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

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

AP42 Section 11.25

Background Chapter 4

Reference: 2

Title: Report on Particulate Emissions From Apron Dryer, American Industrial Clay Company, Sandersonville, Georgia, July 21, 1975.

SECTION 4
REFERENCE 2

Americal Industrial Clay Company--August and September, 1974

D. Emission Data/Mass Flux Rates/Emission Factors

Test ID	Parameter	Units	Values reported			
			Run 1	Run 2	Run 3	Average
1	Stack temperature--avg	Deg F	200.67	203.3	204.3	
Uncont.	Moisture--avg	%	11.11	10.63	10.79	
Apron	Oxygen--avg	%	17.5	17.5	17.6	
Dryer	Total Vol. flow, actual	acfm	29003	28406	28691	
3 stacks	Total Vol. flow, standard	dscfm	20532	20178	20428	
	Isokinetic variation	%	ok	ok	ok	
Feed rate: Capacity:		TPH	3.4	3.1	3.5	
	Pollutant concentrations:					
	Filterable PM					
	CO2	%	0.17	0.9	0.9	
	Pollutant mass flux rates:					
	Filterable PM	lb/hr	3.91	4.32	4.18	
	CO2	lb/hr	241	1252	1267	
	Emission factors:					
	Filterable PM	lb/ton	1.162	1.372	1.182	1.24
	CO2	lb/ton	71	397.7	358.3	276

8/28-30/74; 9/4-10/74

A-82-39
II-A-22

KAOLIN

AMERICAN INDUSTRIAL CLAY COMPANY

SANDERSVILLE, GEORGIA

REPORT ON

RECEIVED
JUL 31 1975
AIR QUALITY EVALUATION SECTION

PARTICULATE EMISSIONS FROM APRON DRYER

by

E. R. DOTSON

CC: Mr. A. H. Willis
Mr. W. L. Hartley
Mr. David Anderson

7/21/75

AMERICAN INDUSTRIAL CLAY COMPANY

SANDERSVILLE, GEORGIA

July 21, 1975

INTRODUCTION

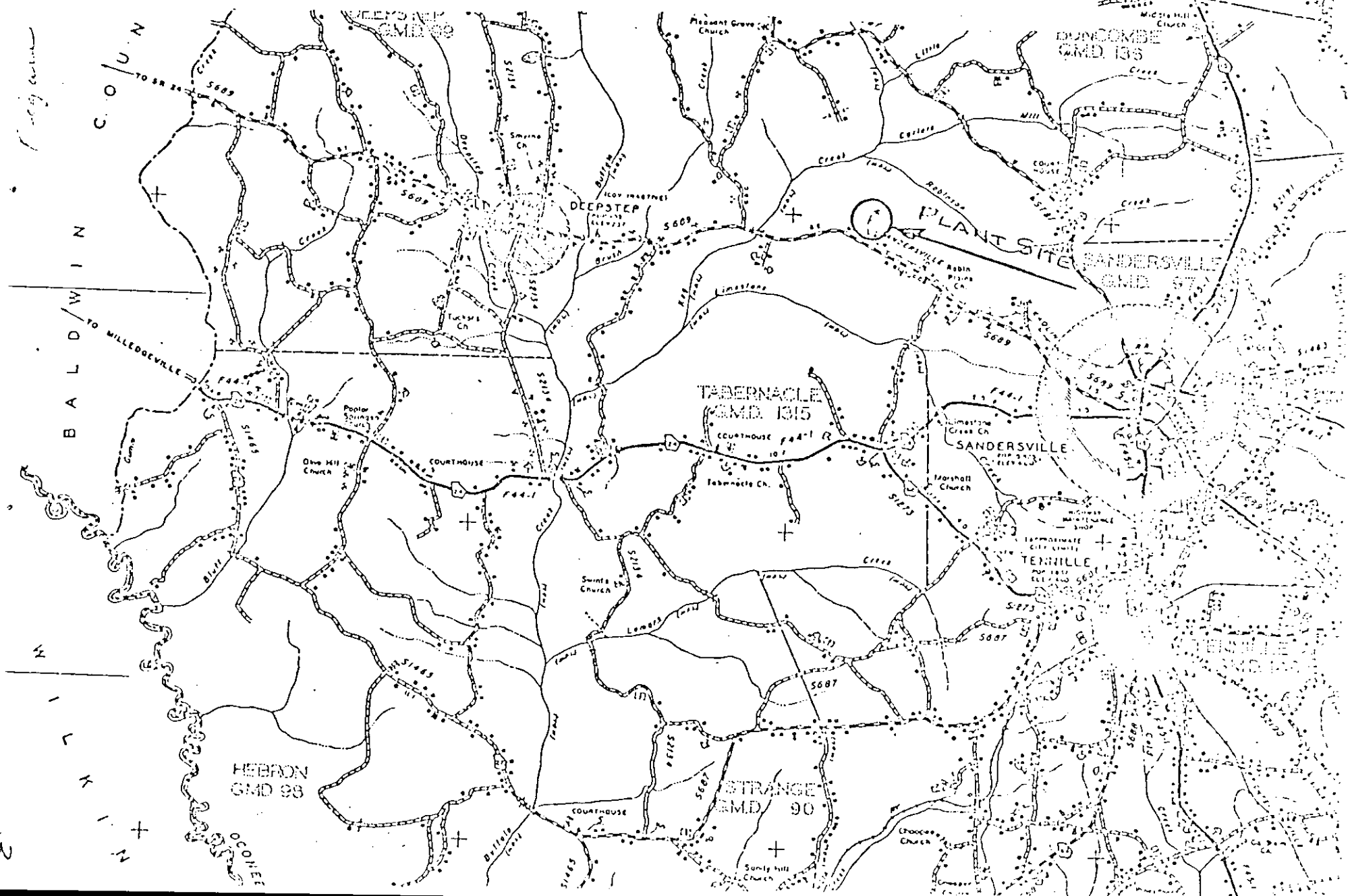
Particulate emissions from the (AICC) Apron Dryer were performed and are reported here in accordance with the requirements and specifications presented in Rules and Regulations for Air Quality Control chapter 270-5-24.

AICC is located approximately six miles from Sandersville, Georgia, on highway S689 and the mailing address is P.O. Box 617, Sandersville, Georgia. (see figures 1 and 2.)

Data presented in this report was collected on August 28 and 30, Sept. 4, 6, 9 & 10, 1974, by Georgia Kaolin Company process technicians, Wilton Lewis and Bob Hamilton.

The sampling stations of the AICC Apron Dryer are located on the exhaust stacks approximately 15 feet above the fan on no. 1 stack, 24 feet above the dryer on no. 2 stack (gravity vent), and 24 feet above the fan on no. 3 stack.

FIGURE 1. Location of American Industrial Clay Company in relation to surrounding area.



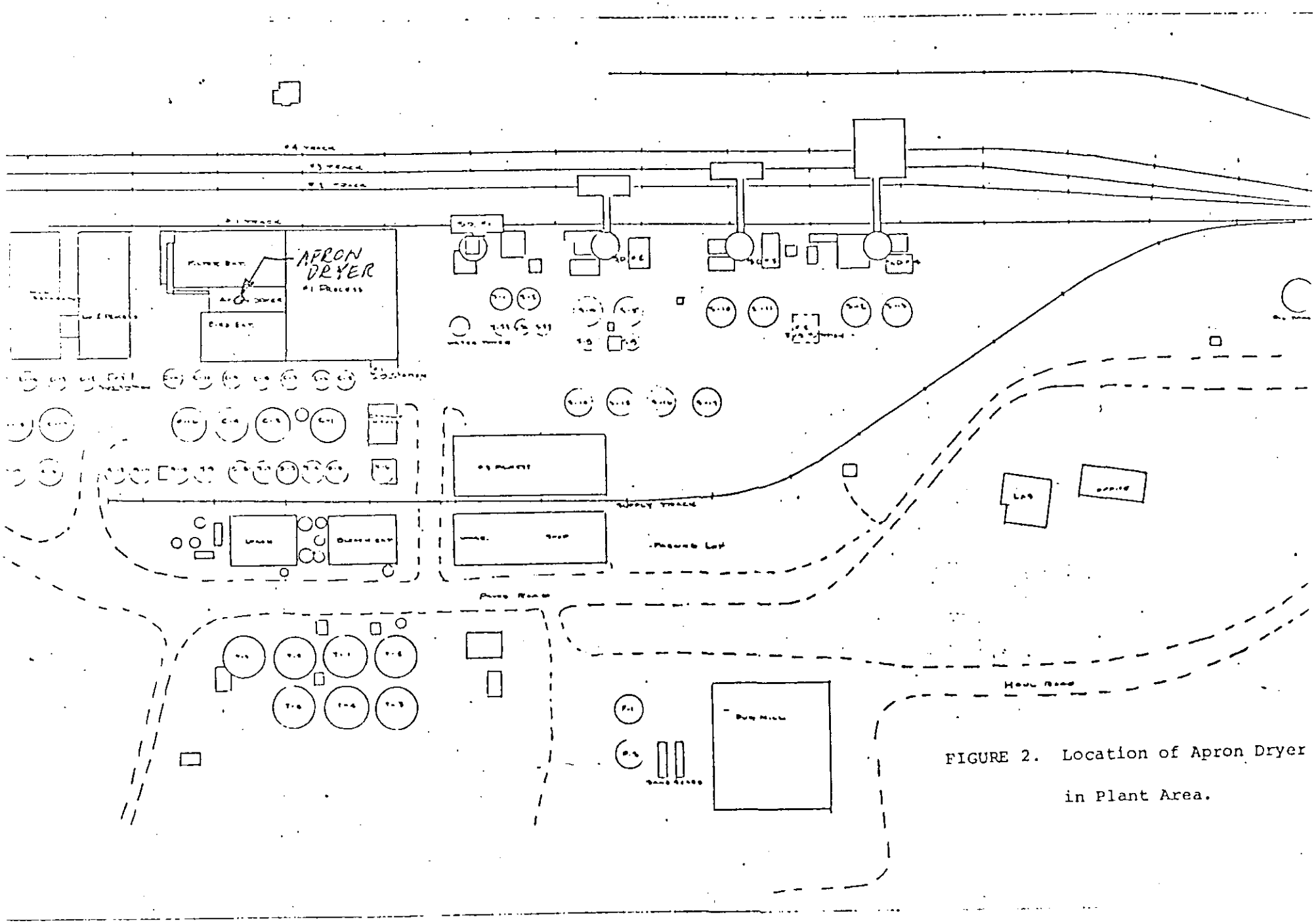


FIGURE 2. Location of Apron Dryer in Plant Area.

- ANALYTICAL PROCEDURE -

All data presented in the appendix was gathered with a Research Appliance Company Train Stachsampler model # 2343.

The R.A.C. Train stacksampler was developed by the Emissions Testing Branch of the Office of Air Programs, E.P.A. It is specified in Volume 36, Number 247 of the Federal Register under the topic "Standards of Performance for New Stationary Sources", "Method 5 Particulate Sampling". It is also specified in Volume 36, Number 234 of the Federal Register under the topic "National Emission Standards for Hazardous Air Pollutants, proposed standards for Asbestos, Beryllium and Mercury".

The sampling train has four major components: (1) The pitobe assembly includes the probe nozzle, a heated, glass lined (optional) probe, and an "S" type pitot tube for monitoring gas velocity during sampling. (2) The sample case has a heated portion for the filter, cyclone and flask and an ice bath portion for the impingers. (3) The umbilical cord connects the sample box with the meter box. It is a development of the aquanaut program called "Life Line". (4) The meter case consists of a dual inclined vertical manometer, an orifice meter, vacuum pump, dry gas meter, thermometers and electrical controls for sampling.

- SUMMARY OF RESULTS -

A summary of emissions data collected on AICC Apron Dryer is presented in TABLE 1.

Examination of this data reveals that the unit was emitting an average of 4.14 pounds per hour, out of an allowable 12.13, or 34% of allowable.

TE STED	STACK DIA X HEIGHT	FLOW @ STACK COND FT/MIN.	CFM	PROCESS RATE	EMISSIONS IN #/hr. ACTUAL	ALLOWABLE
			STACK NO. 1			
ug. 29	3' - 0" X 21'	2,086	14,738	4.8 tons/hr.	2.57	11.73
ug. 30	3' - 0" X 21'	2,028	14,328	5.1 tons/hr	2.42	12.21
ug. 30	3' - 0" X 21'	2,146	15,161	5.22 tons/hr.	3.2	12.4
tack No. 1 Average		2,087	14,742	5.04 tons/hr.	2.73	12.11
			STACK NO. 2			
pt. 4	2' - 6" X 29'	673	3304	4.7	.43	11.56
pt. 6	2' - 6" X 29'	722	3544	4.5	.52	11.23
pt. 6	2' - 6" X 29'	653	3206	4.8	.36	11.73
tack No. 2 Average		683	3351	4.7	.44	11.51
			STACK NO. 3			
pt. 9	2' - 6" X 29'	2233	10,961	5.7	.91	13.2
pt. 9	2' - 6" X 29'	2146	10,534	4.7	1.38	11.56
pt. 10	2' - 6" X 29'	2103	10,324	6.0	.62	13.54
tack No. 3 Average		2161	10,606	5.47	.97	12.77
erages for all three stacks		1644	9,566	5.06	4.14 (total)	12.13

Allowable for all three stacks

DESCRIPTION OF PROCESS

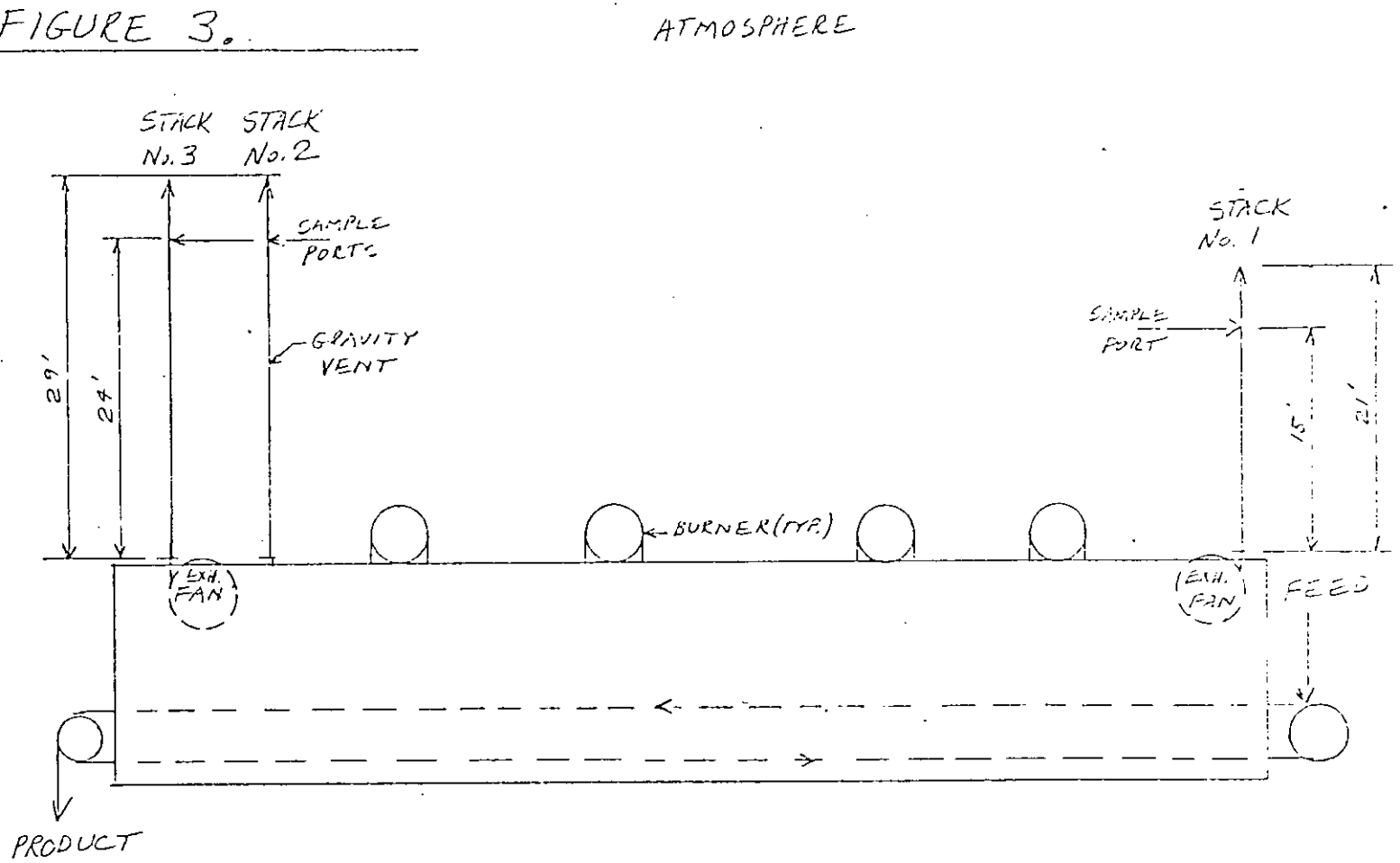
A flow diagram of the C. G. Sargent's Sons Corp. Apron Dryer is presented in Figure 3.

Basically this system receives a kaolin feed from a rotary vacuum filter, extrudes it onto a moving perforated conveyor that takes it through a drying chamber and drops it into a conveyor system at the discharge end. The feed is a thick material having approximately 60% kaolin by weight. The product contains about 6% moisture.

Heat is supplied by four combination gas or oil burners that heat the air that is circulated internally with fans. The exhaust comes out of three stacks, numbers one and three stacks have exhaust blowers, number two stack is a gravity vent. The total exhaust from all three stacks is about 29,000 ACFM.

The clay remains on the 8 ft. wide bed as it progresses through the drying chamber that is about 110 ft. long. The clay does not fall through a moving air stream in this type of dryer, so the exhaust contains only a small amount of particulates, well within the established limits. No cyclones or other collection equipment are needed.

FIGURE 3.



FLOW DIAGRAM

APRON DRYER

AMERICAN INDUSTRIAL CLAY CO.
SANDERSVILLE, GA

E.R.D. 7/23/75

September 11, 1974

American Industrial Clay Company
Sandersville, Georgia

Apron Dryer

DUST EMISSION

* Stack	Emission Rate	
No. 1	2.73 lbs./hr.	average of three tests
No. 2	0.44 lbs./hr.	average of three tests
No. 3	0.97 lbs./hr.	average of three tests
TOTAL	4.14 lbs./hr.	

Allowable	12.08 lbs./hr.	
	7.94 lbs./hr.	less than allowable
	65.8%	less than allowable

Production Input Average 5.06 TPH

All sampling was done within the + or - 10% of isokinetic range, with an overall average of 1.06% less than isokinetic.

* Stacks numbered consecutively from the input end of the dryer.

Wilton Lewis
Bob Hamilton

Apron Dryer

DUST EMISSION

American Industrial Clay Co.
September 11, 1974

COMPANY: American Industrial Clay Co.

ADDRESS: Sandersville, Ga.

DATE: 8/29/74 STACK SAMPLED: Aaron Dryer Stack #1 RUN NO. 1

1. Size of Duct L _____ W _____ D 36"

Probe size used:

Diam., in.			Area, ft.^{2}
1/8	= .125	=	.000085 ft.^{2}
1/4	= .250	=	.000341 ft.^{2}
3/8	= .375	=	.000767 ft.^{2}
1/2	= .500	=	.001363 ft.^{2}

2. Orsat CO_2 = 0.0
   CO = 0.0
   O_2 = 18.0

3.	Total Time Sampled	60 min.
4.	Barometric Pressure	30.08" Hg
5.	Meter Pressure	30.143" Hg
6.	Meter Temperature	100 °F
7.	Stack Pressure	30.0592" Hg
8.	Wet Bulb Temperature of Stack	136 °F
9.	Dry Bulb Temperature of Stack	240 °F
10.	Average Stack Temperature	241 °F
11.	Psychrometric % H_2O 15, Calculated % H_2O	15.06 %
12.	Weight of Particulates in Wash —, Weight in Cyclone .0481, Weight in Filters .0248, Weight in Impingers .0049, Total Weight	.0578 gm
13.	H_2O Condensed 90, H_2O Absorbed on Silica Gel, 16 Total Ml. H_2O	106 ml
14.	Volume of Dry Gas Sampled 28.66, Volume of Gas Sampled at Stack Conditions, Vols	43.789
15.	Average Velocity at Stack Conditions, Vs	2086
16.	Volumetric Flow Rate at Stack Conditions, Qs	14,738 CFM
17.	Process Input Weight Rate	4.8 TPH
18.	Actual Output	2.57 #/hr.
*19.	Allowable Output	11.73 #/hr.

* Allowable for all 3 stacks

12

COMPANY: American Industrial Alloy Co.

ADDRESS: [illegible]

DATE: 8/30/74 STACK SAMPLED: [illegible] RUN NO. 2

1. Size of Duct L _____ W _____ D 36"

Probe size used:

Diam., in.				Area, ft.^{2}
1/8	=	.125	=	.000085 ft.^{2}
1/4	=	.250	=	.000341 ft.^{2}
3/8	=	.375	=	.000767 ft.^{2}
1/2	=	.500	=	.001363 ft.^{2}

2. Orsat CO_2 = 0.0

CO = 18.0

O_2 = 0.0

3. Total Time Sampled — 60 min

4. Barometric Pressure — 29.77 in Hg

5. Meter Pressure — 29.8277 in H

6. Meter Temperature — 90

7. Stack Pressure — 29.807 in H

8. Wet Bulb Temperature of Stack — 136°F

9. Dry Bulb Temperature of Stack — 234°F

10. Average Stack Temperature — 235°F

11. Psychrometric % H_2O 18.5, Calculated % H_2O — 13.69

12. Weight of Particulates in Wash _____, Weight in Cyclone .0315, Weight in Filters .0079, Weight in Impingers .0092, Total Weight — 0.0486

13. H_2O Condensed 85.0, H_2O Absorbed on Silica Gel, 6.8 Total Ml. H_2O — 91.8 ml.

14. Volume of Dry Gas Sampled 28.5, Volume of Gas Sampled at Stack Conditions, Vols — 37.9593

15. Average Velocity at Stack Conditions, V_s — 2028

16. Volumetric Flow Rate at Stack Conditions, Q_s — 14,328 CFM

17. Process Input Weight Rate — 5.1 TPH

18. Actual Output — 2.42 #/hr

*19. Allowable Output — 12.21 #/hr

* Allowable for all 3 stacks

COMPANY: AICC

ADDRESS: Sandersville, Ga

DATE: 8/30/74 STACK SAMPLED: Acme Paper #1 stack RUN NO. 3

1. Size of Duct L _____ W _____ D 36"

Probe size used:

Diam., in.				Area, ft.²
1/8	=	.125	=	.000085 ft.²
1/4	=	.250	=	.000341 ft.²
3/8	=	.375	=	.000767 ft.²
1/2	=	.500	=	.001363 ft.²

2. Orsat CO_2 = 0.0

   CO = 0.0

   O_2 = 18.0

3. Total Time Sampled — 60 min

4. Barometric Pressure — 29.72" Hg

5. Meter Pressure — 29.8355"

6. Meter Temperature — 102 °F

7. Stack Pressure — 29.7752" Hg

8. Wet Bulb Temperature of Stack — 136 °F

9. Dry Bulb Temperature of Stack — 240 °F

10. Average Stack Temperature — 237 °F

11. Psychrometric % H_2O 15, Calculated % H_2O — 15.32%

12. Weight of Particulates in Wash —, Weight in Cyclone .0272, Weight in Filters 0.017, Weight in Impingers .0267, Total Weight — 0.071

13. H_2O Condensed 100, H_2O Absorbed on Silica Gel, 7.8 Total Ml. H_2O — 107.8 ml.

14. Volume of Dry Gas Sampled 29.97, Volume of Gas Sampled at Stack Conditions, Vols — 43.9762

15. Average Velocity at Stack Conditions, V_s — 2146

16. Volumetric Flow Rate at Stack Conditions, Q_s — 15,161 CF.

17. Process Input Weight Rate — 5.22

18. Actual Output — 3.2 #/hr.

* 19. Allowable Output — 12.4 #/hr.

* Allowable for all 3 stacks

COMPANY: American Industrial Clay Co.

ADDRESS: Sandersville, Ga.

DATE: 9/4/74 STACK SAMPLED: Green Dryer Stack No. 2 RUN NO. 1

1. Size of Duct L _____ W _____ D 30 in.

Probe size used:

Diam., in.				Area, ft.
1/8	=	.125	=	.000085 ft.
1/4	=	.250	=	.000341 ft.
3/8	=	.375	=	.000767 ft.
1/2	=	.500	=	.001363 ft.

2. Orsat CO_2 = 0.2

CO = 0.2

O_2 = 17.2

3. Total Time Sampled 64 [illegible]

4. Barometric Pressure [illegible]

5. Meter Pressure 29.7[illegible]

6. Meter Temperature 96 °F

7. Stack Pressure 29.5[illegible]

8. Wet Bulb Temperature of Stack 100 °F

9. Dry Bulb Temperature of Stack 148 °F

10. Average Stack Temperature 158 °F

11. Psychrometric % H_2O 6 %, Calculated % H_2O 7.1 %

12. Weight of Particulates in Wash _____, Weight in Cyclone .0351, Weight in Filters .0201, Weight in Impingers .0010, Total Weight .0562

13. H_2O Condensed 60, H_2O Absorbed on Silica Gel, 12.5 Total Ml. H_2O 72.5

14. Volume of Dry Gas Sampled 47.32, Volume of Gas Sampled at Stack Conditions, Vols 56.9075

15. Average Velocity at Stack Conditions, V_s 673 [illegible]

16. Volumetric Flow Rate at Stack Conditions, Q_s 3304.

17. Process Input Weight Rate 4.7 T/

18. Actual Output 0.43 [illegible]

*19. Allowable Output 7.5[illegible]

[illegible] all 3 stacks.

15

COMPANY: AICC

ADDRESS: Sandersville, Ga.

DATE: 9/6/74 STACK SAMPLED: Apron Dryer No. 2 Stack RUN NO. 2

1. Size of Duct L _____ W _____ D 30"

Probe size used:

Diam., in.			Area, ft.
1/8	= .125	=	.000085 ft.
1/4	= .250	=	.000341 ft.
3/8	= .375	=	.000767 ft.
1/2	= .500	=	.001363 ft.

2. Orsat CO_2 = 0.2%
   CO = 0.2%
   O_2 = 17.2%

3. Total Time Sampled — 64 min.
4. Barometric Pressure — 30.02 "Hg
5. Meter Pressure — 30.1818 "Hg
6. Meter Temperature — 91°F
7. Stack Pressure — 30.0206 "Hg
8. Wet Bulb Temperature of Stack — 102°F.
9. Dry Bulb Temperature of Stack — 148°F
10. Average Stack Temperature — 174°F
11. Psychrometric % H_2O 6% , Calculated % H_2O — 7.07%
12. Weight of Particulates in Wash _____ , Weight in Cyclone .0384 , Weight in Filters .0245 , Weight in Impingers .0027 , Total Weight — .0656
13. H_2O Condensed .60 , H_2O Absorbed on Silica Gel, 14 Total Ml. H_2O — 74 ml
14. Volume of Dry Gas Sampled 47.405 , Volume of Gas Sampled at Stack Conditions, Vols — 59.0113
15. Average Velocity at Stack Conditions, V_s — 722 FT/
16. Volumetric Flow Rate at Stack Conditions, Q_s — 3544 CF
17. Process Input Weight Rate — 4.5 TP
18. Actual Output — 6.52%
19. Allowable Output — 11.23%

COMPANY: AICC

ADDRESS: Sondersville, Ga.

DATE: 9-6-74 STACK SAMPLED: Apron Dryer Stack #2 RUN NO. 3

1. Size of Duct L _____ W _____ D 30"

Probe size used:

Diam., in.				Area, ft.²
1/8	=	.125	=	.000085 ft.²
1/4	=	.250	=	.000341 ft.²
3/8	=	.375	=	.000767 ft.²
1/2	=	.500	=	.001363 ft.²

2. Orsat CO_2 = 0.3 %

CO = 0.2 %

O_2 = 17.4 %

3. Total Time Sampled 64 min

4. Barometric Pressure 30.17

5. Meter Pressure 30.3081

6. Meter Temperature 93°F

7. Stack Pressure 30.1711

8. Wet Bulb Temperature of Stack 132°F

9. Dry Bulb Temperature of Stack 190°F

10. Average Stack Temperature 171°F

11. Psychrometric % H_2O 6.7, Calculated % H_2O 7.3%

12. Weight of Particulates in Wash ——, Weight in Cyclone .0237, Weight in Filters .0242, Weight in Impingers .0006, Total Weight 10 HPS

13. H_2O Condensed .60, H_2O Absorbed on Silica Gel, 14 Total Ml. H_2O 74

14. Volume of Dry Gas Sampled 45.99, Volume of Gas Sampled at Stack Conditions, Vols 56.8613

15. Average Velocity at Stack Conditions, Vs 653 ft/

16. Volumetric Flow Rate at Stack Conditions, Qs 3206 CF

17. Process Input Weight Rate 4.87 PH

18. Actual Output 0.36 #/hr

19. Allowable Output *11.73 #/hr

* Allowable for all 3 stacks

17

COMPANY: AICC

ADDRESS: Sandersville, Ga.

DATE: 9/9/74 STACK SAMPLED: [illegible] Stack #3 RUN NO. 1

1. Size of Duct L _____ W _____ D 30"

Probe size used:

Diam., in.				Area, ft.^{2}
1/8	=	.125	=	.000085 ft.^{2}
1/4	=	.250	=	.000341 ft.^{2}
3/8	=	.375	=	.000767 ft.^{2}
1/2	=	.500	=	.001363 ft.^{2}

2. Orsat CO_2 = 0.3 %

CO = 0.2 %

O_2 = 17.4 %

3. Total Time Sampled 64 min

4. Barometric Pressure 29.79 "Hg

5. Meter Pressure 29.87 "Hg

6. Meter Temperature 92°F

7. Stack Pressure 29.8003 "Hg

8. Wet Bulb Temperature of Stack 132°F

9. Dry Bulb Temperature of Stack 197°F

10. Average Stack Temperature 203°F

11. Psychrometric % H_2O 14%, Calculated % H_2O 11.16 %

12. Weight of Particulates in Wash —, Weight in Cyclone .0158, Weight in Filters .0133, Weight in Impingers .0003, Total Weight .0294

13. H_2O Condensed 80, H_2O Absorbed on Silica Gel, 8.3 Total Ml. H_2O 88.3

14. Volume of Dry Gas Sampled 31.695, Volume of Gas Sampled at Stack Conditions, Vols 47.0131

15. Average Velocity at Stack Conditions, V_s 2233 ft/

16. Volumetric Flow Rate at Stack Conditions, Q_s 10,961 CFM

17. Process Input Weight Rate 5.7 TPH

18. Actual Output 0.91 #/hr

19. Allowable Output *13.2 [illegible]

COMPANY: AICC

ADDRESS: Sandersville, Ga.

DATE: 9-9-74 STACK SAMPLED: [illegible] Stack No. 3 RUN NO. 2

1. Size of Duct L _____ W _____ D 30"

Probe size used:

Diam., in.				Area, ft.
1/8	=	.125	=	.000085 ft.
1/4	=	.250	=	.000341 ft.
3/8	=	.375	=	.000767 ft.
1/2	=	.500	=	.001363 ft.

2. Orsat CO_2 = 0.3%

CO = 0.2%

O_2 = 17.4%

3. Total Time Sampled 64 min

4. Barometric Pressure 29.79" Hg

5. Meter Pressure 29.87" Hg

6. Meter Temperature 93°F

7. Stack Pressure 29.800

8. Wet Bulb Temperature of Stack 132°F

9. Dry Bulb Temperature of Stack 190°F

10. Average Stack Temperature 201°F

11. Psychrometric % H_2O 14%, Calculated % H_2O 11.15%

12. Weight of Particulates in Wash —, Weight in Cyclone .0268, Weight in Filters .0136, Weight in Impingers .0027, Total Weight 0.0431 g

13. H_2O Condensed 78, H_2O Absorbed on Silica Gel, 11.6 Total Ml. H_2O 89.6 ml.

14. Volume of Dry Gas Sampled 35.283, Volume of Gas Sampled at Stack Conditions, Vols 47.577

15. Average Velocity at Stack Conditions, V_s 2146 ft/m

16. Volumetric Flow Rate at Stack Conditions, Q_s 10,534.15

17. Process Input Weight Rate 4.7 T/hr

18. Actual Output 1.38 #/hr

19. Allowable Output * 11.56 #/hr

[illegible] 11 [illegible] 11 [illegible] stack

19

COMPANY: [illegible]

ADDRESS: [illegible]

DATE: 9-10-74 STACK SAMPLED: [illegible] # 3 RUN NO. 3

1. Size of Duct L _____ W _____ D 30"

Probe size used:

Diam., in.			Area, ft.^{2}
1/8	= .125	=	.000085 ft.^{2}
1/4	= .250	=	.000341 ft.^{2}
3/8	= .375	=	.000767 ft.^{2}
1/2	= .500	=	.001363 ft.^{2}

2. Orsat CO_2 = 0.3
   CO = 0.2
   O_2 = 17.4

3.	Total Time Sampled	64 min
4.	Barometric Pressure	30.17"
5.	Meter Pressure	30.2462"
6.	Meter Temperature	96 °F
7.	Stack Pressure	30.1502"
8.	Wet Bulb Temperature of Stack	122 °F
9.	Dry Bulb Temperature of Stack	190 °F
10.	Average Stack Temperature	205 °F
11.	Psychrometric % H_2O 14% , Calculated % H_2O	9.74%
12.	Weight of Particulates in Wash ____, Weight in Cyclone .0142 , Weight in Filters .0237 , Weight in Impingers .0007 , Total Weight	.0386
13.	H_2O Condensed .75 , H_2O Absorbed on Silica Gel, 10 Total Ml. H_2O	25 ml.
14.	Volume of Dry Gas Sampled 34.31 , Volume of Gas Sampled at Stack Conditions, Vols	45.2948
15.	Average Velocity at Stack Conditions, Vs	2105 ft/s
16.	Volumetric Flow Rate at Stack Conditions, Qs	10,324 CFM
17.	Process Input Weight Rate	6.0 TPH
18.	Actual Output	0.62 [illegible]
19.	Allowable Output	13.5 [illegible]

[illegible]