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Planning and Standards
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Air

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A-80-15

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Emission Test Report
U.S. Gypsum Company
Shoals, Indiana

GYPSUM
MANUFACTURING
AP-42 Section 8.14
Reference Number
4

SOURCE EMISSION TEST REPORT
United States Gypsum Company
Shoals, Indiana

- No. 4 Kettle Calciner Baghouse
- Rock Dryer Baghouse
- Board End Sawing Baghouse
- Other Process Emission Test Points

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Work Assignment No. 20

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SUMMARY

The Emission Measurement Branch of the U.S. Environmental Protection Agency contracted Roy F. Weston, Inc. (WESTON) to conduct a source testing and analysis program at United States Gypsum Company's Shoals, Indiana plant.

The program was designed to quantify selected process emissions and to determine collector performance. The locations tested, plus the number and types of tests performed at each site, are indicated below:

	Number of Test Repetitions by Type			
Source Description	Particulate	Particle Size Distribution	Visible Emission	Fugitive Emission
No. 4 Kettle Calciner Baghouse Inlet Duct	3	-	-	-
No. 4 Kettle Calciner Baghouse Discharge Stack	3	-	3	-
Rock Dryer Baghouse Inlet Duct	3	3	-	-
Rock Dryer Baghouse Discharge Stack	3	1	3	-
Board End Sawing Baghouse Discharge Stack	3	1	3	-
Scoring/Chamfering Operation (Station No. 5 and Cyclone Discharge Stack)	-	-	3	3
Surge Bin Baghouse Discharge Stack	-	-	3	-
Packer Baghouse Discharge Stack	-	-	3	3
Board End Sawing Station	-	-	-	3
No. 5 Upper Mixer Station	-	-	-	3
No. 5 Lower Mixer Station	-	-	-	3

The following test protocol was used during the survey:

Parameter	Test Method
Particulate	EPA 5[1]
Particle Size Distribution	Andersen 2000, Inc.[2]
Visible Emission	EPA 9[3]
Fugitive Emission	EPA 22[4]

Particulate matter concentration and mass rate results are summarized below:

No. 4 Kettle Calciner Baghouse Inlet Duct

Test Number	Date	Particulate Concentration Grains/DSCF	Particulate Mass Rate Pounds/Hour
1	6-3-80	96.7	467.
2	6-3-80	113.	507.
3	6-4-80	119.	515.
Series Average		-	497.

No. 4 Kettle Calciner Baghouse Discharge Stack

Test Number	Date	Particulate Concentration Grains/DSCF	Particulate Mass Rate Pounds/Hour
1	6-3-80	0.020	0.093
2	6-3-80	0.006	0.028
3	6-4-80	0.011	0.050
Series Average		-	0.057

Average collector efficiency = 99.99%.

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

[2]Operating Manual for Andersen 2000, Inc., "Mark III Particle Sizing Stack Samplers," Andersen 2000, Inc., P.O. Box 20769, Atlanta, Georgia.

[3]Federal Register, Vol. 39, No. 219, November 12, 1974.

[4]Draft method, revised July 28, 1978.

Rock Dryer Inlet Duct

Test Number	Date	Particulate Concentration Grains/DSCF	Particulate Mass Rate Pounds/Hour
1	6-5-80	3.24	208.
2	6-6-80	4.18	257.
3	6-6-80	4.13	253.
Series Average		-	239.

Rock Dryer Discharge Stack

Test Number	Date	Particulate Concentration Grains/DSCF	Particulate Mass Rate Pounds/Hour
1	6-5-80	0.004	0.302
2	6-6-80	0.004	0.275
3	6-6-80	0.005	0.341
Series Average		-	0.306

Average collector efficiency = 99.87%.

Board End Sawing Baghouse Discharge Stack

Test Number	Date	Particulate Concentration Grains/DSCF	Particulate Mass Rate Pounds/Hour
1	6-5-80	0.002	0.066
2	6-5-80	0.007	0.197
3	6-5-80	0.010	0.307
Series Average		-	0.190

Average collector efficiency = 99.91%.

This efficiency was calculated based on an estimate of uncontrolled emissions from the plant's board end sawing operation. See Appendix C, Sample Calculations, for estimate workup. Note that the board end sawing baghouse inlet duct was not sampled due to the presence of large particulate (up to 6" long by 1/2" wide) which could not be collected representatively using a standard Method 5 train.

Detailed particulate, particle size distribution, visible and fugitive emission test data and test results are presented in the Test Results and Discussion Section.

INTRODUCTION

The Emission Measurement Branch of the U.S. Environmental Protection Agency contracted Roy F. Weston, Inc. (WESTON) to conduct a source testing and analysis program at the United States Gypsum Company's Shoals, Indiana facility. The objective of the testing program was to measure emission parameters relating to the gypsum ore processing operations at the plant.

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

1. No. 4 Kettle Calciner Baghouse Inlet Duct

   a. Three particulate tests by EPA Method 5.

2. No. 4 Kettle Calciner Baghouse Discharge Stack

   a. Three particulate tests by EPA Method 5.

   b. Three opacity tests by EPA Method 9 simultaneously with the three particulate tests.

3. Rock Dryer Inlet Duct

   a. Three particulate tests by EPA Method 5.

   b. Three particle size distribution tests by cascade impaction (Andersen).

4. Rock Dryer Discharge Stack

   a. Three particulate tests by EPA Method 5.

   b. One particle size distribution test by cascade impaction (Andersen).

   c. Three opacity tests by EPA Method 9 simultaneously with the three particulate tests.

5. Board End Sawing Baghouse Discharge Stack

   a. Three particulate tests by EPA Method 5.

   b. One particle size distribution test by cascade impaction (Andersen).

   c. Three opacity tests by EPA Method 9 simultaneously with the three particulate tests.

6. Board End Sawing Station

   a. Three fugitive tests by EPA Method 22.

7. Scoring/Chamfering Operation

   a. Three opacity tests by EPA Method 9 on cyclone stack discharge.

   b. Three fugitive tests by EPA Method 22 on Station No. 5.

8. Surge Bin Baghouse Discharge Stack

   a. Three opacity tests by EPA Method 9.

9. Packer Baghouse Discharge Stack

   a. Three opacity tests by EPA Method 9.

   b. Three fugitive tests by EPA Method 22.

10. No. 5 Upper Mixer Station

    a. Three fugitive tests by EPA Method 22.

11. No. 5 Lower Mixer Station

    a. Three fugitive tests by EPA Method 22.

PROCESS DESCRIPTION AND OPERATION

PLANT DESCRIPTION

The United States Gypsum, Shoals, Indiana plant produces wallboard and plaster products from gypsum ore mined about one mile from the plant. A simplified flow diagram for the process used at the Shoals plant is shown in Figure 1. Ore stockpiled at the plant is crushed to about minus 5 cm (2 inches) and then dried to remove surface moisture. The dry ore is further ground to about 90 percent minus 100 mesh in a grinding mill. The ground crude gypsum, primarily calcium sulfate dihydrate ($CaSO_4 \cdot 2H_2O$), is heated to around 571K (300°F) to remove 75 percent of its water of hydration and thus form calcium sulfate hemihydrate ($CaSO_4 \cdot 1/2H_2O$). This process is known as calcining. The calcined gypsum or stucco is mixed with starch, water, and other additives to form a slurry. The slurry is spread between two paper sheets and formed into wet wallboard. The wallboard is subsequently dried in a multi-deck kiln, trimmed to the correct size, and shipped to distributors.

PROCESS EQUIPMENT TESTED

The emission tests conducted at the Shoals plant are shown in Table 1. A brief description of the major processing equipment tested at the plant is provided in the following sections.

Rock Dryer

The rock dryer employed at the Shoals plant is a direct-fired, co-current rotary dryer. As crushed wet gypsum is passed through the dryer, surface moisture is evaporated by hot combustion gases. A schematic diagram of this type of dryer is shown in Figure 2.

Kettle Calciner

The calciner used at the Shoals plant is a continuous kettle calciner. As finely ground gypsum is fed to the kettle, hot combustion gases are passed through flues inside the kettle to provide an indirect transfer of heat to the ore. The heating of the ore causes the chemical reaction which produces stucco. A schematic diagram of the calcining kettle is shown in Figure 3.

Table 1 Emission Tests Conducted at USG, Shoals, Indiana Plant

Process Tested	Date	Control Method	Test Type	Inlet[a] Test	Outlet[a] Test
Continuous Kettle Calciner	6/3/80 6/4/80	Baghouse	Particulate Loading Particle Size Visible Emissions	EPA-5(3) Bahco(1) N/A	EPA-5(3) Bahco(1) EPA-9
Rock Dryer	6/5/80 6/6/80	Baghouse	Particulate Loading Particle Size Visible Emissions	EPA-5(3) Andersen(3) N/A	EPA-5(3) Andersen(1) EPA-9
Board End Sawing	6/5/80	Baghouse	Particulate Loading Particle Size Visible Emissions	- - -	EPA-5(3) Andersen(1) EPA-9
Board End Sawing	6/6/80	Capture Hood	Visible Emissions	EPA-22	EPA-22
Paper Scoring	6/2/80 6/3/80	Capture Device/ Cyclone	Visible Emissions	EPA-22	EPA-9
Plaster Mixing and Bagging	6/3/80 6/4/80	Capture Device/ Baghouse	Visible Emissions	EPA-22	EPA-9
Stucco Storage and Transfer	6/10/80	Baghouse	Visible Emissions	-	EPA-9
#1 Pin Mixer	6/3/80	Capture Device	Visible Emissions	EPA-22	-
#2 Pin Mixer	6/4/80	Capture Device	Visible Emissions	EPA-22	-

[a]Numbers in parenthesis represent the number of individual tests performed at the site.

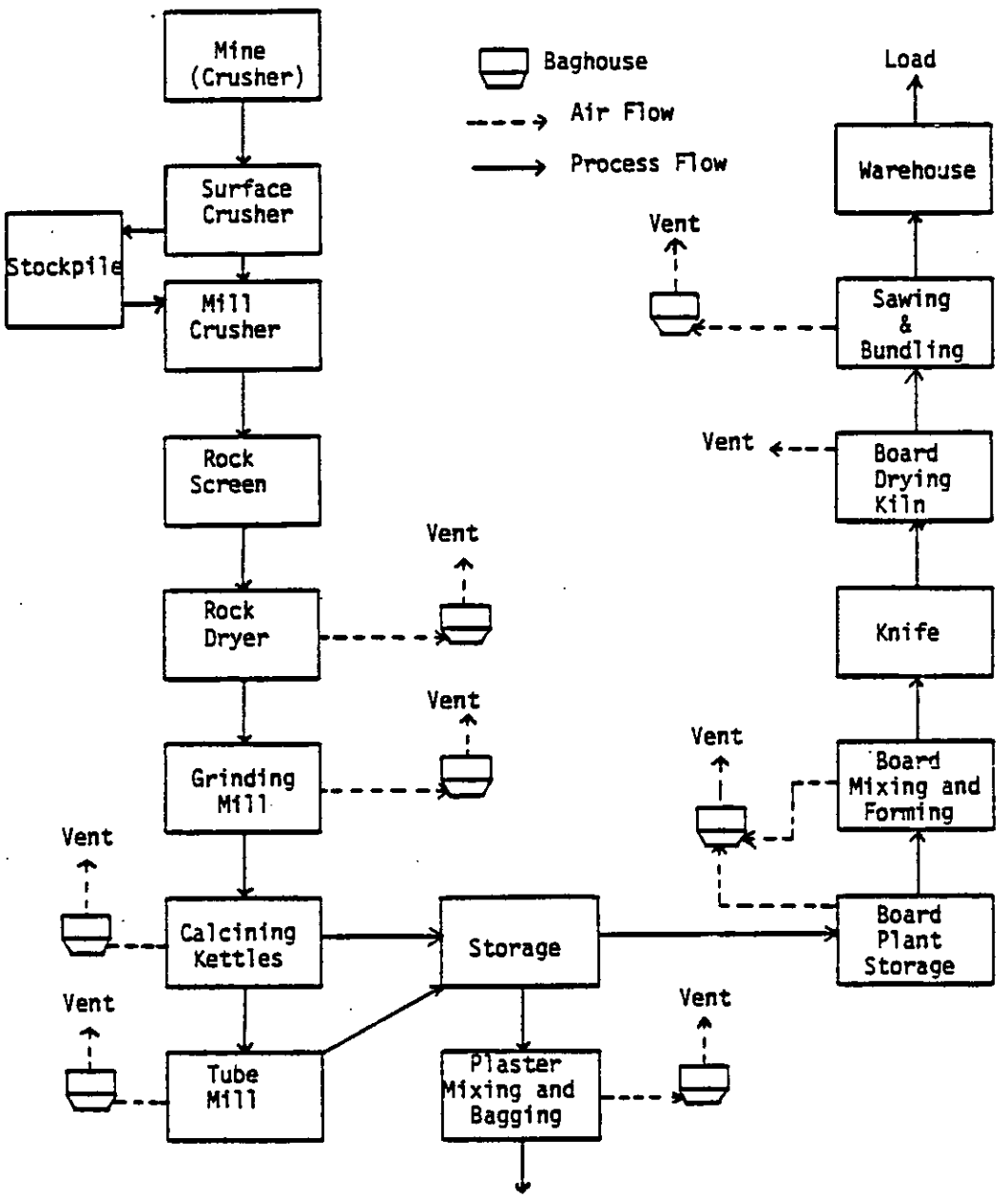

FIGURE 1 BLOCK FLOW DIAGRAM FOR SHOALS BOARD PLANT

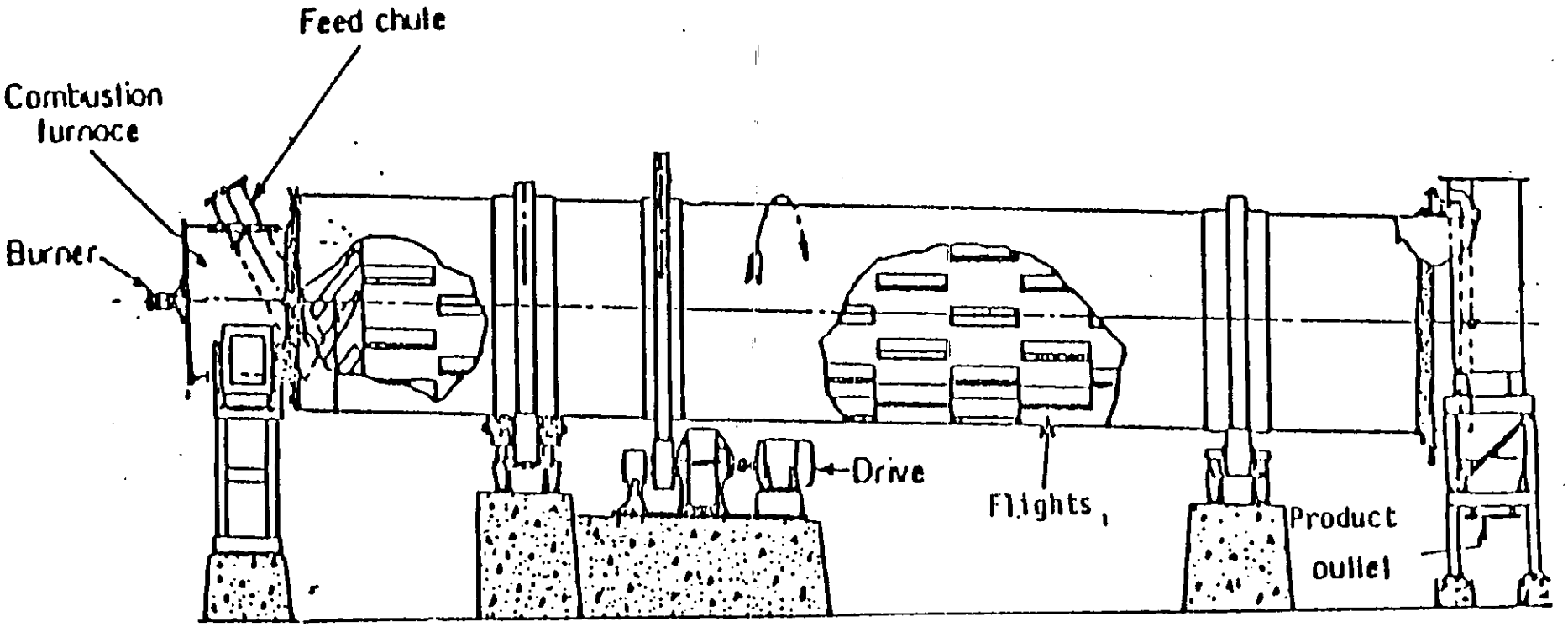

FIGURE 2 DIRECT FIRED, CO-CURRENT, ROTARY DRYER[1]

Stucco Storage and Transfer

The stucco storage and transfer system tested at the plant employs an air conveyor to transfer stucco from a conveyor belt to a 27.2 Mg (30 ton) surge bin and conventional screw conveyors to transfer the stucco from the bin to the board forming line.

Board Forming Line

The two boardlines tested at the Shoals plant are of average size and together are capable of producing about 51 million square meters (550 million square feet) of wallboard per year on a half-inch basis. The process operations tested on the boardlines, which include board end sawing, paper scoring, and pin mixing, are typical of those used throughout the gypsum industry.

Plaster Mixing and Bagging

The plaster mixing and bagging unit at the Shoals plant is typical of those used throughout the gypsum industry.

EMISSION CONTROLS

Fabric filter dust collectors are used at the Shoals plant to control gypsum particulate emissions. Dust-laden gases exiting the rock dryer and the kettle calciner are vented to separate baghouses. The dryer has four Buell cyclones upstream of the baghouse. Emissions from conveyors, bucket elevators, and storage bins are vented to fabric filter dust collectors. Boardline emissions from dry mixing, and board end sawing, are also controlled by baghouses. Paper scoring and pin mixing emissions from one of the boardlines are controlled by a cyclone only. Pin mixing on the other boardline is vented to a baghouse. Emissions from the plaster mixing and bagging operation are vented to a separate baghouse.

Design and operating parameters for the baghouses tested at the Shoals plant are given in Table 2. Estimated operating capacities for the process units vented to the stucco storage and transfer baghouse are given in Table 3.

Normal replacement frequencies and most recent replacement dates for bags in the dust collectors tested are shown in Table 4.

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Normal replacement frequencies and most recent replacement dates for bags in the dust collectors tested are shown in Table 4.

Table 2 Control Equipment Parameters

Process Unit Name	Baghouse Manufacturer (Cleaning Type)	Number of bags	Bag Dimensions (diam.x length in inches)	Cloth Area (square ft.)	Fabric Type	Design Air Flow (m^3/sec)	Design Air Flow (ACFM)	Air to Cloth Ratio (feet/min.)	Duration of Cleaning Cycle (sec.)	Frequency of Cleaning	Pressure of pulse (psig)
Continuous calciner kettle	Flex Kleen (reverse pulse)	80	6 x 84	800	Orlon Felt	1.89	4,000	5:1	0.1	10 sec	90
Rock dryer	Flex Kleen (reverse pulse)	160	6 x 84	1,600	Orlon Felt	4.72	10,000	6.25:1	0.1	10 sec	90
Board end sawing	Dracco (shaker)	80	25 x 117	4,560	Dacron	2.83	6,000	1.3:1	60	15 min	N/A
Mixing and bagging	Flex Kleen (reverse pulse)	144	5 x 112	1,584	(suited to 300°F)	1.42	3,000	2:1	0.1	10 sec	90
Stucco	Wheelabrator	144	5 x 112	1,584	Dacron	1.42	3,000	2:1	60	15 min	N/A

Table 3 Stucco Storage and Transfer System

Process Unit Name	Estimated Operating Capacity[a]
Storage Bin	27.2 Mg (30 Tons)
Air Conveyor (transfers stucco to storage bin)	24.5 Mg/hr (27 TPH)
Screw conveyor (stucco to admix)	24.5 Mg/hr (27 TPH)
Admix conveyor	27.2 Mg (30 TPH[b])
Pin mixer[b]	48.1 Mg (53 TPH)

[a]TPH = Tons per hour

[b]Operating capacity includes stucco plus additives.

Table 4 Bag Replacement Schedules

Process Unit Name	Last Date of Bag Replacement	Normal Replacement Frequency[a] (months)
Continuous kettle	2/29/80	10-12
Rock dryer	1/26/80	10-12
Board end sawing	3/23/80	12
Stucco transfer and storage	4/21/79	12
Mixing and bagging	5/28/80 (20 new bags)	12

[a]These values are estimates.

PROCESS CONDITIONS DURING TESTING

In order to ensure that the ore dryer, calciner, boardline, and plaster operations were operating at representative steady-state conditions during the testing, various process parameters were monitored.

All processes operated normally during the emission testing. The operating condition of each of the processes is discussed in the following sections.

Continuous Kettle Calciner

During the emission testing of the continuous kettle calciner, the calciner was operating at full capacity, producing 11.5 tons of calcined gypsum or stucco per hour. The average heat usage of the unit during the testing was 0.85 KJ/g (0.73 million Btu/ton) of product. The unit was burning natural gas. The stucco product from the kettle contained combined moisture of 5.7 percent during the testing. Process data collected during each of the three EPA Method 5 test runs on the continuous kettle are shown in Tables 5, 6, and 7, respectively. The kettle operated normally during all three test runs.

Rock Dryer

During the emission testing, the rock dryer was operating at 92 percent of design capacity, producing 70 tons of dry rock per hour. Process data collected during the EPA Method 5 test runs is shown in Tables 8, 9, and 10, respectively. The average heat usage of the dryer during the testing was 0.08 KJ/g (0.07 million Btu/ton) of dried rock. The dryer was burning natural gas. The free moisture content of the ore entering the dryer was 1 to 1.5 percent, and the free moisture content of the exiting rock was less than 0.5 percent.

Some fluctuation in the dryer temperature was observed throughout the testing of the dryer. These fluctuations were due to the fact that the automatic controller on the dryer was out of service and the fuel firing rate was under manual control. Changes in the free moisture content of the gypsum feed would require a different firing rate. Manual changes in the firing rate were made whenever the dryer operating temperature varied significantly from a desired value. The length of time required for restabilization of the temperature, which ranged from 10 to 30 minutes, was dependent on the extent of the deviation from the desired temperature at the time the firing rate was reset.

Table 5 Process Data From Continuous Kettle: Run No. 1

Plant: USG
Location: Shoals, Indiana
Date: 6/3/80

Local Time	Flue Gas[a] Temperature K (°F)	Stucco[b] Temperature K (°F)	Process Gas[c] Stack Draft (inches H_2O)	Fabric Filter Pressure Drop (inches H_2O)
9:05 a.m.	416 (290)	377 (220)	-1.1	2.5
9:19	415 (288)	377 (220)	-1.2	-
9:25	414 (285)	377 (220)	-0.9	-
9:34	415 (287)	377 (220)	-1.0	2.5
9:48	414 (285)	377 (220)	-0.9	-
10:30	415 (287)	377 (220)	-1.1	2.5
10:55	414 (286)	377 (220)	-1.1	-
11:20	414 (285)	377 (220)	-1.1	2.8
11:30	414 (285)	377 (220)	-1.1	2.8
12:25	414 (285)	377 (220)	-1.2	-

[a]Measured at point where flue gas leaves the kettle.

[b]Same as process gas exit temperature.

[c]Static pressure at point where process gas leaves kettle.

Table 6 Process Data From Continuous Kettle: Run No. 2

Plant: USG
Location: Shoals, Indiana
Date: 6/3/80

Local Time	Flue Gas[a] Temperature K (°F)	Stucco[b] Temperature K (°F)	Process Gas[c] Stack Draft (inches H_2O)	Fabric Filter Pressure Drop (inches H_2O)
1:25 p.m.	414 (285)	377 (220)	-1.1	2.7
2:00	414 (285)	377 (220)	-1.0	2.7
2:25	414 (285)	377 (220)	-1.1	2.7
2:54	414 (285)	377 (220)	-1.1	2.6
3:13	414 (285)	377 (220)	-1.1	-
3:26	414 (285)	377 (220)	-1.1	-
3:40	413 (284)	377 (220)	-1.1	2.6
4:07	414 (285)	377 (220)	-1.1	-

[a]Measured at point where flue gas leaves the kettle.

[b]Same as process gas exit temperature.

[c]Static pressure at point where process gas leaves kettle.

Table 7 Process Data From Continuous Kettle: Run No. 3

Plant: USG
Location: Shoals, Indiana
Date: 6/4/80

Local Time	Flue Gas[a] Temperature K (°F)	Stucco[b] Temperature K (°F)	Process Gas[c] Stack Draft (inches H_2O)	Fabric Filter Pressure Drop (inches H_2O)
8:35 a.m.	414 (285)	377 (220)	-1.1	2.5
9:02	414 (285)	377 (220)	-1.1	-
9:17	414 (285)	377 (220)	-1.2	2.5
9:28	413 (284)	377 (220)	-1.2	-
9:58	413 (284)	377 (220)	-1.1	2.5
10:23	413 (284)	377 (220)	-1.2	-

[a]Measured at point where flue gas leaves the kettle.

[b]Same as process gas exit temperature.

[c]Static pressure at point where process gas leaves kettle.

Table 8 Process Data From Rock Dryer: Run No. 1

Plant: USG
Location: Shoals, Indiana
Date: 6/5/80

Local Time	Rock[a] Temperature K (°F)	Dryer Temperature K (°F)	Fabric Filter Pressure Drop (inches H_2O)
6:06 p.m.	322 (120)	333 (140)	2.1
6:32	324 (124)	337 (147)	2.1
6:45	325 (126)	335 (144)	2.2
6:55	326 (127)	335 (143)	2.1
7:10	326 (127)	335 (143)	2.1
7:30	326 (127)	335 (144)	2.1

[a]Measured at point where rock exits dryer.

Table 9 Process Data From Rock Dryer: Run No. 2

Plant: USG
Location: Shoals, Indiana
Date: 6/6/80

Local Time	Rock[a] Temperature K (°F)	Dryer Temperature K (°F)	Fabric Filter Pressure Drop (inches H_2O)
7:56 a.m.	327 (130)	340 (152)	2.4
8:11	327 (127)	334 (142)	2.4
8:20	325 (125)	333 (140)	2.4
8:30	325 (126)	334 (142)	2.4
8:49	325 (126)	335 (143)	2.4
9:33	326 (127)	336 (146)	2.4
9:40	326 (127)	337 (148)	-
9:53	326 (128)	337 (148)	2.5
10:20	326 (128)	337 (148)	2.5
10:35	327 (129)	337 (148)	-
10:53	326 (128)	336 (146)	2.6

[a]Measured at point where rock exits dryer.

Table 10 Process Data From Rock Dryer: Run No. 3

Plant: USG
Location: Shoals, Indiana
Date: 6/6/80

Local Time	Rock[a] Temperature K (°F)	Dryer Temperature K (°F)	Fabric Filter Pressure Drop (inches H_2O)
11:36 a.m.	326 (128)	337 (147)	2.6
11:50	327 (129)	338 (149)	2.6
11:58	327 (130)	338 (149)	2.6
12:06	327 (130)	339 (150)	2.6
12:15	327 (130)	339 (150)	2.6
12:25	328 (131)	340 (152)	2.6
12:38	329 (132)	341 (154)	2.6
12:45	329 (132)	341 (154)	2.6
12:55	329 (132)	340 (152)	2.6
1:00	329 (132)	340 (152)	2.6
1:15	329 (132)	341 (154)	-
1:25	329 (132)	341 (154)	2.6

[a]Measured at point where rock exits dryer.

Estimates of the effect of the temperature fluctuations on the air flow rate through the dryer show that the maximum variation in the flow rate during all three test runs should be no greater than two percent.

The dryer at the Shoals plant has a small heater downstream of the four small Buell cyclones which are at the outlet of the dryer. The emission tests performed on the inlet to the collector were performed downstream of the heater. The purpose of the heater is to heat the process gases entering the baghouse. Heating these gases reduces the risk that wet particulate matter will enter the baghouse and blind the filter bags. The burner on the heater is rated at 440 KJ/sec (1.5 million Btu/hour). The instrumentation used to measure the natural gas usage of the rock dryer measured the sum of the main dryer burner and the heater. Between the first and second test runs, the heater was inadvertently left off. Some difference in the temperature of the gas stream entering the baghouse may be observed between the first and second test runs because the temperature set-point on the heater controller was moved by maintenance and operation personnel.

Stucco Storage and Transfer

The storage and transfer system was operating at normal capacity during the emission testing.

Board End Sawing

During the board end sawing testing, the No. 2 boardline was running regular, one half inch board, 12 feet in length. The line was operating at a rate of 47.9 meters per minute (157 feet per minute).

Mixing and Bagging

The plaster mixing and bagging operation was operated by a single operator during the testing. Generally, the process is operated by two operators, one person working the batch mixer and a second working the bagging machine. During the testing, the operator would mix a single batch of plaster, about 1,453 Kg (3,200 pounds), and then return to the bagging machine. Although operation with a single operator is somewhat abnormal for this plant, the test data should still be representative since both emission sources, mixing and bagging, were in continuous operation. During most of the testing, the plant was bagging normal plaster which is about 99-percent stucco; during the remainder of the testing, the plant was bagging a special plaster

containing 13-percent perlite. The plaster was being put in 50-lb bags at the rate of 500 bags per hour.

Other Process Operations

The remaining processes tested, which include paper scoring and pin mixing, were tested under normal operating conditions.

PROCESS DECRIPTION REFERENCES

1. U.S. Environmental Protection Agency. Sodium Carbonate Industry - Background Information for Proposed Standards. Research Triangle Park, North Carolina. EPA-450/3-80-029a. p. 3-30.

2. Permit Application for Construction at Sweetwater, Texas plant. United States Gypsum Company. Texas Air Control Board, Austin, Texas. 19 June 1979.

DESCRIPTION OF PARTICULATE TEST LOCATIONS

NO. 4 KETTLE CALCINER BAGHOUSE INLET DUCT

Three 3 1/2" I.D. test ports, one inch apart, were placed on a straight section of the 11 3/4" x 17 1/2" metal duct at a location 8.2 diameters (10') downstream and 6.6 diameters (8') upstream from the nearest flow disturbances. EPA Method 1 criteria for this test location required a minimum of 9 traverse points. See Figure 4 for port and sampling point locations.

NO. 4 KETTLE CALCINER BAGHOUSE DISCHARGE STACK

Two 3 1/2" I.D. test ports, 90° apart, were placed on a straight section of the 12" I.D. metal stack at a location $>$ eight diameters ($>$ 8') downstream and three diameters upstream from the nearest flow disturbances. Eight sampling points (4 per port) were required for testing. See Figure 5 for port and sampling point locations.

ROCK DRYER BAGHOUSE INLET DUCT

Two 3 1/2" I.D. test ports were placed at right angles on the 23 1/4" I.D. metal stack, less than 1 diameter from both upstream and downstream flow disturbances. The test site required a minimum of 32 traverse points (16 per port). Figure 6 illustrates port and sampling point locations.

ROCK DRYER BAGHOUSE DISCHARGE STACK

Two 3 1/2" I.D. test ports were placed 90° apart on the 23 3/4" I.D. metal duct leading from the Rock Dryer Baghouse. The ports were placed 12.6 diameters (25') downstream and 6.1 diameters (12') upstream from the nearest gas stream flow disturbances. EPA Method 1 required a minimum of 8 traverse points (4 per port) for this test location. See Figure 7 for port and sampling point locations.

BOARD END SAWING BAGHOUSE DISCHARGE STACK

Two 3 1/2" I.D. test ports were placed at right angles on the 11 1/2" I.D. metal stack 15.6 diameters downstream and 5.2 diameters upstream from the nearest flow disturbances. The test site required a minimum of 8 traverse points (4 per port). Figure 8 illustrates port and sampling point locations.

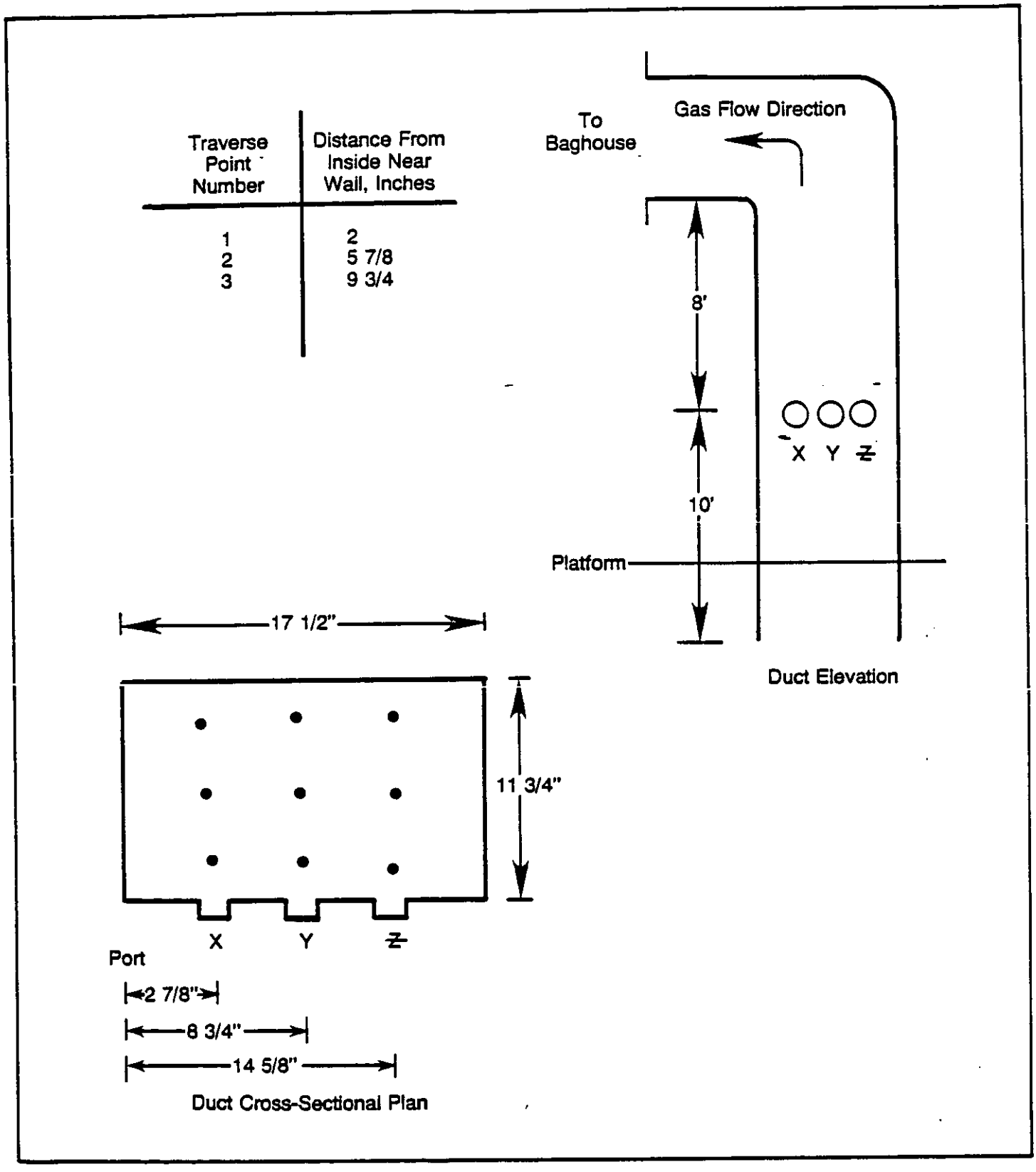


FIGURE 4 PORT AND SAMPLING POINT LOCATIONS – NO. 4 KETTLE CALCINER BAGHOUSE INLET DUCT

Traverse Point Number	Distance From Inside Near Wall, Inches
1	3/4
2	3
3	9
4	11 1/4

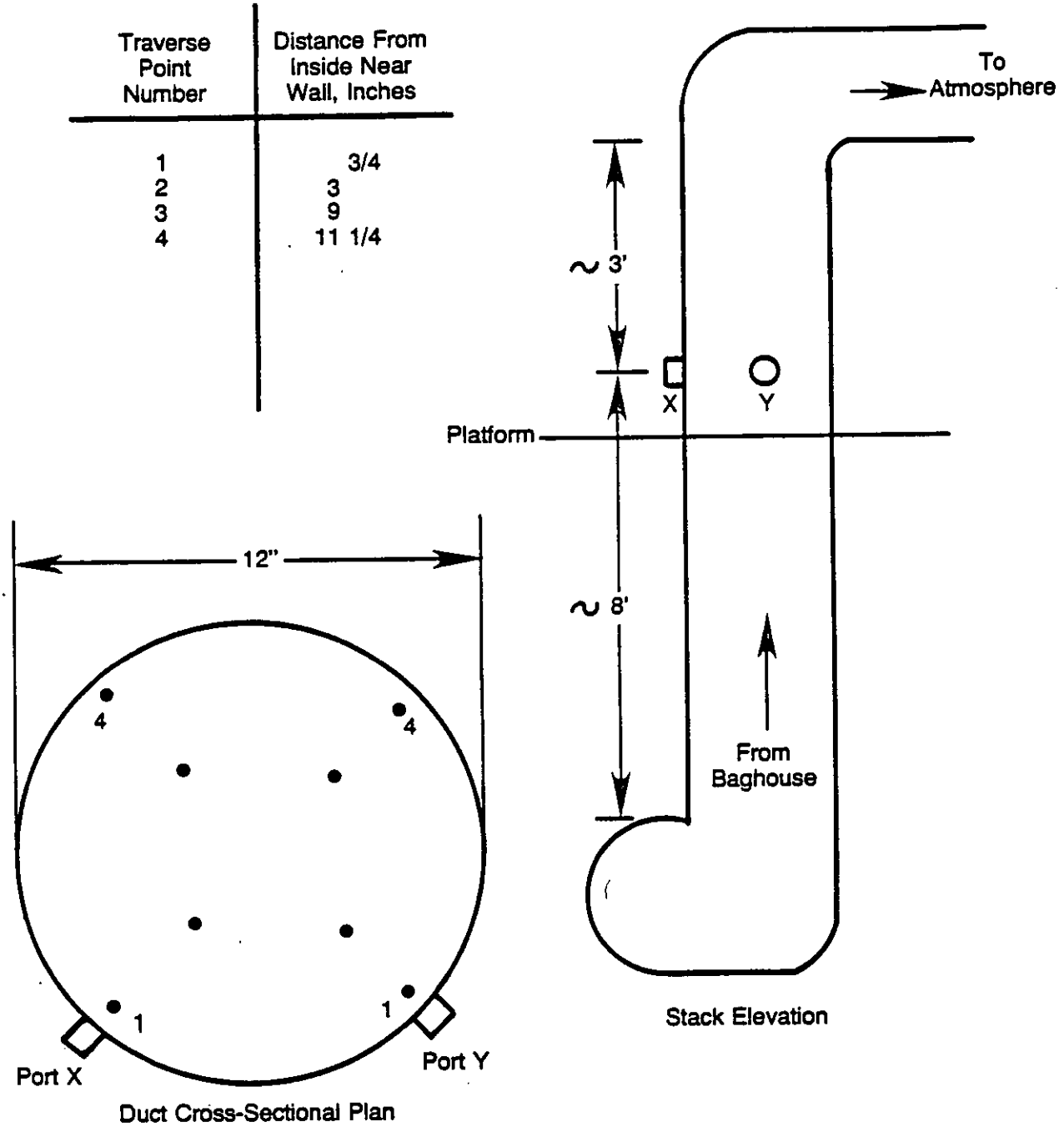
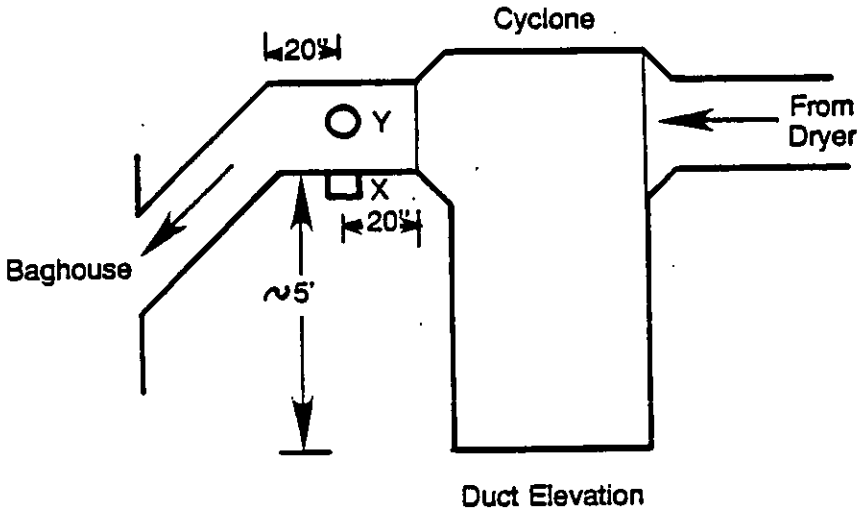
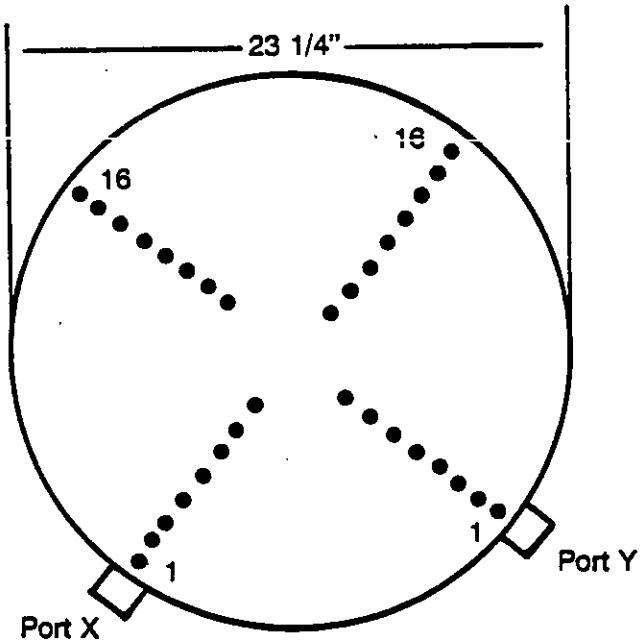


FIGURE 5 PORT AND SAMPLING POINT LOCATIONS – NO. 4 KETTLE CALCINER BAGHOUSE DISCHARGE STACK

Traverse Point Number	Distance From Inside Near Wall, Inches
1	3/8
2	1 1/8
3	2
4	2 7/8
5	3 7/8
6	5 1/8
7	6 5/8
8	8 3/4
9	14 1/2
10	16 5/8
11	18 1/8
12	19 3/8
13	20 3/8
14	21 1/4
15	22 1/8
16	22 7/8



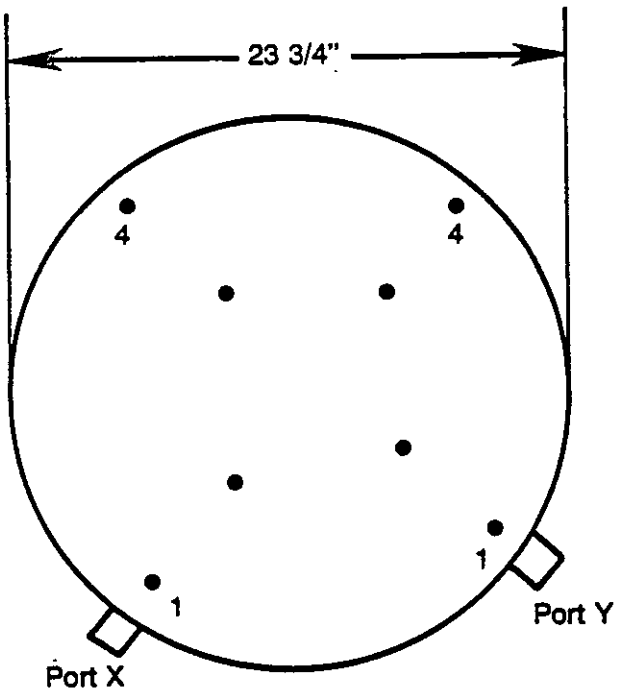
Duct Elevation



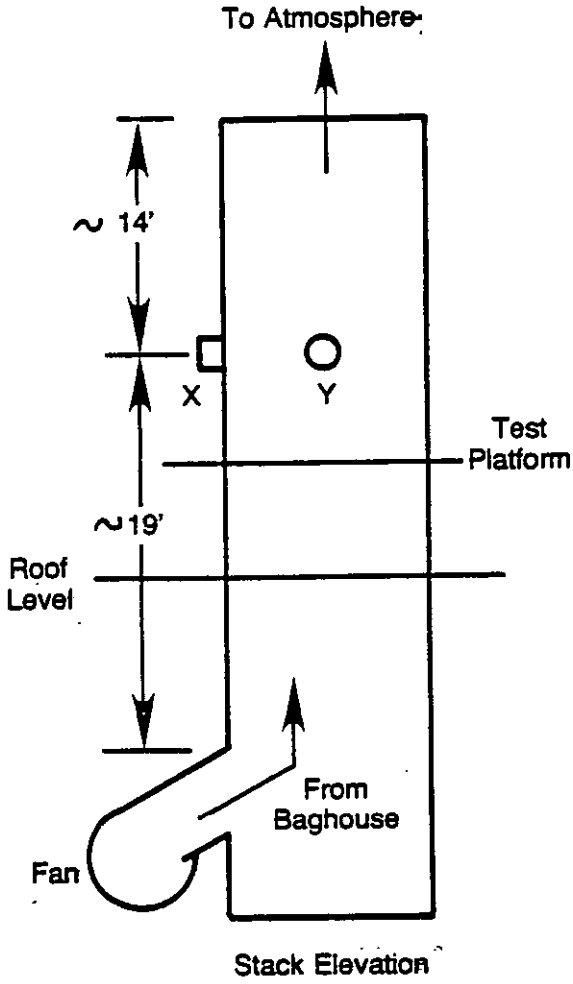
Duct Cross-Sectional Plan

FIGURE 6 PORT AND SAMPLING POINT LOCATIONS – ROCK DRYER BAGHOUSE INLET DUCT

Traverse Point Number	Distance From Inside Near Wall, Inches
1	1 5/8
2	5 7/8
3	17 3/4
4	22 1/8

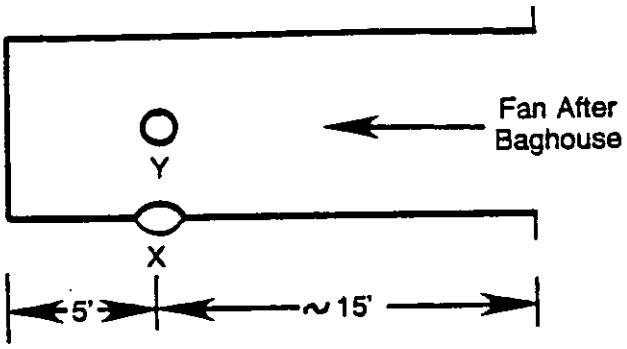


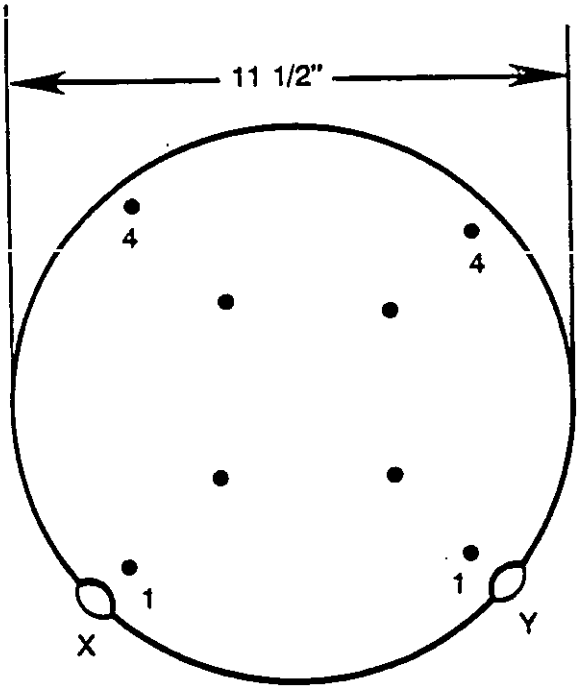
Stack Cross-Sectional Plan



Stack Elevation

FIGURE 7 PORT AND SAMPLING POINT LOCATIONS – ROCK DRYER BAGHOUSE DISCHARGE STACK





Duct Cross-Sectional Plan

Traverse Point Number	Distance From Inside Near Wall, Inches
1	3/4
2	2 7/8
3	8 5/8
4	10 3/4

FIGURE 8 PORT AND SAMPLING POINT LOCATIONS – BOARD END SAWING BAGHOUSE DISCHARGE STACK

DESCRIPTION OF SAMPLING TRAINS

PARTICULATE SAMPLING TRAINS

The test train utilized for particulate sampling at the Board End Sawing Baghouse Discharge Stack was the standard EPA Method 5 train (see Figure 9).

A stainless steel nozzle was attached to a heated (~250°F) borosilicate glass probe which was connected directly to a borosilicate filter holder containing a 9-cm Reeve Angel 900 AF glass fiber filter. The filter holder was maintained at approximately 250°F in a heated chamber, and was connected by 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 types; 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 calibrated 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 with the exception of the Rock Dryer inlet and outlet test sites which contained products of combustion.

Figure 10 shows the EPA Method 5 train utilized at the No. 4 Kettle Calciner Baghouse and at the Rock Dryer Baghouse locations. The test train shown is identical to the one described above, except a rigid glass connection is used between the back half of the filter holder and the first impinger, rather than the flexible vacuum tubing.

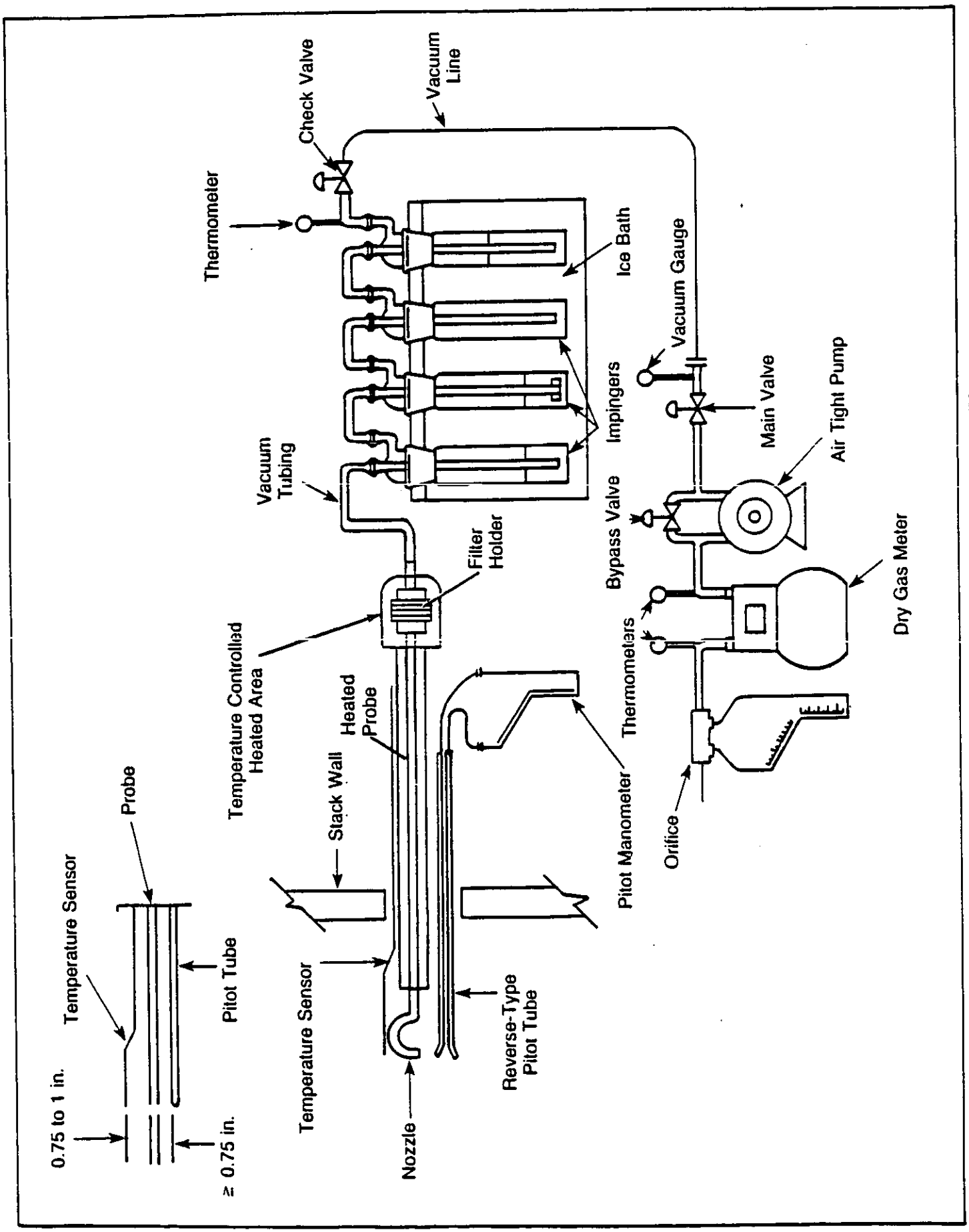


FIGURE 9 PARTICULATE SAMPLING TRAIN -- EPA METHOD 5

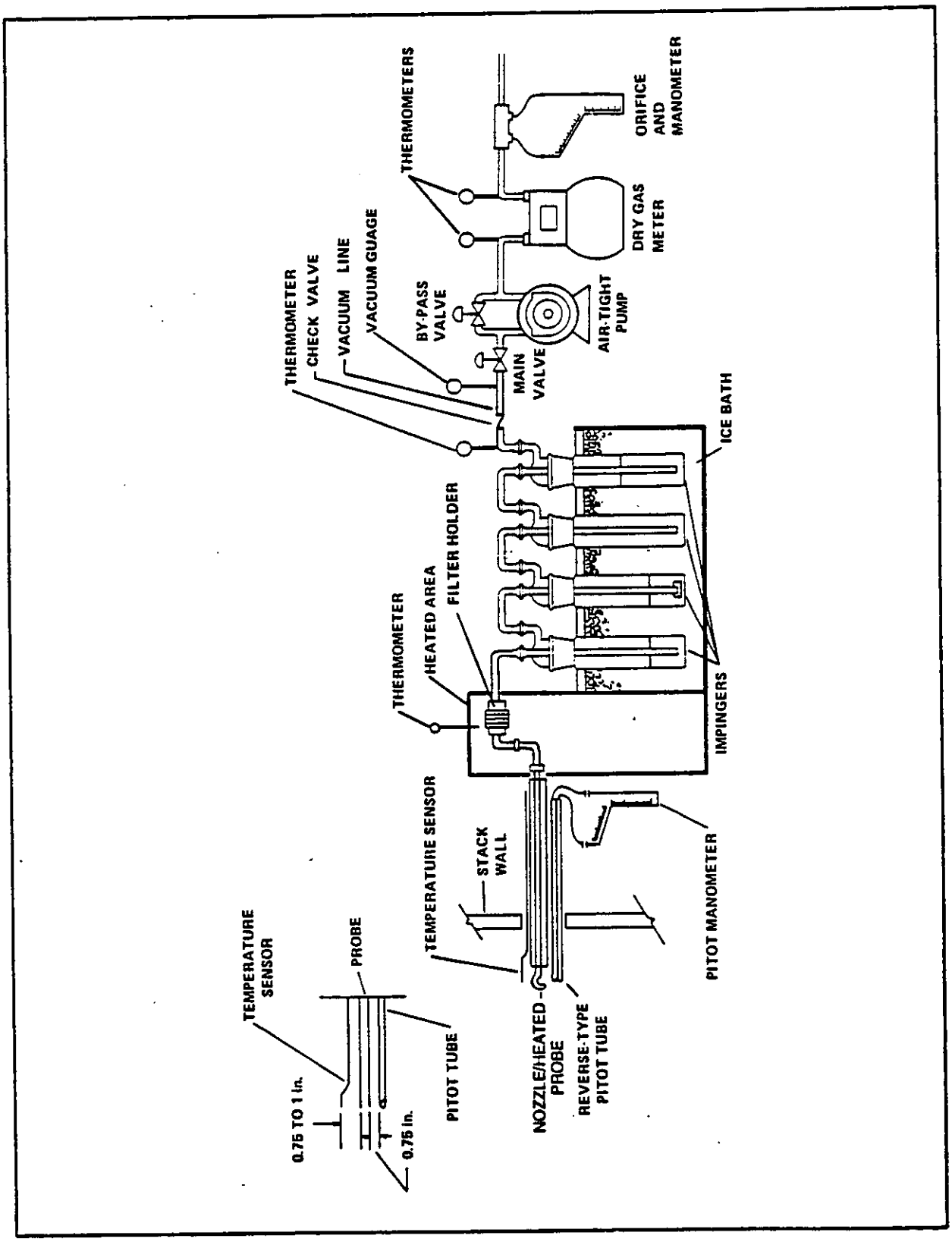


FIGURE 10 PARTICULATE SAMPLING TRAIN–EPA METHOD 5

PARTICLE SIZE DISTRIBUTION SAMPLING APPARATUS

A stainless steel nozzle was connected directly to an 8-stage Andersen cascade impaction device which separated the particles according to their effective aerodynamic particle diameters. A solid 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 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, calibrated orifice, and inclined manometers completed the sampling train (Figure 11).

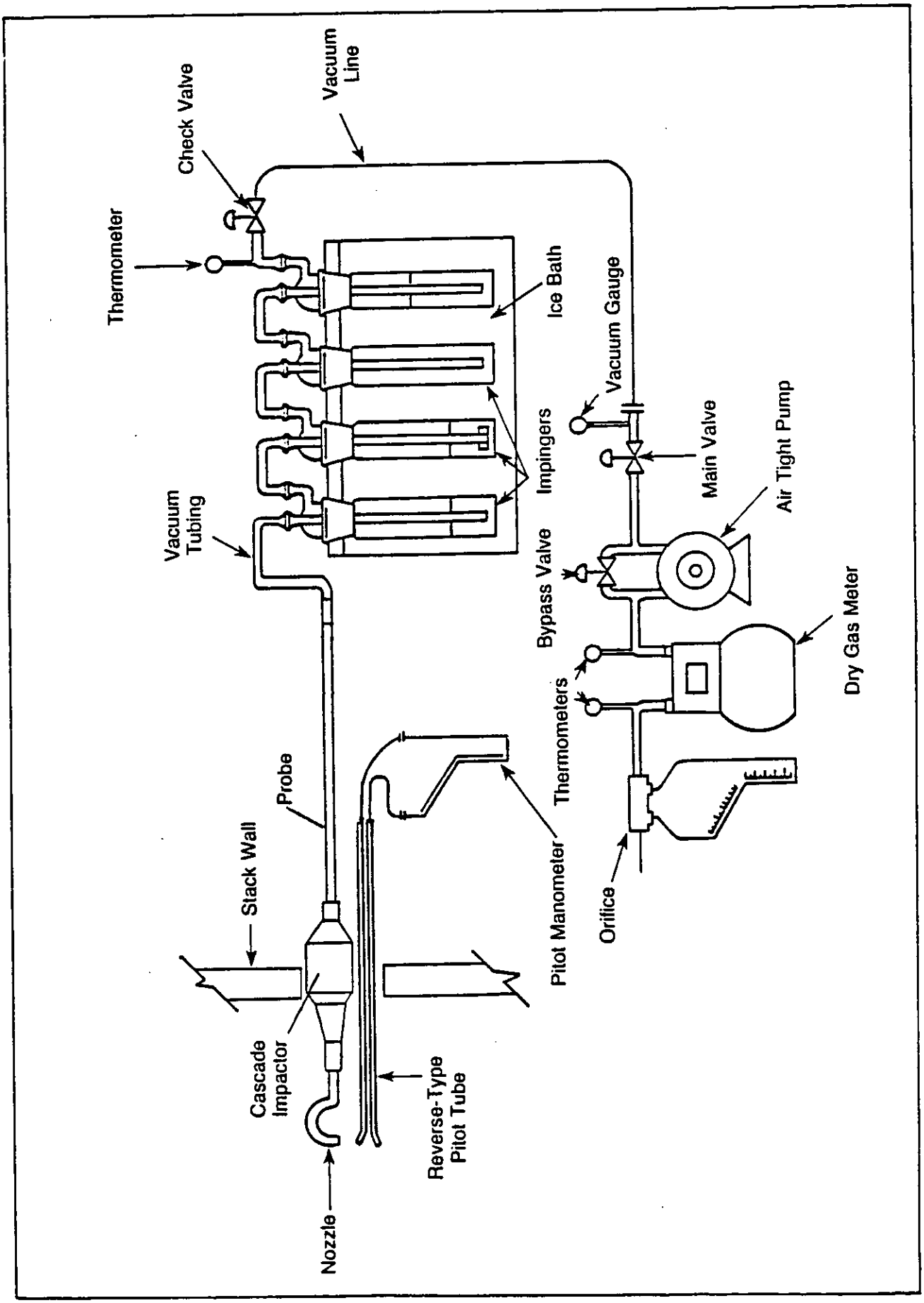


FIGURE 11 PARTICLE SIZE DISTRIBUTION SAMPLING APPARATUS --
ANDERSEN 2000, INC.

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. A check for the presence or absence of cyclonic flow was conducted at each test location prior to formal testing. Stack gas temperatures were observed with a direct readout pyrometer equipped with a chromel-alumel thermocouple.

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.

FORMAL TESTS

No. 4 Kettle Calciner Baghouse Inlet Duct

A series of three tests were conducted at the No. 4 Kettle Calciner Baghouse Inlet Duct to measure the concentration and mass rate of particulate matter emissions. Nine traverse points (3 per port axis) were sampled for 3 minutes each resulting in a total test time of 27 minutes. The Technical Manager approved the reduced sampling interval due to the high grain loading (~110 gr/DSCF) encountered.

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 and at the inlet and outlet of the dry gas meter.

Test data were recorded at each traverse 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. Tables 11 and 12 present a summary of test data for each of the three runs. Test result summarization appears in Tables 21 and 22.

Condensation problems precluded the use of the cascade impactor for particle sizing. Particle size distribution analyses were conducted on the combined filter and cyclone particulate catches. See Appendix B for results.

No. 4 Kettle Calciner Baghouse Discharge Stack

Three Method 5 tests were performed on the No. 4 Kettle Calciner Baghouse Discharge Stack. Eight points were traversed (4 per port) for 12 minutes, each yielding a test period of 96 minutes.

Procedures for isokinetic sampling were identical to those described for the No. 4 Kettle Calciner Baghouse Inlet Duct.

See Tables 13 and 14 for test data and Tables 23 and 24 for test result summaries, respectively.

Visual determinations of plume opacity were performed by a certified observer according to Method 9 procedures during all three test runs. A summary of results is presented in Table 36. No particle size distribution tests were conducted at this test point due to moisture condensation problems.

Rock Dryer Baghouse Inlet Duct

Three 64 minute Method 5 test runs were performed at the Rock Dryer Inlet Duct. A total of 32 points were sampled for two minutes each per test.

Isokinetic sampling procedures were identical to those previously described. Tables 15 and 16 show test data summarization and Tables 25 and 26 present test results.

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 4 minutes for Test Runs 1 and 2, and for 3 minutes for Test Run 3. This permitted collection of sufficient sample for analysis without overloading the filter substrates. Sample volume, temperature, and pressure data were recorded. See Tables 31 through 33 for distribution results.

Rock Dryer Baghouse Discharge Stack

Three Method 5 test runs were conducted on the Rock Dryer Discharge Stack. Eight sampling points (4 per axis) were sampled for eight minutes each, yielding a test period of 64 minutes.

Sampling procedures were identical to those previously described. See Tables 17 and 18 for test data and Tables 27 and 28 for test result summaries, respectively.

One particle size distribution test was completed at an average point of velocity. Total test time was 120 minutes with readings taken every 5 minutes. See Table 34 for particle size distribution results.

Visual determinations of plume opacity were performed by a certified observer according to Method 9 procedures during all three particulate test runs. A summary of results is presented in Table 37.

Board End Sawing Baghouse Discharge Stack

Three 64 minute Method 5 test runs were conducted at the Board End Sawing Baghouse Discharge Stack. A total of eight points (4 per port) were sampled for eight minutes each per test.

Isokinetic sampling procedures were identical to these previously described. Tables 19 and 20 show test data summarization and Tables 29 and 30 present test results.

One particle size distribution test was completed at an average point of velocity. Total test time was 120 minutes with readings taken every 5 minutes. See Table 35 for particle size distribution plot.

Three Method 9 plume opacity determinations were performed by a certified observer during the three particulate test runs. A summary of results is presented in Table 38.

Other Test Points

The visible and fugitive emission tests conducted at the remaining test points were 1 hour in duration each.

ANALYTICAL PROCEDURES

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 Type 1).

The probe 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 Type 2) and the container sealed with a Teflon-lined closure. Fluid levels were marked to determine whether or not leakage occurred during transport. The container was labeled to clearly identify its contents. 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 Type 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 Type 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 WESTON's laboratory.

Each cascade impactor filter was fired at 525°C and preweighed 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.

TEST RESULTS AND DISCUSSION

Particulate test data and test result summaries are presented in Tables 11 through 30 of this section. Tables 31 through 35 list the particle size distribution of the particulate matter for all locations. Visible emission test data summaries are shown in Tables 36 through 41. See Tables 42 and 43 for fugitive emission test result summaries.

No unusual process operating problems were encountered during the test periods. However, a visible plume of 20 percent opacity emanating from the Surge Bin Baghouse (indicating leaking bags) prohibited the conduct of Method 9 tests on the source until repairs were effected. A WESTON observer returned to the plant site on 10 June 1980 to perform the visible emission tests following the completion of collector maintenance.

The following sampling difficulties occurred during the survey:

1. No Andersen particle size distribution tests were performed at the No. 4 Kettle Calciner Baghouse test points. Gas stream moisture content of ~70 percent caused condensation problems on the filter substrates precluding the use of this technique. At the inlet test point, the dry filter and cyclone catches were combined and the resultant sample submitted for sedigraph particle size distribution analysis. No particle sizing was conducted at the outlet test point.

2. Test period length for the particulate tests performed at No. 4 Kettle Calciner Baghouse Inlet Duct was reduced for practical sampling considerations (particulate loadings of ~110 grains/DSCF) to 27 minutes as approved by the EPA Technical Manager.

The quantity of particulate matter discharged to the atmosphere from the No. 4 Kettle Calciner Baghouse Discharge Stack was $\leq$0.020 grains/DSCF and $\leq$0.093 pounds/hour. The certified visible emission observer recorded plume opacities of $\leq$5 percent for this source.

The particulate matter discharged from the Rock Dryer Discharge Duct was $\leq$0.005 grains/DSCF and $\leq$0.341 pounds/hour. The opacity readings recorded by the certified observer were $\leq$5 percent.

The particulate matter discharged from the Board End Sawing Baghouse Discharge Duct was ≤ 0.010 grains/DSCF and ≤ 0.307 pounds/hour. The opacity readings recorded by the certified observer were ≤ 5 percent.

The particulate removal efficiency of the No. 4 Kettle Calciner Baghouse averaged 99.99 percent for the three tests; the efficiency of the Rock Dryer Dust Collector averaged 99.87 percent; the efficiency of the Board End Sawing Baghouse averaged 99.91 percent.

Note that the collection efficiency of the Board End Sawing Baghouse was calculated based on an estimate of uncontrolled emissions (see Appendix C for estimate workup). The inlet duct was not sampled due to the presence of large particulate (up to 6" long by 1/2" wide) which could not be collected representatively using a standard Method 5 train.

ANALYTICAL DATA SUMMARY

Sample: U.S. Gypsum
Shoals, Indiana
No. 4 Kettle Calcium Baghouse Inlet

Run 1

Specific Gravity:	1)	2.4633 g/cc
	2)	2.4852 g/cc
	Average	2.4742 g/cc
Median Particle Size:		6.6 micrometers
% > 104 µm:		0.23

Run 2

Specific Gravity:	1)	2.3511 g/cc
	2)	2.4261 g/cc
	Average	2.3886 g/cc
Median Particle Size:		7.5 micrometers
% > 104 µm:		0.35

Run 3

Specific Gravity:	1)	2.3796 g/cc
	2)	2.3981 g/cc
	Average	2.3888 g/cc
Median Particle Size:		10.7 micrometers
% > 104 µm:		0.46

WESTON

DESIGNERS CONSULTANTS

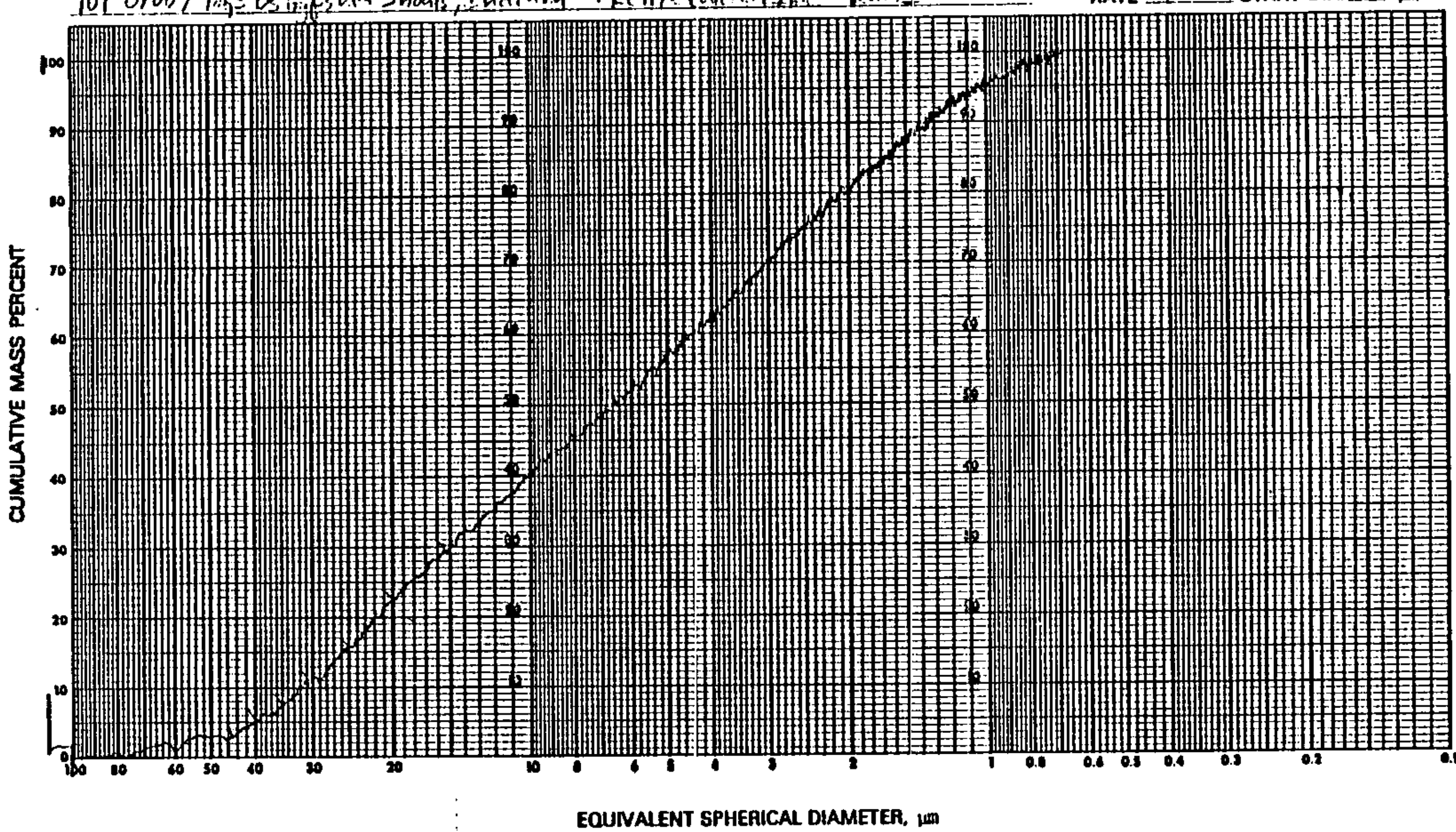
PARTICLE SIZE DISTRIBUTION

SAMPLE IDENTIFICATION Weston Consultants L5992 27127/BP 84-17 DATE 20 Aug 80

Density 2.47 g/cc LIQUID Sedisperse A-12 Density 0.808 g/cc Viscosity 3.412 cp BY W Mills

Preparation 0.7237g <104µm Sample dispersed in 25ml liquid 0.28-104µm Graph ... TEMPERATURE 28 °C

101 01007 ... Gypsum Shoals, Indiana #4 Kettle calcined ... RATE 410 START DIA. 100 µm



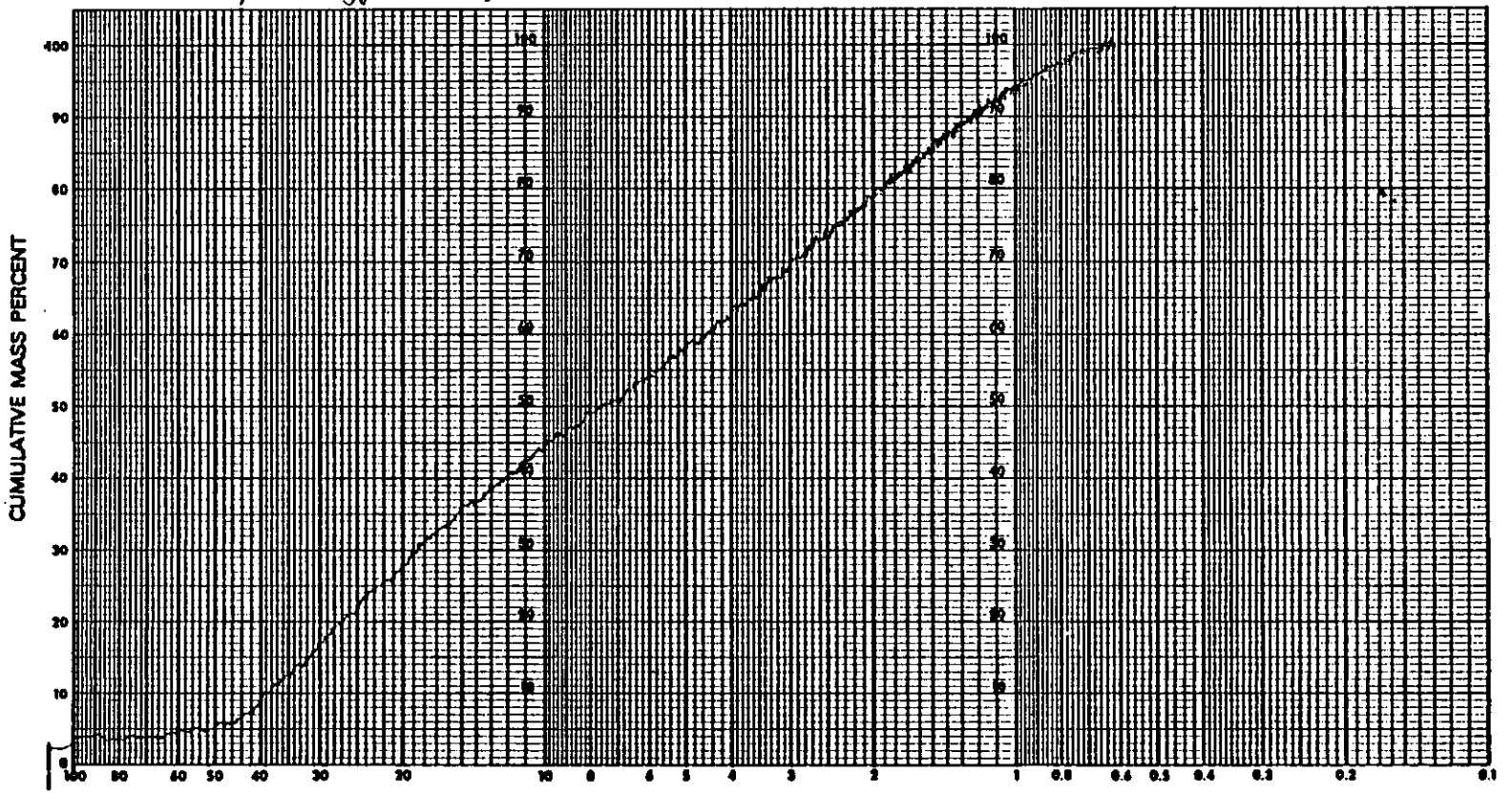
PARTICLE SIZE DISTRIBUTION

SAMPLE IDENTIFICATION Ht. Jon Consultants LS992 7127/RP8527 DATE 20 Aug '99

Density 2.287 g/cc LIQUID Sedisperse A-12 Density 0.807 g/cc Viscosity 3.363 cp BY W. Mills

Preparation Dr. 7126g <10 µm sample dispersed in 25ml liquid 0.35%>10 µm Graphite blend 10% TEMPERATURE 29 °C

ID: 0102 Loft VSI Gypsum Shark, Indiana #4 Kettle calciner B.H. Inlet Run 2 EIA 5 Pt. RATE 399 START DIA. 100 µm



WESTON DESIGNERS CONSULTANTS

PARTICLE SIZE DISTRIBUTION

SAMPLE IDENTIFICATION Weston Consultants L5992 27127/RP8527 DATE 20 Aug 80

Density 2.384 g/cc LIQUID Sedisperse A-12 Density 0.807 g/cc Viscosity 3.363 cp BY W. Mills

Preparation 0.7372 g <10 µm Sample dispersed in 25 ml liquid 0.46% >10 µm Graph shifted + 0% TEMPERATURE 29 °C

103 0102 Ib 64 Dis. Gypsum shoals #4 Kettle Calciner B.H. Inlet Run #3 RATE 399 START DIA. 100 µm

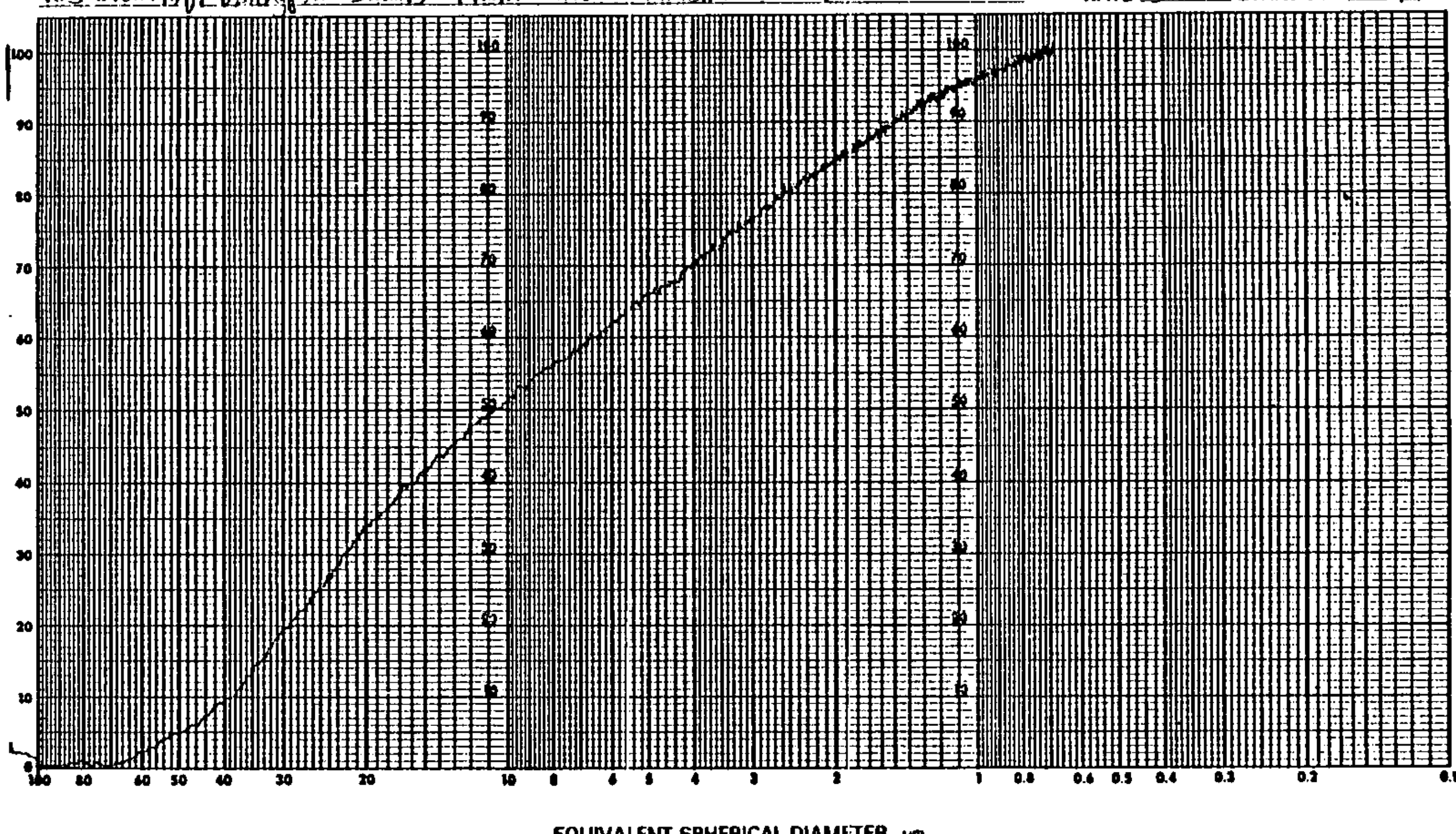


Table 11

No. 4 Kettle Calciner Baghouse Inlet Duct
Summary of Test Data
(English Units)

	1	2	3
Test Data			
Test Run Number	1	2	3
Test Date	6-3-80	6-3-80	6-4-80
Test Period	0932-1110	1402-1528	0838-0959
Sampling Data			
Sampling Duration, minutes	27.0	27.0	27.0
Nozzle Diameter, inches	0.375	0.375	0.375
Barometric Pressure, inches mercury	29.7	29.7	29.8
Average Orifice Pressure Differential, inches water	0.34	0.34	0.34
Average Dry Gas Temperature at Meter, ^{o}F	117.	120.	100.
Total Water Collected by Train, ml	421.2	425.0	421.1
Standard Volume of Water Vapor Collected, cubic feet	19.8	20.2	19.8
Dry Gas Meter Calibration Factor, dimensionless	1.01	1.01	1.01
Sample Volume at Meter Conditions, cubic feet	9.36	8.54	7.57
Sample Volume at Standard Conditions, cubic feet[1]	8.58	7.80	7.18
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
Moisture in Gas Stream, percent by volume	69.8	72.2	73.4
Mole Fraction of Dry Gas	0.302	0.278	0.266
Molecular Weight of Dry Gas	29.0	29.0	29.0
Molecular Weight of Wet Gas	21.3	21.1	20.9
Gas Stream Velocity and Volumetric Flow			
Static Pressure, inches water	-0.83	-0.82	-0.83
Absolute Pressure, inches mercury	29.6	29.6	29.7
Average Temperature, ^{o}F	264.	264.	259.
Pitot Tube Calibration Coefficient, dimensionless	0.84	0.84	0.84
Total Number of Traverse Points	9.0	9.0	9.0
Velocity at Actual Conditions, feet/second	30.2	30.3	30.4
Stack/duct Cross-Sectional Area, square feet	1.43	1.43	1.43
Volumetric Flow, wet actual cubic feet/minute	2,590.	2,600.	2,610.
Volumetric Flow, dry standard cubic feet/minute	564.	522.	505.
Percent Isokinetic	104.9	103.0	97.9
Unit/Process Operations Data	Monitored by Radian Corporation personnel		

[1]Standard Conditions = 68°F (20°C) and 29.92 inches (760 mm) mercury, dry basis.

Table 12

No. 4 Kettle Calciner Baghouse Inlet Duct
Summary of Test Data
(Metric Units)

	1	2	3
Test Data			
Test Run Number	1	2	3
Test Date	6-3-80	6-3-80	6-4-80
Test Period	0932-1110	1402-1528	0838-0959
Sampling Data			
Sampling Duration, minutes	27.0	27.0	27.0
Nozzle Diameter, centimeters	0.953	0.953	0.953
Barometric Pressure, millimeters mercury	754.4	754.4	756.9
Average Orifice Pressure Differential, millimeters water	8.6	8.6	8.6
Average Dry Gas Temperature at Meter, °C	47.	49.	38.
Total Water Collected by Train, ml	421.2	425.0	421.1
Volume of Water Vapor Collected, Standard Cubic Meters	0.561	0.572	0.561
Dry Gas Meter Calibration Factor, dimensionless	1.01	1.01	1.01
Sample Volume at Meter Conditions, cubic meters	0.265	0.242	0.214
Sample Volume at Standard Conditions, cubic meters[1]	0.243	0.221	0.203
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
Moisture in Gas Stream, percent by volume	69.8	72.2	73.4
Mole Fraction of Dry Gas	0.302	0.278	0.266
Molecular Weight of Dry Gas	29.0	29.0	29.0
Molecular Weight of Wet Gas	21.3	21.1	20.9
Gas Stream Velocity and Volumetric Flow			
Static Pressure, millimeters water	-21.1	-20.8	-21.1
Absolute Pressure, millimeters mercury	751.8	751.8	754.4
Average Temperature, °C	129.	129.	126.
Pitot Tube Calibration Coefficient, dimensionless	0.84	0.84	0.84
Total Number of Traverse Points	9.0	9.0	9.0
Velocity at Actual Conditions, meters/second	9.21	9.24	9.27
Stack/duct Cross-Sectional Area, square meters	0.133	0.133	0.133
Volumetric Flow, Wet Actual Conditions, cubic meters/minute	73.3.	73.6	73.9
Volumetric Flow, Dry Standard Conditions, cubic meters/minute	16.0	14.8	14.3
Percent Isokinetic	104.9	103.0	97.9
Unit/Process Operations Data	Monitored by Radian Corporation personnel		

[1]Standard Conditions = 68°F (20°C) and 29.92 inches (760 mm) mercury, dry basis.

Table 13

No. 4 Kettle Calciner Baghouse Discharge Stack
Summary of Test Data
(English Units)

	1	2	3
Test Data			
Test Run Number	1	2	3
Test Date	6-3-80	6-3-80	6-4-80
Test Period	0932-1150	1400-1610	0837-1030
Sampling Data			
Sampling Duration, minutes	96.0	96.0	96.0
Nozzle Diameter, inches	0.300	0.300	0.300
Barometric Pressure, inches mercury	29.7	29.7	29.7
Average Orifice Pressure Differential, inches water	0.44	0.46	0.46
Average Dry Gas Temperature at Meter, ^{o}F	118.	121.	103.
Total Water Collected by Train, ml	1,606.3	1,590.8	1,722.2
Standard Volume of Water Vapor Collected, cubic feet	75.6	74.9	81.1
Dry Gas Meter Calibration Factor, dimensionless	0.990	0.990	0.990
Sample Volume at Meter Conditions, cubic feet	37.9	37.5	37.8
Sample Volume at Standard Conditions, cubic feet[1]	34.1	33.5	34.9
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
Moisture in Gas Stream, percent by volume	68.9	69.1	69.9
Mole Fraction of Dry Gas	0.311	0.309	0.301
Molecular Weight of Dry Gas	29.0	29.0	29.0
Molecular Weight of Wet Gas	21.4	21.4	21.3
Gas Stream Velocity and Volumetric Flow			
Static Pressure, inches water	0.91	0.89	0.95
Absolute Pressure, inches mercury	29.7	29.7	29.8
Average Temperature, ^{o}F	245.	248.	238.
Pitot Tube Calibration Coefficient, dimensionless	0.84	0.84	0.84
Total Number of Traverse Points	8.0	8.0	8.0
Velocity at Actual Conditions, feet/second	49.7	50.0	50.3
Stack/duct Cross-Sectional Area, square feet	0.785	0.785	0.785
Volumetric Flow, wet actual cubic feet/minute	2,340.	2,360.	2,370.
Volumetric Flow, dry standard cubic feet/minute	542.	540.	538.
Percent Isokinetic	104.9	103.3	108.2
Unit/Process Operations Data	Monitored by Radian Corporation personnel		

[1]Standard Conditions = 68°F (20°C) and 29.92 inches (760 mm) mercury, dry basis.

Table 14

No. 4 Kettle Calciner Baghouse Discharge Stack
Summary of Test Data
(Metric Units)

	1	2	3
Test Data			
Test Run Number	1	2	3
Test Date	6-3-80	6-3-80	6-4-80
Test Period	0932-1150	1400-1610	0837-1030
Sampling Data			
Sampling Duration, minutes	96.0	96.0	96.0
Nozzle Diameter, centimeters	0.762	0.762	0.762
Barometric Pressure, millimeters mercury	754.4	754.4	754.4
Average Orifice Pressure Differential, millimeters water	11.2	11.7	11.7
Average Dry Gas Temperature at Meter, °C	48.	49.	39.
Total Water Collected by Train, ml	1,606.3	1,590.8	1,722.2
Volume of Water Vapor Collected, Standard Cubic Meters	2.141	2.121	2.297
Dry Gas Meter Calibration Factor, dimensionless	0.990	0.990	0.990
Sample Volume at Meter Conditions, cubic meters	1.073	1.062	1.070
Sample Volume at Standard Conditions, cubic meters[1]	0.966	0.949	0.988
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
Moisture in Gas Stream, percent by volume	68.9	69.1	69.9
Mole Fraction of Dry Gas	0.311	0.309	0.301
Molecular Weight of Dry Gas	29.0	29.0	29.0
Molecular Weight of Wet Gas	21.4	21.4	21.3
Gas Stream Velocity and Volumetric Flow			
Static Pressure, millimeters water	23.1	22.6	24.1
Absolute Pressure, millimeters mercury	754.4	754.4	756.9
Average Temperature, °C	118.	120.	114.
Pitot Tube Calibration Coefficient, dimensionless	0.84	0.84	0.84
Total Number of Traverse Points	8.0	8.0	8.0
Velocity at Actual Conditions, meters/second	15.1	15.2	15.3
Stack/duct Cross-Sectional Area, square meters	0.073	0.073	0.073
Volumetric Flow, Wet Actual Conditions, cubic meters/minute	66.3	66.8	67.1
Volumetric Flow, Dry Standard Conditions, cubic meters/minute	15.3	15.3	15.2
Percent Isokinetic	104.9	103.3	108.2
Unit/Process Operations Data	Monitored by Radian Corporation personnel		

[1]Standard Conditions = 68°F (20°C) and 29.92 inches (760 mm) mercury, dry basis.

Table 15

Rock Dryer Baghouse Inlet Duct
Summary of Test Data
(English Units)

	1	2	3
Test Data			
Test Run Number	1	2	3
Test Date	6-5-80	6-6-80	6-6-80
Test Period	1809-1933	0934-1056	1150-1311
Sampling Data			
Sampling Duration, minutes	64.0	64.0	64.0
Nozzle Diameter, inches	0.188	0.188	0.188
Barometric Pressure, inches mercury	30.0	29.8	29.8
Average Orifice Pressure Differential, inches water	0.92	0.88	0.88
Average Dry Gas Temperature at Meter, ^{o}F	105.	110.	110.
Total Water Collected by Train, ml	71.2	68.	68.4
Standard Volume of Water Vapor Collected, cubic feet	3.4	3.2	3.2
Dry Gas Meter Calibration Factor, dimensionless	1.01	1.01	1.01
Sample Volume at Meter Conditions, cubic feet	35.4	34.9	35.0
Sample Volume at Standard Conditions, cubic feet[1]	33.6	32.6	32.7
Gas Stream Composition			
CO_2, percent by volume	1.3	1.1	1.2
O_2, percent by volume	17.2	18.5	18.2
CO, percent by volume	0.0	0.0	0.0
N_2, percent by volume	81.6	80.4	80.6
Moisture in Gas Stream, percent by volume	9.1	8.9	9.0
Mole Fraction of Dry Gas	0.909	0.911	0.910
Molecular Weight of Dry Gas	28.9	28.9	28.9
Molecular Weight of Wet Gas	27.9	27.9	27.9
Gas Stream Velocity and Volumetric Flow			
Static Pressure, inches water	-3.2	-3.1	-3.15
Absolute Pressure, inches mercury	29.7	29.5	29.5
Average Temperature, ^{o}F	174.	173.	178.
Pitot Tube Calibration Coefficient, dimensionless	0.84	0.84	0.84
Total Number of Traverse Points	32.0	32.0	32.0
Velocity at Actual Conditions, feet/second	56.3	53.9	54.3
Stack/duct Cross-Sectional Area, square feet	2.95	2.95	2.95
Volumetric Flow, wet actual cubic feet/minute	9,950.	9,550.	9,600.
Volumetric Flow, dry standard cubic feet/minute	7,500.	7,150.	7,150.
Percent Isokinetic	107.0	108.9	109.3
Unit/Process Operations Data	Monitored by Radian Corporation personnel		

[1]Standard Conditions = 68°F (20°C) and 29.92 inches (760 mm) mercury, dry basis.

Table 16

Rock Dryer Baghouse Inlet Duct
Summary of Test Data
(Metric Units)

	1	2	3
Test Data			
Test Run Number	1	2	3
Test Date	6-5-80	6-6-80	6-6-80
Test Period	1809-1933	0934-1056	1150-1311
Sampling Data			
Sampling Duration, minutes	64.0	64.0	64.0
Nozzle Diameter, centimeters	0.478	0.478	0.478
Barometric Pressure, millimeters mercury	762.0	756.9	756.9
Average Orifice Pressure Differential, millimeters water	23.4	22.4	22.4
Average Dry Gas Temperature at Meter, °C	41.	43.	43.
Total Water Collected by Train, ml	71.2	68.0	68.4
Volume of Water Vapor Collected, Standard Cubic Meters	0.096	0.091	0.091
Dry Gas Meter Calibration Factor, dimensionless	1.01	1.01	1.01
Sample Volume at Meter Conditions, cubic meters	1.002	0.988	0.991
Sample Volume at Standard Conditions, cubic meters[1]	0.951	0.923	0.926
Gas Stream Composition			
CO_2, percent by volume	1.3	1.1	1.2
O_2, percent by volume	17.2	18.5	18.2
CO, percent by volume	0.0	0.0	0.0
N_2, percent by volume	81.6	80.4	80.6
Moisture in Gas Stream, percent by volume	9.1	8.9	9.0
Mole Fraction of Dry Gas	0.909	0.911	0.910
Molecular Weight of Dry Gas	28.9	28.9	28.9
Molecular Weight of Wet Gas	27.9	27.9	27.9
Gas Stream Velocity and Volumetric Flow			
Static Pressure, millimeters water	-81.28	-78.74	-80.01
Absolute Pressure, millimeters mercury	754.4	749.3	749.3
Average Temperature, °C	79.	78.	81.
Pitot Tube Calibration Coefficient, dimensionless	0.84	0.84	0.84
Total Number of Traverse Points	32.0	32.0	32.0
Velocity at Actual Conditions, meters/second	17.2	16.4	16.6
Stack/duct Cross-Sectional Area, square meters	0.274	0.274	0.274
Volumetric Flow, Wet Actual Conditions, cubic meters/minute	282.	270.	272.
Volumetric Flow, Dry Standard Conditions, cubic meters/minute	212.	203.	203.
Percent Isokinetic	107.0	108.9	109.3
Unit/Process Operations Data	Monitored by Radian Corporation personnel		

[1]Standard Conditions = 68°F (20°C) and 29.92 inches (760 mm) mercury, dry basis.

Table 17

Rock Dryer Baghouse Discharge Duct
Summary of Test Data
(English Units)

	1	2	3
Test Data			
Test Run Number	1	2	3
Test Date	6-5-80	6-6-80	6-6-80
Test Period	1810-1935	0823-1100	1150-1311
Sampling Data			
Sampling Duration, minutes	64.0	64.0	64.0
Nozzle Diameter, inches	0.195	0.195	0.195
Barometric Pressure, inches mercury	30.0	29.8	29.8
Average Orifice Pressure Differential, inches water	1.14	1.12	1.04
Average Dry Gas Temperature at Meter, ^{o}F	103.	101.	109.
Total Water Collected by Train, ml	75.5	75.2	78.1
Standard Volume of Water Vapor Collected, cubic feet	3.6	3.5	3.7
Dry Gas Meter Calibration Factor, dimensionless	0.990	0.990	0.990
Sample Volume at Meter Conditions, cubic feet	38.6	37.6	38.7
Sample Volume at Standard Conditions, cubic feet[1]	36.0	35.0	35.5
Gas Stream Composition			
CO_2, percent by volume	0.9	1.1	1.2
O_2, percent by volume	17.5	18.1	18.1
CO, percent by volume	0.0	0.0	0.0
N_2, percent by volume	81.6	80.8	80.7
Moisture in Gas Stream, percent by volume	9.0	9.2	9.4
Mole Fraction of Dry Gas	0.910	0.908	0.906
Molecular Weight of Dry Gas	28.8	28.9	28.9
Molecular Weight of Wet Gas	27.9	27.9	27.9
Gas Stream Velocity and Volumetric Flow			
Static Pressure, inches water	0.78	0.61	0.57
Absolute Pressure, inches mercury	30.0	29.8	29.8
Average Temperature, ^{o}F	172.	169.	174.
Pitot Tube Calibration Coefficient, dimensionless	0.84	0.84	0.84
Total Number of Traverse Points	8.0	8.0	8.0
Velocity at Actual Conditions, feet/second	56.0	55.8	54.0
Stack/duct Cross-Sectional Area, square feet	3.08	3.08	3.08
Volumetric Flow, wet actual cubic feet/minute	10,350.	10,300.	9,950.
Volumetric Flow, dry standard cubic feet/minute	7,900.	7,850.	7,500.
Percent Isokinetic	105.7	103.6	109.6
Unit/Process Operations Data	Monitored by Radian Corporation personnel		

[1]Standard Conditions = 68°F (20°C) and 29.92 inches (760 mm) mercury, dry basis.

Table 18

Rock Dryer Baghouse Discharge Duct
Summary of Test Data
(Metric Units)

	1	2	3
Test Data			
Test Run Number	1	2	3
Test Date	6-5-80	6-6-80	6-6-80
Test Period	1810-1935	0823-1100	1150-1311
Sampling Data			
Sampling Duration, minutes	64.0	64.0	64.0
Nozzle Diameter, centimeters	0.495	0.495	0.495
Barometric Pressure, millimeters mercury	762.0	756.9	756.9
Average Orifice Pressure Differential, millimeters water	29.0	28.4	26.4
Average Dry Gas Temperature at Meter, °C	39.	38.	43.
Total Water Collected by Train, ml	75.5	75.2	78.1
Volume of Water Vapor Collected, Standard Cubic Meters	0.102	0.099	0.105
Dry Gas Meter Calibration Factor, dimensionless	0.990	0.990	0.990
Sample Volume at Meter Conditions, cubic meters	1.093	1.065	1.096
Sample Volume at Standard Conditions, cubic feet[1]	1.019	0.991	1.005
Gas Stream Composition			
CO_2, percent by volume	0.9	1.1	1.2
O_2, percent by volume	17.5	18.1	18.1
CO, percent by volume	0.0	0.0	0.0
N_2, percent by volume	81.6	80.8	80.7
Moisture in Gas Stream, percent by volume	9.0	9.2	9.4
Mole Fraction of Dry Gas	0.910	0.908	0.906
Molecular Weight of Dry Gas	28.8	28.9	28.9
Molecular Weight of Wet Gas	27.9	27.9	27.9
Gas Stream Velocity and Volumetric Flow			
Static Pressure, millimeters water	19.812	15.494	14.478
Absolute Pressure, millimeters mercury	762.0	756.9	756.9
Average Temperature, °C	78.	76.	79.
Pitot Tube Calibration Coefficient, dimensionless	0.84	0.84	0.84
Total Number of Traverse Points	8.0	8.0	8.0
Velocity at Actual Conditions, meters/second	17.1	17.0	16.5
Stack/duct Cross-Sectional Area, square meters	0.286	0.286	0.286
Volumetric Flow, Wet Actual Conditions, cubic meters/minute	293.	292.	282.
Volumetric Flow, Dry Standard Conditions, cubic meters/minute	224.	222.	212.
Percent Isokinetic	105.7	103.6	109.6
Unit/Process Operations Data	Monitored by Radian Corporation personnel		

[1]Standard Conditions = 68°F (20°C) and 29.92 inches (760 mm) mercury, dry basis.

Table 19

Board End Sawing Discharge Duct
Summary of Test Data
(English Units)

	1	2	3
Test Data			
Test Run Number	1	2	3
Test Date	6-5-80	6-5-80	6-5-80
Test Period	1215-1329	1418-1529	1545-1707
Sampling Data			
Sampling Duration, minutes	64.0	64.0	64.0
Nozzle Diameter, inches	0.171	0.171	0.171
Barometric Pressure, inches mercury	30.0	30.0	30.0
Average Orifice Pressure Differential, inches water	2.43	2.32	2.49
Average Dry Gas Temperature at Meter, ^{o}F	103.	107.	100.
Total Water Collected by Train, ml	17.	17.6	16.1
Standard Volume of Water Vapor Collected, cubic feet	0.8	0.8	0.8
Dry Gas Meter Calibration Factor, dimensionless	0.99	0.99	0.99
Sample Volume at Meter Conditions, cubic feet	53.7	52.4	55.1
Sample Volume at Standard Conditions, cubic feet[1]	50.2	48.6	51.8
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
Moisture in Gas Stream, percent by volume	1.6	1.7	1.4
Mole Fraction of Dry Gas	0.984	0.983	0.986
Molecular Weight of Dry Gas	28.97	28.97	28.97
Molecular Weight of Wet Gas	28.80	28.79	28.81
Gas Stream Velocity and Volumetric Flow			
Static Pressure, inches water	0.64	0.59	0.63
Absolute Pressure, inches mercury	30.0	30.0	30.0
Average Temperature, ^{o}F	92.	95.	90.
Pitot Tube Calibration Coefficient, dimensionless	0.84	0.84	0.84
Total Number of Traverse Points	8.0	8.0	8.0
Velocity at Actual Conditions, feet/second	83.1	81.4	86.0
Stack/duct Cross-Sectional Area, square feet	0.72	0.72	0.72
Volumetric Flow, wet actual cubic feet/minute	3,600.	3,500.	3,700.
Volumetric Flow, dry standard cubic feet/minute	3,400.	3,300.	3,550.
Percent Isokinetic	104.4	103.8	103.7
Unit/Process Operations Data	Monitored by Radian Corporation personnel		

[1] Standard Conditions = 68°F (20°C) and 29.92 inches (760 mm) mercury, dry basis.

Table 20

Board End Sawing Discharge Duct
Summary of Test Data
(Metric Units)

	1	2	3
Test Data			
Test Run Number	1	2	3
Test Date	6-5-80	6-5-80	6-5-80
Test Period	1215-1329	1418-1529	1545-1707
Sampling Data			
Sampling Duration, minutes	64.0	64.0	64.0
Nozzle Diameter, centimeters	0.434	0.434	0.434
Barometric Pressure, millimeters mercury	762.0	762.0	762.0
Average Orifice Pressure Differential, millimeters water	61.7	58.9	63.2
Average Dry Gas Temperature at Meter, °C	39.	42.	38.
Total Water Collected by Train, ml	17.0	17.6	16.1
Volume of Water Vapor Collected, Standard Cubic Meters	0.023	0.023	0.023
Dry Gas Meter Calibration Factor, dimensionless	0.99	0.99	0.99
Sample Volume at Meter Conditions, cubic meters	1.521	1.484	1.560
Sample Volume at Standard Conditions, cubic meters[1]	1.422	1.376	1.467
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
Moisture in Gas Stream, percent by volume	1.6	1.7	1.4
Mole Fraction of Dry Gas	0.984	0.983	0.986
Molecular Weight of Dry Gas	28.97	28.97	28.97
Molecular Weight of Wet Gas	28.80	28.79	28.81
Gas Stream Velocity and Volumetric Flow			
Static Pressure, millimeters water	16.256	14.986	16.002
Absolute Pressure, millimeters mercury	762.0	762.0	762.0
Average Temperature, °C	33.	35.	32.
Pitot Tube Calibration Coefficient, dimensionless	0.84	0.84	0.84
Total Number of Traverse Points	8.0	8.0	8.0
Velocity at Actual Conditions, meters/second	25.329	24.811	26.213
Stack/duct Cross-Sectional Area, square meters	0.067	0.067	0.067
Volumetric Flow, Wet Actual Conditions, cubic meters/minute	102.	99.1	105.
Volumetric Flow, Dry Standard Conditions, cubic meters/minute	96.3	93.4	101.
Percent Isokinetic	104.4	103.8	103.7
Unit/Process Operations Data	Monitored by Radian Corporation personnel		

[1]Standard Conditions = 68°F (20°C) and 29.92 inches (760 mm) mercury, dry basis.

Table 21

No. 4 Kettle Calciner Baghouse Inlet Duct
Summary of Test Results
(English Units)

	1	2	3
Test Data			
Test Number	6-3-80	6-3-80	6-4-80
Test Date	0932-1110	1402-1528	0838-0959
Test Time			
Gas Stream Volumetric Flow			
Actual cubic feet/minute, wet	2,590.	2,600.	2,610.
Standard cubic feet/minute, dry[1]	564.	522.	505.
Particulate Lab Results			
Front-Half Wash Residue Fraction, g	50.8266	56.5370	52.8880
Filter Catch Fraction, g	2.9199	0.7599	2.4638
Total Particulate Catch Weight, g	53.7465	52.2969	55.3438
Particulate Emission Results[2]			
Grains/Dry Standard cubic foot	96.7	113.	119.
Pounds/hour	467.	507.	515.

[1]Standard Conditions = 68°F (20°C) and 29.92 inches (760 mm) mercury.
[2]Calculated based Total Particulate Catch Weight.

Table 22

No. 4 Kettle Calciner Baghouse Inlet Duct
Summary of Test Results
(Metric Units)

	1	2	3
Test Data			
Test Run Number	1	2	3
Test Date	6-3-80	6-3-80	6-4-80
Test Period	0932-1110	1402-1528	0838-0959
Gas Stream Volumetric Flow Rates			
Dry standard cubic meters/minute[1]	16.0	14.8	14.3
Wet actual cubic meters/minute	73.3	73.6	73.9
Particulate Laboratory Results			
Front-half Wash Residue Fraction, g	50.8266	56.5370	52.8880
Filter Catch Fraction, g	2.9199	0.7599	2.4638
Total Particulate Catch Weight, g	53.7465	52.2969	55.3438
Particulate Emission Results			
Grams/dry standard cubic meter	221.	259.	272.
Kilograms/hour	212.	230.	234.

[1]Standard Conditions = 68°F (20°C) and 29.92 inches (760 mm) mercury, dry basis.

Table 23

No. 4 Kettle Calciner Baghouse Discharge Duct
Summary of Test Results
(English Units)

	1	2	3
Test Data			
Test Number	1	2	3
Test Date	6-3-80	6-3-80	6-4-80
Test Time	0932-1150	1400-1610	0837-1030
Gas Stream Volumetric Flow			
Actual cubic feet/minute, wet	2,340.	2,360.	2,370.
Standard cubic feet/minute, dry[1]	542.	540.	538.
Particulate Lab Results			
Front-Half Wash Residue Fraction, g	0.0389	0.0091	0.0212
Filter Catch Fraction, g	0.0053	0.0041	0.0031
Total Particulate Catch Weight, g	0.0442	0.0132	0.0243
Particulate Emission Results[2]			
Grains/Dry Standard cubic foot	0.020	0.006	0.010
Pounds/hour	0.093	0.028	0.050
Baghouse Collector Performance			
Efficiency, percent	99.98	99.99	99.99

[1]Standard Conditions = 68°F (20°C) and 29.92 inches (760 mm) mercury.
[2]Calculated based Total Particulate Catch Weight.

Table 24

No. 4 Kettle Calciner Baghouse Discharge Duct
Summary of Test Results
(Metric Units)

	1	2	3
Test Data			
Test Run Number	1	2	3
Test Date	6-3-80	6-3-80	6-4-80
Test Period	0932-1150	1400-1610	0837-1030
Gas Stream Volumetric Flow Rates			
Dry standard cubic meters/minute[1]	15.3	15.3	15.2
Wet actual cubic meters/minute	66.3	66.8	67.1
Particulate Laboratory Results			
Front-Half Wash Residue Fraction, g	0.0389	0.0091	0.0212
Filter Catch Fraction, g	0.0053	0.0041	0.0031
Total Particulate Catch Weight, g	0.0442	0.0132	0.0243
Particulate Emission Results			
Grams/dry standard cubic meter	0.046	0.014	0.023
Kilograms/hour	0.042	0.013	0.023

[1]Standard Conditions = 68°F (20°C) and 29.92 inches (760 mm) mercury, dry basis.

Table 25

Rock Dryer Baghouse Inlet Duct
Summary of Test Results
(English Units)

	1	2	3
Test Data			
Test Number	1	2	3
Test Date	6-5-80	6-6-80	6-6-80
Test Time	1809-1933	0934-1056	1150-1311
Gas Stream Volumetric Flow			
Actual cubic feet/minute, wet	9,950.	9,550.	9,600.
Standard cubic feet/minute, dry[1]	7,500.	7,150.	7,150.
Particulate Lab Results			
Front-Half Wash Residue Fraction, g	6.3531	5.0688	4.7256
Filter Catch Fraction, g	0.6837	3.7674	4.0165
Total Particulate Catch Weight, g	7.0368	8.8362	8.7421
Particulate Emission Rate[2]			
Grains/Dry Standard cubic foot	3.23	4.18	4.13
Pounds/hour	208.	257.	253.

[1]Standard Conditions = 68°F (20°C) and 29.92 inches (760 mm) mercury.
[2]Calculated based Total Particulate Catch Weight.

Table 26

Rock Dryer Baghouse Inlet Duct
Summary of Test Results
(Metric Units)

	1	2	3
Test Data			
Test Run Number	6-5-80	6-6-80	6-6-80
Test Date	1809-1933	0934-1056	1150-1311
Test Period			
Gas Stream Volumetric Flow Rates			
Dry standard cubic meters/minute[1]	212.	203.	203.
Wet actual cubic meters/minute	282.	270.	272.
Particulate Laboratory Results			
Front-Half Wash Residue Fraction, g	6.3531	5.0688	4.7256
Filter Catch Fraction, g	0.6837	3.7674	4.0165
Total Particulate Catch Weight, g	7.0368	8.8362	8.7421
Particulate Emission Results			
Grams/dry standard cubic meters	7.39	9.56	9.45
Kilograms/hour	94.3	117.	115.

[1]Standard Conditions = 68°F (20°C) and 29.92 inches (760 mm) mercury, dry basis.

Table 27

Rock Dryer Baghouse Discharge Duct
Summary of Test Results
(English Units)

	1	2	3
Test Data			
Test Number	6-5-80	6-6-80	6-4-80
Test Date	1810-1935	0823-1100	1150-1311
Test Time			
Gas Stream Volumetric Flow			
Actual cubic feet/minute, wet	10,350.	10,300.	9,950.
Standard cubic feet/minute, dry[1]	7,900.	7,850.	7,500.
Particulate Lab Results			
Front-Half Wash Residue Fraction, g	0.0035	0.0027	0.0050
Filter Catch Fraction, g	0.0069	0.0066	0.0072
Total Particulate Catch Weight, g	0.0104	0.0093	0.0122
Particulate Emission Results[2]			
Grains/Dry Standard cubic foot	0.004	0.004	0.005
Pounds/hour	0.302	0.275	0.341
Baghouse Collector Performance			
Efficiency, percent	99.85	99.89	99.87

[1]Standard Conditions = 68°F (20°C) and 29.92 inches (760 mm) mercury.
[2]Calculated based Total Particulate Catch Weight.

Table 28

Rock Dryer Baghouse Discharge Duct
Summary of Test Results
(Metric Units)

	1	2	3
Test Data			
Test Run Number	1	2	3
Test Date	6-5-80	6-6-80	6-4-80
Test Period	1810-1935	0823-1100	1150-1311
Gas Stream Volumetric Flow Rates			
Dry standard cubic meters/minute[1]	224.	222.	212.
Wet actual cubic meters/minute	293.	292.	282.
Particulate Laboratory Results			
Front-Half Wash Residue Fraction, g	0.0035	0.0027	0.0050
Filter Catch Fraction, g	0.0069	0.0066	0.0072
Total Particulate Catch Weight, g	0.0104	0.0093	0.0122
Particulate Emission Results			
Grams/dry standard cubic meter	0.009	0.009	0.011
Kilograms/hour	0.137	0.125	0.155

[1]Standard Conditions = 68°F (20°C) and 29.92 inches (760 mm) mercury, dry basis.

Table 29

Board End Sawing Discharge Duct
Summary of Test Results
(English Units)

	1	2	3
Test Data			
Test Number	1	2	3
Test Date	6-5-80	6-5-80	6-5-80
Test Time	1215-1329	1418-1529	1545-1707
Gas Stream Volumetric Flow			
Actual cubic feet/minute, wet	3,600.	3,500.	3,700.
Standard cubic feet/minute, dry[1]	3,400.	3,300.	3,550.
Particulate Lab Results			
Front-Half Wash Residue Fraction, g	0.0026	0.0058	0.0101
Filter Catch Fraction, g	0.0048	0.0161	0.0240
Total Particulates Catch Weight, g	0.0074	0.0219	0.0341
Particulate Emission Results[2]			
Grains/Dry Standard cubic foot	0.002	0.007	0.010
Pounds/hour	0.066	0.197	0.307

[1]Standard Conditions = 68°F (20°C) and 29.92 inches (760 mm) mercury.
[2]Calculated based Total Particulate Catch Weight.

Table 30

Board End Sawing Discharge Duct
Summary of Test Results
(Metric Units)

	1	2	3
Test Data			
Test Run Number	6-5-80	6-5-80	6-5-80
Test Date	1215-1329	1418-1529	1545-1707
Test Period			
Gas Stream Volumetric Flow Rates			
Dry standard cubic meters/minute[1]	96.3	93.4	101.
Wet actual cubic meters/minute	102.	99.1	105.
Particulate Laboratory Results			
Front-Half Wash Residue Fraction, g	0.0026	0.0058	0.0101
Filter Catch Fraction, g	0.0048	0.0161	0.0240
Total Particulates Catch Weight, g	0.0074	0.0219	0.0341
Particulate Emission Results			
Grams/dry standard cubic meters	0.005	0.016	0.023
Kilograms/hour	0.030	0.089	0.139

[1]Standard Conditions = 68°F (20°C) and 29.92 inches (760 mm) mercury, dry basis.

Table 31

Particle Size Distribution

Run: 1

Date: 6-6-80

Location: U.S. Gypsum

Sampling Location: Rock Dryer Inlet

Traverse Point No. Sampled: Y-13

P_{bar} (in. Hg)	29.97
Stack Temp (^{o}F)	172
Sample Time (min.)	4.0
Sample Volume (cf)	1.794
Moisture (% H_2O)	9.0
Meter Temp (^{o}F)	109
Flow Setting, ΔH (in. H_2O)	0.59
Nozzle Diameter (in.)	0.171

Sample Flow Rate (at stack conditions): 0.46 cfm

Plate No.	Net Wt. (mg)	Percent	Cumulative Percent	EAD (microns)
1	346.2	61.1	100.0	15.0
2	25.9	4.6	38.9	9.6
3	31.3	5.5	34.3	6.3
4	44.0	7.8	28.8	4.5
5	73.7	13.0	21.0	2.8
6	36.1	6.4	8.0	1.4
7	5.9	1.0	1.6	0.90
8	1.3	0.23	0.6	0.60
Backup Filter	1.7	0.37	0.37	----
TOTAL	566.1	100.0		

FIGURE 12

Run No. 1 Rock Dryer Inlet

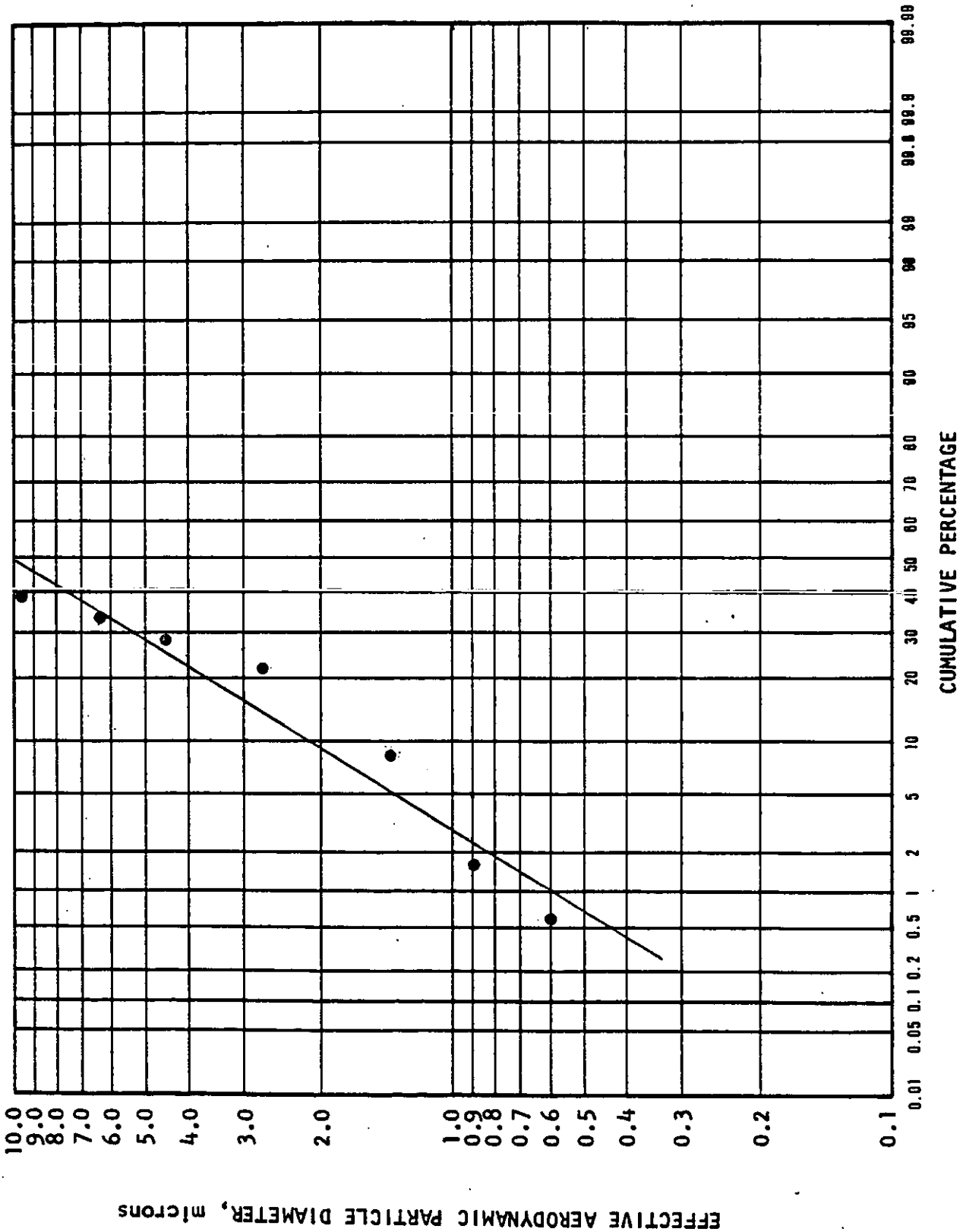


Table 32

Particle Size Distribution

Run: 2

Date: 6-6-80

Location: U.S. Gypsum

Sampling Location: Rock Dryer Inlet

Traverse Point No. Sampled: Y-13

P_{bar} (in. Hg)	29.77
Stack Temp (^{o}F)	172
Sample Time (min.)	4.0
Sample Volume (cf)	1.796
Moisture (% H_2O)	9.0
Meter Temp (^{o}F)	108
Flow Setting, ΔH (in. H_2O)	0.59
Nozzle Diameter (in.)	0.171

Sample Flow Rate (at stack conditions): 0.46 cfm

Plate No.	Net Wt. (mg)	Percent	Cumulative Percent	EAD (microns)
1	271.8	54.6	100.0	15.0
2	38.7	7.8	45.4	9.6
3	31.3	6.3	37.6	6.3
4	78.7	15.8	31.3	4.5
5	41.2	8.3	15.5	2.8
6	26.3	5.3	7.2	1.4
7	6.0	1.1	1.9	0.90
8	1.9	0.38	0.8	0.60
Backup Filter	2.2	0.42	0.42	----
TOTAL	498.1	100.0		

FIGURE 13

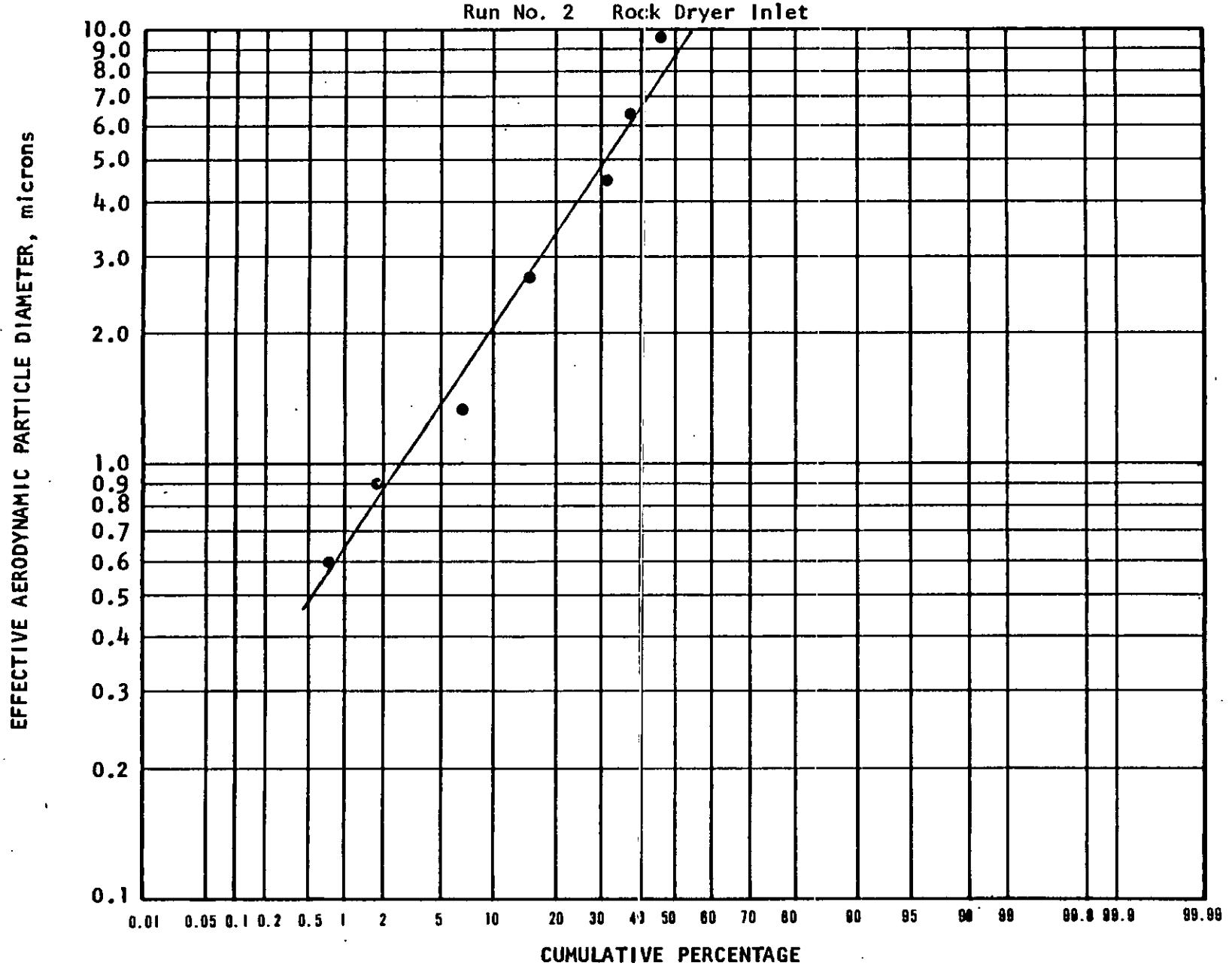

Run No. 2 Rock Dryer Inlet
EFFECTIVE AERODYNAMIC PARTICLE DIAMETER, microns
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.01 0.05 0.1 0.2 0.5 1 2 5 10 20 30 40 50 60 70 80 90 95 98 99 99.8 99.9 99.99
CUMULATIVE PERCENTAGE

Table 33

Particle Size Distribution

Run: 3

Date: 6-6-80

Location: U.S. Gypsum

Sampling Location: Rock Dryer Inlet

Traverse Point No. Sampled: Y-13

P_{bar} (in. Hg)	29.77
Stack Temp (^{o}F)	172
Sample Time (min.)	3.0
Sample Volume (cf)	1.353
Moisture (% H_2O)	9.0
Meter Temp (^{o}F)	110
Flow Setting, ΔH (in. H_2O)	0.59
Nozzle Diameter (in.)	0.171

Sample Flow Rate (at stack conditions): 0.46 cfm

Plate No.	Net Wt. (mg)	Percent	Cumulative Percent	EAD (microns)
1	149.2	47.8	100.0	15.0
2	32.3	10.3	52.2	9.6
3	36.2	11.6	41.9	6.3
4	28.3	9.1	30.3	4.5
5	55.6	17.8	21.2	2.8
6	5.7	1.8	3.4	1.4
7	2.8	0.9	1.6	0.90
8	0.9	0.3	0.7	0.60
Backup Filter	1.1	0.4	0.4	----
TOTAL	312.1	100.0		

FIGURE 14

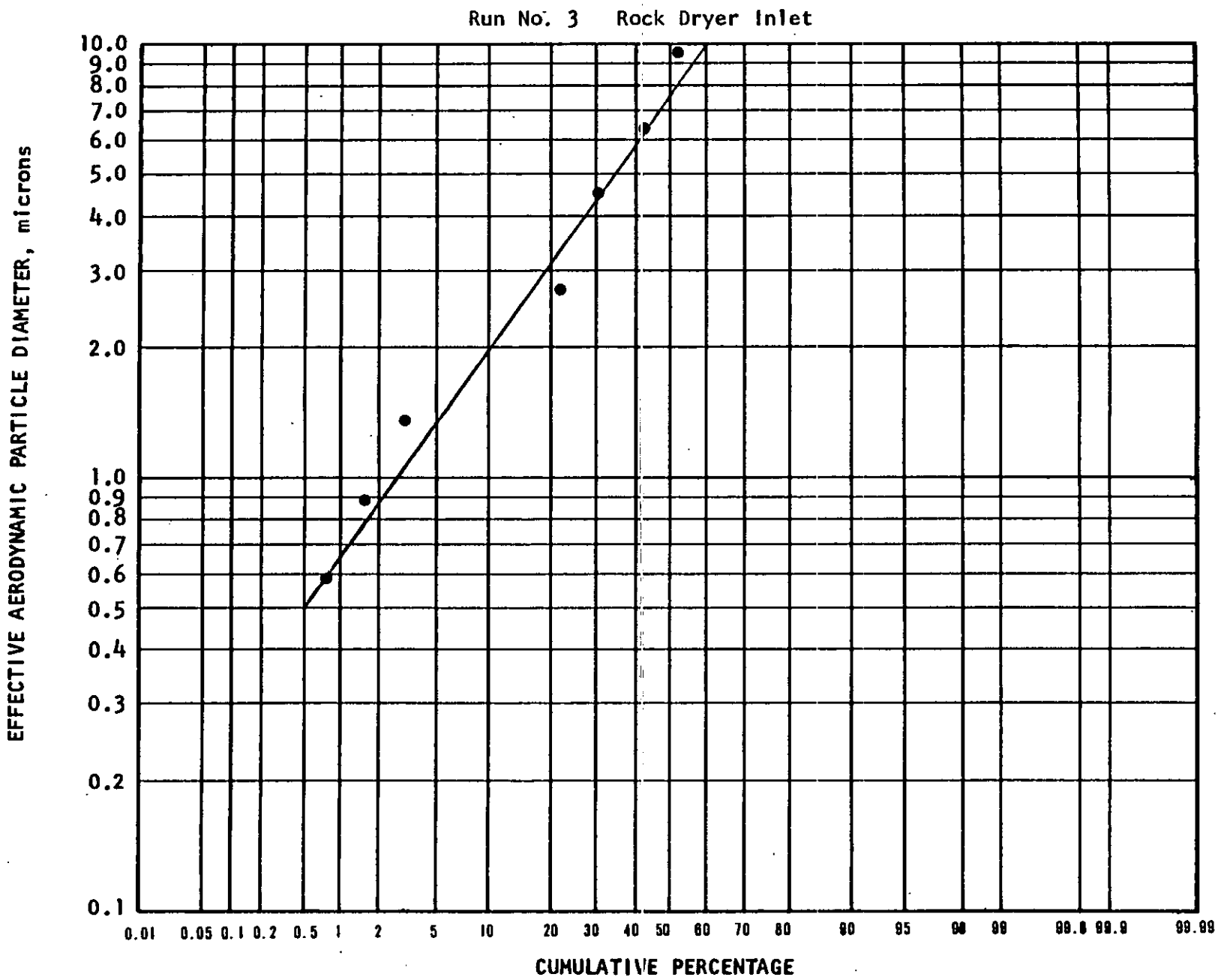

Run No. 3 Rock Dryer Inlet
EFFECTIVE AERODYNAMIC PARTICLE DIAMETER, microns
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.01 0.05 0.1 0.2 0.5 1 2 5 10 20 30 40 50 60 70 80 90 95 98 99 99.8 99.9 99.99
CUMULATIVE PERCENTAGE

Table 34

Particle Size Distribution

Run:	1	P_{bar} (in. Hg)	29.67
Date:	6-3-80	Stack Temp (^{o}F)	184
Location:	U.S. Gypsum	Sample Time (min.)	120
Sampling Location:	Rock Dryer Outlet	Sample Volume (cf)	72.660
Traverse Point No. Sampled:	X-2	Moisture (% H_2O)	9.0
		Meter Temp (^{o}F)	108
		Flow Setting, ΔH (in. H_2O)	1.15
		Nozzle Diameter (in.)	0.230

Sample Flow Rate (at stack conditions): 0.55 cfm

Plate No.	Net Wt. (mg)	Percent	Cumulative Percent	EAD (microns)
1	7.1	51.8	100.0	4.1
2	0.2	1.5	48.2	2.7
3	0.2	1.5	46.7	1.8
4	0.7	5.1	45.2	1.2
5	1.1	8.0	40.1	0.77
6	1.0	7.3	32.1	0.39
7	1.3	9.5	24.8	0.23
8	0.7	5.1	15.3	0.14
Backup Filter	1.4	10.2	10.2	----
TOTAL	13.7	100.0		

FIGURE 15

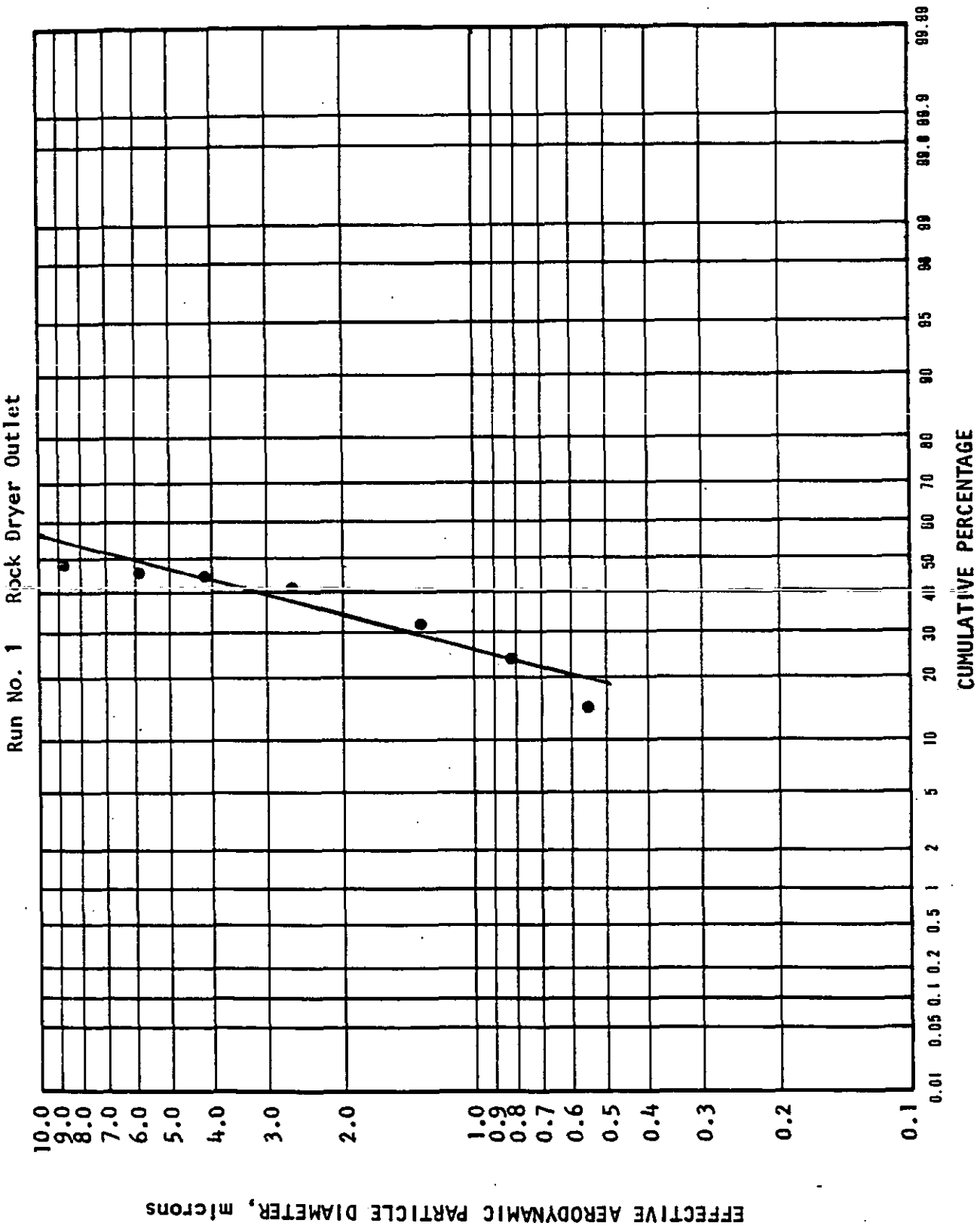

Run No. 1 Rock Dryer Outlet
EFFECTIVE AERODYNAMIC PARTICLE DIAMETER, microns
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.01
0.05
0.1
0.2
0.5
1
2
5
10
20
30
40
50
60
70
80
90
95
98
99
99.8
99.9
99.99
CUMULATIVE PERCENTAGE

Table 35

Particle Size Distribution

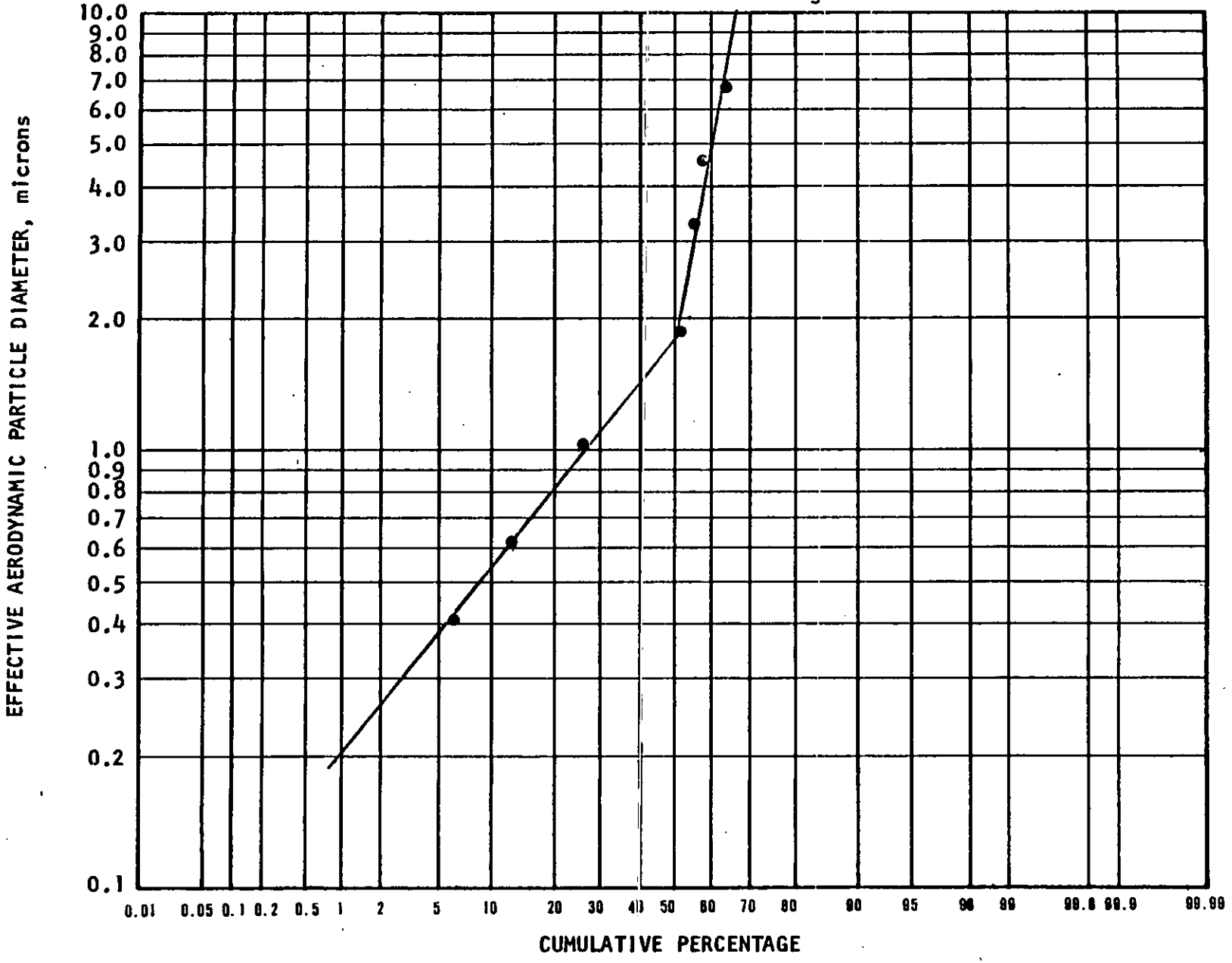
Run:	1	P_{bar} (in. Hg)	29.97
Date:	6-5-80	Stack Temp (^{o}F)	85
Location:	U.S. Gypsum	Sample Time (min.)	120
Sampling Location:	Brd. End Sawing Outlet	Sample Volume (cf)	100.732
Traverse Point No. Sampled:	X-1	Moisture (% H_2O)	1.5
		Meter Temp (^{o}F)	113
		Flow Setting, ΔH (in. H_2O)	2.4
		Nozzle Diameter (in.)	0.171

Sample Flow Rate (at stack conditions): 0.82 cfm

Plate No.	Net Wt. (mg)	Percent	Cumulative Percent	EAD (microns)
1	8.5	36.9	100.0	11.7
2	1.2	5.2	63.1	6.8
3	0.5	2.2	57.9	4.7
4	0.9	4.0	55.7	3.3
5	5.7	24.8	51.7	1.9
6	3.2	13.9	26.9	1.0
7	1.5	6.5	13.0	0.62
8	0.7	3.0	6.5	0.42
Backup Filter	0.8	3.5	3.5	----
TOTAL	23.0	100.0		

FIGURE 16

Run No. 1 Board End Sawing



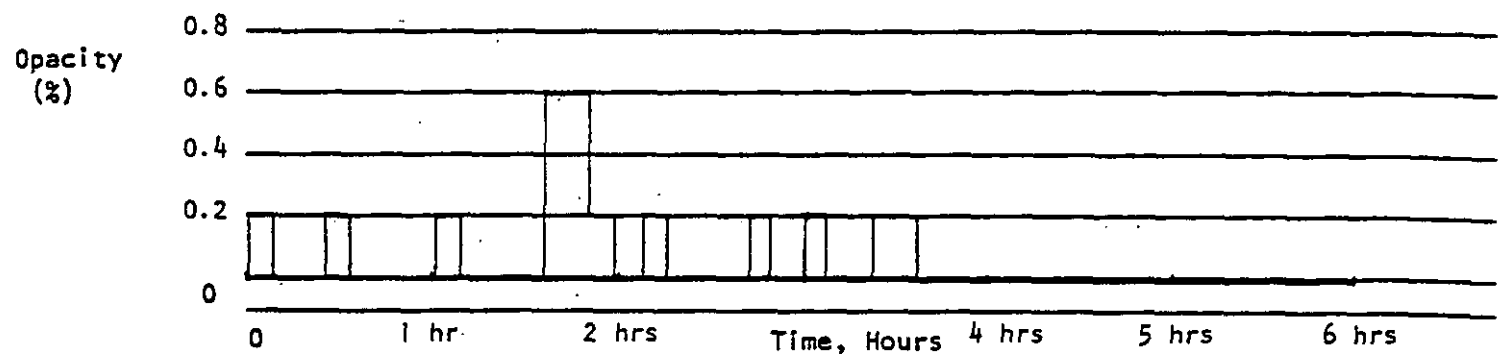
SUMMARY OF VISIBLE EMISSIONS
TABLE 36

Date: June 3, 1980
Type of Plant: Dry Well Board Plant
Type of Discharge: Stack
Location of Discharge: No. 4 Kettle Calciner Exh
Height of Point of Discharge: 2nd level + 50 ft
Description of Sky: Partly cloudy
Wind Direction: West
Wind Velocity: 5 mph
Color of Plume: White
Detached Plume: Yes
Observer No.: N/A
Duration of Observation: 5 hrs 48 minutes
Distance from Observer to Discharge Point: 100 feet
Direction of Observer from Discharge Point: Southwest of Stack
Height of Observation Point: Ground Level
Description of Background: Blue Sky

SUMMARY OF AVERAGE OPACITY

Set Number	Time		Opacity		Set Number	Time		Opacity	
	Start	End	Sum	Average		Start	End	Sum	Average
1	0925	0930	5	0.2	21	1124	1130	0	0.0
2	0930	0936	0	0.0	22	1400	1406	0	0.0
3	0936	0942	5	0.2	23	1406	1412	5	0.2
4	0942	0948	0	0.0	24	1412	1418	0	0.0
5	0948	0954	0	0.0	25	1418	1424	0	0.0
6	0954	1000	5	0.2	26	1424	1430	0	0.0
7	1000	1006	0	0.0	27	1430	1436	0	0.0
8	1006	1012	0	0.0	28	1436	1442	0	0.0
9	1012	1018	0	0.0	29	1442	1448	5	0.2
10	1018	1024	0	0.0	30	1448	1454	0	0.0
11	1024	1030	0	0.0	31	1454	1500	0	0.0
12	1030	1036	5	0.2	32	1500	1506	5	0.2
13	1036	1042	0	0.0	33	1506	1512	0	0.0
14	1042	1048	0	0.0	34	1512	1518	5	0.2
15	1048	1054	0	0.0	35	1518	1524	5	0.2
16	1054	1100	0	0.0	36	1524	1530	0	0.0
17	1100	1106	0	0.0	37	1530	1536	0	0.0
18	1106	1112	15	0.6	38	1536	1542	0	0.0
19	1112	1118	15	0.6	39	0830	0836	0	0.0
20	1118	1124	5	0.2	40	0836	0842	0	0.0

Sketch Showing How Opacity Varied with Time:



SUMMARY OF VISIBLE EMISSIONS
TABLE 36 continued

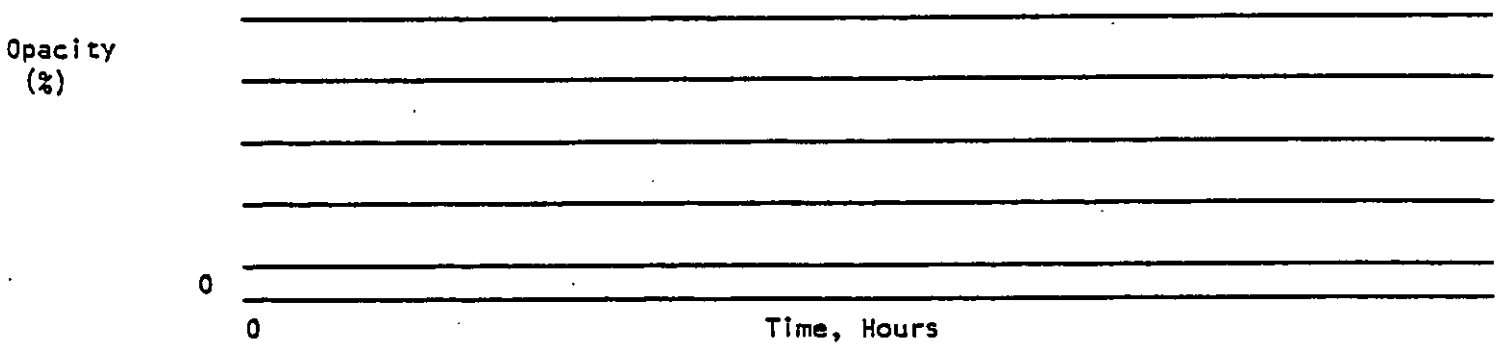
Date: June 3, 1980
Type of Discharge: Stack
Height of Point of Discharge: 2nd level + 50'
Wind Direction: West
Color of Plume: White
Observer No.: N/A
Distance from Observer to Discharge Point: 100 feet
Direction of Observer from Discharge Point: Southwest of Stack
Height of Observation Point: Ground Level
Description of Background: Blue Sky

Type of Plant: Dry Wall Board Plant
Location of Discharge: No. 4 Kettle Calciner Exh
Description of Sky: Partly Cloudy
Wind Velocity: 5 mph
Detached Plume: Yes
Duration of Observation: 5 hrs 48 minutes

SUMMARY OF AVERAGE OPACITY

Set Number	Time		Opacity		Set Number	Time		Opacity	
	Start	End	Sum	Average		Start	End	Sum	Average
1	0842	0848	0	0.0	21				
2	0848	0854	0	0.0	22				
3	0854	0900	0	0.0	23				
4	0900	0906	0	0.0	24				
5	0906	0912	0	0.0	25				
6	0912	0918	0	0.0	26				
7	0918	0924	0	0.0	27				
8	0924	0930	0	0.0	28				
9	0930	0936	0	0.0	29				
10	0936	0942	0	0.0	30				
11	0942	0948	0	0.0	31				
12	0948	0954	0	0.0	32				
13	0954	1000	0	0.0	33				
14	1000	1006	0	0.0	34				
15	1006	1012	0	0.0	35				
16	1012	1018	0	0.0	36				
17	1018	1024	0	0.0	37				
18	1024	1030	0	0.0	38				
19					39				
20					40				

Sketch Showing How Opacity Varied with Time:



SUMMARY OF VISIBLE EMISSIONS

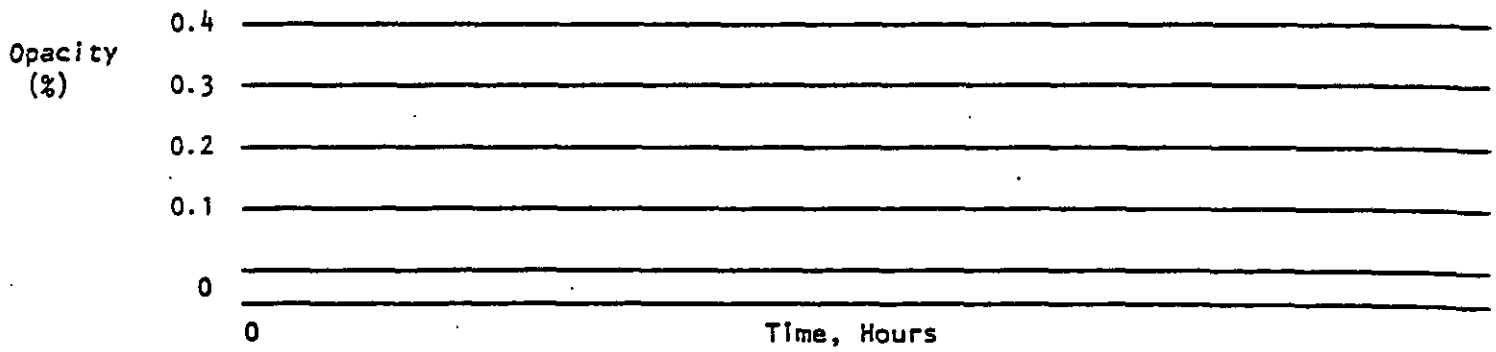
TABLE 37

Date: June 5-6, 1980
Type of Plant: Dry Wall Board Plant
Type of Discharge: Stack
Location of Discharge: Rock Dryer
Height of Point of Discharge: 2nd level + 20'
Description of Sky: Partly Cloudy
Wind Direction: West
Wind Velocity: 3-5 mph
Color of Plume: White
Detached Plume: Yes
Observer No.: N/A
Duration of Observation: 4 hrs 15 minutes
Distance from Observer to Discharge Point: 15 feet
Direction of Observer from Discharge Point: West
Height of Observation Point: 10 feet below stack
Description of Background: Gray building

SUMMARY OF AVERAGE OPACITY

Set Number	Time		Opacity		Set Number	Time		Opacity	
	Start	End	Sum	Average		Start	End	Sum	Average
1	1810	1815	0	0.0	21	1005	1011	5	0.2
2	1815	1821	5	0.2	22	1011	1017	0	0.0
3	1821	1827	0	0.0	23	1017	1023	0	0.0
4	1827	1833	0	0.0	24	1023	1029	0	0.0
5	1833	1839	5	0.2	25	1029	1035	0	0.0
6	1839	1845	0	0.0	26	1035	1041	0	0.0
7	1845	1851	0	0.0	27	1041	1047	0	0.0
8	1851	1857	0	0.0	28	1047	1053	5	0.2
9	1857	1903	0	0.0	29	1053	1055	0	0.0
10	1903	1909	0	0.0	30	1150	1156	0	0.0
11	1909	1915	5	0.2	31	1156	1202	0	0.0
12	1915	1921	0	0.0	32	1202	1208	5	0.2
13	1921	1927	0	0.0	33	1208	1214	0	0.0
14	1927	1930	0	0.0	34	1214	1220	5	0.2
15	0930	0935	0	0.0	35	1220	1226	0	0.0
16	0935	0941	0	0.0	36	1226	1232	0	0.0
17	0941	0947	5	0.2	37	1232	1238	10	0.4
18	0947	0953	0	0.0	38	1238	1244	0	0.0
19	0953	0959	5	0.2	39	1244	1250	0	0.0
20	0959	1005	0	0.0	40	1250	1256	0	0.0

Sketch Showing How Opacity Varied with Time:



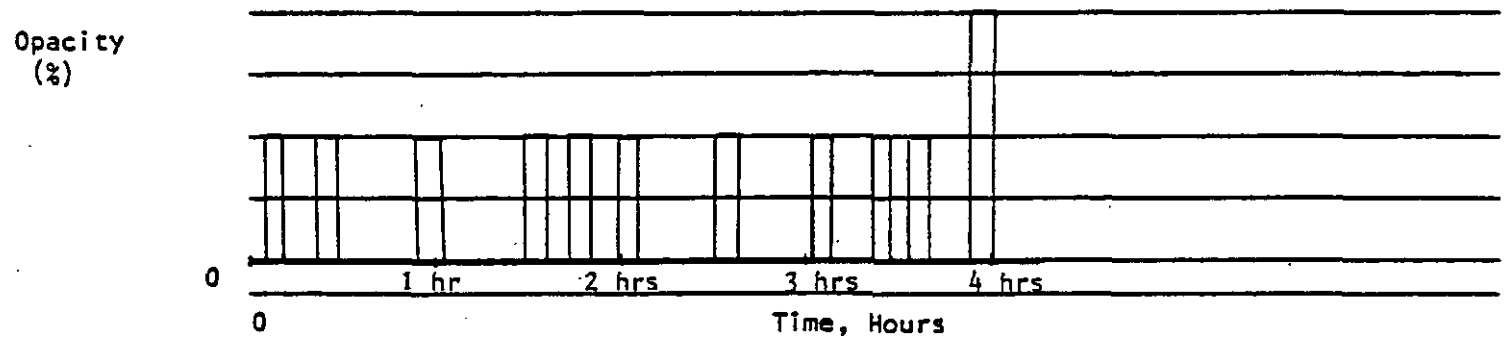
SUMMARY OF VISIBLE EMISSIONS
TABLE 37 continued

Date: June 5-6, 1980
Type of Plant: Dry Wall Board Plant
Type of Discharge: Stack
Location of Discharge: Rock Dryer
Height of Point of Discharge: 2nd level + 20'
Description of Sky: Partly Cloudy
Wind Direction: West
Wind Velocity: 3-5 mph
Color of Plume: White
Detached Plume: Yes
Observer No.: N/A
Duration of Observation: 4 hrs 15 minutes
Distance from Observer to Discharge Point: 15 feet
Direction of Observer from Discharge Point: West
Height of Observation Point: 10 ft. below stack
Description of Background: Gray Building

SUMMARY OF AVERAGE OPACITY

Set Number	Time		Opacity		Set Number	Time		Opacity	
	Start	End	Sum	Average		Start	End	Sum	Average
1	1256	1302	0	0.0	21				
2	1302	1308	0	0.0	22				
3	1308	1314	0	0.0	23				
4	1314	1320	5	0.2	24				
5					25				
6					26				
7					27				
8					28				
9					29				
10					30				
11					31				
12					32				
13					33				
14					34				
15					35				
16					36				
17					37				
18					38				
19					39				
20					40				

Sketch Showing How Opacity Varied with Time:



SUMMARY OF VISIBLE EMISSIONS
TABLE 38

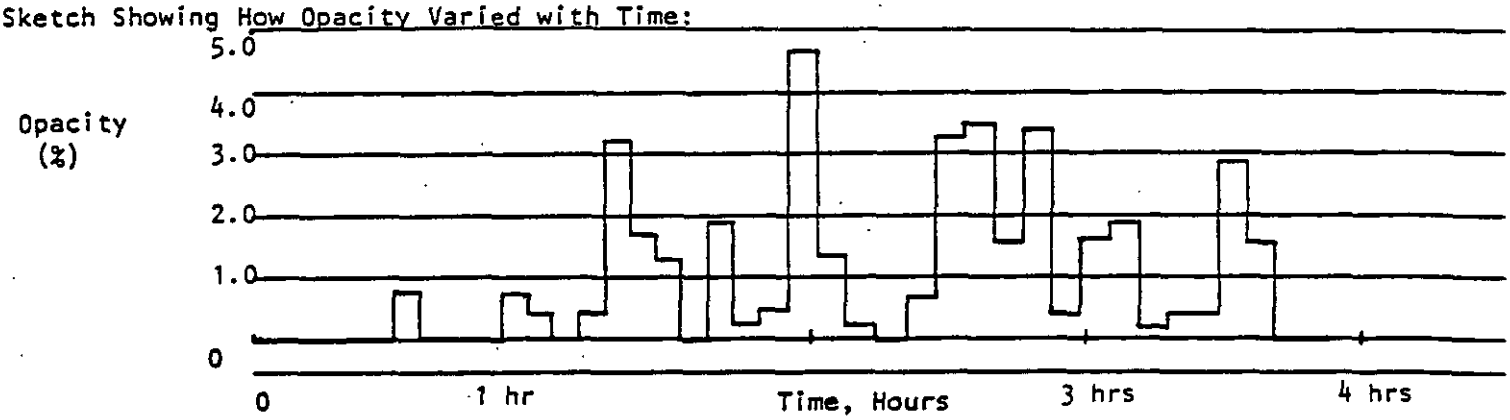
Date: June 5, 1980
Type of Discharge: Stack
Height of Point of Discharge: 2nd level
Wind Direction: West
Color of Plume: White
Observer No.: N/A
Distance from Observer to Discharge Point: 90 feet
Direction of Observer from Discharge Point: Northeast
Height of Observation Point: 2nd Level
Description of Background: Green trees

Type of Plant: Dry Wall Board Plant
Location of Discharge: Board End Sawing
Description of Sky: Clear
Wind Velocity: 3 mph
Detached Plume: Yes
Duration of Observation: 3 hrs 50 minutes

SUMMARY OF AVERAGE OPACITY

Set Number	Time		Opacity		Set Number	Time		Opacity	
	Start	End	Sum	Average		Start	End	Sum	Average
1	1200	1205	0	0.0	21	1439	1445	110	4.6
2	1205	1211	0	0.0	22	1445	1451	30	1.3
3	1211	1217	0	0.0	23	1451	1457	5	0.2
4	1217	1223	0	0.0	24	1457	1503	0	0.0
5	1223	1229	0	0.0	25	1503	1509	15	0.6
6	1229	1235	20	0.8	26	1509	1515	75	3.1
7	1235	1241	0	0.0	27	1515	1520	85	3.5
8	1241	1247	0	0.0	28	1600	1605	40	1.7
9	1247	1253	0	0.0	29	1605	1611	80	3.3
10	1253	1259	20	0.8	30	1611	1617	10	0.4
11	1259	1305	10	0.4	31	1617	1623	40	1.7
12	1305	1311	0	0.0	32	1623	1629	45	1.9
13	1311	1317	10	0.4	33	1629	1635	5	0.2
14	1317	1323	75	3.1	34	1635	1641	10	0.4
15	1323	1329	40	1.7	35	1641	1647	10	0.4
16	1410	1415	30	1.3	36	1647	1653	70	2.9
17	1415	1421	0	0.0	37	1653	1659	40	1.7
18	1421	1427	45	1.9	38	1659	1705	0	0.0
19	1427	1433	5	0.2	39	1705	1711	0	0.0
20	1433	1439	10	0.4	40				

Sketch Showing How Opacity Varied with Time:



SUMMARY OF VISIBLE EMISSIONS
TABLE 39

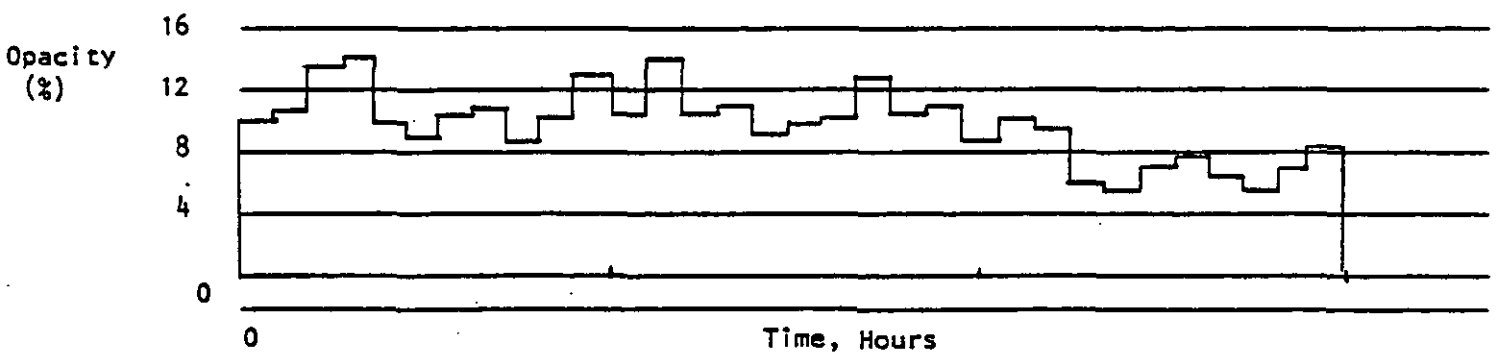
Date: June 3, 1980
Type of Discharge: Stack
Height of Point of Discharge: 2nd level + 30'
Wind Direction: West
Color of Plume: White
Observer No.: N/A
Distance from Observer to Discharge Point: 50 feet
Direction of Observer from Discharge Point: South of stack
Height of Observation Point: 11 ft. below stack
Description of Background: Forest

Type of Plant: Dry Wall Board Plant
Location of Discharge: Scoring & Chambering
Description of Sky: Partly Cloudy
Wind Velocity: 5 mph
Detached Plume: Yes
Duration of Observation: 3 hours

SUMMARY OF AVERAGE OPACITY

Set Number	Time		Opacity		Set Number	Time		Opacity	
	Start	End	Sum	Average		Start	End	Sum	Average
1	0830	0835	240	10.0	21	1308	1314	260	10.8
2	0835	0841	260	10.8	22	1314	1315	35	8.8
3	0841	0847	315	13.1	23	1550	1555	230	9.6
4	0847	0853	340	14.2	24	1555	1601	220	9.2
5	0853	0859	235	9.8	25	1601	1607	155	6.5
6	0859	0905	215	9.0	26	1607	1613	150	6.3
7	0905	0911	240	10.0	27	1613	1619	175	7.3
8	0911	0917	250	10.4	28	1619	1625	185	7.7
9	0917	0922	140	8.8	29	1625	1631	170	7.1
10	1200	1205	230	9.6	30	1631	1637	160	6.7
11	1205	1208	150	12.5	31	1637	1643	180	7.5
12	1215	1220	265	11.0	32	1643	1649	195	8.1
13	1220	1226	340	14.2	33	1649	1650	25	1.0
14	1226	1232	265	11.0	34				
15	1232	1238	280	11.7	35				
16	1238	1244	235	9.8	36				
17	1244	1250	245	10.2	37				
18	1250	1256	250	10.4	38				
19	1256	1302	300	12.5	39				
20	1302	1308	255	10.6	40				

Sketch Showing How Opacity Varied with Time:



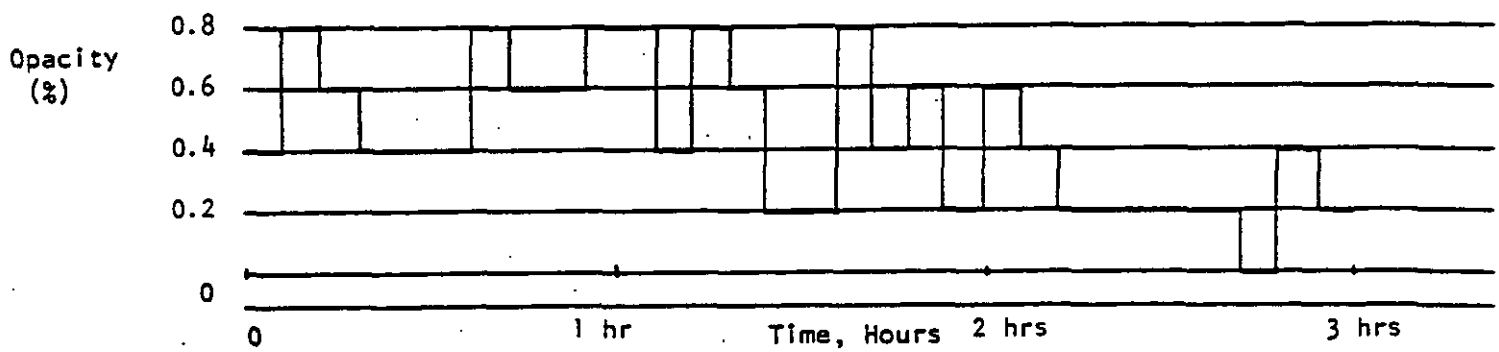
SUMMARY OF VISIBLE EMISSIONS
TABLE 40

Date: June 10, 1980
Type of Plant: Dry Wall Board Plant
Type of Discharge: Stack
Location of Discharge: Surge Bin
Height of Point of Discharge: 2nd level + 20'
Description of Sky: Clear
Wind Direction: East
Wind Velocity: 2 mph
Color of Plume: White
Detached Plume: Yes
Observer No.: N/A
Duration of Observation: 3 hrs
Distance from Observer to Discharge Point: 20 feet
Direction of Observer from Discharge Point: East of stack
Height of Observation Point: 20 ft below stack
Description of Background: Forest

SUMMARY OF AVERAGE OPACITY

Set Number	Time		Opacity		Set Number	Time		Opacity	
	Start	End	Sum	Average		Start	End	Sum	Average
1	1245	1250	10	0.4	21	1450	1455	15	0.6
2	1250	1256	20	0.8	22	1455	1501	10	0.4
3	1256	1302	15	0.6	23	1501	1507	5	0.2
4	1302	1308	10	0.4	24	1507	1513	5	0.2
5	1308	1314	10	0.4	25	1513	1519	5	0.2
6	1314	1320	10	0.4	26	1519	1525	5	0.2
7	1320	1326	20	0.8	27	1525	1531	5	0.2
8	1326	1332	15	0.6	28	1531	1537	0	0.0
9	1332	1338	15	0.6	29	1537	1543	10	0.4
10	1338	1344	20	0.8	30	1543	1549	5	0.2
11	1348	1353	20	0.8	31				
12	1353	1359	10	0.4	32				
13	1359	1405	20	0.8	33				
14	1405	1411	15	0.6	34				
15	1411	1417	5	0.2	35				
16	1417	1423	5	0.2	36				
17	1423	1429	20	0.8	37				
18	1429	1435	10	0.4	38				
19	1435	1441	15	0.6	39				
20	1441	1447	5	0.2	40				

Sketch Showing How Opacity Varied with Time:



SUMMARY OF VISIBLE EMISSIONS
TABLE 41

Date: June 4-5, 1980
Type of Plant: Dry Wall Board Plant
Type of Discharge: Stack
Location of Discharge: Baggage & Packing
Height of Point of Discharge: 2nd level + 25'
Description of Sky: Partly Cloudy
Wind Direction: N/A
Wind Velocity: 3 mph
Color of Plume: White
Detached Plume: No
Observer No.: N/A
Duration of Observation: 3 hours
Distance from Observer to Discharge Point: 15 feet
Direction of Observer from Discharge Point: Northeast of stack
Height of Observation Point: 2nd level + 25 ft.
Description of Background: Gray Building

SUMMARY OF AVERAGE OPACITY

Set Number	Time		Opacity		Set Number	Time		Opacity	
	Start	End	Sum	Average		Start	End	Sum	Average
1	0900	0905	0	0.0	21	0830	0835	0	0.0
2	0905	0911	0	0.0	22	0835	0841	0	0.0
3	0911	0917	0	0.0	23	0841	0847	0	0.0
4	0917	0923	0	0.0	24	0847	0853	0	0.0
5	0923	0929	0	0.0	25	0853	0859	0	0.0
6	0929	0935	0	0.0	26	0859	0905	0	0.0
7	0935	0941	0	0.0	27	1338	1343	0	0.0
8	0941	0947	0	0.0	28	1343	1349	0	0.0
9	0947	0953	0	0.0	29	1349	1355	0	0.0
10	0953	0959	0	0.0	30	1355	1401	0	0.0
11	1130	1135	0	0.0	31	1401	1403	0	0.0
12	1135	1141	0	0.0	32				
13	1141	1147	0	0.0	33				
14	1147	1153	0	0.0	34				
15	1153	1159	0	0.0	35				
16	1300	1305	0	0.0	36				
17	1305	1311	0	0.0	37				
18	1311	1317	0	0.0	38				
19	1317	1323	0	0.0	39				
20	1323	1329	0	0.0	40				

Sketch Showing How Opacity Varied with Time:

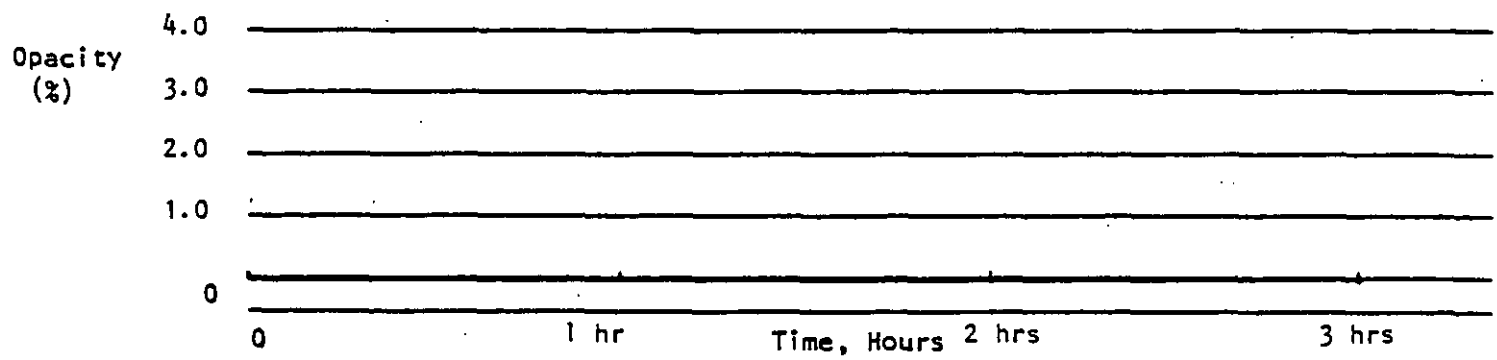


Table 42

No. 5 Upper and Lower Mixer Stations

Mean fugitive emission values (percent frequency emission) for three tests at each location are presented.

No. 5 Upper Mixer Station

	Test Mean
Test 1	0.0
Test 2	0.0
Test 3	0.0
Site Mean	0.0

No. 5 Lower Mixer Station

	Test Mean
Test 1	0.0
Test 2	8.06
Test 3	28.81
Site Mean	12.29

Table 43

Scoring/Chamfering Operation Station 5

	Test Mean
Test 1	0.0
Test 2	0.0
Test 3	0.0
Site Mean	0.0

Packer Baghouse Discharge Station (Bagging Unit)

	Test Mean
Test 1	42.50
Test 2	54.31
Test 3	30.56
Site Mean	42.45

Board End Sawing Baghouse Inlet Station

	Test Mean
Test 1	0.0
Test 2	1.25
Test 3	0.0
Site Mean	0.42

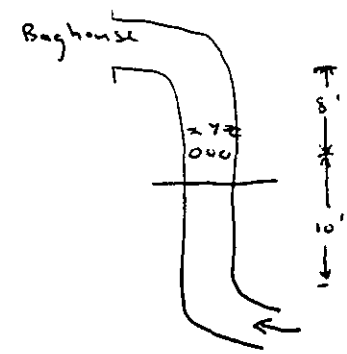
APPENDIX A

RAW TEST DATA

$A_s = 1.423 ft^2$

TRAVERSE POINT LOCATION FOR CIRCULAR DUCTS

PLANT U.S. Gypsum Co
DATE 6-26 80
SAMPLING LOCATION #4 Kettle Calciner Baghouse Inlet Duct
INSIDE OF FAR WALL TO OUTSIDE OF PORT. (DISTANCE A) 15 1/4"
INSIDE OF NEAR WALL TO OUTSIDE OF PORT. (DISTANCE B) 3 1/2"
STACK I.D.. (DISTANCE A - DISTANCE B) 11 3/4" x 17 1/2"
NEAREST UPSTREAM DISTURBANCE 10'
NEAREST DOWNSTREAM DISTURBANCE 8'
CALCULATOR Jackson BCJ



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,Z-1	5/6	11.75	9 3/4"	3 1/2"	13 1/4"
2	3/6	"	5 7/8"	"	9 3/8
3	1/6	"	2"	"	5 1/2

PRELIMINARY VELOCITY TRAVERSE

PLANT U.S. Gypsum Co.
DATE 6-2-80
LOCATION #4 Kettle Calciner Baghouse Inlet Duct
STACK I.D. 11 3/4" x 17 1/2"
BAROMETRIC PRESSURE, in. Hg 29.65
STACK GAUGE PRESSURE, in. H_2O -0.82
OPERATORS Ralston / Jackson

SCHEMATIC OF TRAVERSE POINT LAYOUT

TRAVERSE POINT NUMBER	VELOCITY HEAD (Δp_s), in. H_2O	STACK TEMPERATURE (T_s), °F	α
X - 1	.19	262	< 10°
2	.17	"	"
3	.10	"	"
Y - 1	.18	267	"
2	.15	"	"
3	.12	"	"
Z - 1	.18	265	"
2	.17	"	"
3	.13	"	"
AVERAGE	$\sqrt{\Delta p}$ = .391	265	

TRAVERSE POINT NUMBER	VELOCITY HEAD (Δp_s), in. H_2O	STACK TEMPERATURE (T_s), °F
AVERAGE		

.15

FIELD DATA

PLANT U.S. Gypsum Co.
DATE 6-3-80
SAMPLING LOCATION #4 Kettle Calciner Baghouse Inlet
SAMPLE TYPE EPA 5 Particulate
RUN NUMBER 1
OPERATOR Jackson DLJ
AMBIENT TEMPERATURE 110°F
BAROMETRIC PRESSURE 29.67
STATIC PRESSURE, (P_s) -0.53
FILTER NUMBER (s) 27015, 28055, 28053

PROBE LENGTH AND TYPE 3' borosilicate
NOZZLE I.D. 0.375
ASSUMED MOISTURE, % 6.8
SAMPLE BOX NUMBER 1
METER BOX NUMBER Nutech 2
METER $\Delta H_@$ 1.85
C FACTOR N/A
PITOT TUBE FACTOR 0.89
REFERENCE Δp N/A
NOTE L.C. $\frac{}{1.5}$ = .005cfm
L.C. F_{22}: .006 cfm

READ AND RECORD ALL DATA EVERY 3 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	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
				DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F			
	0 / 0932	358.286									
X-1	3	359.9	.19	.42		265	115	N/A	3	295	61
2	6	360.9	.16	.35		261	115		5	260	67
3	9 / 0941	361.362 361.582	.12	.26		263	111		9→13	295	68
Y-1	12 / 0951	362.8	.19	.42		264	116		3	235	67
2	15	363.8	.15	.33		264	117		8	295	69
3	18 / 1000	364.690 365.029	.11	.24		263	117		7	250	70
Z-1	21 / 1101	366.2	.20	.44		263	120		3	270	66
2	24	367.2	.15	.33		266	120		7→14	260	68
3	27 / 1110	368.198	.13	.29		262	120		15→12	250	69
		9.3580cu									
			$\sqrt{\Delta p}$ =	$\bar{x}$ =		$\bar{x}$ =	$\bar{x}$ =				
				.3422 cu		264 cu					
			.3925 cu				117.33 cu				

change filter
C_{15} = .006
C_{15} = .002

change filter
C_{15} = .003
C_{30} = .006

A-4

NOMOGRAPH DATA BCJ

PLANT U.S. Gypsum Co.

DATE 6-2-80

SAMPLING LOCATION #4 Kettle Calciner Baghouse Inlet Duct

CONTROL BOX NO. Nutech 2

CALIBRATED PRESSURE DIFFERENTIAL ACROSS ORIFICE. in. H_2O	$\Delta H_@$	1.85
AVERAGE METER TEMPERATURE (AMBIENT + 20°F). °F	$T_{m_{avg.}}$	120
PERCENT MOISTURE IN GAS STREAM BY VOLUME	B_{wo}	68
BAROMETRIC PRESSURE AT METER. in Hg	P_m	29.65
STATIC PRESSURE IN STACK. in. Hg ($P_m \pm 0.073$ x STACK GAUGE PRESSURE in in. H_2O) -.82	P_s	29.59
RATIO OF STATIC PRESSURE TO METER PRESSURE	P_s P_m	.998
AVERAGE STACK TEMPERATURE. °F	$T_{s_{avg.}}$	264
AVERAGE VELOCITY HEAD. in. H_2O	$\Delta p_{avg.}$	.15
MAXIMUM VELOCITY HEAD. in. H_2O	$\Delta p_{max.}$	.19
C FACTOR	N/A	
CALCULATED NOZZLE DIAMETER. in.	.375	
ACTUAL NOZZLE DIAMETER. in.	.375	
REFERENCE Δp. in. H_2O	N/A	

FIELD DATA

PLANT U.S. Gypsum Co.
DATE 6-3-80
SAMPLING LOCATION #4 Kettle Calciner B.H. Inlet
SAMPLE TYPE EPA 5
RUN NUMBER 2
OPERATOR Jackson BLJ
AMBIENT TEMPERATURE 103°F
BAROMETRIC PRESSURE 29.67
STATIC PRESSURE, (P_s) -0.82
FILTER NUMBER (s) 27010, 28052, 27011

PROBE LENGTH AND TYPE 3' borosilicate
NOZZLE I.D. 0.375
ASSUMED MOISTURE, % 68
SAMPLE BOX NUMBER 1
METER BOX NUMBER Nutech 2
METER $\Delta H_@$ 1.85
C FACTOR N/A
PITOT TUBE FACTOR 0.84
REFERENCE Δp N/A
NOTE LC #15 = .002 cfm
LC #16 = .012 cfm

READ AND RECORD ALL DATA EVERY 3 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	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
				DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F			
	0 1402	368.996									
X-1	3	369.6	.19	.42		264	117		3	250	67
2	6	370.6	.16	.35		266	118		6	265	69
3	9 1411	371.578	.12	.26		265	118		11→14	265	70
Y-1	12 1430	371.898 373.1	.19	.42		263	119		3	240	68
2	15	374.1	.16	.35		262	120		7	275	70
3	18 1439	375.007 375.258	.10	.22		262	120		11→14	265	70
Z-1	21 1517	376.5	.20	.44		262	122		3	250	67
2	24	377.5	.16	.35		266	122		7	260	69
3	27 1528	378.493	.12	.26		265	123		12→16	245	70
			.3920								
		8.5440				263.588					
				.3414							
							119 ave				

LC #15 = .002 change filter
LC #15 = .002
LC #15 = .009 change filter

A-5

FIELD DATA

PLANT W. C. Gregory Co.
DATE 6-4-96
SAMPLING LOCATION #3 Kiln Calciner Inlet Duct to U.H.
SAMPLE TYPE EPA 5
RUN NUMBER 3
OPERATOR Jackson DLJ
AMBIENT TEMPERATURE 95°F
BAROMETRIC PRESSURE 29.76
STATIC PRESSURE, (P_s) -0.83
FILTER NUMBER (s) 17016, 28084, 28054

PROBE LENGTH AND TYPE 3' borosilicate
NOZZLE I.D. 0.375
ASSUMED MOISTURE, % 6.8
SAMPLE BOX NUMBER 1
METER BOX NUMBER Nutech, 2
METER $\Delta H_@$ 1.85
C FACTOR N/A
PITOT TUBE FACTOR 0.84
REFERENCE Δp N/A.
NOTE $LC_{1,5}$ = .006 cfm
$LC_{F,5}$ = .002 cfm

READ AND RECORD ALL DATA EVERY 3 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			
	0 0838	378.791									
X-1	3	379.9	.20	.49		259	96		3	290	62
2	6	380.9	.16	.35		259	96		4	250	64
3	9 0847	381.864	.12	.26		258	97		7→9	260	67
Y-1	12 0855	382.117 383.2	.19	.42		259	98		3	245	64
2	15	384.3	.15	.33		258	98		4	260	68
3	18 0904	385.218	.12	.26		257	99		7→10	255	68
Z-1	21 0950	385.960 386.7	.19	.42		259	104		3	240	66
2	24	387.7	.16	.35		260	105		7	265	68
3	27 0959	388.640	.12	.26		260	107		11→14	250	69
			.3939 V								
		7.5230 V V		.3433 V		258.77 V V					
							100.0 V V				

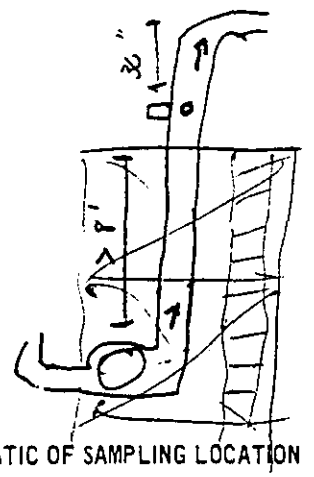
Change filter
$C_{F,5}$ = .005
$C_{1,5}$ = .003
Change filter
$C_{1,5}$ = .004

8
15 min / pt.

TRAVERSE POINT LOCATION FOR CIRCULAR DUCTS

PLANT EPA - U.S. Gypsum
DATE
SAMPLING LOCATION #4 Kettle Calciner Exhaust
INSIDE OF FAR WALL TO OUTSIDE OF PORT, (DISTANCE A) 15 1/2"
INSIDE OF NEAR WALL TO OUTSIDE OF PORT, (DISTANCE B) 3 1/2
STACK I.D., (DISTANCE A - DISTANCE B) 12"
NEAREST UPSTREAM DISTURBANCE >8'
NEAREST DOWNSTREAM DISTURBANCE 36"
CALCULATOR Meeter

$A = \pi r^2$
$= \frac{\pi}{144}\left(\frac{12}{2}\right)^2$
$= .7854$



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)
1	.067	12"	3/4"	3 1/2	4 1/4
2	.25		3"		6 1/2
3	.75		9"		12 1/2
4	.933		11 1/4"		14 3/4

PRELIMINARY VELOCITY TRAVERSE

PLANT EPA- U.S. Gypsum
DATE
LOCATION #4 Kettle Calciner Exhaust
STACK I.D. 12"
BAROMETRIC PRESSURE, in. Hg 29.65
STACK GAUGE PRESSURE, in. H_2O + .88
OPERATORS Neeter

Nutech #4

SCHEMATIC OF TRAVERSE POINT LAYOUT

$\alpha < 10°$

TRAVERSE POINT NUMBER	VELOCITY HEAD (Δp_s), in. H_2O	STACK TEMPERATURE (T_s), °F
X 1	.43	240
2	.45	243
3	.38	240
4	.36	234
	$\overline{\Delta p_s}$ = .43	
	$\Delta p_{s\,max}$ = .51	
	$T_{s\,avg.}$ =	239
AVERAGE		

TRAVERSE POINT NUMBER	VELOCITY HEAD (Δp_s), in. H_2O	STACK TEMPERATURE (T_s), °F
1	.37	238
2	.44	240
3	.51	240
4	.48	234
AVERAGE		

FIELD DATA

PLANT U. S. Gypsum
DATE 6-3-80
SAMPLING LOCATION #4 Kettle Calciner Exhaust Outlet
SAMPLE TYPE Particulate
RUN NUMBER 1B
OPERATOR Meeter / Frye
AMBIENT TEMPERATURE 105
BAROMETRIC PRESSURE 29.67
STATIC PRESSURE, (P_s) ± .91
FILTER NUMBER (s) 28031

PROBE LENGTH AND TYPE 3' Glass
NOZZLE I.D. .300
ASSUMED MOISTURE, % 68%
SAMPLE BOX NUMBER 3
METER BOX NUMBER Nutech #4
METER $\Delta H_@$ 1.9
C FACTOR Calculated
PITOT TUBE FACTOR .84
REFERENCE Δp Calculated
NOTE $\angle CI = 0.011$
$\angle CF = .009$

READ AND RECORD ALL DATA EVERY 4 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	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
				DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F			
	0 0932	287.879									
X 1	4	289.4	.42	.43		244	101		4.0	275	60
	8	291.1	.41	.42		243	101		5.0	275	60
	12	292.6	.42	.43		242	102		5.0	275	63
2	16	294.1	.50	.52		240	104		5.0	280	67
	20	295.9	.48	.49		243	110		6.5	280	67
	24	297.7	.48	.49		243	114		6.5	290	68
3	28	299.3	.45	.46		243	116		6.0	300	68
	32	300.8	.45	.46		241	118		5.0	290	69
	36	302.2	.45	.46		241	118		5.0	290	69
4	40	304.6	.44	.45		243	118		6.0	290	70
	44	305.7	.44	.45		246	120		6.0	290	68
	48 LC_{F15}=.012	307.653	.44	.45		246	120		6.0	285	68
	0 LC_{F15}=.010	307.986									
Y 1	4	309.5	.39	.40		246	121		5.0	300	69
	8	311.1	.39	.40		244	122		5.0	290	68
	12	312.5	.39	.40		244	122		5.0	285	68
2	16	314.0	.43	.44		245	122		6.0	280	69
	20	315.8	.44	.45		246	123		6.0	280	69
	24	317.1	.44	.45		246	124		6.0	280	70
3	28	319.0	.45	.46		247	124		6.0	290	70
	32	320.3	.42	.43		247	124		6.0	300	69
	36	321.9	.42	.43		252	124		6.0	300	68
4	40	323.5	.42	.43		252	124		6.0	290	68
	44	324.9	.41	.42		252	125		6.0	290	67

DRY MOLECULAR WEIGHT DETERMINATION

PLANT U.S. Gypsum Co.
DATE 6-8-80
SAMPLING TIME (24-hr CLOCK) —
SAMPLING LOCATION #9 Kettle Calciner Baghouse Inlet Duct
SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS) —
ANALYTICAL METHOD —
AMBIENT TEMPERATURE —
OPERATOR BLO

COMMENTS:

RUN 1, 2, 3 / GAS	1		2		3		AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M_d, lb lb-mole
	ACTUAL READING	NET	ACTUAL READING	NET	ACTUAL READING	NET			
CO_2								44/100	
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)								32/100	
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)								28/100	
N_2 (NET IS 100 MINUS ACTUAL CO READING)								28/100	
								TOTAL 28.97 = m.w. Ambient Air	

Non-combustion sour

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Run #1 Particulate #4 Kettle Calciner Exhaust 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 DESIRED	ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET $(T_{m_{in}})$, °F	OUTLET $(T_{m_{out}})$, °F	PUMP VACUUM, in Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE °F
	48		326.069	.41	.42		251	124		6.0	285	67
		1150										
								117.54				
			37.937	.6576	.4433		245.29					

0.6576	ΓΔP
0.4433	ΔH
245.3	TS
117.5	TM
37.937	VMA
29.67	PBAR
1584.	VWC
22.3	WSG
20.97	MWD
0.785398	AS
96.	TT
0.91	STAT
0.3	DN
0.99	Y
0.84	CP
1606.3	TH2O
34.08878156	VMS
75.610325	VWS
68.92519672	%M
.3107480328	MD
21.40890592	MWS
29.73691176	PS
49.70478283	VACT
2342.282222	QACT
11.49210101	VSTD
541.5523891	QSTD
104.9099703	%I
0.0442	FHWT
0.	T WT
.0200093511	FHGR
.0928806496	FHLB
0.	T GR
0.	T LB

FIELD DATA

PLANT U. S. Gypsum - EPA
DATE 6-3-88
SAMPLING LOCATION #4 Kettle Calciner Exhaust Outlet
SAMPLE TYPE Particulate
RUN NUMBER 2
OPERATOR Meeter / Frye
AMBIENT TEMPERATURE 90
BAROMETRIC PRESSURE 29.67
STATIC PRESSURE, (P_s) -.89
FILTER NUMBER (s) 27018

PROBE LENGTH AND TYPE 3' Glass
NOZZLE I.D. .300
ASSUMED MOISTURE, % 6.8%
SAMPLE BOX NUMBER 2
METER BOX NUMBER Nutech #4
METER $\Delta H_@$ 1.9
C FACTOR NA
PITOT TUBE FACTOR .84
REFERENCE Δp NA
NOTE LCI = .011
LCF = .012

READ AND RECORD ALL DATA EVERY 4 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	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
				DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F			
	0 14:00	326.252									
Y 1	4	327.8	.45	.46		251	110		3.0	275	60
	8	329.3	.45	.46		249	111		4.0	275	60
	12	331.0	.45	.46		247	112		5.0	280	60
2	16	332.8	.47	.48		245	114		5.0	290	60
	20	334.3	.47	.48		245	115		5.0	300	60
	24	336.0	.44	.45		246	117		5.0	300	60
3	28	337.5	.44	.45		246	118		5.0	300	60
	32	338.8	.41	.42		247	120		5.0	300	60
	36	340.4	.41	.42		247	120		5.0	290	60
4	40	342.0	.41	.42		246	121		5.0	280	60
	44	343.5	.41	.42		244	122		5.0	275	60
	48 step →	345.008	.41	.42		244	123		5.0	275	60
X	0 LC=.012 →	345.108									
1	4	346.7	.46	.47		249	124		4.0	250	60
	8	348.2	.43	.44		247	124		5.0	250	60
	12	350.0	.49	.50		246	124		5.0	250	60
2	16	351.5	.47	.48		246	124		5.0	250	60
	20	352.1	.46	.47		245	125		5.0	260	60
	24	354.6	.46	.47		245	126		5.0	270	60
3	28	356.3	.45	.46		246	126		5.0	285	60
	32	357.9	.43	.44		245	126		5.0	285	60
	36	359.3	.41	.42		246	126		5.0	290	60
4	40	360.9	.40	.41		246	126		5.0	280	60
	44	362.4	.40	.41		244	126		5.0	286	60

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Particulate Run # 2 Kettle Calciner Exhaust 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 DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET $(T_{m\,in})$, °F	DRY GAS METER TEMPERATURE OUTLET $(T_{m\,out})$, °F	PUMP VACUUM, in Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE °F
	48	363.835	.39	.40		243	126		6.0	310	60
		37.4830 LV	.6602 LV	.4625 LV		247.54 LV	121.08 LV				

0.6602	ΓΔP
0.4625	ΔH
247.5	TS
121.1	TM
37.483	VMA
29.67	PBAR
1568.	VWC
22.8	WSG
28.97	MWD
0.785398	AS
96.	TT
0.89	STAT
0.3	DN
0.99	Y
0.84	CP
1590.8	TH2O
33.47376721	VMS
74.88078	VWS
69.10718741	%M
.3089281259	MD
21.38894154	MWS
29.73544118	PS
50.00862681	VACT
2356.364909	QACT
11.45718124	VSTD
539.9068337	QSTD
103.3312133	%I
0.0132	FHWT
0.	T WT
0.006085434	FHGR
.0281619123	FHLB
0.	T GR
0.	T LB

FIELD DATA

PLANT U.S. Gypsum - EPA
DATE 6-4-80
SAMPLING LOCATION #4 Kettle Calciner Exhaust Outlet
SAMPLE TYPE Particulate
RUN NUMBER 3
OPERATOR Meeter / Frye
AMBIENT TEMPERATURE 95 °F
BAROMETRIC PRESSURE 29.67 "Hg
STATIC PRESSURE, (P_s) -.95
FILTER NUMBER (s) 28085

PROBE LENGTH AND TYPE 3' Borosilicate
NOZZLE I.D. .300
ASSUMED MOISTURE, % 68
SAMPLE BOX NUMBER 2
METER BOX NUMBER Nutech #4
METER $\Delta H_@$ 1.9
C FACTOR NA
PITOT TUBE FACTOR .84
REFERENCE Δp NA
NOTE LCF = .008
LCF = .008

READ AND RECORD ALL DATA EVERY 4 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		PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
				DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F			
	0 8:37	363.955									
X 1	4	365.6	.52	.54		237	88		4.0	225	55
	8	367.3	.52	.54		237	88		4.0	230	56
	12	369.1	.52	.54		237	89		5.0	240	58
2	16	370.6	.52	.54		235	92		5.0	250	60
	20	372.3	.48	.49		237	95		5.0	250	61
	24	373.9	.47	.48		237	95		5.0	250	62
3	28	375.5	.47	.48		238	98		5.0	250	62
	32	377.1	.43	.44		237	98		5.0	250	62
	36	378.7	.38	.39		237	100		5.0	250	62
4	40	380.0	.37	.38		238	102		5.0	250	62
	44	381.4	.37	.38		237	102		4.0	260	63
LCF = .010	48 Stop →	382.843	.37	.38		238	104		4.0	260	63
	0 Starts 382.886										
Y 1	4	384.6	.48	.49		239	106		5.0	275	60
	8	386.1	.43	.44		238	107		4.0	275	61
	12	387.5	.42	.43		238	107		4.0	275	61
2	16	389.2	.44	.45		239	108		5.0	275	62
	20	390.7	.44	.45		239	108		5.0	280	65
	24	392.4	.44	.45		239	109		5.0	280	66
3	28	393.9	.45	.46		240	109		5.0	290	67
	32	395.4	.45	.46		241	110		5.0	290	67
	36	397.0	.44	.45		241	110		5.0	300	67
4	40	398.5	.44	.45		241	111		5.5	300	67
	44	400.1	.45	.46		241	111		6.0	290	67

Meeler

Run #3 Particulate #4 Kettle calciner Exhaust 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			
	48	401.748	.45	.46		241	112		6.0	278	67
	10:30										
						238.416					
		37.7510	.6684	.4600			102.45				

0.6684	ΓΔP
0.46	ΔH
238.4	TS
102.5	TM
37.751	VMA
29.76	PBAR
1701.	VWC
21.2	WSG
28.97	MWD
0.785398	AS
96.	TT
0.95	STAT
0.3	DN
0.99	Y
0.84	CP
1722.2	TH2O
34.93319072	VMS
81.06565	VWS
69.88487945	%M
.3011512055	MD
21.30362872	MWS
29.82985294	PS
50.31886207	VACT
2371.220018	QACT
11.42176405	VSTD
538.2378387	QSTD
108.1707375	%I
0.0243	FHWT
0.	T WT
.0107347079	FHGR
.0495240578	FHLB
0.	T GR
0.	T LB

DRY MOLECULAR WEIGHT DETERMINATION

PLANT EPA- U.S. Gypsum

DATE

SAMPLING TIME (24-hr CLOCK)

SAMPLING LOCATION #Kettle Calciner Exhaust

SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS)

ANALYTICAL METHOD Orsat

AMBIENT TEMPERATURE

OPERATOR Meeter

COMMENTS: Ambient Air

RUN / GAS	1		2		3		AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M_d, lb lb-mole
	ACTUAL READING	NET	ACTUAL READING	NET	ACTUAL READING	NET			
CO_2								44/100	
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)								32/100	
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)								28/100	
N_2 (NET IS 100 MINUS ACTUAL CO READING)								28/100	
								TOTAL	28.97

SUMMARY
RECORD OF VISIBLE EMISSIONS

Type of Plant Dry Wall Date 6-3-80

Company Name US Gypsum Hours of Observation 2 hours 5 min

Plant Address Shoals, Ind Observer Nancy E Robertson

Type of Discharge (STACK) OTHER _____

Discharge Location #4 Kettle Calciner Baghouse Exhaust

Height of Point of Discharge 2nd level plus ~50'

Observer's Location:

Distance to Discharge Point ~90-100'

Height of Observation Point 1st level (ground level)

Direction from Discharge Point SW of stack

Background Description Blue skies w/ occasional clouds

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

Wind Direction W 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 ~3'

Run 1 + Run 2

RECORD OF VISIBLE EMISSIONS

Company Name US Gypsum — Date 6-3-80

Plant Address Shoals Ind — Observer Nancy E Robertson

Stack Location #4 Kettle Calciner Baghouse Exhaust — Observer's Location ~ 90' SW of Stack

Weather Conditions partly cloudy

HR	MIN	TIME SECONDS 00	15	30	45	COMMENTS
	00					
	01					
	02					
	03					
	04					
	05					
	06					
	07					
	08					
	09					
	10					
	11					
	12					
	13					
	14					
	15					
	16					
	17					
	18					
	19					
	20					
	21					
	22					
	23					Run 1
	24					
start 09	25	0	0	0	0	0925 - 0935
	26	0	0	0	0	$\frac{5}{40} = 0.125 \cong .1$
	27	0	0	0	0	
	28	0	0	5	0	
	29	0	0	0	0	

RECORD OF VISIBLE EMISSIONS

Company Name US Gypsum Date 6-3-80

Plant Address Shoals, Ind Observer Nancy E Robertson

Stack Location #4 Kettle Calciner Baghouse Exhaust Observer's Location ~ 90' SW of stack

Weather Conditions cloudy, overcast

TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS
						Run 1
09	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	0935 - 0945
	35	0	0	0	0	5/40 = 0.125 ≅ 0.1
	36	0	0	0	0	
	37	0	0	0	0	
	38	0	0	0	5	
	39	0	0	0	0	
	40	0	0	0	0	
	41	0	0	0	0	
	42	0	0	0	-	
	43	0	0	0	0	
	44	0	0	0	0	0945 - 0955
	45	0	0	0	0	0/40 = 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	0955 - 1005
	55	0	0	0	0	5/40 = 0.125 ≅ 0.1
	56	0	0	0	0	
	57	0	0	0	0	
	58	0	0	5	0	
	59	0	0	0	0	

RECORD OF VISIBLE EMISSIONS

Company Name US Gypsum — Date 6-3-80

Plant Address Shoal, Ind — Observer Nancy E Robertson

Stack Location #4 Kettle Calciner Baghouse Exhaust — Observer's Location ~90' SW of Stack

Weather Conditions partly cloudy

HR	MIN	TIME SECONDS 00	15	30	45	COMMENTS
						Run 1
10	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	1005-1015
	05	0	0	0	0	$\frac{0}{40} = 0$
	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	1015-1025
	15	0	0	0	0	$\frac{0}{40} = 0$
	16	0	0	0	0	
	17					
	18					
	19					
	20	0	0	0	0	
	21					
	22					
	23					
	24	0	0	0	0	1025-1035
	25	0	0	0	0	$\frac{5}{40} = 0.125 \cong .1$
	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 US Gypsum — Date 6-3-80

Plant Address Shoals, Ind — Observer Nancy E Robertson

Stack Location #4 Kettle Calciner Baghouse Exhaust — Observer's Location ~90' SW of Stack

Weather Conditions partly cloudy

HR	MIN	TIME SECONDS 00	15	30	45	COMMENTS
						Rain
10	30	0	0	0	0	
	31	5	0	0	0	
	32	0	0	0	0	
	33	0	0	0	0	
	34	0	0	0	0	1035 - 1045
	35	0	0	0	0	0/40 = 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	1045 - 1055
	45	0	0	0	0	0/40 = 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	1055 - 1105
	55	0	0	0	0	0/40 = 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 US Gypsum — Date 1-3-80

Plant Address Shoal, Ind — Observer Nancy Robertson

Stack Location #4 Kettle Calciner Baghouse Exhaust — Observer's Location ~90 SW of stack

Weather Conditions partly cloudy

HR	MIN	TIME SECONDS 00	15	30	45
11	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	5	5	5	0
	13	0	0	0	0
	14	0	0	0	0
	15	0	0	0	0
	16	5	0	0	5
11	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	5	0	0
	25	0	0	0	0
	26	0	0	0	0
	27	0	0	0	0
	28	0	0	0	0
stop 11	29	0	0	0	0

COMMENTS

Run 1

1105 - 1115

$\frac{20}{40} = 0.5$

1115 - 1125

$\frac{15}{40} = .375 = .4$

1125 - 1130

$\frac{0}{20} = 0$

RECORD OF VISIBLE EMISSIONS

Company Name US Gypsum
Plant Address Shoal, Ind
Stack Location #4 Kettle Calciner Baghouse Exhaust
Weather Conditions Partly cloudy

Date 6-3-80
Observer Nancy E Robertson
Observer's Location ~90' SW of stack

HR	MIN	TIME SECONDS 00	15	30	45
start 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	5	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

COMMENTS

Run 2

1400 - 1410

$\frac{0}{40} = 0$

1410 - 1420

$\frac{5}{40} = 0.125 \approx .1$

1420 - 1430

$\frac{0}{40} = 0$

RECORD OF VISIBLE EMISSIONS

Company Name US Gypsum Date 6-3-80

Plant Address Shoals, Ind Observer Danny E Robertson

Stack Location #4 Kettle Calciner Baghouse & exhaust Observer's Location ~90' SW of stack

Weather Conditions Partly cloudy

TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS
						Run 2
14	30	0	0	0	0	1430 - 1440
	31	0	0	0	0	$\frac{0}{40} = 0$
	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	1440 - 1450
	40	0	0	0	0	$\frac{5}{40} = 0.125 \equiv .1$
	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	5	0	0	0	
	47	0	0	0	0	
	48	0	0	0	0	
	49	0	0	0	0	1450 - 1500
	50	0	0	0	0	$\frac{0}{40} = 0$
	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 US Gypsum — Date 6-3-80

Plant Address Shoal 2nd — Observer Danny E Robertson

Stack Location #4 Kettle Calciner Baghouse Exhaust — Observer's Location ~90' SE of stack

Weather Conditions Partly cloudy

HR	MIN	TIME SECONDS 00	15	30	45
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	5	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	5	0	0	0
	19	0	0	0	0
	20	5	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

COMMENTS

Run 2

1500 – 1510

$\frac{5}{40} = 0.125 \cong .1$

1510 – 1520

$\frac{5}{40} = 0.125 \cong .1$

1520 – 1530

$\frac{5}{40} = 0.125 \cong .1$

RECORD OF VISIBLE EMISSIONS

Company Name US Gypsum — Date 6-3-80

Plant Address Shoals, Ind — Observer Nancy E Robertson

Stack Location #4 Kettle Calciner Baghouse Exhaust — Observer's Location ~90' SE of stack

Weather Conditions partly cloudy

TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS
						Run 2
15	30	0	0	0	0	1530 - 1542
	31	0	0	0	0	0 = 0
	32	0	0	0	0	48
	33	0	0	0	0	
	34	0	0	0	0	
	35	0	0	0	0	
1	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	
stop test	41	0	0	0	0	
	42					
	43					
	44					
	45					
	46					
	47					
	48					
	49					
	50					
	51					
	52					
	53					
	54					
	55					
	56					
	57					
	58					
	59					

SUMMARY
RECORD OF VISIBLE EMISSIONS

Type of Plant Dry Board Date 6-4-80

Company Name US Gypsum Hours of Observation 2 hours

Plant Address Shoals, Ind Observer Nancy E Robertson

Type of Discharge (STACK) OTHER _____

Discharge Location ~~[illegible]~~ Kettle calciner Baghouse Exhaust

Height of Point of Discharge ~~[illegible]~~ 3rd level plus 40-50'

Observer's Location:

Distance to Discharge Point ~ 90'

Height of Observation Point 2nd level

Direction from Discharge Point ~ 90' NE of stack

Background Description cloudy skys

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

Wind Direction W Wind Velocity 3 mi/hr

Plume Description:

Detached: (Yes) No

Color: Black (White) Other _____

Plume Dispersion Behavior: Looping Coning Fanning

Lofting Fumigating Other _____

Estimated Distance Plume Visible ~5'

Run 3

RECORD OF VISIBLE EMISSIONS

Company Name US Gypsum
Plant Address Shoals, Ind
Stack Location #4 Kettle Calciner Baghouse & Exhaust
Weather Conditions cloudy, overcast

Date 6-4-30
Observer Nancy E Robertson
Observer's Location ~90' NE of stack

TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS
						Run 3
start 08	30	0	0	0	0	
	31	0	0	0	0	Steam is being emitted
	32	0	0	0	0	from the stack and is
	33	0	0	0	0	dissipating ~40' away
	34	0	0	0	0	
	35	0	0	0	0	
	36	0	0	0	0	0830 - 0840
	37	0	0	0	0	0/40 = 0
	38	0	0	0	0	
	39	0	0	0	0	
	40	0	0	0	0	
	41	0	0	0	0	0840 - 0850
	42	0	0	0	0	0/40 = 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	0850 - 0900
	50	0	0	0	0	0/40 = 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 US Gypsum — Date 6-4-80

Plant Address Shoals, Ind — Observer Nancy E Robertson

Stack Location #4 Kettle Calciner Baghouse Exhaust — Observer's Location ~90 NE of stack

Weather Conditions Cloudy

TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS
						Run 3
09	00	0	0	0	0	0900 - 0910
	01	0	0	0	0	0/40 = 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	0910 - 0920
	10	0	0	0	0	0/40 = 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	0920 - 0930
	21	0	0	0	0	0/40 = 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 US Gypsum — Date 6-4-80

Plant Address Shoals, Ind — Observer Nancy E Robertson

Stack Location# 4 Kettle Calciner Baghouse Exhaust — Observer's Location ~90' NE of Stack

Weather Conditions Cloudy

TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS
						Run 3
0930	30	0	0	0	0	
	31	0	0	0	0	0930 - 0940
	32	0	0	0	0	0/40 = 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	0940 - 0950
	40	0	0	0	0	0/40 = 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	0950 - 1000
	50	0	0	0	0	0/40 = 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 US Gypsum — Date 6-4-80

Plant Address Shoals, Ind — Observer Nancy E Robertson

Stack Location #4 Kettle Calciner Baghouse Exhaust — Observer's Location ~90' NE of Stack

Weather Conditions Cloudy

HR	MIN	TIME SECONDS 00	15	30	45
10	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
10	29	0	0	0	0

COMMENTS

Run 3

1000 - 1010

$\frac{0}{40} = 0$

1010 - 1020

$\frac{0}{40} = 0$

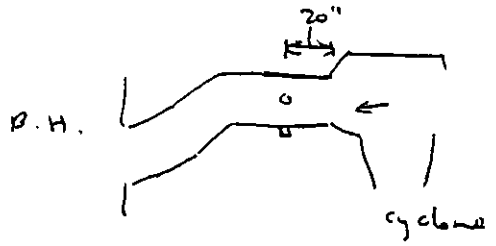
1020 - 1030

$\frac{0}{40} = 0$

End Test

TRAVERSE POINT LOCATION FOR CIRCULAR DUCTS

PLANT U.S. Gypsum Co.
DATE 6-9-80
SAMPLING LOCATION Rock Dryer Inlet to B.H.
INSIDE OF FAR WALL TO
OUTSIDE OF PORT, (DISTANCE A) 26 1/4"
INSIDE OF NEAR WALL TO
OUTSIDE OF PORT, (DISTANCE B) 3"
STACK I.D., (DISTANCE A - DISTANCE B) 23 1/4"
NEAREST UPSTREAM DISTURBANCE 20"
NEAREST DOWNSTREAM DISTURBANCE 20"
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,Y-1	.016	23.25	3/8 → 1/2	3"	3 3/8" → 3 1/2
2	.049		1 1/8		4 1/8
3	.085		2		5
4	.125		2 7/8		5 7/8
5	.169		3 7/8		6 7/8
6	.220		5 1/8		8 1/8
7	.283		6 5/8		9 5/8
8	.375		8 3/4		11 3/4
9	.625		14 1/2		17 1/2
10	.717		16 5/8		19 5/8
11	.780		18 1/8		21 1/8
12	.831		19 3/8		22 3/8
13	.875		20 3/8		23 3/8
14	.915		21 1/4		24 1/4
15	.951		22 1/8		25 1/8
16	.984		22 7/8 → 22 3/4		25 7/8 → 25 3/4

PRELIMINARY VELOCITY TRAVERSE

PLANT U. S. Gypsum Co
DATE 6-9-80
LOCATION Rock Dryer B.H. Inlet
STACK I.D. 23 1/4"ø
BAROMETRIC PRESSURE, in. Hg 29.76
STACK GAUGE PRESSURE, in. H_2O -3.9
OPERATORS Ralston / Jackson

SCHEMATIC OF TRAVERSE POINT LAYOUT

TRAVERSE POINT NUMBER	VELOCITY HEAD (Δp_s), in. H_2O	STACK TEMPERATURE (T_s), °F
X-1	.79	190
2	.76	
3	.74	
4	.73	
5	.76	
6	.74	
7	.74	
8	.75	
9	.81	
10	.73	
11	.75	
12	.82	
13	.80	
14	.78	
15	.76	
16	.72	
AVERAGE		

TRAVERSE POINT NUMBER	VELOCITY HEAD (Δp_s), in. H_2O	STACK TEMPERATURE (T_s), °F
X-1	.59	
2	.65	
3	.69	
4	.73	
5	.79	
6	.74	
7	.75	
8	.76	
9	.80	
10	.81	
11	.83	
12	.85	
13	.87	
14	.89	
15	.90	
16	.91	
AVERAGE		

NOMOGRAPH DATA

PLANT U. S. Gypsum Co.

DATE 6-9-80

SAMPLING LOCATION Rock Dryer B.H. Inlet

CONTROL BOX NO. Nutech 2

CALIBRATED PRESSURE DIFFERENTIAL ACROSS ORIFICE, in. H_2O	$\Delta H_@$	1.85
AVERAGE METER TEMPERATURE (AMBIENT + 20 °F), °F	$T_{m_{avg.}}$	105°
PERCENT MOISTURE IN GAS STREAM BY VOLUME	B_{wo}	6%
BAROMETRIC PRESSURE AT METER, in. Hg	P_m	29.76
STATIC PRESSURE IN STACK, in. Hg ($P_m \pm 0.073$ x STACK GAUGE PRESSURE in in. H_2O)	P_s	- 3.4" in H_2O
RATIO OF STATIC PRESSURE TO METER PRESSURE	P_s P_m	.99
AVERAGE STACK TEMPERATURE, °F	$T_{s_{avg.}}$	190°
AVERAGE VELOCITY HEAD, in. H_2O	$\Delta p_{avg.}$	.77
MAXIMUM VELOCITY HEAD, in. H_2O	$\Delta p_{max.}$	.92
C FACTOR		1.05
CALCULATED NOZZLE DIAMETER, in.		.225
ACTUAL NOZZLE DIAMETER, in.		.188
REFERENCE Δp, in. H_2O		1.62

FIELD DATA

PLANT U.S Gypsum Co.
DATE 6-5-80
SAMPLING LOCATION Rock Dryer B.H. Inlet
SAMPLE TYPE EPA 5 Part.
RUN NUMBER #1
OPERATOR Ralston
AMBIENT TEMPERATURE 86°F
BAROMETRIC PRESSURE 29.97
STATIC PRESSURE, (P_s) -3.2
FILTER NUMBER (s) 27050

$A_s = \left(\frac{3.75}{2}\right)^2 \frac{\pi}{144} = 2.918$

PROBE LENGTH AND TYPE 3' boro.
NOZZLE I.D. 0.188"
ASSUMED MOISTURE, % 6
SAMPLE BOX NUMBER 1
METER BOX NUMBER Nutech 2
METER $\Delta H_@$ 1.85
C FACTOR 1.05
PITOT TUBE FACTOR 0.84
REFERENCE Δp 1.62
NOTE L.C. I_{15} = .009 cfm
L.C. F_{15} = .006 cfm

READ AND RECORD ALL DATA EVERY 2 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		PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
				DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F			
	0 / 1879	423.805									
1-1	2	424.9	.81	.92		165	98°	N/A	3	265	64°
2	4	426.0	.85	.96		169	98°		3	265	65°
3	6	427.1	.87	.99		181	100		3	265	65°
4	8	428.3	.88	1.00		182	100		3	260	65°
5	10	429.5	.88	1.00		182	100		3	260	65°
6	12	430.6	.88	1.00		183	101		3	260	66°
7	14	431.7	.88	1.00		185	102		3	250	66°
8	16	432.9	.90	1.05		184	103		4	250	66°
9	18	434.1	.90	1.05		173	103		4	275	67°
10	20	435.3	.85	.96		171	104		4	275	67°
11	22	436.3	.73	.84		171	104		4	275	67°
12	24	437.4	.77	.89		169	104		4	270	67°
13	26	438.5	.75	.88		170	105		4	270	68°
14	28	439.6	.73	.84		171	105		4	275	68°
15	30	440.6	.69	.80		166	105		4	275	69°
16	32	441.676	.68	.79		170	106		4	270	69°
0	0	441.677									
X 1	2	442.7	.76	.88		175	106		4	270	67°
2	4	443.8	.76	.88		177	107		4	270	68°
3	6	444.9	.79	.90		175	107		4	275	68°
4	8	446.0	.82	.94		174	107		5	270	68°
5	10	447.1	.80	.91		176	107		5	260	68°
6	12	448.2	.80	.91		175	108		5	255	69°
7	14	449.3	.81	.92		176	108		5	255	68°

Ralston Pg. 2 of 2 [illegible] Gypsum Rock Dryer Inlet to B.H. Run 1 6-5-80

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 DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
			449.3									
8	16		450.4	.82	.94		175	108		6	250	69°
9	18		451.5	.88	1.05		177	109		6	250	69°
10	20		452.8	.85	.97		176	109		7	255	69°
11	22		453.8	.80	.91		176	109		7	255	69°
12	24		455.0	.83	.95		175	109		7	255	69°
13	26		456.1	.76	.88		172	110		7	250	69°
14	28		457.1	.76	.88		166	110		7	245	69°
15	30		458.2	.74	.85		163	110		7	255	69°
16	32		459.255	.72	.82		161	110		7	260	70°
			17.578		~~.92375~~ ✓✓		✓✓					
			17.871		.922	1875	173.625					
STOP TIME		1933	~~35.449~~ 35.449					~~101.4375~~ 105.375 ✓✓				
LCF_{15} = .006			✓✓	.89656 ✓✓								

0.89656	√ΔP
0.922188	ΔH
173.63	TS
105.38	TM
35.449	VMA
29.97	PBAR
64.	VWC
7.2	WSG
28.889	MWD
2.9483	AS
64.	TT
-3.2	STAT
0.188	DN
1.01	Y
0.84	CP
71.2	TH2O
33.56788994	VMS
3.35196	VWS
9.079018484	%M
.9092098152	MD
27.90038568	MWS
29.73470588	PS
56.26714775	VACT
9953.545903	QACT
42.36603471	VSTD
7494.466808	QSTD
107.0357891	%I
7.0368	FHWT
0.	T WT
3.234993257	FHGR
207.8097324	FHLB
0.	T GR
0.	T LB

DRY MOLECULAR WEIGHT DETERMINATION

PLANT U. S. Gypsum Co.
DATE 6-5-80
SAMPLING TIME (24-hr CLOCK) as noted
SAMPLING LOCATION Rock Dryer B.H. Inlet
SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS) grabs
ANALYTICAL METHOD Orsat
AMBIENT TEMPERATURE 86°F
OPERATOR Jackson

COMMENTS:

GAS \ RUN	1		2		3		AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M_d, lb lb-mole
	ACTUAL READING	NET	ACTUAL READING	NET	ACTUAL READING	NET			
CO_2	1.2	1.2	1.2	1.2	1.4	1.4	1.27	44/100	0.557
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	18.4	17.2	18.4	17.2	18.5	17.1	17.16	32/100	5.492
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)	18.4	–	18.4	–	18.5	–	0.00	28/100	–
N_2 (NET IS 100 MINUS ACTUAL CO READING)		81.6		81.6		81.5	81.57	28/100	22.840
							TOTAL		28.889

FIELD DATA

PLANT U.S. Gypsum Co
DATE 6-6-90
SAMPLING LOCATION Rock Dryer B.H. Inlet
SAMPLE TYPE EPA 5 Part.
RUN NUMBER 2
OPERATOR Ralston
AMBIENT TEMPERATURE 88°F
BAROMETRIC PRESSURE 29.77
STATIC PRESSURE, (P_s) -.31
FILTER NUMBER (s) 27013

PROBE LENGTH AND TYPE 3' boro.
NOZZLE I.D. 0.188
ASSUMED MOISTURE, % 6
SAMPLE BOX NUMBER 1
METER BOX NUMBER Nutech 2
METER $\Delta H_@$ 1.85
C FACTOR 1.05
PITOT TUBE FACTOR 0.89
REFERENCE Δp 1.62
NOTE L.C. F_{15} = .006 CFM
L.C. F_{15} = .009 CFM

READ AND RECORD ALL DATA EVERY 2 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			
	0 1234	459.435									
Y-1	2	460.6	.81	.96		159	106		3	255	64°
2	4	461.7	.81	.96		165	107		3	255	65°
3	6	462.8	.99	.95		171	107		3	260	65°
4	8	464.0	.82	.97		179	108		3	260	66°
5	10	465.1	.79	.95		179	108		3	260	66°
6	12	466.2	.83	.99		180	109		3	260	66°
7	14	467.4	.82	.97		181	109		3	265	66°
8	16	468.4	.75	.90		182	109		3	265	66°
9	18	469.6	.78	.94		171	109		3	270	67°
10	20	470.7	.72	.86		170	109		3	255	67°
11	22	471.7	.63	.76		169	109		3	255	67°
12	24	472.7	.63	.76		167	109		3	260	68°
13	26	473.8	.65	.78		170	109		3	260	68°
14	28	474.8	.63	.76		170	109		3	260	68°
15	30	475.7	.61	.72		170	109		4	265	68°
16	32	476.788	.61	.72		172	110		4	265	69°
-	0	476.964									
X-1	2	478.0	.70	.84		174	109		3	250	66°
2	4	479.1	.72	.86		174	109		3	250	66°
3	6	480.2	.68	.82		173	110		4	250	67°
4	8	481.3	.71	.85		174	120		4	255	67°
5	10	482.4	.75	.90		174	120		4	255	68°
6	12	483.5	.79	.95		174	120		5	255	68°
7	14	484.6	.78	.94		175	121		6	255	68°

Run 2
Roc. Drill. Int.
Ralston & Jackson
6/4/80

PAGE 2

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 DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\ in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\ out}$), °F	PUMP VACUUM, in Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
		484.6									
X-8	16	485.7	.80	.95		173	111		6	260	68°
9	18	486.9	.84	1.0		174	111		7	260	68°
10	20	488.0	.83	.99		174	111		7	260	68°
11	22	489.2	.83	.99		175	111		8	260	69°
12	24	490.3	.80	.95		169	111		8	265	69°
13	26	491.4	.75	.96		173	111		8	265	69°
14	28	492.6	.67	.80		172	112		8	265	69°
15	30	493.6	.64	.77		171	112		8	255	69°
16	32	494.568	.60	.72		170	112		8	250	69°
	Stop Time =	1056	~~.80~~			172.625					
	RCF =	.007	.857201								
		34.907		.880625			109.59375				

ΓΔP	0.857201
ΔH	0.88063
TS	172.63
TM	109.59
VMA	34.907
PBAR	29.77
VWC	60.
WSG	8.
MWD	28.914
AS	2.9483
TT	64.
STAT	-3.1
DN	0.188
Y	1.01
CP	0.84
TH2O	68.
VMS	32.58853704
VWS	3.2014
%M	8.944972428
MD	.9105502757
MWS	27.93774571
PS	29.54205882
VACT	53.89346468
QACT	9533.646115
VSTD	40.43913859
QSTD	7153.602738
%I	108.8643688
FHWT	8.8362
T WT	0.
FHGR	4.184300702
FHLB	256.5662158
T GR	0.
T LB	0.

DRY MOLECULAR WEIGHT DETERMINATION

PLANT U. S. Gypsum Co.
DATE 6-6-80
SAMPLING TIME (24-hr CLOCK) as noted
SAMPLING LOCATION Rock Dryer B.H. Inlet
SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS) grabs
ANALYTICAL METHOD Orsat
AMBIENT TEMPERATURE 85°F
OPERATOR Jackson

COMMENTS:

GAS \ RUN 2	0830 1		0900 2		1015 3		AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M_d, lb/lb-mole
	ACTUAL READING	NET	ACTUAL READING	NET	ACTUAL READING	NET			
CO_2	1.0		1.2		1.1		1.1	44/100	.484
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	19.5	18.5	19.6	18.4	19.6	18.5	18.467	32/100	5.909
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)	19.5	0.0	19.6	0.0	19.6	0.0	0.0	28/100	0.0
N_2 (NET IS 100 MINUS ACTUAL CO READING)		80.5		80.4		8.4	80.433	28/100	22.52
								TOTAL	28.914

FIELD DATA

PLANT U.S. Gypsum (Shoals)
DATE 6/6/80
SAMPLING LOCATION Rock Dryer Inlet
SAMPLE TYPE Particulate
RUN NUMBER 3
OPERATOR Ralston
AMBIENT TEMPERATURE 93°
BAROMETRIC PRESSURE 29.77
STATIC PRESSURE, (P_s) -3.15
FILTER NUMBER (s) 27017

PROBE LENGTH AND TYPE 8' borosilicate
NOZZLE I.D. 0.180
ASSUMED MOISTURE, % 6
SAMPLE BOX NUMBER 4
METER BOX NUMBER Nutech 2
METER $\Delta H_@$ 1.88
C FACTOR 1.05
PITOT TUBE FACTOR .840
REFERENCE Δp 1.62
NOTE NCT = .009 cfm
ECP = .008 cfm
15

READ AND RECORD ALL DATA EVERY 2 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		PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
				DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F			
	0 1150	498.713									
X 1	2	499.8	.80	.93		177	108		3	240	62°
2	4	500.9	.78	.92		177	108		3	240	64°
3	6	502.1	.80	.93		178	109		3	240	64°
4	8	503.2	.80	.93		177	109		3	245	64°
5	10	504.3	.80	.93		178	110		3	250	65°
6	12	505.5	.81	.94		176	110		3	250	65°
7	14	506.6	.83	.97		177	110		3	250	65°
8	16	507.7	.83	.97		178	110		4	255	66°
9	18	508.9	.79	.92		178	109		4	255	66°
10	20	510.0	.71	.84		178	110		5	255	67°
11	22	511.0	.69	.82		177	110		5	260	68°
12	24	511.9	.53	.62		179	110		4	250	68°
13	26	513.0	.67	.78		174	109		5	250	68°
14	28	514.0	.56	.65		174	109		5	250	69°
15	30	514.9	.58	.68		173	109		5	245	69°
16	32	515.938	.58	.68		173	110		5	240	69°
0	0	516.072				[illegible]					
4 1	2	517.2	.77	.90		178	108		3	255	65°
2	4	518.2	.99	.90		179	109		3	255	67°
3	6	519.3	.71	.84		178	109		4	260	67°
4	9	520.4	.75	.89		180	109		5	265	67°
5	10	521.5	.75	.89		181	110		5	275	67°
6	12	522.6	.77	.91		180	110		6	275	67°
7	14	523.7	.79	.92		179	110		7	270	67°

Page 2

Lock Dacer Inlet
4/6/86
Ralston Jenkins

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 DESIRED	ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
		523.7									
y 8	16	524.9	.80	.93	.93	179	110		7	260	67°
9	18	526.0	.86	1.15		179	110		8	255	67°
10	20	527.2	.86	1.15		180	110		8	255	68°
11	22	528.4	.78	.92		180	110		8	270	68°
12	24	529.5	.65	.76		182	110		8	250	68
13	26	530.6	.77	.91		177	110		8	245	69°
14	28	531.7	.75	.89		177	110		8	255	69°
15	30	532.8	.71	.84		176	110		8	260	69°
16	32	533.837	.60	.82		174	110		8	275	69°
	STOP TIME =	1311									
			.8600059			177.59375					
	LC VFS - =	.008	.859826			VV					
			VV								
		34.990		.87906			109.53				
		VV		VV							

0.85983	Γ∆P
0.87906	∆H
177.59	TS
109.53	TM
34.99	VMA
29.77	PBAR
58.	VWC
10.4	WSG
28.924	MWD
2.9483	AS
64.	TT
-3.15	STAT
0.188	DN
1.01	Y
0.84	CP
68.4	TH2O
32.66933928	VMS
3.22042	VWS
8.973088883	%M
.9102691112	MD
27.94377977	MWS
29.53838235	PS
54.26777511	VACT
9599.860882	QACT
40.38572828	VSTD
7144.154561	QSTD
109.2786252	%I
8.7421	FHWT
0.	T WT
4.12950155	FHGR
252.8717057	FHLB
0.	T GR
0.	T LB

DRY MOLECULAR WEIGHT DETERMINATION

PLANT U. S. Gypsum Co.
DATE 6-6-80
SAMPLING TIME (24 hr CLOCK) as noted
SAMPLING LOCATION Rock Dryer B.H. Inlet
SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS) grabs
ANALYTICAL METHOD Orsat
AMBIENT TEMPERATURE 88 °F
OPERATOR Jackson

COMMENTS:

GAS \ RUN 3	1		2		3		AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M_d, lb lb-mole
	ACTUAL READING	NET	ACTUAL READING	NET	ACTUAL READING	NET			
CO_2	1.2		1.2		1.3		1.233	44/100	.54266
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	19.5	18.3	19.3	18.1	19.4	18.1	18.167	32/100	5.8133
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)	19.5	0.0	19.3	0.0	19.4	0.0	0.0	28/100	0.0
N_2 (NET IS 100 MINUS ACTUAL CO READING)		80.5		80.7		80.6	80.6	28/100	22.568
								TOTAL	28.92396

FIELD DATA

PLANT U.S. Gypsum, EPA
DATE 6-6-80
SAMPLING LOCATION Rock Dryer Outlet
SAMPLE TYPE Part. Size
RUN NUMBER 1
OPERATOR FRYE
AMBIENT TEMPERATURE
BAROMETRIC PRESSURE 29.97
STATIC PRESSURE, (P_s)
FILTER NUMBER (s) 23F ✓

PROBE LENGTH AND TYPE
NOZZLE I.D. .171
ASSUMED MOISTURE, % 6
SAMPLE BOX NUMBER
METER BOX NUMBER NUTECH 2
METER $\Delta H_@$
C FACTOR
PITOT TUBE FACTOR
REFERENCE Δp
NOTE

4.4
9 1F.55
3325
20
1033.2 } 12.5
1048.75

READ AND RECORD ALL DATA EVERY _____ 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	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
				DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F			
	0	495.083									
Y 13	4	496.877	.75	.59	.59	172	109		2.7	~~[illegible]~~	67
		1.794									
		$V_{m_s} = 17.71 \times 1.01 \times 1.794 \left(\frac{29.97 + .54/13.6}{460}\right) = \frac{1.862}{4} = .4655$ ft^3/min									
			.909	(109 + 460)							
		Series 23F		%	Cum %		ECD	× Tcon =	EAD		
	0	346.2		61.1	100		14	1.07	15.0		
	1	25.9		4.6	38.9		9.0		9.6		
	2	31.3		5.5	34.3		5.9		6.3		
	3	44.0		7.8	28.8		4.2		4.5		
	4	73.7		13.0	21.0		2.6		2.8		
	5	36.1		6.4	8.0		1.3		1.4		
	6	5.9		1.0	1.6		.84		.90		
	7	1.3		.23	0.6		.56		.60		
	8	1.7		.37	0.37						
		566.1		100							

FIELD DATA

PLANT U.S. Gypsum
DATE 6-6-80
SAMPLING LOCATION Rock Dryer Inlet
SAMPLE TYPE Particle Size
RUN NUMBER 2
OPERATOR FRYE
AMBIENT TEMPERATURE
BAROMETRIC PRESSURE 29.77
STATIC PRESSURE, (P_s)
FILTER NUMBER (s) 15F

PROBE LENGTH AND TYPE
NOZZLE I.D. .171
ASSUMED MOISTURE, % 6
SAMPLE BOX NUMBER
METER BOX NUMBER NUTECH 2
METER $\Delta H_@$
C FACTOR
PITOT TUBE FACTOR
REFERENCE Δp
NOTE

READ AND RECORD ALL DATA EVERY _____ 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	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
				DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F			
	0	496.837									
	4	498.633	.75	.59	.59	172	108		2.9		65
		1.796									

$$V_{ms} = 17.71 \times \frac{1.01 \times 1.796}{.910} \left(\frac{29.77 + \frac{.59}{13.6}}{108 + 460} \right) = \frac{1.853}{4} = .4632\ ft^3/min$$

	Series 15F		%	Cum %		ECD	× $T_{corr.}$	= EAD	
0	271.8		54.6		100	14	× 1.07		15.0
1	38.7		7.8		45.4	9.0			9.6
2	31.3		6.3		37.6	5.9			6.3
3	78.7		15.8		31.3	4.2			4.5
4	41.2		8.3		15.5	2.6			2.8
5	26.3		5.3		7.2	1.3			1.4
6	6.0		1.1		1.9	.84			.90
7	1.9		.38		0.8	.56			.60
8	2.2		.42		0.42				
	498.1								

FIELD DATA

PLANT U.S. Gypsum EPA
DATE 6-6-80
SAMPLING LOCATION Rock Dryer Inlet
SAMPLE TYPE Particle Size
RUN NUMBER 3
OPERATOR FRYE
AMBIENT TEMPERATURE
BAROMETRIC PRESSURE 29.77
STATIC PRESSURE, (P_s)
FILTER NUMBER (s) 12F ✓

PROBE LENGTH AND TYPE
NOZZLE I.D. .171
ASSUMED MOISTURE, % 6
SAMPLE BOX NUMBER
METER BOX NUMBER NUTECH 2
METER $\Delta H_@$
C FACTOR
PITOT TUBE FACTOR
REFERENCE Δp
NOTE

READ AND RECORD ALL DATA EVERY _____ 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	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
				DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F			
	0	535.049									
	3	536.402	.75	.59		172	110		3.2		66
		1.353									

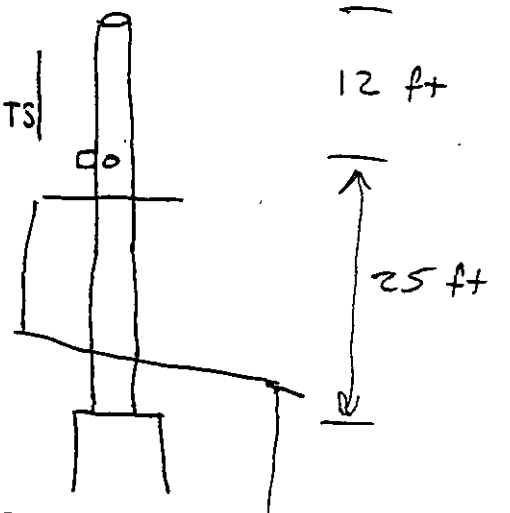
$$V_{ms} = \frac{17.71 \times 1.01 \times 1.353 \left(29.77 + \frac{.59}{13.6}\right)}{.910 \times (110 + 460)} = \frac{1.389}{3} = .4630 \frac{ft^3}{min}$$

	Series 12F	%	Cum %		ECD	× T_{cm} =	EAD
0	149.2	42.8	100		14	1.07	14.98
1	32.3	10.3	52.2		9.0		9.63
2	36.2	11.6	41.9		5.9		6.31
3	28.3	9.1	30.3		4.2		4.49
4	55.6	17.8	21.2		2.6		2.78
5	5.7	1.8	3.4		1.3		1.39
6	2.8	.9	1.6		.84		.898
7	.9	.3	.7		.56		.599
8	1.1	.4	.4		–		
	312.1	100	0.0				

TRAVERSE POINT LOCATION FOR CIRCULAR DUCTS

PLANT U.S. Gypsum - EPA
DATE 6-4-80
SAMPLING LOCATION Rock Dryer Outlet
INSIDE OF FAR WALL TO OUTSIDE OF PORT, (DISTANCE A) 27 1/8"
INSIDE OF NEAR WALL TO OUTSIDE OF PORT, (DISTANCE B) 3 3/8
STACK I.D., (DISTANCE A - DISTANCE B) 23 3/4"
NEAREST UPSTREAM DISTURBANCE > 8 dia.
NEAREST DOWNSTREAM DISTURBANCE > 2 dia.
CALCULATOR Meeter

$A = \pi r^2$
$= \frac{\pi}{144} \left(\frac{23.75}{2}\right)^2$
$= 3.076$

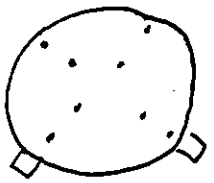


SCHEMATIC OF SAMPLING LOCATION

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	.067	23 3/4"	1 5/8"	3 3/8	5"
2	.250		5 7/8		9 1/4"
3	.750		17 3/4		21 1/8"
4	.933		22 1/8		25 1/2"
4 1					
2					
3					
4					

PRELIMINARY VELOCITY TRAVERSE

PLANT U.S. Gypsum - EPA
DATE 6-4-88
LOCATION Rock Dryer Outlet
STACK I.D. 23 3/4"
BAROMETRIC PRESSURE, in. Hg 29.76
STACK GAUGE PRESSURE, in. H_2O +.78
OPERATORS Meeter / Frye



SCHEMATIC OF TRAVERSE POINT LAYOUT

TRAVERSE POINT NUMBER	VELOCITY HEAD (Δp_s), in. H_2O	STACK TEMPERATURE (T_s), °F
X 1	.75	178
2	.93	184
3	.84	185
4	.72	185
	Δp_{ave} = .8075 = .81 in H_2O	
	T_s = 184 °F	
	Δp_{max} = .93	
AVERAGE		

TRAVERSE POINT NUMBER	VELOCITY HEAD (Δp_s), in. H_2O	STACK TEMPERATURE (T_s), °F
Y 1	.68	183
2	.91	185
3	.86	185
4	.77	184
AVERAGE		

NOMOGRAPH DATA

PLANT U. S. Gypsum

DATE 6-4-80

SAMPLING LOCATION Rock Dryer Outlet

CONTROL BOX NO. Nutech #4

CALIBRATED PRESSURE DIFFERENTIAL ACROSS ORIFICE. in. H_2O	$\Delta H_@$	1.92
AVERAGE METER TEMPERATURE (AMBIENT + 20°F). °F	$T_{m_{avg.}}$	100
PERCENT MOISTURE IN GAS STREAM BY VOLUME	B_{wo}	6%
BAROMETRIC PRESSURE AT METER. in Hg	P_m	29.76
STATIC PRESSURE IN STACK. in. Hg ($P_m \pm 0.073$ x STACK GAUGE PRESSURE in in. H_2O)	P_s	29.82
RATIO OF STATIC PRESSURE TO METER PRESSURE	P_s/P_m	1.0
AVERAGE STACK TEMPERATURE. °F	$T_{s_{avg.}}$	184
AVERAGE VELOCITY HEAD. in. H_2O	$\Delta p_{avg.}$	.81
MAXIMUM VELOCITY HEAD. in. H_2O	$\Delta p_{max.}$	.93
C FACTOR	1.09	
CALCULATED NOZZLE DIAMETER. in.	.220	
ACTUAL NOZZLE DIAMETER. in.	.195	
REFERENCE Δp. in. H_2O	1.3	

12 10% 9½

FIELD DATA

PLANT U.S. Gypsum - EPA
DATE 6-5-80
SAMPLING LOCATION Rock Dryer Outlet
SAMPLE TYPE Particulate
RUN NUMBER ~~3E~~ 1
OPERATOR Meeter
AMBIENT TEMPERATURE 85°F
BAROMETRIC PRESSURE 29.97
STATIC PRESSURE, (P_s) +.78
FILTER NUMBER (s) 27051

PROBE LENGTH AND TYPE 3' Borosilicate
NOZZLE I.D. ~~.300~~ .195
ASSUMED MOISTURE, % 6%
SAMPLE BOX NUMBER ~~1~~ Nutech #4
METER BOX NUMBER 2
METER $\Delta H_@$ 1.92
C FACTOR ~~1.0~~ 1.09
PITOT TUBE FACTOR .84
REFERENCE Δp 1.3
NOTE LCI = .010
LCF = .012

READ AND RECORD ALL DATA EVERY 4 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	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
				DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F			
	0 1810	441.149									
X 1	4	443.4	.73	1.05		165	97		4.0	225	65
	8	446.0	.73	1.05		168	98		4.0	225	65
2	12	448.2	.90	1.25		174	100		5.0	230	65
	16	450.5	.92	1.3		176	101		5.0	240	66
3	20	453.2	.88	1.28		172	102		5.0	250	66
	24	456.0	.89	1.25		171	103		5.0	250	66
4	28	458.1	.74	1.05		169	104		4.0	250	66
	32	460.437	.75	1.06		169	104		4.0	250	66
	0										
X 1	4	462.7	.71	1.0		173	105		4.0	250	67
	8	465.2	.70	1.0		172	105		4.0	250	68
2	12	467.6	.88	1.23		173	106		5.0	250	68
	16	470.2	.88	1.23		173	106		5.0	255	68
3	20	472.6	.87	1.20		173	106		5.0	255	68
	24	475.2	.84	1.18		173	106		5.0	255	69
4	28	477.3	.77	1.1		172	106		4.0	255	69
	32 1935	479.783	.74	1.05		172	106		4.0	255	69
		38.640 ✓✓	.897926			171.5625					
			✓✓	1.139375		✓✓	103.4375				
				✓✓							

A-50

DRY MOLECULAR WEIGHT DETERMINATION

PLANT U. S. Gypsum Co.
DATE 6-5-80
SAMPLING TIME (24 hr CLOCK) —
SAMPLING LOCATION Rock Dryer Outlet
SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS) grabs
ANALYTICAL METHOD Orsat
AMBIENT TEMPERATURE 85 °F
OPERATOR Meeter

COMMENTS:

Run #1

RUN / GAS	1		2		3		AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M_d, lb·lb-mole
	ACTUAL READING	NET	ACTUAL READING	NET	ACTUAL READING	NET			
CO_2	.8	.8	1.0	1.0	.8	.8	.867	44/100	.38148
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	18.6	17.8	18.2	17.2	18.3	17.5	17.5	32/100	5.6
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)	18.6	0.0	18.2	0.0	18.3	0.0	0.0	28/100	0.0
N_2 (NET IS 100 MINUS ACTUAL CO READING)		81.4		81.8		81.7	81.633	28/100	22.857
								TOTAL	28.838

FIELD DATA

PLANT U.S. Gypsum
DATE 6-6-80
SAMPLING LOCATION Rock Dryer Outlet
SAMPLE TYPE Particulate
RUN NUMBER 2
OPERATOR Meeter
AMBIENT TEMPERATURE 80 °F
BAROMETRIC PRESSURE 29.72
STATIC PRESSURE, (P_s) +.61
FILTER NUMBER (s)

PROBE LENGTH AND TYPE 3' Borosilicate
NOZZLE I.D. ~~.300~~ .195
ASSUMED MOISTURE, % 6%
SAMPLE BOX NUMBER Nutech #4
METER BOX NUMBER
METER $\Delta H_@$ ~~2.0~~ 1.92
C FACTOR 1.09
PITOT TUBE FACTOR .84
REFERENCE Δp 1.3
NOTE LCI =
LCF = .

READ AND RECORD ALL DATA EVERY 4 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 8:23	480.308							
X 1	4	482.5	.68	.94		161	96		4.0
	8	484.9	.68	.94		162	96		4.0
2	12	487.1	.85	1.2		170	97		5.0
	16	489.8	.87	1.22		172	97		5.0
3	20	491.9	.85	1.2		172	100		5.0
	24	494.3	.86	1.21		171	100		5.0
4	28	496.8	.79	1.09		169	101		5.0
	32	499.099	.79	1.09		167	102		5.0
	0								
Y 1	4	501.3	.68	.94		168	100		4.0
	8	503.5	.67	.93		169	100		4.0
2	12	505.8	.90	1.25		171	101		5.0
	16	508.3	.90	1.25		171	102		5.0
3	20	510.9	.90	1.25		171	104		5.0
	24	513.2	.89	1.2		171	104		5.0
4	28	515.6	.75	1.05		170	105		4.0
	32	517.929	.77	1.08		171	105		4.0
	1100								
		37.621	.894188						
		″	″			169.125			
				1.115		″	100.625		
				″			″		

0.894188	Γ△F
1.115	△H
169.13	TS
100.63	TM
37.621	VMA
29.77	PBAR
67.	WWC
8.2	WSG
28.901	MWD
3.07648	AS
64.	TT
0.61	STAT
0.195	DN
0.99	Y
0.84	CP
75.2	TH2O
34.99720012	VMS
3.54032	VWS
9.186683494	%M
.9081331651	MD
27.89955963	MWS
29.81485294	PS
55.84427126	VACT
10308.22702	QACT
42.41225137	VSTD
7828.826585	QSTD
103.6122823	%I
0.0093	FHWT
0.	T WT
.0041008309	FHGR
.2751821745	FHLB
0.	T GR
0.	T LB

DRY MOLECULAR WEIGHT DETERMINATION

PLANT U.S. Gypsum
DATE 6-6-80
SAMPLING TIME (24-hr CLOCK)
SAMPLING LOCATION Rock Dryer Outlet
SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS)
ANALYTICAL METHOD Orsat
AMBIENT TEMPERATURE 80°F
OPERATOR Mzeter

COMMENTS: Run #2 Rock Dryer Outlet

GAS \ RUN	1		2		3		AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M_d, lb/lb-mole
	ACTUAL READING	NET	ACTUAL READING	NET	ACTUAL READING	NET			
CO_2	1.2	1.2	.9	.9	1.2	1.2	1.1	44/100	0.484
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	19.6	18.4	18.5	18.6	19.6	18.4	18.133	32/100	5.803
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)	19.6	0.0	18.5	0.0	19.6	0.0	0.0	28/100	0.0
N_2 (NET IS 100 MINUS ACTUAL CO READING)		80.4		81.5		80.4	80.767	28/100	22.615
								TOTAL	28.901

FIELD DATA

PLANT U.S. Gypsum
DATE 6-6-80
SAMPLING LOCATION Rock Dryer Outlet
SAMPLE TYPE Particulate
RUN NUMBER 3
OPERATOR Meeter
AMBIENT TEMPERATURE 70°F
BAROMETRIC PRESSURE 29.77
STATIC PRESSURE, (P_s) -.57
FILTER NUMBER (s) 7-1019

PROBE LENGTH AND TYPE 3' Borosilicate
NOZZLE I.D. ~~.300~~ .195
ASSUMED MOISTURE, % 6%
SAMPLE BOX NUMBER Nutech #4
METER BOX NUMBER
METER $\Delta H_@$ 1.97 1.09
C FACTOR
PITOT TUBE FACTOR .84
REFERENCE Δp 1.3
NOTE LCF = .0
LCF = .0

READ AND RECORD ALL DATA EVERY 4 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 DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\,out}$), °F	PUM VACU in.
	1150 / 0	578.301							
Y 1	4	520.4	.65	.91		172	107		4.(
	8	522.9	.65	.91		172	107		4.(
2	12	525.1	.86	1.2		174	108		4.
	16	527.7	.86	1.2		174	108		5.(
3	20	529.9	.84	1.18		174	108		5.
	24	532.6	.83	1.15		174	109		5.(
4	28	535.1	.65	.91		174	109		5.(
	32	536.882	.65	.91		174	109		5.(
0									
Y 1	4	539.1	.64	.89		171	108		4.(
	8	541.5	.63	.88		174	108		4.(
2	12	543.8	.88	1.23		176	109		5.(
	16	546.7	.88	1.23		176	110		5.(
3	20	549.5	.79	1.1		176	110		4.(
	24	552.0	.79	1.1		176	110		4.(
4	28	553.9	.66	.915		175	111		4.(
	32	556.988	.67	.920		175	111		4.(
	Bll								
		38.687	.861603				108.875		
		"	"			174.1875	"		
		"		1.039687		"			
				"					

0.861603	ΔP
1.0397	ΔH
174.19	TS
108.88	TM
38.687	VMA
29.77	PBAR
72.	VWC
6.1	WSG
28.916	MWD
3.07648	AS
64.	TT
0.57	STAT
0.195	DN
0.99	Y
0.84	CP
78.1	TH2O
35.46035911	VMS
3.676655	VWS
9.394316567	%M
.9060568343	MD
27.8905164	MWS
29.81191176	PS
54.03663657	VACT
9974.5579	QACT
40.6148705	VSTD
7497.050208	QSTD
109.629472	%I
0.0122	FHWT
0.	T WT
.0053093202	FHGR
.3411780621	FHLB
0.	T GR
0.	T LB

DRY MOLECULAR WEIGHT DETERMINATION

PLANT U.S. Gypsum - EPA
DATE 6-5-80
SAMPLING TIME (24-hr CLOCK)
SAMPLING LOCATION Rock Dryer Outlet
SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS)
ANALYTICAL METHOD Orsat
AMBIENT TEMPERATURE
OPERATOR Meeter

COMMENTS:

Run #3

RUN / GAS	1		2		3		AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M_d, lb/lb-mole
	ACTUAL READING	NET	ACTUAL READING	NET	ACTUAL READING	NET			
CO_2	1.2	1.2	1.4	1.4	1.0	1.0	1.2	44/100	.528
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	19.4	18.2	19.3	18.9	19.2	18.2	18.1	32/100	5.792
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)	19.4	0.0	19.3	0.0	19.2	0.0	0.0	28/100	0.0
N_2 (NET IS 100 MINUS ACTUAL CO READING)		80.6		80.7		80.8	80.7	28/100	22.596
								TOTAL	28.916

FIELD DATA

EPA

PLANT U.S. Gypsum Shoal, Ind
DATE 6-3-80
SAMPLING LOCATION Rock Dryer Outlet
SAMPLE TYPE Particulate Size
RUN NUMBER 1
OPERATOR FRYE
AMBIENT TEMPERATURE 75°F
BAROMETRIC PRESSURE ~~29.63~~ 29.67
STATIC PRESSURE, (P_s) +.63
FILTER NUMBER (s) 11E

PROBE LENGTH AND TYPE N/A
NOZZLE I.D. .230
ASSUMED MOISTURE, % 6 9
SAMPLE BOX NUMBER 2
METER BOX NUMBER 1227
METER $\Delta H_@$ 2.02
C FACTOR 1.09
PITOT TUBE FACTOR N/A
REFERENCE Δp 1.3
NOTE Leak Check <.065

READ AND RECORD ALL DATA EVERY 5 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 DESIRED	ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
	0	17:45	180.306									
X 2	5		183.4	.81	1.15	1.15	185	101	90	1		75
	10		186.4				187	105	92	1		
	15		189.5				187	108	94	1		
	20		192.6				189	110	94	1		
	25	18:20	195.705				~~184~~	~~110~~	~~94~~	~~1~~		
	30		198.8				189	110	95	1		
	35		201.7				183	110	99	1		
	40		204.7				183	112	102	1		76
	45		207.7				193	116	103	1		
	50		210.7				193	116	104	1		
	55		213.7				193	117	104	1		
	60	18:00	216.701				182	117	105	1		
							183	115	106	1		77
Y 2	5		219.7									77
	10		222.7				192	119	106	1		
	15		225.7				192	130	107	1		
	20		228.7				192	130	107	1		
	25		231.8				192	131	107	1		78
	30		234.8				193	131	107	1		
	35		237.9				192	120	106	1		
	40		240.9				192	130	106	1		
	45		243.9				192	120	106	1		
	50		246.9				192	119	106	1		
	55		249.9	↓	↓	↓	192	119	106	1		77
	60		252.966				192	120	106	1		

72.660 .81 1.5 1.5 183.7 107/16 106.5

SUMMARY
RECORD OF VISIBLE EMISSIONS

Type of Plant Wall Board Date 6-5-80

Company Name US Gypsum Hours of Observation 1800 - 1929

Plant Address Shoal, Ind Observer Nancy E Roberts

Type of Discharge (STACK) OTHER _____

Discharge Location Rock Dryer

Height of Point of Discharge 2nd level plus ~20'

Observer's Location:

Distance to Discharge Point ~15'

Height of Observation Point 10' below stack

Direction from Discharge Point west

Background Description gray building

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

Wind Direction W Wind Velocity 3-5 mi/hr

Plume Description:

Detached: (Yes) No

Color: Black (White) Other _____

Plume Dispersion Behavior: Looping Coning (Fanning)

Lofting Fumigating Other _____

Estimated Distance Plume Visible ~3'-5'

Run 1

RECORD OF VISIBLE EMISSIONS

Company Name US Gypsum
Plant Address Shoal Ind
Stack Location Rock Dryer
Weather Conditions overcast-slight rain

Date 6-5-80
Observer Nancy E Robertson
Observer's Location ~15' west of stack

HR	MIN	TIME SECONDS 00	15	30	45
	00				
	01				
	02				
	03				
	04				
	05				
	06				
	07				
	08				
	09				
start 18	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	5	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

COMMENTS
Run 1

1810 - 1820
$\frac{5}{40} = .125 = 0.1$

1820 - 1830
$\frac{0}{40} = 0$

RECORD OF VISIBLE EMISSIONS

Company Name US Gypsum
Plant Address Shoals, Ind
Stack Location Rock Dryer
Weather Conditions overcast, slight rain

Date 6-5-80
Observer Nancy E. Robertson
Observer's Location ~15' West of stack

HR	MIN	TIME SECONDS 00	15	30	45	COMMENTS
8	30	0	0	0	0	Plant Start
	31	0	0	0	0	1830 - 1840
	32	0	0	0	0	5/40 = .125 = 0.1
	33	0	0	0	0	
	34	0	0	0	0	
	35	5	0	0	0	
	36	0	0	0	0	
	37	0	0	0	0	
	38	0	0	0	0	
	39	0	0	0	0	1840 - 1850
	40	0	0	0	0	0/40 = 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	1850 - 1900
	50	0	0	0	0	0/40 = 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: US Gypsum
Plant Address: Shoal, Ind
Stack Location: overcast slight rain
Weather Conditions: Rock Dust

Date: 6-5-80
Observer: Nancy E Robertson
Observer's Location: ~15' West of Stack

HR	MIN	TIME SECONDS 00	15	30	45	COMMENTS
						Run 1
19	00	0	6	0	0	1900 - 1910
	01	0	0	0	0	0/40 = 0
	02	0	0	6	0	
	03	0	0	0	0	
	04	6	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	1910 - 1920
	10	0	0	0	0	5/40 = .125 ≈ 0.1
	11	0	0	0	0	
	12	5	5	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	1920 - 1930
	20	0	0	0	0	0/40 = 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	
19	29	0	0	0	0	

end test

SUMMARY
RECORD OF VISIBLE EMISSIONS

Type of Plant Wall Board Date 6-6-80

Company Name US Gypsum Hours of Observation ~1 hr 20 min

Plant Address Shoal, Ind Observer Nancy E Robertson

Type of Discharge (STACK) OTHER _____

Discharge Location Rock Dryer

Height of Point of Discharge 2nd level plus ~20'

Observer's Location:

Distance to Discharge Point ~15'

Height of Observation Point ~10' below stack

Direction from Discharge Point west

Background Description gray building

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

Wind Direction W Wind Velocity 3-5 mi/hr

Plume Description:

Detached: Yes No

Color: Black (White) Other _____

Plume Dispersion Behavior: Looping Coning Fanning

Lofting Fumigating Other _____

Estimated Distance Plume Visible ~3'-5'

Run 2 + 3

RECORD OF VISIBLE EMISSIONS

Company Name US Gypsum
Plant Address Shoal, Ind
Stack Location Rock Dryer
Weather Conditions Cloudy

Date 6-6-80
Observer Nancy E Robertson
Observer's Location ~15' W of stack

HR	MIN	TIME SECONDS 00	15	30	45
start test 09	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	5	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	5	0
	57	0	0	0	0
	58	0	0	0	0
	59	0	0	0	0

COMMENTS

Run 2

0930 - 0940

$\frac{0}{40} = 0$

0940 - 0950

$\frac{5}{40} = .125 \cong 0.1$

0950 - 1000

$\frac{5}{40} = .125 \cong 0.1$

RECORD OF VISIBLE EMISSIONS

Company Name: US Gypsum
Plant Address: Shoal, Ind
Stack Location: Back Dryer
Weather Conditions: cloudy
Date: 6-6-80
Observer: Nancy E Roberts
Observer's Location: ~15' W of Stack

HR	MIN	TIME SECONDS 00	15	30	45
10	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	5	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

COMMENTS

Run 2

1000 - 1010

$\frac{5}{40} = .125 \cong 0.1$

1010 - 1020

$\frac{0}{40} = 0$

1020 - 1030

$\frac{0}{40} = 0$

RECORD OF VISIBLE EMISSIONS

Company Name US Gypsum
Plant Address Shoal, 2nd
Stack Location Back Dryer
Weather Conditions cloudy

Date 6-6-80
Observer Nancy E Robertson
Observer's Location ~15' w of stack

TIME HR	MIN	SECONDS 00	15	30	45
10	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	5	0	0
10	54	0	0	0	0
	55				
	56				
	57				
	58				
	59				

COMMENTS

Run 2

1030 - 1040
$\frac{0}{40} = 0$

1040 - 1050
$\frac{0}{40} = 0$

1050 - 1055
$\frac{5}{20} = .250 \approx .3$

End test

RECORD OF VISIBLE EMISSIONS

Company Name US Gypsum
Plant Address Shoals, Ind
Stack Location Rock Dryer
Weather Conditions cloudy, sprinkles
Date 6-6-80
Observer Nancy E Roberts
Observer's Location ~15' w of stack

TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS
						Run 3
	30					
	31					
	32					
	33					
	34					
	35					
	36					
	37					
	38					
	39					
	40					
	41					
	42					
	43					
	44					
	45					
	46					
	47					
	48					
	49					
start Test 11	50	0	0	0	0	1150 - 1200
	51	0	0	0	0	0 - 0
	52	0	0	0	0	40
	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 US Gypsum
Plant Address Shoals, Ind
Stack Location Rock Dryer
Weather Conditions cloudy, sprinkles

Date 6-6-80
Observer Nancy E Roberton
Observer's Location ~15' W of Stack

HR	MIN	TIME SECONDS 00	15	30	45
12	00	0	0	0	0
	01	0	0	0	0
	02	0	0	0	0
	03	0	0	0	0
	04	5	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	5	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	5	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

COMMENTS

Run 3

1200 - 1210

$\frac{5}{40} = .125 \equiv 0.1$

1210 - 1220

$\frac{5}{40} = .125 \equiv 0.1$

1220 - 1230

$\frac{0}{40} = 0$

RECORD OF VISIBLE EMISSIONS

Company Name: US Gypsum
Plant Address: Shoals, Ind
Stack Location: Rock Dryer
Weather Conditions: cloudy

Date: 6-6-80
Observer: Nancy E Robertson
Observer's Location: ~15' W of stack

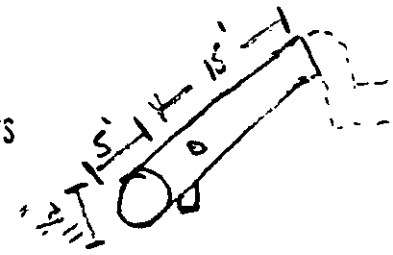
TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS
						Run 3
12	30	0	0	0	0	1230-1240
	31	0	0	0	0	10/40 = .25 = 0.3
	32	0	0	0	0	
	33	0	0	0	0	
	34	0	0	0	0	
	35	0	0	0	0	
	36	0	0	0	0	
	37	5	0	0	5	
	38	0	0	0	0	
	39	0	0	0	0	1240-1250
	40	0	0	0	0	0/40 = 0
	41	0	0	0	0	
	42	0	0	0	0	
	43	0	0	0	0	
	44	0	0	0	0	
	45	0	0	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	1250-1300
	51	0	0	0	0	0/40 = 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: US Gypsum
Plant Address: Shoals, Ind
Stack Location: Rock Dryer
Weather Conditions: cloudy
Date: 6-6-80
Observer: Nancy E. Roberts
Observer's Location: ~15' W of stack

HR	MIN	TIME SECONDS 00	15	30	45	COMMENTS
						Run 3
13	00	0	0	0	0	1300 - 1310
	01	0	0	0	0	$\frac{0}{40} = 0$
	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	1310 - 1320
	10	0	0	0	0	$\frac{5}{40} = .125 \simeq 0.1$
	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	5	0	0	
	17	0	0	0	0	
	18	0	0	0	0	
	19	0	0	0	0	
End Test 13	20					
	21					
	22					
	23					
	24					
	25					
	26					
	27					
	28					
	29					

TRAVERSE POINT LOCATION FOR CIRCULAR DUCTS



PLANT U.S. Gypsum
DATE 6/5/80
SAMPLING LOCATION Board Fab. Shop/E B. H. Outlet
INSIDE OF FAR WALL TO OUTSIDE OF PORT. (DISTANCE A) 14 1/2"
INSIDE OF NEAR WALL TO OUTSIDE OF PORT. (DISTANCE B) 3"
STACK I.D.. (DISTANCE A - DISTANCE B) 11 1/2"
NEAREST UPSTREAM DISTURBANCE ~ 15'
NEAREST DOWNSTREAM DISTURBANCE ~ 5'
CALCULATOR Kalsta

$A = \frac{\pi}{144} r^2 = \frac{\pi}{144}\left(\frac{11.5}{2}\right)^2 = .7213$

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)
1	.067	11 1/2"	3/4"	3"	3 3/4"
2	.250	|	2 7/8"	|	5 7/8
3	.750	|	8 5/8	|	11 5/8
4	.933	|	10 3/4	|	13 3/4

PRELIMINARY VELOCITY TRAVERSE

PLANT U.S Gypsum - EPA
DATE 6-5-86
LOCATION Board End Sawing Outlet
STACK I.D. 11 3/4"
BAROMETRIC PRESSURE, in. Hg 29.97
STACK GAUGE PRESSURE, in. H_2O .64
OPERATORS Meeter / Ralston
Ambient Temp. 78°F

TRAVERSE POINT NUMBER	VELOCITY HEAD (Δp_s), in. H_2O	STACK TEMPERATURE (T_s), °F
X 1	2.0	86
2	2.4	86
3	2.6	86
4	2.4	86
	$\overline{\Delta p_s}$ = 2.1	
	$\Delta p_{s\ MAX}$ = 2.6	
	T_s = 84.75	
AVERAGE		

SCHEMATIC OF TRAVERSE POINT LAYOUT

TRAVERSE POINT NUMBER	VELOCITY HEAD (Δp_s), in. H_2O	STACK TEMPERATURE (T_s), °F
4 1	2.1	84
2	2.0	84
3	1.9	83
4	1.5	83
AVERAGE		

NOMOGRAPH DATA

PLANT U.S. Gypsum

DATE 6-5-86

SAMPLING LOCATION Board End Sawing Outlet

CONTROL BOX NO. 1225

CALIBRATED PRESSURE DIFFERENTIAL ACROSS ORIFICE. in. H_2O	$\Delta H_@$	2.023
AVERAGE METER TEMPERATURE (AMBIENT + 20 °F). °F	$T_{m_{avg.}}$	100
PERCENT MOISTURE IN GAS STREAM BY VOLUME	B_{wo}	1%
BAROMETRIC PRESSURE AT METER. in Hg	P_m	29.97
STATIC PRESSURE IN STACK. in. Hg ($P_m \pm 0.073$ x STACK GAUGE PRESSURE in in. H_2O)	P_s	.64 in H_2O
RATIO OF STATIC PRESSURE TO METER PRESSURE	P_s/P_m	1.00
AVERAGE STACK TEMPERATURE. °F	$T_{s_{avg.}}$	85
AVERAGE VELOCITY HEAD. in. H_2O	$\Delta p_{avg.}$	2.1
MAXIMUM VELOCITY HEAD. in. H_2O	$\Delta p_{max.}$	2.6
C FACTOR	1.24	
CALCULATED NOZZLE DIAMETER. in.	.160	
ACTUAL NOZZLE DIAMETER. in.	.171	
REFERENCE Δp. in. H_2O	1.6	

FIELD DATA

PLANT U.S Gypsum
DATE 6-5-00
SAMPLING LOCATION Board Feed
SAMPLE TYPE Particulate
RUN NUMBER 1
OPERATOR Meeter
AMBIENT TEMPERATURE 90°F
BAROMETRIC PRESSURE 29.97
STATIC PRESSURE, (P_s) -.69
FILTER NUMBER (s)

PROBE LENGTH AND TYPE 3' Borosilicate
NOZZLE I.D. .171
ASSUMED MOISTURE, % 1%
SAMPLE BOX NUMBER 1225
METER BOX NUMBER
METER $\Delta H_@$ 2.02
C FACTOR 1.24
PITOT TUBE FACTOR .8
REFERENCE Δp 1.6
NOTE LCF =
LCF =

READ AND RECORD ALL DATA EVERY 4 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 DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\,out}$), °F	PUM VACU in. H
	0 1215	799.258							
Y 1	4	802.5	2.2	2.5		92	94	94	1.6
	8	806.1	2.1	2.45		91	98	94	1.6
2	12	809.5	2.4	2.75		90	104	94	1.6
	16	812.7	2.2	2.5		92	108	94	1.6
3	20	815.6	2.2	2.5		91	110	94	1.6
	24	820.3	2.25	2.55		92	112	96	1.6
4	28	823.1	1.5	1.7		92	110	96	1.6
	32	825.839	1.5	1.7		91	111	97	1.6
	0								
X 1	4	829.3	2.2	2.5		91	102	97	1.6
	8	831.7	2.1	2.45		93	107	98	1.6
2	12	835.9	2.0	2.3		92	110	100	1.6
	16	839.4	2.7	3.0		92	114	100	1.6
3	20	843.1	2.6	3.0		92	116	100	1.6
	24	846.6	2.2	2.5		91	120	100	1.6
4	28	849.7	1.7	1.95		95	120	101	1.6
	32	852.946	1.9	2.25		92	118	102	1.6
	1329	53.688		2.425		91.81		97.31	
			1.4478				109.62		
								103.465	

1.4478	ΔP
2.425	ΔH
91.81	TS
103.465	TM
53.688	VMA
29.97	PBAR
12.	VWC
5.	WSG
28.97	MWD
0.72131	AS
64.	TT
0.64	STAT
0.171	DN
0.9898	Y
0.84	CP
17.	TH2O
50.17548413	VMS
0.80059	VWS
1.5705211	%M
0.984294789	MD
28.79771384	MWS
30.01705882	PS
83.06821622	VACT
3595.076103	QACT
78.48913194	VSTD
3396.899746	QSTD
104.3826489	%I
0.0074	FHWT
0.	T WT
.0022759481	FHGR
.0662669306	FHLB
0.	T GR
0.	T LB

FIELD DATA

PLANT U.S Gypsum
DATE 6/5/18
SAMPLING LOCATION Baghouse Outlet
SAMPLE TYPE Particulate
RUN NUMBER 2
OPERATOR Ralston
AMBIENT TEMPERATURE 80
BAROMETRIC PRESSURE 29.97
STATIC PRESSURE, (P_s) -1.54
FILTER NUMBER (s) 27007

PROBE LENGTH AND TYPE 3' borosilicate
NOZZLE I.D. .171
ASSUMED MOISTURE, % 19%
SAMPLE BOX NUMBER
METER BOX NUMBER 1225
METER $\Delta H_@$ 2.023
C FACTOR 1.24
PITOT TUBE FACTOR
REFERENCE Δp 1.6
NOTE $\frac{\Sigma C_p}{\Sigma C_{FS}} =$

READ AND RECORD ALL DATA EVERY 4 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	
	1418	854.318							
X 1	4	857.4	1.8	2.05		97	101	99	4
	8	860.8	2.5	2.85		97	109	100	7
2	12	864.4	2.4	2.75		95	112	100	7
	16	867.8	2.4	2.75		96	116	100	7
3	20	871.2	1.8	2.05		96	119	101	5
	24	874.5	2.1	2.40		97	119	102	6
4	28	877.8	1.9	2.20		93	117	101	5
	32	880.961	1.9	2.20		94	117	101	5
0	0	880.963							
1 1	4	884.3	2.1	2.40		97	111	100	5
	8	887.9	2.6	2.95		95	116	100	8
2	12	891.5	2.4	2.75		94	113	100	7
	16	895.0	2.1	2.40		93	115	100	6
3	20	899.2	1.6	1.85		94	117	100	4
	24	902.8	1.6	1.85		93	115	100	4
4	28	903.8	1.6	1.85		93	115	101	4
	32	906.694	1.5	1.75		92	113	100	4
	1529								
Stop Time =			1.4155	2.315		94.56	100.31		
$\Delta H_@$ =		52.376					114.37		
							107.34		

1.4155	$\Gamma_@P$
2.315	$_@H$
94.56	TS
107.34	TM
52.376	VMA
29.97	PBAR
-1.	VWC
18.6	WSG
28.97	MWD
0.72131	AS
64.	TT
0.59	STAT
0.171	DN
0.9898	Y
0.84	CP
17.6	TH2O
48.60194898	VMS
0.82992	VWS
1.678916895	%M
0.983210831	MD
28.78582282	MWS
30.01338235	PS
31.43891012	VACT
8524.562016	QACT
76.47436731	VSTD
8309.703553	QSTD
103.7729256	%I
0.0219	FHWT
0.	T WT
.0069536471	FHGR
.1972665745	FHLB
0.	T GR
0.	T LB

FIELD DATA

PLANT U.S. Gypsum - EPA
DATE Oct-5-88
SAMPLING LOCATION Board End Sawing
SAMPLE TYPE Particulate
RUN NUMBER 3
OPERATOR Meeter
AMBIENT TEMPERATURE 80°F
BAROMETRIC PRESSURE
STATIC PRESSURE, (P_s) -.63
FILTER NUMBER (s)

PROBE LENGTH AND TYPE 3' Glass
NOZZLE I.D. .171
ASSUMED MOISTURE, % 17
SAMPLE BOX NUMBER 1225
METER BOX NUMBER
METER $\Delta H_@$ 2.02
C FACTOR 1.24
PITOT TUBE FACTOR
REFERENCE Δp 1.6
NOTE 4CF .01

READ AND RECORD ALL DATA EVERY 4 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 DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\ in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\ out}$), °F	PUMP VACUU in. Hg
	0 / 1545	906.879							
Y 1	4	910.7	2.7	3.0		94	97	98	6.0
	8	914.3	2.6	2.95		93	106	98	7.0
2	12	918.1	2.6	2.95		93	114	98	7.0
	16	921.7	2.5	2.85		92	116	98	7.0
3	20	925.1	2.2	2.5		92	117	98	7.0
	24	929.3	2.2	2.5		90	115	98	7.0
4	28	932.1	1.1	1.25		90	114	98	1.0
	32	933.840	1.3	1.5		90	114	98	2.0
	0								
X 1	4	937.5	2.5	2.95		88	107	98	7.0
	8	940.9	2.1	2.4		89	113	98	5.0
2	12	944.	2.6	2.95		89	115	98	5.2
	16	948.2	2.6	2.95		87	118	100	5.0
3	20	951.9	2.1	2.4		88	119	100	5.0
	24	955.2	1.9	2.2		89	119	101	4.0
4	28	958.6	2.7	3.1		88	120	101	7.0
	32	962.957	2.9	3.35		87	120	101	9.0
	1707	55.078	1.5021	2.4875		89.94	99.56		

1.5021	ΓΔP
2.4875	ΔH
89.94	TS
99.56	TM
55.078	VMA
29.97	PBAR
3.	VWC
13.1	WSG
28.97	MWD
0.72131	AS
64.	TT
0.63	STAT
0.171	DN
0.9898	Y
0.84	CP
16.1	TH2O
51.84167037	VMS
0.758875	VWS
1.442713178	%M
.9855728682	MD
28.81173436	MWS
30.01632353	PS
86.01766596	VACT
3722.724158	QACT
81.65625678	VSTD
3533.968475	QSTD
103.6658676	%I
0.0341	FHWT
0.	T WT
.0101507377	FHGR
.3074765794	FHLB
0.	T GR
0.	T LB

FIELD DATA

PLANT U.S. Gypsum
DATE 6-5-80
SAMPLING LOCATION Board End Sawing Outlet
SAMPLE TYPE Particle Size
RUN NUMBER 1
OPERATOR FRYE
AMBIENT TEMPERATURE 75
BAROMETRIC PRESSURE 29.97
STATIC PRESSURE, (P_s)
FILTER NUMBER (s) ~~#1 thru 9~~ 10

PROBE LENGTH AND TYPE N/A
NOZZLE I.D. .171
ASSUMED MOISTURE, % 1.5
SAMPLE BOX NUMBER N/A
METER BOX NUMBER 1225
METER $\Delta H_@$ 2.02
C FACTOR 1.24
PITOT TUBE FACTOR —
REFERENCE Δp 1.6
NOTE leak check I-.011
leak chck F-.010

$\gamma = .9898$

Tare = 85
ΔH = 2.4 in H_2O , 2.1

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		PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
				DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F			
	0	966.908									
X 1	5	971.0	2.1	2.4	2.4	85	107	99	3	N/A	75
	10	975.2				85	114	100	3		75
	15	979.4				85	121	101	3		75
	20	983.6				85	124	102	3		75
	25	987.8				85	128	104	3		75
	30	991.9				85	128	104	3		75
	35	996.0				85	127	105	3		75
	40	1000.1				85	127	105	3		75
	45	1004.6				85	127	105	3		75
	50	1008.8				85	127	105	3		75
	55	1013.0				85	125	106	3		75
	60	1017.2				85	124	106	3		75
						~~85~~	~~124~~	106	3		75
	5	1021.4				85	124	106	3		75
	10	1025.6				85	124	106	3		75
	15	1029.0				85	124	106	3		75
	20	1033.2				85	122	106	3		75
	25	1037.6				85	122	106	3		75
	30	1042.0				85	120	105	3		75
	35	1046.4				85	117	104	3		75
	40	1050.8				85	118	102	3		75
	45	1055.2				85	118	102	3		75
	50	1059.4				85	118	102	3		75
	55	1063.5				85	118	102	3		75
	60	1067.640				85	118	102	3		75
							121.75	103.79			

2.1 2.4

A-75

SUMMARY
RECORD OF VISIBLE EMISSIONS

Type of Plant Dry Wall
Date 6-5-80
Company Name US Gypsum
Hours of Observation ~ 1 hr 10 min
Plant Address Shoals, Ind
Observer Nancy E. Roberson
Type of Discharge (STACK) OTHER _____
Discharge Location Board End Saw
Height of Point of Discharge 2nd level
Observer's Location:
Distance to Discharge Point ~90'
Height of Observation Point same level
Direction from Discharge Point NE
Background Description forest (green trees)
Weather: (Clear) Overcast Partly Cloudy Other _____ Sky Color _____
Wind Direction W Wind Velocity 3 mi/hr
Plume Description:
Detached: (Yes) No
Color: Black (White) Other _____
Plume Dispersion Behavior: Looping Coning Fanning
Lofting Fumigating Other Horizontal discharge
Estimated Distance Plume Visible ~5'-10'

Run 1, 2 & 3

RECORD OF VISIBLE EMISSIONS

Company Name US Gypsum
Plant Address Shoal End
Stack Location Board End Saw
Weather Conditions Clear

Date 6-5-80
Observer Nancy E Robertson
Observer's Location ~90' NE of stack

HR	MIN	TIME SECONDS 00	15	30	45
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

COMMENTS

Run 1

1200 - 1210

$\frac{0}{40} = 0$

1210 - 1220

$\frac{0}{40} = 0$

1220 - 1230

$\frac{0}{40} = 0$

RECORD OF VISIBLE EMISSIONS

Company Name US Gypsum
Plant Address Shoals, Ind
Stack Location Board End Saw
Weather Conditions Clear

Date 6-5-80
Observer Nancy E Robertson
Observer's Location ~90° NE of stack

TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS
						Run 1
12	30	0	0	0	0	1230 - 1240
	31	0	0	0	0	20 = .5
	32	0	0	0	0	40
	33	0	0	0	0	
	34	5	10	5	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	1240 - 1250
	40	0	0	0	0	0 - 0
	41	0	0	0	0	40
	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	1250 - 1300
	50	0	0	0	0	20 - .5
	51	0	0	0	0	40
	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	5	5	0	10	
	58	0	0	0	0	
	59	0	0	0	0	

RECORD OF VISIBLE EMISSIONS

Company Name US Gypsum
Plant Address Shoal Creek
Stack Location Board End Saw
Weather Conditions clear

Date 6-5-80
Observer Doug & Roberta
Observer's Location ~90' NE of stack

HR	MIN	SECONDS 00	15	30	45
13	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	5	5	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	5	5	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	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	0	0	0	0
	27	0	0	0	0
	28	0	0	0	0
end Run 1	29	0	0	0	0

COMMENTS

Run 1

1300 - 1310

$\frac{10}{40} = .25 = 0.3$

1310 - 1320

$\frac{10}{40} = .25 = 0.3$

1320 - 1330

$\frac{115}{40} = 2.875 = 2.9$

RECORD OF VISIBLE EMISSIONS

Company Name US Gypsum
Plant Address Shoal Ind
Stack Location Board End Saw
Weather Conditions clear

Date 6-5-80
Observer Nancy E Robertson
Observer's Location ~90' NE of Stack

HR	MIN	TIME SECONDS 00	15	30	45	COMMENTS
						Run 2
	00					
	01					
	02					
	03					
	04					
	05					
	06					
	07					
	08					
	09					
start 14	10	0	0	0	0	1410 - 1420
	11	5	5	5	5	30/40 = .75 ≈ 0.8
	12	0	0	5	5	
	13	0	0	0	0	
	14	0	0	0	0	
	15	0	0	0	0	
	16	0	0	0	0	
	17	0	0	0	0	
	18	0	0	0	0	
	19	0	0	0	0	1420 - 1430
	20	0	0	0	0	45/40 = 1.125 ≈ 1.1
	21	0	0	0	0	
	22	0	0	0	0	
	23	0	5	5	5	
	24	5	5	5	5	
	25	5	5	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 US Gypsum
Plant Address Shoals, Ind
Stack Location Board End Saw
Weather Conditions clear

Date 6-5-80
Observer Nancy E Robertson
Observer's Location ~90' NE of Stack

HR	MIN	TIME SECONDS 00	15	30	45
14	30	0	0	0	0
	31	0	0	0	0
	32	0	0	0	5
	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	5	5	0	0
	39	0	0	0	0
	40	5	5	10	5
	41	5	5	5	5
	42	5	5	5	5
	43	5	5	0	0
	44	5	5	5	0
	45	5	5	5	5
	46	5	5	0	0
	47	0	5	5	5
	48	0	5	0	0
	49	0	0	0	0
	50	0	0	0	0
	51	0	0	0	0
	52	5	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

COMMENTS

Run 2

1430 - 1440

$\frac{15}{40} = .375 \rightarrow 0.4$

1440 - 1450

$\frac{140}{40} = 3.5$

1450 - 1500

$\frac{5}{40} = .125 \rightarrow 0.1$

RECORD OF VISIBLE EMISSIONS

Company Name US Gypsum
Plant Address Shoals, Ind
Stack Location Board End Saw
Weather Conditions clear

Date 6-5-80
Observer Nancy E Robertson
Observer's Location ~90' NE of Stack

HR	MIN	TIME SECONDS 00	15	30	45
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	5	5	5	0
	10	0	0	5	5
	11	0	0	0	0
	12	0	0	5	5
	13	5	5	5	5
	14	5	5	5	5
	15	5	5	5	0
	16	5	5	5	5
	17	5	5	5	5
	18	5	5	10	5
stop 15	19	5	5	5	5
	20				
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				

COMMENTS

Run 2

1500 - 1510

$\frac{15}{40}$ .375 ≈ 0.4

1510 - 1520

$\frac{160}{40}$ = 4.0

RECORD OF VISIBLE EMISSIONS

Company Name: US Gypsum
Plant Address: Shoal 2nd
Stack Location: board saw
Weather Conditions: clear

Date: 6-5-80
Observer: Norman E Roberts
Observer's Location: ~90° NE of stack

HR	MIN	SECONDS 00	15	30	45	COMMENTS
start 14	00	0	0	0	0	Run 3
	01	0	0	0	0	1600 - 1610
	02	0	0	0	0	120/40 = 3.0
	03	0	0	0	0	
	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	1610 - 1620
	10	0	0	0	0	30/40 = .75 ≅ 0.8
	11	0	0	0	0	
	12	0	0	0	10	
	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	5	5	5	5	1620 - 1630
	20	5	5	0	0	65/40 = 1.625 ≅ 1.6
	21	0	0	0	0	
	22	0	0	0	0	
	23	0	0	5	5	
	24	0	0	5	5	
	25	5	5	5	5	
	26	5	5	5	0	
	27	0	0	0	0	
	28	0	0	0	0	
	29	0	0	0	0	

RECORD OF VISIBLE EMISSIONS

Company Name US Gypsum
Plant Address Shoal 2nd
Stack Location Board End Saw
Weather Conditions clear

Date 6-5-80
Observer Nancy E Robertson
Observer's Location ~90' NE of stack

TIME HR	MIN	SECONDS 00	15	30	45
16	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	5	0	0
	36	5	5	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	5	5	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	10	0	0	0
	49	0	0	0	0
	50	10	0	0	0
	51	0	0	5	5
	52	5	5	5	5
	53	5	5	5	5
	54	5	5	5	5
	55	5	0	0	0
	56	0	0	0	0
	57	0	0	0	0
	58	5	5	5	0
	59	0	0	0	0

COMMENTS

Run 3

1630 - 1640

$\frac{15}{40} = .375 \approx 0.4$

1640 - 1650

$\frac{20}{40} = 0.5$

1650 - 1700

$\frac{100}{40} = 2.5$

RECORD OF VISIBLE EMISSIONS

Company Name US Gypsum
Plant Address Shoals, Ind
Stack Location Board End Saw
Weather Conditions Clear

Date 6-5-80
Observer Nancy E Robertson
Observer's Location ~90° SE of stack

HR	MIN	TIME SECONDS 00	15	30	45
17	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
End test 17	10	0	0	0	0
	11				
	12				
	13				
	14				
	15				
	16				
	17				
	18				
	19				
	20				
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				

COMMENTS

Run 3

1700 - 1710

$\frac{0}{40} = 0$

SUMMARY
RECORD OF VISIBLE EMISSIONS

Type of Plant Wall Board Date 6-3-80

Company Name US Gypsum Hours of Observation 1 hr

Plant Address Shoal, Ind Observer Nancy E Robertson

Type of Discharge (STACK) OTHER _____

Discharge Location scoring + chamfering

Height of Point of Discharge 2nd level plus 20-30'

Observer's Location:

Distance to Discharge Point ~50'

Height of Observation Point ~11' below stack

Direction from Discharge Point SE of stack

Background Description forest (Bright green trees)

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

Wind Direction _____ 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 ~5-6'

Run 1

RECORD OF VISIBLE EMISSIONS

Company Name US Gypsum — Date 6-3-80

Plant Address Shoal, Ind — Observer Nancy E Robertson

Stack Location scoring + chamfering — Observer's Location ~50' SE of stack

Weather Conditions Cloudy+overcast

TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS
start 08	30	5	5	5	5	Run 1
	31	5	10	5	10	
	32	10	10	10	10	There were 2 stacks
	33	10	5	20	20	on both sides of the stack
	34	15	20	10	10	I was reading. They were
	35	10	10	10	10	emitting dust & the wind
	36	5	5	10	10	would blow them over the
	37	10	15	15	10	path I was reading. I don't
	38	15	10	10	10	think this kindled any reading
	39	10	10	10	15	
	40	10	10	10	10	830 - 840
	41	10	15	15	10	$\frac{410}{40} = 10.25 \cong 10.3$
	42	10	10	10	10	
	43	10	10	10	15	
	44	15	20	15	15	
	45	20	10	15	10	
	46	10	10	20	15	
	47	15	15	10	15	
	48	10	15	10	15	
	49	20	20	20	15	840 - 850
	50	15	15	15	15	$\frac{530}{40} = 13.25 \cong 13.3$
	51	15	15	15	15	
	52	15	10	15	10	
	53	15	10	10	10	
	54	15	15	15	10	
	55	10	5	10	5	
	56	10	10	10	10	850 - 900
	57	10	10	10	10	$\frac{450}{40} = 11.25 \cong 11.3$
	58	10	10	5	10	
	59	10	10	5	10	

RECORD OF VISIBLE EMISSIONS

Company Name US Gypsum
Plant Address Shoal, Ind
Stack Location scoring + chamfering
Weather Conditions cloudy, overcast

Date 6-3-80
Observer Nancy E Robertson
Observer's Location ~50' SE of stack

HR	MIN	TIME SECONDS 00	15	30	45	COMMENTS
						Run 1
09	00	10	10	10	10	900-910
	01	10	10	5	10	375/40 = 9.375 ≅ 9.4
	02	10	10	5	5	
	03	10	10	10	10	
	04	10	10	10	10	
	05	5	10	5	10	
	06	10	10	10	10	
	07	10	10	10	5	
	08	10	15	10	10	
	09	10	10	10	10	910-920
	10	15	10	5	10	400/40 = 10.0
	11	10	10	10	10	
	12	10	10	10	10	
	13	10	10	10	10	
	14	15	10	10	10	
	15	10	10	10	10	
	16	10	10	10	10	
	17	10	15	10	10	
	18	10	5	10	10	
	19	5	10	10	10	920-922
	20	10	10	10	5	70/8 = 8.75 ≅ 8.8
	21	10	10	10	5	
top 09	22					
	23					
	24					
	25					
	26					
	27					
	28					
	29					

RECORD OF VISIBLE EMISSIONS

Company Name US Gypsum
Plant Address Shoal, 2nd
Stack Location scoring & Chamfering
Weather Conditions partly cloudy

Date 6-3-80
Observer Nancy E Robertson
Observer's Location ~50' SE of stack

HR	MIN	TIME SECONDS 00	15	30	45	COMMENTS
						Run 1
start 12	00	10	10	10	10	1200 - 1208
	01	15	10	10	10	$\frac{380}{36} = 10.55 \cong 10.6$
	02	10	10	10	5	
	03	5	10	5	5	
	04	10	10	10	10	
	05	10	10	10	15	
	06	15	15	15	15	
	07	15	10	10	10	
stop 12	08	10	15	10	10	
	09					
	10					
	11					
	12					
	13					
	14					
	15					
	16					
	17					
	18					
	19					
	20					
	21					
	22					
	23					
	24					
	25					
	26					
	27					
	28					
	29					

SUMMARY
RECORD OF VISIBLE EMISSIONS

Type of Plant Dry Wall Date 6-3-80

Company Name US Gypsum Hours of Observation 1 hour

Plant Address Shoal, 2nd Observer Nancy E Roberson

Type of Discharge ~~STACK~~ OTHER _____

Discharge Location coring & chamfering

Height of Point of Discharge 2nd level plus 20-30'

Observer's Location:

Distance to Discharge Point ~70' sw of stack

Height of Observation Point ~ 10' below stack

Direction from Discharge Point SW

Background Description forest (Bright green trees)

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

Wind Direction W 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 ~5-6'

Run 2 + 3

RECORD OF VISIBLE EMISSIONS

Company Name _____ Date _____

Plant Address _____ Observer _____

Stack Location Scoring + Conferring Observer's Location ~70' SW of stack

Weather Conditions _____

HR	MIN	TIME SECONDS 00	15	30	45	COMMENTS
						Run 2
	00					
	01					
	02					
	03					
	04					
	05					
	06					
	07					
	08					
	09					
	10					
	11					
	12					
	13					
	14					
ast 12	15	10	10	10	10	1215 - 1225
	16	10	10	15	15	490 - 12.0
	17	10	15	10	10	40
	18	15	15	10	10	
	19	10	10	10	10	
	20	10	10	10	10	
	21	15	10	10	10	
	22	10	15	20	15	
	23	20	15	15	15	
	24	10	15	10	10	1225 - 1235
	25	10	20	20	15	490 - 12.25 ≈ 12.3
	26	15	15	15	15	40
	27	15	10	10	10	
	28	10	10	10	15	
	29	10	5	10	10	

RECORD OF VISIBLE EMISSIONS

Company Name _____ Date _____

Plant Address _____ Observer _____

Stack Location Scoring + chamfering Observer's Location ~70' SW of stack

Weather Conditions _____

TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS
						Run 2
12	30	10	10	10	15	
	31	15	15	10	10	
	32	10	10	10	15	
	33	15	15	15	10	
	34	10	15	10	10	1235 - 1245
	35	10	15	10	10	415/40 = 10.375 ≅ 10.4
	36	15	15	10	15	
	37	10	10	10	10	
	38	10	10	10	10	
	39	10	10	10	10	
	40	10	10	10	10	
	41	10	10	10	10	
	42	10	10	10	10	
	43	10	5	10	10	
	44	10	10	10	10	1245 - 1255
	45	10	10	15	10	410/40 = 10.25 ≅ 10.3
	46	10	10	10	10	
	47	10	10	10	10	
	48	10	10	10	10	
	49	10	10	10	10	
	50	10	10	10	10	
	51	10	10	10	10	
	52	15	10	10	10	
	53	10	10	10	10	
	54	10	10	10	10	1255 - 1305
	55	15	10	10	10	470/40 = 11.75 ≅ 11.8
	56	10	10	10	10	
	57	10	10	10	15	
	58	15	15	15	15	
	59	10	10	10	10	

RECORD OF VISIBLE EMISSIONS

Company Name US Gypsum
Plant Address Shoal, Ind
Stack Location Scoring + chamfering
Weather Conditions partly cloudy

Date 6-3-80
Observer Nancy E Robertson
Observer's Location ~70' SW of stack

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

COMMENTS

Run 2

1305 - 1316

$\frac{465}{44} = 10.57 \cong 10.6$

RECORD OF VISIBLE EMISSIONS

Company Name US Gypsum
Plant Address Shoal, Ind
Stack Location Scoring & Chamfering
Weather Conditions clear skys

Date 6-3-80
Observer Nancy E Robertson
Observer's Location ~70' SW of stack

TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS
						Run 3
	30	0				
	31					
	32					
	33					
	34					
	35					
	36					
	37					
	38					
	39					
	40					
	41					
	42					
	43					
	44					
	45					
	46					
	47					
	48					
	49					
start 15	50	10	10	10	10	1550 - 1600
	51	10	10	10	10	380/40 = 9,5
	52	10	10	10	10	
	53	10	10	10	10	
	54	10	5	10	10	
	55	5	10	10	10	
	56	10	10	10	10	
	57	10	5	10	10	
	58	10	10	10	10	
	59	10	10	10	5	

RECORD OF VISIBLE EMISSIONS

Company Name US Gypsum
Plant Address Shoal, 2nd
Stack Location Scoring & Chamfering
Weather Conditions Blue skys

Date 6-3-80
Observer Nancy E Roberson
Observer's Location ~ 70' S W of stack

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

COMMENTS

Run 3
1600 - 1610
$\frac{265}{40} = 6.625 = 6.6$

1610 - 1620
$\frac{285}{40} = 7.125 \cong 7.1$

1620 - 1630
$\frac{300}{40} = 7.5$

RECORD OF VISIBLE EMISSIONS

Company Name US Gypsum — Date 6-3-80

Plant Address Shoal, Ind — Observer Nancy E Robertson

Stack Location Scoring & chamfering — Observer's Location ~70' SW of stack

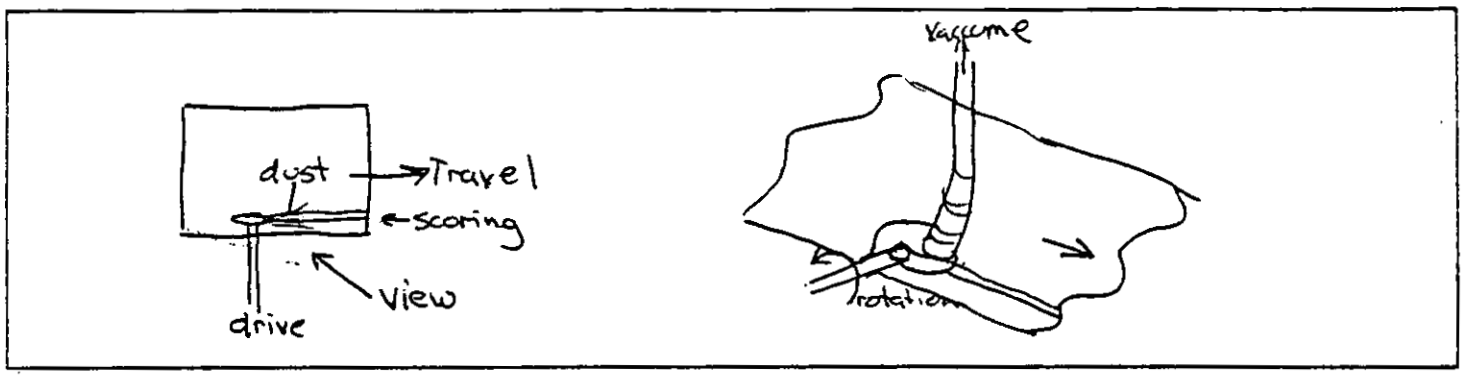
Weather Conditions _____

TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS
						Run 3
16	30	5	5	5	5	1630 - 1640
	31	10	10	10	5	275/40 = 6.875 ≅ 6.9
	32	5	10	10	5	
	33	5	10	5	5	
	34	5	5	5	5	
	35	10	5	5	5	
	36	5	5	5	10	
	37	10	10	10	5	
	38	5	10	5	5	
	39	10	10	5	10	1640 - 1651
	40	5	10	5	5	350/40 = 8.75 ≅ 8.8
	41	5	10	10	5	
	42	5	5	10	10	
	43	10	10	5	10	
	44	5	5	5	5	
	45	10	10	5	10	
	46	5	10	5	10	
	47	10	10	10	10	
	48	10	10	5	5	
	49	10	10	10	10	
stop Test 16	50	5	5	10	5	
	51					
	52					
	53					
	54					
	55					
	56					
	57					
	58					
	59					

FUGITIVE EMISSION
INSPECTION

Company US Gypsum	Inspector M Applebaum
Location Scoring Cutters Station 5	Affiliation Weston
Company Rep.	Date 6-2-80
Sky Conditions -	Wind Direction -
Precipitation -	Wind Speed -
Facility Type	Emission Source

Sketch emission source, indicate observer position relative to source; indicate potential emission points and/or actual emission points.



OBSERVATIONS

	Time	Accumulated Observation Period (Min: Sec)	Accumulated Emission Time (Min: Sec)
Begin Observation	330	0:00	0:00
	3:40	10:00	0:00
	3:50	20:00	0:00
	4:00	30:00	0:00
	4:10	40:00	0:00
	4:20	50:00	0:00
	4:30	60:00	0:00
End Observation			

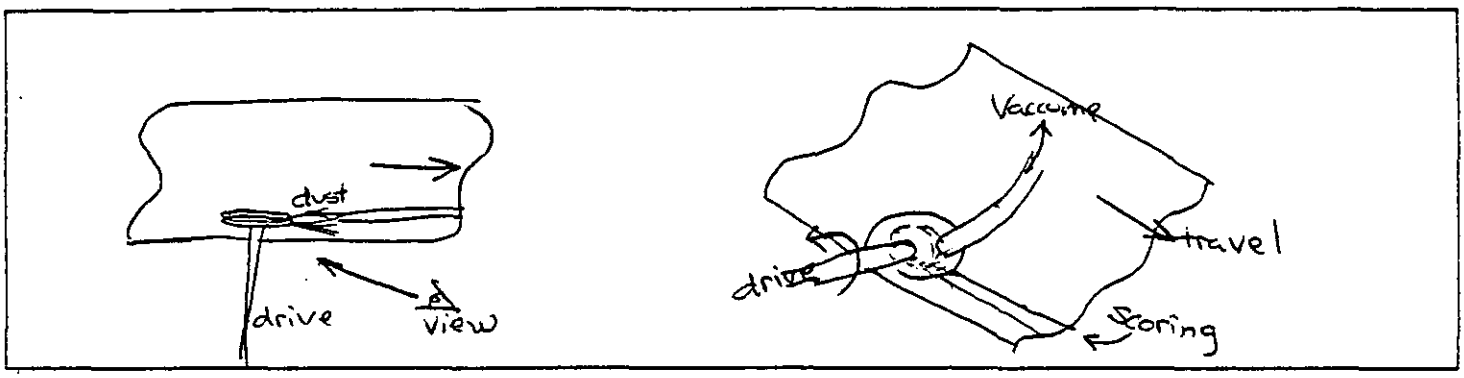
All fugitive emmissions were minimal, A vaccum system over the cutting wheel removed ~99% of the dust. Particles not vaccumed were sandwiched in with the stucco

0% FE over 3 hrs

FUGITIVE EMISSION INSPECTION

Company US Gypsum	Inspector M Appleblum
Location Scoring Cutters	Affiliation Weston
Company Rep.	Date 6-2-80
Sky Conditions –	Wind Direction –
Precipitation –	Wind Speed –
Facility Type	Emission Source

Sketch emission source, indicate observer position relative to source; indicate potential emission points *and/or actual emission points.*



OBSERVATIONS

	Time	Accumulated Observation Period (Min: Sec)	Accumulated Emission Time (Min: Sec)
Begin Observation	5:00 PM	0:00	0:00
A vaccum system removed 99% of the dust.	5:10	10:00	0:00
Fugitive emmisions were minimal. All F.E. were sandwitched in with the plaster paste	5:20	20:00	0:00
	5:30	30:00	0:00
	5:40	40:00	0:00
	5:50	50:00	0:00
	6:00 PM	60:00	0:00
0% FE			
End Observation			

FUGITIVE EMISSION INSPECTION

Company: US Gypsum
Location: Score cutters Station 5
Company Rep.:

Inspector: M Applebaum
Affiliation: Weston
Date: 6-2-80

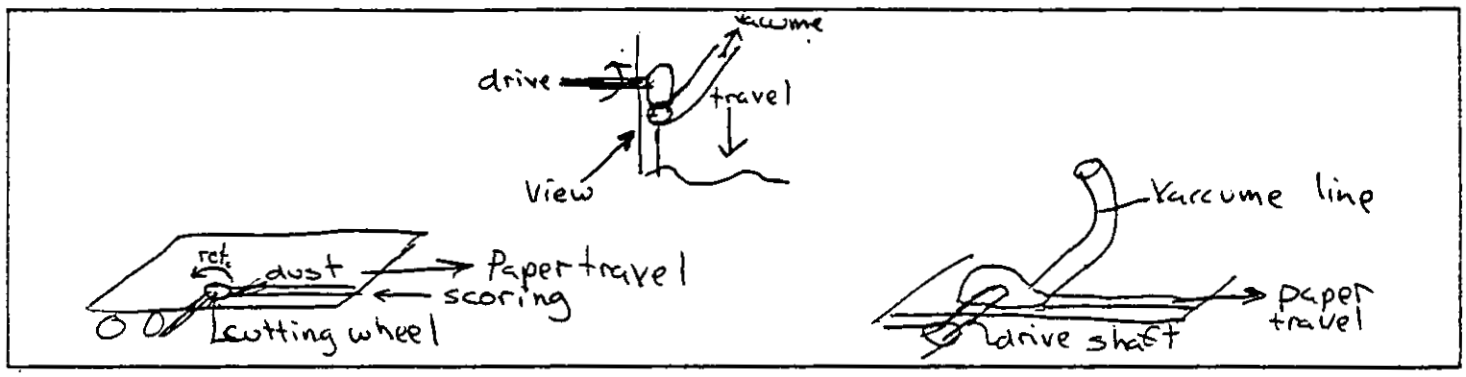
Sky Conditions: —
Precipitation: —

Wind Direction:
Wind Speed:

Facility Type:

Emission Source:

Sketch emission source, indicate observer position relative to source; indicate potential emission points and/or actual emission points.



OBSERVATIONS

	Time	Accumulated Observation Period (Min: Sec)	Accumulated Emission Time (Min: Sec)
Begin Observation	0:00 1:30 pm	0:00	0:00
Small particles of cut paper did eminate from under vaccum cover. I was able to deduce this by wetting my fingers and placing them On the scorings. The amount of particles was minimal and they remained on the paper into the sandwich process	1:40	10:00	0:00
	1:50	20:00	0:00
	2:00	30:00	0:00
	2:10	40:00	0:00
	2:20	50:00	0:00
	2:30 pm	60:00	0:00
0% FE			
End Observation			

SUMMARY
RECORD OF VISIBLE EMISSIONS

Type of Plant Wall Board Date 6-10-80

Company Name US Gypsum Hours of Observation 3 hrs

Plant Address Shoal, Ind Observer Nancy E Roberson

Type of Discharge (STACK) OTHER _____

Discharge Location Surge Bin

Height of Point of Discharge 2nd level plus ~20'

Observer's Location:

Distance to Discharge Point ~20'

Height of Observation Point ~20' below stack

Direction from Discharge Point East of stack

Background Description forest (green trees)

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

Wind Direction East Wind Velocity 2 mi/hr

Plume Description:

Detached: (Yes) No

Color: Black (White) Other _____

Plume Dispersion Behavior: Looping Coning Fanning

Lofting Fumigating Other _____

Estimated Distance Plume Visible ~5'

Run 1, 2 + 3

RECORD OF VISIBLE EMISSIONS

Company Name US Gypsum
Plant Address Shoals, Ind
Stack Location Sand Bin
Weather Conditions clear

Date 6-10-80
Observer Nancy E Robertson
Observer's Location ~ 20' East of stack

HR	MIN	SECONDS 00	15	30	45	COMMENTS
						Run 1
	30					
	31					
	32					
	33					
	34					
	35					
	36					
	37					
	38					
	39					
	40					
	41					
	42					
	43					
	44					
12	45	0	0	0	0	
	46	0	0	0	0	1245 - 1255
	47	0	0	5	0	$\frac{15}{40} = .375 \cong .4$
	48	0	0	0	0	
	49	0	0	0	5	
	50	0	0	0	0	
	51	0	0	0	0	1255 - 1305
	52	0	0	0	0	$\frac{35}{40} = .875 \cong .9$
	53	0	5	0	0	
	54	0	0	0	0	
	55	5	0	0	5	
	56	0	5	0	0	
	57	0	0	0	0	
	58	0	0	5	5	
	59	0	0	0	0	

start test

RECORD OF VISIBLE EMISSIONS

Company Name US Gypsum
Plant Address Shoal, Ind
Stack Location Stack Bank
Weather Conditions clear

Date 6-10-80
Observer Nancy E Robertson
Observer's Location ~20' E of stack

HR	MIN	TIME SECONDS 00	15	30	45	COMMENTS
						Run 1
13	00	0	0	5	0	
	01	0	0	0	0	
	02	0	0	0	0	
	03	0	0	0	5	1305 - 1315
	04	0	0	0	0	$\frac{15}{40} = .375 \cong .4$
	05	0	0	5	0	
	06	0	0	0	0	
	07	0	0	0	0	
	08	0	0	0	0	
	09	0	0	0	0	
	10	5	0	0	0	
	11	0	0	0	0	
	12	0	0	0	0	
	13	0	0	0	0	
	14	0	0	5	0	
	15	0	0	0	0	1315 - 1325
	16	0	0	5	5	$\frac{25}{40} = .625 \cong .6$
	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	5	5	
	23	0	0	5	0	
	24	0	0	0	0	1325 - 1335
	25	0	0	0	0	$\frac{25}{40} = .625 \cong .6$
	26	0	0	5	0	
	27	0	0	0	0	
	28	0	0	5	0	
	29	0	0	0	5	

RECORD OF VISIBLE EMISSIONS

Company Name US Gypsum
Plant Address Shoals, Ind
Stack Location Sand Bin
Weather Conditions clear

Date 6-10-80
Observer Nancy E Robertson
Observer's Location ~20' E. of stack

TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS
						Run
13	30	0	0	0	0	
	31	0	5	0	0	
	32	0	0	0	0	
	33	0	0	0	0	
	34	0	5	0	0	1335 - 1345
	35	0	5	0	0	30/40 = .75 ≈ .8
	36	0	0	0	0	
	37	0	0	5	0	
	38	0	0	0	0	
	39	0	0	5	0	
	40	0	5	5	0	
	41	0	0	0	0	
	42	0	0	0	0	
	43	0	0	0	5	
13	44	0	0	0	0	2nd test
	45					
	46					
	47					
	48					
	49					
	50					
	51					
	52					
	53					
	54					
	55					
	56					
	57					
	58					
	59					

RECORD OF VISIBLE EMISSIONS

Company Name: US Gypsum — Date: 6-10-80

Plant Address: Shoals, Ind — Observer: Nancy E Robertson

Stack Location: Large Rm — Observer's Location: ~20' E of stack

Weather Conditions: clear

	HR	MIN	TIME SECONDS 00	15	30	45	COMMENTS
		30	0				Run 2
		31					
		32					
		33					
		34					
		35					
		36					
		37					
		38					
		39					
		40					
		41					
		42					
		43					
		44					
		45					
		46					
		47					
start test	13	48	0	0	0	0	1348 - 1358
		49	0	5	0	0	$\frac{30}{40} = .75 \simeq .8$
		50	0	5	0	0	
		51	0	0	0	0	
		52	5	6	0	0	
		53	5	0	0	0	
		54	0	0	0	0	
		55	0	5	0	6	
		56	0	0	0	0	
		57	0	0	0	5	1358 - 1408
		58	0	0	0	0	$\frac{20}{40} = .5$
		59	0	0	0	6	

RECORD OF VISIBLE EMISSIONS

Company Name US Gypsum
Plant Address Shoal Snd
Stack Location Sand Bin
Weather Conditions clear

Date 6-10-80
Observer Nancy E Roberton
Observer's Location ~20' E of stack

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

COMMENTS

Run 2

1408 - 1418

$\frac{20}{40} = .5$

1418 - 1428

$\frac{25}{40} = .625 \cong .6$

1428 - 1438

$\frac{10}{40} = .25 \cong .3$

RECORD OF VISIBLE EMISSIONS

Company Name US Gypsum
Plant Address Shoals Ind
Stack Location Sand Run
Weather Conditions clear

Date 6-10-80
Observer Nancy E Roberson
Observer's Location ~20° E of stack

HR	MIN	TIME SECONDS 00	15	30	45
14	30	0	5	0	0
	31	0	0	0	0
	32	0	0	0	5
	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	5	0	0
	40	0	0	0	5
	41	5	0	0	0
	42	0	0	0	0
	43	0	0	0	0
	44	0	0	0	0
	45	5	0	0	0
	46	0	0	0	0
	47	0	0	0	0
End test 14	48				
	49				
	50				
	51				
	52				
	53				
	54				
	55				
	56				
	57				
	58				
	59				

COMMENTS

Run 2

1438 - 1448

$\frac{20}{40} = .5$

RECORD OF VISIBLE EMISSIONS

Company Name U S Gypsum
Plant Address Shoals Ind
Stack Location Sage Run
Weather Conditions clear

Date 6-10-80
Observer Nancy E Robertson
Observer's Location ~20' E of stack

HR	MIN	TIME SECONDS 00	15	30	45	COMMENTS
						Run 3
	30					
	31					
	32					
	33					
	34					
	35					
	36					
	37					
	38					
	39					
	40					
	41					
	42					
	43					
	44					
	45					
	46					
	47					
	48					
	49					
start test 14	50	0	0	5	0	1450 - 1500
	51	5	0	5	0	$\frac{25}{40} = .625 \approx .6$
	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	5	5	0	0	

RECORD OF VISIBLE EMISSIONS

Company Name US Gypsum
Plant Address Shoals, Ind
Stack Location Surge Bin
Weather Conditions clear

Date 6-10-80
Observer Danny E Robertson
Observer's Location ~20' E of stack

HR	MIN	TIME SECONDS 00	15	30	45
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	5	0	0
	08	0	0	0	0
	09	0	0	0	0
	10	5	0	0	0
	11	0	0	0	0
	12	0	0	0	0
	13	0	0	0	0
	14	0	0	0	0
	15	5	0	0	0
	16	0	0	0	0
	17	0	0	0	0
	18	0	0	0	0
	19	0	0	0	0
	20	5	0	0	0
	21	0	0	0	0
	22	0	0	0	0
	23	0	0	0	0
	24	0	5	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

COMMENTS

Run 3

1500 - 1510

$\frac{5}{40} = .125 \cong .1$

1510 - 1520

$\frac{10}{40} = .25 \cong .3$

1520 - 1530

$\frac{5}{40} = .125 \cong .1$

RECORD OF VISIBLE EMISSIONS

Company Name U.S. Gypsum
Plant Address Shoals, Ind
Stack Location Silage Bin
Weather Conditions clear

Date 6-10-80
Observer Nancy E Robertson
Observer's Location ~20' E of stack

HR	MIN	TIME SECONDS 00	15	30	45
15	30	0	0	5	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	5	5	0	0
	43	0	0	0	0
	44	0	0	5	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
end test 15	50				
	51				
	52				
	53				
	54				
	55				
	56				
	57				
	58				
	59				

COMMENTS

Run 3

1530 - 1540

$\frac{5}{40} = .125 \cong .1$

1540 - 1550

$\frac{15}{40} = .375 \cong .4$

SUMMARY
RECORD OF VISIBLE EMISSIONS

Type of Plant Wall Board

Date 6-4-80

Company Name US Gypsum

Hours of Observation 1 hour on

Plant Address Shoal, Ind

Observer Nancy E Roberson

Type of Discharge (STACK) OTHER _____

Discharge Location Baggage + Packing

Height of Point of Discharge 2nd level plus ~25'

Observer's Location:

Distance to Discharge Point ~15'

Height of Observation Point same level

Direction from Discharge Point NE of stack

Background Description gray

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

Wind Direction _____ Wind Velocity 3 mi/hr

Plume Description:

Detached: Yes (No)

Color: Black (White) Other _____

Plume Dispersion Behavior: Looping Coning Fanning

Lofting Fumigating Other _____

Estimated Distance Plume Visible ~1'

Run 1 + 2

RECORD OF VISIBLE EMISSIONS

Company Name US Gypsum
Plant Address Shoals, Ind
Stack Location Baggage + Packing
Weather Conditions Cloudy

Date 6-4-80
Observer Nancy E Robertson
Observer's Location ~ 15' NE of stack

HR	MIN	TIME SECONDS 00	15	30	45	COMMENTS
						Plant
0900	00	0	0	0	0	0900 - 0910
	01	0	0	0	0	0/40 = 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	0910 - 0920
	10	0	0	0	0	0/40 = 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	0920 - 0930
	20	0	0	0	0	0/40 = 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 US Gypsum
Plant Address Shoal, 2nd
Stack Location Baggage & Packing
Weather Conditions Cloudy

Date 6-4-80
Observer Nancy E Roberts
Observer's Location ~15' NE of stack

HR	MIN	SECONDS 00	15	30	45
0930	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
09	59	0	0	0	0

COMMENTS

Run 1

0930 - 0940

$\frac{0}{40} = 0$

0940 - 0950

$\frac{0}{40} = 0$

0950 - 1000

$\frac{0}{40} = 0$

RECORD OF VISIBLE EMISSIONS

Company Name US Gypsum
Plant Address Shoals, Ind
Stack Location Baggage + Packing
Weather Conditions cloudy

Date 6-4-80
Observer Nancy E Robertson
Observer's Location ~15' NE of stack

TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS
						Run 2
start 11	30	0	0	0	0	
	31	0	0	0	0	1100 - 1110
	32	0	0	0	0	0/40 = 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	1110 - 1120
	40	0	0	0	0	0/40 = 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	1120 - 1130
	50	0	0	0	0	0/40 = 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	
stop test	59	0	0	0	0	

RECORD OF VISIBLE EMISSIONS

Company Name US Gypsum — Date 6-4-80

Plant Address Shoal, Ind — Observer Nancy E. Robertson

Stack Location Baggage + Packing — Observer's Location ~15' NE of stack.

Weather Conditions cloudy

TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS
startup 1300	00	0	0	0	0	Run 2
	01	0	0	0	0	1300 - 1310
	02	0	0	0	0	0/40 = 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	1310 - 1320
	10	0	0	0	0	0/40 = 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	1320 - 1330
	20	0	0	0	0	0/40 = 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	
end test B	29	0	0	0	0	

SUMMARY
RECORD OF VISIBLE EMISSIONS

Type of Plant Dry Wall Date 6-5-80

Company Name US Gypsum Hours of Observation 1 hr

Plant Address Shoal, Ind Observer Nancy E Robertson

Type of Discharge (STACK) OTHER _____

Discharge Location Baggage & Packing

Height of Point of Discharge 2nd level plus ~25'

Observer's Location:

Distance to Discharge Point ~15'

Height of Observation Point same level

Direction from Discharge Point NE of stack

Background Description gray

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

Wind Direction W Wind Velocity 3 mi/hr

Plume Description:

Detached: Yes (No)

Color: Black (White) Other _____

Plume Dispersion Behavior: Looping, Coning Fanning

Lofting Fumigating Other _____

Estimated Distance Plume Visible ~1'

Run 3

RECORD OF VISIBLE EMISSIONS

Company Name US Gypsum
Plant Address Shoals, Ind
Stack Location Baggage & Packing
Weather Conditions Partly cloudy

Date 6-5-80
Observer Nancy E Roberson
Observer's Location ~15' NE of stack

start test 08 30 6-5-80

TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS
						Run 3
08	30	0	0	0	0	0830 - 0840
	31	0	0	0	0	0 - 0
	32	0	0	0	0	40
	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	0840 - 0850
	40	0	0	0	0	0 - 0
	41	0	0	0	0	40
	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	0850 - 0900
	50	0	0	0	0	0 - 0
	51	0	0	0	0	40
	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 US Gypsum
Plant Address Shoals, Ind
Stack Location Baggage + Packing
Weather Conditions partly cloudy

Date 6-5-80
Observer Nancy E Robertson
Observer's Location ~15' NE of stack

HR	MIN	TIME SECONDS 00	15	30	45	COMMENTS
						Run 3
09	00	0	0	0	0	0900-0905
	01	0	0	0	0	0/20 = 0
	02	0	0	0	0	
	03	0	0	0	0	
	04	0	0	0	0	
09	05	0	0	0	0	
	06					
	07					
	08					
	09					
	10					
	11					
	12					
	13					
	14					
	15					
	16					
	17					
	18					
	19					
	20					
	21					
	22					
	23					
	24					
	25					
	26					
	27					
	28					
	29					

end (RS 6-5-80) (temporary)

RECORD OF VISIBLE EMISSIONS

Company Name: US Gypsum
Plant Address: Shoals, 2nd
Stack Location: Baggage & Packing
Weather Conditions: partly cloudy

Date: ~~6~~ 6-4-80
Observer: Nancy E Robertson
Observer's Location: ~15' NE of stack

HR	MIN	SECONDS 00	15	30	45
	30				
	31				
	32				
	33				
	34				
	35				
	36				
	37				
13	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

COMMENTS

Run 3

Restart test

1338 - 1348
$\frac{0}{40} = 0$

1348 - 1358
$\frac{0}{40} = 0$

RECORD OF VISIBLE EMISSIONS

Company Name VS Gypsum
Plant Address Shoal, Ind
Stack Location Baggage-Packing
Weather Conditions Cloudy

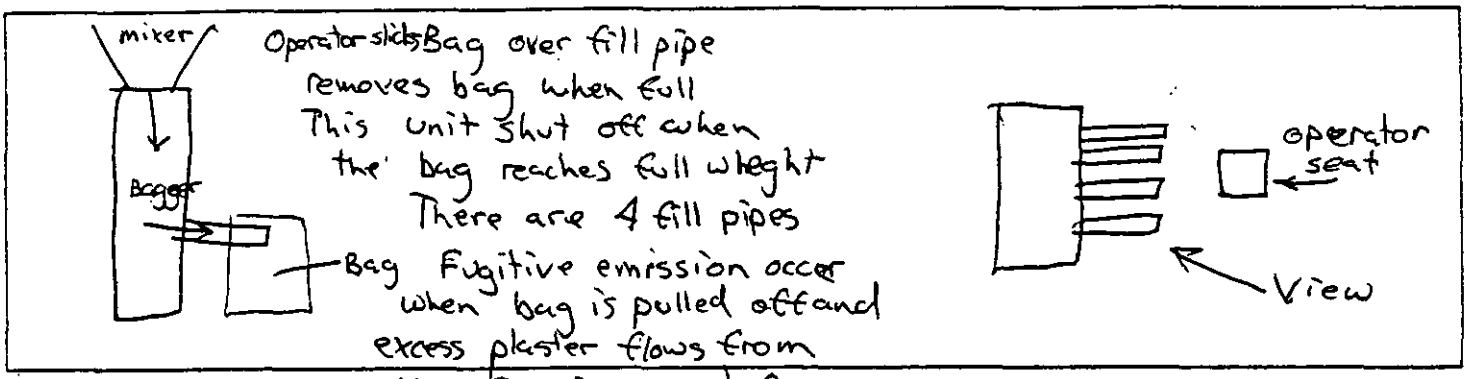
Date 6-4-80
Observer Nancy E Roberts
Observer's Location ~15' ne of Stack

TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS
						Run 3
14	00	0	0	6	0	1358 - 1404
	01	0	0	0	0	0/24 = 0
	02	0	0	0	0	
stop test 6-4-80	14 03	0	0	0	0	
	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					

FUGITIVE EMISSION INSPECTION

Company US Gypsum	Inspector M Applebaum
Location Bagging unit	Affiliation Weston
Company Rep.	Date 6-3-80
Sky Conditions	Wind Direction
Precipitation	Wind Speed
Facility Type	Emission Source

Sketch emission source, indicate observer position relative to source; indicate potential emission points *and/or actual emission points.*



OBSERVATIONS

Time	Accumulated Observation Period (Min: Sec)	Accumulated Emission Time (Min: Sec)
Begin Observation	0:00	0:00
	10:00	327
	20:00	6:22
	30:00	10:35
	40:00	1436
	50:00	18:15
	60:00	25:30
		42.59% FE
End Observation		

42.45% FE over 3hrs

FUGITIVE EMISSION INSPECTION

Company US Gypsum
Location Shoals Ind
Company Rep. Jay King

Inspector M Applbaum
Affilitation Co-op Weston
Date 6-4-80

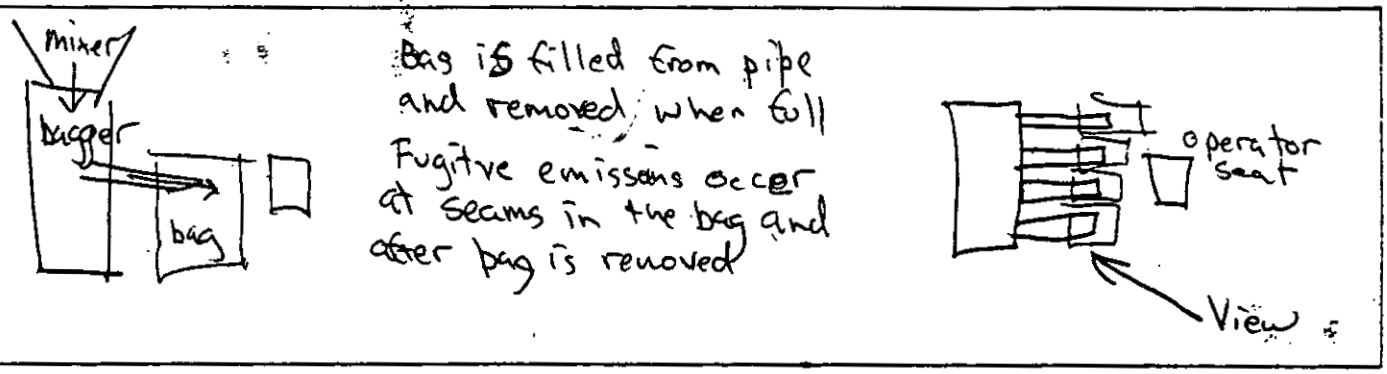
Sky Conditions –
Precipitation –

Wind Direction –
Wind Speed –

Facility Type

Emission Source Bagger

Sketch emission source, indicate observer position relative to source; indicate potential emission points and/or actual emission points.



OBSERVATIONS

	Time	Accumulated Observation Period (Min: Sec)	Accumulated Emission Time (Min: Sec)
Begin Observation Change of product from 80lb to 100lb bags		0:00	0:00
		10:00	3:45
		20:00	10:12
		30:00	16:23
		40:00	22:45
		50:00	25:50
		60:00	32:35
			54.3% FF
End Observation			

FUGITIVE EMISSION INSPECTION

Company: US Gypsum
Location: Bagging Unit
Company Rep.:

Inspector: M Applebaum
Affiliation: 6-5-80 Weston
Date: " "

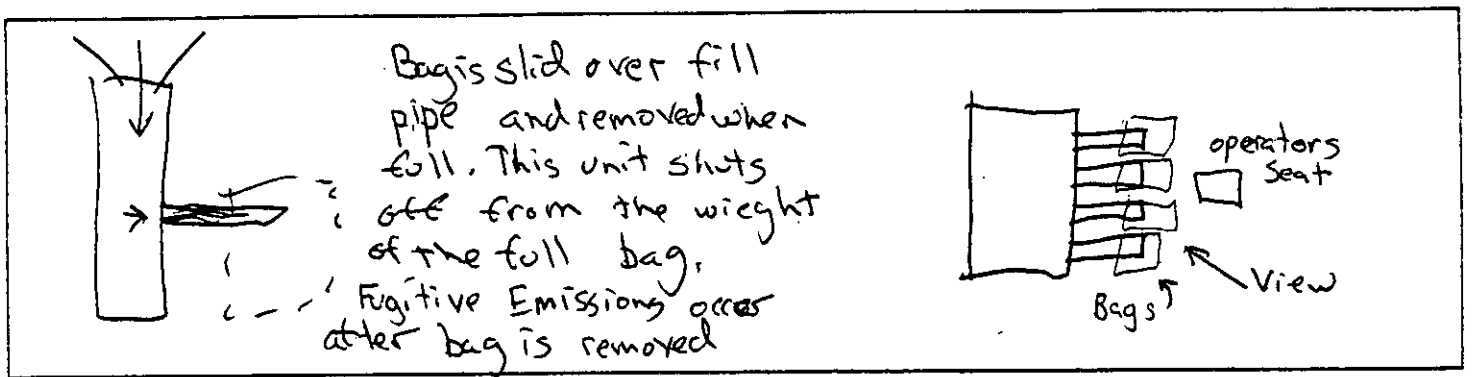
Sky Conditions: —
Precipitation: —

Wind Direction: —
Wind Speed: —

Facility Type:

Emission Source:

Sketch emission source, indicate observer position relative to source; indicate potential emission points and/or actual emission points.



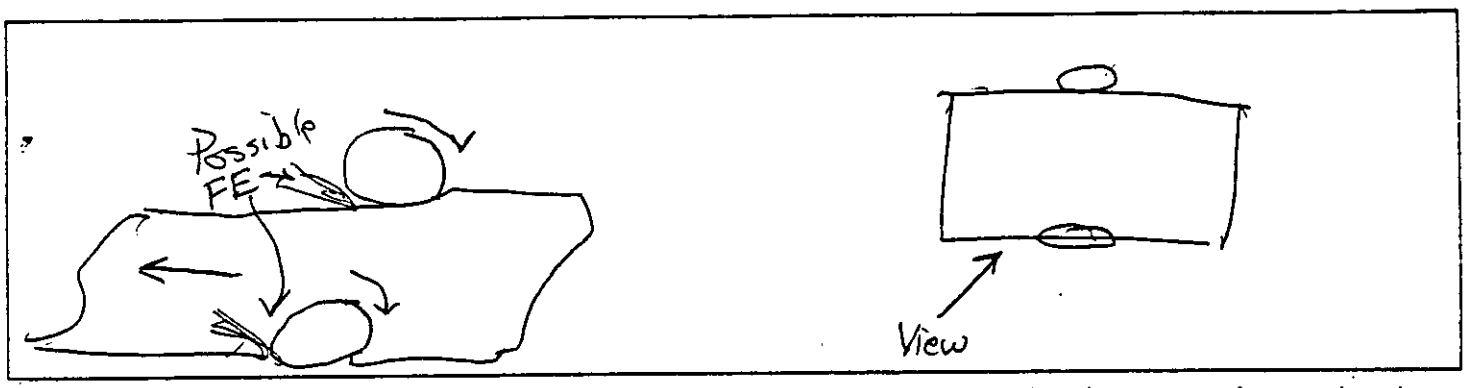
OBSERVATIONS and material flows from the pipe and from leaks in bag seam

	Time	Accumulated Observation Period (Min: Sec)	Accumulated Emission Time (Min: Sec)
Begin Observation	10:20	0:00	0:00
		10:00	3:07
Stop 14:45		20:00	6.37
Change Product	30:00	30:00	7:55
		40:00	12:10
This test was run only		50:00	14:30
while operator was		60:00	18:20
filling bags			30.56%
End Observation			

FUGITIVE EMISSION INSPECTION

Company: US Gypsum	Inspector: M Appleboum
Location: Shoals Ind	Affiliation:
Company Rep.: Jay King	Date: 6-6-89
Sky Conditions: —	Wind Direction: —
Precipitation: —	Wind Speed: —
Facility Type:	Emission Source: Board End Saws

Sketch emission source, indicate observer position relative to source; indicate potential emission points and/or actual emission points.



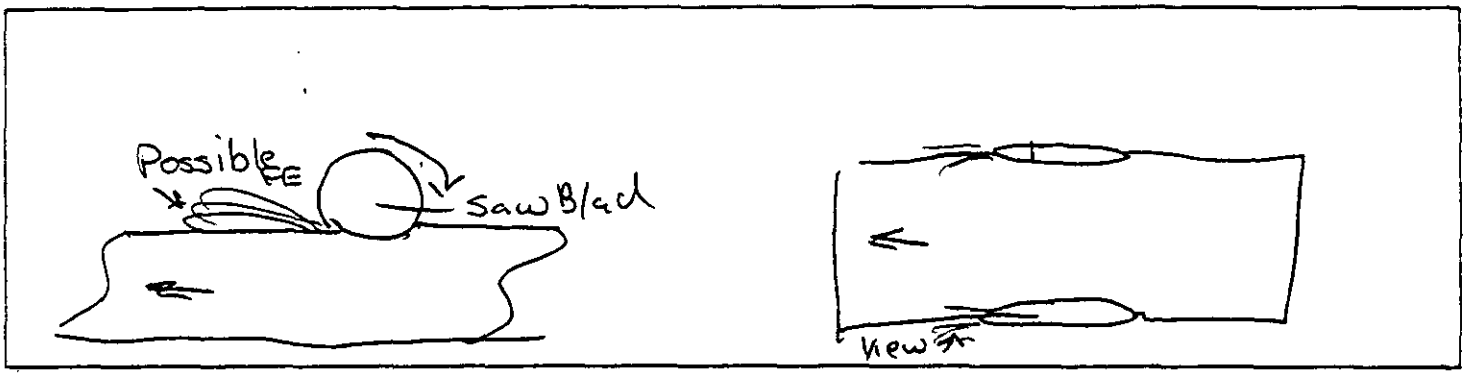
OBSERVATIONS

	Time	Accumulated Observation Period (Min: Sec)	Accumulated Emission Time (Min: Sec)
Begin Observation		0:00	0:00
		10:00	0:00
		20:00	0:00
		30:00	0:00
		40:00	0:00
		50:00	0:00
		60:00	0:00
			0.00
End Observation			

FUGITIVE EMISSION INSPECTION

Company: US Gypsum	Inspector: M Applebaum
Location: Shoals Ind	Affiliation:
Company Rep.:	Date: 6-6-80
Sky Conditions:	Wind Direction:
Precipitation:	Wind Speed:
Facility Type:	Emission Source: board end Saws

Sketch emission source, indicate observer position relative to source; indicate potential emission points and/or actual emission points.



OBSERVATIONS

	Time	Accumulated Observation Period (Min: Sec)	Accumulated Emission Time (Min: Sec)
Begin Observation		0100	0:00
		10:00	0:00
		20:00	0:00
		30:00	0:00
		40:00	0:00
Vaccum clogged		50:00	0:45
		60:00	0:45
		1.25% FE	
End Observation			

FUGITIVE EMISSION INSPECTION

Company: US Gypsum
Location: Shoals Ind
Company Rep.:

Inspector: M Applebaum
Affilitation:
Date: 6-6-80

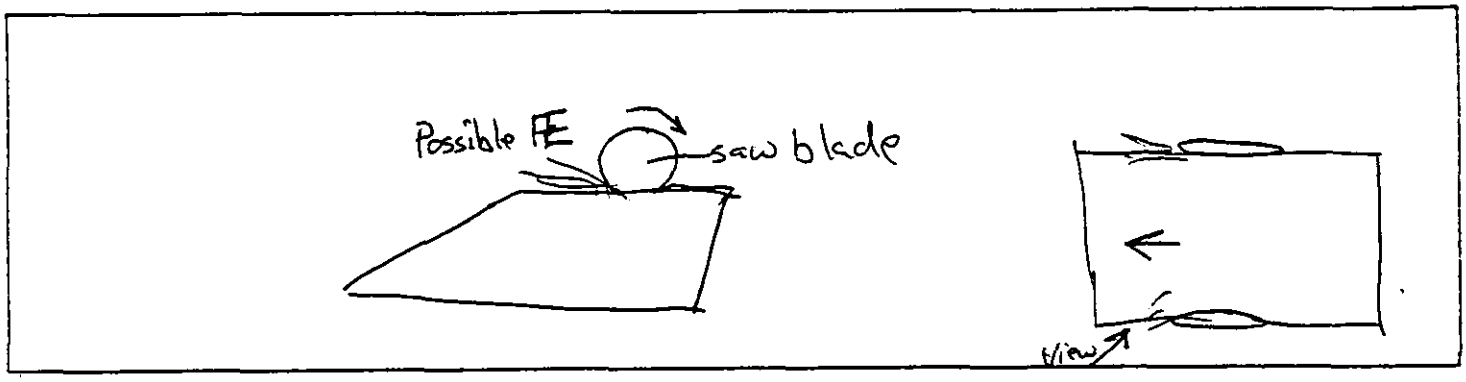
Sky Conditions:
Precipitation:

Wind Direction:
Wind Speed:

Facility Type:

Emission Source: Board end Saws

Sketch emission source, indicate observer position relative to source; indicate potential emission points and/or actual emission points.



OBSERVATIONS

	Time	Accumulated Observation Period (Min: Sec)	Accumulated Emission Time (Min: Sec)
Begin Observation		60:00	0:00
		50:00	0:00
		20:00	0:00
		30:00	0:00
		40:00	0:00
		50:00	0:00
		60:00	0:00
		0%	FE
End Observation			

FUGITIVE EMISSION INSPECTION

Company: US Gypsum
Location: Mixer (Upper)
Company Rep.:

Inspector: M Appleberum
Affilitation: Weston
Date: 6-3-80

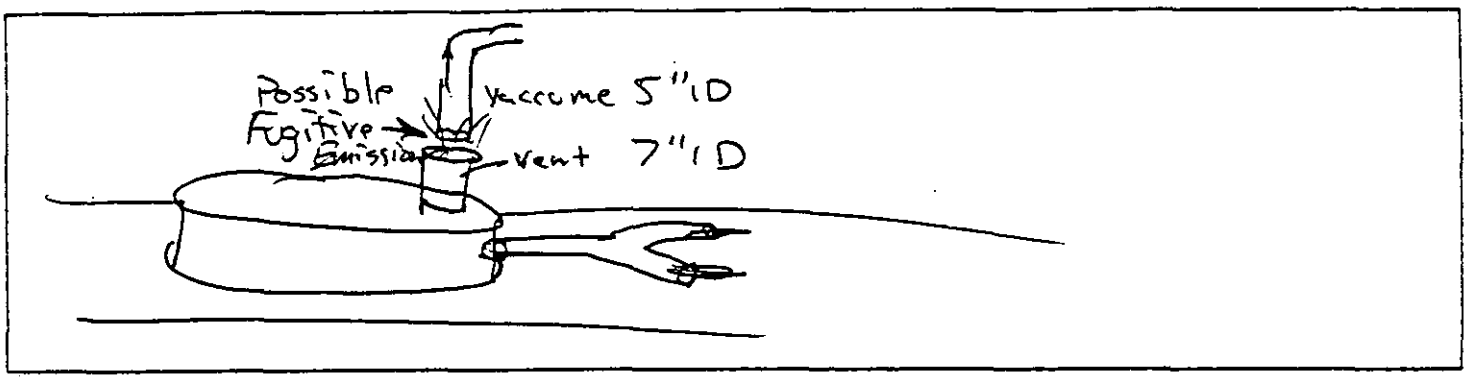
Sky Conditions: ~
Precipitation: —

Wind Direction: =
Wind Speed: =

Facility Type:

Emission Source:

Sketch emission source, indicate observer position relative to source; indicate potential emission points and/or actual emission points.



OBSERVATIONS

	Time	Accumulated Observation Period (Min: Sec)	Accumulated Emission Time (Min: Sec)
Begin Observation	2:30	0:00	0:00
		10:00	0:00
		20:00	0:00
		30:00	0:00
		40:00	0:00
		50:00	0:00
	3:30	60:00	0:00
0% FE over 3hrs			
End Observation			

FUGITIVE EMISSION INSPECTION

Company US Gypsum
Location Mix Station 05 Upper
Company Rep. _____

Inspector M Applebaum
Affilitation Weston
Date 6-3-80

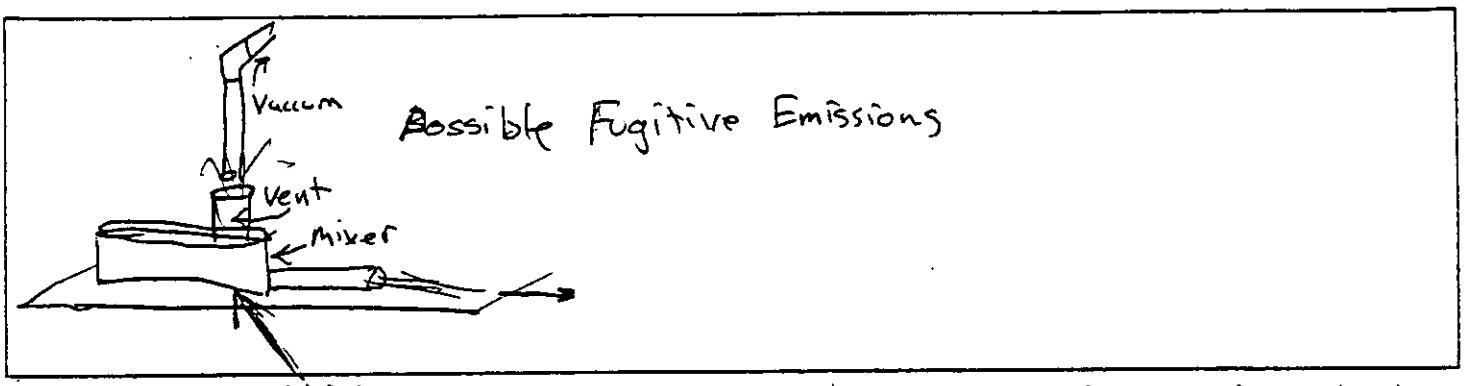
Sky Conditions _____
Precipitation _____

Wind Direction _____
Wind Speed _____

Facility Type _____

Emission Source _____

Sketch emission source, indicate observer position relative to source; indicate potential emission points and/or actual emission points.



OBSERVATIONS

	Time	Accumulated Observation Period (Min: Sec)	Accumulated Emission Time (Min: Sec)
Begin Observation	12:30	0:00	0:00
		10:00	0:00
		20:00	0:00
		30:00	0:00
		40:00	0:00
		50:00	0:00
	1:30	60:00	0:00
0% FE			
End Observation			

FUGITIVE EMISSION INSPECTION

Company: US Gypsum
Location: Mixer (Upper)
Company Rep.:

Inspector: M Appleburn
Affiliation: Weston
Date: 6-3-80

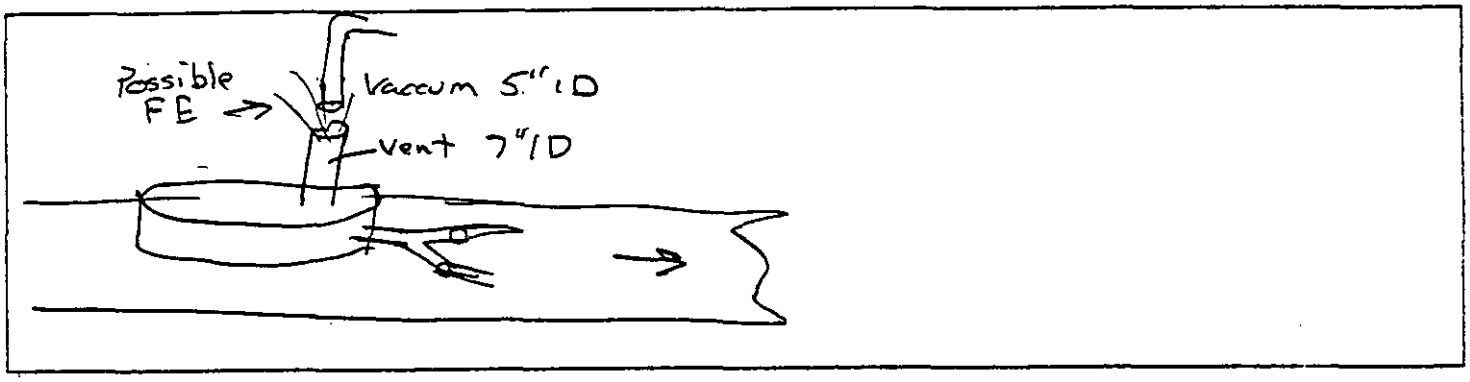
Sky Conditions: —
Precipitation: —

Wind Direction: ⌒
Wind Speed: —

Facility Type:

Emission Source:

Sketch emission source, indicate observer position relative to source; indicate potential emission points and/or actual emission points.



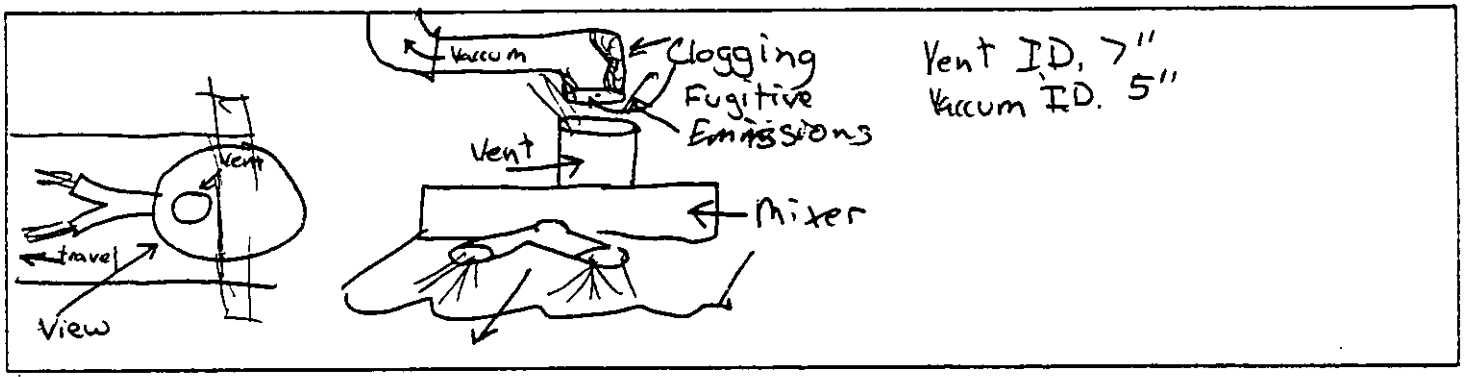
OBSERVATIONS

	Time	Accumulated Observation Period (Min: Sec)	Accumulated Emission Time (Min: Sec)
Begin Observation	210	0:00	0:00
	220	10:00	0:00
	230	20:00	0:00
	240	30:00	0:00
	250	40:00	0:00
	300	50:00	0:00
0% FE	310	60:00	0:00
End Observation			

FUGITIVE EMISSION INSPECTION

Company US Gypsum	Inspector M Applebaum
Location Mixer Station 5 Lower	Affilitation Weston
Company Rep.	Date 6-3-80
Sky Conditions —	Wind Direction —
Precipitation —	Wind Speed
Facility Type	Emission Source

Sketch emission source, indicate observer position relative to source; indicate potential emission points and/or actual emission points.



OBSERVATIONS

	Time	Accumulated Observation Period (Min: Sec)	Accumulated Emission Time (Min: Sec)
Begin Observation	10:50	0:00	0:00
		10:00	0:00
		20:00	0:00
		30:00	0:00
no Fugitive emissions at 35:00 All the Cloggings were removed		40:00	0:00
		50:00	0:00
	11:50	60:00	0:00
End Observation			

0% FE

12.29% EE over 3hrs

FUGITIVE EMISSION INSPECTION

Company: US Gypsum
Location: Mixer Station 5 Lower
Company Rep.:

Inspector: M Applebaum
Affiliation: Weston
Date: 6-3-80

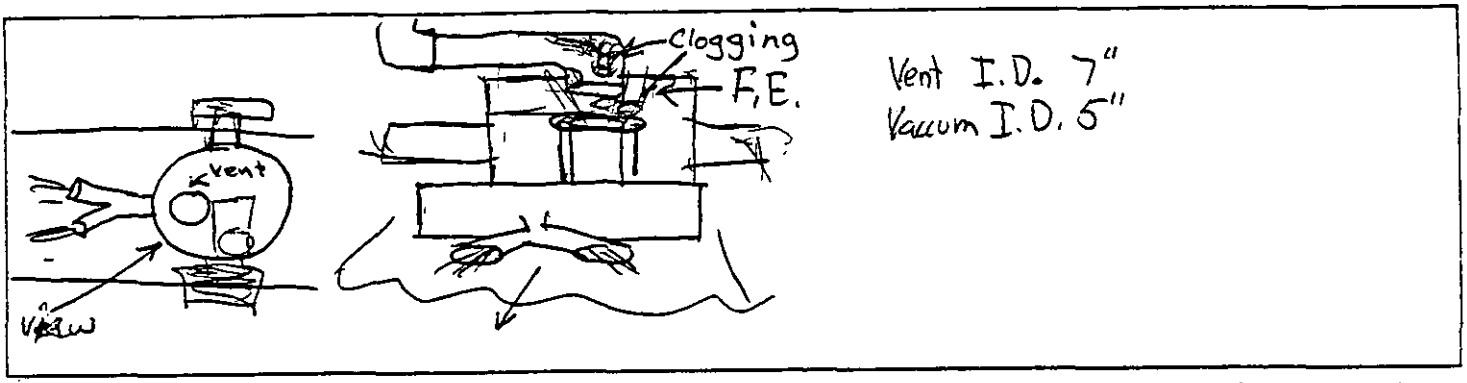
Sky Conditions: —
Precipitation:

Wind Direction: —
Wind Speed:

Facility Type:

Emission Source:

Sketch emission source, indicate observer position relative to source; indicate potential emission points and/or actual emission points.



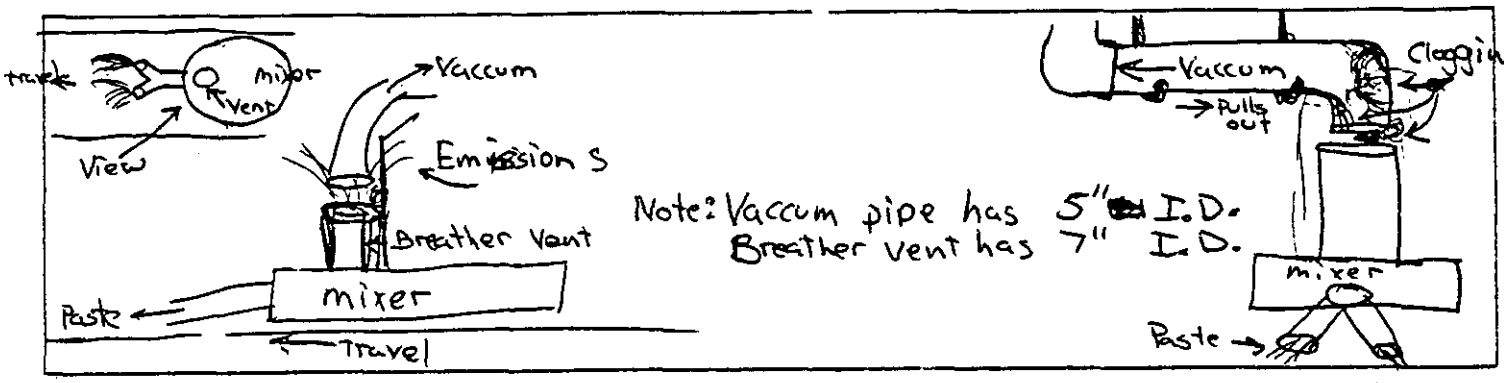
OBSERVATIONS

	Time	Accumulated Observation Period (Min: Sec)	Accumulated Emission Time (Min: Sec)
Begin Observation	9:40 Am	0:00	0:00
		10:00	0:00
as clogging builds up fugitive emissions begin.		20:00	0:00
		30:00	0:00
Pipe had to be removed and unclogged		40:00	4:50
		50:00	4:50
	10:40 Am	60:00	4:50
[redacted]			8.06% F
	Total 60		
End Observation			

FUGITIVE EMISSION INSPECTION

Company: US Gypsum
Location: Mixer Station 5 Lower
Company Rep.:
Inspector: M Applebaum
Affiliation: Weston
Date: 6-3-80
Sky Conditions: —
Precipitation: —
Wind Direction: —
Wind Speed: —
Facility Type:
Emission Source:

Sketch emission source, indicate observer position relative to source; indicate potential emission points and/or actual emission points.



OBSERVATIONS

	Time	Accumulated Observation Period (Min: Sec)	Accumulated Emission Time (Min: Sec)
Begin Observation	8:30 Am	0:00	0:00
		10:00	6:55
		20:00	16:45
During this period the vaccum pipe was clogged and had to be removed and unclogged		30:00	17:17
		40:00	17:17
		50:00	17:17
	930 Am	60:00	17:17
			28.8%
End Observation			

APPENDIX B

LABORATORY REPORTS

PARTICULATE SAMPLE ANALYSES Analyst CW Date 7/9/80

Plant U.S. Gypsum Sampling Location Rock dryer outlet Run # 2
Test Date 6/6/80 Test Period _____ Stack # _____ Process# _____

	Beaker #	Volume ml	Tare(1) grams	Tare(2) grams	Tare 3	Final(1) grams	Final(2) grams	Δ wt. grams	Blk. Cor. grams	Net wt. grams
01049 FHA	G-43	360	99.7448	99.7446	99.7444 ✓	99.7503 ✓	99.7506	.0059	.0032	.0027
01051 FILTER$_1$ #	27012		0.4589	0.4589 ✓		0.4655 ✓	0.4658	.0066	—	.0066
FILTER$_2$ #										
FH TOTAL										.0093
BHW										
BHA										
TOTAL										
Comments		100ml rinse 410								

Plant US Gypsum Sampling Location Rock dryer Baghouse Run # 1
Test Date 6/5/80 Test Period Inlet (2 bottles) Stack # _____ Process# _____

	Beaker #	Volume ml	Tare(1) grams	Tare(2) grams	Tare 3	Final(1) grams	Final(2) grams	Δ wt. grams	Blk. Cor. grams	Net wt. grams
FHA	G-19	405 335	102.3450	102.3446	102.3446 ✓	108.7048	108.7047 ✓	6.3601	.0070	6.3531 ✓
FILTER$_1$ #										
FILTER$_2$ #										
FH TOTAL										
BHW										
BHA										
TOTAL										
Comments		100ml Rinse 870								

B-1
ROY F. WESTON
01039
01040

Plant US Gypsum Sampling Location #1 Kettle Calciner Run # 1
Test Date 6/3/80 Test Period Exhaust Outlet Stack # _____ Process# _____

	Beaker #	Volume ml	Tare(1) grams	Tare(2) grams	Tare 3	Final(1) grams	Final(2) grams	Δ wt. grams	Blk. Cor. grams	Net wt. grams
01003 FHA	G-34	140	96.1200	96.1198 ✓	96.1200	96.1218	96.1217 ✓	.0019	.0015	.0004 ✓
01010 FILTER$_1$ #	28081		0.4578	0.4574 ✓		0.4627 ✓	0.4631	.0053	—	.0053 ✓
FILTER$_2$ #										.0385 ✓
FH TOTAL										.0442
BHW										
BHA										
TOTAL										
Comments		50ml rinse 190								
ACETONE BLK										
WATER BLK										

CODE: FHA=Front half acetone wash BHW=Back half water(impinger contents + water wash) BHA=Back half acetone wash FH TOTAL=Front half catch weight TOTAL=Total train catch weight

PARTICULATE SAMPLE ANALYSES

Analyst GW Date 7/9/80

Plant US Gypsum Sampling Location Rock dryer inlet Run # 1

Test Date 6/6/80 Test Period _____ Stack # _____ Process# _____

	Beaker #	Volume ml	Tare(1) grams	Tare(2) grams	Tare 3	Final(1) grams	Final(2) grams	Δ wt. grams	Blk. Cor. grams	Net wt. grams
01054 FHA	G-5	125	98.3134	98.3135	98.3131 ✓	98.5080	98.5077 ✓	.1946	.0013	.1933 ✓
01045 FILTER$_1$ #	27050		0.4574	0.4574 ✓		1.1411 ✓	1.1412	.6837	—	.6837 ✓
FILTER$_2$ #										
FH TOTAL										
BHW										
BHA										
TOTAL										
Comments		165								

Plant US Gypsum Sampling Location Board end Sawing Run # 2

Test Date 6/6/80 Test Period ~~_____~~ Outlet Stack # _____ Process# _____

	Beaker #	Volume ml	Tare(1) grams	Tare(2) grams	Tare 3	Final(1) grams	Final(2) grams	Δ wt. grams	Blk. Cor. grams	Net wt. grams
01033 FHA	G-42	490	99.9980	99.9981	99.9976 ✓	100.0082	100.0079 ✓	.0103	.0045	.0058 ✓
01034 FILTER$_1$ #	27007		.4583	.4583 ✓		.9794 ✓	.9746	.0161	—	.0161 ✓
FILTER$_2$ #										
FH TOTAL										
BHW										
BHA										
TOTAL										
Comments		70ml. 560								

Plant US Gypsum Sampling Location #4 Kettle Calciner Run # 2

Test Date 6/3/80 Test Period Inlet to Baghouse Stack # _____ Process# _____

	Beaker #	Volume ml	Tare(1) grams	Tare(2) grams	Tare 3	Final(1) grams	Final(2) grams	Δ wt. grams	Blk. Cor. grams	Net wt. grams
01017 FHA	G-11	510	103.0750	103.0748	103.0746 ✓	107.5741	107.5736 ✓	4.4990	.0050	4.4940 ✓
FILTER$_1$ #										
FILTER$_2$ #										
FH TOTAL										
BHW										
BHA										
TOTAL										
Comments		110ml 620								
ACETONE BLK										
WATER BLK										

CODE: FHA=Front half acetone wash BHW=Back half water/impinger contents + water wash) BHA=Back half acetone wash FH TOTAL=Front half catch weight TOTAL=Total train catch weight

ROY F. WESTON

PARTICULATE SAMPLE ANALYSES Analyst GA Date 7/9/80

Plant US Gypsum Sampling Location Rock dryer inlet Run # 2
Test Date 6/6/80 Test Period (2 bottles) Stack # Process#

	Beaker #	Volume ml	Tare(1) grams	Tare(2) grams	Tare 3	Final(1) grams	Final(2) grams	Δ wt. grams	Blk. Cor. grams	Net wt. grams
01042 FHA	G-36	310 / 105	100.8366	100.8369	100.8368	101.3361	101.3362	.4995	.0044	.4951
(918) FILTER$_1$ #	27013		0.4616	0.4616		1.2295	1.2270	3.7674	—	3.7674
01046 FILTER$_2$ #										
FH TOTAL										
BHW										
01047 BHA	G-44	105	103.4141	103.4142		103.4804	103.4806	.0663	.0008	.0655
TOTAL										
Comments		50 ml wash / 25 ml wash / 5 50								

Plant US Gypsum Sampling Location Rock dryer baghouse outlet Run # 1
Test Date 6/6/80 Test Period Stack # Process#

	Beaker #	Volume ml	Tare(1) grams	Tare(2) grams	Tare 3	Final(1) grams	Final(2) grams	Δ wt. grams	Blk. Cor. grams	Net wt. grams
01038 FHA	G-9	245	104.1916	104.1912	104.1914	104.1972	104.1971	.0059	.0024	.0035
FILTER$_1$ #										
FILTER$_2$ #										
FH TOTAL										
BHW										
BHA										
TOTAL										
Comments		50 ml wash / 25 ml wash								

ROY F. WESTON

B-3

Plant US Gypsum Sampling Location #4 Kettle Calciner Baghouse Run # 2
Test Date 6/3/80 Test Period Inlet Stack # Process#

	Beaker #	Volume ml	Tare(1) grams	Tare(2) grams	Tare 3	Final(1) grams	Final(2) grams	Δ wt. grams	Blk. Cor. grams	Net wt. grams
1017 FHA	G-3	445	104.2775	104.2772	104.2776	104.6023	104.6020	.3248	.0041	.3207
01013 FILTER$_1$ #	28052		0.4518	0.4518		0.5585	0.5587	.1067	—	.1067
FILTER$_2$ #	27011		0.4602	0.4602		0.9467	0.9471	.4865	—	.4865
01014 FH TOTAL # P.16-3	27010		0.4588	0.4588		0.6255	0.6258	.1667		.1667
BHW										
BHA										
TOTAL										
Comments		20 ml wash / 515								
ACETONE BLK										
WATER BLK										

CODE: FHA=Front half acetone wash BHW=Back half water(Impinger contents + water wash) BHA=Back half

PARTICULATE SAMPLE ANALYSES Analyst CAW Date 7/11/80

Plant US Gypsum Sampling Location Rock Dryer Outlet Run # 3
Test Date 6/6/80 Test Period _____ Stack # _____ Process# _____

	Beaker #	Volume ml	Tare(1) grams	Tare(2) grams	Tare 3	Final(1) grams	Final(2) grams	Δ wt. grams	Blk. Cor. grams	Net wt. grams
FHA	G-37	260	103.5621	103.5619	103.5616	103.5689	103.5687	.0071	.0021	.0050
01053 FILTER$_1$ #	27014		0.4598	0.4598		0.4670	0.4675	.0072	—	.0072
FILTER$_2$ #										
01056 FH TOTAL										.0122
BHW										
BHA										
TOTAL										
Comments										

Plant US Gypsum Sampling Location Rock Dryer Inlet Run # 3
Test Date 6/6/80 Test Period _____ Stack # _____ Process# _____

	Beaker #	Volume ml	Tare(1) grams	Tare(2) grams	Tare 3	Final(1) grams	Final(2) grams	Δ wt. grams	Blk. Cor. grams	Net wt. grams
FHA	G-35	110	98.0098	98.0098	98.0095	98.0613	98.0615	.0518	.0013	.0505
01046 FILTER$_1$ #	27017		0.4629	0.4629		4.4796	4.4794	4.0165	—	4.0165
FILTER$_2$ #										
01052 FH TOTAL										
BHW										
BHA										
TOTAL										
Comments		50 ml min. 160								

ROY F. WESTON

B-4

Plant US Gypsum Sampling Location Rock dryer Inlet Run # 3
Test Date 6/6/80 Test Period _____ Stack # _____ Process# _____

	Beaker #	Volume ml	Tare(1) grams	Tare(2) grams	Tare 3	Final(1) grams	Final(2) grams	Δ wt. grams	Blk. Cor. grams	Net wt. grams
FHA	I-25	535	97.2782	97.2780	97.2777	102.0086	102.0086	4.7309	.0053	4.7256
FILTER$_1$ #										
FILTER$_2$ #										
01051 FH TOTAL										
BHW										
BHA										
TOTAL		130 2								
Comments		665								
ACETONE BLK										
WATER BLK										

CODE: FHA=Front half acetone wash BHW=Back half water(impinger contents + water wash) BHA=Back half acetone wash FH TOTAL=Front half total weight TOT Total weight

PARTICULATE SAMPLE ANALYSES Analyst AW Date 7/9/80

Plant US Gypsum Sampling Location Board End Sawing Run # 3
Test Date 6/5/80 Test Period _____ Stack # _____ Process# _____

	Beaker #	Volume ml	Tare(1) grams	Tare(2) grams	Tare 3	Final(1) grams	Final(2) grams	Δ wt. grams	Blk. Cor. grams	Net wt. grams
FHA	J-28	200	103.4151	103.4148	103.4146	103.4268	103.4265	.0119	.0018	.0101
01035 FILTER$_1$ #	27097		.4560	.4560		.4800	.4805	.0240	—	.0240
FILTER$_2$ #										
01037 FH TOTAL										.0341
BHW										
BHA										
TOTAL										
Comments		sample wash 230								

Plant US. Gypsum Sampling Location Board End Sawing Run # 1
Test Date 6/5/80 Test Period Outlet Stack # _____ Process# _____

	Beaker #	Volume ml	Tare(1) grams	Tare(2) grams	Tare 3	Final(1) grams	Final(2) grams	Δ wt. grams	Blk. Cor. grams	Net wt. grams
FHA	J-32	480	102.1697	102.1697	102.1694	102.1766	102.1762	.0068	.0042	.0026
01031 FILTER$_1$ #	27052		.4533	.4533		.4581	.4582	.0048	—	.0048
FILTER$_2$ #										
FH TOTAL										.0074
01032 BHW										
BHA										
TOTAL										
Comments		sample wash 530								

ROY F. WESTON

Plant US Gypsum Sampling Location Board End Sawing Outlet Run # 1
Test Date 6/5/80 Test Period _____ Stack # _____ Process# _____

	Beaker #	Volume ml	Tare(1) grams	Tare(2) grams	Tare 3	Final(1) grams	Final(2) grams	Δ wt. grams	Blk. Cor. grams	Net wt. grams
FHA	J-22	105	100.1234	100.1231	100.1232	100.1296	100.1296	.0065	.0012	.0053
FILTER$_1$ #										
FILTER$_2$ #										
FH TOTAL										
BHW										
01041 BHA										
TOTAL										
Comments		sample wash 155								
ACETONE BLK										
WATER BLK										

CODE: FHA=Front half acetone wash BHW=Back half water(impinger contents + water wash) BHA=Back half acetone wash FH TOTAL=Front half catch weight TOTAL=Total train catch weight

PARTICULATE SAMPLE ANALYSES Analyst NIG Date 6-30-80

Plant U.S. Gypsum Sampling Location #4 Kettle Calciner Inlet Run # 2
Test Date 6-4-80 Test Period _____ Stack # _____ Process# _____

	Beaker #	Volume ml	Tare(1) grams	Tare(2) grams	Final(1) grams	Final(2) grams	Δ wt. grams	Blk. Cor. grams	Net wt. grams
01018 FHA	G-17	125	101.4315	101.4320	101.4328	101.4325	.0010	.0010	—
FILTER$_1$ #									
FILTER$_2$ #									
FH TOTAL									
BHW									
BHA									
TOTAL									
Comments									

Plant U.S. Gypsum Sampling Location #4 Kettle Calciner Inlet Run # 3
Test Date 6-4-80 Test Period _____ Stack # _____ Process# _____

	Beaker #	Volume ml	Tare(1) grams	Tare(2) grams	Final(1) grams	Final(2) grams	Δ wt. grams	Blk. Cor. grams	Net wt. grams
01020 FHA	G-27	340	100.8738	100.8742	114.5473	114.5475	13.6735	.0071	13.6664
FILTER$_1$ #		320							
FILTER$_2$ #		260							
FH TOTAL		92.0							
BHW									
BHA									
TOTAL									
Comments									

9-8 ROY F. WESTON

Plant U.S. Gypsum Sampling Location #4 Kettle Calciner Inlet Run # 1
Test Date 6-3-80 Test Period _____ Stack # _____ Process# _____

	Beaker #	Volume ml	Tare(1) grams	Tare(2) grams	Final(1) grams	Final(2) grams	Δ wt. grams	Blk. Cor. grams	Net wt. grams
01009 FHA	G-26	165	100.3153	100.3154	106.1296	106.1296	5.8193	.0093	5.8100
FILTER$_1$ #		370							
FILTER$_2$ #		535							
FH TOTAL									
BHW									
BHA									
TOTAL									
Comments									
ACETONE BLK									
WATER BLK									

FHA ont ac e v Bl ack wi (im er ent wat ash HA= half acetone wash. FH TOTAL=Front half catch weight TOTAL=Total train catch weight

PARTICULATE SAMPLE ANALYSES Analyst AW Date 7/9/80

Plant US Gypsum Sampling Location Rock Dryer Outlet Run # 1
Test Date 6/4/80 Test Period _____ Stack # _____ Process# _____

	Beaker #	Volume ml	Tare(1) grams	Tare(2) grams	Tare 3	Final(1) grams	Final(2) grams	Δ wt. grams	Blk. Cor. grams	Net wt. grams
FHA	I-23	120	101.8185	101.8183	101.8181	101.8259	101.8255	.0074	.0010	.0064
01044 FILTER$_1$ #	27051		0.4568	0.4568		0.4637	0.4642	.0069	—	.0069
FILTER$_2$ #										
01030 FH TOTAL										
BHW										
BHA										
TOTAL										
Comments	30 volume									

Plant US Gypsum Sampling Location #4 Kettle Calciner Run # 2
Test Date 6/3/80 Test Period B.H. Inlet Stack # _____ Process# _____

	Beaker #	Volume ml	Tare(1) grams	Tare(2) grams	Tare 3	Final(1) grams	Final(2) grams	Δ wt. grams	Blk. Cor. grams	Net wt. grams
FHA	I-33	—	108.0320	108.0315	108.0318	159.0718	159.0720	51.0403	—	51.0403
FILTER$_1$ #										
FILTER$_2$ #										
01012 FH TOTAL										
BHW										
BHA										
TOTAL										
Comments										

B-7

ROY F. WESTON

01012 powder

Plant US Gypsum Sampling Location #4 Kettle Calciner B.H. Run # 3
Test Date 6/4/80 Test Period Inlet Stack # _____ Process# _____

	Beaker #	Volume ml	Tare(1) grams	Tare(2) grams	Tare 3	Final(1) grams	Final(2) grams	Δ wt. grams	Blk. Cor. grams	Net wt. grams
01022,3 FHA	I-18	210	103.6715	103.6713		105.1682	105.1685	1.4969	.0017	1.4952
FILTER$_1$ #										
FILTER$_2$ #										
FH TOTAL										
BHW										
BHA										
TOTAL										
Comments										
ACETONE BLK										
WATER BLK										

CODE: FHA=Front half acetone wash BHW=Back half water(Impinger contents + water wash) BHA=Back half acetone wash FH TOTAL=Front half catch weight TOTAL=Total train catch weight

PARTICULATE SAMPLE ANALYSES Analyst (AW) Date 7/9/80

Plant: US Gypsum Sampling Location #4 Kettle Calciner Run # 2
Test Date 6/3/80 Test Period Baghouse Inlet Stack # Process#

	Beaker #	Volume ml	Tare(1) grams	Tare(2) grams	Tare 3	Final(1) grams	Final(2) grams	Δwt. grams	Blk. Cor. grams	Net wt. grams
FHA	G-30	415	97.6985	99.6984	99.6982	100.3846	100.3842	.6860	.0040	.6820
FILTER$_1$ #										
FILTER$_2$ #										
FH TOTAL										
BHW										
BHA										
TOTAL										
Comments		gain rinse 495								

01018

Plant: US Gypsum Sampling Location Back Door Inlet Run # 2
Test Date 6/4/80 Test Period (2 of 2) Stack # Process#

	Beaker #	Volume ml	Tare(1) grams	Tare(2) grams	Tare 3	Final(1) grams	Final(2) grams	Δwt. grams	Blk. Cor. grams	Net wt. grams
FHA	G-41	490	102.1005	102.1002	102.1002	106.6790	106.6786	4.5784	.0047	4.5737
FILTER$_1$ #										
FILTER$_2$ #										
FH TOTAL										
BHW										
BHA										
TOTAL										
Comments		gain rinse 590								

B-8 01058 ROY F. WESTON

Plant US Gypsum Sampling Location #4 Kettle Calciner Inlet Run # 1
Test Date 6/3/80 Test Period Stack # Process#

	Beaker #	Volume ml	Tare(1) grams	Tare(2) grams	Tare 3	Final(1) grams	Final(2) grams	Δwt. grams	Blk. Cor. grams	Net wt. grams
FHA	G-10	—	99.7001	99.7000	99.6996	144.7162	144.8466	45.0166	—	45.0166
FILTER$_1$ #	20055		0.4500	0.4500		2.9118	2.9121	2.4618	—	2.4618
FILTER$_2$ #	27015		0.4603	0.4603		0.5390	0.5385	.0782	—	.0782
FH TOTAL	28053		0.4520	0.4520		0.8319	0.8319	.3799	—	.3799
BHW										
BHA			—							
TOTAL										
Comments										
ACETONE BLK										
WATER BLK										

01008 FILTER$_3$ 01007 powder

CODE: FHA=Front half acetone wash BHW=Back half water(impinger contents + water wash) BHA=Back half acetone wash FH TOTAL=Front half catch weight TOTAL=Total train catch weight

PARTICULATE SAMPLE ANALYSES Analyst CAW Date 7/9/80

Plant U.S. Gypsum Sampling Location _____ Run # _____
Test Date 1 Test Period _____ Stack # _____ Process# _____

ACETONE BLANK

	Beaker #	Volume ml	Tare(1) grams	Tare(2) grams	Tare 3	Final(1) grams	Final(2) grams	Δ wt. grams	Blk. Cor. grams	Net wt. grams
FHA	J-14	200	105.0653	105.0650	105.0649 ✓	105.0668	105.0665 ✓	.0016	—	.0016
FILTER$_1$ #										
FILTER$_2$ #										
FH TOTAL										
BHW										
BHA										
TOTAL										
Comments										0.000008 g/m3

Plant US Gypsum Sampling Location #4 Kettle Calciner B.H Run # 3
Test Date 6/4/80 Test Period Inlet Stack # _____ Process# _____

	Beaker #	Volume ml	Tare(1) grams	Tare(2) grams	Tare 3	Final(1) grams	Final(2) grams	Δ wt. grams	Blk. Cor. grams	Net wt. grams
FHA	J-36	—	104.2420	104.2415 ✓	104.2416	141.9607 ✓	141.9605	37.7187	—	37.7187 ✓
FILTER$_1$ #	28054		0.4515	0.4515 ✓		0.7271 ✓	0.7272	.2756	—	.2756 ✓
FILTER$_2$ #	28084		0.4571	0.4571 ✓		0.5560	0.5559 ✓	.0988	—	.0988 ✓
FH TOTAL	27016		0.4624	0.4624 ✓		2.6518 ✓	2.5521	2.0894	—	2.0894 ✓
BHW										
BHA										
TOTAL										
Comments										

B-9
01021 powder
ROY F. WESTON 01019

Plant _____ Sampling Location _____ Run # _____
Test Date _____ Test Period _____ Stack # _____ Process# _____

	Beaker #	Volume ml	Tare(1) grams	Tare(2) grams		Final(1) grams	Final(2) grams	Δ wt. grams	Blk. Cor. grams	Net wt. grams
FHA										
FILTER$_1$ #										
FILTER$_2$ #										
FH TOTAL										
BHW										
BHA										
TOTAL										
Comments										
ACETONE BLK										
WATER BLK										

CODE: FHA=Front half acetone wash BHW=Back half water(Impinger contents + water wash) BHA=Back half acetone wash FH TOTAL=Front half catch weight TOTAL=Total train catch weight

PARTICULATE SAMPLE ANALYSES Analyst NHG Date 6/30/80

Plant U.S. Gypsum Sampling Location #4 Kettle Calciner Exhaust Run # 1
Test Date 11/6/3/80 Test Period Outlet Stack # Process#

	Beaker #	Volume ml	Tare(1) grams	Tare(2) grams	Final(1) grams	Final(2) grams	Δwt. grams	Blk. Cor. grams	Net wt. grams
01003 FHA	G-18	125	98.3388	98.3389	98.3788	98.3783	.0395	.0010	.0385
FILTER$_1$ #									
FILTER$_2$ #									
FH TOTAL									
BHW									
BHA									
TOTAL									
Comments									

Plant Sampling Location Kettle Calciner Exhaust Outlet Run # 2
Test Date 6-2-80 Test Period Stack # Process#

	Beaker #	Volume ml	Tare(1) grams	Tare(2) grams	Final(1) grams	Final(2) grams	Δwt. grams	Blk. Cor. grams	Net wt. grams
01011 FHA	G-8	375	95.5573	95.5572	95.5693	95.5697	.0121	.0030	.0091
01005 FILTER$_1$ #	27018		0.4633	0.4633	0.4674	0.4679	.0041	—	.0041
FILTER$_2$ #									
FH TOTAL									.0132
BHW									
BHA									
TOTAL									
Comments									

Plant Sampling Location Kettle Calciner Exhaust Outlet Run # 3
Test Date 6-11-80 Test Period Stack # Process#

	Beaker #	Volume ml	Tare(1) grams	Tare(2) grams	Final(1) grams	Final(2) grams	Δwt. grams	Blk. Cor. grams	Net wt. grams
01024 FHA	G-2	280	99.9730	99.9729	99.9963	99.9967	.0234	.0022	.0212
01005 FILTER$_1$ #	28085		0.4591	0.4591	0.4622	0.4625	.0031	—	.0031
FILTER$_2$ #									
FH TOTAL									.0243
BHW									
BHA									
TOTAL									
Comments									
ACETONE BLK									
WATER BLK									

CODE: FHA=Front half acetone wash BHW=Back half water(impinger contents + water wash) BHA=Back half acetone w... FH TOTAL=F... ha... atc... igh... TOTAL ...tal ...n c... we...

ROY F. WESTON

Lt

Liter #		Tar 1	Tar 2	final 1	final 2	AWT.
1		.1786	.1784	.1871	.1873	
2		.1641	.1639	.1726	.1727	.0087
3		.1790	.1789	.1889	.1889	.0100
4		.1644	.1643	.1766	.1763	.0119
5		.1765	.1764	.2066	.2065	.0300
6		.1643	.1643	.2771	.2771	.1128
7		.1776	.1774	.1845	.1844	.0070
8		.1630	.1630	.1967	.1967	.0337
9		.2500	.2506	.2813	.2815	.0307
1		.1790	.1788	.1823	.1822	.0041
2		.1637	.1635	.1676	.1676	.0070
3		.1772	.1770	.1840	.1840	.0130
4		.1661	.1661	.1792	.1791	.0318
5		.1786	.1786	.2106	.2104	.0428
6		.1630	.1630	.2059	.2058	.0147
7		.1777	.1775	.1922	.1922	.0032
8		.1642	.1640	.1672	.1672	.0020
9		.2504	.2501	.2521	.2521	.0462
23F-1		.1791	.1791	.3320	.3320	.0259
2	U.S.	.1641	.1641	.1900	.1902	.0313
3	Gypsum	.1768	.1768	.2084	.2081	.0440
4	Rock	.1651	.1649	.2089	.2090	.0737
5	Dryer	.1781	.1781	.2520	.2518	.0361
6	Inlet -	.1639	.1639	.2000	.2000	.0059
7	Run 1	.1762	.1762	.1821	.1821	.0013
8		.1629	.1631	.1645	.1642	.0017
9		.2512	.2512	.2529	.2529	
1		.1790	.1787			
2		.1655	.1655			
3		.1800	.1800			
4		.1636	.1634			
5		.1775	.1773			
6		.1951	.1951			
7		.1792	.1792			
8		.1629	.1627			
9		.2556	.2556			

N.A.

N.A.

N.A.

To Page

Read & Understood by me

E.J.

Date 7-14-80

Invented by

Date

Recorded by B-11

Project No.

Book No.

TITLE

From Pa...

	Filter	Tare 1	Tare 2	final 1	final 2	
	13F-1	.1778	.1775			
	2	.1633	.1630			
	3	.1793	.1790			
	4	.1628	.1628		N.A.	
	5	.1782	.1782			
	6	.1650	.1653			
	7	.1787	.1785			
	8	.1638	.1638			
	9	.2544	.2542			
	14F-1	.1797	.1797			
	2	.1639	.1639			
	3	.1760	.1764		N.A	
	4	.1620	.1620			
	5	.1775	.1775			
	6	.1613	.1613			
	7	.1780	.1780			
	8	.1642	.1642			
	9	.2559	.2557			
US Gypsum Rotc Dryer Inlet Run 2	15F-1	.1780	.1780	.3843	.3845	.271
	2	.1625	.1625	.2014	.2012	.038
	3	.1789	.1789	.2102	.2105	.031
	4	.1628	.1625	.2412	.2413	.078
	5	.1783	.1780	.2192	.2193	.04
	6	.1620	.1618	.1881	.1881	.026
	7	.1767	.1767	.1827	.1827	.001
	8	.1617	.1617	.1639	.1636	.001
	9	.2503	.2503	.2522	.2523	.002
	16F-1	.1789	.1791			
	2	.1634	.1634			
	3	.1761	.1765			
	4	.1630	.1630		N.A	
	5	.1786	.1786			
	6	.1619	.1619			
	7	.1774	.1774			
	8	.1640	.1640			
	9	.2502	.2503			

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Witnessed & Understood by me.	Date	Invented by	Da
		Recorded by	

B-12

Project No. ____ COPY

TITLE ____ Book No. ____

From Page No.

	filter #		Trial 1	Trial 2	final 1	final 2	
	9F-	1	.1787	.1785			
		2	.1640	.1640			
		3	.1786	.1783			
		4	.1644	.1644			
		5	.1780	.1777			
		6	.1654	.1651			
		7	.1784	[illegible]		N.A.	
		8	.1641	.1641			
		9	[illegible]	.2579			
	10f-	1	[illegible]	.1764			
		2	.1620	[illegible]		N.A.	
		3	.1798	.1796			
		4	.1660	.1663			
		5	.1792	.1790			
		6	.1635	.1632			
		7	.1789	.1787			
		8	.1664	.1661			
		9	.2519	.2517			
US Gypsum Rock Dryer outlet Run 1	11F-	1	.1782	.1780	.1787	.1788	.0007
		2	.1650	.1650	.1652	.1652	.0002
		3	.1783	.1783	.1785	.1785	.0002
		4	.1638	.1635	.1642	.1644	.0007
		5	.1786	.1783	.1794	.1794	.0011
		6	.1646	.1645	.1655	.1655	.0010
		7	.1787	.1787	.1800	.1800	.0013
		8	.1645	.1645	.1652	.1654	.0009
		9	.2527	.2527	.2541	.2544	.0017
US Gypsum Rock Dryer Inlet Run #3	12F-	1	.1783	.1783	.2770	.2772	.1492
		2	.1630	.1630	.1956	.1953	.0323
		3	.1788	.1788	.2154	.2150	.0362
		4	.1630	.1630	.1913	.1913	.0283
		5	.1782	.1780	.2336	.2336	.0556
		6	.1646	.1643	.1800	.1800	.0057
		7	.1777	.1775	.1806	.1803	.0028
		8	.1641	.1641	.1652	.1650	.0009
		9	.2541	.2543	.2557	.2554	.0014

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Recorded by

B-13

TITLE Anderson Tiles

Project No. _____

Book No. _____

Fin. Page No. / Client	filter #	final 1	final 2	Tare 1	Tare 2	final (2)	final (2)
U.S. Gypsum Board End sawing Run 1 6-5-80	1D-1	.1968	.1965	.1935	.1933	.0085	
	2	.1671	.1669	.1659	.1657	.0012	
	3	.1905	.1905	.1902	.1900	.0005	
	4	.1663	.1662	.1655	.1653	.0008	
	5	.2000	.1997	.1941	.1940	.0057	
	6	.1695	.1698	.1665	.1663	.0032	
	7	.1964	.1962	.1949	.1947	.0015	
	8	.1788	.1789	.1784	.1781	.0007	
	9 Fil	.2053	.2053	.2048	.2045	.0008	
Run 2	2D-1	.1358	.1360	.1349	.1351	.0009	
	2	.1262	.1262	.1250	.1250	.0012	
	3	.1357	.1359	.1346	[illegible]	.0011	
	4	.1249	.1252	[illegible]	.1243	.0006	N.A.
	5	[illegible]	[illegible]	.1361	.1361	.0009	
	6	.1249	[illegible]	.1239	[illegible]	.0010	
	7	.1363	.1363	[illegible]	.1361	.0004	
	8	.1259	.1260	.1243	[illegible]	.0016	
	9 Fil	.2549	.2549	.2542	[illegible]	[illegible]	
Run #4	3D-1	.1365	.1365	.1353	.1355	[illegible]	
	2	.1263	.1265	.1249	[illegible]	.0014	
	3	.1378	.1380	[illegible]	[illegible]	.0018	
	4	.1265	[illegible]	.1254	[illegible]	.0009	N.A.
	5	[illegible]	[illegible]	.1364	[illegible]	.0009	
	6	.1260	.1262	[illegible]	[illegible]	.0013	
	7	.1380	.1380	.1373	[illegible]	.0007	
	8	.1258	.1255	.1242	[illegible]	.0016	
	9 Fil	.2541	[illegible]	.2540	[illegible]	[illegible]	
Run 3	1	.1377	.1377	.1363	[illegible]	.0014	
	2	[illegible]	.1274	.1252	[illegible]	[illegible]	
	3	.1372	[illegible]	.1350	[illegible]	.0022	N.A.
	4	.1266	.1266	[illegible]	.1250	.0018	
	5	.1374	[illegible]	.1357	[illegible]	.0017	
	6	.1273	.1274	.1248	.1248	.0025	
	7	.1374	.1374	.1357	.1357	.0017	
	8	.1267	.1269	.1247	[illegible]	.0020	
	9 Fil	.2545	.2545	.2531	[illegible]	.0017	

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Witnessed & Understood by me. | Date | Invented by | Date

Recorded by

ANALYTICAL DATA

PLANT U. S. Gypsum Co.

DATE 6-3-80

SAMPLING LOCATION #4 Kettle Calciner Inlet Duct

SAMPLE TYPE EPA 5 Particulate

RUN NUMBER 1

SAMPLE BOX NUMBER 1

CLEAN UP MAN Jackson BLJ

COMMENTS:

FRONT HALF

LABORATORY RESULTS

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

CONTAINER 01009 — 50.8266 mg

FILTER NUMBER 27015₁ ____

CONTAINER 01007 — 2.9199 mg

28055₂ ____

28053₃ ____

FRONT HALF SUBTOTAL 53.7465 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 53.7465 mg

MOISTURE

IMPINGERS

FINAL VOLUME	616 ml	118 + 244 + 254 = 616
INITIAL VOLUME	200 ml	
NET VOLUME	416 ml	

SILICA GEL

FINAL WEIGHT	209.8 g	____ g
INITIAL WEIGHT	204.6 g	____ g
NET WEIGHT	5.2 g	____ g

SUBTOTAL ____ g

TOTAL MOISTURE 421.2 g

ANALYTICAL DATA

PLANT U. S. Gypsum Co.

DATE 6-3-80

SAMPLING LOCATION #4 Kettle Calciner Inlet to B. H.

SAMPLE TYPE EPA 5 Part.

RUN NUMBER 2

SAMPLE BOX NUMBER 1

CLEAN UP MAN Jackson OLD

COMMENTS:

FRONT HALF

LABORATORY RESULTS

ACETONE WASH OF NOZZLE, PROBE, CYCLONE (BYPASS), FLASK, FRONT HALF OF FILTER HOLDER — CONTAINER 01012 — 56.5370 g

FILTER NUMBER 27010 1. _____

28052 2. _____

27011 3. _____

CONTAINER 01013 — 0.7599 g

FRONT HALF SUBTOTAL 57.2969 g

BACK HALF

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

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

CONTAINER _____ _____ mg

ETHER-CHLOROFORM EXTRACTION _____ mg

CONTAINER _____ _____ mg

BACK HALF SUBTOTAL _____ mg

TOTAL WEIGHT 57.2969 g

MOISTURE

IMPINGERS

FINAL VOLUME	625 ml	124
INITIAL VOLUME	200 ml	255
NET VOLUME	425 ml	296
		625

SILICA GEL

FINAL WEIGHT	204.8 g	_____ g
INITIAL WEIGHT	200.0 g	_____ g
NET WEIGHT	4.8 g	_____ g

SUBTOTAL _____ g

TOTAL MOISTURE 429.8 g

ANALYTICAL DATA

PLANT U.S. Gypsum

DATE 6/4/80

SAMPLING LOCATION #4 Kettle Calciner Inlet

SAMPLE TYPE Particulate

RUN NUMBER 3

SAMPLE BOX NUMBER 1

CLEAN UP MAN Ralston & Jackson BLJ

COMMENTS:

FRONT HALF

LABORATORY RESULTS

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

CONTAINER 01021 — 52.8808 mg

FILTER NUMBER 28084 & — CONTAINER 01019 — 2.4633 mg

28054 & —

27016 & —

FRONT HALF SUBTOTAL — 55.3438 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 — 55.3438 mg

MOISTURE

IMPINGERS

FINAL VOLUME	618	ml	115
INITIAL VOLUME	200	ml	252
NET VOLUME	418	ml	251
			618

SILICA GEL

FINAL WEIGHT	212.9	g	—	g
INITIAL WEIGHT	209.8	g	—	g
NET WEIGHT	3.1	g	—	g

S.G. = 3.1 SUBTOTAL — g

TOTAL MOISTURE 421.1 g

ANALYTICAL DATA

PLANT U. S. Gypsum

DATE 6-3-80

SAMPLING LOCATION #4 Kettle Calciner Exhaust Outlet

SAMPLE TYPE Particulate

RUN NUMBER 1 R

SAMPLE BOX NUMBER _____

CLEAN UP MAN Meeter

COMMENTS:

Nozzle - .300

FRONT HALF

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

FILTER NUMBER 28081 (01010)

LABORATORY RESULTS

FHW

CONTAINER 01003 — 0.0389 mg

CONTAINER _____ — 0.0053 mg

FRONT HALF SUBTOTAL 0.0442 mg

BACK HALF

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

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

CONTAINER _____ — - mg

ETHER-CHLOROFORM EXTRACTION — - mg

CONTAINER _____ — - mg

BACK HALF SUBTOTAL — - mg

TOTAL WEIGHT 0.0442 mg

MOISTURE

IMPINGERS

FINAL VOLUME	1784 ml	34
INITIAL VOLUME	200 ml	175
NET VOLUME	1584 ml	207
		130
		236
		220
		227
		176
		235
		178
		1784

SILICA GEL

FINAL WEIGHT	422.3 g	_____ g
INITIAL WEIGHT	400 g	_____ g
NET WEIGHT	22.3 g	_____ g

SUBTOTAL _____ g

TOTAL MOISTURE 1606.3 g

ANALYTICAL DATA

PLANT U. S. Gypsum - EPA

DATE 6-3-86

SAMPLING LOCATION #4 Kettle Calciner Exhaust Outlet

SAMPLE TYPE Particulate

RUN NUMBER 2

SAMPLE BOX NUMBER _____

CLEAN UP MAN Meeter / Frye

COMMENTS:

FRONT HALF

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

FILTER NUMBER 2708 (01015)

	FHW	LABORATORY RESULTS
CONTAINER	01016	0.0091 mg
CONTAINER	_____	0.0041 mg

FRONT HALF SUBTOTAL 0.0132 mg

BACK HALF

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

ACETONE WASH OF IMPINGERS, CONNECTORS AND BACK HALF OF FILTER HOLDER 142 216 234 180 178 240 222 172 184

CONTAINER	– mg
ETHER-CHLOROFORM EXTRACTION	– mg
CONTAINER	– mg
BACK HALF SUBTOTAL	– mg
TOTAL WEIGHT	0.0132 mg

MOISTURE

IMPINGERS

FINAL VOLUME	1768	ml
INITIAL VOLUME	200	ml
NET VOLUME	1568	ml

1768

SILICA GEL

FINAL WEIGHT	423.8	g	_____	g
INITIAL WEIGHT	200	g	_____	g
NET WEIGHT	223.8	g	_____	g

SUBTOTAL _____ g

TOTAL MOISTURE 1590.8 g

ANALYTICAL DATA

PLANT U.S. Gypsum

DATE 6-3-80

SAMPLING LOCATION #4 Kettle Calciner Exhaust Outlet

SAMPLE TYPE Particulate

RUN NUMBER 3

SAMPLE BOX NUMBER 2

CLEAN UP MAN Meeter

COMMENTS:

FRONT HALF

LABORATORY RESULTS

ACETONE WASH OF NOZZLE, PROBE, CYCLONE (BYPASS), FLASK, FRONT HALF OF FILTER HOLDER — CONTAINER 01024 — 0.0212 mg

FILTER NUMBER 28085 1005 — CONTAINER — 0.0031 mg

FRONT HALF SUBTOTAL 0.0243 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 0.0243 mg

156
196
196
229
184
250
80
236
174
1701

MOISTURE

IMPINGERS

FINAL VOLUME	1701	ml
INITIAL VOLUME	200	ml
NET VOLUME	1501	ml

SILICA GEL

FINAL WEIGHT	426.0	g		g
INITIAL WEIGHT	404.8	g		g
NET WEIGHT	21.2	g		g

SUBTOTAL ____ g

TOTAL MOISTURE 1522.2 g

765.1
210.9
546.0

ANALYTICAL DATA

PLANT U.S. Gypsum

DATE 4/5-/90

SAMPLING LOCATION Rock Dryer Inlet

SAMPLE TYPE Particulate

RUN NUMBER 1 A

SAMPLE BOX NUMBER 1

CLEAN UP MAN Ralston, Jackson

COMMENTS:

FRONT HALF

LABORATORY RESULTS

6.3531

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

CONTAINER 01054 _____ g

FILTER NUMBER 27050 _____

CONTAINER 01095 .6837 g

FRONT HALF SUBTOTAL 7.0368 g

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 7.0368 g

MOISTURE

IMPINGERS

FINAL VOLUME 264 ml

INITIAL VOLUME 200 ml

NET VOLUME 64 ml

SILICA GEL

FINAL WEIGHT 212.9 g _____ g

INITIAL WEIGHT 205.7 g _____ g

NET WEIGHT 7.2 g _____ g

SUBTOTAL _____ g

TOTAL MOISTURE 71.2 g

ANALYTICAL DATA

PLANT U.S. Gypsum Co.

DATE 6-6-88

SAMPLING LOCATION Rock Dryer B.H. Inlet

SAMPLE TYPE EPA 5

RUN NUMBER 2

SAMPLE BOX NUMBER 1

CLEAN UP MAN Jackson

COMMENTS:

FRONT HALF

LABORATORY RESULTS

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

CONTAINER 01046 / 01047 — 4951 / 4.5737 mg

FILTER NUMBER 27013

CONTAINER 01043 — 3.7674 mg

FRONT HALF SUBTOTAL 8.8362 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 8.8362 mg

MOISTURE

IMPINGERS

FINAL VOLUME	260	ml
INITIAL VOLUME	200	ml
NET VOLUME	60	ml

SILICA GEL

FINAL WEIGHT	208.0	g	_____	g
INITIAL WEIGHT	200	g	_____	g
NET WEIGHT	8.0	g	_____	g

SUBTOTAL _____ g

TOTAL MOISTURE 68.0 g

ANALYTICAL DATA

PLANT U.S. Gypsum

DATE 6/4/80

SAMPLING LOCATION Rock Dryer Inlet

SAMPLE TYPE Particulate

RUN NUMBER 3

SAMPLE BOX NUMBER 1

CLEAN UP MAN Ralston & Jackson

COMMENTS:

FRONT HALF

LABORATORY RESULTS

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

CONTAINER 01051 (01048) 4.7256 mg

FILTER NUMBER 27017

CONTAINER 01048 4.0165 mg

FRONT HALF SUBTOTAL 8.7421 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 8.7421 mg

MOISTURE

IMPINGERS

FINAL VOLUME	258	ml
INITIAL VOLUME	200	ml
NET VOLUME	58.0	ml

SILICA GEL

FINAL WEIGHT	210.4	g	_____	g
INITIAL WEIGHT	200	g	_____	g
NET WEIGHT	10.4	g	_____	g

SUBTOTAL _____ g

TOTAL MOISTURE 68.4 g

ANALYTICAL DATA

PLANT U.S. Gypsum

DATE 6-5-80

SAMPLING LOCATION Rock Dryer Outlet

SAMPLE TYPE Particulate

RUN NUMBER #1

SAMPLE BOX NUMBER 2

CLEAN UP MAN Meeter

COMMENTS:

FRONT HALF

LABORATORY RESULTS

ACETONE WASH OF NOZZLE, PROBE, CYCLONE (BYPASS), FLASK, FRONT HALF OF FILTER HOLDER — CONTAINER 01038 — .0035 mg

FILTER NUMBER 27051 — CONTAINER 41044 — .0069 mg

FRONT HALF SUBTOTAL .0104 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 .0104 mg

MOISTURE

IMPINGERS

FINAL VOLUME	268 ml	68	
INITIAL VOLUME	200 ml	7.5	
NET VOLUME	68 ml	75.5	

SILICA GEL

FINAL WEIGHT	216.5 g	____ g
INITIAL WEIGHT	209 g	____ g
NET WEIGHT	7.5 g	____ g

SUBTOTAL ____ g

TOTAL MOISTURE 75.5 g

ANALYTICAL DATA

PLANT U. S. Gypsum

DATE 6-6-80

SAMPLING LOCATION Rock Dryer Outlet

SAMPLE TYPE Particulate

RUN NUMBER 2

SAMPLE BOX NUMBER 2

CLEAN UP MAN Meeter / Robertson

COMMENTS:

FRONT HALF

LABORATORY RESULTS

ACETONE WASH OF NOZZLE, PROBE, CYCLONE (BYPASS), FLASK, FRONT HALF OF FILTER HOLDER — CONTAINER 01049 — .0027 mg

FILTER NUMBER 27012 (01055) — CONTAINER — .0066 mg

FRONT HALF SUBTOTAL .0093 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 .0093 mg

MOISTURE

IMPINGERS

FINAL VOLUME	267	ml
INITIAL VOLUME	200	ml
NET VOLUME	67	ml

8.2
67
75.2

SILICA GEL

FINAL WEIGHT	208.2 g	—	g
INITIAL WEIGHT	200 g	—	g
NET WEIGHT	8.2 g	—	g

SUBTOTAL 75.2 g

TOTAL MOISTURE 75.2 g

ANALYTICAL DATA

PLANT U.S. Gypsum

DATE 6-6-80

SAMPLING LOCATION Rock Dryer Outlet

SAMPLE TYPE Particulate

RUN NUMBER 3

SAMPLE BOX NUMBER _____

CLEAN UP MAN Meeter / Robertson

COMMENTS:

FRONT HALF

LABORATORY RESULTS

ACETONE WASH OF NOZZLE, PROBE, CYCLONE (BYPASS), FLASK, FRONT HALF OF FILTER HOLDER — CONTAINER 01056 — .0050 mg

FILTER NUMBER 27014 (01057) — CONTAINER _____ — .0072 mg

FRONT HALF SUBTOTAL .0122 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 .0122 mg

MOISTURE

IMPINGERS

FINAL VOLUME	272 ml		72
INITIAL VOLUME	200 ml		6.1
NET VOLUME	72 ml		78.1

SILICA GEL

FINAL WEIGHT	214.3 g	_____ g	
INITIAL WEIGHT	208.2 g	_____ g	
NET WEIGHT	6.1 g	_____ g	

SUBTOTAL 78.1 g

TOTAL MOISTURE 78.1 g

ANALYTICAL DATA

PLANT U. S. Gypsum

DATE 6-5-80

SAMPLING LOCATION Board End Sowing Outlet

SAMPLE TYPE Particulate

RUN NUMBER 1

SAMPLE BOX NUMBER _____

CLEAN UP MAN Meeter

COMMENTS:

FRONT HALF

LABORATORY RESULTS

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

CONTAINER 01032 .0026 mg

FILTER NUMBER 27052 (01031)

CONTAINER _____ .0048 mg

FRONT HALF SUBTOTAL .0074 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 .0074 mg

MOISTURE

IMPINGERS

FINAL VOLUME	~~202~~ 212	ml
INITIAL VOLUME	~~200~~ 200	ml
NET VOLUME	~~02~~ 12	ml

SILICA GEL

FINAL WEIGHT	205	g	_____	g
INITIAL WEIGHT	200	g	_____	g
NET WEIGHT	5	g	_____	g

SUBTOTAL 17 g

TOTAL MOISTURE 17 g

ANALYTICAL DATA

PLANT U.S. Gypsum

DATE 6/5/80

SAMPLING LOCATION Board End Sawing Outlet

SAMPLE TYPE Particulate

RUN NUMBER 2

SAMPLE BOX NUMBER _____

CLEAN UP MAN Ralston

COMMENTS:

FRONT HALF

LABORATORY RESULTS

ACETONE WASH OF NOZZLE, PROBE, CYCLONE (BYPASS), FLASK, FRONT HALF OF FILTER HOLDER — CONTAINER 01033 — .0058 mg

FILTER NUMBER 27007 — CONTAINER 01034 — .0161 mg

FRONT HALF SUBTOTAL .0219 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 .0219 mg

MOISTURE

IMPINGERS

FINAL VOLUME	199	ml
INITIAL VOLUME	200	ml
NET VOLUME	-1.0	ml

SILICA GEL

FINAL WEIGHT	218.6 g	_____	g
INITIAL WEIGHT	200 g	_____	g
NET WEIGHT	18.6 g	_____	g

SUBTOTAL 17.6 g

TOTAL MOISTURE 17.6 g

ANALYTICAL DATA

PLANT U.S. Gypsum - EPA

DATE 6-5-80 //

SAMPLING LOCATION Board End Sawing Outlet

SAMPLE TYPE Particulate

RUN NUMBER 3

SAMPLE BOX NUMBER 2

CLEAN UP MAN Meeter

COMMENTS:

FRONT HALF

LABORATORY RESULTS

ACETONE WASH OF NOZZLE, PROBE, CYCLONE (BYPASS), FLASK, FRONT HALF OF FILTER HOLDER — CONTAINER 01037 — .0101 mg

FILTER NUMBER 27042 (01035) — CONTAINER ____ — .0240 mg

FRONT HALF SUBTOTAL .0341 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 .0341 mg

MOISTURE

IMPINGERS

FINAL VOLUME	203	ml
INITIAL VOLUME	200	ml
NET VOLUME	3	ml

3
13.1
16.1

SILICA GEL

FINAL WEIGHT	213.1	g	____	g
INITIAL WEIGHT	200	g	____	g
NET WEIGHT	13.1	g	____	g

SUBTOTAL 16.1 g

TOTAL MOISTURE 16.1 g

APPENDIX C

SAMPLE CALCULATIONS

RADIAN
CORPORATION

June 19, 1980

Mr. Barry L. Jackson
Project Manager
Weston Consultants
Westonway
West Chester, PA 19380

Dear Mr. Jackson:

As discussed during the emission testing at the U.S. Gypsum plant in Shoals, Indiana, I am providing you with the enclosed estimate of the uncontrolled emissions from the plant's board end-sawing operation. This estimate should allow an accurate calculation of the efficiency of the fabric filter dust collector tested on June 4, 1980.

If you have any questions, please contact me.

Very truly yours,

Michael A. Palazzolo

Michael A. Palazzolo
Chemical Engineer

Enclosure

MAP:pkk

Enclosure

cc: Tom Nelson, Radian
Glen DeWolf, Radian

3024 Pickett Road / Durham, North Carolina 27705 / (919) 493-4574

Calculation of Uncontrolled Emissions from Board End-Sawing Operation During Emission Testing at the U.S. Gypsum Plant in Shoals, Indiana

Data and Assumptions

1. Cut ¼" off each side of board
2. Board size: ½" X 4' X 12'
3. Board weight: 1.72 pounds per square foot
4. Board line speed at 158 feet per minute
5. 10 percent of sawed volume is voids

Calculation of Weight Removed per Board

Volume of dust = 2 (½") 1/12 X (½") 1/12 X 4'

Density of board = $1.72\ lb/ft^2 \times \frac{48\ ft^2}{2\ ft^3}$

$= 41.3\ lb/ft^3$

Weight of cuttings per board = $0.0069\ ft^3\ (0.90)\ (41.3\ lb/ft^3)$

$= 0.256$ lb/board

Calculation of Uncontrolled Emissions

Board rate = $\frac{158\ ft/min}{12\ ft/board} = 13.2\ \frac{boards}{min}$

Emission rate = (0.256 lb/board) 13.2 board/min) (60 min/hr)

= 203 lb/hr

SAMPLE CALCULATIONS

Test Run 1- BOARD END-SAWING DISCHARGE DUCT

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

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

$$V_{m(std)} = \frac{17.647 \times .990 \times 53.69 \times \left(30.0 + \frac{2.43}{13.6} \right)}{\left(103 + 460 \right)} = 50.18$$

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.

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

$$V_{w(std)} = (0.04707 \times 12.0 \ ) + (0.04715 \times 5.0 \ ) = .8$$

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) $(ft^3)/(lb\text{-}mole)(^oR)$] ; 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)$(ft^3)/(lb\text{-}mole)(^oR)$], 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.

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

$$B_{ws} = \frac{.8}{.8 + 50.18} = .016$$

Where:

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

4. Mole fraction of dry gas.

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

$$M_d = 1 - .016 = 0.984$$

Where:

M_d = Mole fraction of dry gas, dimensionless

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

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

$MW_d = (0.440 \times 0.0) + (0.320 \times 20.9) + [0.280 (79.1 + 0.0)]$

$= 28.97$

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.

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

$MW_s = (28.97 \times .984) + [18 (1 - .984)]$

$= 28.80$

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.

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

$$v_s = 85.49 \times .840 \times 1.4478 \times \left[\frac{92 + 460}{30.01 \times 28.8}\right]^{\frac{1}{2}}$$

$$= 83.1$$

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.

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

$$Q_{s(std)} = \frac{1058.8 \times 83.1 \times .721 \times .984 \times 30.01}{(92 + 460)}$$

$$= 3,400.$$

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.

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

$$I = \frac{17.316 \times (92 + 460) \times 50.18}{83.1 \times 64 \times 30.01 \times .984 \times (.171)^2}$$

$$= 104.4$$

Where:

I = Percent of isokinetic sampling.

θ = Total sampling time, minutes.

D_n = Diameter of nozzle, inches.

17.316 = Factor which includes standard temperature ($528^{\circ}R$), 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), $\frac{(\text{in. Hg})\ (\text{in}^2)\ (\text{min})}{(^{\circ}R)\ (\text{ft}^2)\ (\text{sec})}$.

10. Particulate concentration, gr/dscf.

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

$$C_l = 0.015432 \times \frac{7.41}{50.18} = 0.002$$

Where:

C_l = 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.

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

$$= 0.0085714 \times 0.002 \times 3,400. = 0.066$$

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 RECORDS

Calibration Book

Date 5/20/80 Box No. 1225

Barometric pressure, P_b = 29.99 E in. Hg Dry gas meter No. ____

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	767.538 772.499	68	68 75 78	66 68 70	70.8333	69.93	.9922	1.86
1.0	5	772.499 777.518	68	79 85 87	67 72 74	77.6666	9.42	.9960	2.04
~~2.0~~ 1.5	10	777.518 787.620	68	82 94 95	74 77 78	82	15.95	.9895	2.1
~~4.0~~ 2.0	10	787.620 797.799	68	89 99 96	78 81 82	88	13.86	.9817	2.09
6.0	10								
8.0	10								
						Average		.9898	

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		1.86
1.0	0.0737		2.04
1.5 ~~2.0~~	0.147		2.10
2.0 ~~4.0~~	0.294		2.09
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

CAL. B - 2W

RAC
1225

Date 6/25/80 Box No. _____

Barometric pressure, P_b = 30.10 B in. Hg Dry gas meter No. _____

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	ΔH@
0.5	5	144.893 150.033	78	88 92 95	86 89 84	89.5	13.1	.9923	1.986
1.0	5	150.033 155.176	78	91 97 98	87 89 90	92.0	9.48	.9950	1.977
~~2.0~~ 1.5	10	155.176 165.533	78	94 101 04	89 90 92	95.3	15.52	.9929	1.952
~~4.0~~ 2.0	10	165.533 175.944	78	99 107 08	91 93 94	98.66	13 39	.9926	1.972
6.0	10								
8.0	10								
						Average		.9932	1.972

Calculations

ΔH	$\frac{\Delta H}{13.6}$	Y: $\frac{V_w P_b (t_d + 460)}{V_d\left(P_b + \frac{\Delta H}{13.6}\right)(t_w + 460)}$	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	549.5-30.10=5 555-30.14-5.14 .9923	.01585 549.5-30.10 .000001	538×13.1 5 1.986
1.0	0.0737	553-30.10=5 559-30.14-5.13 .9950	.0317 .000019 553-30.10	538-9.48 10 1.977
1.5 ~~2.0~~	0.147	553-30.10-10 559-30.14-10.14 .9929	.04755 .000028 553-30.10	538-15.52 10 1.952
2.0 ~~4.0~~	0.294	559.7-30.10-10 569.7-30.14-10.14 .9926	.0634 .000042 569.7-30.10	538-13.39 10 1.972
6.0	0.431			
8.0	0.588	Avg. .9932		

Y = 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 5-2-80 Box No. NUTECH #2

Barometric pressure, P_b = 29.93 in. Hg Dry gas meter No. [redacted]

DR.

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	206.436 211.367	64°	66° 68	72°	68.67	12.65	1.0217	1.7605
1.0	5	211.367 216.398	64°	71°	75° 77°	74.33	9.19	1.0129	1.8386
1.5	5	216.388 221.496	64°	77°	80° 82°	79.67	7.63	1.0044	1.8822
2.0	10	221.496 231.330	64°	81°	85° 87°	84.33	13.43	1.0012	1.9272
6.0	10								
8.0	10								
						Average		1.0100	1.8521

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		
1.0	0.0737		
2.0	0.147		
4.0	0.294		
6.0	0.431		
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

CALIBRATOR 3H

NUTECH

Date 7/17/80

Box No. #2

Barometric pressure, P_b = 29.18 F in. Hg

Dry gas meter No. ____

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	ΔH@
0.5	5	956.340 961.436	82	92 93	94	93	13.02	1.002	1.950
1.0	5	961.436 966.507	82	93 94	96	94.3	8.5	1.004	1.698
~~2.0~~ 1.5	10	977.187 987.324	83	95 96	98	96.3	15.3	1.007	2.02
~~4.0~~ 2.0	10	987.324 997.524	83	96 98	99	97.7	13.4	1.002	2.06
6.0	10								
8.0	10								
						Average		1.004	1.933

Calculations

ΔH	$\frac{\Delta H}{13.6}$	Y: $\frac{V_w P_b (t_d + 460)}{V_d\left(P_b + \frac{\Delta H}{13.6}\right)(t_w + 460)}$		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	553-29.18-5 543-29.29-5.036	1.002	.01585 - .000001 553-29.18	542 - 13.02 ÷ 5 ✓	1.956
1.0	0.0737	554.3-29.18-5 542 - 29.25-5.041	1.004	.0317 - .000002 554.3 - 29.18	542 - 8.5 ÷ 5 ✓	1.698
1.5 ~~2.0~~	0.147	556.3-29.18-10 543-29.29-10.137	1.007	.04755 - .000029 556.3 - 29.18	543 - 15.3 ÷ 10 ✓	2.02
2.0 ~~4.0~~	0.294	5577-29.18-10 543 - 29.33 - 10.12	1.002	.0634 - .000039 5527 - 29.18	543 - 13.4 ÷ 10 ✓	2.06
6.0	0.431					
8.0	0.588	Avg	1.004		Avg	1.934

Y = 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

CALIBRATION

NUTECH

Date 5/20/80

Box No. # 4

Barometric pressure, P_b = 30.19 in. Hg

Dry gas meter No. _____

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	200.349 205.483	74	86 86	87	86	12.86	.991	
1.0	5	215.845 221.033	74	90 91	91	91	9.34	.992	
1.5 ~~2.0~~	10	205.483 215.845	74	89 90	93		15.83	.990	
2.0 ~~4.0~~	10	221.033 231.287	74	91 93	95	93	15.83	.986	
6.0	10								
8.0	10								
						Average		.990	

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	.991	
1.0	0.0737	.992	
1.5 ~~2.0~~	0.147	.990	
2.0 ~~4.0~~	0.294	.986	
6.0	0.431		
8.0	0.588	Ave = .990	

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

Calibrator KW

NUTECH

Date 7-16-80 Box No. #4

Barometric pressure, P_b = 29.89 S in. Hg Dry gas meter No. _____

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	ΔHθ
0.5	5	988.177 993.340	82	98 100	101	99.66	12.45	.9988	1.726
1.0	5	993.340 998.528	82	101 102	102	101.7	9.08	.9963	1.841
~~2.0~~ 1.5	10	019.922 030.864	83	99 101	102	100.7	16.43	.9929	1.999
~~4.0~~ 2.0	10	008.945 019.410	82	104 106	107	105.7	13.43	.9906	1.994
6.0	10								
8.0	10								
						Average		.9947	1.89

Calculations

ΔH	$\frac{\Delta H}{13.6}$	Y: $\frac{V_w P_b (t_d + 460)}{V_d\left(P_b + \frac{\Delta H}{13.6}\right)(t_w + 460)}$	ΔHθ: $\frac{0.0317\ \Delta H}{P_b (t_d + 460)}\left[\frac{(t_w + 460)\,\theta}{V_w}\right]^2$
0.5	0.0368	559.7-24.89-5 543-29.99-5.165 .9988	.01585 .0000009 559.7-29.89 543-12.45 ÷5 Y 1.726
1.0	0.0737	561.7-29.89-5 543-29.96-5.185 .9963	.0517 .000619 561.7-29.89 543-9.08 ÷5 Y 1.841
1.5 ~~2.0~~	0.147	565.7-24.89x10 543-30.100-10.542 .9929	.04752 .00000278 565.7-29.89 544.15.43 ÷10 Y 1.999
2.0 ~~4.0~~	0.294	565.7-24.89-10 543-30.100-10.465 .9906	.0634 .0000637 565.7-29.89 543-13.43 ÷10 1.994
6.0	0.431		
8.0	0.588	Avg .9947	Avg 1.89

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

ΔHθ = 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

Calibration Check: Nomographs

Probe	Temp, °F 100	150	200	250
1-3'	15	30	40	50
2-3'	14	29	38	50
1-9'	22	33	52	60
2-9'	20	37	50	60
1-6'	36	50	72	77

Rheo. settin

Laboratory Weston by BLJ

Date 4-18-80

Sample case thermometers:
① Adj. filt. chamber thermometers to boiling pt. (212°F). OK
② Adj. control box & exit mfg. thermometers to ice pt. (32°F). OK
③ Check pyrometers & thermocouples @ ea. pt. OK ± 2°F.

(1) *C* Factor Adjustment

Probe 1	Probe 2	Probe 3
$C_p =$ _____	$C_p =$ _____	$C_p =$ _____

If $C_p > 0.87$ or $C_p < 0.83$

$$C_{adj} = C\frac{C_p^2}{(0.85)^2}$$

Probe 1	Probe 2	Probe 3
$= C\frac{(\quad)^2}{(0.85)^2}$	$= C\frac{(\quad)^2}{(0.85)^2}$	$= C\frac{(\quad)^2}{(0.85)^2}$
$= C(\quad).$	$= C(\quad).$	$= C(\quad).$

(2) Accuracy (±10% Deviation acceptable)

(a) *K*-factor line, ΔH and Δp scales

Aline	Set		ΔH Reading 1	Nomograph 2	3	Nomograph 4	5
$\Delta p = 0.001$; $\Delta H = 0.1$	$\Delta p = 0.01$		1.02	0.97	0.93	1.00	0.92
	$\Delta p = 0.1$		10.0	9.4	8.7	9.3	8.6
$\Delta p = 10.0$; $\Delta H = 10.0$	$\Delta p = 1.0$		1.02	1.02	1.06	0.99	1.04
	$\Delta p = 0.1$		0.103	0.108	0.108	0.100	0.11
$\Delta p = 0.1$; $\Delta H = 1.0$	$\Delta p = 1.0$		9.9	9.4	9.5	9.9	9.4
	$\Delta p = 0.01$		0.101	0.109	0.106	0.102	0.10

(b) *C*, t_s and D_n scales

ΔH_{calc}	*C*	D_n	t_s (°F)	Δp	ΔH Readings 1	Nomograph 2	3	Nomograph 4	5
0.47	2.0	0.5	2500	0.02	0.47	0.49	0.51	0.48	0.45
8.6	1.5	0.4	1500	0.8	8.7	8.6	8.6	9.0	8.5
0.31	1.0	0.3	1000	0.1	0.32	0.32	0.33	0.31	0.3
4.7	0.7	0.25	500	3.0	4.8	4.7	4.8	4.8	4.7
0.60	0.5	0.2	200	0.9	0.64	0.65	0.66	0.62	0.16

$$\Delta H_{calc} = K_e\, C\, \frac{D_h^4}{T_s}\, \Delta p$$

$K_e = 5.507 \times 10^5$

1, 2, 4 OK

3, 5 Unacceptable

WEIGHT TRACEABILITY CERTIFICATE

TO: WESTON, Roy F.
1426 Lewis Lane
West Chester, Pa. 19380

The Mettler balances listed below have been serviced by our representative on June 24 1980

This is to certify that the test weights used are traceable to the National Bureau of Standards.

Mettler identification number of test weights used: #26

Mettler calibration date of test weights used: 11-29-79

National Bureau of Standards test number: 732/0670-38

National Bureau of Standards test date: 6-6-78

Type and serial number of balances serviced:

H10W 388106	H5 52252
H15 2F3215	P163 564070

Joseph Rogowicz
Mettler Service Representative

6-24-80
Date of Issue

METTLER

Mettler Instrument Corporation
Box 71, Hightstown, NJ 08520
(609) 448-3000

F124 (9/78)

RUTGERS
THE STATE UNIVERSITY
OF NEW JERSEY

COOK COLLEGE

New Brunswick, New Jersey

THIS IS TO CERTIFY THAT

NANCY ROBERTSON

HAS COMPLETED THE SHORT COURSE

VISUAL EMISSIONS EVALUATION RECERTIFICATION

APRIL 17, 1980

COOK COLLEGE
RUTGERS UNIVERSITY

Grant E. Walton

Dean

D-9

TAYLOR INSTRUMENT / CONSUMER PRODUCTS DIVISION SYBRON CORPORATION / ARDEN, N C 28704

REPORT OF CALIBRATION

CERTIFIED PRECISION QUALITY
Type of Instrument

Catalog No. 21015 Serial No. 67F 0961

Scale and Subdivision 203 to 311°F, 0.5°F

FEATURES: TOTAL IMMERSION

Results of Tests

Reading of Thermometer	Temperature IPTS-68	Correction To Be Applied
32.050	32.000	-.050
205.000	205.000	.000
240.000	240.000	.000
274.950	275.000	+.050
310.050	310.000	-.050

If the correction is + the true temperature is higher than the indicated temperature; if the correction is — the true temperature is lower than the indicated temperature.

The following paragraph applies to thermometers with an ice point. The tabulated corrections apply provided the ice-point reading, taken after exposure for not less than 3 days to a temperature of about 25° C. (77° F) is 32.050 If the ice-point reading is found to be higher (or lower) than stated, all other readings will be higher (or lower) by the same amount. If the thermometer is used or tested at a given temperature shortly after being heated to a higher temperature, an error of (minus) —0.01° or less; for each 10° difference between the two temperatures, may be introduced.

We hereby certify that this thermometer is calibrated by comparison to "working standards" whose primary source of accuracy rests in platinum resistance thermometers calibrated by the National Bureau of Standards. Continuing accuracy is assured by periodically submitting our platinum resistance thermometers to the National Bureau of Standards. In addition, intermediate checks are made against a triple point of water cell, a freezing point of zinc cell, and a freezing point of tin cell.

Date 10/22/76
Recertified 6/9/77 No change

Signed R. Wheeler

A7400-C REV. 6/75

APPENDIX E

PROJECT PARTICIPANTS

PROJECT PARTICIPANTS

Peter J. Marks Vice President Laboratory Services	econENVIRONomics Division
Barry L. Jackson Supervisor Air Testing	econENVIRONomics Division
David A. Ralston Assistant Project Scientist	econENVIRONomics Division
Paul D. Meeter Assistant Project Scientist	econENVIRONomics Division
Nancy R. Robertson Senior Laboratory Technician	econENVIRONomics Division
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Martin Appelbaum Laboratory Technician	econENVIRONomics Division