminator type
Packed-bed scrubber	Packing depth L/G ratio Caustic use (Y/N) pH Mist eliminator type
Carbon absorber	Bed depth Superficial gas velocity Bed temperature Desorption mechanism (media) Flue-gas moisture Cycle length Time-on-line after breakthrough