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Air

EPA

Clay

Emission Test Report
Georgia Kaolin
Dry Branch, Georgia

SOURCE EMISSIONS TEST REPORT

GEORGIA KAOLIN COMPANY

Dry Branch Georgia

#8 Raymond Impact Mill

and

Roller Mills

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SUMMARY

The Emission Measurement Branch of the U. S. Environmental Protection Agency contracted Roy F. Weston, Inc. to conduct a source testing and analysis program at the Georgia Kaolin Company's Dry Branch, Georgia clay processing facility.

The primary objective of the testing program was to measure the particulate emissions to the atmosphere from two baghouse-controlled sources at the plant (No. 8 Raymond Impact Mill and Roller Mills). This objective was completed by performing a series of three particulate tests utilizing EPA Method 5[1] procedures at each baghouse exhaust stack location. In addition, visual determinations of plume opacities were made simultaneously with each particulate test at both source discharge points according to EPA Method 9[2] protocol. Also, similar EPA Method 5 particulate and Anderson cascade impactor tests were executed at both baghouse inlet sites to measure the emissions and the particle size distribution of the particulate matter entering the bag collectors.

The particulate matter emission results are summarized below:

No. 8 Raymond Impact Mill Baghouse Exhaust Stack

Test No.	Date	Particulate Concentration Grains/DSCF	Particulate Emission Rate Pounds/Hour
1	12/6/78	0.020	2.49
2	12/6/78	0.012	1.54
3	12/6/78	0.016	2.01
Series Average		--	2.01

No. 8 Raymond Impact Mill Baghouse Inlet Duct [3]

Test No.	Date	Particulate Concentration Grains/DSCF	Particulate Emission Rate Pounds/Hour
1	12/6/78	4.53	545.

(1) Code of Federal Regulations, Title 40, Part 60, Appendix A, "Standards of Performance for New Stationary Sources," August 18, 1977.

(2) Federal Register, Vol. 39, No. 219, November 12, 1974.

(3) Run performed simultaneously with Test Number 2 at exhaust stack.

Roller Mills Baghouse Exhaust Stack

Test No.	Date	Particulate Concentration Grains/DSCF	Particulate Emission Rate Pounds/Hour
1	12/5/78	0.010	0.73
2	12/5/78	0.005	0.38
3	12/6/78	0.007	0.48
Series Average		--	0.53

Roller Mills Baghouse Inlet Duct[4]

Test No.	Date Date	Particulate Concentration Grains/DSCF	Particulate Emission Rate Pounds/Hour
1	12/6/78	1.76	105.

The particulate removal efficiency of No. 8 Raymond Impact Mill Baghouse was measured at 99.72%, that of the Roller Mills was 99.54%. Both efficiencies were calculated based on one simultaneous inlet/outlet test only.

No visible emissions were observed from either stack during the test program with the exception of test run one at the Roller Mills exhaust stack where a maximum of 5% opacity was observed.

Figures 7 and 8 illustrate the particle size distribution of the particulate matter at the baghouse inlet locations.

Detailed summaries of test data and test results are presented in Tables 1 through 8 of this report.

[4] Run performed simultaneously with Test Number 3 at exhaust stack.

INTRODUCTION

The Emission Measurement Branch of the U. S. Environmental Protection Agency contracted Roy F. Weston, Inc. to conduct a source testing and analysis program at the Georgia Kaolin Company's Dry Branch, Georgia clay processing facility. The objective of the testing program was to measure various emission parameters from two milling operations at the plant.

The locations tested, plus the number and types of tests performed at each site, are listed below:

1. No. 8 Raymond Impact Mill Baghouse Exhaust Stack
   a. Three particulate tests by EPA Method 5.
   b. One opacity test by EPA Method 9 simultaneous with Run One particulate test.

2. No. 8 Raymond Impact Mill Baghouse Inlet Duct
   a. One particulate test by EPA Method 5 simultaneous with one of the exhaust stack tests.
   b. One particle size distribution test by cascade impaction (Anderson ^{R}).

3. Roller Mills Baghouse Exhaust Stack
   a. Three particulate tests by EPA Method 5.
   b. Three opacity tests by EPA Method 9 simultaneous with each particulate test.

4. Roller Mills Baghouse Inlet Duct
   a. One particulate test by EPA Method 5 simultaneous with one of the exhaust stack tests.
   b. One particle size distribution test by cascade impaction (Anderson ^{R}).

All tests were conducted during the period 5-6 December 1978 by Weston personnel and were observed by Mr. Dennis P. Holzschuh, EPA Technical Manager.

Test data and test result summaries are presented in Tables 1 through 8 of this report. Particle size distribution results are shown in Figures 7 and 8. Also incorporated herein is a description of the test locations, test equipment, test procedures, sample recovery, and analytical methods used during the test program. Raw test data, laboratory reports, sample calculations, equipment calibration data, a list of project participants and process operation logs are provided in Appendices A through F, respectively.

DESCRIPTION OF TEST LOCATIONS

No. 8 Raymond Impact Mill Baghouse Exhaust Stack

Two 4" I.D. test ports, 90° apart, were installed on a straight section of the 26" I.D. metal stack at a location 5.8 stack diameters (150") downstream and 1.5 diameters (40") upstream from the nearest flow disturbances. EPA Method 1 criteria for this test location required a minimum of 28 traverse points. A total of 32 traverse points (16 per axis) were sampled since this number conveniently related to the desired test period length. See Figure 1 for port and sampling point locations.

No. 8 Raymond Impact Mill Baghouse Inlet Duct

Two 4" I.D. test ports were placed at right angles on a straight section of the 32" I.D. ductwork leading to the inlet of the baghouse at a position greater than eight stack diameters downstream, and greater than two diameters upstream from the nearest gas stream flow disturbances. Since the eight and two diameter criterion were met a minimum of twelve traverse points were required by EPA Method 1 regulations. Figure 2 illustrates port and sampling point locations.

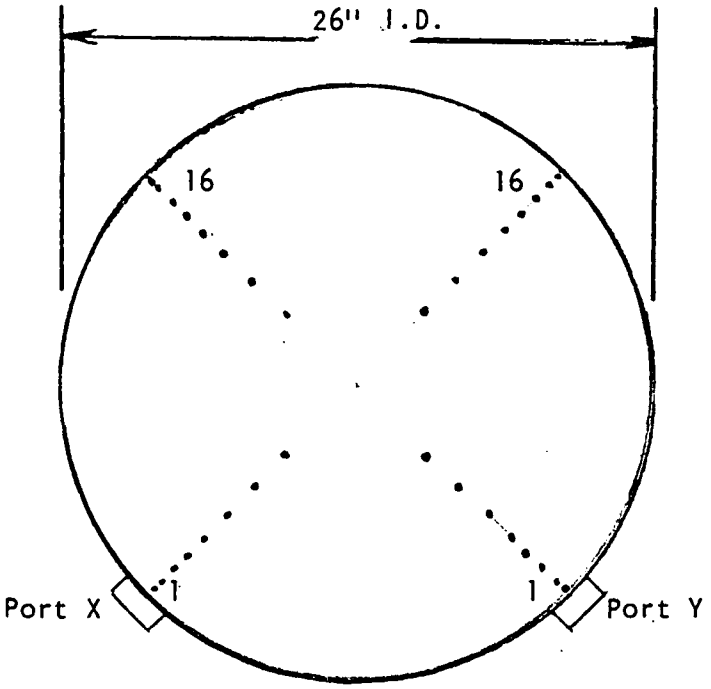
Roller Mills Baghouse Exhaust Stack

Two 4" I.D. test ports at 90° were placed on the 24" I.D. metal stack 5.5 diameters downstream and 2.2 diameters upstream from the nearest flow disturbances. Twenty sampling points (10 per axis) were selected for testing. See Figure 3 for port and sampling point locations.

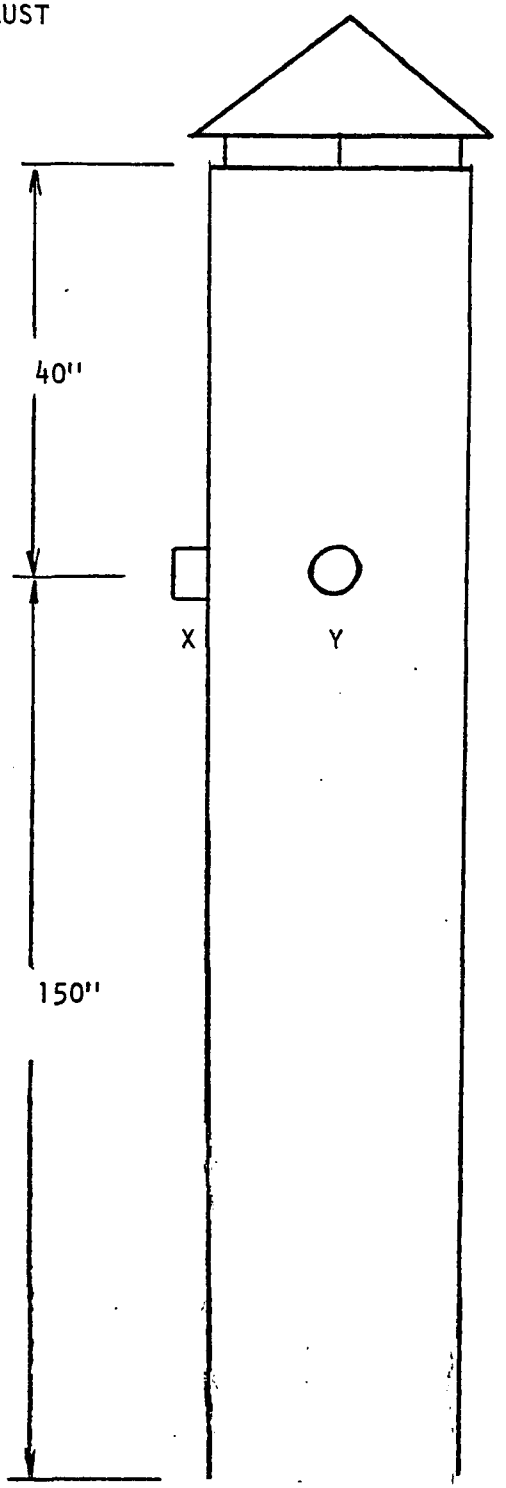
Roller Mills Baghouse Inlet Duct

Two 4" I.D. test ports, 90° apart, were installed in a straight section of the metal duct at a location which was 3.0 duct diameters downstream

GEORGIA KAOLIN COMPANY
Dry Branch, Georgia
FIGURE 1
#8 RAYMOND IMPACT MILL BAGHOUSE EXHAUST
PORT AND SAMPLING POINT LOCATIONS



DUCT CROSS-SECTIONAL VIEW



Traverse Point Number	Distance from Inside Near Wall, Inches
1	3/8
2	1-1/4
3	2-1/4
4	3-1/4
5	4-3/8
6	5-3/4
7	7-3/8
8	9-3/4
9	16-1/4
10	18-5/8
11	20-1/4
12	21-5/8
13	22-3/4
14	23-3/4
15	24-3/4
16	25-5/8

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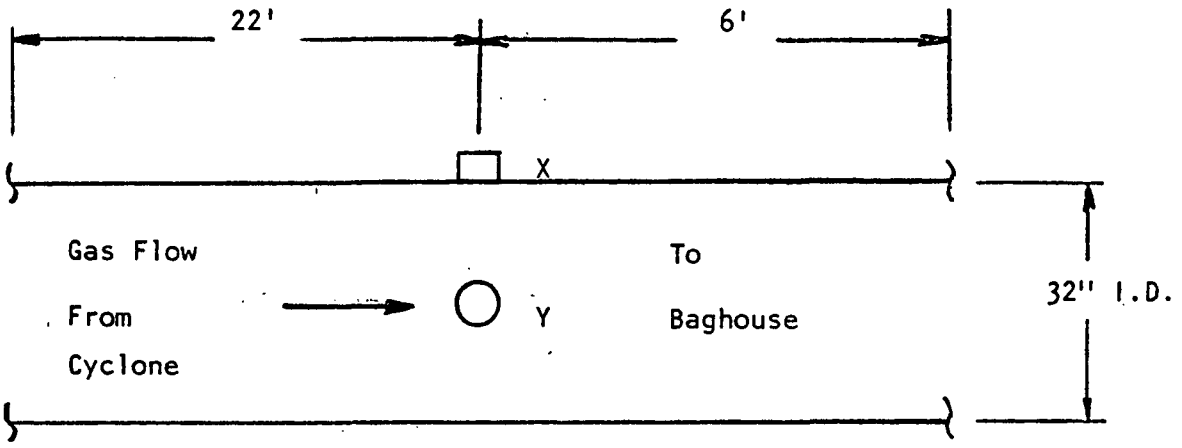
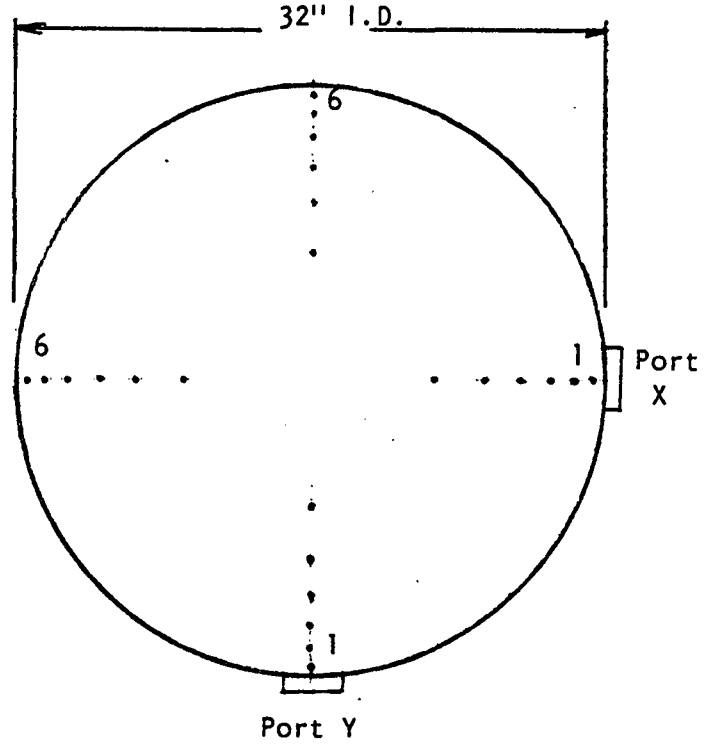
Dry Branch, Georgia
FIGURE 2
#8 Raymond Impact Mill Baghouse Inlet
Port and Sampling Point Locations



Traverse Point Number	Distance From Inside Near Wall, Inches
1	1-3/8
2	4-5/8
3	9-1/2
4	22-1/2
5	27-3/8
6	30-5/8



DUCT CROSS - SECTIONAL VIEW

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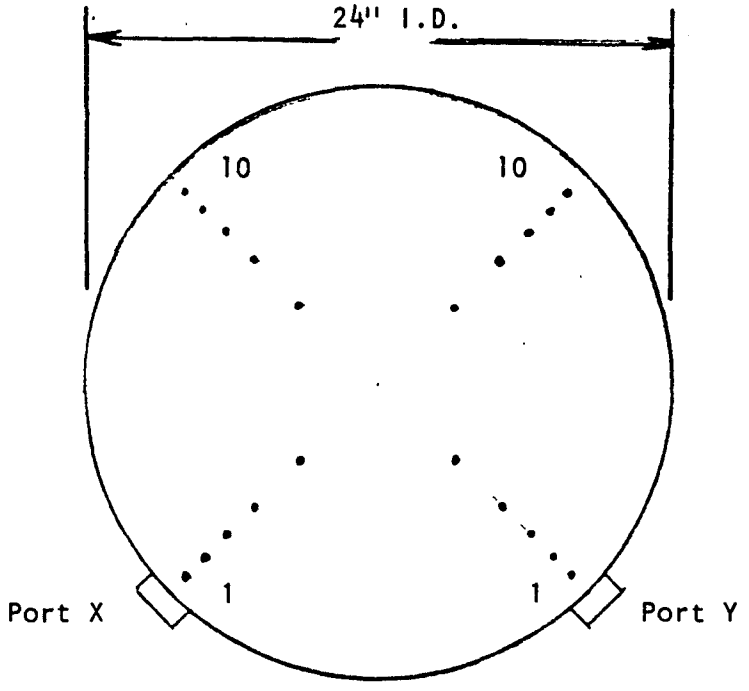
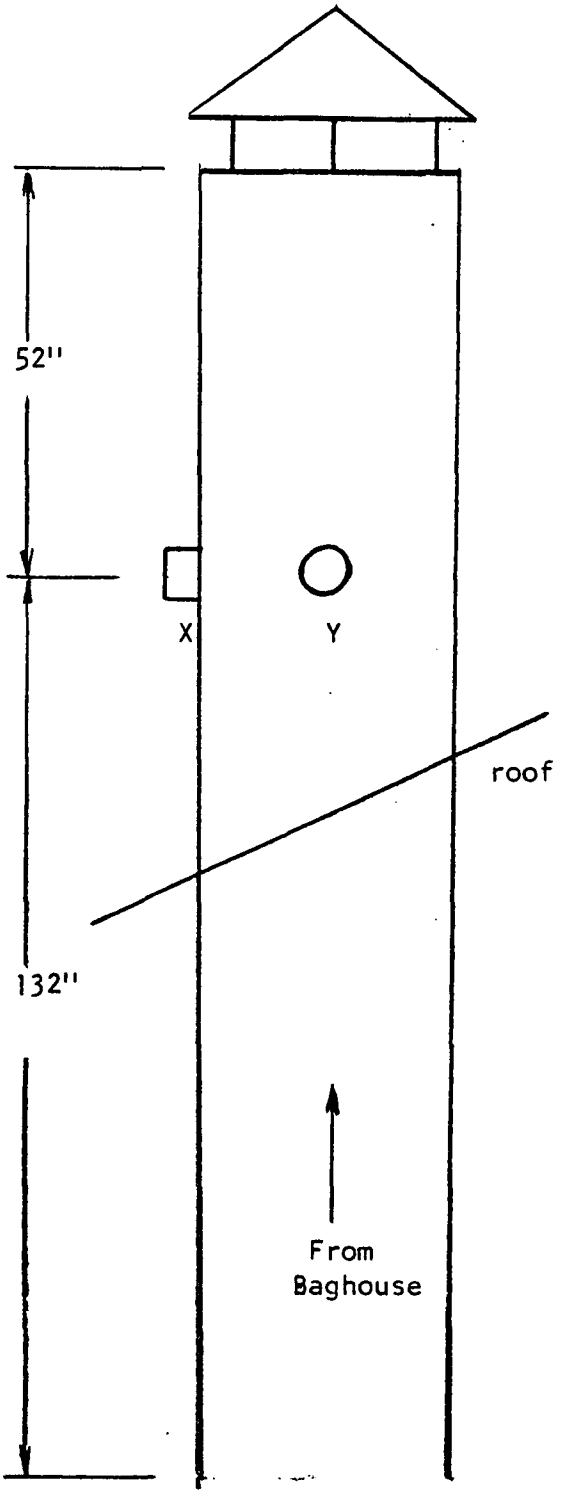
FIGURE 3
ROLLER MILLS BAGHOUSE EXHAUST
PORT AND SAMPLING POINT LOCATIONS



DUCT CROSS-SECTIONAL VIEW



Traverse Point Number	Distance From Inside Near Wall, Inches
1	5/8
2	2
3	3-1/2
4	5-1/2
5	8-1/4
6	15-3/4
7	18-1/2
8	20-1/2
9	22
10	23-3/8

and 1.0 diameters upstream from the nearest flow disturbances. A total of 28 points were selected for test purposes, 14 per port axis. Figure 4 illustrates port and traverse point distances.

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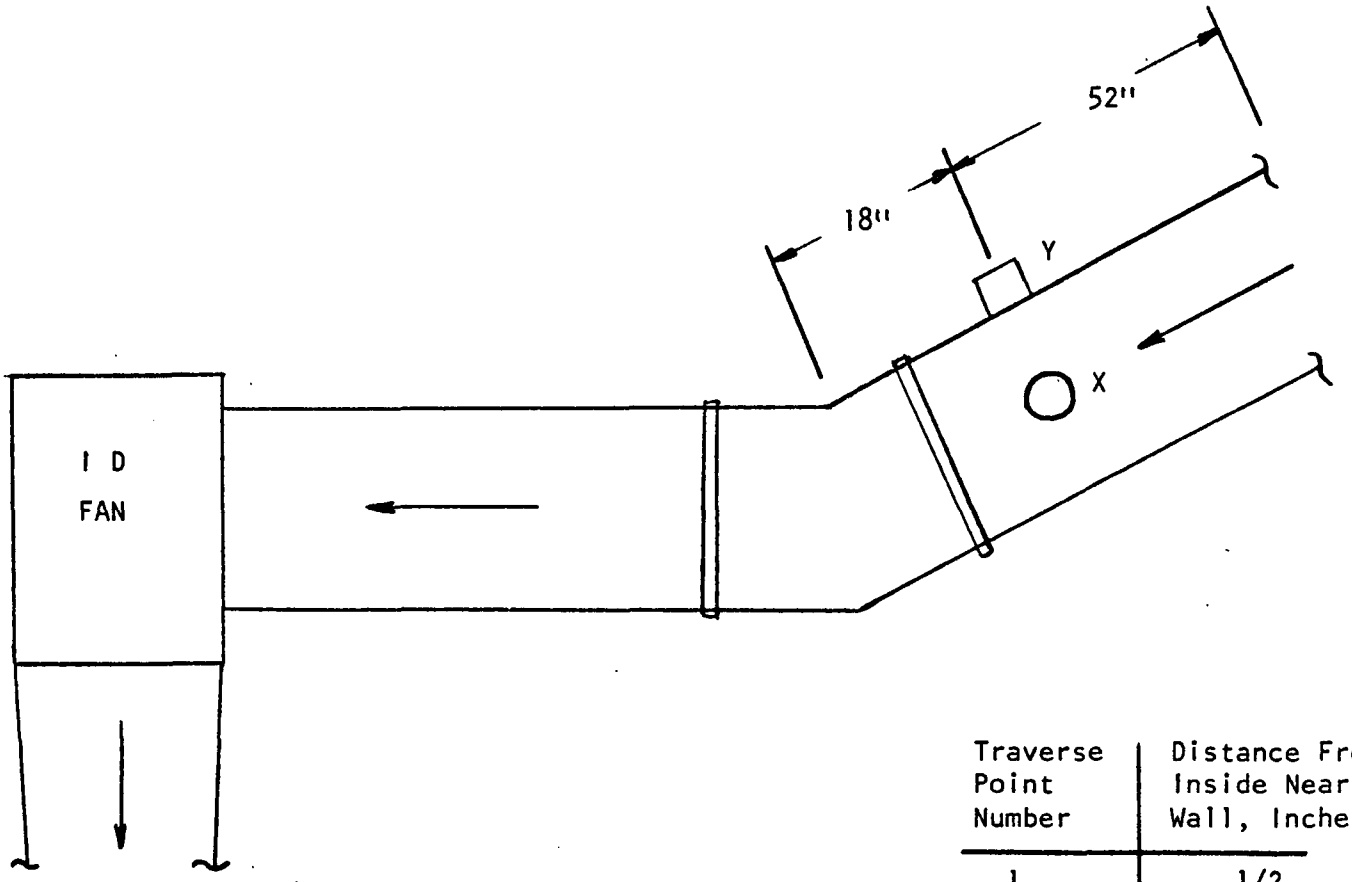
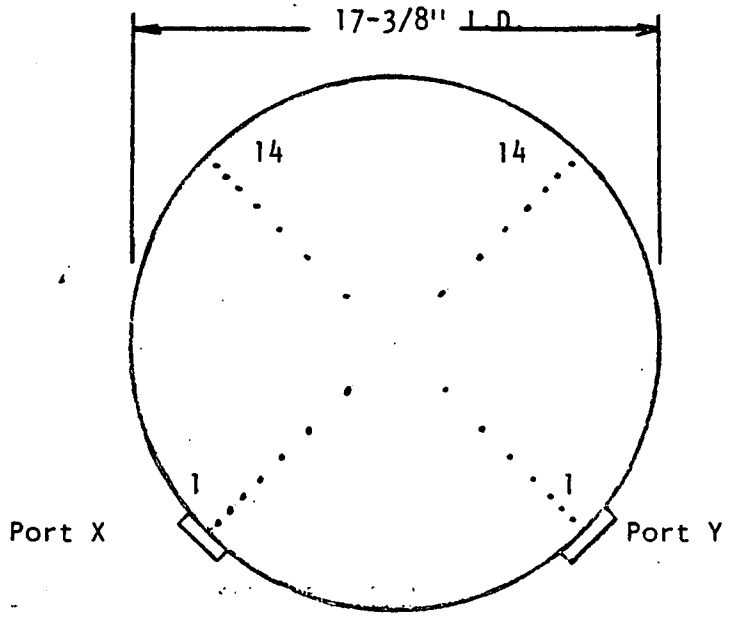
FIGURE 4

ROLLER MILLS BAGHOUSE INLET

PORT AND SAMPLING POINT LOCATIONS



Traverse Point Number	Distance From Inside Near Wall, Inches
1	1/2
2	1
3	1-3/4
4	2-1/2
5	3-1/2
6	4-5/8
7	6-3/8
8	11
9	12-3/4
10	13-7/8
11	14-7/8
12	15-5/8
13	16-3/8
14	16-7/8



DUCT CROSS SECTIONAL VIEW

DESCRIPTION OF SAMPLING TRAINS

Particulate Sampling Trains

The test train utilized for particulate sampling at both inlet duct locations and at #8 Raymond Impact Mill Baghouse exhaust stack location was the standard EPA Method 5 train (see Figure 5).

A stainless steel nozzle was attached to a heated ($\sim$ 250°F) borosilicate glass probe which was connected directly to a borosilicate filter holder containing a 4" Reeve Angel 900 AG glass fiber filter. The filter holder was maintained at approximately 250°F in a heated chamber, and was connected by Tygon® vacuum tubing to the first of four Greenburg-Smith impingers which were included in the train to condense the moisture in the gas stream. Each of the first two impingers contained 100 ml of distilled water, the third was dry and the final impinger contained 200 grams of dry pre-weighed silica gel. The first, third, and fourth impingers were modified Greenburg-Smith type; the second was a standard Greenburg-Smith impinger. All impingers were maintained in a crushed ice bath. A RAC control console with vacuum pump, dry gas meter, a calibrated orifice, and inclined manometers completed the sampling train.

Flue gas temperature was measured by means of a Type K thermocouple which was connected to a direct readout pyrometer. The thermocouple sensor was positioned adjacent to the sampling nozzle.

Gas velocity was measured using a calibrated "S" type pitot tube provided with extensions and fastened alongside the sampling probe. Gas stream composition (carbon dioxide, oxygen, and carbon monoxide content) was determined utilizing Orsat apparatus to analyze stack gas samples. Gas stream composition proved to be ambient air since no combustion products were found in any of the stack gas effluent samples.

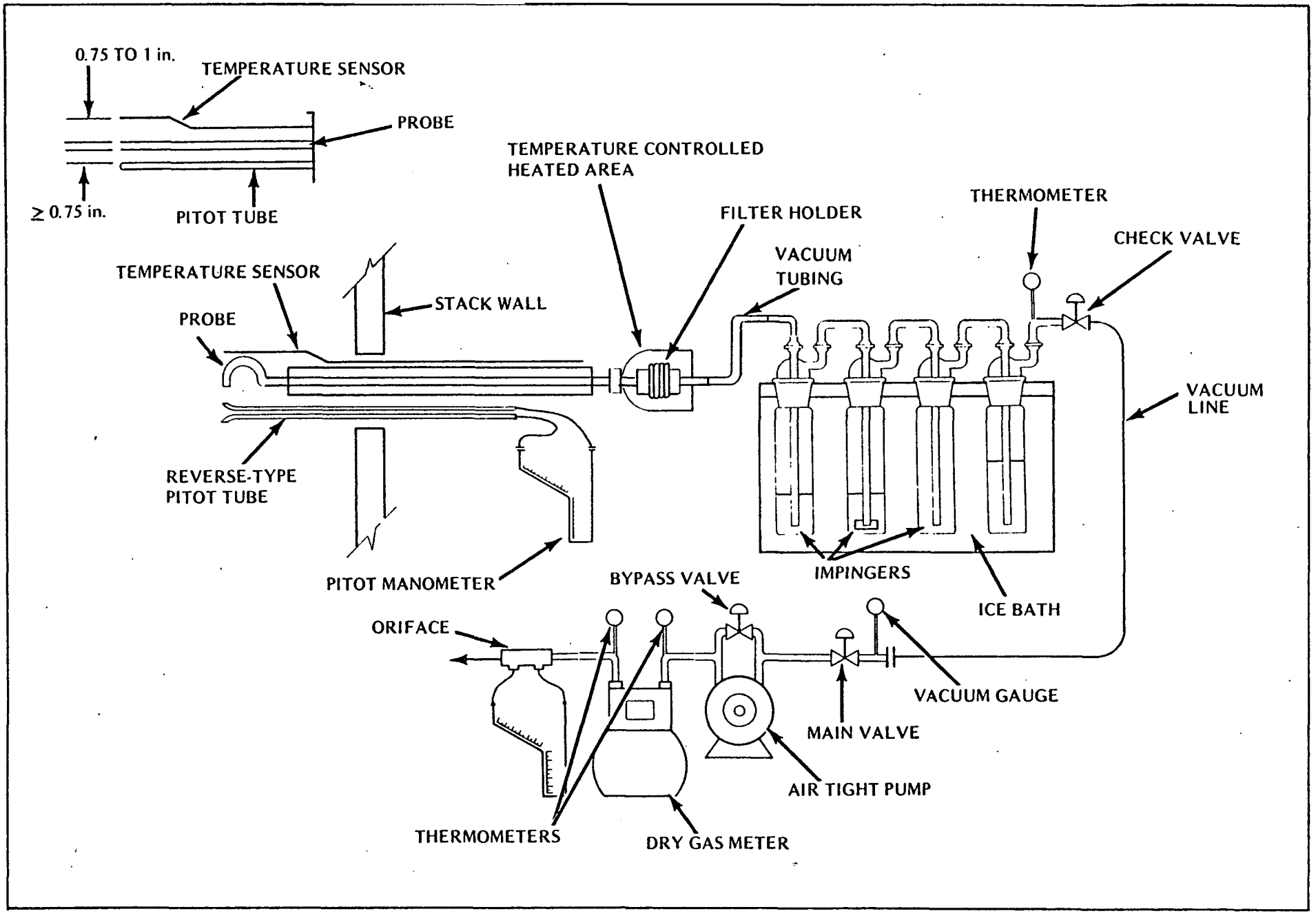


FIGURE 5 PARTICULATE SAMPLING TRAIN
EPA METHOD 5 - MISCO

The test train used for particulate sampling at the Roller Mills Exhaust Stack was identical to the train described above except a rigid glass connector was used between the back half of the filter holder and the first impinger. (See Figure 6.)

Particle Size Distribution Sampling Apparatus

A stainless steel nozzle was connected directly to an 8-stage Anderson[R] cascade impaction device which separated the particles according to their effective aerodynamic particle diamters. A glass fiber filter was used to capture any particles that passed through the impactor substrates to permit the measurement of total particulate. The filter holder was maintained at stack temperature and was connected by Tygon [R] vacuum tubing to the first of four Greenburg-Smith impingers which were included in the train to condense the moisture in the gas stream. All impingers were maintained in a crushed ice bath. A RAC control console with vacuum pump, dry gas meter, a calibrated orifice, and inclined manometers completed the sampling train.

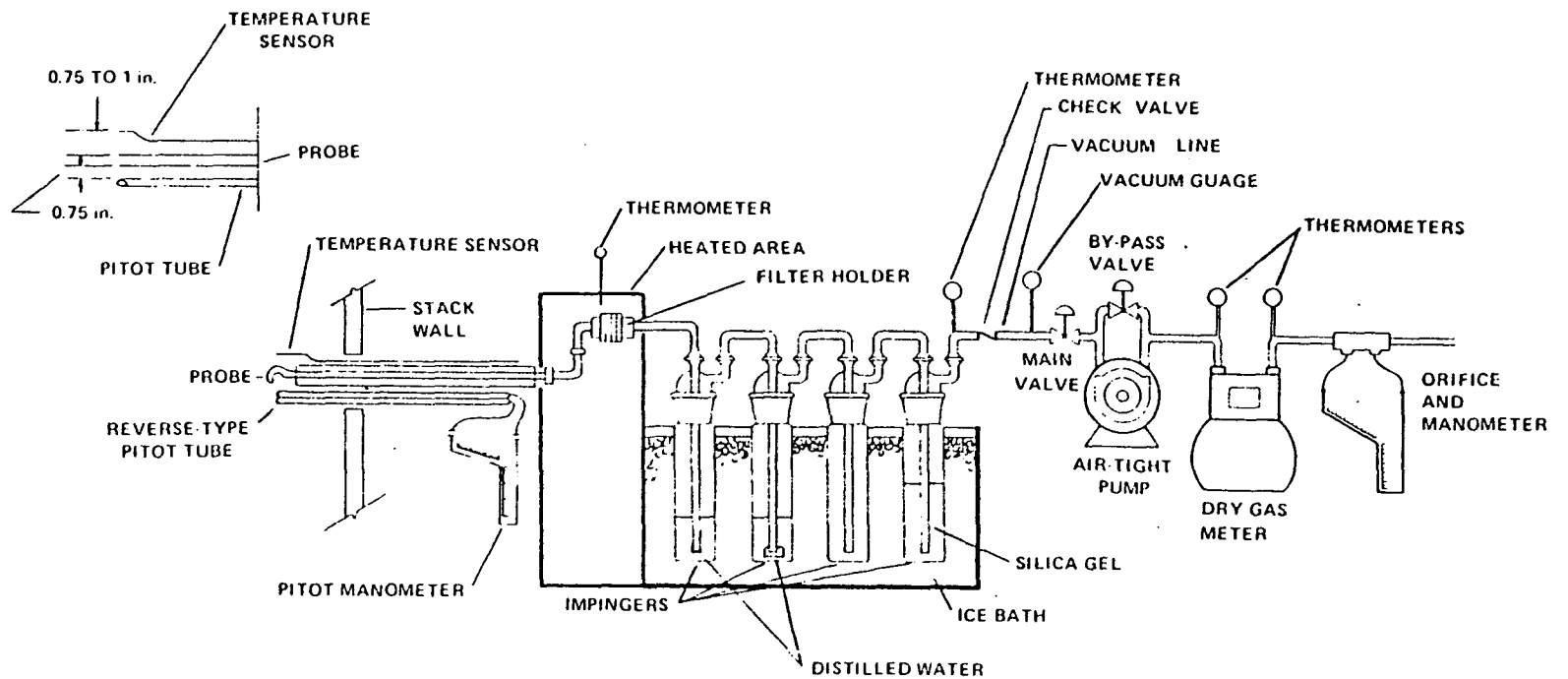


FIGURE 6 PARTICULATE SAMPLING TRAIN–EPA METHOD 5

TEST PROCEDURES

Preliminary Tests

Preliminary test data was obtained at each sampling location. Stack geometry measurements were recorded and sampling point distances calculated. A preliminary velocity traverse was performed at each test location utilizing a calibrated "S" type pitot tube and a Dwyer inclined manometer to determine velocity profiles. Stack gas temperatures were observed with a direct read-out pyrometer equipped with a chromel-alumel thermocouple. Moisture content values were estimated from information supplied by Georgia Kaolin.

Preliminary test data was used for nozzle sizing and nomagraph set-up for isokinetic sampling procedures.

Calibration of the probe nozzles, pitot tubes, metering systems, probe heaters, temperature gauges and barometer were performed as specified in Section 5 of EPA Method 5 test procedures (see Appendix D for calibration data).

No. 8 Raymond Impact Mill Baghouse Exhaust Stack

A series of three tests were conducted at No. 8 Raymond Impact Mill Baghouse Exhaust Stack to measure the concentration and mass rate of particulate matter emissions. Thirty-two traverse points, 16 per port axis, were sampled for three minutes each resulting in a total test time of ninety-six minutes.

During particulate sampling, gas stream velocities were measured by inserting a calibrated "S" type pitot tube into the stream adjacent to the sampling nozzle. The velocity pressure differential was observed immediately after positioning the nozzle at each point, and sampling rates were adjusted to maintain isokinetic sampling. Stack gas temperatures were also monitored at each point with the pyrometer and thermocouple. Additional temperature measurements were made at the final impinger, inlet and outlet of the dry gas meter and at the filter holder chamber.

Test data was recorded every three minutes at each point during all test periods. Leak checks were performed according to EPA Method 5 instructions prior to and after each run and/or component change. Table 2 presents a summary of test data for each of the three runs. Visible emissions observations were recorded with Test Run 1 only due to lack of daylight during the other test periods. Observations were performed by a certified observer according to EPA Method 9 procedures. See Table 6 for result summary.

No. 8 Raymond Impact Mill Baghouse Inlet Duct

One EPA Method 5 test was performed at the inlet simultaneous with particulate Test Run 2 at the outlet. Twelve points were traversed, 6 per port axis, for 5 minutes, each yielding a test period 60 minutes in length.

Procedures for isokinetic sampling were identical for those described for the outlet location except the test data was recorded every 5 minutes. Test data and test result summaries are provided in Tables 1 and 5, respectively.

One sampling point located at a site of average velocity was selected from particulate traverse data for particle size distribution testing. The gas stream was sampled isokinetically at that point for 5 minutes which permitted collection of sufficient sample for analysis without overloading the filter substrates. Sample volume, temperature, and pressure data was recorded before and after the test. See Figure 7 for a distribution plot.

Roller Mills Baghouse Exhaust Stack

Three 120 minute Method 5 test runs were performed at the baghouse outlet. A total of 20 points were sampled for 6 minutes each per test. Readings were taken at 3 minute intervals.

Procedures for isokinetic sampling were identical to those described for No. 8 Raymond Impact Mill Baghouse Exhaust Stack.

See Tables 4 and 8 for test data and test result summaries respectively.

Visual determinations of plume opacity were performed by a certified observer according to Method 9 Procedures. A summary of results is presented in Table 8.

Roller Mills Baghouse Inlet Duct

One Method 5 test was performed at the inlet simultaneous with particulate Test Run 3 at the outlet. Twenty-eight points were traversed, 14 per port axis, for 2 minutes each yielding a test period of 56 minutes.

Isokinetic sampling procedures were identical to those previously described except that test data was recorded every 2 minutes. Table 3 shows test data summarization and Table 7 presents test results.

One particle size distribtuion sample was collected isokinetically at a point of average velocity over a 3 minute period. Sample volume, temperature, and pressure data was recorded before and after the test. See Figure 8 for distribution results.

Particulate Sample Recovery

At the conclusion of each test, the sampling trains were dismantled, openings sealed, and the components transported to the field laboratory. Sample integrity was assured by maintaining chain of custody records which will be supplied upon request.

A consistent procedure was employed for sample recovery:

- The glass fiber filter(s) was removed from its holder with tweezers and placed in its original container (petri dish), along with any loose particulate and filter fragments (Sample 1).
- The probe (EPA 5) and nozzle were separated and the internal particulate rinsed with acetone into a borosilicate container while brushing a minimum of three times until no visible particles remained. Particulate adhering to the brush was rinsed with acetone into the same container. The front half of the filter holder was rinsed with acetone while brushing a minimum of three times. The rinses were combined (Sample 2) and the container sealed with a Teflon lined closure.
- The total liquid in impingers one, two and three was measured, the value recorded, and the liquid discarded.
- The silica gel was removed from the last impinger and immediately weighed.
- An acetone sample was retained for blank analysis.

Particulate Analyses

The filters (Sample 1) and any loose fragments were desiccated for 24 hours and weighed to the nearest 0.1 milligram to a constant weight.

The acetone wash samples (Sample 2) were evaporated at ambient temperature and pressure in tared beakers, and desiccated to constant weight. All sample residue weights were adjusted by the acetone blank value.

The weight of the material collected on the glass fiber filter(s) plus the weight of the residue of the acetone nozzle/probe/front-half filter holder washes represents the "total" EPA Method 5 catch. Complete laboratory results are presented in Appendix B of this report.

Particle Size Sample Recovery and Analyses

The cascade impactor substrates and any loose fragments were carefully removed from their support plates with tweezers and placed in individual containers (petri dishes) for shipment to the Weston Laboratory.

Each cascade impactor filter was fired at 525°C and pre-weighed to the nearest 0.1 milligram to constant weight at Weston's Laboratory prior to on-site application. Subsequent to emissions exposure, the cascade impactor substrates, back-up filters and any loose fragments were desiccated for 24 hours in the Laboratory and weighed to the nearest 0.1 milligram to constant weight.

DISCUSSION OF TEST RESULTS

Particulate test data and test result summaries are presented in Tables 1 through 10 of this report. Figures 7 and 8 illustrate the particle size distribution of the particulate matter at the baghouse inlet locations.

No unusual sampling difficulties were encountered during the test periods, but it should be noted that the two tests performed at the #8 Raymond Impact Mill Baghouse on December 5, 1978 had to be repeated due to a malfunction in the mechanical collector which resulted in an abnormally high particulate loading on the baghouse which invalidated the two tests.

The particulate removal efficiency of No. 8 Raymond Impact Mill Baghouse was measured at 99.72%; that of the Roller Mills was 99.54%. Both efficiencies were calculated on one simultaneous inlet/outlet test only.

Results of the Anderson^{R} cascade impactor particle size distribution tests at both inlet locations show that $\geq$ 95% of the particles entering each baghouse were $\geq$ 1.0 microns in diameter.

Determination of visual opacity at the #8 Raymond Impact Mill Baghouse resulted in no visible emissions observed with the exception of the first test; similar observations of 0% opacity were made at the Roller Mill Baghouse. The first test at this location resulted in readings averaging 5% opacity.

The results of visible emission testing at both sites are summarized in Tables 11 through 14.

GEORGIA KAOLIN COMPANY
Dry Branch, Georgia

TABLE 1

#8 Raymond Impact Mill Baghouse Inlet

Summary of Test Data

Test Data	
Test Number	1
Test Date	12-6-78
Test Period	1615-1723
Sampling Data	
Sampling Duration, minutes	60.0
Nozzle Diameter, inches	0.188
Barometric Pressure, inches mercury	29.98
Average Orifice Pressure Differential, inches water	0.85
Average Dry Gas Temperature at Meter, °F	81.
Sample Volume at Meter Conditions, cubic feet	29.55
Sample Volume at Standard Conditions, [1] cubic feet	28.64
Gas Stream Moisture Content	
Total Water Collected by Train, ml	48.5
Standard Volume of Water Collected, cubic feet	2.28
Moisture in Gas Stream, percent by volume	7.4
Mole Fraction of Dry Gas	0.926
Gas Stream Composition	
CO_2, percent by volume	0.0
O_2, percent by volume	20.9
CO, percent by volume	0.0
N_2, percent by volume	79.1
Molecular Weight of Wet Gas	28.16
Molecular Weight of Dry Gas	28.97
Gas Stream Velocity	
Static Pressure, inches water	- 2.2
Absolute Pressure, inches mercury	29.82
Average Temperature, °F	136.
Pitot Tube Calibration Coefficient	0.839
Total Number of Sampling Points	12.0
Velocity at Actual Conditions, feet/second	51.3
Gas Stream Volumetric Flow	
Stack Cross-Sectional Area, square feet	5.59
Volumetric Flow at Actual Conditions, cubic feet/minute	17,180.
Volumetric Flow at Standard Conditions, cubic feet/minute	14,040.
Percent Isokinetic	98.5
Process Operations Data	See Appendix F for Operations Log

[1] Standard Conditions = 68°F, 29.92 inches mercury, dry basis.

GEORGIA KAOLIN COMPANY
Dry Branch, Georgia

TABLE 2

#8 Raymond Impact Mill Baghouse Exhaust

Summary of Test Data

	1	2	3
Test Data			
Test Number	1	2	3
Test Date	12-6-78	12-6-78	12-6-78
Test Period	1355-1540	1655-1840	1945-2130
Sampling Data			
Sampling Duration, minutes	96.0	96.0	96.0
Nozzle Diameter, inches	0.180	0.180	0.180
Barometric Pressure, inches mercury	29.98	29.98	29.98
Average Orifice Pressure Differential, inches water	1.72	1.72	1.77
Average Dry Gas Temperature at Meter, °F	95.	86.	76.
Sample Volume at Meter Conditions, cubic feet	69.07	69.89	73.32
Sample Volume at Standard Conditions, [1] cubic feet	65.04	66.92	71.52
Gas Stream Moisture Content			
Total Water Collected by Train, ml	104.5	120.0	87.5
Standard Volume of Water Collected, cubic feet	4.92	5.65	4.12
Moisture in Gas Stream, percent by volume	7.0	7.8	5.4
Mole Fraction of Dry Gas	0.929	0.922	0.946
Gas Stream Composition			
CO_2, percent by volume	0.0	0.0	0.0
O_2, percent by volume	20.9	20.9	20.9
CO, percent by volume	0.0	0.0	0.0
N_2, percent by volume	79.1	79.1	79.1
Molecular Weight of Wet Gas	28.20	28.12	28.37
Molecular Weight of Dry Gas	28.97	28.97	28.97
Gas Stream Velocity			
Static Pressure, inches water	1.6	1.7	1.6
Absolute Pressure, inches mercury	30.09	30.11	30.09
Average Temperature, °F	131.	141.	141.
Pitot Tube Calibration Coefficient	0.850	0.850	0.850
Total Number of Sampling Points	32.0	32.0	32.0
Velocity at Actual Conditions, feet/second	80.0	81.2	81.7
Gas Stream Volumetric Flow			
Stack Cross-Sectional Area, square feet	3.69	3.69	3.69
Volumetric Flow at Actual Conditions, cubic feet/minute	17,690.	17,960.	18,060.
Volumetric Flow at Standard Conditions, cubic feet/minute	14,790.	14,650.	15,080.
Percent Isokinetic	95.6	99.3	103.1
Process Operations Data	SEE APPENDIX F FOR OPERATING LOG		

[1] Standard Conditions = 68°F, 29.92 inches mercury, dry basis.

GEORGIA KAOLIN COMPANY

Dry Branch, Georgia

TABLE 3

Roller Mills Baghouse Inlet

Summary of Test Data

Test Data	
Test Number	1
Test Date	12-6-78
Test Period	1053-1240
Sampling Data	
Sampling Duration, minutes	56.0
Nozzle Diameter, inches	0.188
Barometric Pressure, inches mercury	29.98
Average Orifice Pressure Differential, inches water	2.4
Average Dry Gas Temperature at Meter, ^{o}F	99.
Sample Volume at Meter Conditions, cubic feet	46.56
Sample Volume at Standard Conditions, [1] cubic feet	43.28
Gas Stream Moisture Content	
Total Water Collected by Train, ml	79.0
Standard Volume of Water Collected, cubic feet	3.72
Moisture in Gas Stream, percent by volume	7.9
Mole Fraction of Dry Gas	0.921
Gas Stream Composition	
CO_2, percent by volume	0.0
O_2, percent by volume	20.9
CO, percent by volume	0.0
N_2, percent by volume	79.1
Molecular Weight of Wet Gas	28.10
Molecular Weight of Dry Gas	28.97
Gas Stream Velocity	
Static Pressure, inches water	- 3.1
Absolute Pressure, inches mercury	29.75
Average Temperature, ^{o}F	134.
Pitot Tube Calibration Coefficient	0.839
Total Number of Sampling Points	28.0
Velocity at Actual Conditions, feet/second	86.6
Gas Stream Volumetric Flow	
Stack Cross-Sectional Area, square feet	1.65
Volumetric Flow at Actual Conditions, cubic feet/minute	8,550.
Volumetric Flow at Standard Conditions, cubic feet/minute	6,960.
Percent Isokinetic	94.9
Process Operations Data	See Appendix F for Operations Log

[1] Standard Conditions = 68 ^{o}F, 29.92 inches mercury, dry basis.

GEORGIA KAOLIN COMPANY

Dry Branch, Georgia

TABLE 4

Roller Mills Baghouse Exhaust

Summary of Test Data

	1	2	3
Test Data			
Test Number	1	2	3
Test Date	12-5-78	12-5-78	12-5-78
Test Period	0953-1203	1357-1605	1030-1252
Sampling Data			
Sampling Duration, minutes	120.0	120.0	120.0
Nozzle Diameter, inches	0.189	0.189	0.189
Barometric Pressure, inches mercury	30.22	30.22	29.98
Average Orifice Pressure Differential, inches water	1.01	1.02	1.05
Average Dry Gas Temperature at Meter, °F	57.	73.	78.
Sample Volume at Meter Conditions, cubic feet	63.78	65.29	65.42
Sample Volume at Standard Conditions, [1] cubic feet	65.29	64.79	63.87
Gas Stream Moisture Content			
Total Water Collected by Train, ml	126.5	143.4	98.
Standard Volume of Water Collected, cubic feet	5.96	6.75	4.61
Moisture in Gas Stream, percent by volume	8.4	9.4	6.7
Mole Fraction of Dry Gas	0.916	0.906	0.933
Gas Stream Composition			
CO_2, percent by volume	0.0	0.0	0.0
O_2, percent by volume	20.9	20.9	20.9
CO, percent by volume	0.0	0.0	0.0
N_2, percent by volume	79.1	79.1	79.1
Molecular Weight of Wet Gas	28.05	27.93	28.23
Molecular Weight of Dry Gas	28.97	28.97	28.97
Gas Stream Velocity			
Static Pressure, inches water	0.50	0.60	0.55
Absolute Pressure, inches mercury	30.26	30.26	30.02
Average Temperature, °F	129.	123.	136.
Pitot Tube Calibration Coefficient	0.835	0.835	0.835
Total Number of Sampling Points	20.0	20.0	20.0
Velocity at Actual Conditions, feet/second	51.9	52.1	54.8
Gas Stream Volumetric Flow			
Stack Cross-Sectional Area, square feet	3.14	3.14	3.14
Volumetric Flow at Actual Conditions, cubic feet/minute	9,780.	9,830.	10,340.
Volumetric Flow at Standard Conditions, cubic feet/minute	8,120.	8,150.	8,560.
Percent Isokinetic	108.0	106.8	100.2

Process Operations Data — See Appendix F for Operations Log

[1] Standard Conditions = 68° F, 29.92 inches mercury, dry basis.

GEORGIA KAOLIN COMPANY

Dry Branch, Georgia

TABLE 5

#8 Raymond Impact Mill Baghouse Inlet

Summary of Test Results

Test Data	
Test Number	1[3]
Test Date	12-6-78
Test Time	1615-1723
Gas Flow	
Standard Cubic Feet/minute, dry	14,040.
Actual Cubic Feet/minute, wet	17,180.
Particulates	
Nozzle, Probe and Front Half Filter Holder Catch Fraction, g	2.0415
Filter Catch Fraction, g	6.3624
Total Particulates, g	8.4039
Particulate Emissions[1]	
Grains/dry standard cubic foot[2]	4.53
Pounds/hour	545.

[1] Based on Total Particulates captured by train.

[2] Standard Conditions = 68°F and 29.92 inches mercury.

[3] Test conducted concurrently with Run 2, No. 8 Raymond Impact Mill Baghouse Exhaust Test.

GEORGIA KAOLIN COMPANY

Dry Branch, Georgia

TABLE 6

#8 Raymond Impact Mill Baghouse Exhaust

Summary of Test Results

Test Data			
Test Number	1	2	3
Test Date	12-6-78	12-6-78	12-6-78
Test Time	1355-1540	1655-1840	1945-2130
Gas Flow			
Standard Cubic Feet/minute, dry	14,790.	14,650.	15,080.
Actual Cubic Feet/minute, wet	17,690.	17,960.	18,060.
Particulates			
Nozzle and Front Half Filter Holder Catch Fraction, g	0.0381	0.0228	0.0258
Filter Catch Fraction, g	0.0447	0.0309	0.0460
Total Particulates, g	0.0828	0.0537	0.0718
Particulate Emissions[1]			
Grains/dry standard cubic foot[2]	0.020	0.012	0.016
Pounds/hour	2.49	1.54	2.01
Baghouse Particulate Removal Efficiency, percent		99.72	
Visible Emissions[3]			
5 percent opacity, minutes observed	0.0		
0 percent opacity, minutes observed	90.0		
Unobserved readings, minuted observed	0.0		

---

[1] Based on Total Particulates captured by train.

[2] Standard Conditions = 68°F and 29.92 inches mercury

[3] Opacity results listed are in minutes of the observed reading during the test period.

GEORGIA KAOLIN COMPANY
Dry Branch, Georgia

TABLE 7

Roller Mills Baghouse Inlet

Summary of Test Results

Test Data	
Test Number	1
Test Date	12-6-78
Test Time	1053-1240
Gas Flow	
Standard Cubic Feet/minute, dry	6,960.
Actual Cubic Feet/minute, wet	8,550.
Particulates	
Nozzle, Probe and Front Half Filter Holder Catch Fraction, g	1.4983
Filter Catch Fraction , g	3.4416
Total Particulates, g	4.9399
Particulate Emissions[1]	
Grains/dry standard cubic foot[2]	1.76
Pounds/hour	105.

---

[1]Based on Total Particulates captured by train.

[2]Standard Conditions = 68°F and 29.92 inches mercury.

[3]Test conducted concurrently with Run 3, Roller Mills Baghouse Exhaust Test.

GEORGIA KAOLIN COMPANY

Dry Branch, Georgia

TABLE 8

Roller Mills Baghouse Exhaust

Summary of Test Results

Test Data			
Test Number	1	2	3
Test Date	12-5-78	12-5-78	12-6-78
Test Time	0953-1203	1357-1605	1030-1252
Gas Flow			
Standard Cubic Feet/Minute,dry	8,120.	8,150.	8,560.
Actual Cubic Feet/minute, wet	9,780.	9,830.	10,340.
Particulates			
Nozzle and Front Half Filter Holder Catch Fraction, g	0.0335	0.0152	0.0241
Filter Catch Fraction, g	0.0107	0.0075	0.0029
Total Particulates, g	0.0442	0.0227	0.0270
Particulate Emissions[1]			
Grains/dry standard cubic foot[2]	0.010	0.005	0.007
Pounds/hour	0.73	0.38	0.48
Baghouse Particulate Removal Efficiency, percent	-	-	99.54
Visible Emissions[3]			
≥ 10 percent opacity, minutes observed	0.0	-	-
5 percent opacity, minutes observed	112.75	-	-
0 percent opacity, minutes observed	3.	120.0	120.0
Unobservable reading, minutes observed	4.25	-	-

[1] Based on Total Particulates captured by train.

[2] Standard Conditions = 68°F and 29.92 inches mercury

[3] Opacity results listed are in minutes of the observed reading during the 120 minute test period.

GEORGIA KAOLIN COMPANY

Dry Branch, Georgia

TABLE

PARTICLE SIZE DISTRIBUTION

Date: December 6, 1978

Location: Georgia Kaolin

Sampling Location: Raymond Mill

Traverse Point No. Sampled: X-2

P_{bar} (in. Hg.)	29.98
Stack Temp (^{o}F)	135.
Sample Time (Min)	5.
Sample Volume (cf)	2.946
Moisture (% H_2O)	8.
Meter Temp (^{o}F)	82.
Flow Setting, H (in. H_2)	0.94
Nozzle Diameter (in.)	0.188

Sample Flow Rate (at stack conditions): 0.59 cfm

Plate No.	Net Wt. (mg)	%	Cumulative %	EAD (Microns)
1	35.1	10.1	100.	13.1 and larger
2	45.9	13.2	89.9	8.1
3	124.9	35.8	76.7	5.5
4	97.3	27.9	40.9	3.8
5	30.9	8.0	13.0	2.4
6	12.3	3.5	4.1	1.2
7	2.1	0.0	0.6	0.7
8	0.0	0.0	0.0	---
Backup Filter	0.0	0.0	0.0	---
TOTAL	348.5			

#8 RAYMOND IMPACT MILL BAGHOUSE EXHAUST STACK

PARTICLE SIZE DISTRIBUTION

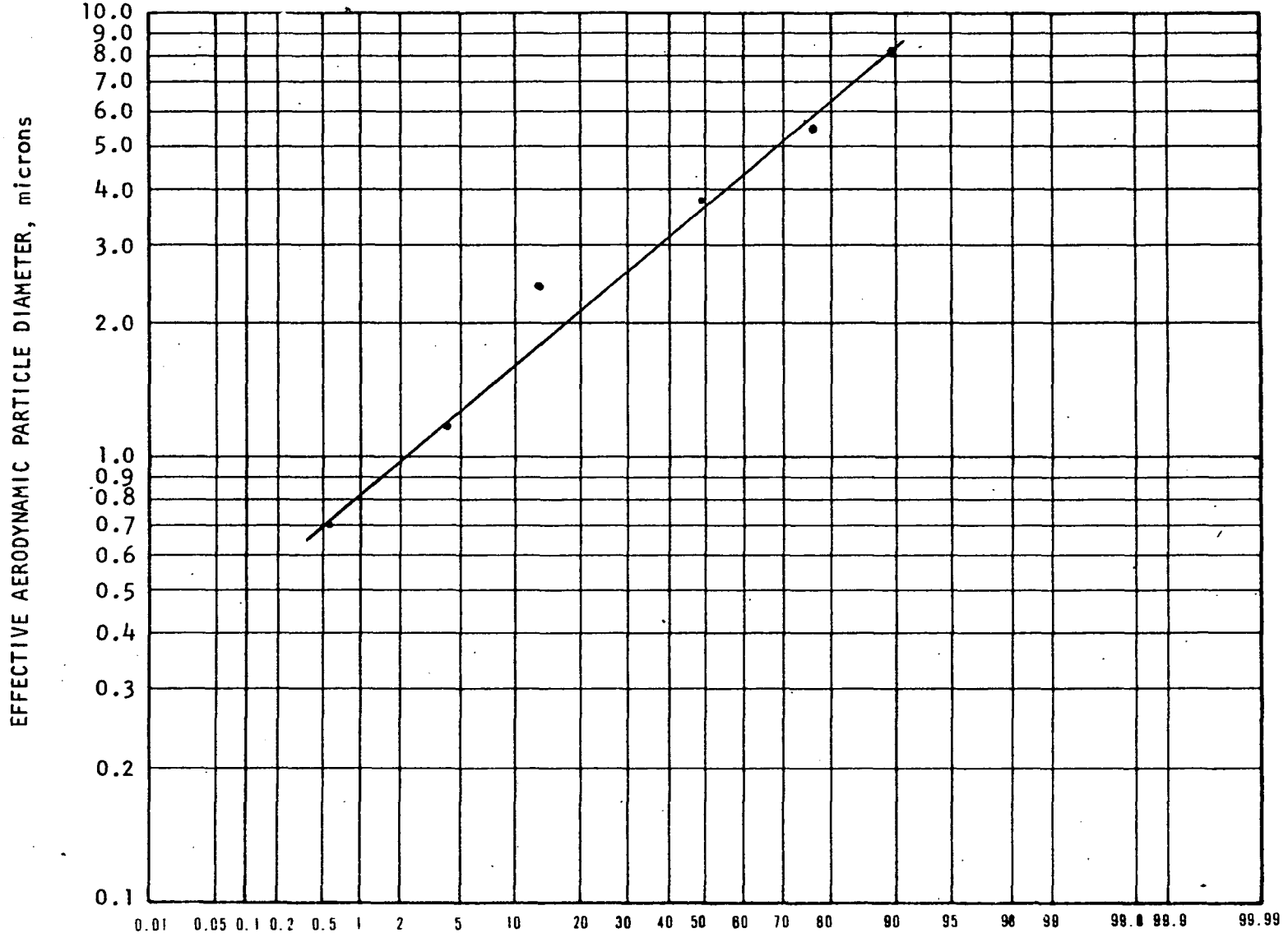


FIGURE 7

GEORGIA KAOLIN COMPANY

Dry Branch, Georgia

TABLE 10

PARTICLE SIZE DISTRIBUTION

Date: December 6, 1978

Location: Georgia Kaolin

Sampling Location: Roller Mill

Traverse Point No. Sampled: Y-6

P_{bar} (in. Hg.)	29.98
Stack Temp (^{o}F)	135.
Sample Time (Min)	3.
Sample Volume (cf)	2.796
Moisture (% H_2O)	8.
Meter Temp (^{o}F)	96.
Flow Setting, H (in. H_2)	2.6
Nozzle Diameter (in.)	0.188

Sample Flow Rate (at stack conditions):

Plate No.	Net Wt. (mg)	%	Cumulative %	EAD (Microns)
1	17.0	13.2	100	10.3 and larger
2	27.4	21.3	86.8	6.7
3	37.1	28.8	65.5	4.4
4	23.0	17.9	36.7	2.9
5	16.8	13.0	18.8	1.8
6	7.1	5.5	5.8	1.0
7	0.4	0.3	0.3	0.6
8	0.0	0.0	0.0	0.4
Backup Filter	0.0	0.0	0.0	
TOTAL	128.8			

ROLLER MILLS BAGHOUSE EXHAUST STACK

PARTICLE SIZE DISTRIBUTION

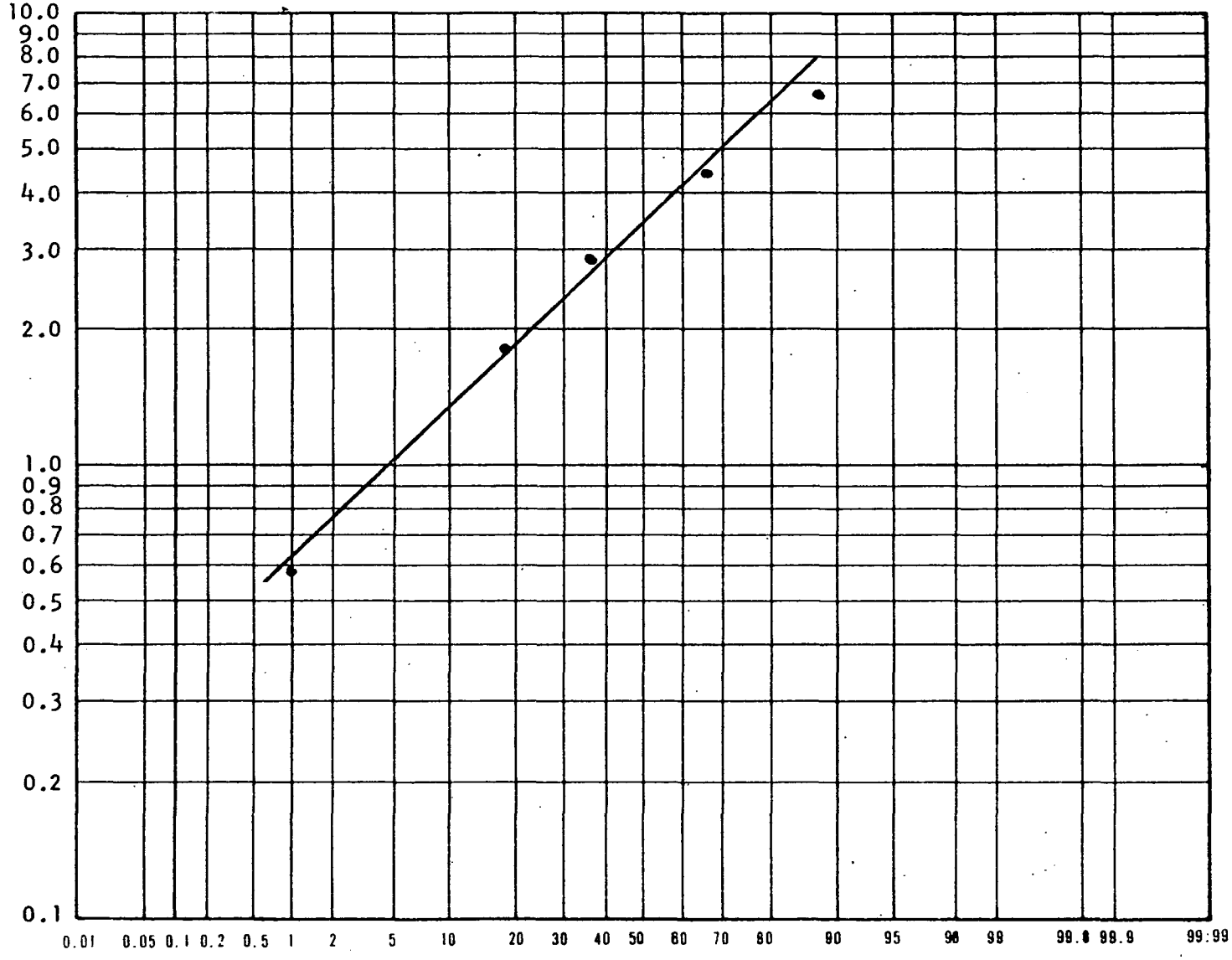


FIGURE 8

Table II

SUMMARY OF VISIBLE EMISSIONS

Date: December 5, 1978
Type of Discharge: Stack
Height of Point of Discharge: Approx100'
Wind Direction: East
Color of Plume: White
Observer No.:
Distance from Observer to Discharge Point: Approx. 25'
Direction of Observer from Discharge Point: Southeast
Height of Observation Point: Approx. 100'
Description of Background: Clear Blue

Type of Plant: Clay
Location of Discharge: Roller Mill Outlet
Description of Sky: Clear Blue
Wind Velocity: 5 - 10 mi/hr
Detached Plume: Yes
Duration of Observation: Approx. 2 h

SUMMARY OF AVERAGE OPACITY

Set Number	Time		Opacity		Set Number	Time		Opacity	
	Start	End	Sum	Average		Start	End	Sum	Average
1	0953	0958	100	5	21	1139	1144	95	5
2	0958	1003	90	5	22	1144	1149	95	5
3	1003	1008	95	5	23	1149	1154	80	4.7
4	1008	1013	100	5	24	1154	1159	95	5
5	1013	1018	90	5	25	1159	1203	70	4.4
6	1018	1023	100	5	26				
7	1023	1028	90	5	27				
8	1028	1033	100	5	28				
9	1033	1038	55	2.9	29				
10	1044	1049	100	5	30				
11	1049	1054	95	5	31				
12	1054	1059	100	5	32				
13	1059	1104	100	5	33				
14	1104	1109	100	5	34				
15	1109	1114	100	5	35				
16	1114	1119	95	5	36				
17	1119	1124	100	5	37				
18	1124	1129	90	5	38				
19	1129	1134	100	5	39				
20	1134	1139	100	5	40				

Sketch Showing How Opacity Varied with Time:

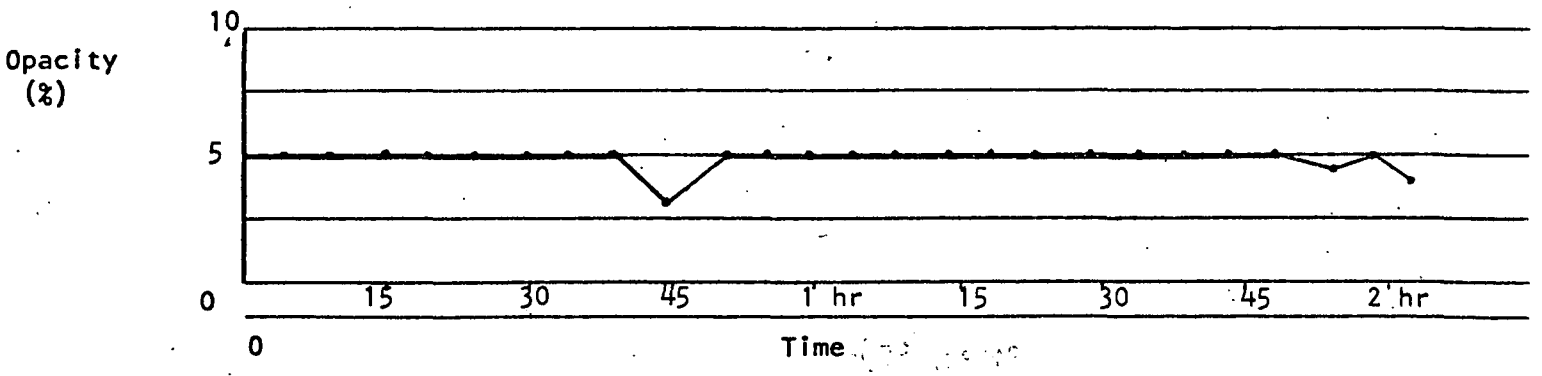


Table 12
SUMMARY OF VISIBLE EMISSIONS

Date: December 1978.
Type of Plant: Clay
Type of Discharge: Stack
Location of Discharge: Roller Mill Outlet
Height of Point of Discharge: Approx. 100'
Description of Sky: Clear Blue
Wind Direction: East
Wind Velocity: 5 - 10 mi/h
Color of Plume: White
Detached Plume: Yes
Observer No.:
Duration of Observation: Approx. 2 h
Distance from Observer to Discharge Point: Approx. 25'
Direction of Observer from Discharge Point: Southeast
Height of Observation Point; Approx. 100'
Description of Background: Clear Blue

SUMMARY OF AVERAGE OPACITY

Set Number	Time		Opacity		Set Number	Time		Opacity	
	Start	End	Sum	Average		Start	End	Sum	Average
1	1050	1055	0	0	21	1235	1240	0	0
2	1055	1100	0	0	22	1240	1245	0	0
3	1105	1110	0	0	23	1245	1250	0	0
4	1110	1115	0	0	24	1250	1251	0	0
5	1115	1120	0	0	25				
6	1120	1125	0	0	26				
7	1125	1130	0	0	27				
8	1130	1135	0	0	28				
9	1135	1140	0	0	29				
10	1140	1145	0	0	30				
11	1145	1150	0	0	31				
12	1150	1155	0	0	32				
13	1155	1200	0	0	33				
14	1200	1205	0	0	34				
15	1205	1210	0	0	35				
16	1210	1215	0	0	36				
17	1215	1220	0	0	37				
18	1220	1225	0	0	38				
19	1225	1230	0	0	39				
20	1230	1235	0	0	40				

Sketch Showing How Opacity Varied with Time:

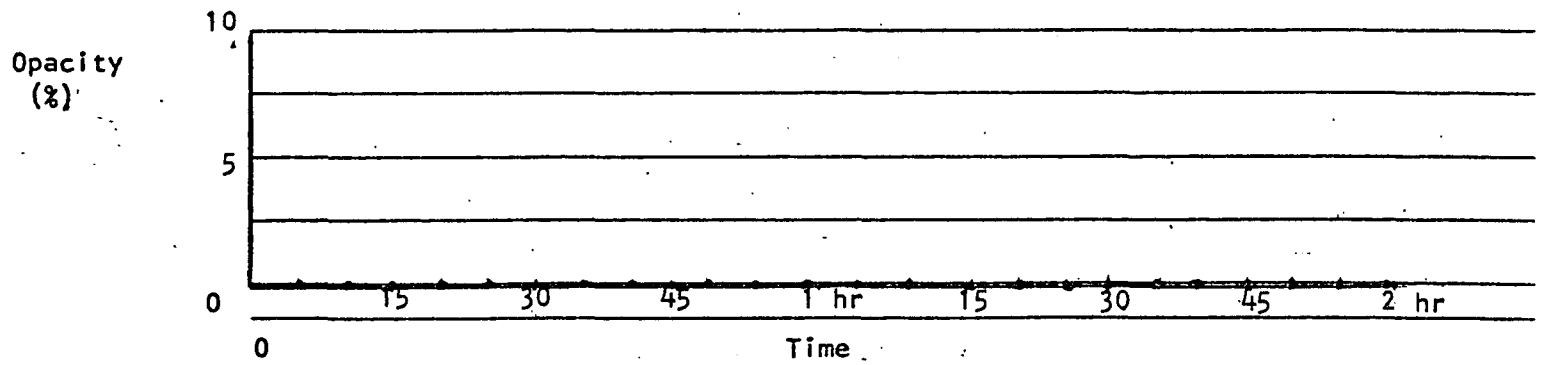


Table 13
SUMMARY OF VISIBLE EMISSIONS

Date: December 5, 1978
Type of Plant: Clay
Type of Discharge: Stack
Location of Discharge: Roller Mill Outlet
Height of Point of Discharge: 100'
Description of Sky: Clear Blue
Wind Direction: East
Wind Velocity: 5 - 10 mi/h
Color of Plume: White
Detached Plume: Yes
Observer No.:
Duration of Observation: 128'
Distance from Observer to Discharge Point: 25'
Direction of Observer from Discharge Point: Southeast
Height of Observation Point: 100'
Description of Background: Clear Blue

SUMMARY OF AVERAGE OPACITY

Set Number	Time		Opacity		Set Number	Time		Opacity	
	Start	End	Sum	Average		Start	End	Sum	Average
1	1357	1402	0	0	21	1537	1542	0	0
2	1402	1407	0	0	22	1542	1547	0	0
3	1407	1412	0	0	23	1547	1552	0	0
4	1412	1417	0	0	24	1552	1557	0	0
5	1417	1422	0	0	25	1557	1602	0	0
6	1422	1427	0	0	26	1602	1605	0	0
7	1427	1432	0	0	27				
8	1432	1437	0	0	28				
9	1437	1442	0	0	29				
10	1442	1447	0	0	30				
11	1447	1452	0	0	31				
12	1452	1457	0	0	32				
13	1457	1502	0	0	33				
14	1502	1507	0	0	34				
15	1507	1512	0	0	35				
16	1512	1517	0	0	36				
17	1517	1522	0	0	37				
18	1522	1527	0	0	38				
19	1527	1532	0	0	39				
20	1532	1537	0	0	40				

Sketch Showing How Opacity Varied with Time:

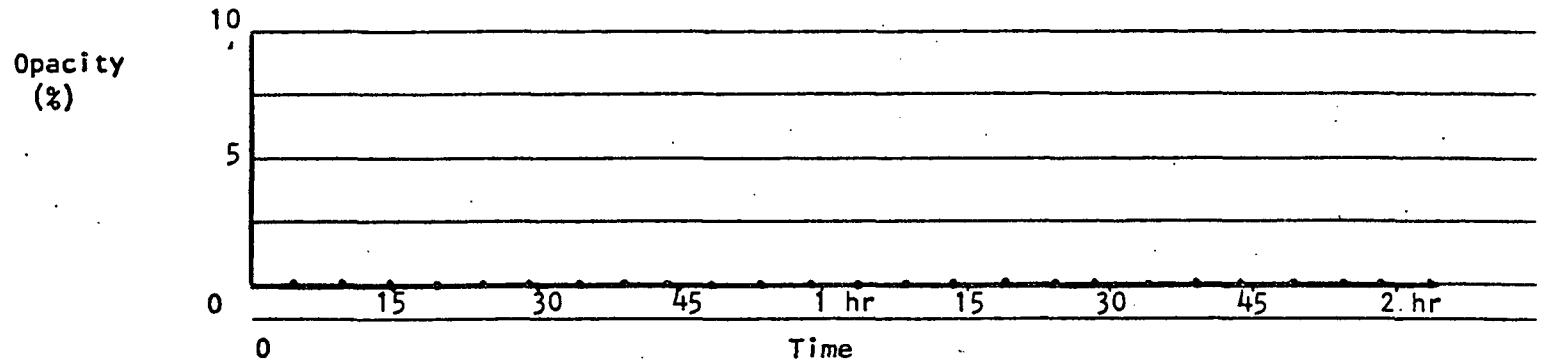


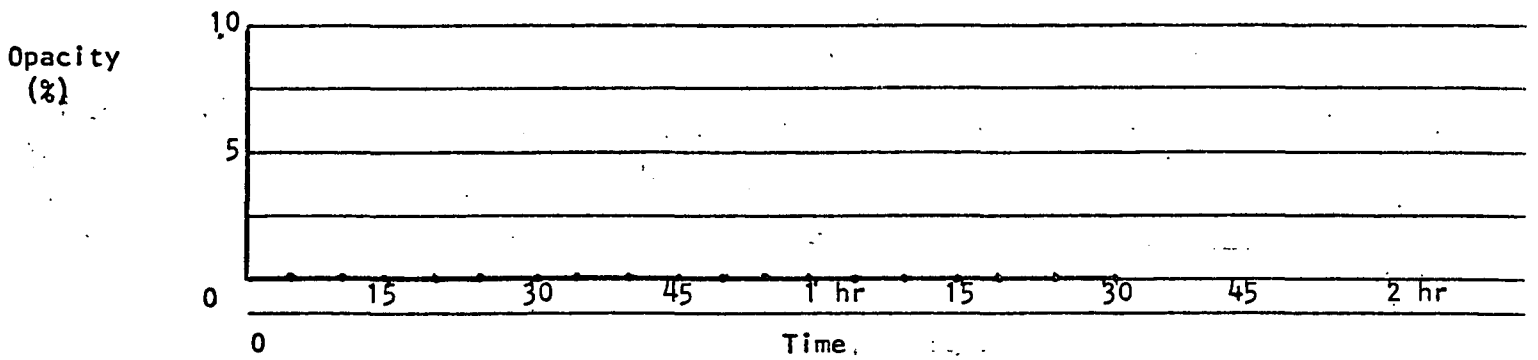
Table 14
SUMMARY OF VISIBLE EMISSIONS

Date: December 6, 1978
Type of Plant: Clay Processing
Type of Discharge: Stack
Location of Discharge: #8 Raymond Impact Mill
Height of Point of Discharge: Approx. 80'
Description of Sky: Blue
Wind Direction: Northwest
Wind Velocity: 5 mi/h
Color of Plume: White
Detached Plume: No
Observer No.:
Duration of Observation: 1 1/2 h
Distance from Observer to Discharge Point: 7'
Direction of Observer from Discharge Point: South
Height of Observation Point; 80'
Description of Background: Green Pine Forest

SUMMARY OF AVERAGE OPACITY

Set Number	Time		Opacity		Set Number	Time		Opacity	
	Start	End	Sum	Average		Start	End	Sum	Average
1	1400	1405	0	0	21				
2	1405	1410	0	0	22				
3	1410	1415	0	0	23				
4	1415	1420	0	0	24				
5	1420	1425	0	0	25				
6	1425	1430	0	0	26				
7	1430	1435	0	0	27				
8	1435	1440	0	0	28				
9	1440	1445	0	0	29				
10	1445	1450	0	0	30				
11	1450	1455	0	0	31				
12	1455	1500	0	0	32				
13	1500	1505	0	0	33				
14	1505	1510	0	0	34				
15	1510	1515	0	0	35				
16	1515	1520	0	0	36				
17	1520	1525	0	0	37				
18	1525	1530	0	0	38				
19					39				
20					40				

Sketch Showing How Opacity Varied with Time:



APPENDIX A

RAW TEST DATA

TRAVERSE POINT LOCATION FOR CIRCULAR DUCTS

PLANT Georgia Kaolin
DATE 12-4-78
SAMPLING LOCATION Inlet Roll Dryer Mill
INSIDE OF FAR WALL TO OUTSIDE OF PORT, (DISTANCE A) 35 1/2"
INSIDE OF NEAR WALL TO OUTSIDE OF PORT, (DISTANCE B) 3 1/2"
STACK I.D., (DISTANCE A - DISTANCE B) 32"
NEAREST UPSTREAM DISTURBANCE 6' 2.25 DIA.
NEAREST DOWNSTREAM DISTURBANCE 22' 8.25 DIA.
CALCULATOR URBAN

0

0

SCHEMATIC OF SAMPLING LOCATION

TRAVERSE POINT NUMBER	FRACTION OF STACK I.D.	STACK I.D.	PRODUCT OF COLUMNS 2 AND 3 (TO NEAREST 1 8 INCH)	DISTANCE B	TRAVERSE POINT LOCATION FROM OUTSIDE OF PORT (SUM OF COLUMNS 4 & 5)
X-Y 1	.044	32"	1 3/8"	3 1/2"	4 7/8
2	.146	↓	4 5/8"	↓	8 1/8
3	.296		9 1/2"		13"
4	.704		22 1/2"		26"
5	.854		27 3/8"		30 7/8"
6	.956	↓	30 5/8"	↓	34 1/8"

PRELIMINARY VELOCITY TRAVERSE

PLANT GEORGIA KAOLIN
DATE 12/4/78
LOCATION INLET #8 R+M
STACK I.D. 32"
BAROMETRIC PRESSURE, in. Hg 29.68
STACK GAUGE PRESSURE, in. H_2O +2.2
OPERATORS URBAN, WILLIAMS

SCHEMATIC OF TRAVERSE POINT LAYOUT

TRAVERSE POINT NUMBER	VELOCITY HEAD (Δp_s), in. H_2O	STACK TEMPERATURE (T_s), °F
X-1	1.20	123
2	1.30	123
3	1.40	124
4	1.50	125
5	1.50	125
6	1.20	124
AVERAGE	1.35	124

TRAVERSE POINT NUMBER	VELOCITY HEAD (Δp_s), in. H_2O	STACK TEMPERATURE (T_s), °F
Y-1	1.25	123
2	1.35	124
3	1.35	125
4	1.45	125
5	1.50	125
6	1.25	124
AVERAGE	1.35	124

NOMOGRAPH DATA

PLANT Ga. Kaolin

DATE 12/4/78

SAMPLING LOCATION #8 Ray. Inn. Mill Inlet

CONTROL BOX NO. 1227

HB = .839

CALIBRATED PRESSURE DIFFERENTIAL ACROSS ORIFICE. in. H_2O	$\Delta H_@$	1.88
AVERAGE METER TEMPERATURE (AMBIENT + 20°F), °F	$T_{m_{avg.}}$	90
PERCENT MOISTURE IN GAS STREAM BY VOLUME	B_{wo}	4%
BAROMETRIC PRESSURE AT METER. in. Hg	P_m	
STATIC PRESSURE IN STACK. in. Hg ($P_m \pm 0.073$ x STACK GAUGE PRESSURE in in. H_2O)	P_s	
RATIO OF STATIC PRESSURE TO METER PRESSURE	$P_s P_m$	1.00
AVERAGE STACK TEMPERATURE, °F	$T_{s_{avg.}}$	125
AVERAGE VELOCITY HEAD. in. H_2O	$\Delta p_{avg.}$	1.35
MAXIMUM VELOCITY HEAD. in. H_2O	$\Delta p_{max.}$	1.50
C FACTOR		1.06
CALCULATED NOZZLE DIAMETER. in.		.183
ACTUAL NOZZLE DIAMETER. in.		.183
REFERENCE Δp. in. H_2O		1.60

FIELD DATA

PLANT Ga. Kaolin
DATE 12/6/78
SAMPLING LOCATION Raymond Inlet
SAMPLE TYPE Part
RUN NUMBER 1
OPERATOR Celiano
AMBIENT TEMPERATURE 57
BAROMETRIC PRESSURE 29.98
STATIC PRESSURE, (P_s) -2.2
FILTER NUMBER (s) 24469, 24470

PROBE LENGTH AND TYPE 4' Pyrex
NOZZLE I.D. .188
ASSUMED MOISTURE, % 8
SAMPLE BOX NUMBER 1
METER BOX NUMBER 1225 $\gamma_1 = .9894$
METER $\Delta H_@$ 2.03
C FACTOR 1.06
PITOT TUBE FACTOR .839 #3
REFERENCE Δp 1.55
NOTE L.C.$_I$ = .003 cfm
L.C.$_P$ = O.K.

READ AND RECORD ALL DATA EVERY 5 MINUTES

TRAVERSE POINT NUMBER	SAMPLING TIME, min / CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE	
				DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F
	1645	492.404						
X-1		494.200	.80	.94	.94	151	70	68
2		497.350	.72	.84	.84	147	78	71
3		499.750	.68	.79	.79	142	80	73
4		502.600	.85	.99	.99	137	83	74
5		505.200	.80	.94	.94	136	86	76
6	1645 stop	507.501	.75	.88	.88	131	90	78
		LC's OK						
	1653 start	507.651						
Y-1		510.000	.55	.63	.63	128	81	78
2		512.200	.57	.66	.66	132	88	81
3		514.500	.65	.77	.77	132	90	82
4		517.200	.80	.94	.94	132	91	82
5		519.750	.75	.88	.88	133	92	82
6	1733	522.100	.75	.88	.88	133	93	82
		15.097						
		14.447						
		29.546	.84827	.895		136.17	81.21	

PUMP	SAMPLE BOX	IMPINGER
	0.84827	T_P
	0.845	T_H
	136.17	TS
	81.21	TM
	29.546	VMA
	29.98	PBAR
	40.	VWC
	8.5	WSG
	48.5	TH2O
	28.97	TWD
	5.585	AS
	60.	TI
	-2.2	STAT
	0.188	DN
	0.9894	Y
	0.839	DP
	28.63560926	VMS
	2.283575	VWS
	7.385624991	%M
	.9261437501	MD
	28.159796 94	MWS
	29.81823529	PS
	51.26733198	VS
	17179.88295	QACF
	14043.52883	QSTD
	98.45915847	%I

FIELD DATA

PLANT GA. Kaolin
DATE 12/6/78
SAMPLING LOCATION Cyclones Inlet
SAMPLE TYPE Particle size
RUN NUMBER 1
OPERATOR Celano
AMBIENT TEMPERATURE 60
BAROMETRIC PRESSURE 29.98
STATIC PRESSURE, (P_g) -.32
FILTER NUMBER (s) 23A

PROBE LENGTH AND TYPE 4' Pyrex
NOZZLE I.D. .188
ASSUMED MOISTURE, % 8
SAMPLE BOX NUMBER
METER BOX NUMBER 1225 ~~1225~~ Y=.9894
METER $\Delta H_@$
C FACTOR
PITOT TUBE FACTOR
REFERENCE Δp
NOTE L.C, I & F = O.K.

READ AND RECORD ALL DATA EVERY 5 MINUTES

TRAVERSE POINT NUMBER	CLOCK TIME (24-hr CLOCK) / SAMPLING TIME, min	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE		PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
				DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F			
	1730	522.343									
X-2	5 min	525.289	.80	.94	.94	135	84	80	1		
		2.946									
		↓									
		$17.71(2.946)\ .9894\left(29.98+\frac{.94}{13.6}\right)$									
		$.926\ (460+82)$							= 3.091 ÷ 5 =	0.618	wscfm
		501.89								through	nozzle
		level	Series wt, mg	23A		%	Cum %		ECD,	x Tap Corr.	EAD, m.
		0	35.1			10.1	100		12.5	1.05	13.1
		1	45.9			13.2	89.9		7.7		8.1
		2	124.9			35.8	76.7		5.2		5.5
		3	97.3			27.9	40.9		3.65		3.8
		4	30.9			8.9	13.0		2.3		2.4
		5	12.3			3.5	4.1		1.15		1.2
		6	2.1			0.6	0.6		0.7		0.7
		7	0.0			0.0	0.0		~~0.48~~		~~0.5~~
		8 (Backup)	0.0			0.0	0.0		—		—
			348.5			100.0					

TRAVERSE POINT LOCATION FOR CIRCULAR DUCTS

PLANT GEORGIA KAOLIN
DATE 12/4/78
SAMPLING LOCATION OUTLET #8 RIM
INSIDE OF FAR WALL TO
OUTSIDE OF PORT. (DISTANCE A) 29"
INSIDE OF NEAR WALL TO
OUTSIDE OF PORT. (DISTANCE B) 3"
STACK I.D.. (DISTANCE A - DISTANCE B) 26"
NEAREST UPSTREAM DISTURBANCE 40" 1.54 DIA.
NEAREST DOWNSTREAM DISTURBANCE 150" 5.77 DIA.
CALCULATOR IARBAN

SCHEMATIC OF SAMPLING LOCATION

TRAVERSE POINT NUMBER	FRACTION OF STACK I.D.	STACK I.D.	PRODUCT OF COLUMNS 2 AND 3 (TO NEAREST 1 8 INCH)	DISTANCE B	TRAVERSE POINT LOCATION FROM OUTSIDE OF PORT (SUM OF COLUMNS 4 & 5)
X-Y 1	.016	26"	3/8"	3"	3 3/8
2	.049		1 1/4		4 1/4
3	.085		2 1/4		5 1/4
4	.125		3 1/4		6 1/4
5	.169		4 3/8		7 1/4
6	.220		5 3/4		8 3/4
7	.283		7 3/8		10 3/8
8	.375		9 3/4		12 3/4
9	.625		16 1/4		19 1/4
10	.717		18 5/8		21 5/8
11	.780		20 1/4		23 1/4
12	.831		21 5/8		24 5/8
13	.875		22 3/4		25 3/4
14	.915		23 3/4		26 3/4
15	.951		24 3/4		27 3/4
16	.984	↓	25 5/8	↓	28 5/8

PRELIMINARY VELOCITY TRAVERSE

PLANT GEORGIA KAOLIN
DATE 12/4/78
LOCATION OUTLET #8 RTM
STACK I.D. 26"
BAROMETRIC PRESSURE, in. Hg 29.88
STACK GAUGE PRESSURE, in. H_2O 1.5" H_2O
OPERATORS URBAN / WILLIAMS

Pitot DA
Box 1204

.5 = 1.72 1.0 = 1.84 1.5 = 1.85

TRAVERSE POINT NUMBER	VELOCITY HEAD (Δp_s), in. H_2O	STACK TEMPERATURE (T_s), °F
X - 1	1.73	127
2	1.93	127
3	2.20	128
4	2.30	128
5	2.26	128
6	2.20	129
7	2.15	130
8	2.0	130
9	1.9	130
10	1.95	130
11	1.95	131
12	1.85	130
13	1.80	130
14	1.80	129
15	1.70	129
16	1.65	129
AVERAGE		

Cyclonic Flow

SCHEMATIC OF TRAVERSE POINT LAYOUT

TRAVERSE POINT NUMBER	VELOCITY HEAD (Δp_s), in. H_2O	STACK TEMPERATURE (T_s), °F
Y - 1	1.30	1.28
2	1.30	128
3	1.50	129
4	1.50	129
5	1.55	129
6	1.60	129
7	1.65	130
8	1.80	130
9	1.90	130
10	1.95	130
11	2.0	130
12	2.13	130
13	2.20	131
14	2.28	132
15	2.20	132
16	2.10	131
AVERAGE		

NOMOGRAPH DATA

PLANT Ga. Kaolin

DATE 12-9-78

SAMPLING LOCATION #8 Raymond Impact mill Outlet

CONTROL BOX NO. 1204

CALIBRATED PRESSURE DIFFERENTIAL ACROSS ORIFICE. in. H_2O	$\Delta H_{@}$	1.89
AVERAGE METER TEMPERATURE (AMBIENT + 20°F). °F	$T_{m\,avg.}$	90
PERCENT MOISTURE IN GAS STREAM BY VOLUME	B_{wo}	8
BAROMETRIC PRESSURE AT METER. in Hg	P_m	30.0
STATIC PRESSURE IN STACK. in. Hg ($P_m \pm 0.073$ x STACK GAUGE PRESSURE in in. H_2O)	P_s	30.1
RATIO OF STATIC PRESSURE TO METER PRESSURE	$P_s\ P_m$	1.0
AVERAGE STACK TEMPERATURE. °F	$T_{s_{avg.}}$	130
AVERAGE VELOCITY HEAD. in. H_2O	$\Delta p_{avg.}$	1.75
MAXIMUM VELOCITY HEAD. in. H_2O	$\Delta p_{max.}$	2.3
C FACTOR		.99
CALCULATED NOZZLE DIAMETER. in.		13/16
ACTUAL NOZZLE DIAMETER. in.		x .180
REFERENCE Δp. in. H_2O		1.80

PLANT GA. KAOLIN
DATE 12/6/78
SAMPLING LOCATION #8 DIM OUT
SAMPLE TYPE PART.
RUN NUMBER 1A
OPERATOR URBAN
AMBIENT TEMPERATURE 70
BAROMETRIC PRESSURE 29.98
STATIC PRESSURE, (P_s) -1.6" H_2O
FILTER NUMBER (s) K4967

PROBE LENGTH AND TYPE 4' PYREX
NOZZLE I.D. .180
ASSUMED MOISTURE, % 8
SAMPLE BOX NUMBER 4
METER BOX NUMBER 120Y
METER $\Delta H_@$ 1.84
C FACTOR .97
PITOT TUBE FACTOR .850 DIA
REFERENCE Δp 1.83
NOTE ~~C_s = .018 CPM~~
C_s = .014 CPM

~~1.0045~~
2.98433

READ AND RECORD ALL DATA EVERY 3.0 MINUTES

TRAVERSE POINT NUMBER	SAMPLING TIME, min / CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE	
				DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F
	0 / 1355	819.682						
Y-1	3	821.2	1.13	1.13		125	90	89
2	6	823.3	1.23	1.23		125	93	90
3	9	825.1	1.25	1.25		123	94	90
4	12	827.0	1.30	1.31		123	96	90
5	15	828.9	1.25	1.25		123	96	90
6	18	830.8	1.42	1.42		124	96	89
7	21	832.8	1.53	1.52		123	97	89
8	24	834.9	1.47	1.46		124	98	89
9	27	836.9	1.63	1.62		123	100	89
10	30	839.2	1.80	1.75		124	100	89
11	33	841.3	1.95	1.90		125	98	90
12	36	843.7	2.10	2.05		125	101	90
13	39	846.1	2.20	2.13		125	102	90
14	42	848.4	2.15	2.09		126	103	90
15	45	850.8	2.18	2.11		127	104	90
16	48	853.154	2.08	2.02		125	105	91

1.3192	$\Gamma_{\Delta P}$
1.7209	ΔH
130.875	TS
95.359	TM
69.073	VMA
29.98	PBAR
90.	VWC
14.5	WSG
104.5	TH2O
28.97	MWD
3.687	AS
96.	TT
1.6	STAT
0.18	DN
0.9843	Y
0.85	CP
65.04196833	VMS
4.919975	VWS
7.082358973	%M
.9296764103	MD
28.19855022	MWS
30.09764706	PS
79.98582531	VS
17694.46428	QACT
14786.89691	QSTD
95.59677428	%I

TRAVERSE POINT NUMBER	SAMPLING TIME, min / CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft³	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE		PUMP VACUUM, in Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
				DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F			
	0	853.154									
Y-1	3	855.2	1.50	1.47		129	90	89	7	250	62
2	6	857.3	1.73	1.70		131	95	90	8	255	62
3	9	859.6	2.00	1.95		132	98	90	10	255	62
4	12	861.9	2.05	2.00		137	100	90	10	260	62
5	15	864.2	2.10	2.05		137	102	90	10	265	62
6	18	866.6	2.00	1.95		136	104	90	10	260	62
7	21	868.9	2.00	1.95		135	105	90	10	260	62
8	24	871.2	2.00	1.95		135	106	90	10	250	62
9	27	873.5	1.90	1.85		136	106	91	10	245	63
10	30	875.8	1.90	1.85		134	106	91	10	240	63
11	33	877.9	1.80	1.76		139	106	92	8	240	63
12	36	880.1	1.70	1.68		143	105	92	8	245	63
13	39	882.3	1.80	1.76		143	105	92	8	250	63
14	42	884.6	1.80	1.76		143	105	92	8	255	63
15	45	886.9	1.70	1.68		145	105	92	8	260	63
16	48	888.755	1.50	1.47		143	104	92	7	250	63
	1540		$\overline{\sqrt{\Delta p}}$								
		69.073	1.3192	1.7209		130.875	95.359				

T.H. Δp = 1.5" H_2O

FIELD DATA

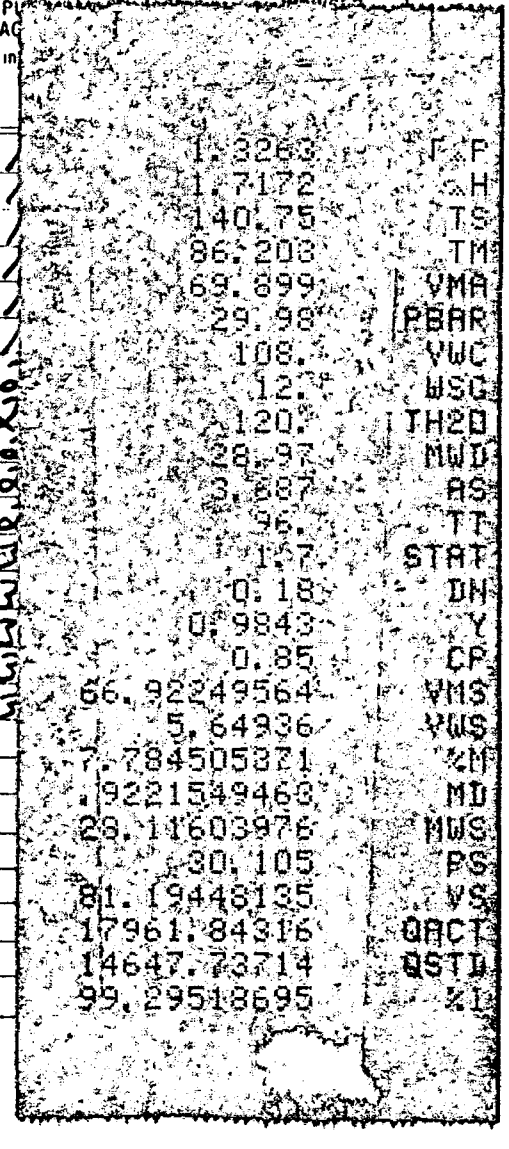
PLANT GA. KAOLIN
DATE 12/16/78
SAMPLING LOCATION #3 RTM OUT
SAMPLE TYPE PART
RUN NUMBER 2A
OPERATOR URBAN
AMBIENT TEMPERATURE 60
BAROMETRIC PRESSURE 29.98
STATIC PRESSURE, (P_s) -1.7 H_2O
FILTER NUMBER (s) 24402

PROBE LENGTH AND TYPE 4' PYREX
NOZZLE I.D. .180
ASSUMED MOISTURE, % 8
SAMPLE BOX NUMBER 4
METER BOX NUMBER 1204
METER $\Delta H_@$ 1.84
C FACTOR .99
PITOT TUBE FACTOR .850 RA
REFERENCE Δp 1.83
NOTE LC_{H_2O} = .016 CAM
LC_{Hg} = .009 CAM

Y_d^2 = .98433

READ AND RECORD ALL DATA EVERY 3.0 MINUTES

TRAVERSE POINT NUMBER	SAMPLING TIME, min / CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE		PUMP VACUUM, in. Hg
				DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F	
	0 / 1655	890.000							
X-1	3	891.7	1.05	1.00		137	83	85	1
2	6	893.4	1.05	1.00		138	81	84	1
3	9	895.2	1.20	1.16		139	83	85	1
4	12	897.0	1.35	1.30		139	85	84	1
5	15	898.0	1.32	1.29		139	86	84	1
6	18	900.9	1.40	1.37		140	88	84	1
7	21	903.0	1.45	1.40		139	88	84	1
8	24	904.9	1.60	1.55		139	89	84	1
9	27	907.1	1.75	1.70		139	89	84	1
10	30	909.4	1.80	1.75		140	90	83	1
11	33	911.6	2.00	1.93		139	91	84	1
12	36	913.9	2.05	1.97		141	92	84	1
13	39	916.4	2.15	2.07		141	94	84	1
14	42	918.8	2.20	2.12		140	94	83	1
15	45	921.2	2.20	2.12		139	95	83	1
16	48	923.503	2.10	2.01		137	96	83	1



TRAVERSE POINT NUMBER	SAMPLING TIME, min / CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft³	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE		PUMP VACUUM, in Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
				DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F			
	0	923.503									
Y-1	3	925.4	1.50	1.45		139	85	82	2	250	49
2	6	927.6	1.50	1.45		141	90	82	2	255	49
3	9	929.7	1.95	1.90		142	89	83	3	260	49
4	12	932.0	2.00	1.93		143	90	82	3	265	48
5	15	934.4	2.05	1.97		143	90	82	3	260	48
6	18	936.7	2.10	2.01		142	91	82	3	260	48
7	21	939.1	2.05	1.97		142	91	82	3	255	48
8	24	941.3	2.00	1.93		142	92	82	3	260	48
9	27	943.5	1.85	1.80		141	92	82	3	255	48
10	30	945.8	1.90	1.85		142	91	82	3	250	48
11	33	948.1	1.90	1.85		143	91	82	3	240	47
12	36	950.4	1.90	1.85		143	91	81	3	240	47
13	39	952.8	1.90	1.85		144	91	80	3	235	47
14	42	955.2	1.90	1.85		144	91	80	3	230	47
15	45	957.6	1.90	1.85		144	91	80	3	235	47
16	48	959.899	1.75	1.70		143	91	80	3	245	47
	1840	69.899	1.3263	1.71	72	140.75	86.203				

SUMMARY
RECORD OF VISIBLE EMISSIONS

Type of Plant Clay Processing — Date 12-6-78

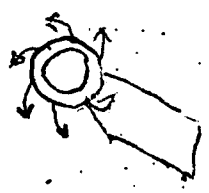
Company Name Ga. Kaolin — Hours of Observation 1400-1530

Plant Address Dry Branch, Ga. — Observer J.A. Williams

Type of Discharge (STACK) OTHER _____

Discharge Location #8 RJM

Height of Point of Discharge ~80'



Observer's Location:

Distance to Discharge Point 7'

Height of Observation Point 80'

Direction from Discharge Point S

Background Description Green Pine Forest.

Weather: (Clear) Overcast Partly Cloudy Other _____ Sky Color BL.

Wind Direction NW Wind Velocity 5 mi/hr

Plume Description:

Detached: Yes (No)

Color: Black (White) Other _____

Plume Dispersion Behavior: (Looping) Coning Fanning

Lofting Fumigating Other _____

Estimated Distance Plume Visible CONDENSATE 100'

RECORD OF VISIBLE EMISSIONS

Company Name: GA. Kaolin
Date: 12-6-78
Plant Address: Dry Branch, Ga.
Observer: J. A. Williams
Stack Location: #8 RIM
Observer's Location: See record
Weather Conditions: See record

TIME						COMMENTS
HR	MIN	SECONDS 00	15	30	45	
14	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	
	05	0	0	0	0	
	06	0	0	0	0	
	07	0	0	0	0	
	08	0	0	0	0	
	09	0	0	0	0	
	10	0	0	0	0	
	11	0	0	0	0	
	12	0	0	0	0	
	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	0	0	0	0	
	25	0	0	0	0	
	26	0	0	0	0	
	27	0	0	0	0	
	28	0	0	0	0	
14	29	0	0	0	0	

RECORD OF VISIBLE EMISSIONS

Company Name Ga. Kaolin
Plant Address Dry Branch
Stack Location #8 RIM
Weather Conditions See record

Date 12-6-78
Observer J. A. Williams
Observer's Location See record

TIME						COMMENTS
HR	MIN	SECONDS				
		00	15	30	45	
14	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	
	35	0	0	0	0	
	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	
	41	0	0	0	0	
	42	0	0	0	0	
	43	0	0	0	0	
	44	0	0	0	0	
	45	0	0	0	0	
	46	0	0	0	0	
	47	0	0	0	0	
	48	0	0	0	0	
	49	0	0	0	0	
	50	0	0	0	0	
	51	0	0	0	0	
	52	0	0	0	0	
	53	0	0	0	0	
	54	0	0	0	0	
	55	0	0	0	0	
	56	0	0	0	0	
	57	0	0	0	0	
	58	0	0	0	0	
14	59	0	0	0	0	

RECORD OF VISIBLE EMISSIONS

Company Name GA. Kaolin. Date 12-6-78

Plant Address Dry Branch, Ga. Observer J.A. Williams

Stack Location #8 Rim Observer's Location See record

Weather Conditions See record

HR	MIN	TIME SECONDS 00	15	30	45	COMMENTS
15	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	
	05	0	0	0	0	
	06	0	0	0	0	
	07	0	0	0	0	
	08	0	0	0	0	
	09	0	0	0	0	
	10	0	0	0	0	
	11	0	0	0	0	
	12	0	0	0	0	
	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	0	0	0	0	
	25	0	0	0	0	
	26	0	0	0	0	
	27	0	0	0	0	
	28	0	0	0	0	
15	29	0	0	0	0	

DA

PLANT G.A. KAKLIN
DATE 12/6/78
SAMPLING LOCATION #8 RTM OUT
SAMPLE TYPE PART
RUN NUMBER 3A
OPERATOR URBAN
AMBIENT TEMPERATURE 50
BAROMETRIC PRESSURE 29.6" H_2O
STATIC PRESSURE, (P_s) -2.9
FILTER NUMBER (s) 24171

PROBE LENGTH AND TYPE 4' PYREX
NOZZLE I.D. .180
ASSUMED MOISTURE, % 8
SAMPLE BOX NUMBER 4
METER BOX NUMBER 1204
METER $\Delta H_@$ 1.84
C FACTOR .97
PITOT TUBE FACTOR .850
REFERENCE Δp 1.90
NOTE CC T_s = 1018 CAM
C_{CO_2} = .011 CAM

READ AND RECORD ALL DATA EVERY 3.0 MINUTES

TRAVERSE POINT NUMBER	SAMPLING TIME, min / CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE		PUMP VACUUM, in. H
				DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F	
	0 / 1415	969.029							
Y-1	3	970.8	1.05	1.02		136	69	64	1
2	6	972.5	1.05	1.02		138	68	64	1
3	9	974.2	.95	.94		137	68	64	1
4	12	976.1	1.30	1.28		138	68	64	2
5	15	978.0	1.40	1.37		142	68	65	2
6	18	980.1	1.47	1.42		142	69	65	3
7	21	982.3	1.53	1.49		143	70	65	3
8	24	984.5	1.70	1.68		144	70	66	4
9	27	986.8	1.90	1.85		144	79	67	4
10	30	989.2	1.98	1.93		145	80	68	5
11	33	991.7	2.00	1.95		146	84	68	5
12	36	994.1	2.10	2.05		147	86	70	5
13	39	996.7	2.22	2.13		145	86	70	5
14	42	999.3	2.25	2.18		146	90	71	5
15	45	1.9	2.30	2.27		145	90	72	6
16	48	4.446	2.20	2.11		143	91	23	6

1.3389	ΓΔP
1.7725	ΔH
141.448	TS
76.2344	TM
73.323	VMA
29.98	PBAR
75.	VWC
12.5	WSG
8.5	TH2O
28.97	MWD
5.687	AS
96.	TT
1.6	STAT
0.18	DN
0.9843	Y
0.85	CP
71.51538048	VMS
4.119625	VWS
5.446717395	%M
.9455328261	MD
28.3724951	MWS
30.09764706	PS
81.65191776	VS
18063.03725	QACT
15082.47916	QSTD
103.0512649	%I

TRAVERSE POINT NUMBER	SAMPLING TIME, min / CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE		PUMP VACUUM, in Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
				DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F			
	0	4,446									
X-1	3	6.3	1.10	1.08		138	80	72	1	255	46
2	6	8.1	1.15	1.12		138	80	73	1	260	45
3	9	10.8	1.55	1.50		139	80	73	3	265	44
4	12	12.5	1.80	1.75		139	82	73	4	270	44
5	15	14.8	1.90	1.85		139	84	73	5	275	44
6	18	17.3	2.13	2.08		139	85	73	5	270	43
7	21	19.8	2.20	2.13		139	86	73	5	265	43
8	24	22.4	2.25	2.18		140	88	73	6	270	43
9	27	24.9	2.10	2.05		140	89	74	5	260	43
10	30	27.4	2.10	2.05		141	90	74	5	250	43
11	33	29.5	2.15	2.10		142	90	74	5	240	43
12	36	32.4	2.13	2.08		142	90	74	5	235	42
13	39	34.9	2.18	2.11		142	90	75	5	240	42
14	42	37.5	2.15	2.10		141	91	75	5	250	42
15	45	39.9	2.05	2.00		142	91	75	5	255	42
16	48	42.352	1.90	1.85		143	92	75	5	260	42
2130		73.323	1.3389	1.7725		141.54181	76.23141				

TRAVERSE POINT LOCATION FOR CIRCULAR DUCTS

PLANT Ga. Kaolin
DATE 12-5-78
SAMPLING LOCATION Inlet-Roller Mill
INSIDE OF FAR WALL TO OUTSIDE OF PORT, (DISTANCE A) 22 5/8
INSIDE OF NEAR WALL TO OUTSIDE OF PORT, (DISTANCE B) 5 1/4
STACK I.D., (DISTANCE A - DISTANCE B) 17 3/8
NEAREST UPSTREAM DISTURBANCE 18" 1.04 D.D.
NEAREST DOWNSTREAM DISTURBANCE 52" 3.0 D.D.
CALCULATOR Jackson

SCHEMATIC OF SAMPLING LOCATION

TRAVERSE POINT NUMBER	FRACTION OF STACK I.D.	STACK I.D.	PRODUCT OF COLUMNS 2 AND 3 (TO NEAREST 1 8 INCH)	DISTANCE B	TRAVERSE POINT LOCATION FROM OUTSIDE OF PORT (SUM OF COLUMNS 4 & 5)
X- 1	.018	17.375"	1/2	5 1/4"	5 3/4"
2	.057		1		6 1/4
3	.099		1 3/4		7
4	.146		2 1/2		7 3/4
5	.201		3 1/2		8 3/4
6	.269		4 5/8		9 7/8
7	.366		6 3/8		11 5/8
8	.634		11		16 1/4
9	.731		12 3/4		18
10	.799		13 7/8		19 1/8
11	.854		14 7/8		20 1/8
12	.901		15 5/8		20 7/8
13	.943		16 3/8		21 5/8
14	.982		16 7/8		22 1/8

PRELIMINARY VELOCITY TRAVERSE

PLANT Ga. Kaolin
DATE 12-5-78
LOCATION Inlet - Roller Mills
STACK I.D. 17 3/8"
BAROMETRIC PRESSURE, in. Hg
STACK GAUGE PRESSURE, in. H_2O -3.1
OPERATORS Celiano / Maloney

SCHEMATIC OF TRAVERSE POINT LAYOUT

TRAVERSE POINT NUMBER	VELOCITY HEAD (Δp_s), in. H_2O	STACK TEMPERATURE (T_s), °F
	2.1	132
	2.15	135
	2.2	136
	2.1	136
	2.1	137
	2.05	137
	1.95	137
	1.9	137
	1.8	138
	1.8	138
	1.8	138
	1.75	138
	1.7	138
	1.7	138
	1.7	138
	1.8	138
AVERAGE	1.95	137

TRAVERSE POINT NUMBER	VELOCITY HEAD (Δp_s), in. H_2O	STACK TEMPERATURE (T_s), °F
	2.0	138
	1.95	139
	1.95	141
	1.85	141
	1.8	141
	1.75	141
	1.75	142
	1.75	142
	1.7	142
	1.65	142
	1.6	142
AVERAGE	1.75	142

1.85 140

NOMOGRAPH DATA

PLANT GA. Kaolin

DATE 12-5-78

SAMPLING LOCATION Inlet - Roller Mill

CONTROL BOX NO. 1205

CALIBRATED PRESSURE DIFFERENTIAL ACROSS ORIFICE, in. H_2O	$\Delta H_@$	1.94
AVERAGE METER TEMPERATURE (AMBIENT + 20 °F), °F	$T_{m_{avg.}}$	90
PERCENT MOISTURE IN GAS STREAM BY VOLUME	B_{wo}	9
BAROMETRIC PRESSURE AT METER, in Hg	P_m	
STATIC PRESSURE IN STACK, in. Hg ~3.1 ($P_m \pm 0.073$ x STACK GAUGE PRESSURE in in. H_2O)	P_s	
RATIO OF STATIC PRESSURE TO METER PRESSURE	P_s P_m	1.0
AVERAGE STACK TEMPERATURE, °F	$T_{s_{avg.}}$	140
AVERAGE VELOCITY HEAD, in. H_2O	$\Delta p_{avg.}$	1.85
MAXIMUM VELOCITY HEAD, in. H_2O	$\Delta p_{max.}$	2.20
C FACTOR	1.0	
CALCULATED NOZZLE DIAMETER, in.	.188	
ACTUAL NOZZLE DIAMETER, in.	.188	
REFERENCE Δp, in. H_2O	1.55	

FIELD DATA

PLANT GA. Kaolin
DATE 12-6-78
SAMPLING LOCATION Roller Mill Dryer
SAMPLE TYPE Part
RUN NUMBER 1
OPERATOR Celiano
AMBIENT TEMPERATURE 50
BAROMETRIC PRESSURE 29.98
STATIC PRESSURE, (P_s) -3.1
FILTER NUMBER (s) 24464,65,68

PROBE LENGTH AND TYPE 4' Pyrex
NOZZLE I.D. .168
ASSUMED MOISTURE, % 8
SAMPLE BOX NUMBER 1
METER BOX NUMBER 1205
METER $\Delta H_@$ 1.97
C FACTOR 1.0
PITOT TUBE FACTOR Hi=.839
REFERENCE Δp 1.55
NOTE L.C. = O.K.
L.C. Filter = O.K.

γ = .9758

READ AND RECORD ALL DATA EVERY 2 MINUTES

TRAVERSE POINT NUMBER	SAMPLING TIME, min / CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE		PUMP VACUUM, in.	SAMPLE BOX	IMPINGER
				DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F			
	0 / 1053	252.237									
X-1	2	253.900	1.7	2.02	2.02	144	83	81	3		
2	4	255.700	1.7	2.02	2.02	134	91	83	4		
3	6	257.200	1.8	2.13	2.13	137	97	89	4		
4	8	258.900	2.0	2.4	2.4	136	101	85	4		
5	10	260.700	1.95	2.3	2.4	134	106	86	9		
6	12	262.200	2.0	2.4	2.4	134	108	86	11		
7	14	263.800	1.95	2.3	2.3	133	110	86	12		
8	16	265.800	1.95	2.3	2.3	134	110	87	13		
9	18	266.950	2.0	2.4	2.4	135	111	87	13		
10	20	268.700	2.0	2.4	2.4	134	112	87	14		
11	22	269.950	2.05	2.45	2.45	134	113	87	13		
12	24	271.750	2.05	2.45	2.45	135	113	87	15		
13	26	273.450	2.00	2.4	2.4	134	113	88	13		
14	28 Stop 1121 →	274.857	2.00	2.4	2.4	139	113	88	13		
Y-1	2 Go 1134	276.800	2.00	2.4	2.4	141	92	87	7		
2	4 OFF 1141 →	279.000	2.00	2.4	2.4	141	104	88	8		
3	6 GAL 1215 →	283.041	2.0	2.4	2.4	140	108	88	13		
4	8	284.000	2.0	2.4	2.4	133	94	90	5		
5	10	285.900	2.15	2.52	2.52	132	104	90	7		
6	12	287.300	2.2	2.6	2.6	132	108	91	8		
7	14	289.300	2.25	2.72	2.72	131	112	91	8		
8	16	291.200	2.35	2.81	2.81	132	116	92	9		
9	18	293.750	2.2	2.6	2.6	132	118	92	9		
10	20	295.950	2.15	2.52	2.52	132	120	93	9		

56 min

1.4312	Γ_a F
2.4439	ΔH
134.46	TS
98.61	TM
46.555	VMA
29.98	PBAR
75.	VWC
4.	WSG
79.	TH2O
28.97	MWD
1.647	AS
56.	TT
-3.1	STAT
0.188	DH
0.9758	Y
0.839	CP
43.28289694	VMS
3.71885	VWS
7.912152722	%M
.9208784728	%MD
28.10203685	MWS
29.75205882	PS
86.55885692	TVS
8553.746241	QAC
6957.031269	QSTD
94.91873727	

[redacted] [redacted] [redacted]

TRAVERSE POINT NUMBER	SAMPLING TIME, min / CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE		PUMP VACUUM, in Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
				DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F			
		296.000									
Y-11	22	297.950	2.1	2.47	2.47	131	120	94	8.5		
Y 12	24	299.830	2.2	2.6	2.6	132	121	99	10.5		
13	26	301.050	2.35	2.81	2.81	132	121	95	15		
14	28	302.833	2.35	2.81	2.81	132	121	95	15		
	off										
	1240	26.763									
		19.792									
		46.555	1.4312	2.4939		134.46	98.61				

FIELD DATA

PLANT Georgia Kadin
DATE 12-6-78
SAMPLING LOCATION Roller Mill
SAMPLE TYPE Part. Size
RUN NUMBER 1
OPERATOR Celiano
AMBIENT TEMPERATURE 52
BAROMETRIC PRESSURE 29.98
STATIC PRESSURE, (P_s) -3.1
FILTER NUMBER (s) 32A

PROBE LENGTH AND TYPE 4' Borosilicate
NOZZLE I.D. .188
ASSUMED MOISTURE, %
SAMPLE BOX NUMBER 1
METER BOX NUMBER
METER $\Delta H_@$
C FACTOR
PITOT TUBE FACTOR
REFERENCE Δp
NOTE

$\gamma = .9758$

READ AND RECORD ALL DATA EVERY _____ MINUTES

TRAVERSE POINT NUMBER	CLOCK TIME (24-hr CLOCK) / SAMPLING TIME, min	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE		PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
				DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F			
	12	302.851									
Y-6		305.647	2.2	2.6	2.6	135	98	94	5		
		2.796									
	TT = 3 min		$17.71\left(\frac{2.796}{.921}\right)\left(\frac{976}{460+96}\right)\left(29.98+\frac{2.6}{13.6}\right)$							$=2.847 \div 3 =$	0.949
				512.1							
		level	Series	32A		%	Cum %		ECD	x T conv	= EAD$_n$
		0	17.6			13.2	100		9.8	1.05	10.3
		1	27.4			21.3	86.8		6.4		6.7
		2	37.1			28.8	65.5		4.2		4.4
		3	23.0			17.9	36.7		2.8		2.9
		4	16.8			13.0	18.8		1.75		1.8
		5	7.1			5.5	5.8		0.94		1.0
		6	0.4			0.3	0.3		0.56		0.6
		7	0.0			0.0	0.0		0.37		0.4
		8	0.0			0.0	0.0				
						100.0					
			128.8								

TRAVERSE POINT LOCATION FOR CIRCULAR DUCTS

PLANT Georgia Kaolin
DATE 12-4-78
SAMPLING LOCATION RM Outlet
INSIDE OF FAR WALL TO OUTSIDE OF PORT, (DISTANCE A) 27 1/2"
INSIDE OF NEAR WALL TO OUTSIDE OF PORT, (DISTANCE B) 3 1/2"
STACK I.D., (DISTANCE A - DISTANCE B) 24"
NEAREST UPSTREAM DISTURBANCE 6' + 5 = 11 = 5.5D
NEAREST DOWNSTREAM DISTURBANCE 52" = 2.16D
CALCULATOR Jackson
Pitot I

SCHEMATIC OF SAMPLING LOCATION

TRAVERSE POINT NUMBER	FRACTION OF STACK I.D.	STACK I.D.	PRODUCT OF COLUMNS 2 AND 3 (TO NEAREST 1 8 INCH)	DISTANCE B	TRAVERSE POINT LOCATION FROM OUTSIDE OF PORT (SUM OF COLUMNS 4 & 5)
X,Y-1	.026	24	5/8	3.5	4 1/8
2	.082	"	2.0		5 1/2
3	.146		3 1/2		7
4	.226		5 1/2		9
5	.342		8 1/4		11 3/4
6	.658		15 3/4		19 1/4
7	.774		18 1/2		22
8	.854		20 1/2		24
9	.918		22		25 1/2
10	.974		23 3/8		26 7/8

PRELIMINARY VELOCITY TRAVERSE

PLANT Ga. Kaolin
DATE 12-4-78
LOCATION Roller Mills Outlet
STACK I.D. 24"
BAROMETRIC PRESSURE, in. Hg 29.88
STACK GAUGE PRESSURE, in. H_2O -.07
OPERATORS Jackson, O'Neill
Box 1225

10 = 2.03 1.5 = 2.01

SCHEMATIC OF TRAVERSE POINT LAYOUT

TRAVERSE POINT NUMBER	VELOCITY HEAD (Δp_s), in. H_2O	STACK TEMPERATURE (T_s), °F
X-1	.1	
2	.125	
3	.13	
4	.13	
5	.13	
6	.135	
7	.135	
8	.13	
AVERAGE	.127	

TRAVERSE POINT NUMBER	VELOCITY HEAD (Δp_s), in. H_2O	STACK TEMPERATURE (T_s), °F
Y-1	.1	
2	.125	
3	.14	
4	.14	
5	.135	
6	.14	
7	.14	
8	.135	
AVERAGE	.131	

NOMOGRAPH DATA

PLANT Georgia Koahin

DATE 12/4/78

SAMPLING LOCATION outlet

CONTROL BOX NO. 1225

CALIBRATED PRESSURE DIFFERENTIAL ACROSS ORIFICE, in. H_2O	$\Delta H_@$	1.9
AVERAGE METER TEMPERATURE (AMBIENT + 20 °F), °F	$T_{m\,avg.}$	90
PERCENT MOISTURE IN GAS STREAM BY VOLUME	B_{wo}	.60%
BAROMETRIC PRESSURE AT METER, in Hg	P_m	29.88
STATIC PRESSURE IN STACK, in. Hg -.07 ($P_m \pm 0.073$ x STACK GAUGE PRESSURE in in. H_2O)	P_s	—
RATIO OF STATIC PRESSURE TO METER PRESSURE	$P_s\ P_m$	1.0
AVERAGE STACK TEMPERATURE, °F	$T_{s_{avg.}}$	~~75~~ 125
AVERAGE VELOCITY HEAD, in. H_2O	$\Delta p_{avg.}$	~~.13~~
MAXIMUM VELOCITY HEAD, in. H_2O	$\Delta p_{max.}$	~~.11~~
C FACTOR		1.1
CALCULATED NOZZLE DIAMETER, in.		~~.313~~ .188
ACTUAL NOZZLE DIAMETER, in.		~~.313~~ .188
REFERENCE Δp, in. H_2O		~~0.17~~ 1.45

FIELD DATA

PLANT Georgia Kaolin
DATE 12-5-78
SAMPLING LOCATION KM Outlet
SAMPLE TYPE Particulate
RUN NUMBER One
OPERATOR Dobraski
AMBIENT TEMPERATURE 60°
BAROMETRIC PRESSURE 30.22
STATIC PRESSURE, (P_s)
FILTER NUMBER (s) 34453

$A = \pi r^2 = \pi \left(\frac{26}{24}\right)^2 = 5.687$

PROBE LENGTH AND TYPE 3'
NOZZLE I.D. .188
ASSUMED MOISTURE, % 30%
SAMPLE BOX NUMBER 1
METER BOX NUMBER 1225
METER $\Delta H_@$ 2.0
C FACTOR 1.1
PITOT TUBE FACTOR .835
REFERENCE Δp 1.45
NOTE L_c = .002 a/m at 1.5

$\gamma_1 = .9894$

READ AND RECORD ALL DATA EVERY 3.0 MINUTES

TRAVERSE POINT NUMBER	SAMPLING TIME, min / CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft³	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE	
				DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F
	0 0953	296.740						
A 1	3	298.4	.6	.78	.78	115	49	47
1	6	300.1	.59	.78		115	51	49
2	9	301.2	.64	.84		120	54	49
2	12	302.7	.64	.84		123	55	50
3	15	304.3	.70	.92		127	55	50
3	18	306.1	.73	.95		126	56	51
4	21	307.1	.79	1.05		128	56	51
4	24	308.7	.78	1.03		128	57	52
5	27	309.9	.80	1.06		128	57	51
5	30	311.6	.79	1.05		128	57	51
6	33	313.4	.83	1.1		128	57	51
6	36	315.1	.82	1.08		127	57	51
7	39	317.3	.85	1.12		127	57	51
7	42	318.7	.86	1.12		122	60	53
8	45	320.6	.88	1.16		120	60	53
8	48	322.6	.87	1.15		120	60	53
9	51	323.9	.74	.96		128	59	55
9	54	326.0	.74	.96		131	59	55
10	57	327.3	.75	.98		124	59	55
10	60	328.605	.76	.99		122	59	55

SAMPLE BOX	IMPINGER

0.87207 CP
1.0054 H
128.95 TS
56.7 TM
69.778 VMA
30.22 PBAR
110. VWC
16.5 WSG
126.5 TH2O
28.97 MWD
3.142 AS
120. TT
0.5 STAT
0.189 DN
0.9894 Y
0.835 CP
265.28755003 VMS
5.955675 VWS
8.359637 %M
0.91640363 MD
28.05294782 MWS
30.25676471 PS
51.8551454 VS
9775.73201 QACT
8121.77653 QSTD
108.0814923 %I

Run 1 Outlet

TRAVERSE POINT NUMBER	SAMPLING TIME, min / CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE		PUMP VACUUM, in Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE °F
				DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F			
	0 / 1055	328.605									
B 1	3	330.3	.57	.76		130	55	55	0	250±25	50±10
1	6	331.9	.57	.76		130	56	56			
2	9	333.0	.67	.89		134	56	56			
2	12	334.6	.67	.89		134	57	56			
3	15	336.3	.75	.98		135	58	56			
3	18	337.9	.77	1.02		134	59	56			
4	21	339.5	.78	1.03		134	59	56			
4	24	341.3	.77	1.02		134	60	58			
5	27	343.3	.82	1.08		134	60	58			
5	30	344.6	.80	1.06		133	61	58			
6	33	346.4	.83	1.10		133	62	57			
6	36	347.7	.85	1.13		134	63	58			
7	39	349.5	.85	1.13		135	64	58			
7	42	351.6	.86	1.13		136	63	59			
8	45	352.5	.84	1.11		135	63	59			
8	48	354.3	.84	1.11		134	62	59			
9	51	355.7	.81	1.07		133	64	60			
9	54	357.4	.80	1.05		133	65	60			
10	57	359.2	.75	.98		133	64	60			
10	60	360.518	.76	.99		133	63	60			
	12:03										
	C_F = .002		$\sqrt{\Delta p}$								
	C_{Fn} 63.778		.87207	1.005		128.95	56.7				
	15										

Same conditions
12-6-78 Run 3
1050 – 1252

Run 2 1357 – 1605

SUMMARY
RECORD OF VISIBLE EMISSIONS

Type of Plant Clay — Date 12-5-78

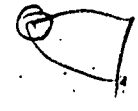
Company Name Georgia Kaolin — Hours of Observation Run 1 0953 – 1203

Plant Address Dry branch — Observer Jeff O'Neill

Type of Discharge (STACK) OTHER _____

Discharge Location Roller Mill Outlet

Height of Point of Discharge ~100'



Observer's Location:

Distance to Discharge Point ~25'

Height of Observation Point ~100'

Direction from Discharge Point Sath East

Background Description clear blue

Weather: (Clear) Overcast Partly Cloudy Other _____ Sky Color _____

Wind Direction East Wind Velocity 5-10 mi/hr

Plume Description:

Detached: (Yes) No

Color: Black (White) Other _____

Plume Dispersion Behavior: Looping Coning Fanning

Lofting Fumigating Other _____

Estimated Distance Plume Visible ~50'

RECORD OF VISIBLE EMISSIONS

Company Name Georgia Kaolin
Plant Address Dry branch
Stack Location Roller Mill Out
Weather Conditions Clear cool

Date 12-5-78
Observer J.P. O'Neill
Observer's Location [illegible] Mills

TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS
	30					
	31					
	32					
	33					
	34					
	35					
	36					
	37					
	38					
	39					
	40					
	41					
	42					
	43					
	44					
	45					
	46					
	47					
	48					
	49					
	50					
	51					
	52					
9	53	5	5	5	5	Start Run 1
	54	5	5	5	5	emission reading due to
	55	5	5	5	5	condensation at breech of
	56	5	5	5	5	duct
	57	5	5	5	5	
	58	X	5	5	5	
	59	5	5	5	5	X = plume from other discharge in background

RECORD OF VISIBLE EMISSIONS

Company Name Georgia Kaolin Date 12-5-78

Plant Address Dry branch Observer J. D. O'Neill

Stack Location Roller Mill Outlet Observer's Location

Weather Conditions Clear Cool

HR	MIN	TIME SECONDS 00	15	30	45	COMMENTS
10	00	5	5	5	5	
	01	5	5	5	5	
	02	5	5	5	X	
	03	5	5	5	X	
	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	X	5	5	5	
	14	5	5	5	5	
	15	5	5	5	5	
	16	5	5	5	5	
	17	X	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	X = plume from other source in background
	23	5	5	5	5	
	24	5	5	X	X	
	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	

RECORD OF VISIBLE EMISSIONS

Company Name Georgia Kaolin Date 12-5-78

Plant Address Dry branch Observer J. D. O'Neill

Stack Location Roller Mill Art Observer's Location

Weather Conditions Clear Cool

TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS
10	30	5	5	5	5	
	31	5	5	5	5	
	32	5	5	5	5	
	33	X	5	5	5	
	34	5	5	5	5	
	35	5	5	5	5	
	36	0	0	0	0	
	37	0	0	0	0	
10	38	0	0	0	0	Unit down rock in conveyor
	39					
	40					
	41					
	42					
	43					
10	44	5	5	5	5	Restart
	45	5	5	5	5	
	46	5	5	5	5	
	47	5	5	5	5	
	48	5	5	5	5	
	49	5	X	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	X = plume from other source in background
	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	

RECORD OF VISIBLE EMISSIONS

Company Name Georgia Kaolin Date 12-5-78

Plant Address Dry Branch Georgia Observer J. D. O'Neill

Stack Location Rotor Mill Outlet Observer's Location

Weather Conditions Clear Cool

TIME						COMMENTS
HR	MIN	SECONDS 00	15	30	45	
11	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	5	5	5	5	
	15	5	5	5	5	
	16	5	5	5	5	
	17	5	5	5	X	
	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	5	5	5	
	28	X	X	5	5	X = interference for other plume
	29	5	5	5	5	

RECORD OF VISIBLE EMISSIONS

Company Name Georgia kaolin Date 12-5-78

Plant Address Drybranch Georgia Observer J. D. O'Neill

Stack Location Roller Mill Outlet Observer's Location East of Stack

Weather Conditions Clear Cool

TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS
11	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	X	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	X	
	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	X	X	
	52	5	5	5	X	
	53	0	5	5	5	
	54	5	5	5	5	
	55	5	X	5	5	
	56	5	5	5	5	X = interference from other plume
	57	5	5	5	5	
	58	5	5	5	5	
11	59	5	5	0	0	

RECORD OF VISIBLE EMISSIONS

Company Name Georgia Kaolin
Date 12-5-78
Plant Address Dry branch
Observer J.D. O'Neill
Stack Location Rotkin Mill Outlet
Observer's Location
Weather Conditions Clear Cool

HR	MIN	TIME SECONDS 00	15	30	45	COMMENTS
12	00	5	5	5	5	
	01	5	5	5	5	
12	02	5	5	5	5	End Test
	03					
	04					
	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					

FIELD DATA

PLANT Georgia Pacific
DATE 15 Aug 89
SAMPLING LOCATION Rolling Mill Outlet
SAMPLE TYPE Partic
RUN NUMBER 2
OPERATOR Debrocki
AMBIENT TEMPERATURE 55
BAROMETRIC PRESSURE 30.22
STATIC PRESSURE, (P_s) 0.6 in
FILTER NUMBER (s) 24456

PROBE LENGTH AND TYPE 3'
NOZZLE I.D. 5/16
ASSUMED MOISTURE, % 6%
SAMPLE BOX NUMBER
METER BOX NUMBER 1225
METER $\Delta H_@$ 2.0
C FACTOR 1.0
PITOT TUBE FACTOR IA = .85
REFERENCE Δp 1.45
NOTE LCF = .012 CFM

Y = .9894

.012 cf min

READ AND RECORD ALL DATA EVERY 3 MINUTES

TRAVERSE POINT NUMBER	SAMPLING TIME, min / CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft³	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE	
				DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F
	0 / 1357	360.797						
1	3	362.8	.55	.73		123	61	59
1	6	364.1	.56	.74		124	63	60
2	9	365.5	.64	.85		129	66	62
2	12	367.1	.62	.83		130	68	63
3	15	368.3	.72	.94		131	69	64
3	18	370.1	.72	.94		131	69	64
4	21	371.7	.75	.98		132	73	66
4	24	373.2	.76	.99		132	76	67
5	27	374.8	.78	1.03		132	77	68
5	30	376.7	.79	1.04		131	78	69
6	33	378.3	.84	1.10		131	79	70
6	36	380.0	.81	1.06		127	77	71
7	39	381.9	.85	1.11		124	77	71
7	42	383.2	.87	1.15		112	76	72
8	45	384.9	.88	1.16		108	75	72
8	48	386.7	.88	1.16		104	75	72
9	51	388.3	.86	1.13		105	76	72
9	54	390.1	.84	1.10		106	77	72
10	57	391.8	.86	1.13		107	79	72
10	60	393.282	.87	1.15		106	80	73

0.87944	Γ_P
1.0203	ΔH
123.3	TS
73.05	TM
65.291	VMA
30.22	PBAR
130.	VWC
13.4	WSG
143.4	TH2O
28.97	MWD
3.142	AS
120.	TT
0.6	STAT
0.189	F_DN
0.9894	Y
0.835	CP
64.7887256	VMS
6.75091	WWS
9.436601044	ZM
.9056339896	MD
27.93480487	MWS
30.26411765	PS
52.14553967	VS
9830.477139	QACT
8151.43814	QSTD
106.8159826	A_N

TRAVERSE POINT NUMBER	CLOCK TIME (24 hr CLOCK) / SAMPLING TIME, min	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s) in H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE		PUMP VACUUM, in Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE °F
				DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F			
	0	393.282									
1	3	394.8	.53	.705		118	74	72	0	250 ± 10	30 ± 10
1	6	396.5	.54	.71		122	74	73	0		
2	9	397.9	.70	.915		122	75	74	0		
2	12	399.6	.70	.94		123	76	74			
3	15	401.1	.77	1.01		123	76	74			
3	18	402.4	.80	1.04		124	76	74			
4	21	404.2	.80	1.04		128	75	74			
4	24	406.0	.79	1.03		130	76	74			
5	27	407.7	.86	1.13		130	76	74			
5	30	409.6	.84	1.18		130	75	74			
6	33	411.0	.88	1.16		129	77	74			
6	36	412.7	.88	1.16		128	76	74			
7	39	414.6	.86	1.13		128	76	73			
7	42	416.4	.87	1.14		128	76	74			
8	45	417.8	.83	1.09		126	78	74			
8	48	419.7	.84	1.10		123	79	74			
9	51	421.4	.82	1.07		122	80	74			
9	54	423.2	.83	1.09		124	80	74			
10	57	424.6	.73	0.96		124	80	75			
10	60	426.088	.74	.97		125	80	76			
			$\sqrt{\Delta p}$								
	1605	65.291	.879949	1.0203		123.3	73.05				
	L_{CF} = .010										

RECORD OF VISIBLE EMISSIONS

Company Name Georgia Kaolin Date 12-5-78

Plant Address Dry branch Georgia Observer J. D. O'Neill

Stack Location Rollen Mill Observer's Location

Weather Conditions Clear

TIME						COMMENTS
HR	MIN	SECONDS 00	15	30	45	
	30					
	31					
	32					
	33					
	34					
	35					
	36					
	37					
	38					
	39					
	40					
	41					
	42					
	43					
	44					
	45					
	46					
	47					
	48					
	49					
	50					
	51					
	52					
	53					
	54					
	55					
	56					Start Test Run 2
13	57	0	0	0	0	No condensation evident
	58	0	0	0	0	
	59	0	0	0	0	

RECORD OF VISIBLE EMISSIONS

Company Name Georgia Kaolin Date 12-5-78

Plant Address Dry Branch Georgia Observer J. D. O'Neill

Stack Location Rollin Mill Out Observer's Location

Weather Conditions clear

HR	MIN	TIME SECONDS 00	15	30	45	COMMENTS
14	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	
	05	0	0	0	0	
	06	0	0	0	0	
	07	0	0	0	0	
	08	0	0	0	0	
	09	0	0	0	0	
	10	0	0	0	0	
	11	0	0	0	0	
	12	0	0	0	0	
	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	0	0	0	0	
	25	0	0	0	0	
	26	0	0	0	0	
	27	0	0	0	0	
	28	0	0	0	0	
14	29	0	0	0	0	

RECORD OF VISIBLE EMISSIONS

Company Name Georgia Kaolin Date 12-5-77

Plant Address dry branch Georgia Observer J.D. O'Neill

Stack Location Rollin Mill Observer's Location

Weather Conditions Clear

TIME						COMMENTS
HR	MIN	SECONDS 00	15	30	45	
14	30	0	0	0	0	Test Run 2
	31	0	0	0	0	
	32	0	0	0	0	
	33	0	0	0	0	
	34	0	0	0	0	
	35	0	0	0	0	
	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	
	41	0	0	0	0	
	42	0	0	0	0	
	43	0	0	0	0	
	44	0	0	0	0	
	45	0	0	0	0	
	46	0	0	0	0	
	47	0	0	0	0	
	48	0	0	0	0	
	49	0	0	0	0	
	50	0	0	0	0	
	51	0	0	0	0	
	52	0	0	0	0	
	53	0	0	0	0	
	54	0	0	0	0	
	55	0	0	0	0	
	56	0	0	0	0	
	57	0	0	0	0	
	58	0	0	0	0	
	59	0	0	0	0	

RECORD OF VISIBLE EMISSIONS

Company Name Georgia Kaolin Date 12-5

Plant Address dry branch Geo. Observer JD O'Neill

Stack Location Rollin Mill Observer's Location

Weather Conditions Clear

HR	MIN	TIME SECONDS 00	15	30	45	COMMENTS
15	00	0	0	0	0	Port Chayce
	01	0	0	0	0	
	02	0	0	0	0	
	03	0	0	0	0	
	04	0	0	0	0	
	05	0	0	0	0	
	06	0	0	0	0	
	07	0	0	0	0	
	08	0	0	0	0	
	09	0	0	0	0	
	10	0	0	0	0	
	11	0	0	0	0	
	12	0	0	0	0	
	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	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	

RECORD OF VISIBLE EMISSIONS

Company Name Georgia Kaolin Date 12-5-78

Plant Address Dry Branch Georgia Observer J. D. O'Neill

Stack Location Pilling Mill Observer's Location

Weather Conditions Clear

TIME						COMMENTS
HR	MIN	SECONDS				
		00	15	30	45	
15	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	
	35	0	0	0	0	
	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	
	41	0	0	0	0	
	42	0	0	0	0	
	43	0	0	0	0	
	44	0	0	0	0	
	45	0	0	0	0	
	46	0	0	0	0	
	47	0	0	0	0	
	48	0	0	0	0	
	49	0	0	0	0	
	50	0	0	0	0	
	51	0	0	0	0	
	52	0	0	0	0	
	53	0	0	0	0	
	54	0	0	0	0	
	55	0	0	0	0	
	56	0	0	0	0	
	57	0	0	0	0	
	58	0	0	0	0	
	59	0	0	0	0	

RECORD OF VISIBLE EMISSIONS

Company Name Georgia Kaolin Date 12-5-78

Plant Address Dry Branch Georgia Observer J. D. O'Neill

Stack Location Rollin Mill Dust Observer's Location

Weather Conditions Clear

TIME						COMMENTS
HR	MIN	SECONDS 00	15	30	45	
16	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	
16	05	0	0	0	0	Stop Test 2
	06					
	07					
	08					
	09					
	10					
	11					
	12					
	13					
	14					
	15					
	16					
	17					
	18					
	19					
	20					
	21					
	22					
	23					
	24					
	25					
	26					
	27					
	28					
	29					

FIELD DATA

PLANT Georgia Kaolin
DATE 12-6-78
SAMPLING LOCATION Rollin Mill Outlet
SAMPLE TYPE Particulate
RUN NUMBER Three
OPERATOR Dobrak
AMBIENT TEMPERATURE 55
BAROMETRIC PRESSURE 29.98
STATIC PRESSURE (P_s) +.25
FILTER NUMBER (s) 2446

PROBE LENGTH AND TYPE 3'
NOZZLE I.D. 0.188
ASSUMED MOISTURE, % 8
SAMPLE BOX NUMBER 1
METER BOX NUMBER 1225 γ = .989
METER $\Delta H_@$ 2.03
C FACTOR 1.9
PITOT TUBE FACTOR C_p = .835
REFERENCE Δp 1.5
NOTE C_{p_1} = .008 cm

READ AND RECORD ALL DATA EVERY 3.0 MINUTES

TRAVERSE POINT NUMBER	CLOCK TIME (24-hr CLOCK) / SAMPLING TIME, min	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE	
				DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F
	0 1050	426.846						
A 1	3	428.5	.58	.73		161	70	76
1	6	430.1	.58	.73		159	71	77
2	9	431.4	.63	.80		157	74	77
2	12	432.9	.62	.78		154	75	77
3	15	434.3	.70	.885		151	76	77
3	18	435.5	.72	.91		149	77	77
4	21	436.9	.78	.97		147	76	76
4	24	438.8	.79	.985		145	76	76
5	27	440.7	.8	1.03		142	77	75
5	30	442.3	.83	1.05		141	77	75
6	33	443.9	.87	1.09		142	79	75
6	36	446.1	.85	1.1		140	78	76
7	39	447.9	.94	1.18		141	78	76
7	42	449.3	.96	1.20		140	78	76
8	45	450.7	.99	1.22		138	79	75
8	48	452.4	.99	1.22		136	78	75
9	51	454.1	.9	1.16		135	77	74
9	54	456.1	.86	1.05		130	78	73
10	57	457.1	.93	1.17		127	77	72
10	60 1150	459.087	.95	1.18		117	77	73

0.91576	Γ*P
1.054	ΔH
136.48	TS
77.56	TM
65.418	VMA
29.98	PBAR
85.	%WC
13.	%SG
98.	TH2O
28.97	MWD
3.142	AS
1.120	TT
0.55	STAT
0.189	DN
0.9894	Y
0.835	CP
63.86544825	VMS
4.6139	VWS
6.737651741	%M
.9926234826	MD
28.2308796	MWS
30.02044118	PS
54.84166928	VS
10338.75149	QACT
8563.799929	QSTD
100.2237138	%I

Run 3 Rolling Mill Outlet

TRAVERSE POINT NUMBER	SAMPLING TIME, min / CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE		PUMP VACUUM, in Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE °F
				DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F			
	0 / 1152	459.087									
B 1	3	460.5	.61	.75		123	74	74			
1	6	462.2	.60	.74		130	75	74			
2	9	463.7	.75	.93		132	76	74			
2	12	465.5	.76	.94		132	77	74			
3	15	466.8	.86	1.06		132	78	74			
3	18	468.5	.88	1.08		131	80	74			
4	21	470.0	.89	1.09		132	81	74			
4	24	471.9	.89	1.09		132	82	75			
5	27	473.6	.90	1.13		133	82	76			
5	30	475.2	.91	1.15		132	83	76			
6	33	476.9	.93	1.17		132	85	76			
6	36	478.8	.93	1.17		132	85	77			
7	39	480.3	.94	1.18		131	85	77			
7	42	481.9	.94	1.18		130	84	78			
8	45	483.3	.93	1.17		130	85	78			
8	48	485.6	.98	1.23		131	85	78			
9	51	487.3	.95	1.20		129	88	79			
9	54	489.0	.97	1.22		130	86	79			
10	57	490.6	.90	1.13		128	86	79			
10	60 / 1252	492.264	.88	1.08		127	86	79			
	$\frac{LCF}{15} = .011$	CFM		~~ΔH~~ = 1.054							
		65.418	.91576			136.48	77.56				
		Vol. H_2O = 285									
		Vol. S.G. = 213									
		98 T.S.V.									

RECORD OF VISIBLE EMISSIONS

Company Name Georgia Kaolin
Plant Address Dryborough Geo.
Stack Location Rollin Mill Ost
Weather Conditions Clear

Date 12-6-78
Observer J. D. O'Neill
Observer's Location

TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS
	30					
	31					
	32					
	33					
	34					
	35					
	36					
	37					
	38					
	39					
	40					
	41					
	42					
	43					
	44					
	45					
	46					
	47					
	48					
	49					
10	50	0	0	0	0	Start Test run 3
	51	0	0	0	0	
	52	0	0	0	0	
	53	0	0	0	0	
	54	0	0	0	0	
	55	0	0	0	0	
	56	0	0	0	0	
	57	0	0	0	0	
	58	0	0	0	0	
	59	0	0	0	0	

RECORD OF VISIBLE EMISSIONS

Company Name Georgia Kaolin Date 12-6-78

Plant Address Dry Branch Geo Observer J. D. O'[illegible]

Stack Location Rolling Mill Outlet Observer's Location

Weather Conditions clear

HR	MIN	TIME SECONDS 00	15	30	45	COMMENTS
11	00	0	0	0	0	Test run 3
	01	0	0	0	0	
	02	0	0	0	0	
	03	0	0	0	0	
	04	0	0	0	0	
	05	0	0	0	0	
	06	0	0	0	0	
	07	0	0	0	0	
	08	0	0	0	0	
	09	0	0	0	0	
	10	0	0	0	0	
	11	0	0	0	0	
	12	0	0	0	0	
	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	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	

RECORD OF VISIBLE EMISSIONS

Company Name Georgia Kaolin Date 12-6-78

Plant Address Dry Branch Geo. Observer J.D. Oakhill

Stack Location Rolling Mill Outlet Observer's Location

Weather Conditions clear

TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS
11	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	
	35	0	0	0	0	
	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	
	41	0	0	0	0	
	42	0	0	0	0	
	43	0	0	0	0	
	44	0	0	0	0	
	45	0	0	0	0	
	46	0	0	0	0	
	47	0	0	0	0	
	48	0	0	0	0	
	49	0	0	0	0	
11	50					← End half test
	51					
11	52	0	0	0	0	Restart Test
	53	0	0	0	0	
	54	0	0	0	0	
	55	0	0	0	0	
	56	0	0	0	0	
	57	0	0	0	0	
	58	0	0	0	0	
	59	0	0	0	0	

RECORD OF VISIBLE EMISSIONS

Company Name Georgia Kaolin Date 12-6-78

Plant Address dry branch Geo. Observer J.D. O'Neill

Stack Location Rotary Mill Outlet Observer's Location

Weather Conditions clear

HR	MIN	TIME SECONDS 00	15	30	45	COMMENTS
12	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	
	05	0	0	0	0	
	06	0	0	0	0	
	07	0	0	0	0	
	08	0	0	0	0	
	09	0	0	0	0	
	10	0	0	0	0	
	11	0	0	0	0	
	12	0	0	0	0	
	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	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	

RECORD OF VISIBLE EMISSIONS

Company Name Georgia Kaolin — Date 12-6-78

Plant Address Dry branch — Observer J.D. O'Neill

Stack Location Rolling Mill — Observer's Location

Weather Conditions clear

TIME						COMMENTS
HR	MIN	SECONDS 00	15	30	45	
1230	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	
	05	0	0	0	0	
	06	0	0	0	0	
	07	0	0	0	0	
	08	0	0	0	0	
	09	0	0	0	0	
	10	0	0	0	0	
	11	0	0	0	0	
	12	0	0	0	0	
	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	
1251	21	0	0	0	0	End Tst 3
	22					
	23					
	24					
	25					
	26					
	27					
	28					
	29					

APPENDIX B

LABORATORY REPORTS

ANALYTICAL DATA

PLANT GK

DATE 12-6-78

SAMPLING LOCATION #8 RIMI

SAMPLE TYPE Part.

RUN NUMBER 1

SAMPLE BOX NUMBER 3

CLEAN UP MAN Jackson

COMMENTS:

FRONT HALF

LABORATORY RESULTS

ACETONE WASH OF NOZZLE, PROBE, CYCLONE (BYPASS), FLASK, FRONT HALF OF FILTER HOLDER

CONTAINER RIMI-1A 2041.5 mg

FILTER NUMBER 24469

24470

CONTAINER RIMI-1F 2573.6 mg

3788.8

FRONT HALF SUBTOTAL 8403.9 mg

BACK HALF

IMPINGER CONTENTS AND WATER WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER

CONTAINER _____ _____ mg

ETHER-CHLOROFORM EXTRACTION _____ mg

ACETONE WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER

CONTAINER _____ _____ mg

BACK HALF SUBTOTAL _____ mg

TOTAL WEIGHT 8403.9 mg

MOISTURE

IMPINGERS

FINAL VOLUME 240 ml

INITIAL VOLUME 200 ml

NET VOLUME 40 ml

SILICA GEL

FINAL WEIGHT 208.5 g _____ g

INITIAL WEIGHT 200 g _____ g

NET WEIGHT 8.5 g _____ g

SUBTOTAL _____ g

TOTAL MOISTURE 48.5 g

ANALYTICAL DATA

PLANT GA. KAOLIN

DATE 12/6/78

SAMPLING LOCATION 8" RIM OUT

SAMPLE TYPE PART

RUN NUMBER 1A

SAMPLE BOX NUMBER 4

CLEAN UP MAN URBAN

COMMENTS:

FRONT HALF

LABORATORY RESULTS

ACETONE WASH OF NOZZLE, PROBE, CYCLONE (BYPASS), FLASK, FRONT HALF OF FILTER HOLDER — CONTAINER RIMO-1A 38.1 mg

FILTER NUMBER 24467 — CONTAINER RIMO-1F 44.7 mg

FRONT HALF SUBTOTAL 82.8 mg

BACK HALF

IMPINGER CONTENTS AND WATER WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER — CONTAINER _____ _____ mg

ETHER-CHLOROFORM EXTRACTION _____ mg

ACETONE WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER — CONTAINER _____ _____ mg

BACK HALF SUBTOTAL _____ mg

TOTAL WEIGHT 82.8 mg

MOISTURE

IMPINGERS

FINAL VOLUME	290	ml
INITIAL VOLUME	200	ml
NET VOLUME	90	ml

SILICA GEL

FINAL WEIGHT	214.5	g	_____	g
INITIAL WEIGHT	200	g	_____	g
NET WEIGHT	14.5	g	_____	g

SUBTOTAL _____ g

TOTAL MOISTURE 104.5 g

ANALYTICAL DATA

PLANT GA KAOLIN

DATE 12/6/18

SAMPLING LOCATION #8 REM OUT

SAMPLE TYPE PART.

RUN NUMBER 2A

SAMPLE BOX NUMBER 4

CLEAN UP MAN URBAN

COMMENTS:

FRONT HALF

LABORATORY RESULTS

ACETONE WASH OF NOZZLE, PROBE, CYCLONE (BYPASS), FLASK, FRONT HALF OF FILTER HOLDER

CONTAINER RIMO-2A 22.8 mg

FILTER NUMBER 24402

CONTAINER RIMO-2F 30.9 mg

FRONT HALF SUBTOTAL 53.7 mg

BACK HALF

IMPINGER CONTENTS AND WATER WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER

CONTAINER _____ _____ mg

ETHER-CHLOROFORM EXTRACTION _____ mg

ACETONE WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER

CONTAINER _____ _____ mg

BACK HALF SUBTOTAL _____ mg

TOTAL WEIGHT 53.7 mg

MOISTURE

250 5=

IMPINGERS

FINAL VOLUME 308 ml

INITIAL VOLUME 200 ml

NET VOLUME 108 ml

SILICA GEL

FINAL WEIGHT	212.0 g	_____ g
INITIAL WEIGHT	200 g	_____ g
NET WEIGHT	12 g	_____ g

SUBTOTAL _____ g

TOTAL MOISTURE 120 g

ANALYTICAL DATA

PLANT GA. KAOLIN

DATE 4/7/78

SAMPLING LOCATION #8 RIN OUT.

SAMPLE TYPE PART.

RUN NUMBER 3A

SAMPLE BOX NUMBER 4

CLEAN UP MAN URBAN

COMMENTS:

FRONT HALF

LABORATORY RESULTS

ACETONE WASH OF NOZZLE, PROBE, CYCLONE (BYPASS), FLASK, FRONT HALF OF FILTER HOLDER

CONTAINER RIMI-3A 25.8 mg

FILTER NUMBER 24471

CONTAINER RIMI-3F 46.0 mg

FRONT HALF SUBTOTAL 71.8 mg

BACK HALF

IMPINGER CONTENTS AND WATER WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER

CONTAINER _____ _____ mg

ETHER-CHLOROFORM EXTRACTION _____ mg

ACETONE WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER

CONTAINER _____ _____ mg

BACK HALF SUBTOTAL _____ mg

TOTAL WEIGHT 71.8 mg

MOISTURE

IMPINGERS

FINAL VOLUME	275	ml
INITIAL VOLUME	200	ml
NET VOLUME	75	ml

75
12.5
825

SILICA GEL

FINAL WEIGHT	212.5	g	_____ g
INITIAL WEIGHT	200	g	_____ g
NET WEIGHT	12.5	g	_____ g

SUBTOTAL _____ g

TOTAL MOISTURE 87.5 g

ANALYTICAL DATA

PLANT GA. Kaolin

DATE 12/6/78

SAMPLING LOCATION Inlet - Roller Mill

SAMPLE TYPE Part

RUN NUMBER 1

SAMPLE BOX NUMBER 1

CLEAN UP MAN Celaino

COMMENTS:

FRONT HALF

LABORATORY RESULTS

ACETONE WASH OF NOZZLE, PROBE, CYCLONE (BYPASS), FLASK, FRONT HALF OF FILTER HOLDER

CONTAINER RMI-1P 1,498.3 mg

FILTER NUMBER 24464 _____

24465 _____

24468 _____

CONTAINER RMI-1F 833.3 mg

787.4 mg

1820.9 mg

FRONT HALF SUBTOTAL 4,939.9 mg

BACK HALF

IMPINGER CONTENTS AND WATER WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER

CONTAINER _____ _____ mg

ETHER-CHLOROFORM EXTRACTION _____ mg

ACETONE WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER

CONTAINER _____ _____ mg

BACK HALF SUBTOTAL _____ mg

TOTAL WEIGHT 4,939.9 mg

MOISTURE

IMPINGERS

FINAL VOLUME	275	ml
INITIAL VOLUME	200	ml
NET VOLUME	75	ml

75
4
79

SILICA GEL

FINAL WEIGHT	204	g	_____	g
INITIAL WEIGHT	200	g	_____	g
NET WEIGHT	4	g	_____	g

SUBTOTAL _____ g

TOTAL MOISTURE 79 g

ANALYTICAL DATA

PLANT Georgia Kaolin

DATE 12-5-78

SAMPLING LOCATION Rolling Mill Outlet

SAMPLE TYPE Particulate

RUN NUMBER One

SAMPLE BOX NUMBER 2

CLEAN UP MAN O'Neill/Dobroski

COMMENTS:

FRONT HALF

LABORATORY RESULTS

ACETONE WASH OF NOZZLE, PROBE, CYCLONE (BYPASS), FLASK, FRONT HALF OF FILTER HOLDER — CONTAINER RMO-1P — 10.7 mg

FILTER NUMBER 24453 — CONTAINER RMO-1F — 33.5 mg

FRONT HALF SUBTOTAL 44.2 mg

BACK HALF

IMPINGER CONTENTS AND WATER WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER — CONTAINER _____ _____ mg

ETHER-CHLOROFORM EXTRACTION _____ mg

ACETONE WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER — CONTAINER _____ _____ mg

BACK HALF SUBTOTAL _____ mg

TOTAL WEIGHT 44.2 mg

MOISTURE

IMPINGERS

FINAL VOLUME	310	ml
INITIAL VOLUME	200	ml
NET VOLUME	110	ml

SILICA GEL

FINAL WEIGHT	216.5	g	_____	g
INITIAL WEIGHT	200	g	_____	g
NET WEIGHT	16.5	g	_____	g

SUBTOTAL _____ g

TOTAL MOISTURE 126.5 g

ANALYTICAL DATA

PLANT Georgia

DATE 12-5-78

SAMPLING LOCATION Rolling Mill Outlet

SAMPLE TYPE Particulate

RUN NUMBER TWO

SAMPLE BOX NUMBER 2

CLEAN UP MAN O'Neill / Dobraski / Moxon

COMMENTS:

FRONT HALF

LABORATORY RESULTS

ACETONE WASH OF NOZZLE, PROBE, CYCLONE (BYPASS), FLASK, FRONT HALF OF FILTER HOLDER — CONTAINER RMO-2P — 15.2 mg

FILTER NUMBER 24456 — CONTAINER RMO-2F — 7.5 mg

FRONT HALF SUBTOTAL 22.7 mg

BACK HALF

IMPINGER CONTENTS AND WATER WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER — CONTAINER ____ ____ mg

ETHER-CHLOROFORM EXTRACTION ____ mg

ACETONE WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER — CONTAINER ____ ____ mg

BACK HALF SUBTOTAL ____ mg

TOTAL WEIGHT 22.7 mg

MOISTURE

IMPINGERS

FINAL VOLUME 330 ml

INITIAL VOLUME 200 ml

NET VOLUME 130 ml

SILICA GEL

FINAL WEIGHT 213.4 g ____ g

INITIAL WEIGHT 200 g ____ g

NET WEIGHT 13.4 g ____ g

SUBTOTAL ____ g

TOTAL MOISTURE 143.4 g

ANALYTICAL DATA

PLANT Georgia Kaolin

DATE 12-6-78

SAMPLING LOCATION Roller Mill

SAMPLE TYPE Particulate

RUN NUMBER Three

SAMPLE BOX NUMBER 2

CLEAN UP MAN O'Neill

COMMENTS:

FRONT HALF

LABORATORY RESULTS

ACETONE WASH OF NOZZLE, PROBE, CYCLONE (BYPASS), FLASK, FRONT HALF OF FILTER HOLDER

CONTAINER RM0-3P 24.1 mg

FILTER NUMBER 24460

CONTAINER RM0-3F 2.9 mg

FRONT HALF SUBTOTAL 27.0 mg

BACK HALF

IMPINGER CONTENTS AND WATER WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER

CONTAINER _____ _____ mg

ETHER-CHLOROFORM EXTRACTION _____ mg

ACETONE WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER

CONTAINER _____ _____ mg

BACK HALF SUBTOTAL _____ mg

TOTAL WEIGHT 27.0 mg

MOISTURE

IMPINGERS

FINAL VOLUME	285	ml
INITIAL VOLUME	200	ml
NET VOLUME	85	ml

SILICA GEL

FINAL WEIGHT	213	g	_____	g
INITIAL WEIGHT	200	g	_____	g
NET WEIGHT	13	g	_____	g

SUBTOTAL _____ g

TOTAL MOISTURE 98 g

TITLE Georgia Kaolin; Dry Branch, Georgia

Project No. _____
Book No. _____

COPY

From Page No. ___

Sample #	Beaker #	TSV mL	Final (1)	Final (2)	Tare (1)	Tare (2)	Δ Wt. grams	-Blk grams	NET Wt. grams
RMO-1P	4Q105	350	144.1831	144.1833	144.1491	144.1491	.0340	.0005	.0335
RMO-2P	4Q106	430	142.1704	142.1703	142.1545	142.1547	.0158	.0006	.0152
RMO-3P	4Q94	230	144.3395	144.3394	144.3150	144.3153	.0244	.0003	.0241
RIMO-1A	4Q107	190	145.1598	145.1599	145.1214	145.1217	.0384	.0003	.0381
RIMO-2A	4Q104	120	142.9019	142.9020	142.8790	142.8789	.0230	.0002	.0228
RIMO-3A	4Q117	170	143.6884	143.6880	143.6619	143.6620	.0261	.0003	.0258
RMI-1	4Q85	530	145.0493	145.0494	143.5503	143.5506	1.4990	.0007	1.4983
RIMI-1	4Q109	415	146.5913	146.5914	144.5494	144.5492	2.0421	.0006	2.0415

Acetone blank = .0003g/200mL = .0000015g/mL

To Page No. ___

Witnessed & Understood by me.	Date	Invented by	Date
D. Malonee	12-26-78	Recorded by	12-12-78

TITLE Anderson Particle Size Project No. ____ Book No. ____ COPY 12

From Page No. ____ Client	Filter Number	Final (1)	Final (2)	Tare (1)	Tare (2)		Δ Wt. grams
	21A-1			0.1807	0.1808		
	2			0.1659	0.1661		
	3			0.1833	0.1833		
	4			0.1651	0.1651		
	5			0.1802	0.1803		
	6			0.1672	0.1672		
	7			0.1834	0.1834		
	8			0.1660	0.1660		
	9 B.U.			0.2049	0.2049		
	22A-1			0.1797	0.1798		
	2			0.1669	0.1670		
	3			0.1803	0.1804		
	4			0.1671	0.1671		
	5			0.1780	0.1780		
	6			0.1659	0.1659		
	7			0.1808	0.1808		
	8			0.1655	0.1656		
	9 B.U.			0.2039	0.2039		
Georgia Kaolin, Dry Branch, Georgia	23A-1	.2147	.2146	0.1805	0.1806		0.0351
	2	.2122	.2120	0.1661	0.1662		0.0459
	3	.3062	.3061	0.1812	0.1812		0.1249
	4	.2630	.2629	0.1656	0.1656		0.0973
	5	.2101	.2102	0.1792	0.1793		0.0309
	6	.1793	.1793	0.1660	0.1660		0.0123
	7	.1833	.1834	0.1812	0.1812		0.0021
	8	.1655	.1655	0.1655	0.1655		0.0000
	9 B.U.	.2046	.2046	0.2046	0.2046		0.0000
	24A-1			0.1824	0.1825		
	2			0.1641	0.1641		
	3			0.1795	0.1796		
	4			0.1616	0.1617		
	5			0.1807	0.1807		
	6			0.1639	0.1639		
	7			0.1798	0.1799		
	8			0.1643	0.1643		
	9 B.U.			0.2038	0.2038		

To Page No. ____

Witnessed & Understood by me, W. H. Malone Date Invented by Date

Recorded by

TITLE Anderson Particle Size — Project No. — Book No. — COPY — 13

From Page No. — Client

Filter Number	Final (1)	Final (2)	Tare (1)	Tare (2)		Δ Wt. grams
29A-1			0.1901	0.1901		
2			0.1658	0.1660		
3			0.1914	0.1914		
4			0.1648	0.1650		
5			0.1811	0.1812		
6			0.1636	0.1636		
7			0.1799	0.1800		
8			0.1651	0.1651		
9 B.U.			0.2039	0.2039		
30A-1			0.1928	0.1930		
2			0.1651	0.1652		
3			0.1895	0.1995		
4			0.1654	0.1654		
5			0.1934	0.1936		
6			0.1659	0.1659		
7			0.1942	0.1942		
8			0.1660	0.1661		
9 B.U.			0.2041	0.2041		
31A-1			0.1734	0.1735		
2			0.1635	0.1635		
3			0.1727	0.1727		
4			0.1660	0.1661		
5			0.1891	0.1892		
6			0.1653	0.1653		
7			0.1906	0.1906		
8			0.1657	0.1657		
9 B.U.			0.2014	0.2014		
32A-1	.1971	.1971	0.1801	0.1801		0.0170
2	.1922	.1920	0.1646	0.1646		0.0274
3	.2161	.2160	0.1789	0.1790		0.0371
4	.1845	.1843	0.1613	0.1613		0.0230
5	.1894	.1893	0.1725	0.1726		0.0168
6	.1691	.1691	0.1620	0.1620		0.0071
7	.1743	.1743	0.1739	0.1739		0.0004
8	.1629	.1628	0.1628	0.1628		0.0000
9 B.U.	.2029	.2029	0.2029	0.2029		0.0000

To Page No. —

Georgia Kaolin Company Division

rstood by me, — Date — Invented by — Date

Recorded by

TITLE 4" Project No. ____ Book No. ____ COPY 11

From Page No. ____ Client	Filter Number	Final (1)	Final (2)	Tare (1)	Tare (2)		ΔWt (grams)
OCA-0-10F	Z4450	.5119	.5120	0.4334	0.4336		0.0785
	Z4451			0.4358	0.4359		
	Z4452			0.4167	0.4169		
Ga. Kaolin, Dry Branch, Ga. RMO-1F	Z4453	.4407	.4406	0.4299	0.4299		0.0107
	Z4454			0.4398	0.4398		
	Z4455			0.4236	0.4237		
Ga. Kaolin, Dry Branch, Ga. RMO-2F	Z4456	.4379	.4378	0.4303	0.4303		0.0075
	Z4457			0.4274	0.4273		
	Z4458			0.4386	0.4386		
	Z4459			0.4285	0.4285		
Ga. Kaolin, Dry Branch, Ga. RMO-3F	Z4460	.4400	.4400	0.4271	0.4271		0.0029
	Z4461			0.4257	0.4258		
	Z4462			0.4337	0.4339		
	Z4463			0.4306	0.4308		
Ga. Kaolin, Dry Branch, Ga. RMI-1F 1of3	Z4464	1.2571	1.2566	0.4233	0.4235		0.8333
RMI-1F 2of3	Z4465	1.2133	1.2128	0.4254	0.4255		0.7874
	Z4466			0.4371	0.4375		
Ga. Kaolin, Dry Branch, Ga. #8 RIMO-1A	Z4467	.4713	.4711	0.4264	0.4266		0.0447
Ga. Kaolin, Dry Branch, Ga. RMI-1F 3of3	Z4468	2.2536	2.2532	0.4323	0.4326		1.8209
Ga. Kaolin, Dry Branch #8 RIMI 1&2 of 2	Z4469	3.0112	3.0107	0.4371	0.4373		2.5736
	Z4470	4.2152	4.2148	0.4260	0.4261		3.7888
Kaolin, Dry Branch #8 RIMO-2A	Z4471	.4864	.4863	0.4403	0.4404		0.0460
	Z4472						
	Z4473						
	Z4474						
	Z4475						
	Z4476						
	Z4477						
	Z4478						
	Z4479						
	Z4480						
	Z4481						
	Z4482						
	Z4483						
	Z4484						
	Z4485						

To Page No. ____

Witnessed & Understood by me, [signature] Date 11-8-78

Invented by

Recorded by

Date

TITLE 4" Glass Fiber 500 AF

Project No. _____ Book No. _____ COPY 8

From Page No. ____

CLIENT / SAMPLE	FILTER #	FINAL 1	FINAL 2	FINAL 3	TARE 1	TARE 2	Δ WT
Oxy-Chem	24351-A	.3842	.3843	.3842	.3728	.3727	0.0115
Houston sed(2)	24352-A	.4295	.4296	.4296	.4108	.4108	0.0187
	24353-A	.4137	.4139	.4137	.4113	.4113	0.0024
	24354-A				.4122	.4122	
	24355-A				.4132	.4132	
Anchor Hocking	24356-A	0.4992	0.4992		.4110	.4112	0.0882
	24357-A	0.4878	0.4879		.4114	.4114	0.0764
Balt. Md 11-7-78	24358-A	0.4901	0.4800		.4142	.4143	0.0658
	24359-A				.4109	.4109	
Penn Power	24387	1.3620	1.3616	1,2 INLET 2	.4050	.4048	0.9568
Penn Power	24388	.4054	.4054	1,2 OUTLET 3	.4023	.4023	0.003
Penn Power	24389	2.3642	2.3640	1,2 INLET 1	.4046	.4046	1.9594
Penn Power	24390	.4074	.4070	3 OUTLET 3	.4052	.4054	0.0016
Penn Power	24391	3.8187	3.8136	3 INLET 3	.4049	.4048	3.4088
Penn Power	24392	4.8082	4.8082	3 INLET 2	.4043	.4043	4.4039
	24393				.4034	.4035	
	24394				.4048	.4047	
Penn Power	24395	.9924	.9922	3 INLET 1	.4075	.4075	0.5377
Penn Power	24396	.4285	.4289	3 OUTLET 2	.4051	.4050	0.0234
Penn Power	24397	.3807	.3804	3 OUTLET 1	.3756	.3757	0.0048
	24398				.3764	.3762	
	24399				.3761	.3760	
Penn Power	24400	1.3488	1.3490	1,2 INLET 3	.3782	.3781	0.9707
	24401				.3792	.3789	
#9 RIMO-2A Georgia Kaolin, Dry Branch Georgia	24402	.4107	.4107		.3801	.3798	0.0309
AHB-7 15 Anchor Hocking	24403	.5325	.5325		.3806	.3808	.1522
AHB-7AF	24404	.4794	.4792		.3812	.3811	.0981
	24405	.4645	.4643		.3827	.3826	.0817
	24406	.4543	.4542		.3820	.3821	.6722
	24407				.3827	.3831	
	24408				.3838	.3840	
	24409				.3821	.3823	
	24410				.3801	.3803	
OCA-0-11F	24411	.5342	.5349		0.4297	0.4296	0.1046
OCA-0-12F	24412	.4598	.4598		0.4435	0.4434	0.0164
OCA-0-13F	24413	.4503	.4504		0.4398	0.4397	0.0106

Witnessed & Understood by me, J. M. Mahoney

Date 11-9-78

Invented by

Date

Recorded by

Page No.

APPENDIX C

SAMPLE CALCULATIONS

SAMPLE CALCULATIONS

Test Run 1 #8 Raymond Impact Mill Exhaust Stack - 12-6-78

1. Volume of dry gas sampled at standard conditions (68°F, 29.92 in. Hg), dscf.

$$V_{m(std)} = \frac{17.647 \times Y \times V_m \times \left(P_b + \frac{\Delta H}{13.6} \right)}{\left(T_m + 460 \right)}$$

$$V_{m(std)} = \frac{17.647 \times 0.984 \times 69.07 \times \left(29.98 + \frac{1.72}{13.6} \right)}{\left(95. + 460 \right)} = 65.04$$

Where:

$V_{m(std)}$ = Volume of gas sample measured by the dry gas meter, corrected to standard conditions, dscf.

V_m = Volume of gas sample measured by the dry gas meter at meter conditions, dcf.

P_b = Barometric pressure, in. Hg.

ΔH = Average pressure drop across the orifice meter, in. H_2O.

T_m = Average dry gas meter temperature, °F.

17.647 = Factor that includes ratio of standard temperature (528°R) to standard pressure (29.92 in. Hg), °R/in. Hg.

Y = Dry gas meter calibration factor.

2. Volume of water vapor in the gas sample corrected to standard conditions, scf.

$$V_{w(std)} = (0.04707 \times V_{wc}) + (0.04715 \times W_{wsg})$$

$$V_{w(std)} = (0.04707 \times 90.0) + (0.04715 \times 14.5) = 4.92$$

Where:

$V_{w(std)}$ = Volume of water vapor in the gas sample corrected to standard conditions, scf.

V_{wc} = Volume of liquid condensed in impingers, ml.

W_{wsg} = Weight of water vapor collected in silica gel, g.

0.04707 = Factor which includes the density of water (0.002201 lb/ml), the molecular weight of water (18.0 lb/lb-mole), the ideal gas constant [21.85 (in. Hg) (ft^3)/(lb-mole)(^oR)] ; absolute temperature at standard conditions (528^oR), absolute pressure at standard conditions (29.92 in. Hg), ft^3/ml.

0.04715 = Factor which includes the molecular weight of water (18.0 lb/lb-mole), the ideal gas constant [21.85 (in. Hg)(ft^3)/(lb-mole)(^oR)], absolute temperature at standard conditions (528^oR), absolute pressure at standard conditions (29.92 in. Hg), and 453.6 g/lb, ft^3/g.

3. Moisture content.

$$B_{ws} = \frac{V_{w(std)}}{V_{w(std)} + V_{m(std)}}$$

$$B_{ws} = \frac{4.92}{4.92 + 65.04} = 0.070$$

Where:

B_{ws} = Proportion of water vapor, by volume, in the gas stream, dimensionless.

4. Mole fraction of dry gas.

$$M_d = 1 - B_{ws}$$

$$M_d = 1 - 0.070 = 0.930$$

Where:

M_d = Mole fraction of dry gas, dimensionless

5. Dry molecular weight of gas stream, lb/lb-mole.

$$MW_d = 0.440(\%CO_2) + 0.320\ (\%O_2) + 0.280\ (\%N_2 + \%\ CO)$$

MW_d = $(0.440 \times 0.3\ ) + (0.320 \times 21.3\ ) + [0.280\ (\ 0.0\ +\ 78.4\ )]$

= 28.97

Where:

MW_d = Dry molecular weight, lb/lb-mole.

$\%CO_2$ = Percent carbon dixoide by volume, dry basis.

$\%O_2$ = Percent oxygen by volume, dry basis.

$\%N_2$ = Percent nitrogen by volume, dry basis.

%CO = Percent carbon monoxide by volume, dry basis.

0.440 = Molecular weight of carbon dioxide, divided by 100.

0.320 = Molecular weight of oxygen, divided by 100.

0.280 = Molecular weight of nitrogen or carbon monoxide, divided by 100.

6. Actual molecular weight of gas stream (wet basis), lb/lb-mole.

$MW_s = (MW_d \times M_d) + [18\ (1 - M_d)]$

$MW_s = (28.98 \times 0.930) + [18\ (1 - 0.930\ )]$

= 28.20

Where:

MW_s = Molecular weight of wet gas, lb/lb-mole.

18 = Molecular weight of water, lb/lb-mole.

7. Average velocity of gas stream at actual conditions, ft/sec.

$$v_s = 85.49 \times C_p \times (\sqrt{\Delta p})_{avg.} \times \left[\frac{T_s\ (avg)}{P_s \times MW_s}\right]^{\frac{1}{2}}$$

$$v_s = 85.49 \times 0.850 \times 1.319 \times \left[\frac{(131. + 460.)}{30.09 \times 28.20}\right]^{\frac{1}{2}}$$

$$= 80.0$$

Where:

v_s = Average gas stream velocity, ft/sec.

85.49 = Pitot tube constant, ft/sec x $\left[\frac{(lb/lb\text{-}mole)(in.Hg)}{(^oR)\ (in.\ H_2O)}\right]^{\frac{1}{2}}$.

C_p = Pitot tube coefficient, dimensionless.

Δp = Velocity head of stack gas, in H_2O.

T_s = Absolute gas stream temperature, ^oR.

P_s = Absolute gas stack pressure, in. Hg.

8. Average gas stream dry volumetric flow rates, dscf/min.

$$Q_{s(std)} = \frac{1058.8 \times v_s \times A_s \times M_d \times P_s}{T_s}$$

$$Q_{s(std)} = \frac{1058.8 \times 80.0 \times 3.69 \times 0.930 \times 30.09}{(131. + 460)}$$

$$= 14790.$$

Where:

$Q_{s(std)}$ = Volumetric flow rate of dry stack gas, corrected to standard conditions, dscf/min.

A_s = Cross-sectional area of stack, ft^2.

1058.8 = Factor which includes standard temperature (528^oR), standard pressure (29.92 in. Hg), and 60 sec/min, $\frac{(^oR)\ (sec)}{(in.\ Hg)(min)}$.

9. Isokinetic variation calculated from intermediate values, percent.

$$= \frac{17.316 \times T_s \times V_{m(std)}}{v_s \times \theta \times P_s \times M_d \times (D_n)^2}$$

$$= \frac{17.316 \times 591. \times 65.04}{80.0 \times 96.0 \times 30.09 \times 0.930 \times (.180)^2}$$

$$= 95.6$$

Where:

I = Percent of isokinetic sampling.

θ = Total sampling time, minutes.

D_n = Diameter of nozzle, inches.

17.316 = Factor which includes standard temperature (528°R), standard pressure (29.92 in. Hg), the formula for calculating area of circle $\frac{\pi D^2}{4}$, conversion of square feet to square inches (144), conversion of seconds to minutes (60), and conversion to percent (100), $\frac{(\text{in. Hg})\ (\text{in}^2)\ (\text{min})}{(^\circ\text{R})\ (\text{ft}^2)\ (\text{sec})}$.

10. Particulate concentration, gr/dscf.

$$C_1 = 0.015432 \times \frac{M_t}{V_{m(std)}}$$

$$C_1 = 0.015432 \times \frac{82.8}{65.04} = 0.020$$

Where:

C_1 = Particulate concentration, gr/dscf.

M_t = Total weight of particulate caught by train, mg.

0.015432 = Conversion factor of gr/mg.

11. Particulate mass emission rate, lb/hr.

$$PMR_t = 0.0085714 \times C_1 \times Q_{s(std)}$$

$$= 0.0085714 \times 0.020 \times 14{,}790 = 2.49$$

Where:

PMR_t	=	Particulate mass emission rate, lb/hr.
0.0085714	=	Conversion factor relating minutes to hours (60), and grains to pounds (7,000), (lb) (min)/(gr) (hr).

APPENDIX D

EQUIPMENT CALIBRATION DATA

VAC : 23"

POS. PRESS = O.K.

METER L.C. = O.K.

Date 11/27/78 Box No. 1225

Barometric pressure, P_b = 30.12 in. Hg Dry gas meter No. SPACED

Orifice manometer setting, ΔH, 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	Time θ, min	γ	$\Delta H_@$
0.5	5	257.308 262.553	50 52 53	76 81 82	70 71 72	75.33	13.54		
1.0	5	262.553 267.843	53 52 52	78 83 84	73 74 74	77.63	9.93		
1.5	5	267.843 273.138	53 52 52	80 84 85	74 74 74	78.50	8.19		
2.0	10	273.138 284.140	52 53 53	84 87 89	74 75 76	80.17	14.74		
3.0	10	284.140 294.2[illegible]	53 53 53	89 90 92	75 76 77	82.00	12.08		
8.0	10								
						Average		.9877	2.0558

Calculations

ΔH	$\frac{\Delta H}{13.6}$	γ = $\frac{V_w P_b (t_d + 460)}{V_d\left(P_b + \frac{\Delta H}{13.6}\right)(t_w + 460)}$	$\Delta H_@$ = $\frac{0.0317\ \Delta H}{P_b (t_d + 460)}\left[\frac{(t_w + 460)\ \theta}{V_w}\right]^2$
0.5	0.0368	.9962	1.8873
1.0	0.0737	.9894	2.0267
2.0	0.147	.9889	2.0646
4.0	0.294	.9768	2.1180
6.0	0.431	.9873	2.1823
8.0	0.588		

γ = Ratio of accuracy of wet test meter to dry test meter. Tolerance = ± 0.01

$\Delta H_@$ = Orifice pressure differential that gives 0.75 cfm of air at 70° F and 29.92 inches of mercury, in. H_2O. Tolerance - ± 0.15

Date 10/11/78 Box No. 1227

Barometric pressure, P_b = [illegible] in. Hg Dry gas meter No. JAWS

Orifice manometer setting, ΔH, 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	Time θ, min	γ	$\Delta H@$
0.5	5	990.000 995.008	62 62 62	81 88 85	68 72 74	78.00	13.083		
1.0	5	995.008 000.299	61 61 61	82 94 84	76 76 78	83.33	9.51		
1.5	5	012.801 018.070	59 59 59	96 106 109	83 84 84	93.00	7.913		
2.0	10	018.070 028.699	59 59 59	94 110 109	84 84 85	94.33	13.913		
6.0	10								
8.0	10								
						Average		1.0053	

Calculations

ΔH	$\frac{\Delta H}{13.6}$	γ: $\frac{V_w P_b (t_d + 460)}{V_d\left(P_b + \frac{\Delta H}{13.6}\right)(t_w + 460)}$	$\Delta H@$: $\frac{0.0317\ \Delta H}{P_b (t_d + 460)}\left[\frac{(t_w + 460)\ \theta}{V_w}\right]^2$
0.5	0.0368	1.0278	1.8003
1.0	0.0737	.9864	1.8790
1.5	0.147	1.0068	1.9025
2.0	0.294	1.0000	1.9533
6.0	0.431		
8.0	0.588		

γ = Ratio of accuracy of wet test meter to dry test meter. Tolerance = ± 0.01

$\Delta H@$ = Orifice pressure differential that gives 0.75 cfm of air at 70° F and 29.92 inches of mercury, in. H_2O. Tolerance - ± 0.15

Date 11/29/72 Box No. 1205

Barometric pressure, P_b = 30.40 in. Hg Dry gas meter No. CRACKED

Orifice manometer setting, ΔH, 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	Time θ, min	γ	ΔH@
0.5	5	211.800 216.954	72 71 70	93 95 93	79 74 77	81.17	12.70		
1.0	5	221.156 226.[illegible]	70 70	97 [illegible]	[illegible]	88.33	9.17		
1.5	10	[illegible]	70 70 70	[illegible]	[illegible]	94.00	8.45		
2.0	10	228.451 238.752	70 70 70	100 110 [illegible]	[illegible]	99.33	14.28		
3.0	10	238.752 251.30[illegible]	70 70 69	106 114 117	[illegible]	103.5	11.68		
8.0	10								
						Average	.9806		1.8705

Calculations

ΔH	$\frac{\Delta H}{13.6}$	γ: $\frac{V_w P_b (t_d + 460)}{V_d\left(P_b + \frac{\Delta H}{13.6}\right)(t_w + 460)}$	ΔH@: $\frac{0.0317\ \Delta H}{P_b (t_d + 460)}\left[\frac{(t_w + 460)\ \theta}{V_w}\right]^2$
0.5	0.0368	.9875	1.7526
1.0	0.0737	.9924	1.7968
1.5	0.147	.9787	1.8720
2.0	0.294	.9758	1.9372
3.0	0.431	.9684	1.9932
8.0	0.588		

γ = Ratio of accuracy of wet test meter to dry test meter. Tolerance = ± 0.01

ΔH@ = Orifice pressure differential that gives 0.75 cfm of air at 70° F and 29.92 inches of mercury, in. H_2O. Tolerance - ± 0.15

Date 11/29/78 Box No. 1227

Barometric pressure, P_b 30.16 in. Hg Dry gas meter No. JAWS

Orifice manometer setting, ΔH, 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	Time θ, min	Y	$\Delta H_@$
0.5	5	907.100 912.054	68 68	72 72	69 66	71.33	12.65		
1.0	5	912.054 917.022	68 68	80 81	77 83	80.83	9.32		
1.5	10	917.022 927.055	68 68	90 90	74 74	82.83	7.69		
2.0	10	927.055 937.219	68 68	91 91	77 78	97.17	12.51		
3.0	10	937.219 947.469	68 68	98 99	86 87	103.50	11.25		
8.0	10								
						Average			

Calculations

ΔH	$\frac{\Delta H}{13.6}$	Y: $\frac{V_w P_b (t_d + 460)}{V_d\left(P_b + \frac{\Delta H}{13.6}\right)(t_w + 460)}$	$\Delta H_@$: $\frac{0.0317\ \Delta H}{P_b (t_d + 460)}\left[\frac{(t_w + 460)\ \theta}{V_w}\right]^2$
0.5	0.0368	1.0144	1.7592
1.0	0.0737	1.0157	1.8762
1.5	0.147	1.0351	1.8881
2.0	0.294	1.0263	1.9134
3.0	0.431	1.0063	1.9678
8.0	0.588		

Y = Ratio of accuracy of wet test meter to dry test meter. Tolerance = ± 0.01

$\Delta H_@$ = Orifice pressure differential that gives 0.75 cfm of air at 70° F and 29.92 inches of mercury, in. H_2O. Tolerance - ± 0.15

BY BLJ DATE 6/2/77 WESTON ENVIRONMENTAL CONSULTANTS & DESIGNERS SHEET _____ OF _____

CHKD BY _____ DATE _____ W.O. NO. _____

PROJECT _____

SUBJECT Pitot Tube Calibration Factors

Pitot	"A" Side					"B" Side				
ID #	0.70	0.96	0.192	0.029	Avg.	0.90	0.96	0.192	0.029	A
E	.848	.832	.830	.844	.839	.848	.832	.839	.832	.83
G	.821	.821	.813	.820	.819	.825	.825	.828	.820	.82
H	.839	.840	.848	.844	.843	.843	.830	.837	.844	.83
I	.839	.841	.828	.832	.835	.830	.834	.828	.832	.83
J	.830	.836	.820	.820	.827	.834	.829	.820	.826	.826
	.65	.330	.125			.65	.330	.125		
W	.848	.852	.851		.850	.846	.850	.849		.84
X	.856	.857	.861		.858	.858	.852	.854		.85
Y	.841	.848	.837		.842	.841	.846	.849		.845
Z	.856	.855	.859		.857	.841	.850	.849		.847

Control Box S-225 (Factory)

Orifice man.	ΔHe	δ
0.5	1.71	0.99
1.0	1.85	1.00
2.0	1.85	1.00
4.0	1.92	1.01

RFW. 231-9-68

BY _____ DATE _____ SHEET _____ OF _____

CHKD BY _____ DATE _____ W.O. NO. _____

PROJECT _____

SUBJECT _____

(1) Nominal 3/16"

VII = .184"

II = .186

III = .186"

X = .180"

XI = .183"

(2) Nominal 1/8"

I = .121

II = .123

(5) Nominal 1/4"

I = .250"

III = .250"

IV = .249"

V = .246"

VI = .248"

(7) Nominal 5/8"

I = .626

II = .625

(4) Nominal 5/16"

I = .311

(8) Nominal 1/2"

IV = .468

V = .465

XI = .490

(3) Nominal 3/8"

I

II = .373

III = .368

IV

V = .355"

VI = .360"

VII = .362"

VIII

IX = .360"

X = .357"

XI

(6) Nominal 7/16"

I

II

III = .438"

VI = .438

specificatio

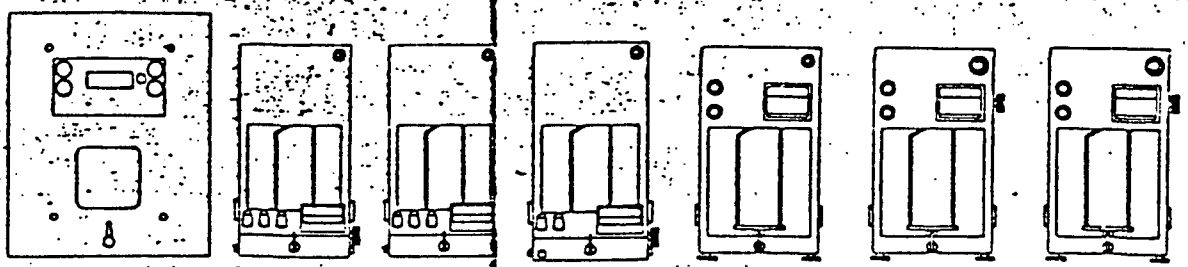
analytical bal

Weston
Lab
Balance
Type

Mettler
INSTRUMENT CORPORATION
609-448-3000

DATE SERVICED	SERIAL NO
6-10-77	388106

TECHNICIAN: Joe Rogowicz



H SERIES ANALYTICAL BALANCES

	Micro Analyticals	Semi Micro Analyticals		Economy Analyticals			
	M5 M5S/A	H51	H51AR	H35AR	H8	H72	H78AR
SPECIAL FEATURES		• optical tare	• optical tare • air release	• full range preweigh • air release • full range tare	• vernier readout	• full range preweigh	• air release • full range preweigh
WEIGHING RANGE	0-20 g	0-160 g	0-160 g	0-150 g	0-160 g	0-160 g	0-160 g
Capacity	20 g	160.1 g	160.1 g	170 g	160 g	160 g	160 g
READABILITY	0.001 mg	0.01 mg	0.01 mg	0.1 mg	0.5 mg	0.1 mg	0.1 mg
Precision (standard deviation)	±0.001 mg	±0.01 mg	±0.01 mg	±0.05 mg	±0.3 mg	±0.05 mg	±0.05 mg
Optical scale range	−0.5 to +20.0 mg	−5 to +125 mg	−5 to +125	0 to 1000 mg	−50 to 1250 mg	0 to 1000 mg	0 to 1000 mg
1 scale div. =	0.1 mg	1 mg	1 mg	10 mg	10 mg	10 mg	10 mg
Digital micrometer, 1 div. =	0.005 mg	0.01 mg	0.01 mg	0.1 mg	—	0.1 mg	0.1 mg
Taring							
By setting optical scale to zero	—	0.1 g	0.1 g	1 g	—	—	—
By use of built-in weight-set	19.99 g*	159.9 g*	159.9 g*	159 g†	159 g	159 g*	159 g
Built-in weights	19.99 g	159.9 g	159.9 g	159 g	159 g	159 g	159 g
Accuracy	±0.02 mg	±0.1 mg	±0.1 mg	±0.18 mg	±1 mg	±0.25 mg	±0.25 mg
1 dialing step	0.01 g	0.1 g	0.1 g	1 g	1 g	1 g	1 g
Balance housing—Base	15¼ x 15½ in.	9½ x 20 in.	9½ x 20 in.	9½ x 20 in.	9½ x 18 in.	9½ x 18 in.	9½ x 20 in.
Height	18¼ in.	16 in.	16 in.	16 in.	16 in.	16 in.	16 in.
Weighing chamber—Base	9 x 6 in.—M5	6¾ x 8 in.	6¾ x 8 in.	6¾ x 8 in.	6¾ x 8 in.	6¾ x 8 in.	6¾ x 8 in.
Height	M5S/A: access port diameter = 2½ in. 6 in.—M5 M5S/A: max. sample height = 1⅛ in.	8 in.	8 in.	8 in.	8 in.	8 in.	8 in.
Weighing pan—Diameter	M5: 1½ in.	3½ in.	3½ in.	3½ in.	3½ in.	3½ in.	3½ in.
Pan-bow height	M5S/A: 1¼ in. M5: 4¼ in. M5S/A: 3½ in.	7 in.	7 in.	7 in.	7 in.	7 in.	7 in.
Power supply	110-220 V 50-60 Hz	110-220 V 50-60 Hz	110-220 V 50-60 Hz	110-220 V 50-60 Hz	110-220 V 50-60 Hz	110-220 V 50-60 Hz	110-220 V 50-60 Hz
Net weight	29 lb	24 lb	24 lb	26 lb	24 lb	24 lb	24 lb.
Prices Effective March 1, 1976	5060./5445.	1850.	1925.	1995.	995.	1095.	1195.

*Without separate tare indication †Weight readout begins at zero regardless of tare used

APPENDIX E

PROJECT PARTICIPANTS

The following Weston employees participated in this project:

Peter J. Marks Department Manager Laboratory Services	econENVIRONomics Division
Barry L. Jackson Supervisor Air Testing	econENVIRONomics Division
Jeffrey D. O'Neill Assistant Project Scientist	econENVIRONomics Division
Gregory L. Celiano Assistant Project Scientist	econENVIRONomics Division
Charles Dobroski Laboratory Technician	econENVIRONomics Division
Theodore B. Moxon Laboratory Technician	econENVIRONomics Division
Richard J. Urban Laboratory Technician	econENVIRONomics Division
John Williams Laboratory Technician	econENVIRONomics Division
David N. Maloney Laboratory Technician	econENVIRONomics Division

Others:

Dennis P. Holzschuh Technical Manager	Emission Measurement Branch Environmental Protection Agency

APPENDIX F

OPERATIONS LOG

No. 8 IMP MILL DAILY OPERATION REPORT

Date 12-5-78

FEED GRADE Hyd Flat D. PRODUCT GRADE Hyd Flat D.

CLAY FROM [illegible] PRODUCT TO #12 Silo

TIME	% MOIST.	PRODUCT TO	STARTED	STOPPED	WHIZZER SPEED	
7	11%	#12 Silo		8:00	Bin Empty	
8						
9						
10						
11						
12						
1						
2	11%	#12 Silo	"	"		
AVE.					OPR. TIME 2 1/2	

OPR. [illegible]

3				3:00 To work on Dust Col.		
4			4:30			
5	10%			5:30 To work on Dust Col.		
6						
7						
8						
9						
10						
AVE.					OPR. TIME 1	

OPR. [illegible]

11	Imp Bin full 11:00 - Mechanics Working on Dust					
12	Collection on #8 Silo					
1						
2		#12 Silo	2:15	- Orders R K		
3	1.0%					
4						
5	1.2%					
6						
AVE.					OPR. TIME	

OPR. [illegible]

No. 7 IMP MILL DAILY OPERATION REPORT

Date 1-12

FEED GRADE Hwl Flat D. PRODUCT GRADE Flat D.

CLAY FROM [illegible] PRODUCT TO [illegible] Silo

TIME	% MOIST.	PRODUCT TO	STARTED	STOPPED	WHIZZER SPEED	
7	1-2	#12 Silo	7:00			
8						
9	1.1%	12:10				
10				10:45	repair ~~gasline~~ flop valve	
11						
12						
1			1:15			
2	1.2%					
AVE.					OPR. TIME	5½

OPR.

3	1.2%	12 Silo				
4						
5	1.2%					
6						
7	1.0 %					
8						
9	1.0 %					
10						
AVE.					OPR. TIME	8

OPR.

11	.5%	12 Silo	11:00			
12						
1	.7%					
2						
3	1.0%					
4						
5	1.0%					
6						
AVE.					OPR. TIME	8

OPR.

MILL NO. 1 ROLLER MILL DAILY OPERATION REPORT

Date 1-2-[illegible]

TIME	FEED GRADE GRIT	MOIST	REEVES	PRODUCT GRADE PRODUCT TO	TIME STARTED	TIME STOPPED	REMARKS
7	1 90	1-9	[illegible]	Sack 1630	7:00	8:00	Misc Downs
8	1000	1.0					2h 45 mins
9							no Feed
10					10:45		
11	1820	1.8				3:00	
12	1480	2.4					
1	1.900						
2	1.280	2.0		11 SILO	2:30		
AVE.							
OPR. TIME 5:15 mins				TONS / HR.		TONS PRODUCT	
OPERATOR Wilmore							
3				11 SILO			
4				1-B-B			
5							
6							
7							
8							
9							
10		2.00	250	#1-B-B	9:30	11:00	
AVE.							
OPR. TIME 1 1/2				TONS / HR.		TONS PRODUCT	
OPERATOR Ross							
11	1140	2.02	250	#1-B-B	11.00	12.30	
12	1742	1.72					
1							
2							
3							
4							
5							
6	1710	2.02	291	#1 Bulk			
AVE.							
OPR. TIME 2 1/2				TONS / HR.		TONS PRODUCT	
OPERATOR [illegible] Russell							
TOTAL OPR. TIME				TONS / HR.		TONS PRODUCT	

NO. 2 **ROLLER MILL DAILY OPERATION REPORT**

Date 12-8-14

TIME	FEED GRADE GRIT	MOIST	REEVES	PRODUCT TO	PRODUCT GRADE C-T TIME STARTED	TIME STOPPED	REMARKS
7	750	2.2	250	FT 11 Bulk	7:00	3:00	
8	648	2.4					
9	680	2.5					
10	554	2.6		SAL31279	10:08		
11	618	2.4					
12	530	2.3					
1	650	2.5					
2	642	2.5					
AVE.							

OPR. TIME 8 hrs TONS / HR. TONS PRODUCT

Wilmore

OPERATOR

3	.642	2.4%	250	SAL31279	3:00	11:00	Mic.
4	.683	2.6%					Dewatering
5							Fan Train
6	705	2.4%					
7	.700	2.4%					Oil
8	.710	2.6%					Shut
9	.502	2.4%					
10	.640	2.2%					
AVE.							

OPR. TIME 7 hrs TONS / HR. TONS PRODUCT

OPERATOR Tom

11	722	2.1%	250	SAL31277	11.00	1.00	
12	673	2.2%					
1	671	2.3%					
2	720	1.7%	210	SAL31230	1.00		
3	615	1.5%					
4	610	1.7%					Oil Stains
5	659	1.7%					
6	671	1.7%	250				
AVE.							

OPR. TIME 7 hrs TONS / HR. TONS PRODUCT

OPERATOR Mullins

TOTAL OPR. TIME TONS / HR. TONS PRODUCT

No. 2 ROLLER MILL DAILY OPERATION REPORT

Date 12-5-18

FEED GRADE PRODUCT GRADE SAF-RA-F

TIME	GRIT	MOIST	REEVES	PRODUCT TO	TIME STARTED	TIME STOPPED	REMARKS
7							
8							
9							
10							
11							
12							
1							
2							
AVE.							

OPR. TIME TONS / HR. TONS PRODUCT

OPERATOR

3							
4							m.c. 6:00
5	.480	3.0%	300	#1-B-B	4:00	9:30	Down this
6	.470	2.4%					no feed
7	.430	2.0%					
8	.490	2.2%					oil Shut
9	.500	2.4%					
10							
AVE.							

OPR. TIME 5 1/2 TONS / HR. TONS PRODUCT

OPERATOR [illegible]

11			300	#1-B-B	12.30		oil on
12							
1	560	2.4%	300	#1-B-B	12.30		
2	542	2.4%					
3	564	2.4%					
4	605						
5	598						
6							
AVE.							

OPR. TIME 5 1/2 TONS / HR. TONS PRODUCT

OPERATOR [illegible]

TOTAL OPR. TIME TONS / HR. TONS PRODUCT

No. 2 ROLLER MILL DAILY OPERATION REPORT

Date 12-5-78

FEED GRADE — PRODUCT GRADE C-P

TIME	GRIT	MOIST	REEVES	PRODUCT TO	TIME STARTED	TIME STOPPED	REMARKS
7	690	1.9	250	SALE/130	7:00	3:00	
8	1100	1.0					7-1
9	718	1.2	260				on oil
10	740	1.0					6 hrs
11	1020	1.2					
12	980	2.4					
1	1.000	2.3					
2	1.280	2.0		11 Silo	2:30		
AVE.							

OPR. TIME 8 hrs — TONS / HR. — TONS PRODUCT

Wilmore

OPERATOR

3				~~11 Silo~~			
4				1-B-B			
5							
6							
7							
8							
9							
10		2.08	250	4-B-B	9:30	11:00	
AVE.							

OPR. TIME 1½ — TONS / HR. — TONS PRODUCT

OPERATOR Tim

11	Tim	2.08	250	11 B-B	11.00	12.30	
12	Tim	1.7					
1							
2							
3							
4							
5							
6	720	2.0	250	11 silo			
AVE.							

OPR. TIME 2½ — TONS / HR. — TONS PRODUCT

OPERATOR Tim

TOTAL OPR. TIME — TONS / HR. — TONS PRODUCT

NO. 8 DRYER DAILY OPERATION REPORT

SLIP GRADE Hyd Flat D. DATE 12-5-78

TIME	SP. GR. Slip	SP. GR. Filt.	Temp.	Vac.	RPM	Prod. Moist.	15 Min Drop	Tons/ Hr.	Feed From	Prod. To	Grade For	Tons Loss	Remarks and Explanation of Delays
7 A.M.													Down at 7:00
8:00													Reversing feed screw broke.
9:00													
10:00													Started up at 1:30
11:00													
12:00													
1:00													
2:00							-						
AVG.													
3 P.M.						20%		8.0					Down 6:00 empties full
4:00													
5:00						20%		8.0	"	"	"		
6:00													
7:00													
8:00													
9:00													
10:00													
AVG.													
11 P.M.													Down, Mechanics working on Dust Collector on #12 Silo & bag Bin full.
12:00													
1:00													
2:00													
3:00													
4:00													
5:00									#8 Conv.	#8 Surge	HYF Flat D.		Started 5:00
6:00						18.2%		7.0	"	"	"		
AVG.													

Dryer Operating Hours: 1½ — Total Tons Fed: 12.15

Filter Hours: A ____ C ____ B ____ D ____ Total

Avg. T/Filt. Hr. 8.1

Presses Fed

Operator Gordon

Explanation of Degrading and/or Losses:

Gas Meter at Start -

Dryer Operating Hours: 3 — Total Tons Fed: 24.0

Filter Hours: A ____ C ____ B ____ D ____ Total

Avg. T/Filt. Hr.

Presses Fed

Operator Thompson

Explanation of Degrading and/or Losses:

Gas Meter at Start -

Dryer Operating Hours: 2 — Total Tons Fed 14.0

Filter Hours: A ____ C ____ B ____ D ____ Totals

Avg. T/Filt. Hr. 7.0A.

Presses Fed

Operator Batts

Explanation of Degrading and/or Losses:

Gas Meter at Start -

NO. 8 DRYER DAILY OPERATION REPORT

SLIP GRADE Hard Flat D. DATE 12-6-78

TIME	SP. GR. Slip	SP. GR. Filt.	Temp.	Vac.	RPM	Prod. Moist	15 Min Drop	Tons/ Hr.	Feed From	Prod. To	Grade For	Tons Loss	Remarks and Explanation of Delays
7 A.M.						20%	-	7.0	#8 Dump	#8 Surf	HARD FLAT		
8:00											D.		
9:00						19%		7.8	"	"	H		
10:00											"		
11:00						19%		7.8	"	"	FLAT		
12:00	Down	12:15				bin		full			FLAT		
1:00											D		
2:00													
AVG.													

Dryer Operating Hours: 6 — Total Tons Fed: 45.2

Filter Hours: A ____ C ____ B ____ D ____ Total ____

Avg. T/Filt. Hr 7.5 — Explanation of Degrading and/or Losses:

Presses Fed

Operator Jordan — Gas Meter at Start -

TIME	SP. GR. Slip	SP. GR. Filt.	Temp.	Vac.	RPM	Prod. Moist	15 Min Drop	Tons/ Hr.	Feed From	Prod. To	Grade For	Tons Loss	Remarks and Explanation of Delays
3 P.M.						20%		8.0	#8 Dump	Surf	F.D.		
4:00													
5:00						20%		8.0	"	"	"		
6:00													
7:00						20%		8.0	"	"	"		
8:00													
9:00						20%		8.0	"	"	"		
10:00													
AVG.													

Dryer Operating Hours: 8 — Total Tons Fed: 64.0

Filter Hours: A ____ C ____ B ____ D ____ Total ____

Avg. T/Filt. Hr. — Explanation of Degrading and/or Losses:

Presses Fed

Operator Thompson — Gas Meter at Start -

TIME	SP. GR. Slip	SP. GR. Filt.	Temp.	Vac.	RPM	Prod. Moist	15 Min Drop	Tons/ Hr.	Feed From	Prod. To	Grade For	Tons Loss	Remarks and Explanation of Delays
11 P.M.						20.5%		8.0	#8 Dump	Surf	F.D.		
12:00													
1:00						20.0%		8.0	"	"	"		
2:00													
3:00						20.5%		8.0	"	"	"		
4:00													
5:00						20.5%		8.0	"	"	"		
6:00													
AVG.													

Dryer Operating Hours: 8 — Total Tons Fed 64.0

Filter Hours: A ____ C ____ B ____ D ____ Totals ____

Avg. T/Filt. Hr. 8.0 — Explanation of Degrading and/or Losses:

Presses Fed

Operator [illegible] — Gas Meter at Start -

1. NO 2 TRACK LOADING
03474-27
P.O. 16

FLEX KLEEN 84 BV 25
5 HP NYB GE FAN
2500 CFM
250 SQ FT CLOTH
10/1 A/C RATIO

---

2. NO 8 FLASH DRYER
03472-12
P.O. 5555

FLEX KLEEN 84 UDC 36?
13,000 CFM
16 GR/FT³
3680 SQ FT CLOTH
4.92/1 A/C RATIO

ROLLER MILLS
03471-11
FLEX KLEEN 84 UDC 17L
9,000 CFM
16 GR/FT³
1760 SQ FT CLOTH
5/1 A/C RATIO

BAK
12/6/78