EMISSION TESTING REPORT

ETB TEST NUMBER 71-MM-02

FINAL

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Emissions From
Dry Process Raw Mill
And Finish Mill Systems
at

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IDEAL CEMENT COMPANY
TIJERAS, NEW MEXICO

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Project Officer
Clyde E. Riley

ENVIRONMENTAL PROTECTION AGENCY
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PREFACE

The work reported herein was conducted by The Roy F. Weston Company, pursuant to a Task Order issued by the Environmental Protection Agency (EPA), under the terms of EPA contract No. CPA-70-132 Task Order 1. Mr. G. E. Benson served as the Project Engineer and directed the Weston field team consisting of: Mr. Brent Cowan and Mr. Larry Johnson. Mr. Howard Schiff and Mr. Cowan performed the pollutant analyses at the Weston laboratories. Roy F. Weston submitted to EPA a draft document from which EPA personnel prepared the final report (Test No. 71-MM-02).

Approved

Environmental Protection Agency

Gene W. Smith
Chief, Metallurgical and Mechanical Section

April, 1972

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ACKNOWLEDGMENTS

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E. F. Gilardi, Senior Project Manager	Concept Technology Division
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G. E. Benson, Project Engineer	Concept Technology Division
H. F. Schiff, Assistant Project Scientist	Concept Technology Division
B. W. Cowan, Technician	Concept Technology Division
L. W. Johnson, Technician	Concept Technology Division

We also wish to acknowledge the following personnel of the Ideal Cement Company, Tijeras, New Mexico for their cooperation and assistance in the preparation of this report:

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The following staff members of EPA-OAP have participated in the planning and execution of this project and/or preparation of this report:

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Chemical Engineer — Source Control Branch

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Chemical Engineer — Emissions Testing Branch

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LIST of FIGURES

~ unknown control device (in other)
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SUMMARY

The Office of Air Programs of the Environmental Protection Agency contracted with Roy F. Weston, Inc. to conduct thirteen OAP particulate sampling runs on six stacks which vent the raw mill and finish mill systems at the Tijeras, New Mexico plant of the Ideal Cement Company. Duplicate tests were conducted on each stack plus a trial run on one stack.

The isokinetic sampling ratios were between 98.6 and 114.3.

A summary of the sampling results is compiled in Tables 1-6.

Table 1

SUMMARY OF PARTICULATE DATA FOR NO. 2 RAW MILL

Run Number	1	2
Date	3-9-71	3-10-71
Percent Excess Air	—	—
Percent Isokinetic	109.6	108.2
Stack Flow Rate - SCFM* dry	3177	3210
Stack Flow Rate - ACFM wet	4684	4708
Volume of Dry Gas Sampled - SCF*	84.47	79.33
Feed Rate - tons/hr	53.1	57.2
Particulates		
Probe, Cyclone, & Filter Catch		
mg	172.5	197.1
gr/SCF* dry	0.0314	0.0383
gr/CF @ Stack Conditions	0.0213	0.0261
lbs/hr.	0.855	1.049
lbs/ton feed	0.0161	0.0183
Total Catch		
mg	201.1	213.9
gr/SCF* dry	0.0367	0.0415
gr/CF @ Stack Conditions	0.0248	0.0283
lbs/hr	0.998	1.140
lbs/ton feed	0.0188	0.0199
% Impinger Catch	14.2	7.9

* 70°F, 29.92" Hg

Table 2

SUMMARY OF PARTICULATE DATA FOR NO. 2 RAW MILL AIR SEPARATOR

Run Number	1	2
Date	3-11-71	3-11-71
Percent Excess Air	—	—
Percent Isokinetic	98.6	100.3
Stack Flow Rate - SCFM* dry	9799	9615
Stack Flow Rate - ACFM wet	14,902	14,623
Volume of Dry Gas Sampled - SCF*	83.56	83.42
Feed Rate - tons/hr	62.1	62.1
Particulates		
Probe, Cyclone, & Filter Catch		
mg	151.0	108.2
gr/SCF* dry	0.0278	0.0199
gr/CF @ Stack Conditions	0.0183	0.0131
lbs/hr.	2.332	1.644
lbs/ton feed	0.0376	0.0265
Total Catch		
mg	163.7	121.2
gr/SCF* dry	0.0302	0.0224
gr/CF @ Stack Conditions	0.0198	0.0147
lbs/hr	2.528	1.836
lbs/ton feed	0.0407	0.0296
% Impinger Catch	7.8	10.7

* 70°F, 29.92" Hg

Table 3

SUMMARY OF PARTICULATE DATA FOR NO. 2 RAW MILL FEED-O-WEIGHT

	1	2
Run Number		
Date	3-5-71	3-5-71
Percent Excess Air	—	—
Percent Isokinetic	107.8	110.9
Stack Flow Rate - SCFM* dry	9646	9588
Stack Flow Rate - ACFM wet	12,250	12,256
Volume of Dry Gas Sampled - SCF*	89.47	91.51
Feed Rate - tons/hr	62.7	62.7
Particulates		
Probe, Cyclone, & Filter Catch		
mg	99.7	69.5
gr/SCF* dry	0.0172	0.0117
gr/CF @ Stack Conditions	0.0135	0.00914
lbs/hr.	1.418	0.959
lbs/ton feed	0.0226	0.0153
Total Catch		
mg	112.1	81.6
gr/SCF* dry	0.0193	0.0137
gr/CF @ Stack Conditions	0.0152	0.0107
lbs/hr	1.592	1.122
lbs/ton feed	0.0254	0.0179
% Impinger Catch	11.1	14.8

* 70°F, 29.92" Hg

Table 4

SUMMARY OF PARTICULATE DATA FOR NO. 2 FINISH MILL

Run Number	1 (TRIAL)	2	3
Date	3-2-71	3-3-71	3-3-71
Percent Excess Air	—	—	—
Percent Isokinetic	105.0	102.9	103.6
Stack Flow Rate - SCFM* dry	4886	5261	5089
Stack Flow Rate - ACFM wet	6406	6843	6631
Volume of Dry Gas Sampled - SCF*	36.62	115.95	112.88
Feed Rate - tons/hr	Not Measured	34.6	34.6
Particulates			
Probe, Cyclone, & Filter Catch			
mg	39.7	34.7	35.0
gr/SCF* dry	0.0167	0.00461	0.00477
gr/CF @ Stack Conditions	0.0127	0.00354	0.00366
lbs/hr.	0.699	0.208	0.208
lbs/ton feed	--	0.00601	0.00601
Total Catch			
mg	74.6	51.0	51.2
gr/SCF* dry	0.0314	0.00677	0.00698
gr/CF @ Stack Conditions	0.0239	0.00520	0.00536
lbs/hr	1.31	0.305	0.304
lbs/ton feed	--	0.00882	0.00879
% Impinger Catch	46.8	32.0	31.6

* 70°F, 29.92" Hg

Table 5

SUMMARY OF PARTICULATE DATA FOR NO. 2 FINISH MILL AIR SEPARATOR

Run Number	1	2
Date	3-6-71	3-6-71
Percent Excess Air	—	—
Percent Isokinetic	114.3	111.6
Stack Flow Rate - SCFM* dry	14,178	13,838
Stack Flow Rate - ACFM wet	19,267	18,842
Volume of Dry Gas Sampled - SCF*	77.56	73.95
Feed Rate - tons/hr	32.8	32.8
Particulates		
Probe, Cyclone, & Filter Catch		
mg	23.6	21.8
gr/SCF* dry	0.00468	0.00454
gr/CF @ Stack Conditions	0.00344	0.00333
lbs/hr.	0.569	0.538
lbs/ton feed	0.0173	0.0164
Total Catch		
mg	44.1	41.6
gr/SCF* dry	0.00876	0.00866
gr/CF @ Stack Conditions	0.00644	0.00636
lbs/hr	1.063	1.024
lbs/ton feed	0.0324	0.0312
% Impinger Catch	46.5	47.6

* 70°F, 29.92" Hg

Table 6

SUMMARY OF PARTICULATE DATA FOR NO. 2 FINISH MILL FEED-O-WEIGHT

	1	2
Run Number	3-8-71	3-8-71
Date	NA	NA
Percent Excess Air	106.2	103.5
Percent Isokinetic	10,517	10,587
Stack Flow Rate - SCFM* dry	12,791	12,936
Stack Flow Rate - ACFM wet	100.34	98.39
Volume of Dry Gas Sampled - SCF*	28.7	28.7
Feed Rate - tons/hr		
Particulates		
Probe, Cyclone, & Filter Catch		
mg	20.1	18.8
gr/SCF* dry	0.00308	0.00294
gr/CF @ Stack Conditions	0.00253	0.00240
lbs/hr.	0.223	0.265
lbs/ton feed	0.00953	0.00922
Total Catch		
mg	33.7	31.1
gr/SCF* dry	0.00517	0.00487
gr/CF @ Stack Conditions	0.00425	0.00398
lbs/hr	0.463	0.434
lbs/ton feed	0.0161	0.0151
% Impinger Catch	40.4	39.5

* 70°F, 29.92" Hg

71-MM-02

INTRODUCTION

Under the Clean Air Act, as amended, the Environmental Protection Agency is charged with the establishment of performance standards for new installations or modifications of existing installations in stationary source categories which may contribute significantly to air pollution. A performance standard is a standard for emissions of air pollutants which reflects the best emission reduction systems that have been adequately demonstrated (taking into account economic considerations).

The development of realistic performance standards requires accurate data on pollutant emissions within the various source categories. In the cement industry, eight plants exhibiting well controlled operation have been selected for the emissions testing program. This report presents the particulate emissions data for the Tijeras, New Mexico plant of the Ideal Cement Company.

Between March 1, 1971 and March 12, 1971, Roy F. Weston, Inc. conducted particulate source sampling at the stacks of the baghouse dust collectors of the:

1. No. 2 Finish Mill
2. No. 2 Finish Mill Air Separator
3. No. 2 Finish Mill Feed-O-Weight
4. No. 2 Raw Mill
5. No. 2 Raw Mill Air Separator
6. No. 2 Raw Mill Feed-O-Weight

The raw ball mill dry grinds the raw materials, which are then fed into the kiln. The finish ball mill grinds the clinker and gypsum to the final cement product. The Mill, Air Separator, and Feed-O-Weight operations on each system are vented to separate baghouse dust collectors and out through separate stacks.

The baghouse dust collectors on each system were evidently well maintained on a regular basis.

A trial run was conducted on the No. 2 Finish Mill baghouse stack, followed by two runs on each of the six stacks mentioned.

The following sections of this report include (1) a description of the process, (2) a discussion of the testing procedure and results, (3) an abstract of the report, (4) analytical procedures and results, and (5) sample calculations.

PROCESS DESCRIPTION

Limestone is trucked from the quarry adjacent to the plant and is reduced to less than 3/8" in size in a crusher. Other ingredients (shale and pyrites) are added to the crushed limestone and the combined mixture is fed into a grinding mill (dry) to be pulverized into a fine powder (85% through 200 mesh screen). The mixture is then pneumatically pumped into one of four blending silos.

This blended material, "raw meal", is fed into the upper end of one of two sloping (3/8 inch per foot), slowly revolving (one revolution per minute) kilns. These gas-fired kilns are 375 feet long by 12 feet inside diameter with refractory lining encased in a steel cylinder. During passage through the kiln (approximately 4 hours), the raw materials are heated to a temperature of about 2800°F to produce the element hydraulic calcium silicates, known in the trade as "clinker". This marble-sized clinker material is then discharged from the lower end of the kiln at temperatures exceeding 2000°F and fed immediately into air-quenching cooler units which reduce the temperature of the material to about 150°F. From these coolers, the newly-formed clinker material is conveyed to a storage silo.

A small amount of gypsum (4.45% by weight) is added to the clinker material and this mixture is fed into the finish grinding mill. The mixture leaving the grinding mill is fed to an air-separator or classifier where the coarse material is returned to the mill and the finished cement (90% through 325 mesh screen) is pneumatically pumped to storage silos. Present plant production is approximately 1,350,000 barrels of cement per year.

The control equipment of interest in this report consists of three Norblo baghouse collectors on the "raw meal" grinding system and three Norblo baghouse collectors on the "finish mill" grinding system. The grinding systems and baghouse collectors are similar for both the raw mill and finish mill (see Figures 1 and 2).

The basic unit of the baghouse collector is a compartment which contains 78 cloth filters (6" dia. x 8' 3" long) or a total of 936 ft^2 of filtering area. These bags are arranged in two groups of 39 bags. Each group has its own individual bag holder and shaker controlled by an electric timer with reversing air flow. Each compartment is a 9' tall x 8.6' x 5' unit with a 60^0 hopper below. The particulate matter is collected on the inside of the cloth filter bags and falls during the cleaning cycle to the hopper below where the material is removed by a screw conveyor.

The design data of these collectors is indicated in Tables 7 and 8.

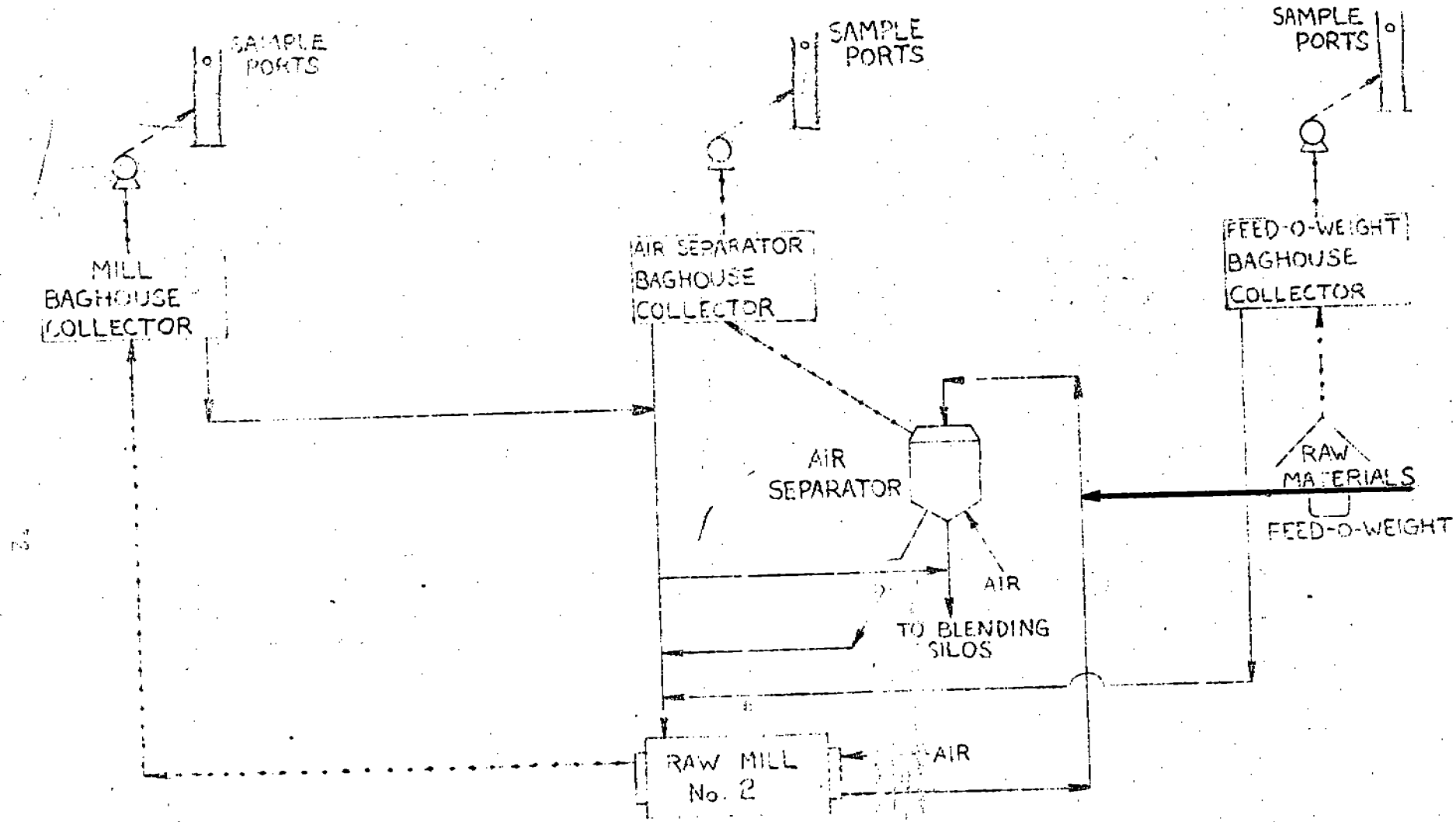

FIGURE 1 – No. 2 RAW MEAL GRINDING SYSTEM

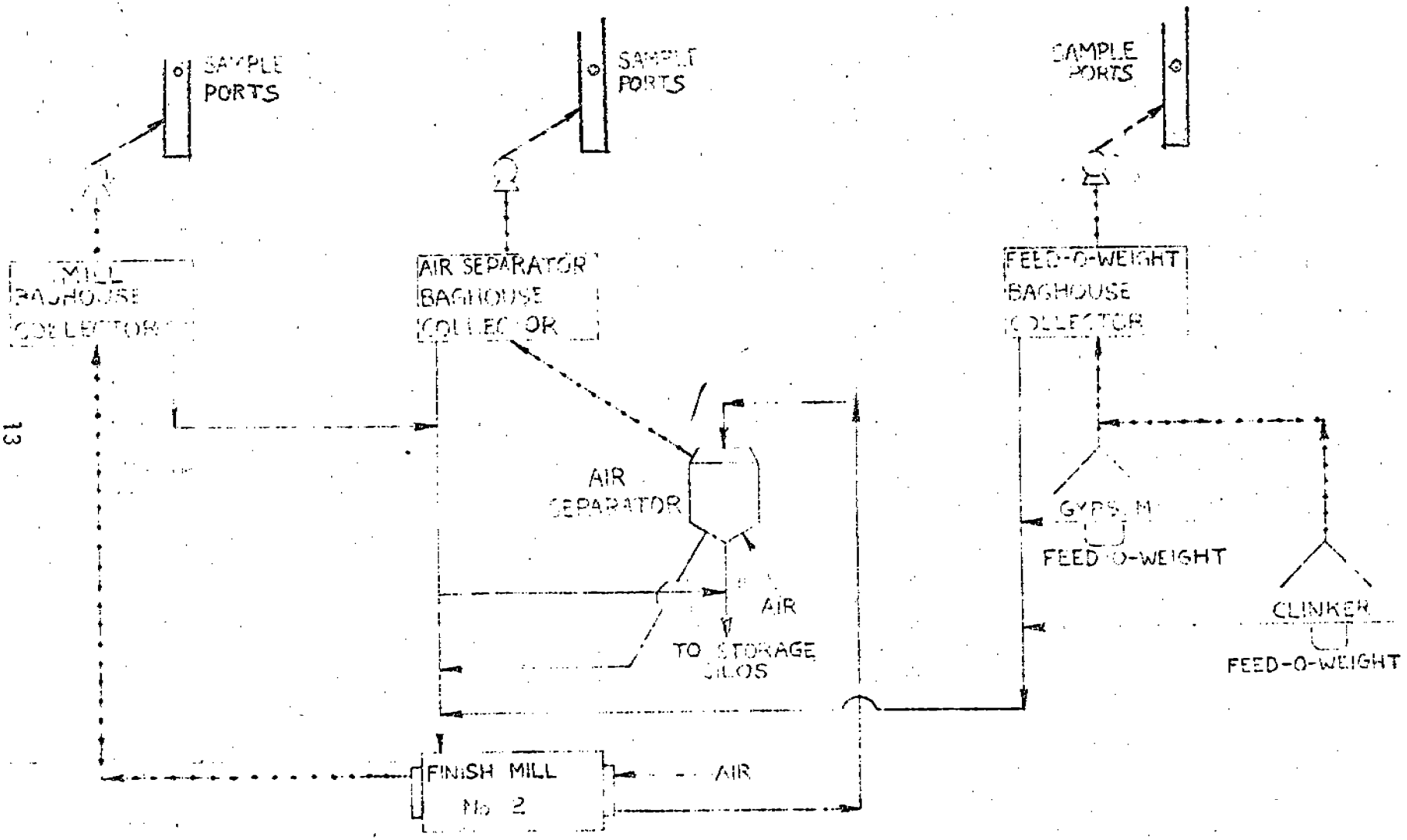

FIGURE 2 – No 2 FINISH MILL GRINDING SYSTEM

Table 7

DESIGN DATA OF RAW MILL GRINDING SYSTEM COLLECTORS

Collector	Number of Compartments	Area (ft^2)	Gas Flow Rate (CFM)	Air-to-cloth Ratio (CFM/ft^2)	(ΔP, in. W.G.)*	Temp. (^oF)	Cleaning cycle
Mill	3	2,808	6,000	2.13	8.7	200	10 sec. shake and reverse air flow every 2.0 min.
Air Separator	8	7,488	16,000	2.14	8.0	200	5 sec. shake and reverse air flow every 2.5 min.
Feed-O-Weight	6	5,616	10,400	1.85	10.5	100	5 sec. shake and reverse air flow every 2.5 min.

*Change in pressure, inches of H_2O guage.

APPENDIX D

LABORATORY PROCEDURES

The following is a detailed outline of the laboratory procedure used in determining the weights of particulates and water collected in the various segments of the EPA-OAP sampling train.

All glassware used for evaporation and residue determinations in the following steps was prepared for use by the following procedure. The beakers were first soaked in 40% nitric acid for several hours. They were then washed and rinsed with distilled water followed by oven-drying. After drying, the beakers were desiccated to constant weight and kept in a desiccator until used. Beakers were weighed to $\pm$0.1 mg.

A. Filter

1.) Preparation
The filters are oven-dried @ 105°C for a minimum of four hours, and then desiccated to constant weight. Filters are weighed to $\pm$0.1 mg. After weighing, the filters are placed in plastic petri dishes until used.

2.) Particulate weight determination
Filter and any loose particulate matter are transferred to a tared glass weighing dish, and desiccated to constant weight. The weight gain is then recorded.

B. Acetone washings prior to filter

1.) The acetone washings are received in glass bottles, and their volume is measured. They are then transferred to the tared beakers prepared as described above.

2.) The acetone washings are allowed to evaporate to dryness at ambient temperature and pressure. The beakers are covered with ribbed cover glasses to facilitate evaporation without allowing dust or other foreign matter into the beakers. When dry, the beakers are desiccated to constant weight. Beakers are weighed to nearest 0.1 mg.

3.) A blank of the acetone (measured amount) is evaporated also as described above. Any residue resulting from this blank is used to correct for the amount of acetone used in the washings. The net weight is the required particulate residue.

C. Impinger water plus water rinsings

1.) The volume of impinger water has been measured in the field and recorded. Final volumes of these samples are measured in the laboratory in order to determine the volume of washings used and to correct for this water using a blank (using the same procedure used in part B-3 above).

2.) At this point an organic extraction of the impinger water is in order. However, this step was omitted since no organic material was considered present.

D. Acetone washings - back

1.) The volume of acetone washings is first measured and then the liquid is transferred to tared beakers (prepared as above) and allowed to evaporate to dryness at ambient temperature and pressure. Upon drying, the beakers are desiccated to constant weight. A blank of the acetone used is also evaporated and any corrections due to the acetone are made if necessary. Beakers are weighed to nearest 0.1 mg.

E. Silica gel

1.) Preparation
The silica gel is placed in a wide mouth plastic bottle and capped. The bottle plus silica gel is then weighed to the nearest 0.1 gm.

2.) After sampling, the bottle plus used silica gel is weighed to the nearest 0.1 gm and the weight of water collected is determined.

Detailed results of these procedures are presented in Tables D-1 and D-2 wherein the distribution of particulates collected within the sampling train is indicated for all tests. Total particulate weights were obtained by adding the weights of the individual sample components.

An emission spectroscopy analysis was conducted on the particulate samples collected from each stack to determine the concentrations ($\mu g/s$)

of the following elements: Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, Sr, V, and Zn. The results of these tests are presented in Table D-3. In general, of the components tested for, iron was present to the highest proportion (reaching concentrations as high as 5%), followed by zinc and strontium. The lead concentration did not exceed 200 μg/g at any stack.

DETAILED RESULTS OF LABORATORY ANALYSIS

BFW No.	Run	Date	Fraction	Location	Original Wash Volume ml	Weight mg	Beaker No.
1374	1	3-11-71	Filter F-78	No. 2 Raw Mill Air Separator	-	44.1	
1375	1	3-11-71	Probe Cyclone Front Filter Wash (Acetone)	No. 2 Raw Mill Air Separator	420	106.9	4
1376	1	3-11-71	(Acetone)	No. 2 Raw Mill Air Separator	285	8.1	3
1377	1	3-11-71	Impinger Water and Wash Water	No. 2 Raw Mill Air Separator	700	4.6	17
			TOTAL PARTICULATE WEIGHT			163.7 6.0	
1410	2	3-11-71	Impinger Water and Wash Water	No. 2 Raw Mill Air Separator	590		123
1411	2	3-11-71	Probe Cyclone Front Filter etc., (Acetone)	No. 2 Raw Mill Air Separator	315	63.9	118
1412	2	3-11-71	Impinger Conn. Rear Filter Holder (Acetone)	No. 2 Raw Mill Air Separator	310	7.	116
1413	2	3-11-71	Filter F-86	No. 2 Raw Mill Air Separator		44.3	
			TOTAL PARTICULATE WEIGHT			121.2 70.4	
1378	1	3-9-71	Filter F-72	No. 2 Raw Mill Baghouse Stack	-		
1379	1	3-9-71	Impinger Conn. (Acetone)	No. 2 Raw Mill Baghouse Stack	315	12.9	5
1380	1	3-9-71	Probe Ft. 1/2 Filter Hold. Cyc., etc.(Acetone)	No. 2 Raw Mill Baghouse Stack	445	102.1	11
1381	1	3-9-71	Impinger Water Water Wash	No. 2 Raw Mill Baghouse Stack	665	15.7	22
			TOTAL PARTICULATE WEIGHT			201.1	

RFW No.	Run	Date	Fraction	Location	Diameter	Weight	
1382	2	3-10-71	Filter F-75	No. 2 Raw Mill Baghouse Stack	-	91.7	
1383	2	3-10-71	Probe, Cyc. Flash (Acetone)	No. 2 Raw Mill Baghouse Stack	360	105.4	7
1384	2	3-10-71	Impinger Conn. Front 1/2 Filter Hold (Acetone)	No. 2 Raw Mill Baghouse Stack	350	12.8	10
1385	2	3-10-71	Impinger Water and Water Wash	No. 2 Raw Mill Baghouse Stack	740	4.0	20
			TOTAL PARTICULATE WEIGHT			213.9	
1386	1	3-5-71	Probe Cyclone Front Filter (Acetone)	No. 2 Raw Mill Feed-O-Weight Stack	300	80.7	33
1387	1	3-5-71	Impinger Wash (Acetone)	No. 2 Raw Mill Feed-O-Weight Stack	250	6.7	2
1388	1	3-5-71	Impinger Wash and Water Wash	No. 2 Raw Mill Feed-O-Weight Stack	710	5.7	26
1389	1	3-5-71	Filter F-62	No. 2 Raw Mill Feed-O-Weight Stack	-	19.0	
			TOTAL PARTICULATE WEIGHT			112.1	
1390	2	3-5-71	Impinger Water Acetone Wash	No. 2 Raw Mill Feed-O-Weight Stack	357	8.1	9
1391	2	3-5-71	Probe, Nozzle Front Filter Acetone Wash	No. 2 Raw Mill Feed-O-Weight Stack	565	54.0	35
1392	2	3-5-71	Impinger Water and Water Wash	No. 2 Raw Mill Feed-O-Weight Stack	245	4.0	27
1393	2	3-5-71	Filter F-59	No. 2 Raw Mill Feed-O-Weight Stack	-	15.5	
			TOTAL PARTICULATE WEIGHT			81.6	

RTI No.	Run	Date	Fraction	Location	Volume ml	Weight mg	Bottle No.
1360	1	3-2-71	Filter F-82	No. 2 Finish Mill Baghouse Stack	-	2.8	
1361	1	3-2-71	Impinger Action Wash	No. 2 Finish Mill Baghouse Stack	340	27.8	16
1362	1	3-2-71	Probe Wash (Acetone)	No. 2 Finish Mill Baghouse Stack	455	36.9	15
1363	1	3-2-71	Impinger Water and Wash	No. 2 Finish Mill Baghouse Stack	920	7.1	25
1372	1	3-2-71	Acetone Blank	No. 2 Finish Mill Baghouse Stack	855	0.	8
	TOTAL PARTICULATE WEIGHT					74.6	
1364	2	3-2-71	Filter F-60	No. 2 Finish Mill Baghouse Stack	-	8.0	
1365	2	3-3-71	Probe Cyclone Front Filter (Acetone)	No. 2 Finish Mill Baghouse Stack	200	26.7	6
1366	2	3-3-71	Impinger Wash (Acetone)	No. 2 Finish Mill Baghouse Stack	230	5.6	12
1367	2	3-3-71	Impinger Water and Wash	No. 2 Finish Mill Baghouse Stack	550	10.7	21
	TOTAL PARTICULATE WEIGHT					51.0	
1368	3	3-3-71	Filter F-87	No. 2 Finish Mill Baghouse Stack	-	8.6	
1369	3	3-3-71	Impinger Wash (Acetone)	No. 2 Finish Mill Baghouse Stack	220	7.8	13
1370	3	3-3-71	Probe Cyclone and Back Filter Wash (Acetone)	No. 2 Finish Mill Baghouse Stack	210	26.4	14
1371	3	3-3-71	Impinger Water Wash	No. 2 Finish Mill Baghouse Stack	590	8.4	19
	TOTAL PARTICULATE WEIGHT					51.2	

BEW No.	Run	Date	Fraction	Location	Original Wash Volume ml	Weight-mg	Beaker No.
1394	2	3-8-71	Impinger Wash (Acetone)	No. 2 Finish Mill Feed-O-Weight Stack	365	3.9	23
1395	2	3-8-71	Probe Cyclone Front Filter (Acetone)	No. 2 Finish Mill Feed-O-Weight Stack	385	18.0	30
1396	2	3-8-71	Impinger Water and Wash Water	No. 2 Finish Mill Feed-O-Weight Stack	450	8.4	29
1397	2	3-8-71	Filter F-55	No. 2 Finish Mill Feed-O-Weight Stack	-	0.8	
	TOTAL PARTICULATE WEIGHT					31.1	
1398	1	3-8-71	Impinger Wash (Acetone)	No. 2 Finish Mill Feed-O-Weight Stack	360	7.7	1
1399	1	3-8-71	Probe Cyclone Front Filter	No. 2 Finish Mill Feed-O-Weight Stack	410	20.1	28
1400	1	3-8-71	Impinger Water Water Wash	No. 2 Finish Mill Feed-O-Weight Stack	435	5.9	36
1401	1	3-8-71	Filter F-54	No. 2 Finish Mill Feed-O-Weight Stack		0	
	TOTAL PARTICULATE WEIGHT					33.7	
1402	1	3-6-71	Probe, Cyclone Flash (Acetone)	No. 2 Finish Mill Air Separator	425	21.0	24
1403	1	3-6-71	Impinger Wash Filter Holder (Acetone)	No. 2 Finish Mill Air Separator	368	15.8	32
1404	1	3-6-71	Impinger Water And Water Wash	No. 2 Finish Mill Air Separator	710	4.7	31
1405	1	3-6-71	Filter F-76	No. 2 Finish Mill Air Separator	-	2.6	
	TOTAL PARTICULATE WEIGHT					44.1	

DFW No.	Run	Date	Fraction	Location	Original Wash Volume ml	Weight-mg	Sample No.
1406	2	3-6-71	Impinger (Acetone) Wash	No. 2 Finish Mill Air Separator	435	10.3	18
1407	2	3-6-71	Probe, Cyclone Filter Wash Acetone	No. 2 Finish Mill Air Separator	410	17.8	34
1408	2	3-6-71	Impinger Water and Water Wash	No. 2 Finish Mill Air Separator	580	9.5	37
1409	2	3-6-71	Filter F-57	No. 2 Finish Mill Air Separator	-	4.0	
			TOTAL PARTICULATE WEIGHT			41.6	

TABLE D-2

SUMMARY OF FILTER CATCHES

Date	Location	RFW #	Run #	Filter #	Net Wt. Particulate, mg
3/2	#2 Fin. Mill Baghouse Stack	1360	1	F82	2.8
3/3	#2 Fin. Mill Baghouse Stack	1364	2	F60	8.0
3/3	#2 Fin. Mill Baghouse Stack	1368	3	F87	8.6
3/5	#2 Raw Mill Feed-O-Weight Stack	1389	1	F62	19.0
3/5	#2 Raw Mill Feed-O-Weight Stack	1393	2	F59	15.5
3/6	#2 Fin. Mill Air Sep. Stack	1405	1	F76	2.6
3/6	#2 Fin. Mill Air Sep. Stack	1409	2	F57	4.0
3/8	#2 Fin. Mill Feed-O-Weight Stack	1401	1	F54	0.0
3/8	#2 Fin. Mill Feed-O-Weight Stack	1397	2	F55	0.8
3/9	#2 Raw Mill Baghouse Stack	1378	1	F72	70.4
3/10	#2 Raw Mill Baghouse Stack	1382	2	F75	91.7
3/11	#2 Raw Mill Air Sep. Stack	1374	1	F78	44.1
		1413	2	F86	44.3

Sample Type	Sample Location	Sample Wt. mg	Sample Vol. Scf	Concentration, µg/g												
				Sb	As	Be	Cd	Cr	Cu	Fe	Pb	Mn	Ni	Sr	V	Zn
Stack	Raw Mill	201.1	84.52	100	<358	<1	<7	100	500	5,000	<36	400	<29	2,000	<7	200
Stack	Raw Mill Feed-O-Weight	112.1	89.51	<198	< 50	1	<10	300	300	1,100	200	500	400	<495	<10	600
Stack	Raw Mill Air separator	121.2	83.40	<183	<458	<2	30	<18	500	1,400	100	500	<37	<458	<10	600
Stack	Finish mill Feed-O-weight	31.1	98.30	<241	<602	<2	100	300	700	24,000	<60	500	800	<602	--	4,000
Stack	Finish Mill	74.6	36.62	<297	<744	<3	<15	400	4,100	9,000	200	200	1,500	<744	<15	3,000
Stack	Finish Mill Air separator	44.1	77.63	<170	<4426	<2	80	<17	1,900	8,000	<43	300	100	<426	<9	4,000
Dust	Raw Mill			<103	<258	<1	<5	50	20	14,000	<26	500	<21	2,000	<5	20
Dust	Finish Mill			200	<285	<1	<6	100	100	53,000	200	900	80	2,000	<6	70
Product				<111	<276	<1	<6	90	30	25,000	100	900	70	2,000	-	40

APPENDIX F

TEST LOG

Table F-1 presents the actual time during which sampling was conducted.

Table F-1

SAMPLING LOG
(No. 2 Raw Mill)

Run	Date	Sampling Port	Began	Ended	Elapsed Time (min)
1	3-9-71	Y	09:30	10:34	64
		X	10:50	11:56	66
2	3-10-71	X	09:30	10:34	64
		Y	10:50	11:54	64
		(No. 2 Raw Mill Air Separator)			
1	3-11-71	1	09:50	10:46	56
		2	11:20	12:16	56
2	3-11-71	1	14:15	15:11	56
		2	15:55	16:51	56
		(No. 2 Raw Mill Feed-O-Weight)			
1	3-5-71	1	09:30	10:30	60
		2	10:40	11:40	60
2	3-5-71	1	14:00	15:00	60
		2	15:10	16:10	60
		(No. 2 Finish Mill)			
1	3-2-71	1	10:50	11:30	40
2	3-3-71	1	09:30	11:30	120
3	3-3-71	1	14:00	16:00	120
		(No. 2 Finish Mill Air Separator)			
1	3-6-71	2	09:30	10:26	56
		1	10:38	11:34	56
2	3-6-71	1	14:00	14:56	56
		2	15:10	16:06	56
		(No. 2 Finish Mill Feed-O-Weight)			
1	3-8-71	1	11:25	12:25	60
		2	12:35	13:35	60
2	3-8-71	2	15:10	16:10	60
		1	16:25	17:25	60