Note: This is a reference cited in *AP 42, Compilation of Air Pollutant Emission Factors, Volume I Stationary Point and Area Sources.* AP42 is located on the EPA web site at www.epa.gov/ttn/chief/ap42/

The file name refers to the reference number, the AP42 chapter and section. The file name "ref02_c01s02.pdf" would mean the reference is from AP42 chapter 1 section 2. The reference may be from a previous version of the section and no longer cited. The primary source should always be checked.

COMPLIANCE STACK TEST
LONE STAR FLORIDA, INC.
REPORT 276-S COOLER NO. 3

NOT USED FOR SAME REASONS

Reference 36:

(1) Clinker cooler + bhouse

Poor documentation of process, throughput, etc.

Data Rating: D

JUL 21 mon

SOUTH FLORIDA ENVIRONMENTAL SERVICES, INC.

P. O. BOX 112
BELLE GLADE, FLA. 33430
305-996-1524

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INTRODUCTION

Lone Star Florida, Inc. operates a portland cement plant located on Okeechobee Road in Miami, Florida. Materials from the kiln are passed through a clinker cooler. Cooler No. 3 utilizes a baghouse to control particulate emissions. The gases from the baghouse are ducted to a stack and exit approximately 95 feet above the ground.

On July 9, 1980, a particulate emission test was performed on Cooler No. 3. The test was conducted by representatives of South Florida Environmental Services, Inc.

The test was performed in accordance with the applicable methods as set forth in the State of Florida, Department of Environmental Regulation Manual (July 1975).

According to the stack configurations 24 sampling points were selected. These points were divided into four equal traverses and sampled at 2 minutes per point.

The results of the above mentioned test verify compliance with chapter 17-2.04 F.A.C.

STACK TEST FOR PARTICULATE EMISSIONS

REPORT NO. 276-S

RUN NO. 1, 2 and 3

COMPANY Lone Star Florida, Inc.

PLANT Miami Plant

INSTALLATION Cooler No. 3

DATE July 9, 1980

TYPE PROCESS Clinker Cooler

ABATEMENT DEVICE Baghouse

ALLOWABLE EMISSIONS .10 lbs. per ton of feed

POLLUTANT MASS RATE .0997 lbs. per ton of feed

REMARKS

TEST PERFORMED BY W. D. Arlington

ALLOWABLE EMISSIONS

According to State New Source Performance Standards for Portland Cement Plants, emissions from the cooler are limited to .10 lbs. per ton of feed.

Plant production records indicate a feed rate of 170.25 tons per hour of dry feed to the cooler during the testing period.

Applying the above standard, the allowable emissions would be as follows:

Cooler Feed Rate	Allowable Emissions
170.25 tons/hr.	17.03 lbs./hr. (.10 lbs. per ton of feed)

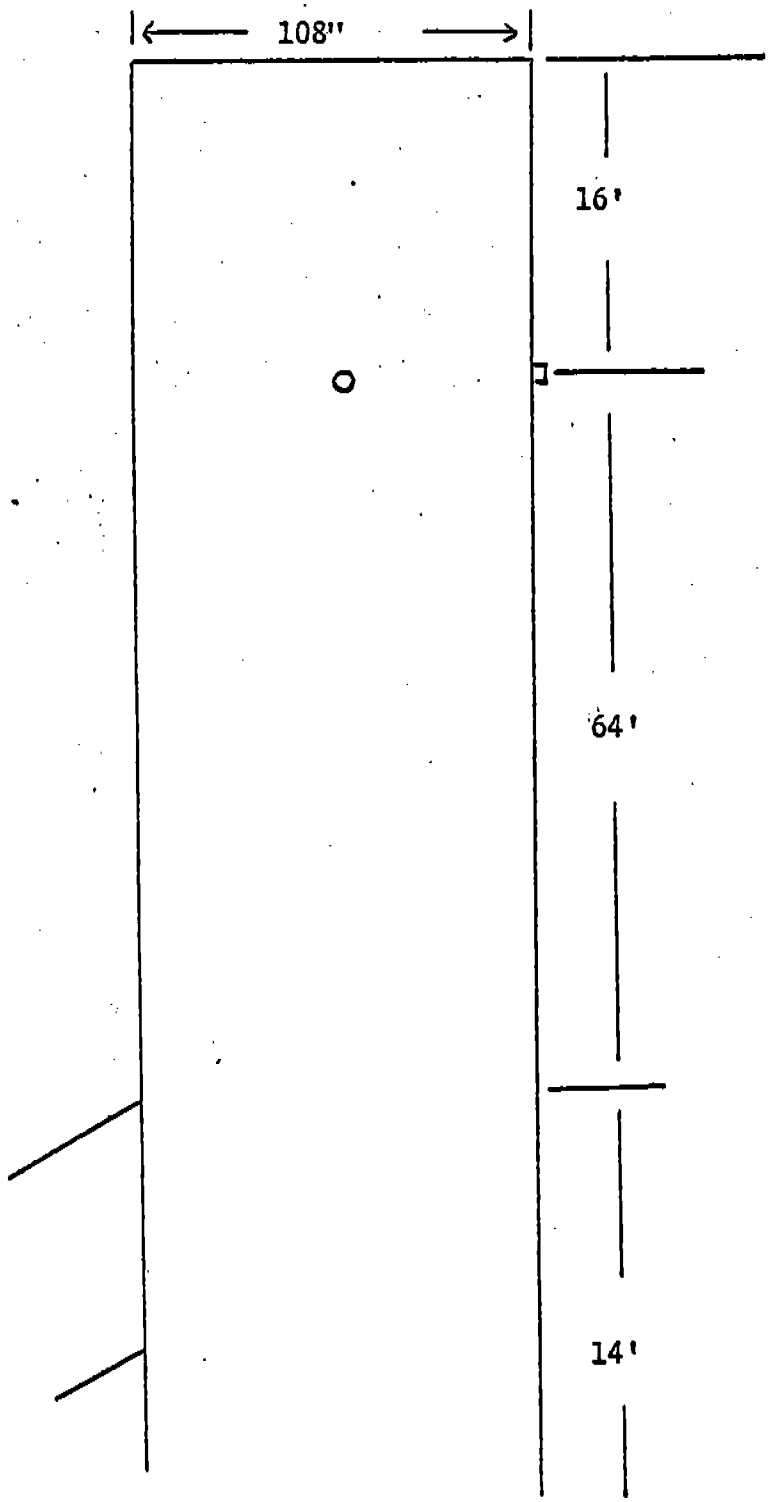
SUMMARY OF RESULTS

	RUN 1	RUN 2	RUN 3	AVERAGE
DATE OF TEST	7-9-80	7-9-80	7-9-80	
EMISSION RATE (LBS./HR.)	11.68	20.81	18.46	16.98
ALLOWABLE EMISSION RATE (LBS./HR.)	17.03	17.03	17.03	17.03
EMISSION RATE (LBS./TON OF FEED)	.0686	.1222	.1084	.0997
ALLOWABLE EMISSION RATE (LBS./TON)	.1000	.1000	.1000	.1000
PERCENT ISOKINETIC	92.37	93.70	92.65	92.91

SUMMARY OF TEST DATA

RUN NO.	STACK AREA FT^3	METERED VOLUME FT^3 STD.	WATER VAPOR VOLUME FT^3	PERCENT MOIST-URE	MOLECULAR WEIGHT	STACK VELOCITY FPM	VOLUMETRIC FLOW RATE STD. SCFM	POLLUTANT MASS RATE LBS/HR.	PERCENT ISOKINETIC
1	63.62	47.29	1.46	3.00	28.61	1943	89528	11.68	92.37
2	63.62	51.81	1.18	2.23	28.70	2096	96677	20.81	93.70
3	63.62	51.27	1.13	2.16	28.70	2125	96748	18.46	92.65
AVG.								16.98	92.91

COOLER No. 3



Drawing not to scale

APPENDIX

SUMMARY OF FIELD DATA

Plant Lonestar Report No. 276-5

	Run No. 1	Run No. 2	Run No. 3
Date	7-9-80	7-9-80	7-9-80
Start Time	9:00 am	10:25 am.	12:40 am.
End Time	9:53 am.	11:24 am.	1:33 p.m.
Nozzle Diameter	.3728	.3728	.3728
Average ΔH	2.93	3.82	3.85
Δ Ha	1.61	1.66	1.66
Static Pressure, Inches H_2O	-.28	-.28	-.28
Volume of Water Condensed, mls.	27	21	20
Y	.99	.99	.99
Stack Diameter, Inches	108	108	108
Vm, Cu. Ft.	49.99	55.69	55.27
PM, Inches Hg	30.32	30.38	30.38
Average Meter Temperature, °F	100.0	110.6	112.3
Barometric Pressure, Hg	30.10	30.10	30.10
Saturation Moisture	100	100	100
Average ΔP	.245	.284	.288
Average Stack Temperature, °F	251.2	256.2	266.0
Cp Factor	.842	.842	.842
Total Particulate Weight, grams	.0467	.0844	.0740
Total Impinger Water Collected, grams	31	25	24
Molecular Weight of Dry Gas, Md.	28.94	28.94	28.94
An, Sq. Ft.	.0007580	.0007580	.0007580
Time in Minutes, θ	48	48	48
No. of Stacks	1	1	1

PARTICULATE FIELD DATA

RT 276-S-1 | ASSUMED MOISTURE % 5 | DIAMETER 108" | AVERAGE Δp .245

7-9-80 | DRY GAS METER NO. 1 | Vm 49.99 | AVG. STACK TEMP. °F 251.2

ATOR Ba | PROBE TIP DIA., IN. 3/8 | Pm 30.32 | Cp FACTOR .842

9:00 a.m - 9:53 a.m. | WET BULB TEMP. — | AVG. METER TEMP. 100.0 | An .0007580

CTOR .92 8:.15 | LEAK CHECK 0.00 @ 25" | BAR. PRESS. "Hg" 30.10 | θ 48

OINT	IN FROM WALL	SAMPLING TIME	DRY GAS METER CU. FT. 89.40....START	PITOT MANOMETER (Δp) in. H_2O Δp	$\sqrt{\Delta p}$	ORIFICE MANOMETER (ΔH)	DRY GAS TEMP. °F INLET	OUTLET	PUMP VACUUM IN. Hg GAUGE	IMPINGER & FILTER TEMP. °F	STACK TEMP. °F
ueT											
1	2.3	2	91.57	.28	.53	3.4	82	83	7		219
2	7.2	"	94.06	.36	.60	4.4	88	83	8	231	250
3	12.7	"	96.84	.47	.69	5.7	93	84	11	52	252
4	19.1	"	99.46	.40	.63	4.8	98	85	9		251
5	27.0	"	101.98	.36	.60	4.4	100	86	8		251
6	38.3	"	104.35	.32	.57	3.9	103	87	7		250
nT											
1	2.3	"	106.37	.22	.47	2.6	100	88	5		246
2	7.2	"	108.36	.25	.50	3.0	103	89	6	255	252
3	12.7	"	110.68	.29	.54	3.5	106	90	7	55	258
4	19.1	"	112.93	.32	.57	3.9	108	91	7		262
5	27.0	"	115.15	.29	.54	3.5	110	92	7		266
6	38.3	"	117.29	.29	.54	3.5	112	93	7		271
aeT											
	2.3	"	119.56	.28	.53	3.4	109	94	7		263
	7.2	"	121.59	.19	.44	2.3	112	96	5	265	263
	12.7	"	123.42	.17	.41	2.1	112	96	4	56	263
	19.1	"	125.01	.16	.40	1.9	112	97	4		262
	27.0	"	126.78	.17	.41	2.1	113	98	4		261
	38.3	"	128.63	.19	.44	2.3	114	99	5		257
rT											
	2.3	"	130.44	.17	.41	2.1	110	100	4		248
	7.2	"	132.23	.17	.41	2.1	113	100	4	263	239
	12.7	"	133.89	.16	.40	1.9	114	101	4	56	233
	19.1	"	135.65	.17	.41	2.1	115	102	4		232
	27.0	"	137.54	.18	.42	2.2	116	102	4		238
	38.3	"	139.39	.19	.44	2.3	117	102	5		241
			49.99	.245	.495	2.93					

PARTICULATE FIELD DATA

PORT 276-S-2	ASSUMED MOISTURE % 3	DIAMETER 108"	AVERAGE Δp .284
DATE 7-9-80	DRY GAS METER NO. 1	Vm 55.169	AVG. STACK TEMP. °F 256.2
OPERATOR Ba	PROBE TIP DIA., IN. 3/8	Pm 30.38	Cp FACTOR .842
TIME 10:25 A.m. - 11:24 A.m.	WET BULB TEMP. —	AVG. METER TEMP. 110.10	An .0007580
K FACTOR .96 R: .14	LEAK CHECK <.02 CFm @ 25"	BAR. PRESS. "Hg" 30.10	θ 48

POINT	IN FROM WALL	SAMPLING TIME	DRY GAS METER CU. FT. 139.75 START	PITOT MANOMETER (Δp) in. H_2O Δp	√Δp	ORIFICE MANOMETER (ΔH)	DRY GAS TEMP. °F INLET	OUTLET	PUMP VACUUM IN. Hg GAUGE	IMPINGER & FILTER TEMP. °F	STACK TEMP. °F
1		2	142.08	.27	.52	3.5	98	98	7		261
2		"	144.52	.34	.58	4.4	102	100	8	227	267
3	S	"	147.17	.40	.63	5.2	107	100	10	54	274
4		"	149.91	.43	.66	5.6	111	100	10		280
5		"	152.84	.48	.69	6.2	114	100	12		280
6		"	155.76	.45	.67	5.8	118	100	11		278
1		"	158.45	.30	.55	3.9	116	101	7		266
2		"	161.20	.44	.66	5.7	118	102	11	264	268
3	A	"	164.21	.51	.71	6.5	121	102	13	54	262
4		"	167.26	.51	.71	6.5	124	103	13		261
5		"	170.00	.39	.62	5.0	125	104	9		260
6		"	172.42	.29	.54	3.7	125	105	7		258
1		"	174.10	.15	.39	2.0	117	105	4		248
2		"	175.85	.16	.40	2.1	118	106	4	234	252
3	M	"	177.88	.18	.42	2.3	120	106	4	56	250
4		"	179.58	.19	.44	2.5	121	106	5		249
5		"	181.65	.21	.46	2.7	123	106	5		247
6		"	183.61	.20	.45	2.6	124	106	5		245
1		"	185.56	.19	.44	2.5	116	106	5		237
2		"	187.48	.19	.44	2.5	117	107	5	234	240
3	C	"	189.40	.20	.45	2.6	118	107	5	53	242
4		"	191.46	.19	.44	2.5	120	107	5		239
5		"	193.38	.21	.46	2.7	121	108	5		240
6		"	195.44	.21	.46	2.7	122	108	5		244
			55.169	.284	.532	3.82	118	68			

PARTICULATE FIELD DATA

EPORT 276-S-3 | ASSUMED MOISTURE % 3 | DIAMETER 108" | AVERAGE Δp .288

ATE 7-9-80 | DRY GAS METER NO. 1 | Vm 5527 | AVG. STACK TEMP. °F 266.0

PERATOR Ba | PROBE TIP DIA., IN. 3/8 | Pm 30.38 | Cp FACTOR .842

ME 12:40 p.m. - 1:33 p.m. | WET BULB TEMP. — | AVG. METER TEMP. 112.3 | An .0007580

FACTOR .96 R = .14 | LEAK CHECK < .02 cfm @ 25" | BAR. PRESS. "Hg" 30.10 | θ 48

POINT	IN FROM WALL	SAMPLING TIME	DRY GAS METER CU. FT. 195.9 START	PITOT MANOMETER (Δp) in. H_2O Δp	√Δp	ORIFICE MANOMETER (ΔH)	DRY GAS TEMP. °F INLET	OUTLET	PUMP VACUUM IN. Hg GAUGE	IMPINGER & FILTER TEMP. °F	STACK TEMP. °F
1		2	198.45	.36	.60	4.6	97	99	8		264
2		"	201.27	.45	.67	5.8	104	99	11	222	265
3	S	"	204.24	.49	.70	6.3	108	100	12	52	267
4		"	207.67	.48	.69	6.2	114	100	12		267
5		"	210.26	.48	.69	6.2	117	100	12		267
6		"	212.87	.39	.62	5.0	120	101	9		267
1		"	214.67	.38	.62	4.9	117	102	9		262
2	A	"	217.25	.39	.62	5.0	120	102	9	244	269
3		"	220.11	.45	.67	5.8	122	103	11	53	268
4		"	222.65	.31	.56	4.0	124	104	7		265
5		"	225.06	.28	.53	3.6	125	106	7		266
6		"	227.42	.29	.54	3.8	125	106	7		264
1		"	229.16	.17	.41	2.2	118	106	4		264
2	M	"	231.11	.19	.44	2.5	120	107	5	239	265
3		"	232.95	.18	.42	2.4	122	107	5	56	260
4		"	234.90	.19	.44	2.5	122	108	5		261
5		"	236.91	.22	.47	2.8	123	108	5		270
6		"	239.32	.22	.47	2.8	124	109	5		278
1		"	241.36	.22	.47	2.8	120	109	5		267
2		"	243.42	.23	.48	2.9	123	110	5	240	269
3	e	"	245.49	.22	.47	2.8	124	110	5	56	270
4		"	247.23	.15	.39	2.0	124	110	4		258
5		"	248.88	.13	.36	1.7	124	110	4		263
6		"	251.17	.30	.55	3.9	125	111	7		269
			55.27	.288	.537	3.85	112.3				

LABORATORY DATA SHEET

RUN NUMBER 276-S-1 DATE 7-10-80

FINAL WEIGHT OF FILTER # 772 .4112 GRAMS

TARE WEIGHT OF FILTER .3817 GRAMS

WEIGHT GAIN: .0295 GRAMS

FINAL WEIGHT OF EVAPORATING DISH: 98.6190 GRAMS

TARE WEIGHT OF EVAPORATING DISH: 98.6003 GRAMS

WEIGHT GAIN: .0187 GRAMS

ML. ACETONE IN DISH 150 x .00010 RESIDUE .0015 GRAMS

WEIGHT GAIN MINUS RESIDUE: .0172 GRAMS

TOTAL PARTICULATE WEIGHT: .04167 GRAMS

TOTAL IMPINGER WATER: 227 MLS.

IMPINGER AT START: 200 MLS.

TOTAL WEIGHT OF SILICA GEL: 204 GRAMS

INITIAL WEIGHT OF SILICA GEL: 200 GRAMS

TOTAL IMPINGER WATER COLLECTED: 31 GRAMS

ORSAT ANALYSIS

CO_2 _____ x .44 = _____

O_2 _____ x .32 = _____

CO _____ x .28 = _____

N_2 (BALANCE) _____ x .28 = _____

MOLECULAR WEIGHT OF DRY GAS MD: 28.94

KB
ANALYST

LABORATORY DATA SHEET

RUN NUMBER 2716-S-2 DATE 7-10-80

FINAL WEIGHT OF FILTER # 773 .4470 GRAMS

TARE WEIGHT OF FILTER .3826 GRAMS

WEIGHT GAIN: .0644 GRAMS

FINAL WEIGHT OF EVAPORATING DISH: 97.9047 GRAMS

TARE WEIGHT OF EVAPORATING DISH: 97.8832 GRAMS

WEIGHT GAIN: .0215 GRAMS

ML. ACETONE IN DISH 150 x .000010 RESIDUE .0015 GRAMS

WEIGHT GAIN MINUS RESIDUE: .0200 GRAMS

TOTAL PARTICULATE WEIGHT: .0844 GRAMS

TOTAL IMPINGER WATER: 221 MLS.

IMPINGER AT START: 200 MLS.

TOTAL WEIGHT OF SILICA GEL: 204 GRAMS

INITIAL WEIGHT OF SILICA GEL: 200 GRAMS

TOTAL IMPINGER WATER COLLECTED: 25 GRAMS

ORSAT ANALYSIS

CO_2 _____ x .44 = _____

O_2 _____ x .32 = _____

CO _____ x .28 = _____

N_2 (BALANCE) _____ x .28 = _____

MOLECULAR WEIGHT OF DRY GAS MD: 28.94

KB
ANALYST

LABORATORY DATA SHEET

RUN NUMBER 276-5-3 DATE 7-10-80

FINAL WEIGHT OF FILTER # 774 .4372 GRAMS

TARE WEIGHT OF FILTER .3825 GRAMS

WEIGHT GAIN: .0547 GRAMS

FINAL WEIGHT OF EVAPORATING DISH: 95.7551 GRAMS

TARE WEIGHT OF EVAPORATING DISH: 95.7346 GRAMS

WEIGHT GAIN: .0205 GRAMS

ML. ACETONE IN DISH 125 x .000010 RESIDUE .0013 GRAMS

WEIGHT GAIN MINUS RESIDUE: .0193 GRAMS

TOTAL PARTICULATE WEIGHT: .0740 GRAMS

TOTAL IMPINGER WATER: 220 MLS.

IMPINGER AT START: 200 MLS.

TOTAL WEIGHT OF SILICA GEL: 204 GRAMS

INITIAL WEIGHT OF SILICA GEL: 200 GRAMS

TOTAL IMPINGER WATER COLLECTED: 24 GRAMS

ORSAT ANALYSIS

CO_2 _____ x .44 = _____

O_2 _____ x .32 = _____

CO _____ x .28 = _____

N_2 (BALANCE) _____ x .28 = _____

MOLECULAR WEIGHT OF DRY GAS MD: 28.94

KB
ANALYST

SOURCE NAME	SOURCE ID NUMBER	OBSERVATION DATE
Lone Star Florida, Inc.		7/9/80

ADDRESS	OBSERVER'S NAME (PRINT)
Okeechobee Rd.	William D. Arlington
	ORGANIZATION: South Florida Environmental Services, Inc.

STATE	ZIP	PHONE	CERTIFIED BY
Fla.		823-8800	State of Florida

70° 70° SUN SHADOW LINE

DATE: 4/18/80

Cooler #3

PROCESS	OPERATING MODE
Clinker Cooler	Normal
CONTROL EQUIPMENT	**OPERATING MODE**
Bag Collector	Normal

DESCRIBE EMISSION POINT

EMISSION POINT HEIGHT ABOVE GROUND LEVEL	EMISSION POINT HEIGHT RELATIVE TO OBSERVER
92'	60°
DISTANCE TO EMISSION POINT	**DIRECTION TO EMISSION POINT**
103'	292°

DESCRIBE EMISSIONS

COLOR OF EMISSIONS

CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☐

WATER VAPOR PRESENT NO ☒ YES ☐

IF YES, IS PLUME ATTACHED ☐ DETACHED ☐

AT WHAT POINT WAS OPACITY DETERMINED

DESCRIBE BACKGROUND: Scattered clouds

COLOR OF BACKGROUND	SKY CONDITIONS
blue - white	
WIND SPEED	**WIND DIRECTION**
0 - 5 mph	East
AMBIENT TEMPERATURE	**RELATIVE HUMIDITY**

COMMENTS

START TIME 11:48 A.M. STOP TIME 12:18 P.M.

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

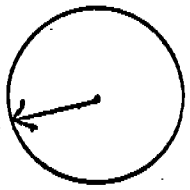
AVERAGE OPACITY: 0 %

NUMBER OF READINGS ABOVE ____ % WERE ____

RANGE OF OPACITY READINGS FROM ____ TO ____

SOURCE LAYOUT SKETCH

DRAW NORTH ARROW



X EMISSION PT.

OBSERVER'S SIGNATURE	DATE	I HAVE RECEIVED A COPY OF THESE OPACITY OBSERVATIONS.
W. D. Arlington	7/9/80	SIGNATURE
VERIFIED BY		TITLE / DATE / /

LONE STAR FLORIDA, INC.
Cement and Aggregate Division
Post Office Box 122035
Palm Village Station
Hialeah, Florida 33012
(305) 823-8800

July 9, 1980

Mr. Bill Arlington
South Florida Environmental Services, Inc.
P. O. Box 112
Belle Glade, Florida 33430

RE: Process Weights

Dear Mr. Arlington:

During the kiln feed-end stack test, the process weight was 155.25 tons of dry feed plus 15.0 tons/hour of insufflated dust giving a total dry process weight of 170.25 tons/hour. This process weight was also identical on July 9, 1980 when the cooler stack was tested.

If you have any questions, please contact me.

Sincerely,

Albert W. Townsend
Coordinator of Ecological Planning

AWT/dc

CC: T. Mendez

CALIBRATION DATA

Pitot Tube No. P-4 Date May 29, 1979

Run No.	ΔP Std. (in. H_2O)	ΔPs (in. H_2O) Side A	Side B	CpS	Deviation
1	.41	.57	.58	.840	.008
2	.42	.58	.58	.842	.0
3	.43	.59	.58	.845	.007

Average CpS .842

$$Cp\ (S) = .99 \sqrt{\frac{\Delta P\ (Std)}{\Delta P\ (S)}}$$

Dry Gas Meter No. 1 P_b 29.78 Date May 26, 1980

ΔH (in. H_2O)	*CF_w	CF_d	T_w °F	IT_d °F	OT_d °F	Time (t) (min.)	Y	ΔH_a
0.3	2.47	2.50	75	84	84	7.31	1.00	1.47
0.5	4.87	5.00	76	93	86	11.38	.99	1.53
1.0	4.82	5.00	76	100	91	8.18	.99	1.60
2.0	9.55	10.00	77	107	94	11.52	.99	1.61

$$Y = \frac{CF_w\ P_b\ (T_d + 460)}{CF_d\ (P_b + \frac{\Delta H}{13.6})\ (T_w + 460)} \qquad \Delta H_a = \frac{0.0317\ \Delta H}{P_b\ (OT_d + 460)} \cdot \left[\frac{(T_w + 460)\ t}{CF_w}\right]^2$$

Thermometers - Calibrated To 32°F and 212°F Date of Calibration 1-05-80

	Number	Ice Bath	Boiling Water
Filter Holder	TC-2	32° F	214° F
Impinger Outlet	T-1	33° F	212° F
Meter Inlet	T-2	30° F	213° F
Meter Outlet	T-3	32° F	213° F
Stack	TC-1	32° F	214° F

Probe Nozzle Calibration - Date 7-09-80 Nozzle Area .0007580

Diameter - 3/8A = .373, .372, .372, .372, .373 = .3728

* Using dry test meter in place of wet test meter.

NOMENCLATURE

A = Area, ft^2

D = Diameter, ft

ΔH = Orifice pressure differential, inches H_2O = Δ m

M = Molecular weight

P = Absolute pressure, inches Hg

Δp = Pitot tube pressure differential, inches H_2O

Q = Volumetric flow rate, scfm dry

T = Absolute temperature, °R

tpw = Total particulate weight

V = Volume, ft^3

v = Face velocity, ft/min

O = Time in minutes

pmr = Pollutant mass rate, lb/hr

r = Radius

C = Correction factor

SUBSCRIPTS

d = Dry gas or dry bulb

m = At meter

n = At nozzle

p = Of pitot

s = At stack

wv = Water vapor ft^3

wc = Water collected grams

std = Standard conditions 68°F, 29.92" Hg

SCFM = Standard cubic feet per minute