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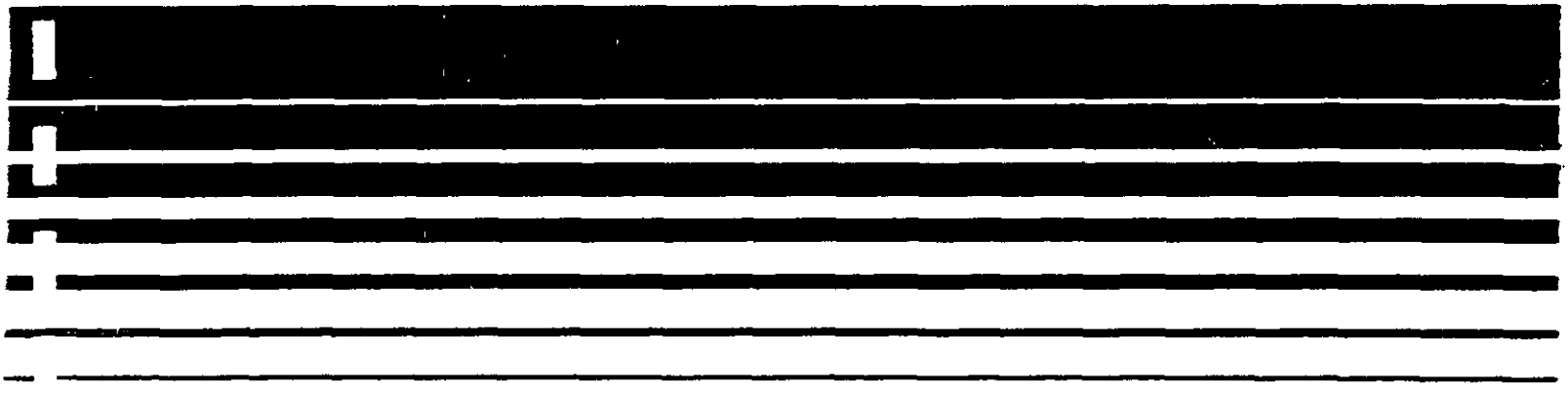
EPA

Building Brick and Structural Clay Industry

Emission Test Report Lee Brick and Tile Company Sanford, North Carolina



BUILDING BRICK AND STRUCTURAL CLAY INDUSTRY

Lee Brick and Tile Company
Sanford, North Carolina

Prepared for the

U.S. Environmental Protection Agency
Emission Measurement Branch
Research Triangle Park, North Carolina 27711

Prepared by

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EMB REPORT NO. 80-BRK-1

Work Assignment 22

Contract No. 68-02-2817

TABLE OF CONTENTS

TABLE OF CONTENTS (CONTINUED)

LIST OF FIGURES

LIST OF TABLES

1.0 INTRODUCTION

The U.S. Environmental Protection Agency (EPA) retained Clayton Environmental Consultants, Inc. to conduct an emission study at Lee Brick and Tile Company, in Sanford, North Carolina. The purpose of the study was to determine various emission data from the kiln/dryer exhausts (four locations) under two operating conditions. The results of this study will be used in research and development efforts for supporting New Source Performance Standards for the Building Brick and Structural Clay Industry. This study was commissioned as EMB Project No. 80-BRK-1, Contract No. 68-02-2817, Work Assignment No. 22.

Testing was conducted under two kiln firing conditions: low ash coal (Condition 1), and high ash coal (Condition 2). Table 1.1 presents the distribution of the various tests conducted.

Auxiliary data gathered for each source included exhaust gas compositions, moistures, temperatures, and flowrates. Figure 1.1 presents a plan view of the four sampling locations. A list of the project participants is presented in Appendix A.

TABLE 1.1. TESTING PROGRAM PROTOCOL

Test Type[1]	North Kiln		South Kiln		Bottom Kiln		Dryer	
	Cond. 1	Cond. 2	Cond. 1	Cond. 2	Cond. 1	Cond. 2	Cond. 1	Cond. 2
Particulate	3	1	3	1	3	1	3	1
Nitrogen Oxides	1	0	1	0	1	0	1	0
Sulfur Oxides	1	0	1	0	1	0	1	0
Particle Size	1	1	1	1	1	0	1	0
Coal Sample (Sulfur and ash content)	3	1	3	1	3	1	3	1
Opacities	Recorded for the duration of each particulate run.				-	-	-	-

[1]Clay samples were acquired from each brick car which was in the kiln during sulfur oxide sampling.

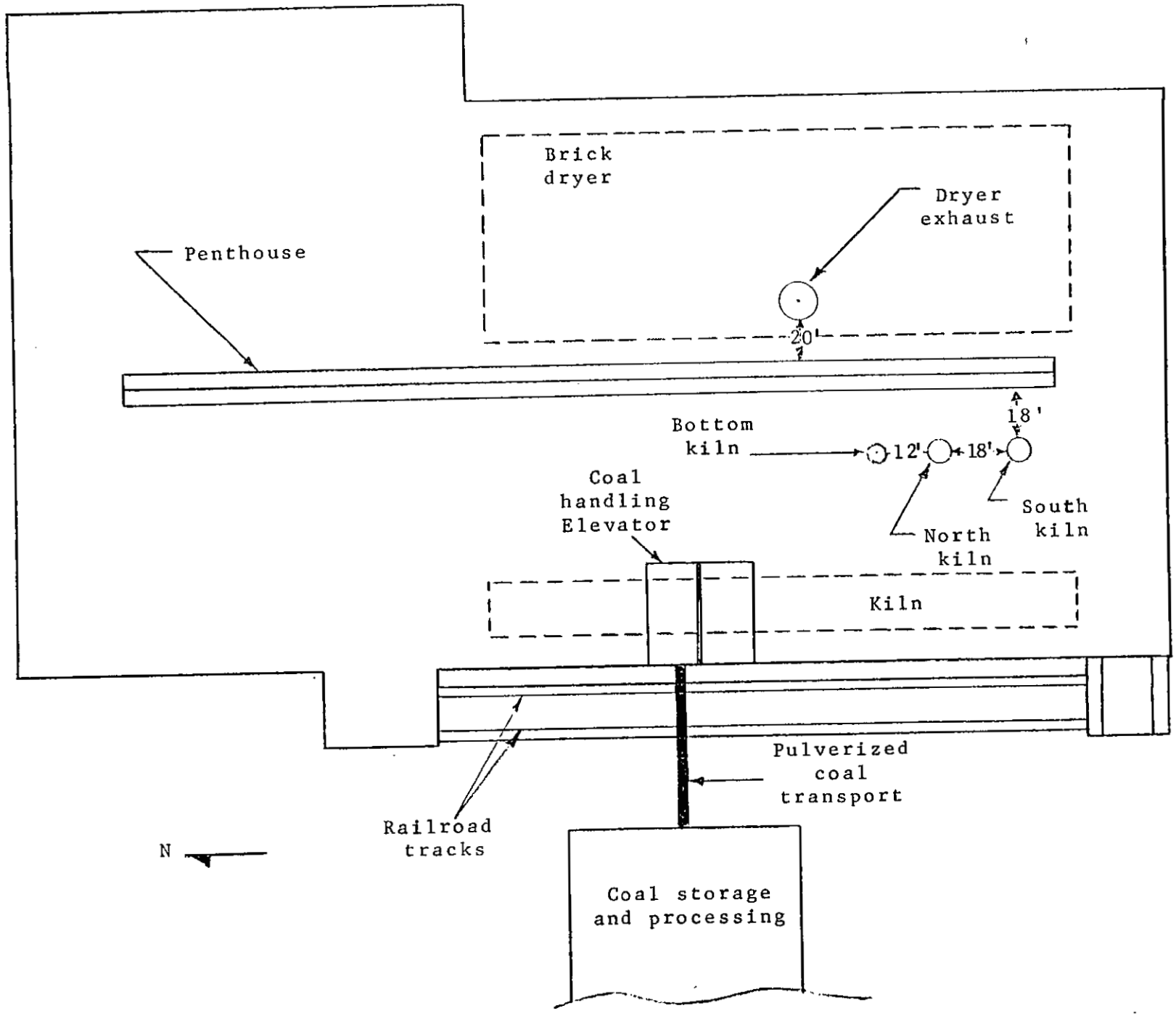

Figure 1.1. Plant roof and source layout (plan view).

2.0 SUMMARY AND DISCUSSION OF RESULTS

For all particulate, sulfur oxide, nitrogen oxide, and gas composition results discussed in this section, Sample Nos. 1, 2, and 3 were collected during Condition 1 (low ash coal) and Sample No. 4 during Condition 2 (high ash coal). Field data sheets are presented in Appendix B.

PARTICULATE EMISSIONS

Table 2.1 presents a summary of the particulate concentrations and emission rates for each of the four sampling locations. All results from Sample Nos. 1, 2, and 3 representing Condition 1 are averaged for each location, and results from Sample No. 4, representing Condition 2, are shown separately. Concentrations are presented in grains per dry standard cubic foot (gr/dscf) and milligrams per dry standard cubic meter (mg/dscm). Emission rates are presented in pounds per hour (lb/hr) and kilograms per hour (kg/hr).

North Kiln

Filterable particulate concentrations for Sample Nos. 1, 2, and 3 ranged from 0.133 to 0.151 gr/dscf (305 to 346 mg/dscm) and averaged 0.143 gr/dscf (328 mg/dscm). Total particulate concentrations ranged from 0.144 to 0.161 gr/dscf (329 to 368 mg/dscm) and averaged 0.155 gr/dscf (355 mg/dscm). The filterable

TABLE 2.1. PARTICULATE CONCENTRATIONS AND EMISSION RATES

Sampling Location	Sample Number[a]	1980 Date	Stack Gas Parameters		Concentration				Emis	
			Flowrate	Temp	Filterable		Total		Filterable	
			dscfm	F	gr/dscf	mg/dscm	gr/dscf	mg/dscm	lb/hr	kg/h
North Kiln	1	1-9	6,840	520	0.133	305	0.144	329	7.81	3.54
	2	1-10	6,800	520	0.146	334	0.161	368	8.51	3.86
	3	1-11	6,860	489	0.151	346	0.161	367	8.89	4.03
	Average		6,830	510	0.143	328	0.155	355	8.40	3.81
	4	1-12	7,280	496	0.190	434	0.190	436	11.8	5.36
South Kiln	1	1-9	10,600	184	0.035	80.1	0.037	85.4	3.19	1.45
	2	1-10	10,500	192	0.036	82.4	0.037	84.7	3.24	1.47
	3	1-11	10,100	197	0.035	80.8	0.037	84.9	3.05	1.38
	Average		10,400	191	0.035	81.1	0.037	85.0	3.16	1.43
	4	1-12	10,500	192	0.053	120	0.057	131	4.74	2.15
Bottom Kiln	1	1-9	4,200	136	0.004	8.96	0.007	15.8	0.141	0.06
	2	1-10	4,230	130	0.004	9.80	0.006	13.1	0.155	0.07
	3	1-11	3,970	144	0.003	7.08	0.005	11.3	0.105	0.04
	Average		4,130	137	0.004	8.61	0.006	13.4	0.134	0.06
	4	1-12	4,230	144	0.006	13.6	0.007	16.5	0.215	0.09
Dryer	1	1-9	45,800	84.1	0.001	2.13	0.004	8.14	0.366	0.16
	2	1-10	47,000	82.1	0.002	3.58	0.003	7.92	0.630	0.28
	3	1-11	45,800	81.9	0.001	2.71	0.003	7.20	0.466	0.21
	Average		46,200	82.7	0.001	2.81	0.003	7.75	0.487	0.22
	4	1-12	45,700	83.9	0.001	2.52	0.004	8.07	0.430	0.19

Sample Nos. 1, 2, and 3 were collected during Condition 1 with Sample No. 4 collected during Condi
sampling locations.

TABLE 2.1. PARTICULATE CONCENTRATIONS AND EMISSION RATES

Sampling Location	Sample Number[a]	1980 Date	Stack Gas Parameters		Concentration				Emission Rate			
					Filterable		Total		Filterable		Total	
			Flowrate dscfm	Temp F	gr/dscf	mg/dscm	gr/dscf	mg/dscm	lb/hr	kg/hr	lb/hr	kg/hr
North Kiln	1	1-9	6,840	520	0.133	305	0.144	329	7.81	3.54	8.43	3.82
	2	1-10	6,800	520	0.146	334	0.161	368	8.51	3.86	9.36	4.25
	3	1-11	6,860	489	0.151	346	0.161	367	8.89	4.03	9.44	4.28
	Average		6,830	510	0.143	328	0.155	355	8.40	3.81	9.08	4.12
	4	1-12	7,280	496	0.190	434	0.190	436	11.8	5.36	11.9	5.39
South Kiln	1	1-9	10,600	184	0.035	80.1	0.037	85.4	3.19	1.45	3.40	1.54
	2	1-10	10,500	192	0.036	82.4	0.037	84.7	3.24	1.47	3.33	1.51
	3	1-11	10,100	197	0.035	80.8	0.037	84.9	3.05	1.38	3.20	1.45
	Average		10,400	191	0.035	81.1	0.037	85.0	3.16	1.43	3.31	1.50
	4	1-12	10,500	192	0.053	120	0.057	131	4.74	2.15	5.16	2.34
Bottom Kiln	1	1-9	4,200	136	0.004	8.96	0.007	15.8	0.141	0.064	0.248	0.113
	2	1-10	4,230	130	0.004	9.80	0.006	13.1	0.155	0.070	0.208	0.094
	3	1-11	3,970	144	0.003	7.08	0.005	11.3	0.105	0.048	0.168	0.076
	Average		4,130	137	0.004	8.61	0.006	13.4	0.134	0.061	0.208	0.094
	4	1-12	4,230	144	0.006	13.6	0.007	16.5	0.215	0.098	0.261	0.118
Dryer	1	1-9	45,800	84.1	0.001	2.13	0.004	8.14	0.366	0.166	1.40	0.633
	2	1-10	47,000	82.1	0.002	3.58	0.003	7.92	0.630	0.286	1.39	0.632
	3	1-11	45,800	81.9	0.001	2.71	0.003	7.20	0.466	0.211	1.23	0.560
	Average		46,200	82.7	0.001	2.81	0.003	7.75	0.487	0.221	1.34	0.608
	4	1-12	45,700	83.9	0.001	2.52	0.004	8.07	0.430	0.195	1.38	0.626

ample Nos. 1, 2, and 3 were collected during Condition 1 with Sample No. 4 collected during Condition 2, for all sampling locations.

emission rate ranged from 7.81 to 8.89 lb/hr (3.54 to 4.03 kg/hr) and averaged 8.40 lb/hr (3.81 kg/hr). The total emission rate ranged from 8.43 to 9.44 lb/hr (3.82 to 4.28 kg/hr) and averaged 9.08 lb/hr (4.12 kg/hr). The filterable concentration for Sample No. 4 was 0.190 gr/dscf (434 mg/dscm). Total particulate concentration was 0.190 gr/dscf (436 mg/dscm). The filterable and total emission rates were 11.8 lb/hr (5.36 kg/hr) and 11.9 lb/hr (5.39 kg/hr), respectively.

South Kiln

During Condition 1, filterable particulate concentrations ranged from 0.035 to 0.036 gr/dscf (80.1 to 82.4 mg/dscm) and averaged 0.035 gr/dscf (81.1 mg/dscm). Total particulate concentrations were 0.037 gr/dscf for each sample (ranging from 84.7 to 85.4 mg/dscm, averaging 85.0 mg/dscm). The filterable and total emission rates ranged from 3.05 to 3.24 lb/hr (1.38 to 1.47 kg/hr), and 3.20 to 3.40 lb/hr (1.45 to 1.54 kg/hr), respectively, averaging 3.16 lb/hr (1.43 kg/hr) and 3.31 lb/hr (1.50 kg/hr), respectively. The concentrations of filterable and total particulate for Sample No. 4 were 0.053 gr/dscf (120 mg/dscm) and 0.057 gr/dscf (131 mg/dscm), respectively. The filterable and total emission rates were 4.74 lb/hr (2.15 kg/hr) and 5.16 lb/hr (2.34 kg/hr), respectively.

Bottom Kiln

Filterable particulate concentrations for Sample Nos. 1, 2, and 3 ranged from 0.003 to 0.004 gr/dscf (7.08 to 9.80 mg/dscm) and averaged 0.004 gr/dscf (8.61 mg/dscm). Total particulate concentrations ranged from 0.005 to 0.007 gr/dscf (11.3 to 15.8 mg/dscm) averaging 0.006 gr/dscf (13.4 mg/dscm). The emission rates of filterable and total particulat ranged from 0.105 to 0.155 lb/hr (0.048 to 0.070 kg/hr) and 0.168 to 0.248 lb/hr (0.076 to 0.113 kg/hr respectively, averaging 0.134 lb/hr (0.061 kg/hr) and 0.208 lb/hr (0.094 kg/hr), respectively. For Sample No. 4 the filterable and total particulate concentrat were 0.006 gr/dscf (13.6 mg/dscm) and 0.007 gr/dscf (16.5 mg/dscm), respectively. The emission rates of filterable and total particulate were 0.215 lb/hr (0.098 kg/hr) and 0.261 lb/hr (0.118 kg/hr), respecti

Dryer Stack

Filterable particulate concentrations for Sample Nos. 1, 2, and 3 ranged from 0.001 to 0.002 gr/dscf (2.13 to 3.58 mg/dscm) and averaged 0.001 gr/dscf (2. mg/dscm). Total particulate concentrations ranged fr 0.003 to 0.004 gr/dscf (7.20 to 8.14 mg/dscm) and averaged 0.003 gr/dscf (7.75 mg/dscm). The emission rates for filterable and total particulate ranged fr 0.366 to 0.630 lb/hr (0.166 to 0.286 kg/hr) and 1.23

Bottom Kiln

Filterable particulate concentrations for Sample Nos. 1, 2, and 3 ranged from 0.003 to 0.004 gr/dscf (7.08 to 9.80 mg/dscm) and averaged 0.004 gr/dscf (8.61 mg/dscm). Total particulate concentrations ranged from 0.005 to 0.007 gr/dscf (11.3 to 15.8 mg/dscm) averaging 0.006 gr/dscf (13.4 mg/dscm). The emission rates of filterable and total particulate ranged from 0.105 to 0.155 lb/hr (0.048 to 0.070 kg/hr) and 0.168 to 0.248 lb/hr (0.076 to 0.113 kg/hr) respectively, averaging 0.134 lb/hr (0.061 kg/hr) and 0.208 lb/hr (0.094 kg/hr), respectively. For Sample No. 4 the filterable and total particulate concentrations were 0.006 gr/dscf (13.6 mg/dscm) and 0.007 gr/dscf (16.5 mg/dscm), respectively. The emission rates of filterable and total particulate were 0.215 lb/hr (0.098 kg/hr) and 0.261 lb/hr (0.118 kg/hr), respectively.

Dryer Stack

Filterable particulate concentrations for Sample Nos. 1, 2, and 3 ranged from 0.001 to 0.002 gr/dscf (2.13 to 3.58 mg/dscm) and averaged 0.001 gr/dscf (2.81 mg/dscm). Total particulate concentrations ranged from 0.003 to 0.004 gr/dscf (7.20 to 8.14 mg/dscm) and averaged 0.003 gr/dscf (7.75 mg/dscm). The emission rates for filterable and total particulate ranged from 0.366 to 0.630 lb/hr (0.166 to 0.286 kg/hr) and 1.23

to 1.40 lb/hr (0.560 to 0.633 kg/hr) respectively, averaging 0.487 lb/hr (0.221 kg/hr) and 1.34 lb/hr (0.608 kg/hr), respectively. The filterable and total particulate concentrations for Sample No. 4 were 0.001 gr/dscf (2.52 mg/dscm) and 0.004 gr/dscf (8.07 mg/dscm), respectively. Filterable and total particulate emission rates were 0.430 lb/hr (0.195 kg/hr) and 1.38 lb/hr (0.626 kg/hr), respectively.

Examination of the data reveals a high degree of reproducibility for concentrations and emission rates at each sampling location. Additionally, flowrates are quite consistent at each location, even between the two conditions.

The single run under Condition 2 shows higher total concentrations and emission rates than the average of the three runs under Condition 1 for each location. The increase in total particulate concentrations from Condition 1 to Condition 2 ranges from 16.7-percent at the bottom kiln location to 54.1-percent at the south kiln location. Total particulate emission rates increased in Condition 2 from Condition 1 from 2.8-percent at the dryer stack to 56-percent at the south kiln stack.

EXHAUST GAS COMPOSITION

Table 2.2 displays the exhaust gas composition and moisture content results for each sampling location. Initially, four determinations of carbon dioxide, oxygen, and carbon monoxide were made, one for each sampling location. The Orsat analyses at the bottom kiln and dryer locations failed to detect either carbon dioxide or carbon monoxide in integrated bag sample acquired simultaneously with the first particulate run. Following this analysis no subsequent samples were collected at these locat The values obtained from the first sample were used for all remaining tests. Samples were taken for ga composition and analyzed simultaneously with each particulate run at the north and south kilns.

SULFUR OXIDES

Table 2.3 presents the sulfur oxides results. Concentrations of sulfur dioxide are presented in p per million (ppm) and emission rates in pounds per hour (lb/hr) and kilograms per hour (kg/hr). Conce tions ranged from less than 3.65 ppm at the bottom kiln to 36.5 ppm at the north kiln. Emission rates ranged from less than 0.151 lb/hr (0.068 kg/hr) at the bottom kiln to 6.10 lb/hr (2.77 kg/hr) at the d stack.

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TABLE 2.2. EXHAUST GAS COMPOSITION

Sampling Location	Sample Number	Moisture Content, Percent	Exhaust Gas Composition, Dry Basis, Percent			
			Carbon Dioxide	Oxygen	Carbon Monoxide	Nitrogen and Other Inerts
North Kiln	1	5.95	3.3	16.1	<0.1	80.6
	2	5.69	3.4	16.4	<0.1	80.2
	3	6.59	3.2	16.3	<0.1	80.5
	Average	6.08	3.3	16.3	<0.1	80.4
	4	5.31	3.5	16.2	<0.1	80.3
South Kiln	1	2.45	0.7	19.5	<0.1	79.8
	2	2.57	1.0	19.0	<0.1	80.0
	3	3.27	1.1	18.7	<0.1	80.2
	Average	2.76	0.93	19.1	<0.1	80.0
	4	1.99	1.0	18.8	<0.1	80.2
Bottom Kiln	1	0.747	<0.1	20.2	<0.1	79.8
	2[a]	0.654	<0.1	20.2	<0.1	79.8
	3[a]	1.476	<0.1	20.2	<0.1	79.8
	Average	0.959	<0.1	20.2	<0.1	79.8
	4[a]	0.402	<0.1	20.2	<0.1	79.8
Dryer	1	2.94	<0.1	20.4	<0.1	79.6
	2[a]	2.79	<0.1	20.4	<0.1	79.6
	3[a]	3.49	<0.1	20.4	<0.1	79.6
	Average	3.07	<0.1	20.4	<0.1	79.6
	4[a]	2.19	<0.1	20.4	<0.1	79.6

[a]Since the initial Orsat analyses indicated no combustion gases at this location, samples were not collected during Runs 2, 3, and 4. Therefore, values from the first test were used for the remaining tests.

TABLE 2.3. SULFUR OXIDES CONCENTRATIONS AND EMISSION RATES

Sampling Location	Sample Number	1980 Date	Stack Gas Flowrate dscfm	Sulfur Dioxide		
				Concentration ppm	Emission Rate lb/hr	kg/hr
North Kiln	1	1-10	6,830[a]	36.5	2.49	1.13
South Kiln	1	1-10	10,400[a]	7.52	0.781	0.354
Bottom Kiln	1	1-10	4,130[a]	<3.65	<0.151	<0.068
Dryer	1	1-10	46,200[a]	13.2	6.10	2.77

[a]An average of the three particulate runs conducted during Condition 1.

Although the reproducibility of these values is uncertain due to taking only single samples at each location, the relative magnitude of sulfur dioxide concentrations for each location is logical. Sulfur dioxide in the dryer stack originates primarily from the waste heat exhaust of the kiln. The waste heat is withdrawn from the cooling zone, just downline from the kiln firing zone. Although particulate could possibly settle out in the kiln and ductwork leading to the dryer, sulfur dioxide, being a gas, would be carried over. Therefore, everything else being equal, the sulfur dioxide concentrations could probably be expected to be about the same at the waste heat intake in the dryer as in the firing zone. However, when the addition of dilution air is considered, it is logical that the dryer emitted lower sulfur dioxide concentrations than measured in the north kiln stack. Given that the flowrate in the dryer stack was much higher than any of the other stacks, the mass emission of sulfur dioxide was highest at the dryer. The sulfur dioxide found at the north and south kiln is from a combination of the sulfur in the clay and combustion gases from the coal. As expected, more sulfur dioxide was detected at the north kiln than the south kiln because the north kiln stack exhausts the actual burning zone of the kiln,whereas the south kiln stack exhausts

the entrance to the burning zone in the tunnel.

NITROGEN OXIDES

A summary of nitrogen oxides results is presented in Table 2.4. Concentrations are given in parts per million (ppm) and emission rates are in pounds per hour (lb/hr) and kilograms per hour (kg/h

Single nitrogen oxides samples were taken at ea location. Concentrations ranged from 14.5 ppm at the dryer stack to 134 ppm at the north kiln. Emiss rates ranged from 2.12 lb/hr (0.963 kg/hr) at the bo kiln to 6.58 lb/hr (2.99 kg/hr) at the north kiln. Since nitrogen oxides formation is proportional to temperature, it was expected that the highest levels of nitrogen oxides would be found at the north kiln, which had the highest stack gas temperatures of the four locations. Similarly, the lowest concentration of nitrogen oxides was found at the dryer stack, which was also the coolest of the four locations.

PARTICLE SIZE

Tables C-1 and C-2 in Appendix C display the pa size distribution at the north kiln under Conditions and 2, respectively. Both distributions are graphic displayed in Figures 2.1 and 2.2, respectively. The particle size distribution is nearly the same for bo conditions. During Condition 1, approximately 50- percent of the particles were 7.7 microns or less,

TABLE 2.4. NITROGEN OXIDES CONCENTRATIONS AND EMISSION RATES

Sampling Location	Sample Number	1980 Date	Stack Gas Flowrate dscfm	Nitrogen Oxides (as NO_2)		
				Concentration ppm	Emission Rate lb/hr	kg/hr
North Kiln	1	1-10	6,830[a]	134.	6.58	2.99
South Kiln	1	1-10	10,400[a]	40.2	3.00	1.36
Bottom Kiln	1	1-10	4,130[a]	71.7	2.12	0.963
Dryer	1	1-10	46,200[a]	14.5	4.81	2.18

[a]An average of the three particulate tests conducted during Condition 1.

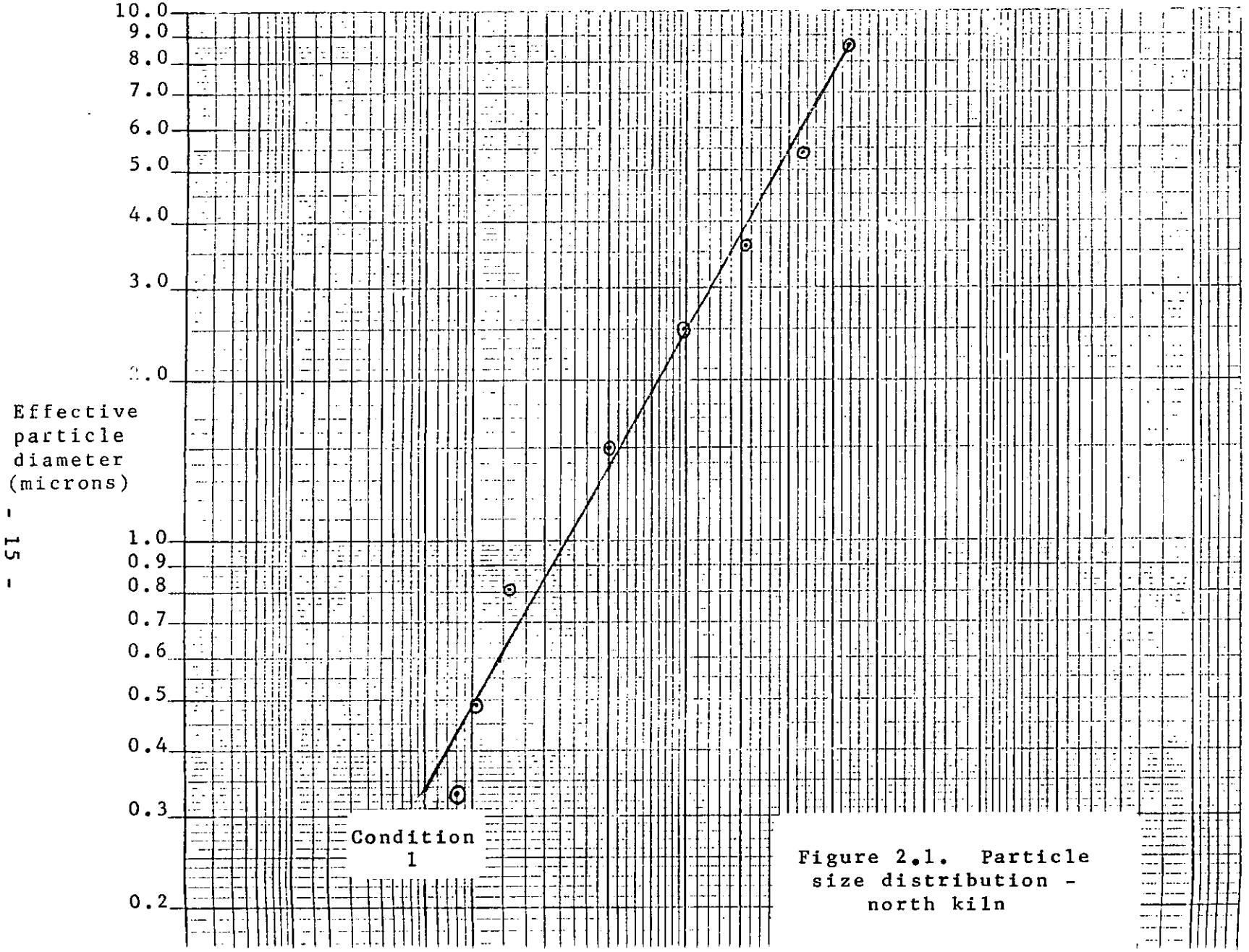


Figure 2.1. Particle size distribution - north kiln

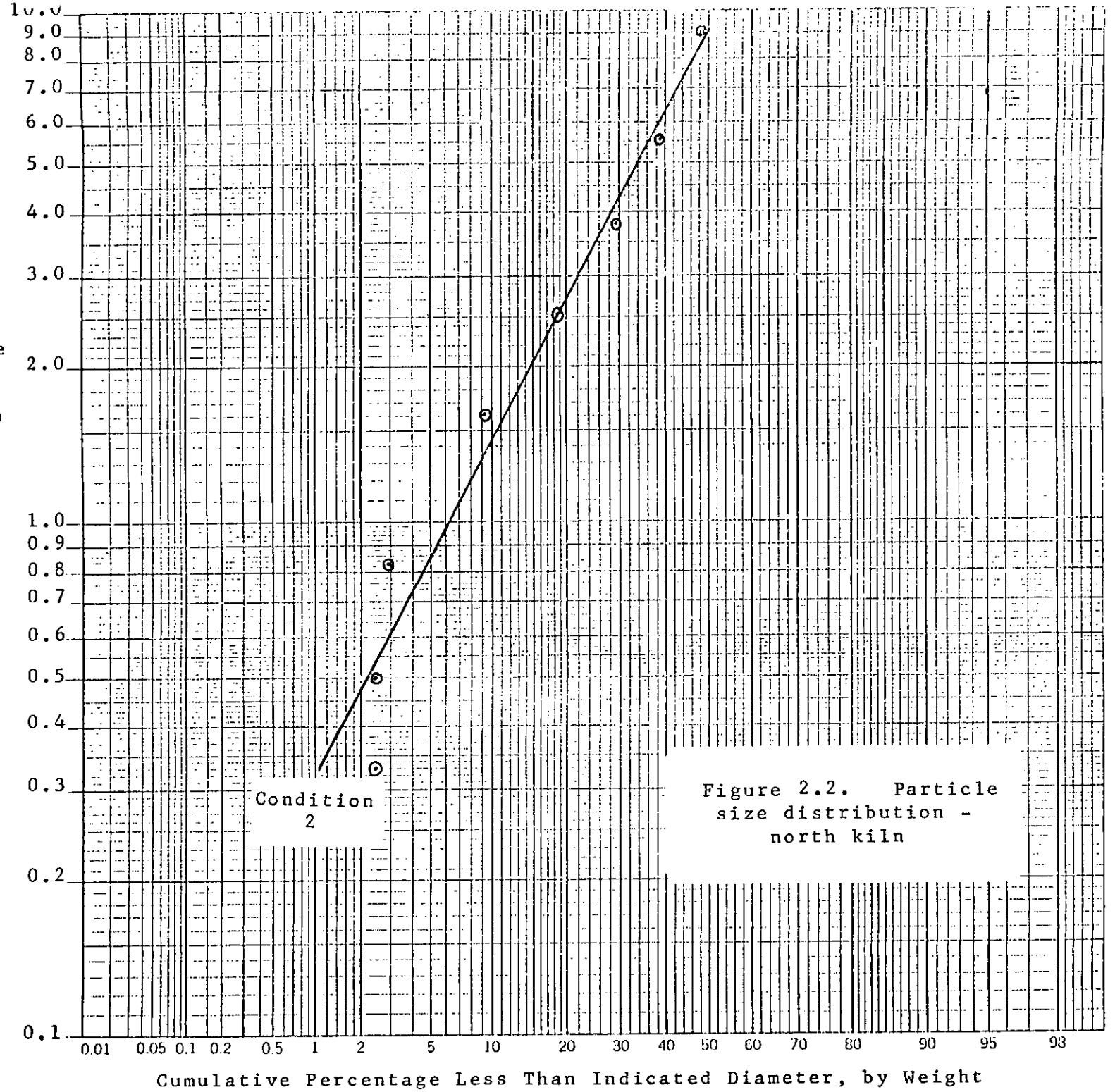


Figure 2.2. Particle size distribution - north kiln

whereas in Condition 2, 50-percent of the particles were 9.0 microns or less.

Tables C-3 and C-4 in Appendix C display the particle size distributions at the south kiln under Conditions 1 and 2, respectively. These distributi are graphically displayed in Figure 2.3. In compari these two conditions at this location, it is found that Condition 1 resulted in particle sizes which were somewhat evenly balanced over the distribution spectrum. Particle sizes for Condition 2 were relat large in diameter. During Condition 1, approximatel 50-percent of the particles were 7.0 microns or less while during Condition 2, approximately 76-percent were 7.7 microns or larger.

Particle sizing runs were conducted at the bott kiln and dryer locations, but due to extremely low particulate levels for these two locations, an accur determination of the size distribution was not possi

VISIBLE EMISSIONS

A summary of visible emissions is found in Appe B-3. At the north kiln during Condition 1, opacitie ranged from 5 to 23-percent, based on 6-minute avera For Condition 2, opacities range from 16 to 43-perce also based on 6-minute averages. For the south kiln during Condition 1, opacities ranged from 0 to 13-pe

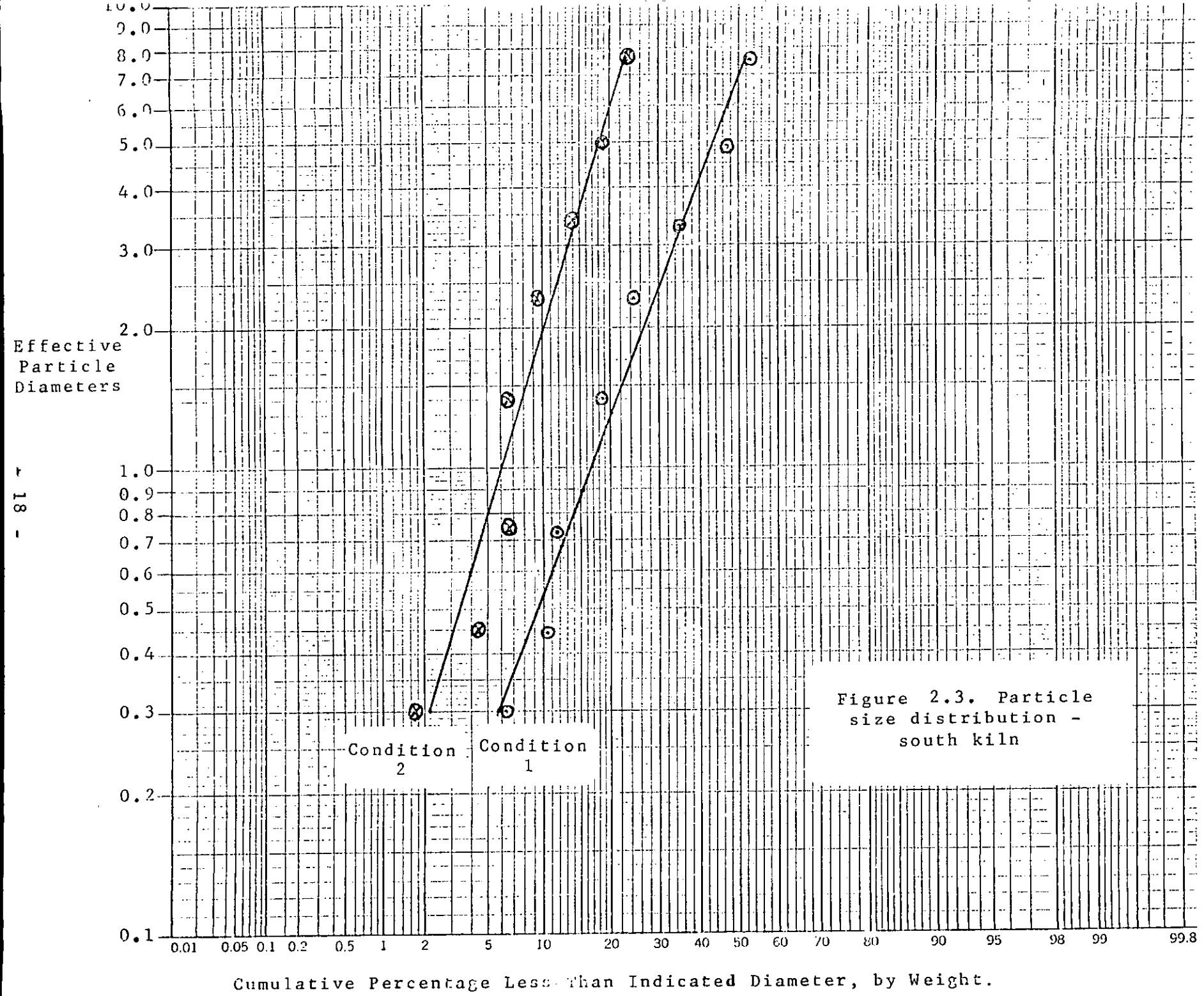


Figure 2.3. Particle size distribution - south kiln

while Condition 2 opacities ranged from 7 to 20-perc both based on 6-minute averages.

CLAY AND COAL SAMPLES

Table 2.5 displays the results of the analyses for percent sulfur and ash in the coal samples and percent sulfur in the clay sample. During Condition 1, the percent ash in the coal samples ranged from 4.1 to 4.4-percent, and averaged 4.3-percent. During Condition 2, the ash content was 6.9-percent. The sulfur content of the coal samples acquired during Condition 1 ranged from 0.70 to 0.82-percent, and averaged 0.76-percent. The sulfur content was 0.64-percent during Condition 2. The sulfur content of the clay sample was 0.04-percent.

The ash content of the coal was 38-percent high for Condition 2 than the average of the three sample acquired during Condition 1 The sulfur analysis re a 19-percent decrease from Condition 1 to Condition

Since the clay sample was acquired from brick cars which had passed through the dryer, the sulfur content of the "raw" clay is unknown. However, the sulfur content of dried bricks is insignificant with respect to the sulfur content of the coal.

An example of calculations and calibration data used for all data reduction are presented in Appendi D and E, respectively.

TABLE 2.5. COAL AND CLAY SAMPLES, ASH AND SULFUR ANALYSES

Sample Type		Analysis	
		Percent Ash	Percent Sulfur
Coal	Run 1	4.4	0.75
	Run 2	4.3	0.70
	Run 3	4.1	0.82
Average		4.3	0.76
Coal	Run 4	6.9	0.64
Clay		---	0.04

3.0 PROCESS DESCRIPTION AND OPERATION
(Provided by Energy and Environmental Analysis, Inc.)

Lee Brick and Tile started operation in 1946. The new fully automated plant was built in 1976; this facility utilizes one tunnel kiln and one dryer. The plant operates 24 hours per day, seven days per week, with a two to six week shutdown for plant maintenance. This shutdown period each year will vary in length depending upon market conditions.

The building brick process is a very steady operation without any typical variations in production. The normal production rate for Lee Brick is 96,768 brick per day; the design maximum capacity is 116,928 brick per day, but this production rate is seldomly used.

The processes of interest in the building brick industry are the drying and firing operations used to "cure" the brick. These two sources are being studied as a single unit process. There are no controls utilized at Lee Brick, but this facility will provide data for baseline emissions resulting from firing coals with different ash content.

PROCESS DESCRIPTION

Figure 3.1. demonstrates the basic steps utilized in the production of building brick at Lee Brick and also shows locations of the various emission tests

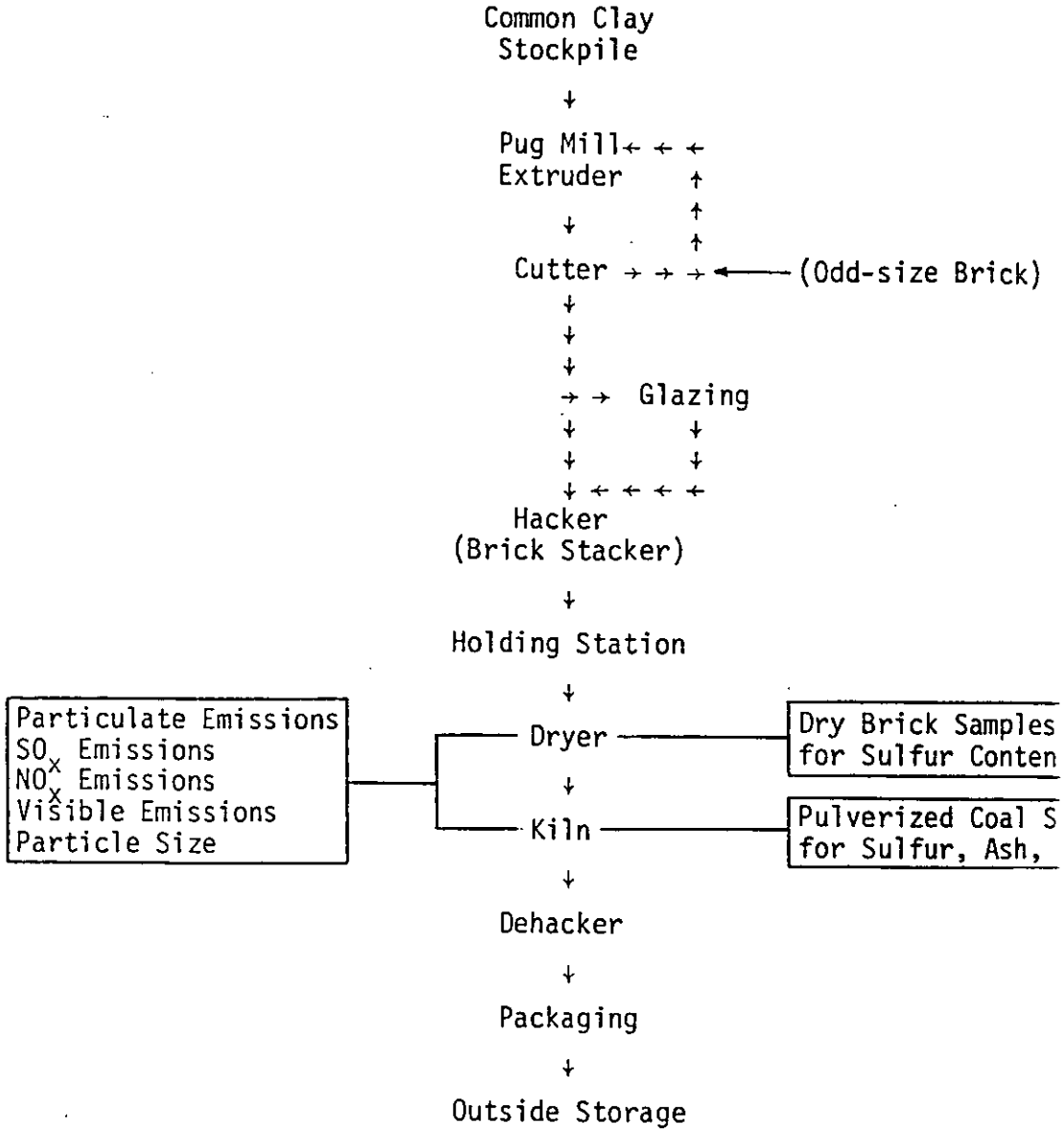


Figure 3.1. Lee Brick and Tile Co., Process Flow Diag

administered during the source test program.

The clay is brought from the stockpile to the pug mill on a belt conveyor. Water is added to the raw material and then mixed in the pug mill until the proper consistency is reached. The material is then moved through the deaerating section of the pug mill to remove any bubbles or air holes. This mixture is extruded in a continuous column onto a conveyor which passes the clay column through the cutting machine. Odd-sized brick are returned to the pug mill by another conveyor, where they are reworked into the raw material.

The unfired (green) brick continues on the conveyor and may or may not be glazed (during the testing program no glazing was done). The bricks are then stacked on the kiln cars in two stacks by an automatic hacker. Each kiln car (ware) holds 8,064 bricks (3 1/2" x 8" x 2 1/4").

From the loading area, kiln cars are moved to a holding station, where they sit until they are moved into the dryer. There are always cars in the holding station so that the drying and firing processes can continue to operate during the night when the production line is down or in case of a malfunction in the production line during the day.

The tunnel dryer can hold up to 24 cars. The brick remain in the dryer for 48-hours before entering the kiln. Waste heat is drawn from the rapid cooling zone of the kiln and used to dry the brick.

The tunnel kiln can accommodate 21 cars. The movement of the cars throughout the kiln is not continuous; they are moved intermittently, or indexed. Each car is indexed one-half its length every hour. This allows the heat from the burners to be directed between the cars and between the stacks of brick on each car.

The kiln is fired by a total of 47 burners. Lee Brick uses a side-firing configuration. The kiln can use natural gas, No. 2 fuel oil or coal as its primary fuel. Several crown burners ensure even heating throughout the top of the kiln and always fire gas, independent of the primary fuel. The burners used for oil and gas are the same; however, the burner nozzles are different for the two types of fuel. Different burners, however, are needed for coal-firing. When firing with coal, only half the number of side burners are needed bec they fire across the entire width of the kiln as opposed to gas/oil firing. The burners in the latt case fire just half-way across the kiln, thus,

necessitating opposing burners on each side of the kiln. During coal-firing, the first pair of side burners are fired with gas to produce an effective environment for coal combustion. Currently, normal coal-firing procedures call for the first five burner pairs to use gas. This procedure was established due to earlier particulate source tests accomplished during the burning of 8 1/2-percent ash coal. These early tests showed that five burner pairs had to fire gas to enable the kiln's particulate emission rate to conform with state regulations.

As the cars move through the firing zone, the temperature is gradually increased, reaching a maximum of approximately 2000F. After the firing zone, the brick move into the cooling zone of the kiln. Ambient air is drawn into the kiln, passed over the hot bricks, and then this heated air is passed to the dryer.

When the fired brick come from the kiln, they are moved to an automatic dehacker, which takes the brick from the kiln cars and restacks them to marketable bundles. They are then packaged and taken to an outside storage area.

PROCESS OPERATIONS

The purpose of this test program was to measure emission levels from a coal-fired kiln. There are

three exhaust stacks from the kiln; the north and south kiln stacks exhaust waste gases from inside the kiln, while the bottom kiln stack pulls exhaust gases from underneath the kiln. In addition to the sampling of the three kiln stacks, measurements were also taken from the dryer exhaust stack. A stack extension with portholes had to be added to the exhaust stack from the dryer.

Process conditions were carefully observed and testing was performed during normal operating conditions (7.26 tons/hr of brick + 0.42 tons/hr of coal) the process was very steady with no interruptions in production. During the test, operating conditions were monitored and recorded on process data sheets. These data sheets are included in Appendix F.

The following process parameters were monitored

(1) Relative humidity in the dryer exhaust gas

(2) Temperature of the dryer exhaust gas;

(3) Temperature of kiln waste heat entering the dryer;

(4) Maximum kiln temperature which controls the coal feeding rate;

(5) Internal kiln pressure; and,

(6) Natural gas flowrate.

The natural gas flowrate was determined by taking gas meter readings at the beginning and end of the

day and averaging the total amount of gas over the length of the day. Relative changes in the flowrate could be observed on the gas flow recorder (also shown on process data sheets); however, this instrument does not give a good indication of the absolute flowrates.

Process monitoring began approximately six hours before the start of emission testing on January 9, 1980. Simultaneous particulate emissions testing on the three kiln stacks and dryer stack began around 3:00 pm and were concluded by 7:30 pm. Low ash coal (4.3-percent ash) was burned during this test period and no irregularities, process changes, or malfunctions occurred during this time. The coal feeding rate was estimated to be 0.42 tons/hr.

On January 10, 1980, process monitoring began at 8:00 am; testing began at 11:00 am and ended at 6:30 pm. The tests occurring this day included simultaneous particulate emission testing on all four stacks, nitrogen oxides emission testing on all four stacks, sulfur oxides emission testing on all four stacks, and a particle size test on the north kiln stack. The absolute coal feeding rate was constant throughout testing and had not been changed from the previous day. There was a slight change in the distribution of the coal (2-percent increase in Zone 1 of the kiln) throughout the day due to a malfunction of one of the burners.

The coal used this day was the same as the day befo (4.3-percent ash).

Process monitoring began at 8:00 am on January 11, 1980. Once again, the coal being fired was low ash coal. Simultaneous particulate emissions testi on all four stacks began around 11:00 am. The only other tests performed on this day were particle siz tests on the dryer, bottom kiln, and south kiln stac After the testing was completed, high ash coal (6.9-percent ash) was fired to stabilize the system for the following day's tests during high ash coal-firing. The coal feeding rate was increased by 5-p in Zone 1 of the kiln once the 6.9-percent coal rea the burners.

During testing on January 12, 1980, high ash c was fired. Process monitoring began at 9:00 am, whi testing began at 9:30 am. At 10:30 am the coal fee rate had to be increased by 2-percent in Zone 1 bec the maximum temperature in the kiln had dropped. T temperature dropped again at 2:30 pm, thus, the flo rate was increased by another 2-percent. As the temperature continued to drop, the flowrate was further increased. Additional problems in maintain temperature were encountered at the end of the test so the operation was shut down after source testing was completed at 5:00 pm. Simultaneous particulate

emission tests on all four kilns began around 10:00 am. The only other tests accomplished this day were particle size tests on the south kiln stack and the north kiln stack.

Lee's head fireman stated that the minor increases in the coal feed rate and the partial malfunction of one burner are relatively insignificant process upsets. These problems should not cause any noticeable changes in the stack emissions. The continuing temperature drops during January 12 were not a problem by the time the testing was finished, but if the trend had continued, production variations would have occurred. Since Lee was operating its kiln on only high ash coal solely for EPA testing purposes, Lee shut down the operation once the testing was completed instead of trying to correct the problem.

4.0 LOCATION OF SAMPLING POINTS

All four sampling locations were at roof level. Each stack was accessed through two ports which were 90-degrees apart. Additional physical parameters for each stack are provided in Table 4.1. Sampling locations and each of the traverse points with their respective distances from the duct wall for the north kiln, south kiln, bottom kiln, and dryer stack are presented in Figures 4.1, 4.2, 4.3 and 4.4, respectively.

All sampling locations were considered adequate in their original configuration, with the exception of the dryer stack. An extension to the stack was needed since the original stack height did not allow for sampling port placement which would meet the minimum upstream and downstream distances from disturbances as required by EPA Method 1. Originally, the traverse at the dryer stack was to consist of 24 sampling points per port. Since Point 24 was too close to the stack wall, Point 23 was sampled for twice the normal duration. Also, Points 1 and 2 could not be sampled because the port nipples were not flush with the stack wall and extended into the stack by 1.75-inches. Therefore, Point 3 was sampled for three times the normal duration.

TABLE 4.1. PHYSICAL PARAMETERS OF SOURCES

Parameters	North Kiln	South Kiln	Bottom Kiln	Dryer
Stack Diameter (I.D.)	35.8 in(90.9cm)	35.9 in(91.2cm)	22.8 in(57.9cm)	72.1 in(183cm)
Diameters Downstream (disturbances)	3.4 (fan coupling)	3.4 (fan coupling)	5.0 (bend in duct)	2.4 (reducing coupler)
Diameters Upstream (disturbances)	1.3 (top of stack)	1.2 (top of stack)	1.0 (top of stack)	0.5 (top of stack)
No. of sampling points per traverse	20	20	20	24

Point	Distance (Inches)
1	0.5
2	1.4
3	2.4
4	3.5
5	4.6
6	5.9
7	7.3
8	8.9
9	10.9
10	13.9
11	21.9
12	24.9
13	26.9
14	28.5
15	29.9
16	31.2
17	32.3
18	33.4
19	34.4
20	35.3

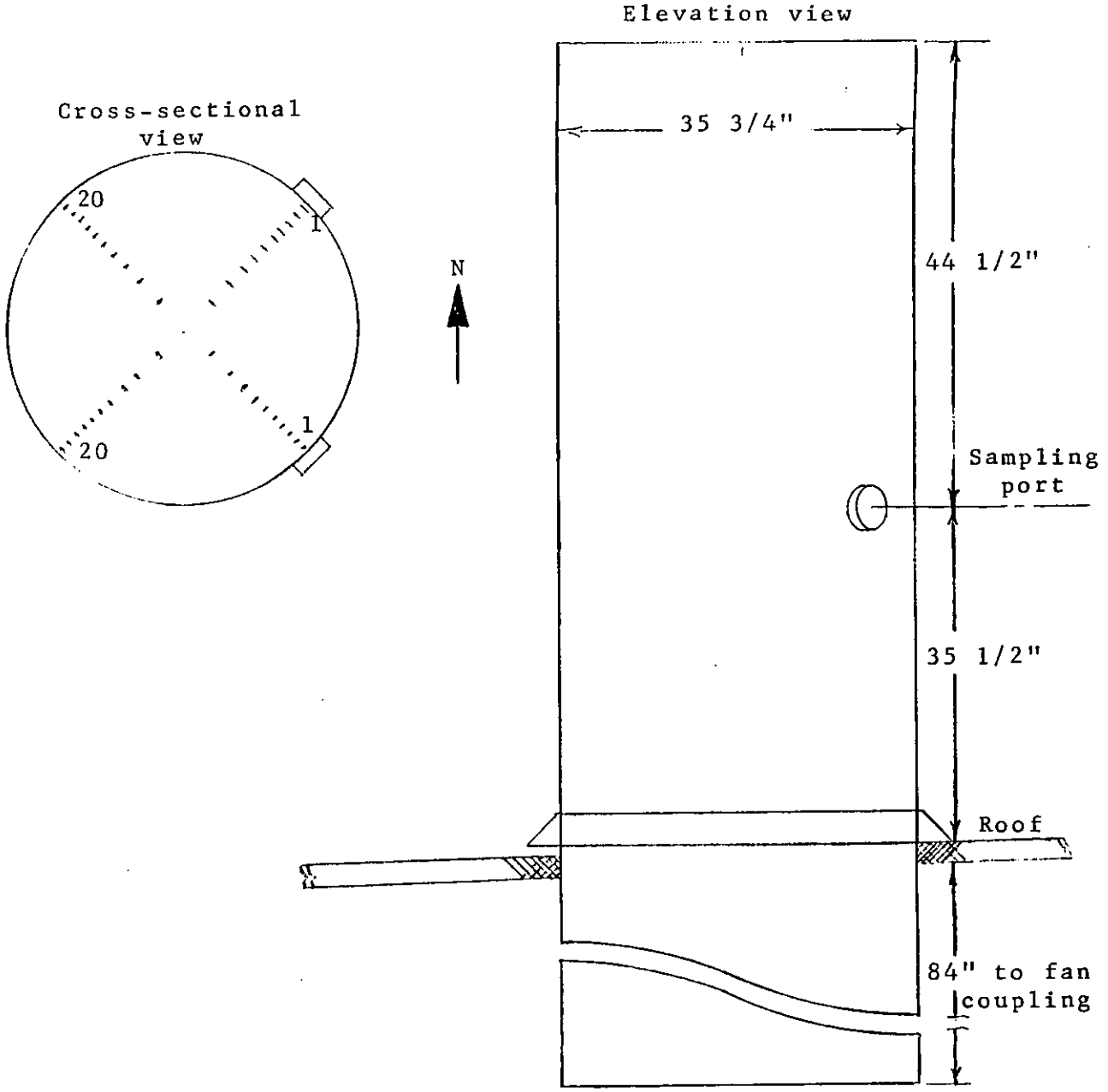
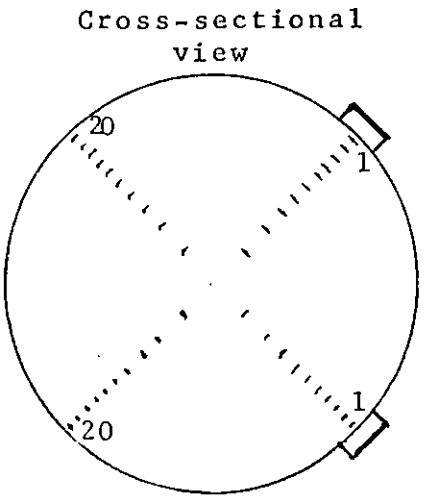
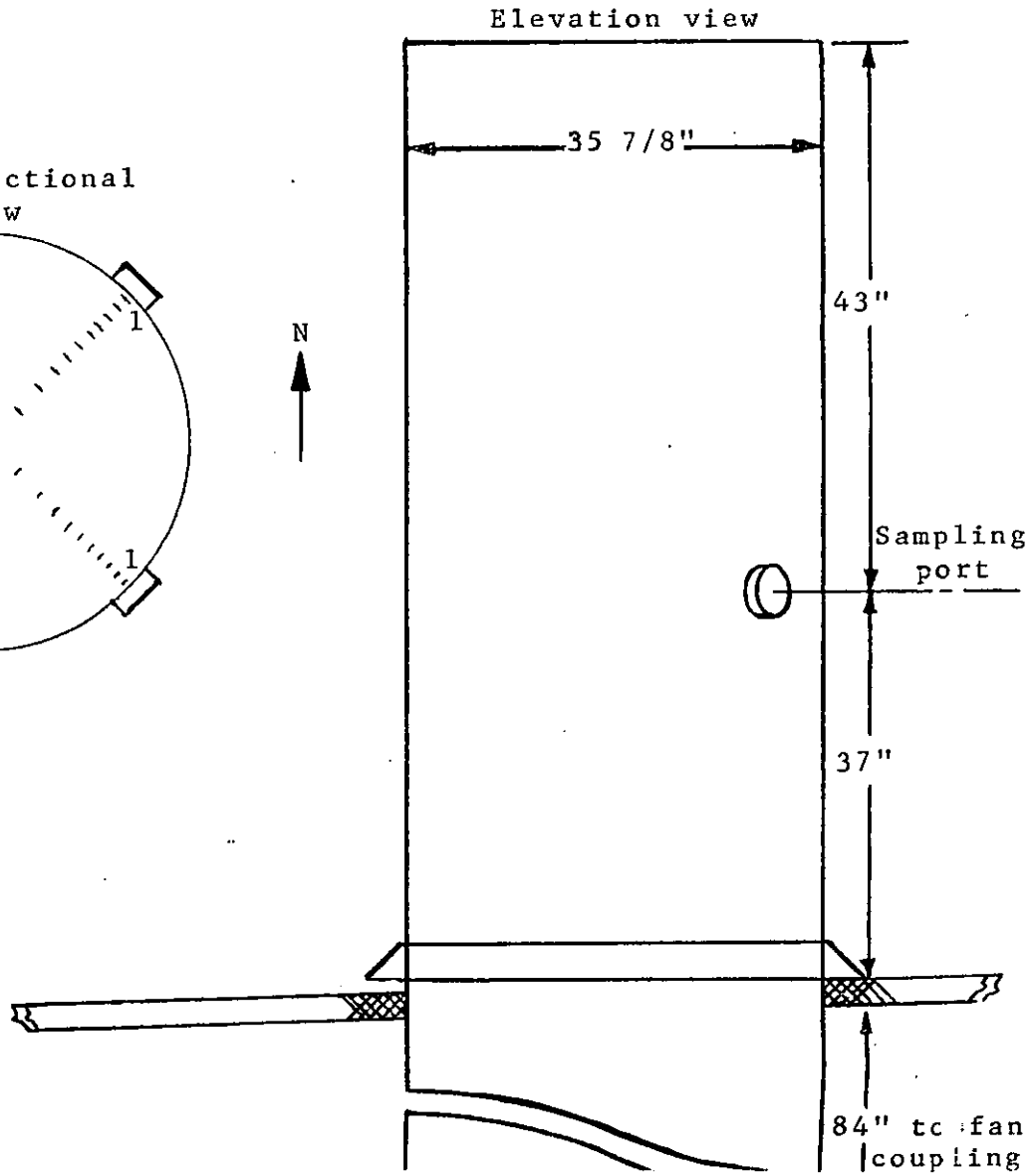


Figure 4.1. North kiln stack cross-section and sampling point locations (not to scale).

Point	Distance (Inches)
1	0.5
2	1.4
3	2.4
4	3.5
5	4.6
6	5.9
7	7.3
8	9.0
9	11.0
10	13.9
11	22.0
12	24.9
13	26.9
14	28.6
15	30.0
16	31.3
17	32.4
18	33.5
19	34.5
20	35.4





Point	Distance (Inches)
1	0.3
2	0.9
3	1.5
4	2.3
5	2.9
6	3.8
7	4.6
8	5.7
9	7.0
10	8.9
11	13.9
12	15.8
13	17.1
14	18.2
15	19.0
16	19.9
17	20.5
18	21.3
19	21.9
20	22.5

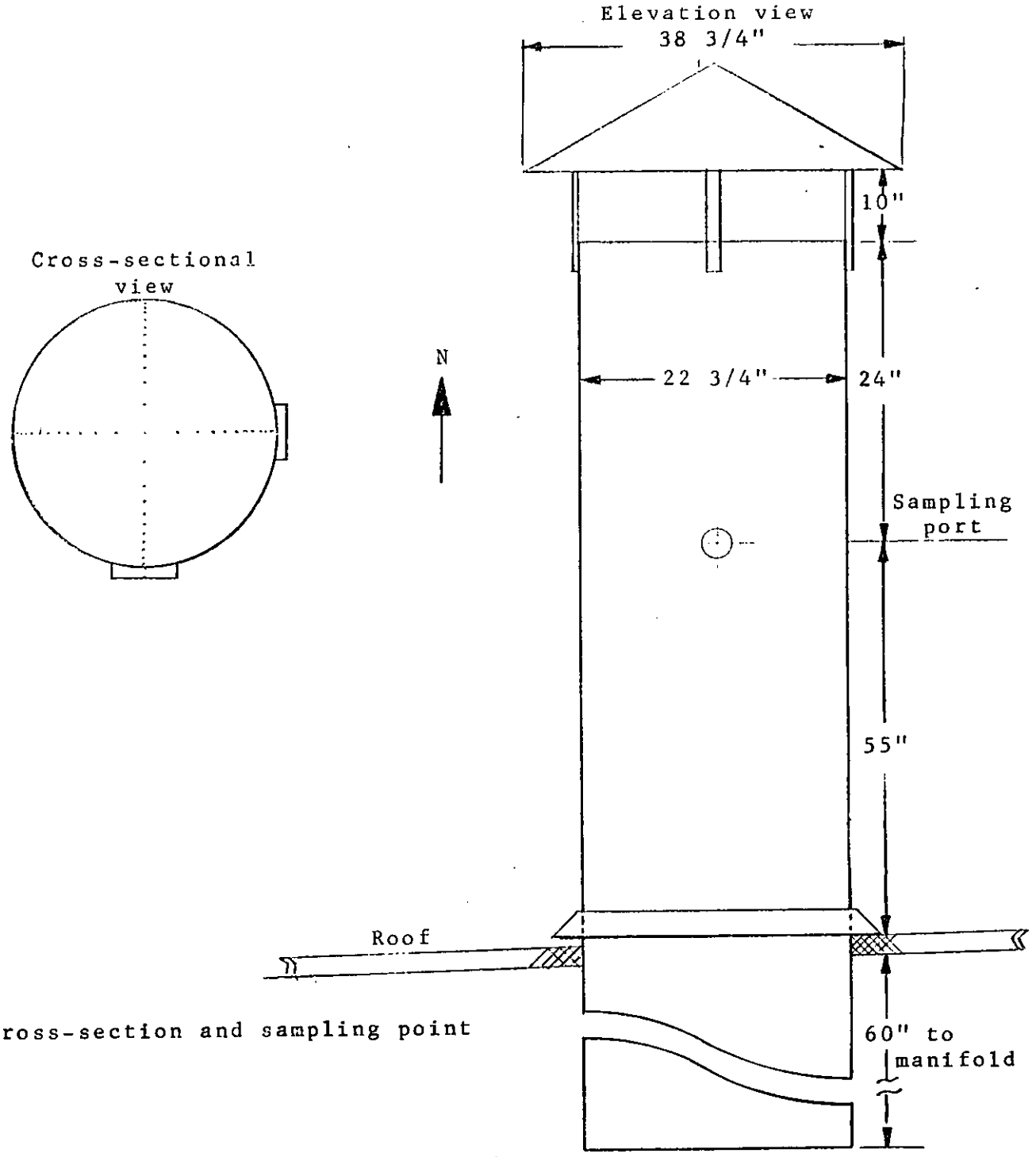
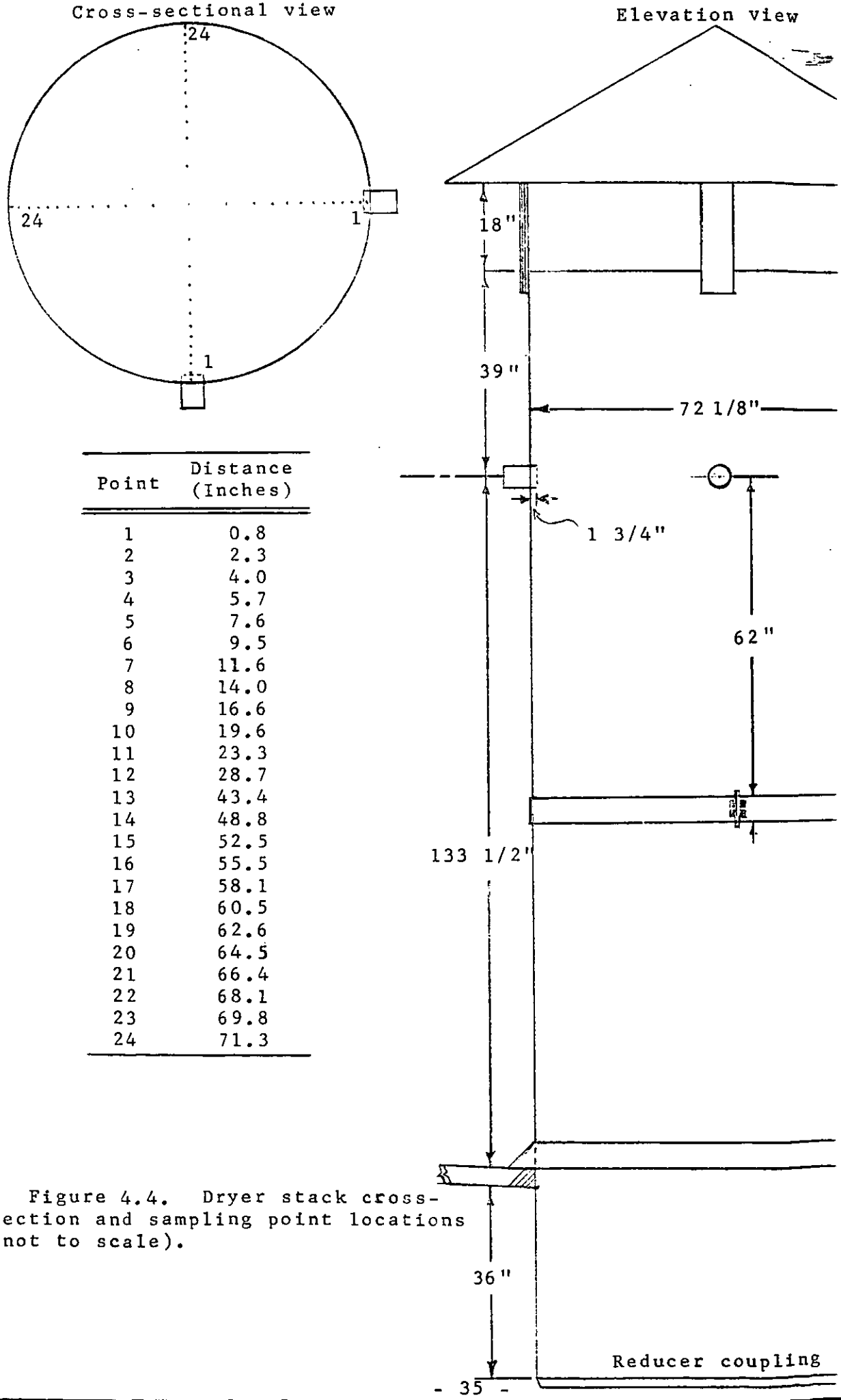


Figure 4.3. Bottom kiln stack cross-section and sampling point locations (not to scale).



Point	Distance (Inches)
1	0.8
2	2.3
3	4.0
4	5.7
5	7.6
6	9.5
7	11.6
8	14.0
9	16.6
10	19.6
11	23.3
12	28.7
13	43.4
14	48.8
15	52.5
16	55.5
17	58.1
18	60.5
19	62.6
20	64.5
21	66.4
22	68.1
23	69.8
24	71.3

Figure 4.4. Dryer stack cross-section and sampling point locations (not to scale).

5.0 SAMPLING AND ANALYTICAL PROCEDURES

Exhaust gas sampling was conducted in accordance with the procedures outlined in the U.S. Environmental Protection Agency's (EPA) Standards of Performance for New Stationary Sources Methods 1-7 (Federal Register, 40CFR60, December 23, 1971, as amended through August, 18 1977). An EPA Method 5 particulate sampling train was used at each location with the following modification: flexible Teflon® tubing was used in the dryer and bottom kiln sampling train to connect the filter holder to the impinger series.

During a preliminary velocity traverse conducted prior to testing, each stack was divided into equal annular areas at whose midpoints exhaust gas velocities and temperatures were measured, in accordance with EPA Methods 1 and 2. Velocity pressures were measured at each sampling point using an S-type Pitot tube and inclined 0 to 10-inch water gauge manometer. Temperatures were measured with an iron constantan (Type-J) thermocouple attached to the Pitot tube and to a calibrated Omega Engineering, Model 199, digital pyrometer. Exhaust gas flowrates and a nozzle size required to maintain isokinetic sampling rates were calculated from the preliminary velocity traverse data. Stack gas moisture content was determined using the volumetric condensate procedure outlined in EPA Method 4.

PARTICULATE EMISSIONS

Four particulate samples were extracted simultaneously and isokinetically from each of the four stack locations. The tunnel dryer stack was sampled for 192 minutes at three minutes per point while the three kiln locations were each sampled for 200 minutes at four minutes per point.

Each sampling train (Figure 5.1) consisted of sharp, tapered, stainless steel sampling nozzle; a heated glass probe; a heated, preweighed 110-mm Typ A glass-fiber filter; flexible Teflon® tubing at th tunnel dryer and bottom kiln only; two Greenburg-Sm impingers, the first modified, the second standard, containing 100-ml of distilled water; an empty modi Greenburg-Smith impinger serving as a dry trap; a m ed Greenburg-Smith impinger containing approximatel grams of silica gel; a leakless pump with vacuum ga a calibrated dry gas meter equipped with bimetallic inlet and outlet thermometers; and, a calibrated or type flowmeter connected to an inclined 0 to 10-inc water gauge manometer.

The impinger trains were immersed in ice baths maintain the temperature in the last impinger at 70 less. All sampling train glassware was connected t ground joints, sealed with stopcock grease, and cla to prevent leakage.

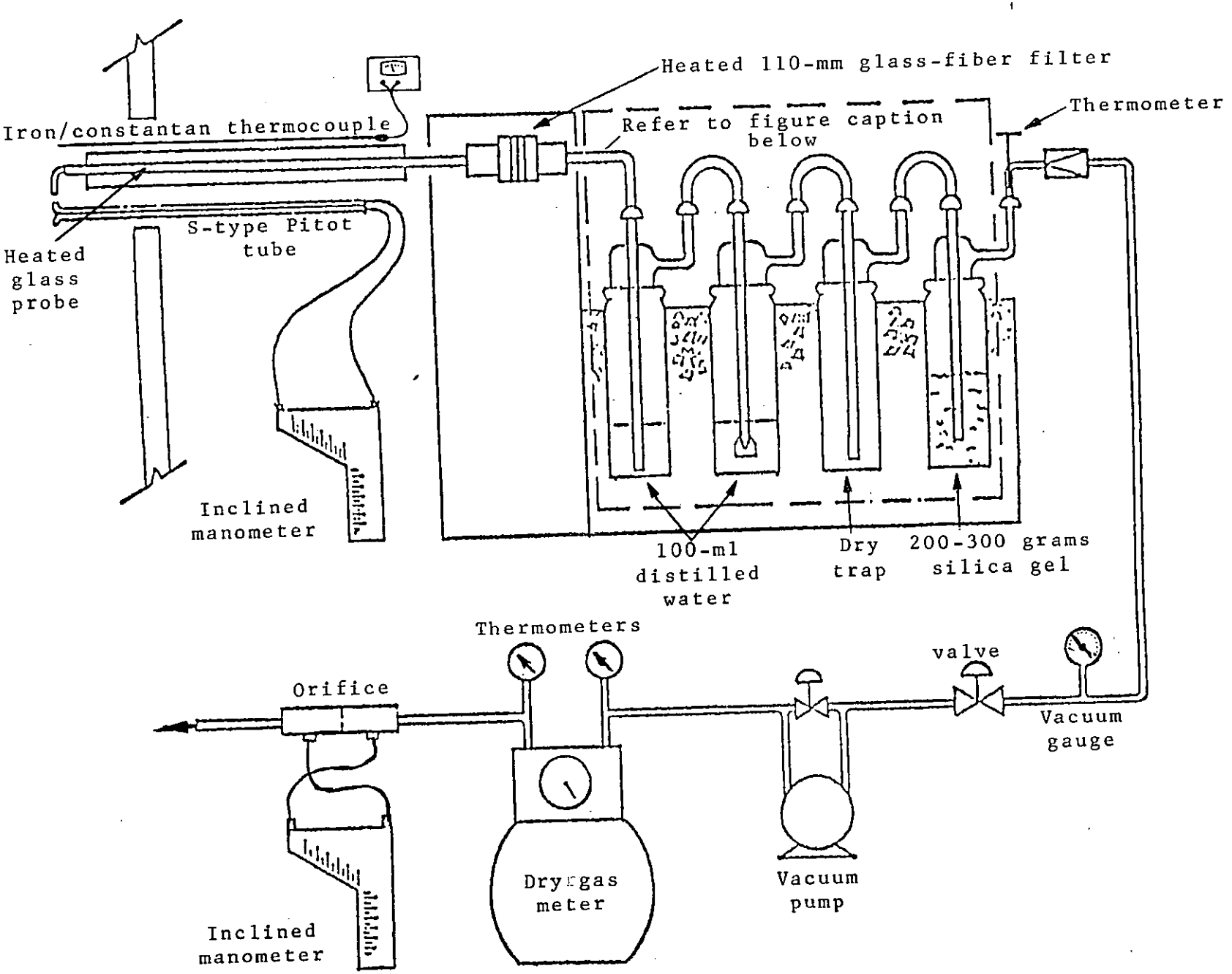


Figure 5.1. Particulate sampling train. A Teflon® extension was used for the bottom and dryer stack sampling locations.

The sampling train was checked for leaks before each sample run in accordance with the requirement that the initial leak rate shall not exceed 0.02 cu feet per minute at 15-inches of mercury vacuum.

During the course of testing, the probe, therm couple, and pitot tube assembly was moved to each s point, the velocity pressures and stack gas tempera were measured, and isokinetic sampling rates were adjusted accordingly, using an orifice meter to ind instantaneous flowrates. Throughout the test, the temperature was maintained at 250 $\pm$ 25F.

Upon the conclusion of each particulate run, t sampling train was again leak tested in accordance the requirement that the leak rate cannot exceed 0. cubic feet per minute at the greatest vacuum incurr during the run.

Following the leak check, each sampling train transferred to a clean-up area. The volumes of the impinger contents were measured and volume increas recorded. The solutions were placed in glass (or polyethylene) sample bottles with Teflon®-lined ca The silica gel was weighed to determine the weight (as condensate). The glass fiber filter was retur to its original plastic petri dish and sealed. Th nozzle, and front-half of the glass-filter holder rinsed and brushed with acetone. These rinsings w

collected in separate glass sample bottles with Teflon®-lined caps. The Teflon® tubing, the back-half of the glass-filter holder, and the impinger assembly were initially rinsed with water, and placed in the same sample bottle as the impinger contents. These same components were then rinsed with acetone and placed in separate glass sample bottles with Teflon®-lined caps. Thus, four fractions were collected for each particulate sample:

(1) acetone rinsings of probe, nozzle, and front-half of the glass-filter holder;

(2) 110-mm type A glass-fiber filter;

(3) impinger contents and distilled water rinsings; and,

(4) acetone rinsings of the Teflon® extension, back-half of the glass-filter holder, impingers, and interconnecting glassware.

Filterable particulate was the sum of Fractions 1 and 2, and total particulate the sum of Fractions 1, 2, 3, and 4. The particulate weights, by fraction, are presented in Appendix G.

In the laboratory, the liquid fractions were measured volumetrically and transferred to tared beakers. Fraction 3 was then evaporated to residue at 105C and the particulate weight determined. Fractions 1 and 4 were evaporated at room temperature and weighed until constant. Fraction 2 was desiccated at room

temperature and weighed until constant. All weight determinations were performed on an analytical balan having a sensitivity of 0.1 milligrams.

ORSAT ANALYSIS

Simultaneously with each particulate sample run at the north and south kiln locations, integrated exh gas samples were withdrawn in accordance with EPA Me 3. The gas sample was extracted by a pump through a probe, tubing, and condenser to a three-cubic-foot Tedlar® bag. Exhaust gas gradually filled the bag at controlled flowrate during the run. At the end of e run, an aliquot of the gas in the bag was passed thr an Orsat apparatus which measured the concentrations carbon dioxide, oxygen, and carbon monoxide. Volume decreases were noted after each gaseous component wa selectively absorbed from the aliquot sample. These results were used to calculate the specific gravity the exhaust gas relative to dry air.

VISIBLE EMISSIONS

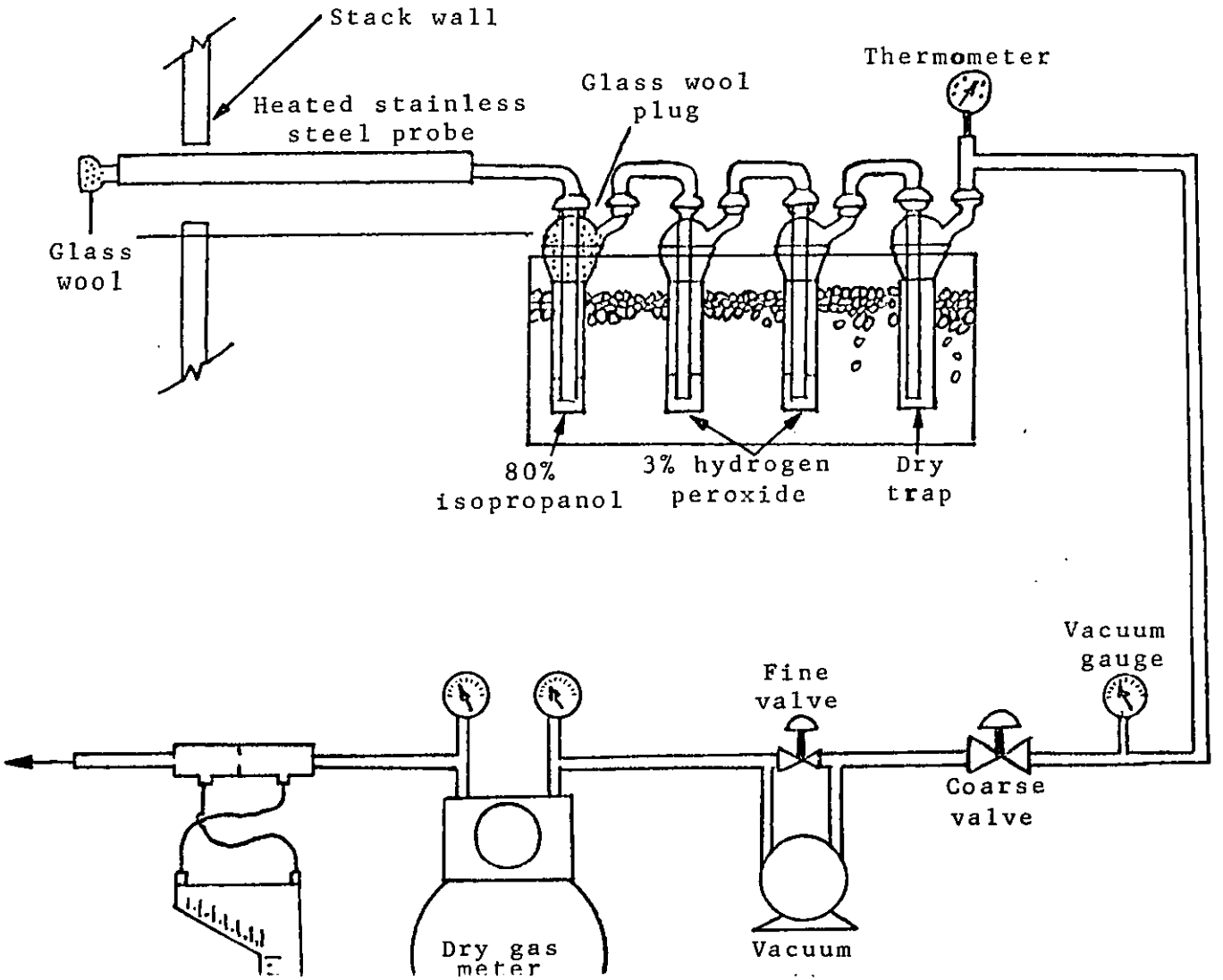
Visible emissions were recorded for the duratic each sample run on the north and south kiln stacks. Each of these observations was performed in accorda with EPA Method 9 by a certified observer of visibl emissions. Visible emissions were not recorded for

bottom kiln and dryer stacks since neither source involved combustion. In addition, the dryer exhaust plume was mostly steam.

SULFUR OXIDES

Sulfur oxides emissions were measured at each location in accordance with EPA Method 6. The sampling train (Figure 5.2) consisted of a heated stainless steel probe; Teflon® tubing; four midget impingers connected in series and immersed in an ice bath, the first impinger containing 15-ml of 80-percent isopropanol, the second and third each containing 15-ml of 3-percent hydrogen peroxide, and the fourth, dry; a limiting orifice; a vacuum pump; and a dry gas meter. A glass wool plug inserted in the glass impinger connector separated the first and second impingers.

Sampling was conducted at approximately one-liter per minute for 20-minutes. A leak check was performed before and after each test as per procedures outlined in "An Alternative Method for Stack Gas Moisture Determination", US EPA, August, 1978. Following the leak test, the sampling train was purged with ambient air for 15-minutes. After the purge, the hydrogen peroxide was transferred along with distilled water rinses to polyethylene sample bottles.

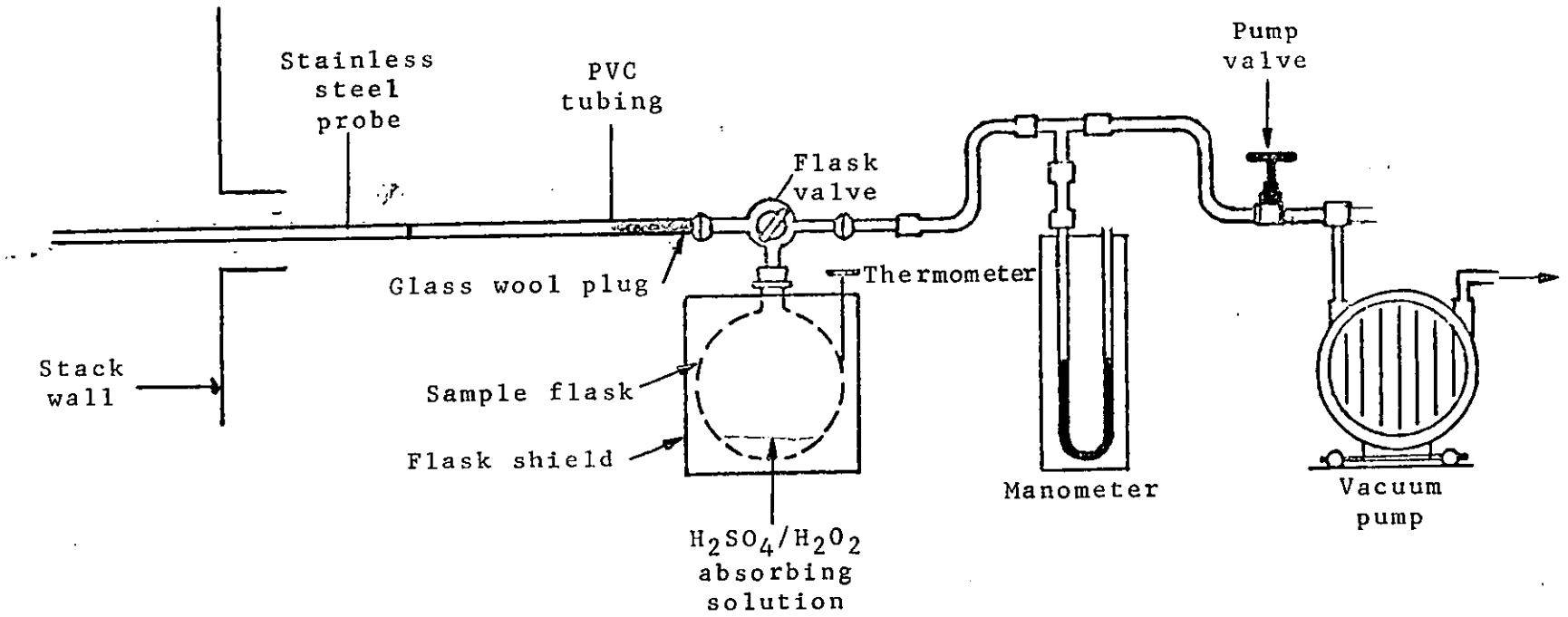

Stack wall
Heated stainless steel probe
Glass wool plug
Thermometer
Glass wool
80% isopropanol
3% hydrogen peroxide
Dry trap
Vacuum gauge
Fine valve
Coarse valve
Dry gas meter
Vacuum

In the laboratory, the hydrogen peroxide solution was diluted to 100-ml with distilled water. A 20-ml aliquot was then combined with 80-ml of 100-percent isopropanol and two to four drops of thorin indicator This solution was then titrated with barium perchlorate to a pink endpoint and the results reported as sulfur dioxide.

NITROGEN OXIDES

Nitrogen oxides were measured at each location in accordance with EPA Method 7. The sampling train (Figure 5.3.) consisted of a stainless steel probe, polyvinyl chloride tubing, a three-way stopcock, and a gas collection flask. A 25-ml quantity of 0.02-percent hydrogen peroxide and 0.03-percent sulfuric acid reagent was added to each flask.

The glass collection flask was then evacuated with a vacuum pump capable of drawing a vacuum to within 3-inches of absolute barometric pressure. The three-way stopcock was opened until a vacuum gauge, placed in-line between the stopcocks, indicated a vacuum of approximately 27-inches of mercury within the flask. The stopcock was closed, the pump was turned off, the vacuum was observed for one minute to assure there was no leakage into the flask, and the flask vacuum was recorded. The stopcock was then closed and the evacuated flask was connected via tubing to the probe located in the gas stream.


Stainless steel probe
PVC tubing
Pump valve
Flask valve
Glass wool plug
Thermometer
Stack wall
Sample flask
Flask shield
Manometer
Vacuum pump
H_2SO_4/H_2O_2 absorbing solution

After the sampling line was purged with stack gas, the stopcock was opened to allow the exhaust gas to fill the evacuated flask. Upon reaching equilibrium, the stopcock was closed. After the exhaust gas sample was collected, the flask was shaken for five minutes and the reagent was allowed to remain in contact with the gas sample for approximately 24-hours to absorb the desired gas fractions.

At the end of the absorbing period, the flask was again shaken and the pressure of the gas sample was measured by connecting a U-tube mercury manometer to the stoppered flask. After recording the final flask pressure and temperature, the sample solution was rinsed from the flask with two 5-ml portions of distilled water and transferred to a polyethylene bottle. This solution was then made basic with 1.0 N sodium hydroxide and sealed for transport to the laboratory.

In the laboratory, the sample solution was transferred to a tared beaker and evaporated to dryness in an oven at 105°C. The dried residue was treated successively with phenoldisulfonic acid solution, distilled water, and sulfuric acid. The resulting solution was made basic by the dropwise addition of ammonium hydroxide, transferred to a volumetric flask, and diluted to volume with distilled water. The absorbance of the solution at 420 nanometers was measured, and the concentration of nitrogen oxides, expressed as

nitrogen dioxide, was determined by reference to a calibration curve prepared from potassium nitrate standards.

PARTICLE SIZE

Particle sizing tests were conducted at all fou sampling locations. A single 60-minute isokinetic cascade impactor sample was obtained from the dryer bottom kiln stacks during Condition 1. One 30-minut sample, during each of Conditions 1 and 2, was obtai from the north and south kiln stacks; Figure 5.4 dep the particle sizing sampling train. The sample was drawn from a single point which represented the aver velocity profile of the stack. The impactor was cal by the manufacturer for unit particle densities of 1 with constant shape and size.

During the test, particles with equivalent aer dynamic diameters were collected on each stage of tl impactor at an optimal flowrate of approximately 0.7 acfm. The impactor system was leak checked before sample run at 5-inches of mercury vacuum to insure leak rate less then 0.02 cfm.

Each stage of the impactor was transferred with acetone or distilled water rinses into glass sample bottles. Additionally, glass-fiber fi associated with stages 1-7, plus the back-up stage w transferred to their original petri dishes.

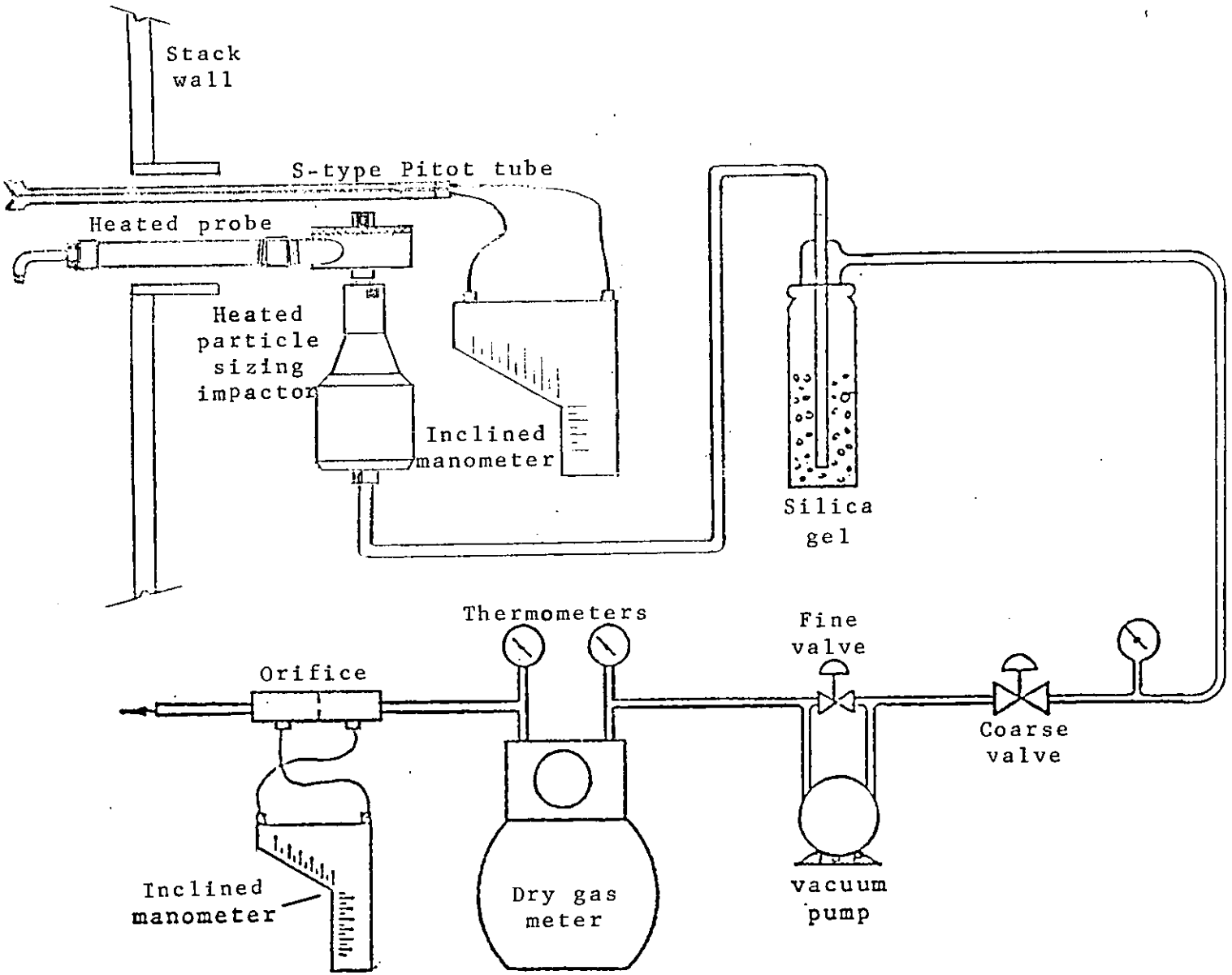


Figure 5.4. Particle sizing sampling train.

In the laboratory, gravimetric analysis was determined for each fraction in an identical manner as corresponding fractions from the particulate runs. The percentage of the total weight gain was determined for each stage.

CLAY SAMPLES

In conjunction with the Energy and Environmental Analysis Inc. Project Manager, samples of the extruded clay brick were obtained at the exit of the dryer, before entering the kiln, for sulfur content determination. One brick was removed from each car as it left the dryer to represent those contained within the kiln during the sulfur oxides tests. Chips of approximately equal size were acquired from each brick to form a composite sample.

The brick composite was analyzed by Surface Analysis and Research, Inc. for percent sulfur by weight. Sulfur was determined by the quantitative energy dispersion X-ray spectrographic method. In this procedure, the brick material was bombarded with electrons to induce X-ray emissions. These X-rays were measured with an X-ray spectrometer and compared to the spectra generated by sulfur standards to quantitate the sulfur in the sample.

COAL SAMPLES

At the beginning, middle, and end of each particulate run, pulverized coal grab samples were obtained to form a

composite sample from a Swindell air slide coal distributor above the kiln. The coal samples were collected in plastic containers. These coal samples were analyzed for percent ash and sulfur by weight. Ash content was determined in accordance with ASTM Method D3174. Sulfur content was determined by Surface Analysis and Research, Inc. in accordance with the quantitative energy dispersion X-ray spectrographic method. Appendix H contains the analytical results reported by Surface Analysis and Research, Inc.

APPENDIX A

PROJECT PARTICIPANTS

PROJECT PARTICIPANTS

Clayton Environmental Consultants, Inc.

N. Steve Walsh	Assistant Vice-President Director, Air Resource Engineering
Timothy V. Mattson	Group Leader, Emission Measurement
August H. Baecker	Laboratory Technician
Bruce G. Bird	Source Testing Specialist
Crystal B. Borthwick	Laboratory Technician
Albert W. Eissler	Industrial Hygienist, C.I.H.
Dean Gilman	Environmental Chemist
Randy M. Knutson	Source Testing Specialist
Dusanka Lazarevic	Environmental Data Specialist
Daniel C. Maser	Industrial Hygiene Technologist
Donna L. Opthoff	Environmental Data Specialist
Timothy J. Palmer	Environmental Control Specialist

Lee Brick and Tile Company

Sonny Howington

Energy and Environmental Analysis, Inc.

Robert Purcell

Barbara Lübkert

U.S. Environmental Protection Agency

Frank Clay

APPENDIX B

FIELD DATA SHEETS

B-1. Particulate

Sulfur Oxides

Nitrogen Oxides

Particle Size

Visible Emissions

B-2. Sampling Summary Data

B-3. Summary of Visible Emissions

APPENDIX B-1

Particulate

Sulfur Oxides

Nitrogen Oxides

Particle Size

Visible Emissions

SAMPLING TRAIN DATA

COMPANY: LaBlanc

SOURCE DESIGNATION: Kiln #6

REGULATING AUTHORITY:

DATE: 11/20/80

TEST NUMBER: P-1

Field Person(s): BGB

Filter Number: A-003-16

Barometric Pressure ("Hg): 29.84

Stack Static Pressure ("H2O): +0.07

Stack Dimensions: 35 3/4 ID

Ambient Temperature (°F):

Record all Data Every 5 Minutes

Nozzle(Dia-in): .415 .415 .419 (Avg): .416

Pitot Tube No. 41, Corr. Factor: 0.827

Meter Box No. R 5, Corr. Factor: 1.013

Meter Isokinetic Factor: 1843

Assumed Moisture (%): 3.1

Condensate Volume (ml):

Silica Gel Weight Gain (g):

Actual Moisture (%):

Leak Rate: Initial: 0.008 CFM at 15 "Hg; Final: CFM at "Hg

Traverse Point No.	Time: Sampling (min)	Time: Clock	Velocity Pressure ("H2O)	Stack Temp (°F)	Dry Gas Meter: Volume (ft3)	Dry Gas Meter: Temp. (°F) Inlet	Dry Gas Meter: Temp. (°F) Outlet	Orifice Pressure Differential ("H2O)	Filter Box Temp (°F)	Last Imp. Gas Temp (°F)	Sampling Train Static Pressure ("Hg)
1	0	1500	.17	515	546.904	52	49	2.1	215		
2	5	:30	.16	500	—	76	54	3.0	195		0
3	10	:35	.15	490	—	96	57	2.9			
4	15	:40	.15	510	—	97	59	2.9	190		1.0
5	20	:45	.13	515	64.7	96	60	2.5			
6	25	:50	.19	515	69.7	99	62	3.67	205	56	1
7	30	:55	.19	515	—	104	64	3.47			
8	35	1600	.19	520	74.3	106	69	3.5			
9	40	:05	.19	525	83.1	108	70	3.46			
10	45	:10	.17	545	—	102	70	3.24	210	55	
11	50	:15	.17	545	92.4	104	70	3.24			2.0
12	55	:20	.16	555	—	106	72	3.0	215		
13	60	:25	.15	560	—	106	74	2.92			
14	65	:30	.15	560	605.	106	74	2.82		59	
15	70	:35	.14	570	—	106	74	2.74			
16	75	:40	.24	390	—	106	74	5.4			
17	80	:45	.19	495	—	106	74	3.86			
AVERAGE (TOTAL)					( )						

2785 1670 112 55.62

SAMPLING TRAIN DATA 34.407

COMPANY: Lee Rixie
SOURCE DESIGNATION: North Kiln
REGULATING AUTHORITY: _____ Nozzle(Dia-in): ___
DATE: 11/9/90 Pitot Tube No. ___, Corr.
TEST NUMBER: 1-1 Meter Box No. ___, Corr.
Field Person(s): DAR Meter Isokinetic Factor
Filter Number: [illegible] Assumed Moisture (%): ___
Barometric Pressure ("Hg): _____ Condensate Volume(ml): ___
Stack Static Pressure ("H_2O): _____ Silica Gel Weight Gain(
Stack Dimensions: _____ Actual Moisture (%): ___
Ambient Temperature (°F): _____ Leak Rate } Initial: _____(
Record all Data Every _____ Minutes Final: _____(

Traverse Point No.	Time		Velocity Pressure ("H_2O)	Stack Temp (°F)	Dry Gas Meter			Orifice Pressure Differential ("H20)	Filte Box Temp (°F)
	Sampling (min)	Clock			Volume (ft^3)	Temp. (°F) Inlet	Outlet		
18	85	50	.19	495	25.4	106	76	2.86	
19	90	55	.15	500	—	104	76	3.00	
20	95	1700	.15	500	34.19	104	76	3.00	
	100	05			639.277				
1	105	1740	.16	500	639.277	66	66	3.44	
2	115	45	.18	520	—	82	66	3.42	
3	119	50	.17	520	—	92	66	3.26	
4	115	55	.14	520	—	96	66	3.46	190
5	120	1800	.19	530	52.1	100	68	3.64	
6	125	05	.20	535	—	104	70	3.53	
7	130	10	.21	545	—	106	72	4.00	
8	135	15	.21	545	73.1	106	72	4.00	200
9	140	20	.21	555	78.1	106	74	3.97	
10	145	25	.20	565	—	106	74	3.74	
11	150	30	.20	565	—	106	74	3.74	
AVERAGE (TOTAL)				7385	( )	1321	996	50.36	

SAMPLING TRAIN DATA

COMPANY: Ice Bank

SOURCE DESIGNATION: Nozzle 12 in

REGULATING AUTHORITY: _____ Nozzle(Dia-in): ___ ___ ___(Avg): ___

DATE: 1/9/90 Pitot Tube No. ___, Corr. Factor: ___

TEST NUMBER: P-1 Meter Box No. ___, Corr. Factor: ___

Field Person(s): _____ Meter Isokinetic Factor: _____

Filter Number: _____ Assumed Moisture (%): _____

arometric Pressure ("Hg): _____ Condensate Volume(ml): 213

Stack Static Pressure ("H_2O): _____ Silica Gel Weight Gain(g): 44.6 (2)

tack Dimensions: _____ Actual Moisture (%): _____

mbient Temperature (°F): _____ Leak Rate } Initial: _____ CFM at ___ "Hg

Record all Data Every _____ Minutes Final: .005 CFM at 10 "Hg

Traverse Point No.	Time: Sampling (min)	Time: Clock	Velocity Pressure ("H_2O)	Stack Temp (°F)	Dry Gas Meter: Volume (ft^3)	Dry Gas Meter: Temp. (°F) Inlet	Dry Gas Meter: Temp. (°F) Outlet	Orifice Pressure Differential ("H_2O)	Filter Box Temp (°F)	Last Imp. Gas Temp (°F)	Sampling Train Static Pressure ("Hg)
13	0155	30	.21	565	—	106	74	3.92	210		
14	160	40	.26	460	✓	106	74	5.42			3.0
15	165	45	.22	475	✓	104	76	4.53		50	
16	170	50	.22	500	✓	109	76	4.61			
17	175	55	.22	510	✓	109	76	4.37	210		
18	180	19:00	.22	510	20.7	109	76	4.27		60	
19	185	:05	.22	520	26.1	107	76	4.79			
20	190	:10	.19	540	—	109	76	3.66			
20	195	:15	.19	540	—	108	76	3.66			
	200	:20			741.282						
			13.45 ✓	520.0 ✓		100.3 ✓	64.9 ✓	3.62 ✓			
AVERAGE (TOTAL)				520.0 ✓	(194.378) ✓	100.75 ✓	64.9 ✓	2			

20800 ✓ (196.905) 100 ✓ 6000 3852 ✓

85.35 ✓

Revised 11-78

DRY MOLECULAR WEIGHT DETERMINATION (M_d)

Plant: Lee Brick & Tile
Date: 1-9-80
Sampling Time (24-hour Clock): P-1 ~18:00
Sampling Location:: North Kiln Stack

Sample Type (bag, integrated, continuous) _____
Analytical Method: Orsat
Ambient Temperature: 60
Operator: TVM

Comments:

Gas \ Run	1		2		3		Average Net Volume	Multiplier	Molecular Weight Of Stack Gas (dry basis) M_d, lb/lb-mole
	Actual Reading	Net	Actual Reading	Net	Actual Reading	Net			
CO_2	3.2	3.2	3.4	3.4	3.2	3.2	3.3	44/100	1.45
O_2 (Net is actual O_2 reading minus actual CO_2 reading)	19.3	16.1	19.6	16.2	19.2	16.0	16.1	32/100	5.15
CO (net is actual CO reading minus actual O_2 reading)	19.3	0		0		Ø	–	28/100	
N_2 (Net is 100 minus actual CO reading)							80.6	28/100	22.57
								Total	29.17 = M_d

WET MOLECULAR WEIGHT DETERMINATION (M_s)

B_{wo} = Proportion by volume of water vapor in the gas stream

M_s = Molecular weight of stack gas (wet basis), lb/lb-mole = $M_d(1-B_{wo}) + 18(B_{wo})$

SAMPLING TRAIN DATA

TM

$33.\frac{T_M}{T_S}H$

IPANY: Lee Brick + Tile

URCE DESIGNATION: N. kiln

GULATING AUTHORITY:

E: 1/10/90

ST NUMBER: P-2

ld Person(s): BGB

ter Number: 11105-15

ometric Pressure ("Hg): 30.42

ck Static Pressure ("H_2O):

ck Dimensions:

ient Temperature (°F): 40°F

ord all Data Every 5 Minutes

Nozzle(Dia-in): ___ ___ ___(Avg): ___

Pitot Tube No. 41, Corr.Factor: .827

Meter Box No. R-5, Corr.Factor: 1.013

Meter Isokinetic Factor: 1.043

Assumed Moisture (%):

Condensate Volume(ml): 200 ml (210.5)

Silica Gel Weight Gain(g): 40.5 ml

Actual Moisture (%):

Leak Rate } Initial: .01 CFM at 15 "Hg

Final: ___ CFM at ___ "Hg

Interval	Time: Sampling (min)	Time: Clock	Velocity Pressure ("H_2O)	Stack Temp (°F)	Dry Gas Meter: Volume (ft^3)	Dry Gas Meter: Temp. (°F) Inlet	Dry Gas Meter: Temp. (°F) Outlet	Orifice Pressure Differential ("H_2O)	Filter Box Temp (°F)	Last Imp. Gas Temp (°F)	Sampling Train Static Pressure ("Hg)
	0	[illegible]	.17	500	42.152	58	50	3.0	210		
	5	10	.16	520	46.5	70	52	2.82		48	1.0
	10	15	.16	530	—	82	54	3.19			
	15	20	.14	540	—	90	56	3.17			
	20	25	.19	550	59.9	94	60	3.35	240		
	25	30	.20	510	-	96	62	3.70		49	
	30	35	.20	510	69.7	100	64	3.71			1.0
	35	40	.20	510	-	102	66	3.77			
	40	45	.18	510	79.3	104	68	3.36	220		
	45	50	.18	520	84.0	104	70	3.34			
	50	55	.19	530	—	104	70	3.49		52	
	55	12:00	.18	530	93.1	106	72	3.31			
	60	05	.17	540	98.2	106	72	3.1			
	65	10	.18	540	/	106	72	3.28	250		
	70	15	.17	540	307.5	106	74	3.1		56	
	75	20	.16	540	12.0	106	74	2.92			
	80	25	.17	540	—	106	74	2.93			
	AVERAGE (TOTAL)				( )						

1642 1110 23.48

SAMPLING TRAIN DATA

COMPANY: Lee Brick + Tile
SOURCE DESIGNATION: N. Kiln
REGULATING AUTHORITY: _____ Nozzle(Dia-in): ___ ___
DATE: 1/10/80 Pitot Tube No. ___, Corr.
TEST NUMBER: P-2 Meter Box No. ____, Corr.
Field Person(s): BGR Meter Isokinetic Factor
Filter Number: A 003-115 Assumed Moisture (%): ___
Barometric Pressure ("Hg): _____ Condensate Volume(ml): _____
Stack Static Pressure ("H_2O): _____ Silica Gel Weight Gain(_____
Stack Dimensions: _____ Actual Moisture (%): ___
Ambient Temperature (°F): _____ Leak Rate } Initial: _____ C
Record all Data Every 5 Minutes Final: _____ C

Traverse Point No.	Time		Velocity Pressure ("H_2O)	Stack Temp (°F)	Dry Gas Meter			Orifice Pressure Differential ("H2O)	Filte Box Temp (°F)
	Sampling (min)	Clock			Volume (ft^3)	Temp. (°F) Inlet	Outlet		
1A	85	30	.15	500	—	106	76	2.74	-
1A	90	35	.14	490	25.1	106	76	2.7	
2D	95	40	.14	490	—	106	76	2.7	235
	100	45			833.609				
1	100	1330	.17	510	833.609	70	66	3.04	
2	105	35	.17	510	37.1	82	69	3.07	
3	110	30	.16	500	—	92	68	2.87	
A	115	25	.18	500	—	98	69	3.38	
5	120	20	.19	500	51.4	102	70	3.59	
6	125	45	.18	500	—	106	72	3.47	
7	130	50	.19	510	61.2	106	72	3.57	230
8	135	55	.19	520	—	108	74	355	
9	140	1400	.18	530	70.8	110	76	3.34	
10	145	05	.14	540	—	110	78	3.55	
11	150	10	.17	540		112	80	3.14	
AVERAGE (TOTAL)				7260'	( )	1414	1020'	44.61	

Revised 11-78

SAMPLING TRAIN DATA

COMPANY: LEE Brick + Tile

SOURCE DESIGNATION: N. Kiln

REGULATING AUTHORITY: _____ Nozzle(Dia-in): ___ ___ ___(Avg): ____

DATE: 1/10/90 Pitot Tube No. ___, Corr.Factor: ____

TEST NUMBER: P-2 Meter Box No. ____, Corr.Factor: ____

Field Person(s): _____ Meter Isokinetic Factor: _____

Filter Number: _____ Assumed Moisture (%): _____

Barometric Pressure ("Hg): _____ Condensate Volume(ml): _____

Stack Static Pressure ("H_2O): _____ Silica Gel Weight Gain(g): _____

Stack Dimensions: _____ Actual Moisture (%): _____

Ambient Temperature (°F): _____ Leak Rate } Initial: _____ CFM at _____ "Hg

Record all Data Every _____ Minutes Final: 4.01 CFM at 5 "Hg

Traverse Point No.	Time		Velocity Pressure ("H_2O)	Stack Temp (°F)	Dry Gas Meter			Orifice Pressure Differential ("H2O)	Filter Box Temp (°F)	Last Imp. Gas Temp (°F)	Sampling Train Static Pressure ("Hg)
	Sampling (min)	Clock			Volume (ft^3)	Temp. (°F) Inlet	Outlet				
1A	0	15	.14	550	—	112	90	3.29		60	1.0
1B	1:41	20	.18	550	29.6	112	90	3.29	250		
1A	1:45	25	.14	550	94.1	112	90	3.29			
1B	1:50	30	.18	550	—	112	90	3.29			1.0
1A	1:55	35	.20	510	902.6	112	92	3.51		62	
1B	1:59	40	.19	500	09.6	114	92	3.67			
1A	1:05	45	.25	410	—	114	92	5.32	240		3.0
1B	1:10	50	.18	440	—	116	92	3.55	220		
1A	1:15	55	.14	490	—	116	92	2.65		58	
	2:00	1600			929.395						
			13.22			1020					
AVERAGE (TOTAL)			520.1	(187.233)		101.9	71.5	3.33			

2052 (189.667) 4076 2860 = 133.15

86.7

Revised 11-78

P-2 NORTH

DRY MOLECULAR WEIGHT DETERMINATION (M_d)

Plant: LEE BRICK AND TILE CO SANFORD, NC, Sample Type (bag, integrated, continuous) _____
Date: 1/10/80 Analytical Method: ORSAT
Sampling Time (24-hour Clock): 1160-1500 Ambient Temperature: 39
Sampling Location:: NORTH KILN P-2 Operator: JOE

Comments:

Gas \ Run	1		2		3		Average Net Volume	Multiplier	Molecular Weight Of Stack Gas (dry basis) M_d, lb/lb-mole
	Actual Reading	Net	Actual Reading	Net	Actual Reading	Net			
CO_2	3.4	3.4	3.3	3.3	3.5	3.5	3.4	44/100	1.496
O_2 (Net is actual O_2 reading minus actual CO_2 reading)	19.8	16.4	19.7	16.4	19.8	16.3	16.4	32/100	5.248
CO (net is actual CO reading minus actual O_2 reading)	19.8	0.0	19.7	0.0	19.8	0.0	0	28/100	—
N_2 (Net is 100 minus actual CO reading)							~~79.3~~ 80.2	28/100	22.456
								Total	29.20 = M_d

WET MOLECULAR WEIGHT DETERMINATION (M_s)

B_{wo} = Proportion by volume of water vapor in the gas stream

SAMPLING TRAIN DATA

TVM 33.2

COMPANY: LEE BRICK

SOURCE DESIGNATION: NORTH KILN

REGULATING AUTHORITY: _____ Nozzle(Dia-in): ___ ___ ___(Avg): ____

DATE: 1/11/90 Pitot Tube No. 41, Corr.Factor: .822

TEST NUMBER: P-3 Meter Box No. 5, Corr.Factor: 1.013

Field Person(s): BGB Meter Isokinetic Factor: _____

Filter Number: A-003-09 Assumed Moisture (%): _____

Barometric Pressure ("Hg): 29.90 Condensate Volume(ml): _____

Stack Static Pressure ("H_2O): +.07 Silica Gel Weight Gain(g): _____

Stack Dimensions: _____ Actual Moisture (%): _____

Ambient Temperature (°F): 50°F Leak Rate } Initial: .01 CFM at 15 "Hg

Record all Data Every (5) Minutes Final: _____ CFM at ____ "Hg

Traverse Point No.	Time: Sampling (min)	Time: Clock	Velocity Pressure ("H_2O)	Stack Temp (°F)	Dry Gas Meter: Volume (ft^3)	Dry Gas Meter: Temp. (°F) Inlet	Dry Gas Meter: Temp. (°F) Outlet	Orifice Pressure Differential ("H_2O)	Filter Box Temp (°F)	Last Imp. Gas Temp (°F)	Sampling Train Static Pressure ("Hg)
1	0	1050.5	.17	500	988.105	56	56	3.03			
2	5		.19	490	92.7	66	54	3.32	190	48	1.0
3	10		.19	490	97.3	79	54	3.34			
4	15		.20	490	101.9	86	58	3.73			
5	20		.21	500	06.7	96	60	3.91			
6	25		.21	490	11.8	102	64	3.99			2.0
7	30		.21	500	17.0	106	69	3.97	230	50	
8	35		.21	500	—	109	69	3.99			
9	40		.21	510	—	110	72	3.96	245	50	
10	45		.21	490	32.4	110	74	4.05			
11	50		.20	460	37.5	112	76	3.91			
12	55		.21	440		112	76	4.11		52	
13	60		.20	490	47.9	114	78	3.93			
14	65		.20	490	53.1	114	78	3.93	245		
15	70		.19	495	—	114	80	3.72			
16	75		.19	490	63.2	112	80	3.50		5	
17	80		.16	490	—	112	80	3.12			2.0
AVERAGE (TOTAL)					( )	1110	1170	63.49			

Revised 11-78

SAMPLING TRAIN DATA

33.2

COMPANY: LEE Brick

SOURCE DESIGNATION: North Kiln

REGULATING AUTHORITY: _____ Nozzle(Dia-in): ___ ___

DATE: 1/11/80 Pitot Tube No. ___, Corr.

TEST NUMBER: P-3 Page 2 of 3 Meter Box No. ___, Corr.

Field Person(s): B&B Meter Isokinetic Facto:

Filter Number: _____ Assumed Moisture (%): ___

Barometric Pressure ("Hg): _____ Condensate Volume(ml):

Stack Static Pressure ("H_2O): _____ Silica Gel Weight Gain

Stack Dimensions: _____ Actual Moisture (%): ___

Ambient Temperature (°F): _____ Leak Rate } Initial: _____

Record all Data Every _____ Minutes Final: _____

Traverse Point No.	Time		Velocity Pressure ("H_2O)	Stack Temp (°F)	Dry Gas Meter			Orifice Pressure Differential ("H2O)	Filt. Box Tem: (°F
	Sampling (min)	Clock			Volume (ft^3)	Temp. (°F) Inlet	Outlet		
IV	95		.15	490	—	112	82	2.92	
19	90		.17	490	77.2	112	82	2.53	
20	95		.12	480	—	112	80	2.36	
	100				85.397				
					↓				
1	105	12:55	.16	470	85.397	76	74	3.06	
2	110		.15	485	—	94	72	2.99	220
3	115		.17	490	94.2	98	74	3.24	
4	120		.17	495	—	104	74	3.24	
5	125		.17	500	—	104	76	3.25	
6	125		.16	510	—	110	78	2.41	
7	130		.19	510	13.2	114	80	3.43	
8	135		.19	510	—	114	86	3.42	245
9	140		.19	490	—	114	82	3.48	
10	145		.14	490	27.7	116	84	3.56	
11	150		.17	490	32.7	118	84	3.37	190
12	155		.17	490	37.2	115	84	3.37	
AVERAGE (TOTAL)					( )				
				4900		1614	1185	47.534	

SAMPLING TRAIN DATA

OMPANY: LEE BRICK
OURCE DESIGNATION: NORTH KILN
EGULATING AUTHORITY: _____ Nozzle(Dia-in): ___ ___ ___(Avg): ____
ATE: 1/11/86 Pitot Tube No. ___, Corr.Factor: ____
EST NUMBER: P-3 Meter Box No. ___, Corr.Factor: ____
ield Person(s): BCKS Meter Isokinetic Factor: 1
ilter Number: _____ Assumed Moisture (%): 28
arometric Pressure ("Hg): _____ Condensate Volume(ml): +172, +53
tack Static Pressure ("H2O): _____ Silica Gel Weight Gain(g): 47.7
tack Dimensions: _____ Actual Moisture (%): _____
mbient Temperature (°F): _____ Leak Rate } Initial: _____ CFM at ___ "Hg
ecord all Data Every _____ Minutes Final: .106 CFM at 5 "Hg

rav-erse oint No.	Time: Sam-pling (min)	Time: Clock	Velocity Pressure ("H2O)	Stack Temp (°F)	Dry Gas Meter: Volume (ft^3)	Dry Gas Meter: Temp. (°F) Inlet	Dry Gas Meter: Temp. (°F) Outlet	Orifice Pressure Differ-ential ("H2O)	Filter Box Temp (°F)	Last Imp. Gas Temp (°F)	Sampling Train Static Pressure ("Hg)
1	160		.16	490	49.7	116	96	3.57			
14	165		.14	490	—	114	88	3.54			
15	170		.20	490	—	118	96	3.97		54	
16	175		.20	490	57.3	114	88	3.94	275		
17	180		.21	490	62.4	116	88	4.13			
18	185		.20	490	—	120	90	3.94		54	
19	190		.19	490	—	120	92	3.59			
20	195		.19	490	—	120	92	3.59	280	54	
	200				182.959						
			13.15	490		118	96	3.93			
AVERAGE (TOTAL)			189.1	(~~194.753~~) 186.753		106.8	76.53	3.53			

1-1555 (189.181) 4272 3061 141.25 91.66

Leak Check Correct
Retightened probe ferrule near nozzle, relak checked @ 2.5" Hg
leak rate 0.020

evised 11-78 Clayton Environmental Consultants, Inc.

P-3 ~~K~~ KILN North

DRY MOLECULAR WEIGHT DETERMINATION (M_d)

Plant: LEE BRICK AND TILE CO. SANFORD, NC
Date: 11 11 80
Sampling Time (24-hour Clock): 1100 - 1500
Sampling Location:: NORTH KILN P-3
Sample Type (bag, integrated, continuous)
Analytical Method: ORSAT
Ambient Temperature: 43
Operator: TJP

Comments:

Gas \ Run	1		2		3		Average Net Volume	Multiplier	Molecular Weight Of Stack Gas (dry basis) M_d, lb/lb-mole
	Actual Reading	Net	Actual Reading	Net	Actual Reading	Net			
CO_2	3.2	3.2	3.3	3.3	3.2	3.2	3.2 ✓	44/100	1.408 ✓✓
O_2 (Net is actual O_2 reading minus actual CO_2 reading)	19.6	16.4 ✓	19.5	16.2 ✓	19.5	16.3 ✓	16.3 ✓✓	32/100	5.216 ✓✓
CO (net is actual CO reading minus actual O_2 reading)	19.6	0	19.5	0	19.5	0	0	28/100	
N_2 (Net is 100 minus actual CO reading)							80.5 ✓✓	28/100	22.540 ✓✓
								Total	29.164 ✓✓ = M_d

WET MOLECULAR WEIGHT DETERMINATION (M_s)

B_{wo} = Proportion by volume of water vapor in the gas stream

M_s = Molecular weight of stack gas (wet basis), lb/lb-mole = $M_d(1-B_{wo}) + 18(B_{wo})$

SAMPLING TRAIN DATA NM 33.2

COMPANY: LEE BRICK
SOURCE DESIGNATION: NORTH KILN
REGULATING AUTHORITY:
DATE: 1/12/80
TEST NUMBER: P-A
Field Person(s): BGP
Filter Number: A-003-13
Barometric Pressure ("Hg): 30.06
Stack Static Pressure ("H2O):
Stack Dimensions:
Ambient Temperature (°F): 40
Record all Data Every 5 Minutes

Nozzle(Dia-in): ___ ___ ___ (Avg): ___
Pitot Tube No. ___, Corr. Factor: .822
Meter Box No. ___, Corr. Factor: 1.013
Meter Isokinetic Factor:
Assumed Moisture (%):
Condensate Volume(ml):
Silica Gel Weight Gain(g):
Actual Moisture (%):
Leak Rate: Initial: ___ CFM at ___ "Hg; Final: ___ CFM at ___ "Hg

Traverse Point No.	Time: Sampling (min)	Time: Clock	Velocity Pressure ("H2O)	Stack Temp (°F)	Dry Gas Meter: Volume (ft3)	Dry Gas Meter: Temp. (°F) Inlet	Dry Gas Meter: Temp. (°F) Outlet	Orifice Pressure Differential ("H2O)	Filter Box Temp (°F)	Last Imp. Gas Temp (°F)	Sampling Train Static Pressure ("Hg)
1	0	0940.5	.16	500	183.964	46	44	3.14			
2	5		.19	4955	—	62	46	3.43		47	
3	10		.20	490	93.1	74	49	3.64	190		
4	15		.21	490	—	84	50	3.87			1.0
5	20		.22	500	—	92	54	4.06		60	
6	25		.21	500	207.9	96	58	3.90			1.0
7	30		.21	510	13.1	102	62	3.90			
8	35		.22	510	—	104	66	4.10		58	
9	40		.21	515	23.4	106	68	3.91			
10	45		.20	520	24.4	108	70	3.72			
11	50		.20	525	—	108	72	3.71		62	
12	55		.21	490	—	110	76	4.06	230		
13	60		.26	400	—	110	76	5.56			
14	65		.22	460	—	114	78	4.41		58	
15	70		.19	480	45.1	112	78	3.72			
16	75		.19	500	1.0.1	112	80	3.65			
17	80		.19	500	65.1	112	80	3.65		60	
AVERAGE (TOTAL)					( )						

1652 1106 66.43

Revised 11-78

Clayton Environmental Consultants, Inc.

SAMPLING TRAIN DATA 33.2

COMPANY: LEE Brick
SOURCE DESIGNATION: North Kiln
REGULATING AUTHORITY: _____ Nozzle(Dia-in): ___ ___ ___
DATE: 1/12/90 Pitot Tube No. ___, Corr. Fa
TEST NUMBER: P-1 Meter Box No. ___, Corr. Fa
Field Person(s): BCB Meter Isokinetic Factor:
Filter Number: _____ Assumed Moisture (%): ___
Barometric Pressure ("Hg): _____ Condensate Volume(ml): ___
Stack Static Pressure ("H_2O): _____ Silica Gel Weight Gain(g)
Stack Dimensions: _____ Actual Moisture (%): ___
Ambient Temperature (°F): _____ Leak Rate } Initial: ___ CFM
Record all Data Every ___ Minutes Final: ≤ 0.01 CFM

Traverse Point No.	Time		Velocity Pressure ("H_2O)	Stack Temp (°F)	Dry Gas Meter			Orifice Pressure Differential ("H_2O)	Filter Box Temp (°F)
	Sampling (min)	Clock			Volume (ft^3)	Temp. (°F) Inlet	Outlet		
19	85		.17	500	702	112	84	3.65	
19	90		.19	500	—	112	80	3.65	
20	95		.19	500	—	112	80	3.65	270
	100				285.051				
	"				101.067				
	"								
1	100		.16	490	305.445	68	68	2.95	
2	105		.16	500	—	88	68	2.98	
3	110		.19	500	—	94	68	3.37	
4	115		.19	510	99.1	100	70	3.54	
5	120		.19	515		106	70	3.55	225
6	125		.19	515	308.8	106	72	3.55	
7	130		.19	520	13.6	108	74	3.55	
8	135		.19	520	14.1	108	74	3.55	
9	140		.19	525	—	108	76	3.54	
10	145		.20	490	28.1	110	76	3.57	
11	150		.25	390		112	78	5.42	225
AVERAGE (TOTAL)				6975	( )	1444	1034	50.82	

SAMPLING TRAIN DATA

COMPANY: LEE Brick
SOURCE DESIGNATION: North 16-1 M
REGULATING AUTHORITY: _____
DATE: 1/12/20
TEST NUMBER: P-6
Field Person(s): BAB
Filter Number: A-003-13
Barometric Pressure ("Hg): 30.09
Stack Static Pressure ("H_2O): _____
Stack Dimensions: _____
Ambient Temperature (°F): _____
Record all Data Every _____ Minutes

Nozzle(Dia-in): ___ ___ ___(Avg): ____
Pitot Tube No. ___, Corr. Factor: ____
Meter Box No. ____, Corr. Factor: ____
Meter Isokinetic Factor: ____
Assumed Moisture (%): ____
Condensate Volume(ml): +195 238.5
Silica Gel Weight Gain(g): 23.5+20
Actual Moisture (%): ____
Leak Rate } Initial: ____ CFM at ____ "Hg
Leak Rate } Final: 0.001 CFM at 7 "Hg

Traverse Point No.	Time: Sampling (min)	Time: Clock	Velocity Pressure ("H_2O)	Stack Temp (°F)	Dry Gas Meter: Volume (ft^3)	Dry Gas Meter: Temp. (°F) Inlet	Dry Gas Meter: Temp. (°F) Outlet	Orifice Pressure Differential ("H_2O)	Filter Box Temp (°F)	Last Imp. Gas Temp (°F)	Sampling Train Static Pressure ("Hg)
12	0/5		.20	490	39.3	114	80	3.93		56	
13	760		.21	490	—	114	80	4.09			
14	165		.21	490	—	114	80	4.09			
15	170		.22	500	—	114	80	4.24			
16	175		.22	500	—	114	82	4.55	240	52	
17	180		.20	510	65.7	114	82	4.09			
18	185		.22	510	—	114	82	4.5		50	3.0
19	190		.20	510	76.4	114	82	4.09	195		
20	195		.20	510	—	114	82	4.09			
	200				396.270						
					101.322						
			13.85			93.6	92.0				
AVERAGE (TOTAL)				498.3	(202.389)	103.1	71.75	3.87			

195.5 (205.020) 4/22 257.0 89.4 154.92

Revised 11-78

Clayton Environmental Consultants, Inc.

P-4 N. KILN

DRY MOLECULAR WEIGHT DETERMINATION (M_d)

Plant: LEE BRICK AND TILE CO SANFORD, N.C.
Date: 11/21/80
Sampling Time (24-hour Clock): 10:0 - 1400
Sampling Location:: NORTH KILN P-4
Sample Type (bag, integrated, continuous) _____
Analytical Method: ORSAT
Ambient Temperature: 42
Operator: TJP

Comments:

Gas \ Run	1		2		3		Average Net Volume	Multiplier	Molecular Weight Of Stack Gas (dry basis) M_d, lb/lb-mole
	Actual Reading	Net	Actual Reading	Net	Actual Reading	Net			
CO_2	3.6	3.6	3.5	3.5	3.5	3.5	3.5 ✓✓	44/100	1.540 ✓
O_2 (Net is actual O_2 reading minus actual CO_2 reading)	19.8	16.2 ✓	19.7	16.2 ✓	19.8	16.3 ✓	16.2 ✓✓	32/100	5.184 ✓
CO (net is actual CO reading minus actual O_2 reading)	19.8	0	19.7	0	19.8	0		28/100	
N_2 (Net is 100 minus actual CO reading)							80.3 ✓	28/100	22.484
								Total	29.21 ✓ = M_d

WET MOLECULAR WEIGHT DETERMINATION (M_s)

B_{wo} = Proportion by volume of water vapor in the gas stream

M_s = Molecular weight of stack gas (wet basis), lb/lb-mole = $M_d(1-B_{wo}) + 18(B_{wo})$

SAMPLING TRAIN DATA

COMPANY: Lee Brick & TILE Co SANFORD N.C.
SOURCE DESIGNATION: South KILN
REGULATING AUTHORITY: EPA
DATE: 1/9/80
TEST NUMBER: P-1 pg 1 of 3
Field Person(s): TJP
Filter Number: A-003-17
Barometric Pressure ("Hg): 29.84
Stack Static Pressure ("H_2O): ±0.14
Stack Dimensions: 35"/s ID
Ambient Temperature (°F): 38
Record all Data Every 5 Minutes

Nozzle (Dia-in): [illegible] (Avg): .314
Pitot Tube No. [illegible], Corr. Factor: .831
Meter Box No. [illegible], Corr. Factor: 1.011
Meter Isokinetic Factor:
Assumed Moisture (%):
Condensate Volume (ml):
Silica Gel Weight Gain (g):
Actual Moisture (%):
Leak Rate: Initial: <0.005 CFM at 17 "Hg
Leak Rate: Final: <0.005 CFM at 12 "Hg

Traverse Point No.	Time: Sampling (min)	Time: Clock	Velocity Pressure ("H_2O)	Stack Temp (°F)	Dry Gas Meter: Volume (ft^3)	Dry Gas Meter: Temp. (°F) Inlet	Dry Gas Meter: Temp. (°F) Outlet	Orifice Pressure Differential ("H_2O)	Filter Box Temp (°F)	Last Imp. Gas Temp (°F)	Sampling Train Static Pressure ("Hg)
NE-1	0	1525	0.23	200	675.284	49	50	2.0			2.5
-2	5	1530	0.25	190	679.080	50	54	2.2			2.5
-3	10	1535	0.26	180	682.960	64	56	2.3	255	50	2.5
-4	15	1540	0.29	175	686.840	67	58	2.6			2.5
-5	20	1545	0.30	185	691.030	69	60	2.7			2.5
-6	25	1550	0.30	175	695.385	71	61	2.7	250	58	2.5
-7	30	1555	0.30	185	699.770	72	63	2.7			2.5
-8	35	1600	0.30	185	704.105	72	64	2.7			2.5
-9	40	1605	0.28	190	708.480	73	65	2.5			2.5
-10	45	1620	0.27	185	712.755	73	66	2.4	235	56	2.5
-11	50	1615	0.26	185	716.900	73	66	2.4			2.5
-12	55	1620	0.26	180	721.070	74	67	2.4	240	58	2.5
-13	60	1625	0.26	185	725.210	74	67	2.4			2.5
14	65	1635	0.27	175	729.350	74	68	2.5			2.5
15	70	1640	0.28	175	733.585	74	68	2.6			2.5
16	75	1645	0.31	170	737.915	74	68	2.9			2.5
~~17~~		1646/1647	circuit between dial meter								
AVERAGE (TOTAL)					( )						

SAMPLING TRAIN DATA

COMPANY: LEE BRICK & TILE CO.
SOURCE DESIGNATION: SOUTH KILN
REGULATING AUTHORITY: EPA
DATE: 1/9/80
TEST NUMBER: P-1 of 2 of 3
Field Person(s): TJP et al
Filter Number: A-CC3-17
Barometric Pressure ("Hg): 29.84
Stack Static Pressure ("H_2O): +0.14
Stack Dimensions:
Ambient Temperature (°F):
Record all Data Every 5 Minutes

Nozzle(Dia-in): ___ ___
Pitot Tube No. ___, Corr
Meter Box No. ___, Corr
Meter Isokinetic Facto
Assumed Moisture (%): _
Condensate Volume(ml):
Silica Gel Weight Gain
Actual Moisture (%): _
Leak Rate } Initial: <0.005
Final: <0.005

Traverse Point No.	Time: Sampling (min)	Time: Clock	Velocity Pressure ("H_2O)	Stack Temp (°F)	Dry Gas Meter: Volume (ft^3)	Dry Gas Meter: Temp. (°F) Inlet	Dry Gas Meter: Temp. (°F) Outlet	Orifice Pressure Differential ("H_2O)	Filt Box Tem (°F
NE-17	80	1652	0.26	170	742.350	74	68	2.4	
18	85	1657	0.28	167	746.630	75	69	2.6	24
19	90	1702	0.22	167	750.840	75	69	2.1	
20	95	1707	0.22	175	754.730	75	69	2.0	
1-SE	100	1712 1742	0.16	175	758.585	59	60	1.4	24
SE-2	105	1747	0.16	175	761.830	61	61	1.4	23
SE-3	110	1752	0.18	180	764.970	64	61	1.6	
-4	115	1757	0.19	180	768.270	66	62	1.7	23
-5	120	1802	0.21	185	771.765	68	63	1.9	2
-6	125	1807	0.21	185	775.395	70	63	1.9	22
-7	130	1812	0.22	185	779.070	71	64	2.0	23
-8	135	1817	0.22	190	782.770	72	65	2.0	
-9	140	1822	0.22	190	786.550	72	66	2.0	23
-10	145	1827	0.24	190	790.360	72	67	2.2	26
-11	150	1832	0.26	185	794.305	73	67	2.4	
-12	155	1837	0.32	180	798.420	74	67	2.9	
-13	160	1842	0.37	180	802.890	74	67	3.4	25
AVERAGE (TOTAL)					( )				

SAMPLING TRAIN DATA

COMPANY: LEE BRICK & TILE CO SANFORD N.C.
SOURCE DESIGNATION: SOUTH KILN
REGULATING AUTHORITY: EPA
DATE: 4/9/80
TEST NUMBER: P-1 of 3
Field Person(s): TVP et al.
Filter Number: A-003-17
Barometric Pressure ("Hg): 29.8
Stack Static Pressure ("H_2O): +0.14
Stack Dimensions:
Ambient Temperature (°F):
Record all Data Every 5 Minutes

Nozzle(Dia-in): ___ ___ ___ (Avg): ___
Pitot Tube No. ___, Corr. Factor: ___
Meter Box No. ___, Corr. Factor: ___
Meter Isokinetic Factor: ___
Assumed Moisture (%): ___
Condensate Volume(ml): 58
Silica Gel Weight Gain(g): 31.2
Actual Moisture (%): ___
Leak Rate: Initial: <0.005 CFM at 17 "Hg
Final: <0.005 CFM at 12 "Hg

Traverse Point No.	Time: Sampling (min)	Time: Clock	Velocity Pressure ("H_2O)	Stack Temp (°F)	Dry Gas Meter: Volume (ft^3)	Dry Gas Meter: Temp. (°F) Inlet	Dry Gas Meter: Temp. (°F) Outlet	Orifice Pressure Differential ("H_2O)	Filter Box Temp (°F)	Last Imp. Gas Temp (°F)	Sampling Train Static Pressure ("Hg)
14	165	1847	0.33	190	807.460	75	68	3.0	245	60	3.0
15	170	1852	0.33	200	812.405	75	68	2.9			3.0
16	175	1857	0.35	200	817.000	74	67	3.1		62	3.0
17	180	1902	0.34	200	821.670	75	67	3.0	250		3.0
18	185	1907	0.33	200	826.325	75	67	2.9			3.0
19	190	1912	0.33	205	830.935	75	67	2.8			
20	195	1917	0.32	205	835.460	75	67	2.8			
	200	1922			839.974						
							67.7				
			0.326			76.8	64.5				
AVERAGE (TOTAL)				184.5	(164.690) 166.502			2.41			

67.65

DRY MOLECULAR WEIGHT DETERMINATION (M_d)

Plant: Lee Brick & Tile
Date: 1-9-80
Sampling Time (24-hour Clock): P-1 ~ 1800
Sampling Location:: South Kiln outlet

Sample Type (bag, integrated, continuous) _____
Analytical Method: Orsat
Ambient Temperature: 60
Operator: TVM

Comments:

Gas \ Run	1		2		3		Average Net Volume	Multiplier	Molecular Weight Of Stack Gas (dry basis) M_d, lb/lb-mole
	Actual Reading	Net	Actual Reading	Net	Actual Reading	Net			
CO_2	0.8	0.8	0.6	0.6	0.6	0.6	0.7	44/100	0.308
O_2 (Net is actual O_2 reading minus actual CO_2 reading)	20.3	19.5	20.1	19.5	20.1	19.5	19.5	32/100	6.240
CO (net is actual CO reading minus actual O_2 reading)	20.3		20.1		20.1		<0.0	28/100	
N_2 (Net is 100 minus actual CO reading)							79.8	28/100	22.344
							Total		28.892 = M_d

WET MOLECULAR WEIGHT DETERMINATION (M_s)

B_{wo} = Proportion by volume of water vapor in the gas stream

M_s = Molecular weight of stack gas (wet basis) lb/lb-mole = $M_d(1-B_{wo}) + 18(B_{wo})$

TVM

SAMPLING TRAIN DATA

COMPANY: LEE BRICK AND TILE COMPANY

SOURCE DESIGNATION: S. Kiln 2

REGULATING AUTHORITY: EPA

DATE: 1/10/80

TEST NUMBER: P-2 pg 1 of 3

Field Person(s): TJP ET al

Filter Number: A-003-21

Barometric Pressure ("Hg): 30.42

Stack Static Pressure ("H_2O): +0.14

Stack Dimensions:

Ambient Temperature (°F): 35

Record all Data Every 5 Minutes

SAMPLING $\frac{T_M}{T_S}$ H

Nozzle (Dia-in): 5/16 (Avg): 0.314

Pitot Tube No. 19, Corr. Factor: .831

Meter Box No. MC 2 Corr. Factor: 1.011

Meter Isokinetic Factor:

Assumed Moisture (%):

Condensate Volume (ml): 57

Silica Gel Weight Gain (g): 35.3

Actual Moisture (%):

Leak Rate: Initial: <0.005 CFM at 15 "Hg; Final: CFM at 12 "Hg

$\Delta H = 10.86 \frac{T_M}{T_S} \Delta P$

Traverse Point No.	Time: Sampling (min)	Time: Clock	Velocity Pressure ("H_2O)	Stack Temp (°F)	Dry Gas Meter: Volume (ft^3)	Dry Gas Meter: Temp. (°F) Inlet	Dry Gas Meter: Temp. (°F) Outlet	Orifice Pressure Differential ("H_2O)	Filter Box Temp (°F)	Last Imp. Gas Temp (°F)	Sampling Train Static Pressure ("Hg)
NE-1	0	1108	0.22	195	842.513	58	58	1.8	235	48	2.5
-2	5	1113	0.22	200	844.210	60	60	1.9	225	48	2.5
-3	10	1118	0.24	205	847.865	66	61	2.0	235		2.5
-4	15	1123	0.26	205	851.670	68	62	2.2			2.5
-5	20	1128	0.28	205	855.720	70	62	2.4	235		2.5
-6	25	1133	0.29	185	859.850	72	63	2.6	230	45	2.5
-7	30	1138	0.30	175	864.170	73	64	2.7			2.5
NE-8	35	1143	0.29	175	868.585	74	65	2.6	230		2.5
NE-9	40	1148	0.28	180	872.870	74	66	2.5	240		2.5
-10	45	1153	0.27	185	877.020	74	66	2.4		50	2.5
-11	50	1158	0.25	185	881,090	74	66	2.2	240		2.5
12	55	1203	0.25	190	885.080	74	67	2.2			2.5
13	60	1208	0.26	190	888.940	74	68	2.3	245		2.5
14	65	1213	0.26	190	892.980	74	68	2.3	245	52	2.5
15	70	1218	0.25	190	897.000	75	68	2.2	250		2.5
NE-16	75	1223	0.26	195	900.990	75	68	2.3	250		2.5
NE-17	80	1228	0.25	200	905.090	76	69	2.2	260		2.5
AVERAGE (TOTAL)					( )						

SAMPLING TRAIN DATA

COMPANY: LEE BRICK AND TILE COMPANY SANF
SOURCE DESIGNATION: SOUTH KILN
REGULATING AUTHORITY: EPA
DATE: 1/10/80
TEST NUMBER: P-2 pg 2 of 3
Field Person(s): TJP et al.
Filter Number: A-003-21
Barometric Pressure ("Hg): 30.42
Stack Static Pressure ("H_2O): +0.14
Stack Dimensions:
Ambient Temperature (°F):
Record all Data Every 5 Minutes

Nozzle(Dia-in): ___ ___
Pitot Tube No. 19, Corr
Meter Box No. PAC 2, Corr
Meter Isokinetic Facto
Assumed Moisture (%):
Condensate Volume(ml):
Silica Gel Weight Gain
Actual Moisture (%):
Leak Rate } Initial: <0.005
Final:

Traverse Point No.	Time: Sampling (min)	Time: Clock	Velocity Pressure ("H_2O)	Stack Temp (°F)	Dry Gas Meter: Volume (ft^3)	Dry Gas Meter: Temp. (°F) Inlet	Dry Gas Meter: Temp. (°F) Outlet	Orifice Pressure Differential ("H_2O)	Filt Box Tem (°F
NE-18	85	1233	0.22	185	909.080	76	69	2.0	25
19	90	1238	0.23	180	912.870	76	70	2.1	
20	95	1243	0.22	185	916.655	76	70	2.0	
SE-1	100	1248/1318	0.14	200	920.406	62	64	1.2	27
-2	105	1323	0.14	200	923.320	64	64	1.2	
-3	110	1328	0.16	210	926.265	68	65	1.4	
-4	115	1333	0.19	190	929.370	70	66	1.7	24
-5	120	1338	0.21	185	932.820	73	67	1.9	
-6	125	1343	0.22	190	936.510	76	68	2.0	
-7	130	1348	0.21	185	940.220	77	69	1.9	24
-8	135	1353	0.21	185	943.905	78	69	1.9	
-9	140	1358	0.23	195	947.610	79	70	2.0	23
-10	145	1403	0.23	195	951.405	80	71	2.0	
11	150	1408	0.29	195	955.130	80	72	2.6	
SE-12	155	1413	0.30	200	959.360	81	73	2.6	24
-13	160	1418	0.33	200	963.790	82	74	2.9	24
-14	165	1423	0.33	200	968.300	82	74	2.9	
AVERAGE (TOTAL)					( )				

SAMPLING TRAIN DATA

IPANY: LEE BRICK AND TILE COMPANY SANFORD, N.C.
JRCE DESIGNATION: SOUTH KILN
ULATING AUTHORITY: EPA
E: 1/10/80
T NUMBER: P-2 pg 3 of 3
ld Person(s): TJP et al
ter Number: A-003-21
ometric Pressure ("Hg): 30.42
ck Static Pressure ("H_2O): -0.14
ck Dimensions:
ient Temperature (°F): 42
ord all Data Every 5 Minutes

Nozzle(Dia-in): ___ ___ ___(Avg): ___
Pitot Tube No. 19, Corr.Factor: ___
Meter Box No. RAC 2, Corr.Factor: ___
Meter Isokinetic Factor: ___
Assumed Moisture (%): ___
Condensate Volume(ml): 57
Silica Gel Weight Gain(g): 35.3
Actual Moisture (%): ___
Leak Rate: Initial: <0.005 CFM at 15 "Hg; Final: <0.005 CFM at 5 "Hg

v-se nt	Time: Sampling (min)	Time: Clock	Velocity Pressure ("H_2O)	Stack Temp (°F)	Dry Gas Meter: Volume (ft^3)	Dry Gas Meter: Temp. (°F) Inlet	Dry Gas Meter: Temp. (°F) Outlet	Orifice Pressure Differential ("H_2O)	Filter Box Temp (°F)	Last Imp. Gas Temp (°F)	Sampling Train Static Pressure ("Hg)
5	170	1428	0.35	205	972,870	83	74	3.1	250		3.0
10	175	1433	0.36	195	977,530	82	75	3.2		60	3.0
15	180	1438	0.35	200	982,890	83	75	3.1	240		3.0
18	185	1443	0.38	175	987,070	83	75	3.5			3.0
19	190	1448	0.32	200	992,000	83	75	2.8	240		3.0
20	195	1453	0.33	205	996,540	82	75	2.9		58	3.0
	200	1458			1001.091						
AVERAGE (TOTAL)				192.8	(160.578)		78.13				

(162.344) 71.38

P-2 South

DRY MOLECULAR WEIGHT DETERMINATION (M_d)

Plant: LEE BRICK & TILE CO SANFORD, NC
Date: 1/10/80
Sampling Time (24-hour Clock): 1100 – 1500
Sampling Location:: SOUTH KILN P-2
Sample Type (bag, integrated, continuous)
Analytical Method: ORSAT
Ambient Temperature: 40
Operator: TJP

Comments:

Gas \ Run	1		2		3		Average Net Volume	Multiplier	Molecular Weight Of Stack Gas (dry basis) M_d, lb/lb-mole
	Actual Reading	Net	Actual Reading	Net	Actual Reading	Net			
CO_2	1.0	1.0	1.0	1.0	1.0	1.1	1.0	44/100	0.440
O_2 (Net is actual O_2 reading minus actual CO_2 reading)	20.1	19.1	20.1	19.1	20.0	18.9	19.0	32/100	6.080
CO (net is actual CO reading minus actual O_2 reading)	20.1	0.0	20.1	0.0	20.0	0.0	0.0	28/100	
N_2 (Net is 100 minus actual CO reading)							~~79.9~~ 80.0	28/100	22.400
								Total	28.92 = M_d

WET MOLECULAR WEIGHT DETERMINATION (M_s)

B_{wo} = Proportion by volume of water vapor in the gas stream

M_s = Molecular weight of stack gas (wet basis), lb/lb-mole = $M_d(1-B_{wo}) + 18(B_{wo})$

SAMPLING TRAIN DATA TVM

COMPANY: LEE BRICK AND TILE COMPANY SANFORD, N.C.
SOURCE DESIGNATION: SOUTH KILN
REGULATING AUTHORITY: EPA
DATE: 11/11/80
TEST NUMBER: P-3 pg 1 of 3
Field Person(s): TJP et al
Filter Number: A-003-10
Barometric Pressure ("Hg): 29.80
Stack Static Pressure ("H_2O): +0.13
Stack Dimensions:
Ambient Temperature (°F): 49
Record all Data Every 5 Minutes
RAIN

Nozzle (Dia-in): 5/16 (Avg): 0.314
Pitot Tube No. 19, Corr. Factor: .831
Meter Box No. #2, Corr. Factor: 1.011
Meter Isokinetic Factor:
Assumed Moisture (%):
Condensate Volume (ml):
Silica Gel Weight Gain (g):
Actual Moisture (%):
Leak Rate: Initial: 0.008 CFM at 15 "Hg; Final: CFM at "Hg

ΔH = 10.86 Ts ΔP

Traverse Point No.	Time: Sampling (min)	Time: Clock	Velocity Pressure ("H_2O)	Stack Temp (°F) 605	Dry Gas Meter: Volume (ft^3)	Dry Gas Meter: Temp. (°F) Inlet 515	Dry Gas Meter: Temp. (°F) Outlet	Orifice Pressure Differential ("H_2O)	Filter Box Temp (°F)	Last Imp. Gas Temp (°F)	Sampling Train Static Pressure ("Hg)
E-1	0	1049	0.16	165	002.668	55	56	1.4	250	44	2.0
-2	5	1054	0.23	190	005.805	61	58	2.0			2.5
-3	10	1059	0.25	200	009.680	68	60	2.2			2.5
-4	15	1104	0.27	205	013.350	72	62	2.3	240		2.5
-5	20	1109	0.27	207	017.380	74	64	2.3			2.5
-6	25	1114	0.28	210	021.450	76	66	2.4		46	2.5
-7	30	1119	0.28	205	025.580	78	68	2.4	255		2.5
-8	35	1124	0.27	210	029.770	79	69	2.3			2.5
-9	40	1129	0.27	215	033.860	80	71	2.3		46	2.5
-10	45	1134	0.27	185	037.955	80	72	2.4	240		2.5
-11	50	1139	0.25	180	042.125	81	73	2.3			2.5
-12	55	1144	0.25	185	046.280	82	74	2.3	240	48	2.5
E-13	60	1149	0.27	185	050.345	82	74	2.4			2.5
E-14	65	1154	0.27	185	054.570	83	75	2.4			2.5
15	70	1159	0.25	185	058.780	83	75	2.3	240		2.5
16	75	1204	0.26	190	062.770	83	76	2.3		46	2.5
17	80	1209	0.24	190	066.860	84	76	2.2			2.5
AVERAGE (TOTAL)					( )						

SAMPLING TRAIN DATA

COMPANY: LEE BRICK AND TILE COMPANY SAN
SOURCE DESIGNATION: SOUTH KILN
REGULATING AUTHORITY: EPA
DATE: 1/11/80
TEST NUMBER: P-3 pg 2 of 3
Field Person(s): TJP et.al.
Filter Number: A-003-10
Barometric Pressure ("Hg): 29.80
Stack Static Pressure ("H_2O): +0.13
Stack Dimensions:
Ambient Temperature (°F): 44
Record all Data Every 5 Minutes

Nozzle(Dia-in):
Pitot Tube No. 19, Corr.F
Meter Box No. RAC 2, Corr.F
Meter Isokinetic Factor:
Assumed Moisture (%):
Condensate Volume(ml):
Silica Gel Weight Gain(g
Actual Moisture (%):
Leak Rate } Initial: 0.008 CF
Final: CF

Traverse Point No.	Time: Sampling (min)	Time: Clock	Velocity Pressure ("H_2O)	Stack Temp (°F)	Dry Gas Meter: Volume (ft^3)	Dry Gas Meter: Temp. (°F) Inlet	Dry Gas Meter: Temp. (°F) Outlet	Orifice Pressure Differential ("H_2O)	Filter Box Temp (°F)
NE-18	85	1214	0.23	195	070.900	84	77	2.1	240
NE-19	90	1219	0.20	195	074.840	84	78	1.8	
-20	95	1224	0.20	190	078.485	84	78	1.8	240
SE-1	100	1229/1255	0.14	200	082.101	72	73	1.2	280
-2	105	1300	0.14	200	085.290	72	73	1.2	
-3	110	1305	0.15	205	088.475	75	74	1.3	
-4	115	1310	0.17	210	091.540	77	74	1.5	235
-5	120	1315	0.19	210	094.810	80	75	1.7	
SE-6	125	1320	0.19	215	098.300	82	76	1.6	
-7	130	1325	0.20	215	101.735	83	76	1.7	240
-8	135	1330	0.19	220	105.250	83	77	1.6	
-9	140	1335	0.21	185	108.670	83	78	1.9	245
-10	145	1340	0.23	185	112.350	84	78	2.1	
-11	150	1345	0.28	190	116.245	85	78	2.5	240
12	155	1350	0.32	190	120.490	86	79	2.9	
-13	160	1355	0.32	195	125.010	87	80	2.9	245
SE-14	165	1400	0.32	195	129.590	87	80	2.9	
AVERAGE (TOTAL)					( )				

SAMPLING TRAIN DATA

COMPANY: LEE BRICK AND TILE COMPANY SANFORD, N.C.
SOURCE DESIGNATION: SOUTH KILN
REGULATING AUTHORITY: EPA
DATE: 1/11/80
TEST NUMBER: P-3 pg 3 of 3
Field Person(s): TJP et-al
Filter Number: A-003-10
Barometric Pressure ("Hg): 29.80
Stack Static Pressure ("H_2O): -0.13
Stack Dimensions:
Ambient Temperature (°F): 44
Record all Data Every 5 Minutes

Nozzle(Dia-in): ___ ___ ___ (Avg): ___
Pitot Tube No. 19, Corr. Factor: ___
Meter Box No. RAC 2, Corr. Factor: ___
Meter Isokinetic Factor: ___
Assumed Moisture (%): ___
Condensate Volume(ml): ~~[illegible]~~ 78 113
Silica Gel Weight Gain(g): 35.6
Actual Moisture (%): ___
Leak Rate } Initial: 0.008 CFM at 15 "Hg
Final: .0175 CFM at 15 "Hg

Traverse Point No.	Time: Sampling (min)	Time: Clock	Velocity Pressure ("H_2O)	Stack Temp (°F)	Dry Gas Meter: Volume (ft^3)	Dry Gas Meter: Temp. (°F) Inlet	Dry Gas Meter: Temp. (°F) Outlet	Orifice Pressure Differential ("H_2O)	Filter Box Temp (°F)	Last Imp. Gas Temp (°F)	Sampling Train Static Pressure ("Hg)
SE-5	170	1405	0.33	200	134.170	88	80	2.9	240	45	2.5
-16	175	1410	0.34	200	138.790	88	80	3.0			2.5
-17	180	1415	0.34	200	143.450	88	81	3.0	240		2.5
-18	185	1420	0.32	200	148.160	88	82	2.9	245	48	2.5
-19	190	1425	0.31	205	152.720	88	82	2.9			2.5
SE-20	195	1430	0.31	205	157.440	88	82	2.8	250	56	2.5
	200	1435			161.831						
			12.71								
AVERAGE (TOTAL)				197.4	(159.163) 160.914			17.21			

1-S S. KILN

DRY MOLECULAR WEIGHT DETERMINATION (M_d)

Plant: LEE BRICK AND TILE CO. SANFORD, NC Sample Type (bag, integrated, continuous) _____
Date: 1/11/80 Analytical Method: ORSAT
Sampling Time (24-hour Clock): 11:00-1500 Ambient Temperature: 45
Sampling Location:: SOUTH KILN P-3 Operator: TJP

Comments:

Gas \ Run	1		2		3		Average Net Volume	Multiplier	Molecular Weight Of Stack Gas (dry basis) M_d, lb/lb-mole
	Actual Reading	Net	Actual Reading	Net	Actual Reading	Net			
CO_2	1.1	1.1	1.0	1.0	1.1	1.1	1.1 ✓	44/100	0.484 ✓
O_2 (Net is actual O_2 reading minus actual CO_2 reading)	19.7	18.6 ✓	19.8	18.8 ✓	19.8	18.7 ✓	18.7 ✓	32/100	5.984 ✓
CO (net is actual CO reading minus actual O_2 reading)	19.7	0	19.8	0	19.8	0		28/100	
N_2 (Net is 100 minus actual CO reading)							80.2 ✓	28/100	22.456 ✓
								Total	28.924 ✓ = M_d

WET MOLECULAR WEIGHT DETERMINATION (M_s)

B_{wo} = Proportion by volume of water vapor in the gas stream

SAMPLING TRAIN DATA TVM

COMPANY: LEE BRICK AND TILE CO. SANFORD, N.C.
SOURCE DESIGNATION: SOUTH KILN
REGULATING AUTHORITY: EPA
DATE: 11/2/80
TEST NUMBER: P-4 pg 1 of 3
Field Person(s): JP et al.
Filter Number: A-003-07
Barometric Pressure ("Hg): 30.06
Stack Static Pressure ("H_2O): +0.14
Stack Dimensions:
Ambient Temperature (°F): 44
Record all Data Every 5 Minutes

Nozzle(Dia-in): ___ ___ ___ (Avg): .314
Pitot Tube No. 19, Corr. Factor: .831
Meter Box No. RAE 2, Corr. Factor: 1.011
Meter Isokinetic Factor:
Assumed Moisture (%):
Condensate Volume(ml):
Silica Gel Weight Gain(g):
Actual Moisture (%):
Leak Rate } Initial: 0.01 CFM at 15 "Hg
Final: ___ CFM at ___ "Hg

Traverse Point No.	Time: Sampling (min)	Time: Clock	Velocity Pressure ("H_2O)	Stack Temp (°F)	Dry Gas Meter: Volume (ft^3)	Dry Gas Meter: Temp. (°F) Inlet	Dry Gas Meter: Temp. (°F) Outlet	Orifice Pressure Differential ("H_2O)	Filter Box Temp (°F)	Last Imp. Gas Temp (°F)	Sampling Train Static Pressure ("Hg)
NE-1	0	0940	0.24	200	213.211	46	48	2.0	245	46	2.5
NE-2	5	0945	0.25	195	217.010	53	49	2.1	240	47	2.5
NE-3	10	0950	0.26	205	220.880	58	51	2.2	235		2.5
NE-4	15	0955	0.28	185	224.750	62	54	2.4	235		2.5
NE-5	20	1000	0.31	185	228.780	66	56	2.7	230		2.5
NE-6	25	1005	0.30	190	233.160	69	58	2.6		56	2.5
NE-7	30	1010	0.30	185	237.400	72	61	2.6	230	58	2.5
NE-8	35	1015	0.29	195	241.605	73	63	2.5			2.5
-9	40	1020	0.29	195	245.820	74	64	2.5	235		2.5
-10	45	1025	0.27	200	250.010	75	66	2.4		59	2.5
-11	50	1030	0.28	200	254.190	75	67	2.4			2.5
-12	55	1035	0.28	190	258.270	75	68	2.5	235		2.5
NE-13	60	1040	0.32	150	262.690	76	69	3.0		54	2.5
-14	65	1045	0.27	180	267.130	76	70	2.4			2.5
-15	70	1050	0.27	195	271.210	76	70	2.4			2.5
-16	75	1055	0.26	200	275.320	76	70	2.3	240	50	2.5
NE-17	80	1100	0.25	200	279.410	76	70	2.2			
AVERAGE (TOTAL)					( )						

SAMPLING TRAIN DATA

COMPANY: LEE BRICK AND TILE COMPANY SA
SOURCE DESIGNATION: SOUTH KILN
REGULATING AUTHORITY: EPA
DATE: 11/2/80
TEST NUMBER: P-4 Rs 2 of 3
Field Person(s): DP et al
Filter Number: A-003-07
Barometric Pressure ("Hg): 30.06
Stack Static Pressure ("H_2O): +0.14
Stack Dimensions:
Ambient Temperature (°F):
Record all Data Every 5 Minutes

Nozzle(Dia-in):
Pitot Tube No. 19, Corr.
Meter Box No. Rx 2, Corr.
Meter Isokinetic Factor
Assumed Moisture (%):
Condensate Volume(ml):
Silica Gel Weight Gain(
Actual Moisture (%):
Leak Rate } Initial: 0.01 C
Final: C
10.86 +/

Traverse Point No.	Time: Sampling (min)	Time: Clock	Velocity Pressure ("H_2O)	Stack Temp (°F)	Dry Gas Meter: Volume (ft^3)	Dry Gas Meter: Temp. (°F) Inlet	Dry Gas Meter: Temp. (°F) Outlet	Orifice Pressure Differential ("H_2O)	Filter Box Temp (°F)
NE-18	85	1105	0.23	200	283.380	76	70	2.0	245
19	90	1110	0.21	200	287.250	76	71	1.8	
20	95	1115	0.22	200	290.910	76	71	1.9	240
SE-1	100	1120/1157	0.15	150	294.553	70	62	1.4	270
-2	105	1202	0.15	175	297.910	62	62	1.4	245
-3	110	1207	0.16	180	300.950	64	63	1.4	
-4	115	1212	0.18	190	304.130	67	64	1.6	260
-5	120	1217	0.19	190	307.535	68	64	1.7	
-6	125	1222	0.21	190	311.030	70	65	1.8	240
-7	130	1227	0.20	195	314.610	72	66	1.8	
-8	135	1232	0.20	195	318.200	72	66	1.8	240
-9	140	1237	0.22	180	321.790	74	67	2.0	
-10	145	1242	0.24	185	325.530	74	68	2.1	240
-11	150	1247	0.31	150	329.410	74	68	2.9	
-12	155	1252	0.29	200	333.950	76	69	2.5	
-13	160	1257	0.31	205	338.100	77	70	2.7	240
-14	165	1302	0.23	205	342.460	77	70	2.9	
AVERAGE (TOTAL)					( )				

SAMPLING TRAIN DATA

COMPANY: LEE BRICK AND TILE COMPANY SANFORD, N.C.
SOURCE DESIGNATION: SOUTH KILN
REGULATING AUTHORITY: EPA
DATE: 1/12/80
TEST NUMBER: P-4 pg 3 of 3
Field Person(s): TJP et. al.
Filter Number: A-003-07
Barometric Pressure ("Hg): 30.06
Stack Static Pressure ("H_2O): +0.14
Stack Dimensions:
Ambient Temperature (°F): 44
Record all Data Every 5 Minutes

Nozzle(Dia-in): ___ ___ ___ (Avg): ___
Pitot Tube No. 12, Corr. Factor: ___
Meter Box No. Rac 2, Corr. Factor: ___
Meter Isokinetic Factor: ___
Assumed Moisture (%): ___
Condensate Volume(ml): 14 + 26 = 40
Silica Gel Weight Gain(g): 30.5
Actual Moisture (%): ___
Leak Rate: Initial: 0.01 CFM at 15 "Hg; Final: 0.015 CFM at 5 "Hg

ΔH - 1.86 ΔP

Traverse Point No.	Time: Sampling (min)	Time: Clock	Velocity Pressure ("H_2O)	Stack Temp (°F)	Dry Gas Meter: Volume (ft^3)	Dry Gas Meter: Temp. (°F) Inlet	Dry Gas Meter: Temp. (°F) Outlet	Orifice Pressure Differential ("H_2O)	Filter Box Temp (°F)	Last Imp. Gas Temp (°F)	Sampling Train Static Pressure ("Hg)
15	170	1307	0.33	210	346.970	78	71	2.9	245	~~25~~	2.5
16	175	1312	0.33	205	351.52	78	72	2.9		50	2.5
17	180	1317	0.32	210	356.070	78	72	2.8	240		2.5
18	185	1322	0.32	210	360.540	78	72	2.8		48	2.5
19	190	1327	0.31	210	364.995	78	72	2.7	255		2.5
20	195	1332	0.31	210	369.390	78	72	2.7	255		2.5
	200	1337			373.823						
AVERAGE (TOTAL)				~~166~~ 162.57	(160.612)						68.53

P-4 S.K.C.

DRY MOLECULAR WEIGHT DETERMINATION (M_d)

Plant: LEE BRICK AND TILE CO. SANFORD, N.C.
Date: 11/2/80
Sampling Time (24-hour Clock): 10-1400
Sampling Location:: SOUTH KILN P-4
Sample Type (bag, integrated, continuous) _____
Analytical Method: ORSAT
Ambient Temperature: 44
Operator: TJP

Comments:

Gas \ Run	1		2		3		Average Net Volume	Multiplier	Molecular Weight Of Stack Gas (dry basis) M_d, lb/lb-mole
	Actual Reading	Net	Actual Reading	Net	Actual Reading	Net			
CO_2	1.0	1.0	1.1	1.1	1.0	1.0	1.0 ✓	44/100	0.440 ✓
O_2 (Net is actual O_2 reading minus actual CO_2 reading)	19.8	18.8	19.9	18.8	19.9	18.9	18.8 ✓	32/100	6.016 ✓
CO (net is actual CO reading minus actual O_2 reading)	19.8	✓	19.9	✓	19.9	✓		28/100	
N_2 (Net is 100 minus actual CO reading)							80.2 ✓	28/100	22.456 ✓
								Total	28.912 ✓ = M_d

WET MOLECULAR WEIGHT DETERMINATION (M_s)

B_{wo} = Proportion by volume of water vapor in the gas stream

M_s = Molecular weight of stack gas (wet basis), lb/lb-mole = $M_d(1-B_{wo}) + 18(B_{wo})$

1 of 3 SAMPLING TRAIN DATA TM 10-17 $\frac{\sqrt{\Delta P}}{T_s} H = \Delta H$

Company: Lee Brick & Tile

Source Designation: Bottom Kiln Exhaust

Date: 1-9-80

Test Number: P-1

Field Person: DLO

Filter Number: A-003-19

Barometric Pressure ("Hg): 29.84

Stack Static Pressure ("H_2O): +0.05

Stack Dimensions: 32.75" ID

Plume Appearance:

Ambient Temperature(°F):

Record all Data Every 5 Minutes

Filter Heater Setting:

Probe Heater Setting:

Nozzle Number: 5/16, Dia.(in.): 0.309

Pitot Tube No. 10, Corr.Factor: 0.826

Meter Box No. R3, Corr.Factor: 0.991

Meter Isokinetic Factor: 1705

Assumed Moisture(%): 2.03

Condensate Volume(ml): 0

Silica Gel Weight Gain(g): 25.2

Leak Rate 0.015 CFM at 15 "Hg

Final

Traverse Point No.	Time: Sampling (min)	Time: Clock	Velocity Pressure ("H_2O)	Stack Temp (°F)	Dry Gas Meter: Volume (ft^3)	Dry Gas Meter: Temp (°F) Inlet	Dry Gas Meter: Temp (°F) Outlet	Orifice Pressure Differential ("H_2O)	Filter Box Temp (°F)	Last Imp. Gas Temp (°F)	Sampling Train Static Pressure ("Hg)
E-1	0	1526	0.24	139	641.248	55	55	2.10			
2	5	1531	0.24	136	645.05	62	57	2.10			
3	10	1536	0.24	135	648.86	70	60	2.15		48	
4	15	1541	0.25	136	652.95	75	62	2.25			
5	20	1546	0.27	132	566.8	77	64	2.46			
6	25	1551	0.29	141	661.20	80	68	2.62	230	50	
7	30	1556	0.29	138	665.66	80	68	2.63			
8	35	1601	0.29	134	669.95	82	68	2.66			
9	40	1606	0.29	139	674	82	70	2.64			
10	45	1611	0.27	137	679.05	83	70	2.47			
11	50	1616	0.24	139	683.10	83	71	2.19			
12	55	1621	0.22	136	687.10	83	81	2.03	240	55	
13	60	1626	0.21	136	690.02	83	82	1.94			
14	65	1631	0.20	127	695.	82	72	2.38			
15	70	1636	0.19	125	698.0	83	72	1.78			
16	75	1641	0.19	126	702.85	82	72	1.86			
17	80	1648	0.18	139	706.	81	72	1.64			
AVERAGE (TOTAL)					( )						

#2 probe

P

SAMPLING TRAIN DATA

COMPANY: _____

SOURCE DESIGNATION: Bottom Kiln

REGULATING AUTHORITY: _____ Nozzle (Dia-in): ___ ___

DATE: _____ Pitot Tube No. ___, Corr.

TEST NUMBER: P-1 Meter Box No. ____, Corr.

Field Person(s): DLD Meter Isokinetic Factor

Filter Number: _____ Assumed Moisture (%): ___

Barometric Pressure ("Hg): _____ Condensate Volume (ml):

Stack Static Pressure ("H_2O): _____ Silica Gel Weight Gain

Stack Dimensions: _____ Actual Moisture (%): ___

Ambient Temperature (°F): _____ Leak Rate } Initial: _____

Record all Data Every 5 Minutes Final: _____

Traverse Point No.	Time		Velocity Pressure ("H_2O)	Stack Temp (°F)	Dry Gas Meter			Orifice Pressure Differential ("H2O)	Filter Box Temp (°F
	Sampling (min)	Clock			Volume (ft^3)	Temp. (°F)			
						Inlet	Outlet		
18	085	1653	0.18	137	710.04	82	72	1.65	24
19	90	1659	0.17	139	713.62	82	72	1.55	
20	95	1703	0.18	133	717.3	82	72	1.66	
1	100	1726	0.19	133	720.535	66	68	1.63	
2	105	1731	0.19	141		68	68	1.61	
3	110	1736	0.19	144	727.50	71	67	1.69	
4	115	1741	0.21	143	730.10	74	67	1.88	
5	120	1746	0.21	140	734.9	77	68	1.71	
6	125	1751	0.24	143	738.61	78	68	2.16	
7	130	1756	0.24	142	742.70	80	70	2.17	
8	135	1801	0.26	146	746.70	80	70	2.33	
9	140	1806	0.26	137	750.	80	70	2.37	
10	145	1811	0.26	135	754.	81	70	2.38	
11	150	1816	0.24	132	759	81	71	2.30	
12	155	1821	0.23	132	763.9	81	71	2.12	
13	160	1826	0.24	129	767.68	81	71	2.22	
14	165	1831	0.24	138	772.0	81	71	2.09	
AVERAGE (TOTAL)					( )				

SAMPLING TRAIN DATA

COMPANY: _____

SOURCE DESIGNATION: Bottom Kiln

REGULATING AUTHORITY: _____ Nozzle(Dia-in): ___ ___ ___(Avg): ____

DATE: _____ Pitot Tube No. ___, Corr.Factor: _____

TEST NUMBER: P-1 Meter Box No. ____, Corr.Factor: _____

Field Person(s): _____ Meter Isokinetic Factor: _____

Filter Number: _____ Assumed Moisture (%): _____

Barometric Pressure ("Hg): _____ Condensate Volume(ml): _____

Stack Static Pressure ("H_2O): _____ Silica Gel Weight Gain(g): _____

Stack Dimensions: _____ Actual Moisture (%): _____

Ambient Temperature (°F): _____ Leak Rate } Initial: _____ CFM at ____ "Hg

Record all Data Every _____ Minutes Final: .02 CFM at 5 "Hg

Traverse Point No.	Time		Velocity Pressure ("H_2O)	Stack Temp (°F)	Dry Gas Meter			Orifice Pressure Differential ("H2O)	Filter Box Temp (°F)	Last Imp. Gas Temp (°F)	Sampling Train Static Pressure ("Hg)
	Sampling (min)	Clock			Volume (ft^3)	Temp. (°F) Inlet	Outlet				
15	110	1836	0.24	138	775.90	81	70	2.19			
16	175	1841	0.24	135	779.25	80	71	2.20	260		
17	180	1846	0.25	136	784.12	80	71	2.28			
18	185	1851	0.23	138	788.4	81	71	2.10			
19	190	1856	0.24	143	792.40	81	71	2.17			
20	195	1901	0.24	143	796.48	81	71	2.17			
	200	1906			800.595						
			0.168	133.7		93.09		2.11			
AVERAGE (TOTAL)					(159.346)	92.5					

158.8635

DRY MOLECULAR WEIGHT DETERMINATION (M_d)

Plant: Lee Brick and Tile
Date: 1-9-80
Sampling Time (24-hour Clock): 1800 P-1
Sampling Location:: Kiln Bottom Exhaust

Sample Type (bag, integrated, continuous) _____
Analytical Method: Orsat
Ambient Temperature: 60
Operator: TVM

Comments:

Gas \ Run	1		2		3		Average Net Volume	Multiplier	Molecular Weight Of Stack Gas (dry basis) M_d, lb/lb-mole
	Actual Reading	Net	Actual Reading	Net	Actual Reading	Net			
CO_2	0	0	0	0				44/100	
O_2 (Net is actual O_2 reading minus actual CO_2 reading)	20.2	20.2	20.2	20.2			20.2	32/100	6.464
CO (net is actual CO reading minus actual O_2 reading)								28/100	
N_2 (Net is 100 minus actual CO reading)							79.8	28/100	22.344
								Total	28.81 = M_d

WET MOLECULAR WEIGHT DETERMINATION (M_s)

B_{wo} = Proportion by volume of water vapor in the gas stream

SAMPLING TRAIN DATA TVM

10.381 $\frac{T_M}{P_S}$ H

COMPANY: LeBuck & Tile

SOURCE DESIGNATION: Bottom Kiln

REGULATING AUTHORITY: US EPA

DATE: 1-10-90

TEST NUMBER: P-2

Field Person(s): DLC ABE

Filter Number: A-003-01

Barometric Pressure ("Hg): 30.42

Stack Static Pressure ("H_2O):

Stack Dimensions: 22.75

Ambient Temperature (°F): 46

Record all Data Every 5 Minutes

Nozzle(Dia-in): 5/16 (Avg): 0.30

Pitot Tube No. , Corr. Factor: 0.827

Meter Box No. R3, Corr. Factor: 0.997

Meter Isokinetic Factor: 1705

Assumed Moisture (%): 0.8

Condensate Volume(ml):

Silica Gel Weight Gain(g):

Actual Moisture (%):

Leak Rate: Initial: 0.01 CFM at 15 "Hg; Final: 0.0 CFM at 3 "Hg

Traverse Point No.	Time: Sampling (min)	Time: Clock	Velocity Pressure ("H_2O)	Stack Temp (°F)	Dry Gas Meter: Volume (ft^3)	Dry Gas Meter: Temp. (°F) Inlet	Dry Gas Meter: Temp. (°F) Outlet	Orifice Pressure Differential ("H_2O)	Filter Box Temp (°F)	Last Imp. Gas Temp (°F)	Sampling Train Static Pressure ("Hg)
E-1	0	1109	0.24	144	801.286	68	69	2.16	215	50	
2	5	1114	0.24	145	805.20	67	64	2.16	210	50	
3	10	1119	0.24	129	809.20	72	64	2.23	214		
4	15	1124	0.24	136	813.30	76	65	2.40	216		
5	20	1129	0.27	136	818.0	79	67	2.51	212	56	
6	25	1134	0.28	133	821.85	81	68	2.62	244	56	
7	30	1139	0.30	147	826.0	81	69	2.74	251		
8	35	1144	0.31	142	830.45	83	70	2.87	247		
9	40	1149	0.31	136	835.25	84	71	2.90	266		
10	45	1154	0.29	124	839.70	84	72	2.77	274	55	
11	50	1159	0.24	139	844.28	85	72	2.24	242		
12	55	1204	0.24	121	848.48	84	72	2.34	217		
13	60	1209	0.21	114	852.59	84	73	2.05	216		
14	65	1214	0.21	119	856.58	84	73	2.03	225	58	
15	70	1219	0.19	119	860.52	83	73	1.83	243		
16	75	1224	0.19	140	864.30	83	73	1.77	243		
17	80	1229	0.19	118	867.91	83	73	1.84	249		
AVERAGE (TOTAL)					( )						

SAMPLING TRAIN DATA

COMPANY: ______________________

SOURCE DESIGNATION: Bottom kiln

REGULATING AUTHORITY: ______________________ Nozzle(Dia-in): ____

DATE: ______________________ Pitot Tube No.___,Cor

TEST NUMBER: P-2 page 2 Meter Box No.____,Cor

Field Person(s): ______________________ Meter Isokinetic Fact

Filter Number: ______________________ Assumed Moisture (%):

Barometric Pressure ("Hg): ____________ Condensate Volume(ml)

Stack Static Pressure ("H2O): ____________ Silica Gel Weight Gai

Stack Dimensions: ______________________ Actual Moisture (%):

Ambient Temperature (°F): ____________ Leak Rate } ~~Initial~~ Mid-way: <.01 Final: ______

Record all Data Every ______ Minutes

Traverse Point No.	Time		Velocity Pressure ("H_2O)	Stack Temp (°F)	Dry Gas Meter			Orifice Pressure Differential ("H2O)	Fil Bo Te (°
	Sampling (min)	Clock			Volume (ft^3)	Temp. (°F) Inlet	Temp. (°F) Outlet		
18	85	1234	0.18	121	871.80	83	73	1.73	2
19	90	1239	0.18	117	875.30	83	73	1.74	2
20	95	1244	0.19	104	878.85	83	74	1.88	2
1	100	1319	0.17	125	882.550	69	68	1.59	1
2	105	1324	0.17	128	886.	72	68	1.59	1
3	110	1329	0.16	140	890.05	76	69	1.47	2
4	115	1334	0.19	132	893.40	80	70	1.78	2
5	120	1339	0.21	154	897.10	82	72	1.91	2
6	125	1344	0.24	130	900.85	85	73	2.24	2
7	130	1349	0.24	130	904.93	86	74	2.28	2
8	135	1354	0.25	135	909.2	88	75	2.36	2
9	140	1359	0.25	150	913.20	89	76	2.31	2
10	145	1404	0.23	140	917.5	90	78	2.16	2
11	150	1409	0.22	134	921.70	91	78	2.09	2
12	155	1414	0.21	131	925.42	91	79	2.01	2
13	160	1419	0.21	134	929.35	91	79	2.00	2
14	165	1424	0.22	130	933.50	91	80	2.09	
AVERAGE (TOTAL)					( )				

SAMPLING TRAIN DATA

COMPANY: _____

SOURCE DESIGNATION: Bottom kiln

REGULATING AUTHORITY: _____ Nozzle(Dia-in): ___ ___ ___(Avg): ____

DATE: _____ Pitot Tube No. ___, Corr. Factor: ____

TEST NUMBER: P-2 pag 3 Meter Box No. ____, Corr. Factor: ____

Field Person(s): _____ Meter Isokinetic Factor: _____

Filter Number: _____ Assumed Moisture (%): _____

Barometric Pressure ("Hg): _____ Condensate Volume(ml): -10, +2 ✓

Stack Static Pressure ("H_2O): _____ Silica Gel Weight Gain(g): 30.5

Stack Dimensions: _____ Actual Moisture (%): _____

Ambient Temperature (°F): _____ Leak Rate } Initial: _____ CFM at ____ "Hg

Record all Data Every _____ Minutes Final: _____ CFM at ____ "Hg

E-7 8

Traverse Point No.	Time: Sampling (min)	Time: Clock	Velocity Pressure ("H_2O)	Stack Temp (°F)	Dry Gas Meter: Volume (ft^3)	Dry Gas Meter: Temp. (°F) Inlet	Dry Gas Meter: Temp. (°F) Outlet	Orifice Pressure Differential ("H2O)	Filter Box Temp (°F)	Last Imp. Gas Temp (°F)	Sampling Train Static Pressure ("Hg)
16	170	1429	0.22	143	937.35	91	80	2.07	223	60	1
16	175	1434	0.23	133	941.45	91	80	2.20	224		
17	180	1439	0.23	119	945.	91	80	2.25	238		
18	185	1444	0.25	113	949.88	92	80	2.47	250		
19	190	1449	0.23	122	954.27	92	80	2.24	259	61	
20	195	1454	0.23	116	958.30	91	80	2.26	250		1
	200	1459			962.373						
						90.13					
			11.67	130.9		86		2.15			
AVERAGE (TOTAL)					(11.067)						

* at these #s didn't agree with final test if the error may be in the E-pt E12 was E-

SAMPLING TRAIN DATA TVM

COMPANY: Lee Brick & Tile
SOURCE DESIGNATION: Bottom Kiln
REGULATING AUTHORITY: U.S EPA
DATE: 1-11-80
TEST NUMBER: P-3 page 1
Field Person(s): DLO etc.
Filter Number: A-003-02
Barometric Pressure ("Hg): 29.80
Stack Static Pressure ("H_2O): -0.05
Stack Dimensions: 22 3/4
Ambient Temperature (°F): 40
Record all Data Every 5 Minutes

Nozzle(Dia-in): 5/16
Pitot Tube No. 10, Cor
Meter Box No. R3, Cor
Meter Isokinetic Fact
Assumed Moisture (%):
Condensate Volume(ml)
Silica Gel Weight Gai
Actual Moisture (%):
Leak Rate } Initial:
Final:

Traverse Point No.	Time: Sampling (min)	Time: Clock	Velocity Pressure ("H_2O)	Stack Temp (°F)	Dry Gas Meter: Volume (ft^3)	Dry Gas Meter: Temp. (°F) Inlet	Dry Gas Meter: Temp. (°F) Outlet	Orifice Pressure Differential ("H_2O)	Fil Bo Te (°
1	0	1051	0.22	138	963.948	56	57	2.51	2
2	5	1056	0.21	140	968.	65	58	1.86	1
3	10	1101	0.20	139	972.06	70	60	1.78	2
4	15	1106	0.23	142	975.7	74	62	2.05	2
5	20	1111	0.25	143	979.57	78	65	2.24	2
6	25	1116	0.27	144	983.67	80	68	2.45	2
7	30	1121	0.28	145	897.0	83	70	2.53	30
8	35	1126	0.29	146	992.30	85	72	2.62	2
9	40	1131	0.28	146	996.80	86	73	2.54	2
10	45	1136	0.27	141	1.20	87	74	2.47	2
11	50	1141	0.23	142	5.60	87	76	2.10	2
12	55	1146	0.21	143	9.78	87	76	1.97	2
13	60	1151	0.20	144	13.56	87	77	1.83	2
14	65	1156	0.19	144	17.50	87	77	1.73	2
15	70	1201	0.18	145	21.12	87	78	1.64	2
16	75	1206	0.18	145	24.69	87	78	1.64	2
17	80	1211	0.18	146	28.50	88	79	1.64	2
AVERAGE (TOTAL)					( )				

1

SAMPLING TRAIN DATA

2 of 3

COMPANY: _____

SOURCE DESIGNATION: Button kiln

REGULATING AUTHORITY: _____ Nozzle(Dia-in): ___ ___ ___(Avg): ____

DATE: _____ Pitot Tube No. ___, Corr.Factor: ____

TEST NUMBER: P-3 page 2 Meter Box No. ____, Corr.Factor: ____

Field Person(s): _____ Meter Isokinetic Factor: _____

Filter Number: _____ Assumed Moisture (%): _____

Barometric Pressure ("Hg): _____ Condensate Volume(ml): _____

Stack Static Pressure ("H_2O): _____ Silica Gel Weight Gain(g): _____

Stack Dimensions: _____ Actual Moisture (%): _____

Ambient Temperature (°F): _____ Leak Rate } Initial: _____ CFM at ____ "Hg

Record all Data Every _____ Minutes Final: _____ CFM at ____ "Hg

Traverse Point No.	Time: Sampling (min)	Time: Clock	Velocity Pressure ("H_2O)	Stack Temp (°F)	Dry Gas Meter: Volume (ft^3)	Dry Gas Meter: Temp. (°F) Inlet	Dry Gas Meter: Temp. (°F) Outlet	Orifice Pressure Differential ("H20)	Filter Box Temp (°F)	Last Imp. Gas Temp (°F)	Sampling Train Static Pressure ("Hg)
18	85	1216	0.17	146	31.9	88	79	1.55	249	53	
19	90	1221	0.17	146	35.53	88	80	1.55	249		
20	95	1226	0.17	146	39.10	88	80	1.55	260	54	
1	100	1231	0.16	142	42.625 OK	76	76	1.45	280	54	
2	105	1256	0.16	143	45.93	77	76	1.45	299		
3	110	1301	0.15	144	49.42	80	76	1.44	309		
4	115	1306	0.18	145	52.68	82	76	1.65	313	53	
5	120	1311	0.20	145	56.13	84	77	1.82	307		
6	125	1316	0.21	146	59.91	87	78	1.91	288		
7	130	1321	0.22	146	63.73	88	78	2.00	260		
8	135	1326	0.24	144	67.65	89	79	2.20	247	~~54~~ 45	
9	140	1331	0.24	143	71.81	90	80	2.21	262		
10	145	1336	0.23	143	75.90	90	80	2.11	275		
11	150	1341	0.22	145	79.92	91	81	2.02	260	54	
12	155	1346	0.21	146	83.95	91	82	1.93	247		
13	160	1351	0.21	146	87.84	91	82	1.93	235		
14	165	1356	0.21	147	91.	91	82	1.92	233		
AVERAGE (TOTAL)				( )							

SAMPLING TRAIN DATA

30

COMPANY: _____

SOURCE DESIGNATION: Button kiln

REGULATING AUTHORITY: _____ Nozzle (Dia-in): ___ ___

DATE: _____ Pitot Tube No. ___, Corr

TEST NUMBER: _____ Meter Box No. ___, Corr

Field Person(s): P-3 pg 35 Meter Isokinetic Facto

Filter Number: _____ Assumed Moisture (%): _

Barometric Pressure ("Hg): _____ Condensate Volume (ml):

Stack Static Pressure ("H_2O): _____ Silica Gel Weight Gain

Stack Dimensions: _____ Actual Moisture (%): _

Ambient Temperature (°F): _____ Leak Rate } Initial: _____

Record all Data Every _____ Minutes Final: _____

Traverse Point No.	Time		Velocity Pressure ("H_2O)	Stack Temp (°F)	Dry Gas Meter			Orifice Pressure Differential ("H_2O)	Filt Box Tem (°F
	Sampling (min)	Clock			Volume (ft^3)	Temp. (°F) Inlet	Outlet		
15	170	1401	0.22	147	95.603	91	82	2.01	24
16	175	1406	0.22	147	99.621	92	82	2.02	27
17	180	1411	0.22	147	103.6	91	82	2.01	27
18	185	1416	0.21	147	107.6	92	82	1.92	25
19	190	1421	0.22	147	111.58	92	82	2.02	23
20	195	1426	0.22	147	115.42	91	84	2.02	22
	200	1431			119.329				
			~~4.28~~	~~140.9~~		91.5		1.96	
AVERAGE (TOTAL)					(155.341)				

(154.925)

TVM

SAMPLING TRAIN DATA

COMPANY: Lee Brick & TC

SOURCE DESIGNATION: Bottom

REGULATING AUTHORITY: TCEPH

DATE: 1-12-80

TEST NUMBER: P-4

Field Person(s): DLO

Filter Number: A-003-06

Barometric Pressure ("Hg): 30.06

Stack Static Pressure ("H_2O): 0.05

Stack Dimensions: 22 3/4

Ambient Temperature (°F): 50

Record all Data Every 5 Minutes

Nozzle(Dia-in): 3/16 (Avg): .309

Pitot Tube No. 10, Corr.Factor: 0.826

Meter Box No. R3, Corr.Factor: 0.997

Meter Isokinetic Factor: 1705

Assumed Moisture (%): 0.8

Condensate Volume(ml):

Silica Gel Weight Gain(g):

Actual Moisture (%):

Leak Rate: Initial: <0.02 CFM at 15 "Hg; Final: CFM at "Hg

Traverse Point No.	Time: Sampling (min)	Time: Clock	Velocity Pressure ("H_2O)	Stack Temp (°F)	Dry Gas Meter: Volume (ft^3)	Dry Gas Meter: Temp. (°F) Inlet	Dry Gas Meter: Temp. (°F) Outlet	Orifice Pressure Differential ("H2O)	Filter Box Temp (°F)	Last Imp. Gas Temp (°F)	Sampling Train Static Pressure ("Hg)
1	0	0942	0.22	144	171.110	50	50	1.38	205	48	0
2	5	0947	0.26	146	174.7	55	50	1.89	214	48	0
3	10	0952	0.25	145	178.3	60	52	2.17	227		0
4	15	0957	0.27	146	182.07	56	55	2.34	247		0
5	20	1002	0.28	147	186.06	72	58	2.46	256	55	0
6	25	1007	0.29	148	190.28	76	61	2.56	265		1
7	30	1012	0.30	150	194.67	79	64	2.66	269	56	1
8	35	1017	0.31	148	198.95	82	67	2.80	259		
9	40	1022	0.30	148	203.8	84	69	2.69	227	59	
10	45	1027	0.28	147	207.7	84	71	2.52	224		
11	50	1032	0.25	143	211.7	86	72	2.27	225		
12	55	1037	0.23	143	215.60	86	74	2.09	236	60	
13	60	1042	0.23	135	219.90	86	74	2.09	239		
14	65	1047	0.22	141	223.50	86	75	2.01	234		
15	70	1052	0.20	142	227.39	86	76	1.83	237		
16	75	1057	0.20	142	231.02	86	76	1.83	245	56	
17	80	1102	0.20	142	234	86	76	1.83	250		
AVERAGE (TOTAL)					( )						

SAMPLING TRAIN DATA

COMPANY: _____

SOURCE DESIGNATION: Bottom Kiln

REGULATING AUTHORITY: _____ Nozzle(Dia-in): ___ ___

DATE: _____ Pitot Tube No. ___, Cor

TEST NUMBER: P-4 page 2 Meter Box No. ____, Cor

Field Person(s): _____ Meter Isokinetic Fact

Filter Number: _____ Assumed Moisture (%):

Barometric Pressure ("Hg): _____ Condensate Volume(ml)

Stack Static Pressure ("H_2O): _____ Silica Gel Weight Gai

Stack Dimensions: _____ Actual Moisture (%):

Ambient Temperature (°F): _____ Leak Rate } Initial: _____ Final: _____

Record all Data Every _____ Minutes

Traverse Point No.	Time		Velocity Pressure ("H_2O)	Stack Temp (°F)	Dry Gas Meter			Orifice Pressure Differential ("H20)	Fil Bo Te (°
	Sampling (min)	Clock			Volume (ft^3)	Temp. (°F) Inlet	Outlet		
18	85	1107	0.18	142		86	77	1.65	25
19	90	1112	0.19	142	242.0	86	77	1.74	25
20	95	1117	0.19	142	245.35	86	78	1.65	25
1	100	1158	0.17	142	248.815	69	70	1.52	2
2	105	1203	0.17	143	252.17	72	72	1.53	23
3	110	1208	0.17	143	255.48	76	72	1.53	24
4	115	1213	0.20	144	258.89	80	72	1.81	26
5	120	1218	0.22	145	262.51	82	74	1.99	25
6	125	1223	0.23	146	266.27	86	75	2.09	25
7	130	1228	0.24	146	270.13	86	76	2.36	2
8	135	1233	0.24	147	274.38	88	76	2.36	2
9	140	1238	0.26	140	278.	90	78	2.40	26
10	145	1243	0.24	142	282.68	90	78	2.21	25
11	150	1248	0.25	135	286.73	90	78	2.32	25
12	155	1253	0.23	143	290.88	90	79	2.11	25
13	160	1258	0.23	144	294.77	90	79	2.11	2
14	165	1303	0.23	144	298.7	90	79	2.11	2
AVERAGE (TOTAL)					( )				

123 1310 33.19

SAMPLING TRAIN DATA

COMPANY: _____

SOURCE DESIGNATION: Bottom Kiln

REGULATING AUTHORITY: _____ Nozzle(Dia-in): ___ ___ ___(Avg): ____

DATE: _____ Pitot Tube No. ___, Corr. Factor: ____

TEST NUMBER: P-4 pag 3 Meter Box No. ____, Corr. Factor: ____

Field Person(s): _____ Meter Isokinetic Factor: _____

Filter Number: _____ Assumed Moisture (%): _____

Barometric Pressure ("Hg): _____ Condensate Volume(ml): -4

Stack Static Pressure ("H_2O): _____ Silica Gel Weight Gain(g): 27.2

Stack Dimensions: _____ Actual Moisture (%): _____

Ambient Temperature (°F): _____ Leak Rate } Initial: _____ CFM at ____ "Hg

Record all Data Every _____ Minutes Final: .001 CFM at 4 "Hg

Traverse Point No.	Time: Sampling (min)	Time: Clock	Velocity Pressure ("H_2O)	Stack Temp (°F)	Dry Gas Meter: Volume (ft^3)	Dry Gas Meter: Temp. (°F) Inlet	Dry Gas Meter: Temp. (°F) Outlet	Orifice Pressure Differential ("H_2O)	Filter Box Temp (°F)	Last Imp. Gas Temp (°F)	Sampling Train Static Pressure ("Hg)
15	170	1308	0.24	145	302.65	90	80	2.20	250	50	
16	175	1313	0.23	145	306.7	90	80	2.11	249		
17	180	1318	0.24	145	311.	90	80	2.20	248		
18	185	1323	0.24	145	314.77	90	80	2.20	245	58	
19	190	1328	0.24	145	318.80	90	80	2.20	249		
20	195	1333	0.24	145	322.18	90	80	2.20	260		
	200	1338			326.827						
			11.85	144.5				77.07			
			~~11.85~~	~~144.5~~			77.09	2.11			
AVERAGE (TOTAL)					(155.717)			2.11			

155.250 77.09 34.52

Revised 11-78

B - dryer vent A

SAMPLING TRAIN DATA

COMPANY: [illegible]
SOURCE DESIGNATION: [illegible]
REGULATING AUTHORITY: SBA
DATE: 1/3/90
TEST NUMBER: P-1
Field Person(s): DL RMK
Filter Number: A-003-18
Barometric Pressure ("Hg): 29.84
Stack Static Pressure ("H_2O): [illegible]
Stack Dimensions: [illegible]
Ambient Temperature (°F): [illegible]
Record all Data Every 4 Minutes

Nozzle (Dia-in): .255, .25[illegible]
Pitot Tube No. [illegible], Cor[illegible]
Meter Box No. [illegible], Cor[illegible]
Meter Isokinetic Factc
Assumed Moisture (%):
Condensate Volume (ml):
Silica Gel Weight Gair
Actual Moisture (%):
Leak Rate } Initial: 0.00
Final: <0.01

Traverse Point No.	Time: Sampling (min)	Time: Clock	Velocity Pressure ("H_2O)	Stack Temp (°F)	Dry Gas Meter: Volume (ft^3)	Dry Gas Meter: Temp. (°F) Inlet	Dry Gas Meter: Temp. (°F) Outlet	Orifice Pressure Differential ("H_2O)	Filt Box Tem (°F
23	0	15:25	0.57	83	279.97	50	49	2.5	
23	4		0.59	84	283.4	60	53	2.6	
22	8		0.61	84	286.8	66	55	2.7	
21	12		0.46	84	290.4	70	57	2.1	25
20	14 16		0.36 0.36	85	293.	72	60	(1.6) 1.6	
19	20		0.29	85	295.	72	60	1.3	
18	24		0.25	85	298.9	73	62	1.1	
17	28		0.20	85	301.	74	63	0.91	23
16	32		0.16	85	303.	74	64	0.73	
15	36		0.14	85	305.2	73	64	0.64	
14	40		0.10	85	307.1	73	66	0.46	
13	44		0.06	85		73	66	0.27	
12	48		0.05	86	309.8	72	66	0.23	23
11	52		0.06	86	311.0	72	66	0.27	
10	56		0.09	86	312.2	72	67	0.41	
9	60		0.11	86	313.9	72	68	0.50	23
8	64		0.13	86	315.4	73	68	0.59	
AVERAGE (TOTAL)					( )				

#3 ~~factor~~ #4 ~~probe~~ stk temp

SAMPLING TRAIN DATA

COMPANY: Lee Brick

SOURCE DESIGNATION: Dryer Tunnel

REGULATING AUTHORITY: EPA

DATE: 1/9/80

TEST NUMBER: P-1 cont'd

Field Person(s): DL/RMK

Filter Number: A-0003-13

Barometric Pressure ("Hg): _____

Stack Static Pressure ("H_2O): _____

Stack Dimensions: _____

Ambient Temperature (°F): _____

Record all Data Every 4 Minutes

Nozzle (Dia-in): ___ ___ ___ (Avg): ____

Pitot Tube No. ___, Corr. Factor: _____

Meter Box No. ____, Corr. Factor: _____

Meter Isokinetic Factor: _____

Assumed Moisture (%): _____

Condensate Volume (ml): _____

Silica Gel Weight Gain (g): _____

Actual Moisture (%): _____

Leak Rate (pitot chg): Initial: <0.02 CFM at 15 "Hg; Final: _____ CFM at ____ "Hg

1.5 1.8 1.2 4.67

Traverse Point No.	Time: Sampling (min)	Time: Clock	Velocity Pressure ("H_2O)	Stack Temp (°F)	Dry Gas Meter: Volume (ft^3)	Dry Gas Meter: Temp. (°F) Inlet	Dry Gas Meter: Temp. (°F) Outlet	Orifice Pressure Differential ("H_2O)	Filter Box Temp (°F)	Last Imp. Gas Temp (°F)	Sampling Train Static Pressure ("Hg)
7	68		0.16	86	317.2	74	72 69	0.73			
6	72		0.17	86	319.	75	72 69	0.78			
5	76		0.22	86	321.2	76	73 69	1.0			0
~~4~~	~~1645~~ 80		~~0.24~~	~~84~~	~~321.663~~ 322.5	~~76~~	~~73 69.~~	~~0.16~~			
3	84		0.25	84	325.7	78	74 70	1.1	225	44	
3	88		0.24	84	328.1	77	74 70	1.1			
3	92	[redacted]	0.24	84	330.	77	74 70	1.1			
23	96	~~1704~~ 1745	0.29	84	~~332.921~~ ~~334.421~~ 333.015	62	61 60	1.3	250	34	
23	100		0.28	84	333.65	62	62	1.3			
22	104		0.24	84	337.	65	64 62	1.1			
21	108		0.23	84	340.44	68	63 62	0.89			
20	112		0.26	84	342.615	70	64 62	1.2			
19	116		0.26	84	345.05	71	67 63	1.2			0
18	120		0.23	84		72	68 64	1.0			
17	124		0.22	85	349.75	73	69 64	1.0			
16	128		0.21	85		74	69 64	0.95			
15	132		0.26	85	354.12	74	70 65	1.2			
AVERAGE (TOTAL)					( )		/				

SAMPLING TRAIN DATA

COMPANY: Lee Buick
SOURCE DESIGNATION: Dryer
REGULATING AUTHORITY: _____ Nozzle(Dia-in): ___ ___
DATE: 1/9/80 Pitot Tube No. ___, Corr.
TEST NUMBER: P-1 cont'd Meter Box No. ____, Corr.
Field Person(s): DL/RMK Meter Isokinetic Factor
Filter Number: A-005-13 Assumed Moisture (%): ___
Barometric Pressure ("Hg): _____ Condensate Volume(ml):
Stack Static Pressure ("H_2O): _____ Silica Gel Weight Gain(
Stack Dimensions: _____ Actual Moisture (%): ___
Ambient Temperature (°F): _____ Leak Rate } Initial: _____ C
Record all Data Every 4 Minutes Final: _____ C

Traverse Point No.	Time		Velocity Pressure ("H_2O)	Stack Temp (°F)	Dry Gas Meter			Orifice Pressure Differential ("H_2O)	Filter Box Temp (°F)
	Sampling (min)	Clock			Volume (ft^3)	Temp. (°F) Inlet	Outlet		
14	136		0.25	85	356.49	74	70 66	1.1	225
13	140		0.21	85	358.88	74	70 66	0.96	
12	144		0.18	85	360.95	74	70 66	0.82	
11	148		0.13	85	362.99	73	70 66	0.59	
10	152		0.09	85	364.72	72	69 66	0.41	
9	156		0.16	84	366.	71	68 65	0.72	235
8	160		0.14	81	368.	70	67 64	0.68	
7	164		0.27	81	369.	70	67 64	1.3	
6	168		0.48	81	372.37	72	68 64	2.2	245
5	172		0.50	81	375.67	75	70 65	2.3	
4	176		0.59	81	378.	78	72 66	2.7	
3	180		0.60	81	382.45	80	73 66	2.8	
2	184		0.63	81		82	75 68	2.9	
1	188		0.62	81	389.74	84	76 68	2.9	
	192				393.470				
							63		
			0.48			77	64	1.24	
AVERAGE (TOTAL)				82.1	(112.897)	78.11	64.33	1.24	

Revised 11-78

Clayton Environmental Consultan

DRY MOLECULAR WEIGHT DETERMINATION (M_d)

Plant: Lee Brick and Tile
Date: 1-9-80
Sampling Time (24-hour Clock): 1800 - P-1
Sampling Location:: Dryer

Sample Type (bag, integrated, continuous) _____
Analytical Method: Orsat
Ambient Temperature: 60
Operator: TVM

Comments:

Gas \ Run	1		2		3		Average Net Volume	Multiplier	Molecular Weight Of Stack Gas (dry basis) M_d, lb/lb-mole
	Actual Reading	Net	Actual Reading	Net	Actual Reading	Net			
CO_2	0	0	0	0			0	44/100	0
O_2 (Net is actual O_2 reading minus actual CO_2 reading)	20.4	20.4	20.3	20.3			20.4	32/100	6.528 ✓
CO (net is actual CO reading minus actual O_2 reading)							–	28/100	22.288 ✓
N_2 (Net is 100 minus actual CO reading)							79.6 ✓	28/100	
								Total	28.816 ✓ = M_d

WET MOLECULAR WEIGHT DETERMINATION (M_s)

B_{wo} = Proportion by volume of water vapor in the gas stream

M_s = Molecular weight of stack gas (wet basis), lb/lb-mole = $M_d(1-B_{wo}) + 18(B_{wo})$

M_s = ( )(1-) + 18( ) = 28.513

$G_m = \frac{M_d}{28.96} = \frac{\quad}{28.96} =$, $G_s = \frac{M_s}{28.96} = \frac{\quad}{28.96} = 0.985$, $\frac{G_m}{G_s} = \frac{\quad}{\quad} =$

SAMPLING TRAIN DATA

COMPANY: Lee Brick 4.85

SOURCE DESIGNATION: Dryer

REGULATING AUTHORITY: _____ Nozzle(Dia-in): _____

DATE: 1/10/80 Pitot Tube No. 21, Corr.

TEST NUMBER: P-2 Meter Box No. EAC-1, Corr.

Field Person(s): DL/RMK Meter Isokinetic Factor

Filter Number: A-003-24 Assumed Moisture (%): _____

Barometric Pressure ("Hg): 30.42 Condensate Volume(ml): _____

Stack Static Pressure ("H_2O): _____ Silica Gel Weight Gain(

Stack Dimensions: _____ Actual Moisture (%): _____

Ambient Temperature (°F): _____ Leak Rate } Initial: <0.015 C

Record all Data Every 4 Minutes Final: _____ C

Traverse Point No.	Time		Velocity Pressure ("H_2O)	Stack Temp (°F)	Dry Gas Meter			Orifice Pressure Differential ("H2O)	Filte Box Temp (°F)
	Sampling (min)	Clock			Volume (ft^3)	Temp. (°F) Inlet	Outlet		
U23	0	11:08	0.54	79	394.21	52	50 48	2.5	
23	4		0.55	79		62	60 58	2.6	234
22	8		0.50	79	401.3	70	64 58	2.4	
21	12		0.41	79	404.65	74	67 59	1.9	
20	16		0.36	80	407.7	75	68 60	1.7	247
19	20		0.31	80	410.54	76	69 62	1.5	
18	24		0.24	80	412.22	76	69 62	1.1	259
17	28		0.16	81	415.	76	70 63	0.76	251
16	32		0.14	81	419.4	74	69 64	0.66	
15	36		0.11	81		74	69 64	0.52	269
14	40		0.10	81	[redacted]	72	68 64	047	255
13	44		0.07	81	422.545	72	69 65	0.33	249
12	48		0.06	81	423.98	72	69 65	0.28	245
11	52		0.08	82	425.19	71	69 66	0.38	
10	56		0.10	82	426.51	70	68 66	0.47	269
9	60		0.12	82	428.09	72	69 66	0.57	272
8	64		0.14	82	429.81	72	69 66	0.66	266
AVERAGE (TOTAL)					( )				

SAMPLING TRAIN DATA

COMPANY: Lee Brick

SOURCE DESIGNATION: Dryer

REGULATING AUTHORITY: EPA

DATE: 1/10/80

TEST NUMBER: P-2 contd

Field Person(s): DL/RMK

Filter Number:

Barometric Pressure ("Hg): 30.42

Stack Static Pressure ("H_2O):

Stack Dimensions:

Ambient Temperature (°F):

Record all Data Every 4 Minutes

$4.850 \frac{T_m}{T_s} H$

Nozzle(Dia-in): ___ ___ ___(Avg):___

Pitot Tube No.___, Corr.Factor:___

Meter Box No.___, Corr.Factor:___

Meter Isokinetic Factor:

Assumed Moisture (%):

Condensate Volume(ml):

Silica Gel Weight Gain(g):

Actual Moisture (%):

Leak Rate } Initial: ___ CFM at ___ "Hg

Leak Rate } Final: ___ CFM at ___ "Hg

Traverse Point No.	Time: Sampling (min)	Time: Clock	Velocity Pressure ("H_2O)	Stack Temp (°F)	Dry Gas Meter: Volume (ft^3)	Dry Gas Meter: Temp. (°F) Inlet	Dry Gas Meter: Temp. (°F) Outlet	Orifice Pressure Differential ("H_2O)	Filter Box Temp (°F)	Last Imp. Gas Temp (°F)	Sampling Train Static Pressure ("Hg)
7	68		0.16	83	431.66	73	70 66	0.76	257	50	0
6	72		0.19	83	433.	74	70 66	0.90	239		
5	76		0.21	83	435.78	75	71 67	1.0	251		
4	80		0.23	83	438.07	77	73 68	1.1	278		
3	84		0.25	83	440.	78	73 68	1.2	259		
3	88		0.25	83	442.78	80	74 68	1.2	247		
V-3	92		0.26	83	445.25	80	74 68	1.2	235	40	
	96				447.678		53.26				
		leak ck at 15"	0.013			leak ck		at 5"	0.013		
5-23	0	13:18	0.33	81	448.767	64	64 63	1.4	204		
23	4		0.33	82	451.54	67	66 64	1.6	214		
22	8		0.30	82		72	63 64	1.4	236		
21	12		0.31	83	454.9	74	70 66	1.5			
20	16		0.30	83	459.	76	71 66	1.4			
19	20		0.25	83	462.39	77	72 67	1.2			
18	24		0.22	83	464.77	78	73 68	1.0			
17	28		0.20	83	467.03	78	73 68	0.95	271		
AVERAGE (TOTAL)					( )						

SAMPLING TRAIN DATA

COMPANY: Le Brick
SOURCE DESIGNATION: Dryer
REGULATING AUTHORITY: _____
DATE: 1/10/80
TEST NUMBER: P-2 contd
Field Person(s): _____
Filter Number: _____
Barometric Pressure ("Hg): 30.42
Stack Static Pressure ("H_2O): _____
Stack Dimensions: _____
Ambient Temperature (°F): _____
Record all Data Every 4 Minutes

Nozzle(Dia-in): ___ ___
Pitot Tube No. ___, Corr.
Meter Box No. ___, Corr.
Meter Isokinetic Factor
Assumed Moisture (%): ___
Condensate Volume(ml):
Silica Gel Weight Gain(
Actual Moisture (%): ___
Leak Rate: Initial: _____ Cf
Final: 0.013 Cf

Traverse Point No.	Time: Sampling (min)	Time: Clock	Velocity Pressure ("H_2O)	Stack Temp (°F)	Dry Gas Meter: Volume (ft^3)	Dry Gas Meter: Temp. (°F) Inlet	Dry Gas Meter: Temp. (°F) Outlet	Orifice Pressure Differential ("H_2O)	Filter Box Temp (°F)
16	~~32~~		0.18(4)	83	469.22	78	74 69	0.95	
15	36		0.17	84	471.37	78	74 70	0.81	
14	40		0.15	84		79	74 70	0.71	289
13	44		0.13	84	475.375	78	70	0.62	
12	48		0.13	85	477.13	78	75 71	0.62	
11	52		0.19	84	479.0	79	74 72	0.96	
10	56		0.24	85	481.07	80	74 72	1.1	
9	60		0.30	83	483.42	80	72	1.4	254
8	64		0.36	83	486.03	82	75 73	1.7	
7	68		0.43	83	488.95	84	74 74	2.1	
6	72		0.47	82		86	77 74	2.3	273
5	76		0.48	83	495.48	86	80 74	2.3	
4	80		0.58	83	498.	88	77 75	2.8	
3	84		0.60	82	502.07	88	75	2.9	
3	88		0.61	81	505.83	89	83 76	3.0	
5-3	92		0.62	80	509.65	90	83 76	3.0	313
	96	14:54	11.0		513.457				
AVERAGE (TOTAL)				82.1	(117.947) 115.706		71.6 72.31	1.33	

SAMPLING TRAIN DATA

$\frac{T_M}{T_S}$ H

COMPANY: Lee Brick

SOURCE DESIGNATION: Dryer

REGULATING AUTHORITY: EPA 8

DATE: 1/11/20

TEST NUMBER: P-3

Field Person(s): DL/RMK

Filter Number: A-003-11

Barometric Pressure ("Hg): 29.80

Stack Static Pressure ("H_2O): 0.20

Stack Dimensions: 72 1/8" ID

Ambient Temperature (°F): 45

Record all Data Every 4 Minutes

Nozzle(Dia-in): 0.255, .255, .255 (Avg): 0.255

Pitot Tube No. 21, Corr. Factor: .836

Meter Box No. RAC-1, Corr. Factor: .981 ✓

Meter Isokinetic Factor: 1723

Assumed Moisture (%):

Condensate Volume(ml):

Silica Gel Weight Gain(g):

Actual Moisture (%):

Leak Rate: Initial: <0.01 CFM at 16 "Hg; Final: ____ CFM at ____ "Hg

Traverse Point No.	Time: Sampling (min)	Time: Clock	Velocity Pressure ("H_2O)	Stack Temp (°F)	Dry Gas Meter: Volume (ft^3)	Dry Gas Meter: Temp. (°F) Inlet	Dry Gas Meter: Temp. (°F) Outlet	Orifice Pressure Differential ("H_2O)	Filter Box Temp (°F)	Last Imp. Gas Temp (°F)	Sampling Train Static Pressure ("Hg)
1-23	2 / 2	10:47	0.52 / 0.51	82	515.804	56	54	2.4 / 2.3	236		
23	4 / 4		0.51	83		65	61 56	2.4	277		
22	1 / 3		0.50 / .45	83		71	65 58	2.3 / 2.1		42	
21	1 / 3		0.46 / 0.38	83		73	69 60	1.9 / 1.8	233		
20	2 / 2		0.36 / 0.38	83	528.7	80	71 62	1.7 / 1.8			
19	4		0.31	83		82	73 64	1.5			7b
18	1 / 3		0.27 / 0.25	83		82	74 66	1.3 / 1.2			7b
17	1 / 2		0.20 / 0.14	83		82	75 68	0.96 / 0.91		54	4
16	1 / 3		0.18 / 0.17	83	539.15	82	75 68	0.86 / 0.81			
15	2 / 2		0.15 / 0.14	82		81	74 70	0.72 / 0.67			3.5
14	2 / 2		0.13 / 0.12	82		80	75 70	0.62 / 0.57	200	38	
13	4		0.08	82	544.97	80	74 71	0.38			1
12	1 / 3		0.05 / 0.06	83		79	76 72	0.24 / 0.29			
11	4		0.07	84		78	75 72	0.33			
10	1 / 3		0.09 / 0.08	84	549.12	78	72	0.43 / 0.38	260	48	
9	1 / 3		0.10 / 0.11	84		78	72	0.48 / 0.52			
8	4		0.13	85	552.	78	75 72	0.62			
AVERAGE (TOTAL)					( )						

SAMPLING TRAIN DATA

COMPANY: Lee Brick
SOURCE DESIGNATION: Dryer
REGULATING AUTHORITY: EPA
DATE: 1/11/80
TEST NUMBER: P-3 contd
Field Person(s): DL/RMK
Filter Number:
Barometric Pressure ("Hg): 29.80
Stack Static Pressure ("H_2O):
Stack Dimensions:
Ambient Temperature (°F):
Record all Data Every 4 Minutes

Nozzle (Dia-in):
Pitot Tube No. , Corr.
Meter Box No. , Corr.
Meter Isokinetic Factor:
Assumed Moisture (%):
Condensate Volume (ml):
Silica Gel Weight Gain (g
Actual Moisture (%):
Leak Rate } Initial: <0.001 CF
Final: CF

Traverse Point No.	Time: Sampling (min)	Time: Clock	Velocity Pressure ("H_2O)	Stack Temp (°F)	Dry Gas Meter: Volume (ft^3)	Dry Gas Meter: Temp. (°F) Inlet	Dry Gas Meter: Temp. (°F) Outlet	Orifice Pressure Differential ("H2O)	Filter Box Temp (°F)
7	0	68	0.16	85	554.15	79	74 73	0.76	
6	2	72	0.18 0.19	85		80	77 73	0.86 0.91	
5	4	76	0.21	85		80	77 73	1.0	
4	4	80	0.24	85		82	78 73	1.1	
3	2 2	84	0.27 0.25	85		82	78 73	1.3 1.2	
2	4	88	0.25	85	565.58	84	79 74	1.2	270
W-3	4	92	0.24	85	569.98	86	80 74	1.2	200
		96 12:23			570.496				
					[illegible]	leak at 7" <0.001			
5-23	4	12:55	0.31	72	570.828	72	70	1.5	
23	4	4	0.30	71		72	70	1.5	
22	1 3	8	0.29 0.32	72		76	73 70	1.4 1.6	
21	4	12	0.33	73		80	75 70	1.16	
20	4	16	0.31	74	581.84	82	77 71	1.5	250
19	3 1	20	0.28 0.27	72		84	73 72	1.4 1.3	
18		24	0.25	81		84	78 72	1.2	
17	1 3	28	0.23 0.22	83	589.77	86	80 74	1.2 1.1	
AVERAGE (TOTAL)					( )				

SAMPLING TRAIN DATA

COMPANY: Lee Brick
SOURCE DESIGNATION: Dryer
REGULATING AUTHORITY: EPA
DATE: 1/11/90
TEST NUMBER: P-3 contd
Field Person(s): DL/RMK
Filter Number: A-003-11
Barometric Pressure ("Hg): 29.80
Stack Static Pressure ("H_2O): _____
Stack Dimensions: 72 1/8" ID
Ambient Temperature (°F): _____
Record all Data Every 4 Minutes

Nozzle(Dia-in): ___ ___ ___ (Avg): 0.255
Pitot Tube No. 21, Corr.Factor: _____
Meter Box No. PAC 1, Corr.Factor: _____
Meter Isokinetic Factor: _____
Assumed Moisture (%): _____
Condensate Volume(ml): +60, +2
Silica Gel Weight Gain(g): 27.0
Actual Moisture (%): _____
Leak Rate } Initial: _____ CFM at _____ "Hg
Final: _____ CFM at _____ "Hg

Traverse Point No.	Time: Sampling (min)	Time: Clock	Velocity Pressure ("H_2O)	Stack Temp (°F)	Dry Gas Meter: Volume (ft^3)	Dry Gas Meter: Temp. (°F) Inlet	Dry Gas Meter: Temp. (°F) Outlet	Orifice Pressure Differential ("H_2O)	Filter Box Temp (°F)	Last Imp. Gas Temp (°F)	Sampling Train Static Pressure ("Hg)
16	4	32	0.19	83		86	70 74	0.98			
15	4	36	0.18	83		84	81 75	0.87	260	50	
14	2 2	40	0.15 .14	84	596.	85	80 75	0.72 0.67			3
13	4	44	0.1	84		85	81 76	0.48			
12	2 2	48	0.08 0.09	84		84	80 76	0.39 0.43			2
11	4	52	0.15	84	601.97	84	81 77	0.72	265		
10	4 5 3.5	56	0.20 0.21	83		84	81 78	0.97 1.0			5
9	4	60	0.27	83	606.80	85	82 78	1.3			6
8	1 3	64	0.31 0.32	83		86	82 78	1.5 1.5			
7	4	68	0.33	83	610.1	88	83 78	1.8			
6	4	72	0.43	83		90	84 78	2.1	240	52	11
5	1 3	76	0.49 0.48	82		91	85 79	2.4 2.3			12
4		80	0.52	82		94	87 80	2.5			
3	2 1	84	0.59 0.59 0.0	81	624.35	95	88 80	2.8 2.9 2.9	274	53	13.5
3	4	88	0.60 0.0	81		96	88 80	2.9			15/14
3	4 2	92	0.60 0.4	81		98	90 81	3.0 3.0		50	16
		96			631.209						
AVERAGE (TOTAL)					(120.073) 117.792		71.417 76.96				

Revised 11-78

TVM 1

SAMPLING TRAIN DATA

4.85

COMPANY: Lee Brick

SOURCE DESIGNATION: Dryer - High Ash Coal

REGULATING AUTHORITY: EPA

DATE: 1/12/90

TEST NUMBER: P-4

Field Person(s): DL/RMK

Filter Number: A-003 thru 17

Barometric Pressure ("Hg): 30.06

Stack Static Pressure ("H_2O): _____

Stack Dimensions: _____

Ambient Temperature (°F): _____

Record all Data Every 4 Minutes

Nozzle (Dia-in): _____

Pitot Tube No. 21, Corr

Meter Box No. 1-Bn, Corr

Meter Isokinetic Factc

Assumed Moisture (%): _

Condensate Volume (ml):

Silica Gel Weight Gair

Actual Moisture (%): _

Leak Rate } Initial: _____ Final: _____

Traverse Point No.	Time: Sampling (min)	Time: Clock	Velocity Pressure ("H_2O)	Stack Temp (°F)	Dry Gas Meter: Volume (ft^3)	Dry Gas Meter: Temp. (°F) Inlet	Dry Gas Meter: Temp. (°F) Outlet	Orifice Pressure Differential ("H2O)	Filt Box Tem (°F
W-23	2½ / 1½	0934	0.52 / 0.49	83	677.471	48	46	2.4 / 2.2	25
23	4 /	4	0.44 /	84		53	50 46	2.2 /	21
22	4 /	8	0.52 /	84		59	59 48	2.4 /	
21	3 / 0	12	0.44 / 0.47	84	687.495	65	58 51	2.0 / 2.2	205
20	4 /	16	.41 /	84		70	62 54	1.9 /	22
19	4 5 sec / 2:15	20	0.35 / 0.30	84		72	65 58	1.6 / 1.4	1.3
18	4 /	24	0.23 /	85		76	67 60	1.1 /	26
17	4 /	28	0.21 /	84	698.7	76	69 62	0.99 /	26
16	2 / 2	32	0.16 / 0.15	84		77	71 64	0.76 / 0.71	28
15	2½ / 2½	36	0.13 / 0.12	84		79	73 66	0.62 / 0.57	
14	2 / 2	40	0.08 / 0.09	84		78	73 69	0.38 / 0.43	25
13	/	44	0.05 /	84		78	74 70	0.24 /	27
12	/	48	0.04 /	84	707.38	78	75 72	0.14 /	27
11	/	52	0.07 /	85		78	75 72	0.33 /	
10	3 /	56	0.09 / 0.08	86	709	78	76 74	0.43 / 0.38	
9	2½ / 1½	0	0.1 / 0.11	84		80	77 74	0.48 / 0.53	26
8	/	04	0.13 /	84		80	78 75	0.58 /	26
AVERAGE (TOTAL)					( )				

SAMPLING TRAIN DATA

COMPANY: _____

SOURCE DESIGNATION: Dryer - High Air Cool

REGULATING AUTHORITY: _____ Nozzle(Dia-in): ___ ___ ___(Avg): ____

DATE: 1/12/80 Pitot Tube No. ___, Corr. Factor: ____

TEST NUMBER: P-4 Cont'd Meter Box No. ____, Corr. Factor: ____

Field Person(s): DL/RMK Meter Isokinetic Factor: _____

Filter Number: _____ Assumed Moisture (%): _____

Barometric Pressure ("Hg): _____ Condensate Volume(ml): _____

Stack Static Pressure ("H2O): _____ Silica Gel Weight Gain(g): _____

Stack Dimensions: _____ Actual Moisture (%): _____

Ambient Temperature (°F): _____ Leak Rate } Initial: _____ CFM at _____ "Hg

Record all Data Every _____ Minutes Final: 0.015 CFM at 10 "Hg

Traverse Point No.	Time: Sampling (min)	Time: Clock	Velocity Pressure ("H2O)	Stack Temp (°F)	Dry Gas Meter: Volume (ft^3)	Dry Gas Meter: Temp. (°F) Inlet	Dry Gas Meter: Temp. (°F) Outlet	Orifice Pressure Differential ("H2O)	Filter Box Temp (°F)	Last Imp. Gas Temp (°F)	Sampling Train Static Pressure ("Hg)
7	4	68	0.15	84		80	76 75	0.72			
6	4	72	0.17	84		80	78 75	0.82	242		0
5	4	76	0.19	84		81	77 76	0.91	249	54	
4	1 3	80	0.24 0.23	83	721.16	82	77 76	1.2 1.1	259		0
3	4	84	0.25	83	723.53	82	77 75	1.2	244		0
3	4	88	0.24	84	726.05	83	79 75	1.2	236		0
5-3		92	0.25	83		84	80 76	1.2	248	47	0
		96 11:15			731.090						
					731.307						
5-23	4	11:20	0.31	83	731.574	66	66	1.5	261		0
23	4	4	0.32	83		68	68	1.5	236		0
22	2 2	8	0.33 0.31	83	737.10	70	68	1.6 1.5	209	42	0
21	4	12	0.31	84	739.88	72	70 67	1.5	230		0
20	4	16	0.30	84	742.64	75	72 68	1.4	246		0
19		20	0.26	84		76	72 68	1.2	269	46	0
18		24	0.24	84	747.	78	73 68	1.1	246		0
17	2 2	28	0.2 0.19	85	750.12	78	74 70	0.95 0.90	250		0
AVERAGE (TOTAL)					( )						

SAMPLING TRAIN DATA

COMPANY: Lee Brick
SOURCE DESIGNATION: Dryer - High ash Coal
REGULATING AUTHORITY: _____ Nozzle(Dia-in): ___ ___
DATE: 1/12/90 Pitot Tube No. ___, Corr
TEST NUMBER: P-4 Cont'd Meter Box No. ___, Corr
Field Person(s): DL/RMK Meter Isokinetic Factor
Filter Number: _____ Assumed Moisture (%): ___
Barometric Pressure ("Hg): _____ Condensate Volume(ml): ___
Stack Static Pressure ("H_2O): _____ Silica Gel Weight Gain
Stack Dimensions: _____ Actual Moisture (%): ___
Ambient Temperature (°F): _____ Leak Rate Initial: _____
Record all Data Every _____ Minutes Final: 0.008

Traverse Point No.	Time: Sampling (min)	Time: Clock	Velocity Pressure ("H_2O)	Stack Temp (°F)	Dry Gas Meter: Volume (ft^3)	Dry Gas Meter: Temp. (°F) Inlet	Dry Gas Meter: Temp. (°F) Outlet	Orifice Pressure Differential ("H2O)	Filter Box Temp (°F
16	0 /	32	0.20 /	85	752.31	78	70	0.95 /	273
15	1½ / 2½	36	0.17 / 0.16	85	754.515	78	70	0.81 / 0.76	247
14	4 /	40	0.13 /	85		79	71	0.62 /	240
13	4 /	44	0.09 /	84	758.38	78	72	0.43 /	258
12	2 / 2	48	0.07 / 0.08	84	759.95	78	72	0.33 / 0.38	271
11	4 /	52	0.13 /	83		78	72	0.62 /	27
10	1 / 3	56	0.17 / 0.18	83	763.24	78	74	0.81 / 0.86	215
9	4 /	60	0.24 /	83		80	74	1.2 /	211
8	1 / 3	64	0.29 / 0.30	84	767.	82	74	1.4 / 1.4	23
7	4 /	68	0.38 /	83	770.48	83	75	1.8 /	243
6	4 /	72	0.43 /	83	773.3	84	75	2.1 /	247
5	4 /	76	0.49 /	83	776.16	86	76	2.4 /	261
4	1 / 3	80	0.51 / 0.54	83	780.21	86	76	2.5 / 2.6	250
3	/	84	0.61 /	83	783.83	87	76	3.0 /	248
3	/	88	0.63 /	83	787.68	88	77	3.1 /	263
S-3	/	92	0.63 /	83		89	78	3.1 /	27
		96			795.476				
AVERAGE (TOTAL)					(117.521)				

(115.288)

SAMPLING TRAIN DATA

COMPANY: Lee Brick

SOURCE DESIGNATION: North Kiln

REGULATING AUTHORITY: _____ Nozzle(Dia-in): ___ ___ ___(Avg): ____

DATE: 1/16/80 Pitot Tube No. ___, Corr.Factor: ____

TEST NUMBER: SO_2-1 Meter Box No. R-5, Corr.Factor: 1.013

Field Person(s): _____ ~~Meter Isokinetic Factor~~: Orifice 102

Filter Number: _____ Assumed Moisture (%): _____

Barometric Pressure ("Hg): 30.34 Condensate Volume(ml): _____

Stack Static Pressure ("H_2O): _____ Silica Gel Weight Gain(g): _____

Stack Dimensions: _____ Actual Moisture (%): _____

Ambient Temperature (°F): _____ Leak Rate } Initial: _____ CFM at ____ "Hg

Record all Data Every _____ Minutes Final: _____ CFM at ____ "Hg

Traverse Point No.	Time: Sampling (min)	Time: Clock	Velocity Pressure ("H_2O)	Stack Temp (°F)	Dry Gas Meter: Volume (ft^3)	Dry Gas Meter: Temp. (°F) Inlet	Dry Gas Meter: Temp. (°F) Outlet	Orifice Pressure Differential ("H_2O)	Filter Box Temp (°F)	Last Imp. Gas Temp (°F)	Sampling Train Static Pressure ("Hg)
A	0	1615			929.863	62	62	.01			15"
A	20	1635			930.669	70	62	.01			15"
							LK	CHK	OK at 15"		
					0.806						
AVERAGE (TOTAL)					(0.816)	66	62	0.01			

(64)

SAMPLING TRAIN DATA

COMPANY: Lee Brick

SOURCE DESIGNATION: South Kiln

REGULATING AUTHORITY: _____ Nozzle(Dia-in): ___ ___

DATE: 1/16/80 Pitot Tube No. ___, Corr.

TEST NUMBER: SO_2-1 Meter Box No. B-2, Corr.

Field Person(s): _____ ~~Meter Isokinetic Factor~~

Filter Number: _____ Assumed Moisture (%): ___

Barometric Pressure ("Hg): 30.34 Condensate Volume(ml): _

Stack Static Pressure ("H_2O): _____ Silica Gel Weight Gain(

Stack Dimensions: _____ Actual Moisture (%): ___

Ambient Temperature (°F): _____ Leak Rate } Initial: _____ C

Record all Data Every _____ Minutes Final: _____ C

Traverse Point No.	Time		Velocity Pressure ("H_2O)	Stack Temp (°F)	Dry Gas Meter			Orifice Pressure Differential ("H_2O)	Filte Box Temp (°F)
	Sampling (min)	Clock			Volume (ft^3)	Temp. (°F) Inlet	Outlet		
A	0	1535			001.253	62	62	.03	
A	20	1555			001.919	68	68	.03	
							LK CHK OK		a
					0.666				
AVERAGE (TOTAL)					(0.673)	65	65	0.03	

65

SAMPLING TRAIN DATA

COMPANY: LEE Brick

SOURCE DESIGNATION: Bottom Kiln

REGULATING AUTHORITY: _____ Nozzle(Dia-in): ___ ___ ___(Avg): ____

DATE: 1/10/90 Pitot Tube No. ___, Corr.Factor: ____

TEST NUMBER: SO$_2$-1 Meter Box No. R-3, Corr.Factor: 0.997

Field Person(s): _____ ~~Meter Isokinetic Factor:~~ Orifice 1.02

Filter Number: _____ Assumed Moisture (%): _____

Barometric Pressure ("Hg): 30.34 Condensate Volume(ml): _____

Stack Static Pressure ("H2O): _____ Silica Gel Weight Gain(g): _____

Stack Dimensions: _____ Actual Moisture (%): _____

Ambient Temperature (°F): _____ Leak Rate } Initial: _____ CFM at ____ "Hg

Record all Data Every _____ Minutes Final: _____ CFM at ____ "Hg

Traverse Point No.	Time: Sampling (min)	Time: Clock	Velocity Pressure ("H2O)	Stack Temp (°F)	Dry Gas Meter: Volume (ft3)	Dry Gas Meter: Temp. (°F) Inlet	Dry Gas Meter: Temp. (°F) Outlet	Orifice Pressure Differential ("H2O)	Filter Box Temp (°F)	Last Imp. Gas Temp (°F)	Sampling Train Static Pressure ("Hg)
A	0	1700			962.552	56	56	.01			15"
A	720	1720			963.648	63	63	.01			15"
							LK CHK OK	15"			
					1.093						
AVERAGE (TOTAL)					(1.093)	59.5	59.5	.01			

SAMPLING TRAIN DATA

COMPANY: Lee Beck
SOURCE DESIGNATION: Dryer
REGULATING AUTHORITY: _____
DATE: 11/19/90
TEST NUMBER: SO_2-1
Field Person(s): _____
Filter Number: _____
Barometric Pressure ("Hg): 30.34
Stack Static Pressure ("H_2O): _____
Stack Dimensions: _____
Ambient Temperature (°F): _____
Record all Data Every _____ Minutes

Nozzle(Dia-in): ___ ___
Pitot Tube No. ___, Corr
Meter Box No. R-1, Corr
~~Meter Isokinetic Facto~~
Assumed Moisture (%): _
Condensate Volume(ml):
Silica Gel Weight Gain
Actual Moisture (%): _
Leak Rate } Initial: _____
Final: _____

Traverse Point No.	Time: Sampling (min)	Time: Clock	Velocity Pressure ("H_2O)	Stack Temp (°F)	Dry Gas Meter: Volume (ft^3)	Dry Gas Meter: Temp. (°F) Inlet	Dry Gas Meter: Temp. (°F) Outlet	Orifice Pressure Differential ("H_2O)	Filt Box Tem (°F
A	0	1756			513.921	50	50	.01	
A	20	1816			514.722	58	56	.01	
							LK CHK OK		
					0.801				
AVERAGE (TOTAL)					(0.884)	54	53	0.01	

53.5

GEORGE D. CLAYTON & ASSOCIATES

NO_x DATA SHEET (PHENOLDISULFONIC ACID METHOD)

Project: US EPA Lee Brick & Tile Field Man: DLO BGB TJP

Sampling Station	Test Number	Flask Number & Volume		Date	Time	Barometric Pressure	Flask Pressure (±)	Temperature (°F)	Final Volume (liters)
Tunnel Dryer	1	051 2072	Initial Final	1-9 1-11	1300 1500	29.84 29.80	-25.7 0.8	45 68	1.80
Bottom Kiln	1	100 2069	Initial Final	1-10 1-11	1500 1445	~~30.92~~ 29.80	-25.8 0.6	56 68	1.75
North Kiln	1	102 2053	Initial Final	1-10 1-11	1515 1505	30.92 29.80	~~-26.1~~ 0.5	56 68	1.75
South Kiln	1	015 2048	Initial Final	1-10 1-11	1530 1445	30.92 29.80	-26.8 0.3	56 59	1.82
			Initial Final						
			Initial Final						
			Initial Final						
			Initial Final						

PARTICLE SIZING DATA SHEET 33.2

COMPANY Lee Brick & Tile - EPA

SOURCE DESIGNATION Alamo Kiln

DATE 1/10/85

TEST NUMBER PS-1

Field Person: JVM - RMK

Filter Number: see below

Barometric Pressure ("Hg): 30.42

Stack Static Pressure ("H_2O): +.17

Stack Dimensions:

Plume Appearance:

Ambient Temperature(°F):

Record all Data Every 10 Minutes

Filter Heater Setting:

Probe Heater Setting:

Nozzle Number: 3/8, Dia

Pitot Tube No. 31, Corr

Meter Box No. R-5, Cor

Meter Isokinetic Factc

Assumed Moisture(%):

Condensate Volume(ml):

Silica Gel Weight Gair

Leak Rate .02 CFM

Fin. 1

Traverse Point No.	Time		Velocity Pressure ("H_2O)	Stack Temp (°F)	Dry Gas Meter			Orifice Pressure Differential ("H_2O)	Filte Box Temp (°F)
	Sampling (min)	Clock			Volume (ft^3)	Temp (°F) Inlet	Outlet		
4	0	1773	.12	520	932.072	69	64	3.03	
4	30	53	.17	520	56.7	112	72	3.18	
	61				987.456				
			12.91						
AVERAGE (TOTAL)				520	56.096 (~~55.376~~)	90	68	3.11	

ANDERSEN IN / OUT OF STACK		
	Filter No.	Comments
Cyclone		heavy
Stage 0	AFP-226-01	very heavy
Stage 1	AFP-226-23	heavy
Stage 2	AFP-226-02	very heavy
Stage 3	AFP-226-24	heavy
Stage 4	AFP-226-03	heavy
Stage 5	AFP-226-25	heavy
Stage 6	AFP-226-04	moderate
Stage 7	AFP-226-26	light
Back up	A-190-16	moderate

BRINKS IN/CU	
	Filter No.
Cyclone	A-
Stage 1	A-
Stage 2	A-
Stage 3	A-
Stage 4	A-
Stage 5	A-
Back up	A-

0.920 acfm

PARTICLE SIZING DATA SHEET

COMPANY Lee Brick

SOURCE DESIGNATION North Kiln

DATE 1/12/90

TEST NUMBER PS-2

Field Person: _____

Filter Number: see Below

Barometric Pressure ("Hg): _____

Stack Static Pressure ("H_2O): _____

Stack Dimensions: _____

Plume Appearance: _____

Ambient Temperature(°F): _____

Record all Data Every 30 Minutes

Filter Heater Setting: _____

Probe Heater Setting: _____

Nozzle Number: ____, Dia.(in.): _____

Pitot Tube No. ___, Corr.Factor: _____

Meter Box No. R5, Corr.Factor: 1.013

Meter Isokinetic Factor: _____

Assumed Moisture(%): _____

Condensate Volume(ml): _____

Silica Gel Weight Gain(g): 30.5

Leak Rate _____ CFM at _____ "Hg

Traverse Point No.	Time		Velocity Pressure ("H_2O)	Stack Temp (°F)	Dry Gas Meter			Orifice Pressure Differential ("H_2O)	Filter Box Temp (°F)	Last Imp. Gas Temp (°F)	Sampling Train Static Pressure ("Hg)
	Sampling (min)	Clock			Volume (ft^3)	Temp (°F) Inlet	Outlet				
A	0	1630	.19	495	387.352	52	52	3.38			6.0
	30				413.774	102	66				
AVERAGE (TOTAL)					26.765 (26.422)						

ANDERSEN IN/OUT OF STACK		
	Filter No.	Comments
Cyclone		
Stage 0	AFP-230-39	very heavy
Stage 1	AFP-230-~~69~~	21 very heavy
Stage 2	AFP-230-08	very heavy
Stage 3	AFP-230-20	very heavy
Stage 4	AFP-230-07	very heavy
Stage 5	AFP-230-19	heavy
Stage 6	AFP-230-06	moderate
Stage 7	AFP-230-18	light
Back up	A-257-27	heavy

BRINKS IN/OUT OF STACK		
	Filter No.	Comments
Cyclone	A-	
Stage 1	A-	
Stage 2	A-	
Stage 3	A-	
Stage 4	A-	
Stage 5	A-	
Back up	A-	

ACFM = 0.892

PARTICLE SIZING DATA SHEET 11.27

COMPANY LEE Brick
SOURCE DESIGNATION S. Kiln
DATE 1/11/80
TEST NUMBER PS-1
Field Person:
Filter Number: See Below
Barometric Pressure ("Hg):
Stack Static Pressure ("H_2O):
Stack Dimensions:
Plume Appearance:
Ambient Temperature(°F):
Record all Data Every ____ Minutes

Filter Heater Setting:
Probe Heater Setting:
Nozzle Number: ____, Dia.
Pitot Tube No. 31, Corr.
Meter Box No. R-2, Corr
Meter Isokinetic Factor
Assumed Moisture(%):
Condensate Volume(ml):
Silica Gel Weight Gain(
Leak Rate 01 CFM a
Final 02

Traverse Point No.	Time: Sampling (min)	Time: Clock	Velocity Pressure ("H_2O)	Stack Temp (°F)	Dry Gas Meter: Volume (ft^3)	Dry Gas Meter: Temp (°F) Inlet	Dry Gas Meter: Temp (°F) Outlet	Orifice Pressure Differential ("H_2O)	Filter Box Temp (°F)
A	0	2110	.27	210	162.337	66	66	2.39	
	30		.28	190	86.2	90	80	2.65	
	60				212.163				
AVERAGE (TOTAL)				[illegible]	50.374 (49.826)	78	73	2.52	

ANDERSEN IN/OUT OF STACK

Filter No.	Comments
Cyclone	
Stage 0 AFP-228-86	heavy
Stage 1 AFP-228-65	heavy
Stage 2 AFP-228-85	heavy
Stage 3 AFP-228-64	heavy
Stage 4 AFP-228-84	moderate
Stage 5 AFP-228-63	moderate
Stage 6 AFP-228-83	light
Stage 7 AFP-228-72	light
Back up A-257-30	light

BRINKS IN/CUT

Filter No.	
Cyclone	A-
Stage 1	A-
Stage 2	A-
Stage 3	A-
Stage 4	A-
Stage 5	A-
Back up	A-

0.840 Leg

PARTICLE SIZING DATA SHEET

11.27

COMPANY LEE BRICK AND TILE COMPANY SANFORD, N.C.

SOURCE DESIGNATION SOUTH KILN

DATE 11/12/80

TEST NUMBER PS-2

Field Person: TVM etal

Filter Number:

Barometric Pressure ("Hg): 30.18

Stack Static Pressure ("H_2O): +0.14

Stack Dimensions:

Plume Appearance:

Ambient Temperature(°F):

Record all Data Every 30 Minutes

Filter Heater Setting:

Probe Heater Setting:

Nozzle Number: ____, Dia.(in.): ____

Pitot Tube No. 31, Corr.Factor: ____

Meter Box No. E-2, Corr.Factor: 1.011

Meter Isokinetic Factor:

Assumed Moisture(%):

Condensate Volume(ml):

Silica Gel Weight Gain(g): 14.3

Leak Rate ____ CFM at ____ "Hg

Traverse Point No.	Time: Sampling (min)	Time: Clock	Velocity Pressure ("H_2O)	Stack Temp (°F)	Dry Gas Meter: Volume (ft^3)	Dry Gas Meter: Temp (°F) Inlet	Dry Gas Meter: Temp (°F) Outlet	Orifice Pressure Differential ("H_2O)	Filter Box Temp (°F)	Last Imp. Gas Temp (°F)	Sampling Train Static Pressure ("Hg)
A	0	1420	.30	200	375.144	68	68	2.7			
	30	1450			399.492						
AVERAGE (TOTAL)				200	24.616 ✓ (24.348)	68	68	2.7			

ANDERSEN IN/OUT OF STACK		
	Filter No.	Comments
Cyclone		
Stage 0	AFP-228-75	heavy
Stage 1	AFP-228-70	heavy
Stage 2	AFP-228-74	heavy
Stage 3	AFP-228-69	heavy
Stage 4	AFP-228-89	moderate
Stage 5	AFP-228-68	moderate
Stage 6	AFP-228-88	light
Stage 7	AFP-228-67	light
Back up	A-257-28	light

BRINKS IN/OUT OF STACK		
	Filter No.	Comments
Cyclone	A-	
Stage 1	A-	
Stage 2	A-	
Stage 3	A-	
Stage 4	A-	
Stage 5	A-	
Back up	A-	

0.824 2.91m

PARTICLE SIZING DATA SHEET

COMPANY LEE Brick

SOURCE DESIGNATION Bottom Kiln

DATE 1/11/90

TEST NUMBER PS-1

Field Person: _____

Filter Number: See Below

Barometric Pressure ("Hg): _____

Stack Static Pressure ("H_2O): _____

Stack Dimensions: _____

Plume Appearance: _____

Ambient Temperature (°F): _____

Record all Data Every _____ Minutes

Filter Heater Setting: _____

Probe Heater Setting: _____

Nozzle Number: _____, Dia. (

Pitot Tube No. 31, Corr. F

Meter Box No. R-3, Corr.

Meter Isokinetic Factor:

Assumed Moisture (%): _____

Condensate Volume (ml): _____

Silica Gel Weight Gain (g

Leak Rate 0Z CFM at

Final " 0Z " "

Traverse Point No.	Time		Velocity Pressure ("H_2O)	Stack Temp (°F)	Dry Gas Meter			Orifice Pressure Differential ("H_2O)	Filter Box Temp (°F)
	Sampling (min)	Clock			Volume (ft^3)	Temp (°F) Inlet	Outlet		
A	0	1430	.22	150	121.703	70	70	2.13	
	30		.22	196	95.6	100	86	2.23	
	60	1930			170.603				
AVERAGE (TOTAL)					48.753 (48.900)				

ANDERSEN IN/OUT OF STACK		
	Filter No.	Comments
Cyclone		
Stage 0 AFP-	228-43	light
Stage 1 AFP-	228-09	moderate
Stage 2 AFP-	228-44	"
Stage 3 AFP-	228-10	"
Stage 4 AFP-	228-45	"
Stage 5 AFP-	228-15	"
Stage 6 AFP-	228-46	light
Stage 7 AFP-	228-95	"
Back up A-	190-05	

BRINKS IN/OUT		
	Filter No.	
Cyclone	A-	
Stage 1	A-	
Stage 2	A-	
Stage 3	A-	
Stage 4	A-	
Stage 5	A-	
Back up	A-	

Fireman was cleaning Vents Bottom Kiln exhaust

ACFM = 0.812

PARTICLE SIZING DATA SHEET

4.828 $\frac{T_m}{T_s}$ A

COMPANY W. Brick

SOURCE DESIGNATION Dryer

DATE 1/11/80

TEST NUMBER Part. Run 1

Field Person: _____

Filter Number: _____

Barometric Pressure ("Hg): _____

Stack Static Pressure ("H_2O): _____

Stack Dimensions: _____

Plume Appearance: _____

Ambient Temperature (°F): _____

Record all Data Every ~~5~~ 60 Minutes

Filter Heater Setting: _____

Probe Heater Setting: _____

Nozzle Number: ____, Dia. (in.): _____

Pitot Tube No. 31, Corr. Factor: _____

Meter Box No. E-1, Corr. Factor: 0.991

Meter Isokinetic Factor: _____

Assumed Moisture (%): _____

Condensate Volume (ml): _____

Silica Gel Weight Gain (g): 21.9

Leak Rate _____ CFM at _____ "Hg

Traverse Point No.	Time		Velocity Pressure ("H_2O)	Stack Temp (°F)	Dry Gas Meter			Orifice Pressure Differential ("H_2O)	Filter Box Temp (°F)	Last Imp. Gas Temp (°F)	Sampling Train Static Pressure ("Hg)
	Sampling (min)	Clock			Volume (ft^3) 641.037	Temp (°F) Inlet	Outlet				
9	0	15:30	.73	84	[redacted]	71	72	1.09			1.0
	60	16:30	[illegible]	[illegible]	676.941	[illegible]	[illegible]	[illegible]			
AVERAGE (TOTAL)					35.222 (35.904)						

ANDERSEN IN/OUT OF STACK		
	Filter No.	Comments
Cyclone		
Stage 0	AFP-224-08	light
Stage 1	AFP-224-18	"
Stage 2	AFP-224-09	"
Stage 3	AFP-224-19	"
Stage 4	AFP-224-10	moderate
Stage 5	AFP-224-20	"
Stage 6	AFP-224-11	light
Stage 7	AFP-224-22	"
Back up	A- 190-11	

BRINKS IN/OUT OF STACK		
	Filter No.	Comments
Cyclone	A-	
Stage 1	A-	
Stage 2	A-	
Stage 3	A-	
Stage 4	A-	
Stage 5	A-	
Back up	A-	

ACFM = 0.587

Clayton Environmental Consultants, Inc.

North Nim

SUMMARY
RECORD OF VISIBLE EMISSIONS

Type of Plant Coal Fired Brick Plant Date 1-9

Company Name Lee Brick & Tile Co Hours of Obs

Plant Address Sanford, N.C. Observer L.

Type of Discharge STACK ✓ OTHER _____

Discharge Location roof top

Height of Point of Discharge 2 ft.

Observer's Location:

Distance to Discharge Point 30 ft.

Height of Observation Point roof top level

Direction from Discharge Point N-NE.

Background Description trees & wooded area

Weather: Clear ____ Overcast X Partly Cloudy ____ Other ____

Wind Direction North Wind Velocity 5-

Plume Description:

Detached: Yes ___ No ___

Color: Black ___ White ___ Other ✓ Brownish

Plume Dispersion Behavior: Looping ___ Coning ___ Fanni

Lofting ___ Fumigating ___ Ot

Estimated Distance Plume Visible 5-6 ft.

Summary of Observations:

Opacity	Aggregate Time O Opacity	Opacity	Aggregate T
0	___min. ___sec.	55	___min
5	___min. ___sec.	60	___min
10	___min. ___sec.	65	___min
15	___min. ___sec.	70	___min
20	___min. ___sec.	75	___min
25	___min. ___sec.	80	___min
30	___min. ___sec.	85	___min
35	___min. ___sec.	90	___min
40	___min. ___sec.	95	___min
45	___min. ___sec.	100	___min
50	___min. ___sec.		

Test #1 N. Kiln (1)

RECORD OF VISIBLE EMISSIONS

Company Name Lee Brick & Tile Co
Plant Address Sanford, N.C.
Stack Location roof top
Weather Conditions overcast

Date 1-9-80
Observer A. Beeker
Observer's Location ~~South Southeast~~ of Stack Northeast

TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS
15	00	10	10	10	10	
	01	15	15	15	15	
	02	10	10	15	15	
	03	15	15	15	10	
	04	15	15	15	15	
20	05	15	15	15	15	325 " 14 "
	06	10	10	10	10	
	07	10	10	10	10	
	08	15	15	15	15	
	09	15	15	15	15	
	10	20	20	25	20	
	11	15	10	15	10	335 " 14 "
	12	15	15	15	15	
	13	10	10	10	10	
	14	15	15	15	15	
	15	15	20	20	20	
	16	10	5	10	10	
	17	10	10	10	10	340 " 15 "
	18	10	10	10	10	
	19	10	15	10	10	
	20	10	10	10	10	
	21	10	10	10	10	
	22	10	5	5	10	
	23	10	15	15	15	345 " 10 "
	24	10	10	10	10	
	25	10	10	10	10	
	26	10	10	10	10	
	27	10	15	15	15	
	28	10	10	10	10	" "
	29	10	15	15	10	350 " 11 "

Test I North Main Kiln (2)

RECORD OF VISIBLE EMISSIONS

Company Name Lee Brick & Tile Co. Date 1-9-80
Plant Address Sanford, N. C. Observer A. Brackett
Stack Location roof top Observer's Location roof top - N-W
Weather Conditions overcast

TIME						COMMENTS
HR	MIN	SECONDS 00	15	30	45	
25	30	10	10	10	10	
	31	10	15	10	10	
	32	15	15	15	15	
	33	15	15	15	15	
	34	10	10	15	15	
1600	35	15	15	15	15	315° 15"
1	36	10	10	10	10	
	37	10	15	10	10	
	38	10	10	10	10	
	39	10	10	10	10	
	40	10	10	10	10	
2	41	10	10	10	10	345° 10"
3	42	10	10	10	10	
	43	10	10	10	10	
	44	10	10	10	10	
	45	10	10	10	10	
	46	10	10	10	10	
4	47	10	10	10	10	020° 10"
5	48	10	10	10	10	
	49	10	15	15	15	
	50	10	10	10	10	
	51	10	10	10	10	
	52	10	10	10	10	
6	53	10	15	15	15	270° 11"
7	54	15	15	15	15	
	55	10	10	10	10	
	56	10	10	10	10	
	57	10	10	10	10	
	58	10	10	10	10	
29	59	10	10	10	10	260° 11"

Test I North Kiln #3

RECORD OF VISIBLE EMISSIONS

Company Name Lee Brick Tile
Plant Address Central N.C.
Stack Location roof top
Weather Conditions overcast

Date 1-9-80
Observer Wayne Barker
Observer's Location rooftop - N-NE of stack

nR	MIN	TIME SECONDS 00	15	30	45	COMMENTS
	00	5	5	5	5	
	01	10	10	10	10	
	02	10	10	10	10	
	03	10	10	10	10	
	04	10	10	10	10	
	05	10	10	10	10	
	06	10	10	10	10	
	07	10	10	10	10	
	08	10	10	10	10	
	09	10	15	15	15	
	10	10	10	10	10	
	11	10	10	10	10	
	12	10	10	10	10	
	13	10	10	10	10	
	14	10	10	10	10	
	15	10	10	15	15	
All	16	10	10	10	10	
end	17	10	10	10	10	
	18	10	10	10	10	11:43 - 11:47 (power loss)
start	19	~~15~~	~~15~~			
	20	10	10	10	10	started again
	21	10	10	10	10	
	22	10	15	15	15	
	23	15	15	15	15	
	24	10	10	10	10	
	25	10	10	10	10	
	26	15	15	15	15	
	27	10	10	10	10	
	28	15	15	15	15	
	29	15	15	15	15	

Test I North Kiln 1-4-80

RECORD OF VISIBLE EMISSIONS

Company Name Lee Brick & Tile
Plant Address Sanford, NC
Stack Location roof top
Weather Conditions overcast

Date 1-4-80
Observer Eugene Byrd
Observer's Location roof top #6

TIME HR	TIME MIN	SECONDS 00	15	30	45	COMMENTS
	30	10	10	10	10	
1004	31	10	10	10	10	30' 15'
05	32	10	10	10	10	
	33	10	10	10	10	
	34	10	10	10	10	
	35	10	10	10	10	1705 - 1709 30'
1710	36	10	10	10	10	End of test 5:10 P.M.
5:10	37					(First half)
	38					
	39					Couldn't read opacity for 2nd
	40					of test because it was too a
	41					
	42					
	43					
	44					
	45					
	46					
	47					
	48					
	49					
	50					
	51					
	52					
	53					
	54					
	55					
	56					
	57					
	58					
	59					

Test 2

(5)

SUMMARY
RECORD OF VISIBLE EMISSIONS

Type of Plant Brick & Tile Date 1-10-80

Company Name Lee Brick & Tile Hours of Observation ____

Plant Address Sanford, N.C. Observer August Baeck.

Type of Discharge STACK X OTHER ____

Discharge Location roof top

Height of Point of Discharge 7 ft.

Observer's Location:

Distance to Discharge Point 300 ft.

Height of Observation Point hill top - level to stack

Direction from Discharge Point South west

Background Description dark wooded area

Weather: Clear ____ Overcast ____ Partly Cloudy X Other ____ Color ____

Wind Direction East Wind Velocity 2-5 (mi/hr

Plume Description:

Detached: Yes ___ No ___

Color: Black ___ White ___ Other red-brown

Plume Dispersion Behavior: Looping ___ Coning ___ Fanning ___

Lofting ___ Fumigating ___ Other ____

Estimated Distance Plume Visible 7-8 ft.

Summary of Observations:

Opacity	Aggregate Time 0 Opacity	Opacity	Aggregate Time 0 Opacity
0	___min. ___sec.	55	___min. ___sec.
5	___min. ___sec.	60	___min. ___sec.
10	___min. ___sec.	65	___min. ___sec.
15	___min. ___sec.	70	___min. ___sec.
20	___min. ___sec.	75	___min. ___sec.
25	___min. ___sec.	80	___min. ___sec.
30	___min. ___sec.	85	___min. ___sec.
35	___min. ___sec.	90	___min. ___sec.
40	___min. ___sec.	95	___min. ___sec.
45	___min. ___sec.	100	___min. ___sec.
50	___min. ___sec.		

Test 2
(first h

RECORD OF VISIBLE EMISSIONS

Company Name Lee Brick
Plant Address
Stack Location
Weather Conditions

Date 1-10-80
Observer
Observer's Location

TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS
Start 10 35	00	15	15	15	15	
	01	—	—	15	15	steam interference
	02	15	15	20	20	
	03	15	15	15	15	
	04	15	15	15	10	
10	05	—	—	15	15	steam interference 30
11	06	10	10	10	15	
	07	15	15	10	15	
	08	15	15	—	—	
	09	—	—	—	—	steam hinderance etc
	10	15	—	10	15	
11	11	10	10	10	10	210
12	12	10	10	—	—	
	13	10	15	15	15	
	14	—	—	10	10	
	15	—	15	15	15	
	16	—	15	15	15	
5	17	20	20	15	15	255
18	18	15	15	15	15	
	19	10	—	15	15	
	20	10	10	10	10	
	21	15	15	15	—	
	22	15	10	10	10	
58	23	10	10	15	15	220
23	24	15	—	—	15	
	25	15	15	—	—	
	26	15	15	15	15	
	27	15	15	15	15	
	28	15	15	15	15	
11 04	29	15	15	15	15	300 15

N. Mill Test 2 (2)

(7)

RECORD OF VISIBLE EMISSIONS

Company Name Lee Brick
Plant Address
Stack Location
Weather Conditions

Date 1-10-80
Observer
Observer's Location

TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS
10	30	15	15	15	15	
	31	15	15	15	15	
	32	15	15	15	20	
	33	20	20	15	20	
	34	20	20	20	20	
11	35	15	15	10	10	300' 16
	36	15	15	15	15	
	37	20	20	20	20	
	38	20	20	20	25	
	39	—	15	15	15	
	40	15	15	15	15	
12	41	15	15	15	15	300' 17/23 ✓
	42	20	20	20	20	
	43	—	15	15	15	
	44	-	15	15	15	
	45	15	15	15	15	
	46	20	20	20	20	
1	47	20	20	20	20	300' 18/23 ✓
	48	15	15	15	15	
	49	15	15	15	15	
	50	20	20	20	20	
	51	20	20	20	20	
	52	25	25	25	25	
20	53	15	15	15	15	400' 13 ✓
21	54	20	20	20	20	
	55	20	20	15	15	
	56	30	30	30	35	
	57	30	30	25	25	
	58	25	25	30	30	
22	59	20	20	20	20	24

N. Mill

Test 2
pg (3)

RECORD OF VISIBLE EMISSIONS

Company Name Lee Brick
Plant Address
Stack Location
Weather Conditions

Date 1-10-80
Observer
Observer's Location

TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS
3	00	15	15	15	15	
	01	15	15	15	15	
	02	15	15	15	15	
	03	15	15	15	15	
	04	15	15	15	15	
10	05	15	15	15	15	30' 15'
5	06	15	15	15	15	
	07	15	15	15	15	
	08	15	15	15	15	
	09	15	15	20	20	[illegible] 270'
10	10	20	-	-	-	stop - bad stopwatch problem at 11:46
	11					
	12					started at 11:53
1	13	15	15	15	15	
	14	15	15	15	15	
	15	15	15	20	20	
	16	20	20	15	15	
	17	10	10	10	10	
4	18	15	15	15	15	360' 15'
2	19	15	15	15	15	
	20	10	10	10	10	
	21	20	20	20	20	
	22	15	15	15	15	
	23	15	15	15	15	
30	24	15	15	15	15	210' 15'
35	25	15	15	15	15	
	26	15	15	15	15	
	27	15	15	15	15	
	28	15	15	15	15	
2	29	15	15	15	15	

N. Kiln

Test 2 pg. 9

9-

RECORD OF VISIBLE EMISSIONS

Company Name Lee Brick
Plant Address
Stack Location
Weather Conditions

Date 1-10-80
Observer
Observer's Location

TIME						COMMENTS
HR	MIN	SECONDS 00	15	30	45	
1230	30	15	15	15	15	[illegible]
	31	15	15	15	15	
	32	15	15	15	15	
	33	15	15	15	15	
	34	15	15	15	15	
	35	15	15	15	15	
	36	15	10	10	15	[illegible]
	37	15	15	15	15	
	38	15	15	15	15	
	39	15	—	15	15	
	40	15	15	15	15	
	41	15	20	20	15	
	42	15	15	15	15	[illegible]
	43	15	15	15	15	
	44	20	20	20	20	
	45	15	—	—	15	
	46	15	15	15	15	
	47	—	15	—	15	
	48	15	15	15	15	[illegible]
	49	15	15	15	15	
	50	15	15	15	—	
	51	20	20	25	20	
	52	15	15	25	25	
	53	20	15	15	15	
	54	15	15	15	15	[illegible]
	55	10	10	15	15	
	56	15	15	15	15	
	57	15	15	15	15	
	58	15	15	15	15	
	59	15	15	15	15	

N.K. 1/1

Test ..

RECORD OF VISIBLE EMISSIONS

Company Name Lee Brick
Plant Address
Stack Location
Weather Conditions

Date 1-10-80
Observer
Observer's Location

TIME						COMMENTS
HR	MIN	SECONDS 00	15	30	45	
1300	00	15	15	15	15	3-0' 15
	01	10	10	10	10	
	02	15	15	15	15	
	03	5	5	5	5	
	04	10	10	10	10	
	05	15	15	15	15	
	06	10	10	15	20	2-5' 11
	07	15	15	15	15	
	08	10	10	10	10	1245-1259 1345
1400	09	15	15	15		end 12:50 p.m. - of 1st half - To
	10					
	11					
	12					
	13					
	14					
	15					
	16					
	17					
	18					
	19					
	20					
	21					
	22					
	23					
	24					
	25					
	26					
	27					
	28					
	29					

N. Kiln Test #2 (2nd half)

11

RECORD OF VISIBLE EMISSIONS

Company Name Lee Brick
Plant Address Sanford
Stack Location roof top
Weather Conditions partly cloudy

Date 1-10-80
Observer E. Becker
Observer's Location Hillside - S.W. of stack

nR	MIN	TIME SECONDS 00	15	30	45	COMMENTS
25	00	15	15	15	15	start 2nd half of test #2
	01	15	15	15	15	
	02	15	15	15	15	
	03	20	20	20	20	
	04	15	15	15	15	
	05	15	15	15	15	320' 16'
	06	15	15	15	15	
	07	15	15	15	15	
	08	15	15	15	15	
	09	15	15	15	15	
	10	10	10	10	10	
	11	10	10	10	10	320' 12'
	12	10	10	10	10	
	13	15	15	15	15	
	14	15	15	15	15	
	15	15	15	10	10	
	16	15	15	15	15	14'
	17	15	15	15	15	
	18	15	15	15	15	
	19	15	15	15	15	
	20	15	15	15	15	
	21	10	10	10	10	
	22	10	10	10	10	
	23	10	10	10	10	300' 12
	24	15	15	15	15	
	25	15	15	15	15	
	26	15	15	15	15	
	27	15	10	10	15	
	28	20	20	20	20	
	29	15	15	15	15	270' 15'

N. Kiln pg 2

RECORD OF VISIBLE EMISSIONS

Company Name Lee Brick
Plant Address
Stack Location
Weather Conditions

Date 1-10-80
Observer R. Breeck
Observer's Location

TIME						COMMENTS
HR	MIN	SECONDS 00	15	30	45	
5	30	15	15	15	15	
	31	10	10	10	10	
	32	15	15	15	15	
	33	15	15	15	15	
	34	15	15	15	15	
10	35	15	15	15	15	20 ' 14 '
	36	15	20	20	15	
	37	15	15	15	15	
	38	15	15	15	15	
	39	15	15	15	15	
	40	15	15	15	15	
	41	15	15	15	15	270 ' 15 '
1	42	15	15	15	15	
	43	15	15	15	15	
	44	15	15	15	15	
	45	15	15	15	15	
	46	15	15	15	15	
1	47	15	15	15	15	310 ' 15 '
13	48	15	15	15	15	
	49	15	10	10	10	
	50	10	10	10	10	
	51	10	10	10	10	
	52	10	10	15	15	
1	53	15	15	15	15	290 ' 12 '
1	54	15	15	15	15	
	55	10	10	10	10	
	56	10	10	10	10	
	57	10	10	10	10	
	58	10	10	10	10	
1	59	10	10	10	10	260 ' 11 '

N. Kiln pg. (3)

13

RECORD OF VISIBLE EMISSIONS

Company Name Lee Brick
Plant Address
Stack Location
Weather Conditions

Date 1-10-80
Observer E Bowker
Observer's Location

HR	MIN	TIME SECONDS 00	15	30	45	COMMENTS
	00	10	10	10	10	
	01	10	10	10	10	
	02	10	10	10	10	
	03	10	10	10	10	
	04	20	20	20	20	
	05	10	10	10	10	12"
	06	10	10	10	10	
	07	10	10	10	10	
	08	10	10	15	15	
	09	15	15	15	15	
	10	15	15	15	10	
	11	10	10	15	15	295' 12"
	12	10	10	10	10	
	13	10	10	10	10	
	14	5	5	10	10	
	15	10	10	10	10	
	16	15	15	10	10	
	17	10	10	10	10	10"
	18	10	10	10	10	
	19	10	10	10	10	
	20	10	10	10	10	
	21	10	10	10	10	
	22	10	10	10	10	
	23	15	15	15	15	260' 11"
	24	15	15	15	15	
	25	10	10	15	15	
	26	10	10	10	10	
	27	10	10	10	10	
	28	10	10	10	10	
	29	10	10	10	10	270 11"

N. Kiln #4

RECORD OF VISIBLE EMISSIONS

Company Name Lee Brick
Plant Address
Stack Location
Weather Conditions

Date 1-10-80
Observer A. Booker
Observer's Location

TIME						COMMENTS
HR	MIN	SECONDS 00	15	30	45	
1455	30	10	10	10	10	
	31	15	15	15	15	1455 - 10 - 7 ✓ 105 ✓
1457	32	10	10	10	10	Test 2 end - 3 o'clock
	33					
	34					
	35					
	36					
	37					
	38					
	39					
	40					
	41					
	42					
	43					
	44					
	45					
	46					
	47					
	48					
	49					
	50					
	51					
	52					
	53					
	54					
	55					
	56					
	57					
	58					
	59					

Test 3

15

SUMMARY
RECORD OF VISIBLE EMISSIONS

Type of Plant Brick & Tile Co. Date 1-11-80

Company Name Lee Brick Hours of Observation ___

Plant Address Sanford, N.C. Observer August Baecker

Type of Discharge STACK X OTHER ___

Discharge Location rooftop

Height of Point of Discharge 7ft.

Observer's Location:

Distance to Discharge Point 200ft.

Height of Observation Point 12 ft. - side of hill

Direction from Discharge Point S. E.

Background Description overcast, rainy - using blue steel side of bldg.

Weather: Clear ___ Overcast X Partly Cloudy ___ Other ___ Color ___

Wind Direction West Wind Velocity 0 - 2 (mi/hr

Plume Description:

Detached: Yes ___ No ___

Color: Black ___ White ___ Other red-brown

Plume Dispersion Behavior: Looping ___ Coning ___ Fanning ___

Lofting ___ Fumigating ___ Other ___

Estimated Distance Plume Visible ___

Summary of Observations:

Opacity	Aggregate Time 0 Opacity	Opacity	Aggregate Time 0 Opacity
0	___min. ___sec.	55	___min. ___sec.
5	___min. ___sec.	60	___min. ___sec.
10	___min. ___sec.	65	___min. ___sec.
15	___min. ___sec.	70	___min. ___sec.
20	___min. ___sec.	75	___min. ___sec.
25	___min. ___sec.	80	___min. ___sec.
30	___min. ___sec.	85	___min. ___sec.
35	___min. ___sec.	90	___min. ___sec.
40	___min. ___sec.	95	___min. ___sec.
45	___min. ___sec.	100	___min. ___sec.
50	___min. ___sec.		

Tested SPC
N. Kiln

RECORD OF VISIBLE EMISSIONS

Company Name Lee Brick
Plant Address
Stack Location
Weather Conditions

Date 1-11-80
Observer R. Baeseke
Observer's Location S.E. of st

start TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS
11.28	00	5	5	5	5	
	01	5	5	10	10	
	02	10	10	10	10	
	03	5	5	5	5	
	04	5	5	5	5	
33	05	5	5	5	5	150° 6°
34	06	10	10	10	10	
	07	10	10	10	10	
	08	5	5	10	10	
	09	5	5	5	5	
	10	5	5	10	5	
39	11	5	10	10	10	190° 8
40	12	5	5	5	5	
	13	5	5	10	10	
	14	10	10	5	5	
	15	5	5	5	5	
	16	5	0	0	5	
45	17	5	5	5	5	130° 5
46	18	5	5	5	5	
	19	5	5	5	5	
	20	5	5	5	5	
	21	5	5	5	10	
	22	10	10	10	10	
51	23	10	10	10	10	160 7°
52	24	5	5	5	5	
	25	5	5	5	5	
	26	5	5	5	5	
	27	5	5	5	5	
	28	5	5	5	5	
57	29	5	5	5	5	120° 5°

N. Kiln pg ② Tests 3

17

RECORD OF VISIBLE EMISSIONS

Company Name Lee Brick
Plant Address
Stack Location
Weather Conditions

Date 1-11-88
Observer R. Beeks
Observer's Location

TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS
58	30	5	5	5	5	
	31	5	5	5	5	
1:00	32	10	10	10	10	
	33	10	10	10	10	
	34	5	5	5	5	
2:03	35	5	5	10	10	170° 7'
04	36	5	5	5	5	
	37	5	5	5	5	
	38	5	5	5	5	
	39	5	5	5	5	
	40	5	5	5	5	
09	41	5	5	5	5	120° 5'
10	42	5	5	5	5	
	43	5	10	10	10	
	44	5	10	5	10	
	45	5	5	5	5	
	46	5	10	10	10	
15	47	5	5	5	5	160° 7'
16	48	5	5	5	5	
	49	5	5	5	5	
	50	5	5	5	5	
	51	5	5	5	5	
	52	10	10	10	10	
21	53	10	10	10	10	160° 7'
22	54	5	5	5	5	
	55	5	5	5	5	
	56	5	5	10	10	
	57	10	10	10	10	
	58	10	10	10	10	
27	59	10	10	10	10	190° 8'

N. Kiln Pg (3) Test 3

RECORD OF VISIBLE EMISSIONS

Company Name Lee Brick
Plant Address
Stack Location
Weather Conditions

Date 1-11-80
Observer R. Buecker
Observer's Location

TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS
1228	00	5	5	5	5	
	01	5	5	5	5	
	02	5	5	5	5	
	03	5	5	5	5	end test at 12:30
32	04	5	5			(first half) 90°
	05					
	06					
	07					
	08					
	09					
	10					
	11					
	12					
	13					
	14					
	15					
	16					
	17					
	18					
	19					
	20					
	21					
	22					
	23					
	24					
	25					
	26					
	27					
	28					
	29					

N. Kiln Test 3 (second half) 12.0

19

RECORD OF VISIBLE EMISSIONS

Company Name Lee Brick
Plant Address
Stack Location
Weather Conditions

Date 1-11-80
Observer C Buckner
Observer's Location S.E. of stack (hill side)

start TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS
4						
7	00	5	5	5	5	
	01	5	5	5	5	
	02	5	5	5	5	
	03	5	5	5	5	
	04	5	5	5	5	
12	05	5	5	5	5	120' 5'
13	06	5	5	5	5	
	07	5	5	5	5	
	08	10	10	10	10	
	09	10	10	10	10	
	10	10	10	10	10	
18	11	10	10	10	10	200' 8'
19	12	10	10	10	10	
	13	5	5	5	5	
	14	5	5	5	5	
	15	5	5	5	5	
	16	5	5	5	5	
24	17	5	5	5	5	140' 6'
25	18	5	5	5	5	
	19	5	5	5	5	
	20	5	5	5	5	
	21	5	5	5	5	
	22	5	5	5	5	
30	23	5	5	5	5	120' 5'
31	24	10	10	10	10	
	25	10	15	15	15	
	26	15	15	15	10	
	27	10	10	10	10	
	28	10	10	10	10	
36	29	5	5	5	5	250' 10'

N. Kiln pg. ② Test 3

RECORD OF VISIBLE EMISSIONS

Company Name Lee Brick
Plant Address
Stack Location
Weather Conditions

Date 1-11-80
Observer R. Boeckx
Observer's Location

TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS
37	30	10	10	10	10	
	31	10	10	10	10	
	32	10	10	5	5	
	33	5	5	5	5	
	34	5	5	5	5	
42	35	5	5	5	5	170° 7°
43	36	5	5	5	5	
	37	5	5	5	5	
	38	10	10	10	10	
	39	10	10	10	5	
	40	5	10	10	10	
48	41	5	5	5	5	170° 7
49	42	5	5	5	5	
	43	10	10	10	10	
	44	10	10	10	10	
	45	10	10	10	10	
	46	10	10	10	10	
54	47	10	10	10	10	220° 9°
55	48	10	10	10	10	
	49	10	10	10	10	
	50	10	10	10	10	
	51	10	10	10	10	
	52	10	10	10	5	
1400	53	5	5	5	5	215 9
01	54	5	5	5	10	
	55	10	10	5	5	
	56	5	5	5	5	
	57	5	5	10	10	
	58	10	5	5	5	
06	59	5	5	5	5	150° 6°

N. Kiln pg ③

Test 3

21

RECORD OF VISIBLE EMISSIONS

Company Name Lee Brick
Plant Address
Stack Location
Weather Conditions

Date 1-11-88
Observer E. Bracker
Observer's Location

TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS
1 07	00	5	5	5	5	
	01	5	5	5	5	
	02	10	10	5	5	
	03	10	10	10	10	
	04	10	10	10	10	
12	05	10	10	10	10	190° 8'
13	06	10	10	10	10	
	07	10	5	5	5	
	08	10	10	10	10	
	09	15	15	15	15	
	10	10	10	10	10	
18	11	10	10	10	10	345° 10'
19	12	10	10	10	10	
	13	10	10	10	10	
	14	10	10	10	10	
	15	10	10	10	10	
	16	10	10	10	10	
24	17	10	10	10	10	240° 10'
26	18	15	10	15	15	
	19	15	15	15	15	
	20	10	10	10	10	
	21	10	15	15	15	
	22	15	15	15	15	
30	23	15	20	20	20	345° 14'
31	24	15	15	20	20	
	25	20	20	20	20	
	26	20	20	20	20	
	27	15	15	15	20	
	28	15	15	15	15	End Test
36	29	15	15	15	15	at 2:37 PM 415° 17'

North Kiln Test 4 High As Coal

SUMMARY
RECORD OF VISIBLE EMISSIONS

Type of Plant Brick & Tile Date 1-12-

Company Name Lee Brick & Tile Co. Hours of Obse

Plant Address Sanford, N.C. Observer Bug

Type of Discharge STACK X OTHER ____

Discharge Location roof top of plant

Height of Point of Discharge ? ft.

Observer's Location:

Distance to Discharge Point 300 ft.

Height of Observation Point roadside - even w/ stack

Direction from Discharge Point S.W.

Background Description trees - wooded area

Weather: Clear X Overcast ____ Partly Cloudy X Other ____

Wind Direction West Wind Velocity 12

Plume Description:

Detached: Yes ___ No ___

Color: Black ___ White ___ Other ✓ brownish-red

Plume Dispersion Behavior: Looping ___ Coning ___ Fanning

Lofting ___ Fumigating ___ Oth

Estimated Distance Plume Visible 10 ft.

Summary of Observations:

Opacity	Aggregate Time O Opacity	Opacity	Aggregate Ti
0	___min. ___sec.	55	___min.
5	___min. ___sec.	60	___min.
10	___min. ___sec.	65	___min.
15	___min. ___sec.	70	___min.
20	___min. ___sec.	75	___min.
25	___min. ___sec.	80	___min.
30	___min. ___sec.	85	___min.
35	___min. ___sec.	90	___min.
40	___min. ___sec.	95	___min.
45	___min. ___sec.	100	___min.
50	___min. ___sec.		

North Kiln Test 4 pp. ①

High Ash Coal

23

RECORD OF VISIBLE EMISSIONS

Company Name Lee Brick
Plant Address Sanford, N.C.
Stack Location rooftop
Weather Conditions clear

Date 1-12-80
Observer Ernest Barker
Observer's Location S. w/ of stack

HR	MIN	TIME SECONDS 00	15	30	45	COMMENTS
40	00	25	25	25	25	
	01	25	25	25	25	
	02	25	25	25	25	
	03	25	25	30	30	
	04	30	30	30	30	
45	05	30	30	30	30	650' 27
46	06	30	30	30	30	
	07	30	30	30	30	
	08	30	30	30	30	
	09	30	30	30	30	
	10	30	30	30	30	
1	11	30	30	30	30	720' 30
52	12	30	30	30	30	
	13	30	30	30	30	
	14	30	30	30	30	
	15	30	30	30	30	
	16	30	30	30	30	
57	17	30	30	30	30	720' 30
8	18	30	30	30	30	
	19	30	30	30	30	
	20	25	25	25	25	
	21	30	30	30	30	
	22	25	25	30	30	
1003	23	25	25	25	25	670' 28
04	24	25	25	25	25	
	25	30	30	30	30	
	26	30	30	30	30	
	27	30	30	30	30	
	28	30	30	30	30	
9	29	30	30	30	30	700' 29

N. Kiln Test 4 12.

RECORD OF VISIBLE EMISSIONS

Company Name Lee Brick
Plant Address
Stack Location
Weather Conditions

Date 1-12-80
Observer E. Pocock
Observer's Location

TIME						COMMENTS	
HR	MIN	SECONDS 00	15	30	45		
1010	30	30	30	30	30		
	31	30	30	30	30		
	32	30	30	30	30		
	33	30	30	30	30		
	34	30	30	30	30		
15	35	30	30	30	30	720	30
16	36	30	30	30	30		
	37	30	30	30	30		
	38	25	25	25	25		
	39	25	25	25	25		
	40	30	30	30	30		
21	41	30	30	30	30	680	28
22	42	30	30	30	30		
	43	30	30	30	30		
	44	30	30	30	30		
	45	30	30	30	30		
	46	30	30	30	30		
27	47	30	30	30	30	720	30
28	48	30	30	30	30		
	49	30	30	30	30		
	50	30	35	35	35		
	51	35	35	35	35		
	52	50	50	35	30		
33	53	25	25	25	25	780	22
34	54	25	30	30	30		
	55	30	30	30	30		
	56	30	30	30	30		
	57	30	25	25	25		
	58	25	20	20	20		
39	59	15	15	15	15	605	25

N. Kiln #2 @ Test 4

25

RECORD OF VISIBLE EMISSIONS

Company Name Lee Brick
Plant Address
Stack Location
Weather Conditions

Date 1-12-80
Observer C. Beeker
Observer's Location

TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS
1 40	00	25	25	25	25	
	01	25	25	25	25	
	02	25	25	25	25	
	03	30	30	30	30	
	04	25	25	30	30	
45	05	30	30	30	30	650' 27'
46	06	30	30	30	30	
	07	30	30	30	30	
	08	30	30	30	30	
	09	30	30	30	30	
	10	30	30	30	30	
51	11	30	30	30	30	720' 30'
52	12	30	30	30	30	
	13	30	30	30	30	
	14	30	30	30	30	
	15	30	30	30	30	
	16	30	30	30	30	
57	17	30	30	30	30	720' 30
58	18	35	35	30	30	
	19	35	35	35	35	
00	20	35	35	35	35	
	21	35	35	35	35	
	22	30	30	30	30	
03	23	30	30	30	30	790' 33'
04	24	30	30	30	30	
	25	30	30	30	30	
	26	30	30	30	30	
	27	30	30	30	30	
	28	30	30	30	30	
09	29	30	30	30	30	720' 30

N. Kiln Pg ④
Test ④

RECORD OF VISIBLE EMISSIONS

Company Name Lee Brick Date 1-12-80
Plant Address Observer C. Becker
Stack Location Observer's Location
Weather Conditions

TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS
1110	30	30	30	30	30	
	31	30	35	35	35	
	32	35	35	35	35	
	33	40	40	40	40	
	34	40	40	40	40	
15	35	40	40	35	35	865' 316°
16	36	35	35	35	35	
	37	40	40	35	35	
	38	35	35	35	35	
	39	35	35	35	35	
20	40-	30	30	30	30	end. 11:20 E 1st half of Test 4.
	41					690' .3
	42					
	43					
	44					
	45					
	46					
	47					
	48					
	49					
	50					
	51					
	52					
	53					
	54					
	55					
	56					
	57					
	58					
	59					

N. Kiln Test 4 (2nd half) 1-12-80

27

RECORD OF VISIBLE EMISSIONS

Company Name Lee Brick
Plant Address Sanford, N. C.
Stack Location roof top - plant
Weather Conditions pt. cloudy

Date 1-12-80
Observer E. Bracken
Observer's Location W. - S.W. of stack.

TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS
2	00	30	30	30	30	
	01	30	30	30	30	
	02	30	30	30	30	
	03	30	30	30	30	
	04	30	30	30	30	
1205	05	30	30	30	30	720' 30
06	06	30	30	30	30	
	07	30	30	30	30	
	08	30	30	30	30	
	09	35	35	35	35	
	10	40	40	40	40	
11	11	40	40	40	40	820' 34
12	12	35	35	35	35	
	13	35	35	40	40	
	14	40	40	40	40	
	15	35	35	35	35	
	16	35	35	35	35	
17	17	35	35	35	35	870' 36'
18	18	35	35	35	35	
	19	35	35	35	35	
	20	40	40	40	40	
	21	40	40	45	45	
	22	45	45	50	50	
23	23	55	55	55	55	1020' 43
24	24	50	40	40	35	
	25	35	35	35	35	
	26	35	35	35	35	
27	27	30	30	25	25	555' 35 1/16
	28					
	29					

N. Kiln Test 4
Pg 2

RECORD OF VISIBLE EMISSIONS

Company Name Lee Brick
Plant Address
Stack Location
Weather Conditions

Date 1-12-80
Observer (Com) E Bass
Observer's Location

TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS	
1230	30	35	35	35	40		
	31	60	65	70	70		
	32	35	35	30	30		
	33	25	25	20	20		
	34	30	30	30	30		
1235	35	35	35	35	35	890	37
1236	36	35	35	35	35		
	37	40	40	40	40		
	38	40	40	40	40		
	39	40	40	35	35		
	40	35	35	35	35		
1241	41	35	30	25	25	865	36
1242	42	25	25	25	15		
	43	20	20	25	30		
	44	30	30	30	30		
	45	35	35	35	35		
	46	35	35	35	35		
1247	47	35	35	35	35	775	30
1248	48	40	40	40	40		
	49	40	40	40	40		
	50	35	35	35	35		
	51	35	35	35	35		
	52	35	35	35	35		
1253	53	30	30	30	30	810	36
1254	54	30	30	30	30		
	55	25	25	25	25		
	56	25	25	25	25		
	57	30	30	30	30		
	58	30	30	30	30		
1259	59	30	30	30	30	680	28

Test 4

Pg (3)

N. K.M.

29

RECORD OF VISIBLE EMISSIONS

Company Name Lee Brick
Plant Address
Stack Location
Weather Conditions

Date 1-12-80
Observer R. Bucker
Observer's Location

TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS
1 00	00	30	30	30	30	
	01	30	30	30	30	
	02	30	30	30	30	
	03	35	35	35	35	
	04	35	35	35	35	
05	05	35	35	35	35	780 33
06	06	30	30	30	30	
	07	30	30	30	30	
	08	30	30	30	30	
	09	30	30	30	30	
	10	30	30	30	30	
11	11	35	35	35	35	740 31
12	12	35	35	35	35	
	13	30	30	30	30	
	14	30	30	30	30	
	15	30	30	30	30	
	16	35	35	35	35	
17	17	35	35	35	35	780 33
18	18	35	35	35	35	
	19	35	35	35	35	
	20	35	35	35	35	
	21	35	35	35	35	
	22	35	35	35	35	
23	23	35	35	35	35	840 35
24	24	35	35	35	35	
	25	40	40	40	40	
	26	35	35	35	35	
	27	35	35	35	35	
	28	35	35	35	35	
29	29	35	40	40	40	875 36

Test 4 By (4)
N. Kiln

RECORD OF VISIBLE EMISSIONS

Company Name Lee Brick
Plant Address
Stack Location
Weather Conditions

Date 1-12-80
Observer R. Becker
Observer's Location

TIME						COMMENTS
HR	MIN	SECONDS 00	15	30	45	
1330	30	70	65	60	50	
	31	35	40	40	40	
	32	35	35	35	35	
	33	30	30	25	25	
	34	25	25	25	25	
1335	35	25	25	25	25	850' 35
	36	30	30	30	30	
	37	30	30	30	30	
	38	35	35	35	35	
	39	35	35	35	35	
1340	40	35	35	35	35	end Test 4 at 1:40
	41					1060' 33/20
	42					
	43					
	44					
	45					
	46					
	47					
	48					
	49					
	50					
	51					
	52					
	53					
	54					
	55					
	56					
	57					
	58					
	59					

South Kiln Test I

SUMMARY
RECORD OF VISIBLE EMISSIONS

31

Type of Plant Coal-fired Brick Date 1-9-80

Company Name Lee Brick & Tile Co Hours of Observation ___

Plant Address Sanford N. C. Observer August Boeckeler

Type of Discharge STACK X OTHER ___

Discharge Location rooftop

Height of Point of Discharge 7 ft.

Observer's Location:

Distance to Discharge Point 40 ft.

Height of Observation Point rooftop level

Direction from Discharge Point SW-NE.

Background Description trees - wooded lot

Weather: Clear ___ Overcast X Partly Cloudy ___ Other ___ Color ___

Wind Direction North Wind Velocity 5-10 (mi/hr)

Plume Description:

Detached: Yes ___ No ___

Color: Black ___ White ___ Other X reddish-brown

Plume Dispersion Behavior: Looping ___ Coning ___ Fanning ___

Lofting ___ Fumigating ___ Other ___

Estimated Distance Plume Visible 5 ft.

Summary of Observations:

Opacity	Aggregate Time 0 Opacity	Opacity	Aggregate Time 0 Opacity
0	___min. ___sec.	55	___min. ___sec.
5	___min. ___sec.	60	___min. ___sec.
10	___min. ___sec.	65	___min. ___sec.
15	___min. ___sec.	70	___min. ___sec.
20	___min. ___sec.	75	___min. ___sec.
25	___min. ___sec.	80	___min. ___sec.
30	___min. ___sec.	85	___min. ___sec.
35	___min. ___sec.	90	___min. ___sec.
40	___min. ___sec.	95	___min. ___sec.
45	___min. ___sec.	100	___min. ___sec.
50	___min. ___sec.		

Test #1 S. Kiln. Pg. (1.)

RECORD OF VISIBLE EMISSIONS

Company Name Lee Brick-Tile Co
Plant Address Scotland Neck
Stack Location roof top
Weather Conditions overcast

Date 1-9-80
Observer W. Barnes Ker
Observer's Location ~~South-Northeast~~ North/East

TIME						COMMENTS
HR	MIN	SECONDS 00	15	30	45	
9:25	00	10	15	15	15	
	01	10	10	10	10	
	02	5	5	10	10	
	03	10	10	10	5	
	04	10	10	10	10	
1520	05	10	10	10	10	[illegible]
[illegible]	06	5	5	5	5	
	07	5	5	5	5	
	08	10	10	10	10	
	09	10	10	10	10	
	10	10	10	10	5	
1130	11	5	10	10	10	[illegible]
[illegible]	12	5	5	5	5	
	13	5	5	5	5	
	14	10	10	10	10	
	15	10	15	15	15	
	16	15	10	10	10	
[illegible]	17	5	5	5	5	[illegible]
[illegible]	18	5	5	5	5	
	19	5	5	5	5	
	20	5	5	5	5	
	21	5	5	5	5	
	22	5	0	0	5	
[illegible]	23	5	10	5	5	[illegible]
[illegible]	24	5	5	5	5	
	25	5	5	5	5	
	26	5	5	5	5	
	27	5	10	10	10	
	28	5	5	5	5	
[illegible]	29	5	10	5	5	[illegible]

Test I South Kiln #2

33

RECORD OF VISIBLE EMISSIONS

Company Name Lee Brick & Tile Co
Plant Address Sanford N.C.
Stack Location roof-top
Weather Conditions Overcast

Date 1-4-80
Observer W. Beckner
Observer's Location rooftop N.W. of stack

TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS
	30	5	5	5	5	
	31	5	5	5	5	
	32	5	10	10	10	
	33	5	5	10	10	
	34	10	5	5	5	
	35	5	5	5	5	
	36	5	5	5	5	
	37	5	10	10	5	
	38	5	5	5	5	
	39	5	5	5	5	
	40	5	5	5	5	
	41	5	5	5	5	
	42	5	5	5	5	
	43	5	5	5	5	
	44	5	5	5	5	
	45	5	5	5	5	
	46	5	5	5	5	
	47	5	5	5	5	
	48	5	5	5	5	
	49	5	5	5	5	
	50	5	5	5	5	
	51	5	5	5	5	
	52	5	5	5	5	
	53	5	5	5	5	
	54	5	5	5	5	
	55	5	5	5	5	
	56	5	5	5	5	
	57	5	5	5	5	
	58	5	5	5	5	
	59	5	5	5	5	

Test I ~~North~~ South Kiln pg (5)

RECORD OF VISIBLE EMISSIONS

Company Name Lee Brick & Tile
Plant Address Sanford, N.C.
Stack Location roof
Weather Conditions overcast

Date 1-9-80
Observer August Buckner
Observer's Location south - S/SE of

TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS
	00	5	5	5	5	
	01	5	5	5	5	
	02	5	5	5	5	
	03	5	5	5	5	
	04	5	5	5	5	
	05	5	5	5	5	
	06	5	5	5	5	
	07	5	5	5	5	
	08	5	5	5	5	
	09	5	5	5	5	
	10	5	5	5	5	
	11	5	5	5	5	
	12	5	5	5	5	
	13	5	5	5	5	
	14	10	10	10	10	
	15	10	10	10	10	
	16	5	5	5	5	
	17	0	0	0	0	
4:44	18	5	5	5	5	(power loss)
4:53	19					(down)
	20	5	5	5	5	start again
	21	5	5	5	5	
	22	5	5	5	5	
	23	10	10	10	10	
	24	5	5	5	5	
	25	5	5	5	5	
	26	10	10	10	10	
	27	5	5	5	5	
	28	10	10	10	10	
	29	10	10	10	10	

Test I South Kiln #4

35

RECORD OF VISIBLE EMISSIONS

Company Name Lee Brick & Tile
Plant Address Sanford, N.C.
Stack Location roof-top
Weather Conditions overcast.

Date 1-9-80
Observer August Backus
Observer's Location roof-top - N.E. of stack

TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS
	30	5	5	5	5	
	31	5	5	5	5	150'
	32	5	5	5	5	
	33	5	5	5	5	
	34	5	5	5	5	
	35	5	5	5	5	
	36	5	5	5	5	Beginning of Test 5:16 P.M.
	37					(First half)
	38					
	39					Too dark to read opacity for
	40					2nd half.
	41					
	42					
	43					
	44					
	45					
	46					
	47					
	48					
	49					
	50					
	51					
	52					
	53					
	54					
	55					
	56					
	57					
	58					
	59					

Day 2
Test

SUMMARY
RECORD OF VISIBLE EMISSIONS
South Kiln

Type of Plant Brick & Tile Date 1-10

Company Name Lee Brick & Tile Hours of Obse

Plant Address Sanford, NC. Observer Hugg

Type of Discharge STACK X OTHER ____

Discharge Location rooftop

Height of Point of Discharge 7 ft.

Observer's Location:

Distance to Discharge Point 300 ft.

Height of Observation Point hill top - even e stack

Direction from Discharge Point South-west

Background Description dark wooded area

Weather: Clear X Overcast ____ Partly Cloudy X Other ____

Wind Direction East Wind Velocity 2-

Plume Description:

Detached: Yes ___ No ___

Color: Black ___ White ___ Other ✓ Brown-red

Plume Dispersion Behavior: Looping ___ Coning ___ Fanning

Lofting ___ Fumigating ___ Oth

Estimated Distance Plume Visible 7-8 ft.

Summary of Observations:

Opacity	Aggregate Time O Opacity	Opacity	Aggregate T:
0	___min. ___sec.	55	___min.
5	___min. ___sec.	60	___min.
10	___min. ___sec.	65	___min.
15	___min. ___sec.	70	___min.
20	___min. ___sec.	75	___min.
25	___min. ___sec.	80	___min.
30	___min. ___sec.	85	___min.
35	___min. ___sec.	90	___min.
40	___min. ___sec.	95	___min.
45	___min. ___sec.	100	___min.
50	___min. ___sec.		

S. Kiln

Test 2 (1st half) (pg 1)

3

RECORD OF VISIBLE EMISSIONS

Company Name Sanford
Plant Address Lee Brick
Stack Location roof-top
Weather Conditions partly cloudy

Date 1-10-80
Observer E. Becker
Observer's Location Hilltop - S. W.

TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS
1	00	10	10	10	10	start Test 2 - 1st half
	01	10	10	10	10	
	02	10	10	10	10	
	03	10	10	10	10	
	04	15	20	20	15	
	05	20	20	15	15	
	06	10	10	10	15	
	07	10	10	5	5	
	08	5	10	10	10	
	09	5	5	5	10	
	10	5	5	5	5	
	11	5	5	5	5	
	12	5	5	5	5	
	13	5	5	5	5	
	14	—	5	5	5	
	15	5	5	10	10	
	16	10	10	5	5	
	17	10	10	5	5	
	18	10	10	10	5	
	19	5	10	10	10	
	20	5	5	5	5	
	21	5	5	5	5	
	22	5	5	5	5	
	23	5	5	5	5	
	24	5	5	10	10	
	25	5	5	5	5	
	26	5	5	5	5	
	27	5	5	5	5	
	28	5	5	5	5	
	29	5	5	5	5	

S. Kiln Test 2 pg 2

RECORD OF VISIBLE EMISSIONS

Company Name Lee Brick
Plant Address
Stack Location
Weather Conditions

Date 1-10-90
Observer
Observer's Location

TIME						COMMENTS
HR	MIN	SECONDS				
		00	15	30	45	
	30	5	5	5	5	
	31	5	5	5	5	
	32	5	5	5	10	
	33	10	10	10	10	
	34	10	10	10	10	
	35	10	5	5	5	
	36	10	10	10	10	
	37	10	10	10	10	
	38	10	10	10	10	
	39	5	5	5	5	
	40	10	10	5	5	
	41	10	10	10	10	
	42	5	10	10	10	
	43	5	5	5	5	
	44	5	5	5	5	
	45	10	10	10	10	
	46	10	10	10	10	
	47	10	10	10	10	
	48	5	5	5	5	
	49	5	5	5	5	
	50	10	10	10	10	
	51	10	10	10	10	
	52	10	10	10	10	
	53	5	5	5	5	
	54	10	10	10	10	
	55	10	10	10	10	
	56	15	15	15	15	
	57	15	15	10	10	
	58	10	10	10	10	
	59	10	10	10	10	

S. K. H.

Test 2 (3)

39

RECORD OF VISIBLE EMISSIONS

Company Name Lee Brick
Plant Address
Stack Location
Weather Conditions

Date 1-10-80
Observer
Observer's Location

TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS
	00	5	5	5	5	
	01	5	5	5	5	
	02	5	5	5	5	
	03	5	5	5	5	
	04	5	5	5	5	
	05	5	5	5	5	
	06	5	5	5	5	
	07	5	5	5	5	
	08	5	5	5	5	
	09	5	5	10	10	
	10	10	10	10	10	stop - strip with problem - stop 11:46
	11					
	12					started at 11:58
	13	5	5	5	5	
	14	5	5	5	5	
	15	5	5	10	10	
	16	10	10	5	5	
	17	5	5	5	5	
	18	5	5	5	5	
	19	5	5	5	5	
	20	5	5	5	5	
	21	10	10	10	10	
	22	5	5	5	5	
	23	5	5	5	5	
	24	5	5	5	5	
	25	5	5	5	5	
	26	5	5	5	5	
	27	5	5	5	5	
	28	5	5	5	5	
	29	5	5	5	5	

5 kiln

Test 2 of 4

RECORD OF VISIBLE EMISSIONS

Company Name Lee Brick
Plant Address
Stack Location
Weather Conditions

Date 1-10-80
Observer
Observer's Location

TIME						COMMENTS
HR	MIN	SECONDS 00	15	30	45	
	30	5	5	5	5	
	31	5	5	5	5	
	32	5	5	5	5	
	33	5	5	5	5	
	34	5	5	5	5	
	35	5	5	5	5	
	36	5	5	5	5	
	37	5	5	5	5	
	38	5	5	5	5	
	39	5	5	5	5	
	40	5	5	5	5	
	41	10	10	10	10	
	42	5	5	5	5	
	43	5	5	5	5	
	44	10	10	10	10	
	45	5	5	5	5	
	46	5	5	5	5	
	47	5	5	5	5	
	48	5	5	5	5	
	49	5	5	5	5	
	50	5	5	5	10	
	51	10	10	15	10	
	52	5	5	10	10	
	53	5	5	5	5	
	54	5	5	5	5	
	55	5	5	5	5	
	56	5	5	5	5	
	57	5	5	5	5	
	58	5	5	5	5	
	59	5	5	5	5	

S. Kiln

Test 2 (1st half) 13:35 (5")

41-

RECORD OF VISIBLE EMISSIONS

Company Name Lee Brick
Plant Address
Stack Location
Weather Conditions

Date 1-10-80
Observer
Observer's Location

TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS
	00	5	5	5	5	12:00
	01	5	5	5	5	
	02	5	15	15	15	
	03	10	25	25	20	
	04	15	15	15	15	
	05	10	5	5	0	
	06	0	0	5	5	
	07	5	5	5	5	
	08	0	0	0	0	
	09	5	5	5		end 12:50 p.m. Test 2 (first half)
	10					
	11					
	12					
	13					
	14					
	15					
	16					
	17					
	18					
	19					
	20					
	21					
	22					
	23					
	24					
	25					
	26					
	27					
	28					
	29					

S. Kiln Test 2 (2nd half) #2①

RECORD OF VISIBLE EMISSIONS

Company Name Lee Brick
Plant Address Sanford, N.C.
Stack Location roof top
Weather Conditions partly cloudy

Date 1-10-80
Observer C. Burke
Observer's Location Hill side -

start TIME		SECONDS				COMMENTS
HR	MIN	00	15	30	45	
7:25	00	5	5	5	5	start test 2 - second ha
	01	5	5	5	5	
	02	5	5	5	5	
	03	10	10	10	10	
	04	5	5	5	5	
	05	5	5	5	5	
	06	5	5	5	5	
	07	5	5	5	5	
	08	5	5	5	5	
	09	5	5	5	5	
	10	5	5	5	5	
	11	5	5	5	5	
	12	5	5	5	5	
	13	5	5	5	5	
	14	10	10	10	5	
	15	5	5	5	5	
	16	5	5	5	5	
	17	5	5	5	5	
	18	5	5	5	5	
	19	5	5	5	5	
	20	5	5	5	5	
	21	5	5	5	5	
	22	5	5	5	5	
	23	5	5	5	5	
	24	5	5	5	5	
	25	5	5	5	5	
	26	5	5	5	5	
	27	5	0	0	5	
	28	10	10	10	10	
	29	5	5	5	5	

S. Kiln P.F. ②

43

RECORD OF VISIBLE EMISSIONS

Company Name Lee Brick
Plant Address
Stack Location
Weather Conditions

Date 1-10-80
Observer E. Bracken
Observer's Location

TIME						COMMENTS
HR	MIN	SECONDS 00	15	30	45	
	30	10	10	10	10	
	31	10	10	10	10	
	32	5	5	5	5	
	33	5	5	5	5	
	34	5	5	5	5	
	35	5	5	5	5	
	36	10	10	10	10	
	37	10	10	10	10	
	38	5	5	5	5	
	39	5	5	5	5	
	40	5	5	5	5	
	41	5	5	5	5	
	42	5	5	5	5	
	43	5	5	5	5	
	44	5	5	5	5	
	45	5	5	5	5	
	46	5	5	5	5	
	47	5	5	5	5	
	48	5	5	5	5	
	49	5	5	5	5	
	50	5	5	0	0	
	51	0	5	5	0	
	52	0	0	0	0	
	53	5	5	5	5	
	54	5	5	5	5	
	55	5	5	5	5	
	56	0	0	0	0	
	57	0	0	0	0	
	58	5	5	5	5	
	59	5	5	5	5	

S. Kiln p. ③

RECORD OF VISIBLE EMISSIONS

Company Name Lee Brick
Plant Address
Stack Location
Weather Conditions

Date 1-10-86
Observer R. Feeck
Observer's Location

TIME						COMMENTS
HR	MIN	SECONDS 00	15	30	45	
	00	5	5	5	5	
	01	5	5	5	5	
	02	5	5	5	5	
	03	5	5	5	5	
	04	10	10	10	10	
	05	5	5	5	5	
	06	5	5	5	5	
	07	5	5	5	5	
	08	5	5	5	5	
	09	5	5	5	5	
	10	5	5	5	5	
	11	5	5	5	5	
	12	5	5	5	5	
	13	5	5	10	10	
	14	10	10	15	15	
	15	10	10	10	10	
	16	10	5	5	5	
	17	0	0	0	0	
	18	5	5	5	5	
	19	5	5	5	5	
	20	5	5	5	5	
	21	5	5	5	5	
	22	5	5	5	5	
	23	5	5	5	5	
	24	5	5	5	5	
	25	5	5	5	5	
	26	5	5	5	5	
	27	0	0	5	5	
	28	5	5	5	5	
	29	5	5	5	5	

S. Kiln pg ④

RECORD OF VISIBLE EMISSIONS

Company Name Lee Brick Tile
Plant Address
Stack Location
Weather Conditions

Date 1-10-85
Observer [illegible] Brooks
Observer's Location Hillside

TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS
15	30	5	5	5	5	
15	31	5	5	5	5	
15	32	5	5	5	5	Test 2 end - 3 o'clock
	33					
	34					
	35					
	36					
	37					
	38					
	39					
	40					
	41					
	42					
	43					
	44					
	45					
	46					
	47					
	48					
	49					
	50					
	51					
	52					
	53					
	54					
	55					
	56					
	57					
	58					
	59					

South Kiln

Test

SUMMARY
RECORD OF VISIBLE EMISSIONS

Type of Plant ~~Ice~~ Brick & Tile Co Date 1-11

Company Name Lee Brick Hours of Obse

Plant Address Sanford, N. C. Observer Hugo

Type of Discharge STACK X OTHER ____

Discharge Location roof top

Height of Point of Discharge 7 ft.

Observer's Location:

Distance to Discharge Point 200 ft.

Height of Observation Point 12ft - side of hill

Direction from Discharge Point S. E.

Background Description overcast, rainy - using blue steel side

Weather: Clear ____ Overcast X Partly Cloudy ____ Other ____

Wind Direction West Wind Velocity 0 -

Plume Description:

Detached: Yes ___ No ___

Color: Black ___ White ___ Other red-brown

Plume Dispersion Behavior: Looping ___ Coning ___ Fanning

Lofting ___ Fumigating ___ Oth

Estimated Distance Plume Visible 15 ft.

Summary of Observations:

Opacity	Aggregate Time O Opacity	Opacity	Aggregate Ti
0	___min. ___sec.	55	___min.
5	___min. ___sec.	60	___min.
10	___min. ___sec.	65	___min.
15	___min. ___sec.	70	___min.
20	___min. ___sec.	75	___min.
25	___min. ___sec.	80	___min.
30	___min. ___sec.	85	___min.
35	___min. ___sec.	90	___min.
40	___min. ___sec.	95	___min.
45	___min. ___sec.	100	___min.
50	___min. ___sec.		

S. Kiln Test 3 pg. ① (1st half)

47

RECORD OF VISIBLE EMISSIONS

Company Name Lee Brick
Plant Address Sanford, N.C.
Stack Location roof top
Weather Conditions overcast-rainy

Date 1-11-80
Observer R. Spencer
Observer's Location S.E. of stack - hillside.

Start TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS
1	00	0	0	0	0	trouble reading opacity - observed
	01	0	0	5	5	for 15 min. - then changed position -
	02	5	5	5	5	for a better reading -
	03	0	0	0	0	
	04	0	0	0	0	
	05	0	0	0	0	
	06	5	5	5	5	
	07	5	5	5	5	
	08	5	5	5	5	
	09	0	0	0	0	
	10	5	5	0	0	
	11	0	0	0	0	
	12	5	5	5	0	
	13	0	0	0	5	
	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	5	
	20	5	5	5	5	
	21	5	5	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	

S. Kiln Test 3 pg ②

RECORD OF VISIBLE EMISSIONS

Company Name Lee Brick
Plant Address
Stack Location
Weather Conditions

Date 1-11-80
Observer E. Bruce Fa
Observer's Location

TIME						COMMENTS
HR	MIN	SECONDS 00	15	30	45	
1158	30	0	0	0	0	
	31	0	0	0	0	
	32	5	5	5	5	
	33	5	5	5	5	
	34	0	0	0	0	
1203	35	0	0	0	0	start 2
1204	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	
1209	41	5	5	5	5	40 1
1210	42	5	5	5	5	
	43	0	0	0	0	
	44	0	0	0	0	
	45	0	5	5	5	
	46	0	0	0	0	
1215	47	0	0	0	0	35 1
1216	48	0	0	0	0	
	49	0	0	0	0	
	50	5	5	0	0	
	51	0	0	0	0	
	52	0	0	0	0	
1221	53	0	0	0	0	10 0
1222	54	0	0	0	0	
	55	0	0	0	0	
	56	0	0	5	5	
	57	5	5	5	5	
	58	5	5	5	5	
1229	59	5	5	5	5	40 2

3. Nilm Tests 1 & 2

49

RECORD OF VISIBLE EMISSIONS

Company Name Lee Brick
Plant Address
Stack Location
Weather Conditions

Date 1-11-80
Observer R. Boerker
Observer's Location

TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS
12	00	0	0	0	0	End 1st half of test
	01	0	0	0	0	at 12:30 P.M.
	02	0	0	0	0	
	03	0	0	0	0	
13	04	0	0			0/15 0
	05					
	06					
	07					
	08					
	09					
	10					
	11					
	12					
	13					
	14					
	15					
	16					
	17					
	18					
	19					
	20					
	21					
	22					
	23					
	24					
	25					
	26					
	27					
	28					
	29					

S. Kiln Test 3 (second half)

RECORD OF VISIBLE EMISSIONS

Company Name Lee Brick
Plant Address Sanford, N.C.
Stack Location roof top
Weather Conditions overcast-rain

Date 1-11-80
Observer R. Baecke
Observer's Location S. E. of st

Start TIME		SECONDS				COMMENTS
HR	MIN	00	15	30	45	
1307	00	0	0	0	0	
	01	0	0	0	0	
	02	0	0	0	0	
	03	0	0	0	0	
	04	0	0	0	0	
1312	05	0	0	0	0	
1313	06	0	0	0	0	
	07	0	0	0	0	
	08	5	5	5	5	
	09	5	5	5	5	
	10	5	5	5	5	
1319	11	5	5	5	5	
	12	5	5	5	5	
	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	5	5	5	5	
	25	5	5	5	5	
	26	5	5	10	10	
	27	5	5	5	5	
	28	5	5	5	5	
	29	5	5	5	5	

S. Kiln pg ②

51

RECORD OF VISIBLE EMISSIONS

Company Name Lee Brick
Plant Address
Stack Location
Weather Conditions

Date 1-11-80
Observer A. Becker
Observer's Location

TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS
1327	30	0	0	0	0	
	31	0	0	0	0	
	32	0	0	0	0	
	33	0	0	0	0	
	34	0	0	0	0	
1342	35	0	0	0	0	25' 0"
13	36	0	0	5	5	
	37	5	5	5	5	
	38	5	5	5	5	
	39	5	5	5	5	
	40	5	5	5	5	
1349	41	5	5	5	5	40' 5"
1350	42	5	5	5	5	
	43	5	5	5	5	
	44	5	5	5	5	
	45	5	5	5	5	
	46	5	5	5	5	
1354	47	5	5	5	5	120' 5"
1355	48	5	5	5	5	
	49	5	5	5	5	
	50	5	5	5	5	
	51	0	0	0	0	
	52	0	0	0	0	
1400	53	5	5	0	0	70' 3"
	54	5	5	5	5	
	55	5	5	0	0	
	56	5	5	5	5	
	57	5	5	5	5	
	58	0	0	0	0	
1409	59	5	5	5	5	40' 4"

S. Kiln pg. ③

RECORD OF VISIBLE EMISSIONS

Company Name Lee Brick
Plant Address Sanford
Stack Location
Weather Conditions

Date 1-11-80
Observer E Buckner
Observer's Location

	TIME					COMMENTS
HR	MIN	SECONDS 00	15	30	45	
1407	00	0	0	0	0	
	01	0	0	0	0	
	02	0	0	0	0	
	03	5	5	0	0	
	04	0	0	5	5	
1412	05	5	5	0	0	20" 1'
1413	06	5	5	5	5	
	07	5	5	5	5	
	08	5	5	5	5	
	09	5	5	5	5	
	10	5	5	5	5	
1418	11	5	5	5	5	120" 5
1420	12	5	5	5	5	
	13	5	5	5	5	
	14	5	5	5	5	
	15	5	5	5	5	
	16	5	5	5	5	
1424	17	5	5	5	5	120" 5"
1425	18	10	10	10	10	
	19	5	5	5	5	
	20	5	5	5	5	
	21	5	5	5	5	
	22	5	5	5	5	
1430	23	5	5	5	5	140" 6"
1431	24	5	5	5	5	
	25	5	5	10	10	
	26	10	10	15	15	
	27	15	15	15	10	
	28	10	10	5	5	End test
1436	29	5	5	5	5	205" 9 at 2:37

South Kiln Test 4 High Ash Load

53

SUMMARY
RECORD OF VISIBLE EMISSIONS

Type of Plant Brick Manuf. Date 1-12-80

Company Name Lee Brick & Tile Co. Hours of Observation ___

Plant Address Sanford, N.C. Observer August Boecker

Type of Discharge STACK X OTHER ___

Discharge Location roof top of plant

Height of Point of Discharge 7 ft from roof top

Observer's Location:

Distance to Discharge Point 300 ft.

Height of Observation Point roadside - even w stack

Direction from Discharge Point S.W.

Background Description trees - wooded area

Weather: Clear X Overcast ___ Partly Cloudy X Other ___ Color ___

Wind Direction West Wind Velocity 12 (mi/hr)

Plume Description:

Detached: Yes ___ No ___

Color: Black ___ White ___ Other X brown - grey

Plume Dispersion Behavior: Looping ___ Coning ___ Fanning ___

Lofting ___ Fumigating ___ Other ___

Estimated Distance Plume Visible 10 ft.

Summary of Observations:

Opacity	Aggregate Time @ Opacity	Opacity	Aggregate Time @ Opacity
0	___min. ___sec.	55	___min. ___sec.
5	___min. ___sec.	60	___min. ___sec.
10	___min. ___sec.	65	___min. ___sec.
15	___min. ___sec.	70	___min. ___sec.
20	___min. ___sec.	75	___min. ___sec.
25	___min. ___sec.	80	___min. ___sec.
30	___min. ___sec.	85	___min. ___sec.
35	___min. ___sec.	90	___min. ___sec.
40	___min. ___sec.	95	___min. ___sec.
45	___min. ___sec.	100	___min. ___sec.
50	___min. ___sec.		

South Kiln Test 4 pg. ①
High Ash Coal

RECORD OF VISIBLE EMISSIONS

Company Name Lee Brick
Plant Address Sanford, N.C.
Stack Location roof top of plant
Weather Conditions clear

Date 1-12-80
Observer Augusta Bacon
Observer's Location S.W. of st

TIME HR (start)	MIN	SECONDS 00	15	30	45	COMMENTS
9:40	00	10	10	10	10	
	01	10	10	10	10	
	02	10	10	10	10	
	03	10	10	10	10	
	04	10	10	5	5	
45	05	5	5	10	10	220 9
46	06	10	10	10	10	
	07	10	10	10	10	
	08	10	10	10	10	
	09	10	10	10	10	
	10	10	10	10	10	
51	11	10	10	10	10	240 10
52	12	10	10	10	10	
	13	10	10	10	10	
	14	10	10	10	10	
	15	10	10	10	10	
	16	10	10	10	10	
57	17	10	10	10	10	240 10
58	18	10	10	10	10	
	19	10	10	10	10	
1000	20	10	10	10	10	
	21	10	10	10	10	
	22	10	10	10	10	
03	23	10	10	10	10	240 10
04	24	5	5	5	5	
	25	5	5	5	5	
	26	10	5	5	5	
	27	10	10	10	10	
	28	10	10	10	10	
09	29	10	10	10	10	180 8

S. Kiln PB (2) Test 4

55

RECORD OF VISIBLE EMISSIONS

Company Name Lee Brick
Plant Address
Stack Location
Weather Conditions

Date 1-12-80
Observer P. Becker
Observer's Location

TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS
1010	30	10	10	10	10	
	31	10	10	10	10	
	32	10	10	10	10	
	33	10	10	10	10	
	34	10	10	10	10	
1015	35	10	10	10	10	240 10
16	36	10	10	10	10	
	37	10	10	10	10	
	38	~~10~~	5	5	5	
	39	5	5	5	5	
	40	10	10	10	10	
21	41	10	15	15	15	220 9
22	42	10	10	10	10	
	43	10	10	10	10	
	44	10	10	10	10	
	45	10	10	10	10	
	46	10	10	10	10	
27	47	10	10	10	10	240 10
28	48	10	10	10	10	
	49	10	10	10	10	
	50	10	10	10	10	
	51	15	15	15	15	
	52	20	20	20	20	
33	53	25	25	20	20	350 15
34	54	10	10	10	10	
	55	10	10	10	10	
	56	10	10	10	10	
	57	10	10	10	10	
	58	10	10	15	15	
39	59	15	15	20	20	280 12

South Kiln (High Ash Coal) pg (3) Test 4

RECORD OF VISIBLE EMISSIONS

Company Name Lee Rock
Plant Address
Stack Location
Weather Conditions

Date 1-12-80
Observer K. Bueker
Observer's Location

TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS
1040	00	15	15	10	10	
	01	10	10	10	10	
	02	10	10	10	10	
	03	10	10	10	10	
	04	10	10	10	10	
45	05	10	10	10	10	250 10
46	06	10	10	10	10	
	07	10	10	10	10	
	08	10	10	10	10	
	09	10	10	10	10	
	10	10	10	10	10	
51	11	10	10	10	10	240 10
52	12	10	10	10	10	
	13	10	10	10	10	
	14	10	10	10	10	
	15	10	10	10	10	
	16	10	10	10	10	
57	17	10	10	10	10	240 10
58	18	10	10	10	10	
	19	15	15	15	15	
	20	15	15	15	15	
	21	10	10	10	10	
	22	10	10	10	10	
1103	23	5	5	5	5	260 11
04	24	5	5	5	5	
	25	5	5	5	5	
	26	5	5	5	5	
	27	5	5	5	5	
	28	10	10	10	10	
1109	29	10	10	10	10	160 7

S. Kiln #4
Test 4

51

RECORD OF VISIBLE EMISSIONS

Company Name: Lee Brick
Plant Address:
Stack Location:
Weather Conditions:

Date: 1-12-80
Observer: C. Becker
Observer's Location:

TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS
10	30	10	10	10	10	
	31	10	10	10	10	
	32	10	10	15	15	
	33	15	15	15	15	
	34	15	15	15	15	
15	35	10	10	10	10	290 12
0	36	10	10	10	10	
	37	10	10	10	10	
	38	10	10	10	10	
	39	10	10	10	10	
20	40	10	15	15	15	End 1st half of Test 4 11:20
	41					215 11/20
	42					
	43					
	44					
	45					
	46					
	47					
	48					
	49					
	50					
	51					
	52					
	53					
	54					
	55					
	56					
	57					
	58					
	59					

S. Kiln Test 4 (2nd half)

RECORD OF VISIBLE EMISSIONS

Company Name Lee Brick
Plant Address Sanford N.C.
Stack Location roof-top-plant
Weather Conditions pt. cloudy

Date 1-12-80
Observer H. Beeker
Observer's Location 66-S. W. of s

HR	MIN	SECONDS 00	15	30	45	COMMENTS
start TIME noon 1200	00	10	10	10	10	
	01	10	10	10	10	
	02	10	10	10	10	
	03	10	10	10	10	
	04	10	10	10	10	
05	05	10	10	10	10	240 10
06	06	10	10	10	10	
	07	10	10	10	10	
	08	10	10	10	10	
	09	15	15	15	15	
	10	15	15	15	15	
11	11	15	15	15	15	300 15
12	12	15	15	15	15	
	13	15	15	15	15	
	14	15	15	15	15	
	15	15	15	15	15	
	16	15	15	15	15	
17	17	15	15	15	15	360 15
18	18	15	15	15	15	
	19	15	15	20	20	
	20	15	15	15	15	
	21	20	20	20	20	
	22	20	20	20	20	
23	23	20	20	20	20	430 18
24	24	20	20	15	15	
	25	15	15	15	15	
	26	10	10	10	10	
	27	5	5	5	5	
	28	10	10	10	10	
29	29	15	15	15	15	290 12

S. Kiln Test #2

4

59

RECORD OF VISIBLE EMISSIONS

Company Name Lee Brick
Plant Address
Stack Location
Weather Conditions

Date 1-12-80
Observer E. Buckner
Observer's Location

TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS
30	30	15	15	15	15	
	31	30	40	50	50	
	32	15	15	15	15	
	33	15	5	5	10	
	34	20	20	20	20	
35	35	20	20	20	20	485 20
36	36	20	20	20	20	
	37	15	15	15	15	
	38	15	15	20	20	
	39	15	15	15	15	
	40	15	15	15	15	
41	41	20	25	30	40	445 19
42	42	35	40	50	60	
	43	40	35	35	25	
	44	30	30	30	30	
	45	20	20	20	20	
	46	20	20	20	20	
47	47	20	20	20	20	680 28
48	48	20	20	20	20	
	49	20	20	20	20	
	50	20	20	20	20	
	51	15	15	15	15	
	52	15	15	15	15	
53	53	15	15	15	15	420 18
54	54	15	15	15	15	
	55	15	15	15	15	
	56	20	20	20	20	
	57	15	15	15	15	
	58	15	15	15	15	
59	59	15	15	15	15	380 16

S. Kiln Test 4 (3)

RECORD OF VISIBLE EMISSIONS

Company Name Lee Brick
Plant Address
Stack Location
Weather Conditions

Date 1-12-80
Observer R. Becker
Observer's Location

TIME						COMMENTS	
HR	MIN	SECONDS 00	15	30	45		
1300	00	10	10	10	10		
	01	10	10	10	10		
	02	10	10	10	10		
	03	10	10	15	15		
	04	15	15	15	15		
05	05	15	15	15	15	290	12
06	06	15	15	15	15		
	07	15	15	15	15		
	08	10	10	10	10		
	09	10	10	10	10		
	10	10	10	10	10		
11	11	10	10	10	10	280	12
12	12	10	10	10	10		
	13	10	10	10	10		
	14	10	10	10	10		
	15	10	10	10	10		
	16	15	15	15	15		
17	17	15	15	15	15	280	12
18	18	15	15	15	15		
	19	15	15	15	15		
	20	15	15	15	15		
	21	15	15	15	15		
	22	15	15	15	15		
23	23	15	15	15	15	260	15
24	24	15	15	15	15		
	25	15	15	15	15		
	26	15	15	15	15		
	27	15	15	15	15		
	28	15	15	15	15		
29	29	15	15	15	15	360	15

S.Kiln Test 4
B3@

61

RECORD OF VISIBLE EMISSIONS

Company Name Lee Brick
Plant Address
Stack Location
Weather Conditions

Date 1-12-90
Observer E. Booker
Observer's Location

TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS
30	30	35	40	45	50	
	31	20	20	15	15	
	32	15	15	15	15	
	33	10	10	10	10	
	34	10	10	10	10	
35	35	10	10	15	15	420 18
36	36	15	15	15	15	
	37	15	15	15	15	
	38	15	15	15	15	
	39	15	15	15	15	
40	40	15	15	15	15	End Test 4 at 1:40
	41					300 15/20
	42					
	43					
	44					
	45					
	46					
	47					
	48					
	49					
	50					
	51					
	52					
	53					
	54					
	55					
	56					
	57					
	58					
	59					

APPENDIX B-2

Sampling Summary Data

SAMPLING SUMMARY SHEET

Plant Lee Brick and Tile Company Location Sanford, North Carolina

Sampled Source North Kiln

Run	Date	N_p	P_m	P_b	V_m	T_m	$V_{m_{std}}$	V_w	$V_{w_{gas}}$	%M	M_d
P-1	1-9-80	40	3.62	29.84	196.905	85.35	191.859	257.6	12.13	5.95	0.941
P-2	1-10-80	40	3.33	30.42	189.667	86.70	187.771	240.5	11.33	5.69	0.943
P-3	1-11-80	40	3.53	29.80	189.181	91.66	181.942	272.7	12.84	6.59	0.934
P-4	1-12-80	40	3.87	30.06	205.020	87.40	200.594	238.8	11.25	5.31	0.947

Run	MW_d	MW	P_{st}	P_s	C_p	$\sqrt{\Delta P_s X (T_s+460)^c}$	V_s	T_s	T_t	D_n	%I
P-1	29.17	28.51	+0.0051	29.85	0.822	13.45	1941	520.0	200	0.414	103.9
P-2	29.20	28.56	+0.0051	30.43	0.822	13.22	1888	520.1	200	0.414	102.3
P-3	29.16	28.43	+0.0051	29.81	0.822	13.15	1902	489.1	200	0.414	98.2
P-4	29.21	28.61	+0.0051	30.07	0.822	13.85	1988	496.3	200	0.414	102.1

$$V_{m_{std}} = \frac{17.65 \times V_m \left(P_b + \frac{P_m}{13.6}\right)}{(T_m + 460)}$$

$$V_{w_{gas}} = 0.0471 \times V_w$$

$$\%H = \frac{100 \times V_{w_{gas}}}{V_{m_{std}} + V_{w_{gas}}}$$

$$M_d = \frac{100 - \%H}{100}$$

$$MW_d = (\%CO_2 \times \tfrac{44}{100}) + (\%O_2 \times \tfrac{32}{100}) + \{\%CO + \%N_2) \times \tfrac{28}{100}$$

$$MW = MW_d \times M_d + 18 (1 - M_d)$$

$$P_s = P_b \pm P_{st}$$

$$V_s = 5120.8 \times Cp \times \sqrt{\Delta P_s \times (T_s + 460)} \left[\frac{1}{P_s \times MW}\right]^{1/2}$$

$$\%I = \frac{1,032 \times (T_s + 460) \times V_{m_{std}}}{V_s \times T_t \times P_s \times M_d \times (D_n)^2}$$

N_p Total No. of Sampling Points

P_m Average Orifice Pressure Drop, in. H_2O

P_b Barometric Pressure, in. Hg. Absolute

V_m Volume of Dry Gas at Meter Conditions, DCF

T_m Average Meter Temperature, °F

$V_{m_{std}}$ Volume of Dry Gas at STP, DSCF[a]

V_w Total H_2O Collected in Impingers and Silica Gel, ml

$V_{w_{gas}}$ Volume of Water Vapor Collected at STP, SCF[b]

%H Moisture by Volume

M_d Mole Fraction of Dry Gas

$\%CO_2$ Volume % Dry

$\%O_2$ Volume % Dry

%CO Volume % Dry

$\%N_2$ Volume % Dry

MW_d Molecular Weight of Stack Gas, Dry Basis

MW Molecular Weight of Stack Gas, Wet Basis

P_{st} Static Pressure of Stack Gas, in. Hg

P_s Stack Gas Pressure, in. Hg Absolute

C_p Pitot Tube Coefficient

V_s Stack Gas Velocity at Stack Conditions, fps.

T_s Average Stack Temperature °F

T_t Net Time of Test, Min.

D_n Sampling Nozzle Diameter, in.

%I Percent Isokinetic

[a] Dry standard cubic feet at 68°F. 29.92 in. Hg.

[b] Standard conditions at 68°F. 29.92 in. Hg.

[c] $\sqrt{\Delta P_s \times (T_s + 460)}$ is determined by averaging the square root of the product of the velocity head (ΔP_s) and the absolute stack temperature from each sampling point.

SAMPLING SUMMARY SHEET

Plant Lee Brick and Tile Company **Location** Sanford, North Carolina

Sampled Source South Kiln

Run	Date	N_p	P_m	Pb	V_m	T_m	$V_{m_{std}}$	V_w	$V_{w_{gas}}$	%M	M_d
P-1	1-9-80	40	2.41	29.84	166.502	67.65	167.182	89.2	4.201	2.45	0.975
P-2	1-10-80	40	2.30	30.42	162.344	71.38	164.946	92.3	4.347	2.57	0.974
P-3	1-11-80	40	2.21	29.80	160.914	77.21	158.406	113.6	5.351	3.27	0.967
P-4	1-12-80	40	2.29	30.06	162.379	68.53	163.915	70.5	3.321	1.99	0.980

Run	MW_d	MW	P_{st}	P_s	C_p	$\sqrt{\Delta P_s X (T_s+460)^c}$	V_s	T_s	T_t	D_n	%I
P-1	28.89	28.62	+0.010	29.85	0.831	13.06	1901	184.5	200	0.314	101.9
P-2	28.92	28.64	+0.010	30.43	0.831	12.93	1864	192.8	200	0.314	102.0
P-3	28.92	28.57	+0.010	29.81	0.831	12.71	1853	197.4	200	0.314	102.0
P-4	28.91	28.70	+0.010	30.07	0.831	12.98	1880	192.4	200	0.314	101.0

$$V_{m_{std}} = \frac{17.65 \times V_m \left(P_b + \frac{P_m}{13.6}\right)}{(T_m + 460)}$$

$$V_{w_{gas}} = 0.0471 \times V_w$$

$$MW_d = (\%CO_2 \times \tfrac{44}{100}) + (\%O_2 \times \tfrac{32}{100}) + (\%CO + \%N_2) \times \tfrac{28}{100}$$

$$MW = MW_d \times M_d + 18 (1 - M_d)$$

$$\%M = \frac{100 \times V_{w_{gas}}}{V_{m_{std}} + V_{w_{gas}}}$$

$$M_d = \frac{100 - \%M}{100}$$

N_p Total No. of Sampling Points

P_m Average Orifice Pressure Drop, in. H_2O

P_b Barometric Pressure, in. Hg. Absolute

V_m Volume of Dry Gas at Meter Conditions, DCF

T_m Average Meter Temperature, °F

$V_{m_{std}}$ Volume of Dry Gas at STP, DSCF

$V_{w_{gas}}$ Volume of Water Vapor Collected at STP, SCF

%M % Moisture by Volume

M_d Mole Fraction of Dry Gas

$\%CO_2$ Volume % Dry

$\%O_2$ Volume % Dry

%CO Volume % Dry

$\%N_2$ Volume % Dry

MW_d Molecular Weight of Stack Gas

P_{st} Static Pressure of Stack Gas, in. Hg

P_s Stack Gas Pressure, in. Hg Absolute

C_p Pitot Tube Coefficient

V_s Stack Gas Velocity at Stack Conditions, fpm

T_s Average Stack Temperature °F

T_t Net Time of Test, Min.

SAMPLING SUMMARY SHEET

Plant Lee Brick and Tile Company Location Sanford, North Carolina

Sampled Source Bottom Kiln

Run	Date	N_p	P_m	P_b	V_m	T_m	$V_{m_{std}}$	V_w	$V_{w_{gas}}$	%M	M_d
P-1	1-9-80	40	2.11	29.84	158.863	73.59	157.620	25.2	1.187	0.747	0.993
P-2	1-10-80	40	2.15	30.42	160.604	78.13	161.074	22.5	1.060	0.654	0.993
P-3	1-11-80	40	1.96	29.80	154.925	80.38	151.523	48.2	2.270	1.476	0.985
P-4	1-12-80	40	2.11	30.06	155.250	77.09	154.154	13.2	0.622	0.402	0.996

Run	MW_d	MW	P_{st}	P_s	C_p	$\sqrt{\Delta P_s X (T_s+460)^c}$	V_s	T_s	T_t	D_n	%I
P-1	28.81	28.73	+0.0037	29.84	0.828	11.73	1699	136.8	200	0.309	101.0
P-2	28.81	28.74	+0.0037	30.42	0.828	11.57	1659	130.9	200	0.309	102.6
P-3	28.81	28.65	+0.0037	29.80	0.828	11.32	1643	144.4	200	0.309	102.6
P-4	28.81	28.76	+0.0037	30.06	0.828	11.88	1713	144.0	200	0.309	98.11

$$V_{m_{std}} = \frac{17.65 \times V_m \left(P_b + \frac{P_m}{13.6}\right)}{(T_m + 460)}$$

$$V_{w_{gas}} = 0.0471 \times V_w$$

$$\%M = \frac{100 \times V_{w_{gas}}}{V_{m_{std}} + V_{w_{gas}}}$$

$$M_d = \frac{100 - \%M}{100}$$

$$MW_d = (\%CO_2 \times \tfrac{44}{100}) + (\%O_2 \times \tfrac{32}{100}) + (\%CO + \%N_2) \times \tfrac{28}{100}$$

$$MW = MW_d \times M_d + 18 (1 - M_d)$$

$$P_s = P_b \pm P_{st}$$

$$V_s = 5120.8 \times C_p \times \sqrt{\Delta P_s \times (T_s + 460)} \left[\frac{1}{P_s \times MW}\right]^{1/2}$$

$$\%I = \frac{1{,}032 \times (T_s + 460) \times V_{m_{std}}}{V_s \times T_t \times P_s \times M_d \times (D_n)^2}$$

N_p Total No. of Sampling Points

P_m Average Orifice Pressure Drop, in. H_2O

P_b Barometric Pressure, in. Hg. Absolute

V_m Volume of Dry Gas at Meter Conditions, DCF

T_m Average Meter Temperature, °F

$V_{m_{std}}$ Volume of Dry Gas at STP, DSCF[a]

V_w Total H_2O Collected in Impingers and Silica Gel, ml

$V_{w_{gas}}$ Volume of Water Vapor Collected at STP, SCF[b]

%M % Moisture by Volume

M_d Mole Fraction of Dry Gas

$\%CO_2$ Volume % Dry

$\%O_2$ Volume % Dry

%CO Volume % Dry

$\%N_2$ Volume % Dry

MW_d Molecular Weight of Stack Gas, Dry Basis

MW Molecular Weight of Stack Gas, Wet Basis

P_{st} Static Pressure of Stack Gas, in. Hg

P_s Stack Gas Pressure, in. Hg Absolute

C_p Pitot Tube Coefficient

V_s Stack Gas Velocity at Stack Conditions, fps

T_s Average Stack Temperature °F

T_t Net Time of Test, Min.

D_n Sampling Nozzle Diameter, in

%I Percent Isokinetic

[a] Dry standard cubic feet at 68°F, 29.92 in. Hg.

[b] Standard conditions at 68°F, 29.92 in. Hg.

[c] $\sqrt{\Delta P_s \times (T_s + 460)}$ is determined by averaging the square root of the product of the velocity head (ΔP_s) and the absolute stack temperature from each sampling point.

SAMPLING SUMMARY SHEET

Plant Lee Brick and Tile Company Location Sanford, North Carolina

Sampled Source Dryer

Run	Date	N_p	P_m	P_b	V_m	T_m	$V_{m_{std}}$	V_w	$V_{w_{gas}}$	%M	M_d
P-1	1-9-80	48	1.24	29.84	109.283	68.25	109.290	70.3	3.311	2.94	0.971
P-2	1-10-80	48	1.33	30.42	115.706	71.57	117.245	71.4	3.363	2.79	0.972
P-3	1-11-80	48	1.31	29.80	117.792	76.96	115.754	89.0	4.192	3.49	0.965
P-4	1-12-80	48	1.28	30.06	115.288	72.96	115.128	54.8	2.581	2.19	0.978

Run	MW_d	MW	P_{st}	P_s	C_p	$\sqrt{\Delta P_s X (T_s+460)^c}$	V_s	T_s	T_t	D_n	%I
P-1	28.82	28.50	+0.015	29.86	0.836	11.70	1717	84.1	192	0.255	98.8
P-2	28.82	28.51	+0.015	30.43	0.836	11.83	1719	82.1	192	0.255	103.3
P-3	28.82	28.44	+0.015	29.81	0.836	11.72	1723	81.9	192	0.255	104.6
P-4	28.82	28.58	+0.015	30.07	0.836	11.55	1687	83.9	192	0.255	104.3

$$V_{m_{std}} = \frac{17.65 \times V_m \left(P_b + \frac{P_m}{13.6}\right)}{(T_m + 460)}$$

$$\%M = \frac{100 \times V_{w_{gas}}}{V_{m_{std}} + V_{w_{gas}}}$$

$$V_{w_{gas}} = 0.0471 \times V_w$$

$$M_d = \frac{100 - \%M}{100}$$

$$MW_d = (\%CO_2 \times \tfrac{44}{100}) + (\%O_2 \times \tfrac{32}{100}) + (\%CO + \%N_2) \times \tfrac{28}{100}$$

$$MW = MW_d \times M_d + 18 (1 - M_d)$$

$$P_s = P_b \pm P_g$$

N_p Total No. of Sampling Points

P_m Average Orifice Pressure Drop, in. H_2O

P_b Barometric Pressure, in. Hg. Absolute

V_m Volume of Dry Gas at Meter Conditions, DCF

T_m Average Meter Temperature, °F

$V_{m_{std}}$ Volume of Dry Gas at STP, DSCF

V_w Total H O Collected in Impin-

$V_{w_{gas}}$ Volume of Water Vapor Collected at STP, SCF

%M % Moisture by Volume

M_d Mole Fraction of Dry Gas

$\%CO_2$ Volume % Dry

$\%O_2$ Volume % Dry

%CO Volume % Dry

$\%N_2$ Volume % Dry

MW_d Molecular Weight of Stack Gas, Dry Basis

P_{st} Static Pressure of Stack Gas, in. Hg

P_s Stack Gas Pressure, in. Hg Absolute

C_p Pitot Tube Coefficient

V_s Stack Gas Velocity at Stack Conditions, fpm.

T_s Average Stack Temperature °F

T_t Net Time of Test, Min.

D_n Sampling Nozzle Diameter, in.

TABLE B-2.1. SUMMARY OF STACK GAS TEMPERATURES AND FLOWRATES

Sampling Location	Sample Number	Date 1980	Temperature		Flowrate			
			F	C	dscfm	acfm	$\frac{dsm^3}{min}$	$\frac{am^3}{min}$
North Kiln	1	1-9	520	271	6,840	13,500	194	383
	2	1-10	520	271	6,800	13,200	192	373
	3	1-11	489	254	6,860	13,300	194	375
	Average		510	265	6,830	13,300	193	377
	4	1-12	496	258	7,280	13,900	206	392
South Kiln	1	1-9	184	84.4	10,600	13,300	301	378
	2	1-10	193	89.4	10,500	13,100	297	370
	3	1-11	197	91.7	10,100	13,000	285	368
	Average		191	88.5	10,400	13,100	294	372
	4	1-12	192	88.9	10,500	13,200	298	374
Bottom Kiln	1	1-9	137	58.3	4,200	4,790	119	136
	2	1-10	131	55.0	4,230	4,680	120	133
	3	1-11	144	62.2	3,970	4,640	113	131
	Average		137	58.5	4,130	4,700	117	133
	4	1-12	144	62.2	4,230	4,830	120	137
Dryer	1	1-9	84.1	28.9	45,800	48,700	1300	1380
	2	1-10	82.1	27.8	47,000	48,800	1330	1380
	3	1-11	81.9	27.7	45,800	48,900	1300	1380
	Average		82.7	28.1	46,200	48,800	1310	1380
	4	1-12	83.9	28.8	45,700	47,800	1290	1350

APPENDIX B - 3

Summary of Visible Emissions

SUMMARY OF VISIBLE EMISSIONS
Test No.1
North Kiln

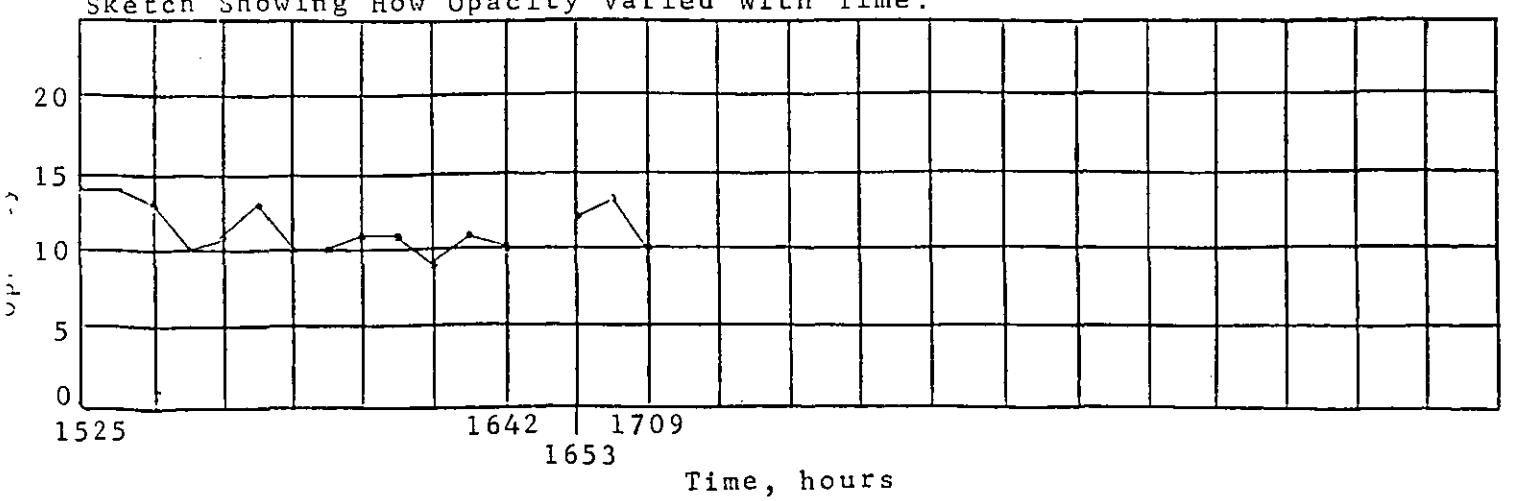
Date: 1/9/80
Type of Plant: Brick and Tile
Type of Discharge: Stack
Location of Discharge: Roof top
Height of Point of Discharge: 30 ft
Description of Sky: Overcast
Wind Direction: North
Wind Velocity: 5-10 mph
Color of Plume: Brownish
Detached Plume: No
Observer's Name: A. Baecker
Duration of Observation: 1 hr 33 min
Distance from Observer to Discharge Point: 30 ft
Direction of Observer from Discharge Point: North - Northeast
Height of Observation Point: Roof top level
Description of Background: Trees and wooded area

SUMMARY OF AVERAGE OPACITY

Set Number	Time		Opacity		Set Number	Time		Opacity	
	Start	End	Sum	Average		Start	End	Sum	Average
1	1525	1530	325	14	21				
2	1531	1536	335	14	22				
3	1537	1542	310	13	23				
4	1543	1548	250	10	24				
5	1549	1554	265	11	25				
6	1555	1600	315	13	26				
7	1601	1606	245	10	27				
8	1607	1612	240	10	28				
9	1613	1618	270	11	29				
10	1619	1624	260	11	30				
11	1625	1630	220	9	31				
12	1631	1636	255	11	32				
13	1637	1642	250	10	33				
14	1653	1658	275	12	34				
15	1659	1704	300	13	35				
16	1705	1709	200	10/20[a]	36				
17	Due to darkness, opacities were not read during the second half of the particulate test.				37				
18					38				
19					39				
20					40				

[a]This value represents the total number of readings for the 6-minute average when 24 readings were not available.

Sketch Showing How Opacity Varied With Time:



SUMMARY OF VISIBLE EMISSIONS
Test No.2
North Kiln

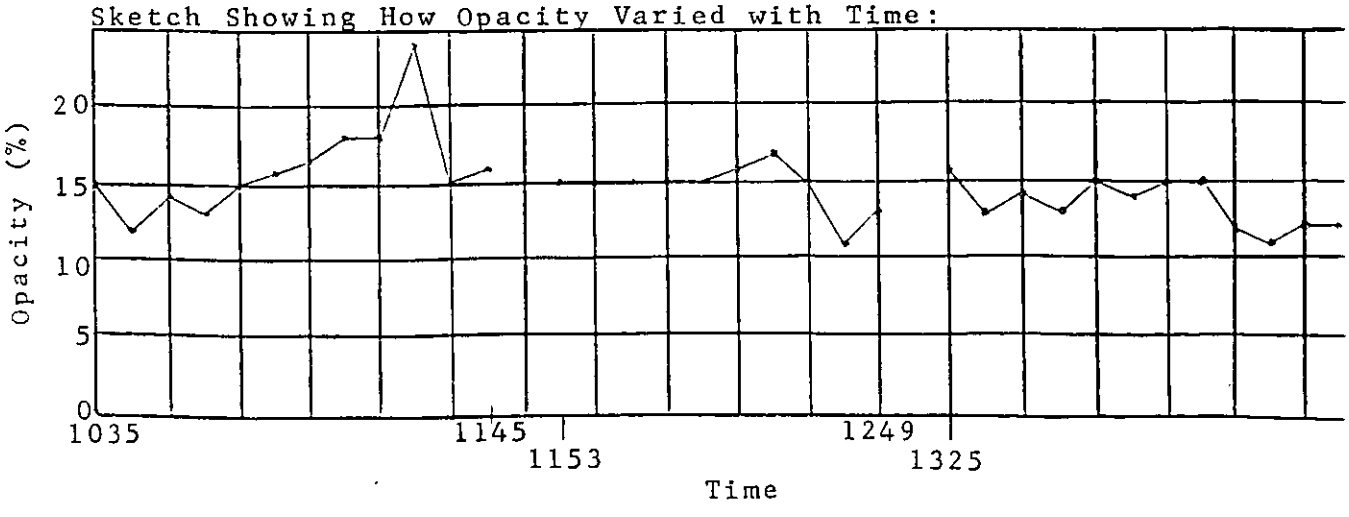
Date: 1/10/80
Type of Discharge: Stack
Height of Point of Discharge: 30 ft
Wind Direction: East
Color of Plume: Red-brown
Observer's Name: A. Baecker
Type of Plant: Brick and Tile
Location of Discharge: Roof to
Description of Sky: Partly c
Wind Velocity: 2-5 mph
Detached Plume: No
Duration of Observation: 3 hr
Distance from Observer to Discharge Point: 300 ft
Direction of Observer from Discharge Point: Southwest
Height of Observation Point: Hilltop-level with stack
Description of Background: Dark wooded area

SUMMARY OF AVERAGE OPACITY

Set Number	Time		Opacity		Set Number	Time		Opac
	Start	End	Sum	Average		Start	End	Sum
1	1035	1040	305	15/20[a]	21	1241	1246	275
2	1041	1046	210	12/17[a]	22	1247	1249	145
3	1047	1052	255	14/18[a]	23	1325	1330	380
4	1053	1058	280	13/22[a]	24	1331	1336	320
5	1059	1104	300	15/20[a]	25	1337	1342	330
6	1105	1110	390	16	26	1343	1348	300
7	1111	1116	390	17/23[a]	27	1349	1354	370
8	1117	1122	390	18/22[a]	28	1355	1400	340
9	1123	1128	440	18	29	1401	1406	370
10	1129	1134	575	24	30	1407	1412	360
11	1135	1140	360	15	31	1413	1418	295
12	1141	1145	270	16/17[a]	32	1419	1424	260
13	1153	1158	360	15	33	1425	1430	280
14	1159	1204	360	15	34	1431	1436	295
15	1205	1210	360	15	35	1437	1442	240
16	1211	1216	350	15	36	1443	1448	260
17	1217	1222	355	15/23[a]	37	1449	1454	270
18	1223	1228	320	16/20[a]	38	1455	1457	140
19	1229	1234	395	17/23[a]	39			
20	1235	1240	350	15	40			

[a]This value represents the total number of readings for the 6-minu
average when 24 readings were not available.

Sketch Showing How Opacity Varied with Time:



SUMMARY OF VISIBLE EMISSIONS
Test No.3
North Kiln

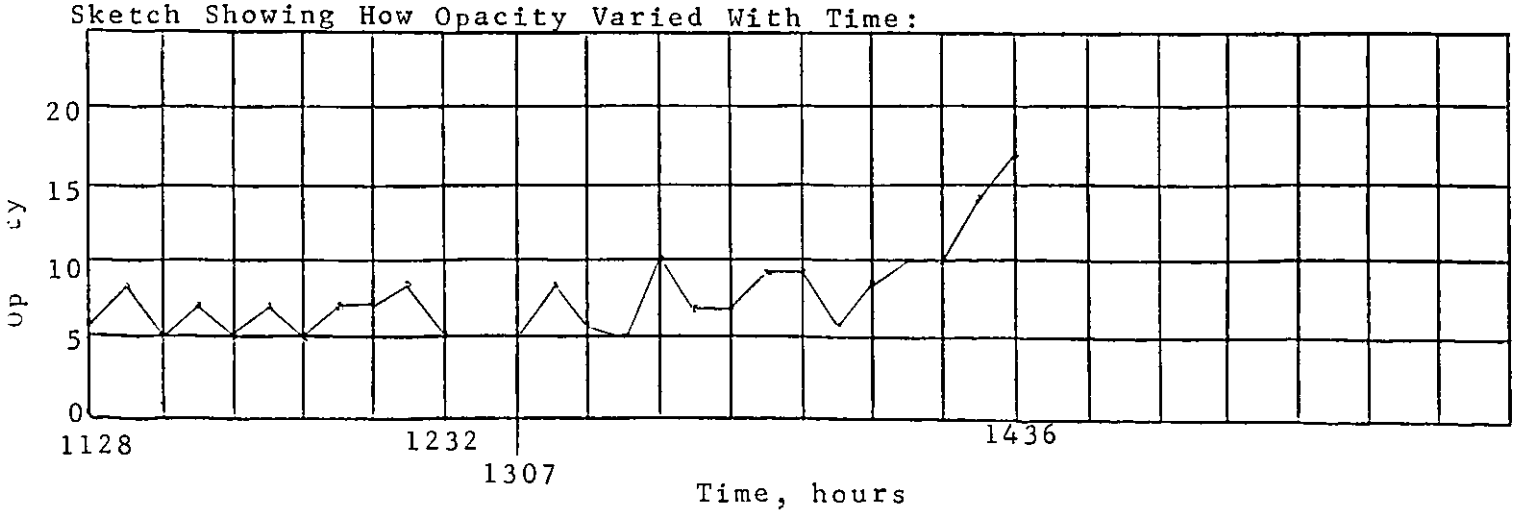
Date: 1/11/80
Type of Discharge: Stack
Height of Point of Discharge: 30 ft
Wind Direction: West
Color of Plume: Red-brown
Observer's Name: A. Baecker
Type of Plant: Brick and Tile
Location of Discharge: Roof top
Description of Sky: Overcast
Wind Velocity: 0-2 mph
Detached Plume: No
Duration of Observation: 2 hr 33 min
Distance from Observer to Discharge Point: 200 ft
Direction of Observer from Discharge Point: Southeast
Height of Observation Point: 12 ft - side of hill
Description of Background: Overcast, rainy - using blue steel side of bldg.

SUMMARY OF AVERAGE OPACITY

Set Number	Time		Opacity		Set Number	Time		Opacity	
	Start	End	Sum	Average		Start	End	Sum	Average
1	1128	1133	150	6	21	1401	1406	150	6
2	1134	1139	190	8	22	1407	1412	190	8
3	1140	1145	130	5	23	1413	1418	245	10
4	1146	1151	165	7	24	1419	1424	240	10
5	1152	1157	120	5	25	1425	1430	345	14
6	1158	1203	170	7	26	1431	1436	415	17
7	1204	1209	120	5	27				
8	1210	1215	160	7	28				
9	1216	1221	160	7	29				
10	1222	1227	190	8	30				
11	1228	1232	90	5/18[a]	31				
12	1307	1312	120	5	32				
13	1313	1318	200	8	33				
14	1319	1324	140	6	34				
15	1325	1330	120	5	35				
16	1331	1336	250	10	36				
17	1337	1342	170	7	37				
18	1343	1348	170	7	38				
19	1349	1354	220	9	39				
20	1355	1400	215	9	40				

[a]This value represents the total number of readings for the 6-minute average when 24 readings were not available.

Sketch Showing How Opacity Varied With Time:



SUMMARY OF VISIBLE EMISSIONS
Test No.4
North Kiln

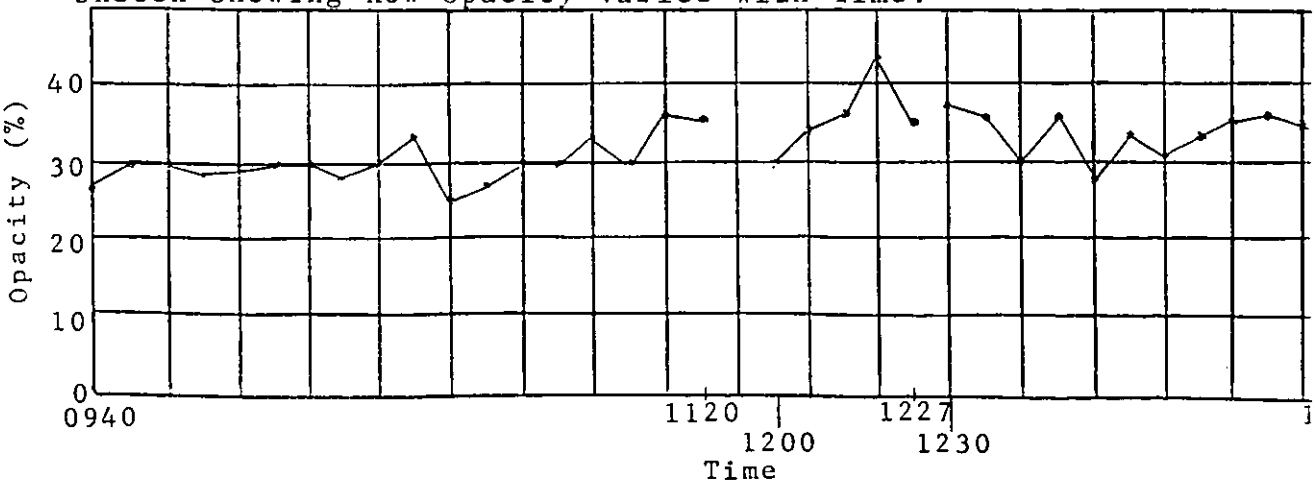
Date: 1/12/80
Type of Discharge: Stack
Height of Point of Discharge: 30 ft
Wind Direction: West
Color of Plume: Brownish-red
Observer's Name: A. Baecker
Type of Plant: Brick and T
Location of Discharge: Roof t
Description of Sky: Partly c
Wind Velocity: 12-mph
Detached Plume: No
Duration of Observation: 3
Distance from Observer to Discharge Point: 300 ft
Direction of Observer from Discharge Point: Southwest
Height of Observation Point: Roadside - even with stack
Description of Background: Trees - wooded area

SUMMARY OF AVERAGE OPACITY

Set Number	Time		Opacity		Set Number	Time		Op
	Start	End	Sum	Average		Start	End	Sum
1	0940	0945	650	27	21	1218	1223	1020
2	0946	0951	720	30	22	1224	1227	555
3	0952	0957	720	30	23	1230	1235	890
4	0958	1003	670	28	24	1236	1241	865
5	1004	1009	700	29	25	1242	1247	725
6	1010	1015	720	30	26	1248	1253	860
7	1016	1021	680	28	27	1254	1259	680
8	1022	1027	720	30	28	1300	1305	780
9	1028	1033	780	33	29	1306	1311	740
10	1034	1039	605	25	30	1312	1317	780
11	1040	1045	650	27	31	1318	1323	840
12	1046	1051	720	30	32	1324	1329	875
13	1052	1057	720	30	33	1330	1335	850
14	1058	1103	790	33	34	1336	1340	660
15	1104	1109	720	30	35			
16	1110	1115	865	36	36			
17	1116	1120	690	35/20[a]	37			
18	1200	1205	720	30	38			
19	1206	1211	820	34	39			
20	1212	1217	870	36	40			

[a]This value represents the total number of readings for the 6-min average when 24 readings were not available.

Sketch Showing How Opacity Varied With Time:



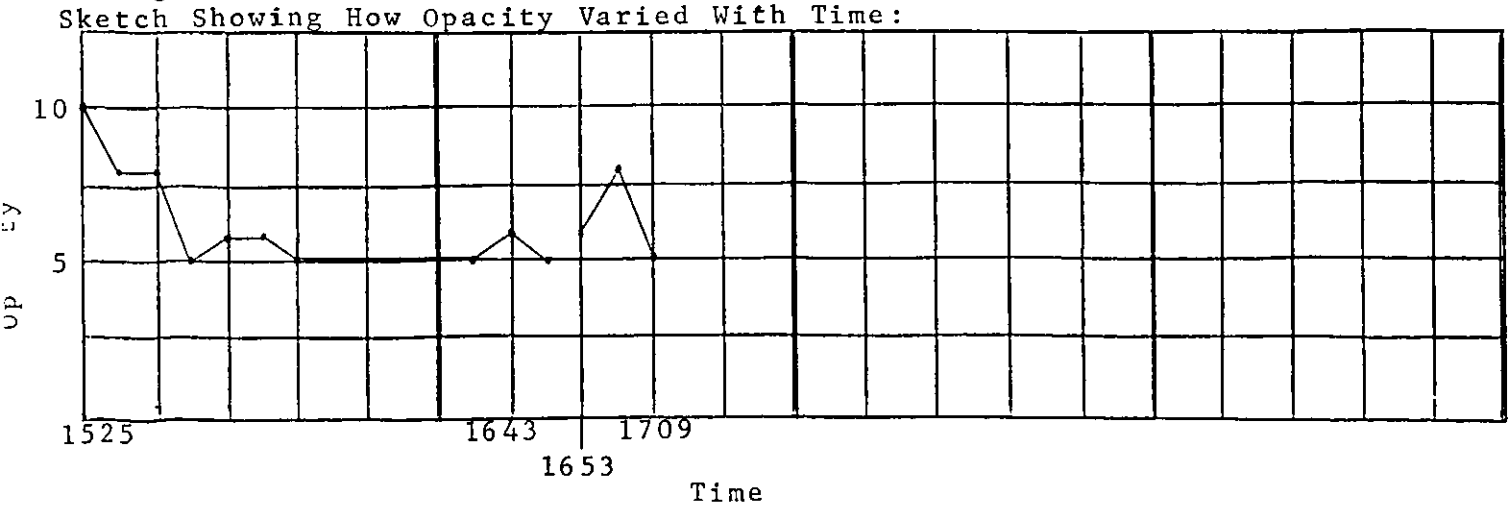
SUMMARY OF VISIBLE EMISSIONS
Test No. 1
South kiln

Date: 1/9/80
Type of Discharge: Stack
Height of Point of Discharge: 7'
Wind Direction: North
Color of Plume: Reddish brown
Observer's Name: A. Baecker
Type of Plant: Brick and Tile
Location of Discharge: South kiln
Description of Sky: Partly cloudy
Wind Velocity: 5-10 mph
Detached Plume:
Duration of Observation: 96 min.
Distance from Observer to Discharge Point: 40ft
Direction of Observer from Discharge Point: North-northeast
Height of Observation Point: Roof top level
Description of Background: Trees, wooded lot

SUMMARY OF AVERAGE OPACITY									
Set Number	Time		Opacity		Set Number	Time		Opacity	
	Start	End	Sum	Average		Start	End	Sum	Average
1	1525	1530	240	10	21				
2	1531	1536	190	8	22				
3	1537	1542	200	8	23				
4	1543	1548	115	5	24				
5	1549	1554	140	6	25				
6	1555	1600	150	6	26				
7	1601	1606	130	5	27				
8	1607	1612	120	5	28				
9	1613	1618	120	5	29				
10	1619	1624	120	5	30				
11	1625	1630	120	5	31				
12	1631	1636	120	5	32				
13	1637	1642	140	6	33				
14	1643	1643	20/4	5	34				
15	1653	1658	140	6	35				
16	1659	1704	180	8	36				
17	1705	1709	100/20	5	37				
18					38				
19					39				
20					40				

[a]This value represents the total number of readings for the 6-minute average when 24 readings were not available.

Sketch Showing How Opacity Varied With Time:



SUMMARY OF VISIBLE EMISSIONS
Test No.2
South kiln

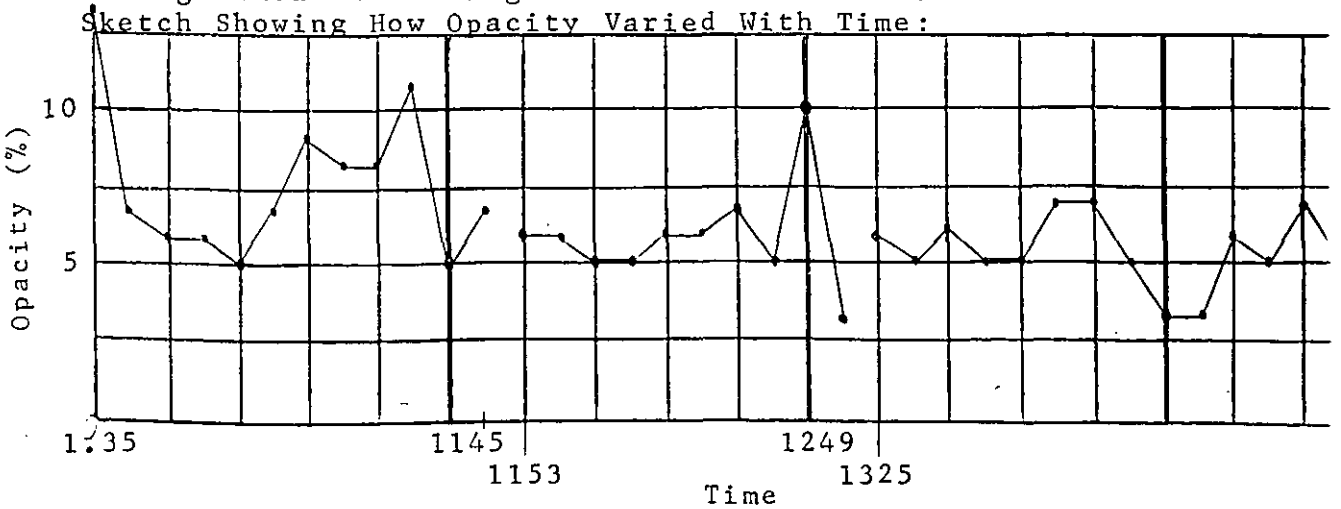
Date: 1/10/80
Type of Discharge: Stack
Height of Point of Discharge: 7'
Wind Direction: East
Color of Plume: Brown-red
Observer's Name: A.Baecker
Type of Plant: Brick and Ti
Location of Discharge: South
Description of Sky: Partly cl
Wind Velocity: 2-5 mph
Detached Plume:
Duration of Observation: 221
Distance from Observer to Discharge Point: 300ft
Direction of Observer from Discharge Point: South-west
Height of Observation Point: Hilltop - even with stack
Description of Background: Dark wooded area

SUMMARY OF AVERAGE OPACITY

Set Number	Time		Opacity		Set Number	Time		Opa
	Start	End	Sum	Average		Start	End	Sum
1	1035	1040	300	13	21	1241	1246	240
2	1041	1046	175	7	22	1247	1249	35/11
3	1047	1052	145/23	6	23	1325	1330	140
4	1053	1058	150	6	24	1331	1336	120
5	1059	1104	130	5	25	1337	1342	135
6	1105	1110	170	7	26	1343	1348	120
7	1111	1116	210	9	27	1349	1354	130
8	1117	1122	195	8	28	1355	1400	160
9	1123	1128	180	8	29	1401	1406	160
10	1129	1134	270	11	30	1407	1412	120
11	1135	1140	120	5	31	1413	1418	80
12	1141	1145	130/20	7	32	1419	1424	80
13	1153	1158	140	6	33	1425	1430	140
14	1159	1204	140	6	34	1431	1436	120
15	1205	1210	120	5	35	1437	1442	165
16	1211	1216	120	5	36	1443	1448	120
17	1217	1222	140	6	37	1449	1454	110
18	1223	1228	140	6	38	1455	1457	60/12
19	1229	1234	160	7	39			
20	1235	1240	120	5	40			

[a]This value represents the total number of readings for the 6-minu
average when 24 readings were not available.

Sketch Showing How Opacity Varied With Time:



SUMMARY OF VISIBLE EMISSIONS
Test No.3
South kiln

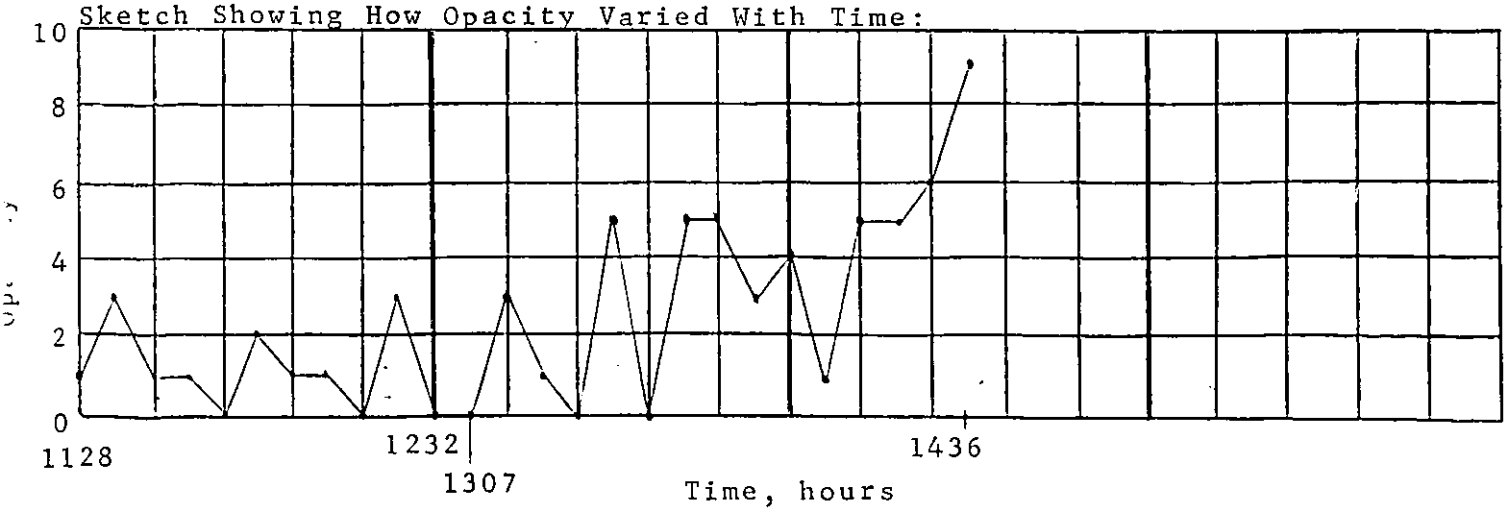
Date: 1/11/80
Type of Plant: Brick and Tile
Type of Discharge: Stack
Location of Discharge: South kiln
Height of Point of Discharge: 7'
Description of Sky: Overcast
Wind Direction: West
Wind Velocity: 0-2 mph
Color of Plume: Red-brown
Detached Plume:
Observer's Name: A.Baecker
Duration of Observation: 155 min.
Distance from Observer to Discharge Point: 200 ft
Direction of Observer from Discharge Point: Southeast
Height of Observation Point: 12ft - side of hill
Description of Background: Overcast,rainy, using blue steel side of building

SUMMARY OF AVERAGE OPACITY

Set Number	Time		Opacity		Set Number	Time		Opacity	
	Start	End	Sum	Average		Start	End	Sum	Average
1	1128	1133	30	1	21	1401	1406	90	4
2	1134	1139	70	3	22	1407	1412	30	1
3	1140	1145	20	1	23	1413	1418	120	5
4	1146	1151	35	1	24	1419	1424	120	5
5	1152	1157	0	0	25	1425	1430	140	6
6	1158	1203	40	2	26	1431	1436	205	9
7	1204	1209	20	1	27				
8	1210	1215	35	1	28				
9	1216	1221	10	0	29				
10	1222	1227	70	3	30				
11	1228	1232	0/18	0	31				
12	1307	1312	0	0	32				
13	1313	1318	80	3	33				
14	1319	1324	20	1	34				
15	1325	1330	0	0	35				
16	1331	1336	130	5	36				
17	1337	1342	0	0	37				
18	1343	1348	110	5	38				
19	1349	1354	120	5	39				
20	1355	1400	70	3	40				

[a]This value represents the total number of readings for the 6-minute average when 24 readings were not available.

Sketch Showing How Opacity Varied With Time:



SUMMARY OF VISIBLE EMISSIONS
Test No.4
South Kiln

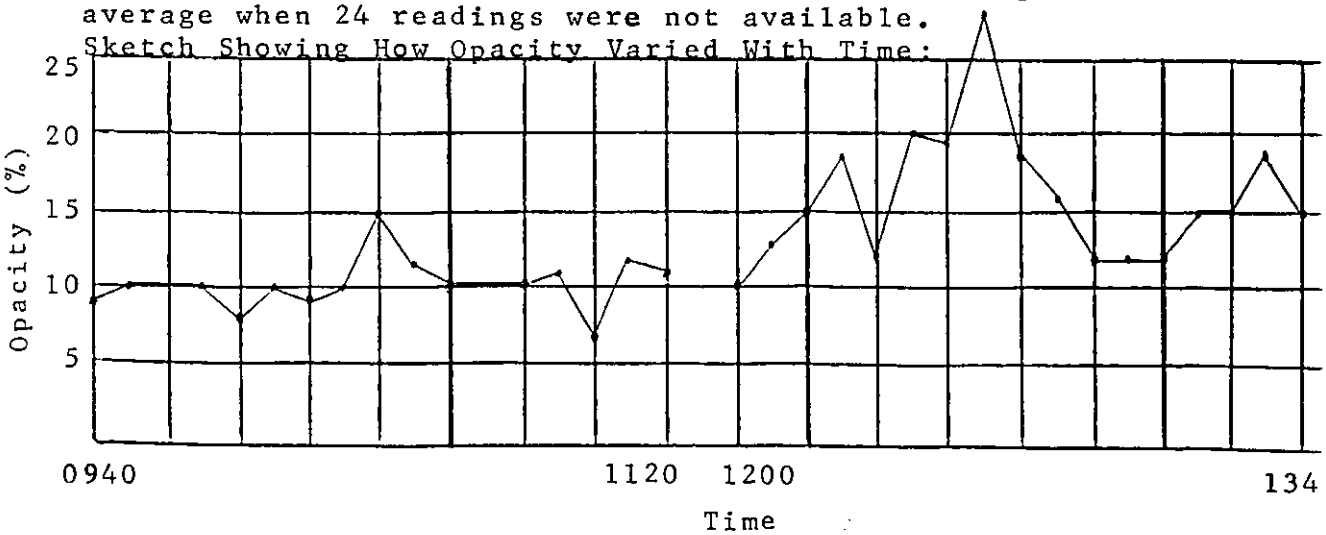
Date: 1/12/80
Type of Discharge: Stack
Height of Point of Discharge: 7'
Wind Direction: West
Color of Plume: Brown-grey
Observer's Name: A.Baecker
Type of Plant: Brick and Ti
Location of Discharge: Sout
Description of Sky: Partly cl
Wind Velocity: 12-mph
Detached Plume:
Duration of Observation: 2
Distance from Observer to Discharge Point: 300ft
Direction of Observer from Discharge Point: Southwest
Height of Observation Point: Roadside - even with stack
Description of Background: Trees - wooded area

SUMMARY OF AVERAGE OPACITY

Set Number	Time		Opacity		Set Number	Time		Op
	Start	End	Sum	Average		Start	End	Sum
1	0940	0945	220	9	21	1218	1223	430
2	0946	0951	240	10	22	1224	1229	290
3	0952	0957	240	10	23	1230	1235	485
4	0958	1003	240	10	24	1236	1241	445
5	1004	1009	180	8	25	1242	1247	680
6	1010	1015	240	10	26	1248	1253	420
7	1016	1021	220	9	27	1254	1259	380
8	1022	1027	240	10	28	1300	1305	290
9	1028	1033	350	15	29	1306	1311	280
10	1034	1039	280	12	30	1312	1317	280
11	1040	1045	250	10	31	1318	1323	360
12	1046	1051	240	10	32	1324	1329	360
13	1052	1057	240	10	33	1330	1335	430
14	1058	1103	260	11	34	1336	1340	300/20
15	1104	1109	160	7	35			
16	1110	1115	290	12	36			
17	1116	1120	215/20	11	37			
18	1200	1205	240	10	38			
19	1206	1211	300	13	39			
20	1212	1217	360	15	40			

[a]This value represents the total number of readings for the 6-min average when 24 readings were not available.

Sketch Showing How Opacity Varied With Time:



APPENDIX C

PARTICLE SIZE DISTRIBUTION TABLES

- TABLE C-1. PARTICLE SIZE DISTRIBUTION - NORTH KILN (CONDITION 1)

Andersen Impactor Fraction	Characteristic Diameter of Particles (μ)	Weight (mg)	Size Distribution by Weight	
			Percent	Cum. Percent
Stage 0 and Cyclone	>8.6	160.8	47.4	100
Stage 1	5.4 - 8.6	32.5	9.6	52.6
Stage 2	3.6 - 5.4	43.3	12.8	43.0
Stage 3	2.5 - 3.6	35.8	10.6	30.2
Stage 4	1.5 - 2.5	32.7	9.6	19.6
Stage 5	0.81 - 1.5	23.1	6.8	10.0
Stage 6	0.49 - 0.81	3.9	1.1	3.2
Stage 7	0.33 - 0.49	1.8	0.5	2.1
Back-up Filter	<0.33	5.4	1.6	1.6
Total	--	339.3	100.0	--

TABLE C-2. PARTICLE SIZE DISTRIBUTION - NORTH KILN (CONDI

Andersen Impactor Fraction	Characteristic Diameter of Particles (μ)	Weight (mg)	Size Distribut by Weight	
			Percent	Cu Per
Stage 0 and Cyclone	>9.13	125.7	50.8	10(
Stage 1	5.56 - 9.13	23.6	9.5	4
Stage 2	3.83 - 5.56	25.5	10.3	3
Stage 3	2.52 - 3.83	26.9	10.9	2
Stage 4	1.61 - 2.52	23.0	9.3	1
Stage 5	0.83 - 1.61	15.7	6.3	
Stage 6	0.50 - 0.83	0.9	0.4	
Stage 7	0.33 - 0.50	<0.1	<0.1	
Back -up Filter	<0.33	6.3	2.5	
Total	--	247.6	100.0	

TABLE C-3. PARTICLE SIZE DISTRIBUTION - SOUTH KILN (CONDITION 1)

Andersen Impactor Fraction	Characteristic Diameter of Particles (μ)	Weight (mg)	Size Distribution by Weight	
			Percent	Cum. Percent
Stage 0 and Cyclone	>7.5	47.2	47.6	100
Stage 1	4.9 - 7.5	6.1	6.1	52.4
Stage 2	3.3 - 4.9	10.9	11.0	46.3
Stage 3	2.3 - 3.3	10.1	10.2	35.3
Stage 4	1.4 - 2.3	6.3	6.4	25.1
Stage 5	0.73 - 1.4	7.0	7.1	18.7
Stage 6	0.44 - 0.73	1.5	1.5	11.6
Stage 7	0.30 - 0.44	3.8	3.8	10.1
Back-up filter	<0.30	6.2	6.3	6.3
Total	--	99.1	100.0	--

TABLE C-4. PARTICLE SIZE DISTRUBUTION - SOUTH KILN (CONI

Andersen Impactor Fraction	Characteristic Diameter of Particles (μ)	Weight (mg)	Size Distribut by Weight	
			Percent	Cu Perc
Stage 0 and Cyclone	>7.7	121.7	77.4	10(
Stage 1	5.0 - 7.7	5.8	3.7	2
Stage 2	3.4 - 5.0	7.2	4.6	1
Stage 3	2.3 - 3.4	8.2	5.2	1
Stage 4	1.4 - 2.3	3.9	2.5	
Stage 5	0.75 - 1.4	2.0	1.3	
Stage 6	0.45 - 0.75	1.1	0.7	
Stage 7	0.30 - 0.45	4.5	2.9	
Back-up filter	<0.30	2.7	1.7	
Total	--	157.1	100.0	

APPENDIX D

EXAMPLE CALCULATIONS

Nomenclature

A_s = Stack area, inches^2

C_f = Concentration (filterable), ppm

C_n = Concentration (nitrogen oxides), ppm

C_p = Pitot tube correction factor, dimensionless

C_s = Sulfur oxide concentration, ppm

C_t = Concentration (total), gr/dscf

CM_f = Concentration (filterable), mg/dscm

CM_t = Concentration (total), mg/dscm

D_n = Sampling nozzle diameter, inches

ER_f = Emission rate (filterable), lb/hr

ER_t = Emission rate (total), lb/hr

ERM_f = Emission rate (filterable), kg/hr

ERM_t = Emission rate (total), kg/hr

M_d = Mole fraction of dry gas, g/g-mole

MW = Molecular weight of wet stack gas

MW_d = Molecular weight of dry stack gas

MW_g = Molecular weight of sampled gas

P_b = Barometric pressure, inches mercury

P_f = Final pressure of flask, inches mercury

P_i = Initial pressure of flask, inches mercury

P_m = Average orifice pressure drop, inches water

P_s = Absolute stack gas pressure, inches mercury

P_{st} = Static pressure of stack gas, inches mercury

Q_a = Actual stack gas flowrate at stack conditions, acfm

Q_{am} = Actual stack gas flowrate at stack conditions, acm/min

Q_m = Dry stack gas flowrate at standard conditions dscm/min

Q_s = Dry stack gas flowrate at standard condition,

SW_f = Filterable sample weight, mg

SW_t = Total sample weight, mg

T_f = Final temperature, F

T_i = Initial temperature, F

T_m = Average meter temperature, F

T_s = Stack temperature, F

T_t = Net time of test, minutes

V_a = Volume of absorbing solution, ml

V_f = Volume of flask, ml

V_m = Volume of dry gas at meter conditions, cf

$V_{m_{std}}$ = Volume of dry gas at standard conditions, dsc

V_n = Volume of gas (nitrogen oxides), l

V_s = Stack gas velocity at stack conditions, fpm

V_w = Total condensate collected in sampling train

$V_{w_{gas}}$ = Volume of water vapor at standard conditions

$\triangle P_s$ = Velocity pressure, inches water

%I = Percent of isokinetic variation, dimensionle

%M = Percent moisture, dimensionless

Calculation of Particulate Emissions

The dry volume of sampled gas corrected to stand conditions of 68 F and 29.92 in. Hg is calculated as follows:

$$V_{m_{std}} = \frac{17.65 * V_m * \left[P_b + \left(\frac{P_m}{13.6}\right)\right]}{T_m + 460}$$

The dry stack gas flowrate correct to standard conditions is calculated using the following set of equations sequentially:

$$V_{w_{gas}} = 0.0471 * V_w$$

$$\%M = \frac{100 * V_{w_{gas}}}{V_{m_{std}} + V_{w_{gas}}}$$

$$M_d = \frac{100 - \%M}{100}$$

$$MW_d = (\%CO_2 * 44/100) + (\%O_2 * 32/100) + [(\%CO + \%N_2) * 28/100]$$

$$MW = (MW_d * M_d) + 18(1 - M_d)$$

$$P_s = P_b + P_{st}$$

$$V_s = 5120.8 * C_p * \sqrt{\Delta P_s * (T_s + 460)} * \sqrt{\frac{1}{P_s * MW}}$$

$$Q_s = \frac{0.1225 * V_s * A_s * M_d * P_s}{T_s + 460}$$

Stack gas flowrate may be expressed metrically as dry standard cubic meters per minute (dscm/min), in terms of actual cubic feet per minute (acfm), and metrically as actual cubic meters per minute (acm/min) by using the following equations:

$$Q_m = Q_s * 0.02832$$

$$Q_a = \frac{0.05667 * Q_s * (T_s + 460)}{P_s * M_d}$$

$$Q_{am} = Q_a * 0.02832.$$

The equation employed to determine percent of iso kinetic variation is:

$$\%I = \frac{1032 * (T_s + 460) * V_{m_{std}}}{V_s * T_t * P_s * M_d * (D_n)^2}$$

To determine the concentration of particulate mat in grains per dry standard cubic foot (gr/dscf), one o the following equations is used:

$$C_f = 0.01543 * \frac{SW_f}{V_{m_{std}}} \quad \text{and}$$

$$C_t = 0.01543 * \frac{SW_t}{V_{m_{std}}} \quad .$$

When metric units are desired, the concentration calculated in milligrams per dry standard cubic meter (mg/dscm) as follows:

$$CM_f = \frac{SW_f}{(0.02832)(V_{m_{std}})} \quad \text{and}$$

$$CM_t = \frac{SW_t}{(0.02832)(V_{m_{std}})} \quad .$$

Filterable particulate concentrations are obtained by summing the weight of particulate matter collected on filter and all portions of the train preceding it. T particulate concentration includes, in addition, any particulate matter collected in the impingers.

The emission rate of particulate matter can be calculated from the filterable or total particulate concentration using one of the following equations:

$$ER_f = 0.00857 * C_f * Q_s \quad \text{and}$$

$$ER_t = 0.00857 * C_t * Q_s \quad .$$

When metric units are desired, the emission rates are calculated as kilograms per hour (kg/hr):

$$ERM_f = ER_f * 0.4536$$

$$ERM_t = ER_t * 0.4536 \quad .$$

To avoid rounding errors, carry out the calculations of concentration and emission rate in one operation.

The volume of nitrogen oxide sampled in liters (l) at standard conditions can be calculated using the following equation:

$$V_n = \frac{528}{1000 * 29.92}(V_f - V_a) \frac{P_b \pm P_f}{T_f + 460} - \frac{P_b - P_i}{T_i + 460}$$

The following equations are used to calculate the concentration in parts per million (ppm) and emission rate in pounds per hour (lb/hr) of nitrogen oxide compounds:

$$C_n = \frac{24040 * SW_t}{V_n * MW_g}$$

$$ER_n = \frac{60 * 0.07523 * 10^{-6}}{28.96} * C_n * Q_s * MW_g$$

To determine the concentration and emission rat sulfur oxide gases in parts per million (ppm) and po per hour (lb/hr) respectively, at standard condition the following equations are used:

$$C_s = \frac{24140 * SW_t}{28.32 * V_{m_{std}} * MW_g}$$

$$ER_s = \frac{60 * 0.07523 * 10^{-6}}{28.96} * C_s * Q_s * MW_g$$

Example Calculation

Using the data from Run 1 at the bottom kiln, the sa volume is calculated using the formula on page 2.

Given:

V_m = 158.863

P_b = 29.84

P_m = 2.11 in H_2O

T_m = 73.59

then:

$V_{m_{std}}$ = 157.6 dscf

Percent moisture in the stack during the test then determined from the measured condensate volume.

Given:

V_w = 25.2 ml

then:

$V_{w_{gas}}$ = 1.187 scf

%M = 0.747

M_d = 0.993

Using the data from the Orsat analyses conducted during this run, the molecular weight of the stack gas can be determined.

Given:

$\%CO_2$ = <0.1

$\%O_2$ = 20.2

%CO = <0.1

$\%N_2$ = 79.8

then:

MW_d = 28.81

MW = 28.73

The flowrate in dry standard cubic feet can then be calculated using the formulae on page 3.

Given:

P_{st} = -0.0037 in Hg

C_p = 0.828

$\sqrt{\Delta P_s} * (T_s + 460)$ = 11.73

A_s = 406.5 in^2

T_s = 136.8 F

then:

P_s = 29.84 in Hg

V_s = 1,699 fpm

Q_s = 4,198 dscfm

Q_m = 118.9 dscm/min

Q_a = 4,793 acfm

Q_{am} = 135.7 acm/min

Utilizing the sampled volume and the flowrate, the percent of isokinetic variation can be calculate

Given:

T_t = 200 min

D_n = 0.309 in

then:

%I = 101.0

Given the analytical data, the concentrations and emission rates may be calculated for particulate

Given:

SW_f = 40.0 mg

SW_t = 70.5 mg

then:

C_f = 0.004 gr/dscf

C_t = 0.007 gr/dscf

CM_f = 8.96 mg/dscm

CM_t = 15.8 mg/dscm

ER_f = 0.141 lb/hr

ER_t = 0.248 lb/hr

ERM_f = 0.064 kg/hr

ERM_t = 0.113 kg/hr

Using the nitrogen dioxide test from the botto kiln as an example, the sampled volume of nitrogen can be determined as follows:

Given:

V_f = 2,069 ml

V_a = 25 ml

T_i = 56 F

T_f = 68 F

P_i = 4.62 in Hg

P_f = 30.40 in Hg

Then, using the equation for V_n the volume in liters (l) is:

V_n = 1.75 l

The concentration and emission rate for nitrogen dioxide can then be calculated as follows:

Given:

SW_t = 0.24 mg

MW_g = 46.0

The flowrate used is the average of the three particulate runs conducted under Condition 1 at the bottom kiln (4,133 dscfm). Then using the associated equations, concentrationsin parts per million (ppm) and the emission rates in pounds per hour (lb/hr) and kilograms per hour are as follows:

C_n = 71.7 ppm

ER_n = 2.12 lb/hr

ERM_t = 0.964 kg/hr

Using the sulfur oxide data from the bottom kiln, the sampled volume is calculated in the same manner as for particulate.

Given:

$V_m = 1.093$

$P_b = 30.34$

$P_m = 0.01$

$T_m = 59.5$

then:

$V_{m_{std}} = 1.127$

The flowrate used is the average of three particulate runs conducted under Condition 1 at the bottom kiln (4,133 dscfm). Then using the sulfur oxide equations, concentrations in parts per million (ppm) and the emission rates in pounds per hour (lb/hr) and kilograms per hour (kg/hr) are as follows:

Given:

$SW_t = <0.31$ mg

$MW_g = 64.06$

then:

$C_s = <3.65$

$ER_s = <0.151$

$ERM_s = <0.068$

APPENDIX E

CALIBRATION DATA

$C_{ptest} = 0.99\sqrt{\frac{\Delta P_{std}}{\Delta P_{test}}}$

Pitot Tube Type S Pitot Tube No. 41

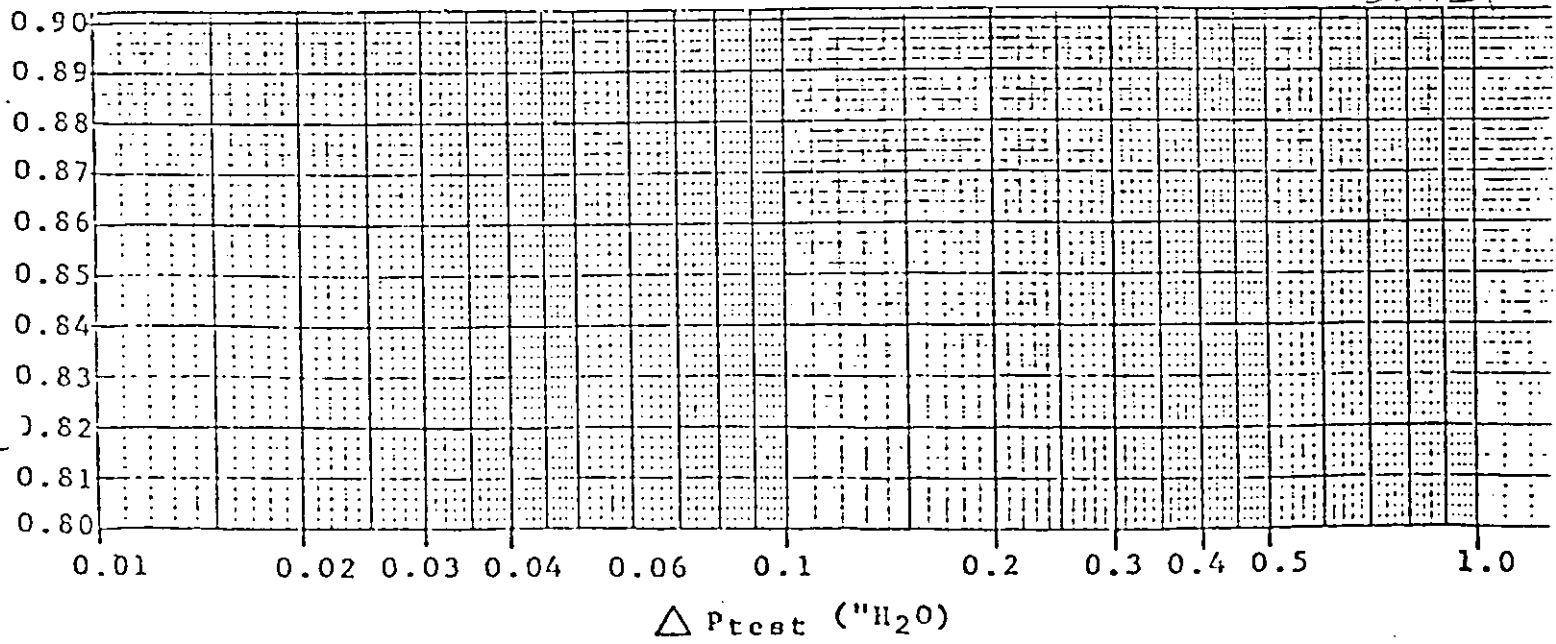
Standard Pitot Tube No. 160-18

Calibrator: TJP Date: 11/9/89 Client:

(metric units, psi)

Anticipated ΔP_{std}	ΔP_{std}	A		B	
		ΔP_{test}	ΔC_{ptest}	ΔP_{test}	ΔC_{ptest}
0.02	0.017	0.024	0.	0.023	0.
0.04	0.046	0.070	0.	0.069	0.
0.06	0.	0.	0.	0.	0.
0.08	0.078	0.104	0.	0.104	0.
0.10	0.086	0.126	0.	0.124	0.
0.12	0.	0.	0.	0.	0.
0.16	0.	0.	0.	0.	0.
0.20	0.	0.	0.	0.	0.
0.30	0.	0.	0.	0.	0.
0.50	0.	0.	0.	0.	0.
0.70	0.	0.	0.	0.	0.
0.80	0.860	1.292	0.	1.268	0.

0.827



$C_{ptest} = 0.99\sqrt{\frac{\Delta P_{std}}{\Delta P_{test}}}$

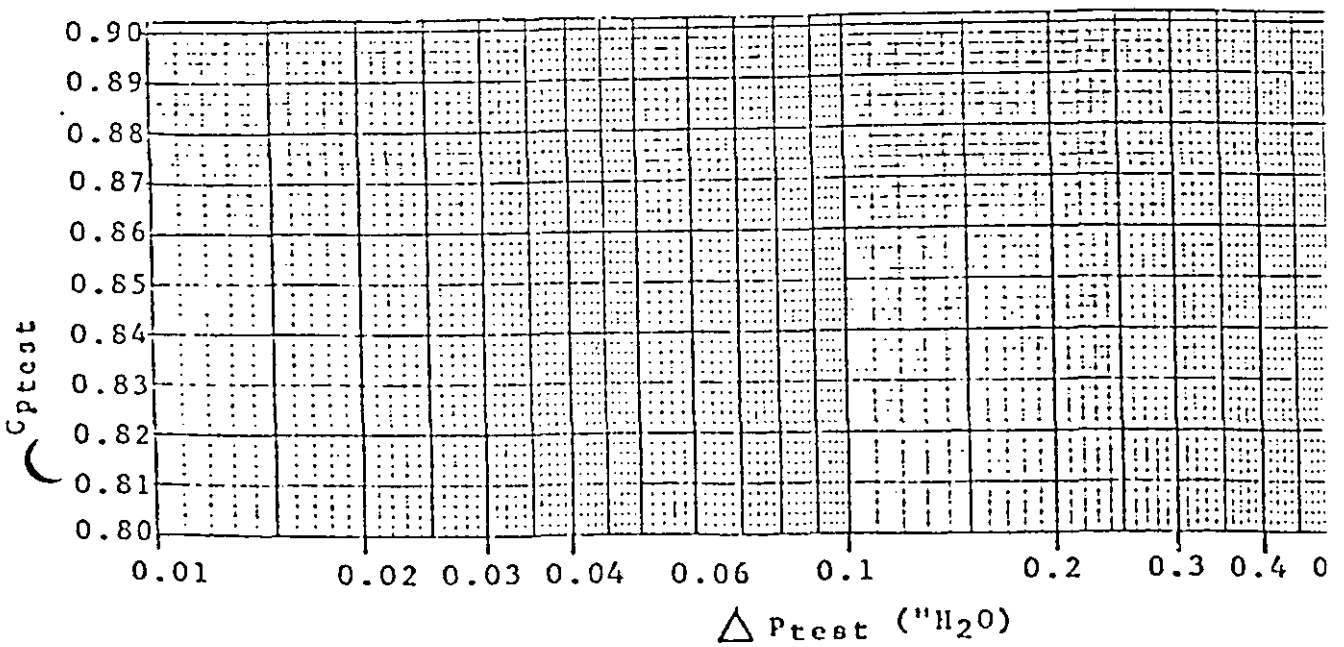
Pitot Tube Type _____ Pitot T

Standard Pitot Tube No. 160-1

Calibrator: TJP Date: 1/22/80 Client: USEPA, TASK 22

(Smith, Bolin,)

Anticipated ΔP_{std}	ΔP_{std}	A		
		ΔP_{test}	ΔC_{ptest}	ΔP_{test}
0.02	0.015	0.021	0.837 "	0.019
0.04	0.033	0.050	0.804 "	0.049
0.06	0.050	0.076	0.803 "	0.078
0.08	0.____	0.____	0.____	0.____
0.10	0.092	0.140	0.803 "	0.143
0.12	0.129	0.189	0.818 "	0.191
0.16	0.____	0.____	0.____	0.____
0.20	0.____	0.____	0.____	0.____
0.30	0.____	0.____	0.____	0.____
0.50	0.____	0.____	0.____	0.____
0.70	0.____	0.____	0.____	0.____
0.80	0.____	0.____	0.____	0.____



$C_{Ptest} = 0.99\sqrt{\frac{\Delta P_{std}}{\Delta P_{test}}}$

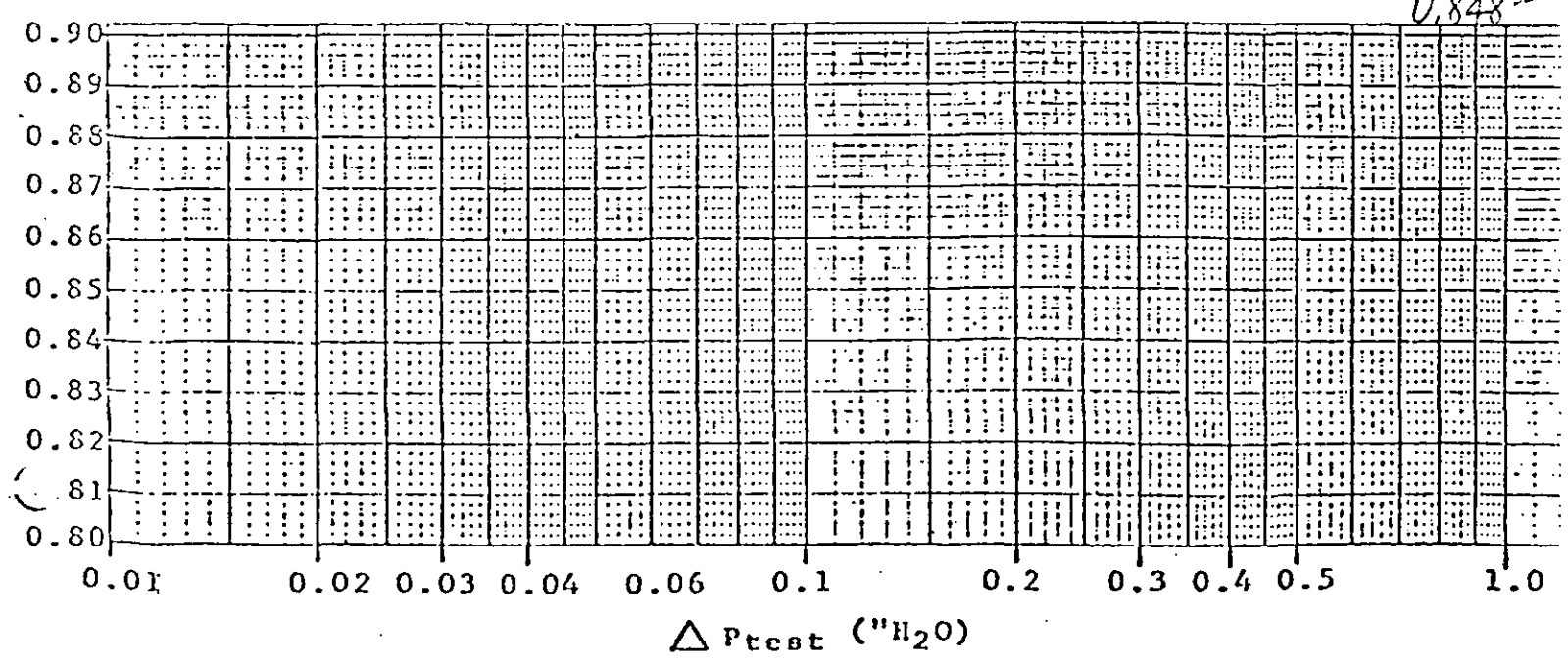
Pitot Tube Type S Pitot Tube No. 19

Standard Pitot Tube No. —

Calibrator: RMK Date: 8/27/79 Client:

Sound Data, (psi)

Anticipated ΔP_{std}	ΔP_{std}	A		B	
		ΔP_{test}	ΔC_{Ptest}	ΔP_{test}	ΔC_{Ptest}
0.02	0.____	0.____	0.____	0.____	0.____
0.04	0.102	0.139	0.848	0.141	0.842
0.06	0.____	0.____	0.____	0.____	0.____
0.08	0.100	0.136	0.849	0.138	0.843
0.10	0.____	0.____	0.____	0.____	0.____
0.12	0.102	0.136	0.857	0.138	0.851
0.16	0.____	0.____	0.____	0.____	0.____
0.20	0.____	0.____	0.____	0.____	0.____
0.30	0.____	0.____	0.____	0.____	0.____
0.50	0.____	0.____	0.____	0.____	0.____
0.70	0.____	0.____	0.____	0.____	0.____
0.80	0.____	0.____	0.____	0.____	0.____



$C_{ptest} = 0.99\sqrt{\frac{\Delta P_{std}}{\Delta P_{test}}}$

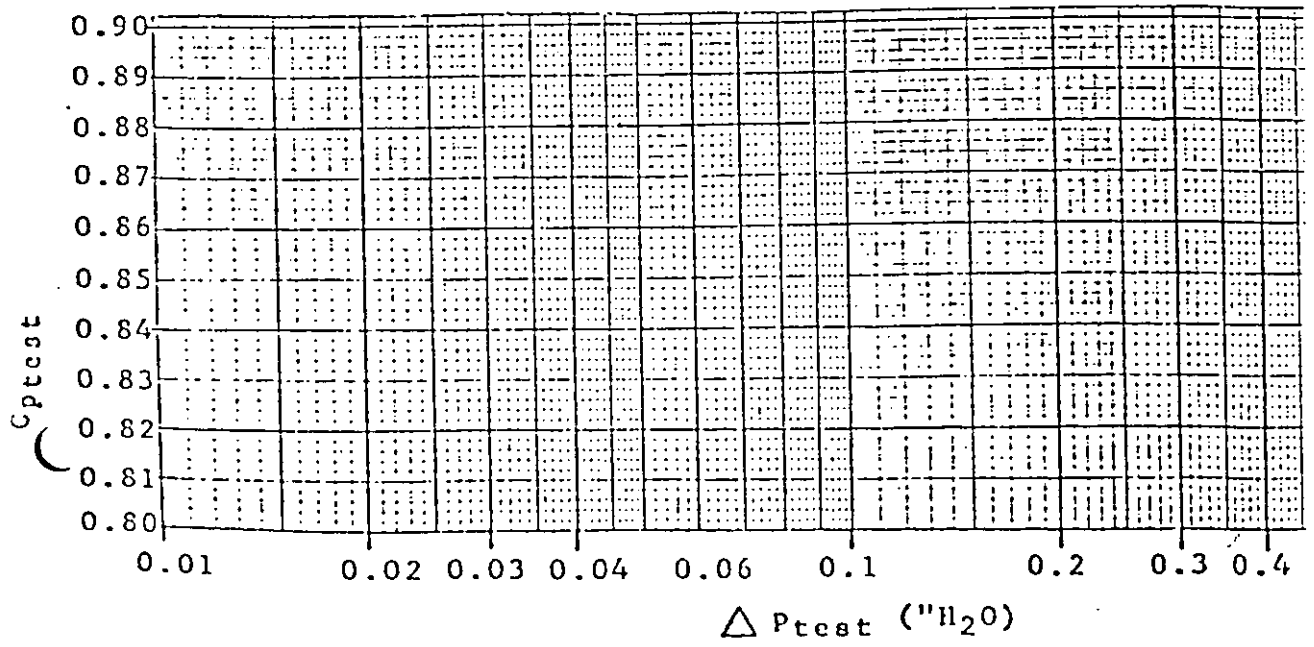
Pitot Tube Type "S" NAKED Pitot

Standard Pitot Tube No. 160-

Calibrator: TJP Date: 1/21/80 Client: U.S. EPA TAS

with cals

Anticipated ΔP_{std}	ΔP_{std}	A		
		ΔP_{test}	ΔC_{ptest}	ΔP_{test}
0.02	0.016 038	0.025 055	0.792 ✓ 0.823 ✓	0.024 056
0.04	0.034	0.051	0.808 ✓	0.051
0.06	0.056	0.082	0.818 ✓ 802 ✓	0.084 165
0.08	109 0.112	166 0.164	0.819 ✓	0.163
0.10	0.	0.	0.	0.
0.12	0.	0.	0.	0.
0.16	0.154	0.215	0.838 ✓	0.224
0.20	0.	0.	0.	0.
0.30	0.	0.	0.	0.
0.50	0.	0.	0.	0.
0.70	0.	0.	0.	0.
0.80	0.	0.	0.	0.



$C_{Ptest} = 0.99\sqrt{\frac{\Delta P_{std}}{\Delta P_{test}}}$

Pitot Tube Type S Pitot Tube No. 10

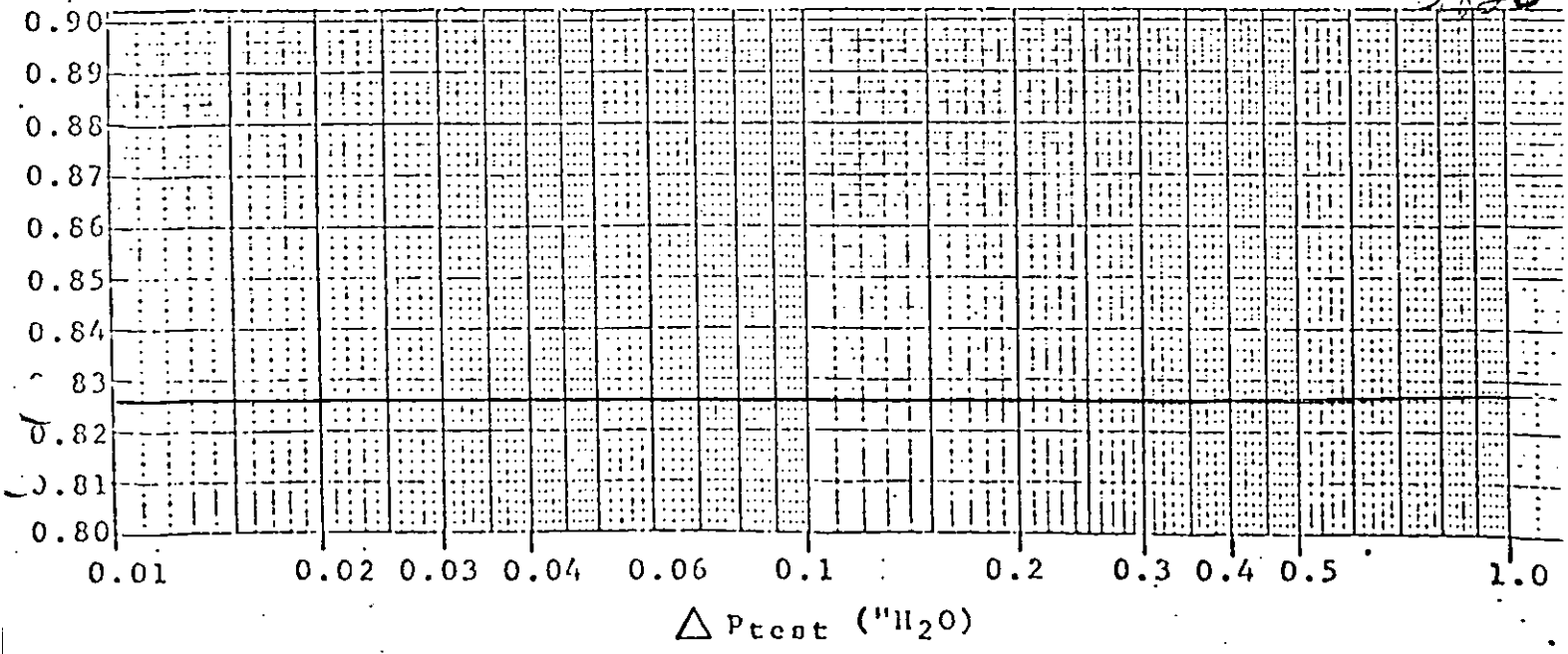
Standard Pitot Tube No. 18

Calibrator: BFE Date: 6 Sept. 78 Client:

Bottom (Back, SW)

Anticipated ΔP_{std}	ΔP_{std}	A		B	
		ΔP_{test}	ΔC_{Ptest}	ΔP_{test}	ΔC_{Ptest}
0.02	0.____	0.____	0.____	0.____	0.____
0.04	0.____	0.____	0.____	0.____	0.____
0.06	0.____	0.____	0.____	0.____	0.____
0.08	0.____	0.____	0.____	0.____	0.____
0.10	0.____	0.____	0.____	0.____	0.____
0.12	0.____	0.____	0.____	0.____	0.____
0.16	0.103	0.147	0.829	0.146	0.832
0.20	0.102	0.146	0.827	0.148	0.822
0.30	0.103	0.146	0.832	0.143	0.826
0.50	0.____	0.____	0.____	0.____	0.____
0.70	0.____	0.____	0.____	0.____	0.____
0.80	0.____	0.____	0.____	0.____	0.____

0.828



$C_{ptest} = 0.99\sqrt{\frac{\Delta P_{std}}{\Delta P_{test}}}$

Pitot Tube Type "S" Naked Pitot Tube No. 1(

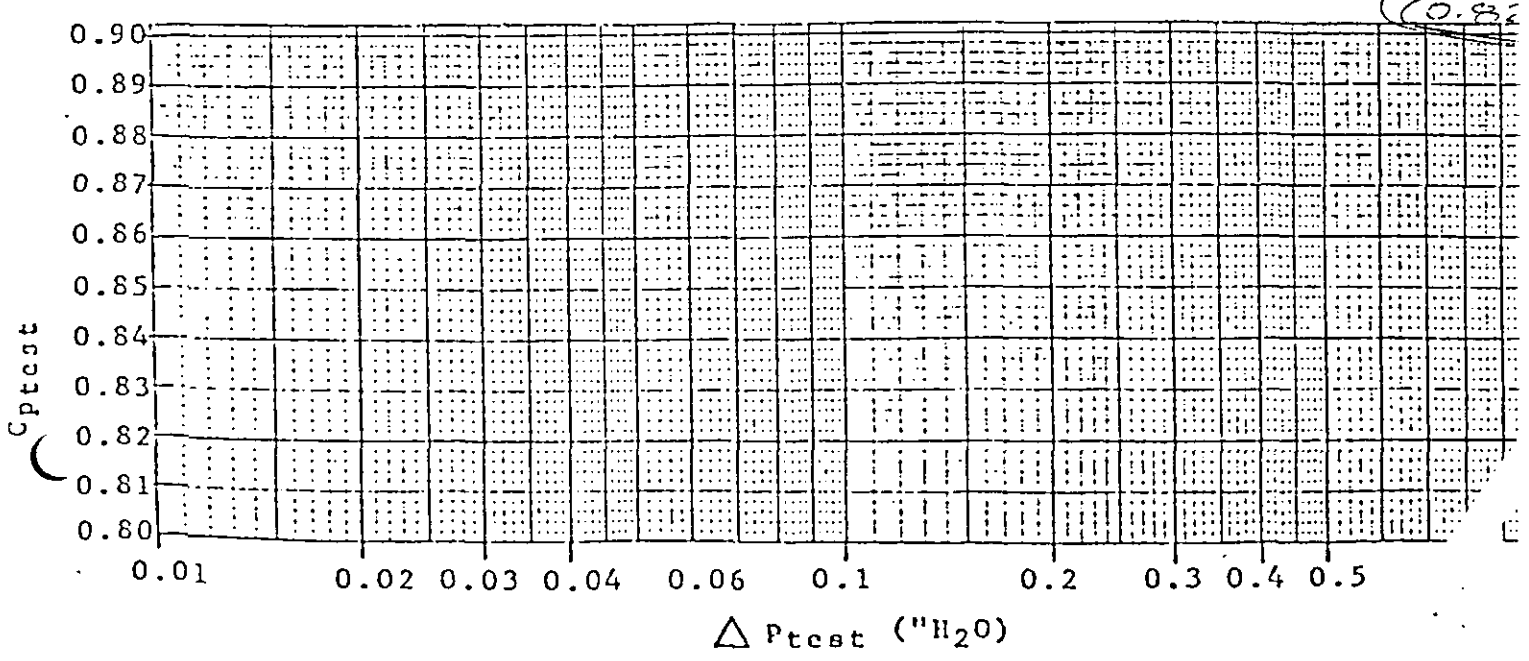
Standard Pitot Tube No. 160-18

Calibrator: TJP Date: 1/21/80 Client: U.S. EPA TASK-22 SAUE

Bottom Wilcox, post

Anticipated ΔP_{std}	ΔP_{std}	A		B	
		ΔP_{test}	ΔC_{ptest}	ΔP_{test}	ΔC_{ptes}
0.02	0.016	0.022	0.844 ✓	0.022	0.844
0.04	0.037	0.050	0.852 ✓	0.050	0.852
0.06	0.052	0.076	0.819 ✓	0.080	0.798
0.08	0.	0.	0. 0.822 ✓	0.	0. 0.819 ✓
0.10	0.098 (100)	0.144 (145)	0.817 ✓	0.145 (146)	0.814 ✓
0.12	0.	0.	0.	0.	0.
0.16	0.159	0.234	0.816 ✓	0.230	0.823
0.20	0.	0.	0.	0.	0.
0.30	0.	0.	0.	0.	0.
0.50	0.	0.	0.	0.	0.
0.70	0.	0.	0.	0.	0.
0.80	0.	0.	0.	0.	0.

0.83



$C_{Ptest} = 0.99\sqrt{\frac{\Delta P_{std}}{\Delta P_{test}}}$

Pitot Tube Type _____ Pitot Tube No. 21

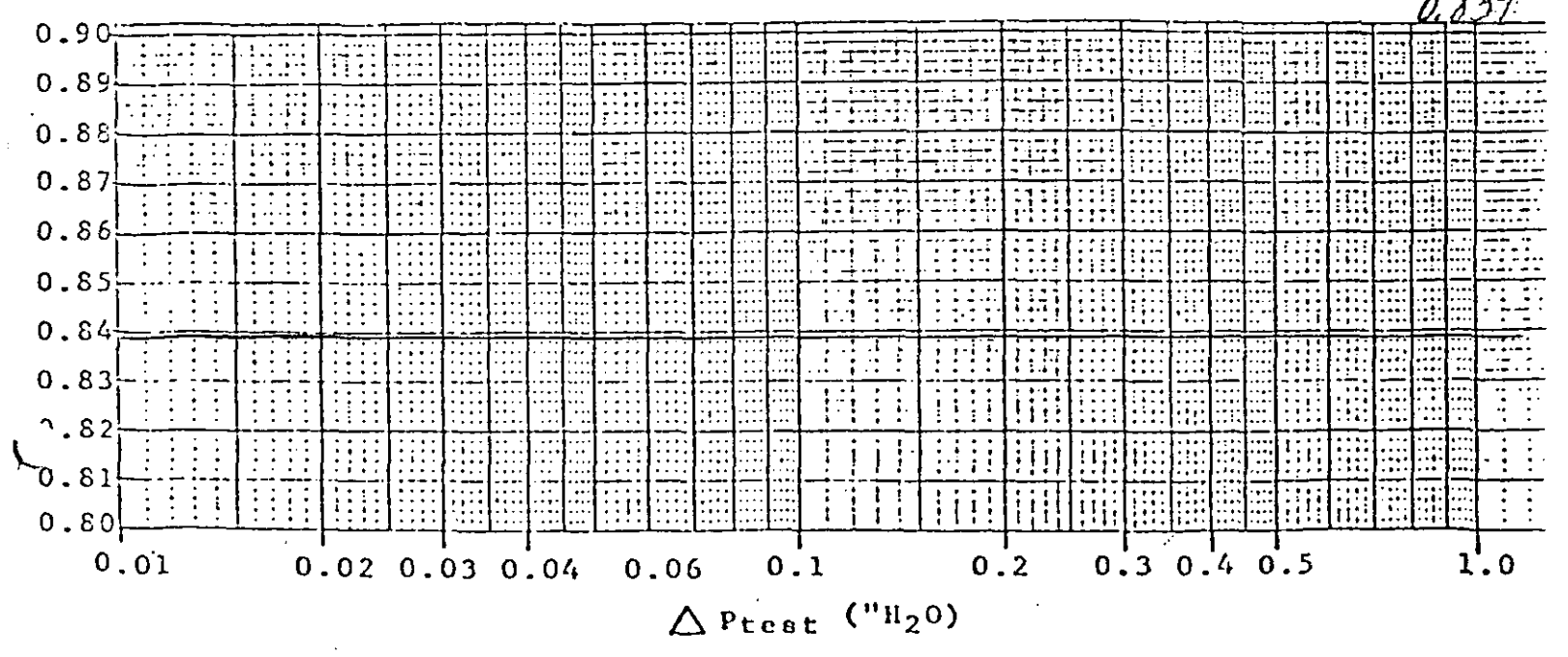
Standard Pitot Tube No. _____

Calibrator: TJF Date: 10/17/24 Client: _____

(Meyer, Jone)

Anticipated ΔP_{std}	ΔP_{std}	B		A	
		ΔP_{test}	ΔC_{Ptest}	ΔP_{test}	ΔC_{Ptest}
0.02	0.021	0.025	0.907	0.028	0.857
0.04	0.020	0.026	0.868	0.027	0.852
0.06	0.051	0.073	0.824	0.073	0.827
0.08	0.053	0.074	0.838	0.074	0.828
0.10	0.096	0.134	0.838	0.138	0.826
0.12	0.098	0.136	0.849	0.138	0.834
0.16	0.	0.	0.	0.	0.
0.20	0.	0.	0.	0.	0.
0.30	0.318	0.502	0.826	0.496	0.827
0.50	0.350	0.502	0.837	0.498	0.830
0.70	0.421	0.319	0.827	0.306	0.831
0.80	0.922	0.320	0.822	0.310	0.821

0.839



$C_{ptest} = 0.99\sqrt{\frac{\Delta P_{std}}{\Delta P_{test}}}$

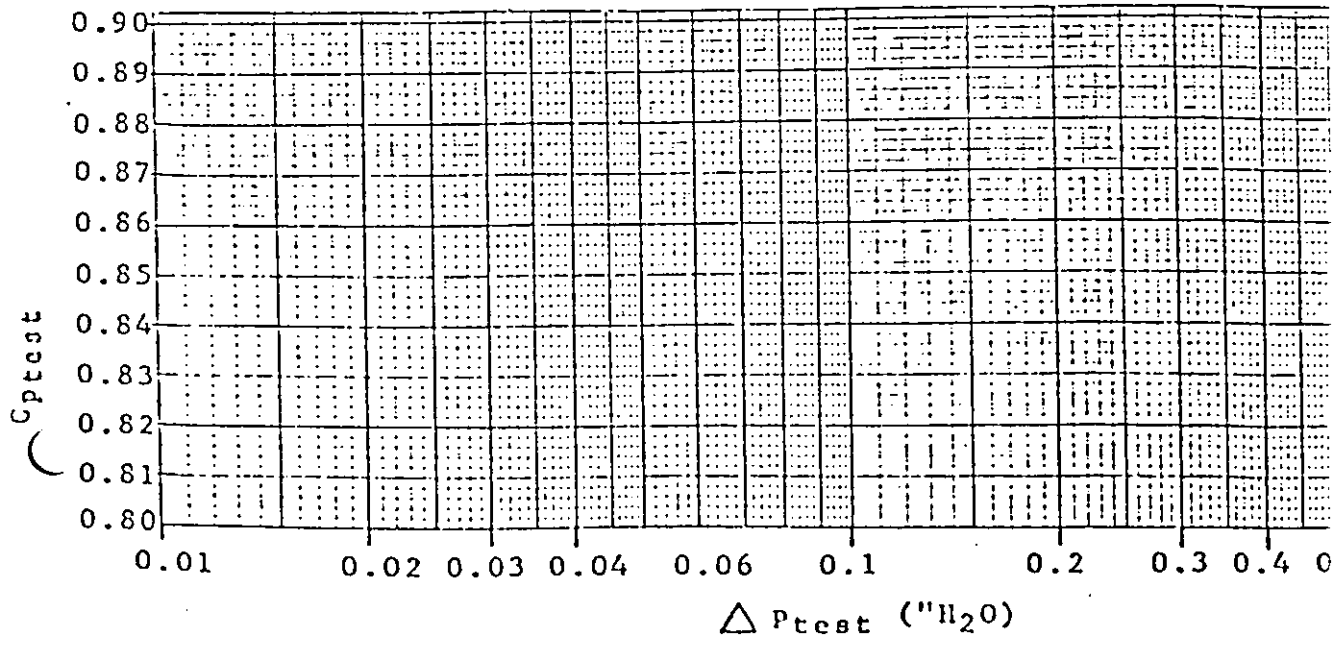
Pitot Tube Type "S" Naked Pitot T

Standard Pitot Tube No. 160-18

Calibrator: TJP Date: 1/22/80 Client: USEPA TASK 22

Orifice,

Anticipated ΔP_{std}	ΔP_{std}	A		
		ΔP_{test}	ΔC_{ptest}	ΔP_{test}
0.02	0.016 0.017	0.021 0.025	0.864 ✓ 0.816 //	0.019 0.023
0.04	0.034	0.048	0.833 //	0.048
0.06	0.052 0.051	0.074 0.074	0.830 // 0.822 //	0.075 0.076
0.08	0.	0.	0.	0.
0.10	0.094 0.095	0.134 0.137	0.829 // 0.824 //	0.136 0.138
0.12	0.128	0.190	0.813 //	0.192
0.16	0.	0.	0.	0.
0.20	0.	0.	0.	0.
0.30	0.	0.	0.	0.
0.50	0.	0.	0.	0.
0.70	0.	0.	0.	0.
0.80	0.	0.	0.	0.



$C_{ptest} = 0.99\sqrt{\frac{\Delta P_{std}}{\Delta P_{test}}}$

Pitot Tube Type S Pitot Tube No. 31

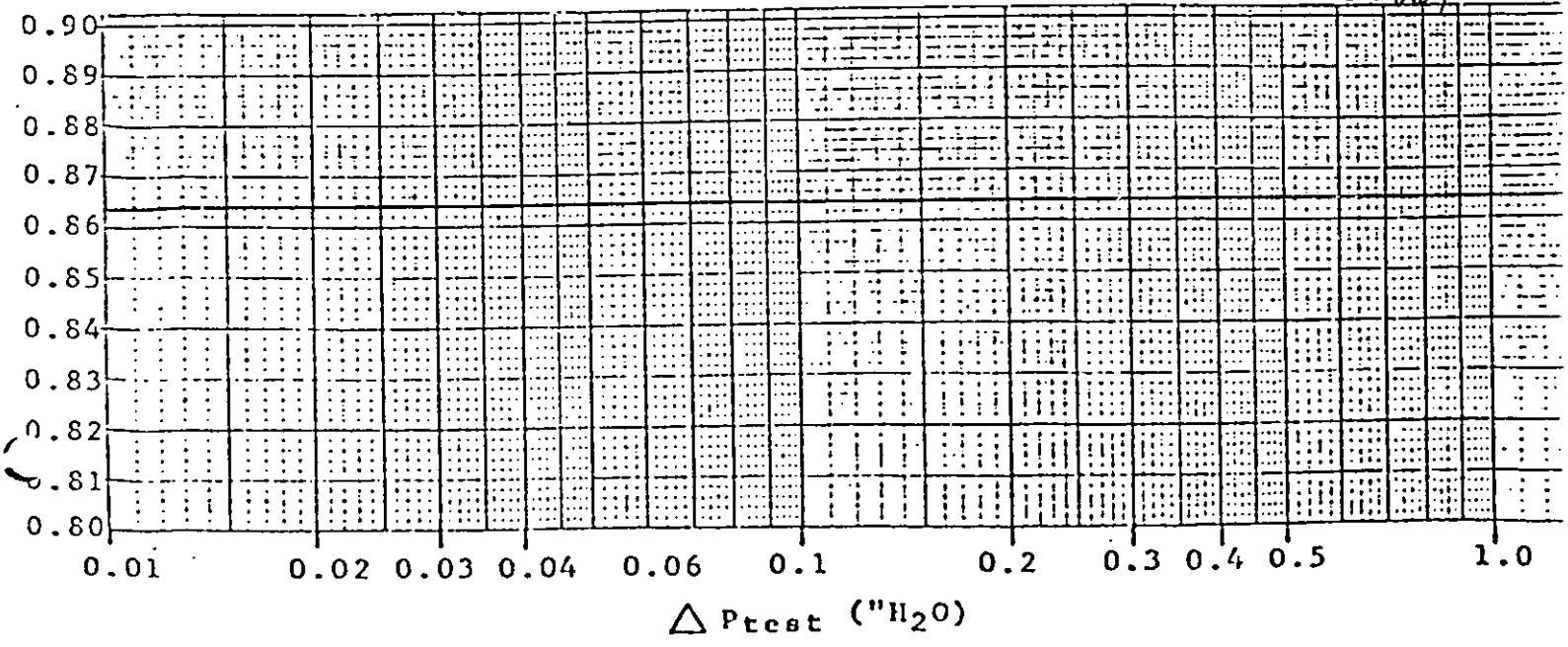
Standard Pitot Tube No. _____

Calibrator: JTB Date: 8/29/79 Client: _____

Leaving (both directions)

Anticipated ΔP_{std}	ΔP_{std}	A		B	
		ΔP_{test}	ΔC_{ptest}	ΔP_{test}	ΔC_{ptest}
0.02	0.102	0.877	0.130	0._____	0._____
0.04	0.100	0._____	0._____	0.855	0.134
0.06	0.101	0.873	0.130	0._____	0._____
0.08	0.101	0._____	0._____	0.853	0.136
0.10	0.99	0.871	0.128	0._____	0._____
0.12	0.100	0._____	0._____	0.852	0.135
0.16	0.100	0.872	0.129	0._____	0._____
0.20	0.101	0._____	0._____	0.859	0.134
0.30	0._____	0._____	0._____	0._____	0._____
0.50	0._____	0._____	0._____	0._____	0._____
0.70	0._____	0._____	0._____	0._____	0._____
0.80	0._____	0._____	0._____	0._____	0._____

0.864



METER AND ORIFICE CALIBRATION

Meter Box Number RAC #5

Date 12/20/79 Client

Barometric Pressure Pb ("Hg) 29.84 Calibrator TJF Gas Meter Number

	Orifice Manometer Setting, Δm (in. H_2O)	Gas Volume Wet Test Meter V_w (ft^3)	Gas Volume Dry Gas Meter V_d (ft^3)	Temperature: Wet Test Meter t_w (°F)	Temperature: Dry Gas Meter Inlet t_{di} (°F)	Temperature: Dry Gas Meter Outlet t_{do} (°F)	Temperature: Dry Gas Meter Average t_d (°F)	Vacuum Wet Test Meter p_w (in. H_2O)	Time θ (min)	γ	K_m
Stop	0.5	3406.000	466.530	66	113	86					
Start		3400.000	460.268	65.5	101	81		0.005	15'43"		
Average	29.88	(5) 6.0	6.262	65.8			95.25	29.84	15.72	1.011	0.1-93
Stop	1.0	3414.000	474.920	66	117	90					
Start		3407.000	467.574	66	113	87		0.05	13'33"		
Average	29.91	(5) 7.0	7.346	66			101.75	29.84	13.55	1.015	0.123
Stop	2.0	3426.000	487.573	65.5	122	93					
Start		3415.000	475.963	66	118	90		0.05	15.33		
Average	29.99	(10) 11.0	11.610	65.8			105.8	29.84	15'20"	1.014	0.121
Stop	3.0	3437.000	499.206	65.5	125	95					
Start		3427.000	488.624	65.5	121	93		0.1	11'23"		
Average	30.06	(10) 10.0	10.582	65.5			108.5	29.82	11.38	1.015	0.121
Stop	4.0	3448.000	510.856	65.5	126	96					
Start		3438.000	500.267	65.5	120	94		0.1	9'58		
Average	30.13	(10) 10.0	10.589	65.5			109.0	29.83	9.97	1.012	0.120
Stop	5.0	3461.000	524.641	65.5	127	97					
Start		3449.000	511.910	65.5	122	95		0.15	10'46"		
Average	30.21	(10) 12.0	12.731	65.5			110.3	29.83	10.77	1.010	0.119

METER AND ORIFICE CALIBRATION

South Salem, Ipse

Date 12/3/79 Client _____ Meter Box Number RAC 2

Barometric Pressure Pb ("Hg) 29.61 Calibrator RGB Gas Meter Number _____

	Orifice Manometer Setting, Δm (in. H_2O)	Gas Volume Wet Test Meter V_w (ft^3)	Gas Volume Dry Gas Meter V_d (ft^3)	Temperature: Wet Test Meter t_w (°F)	Temperature: Dry Gas Meter Inlet t_{di} (°F)	Temperature: Dry Gas Meter Outlet t_{do} (°F)	Temperature: Dry Gas Meter Average t_d (°F)	Vacuum Wet Test Meter P_w (in. H_2O)	Time θ (min)	γ	K_m
Stop	0.5	3168.000	591.376	64	64	64		.10			
Start		73.000	596.123	65	69	67		.10	12:33		
Average	29.65	(5) 5.00	4.847	64.5			62.5	29.60	12.55	1.026	0.134
Stop	1.0	3173.000	596.123	65	69	63		.10			
Start		79.000	602.037	65	76	68		.10	10:49	20	
Average	29.68	(5) 6.00	5.914	65.0			69.0	29.60	10.82	1.019	0.132
Stop	2.0	3179.000	602.037	65	76	69		.10			
Start		90.000	612.995	66	53	72		.10	14:22		
Average	29.76	(10) 11.00	10.958	65.5			74.75	29.60	14.37	1.016	0.128
Stop	3.0	3190.000	612.995	66	83	72		.15			
Start		3200.000	623.035	66	84	75		.15	10:46		
Average	29.83	(10) 10.0	10.040	66.0			78.5	29.60	10.77	1.012	0.127
Stop	4.0	3200.000	623.055	66	86	75		.15			
Start		14.000	637.112	66	89	79		.15	13:03		
Average	29.90	(10) 14.00	14.077	66.0			81.75	29.60	13.05	1.014	0.127
Stop	5.0	3214.000	637.112	66	89	79		.15			
Start		31.000	654.256	67	91	81		.15	14:19		
Average	29.98	(10) 17.00	17.174	66.5			85.0	29.60	14.32	1.012	0.126
									AVERAGE	1.017	0.129

$$P_w = P_b - \frac{P_w}{13.6} \qquad P_d = P_b + \frac{\Delta m}{13.6} \qquad K_m = \frac{V_w}{\theta}\sqrt{\frac{P_w}{T_w \Delta m}}$$

$$\gamma = \frac{V_w P_w (t_d + 460)}{V_d P_d (t_w + 460)}$$

Factor in isokinetic equation = $\frac{27.40}{(K_m)^2} = \frac{27.40}{(\quad)^2} = \frac{.990}{1682} = .1645$

Clayton Environmental Consultants, Inc.

METER AND ORIFICE CALIBRATION

Bottom Salem, Post

Date 1/15/80 Client _____ Meter Box Number _____

Barometric Pressure Pb ("Hg) 29.52 Calibrator GEH Gas Meter Number Acct #3

	Orifice Manometer Setting, Δm (in. H_2O)	Gas Volume Wet Test Meter V_w (ft^3)	Gas Volume Dry Gas Meter V_d (ft^3)	Temperature: Wet Test Meter t_w (°F)	Temperature: Dry Gas Meter Inlet t_{di} (°F)	Temperature: Dry Gas Meter Outlet t_{do} (°F)	Temperature: Dry Gas Meter Average t_d (°F)	Vacuum Wet Test Meter p_w (in. H_2O)	Time θ (min)	γ	K_m
Stop	0.5	3605.00	352.607		84	76	80				
Start		3600.00	347.456	67	72	78	75	.05	12:20		
Average	29.56	(5) 5.00	5.157	67.0			77.5	29.52	12.33	0.988	0.136
Stop	1.0	3610.00	357.727		90	76	83				
Start		3605.00	352.607	67	84	76	80	.05	8:55		
Average	29.59	(5) 5.00	5.120	67.0			81.5	29.52	8.92	1.001	0.133
Stop	2.0	3620.00	367.945		98	86	92				
Start		3610.00	357.727	67	90	76	83	.05	12:58		
Average	29.67	(10)10.00	10.218	67			87.5	29.52	12.97	1.012	0.129
Stop	3.0	3630.00	378.146		102	90	96				
Start		3620.00	367.945	67	98	86	92	.10	10:46		
Average	29.74	(10)10.00	10.201	67			94	29.51	10.77	1.023	0.127
Stop	4.0	3640.00	388.350		104	90	97				
Start		3630.00	378.146	67	102	90	96.	.15	9:28		
Average	29.81	(10)10.00	10.204	67			96.5	29.51	9.47	1.024	0.125
Stop	5.0	3650.00	398.567		106	92	99				
Start		3640.00	388.350	67	104	90	97	.15	8:31		
Average	29.89	(10)10.00	10.217	67			98	29.51	8.52	1.023	0.124
									AVERAGE	1.012	0.129

$$P_w = P_b - \frac{P_w}{13.6} \qquad P_d = P_b + \frac{\Delta m}{13.6} \qquad K_m = \frac{V_w}{\theta}\sqrt{\frac{P_w}{T_w \Delta m}}$$

$$\gamma = \frac{V_w P_w (t_d + 460)}{V_d P_d (t_w + 460)}$$

Factor in isokinetic equation = $\frac{27.40}{(K_m)^2} = \frac{27.40}{(\quad)^2} =$ 1648

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METER AND ORIFICE CALIBRATION

Bottom bolts, pre

Date 10/9/79 Client Repair Meter Box Number

Barometric Pressure Pb ("Hg) 29.05 Calibrator GEH Gas Meter Number RAC #3

	Orifice Manometer Setting, Δm (in. H_2O)	Gas Volume Wet Test Meter V_w (ft^3)	Gas Volume Dry Gas Meter V_d (ft^3)	Temperature: Wet Test Meter t_w (°F)	Temperature: Dry Gas Meter Inlet t_{di} (°F)	Temperature: Dry Gas Meter Outlet t_{do} (°F)	Temperature: Dry Gas Meter Average t_d (°F)	Vacuum Wet Test Meter P_w (in. H_2O)	Time θ (min)	γ	K_m
Stop	0.5	1615.00	587.528		80	72	76				
Start		1610.00	582.300	68	78	70	74	.05	12:37		
Average	29.09	(5) 5.00	5.228	68	[illegible]	[illegible]	75	29.05	12.62	0.968	0.131
Stop	1.0	1620.00	592.753		82	74	78				
Start		1615.00	587.528	68	80	72	76	.05	9:10		
Average	29.12	(5) 5.00	5.225	68	[illegible]	[illegible]	77	29.05	9.17	0.971	0.128
Stop	2.0	1630.00	603.153		90	78	84				
Start		1620.00	592.753	68	82	74	78	.05	13:04		
Average	29.20	(10)10.00	10.400	68	[illegible]	[illegible]	81	29.05	13.07	0.980	0.127
Stop	3.0	1640.00	613.513		92	80	86				
Start		1630.00	603.153	68	90	78	84	.05	10:47		
Average	29.27	(10)10.00	10.360	68	[illegible]	[illegible]	85	29.05	10.78	0.989	0.126
Stop	4.0	1650.00	623.863		92	8C	86				
Start		1640.00	613.513	68	92	80	86	.05	9:20		
Average	29.34	(10)10.00	10.350	68	[illegible]	[illegible]	86	29.05	9.35	0.989	0.125
Stop	5.0	1660.00	634.213		94	82	88				
Start		1650.00	623.863	68	92	80	86	.10	8:30		
Average	29.42	(10)10.00	10.350	68	[illegible]	[illegible]	87	29.04	8.50	0.988	0.123
									AVERAGE	0.981	0.127

$$P_w = P_b - \frac{P_w}{13.6} \qquad P_d = P_b + \frac{\Delta m}{13.6} \qquad K_m = \frac{V_w}{\theta}\sqrt{\frac{P_w}{T_w \Delta m}}$$

$$\gamma = \frac{V_w P_w (t_d + 460)}{V_d P_d (t_w + 460)}$$

Factor in isokinetic equation = $\frac{27.40}{(K_m)^2} = \frac{27.40}{(\quad)^2} =$ 1705

Clayton Environmental Consultants, Inc.

METER AND ORIFICE CALIBRATION

Dayer, pre)-probe

Date 12/21/79 Client _____ Meter Box Number RAC #1

Barometric Pressure Pb ("Hg) 29.66 Calibrator TJP Gas Meter Number _____

	Orifice Manometer Setting, Δm (in. H_2O)	Gas Volume Wet Test Meter V_w (ft^3)	Gas Volume Dry Gas Meter V_d (ft^3)	Temperature: Wet Test Meter t_w (°F)	Temperature: Dry Gas Meter Inlet t_{di} (°F)	Temperature: Dry Gas Meter Outlet t_{do} (°F)	Temperature: Dry Gas Meter Average t_d (°F)	Vacuum Wet Test Meter p_w (in. H_2O)	Time θ (min)	γ	K_m
Stop	0.5	3475.000	199.208	67	99	92					
Start		3470.000	193.824	67.5	104	90		0.025	12'46"		
Average	29.70	(5) 5.0	5.384	67.3			96.3	29.66	12.77	0.978	0.131
Stop	1.0	3483.000	207.785	67	98	92					
Start		3478.000	200.259	67	98	92		0.05	13'01"		
Average	29.73	(5) 7.0	7.526	67			95.0	29.66	13.02	0.977	0.128
Stop	2.0	3495.000	220.618	66.5	99	92					
Start		3484.000	208.844	67	97	91		0.05	14'38"		
Average	29.81	(10) 11.0	11.774	66.8			94.8	29.66	14.63	0.979	0.126
Stop	3.0	3509.000	235.551	66.5	100	92					
Start		3496.000	221.682	66.5	98	91		0.1	14'18"		
Average	29.88	(10) 13.0	13.869	66.5			95.3	29.65	14.30	0.981	0.125
Stop	4.0	3520.000	247.222	66.5	101	91					
Start		3510.000	236.600	66.5	99	91		0.1	9'35"		
Average	29.95	(10) 10.0	10.622	66.5			95.5	29.65	9.58	0.982	0.124
Stop	5.0	3535.000	263.088	66	101	91					
Start		3521.000	248.282	66.5	100	91		0.15	12'04"		
Average	30.03	(10) 14.0	14.806	66.3	526		95.8	29.65	12.07	0.986	0.123
									AVERAGE	0.981	0.126

$$P_w = P_b - \frac{P_w}{13.6} \qquad P_d = P_b + \frac{\Delta m}{13.6} \qquad K_m = \frac{V_w}{\theta}\sqrt{\frac{P_w}{T_w \Delta m}}$$

$$\gamma = \frac{V_w P_w (t_d + 460)}{V_d P_d (t_w + 460)}$$

Factor in isokinetic equation = $\frac{27.40}{(K_m)^2} = \frac{27.40}{(\quad)^2} =$ 1723

Clayton Environmental Consultants, Inc.

APPENDIX F

PROCESS CONDITIONS
(provided by Energy and Environmental Analysis, Inc.)

TABLE 1. LEE BRICK OPERATING PARAMETERS: 1/9/80

Time	Dryer Exhaust Temp. (°F)	Relative* Humidity (%)	Kiln Waste Heat Temp. (°F)	Maximum Kiln Temp. (°F)	Kiln Pressure (in. H_2O)	Recorder Gas Flow (SCFH)
8:10A	81	83.5	337	1995	-.04	11,000
8:30	81	83.5	336	1995	-.053	11,000
9:00	80	83	340	1995	-.025	11,000
9:30	80	83	338	1995	-.03	11,000
10:00	81	83.5	337	1990	-.04	11,000
10:30	82	84	337	1995	-.035	11,000
11:00	81	83.5	340	1990	-.028	11,000
11:30	82	84	337	1995	-.04	11,000
12:00	82	84	337	1995	-.03	11,000
12:30	82	84	337	1990	-.025	11,000
1:00	81	83.5	340	1995	-.03	11,000
1:30	82	84	337	1995	-.04	11,000
2:00	82	84	338	1990	-.04	11,000
2:30	82	84	339	1990	-.037	11,000
3:00	82	84	342	1995	-.023	11,000
3:00	82	84	340	1990	-.14	11,000
4:00	84	84	340	1995	-.035	11,000
4:30	84	84	340	2000	-.035	11,000
5:00	82	84	340	1995	-.04	11,000
5:30	82	84	340	1995	-.035	11,000
6:00	83	84	337	1995	-.04	11,000
6:30	83	84	335	1990	-.04	11,000
7:00	81	83.5	340	1995	-.04	11,000
7:30	82	84	337	1995	-.04	11,000

Gas Meter #1: 232061 x 10^3 ACF @ 7:50A; 232088 x 10^3 ACF @ 7:15P
Gas Meter #2: 234372 x 10^3 ACF @ 7:50A; 234415 x 10^3 ACF @ 7:15P
Total Gas Flow: 6130 ACFH
Coal Flow Rate: ≈10 tons/day

Kiln Production Information:

a. 12 ware cars/day production; design maximum is 14.5 ware cars/day
b. 8064 brick/ware car
c. 3.6 lb/brick (fired)

*Relative humidity is determined by wet-bulb, dry-bulb readings.

TABLE 2. LEE BRICK OPERATING PARAMETERS: 1/10/80

Time	Dryer Exhaust Temp. (^{o}F)	Relative* Humidity (%)	Kiln Waste Heat Temp. (^{o}F)	Maximum Kiln Temp. (^{o}F)	Kiln Pressure (in. H_2O
8:00A	74	81	327	2010	-.06
8:30	74	81	327	2010	-.06
9:00	75	82	333	2010	-.055
9:30	76	82	331	2010	-.052
10:00	77	83	335	2000	-.05
10:30	78	83	337	2010	-.04
11:00	78	83	340	2010	-.04
11:30	78	83	340	2005	-.04
12:00	79	89	340	2010	-.03
12:30	80	83	340	2010	-.03
1:00	78	83	347	2010	-.03
1:30	79	83	344	2010	-.03
2:00	81	83	342	2010	-.03
2:30	81	83	342	2010	-.03
3:00	80	83	347	2005	-.03
3:30	81	83	341	2010	-.03
4:00	82	84	340	2010	-.025
4:30	82	84	340	2010	-.025
5:00	81	83.5	342	2010	-.024
5:30	81	83.5	340	2010	-.02
6:00	82	83.5	340	2010	-.03
6:30	82	83.5	340	2010	-.03

Gas Meter #1: 232123 x 10^3 ACF @ 8:00A; 232148 x 10^3 ACF @ 8:00P
Gas Meter #2: 234462 x 10^3 ACF @ 8:00A; 234497 X 10^3 ACF @ 8:00P
Total Gas Flow: 5000 SCFH
Coal Flow Rate: ≈10 tons/day

Kiln Production Information:

a. 12 ware cars/day production; design maximum is 14.5 ware cars/day
b. 8064 bricks/ware car
c. 3.6 lb/brick (fired)

*Relative humidity is determined by wet-bulb, dry-bulb, readings.

TABLE 3. LEE BRICK OPERATING PARAMETERS: 1/11/80

Time	Dryer Exhaust Temp. (^{o}F)	Relative* Humidity (%)	Kiln Waste Heat Temp. (^{o}F)	Maximum Kiln Temp. (^{o}F)	Kiln Pressure (in. H_2O)	Recorder Gas Flow (SCFH)
8:00A	80	83	340	2000	-.04	10,000
8:30	81	83.5	338	1995	-.045	10,000
9:00	80	83	340	2000	-.03	11,000
9:30	80	83	335	2000	-.03	10,000
10:00	82	88	340	2000	-.03	10,000
10:30	84	84	340	1995	-.03	10,000
11:00	84	84	340	1995	-.025	10,000
11:30	84	84	340	2000	-.02	10,000
12:00	84	84	340	1995	-.03	10,000
12:30	85	84	340	2000	-.025	10,000
1:00	84	84	350	2000	-.015	10,000
1:30	84	84	340	2000	-.015	10,000
2:00	86	84	345	2000	-.025	10,000
2:30	88	85	345	1970	-.02	10,000
3:00	83	91.5	350	2000	-.02	10,000
3:30	86	84	345	1985	-.03	10,000
4:00	88	81	345	2000	-.02	10,000
4:30	88	85	345	2000	-.02	10,000
5:00	88	85	350	2000	-.02	10,000
5:30	88	85	345	2000	-.03	10,000
6:00	88	85	345	2000	-.025	10,000
6:30	90	85	345	1995	-.03	10,000
7:00	88	88	350	2000	-.025	10,000
7:30	88	88	345	1985	-.025	10,000
8:00	89	85	345	1995	-.025	10,000
8:30	91	89	340	2000	-.02	10,000
9:00	88	85	345	2000	-.02	10,000
9:30	88	85	340	1980	-.025	10,000
10:00	88	85	340	2000	-.02	10,000
10:30	89	85	340	1960	-.02	10,000

Gas Meter #1: 232181 x 10^3 ACF @ 8:00A; 232216 x 10^3 ACF @ 10:30P
Gas Meter #2: 234548 x 10^3 ACF @ 8:00A; 234598 x 10^3 ACF @ 10:30P
Total Gas Flow: 5860 ACFH
Coal Flow Rate: ≈10 tons/day

Kiln Production Information:

a. 12 ware cars/day production; design maximum is 14.5 ware cars/day
b. 8064 bricks/ware car
c. 3.6 lb/brick (fired)

*Relative humidity is determined by wet-bulb, dry-bulb readings.

TABLE 4. LEE BRICK OPERATING PARAMETERS: 1/12/80

Time	Dryer Exhaust Temp. (°F)	Relative* Humidity (%)	Kiln Waste Heat Temp. (°F)	Maximum Kiln Temp. (°F)	Kiln Pressure (in. H_2O)
9:00A	82	84	335	1495	-.025
9:30	83	84	330	2000	-.02
10:00	84	84	335	1995	-.025
10:30	84	84	335	1980	-.02
11:00	83	84	340	1995	-.01
11:30	83	84	335	1985	-.01
12:00	84	84	335	1995	-.015
12:30	84	84	335	2000	-.015
1:00	83	84	340	2000	-.015
1:30	83	88	335	1985	-.02
2:00	83	84	340	1985	-.02
2:30	84	84	335	1975	-.02
3:00	81	91.5	340	1995	-.015
3:30	82	84	335	1975	-.02
4:00	83	84	335	1975	-.015
4:30	83	88	335	1980	-.02
5:00	84	84	330	1965	-.015

Gas Meter #1: 232249 x 10^3 ACF @ 9:00A; 232272 x 10^3 ACF @ 5:20P
Gas Meter #2: 234627 x 10^3 ACF @ 9:00A; 234656 x 10^3 ACF @ 5:20P
Total Gas Flow: 6240 ACFH
Coal Flow Rate: ≈10 tons/day

Kiln Production Information:

a. 12 ware cars/day production; design maximum is 14.5 ware cars/day
b. 8064 bricks/ware car
c. 3.6 lb/brick

*Relative humidity is determined by wet-bulb, dry-bulb readings.

APPENDIX G

PARTICULATE WEIGHT BY FRACTION