AP42 Section:	11.7
Reference:	23
Title:	Emission Test Report--Plant A, Roller Kiln, May 1994, Document No. 4602-01-02, Confidential Business Information Files, Contract No 68-D2-0159, Assignment No. 2-01, U. S. Environmental Protection Agency, Research Triangle Park, NC, June 8, 1995.

[redacted]

MONOPOROSA ROLLER KILN

MAY 23, 1994

[redacted]

AP-42 Section 8.7
Reference 23
Report Sect. 4
Reference 21

EMISSIONS TEST REPORT

MONOPOROSA ROLLER KILN

MAY 23, 1994

Prepared For:

7

Prepared By:

[redacted]

JUNE 22, 1994

TABLE OF CONTENTS

I. SUMMARY

On May 23, 1994 [redacted] conducted fluoride and particulate emissions tests for annual compliance certification at [redacted]. The source tested was the Monoporosa Roller Kiln operating under [redacted].

The tests were conducted by [redacted] and [redacted] of [redacted] with the assistance and cooperation of employees of [redacted].

A summary of the fluoride and particulate test results is shown in Table 1. The average fluoride emission rate was 0.198 lb/hr, less than the maximum allowable emission rate of 3.0 lb/hr. The average particulate emission rate was 0.0048 gr/dscf, less than the maximum allowable emission rate of 0.03 gr/dscf. No visible emissions were observed during the one hour test, conducted on April 14, 1994 (previously submitted). During the test, the kiln was processing green tile at the normal production rate of 2.5 tons per hour.

All emission rates were determined according to the procedures prescribed by the [redacted] and the tested source was found to be in compliance with applicable emission standards.

I hereby certify that these results are true and correct and were obtained by the procedures and methods described herein.

Respectfully Submitted;

[redacted]
Environmental Specialist II

[redacted]
Test Team Chief

TABLE 1

TEST SUMMATION

PLANT:

SOURCE: MONOPOROSA KILN

PARAMETER: PART.&FLUORIDE

DATE: 5-23-94

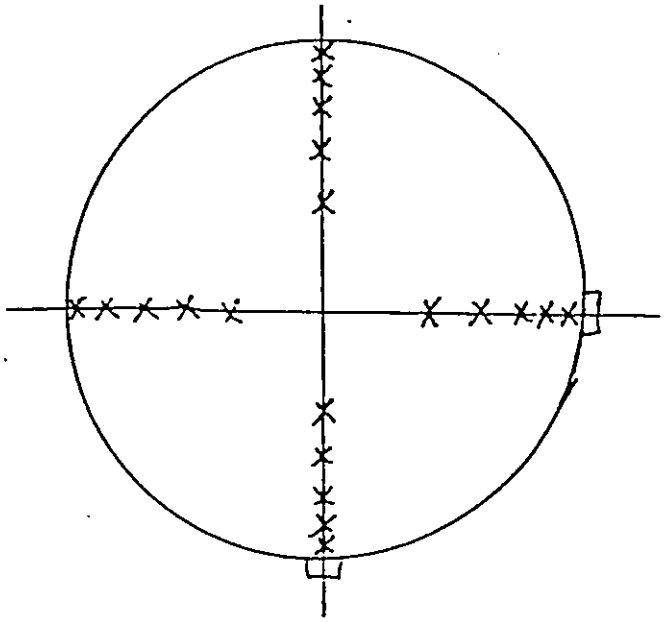
RUN NO.	SAMPLE VOL. (DSCF)	FLOWRATE (ACFM)	FLOWRATE (DSCFM)	WATER CONTENT (%)	STACK TEMP. (deg F)	ISO KINETIC (%)	PARTICULATE EMISSIONS (gr/dscf)	PARTICULATE EMISSIONS (lb/hr)	FLOURIDE EMISSIONS (lb/hr)
1	30.422	9341	4726	7.48	512	95.4	0.0047	0.19	0.236
2	32.318	9253	4728	6.68	510	96.1	0.0048	0.20	0.203
3	31.104	9320	4742	6.42	517	97.2	0.0048	0.20	0.154
Average		9305	4732	6.86	513	96.2	0.0048	0.19	0.198
						* ALLOWABLE	0.0300		3.000

* Allowable emissions per Permit No.

II. SOURCE DESCRIPTION

[redacted] is a ceramic tile manufacturing plant operating a Sacmi brand monoporosa roller kiln. The kiln is direct fired using natural gas. The kiln has two stacks, one located at the tile discharge end of the kiln and one at the tile feed end of the kiln. During the test, all emissions were routed through the stack located at the tile feed end of the kiln. The damper on the stack at the tile discharge end of the kiln was observed to be closed during emission testing.

The tested stack was 24.8 inches in diameter with two ports 90 degrees apart. The sampling port locations were 4.6 stack diameters upstream and approximately 4.8 stack diameters downstream from disturbances in the exhaust flow. A diagram of the stack is shown in Figure 1.



24.8 inch Diameter Stack

Sampling Point	Distance From Stack Wall (Inches)
1	0.6 *
2	2.0
3	3.6
4	5.6
5	8.5
6	16.3
7	19.2
8	21.2
9	22.8
10	24.2 *

* Note: Points 1 & 10 Relocated to 1.0" From Stack Wall.

FIGURE 1

.ONOPOROSA ROLLER KILN
SAMPLING POINT LOCATION

III. METHODS AND PROCEDURES

The modified Method 13B sampling train was assembled as shown in Figure 2 for each fluoride/particulate test. A five foot probe with a heated stainless steel liner was used for all test runs. Stack temperature measurements were conducted at each point during sampling.

The first and second impingers were each charged with 100 ml of distilled, deionized water; the third was dry; and the fourth was filled with known weight of indicator-grade silica gel. Crushed ice was placed around the impingers during sampling to maintain the temperature of the gas leaving the last impinger below 68°F.

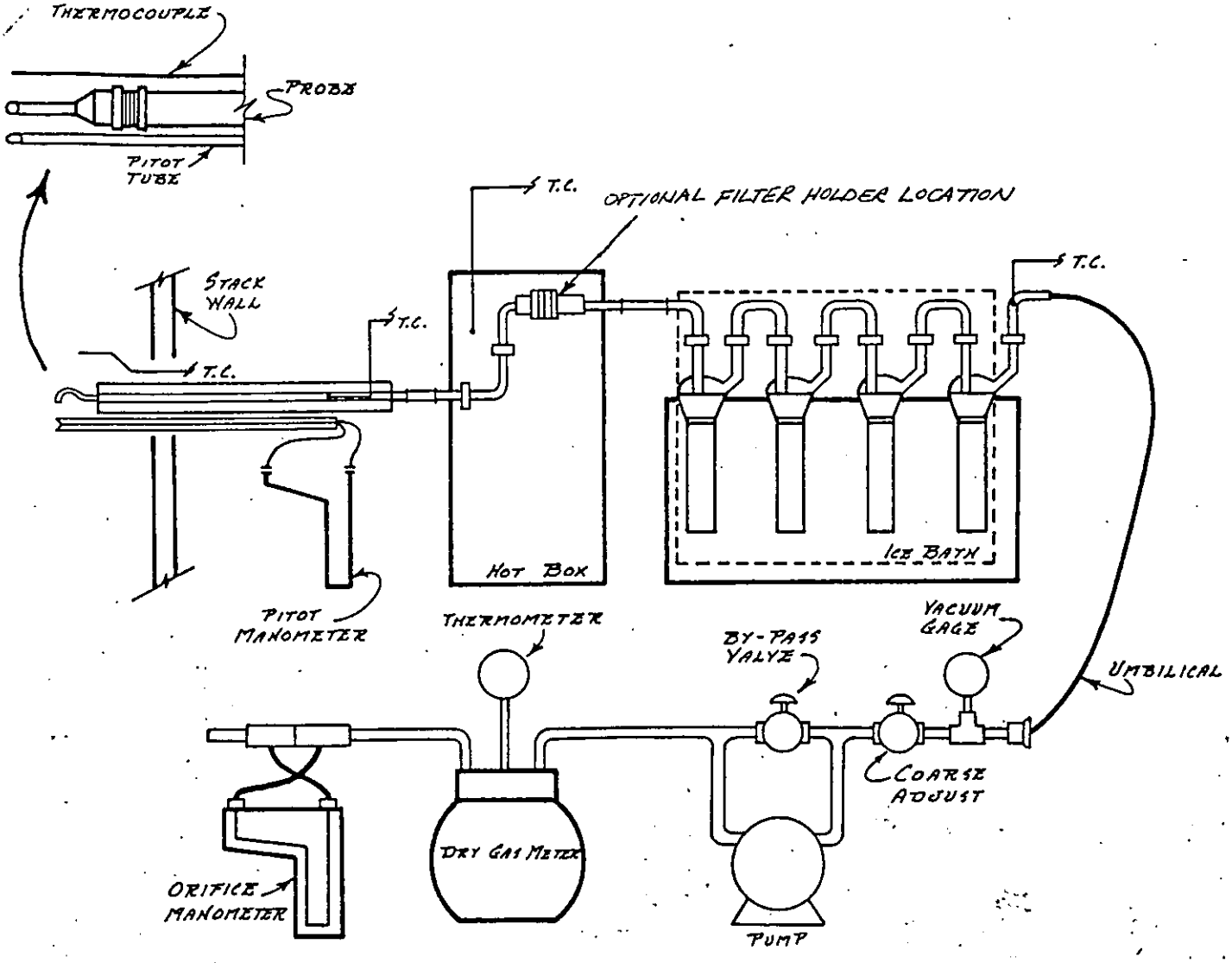
A heated glass microfiber filter in a glass filter holder was placed between the probe and the first impinger.

Leak tests were performed on the sampling train before and after each sampling run by blocking the nozzle inlet. No leakages were observed at vacuum levels at or exceeding those experienced during sampling.

Each sampling run consisted of 20 points, 10 points through each of two ports. Each point was sampled for three minutes, giving a total test time of 60 minutes per run.

At the end of each run, the volume of water collected in the first three impingers was measured and the silica gel in the fourth impinger was weighed to the nearest 0.5 gram to determine the volume of water collected. The impinger contents and a deionized distilled water rinse of the impingers and connecting glassware up to the filter were collected in a sample storage container for subsequent laboratory analysis. The filter bell, probe and nozzle were rinsed with acetone and collected in a separate sample bottle for subsequent particulate analysis according to EPA Method 5 procedures.

Upon completion of the gravimetric analysis of the particulate sample, the particulate residue in beakers, the filters, as well as the impinger, samples collected plus a blank sample of distilled water, acetone residue blank and an unused filter were analyzed for total fluorides by , Inc. The analyses were performed using a specific ion electrode procedures as described in EPA Method 13B.



PARTICULATE / FLUORIDE SAMPLING TRAIN
MODIFIED EPA METHOD 13B

Figure 2

APPENDIX A

TEST DATA AND CALCULATIONS

SUMMARY OF TEST DATA

Plant:

Source: MONOPOROSA KILN

Emission:PART.&FLUORIDE

	RUN 1	RUN 2	RUN 3
Test Date:	5-23-94	5-23-94	5-23-94
Test Interval:	0920-1021	1100-1202	1213-1314
Test Time, min.:	60	60	60
Stack Area, sq. ft.:	3.353	3.353	3.353
Nozzle Diameter, in.:	0.263	0.27	0.263
Barometric Pressure, in. Hg.:	30.10	30.10	30.10
Absolute Stack Pressure, in. Hg.:	30.14	30.13	30.13
Volume Liquid Collected, ml.:	52.2	49.1	45.3
Stack Moisture (measured value), %	7.5	6.7	6.4
Stack Moisture (saturated value), %	5362.2	5291.3	5621.8
Stack Gas Temperature, deg F:	512	510	517
Sample Volume, DSCF:	30.4222	32.3180	31.1041
Gas Velocity, FPS:	46.430	45.994	46.328
Gas Flowrate, ACFM:	9341	9253	9320
Gas Flowrate, DSCFM:	4726	4728	4742
Particulate Collected, mg:	0.009	0.010	0.010
Acid Mist Concentration, lb/DSCF:	4.72E-03	4.82E-03	4.81E-03
Emission Rate, lb/hr:	0.19	0.20	0.20
Percent Isokinetic, %:	95.4	96.1	97.2

CALCULATIONS

PLANT:
SOURCE: MONOPOROSA KILN
PARAMETER:PART.&FLUORIDE
DATE: 5-23-94

RUN NO.	1		2		3	
Cp=	0.84		0.84		0.84	
Y=	1.012		1.012		1.012	
Dn=	0.263	inches	0.27	inches	0.263	inches
An=	3.773E-04	sq. ft.	3.976E-04	sq. ft.	3.773E-04	sq. ft.
Pb =	30.10	in Hg	30.10	in Hg	30.10	in Hg
Ps =	30.14	in Hg	30.13	in Hg	30.13	in Hg
As =	3.353	sq. ft.	3.353	sq. ft.	3.353	sq. ft.
Time=	60	min	60	min	60	min
Vm =	30.800	DCF	32.943	DCF	32.002	DCF
Vm(COR)=	30.800	DCF	32.943	DCF	32.002	DCF
dH=	0.93	in. H2O	1.06	in. H2O	0.93	in. H2O
Tm=	545	deg R	549	deg R	554	deg R
Ts=	972	deg R	970	deg R	977	deg R
Vlc=	52.2	ml.	49.1	ml.	45.3	ml.
SQRTdPavg=	0.6044		0.6000		0.6025	
Mn=	0.0093	mg	0.0101	mg	0.0097	mg
F=	11.50	mg	10.50	mg	7.62	mg
Vms=	30.4222	DSCF	32.3180	DSCF	31.1041	DSCF
Vw=	2.4586	SCF	2.3126	SCF	2.1336	SCF
Bws=	0.0748		0.0668		0.0642	
Bws(sat)=	53.62		52.91		56.22	
Md=	29	assumed	29	assumed	29	assumed
Ms=	28.1775		28.2654		28.2939	
Vs=	46.4296	FPS	45.9945	FPS	46.3280	FPS
Qs=	4726	DSCFM	4728	DSCFM	4742	DSCFM
Qa=	9341	ACFM	9253	ACFM	9320	ACFM
I=	95.4	%	96.1	%	97.2	%
Cs=	0.0047	gr/dscf	0.0048	gr/dscf	0.0048	gr/dscf
E=	0.191	lb/hr	0.195	lb/hr	0.196	lb/hr
Ef=	0.2363	lb/hr	0.2031	lb/hr	0.1536	lb/hr

Vms=17.64*Vm*Y*(Pb+dH/13.6)
Vw=.0471*Vlc
Bws=Vw/(Vw+Vms)
Md=0.44(%CO2)+0.32(%O2)+0.28(%CO+%N2)
Ms=Md(1-Bws)+18*Bws
Vs=85.49*Cp*SQRTdPavg*SQRT(Ts/Ps*Ms)
Qs=1058*(1-Bws)*Vs*As*(Ps/Ts)
Qa=60*As*Vs
I=100*Vm(std)*As/(Time*Qs*An)
Cs=15.43*Mn/Vms
E=Cs*Qs/116.67
Ef=2.205E-6*60*F*Qs/Vms

PLANT 1 2 SOURCE Monoporosa K/h

NOZZLE I.D. NO. 9
DIA 1 .264
DIA 2 .263
DIA 3 .263
AVERAGE .263

FINAL VOLUME	773.500
INITIAL VOLUME	742.700
NET VOLUME	30.800

RUN NO Orio.
DATE 5/23/94
OPERATORS [redacted]
METER BOX NO [redacted]
FILTER NO 113

NOMOGRAPH VALUES	
ΔH@ 1.929	C FACTOR .612
Tm	AVG ΔP
VmH2O 80	Ts 540
REFERENCE 2.55	

BAROMETRIC PRESSURE 30.10
STATIC PRESSURE +0.55
AMBIENT TEMPERATURE
PROBE LENGTH 5
PROBE LINER 9/a.ss
PORT LENGTH
PORT DIAMETER 3"
METER SYSTEM LEAK-CHECK 0.006 @ 5
ORSAT LEAK-CHECK ✓
SAMPLE BAG LEAK-CHECK

SCHEMATIC OF STACK
CROSS SECTION
SAMPLING SITE
PORT LOCATION

TRAVERSE POINT NUMBER	SAMPLING TIME CLOCK	SAMPLING TIME SAMPLE	STACK TEMP (Ts) °F	VELOCITY HEAD (ΔPs)	VELOCITY HEAD (√ΔPs)	ORIFICE METER (ΔH)	GAS SAMPLE VOLUME (Vm) ft³	DRY GAS METER TEMP (Tm) °F	PROBE TEMP °F	SAMPLE BOX TEMP °F	TEMP OF GAS LEAVING LAST IMPINGER °F	PUMP VACUUM GAUGE in. Hg
	0920						742.700					
1-1		3	513	.33		.84	744.200	75	231	233	62	6
2		6	515	.33		.84	745.70	76	233	234	50	6
3		9	517	.33		.84	747.12	78	242	238	43	6
4		12	510	.34		.87	748.67	78	245	240	41	5.5
5		15	511	.35		.89	750.17	81	247	260	41	5
6		18	511	.35		.89	751.67	84	249	253	42	5
7		21	517	.42		1.07	753.32	85	249	240	42	6
8		24	517	.42		1.07	755.00	84	256	252	42	6
9		27	513	.46		1.17	756.71	86	251	268	42	6
10		30	516	.47		1.20	758.43	87	251	263	41	6.5
2-1		33	507	.30		.77	759.95	87	252	249	42	4
2		36	505	.30		.77	761.30	87	250	250	42	4
3		39	510	.33		.84	762.92	87	237	251	40	4
4		42	510	.33		.84	764.25	87	243	255	39	4
5		45	510	.33		.84	765.80	86	260	263	34	4.5
6		48	512	.35		.89	767.30	86	245	269	39	4.0
7		51	510	.35		.89	768.79	85	245	244	39	4
8		54	509	.37		.94	770.46	84	250	232	34	5
9		57	511	.37		.94	771.96	84	249	246	39	5
10	1021	60	512	.37		.94	773.500	84	251	252	40	5
TOTAL												
AVERAGE												

STATIC PITOT LEAK-CHECK @ 15 sec	✓
IMPACT PITOT LEAK-CHECK @ 15 sec	✓
TRAIN LEAK RATE @ 60 sec 0.00 cf @	in

VOLUME OF LIQUID WATER COLLECTED	IMPINGER WEIGHT (g) OR VOLUME (ml) 1	2	3	4
FINAL	140	106	0	271.2
INITIAL	100	100	0	271.0
LIQUID COLL	40	6	0	6.2
TOTAL VOLUME		52.2		

GAS MEASUREMENTS					
	TIME	CO_2	O_2	CO	N_2
1					
2					
3					
4					

SIGNATURE [redacted]

PLANT _____ SOURCE Monoyerosa Kiln

NOZZLE I.D. NO. 2A	
DIA 1	.270
DIA 2	.269
DIA 3	.270
AVERAGE	.270

FINAL VOLUME	807.003
INITIAL VOLUME	774.050
NET VOLUME	32.943

RUN NO Two
DATE 5/23/94
OPERATORS [redacted]
METER BOX NO [redacted]
FILTER NO 114

NOMOGRAPH VALUES	
ΔH@	C FACTOR
Tm	AVG ΔP
%H2O	Ts
REFERENCE	2.95

BAROMETRIC PRESSURE 30.16
STATIC PRESSURE +0.40
AMBIENT TEMPERATURE 88
PROBE LENGTH 3
PROBE LINER glass
PORT LENGTH
PORT DIAMETER 3"
METER SYSTEM LEAK-CHECK 0.000@15
ORSAT LEAK-CHECK ✓
SAMPLE BAG LEAK-CHECK ✓

SCHEMATIC OF STACK
CROSS SECTION
SAMPLING SITE
PORT LOCATION

TRAVERSE POINT NUMBER	SAMPLING TIME CLOCK	SAMPLING TIME SAMPLE	STACK TEMP (Ts) °F	VELOCITY HEAD (ΔPs)	VELOCITY HEAD (√ΔPs)	ORIFICE METER (ΔH)	GAS SAMPLE VOLUME (Vm) ft³	DRY GAS METER TEMP (Tm) °F	PROBE TEMP °F	SAMPLE BOX TEMP °F	TEMP OF GAS LEAVING LAST IMPINGER °F	PUMP VACUUM GAUGE in. Hg
							774.05					
1-1	1100	3	509	.33		.97	775.60	87	237	246	67	5
2		6	509	.33		.97	777.17	87	238	254	65	5
3		9	509	.33		.97	778.77	86	246	261	65	5
4		12	513	.32		.97	780.33	87	229	259	63	5
5		15	513	.35		1.03	782.00	86	229	262	63	5.5
6		18	517	.35		1.03	783.70	87	232	256	60	5.0
7		21	507	.40		1.18	785.30	88	239	246	61	6.0
8		24	506	.40		1.18	787.02	88	245	250	61	5.5
9		27	507	.37		1.09	788.68	89	252	252	61	5.5
10		30	504	.37		1.09	790.02	89	254	253	61	5.5
2-1		33	506	.30		.89	791.87	89	253	256	60	4
2		36	510	.35		1.03	793.51	90	251	253	62	5.0
3		39	509	.35		1.03	795.16	90	250	253	62	5.0
4		42	515	.35		1.03	796.76	91	238	253	60	5.0
5		45	516	.37		1.09	798.40	91	239	253	61	6.0
6		48	515	.37		1.09	800.01	91	232	252	60	6.0
7		51	514	.37		1.09	801.80	91	235	246	63	5.5
8		54	510	.35		1.03	803.45	92	241	251	63	5.5
9		57	510	.35		1.03	805.10	92	240	249	64	5.5
10	1202	60	509	.50		1.48	807.003	92	241	247	63	8
TOTAL												
AVERAGE												

STATIC PITOT LEAK-CHECK @ 15 sec	✓
IMPACT PITOT LEAK-CHECK @ 15 sec	✓
TRAIN LEAK RATE @ 60 sec	0.0 cf@10 in

VOLUME OF LIQUID WATER COLLECTED	IMPINGER WEIGHT (g) OR VOLUME (ml) 1	2	3	4
FINAL	126	104	0	278.7
INITIAL	100	100	0	269.6
LIQUID COLL.	36	4	0	9.1
TOTAL VOLUME		49.1		

GAS MEASUREMENTS				
	TIME	CO_2	O_2	CO	N_2
1					
2					
3					
4					

SIGNATURE [redacted]

PLANT ____________ SOURCE Moncparosa Kiln

NOZZLE I.D. NO. 911	
DIA 1	
DIA 2	
DIA 3	
AVERAGE	.263

FINAL VOLUME	839.002
INITIAL VOLUME	807.000
NET VOLUME	32.002

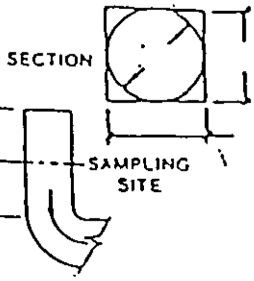
RUN NO Three
DATE 5/23/84
OPERATORS [redacted]
METER BOX NO [redacted]
FILTER NO 115

NOMOGRAPH VALUES
ΔH@ ____ C FACTOR ____
Tm ____ AVG ΔP ____
%H2O ____ Ts ____
REFERENCE ____

BAROMETRIC PRESSURE 30.10
STATIC PRESSURE +0.46
AMBIENT TEMPERATURE 89
PROBE LENGTH 5'
PROBE LINER glass
PORT LENGTH ____
PORT DIAMETER 3"
METER SYSTEM LEAK-CHECK 0.00@15
ORSAT LEAK-CHECK ✓
SAMPLE BAG LEAK-CHECK ✓

SCHEMATIC OF STACK

CROSS SECTION



PORT LOCATION

TRAVERSE POINT NUMBER	SAMPLING TIME CLOCK	SAMPLING TIME SAMPLE	STACK TEMP (Ts) °F	VELOCITY HEAD (ΔPs)	VELOCITY HEAD (√ΔPs)	ORIFICE METER (ΔH)	GAS SAMPLE VOLUME (Vm) ft³	DRY GAS METER TEMP (Tm) °F	PROBE TEMP °F	SAMPLE BOX TEMP °F	TEMP OF GAS LEAVING LAST IMPINGER °F	PUMP VACUUM GAUGE in. Hg
							807.00					
1-1	1213	3	501	.33		.84	809.11	93	229	232	67	4.5
2		6	516	.33		.84	810.64	93	238	234	65	4.5
3		9	519	.35		.89	812.20	92	260	231	64	5.0
4		12	518	.35		.89	813.80	92	251	232	63	5.0
5		15	518	.35		.89	815.23	92	250	240	60	5.0
6		18	517	.35		.89	816.80	93	248	257	58	5.0
7		21	519	.37		.94	818.40	93	267	254	56	5.0
8		24	520	.37		.94	820.00	94	267	257	55	5
9		27	519	.37		.94	821.50	94	271	256	54	5
10		30	520	.40		1.02	823.02	94	268	246	59	6
2-1		33	510	.30		.77	824.60	95	255	255	56	4.5
2		36	506	.30		.77	826.10	95	256	257	54	4.5
3		39	529	.35		.89	827.70	94	257	251	54	5
4		42	516	.35		.89	829.20	95	251	252	54	5
5		45	529	.35		.89	830.70	95	260	247	55	5
6		48	522	.40		1.02	832.40	96	261	248	57	5.5
7		51	518	.37		.94	834.00	96	260	250	56	5.0
8		54	516	.43		1.10	835.69	95	262	247	58	6
9		57	513	.43		1.10	837.25	96	264	251	60	6
10	1314	60	519	.43		1.10	839.002	95	261	240	61	6
TOTAL												
AVERAGE												

STATIC PITOT LEAK-CHECK @ 15 sec ✓
IMPACT PITOT LEAK-CHECK @ 15 sec ✓
TRAIN LEAK RATE @ 60 sec 0.0 cf@10in

VOLUME OF LIQUID WATER COLLECTED	IMPINGER WEIGHT (g) OR VOLUME (ml) 1	2	3	4
FINAL	132	104	0	270.8
INITIAL	100	100	0	261.5
LIQUID COLL.	32	4	0	9.3
TOTAL VOLUME		45.3		

GAS MEASUREMENTS

	TIME	CO_2	O_2	CO	N_2
1					
2					
3					
4					

SIGNATURE [redacted]

[redacted]

6-Jun-1994
Page 1

Report For:

Sample Identification:

Impinger solution/Filter 113 attn: [redacted]
Run 1, Monoporoson kiln

Date Received: 27-May-1994

Laboratory Number:

CERTIFICATE OF ANALYSIS

Method	Parameter	Result	Units
40CFR Part 60 App.A Method 13B			
EPA	Total Fluoride in Solution & Filter	11.5	mg
	Volume of Solution	395	mL

[redacted]

RECEIVED
JUN 9 1994

[redacted]

6-Jun-1994
Page 1

Report For:

Sample Identification:

Impinger solution/Filter 114 attn: [redacted]
Run 2. Monoporoson kiln

Date Received: 27-May-1994

Laboratory Number:

CERTIFICATE OF ANALYSIS

Method	Parameter	Result	Units
40CFR Part 60 App.A Method 13B			
EPA	Total Fluoride in Solution & Filter	10.5	mg
	Volume of Solution	445	mL

[redacted]

[redacted]

6-Jun-1994
Page 1

Report For:

Sample Identification:

Impinger solution/Filter 115 attn: [redacted]
Run 3, Monoporoson kiln

Date Received: 27-May-1994

Laboratory Number:

CERTIFICATE OF ANALYSIS

Method	Parameter	Result	Units
40CFR Part 60 App.A Method 13B			
	Total Fluoride in Solution & Filter	7.62	mg
EPA			
	Volume of Solution	387	mL

[redacted]

[redacted]

6-Jun-1994
Page 1

Report For:

Sample Identification:

Impinger solution/Filter 116 Run 4, Blank

attn: [redacted]

Date Received: 27-May-1994

Laboratory Number:

CERTIFICATE OF ANALYSIS

Method	Parameter	Result	Units
40CFR Part 60 App.A Method 13B			
	Total Fluoride in Solution & Filter	0.004	mg
EPA			
	Volume of Solution	100	mL

[redacted]

APPENDIX B

VISIBLE EMISSION TEST REPORT

ENVIRONMENTAL ENGINEERING CONSULTANTS, INC.

VISIBLE EMISSION OBSERVATION FORM

SOURCE NAME: Monoporosa Kiln	PROJECT NUMBER:
LOCATION: [redacted]	OBSERVATION DATE: 4/14/94
	OBSERVER'S NAME (PRINT): [redacted]
	CERTIFIED BY: EEA — DATE: March 2 1994
PROCESS: Tile Kiln	CONTROL EQUIPMENT: N/A
DESCRIBE EMISSION POINT: 16' rusty stack on roof above kiln.	
EMISSION POINT HEIGHT ABOVE GROUND LEVEL: 35'	EMISSION POINT HEIGHT RELATIVE TO OBSERVER: 10'
DISTANCE TO EMISSION POINT: 25'	DIRECTION TO EMISSION POINT: NW
DESCRIBE EMISSIONS: None	
COLOR OF EMISSIONS: —	CONTINUOUS / INTERMITTENT / FUGITIVE
WATER VAPOR PRESENT: (NO) / YES	IF YES, IS PLUME ATTACHED / DETACHED
AT WHAT POINT WAS OPACITY DETERMINED: Lip of the stack	
DESCRIBE BACKGROUND: Overcast Grey Sky	
COLOR OF BACKGROUND: Grey	SKY CONDITIONS: Overcast
WIND SPEED: 0-7 mph	WIND DIRECTION: South
AMBIENT TEMPERATURE: 79°	RELATIVE HUMIDITY: 90%

START TIME: 8:45 AM — STOP TIME: 9:45 AM

	15	30	45	60		15	30	45	60
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

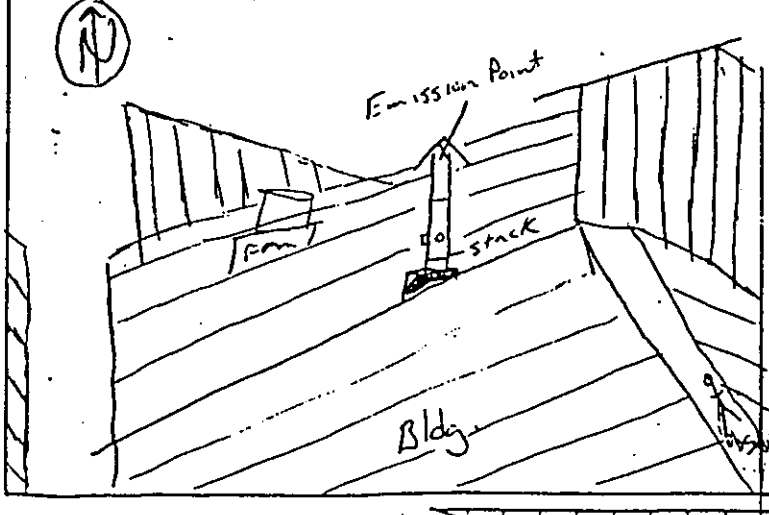
AVERAGE OPACITY: 0 — NUMBER OF READINGS ABOVE: 0 : 0 % WERE

OBSERVER'S SIG[redacted] — DATE: 4/14/94

REMARKS

PROCESS RATE: 2.5 TPH

SOURCE LAYOUT SKETCH



[redacted] has completed the [redacted] ified

THIS CERTIFICATE EXPIRES Sep 1, 1994

[redacted]

CERTIFICATE OFFICER [redacted] SIGNATURE

APPENDIX C

PROCESS WEIGHT STATEMENT

[redacted]

PROCESS RATE STATEMENT

COMPANY: [redacted]

SOURCE: Monoporosa Kiln

DATE: May 23, 1994

	TIME	PROCESS RATE
RUN NO. 1	0920-1021	4928 lbs/hr
RUN NO. 2	1100-1202	4980 lbs/hr
RUN NO. 3	1213-1314	5000 lbs/hr

[redacted]
SIGNATURE

MONOPOROSA MANAGER
TITLE

5-23-94
DATE

APPENDIX D

CALIBRATION DATA

SUMMARY OF EQUIPMENT CALIBRATION

Equipment	Calib. Date	Place	Method	Results
Nozzle #9A	05/23/94	On-Site	3 measurements w/ vernier caliper	Dn=0.274
Nozzle #9B	05/23/94	"		Dn=0.263
Pitot Tube P-1	03/25/94	[redacted]	EPA Method	Cp=0.84
Pitot Tube P-5	03/24/95	"		Cp=0/84
Meter Console [redacted]	01/17/94	[redacted]	Wet Test Meter	Y=1.012 H@=1.929
Post-Test Check	05/31/94	[redacted]	Wet Test Meter	Y=0.999
Thermocouples (Console [redacted])	03/18/94	[redacted]	Comparison to ASTM Thermometer	Correct to ±1%

TYPE S PITOT TUBE INSPECTION DATA FORM

Pitot tube assembly level? X yes _____ no

Pitot tube openings damaged? _____ yes (explain below) X no

P_A .529 cm (in.) P_B .519 cm (in.)

D_t = .375 cm (in.) $A = P_A + P_B$ = 1.048 cm (in.)

α_1 = 10 ° (<10°), α_2 = 0 ° (<10°), β_1 = 0.5 ° (<5°),

β_2 = 0.5 ° (<5°)

γ = 2 °, θ = 1 °

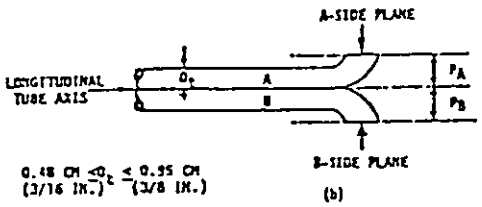
$z = A \sin \gamma$ = 0.0365 cm (in.); <0.32 cm (<1/8 in.),

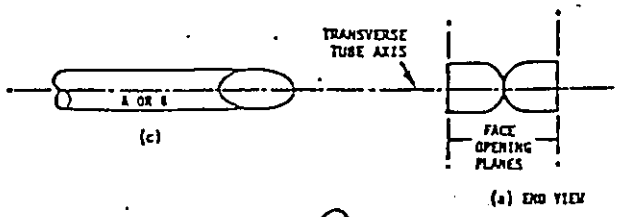
$w = A \sin \theta$ = 0.0183 cm (in.); <.08 cm (<1/32 in.)

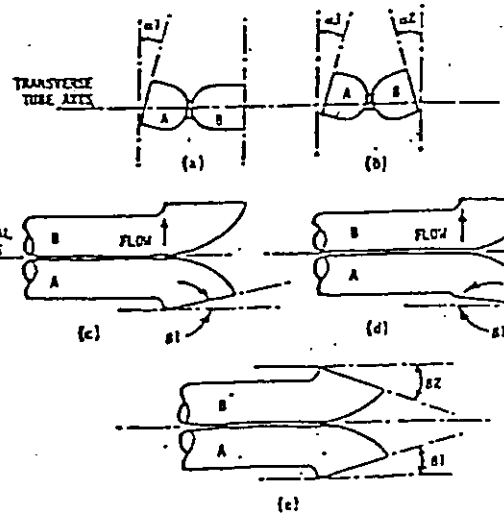
Comments: Meets Specifications

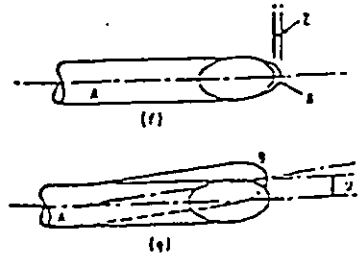
Cp = 0.84

Calibration required? _____ yes X no









Pitot tube I.D. Number: P-1

Inspection Date: 3/25/94

Inspected By: [redacted]

TYPE S PITOT TUBE INSPECTION DATA FORM

Pitot tube assembly level? X yes _____ no

Pitot tube openings damaged? ____ yes (explain below) X no

P_A .1430 cm (in.) P_B .1396 cm (in.)

D_t = .376 cm (in.) $A = P_A + P_B$ = .1826 cm (in.)

α_1 = 1 ° (<10°), α_2 = 2 ° (<10°), β_1 = 1 ° (<5°),

β_2 = 3 ° (<5°)

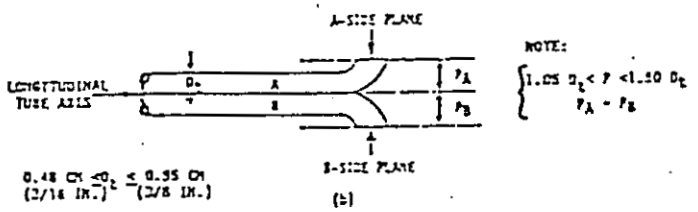
γ = 0 °, ϵ = 2 °

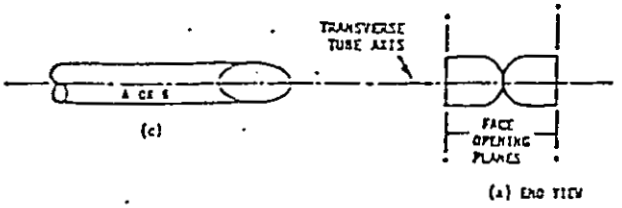
$z = A \sin \gamma$ = 0 cm (in.); <0.32 cm (<1/8 in.),

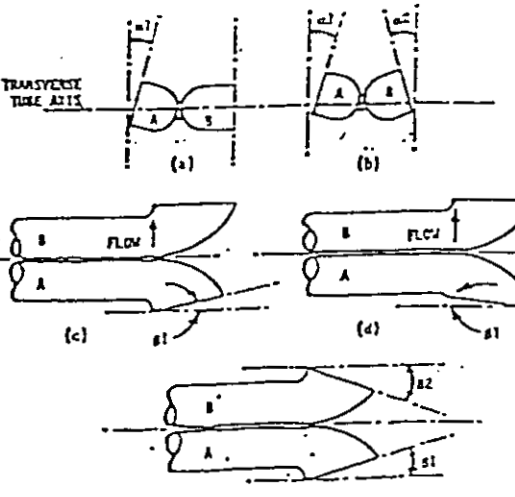
$w = A \sin \epsilon$ = .0289 cm (in.); <.08 cm (<1/32 in.)

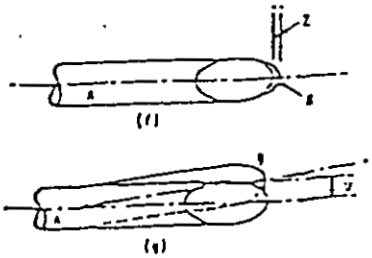
Comments: Meets Spec. $C_D = 0.84$

Calibration required? ____ yes X no









Pitot tube I.D. Number: P-5

Inspection Date: 3/25/94

Inspected By: [redacted]

[redacted]

DGM Calibration

Technician: [redacted] DATE:1/17/94

Control Box No.: [redacted] SDGM:

Barometer ("Hg): 29.990 Ys: 0.9980

^Hd ("H2O) [dHd]	Net SDGM Volume (ft3) [Vs]	Net DGM Volume (ft3) [Vd]	SDGM Temp (F) [ts]	DGM In (F)	DGM Out (F)	DGM Avg. (F) [td]	Time (min)	Vacuum Setting ("Hg)	Y	dHa ("H2O)
0.50	5.706	5.634	67.0	67	67	67.0	15	3	1.010	1.9247
1.00	8.115	8.000	68.0	68	70	69.0	15	3	1.012	1.9068
1.50	10.591	10.424	68.0	72	76	74.0	16	3	1.022	1.8962
2.00	12.896	12.829	68.0	73	77	75.0	17	3	1.012	1.9215
2.50	12.596	12.555	68.0	74	78	76.0	15	3	1.010	1.9564
3.00	13.765	13.714	68.0	74	78	76.0	15	3	1.009	1.9658
									1.012	1.929

dHd RANGE	CRITERIA
0.069	<0.15"H20

Thermocouple Check

EEC-2: 75 F = 535 R

ASTM: 68 F = 528 R

DIFFERENCE % : 0.09

Calibration Performed By

[redacted]

Y=[Vs*Ys*Pbar*(td+460)]/[Vd*(Pbar+(dHd/13.6))*(ts+460)]

dHa=[Pb(0.0317*dH/(td+460)[(tw*460)*Time/Vw]^2

SDGM= Standard Dry Gas Meter

Recheck of Orifice and DGM Calibration

Technician: [redacted] Date: 5/31/94

Control Box No.: [redacted] SDGM: 30593

Barometer ("Hg): 30.010 Ys: 0.9990

Monoporosa Kiln

^Hd ("H2O) [dHd]	Net SDGM Volume (ft3) [Vs]	Net DGM Volume (ft3) [Vd]	SDGM Temp (F) [ts]	DGM In (F)	DGM Out (F)	DGM Avg. (F) [td]	Time (min)	Vacuum Setting ("Hg)
1.50	9.801	9.804	85.0	85	84	84.5	15	15
1.50	9.796	9.766	80.0	83	82	82.5	15	15
1.50	9.770	9.771	80.0	84	82	83.0	15	15

Y(1)= 0.994

Y(2)= 1.003

Y(3)= 1.001

Y(avg)= 0.999

Prior Y = 1.012

Diff.= 1.3%

Thermocouple Check

EEC-2 83.33 F = 543. R

ASTM: 81 F = 541 R

DIFFERENCE: 0.43%

Calibration Performed By [redacted]

Y=[Vs*Ys*Pbar*(td+460)]/[Vd*(Pbar+(dHd/13.6))*(ts+460)]

SDGM= Standard Dry Gas Meter

PYROMETER/THERMOMETER CALIBRATION

IDENTIFICATION	DATE	REFERENCE TEMP. °F(ASTM-Hg)	INDICATION TEMP. °F	REFERENCE MEDIUM	CORRECTION
#1	3/18/94	538°	539°	Ambient	0.19%
		502°	499°	Ice Water	0.60%
		674°	674°	Boiling Water	0%
		840°	842°	Hot Oil	0.24%
#2	3/18/94	538°	537°	Ambient	0.19%
		502°	500°	Ice Water	0.40%
		674°	673°	Boiling Water	0.15%
		840°	842°	Hot Oil	0.24%
#3	3/18/94	538°	539°	Ambient	0.19%
		502°	502°	Ice Water	0%
		674°	674°	Boiling Water	0%
		840°	843°	Hot Oil	0.35%
Fluke	3/18/94	538°	539°	Ambient	0.19%
		502°	499.2	Ice Water	0.56%
		674°	675°	Boiling Water	0.15%
		850°	849°	Hot Oil	0.12%
DGM Dial	3/18/94	538°	536°	Ambient	0.37%

[redacted]

APPENDIX E

CHAIN OF CUSTODY

Chain -of- Custody

(wr c. "t manual.

Sample Identification	Transferred From: Signature:	Date	Time	Transferred To: Signature:	Date	Time	Comments:
Monoporosa Kiln Run 1 Beaker # 415 Filter # 113 EPA Meth. 13 B [redacted]	[redacted]	5/23/94	0930	[redacted]	5/23/94	0930	Report Results To: [redacted]
	[redacted]	5/27/94	1110	[redacted]	5/27/94	1110	
Monoporosa Kiln Run 2 Beaker # 468 Filter # 114 EPA Meth. 13B [redacted]	[redacted]	5/23/94	1100	[redacted]	5/23/94	1100	Please be Very Careful This time!
	[redacted]	5/27/94	1110	[redacted]	5/27/94	1110	
Monoporosa Kiln Run 3 Beaker # 613 Filter # 115 EPA Meth 13B [redacted]	[redacted]	5/23/94	1230	[redacted]	5/23/94	1230	Method 13 B
	[redacted]	5/27/94	1110	[redacted]	5/27/94	1110	
Monoporosa Kiln Run 4 (Blank) Beaker # 157 Filter # 116 EPA Meth 13B [redacted]	[redacted]	5/23/94	1245	[redacted]	5/23/94	1245	
	[redacted]	5/27/94	1110	[redacted]	5/27/94	1110	

[redacted]

[redacted] Consulting

[redacted]

LETTER OF TRANSMITTAL

DATE	JOB NO.
June 29, 1994	[redacted]
RE	

TO Mr. [redacted] - Air Section

GENTLEMEN:

WE ARE SENDING YOU ☒ Attached ☐ Permit Applications ☐ Report ☐ Review Fees
☐ Shop Drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications

COPIES	NO.	DESCRIPTION
1		Annual compliance test conducted on the Monoporosa Kiln located at the above-referenced facility on May 23, 1994.

THESE ARE TRANSMITTED as checked below:

☐ For approval ☒ For Your use ☐ As requested

REMARKS

If you have any questions, please call me at [redacted]

[redacted]

COPY TO [redacted] SIGNED: [redacted] Environmental Tech. II