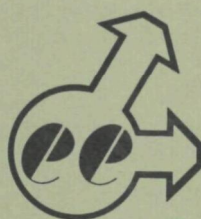


72 - CI - 21
INTERNATIONAL MINERALS AND CHEMICALS
DICALCIUM PHOSPHATE
BARTOW, FLORIDA

MARCH 13 - 14, 1972



environmental engineering, inc.

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72 - CI - 21

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Test Conducted By:

Environmental Engineering, Inc.

Contract CPA - 70 - 82

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INTRODUCTION

Under the direction of the Environmental Protection Agency, Environmental Engineering, Inc. conducted emission tests at the IMC phosphate works in Bartow, Florida. On March 13 - 14, 1972, three test runs were conducted on IMC's dicalcium phosphate production facilities. The purpose of the tests was to obtain data for the use of both the Industrial Studies Branch and the Performance Standards Branch of the Environmental Protection Agency.

Measurements for total fluorides were made at the inlet and outlet ducts of the reactor - granulator, dryer, and screen-mill scrubbers. Grab samples of the scrubbing liquids, the process reactants and the process product were analyzed for fluoride and P_2O_5 content. A schematic flow diagram indicating the sampling locations is given in Figure 1.

Complete test results are given in Appendix A.

SUMMARY OF RESULTS

The plant was operating under normal process conditions during all of the test runs. However, in order to complete two test runs before the plant shut down on March 15, the total sample times of the second and third runs were shortened from 120 minutes to 90 and 70 minutes, respectively.

The only major problem encountered with the sampling occurred at the inlet to the reactor - granulator scrubber; the duct was extremely dusty and the probe frequently became plugged. To alleviate this problem, the nozzle diameter was increased from 0.250 to 0.50 inch. In addition, the test times of the first, second, and third runs were reduced from 120 minutes to 42, 34, and 28 minutes, respectively.

Due to the fact that a larger nozzle was used for the tests at station "J", all three test runs were performed at an isokinetic rate outside of the acceptable range (90% - 110%). Run 1 at the screen-mill scrubber inlet (station "N") was also performed at an under-isokinetic rate. Due to this fact, the reported test results may be biased on the high side.

Runs two and three performed at the dryer scrubber inlet (station "L") were both conducted at a rate above the acceptable isokinetic rate which may have biased (the reported results to the low side. All of the above-mentioned test points are scrubber inlets. It has been pointed out that some of the reported results are probably biased due to isokinetic variations. Any error involved would, of course, affect the validity of the calculated scrubber efficiencies.

During the first test run at the dryer scrubber outlet (station "K") the nozzle size was changed in an attempt to maintain an isokinetic sampling rate; nonetheless, an isokinetic rate was not maintained within an acceptable range. Therefore, the data from this particular test run at the dryer scrubber outlet should not be considered in establishing new source performance standards.

It should be noted that the test samples from the second run at station "M" and the third run at station "N" were damaged in transit; consequently, no emission data is available for these test runs.

A complete summary of stack gas conditions emission levels, and scrubber efficiencies for each test run and test location is given in Tables 1 - 6.

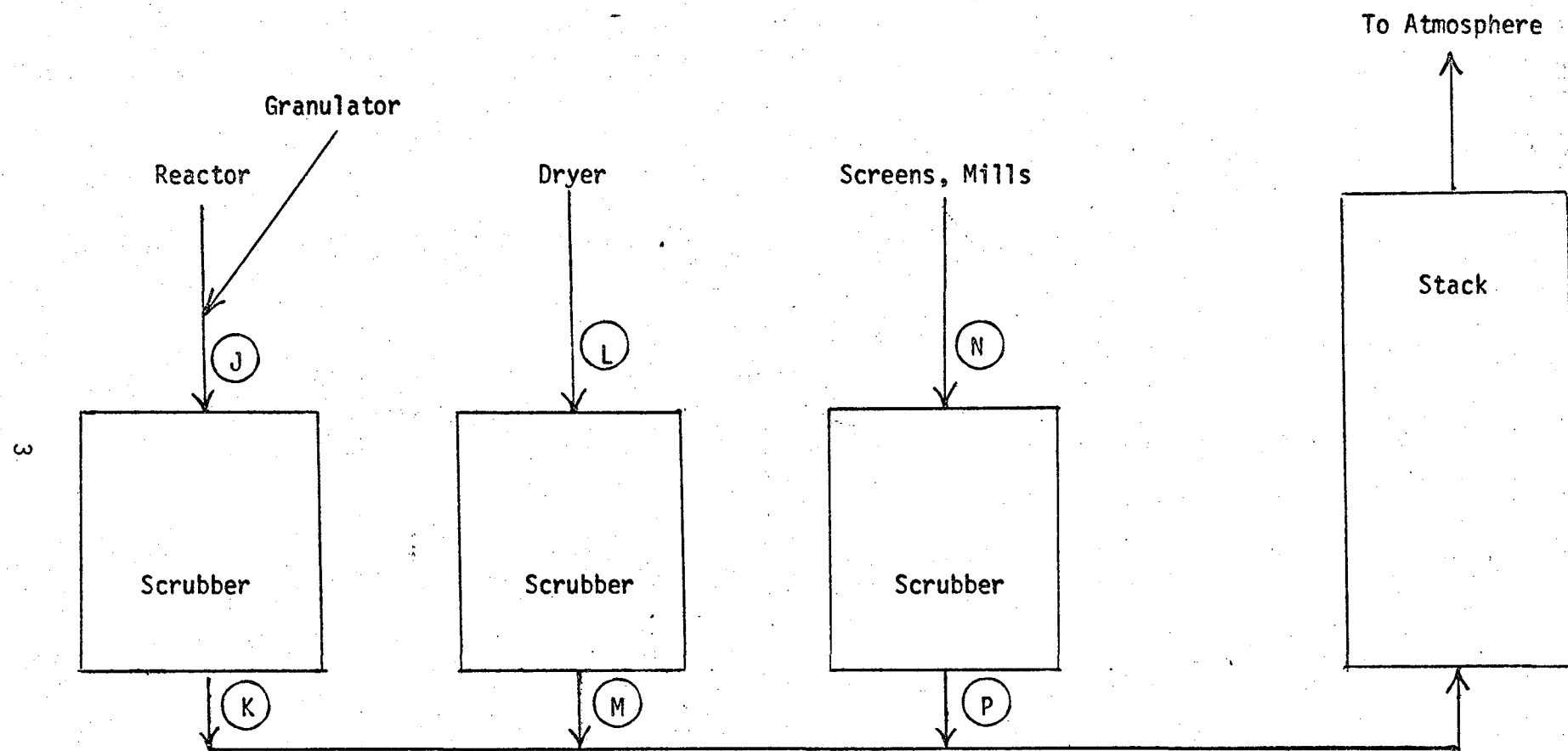


Figure 1
Location of Sampling Points
IMC Dicalcium Phosphate

TABLE 1
SUMMARY OF RESULTS
FLUORIDES
STATION "J"
REACTOR SCRUBBER INLET

Run No.	1	2	3
Date	3/14/72	3/15/72	3/15/72
Barometric pressure, inches Hg	30	30	30
Stack pressure, inches Hg	29.5	29.5	29.5
Stack gas moisture, % volume	8.8	9.5	10.2
Average stack gas temperature, °F.	134	134	134
Stack gas flow rate @ S.T.P.*, SCFM	9319	10402	10971
Volume of gas sampled @ S.T.P.*	52.289	58.045	50.698
Fluoride, water soluble, mg	2.6	1.7	2.2
Fluoride, total, mg	78.6	92.7	120.2
Fluoride, water soluble, gr/SCF	0.0008	0.0005	0.0007
Fluoride, total, gr/SCF	0.023	0.025	0.037
Fluoride, water soluble, gr/CF stk. cond.	0.0006	0.0004	0.0005
Fluoride, total, gr/CF stk. cond.	0.019	0.020	0.029
Fluoride, water soluble, lb/hour	0.061	0.04	0.063
Fluoride, total, lb/hour	1.85	2.19	3.43
Fluoride, water soluble, lb/ton P_2O_5 Fed.	0.002	0.001	0.002
Fluoride, total, lb/ton P_2O_5 Fed.	0.065	0.070	0.115
Scrubber efficiency, %	----	----	----

* Dry, 70°F., 29.92 inches Hg.

TABLE 2
SUMMARY OF RESULTS
FLUORIDES

STATION "K"
REACTOR SCRUBBER OUTLET

Run No.	1	2	3
Date	3/14/72	3/15/72	3/15/72
Barometric pressure, inches Hg	30	30	30
Stack pressure, inches Hg	28.67	28.67	28.67
Stack gas moisture, % volume	9.2	14	13.8
Average stack gas temperature, °F.	120	125	130
Stack gas flow rate @ S.T.P.*, SCFM	15902	14636	14293
Volume of gas sampled @ S.T.P.*	64.943	41.542	28.117
Fluoride, water soluble, mg	1.6	1.7	1.3
Fluoride, total, mg	1.6	3	3.5
Fluoride, water soluble, gr/SCF	0.0004	0.0006	0.0007
Fluoride, total, gr/SCF	0.0004	0.0011	0.0019
Fluoride, water soluble, gr/CF stk. cond.	0.0003	0.0005	0.0005
Fluoride, total, gr/CF stk. cond.	0.0003	0.0008	0.0014
Fluoride, water soluble, lb/hour	0.076	0.079	0.087
Fluoride, total, lb/hour	0.076	0.140	0.235
Fluoride, water soluble, lb/ton P_2O_5 Fed.	0.003	0.003	0.003
Fluoride, total, lb/ton P_2O_5 Fed.	0.003	0.004	0.008
Scrubber efficiency, %	95.9	93.6	93.1

* Dry, 70°F., 29.92 inches Hg.

TABLE 3

SUMMARY OF RESULTS
FLUORIDESSTATION "L"
DRYER SCRUBBER INLET

Run No.	1	2	3
Date	3/14/72	3/15/72	3/15/72
Barometric pressure, inches Hg	30	30	30
Stack pressure, inches Hg	29.62	29.62	29.62
Stack gas moisture, % volume	28.8	27.9	34.7
Average stack gas temperature, °F.	191	193	193
Stack gas flow rate @ S.T.P. [*] , SCFM	56821	55688	53543
Volume of gas sampled @ S.T.P. [*]	90.93	82.547	55.766
Fluoride, water soluble, mg	5	36	1.9
Fluoride, total, mg	11.1	48.3	2.6
Fluoride, water soluble, gr/SCF	0.0008	0.0067	0.0005
Fluoride, total, gr/SCF	0.0019	0.009	0.0007
Fluoride, water soluble, gr/CF stk. cond.	0.0005	0.0039	0.0003
Fluoride, total, gr/CF stk. cond.	0.0011	0.0052	0.0004
Fluoride, water soluble, lb/hour	0.41	3.2	0.24
Fluoride, total, lb/hour	0.92	4.3	0.33
Fluoride, water soluble, lb/ton P ₂ O ₅ Fed.	0.01	0.10	0.01
Fluoride, total, lb/ton P ₂ O ₅ Fed.	0.03	0.14	0.01
Scrubber efficiency, %	---	---	---

* Dry, 70°F., 29.92 inches Hg.

TABLE 4
SUMMARY OF RESULTS
FLUORIDES

STATION "M"
DRYER SCRUBBER OUTLET

Run No.	1	2	3
Date	3/14/72	3/15/72	3/15/72
Barometric pressure, inches Hg	30	30	30
Stack pressure, inches Hg	28.65	28.65	28.65
Stack gas moisture, % volume	18.2	18.5	20
Average stack gas temperature, °F.	152	154	156
Stack gas flow rate @ S.T.P.*, SCFM	65093	66647	64734
Volume of gas sampled @ S.T.P.*	58.127	53.501	37.366
Fluoride, water soluble, mg	0.6	No Lab	0.5
Fluoride, total, mg	0.6	Data	0.5
Fluoride, water soluble, gr/SCF	0.0002		0.0002
Fluoride, total, gr/SCF	0.0002		0.0002
Fluoride, water soluble, gr/CF stk. cond.	0.0001		0.0001
Fluoride, total, gr/CF stk. cond.	0.0001		0.0001
Fluoride, water soluble, lb/hour	0.09		0.11
Fluoride, total, lb/hour	0.09		0.11
Fluoride, water soluble, lb/ton P ₂ O ₅ Fed.	0.003		0.004
Fluoride, total, lb/ton P ₂ O ₅ Fed.	0.003		0.004
Scrubber efficiency, %	90.2	----	66.7

* Dry, 70°F., 29.92 inches Hg.

TABLE 5
SUMMARY OF RESULTS
FLUORIDES

STATION "N"
SCREEN MILL SCRUBBER INLET

Run No.	1	2	3
Date	3/14/72	3/15/72	3/15/72
Barometric pressure, inches Hg	30	30	30
Stack pressure, inches Hg	29.59	29.59	29.59
Stack gas moisture, % volume	3.2	3.7	3.2
Average stack gas temperature, °F.	140	138	139
Stack gas flow rate @ S.T.P.*, SCFM	45350	37953	33424
Volume of gas sampled @ S.T.P.*	79.2	62.635	41.548
Fluoride, water soluble, mg	18.9	1.3	No Lab Data
Fluoride, total, mg	53.4	34	
Fluoride, water soluble, gr/SCF	0.0037	0.0003	
Fluoride, total, gr/SCF	0.0104	0.0084	
Fluoride, water soluble, gr/CF stk. cond.	0.0031	0.0003	
Fluoride, total, gr/CF stk. cond.	0.0088	0.0071	
Fluoride, water soluble, lb/hour	1.43	0.1	
Fluoride, total, lb/hour	4.04	2.7	
Fluoride, water soluble, lb/ton P_2O_5 Fed.	0.05	0.003	
Fluoride, total, lb/ton P_2O_5 Fed.	0.14	0.087	
Scrubber efficiency, %	----	----	----

* Dry, 70°F., 29.92 inches Hg.

TABLE 6
SUMMARY OF RESULTS
FLUORIDES

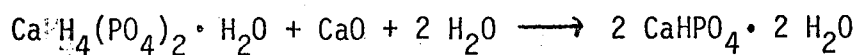
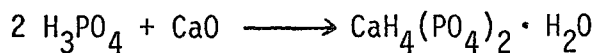
STATION "P"
SCREEN MILL SCRUBBER OUTLET

Run No.	1	2	3
Date	3/14/72	3/15/72	3/15/72
Barometric pressure, inches Hg	30	30	30
Stack pressure, inches Hg	28.5	28.5	28.5
Stack gas moisture, % volume	12	13.5	13.3
Average stack gas temperature, °F.	124	125	125
Stack gas flow rate @ S.T.P.*, SCFM	41858	39716	40005
Volume of gas sampled @ S.T.P.*	64.245	46.911	36.878
Fluoride, water soluble, mg	2.2	1.8	2.8
Fluoride, total, mg	2.2	1.8	2.8
Fluoride, water soluble, gr/SCF	0.0005	0.0006	0.0012
Fluoride, total, gr/SCF	0.0005	0.0006	0.0012
Fluoride, water soluble, gr/CF stk. cond.	0.0004	0.0004	0.0009
Fluoride, total, gr/CF stk. cond.	0.0004	0.0004	0.0009
Fluoride, water soluble, lb/hour	0.19	0.20	0.40
Fluoride, total, lb/hour	0.19	0.20	0.40
Fluoride, water soluble, lb/ton P_2O_5 Fed.	0.007	0.006	0.013
Fluoride, total, lb/ton P_2O_5 Fed.	0.007	0.006	0.013
Scrubber efficiency, %	95.3	92.6	----

* Dry, 70°F., 29.92 inches Hg.

Process Description

Defluorinated phosphoric acid and limestone are mixed in a pug mill reactor to form dicalcium phosphate as follows:



The product is dried and screened before being conveyed to storage.

The air pollution control system consists of three scrubbers, one on the reactor-granulator, and one each on the dryer and screens. Dilute phosphoric acid is used as the scrubbing medium.

Process Operation

Operating conditions were normal for the three test runs conducted from March 14 to March 15, 1972.

LOCATION OF SAMPLING POINTS

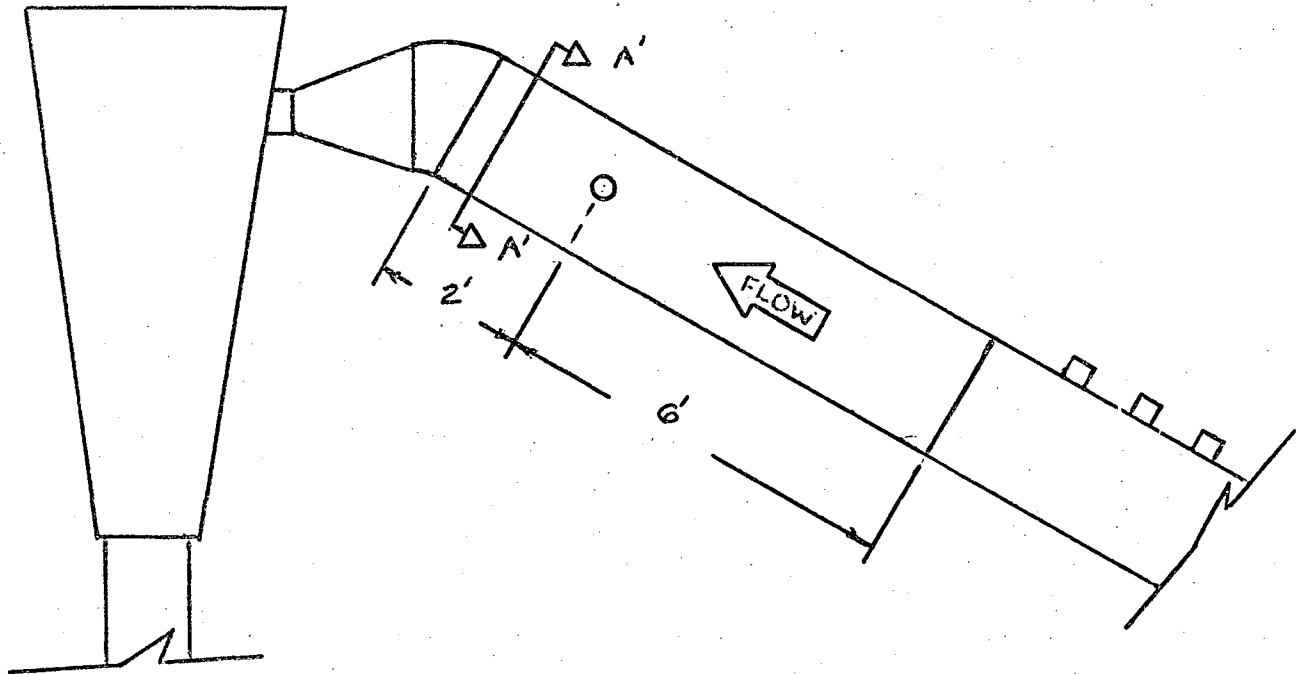
The sampling sites and number of traverse points were selected as per "Method I - Sample and Velocity Traverses for Stationary Sources, Part 60, Subchapter C, Chapter 1, Title 40," Federal Register, No. 247-Pt. II-1.

The above method suggests using two perpendicular diameters of traverse points per sampling station, however, on-site conditions necessitated the use of only one traverse diameter. The suggested number of traverse points per diameter was used where possible without sampling within one inch of the inner wall.

Figures 2 through 7 are schematic diagrams of the stack configurations near the sampling location, and the sampling points traversed during the emission tests.

SAMPLE LOCATION "J"

REACTOR-GRANULATOR INLET



TRAVERSE POINT NO.	DISTANCE FROM PORT (INCHES)
1	1
2	1 9/32
3	2 7/32
4	3 7/32
5	4 1/4
6	5 7/16
7	6 3/4
8	8 1/4
9	10 3/32
10	12 13/16
11	20 3/16
12	22 29/32
13	24 3/4
14	26 1/4
15	27 9/16
16	28 3/4
17	29 13/16
18	30 25/32
19	31 23/32
20	32 1/2

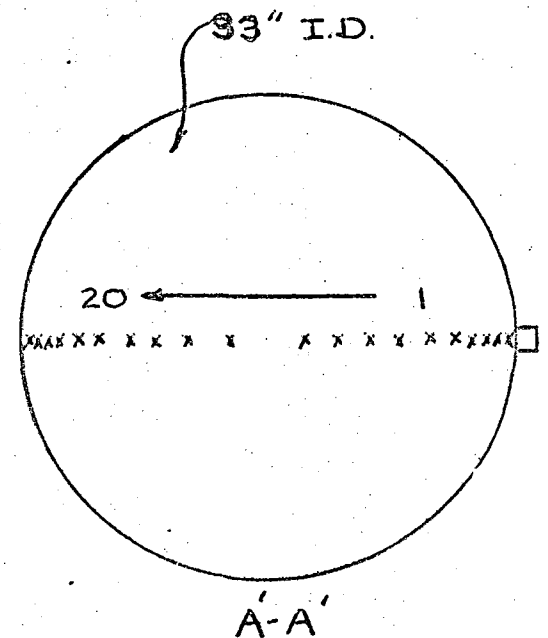
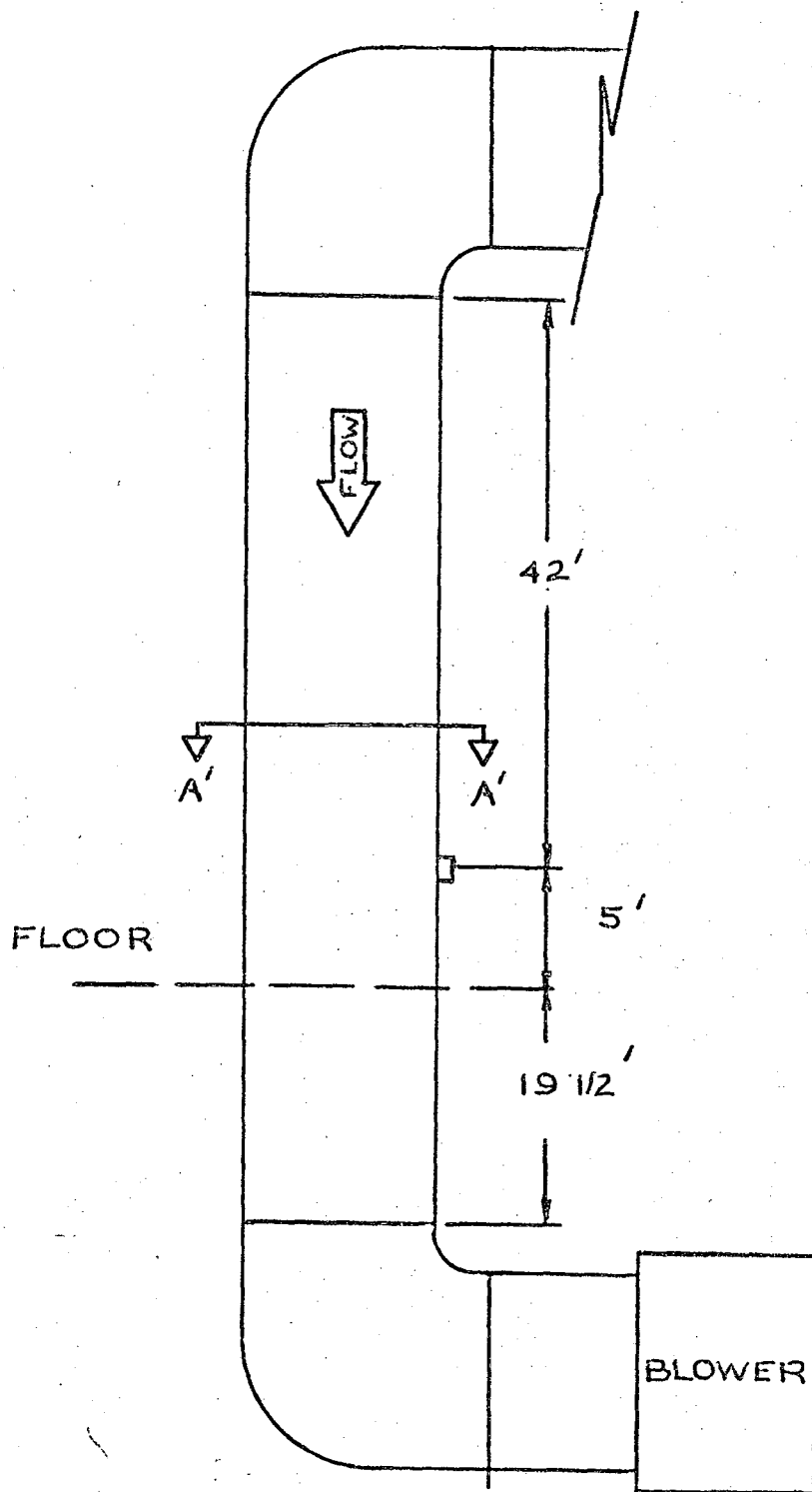


FIGURE 2

SAMPLE LOCATION "K" REACTOR-GRANULATOR OUTLET



TRAVERSE POINT NO.	DISTANCE FROM PORT (INCHES)
1	1
2	3 1/8
3	5 1/8
4	8 5/16
5	11 3/4
6	16 11/16
7	30 5/16
8	35 1/4
9	38 11/16
10	41 7/16
11	43 27/32
12	46

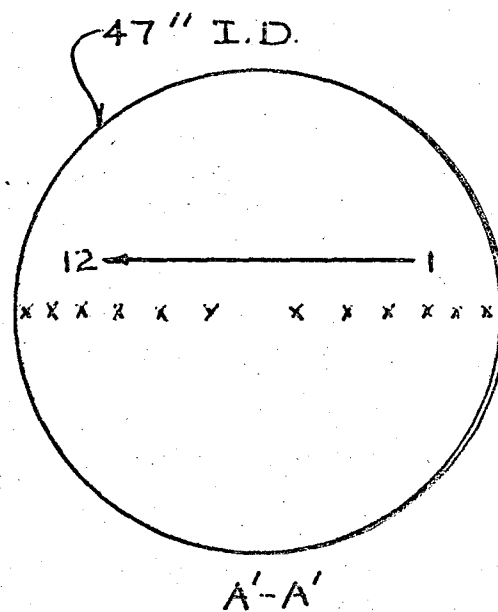
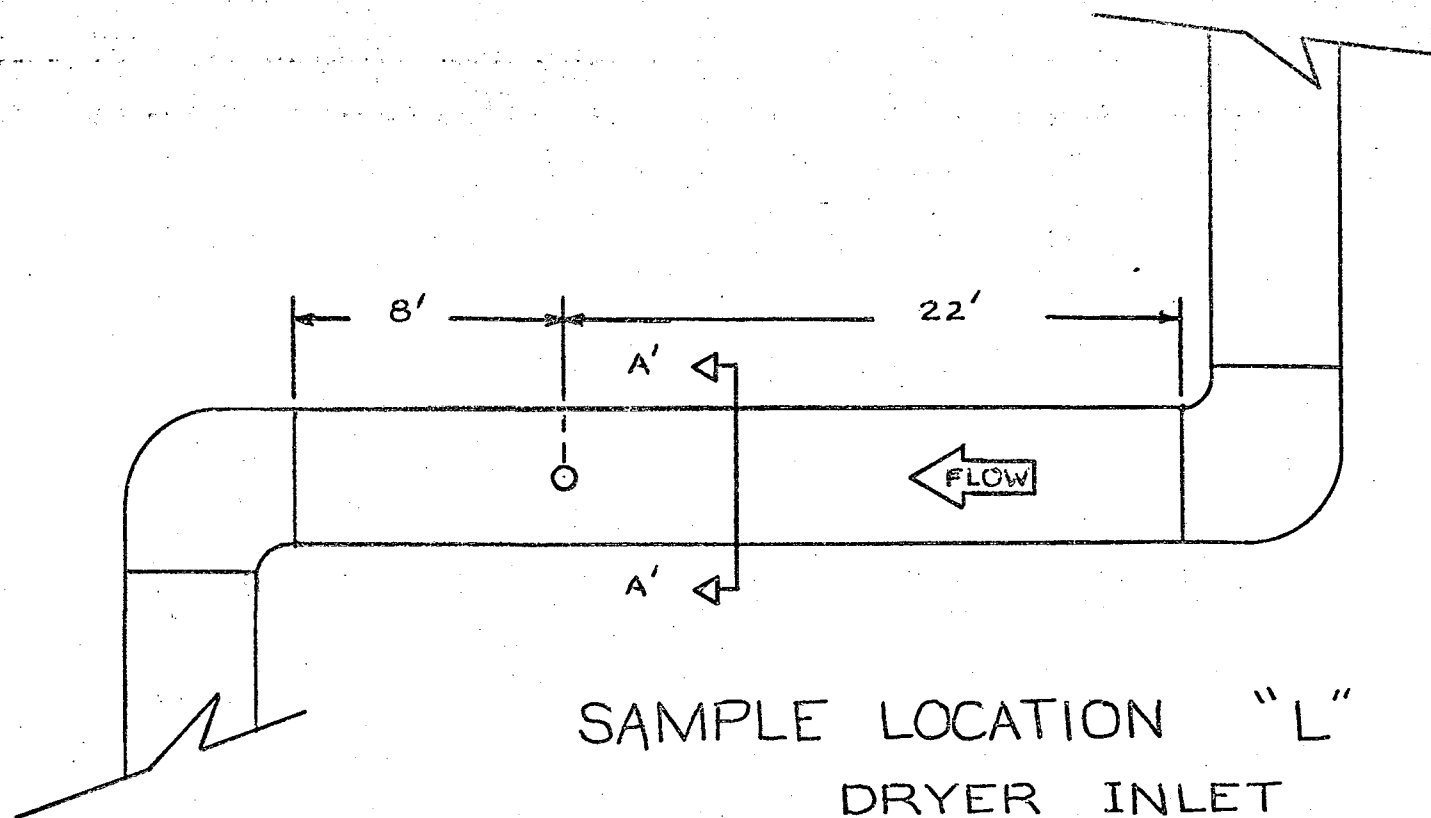


FIGURE 3



SAMPLE LOCATION "L"
DRYER INLET

TRAVERSE POINT NO.	DISTANCE FROM PORT (INCHES)
1	1 7/16
2	4 5/8
3	8 1/8
4	12 3/8
5	17 1/4
6	24 1/2
7	44 1/2
8	51 3/4
9	56 3/4
10	60 7/8
11	64 3/8
12	67 9/16

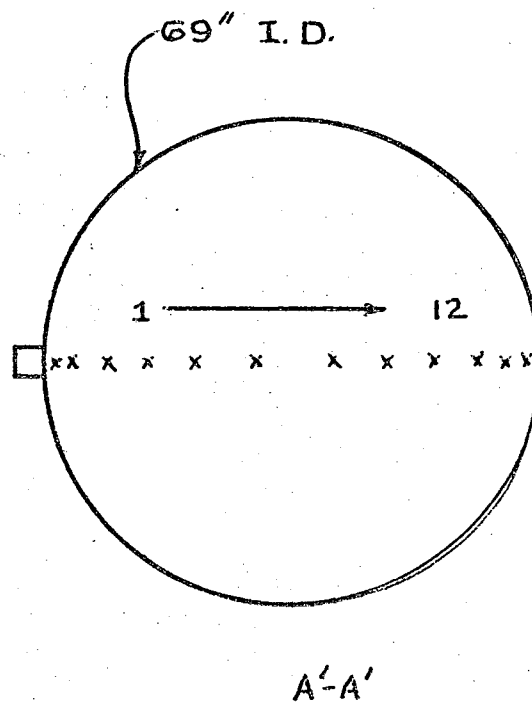
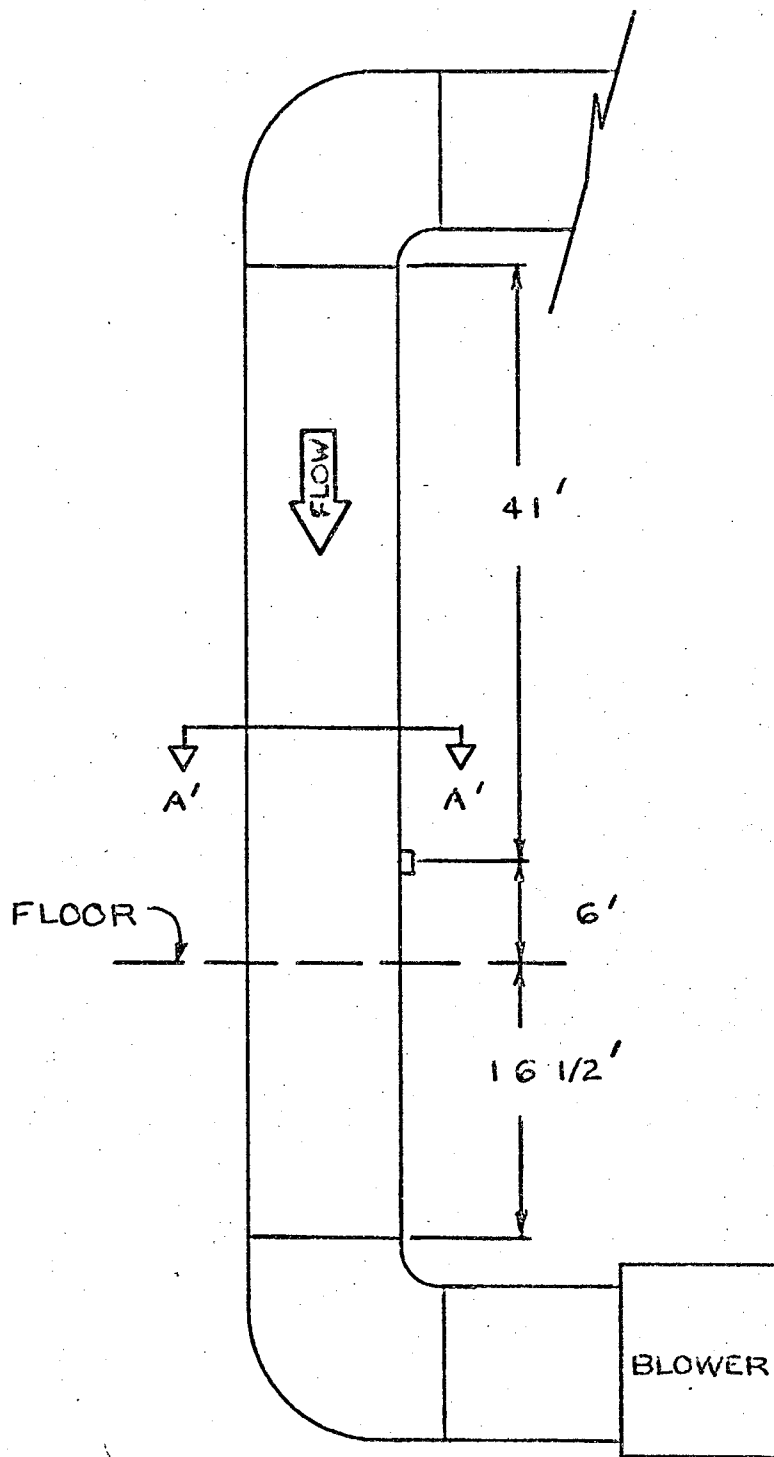


FIGURE 4

SAMPLE LOCATION "M" DRYER OUTLET



TRAVERSE POINT NO.	DISTANCE FROM PORT (INCHES)
1	1 3/16
2	5 5/32
3	8 31/32
4	13 7/32
5	18 3/16
6	24 11/32
7	33 13/32
8	57 3/8
9	66 5/32
10	72 5/16
11	77 9/32
12	81 9/16
13	85 11/32
14	88 7/8

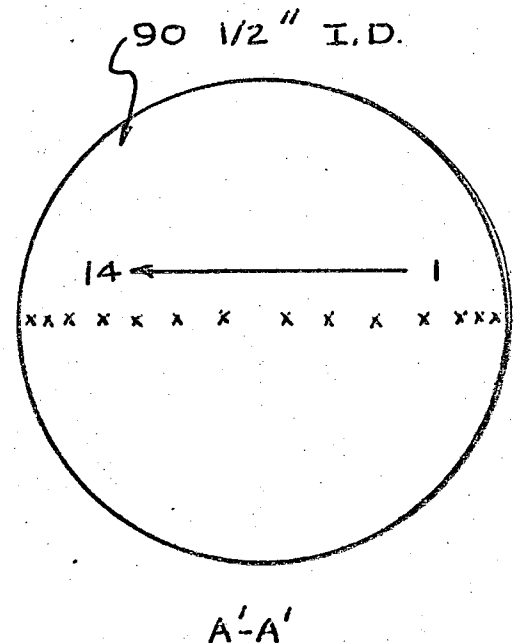
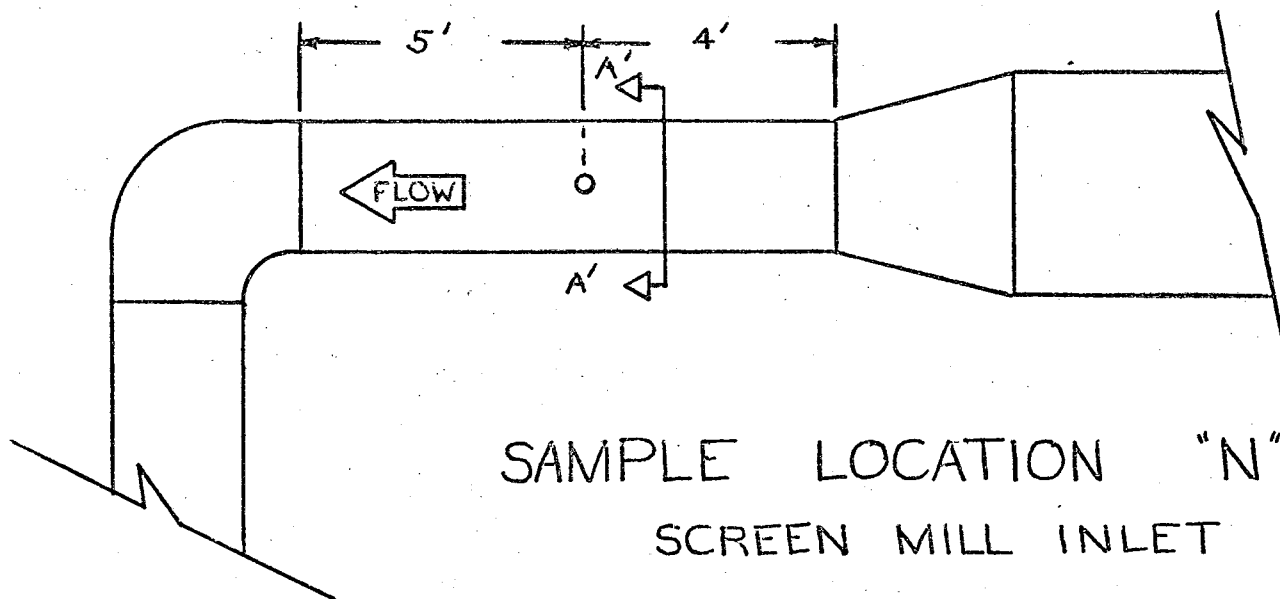


FIGURE 5



TRAVERSE POINT NO.	DISTANCE FROM PORT (INCHES)
1	1 1/4
2	4 1/32
3	7 3/32
4	10 5/8
5	15
6	21 11/32
7	30 11/16
8	45
9	49 3/8
10	52 15/16
11	56
12	58 1/2

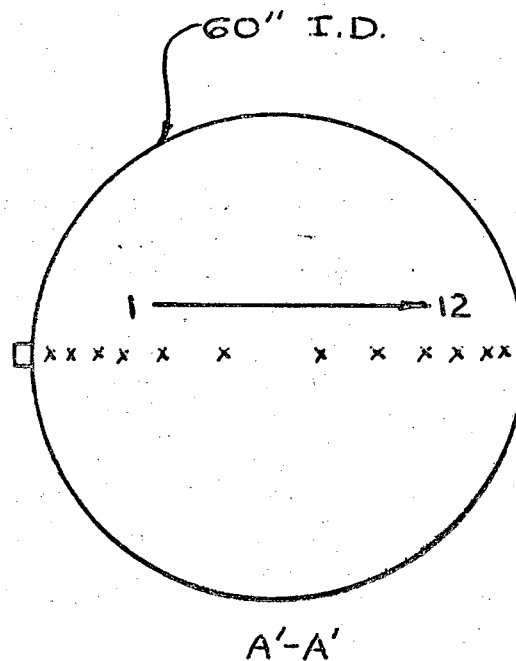
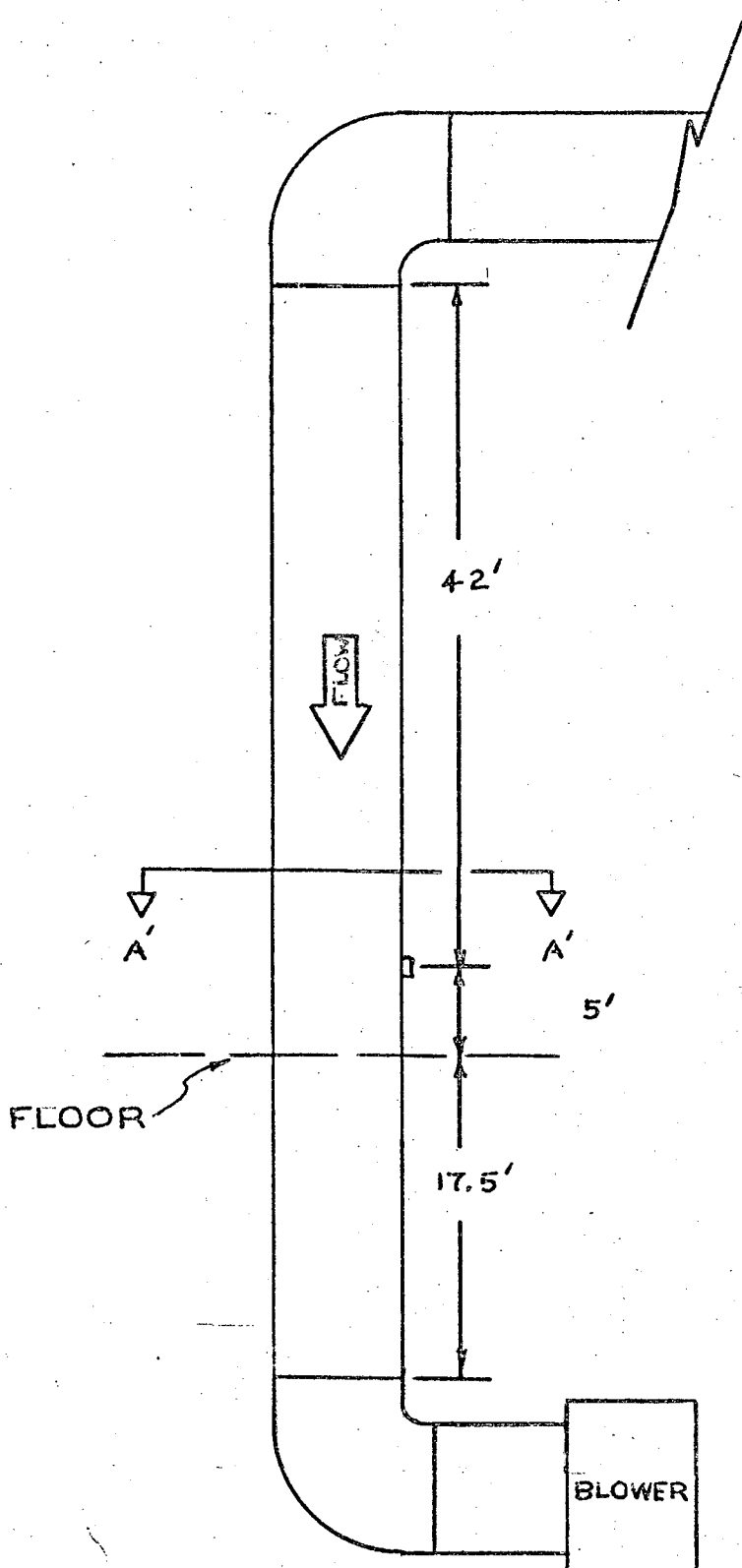


FIGURE 6

SAMPLE LOCATION "P"

SCREEN MILL
OUTLET



TRAVERSE POINT NO.	DISTANCE FROM PORT (INCHES)
1	1 13/16
2	5 29/32
3	10 1/2
4	16 1/4
5	24 5/8
6	47 3/8
7	55 3/4
8	61 1/2
9	66 3/32
10	70 7/32

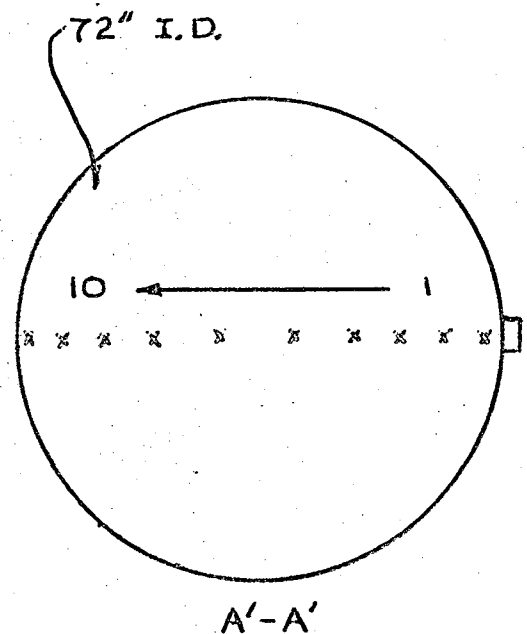


FIGURE 7
17

SAMPLING AND ANALYTICAL PROCEDURES

A. Preliminary Moisture Determination

The preliminary moisture content of the stack gases at each sampling site was determined by Method 4 of the Federal Register (Volume 36, Number 247, Part II, December 23, 1971).

The only significant difference between F.R. Method 4 and the method used was the configuration of the sampling train (see Figure 8). The sampling train used in these tests consisted of the first two midget impingers with 5 grams of distilled-deionized water followed by two dry midget impingers in place of a silica gel cartridge.

After completing the moisture run, the total impinger liquid plus water rinsings of the probe tip thorough the fourth impinger were placed in an 8 ounce polyethylene container. The samples were held by EPA personnel for further analyses.

Field data sheets are contained in Appendix B.

B. Preliminary Velocity Determination

Method 2 of the above mentioned Federal Register was used as a guide in determining the preliminary stack gas velocity for each source tested. The major difference was that only the maximum and minimum

- 61
1. Heated Glass Probe With Pyrex Wool as Filter
 2. Glass Connector
 3. Ice Bath
 4. Midget Impinger With 5 Grams H_2O
 5. Midget Impinger With 5 Grams H_2O
 6. Midget Impinger, Dry
 7. Midget Impinger, Dry
 8. Flexible Sample Line
 9. Vacuum Gauge
 10. Main Control Valve
 11. By-Pass Control Valve
 12. Air Tight Vacuum Pump
 13. Dry Test Meter
 14. Thermometer
 15. Calibrated Orifice
 16. Inclined Manometer
 17. S-Type Pitot Tube

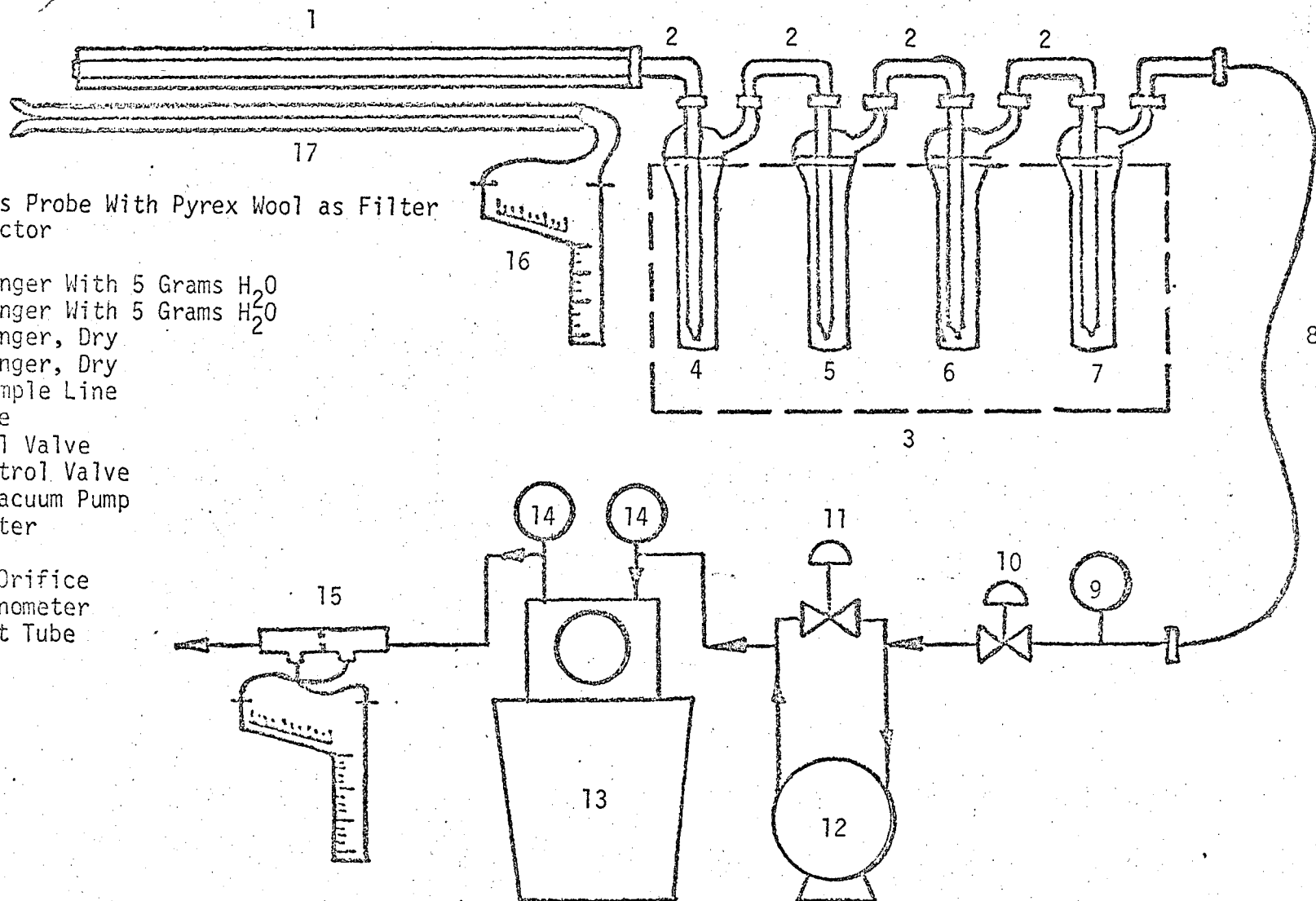


Figure 8

MOISTURE SAMPLING TRAIN

velocity heads across each stack area were determined so that a proper nozzle size could be selected. During each of the three fluoride emission tests, velocity head readings were taken at points selected by using Method 1 of the Federal Register.

Stack pressure and temperature measurements were also made during the preliminary velocity determinations.

C. Sampling for Fluoride Emissions

The sampling procedure used for determining fluoride emissions was similar to Method 5 of the Federal Register. The major difference between the two methods was the configuration of the sampling train. The sampling train described in the Federal Register has a heated box containing the filter holder directly following the glass probe. The sampling train used in these tests contained no heated box and the filter holder was placed between the third and fourth impingers (between dry impinger and silica gel impinger) to prevent sample carry-over. Figure 9 is a schematic diagram of the sampling train used.

After the selection of the sampling site and the minimum number of sampling points per Method 2 of the above mentioned Federal Register, three separate test runs were performed. For each run, the required stack and sampling parameters were recorded on field data sheets. They are included in Appendix B. Readings were taken at each traverse point at least every five minutes, and when significant changes in stack parameters necessitated additional adjustments to maintain an isokinetic flow rate. Nomographs were used to aid in the rapid adjustment of the sampling

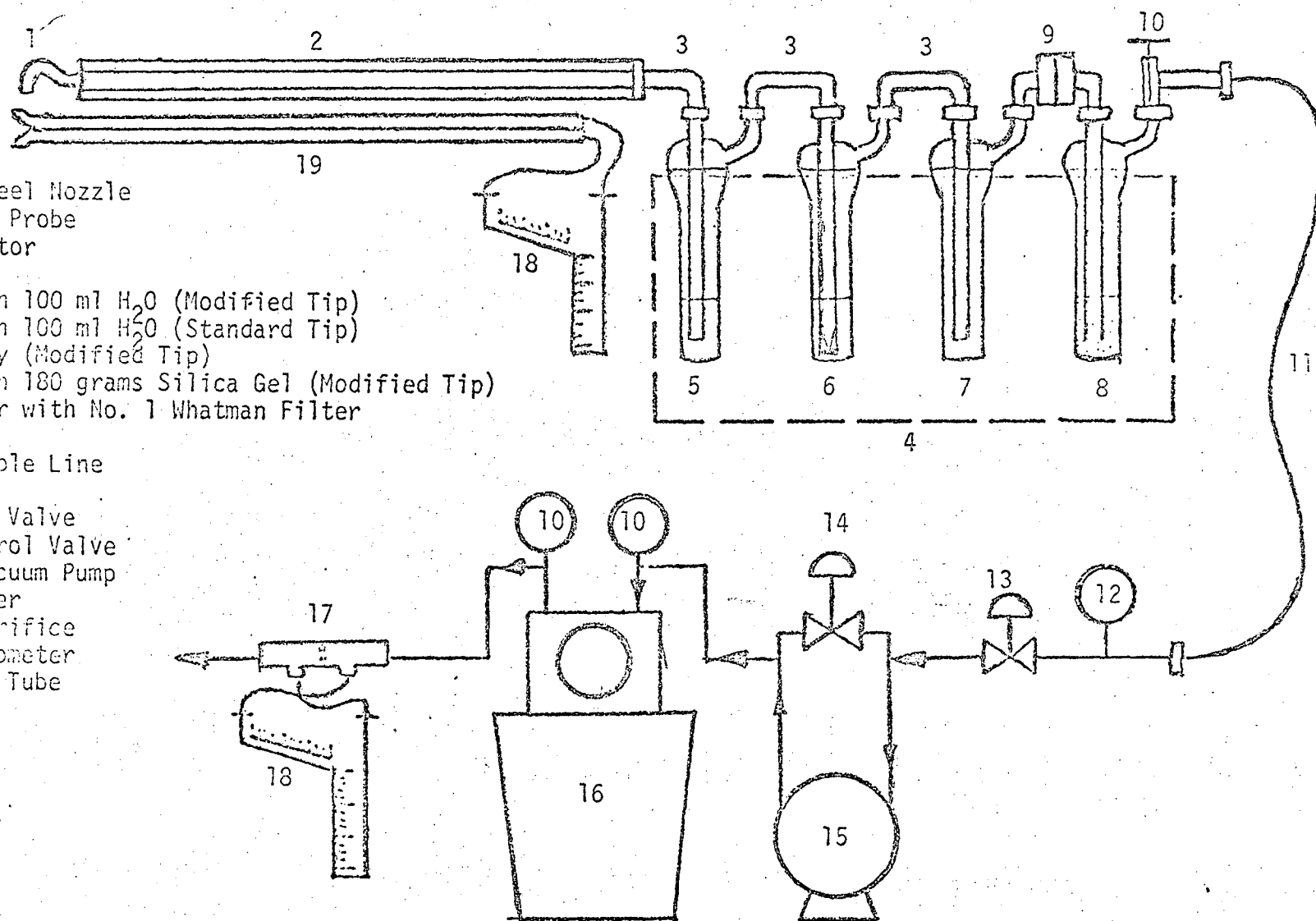


Figure 9
 FLUORIDE SAMPLING TRAIN

rate. The traverse points were selected to maintain at least one inch from the inner stack wall.

After each run, the liquid volume in the first three impingers was measured volumetrically and the silica gel was reweighed. The impinger liquid, the filter, plus the water washings of the probe and other sampling train components up to the silica gel were placed into a single polyethylene container.

D. Liquid and Product Grab Samples

Periodically, during each test run, grab samples of the raw materials, finished product, and scrubber liquid were taken, and the temperature and pH were determined at the site. All samples were split with the plant personnel so that comparative analyses could be performed.

E. Laboratory Analysis Procedures

Water soluble fluorides were done by a sulfuric acid distillation followed by the SPADNS-ZIRCONIUM LAKE METHOD. Water insoluble fluorides were first fused with NaOH followed by a sulfuric acid distillation then by the SPADNS-ZIRCONIUM LAKE METHOD.

P_2O_5 analysis of the stack effluent was done by EPA personnel. All other P_2O_5 analyses were done by plant personnel.

For more details of exact method used, see Appendix C.

APPENDICES

APPENDIX A

Emission Calculations and Results

E.E.I. SOURCE SAMPLING NOMENCLATURE SHEET

- PB - Barometric pressure, inches Hg
- PS - Stack pressure, inches Hg
- As - Stack area, sq. ft.
- AS' - Effective area of positive stack gas flow, sq. ft.
- NPTS - Number of traverse points where the pitot velocity head was greater than zero
- TS - Stack temperature, °R
- TM - Meter temperature, °R
- $\bar{H}$ - Average square root of velocity head, $\sqrt{\text{inches H}_2\text{O}}$
- ΔH - Average meter orifice pressure differential, inches H₂O
- AN - Sampling nozzle area, square feet
- CP - S-type pitot tube correction factor
- VM - Recorded meter volume sample, cubic feet (meter conditions)
- VC - Condensate and silica gel increase in impringers, milliliters
- Po - Pressure at the dry test meter orifice, $\left[\frac{PB + \Delta H}{13.6} \right]$ inches Hg
- STP - Standard conditions, dry, 70°F, 29.92 inches Hg
- - - - -
- VWV - Conversion of condensate in milliliters to water vapor in cubic feet (STP)
- VSTPD - Volume sampled, cubic feet (STP)
- VT - Total water vapor volume and dry gas volume sampled, cubic feet (STP)
- W - Moisture fraction of stack gas
- FDA - Dry gas fraction
- MD - Molecular weight of stack gas, lbs/lb-mole (dry conditions)
- MS - Molecular weight of stack gas, lbs/lb-mole (stack conditions)
- GS - Specific gravity of stack gas, referred to air
- EA - Excess air, %
- $\sqrt{H \times TS}$ - Average square root of velocity head times stack temperature
- U - Stack gas velocity, feet per minute
- QS - Stack gas flow rate, cubic feet per minute (stack conditions)
- QD - Stack gas flow rate, cubic feet per minute (dry conditions)
- QSTPD - Stack gas flow rate, cubic feet per minute (STP)
- PISO - Percent isokinetic volume sampled (method described in Federal Register)

EQUATIONS FOR CALCULATING FLUORIDE EMISSIONS

$$VWV = (0.0474) \times (VC)$$

$$VSTPD = (17.71 \times (VM) \times (PB + \frac{\Delta H}{13.6}) \div TM$$

$$VT = (VWV) + (VSTPD)$$

$$W = (VWV) \div (VT)$$

$$FDA = (1.0) - (W)$$

FMOIST = Assumed moisture fraction

$$MD = (0.44 \times \% CO_2) + (0.32 \times \% O_2) + (0.28 \times \% N_2) + (0.28 \times \% CO)$$

$$MS = (MD \times FDA) + (18 \times W)$$

$$GS = (MS) \div (28.99)$$

$$EA = \left[(100) \times (\% O_2 - \frac{\% CO}{2}) \right] \div \left[(0.266 \times \% N_2) - (\% O_2 - \frac{\% CO}{2}) \right]$$

$$\underline{U} = (174) \times (CP) \times (\underline{H}) \times \sqrt{(TS \times 29.92) \div (GS \times PS)}$$

$$QS = (\underline{U}) \times (AS)$$

$$QD = (QS) \times (FDA)$$

$$QSTPD = (QD) \times (\frac{530}{29.92}) \times (\frac{PS}{TS})$$

$$PISO = (0.00267 \times VC \times TS) + (P_o \times TS \times VM \times TM) \div (Time \times \underline{U} \times PS \times AN)$$

Fluoride Emissions:

MG = Milligrams of fluoride from lab analysis

$$\text{Grains/SCF} = (0.01543) \times (MG) \div VSTPD$$

$$\text{Grains/CF, Stack Cond.} = (17.71) \times (PS) \times (FDA) \times (\text{Grains/SCF}) \div (TS)$$

$$\text{Lbs/hour} = (\text{Grains/SCF}) \times (0.00857) \times (QSTPD)$$

P₂O₅ Fed = Tons/hour, determined from plant data

$$\text{Lbs/ton P}_{20}_5 \text{ Fed} = (\text{lbs/hour}) \div (\text{Tons/hour P}_{20}_5 \text{ Fed})$$

SOURCE TEST DATA

TEST NO - NO OF RUNS - 3
 PLANT - I.M.C. PHOSPHATES BARTOW, FLA.
 SOURCE - REACTOR INLET STATION J
 TYPE OF PLANT - DICAL
 CONTROL EQUIPMENT -
 POLLUTANTS SAMPLED - FLUORIDES

1) RUN NUMBER	1	2	3
2) DATE	3/14/72	3/15/72	3/16/72
3) TIME BEGAN	14:45	12:45	15:01
4) TIME END	15:56	13:27	15:37
5) BAROMETRIC PRESSURE, IN HG	30	30	30
6) METER ORIFICE PRESSURE DROP, IN H ₂ O	4.5	5	5
7) VOL DRY GAS, METER COND, CUBIC FEET	53.114	58.08	51.264
8) AVERAGE GAS METER TEMPERATURE, DEG F	85.8	78.3	80.3
9) VOL DRY GAS, S.T.P., CUBIC FEET	52.289	58.045	50.602
10) TOTAL H ₂ O COLLECTED, ML	106	128.2	122.2
11) VOL H ₂ O VAPOR COLLECTED, S.T.P., CU FT	5.02	6.08	5.22
12) STACK GAS MOISTURE, PERCENT VOLUME	8.8	9.5	10.3
13) ASSUMED STACK GAS MOISTURE, PCT VOL	12	8	8
14) PERCENT CO ₂			
15) PERCENT O ₂			
16) PERCENT CO			
17) PERCENT N ₂			
18) PERCENT EXCESS AIR	0	0	0
19) MOLECULAR WEIGHT OF STACK GAS, DRY	28.85	28.85	28.85
20) MOLECULAR WEIGHT OF STACK GAS, STK COND	27.9	27.82	27.73
21) STACK GAS SPECIFIC GRAVITY	0.96	0.96	0.96
22) AVG SQUARE ROOT (VEL HEAD), IN H ₂ O	0.541	0.608	0.546
23) AVERAGE STACK GAS TEMPERATURE, DEG F	134	134	134
24) AVG SQUARE ROOT (STK TEMP*VEL HEAD)	13.186	14.818	15.74
25) PITOT CORRECTION FACTOR	0.83	0.83	0.83
26) STACK PRESSURE, IN HG, ABSOLUTE	29.5	29.5	29.5
27) STACK GAS VEL, STACK COND, F.P.M.	1954.9	2199.6	2340.6
28) STACK AREA, SQ FEET	5.94	5.94	5.94
29) EFFECTIVE STACK AREA, SQUARE FEET	5.94	5.94	5.94
30) STACK GAS FLOW RATE, S.T.P., SCFMD	9319	10402	10071
31) NET TIME OF TEST, MINUTES	42	34	28
32) SAMPLING NOZZLE DIAMETER, INCHES	0.25 & 0.5	0.5	0.5
33) PERCENT ISOKINETIC	58	71.4	67.1
34) FLUORIDE - WATER SOLUBLE, MG	2.6	1.7	2.2
35) FLUORIDE - TOTAL, MG	78.6	92.7	120.2
36) FLUORIDE - WATER SOLUBLE, GR/SCF	0.0008	0.0005	0.0007
37) FLUORIDE - TOTAL, GR/SCF	0.0231	0.0246	0.037
38) FLUORIDE - WATER SOL., GR/CF, STK CND.	0.0006	0.0004	0.0005
39) FLUORIDE - TOTAL, GR/CF, STK CND.	0.0186	0.0196	0.029
40) FLUORIDE - WATER SOLUBLE, LB/HOUR	0.0612	0.0402	0.0628
41) FLUORIDE - TOTAL, LB/HOUR	1.8488	2.1924	3.433
43) FLUORIDE - WATER SOL., LB/TON P ₂ O ₅ FED	0.0021	0.0013	0.0021
44) FLUORIDE - TOTAL, LB/TON P ₂ O ₅ FED	0.0646	0.0703	0.115

S.T.P. ↔ DRY, 70 DEGREES F, 29.92 INCHES MERCURY

SOURCE TEST DATA

TEST NO -
 PLANT - I.M.C. PHOSPHATES
 SOURCE - REACTOR OUTLET K
 TYPE OF PLANT - DICAL
 CONTROL EQUIPMENT -
 POLLUTANTS SAMPLED - FLUORIDES

NO OF RUNS - 3
 BARTON, FLA.

1) RUN NUMBER	1	2	3
2) DATE	3/14/72	3/15/72	3/15/72
3) TIME BEGAN	14:55	12:47	15:15
4) TIME END	17:05	14:23	16:26
5) BAROMETRIC PRESSURE, IN HG	30	30	30
6) METER ORIFICE PRESSURE DROP, IN H ₂ O	0.34	0.56	0.53
7) VOL DRY GAS, METER COND, CUBIC FEET	66.15	42.02	28.699
8) AVERAGE GAS METER TEMPERATURE, DEG F	81.8	78.5	83.1
9) VOL DRY GAS, S.T.P., CUBIC FEET	64.943	41.524	28.117
10) TOTAL H ₂ O COLLECTED, ML	139.5	142.6	95
11) VOL H ₂ O VAPOR COLLECTED, S.T.P., CU FT	6.61	6.76	4.5
12) STACK GAS MOISTURE, PERCENT VOLUME	9.2	14	13.8
13) ASSUMED STACK GAS MOISTURE, PCT VOL	14	14	14
14) PERCENT CO ₂			
15) PERCENT O ₂			
16) PERCENT CO			
17) PERCENT N ₂			
18) PERCENT EXCESS AIR	0	0	0
19) MOLECULAR WEIGHT OF STACK GAS, DRY	28.85	28.85	28.85
20) MOLECULAR WEIGHT OF STACK GAS, STK COND	27.85	27.33	27.35
21) STACK GAS SPECIFIC GRAVITY	0.96	0.94	0.94
22) AVG SQUARE ROOT (VEL HEAD), IN H ₂ O	0.673	0.443	0.433
23) AVERAGE STACK GAS TEMPERATURE, DEG F	120	125.1	130
24) AVG SQUARE ROOT (STK TEMP*VEL HEAD)	11.034	10.708	10.525
25) PITOT CORRECTION FACTOR	0.83	0.83	0.83
26) STACK PRESSURE, IN HG, ABSOLUTE	28.67	28.67	28.67
27) STACK GAS VEL, STACK COND, F.P.M.	1660.9	1627.1	1598.7
28) STACK AREA, SQ FEET	12.05	12.05	12.05
29) EFFECTIVE STACK AREA, SQUARE FEET	12.05	12.05	12.05
30) STACK GAS FLOW RATE, S.T.P., SCFMD	15902	14636	14293
31) NET TIME OF TEST, MINUTES	120	96	72
32) SAMPLING NOZZLE DIAMETER, INCHES	0.375 & 0.25	0.25	0.25
33) PERCENT ISOKINETIC	124.6 & 71.4	104.4	96.6
34) FLUORIDE - WATER SOLUBLE, MG	1.6	1.7	1.3
35) FLUORIDE - TOTAL, MG	1.6	3	3.5
36) FLUORIDE - WATER SOLUBLE, GR/SCF	0.0004	0.0006	0.0007
37) FLUORIDE - TOTAL, GR/SCF	0.0004	0.0011	0.0019
38) FLUORIDE - WATER SOL., GR/CF, STK CHD.	0.0003	0.0005	0.0005
39) FLUORIDE - TOTAL, GR/CF, STK CHD.	0.0003	0.0008	0.0014
40) FLUORIDE - WATER SOLUBLE, LB/HOUR	0.076	0.0791	0.0872
41) FLUORIDE - TOTAL, LB/HOUR	0.076	0.1395	0.2348
43) FLUORIDE - WATER SOL., LB/TON P2O5 FED	0.0027	0.0025	0.0029
44) FLUORIDE - TOTAL, LB/TON P2O5 FED	0.0027	0.0045	0.0079

S.T.P. ↔ DRY, 70 DEGREES F, 29.92 INCHES MERCURY

SOURCE TEST DATA

TEST NO - NO OF RUNS - 3
 PLANT - I.M.C. PHOSPHATES BARTOW, FLA.
 SOURCE - DRYER INLET STATION L
 TYPE OF PLANT - DICAL
 CONTROL EQUIPMENT -
 POLLUTANTS SAMPLED - FLUORIDES

1) RUN NUMBER	1	2	3
2) DATE	3/14/72	3/15/72	3/15/72
3) TIME BEGAN	15.00	12.50	15.35
4) TIME END	17.10	15.03	16.35
5) BAROMETRIC PRESSURE, IN HG	30	30	30
6) METER ORIFICE PRESSURE DROP, IN H ₂ O	2.33	1.50	2
7) VOL DRY GAS, METER COND, CUBIC FEET	94.66	24.723	57.561
8) AVERAGE GAS METER TEMPERATURE, DEG F	96.4	87.5	91.2
9) VOL DRY GAS, S.T.P., CUBIC FEET	90.93	22.547	55.766
10) TOTAL H ₂ O COLLECTED, ML	777.5	674.1	624
11) VOL H ₂ O VAPOR COLLECTED, S.T.P., CU FT	36.85	31.95	29.58
12) STACK GAS MOISTURE, PERCENT VOLUME	28.8	27.9	34.7
13) ASSUMED STACK GAS MOISTURE, PCT VOL	20	28	28
14) PERCENT CO ₂			
15) PERCENT O ₂			
16) PERCENT CO			
17) PERCENT N ₂			
18) PERCENT EXCESS AIR	0	0	0
19) MOLECULAR WEIGHT OF STACK GAS, DRY	28.85	28.85	28.85
20) MOLECULAR WEIGHT OF STACK GAS, STK COND	25.72	25.82	25.02
21) STACK GAS SPECIFIC GRAVITY	0.89	0.89	0.87
22) AVG SQUARE ROOT (VEL HEAD), IN H ₂ O	0.97	0.942	0.985
23) AVERAGE STACK GAS TEMPERATURE, DEG F	190.8	192.8	193
24) AVG SQUARE ROOT (STK TEMP*VEL HEAD)	24.75	24.06	25.168
25) PITOT CORRECTION FACTOR	0.83	0.83	0.83
26) STACK PRESSURE, IN HG, ABSOLUTE	29.62	29.62	29.62
27) STACK GAS VEL, STACK COND, F.P.M.	3813.9	3700.3	3926.9
28) STACK AREA, SQ FEET	25.97	25.97	25.97
29) EFFECTIVE STACK AREA, SQUARE FEET	25.97	25.97	25.97
30) STACK GAS FLOW RATE, S.T.P., SCFMD	56821	55688	53543
31) NET TIME OF TEST, MINUTES	120	96	60
32) SAMPLING NOZZLE DIAMETER, INCHES	0.25	0.25	0.25
33) PERCENT ISOKINETIC	101.5	117.6	132.1
34) FLUORIDE - WATER SOLUBLE, MG	5	36	1.9
35) FLUORIDE - TOTAL, MG	11.1	48.3	2.6
36) FLUORIDE - WATER SOLUBLE, GR/SCF	0.0008	0.0067	0.0005
37) FLUORIDE - TOTAL, GR/SCF	0.0019	0.009	0.0007
38) FLUORIDE - WATER SOL., GR/CF, STK COND.	0.0005	0.0039	0.0003
39) FLUORIDE - TOTAL, GR/CF, STK COND.	0.0011	0.0052	0.0004
40) FLUORIDE - WATER SOLUBLE, LB/HOUR	0.4124	3.2053	0.2408
41) FLUORIDE - TOTAL, LB/HOUR	0.9154	4.3004	0.3255
43) FLUORIDE - WATER SOL., LB/TON P2O5 FED	0.0144	0.1027	0.0081
44) FLUORIDE - TOTAL, LB/TON P2O5 FED	0.032	0.1378	0.0111

S.T.P. ↔ DRY, 70 DEGREES F, 29.92 INCHES MERCURY

SOURCE TEST DATA

TEST NO - NO OF RUNS - 3
 PLANT - I.M.C. PHOSPHATES BARTOW, FLA.
 SOURCE - DRYER OUTLET STATION H
 TYPE OF PLANT - DICAL
 CONTROL EQUIPMENT -
 POLLUTANTS SAMPLED - FLUORIDES

1) RUN NUMBER	1	2	3
2) DATE	3/14/72	3/15/72	3/15/72
3) TIME BEGAN	14.45	12.59	15.45
4) TIME END	16.37	14.28	16.25
5) BAROMETRIC PRESSURE, IN HG	30	30	30
6) METER ORIFICE PRESSURE DROP, IN H ₂ O	0.74	0.8	0.79
7) VOL DRY GAS, METER COND, CUBIC FEET	59.256	54.23	32.24
8) AVERAGE GAS METER TEMPERATURE, DEG F	82.7	79.7	84.8
9) VOL DRY GAS, S.T.P., CUBIC FEET	58.127	53.501	37.266
10) TOTAL H ₂ O COLLECTED, ML	273.5	255.5	197.3
11) VOL H ₂ O VAPOR COLLECTED, S.T.P., CU FT	12.96	12.11	9.25
12) STACK GAS MOISTURE, PERCENT VOLUME	18.2	18.5	20
13) ASSUMED STACK GAS MOISTURE, PCT VOL	25	20	20
14) PERCENT CO ₂			
15) PERCENT O ₂			
16) PERCENT CO			
17) PERCENT N ₂			
18) PERCENT EXCESS AIR	0	0	0
19) MOLECULAR WEIGHT OF STACK GAS, DRY	28.85	28.85	28.85
20) MOLECULAR WEIGHT OF STACK GAS, STK COND	26.87	26.85	26.82
21) STACK GAS SPECIFIC GRAVITY	0.93	0.93	0.92
22) AVG SQUARE ROOT (VEL HEAD), IN H ₂ O	0.567	0.583	0.576
23) AVERAGE STACK GAS TEMPERATURE, DEG F	152.4	154.4	156
24) AVG SQUARE ROOT (STK TEMP*VEL HEAD)	14.028	14.444	14.295
25) PITOT CORRECTION FACTOR	0.83	0.83	0.83
26) STACK PRESSURE, IN HG, ABSOLUTE	28.65	28.65	28.65
27) STACK GAS VEL, STACK COND, F.P.M.	2150.4	2215.2	2199.2
28) STACK AREA, SQ FEET	44.67	44.67	44.67
29) EFFECTIVE STACK AREA, SQUARE FEET	44.67	44.67	44.67
30) STACK GAS FLOW RATE, S.T.P., SCFMD	65093	66647	64734
31) NET TIME OF TEST, MINUTES	112	98	70
32) SAMPLING NOZZLE DIAMETER, INCHES	0.25	0.25	0.25
33) PERCENT ISOKINETIC	104.4	107.3	108
34) FLUORIDE - WATER SOLUBLE, MG	0.6		0.5
35) FLUORIDE - TOTAL, MG	0.6		0.5
36) FLUORIDE - WATER SOLUBLE, GR/SCF	0.0002		0.0002
37) FLUORIDE - TOTAL, GR/SCF	0.0002		0.0002
38) FLUORIDE - WATER SOL., GR/CF, STK CND.	0.0001		0.0001
39) FLUORIDE - TOTAL, GR/CF, STK CND.	0.0001		0.0001
40) FLUORIDE - WATER SOLUBLE, LB/HOUR	0.0887		0.1143
41) FLUORIDE - TOTAL, LB/HOUR	0.0887		0.1143
43) FLUORIDE - WATER SOL., LB/TON P2O5 FED	0.0031		0.0038
44) FLUORIDE - TOTAL, LB/TON P2O5 FED	0.0031		0.0038

S.T.P. ↔ DRY, 70 DEGREES F, 29.92 INCHES MERCURY

SOURCE TEST DATA

TEST NO -

NO OF RUNS - 3

PLANT - I.M.C. PHOSPHATES

BARTOW, FLA.

SOURCE - INLET STATION N

TYPE OF PLANT - DICAL

CONTROL EQUIPMENT -

POLLUTANTS SAMPLED - FLUORIDES

1) RUN NUMBER	1	2	3
2) DATE	3/14/72	3/15/72	3/15/72
3) TIME BEGAN	15.45	12.45	15.15
4) TIME END	17.15	14.21	16.33
5) BAROMETRIC PRESSURE, IN HG	30	30	30
6) METER ORIFICE PRESSURE DROP, IN H ₂ O	1.57	1.38	1.09
7) VOL DRY GAS, METER COND, CUBIC FEET	81.024	63.971	42.808
8) AVERAGE GAS METER TEMPERATURE, DEG F	85.8	84.5	89
9) VOL DRY GAS, S.T.P., CUBIC FEET	79.2	62.635	41.548
10) TOTAL H ₂ O COLLECTED, ML	55	50.3	29
11) VOL H ₂ O VAPOR COLLECTED, S.T.P., CU FT	2.61	2.41	1.37
12) STACK GAS MOISTURE, PERCENT VOLUME	3.2	3.7	3.2
13) ASSUMED STACK GAS MOISTURE, PCT VOL	10	3.2	3.2
14) PERCENT CO ₂			
15) PERCENT O ₂			
16) PERCENT CO			
17) PERCENT N ₂			
18) PERCENT EXCESS AIR	0	0	0
19) MOLECULAR WEIGHT OF STACK GAS, DRY	28.85	28.85	28.85
20) MOLECULAR WEIGHT OF STACK GAS, STK COND	28.5	28.45	28.5
21) STACK GAS SPECIFIC GRAVITY	0.98	0.98	0.98
22) AVG SQUARE ROOT (VEL HEAD), IN H ₂ O	0.761	0.639	0.561
23) AVERAGE STACK GAS TEMPERATURE, DEG F	140	137.7	139.3
24) AVG SQUARE ROOT (STK TEMP*VEL HEAD)	18.647	15.616	13.733
25) PITOT CORRECTION FACTOR	0.83	0.83	0.83
26) STACK PRESSURE, IN HG, ABSOLUTE	29.59	29.59	29.59
27) STACK GAS VEL, STACK COND, F.P.M.	2730.9	2289.3	2011.3
28) STACK AREA, SQ FEET	19.63	19.63	19.63
29) EFFECTIVE STACK AREA, SQUARE FEET	19.63	19.63	19.63
30) STACK GAS FLOW RATE, S.T.P., SCFMD	45350	37953	33424
31) NET TIME OF TEST, MINUTES	120	96	72
32) SAMPLING NOZZLE DIAMETER, INCHES	0.25	0.25	0.25
33) PERCENT ISOKINETIC	83.8	39	99.4
34) FLUORIDE - WATER SOLUBLE, MG	12.9	1.3	0
35) FLUORIDE - TOTAL, MG	53.4	34	0
36) FLUORIDE - WATER SOLUBLE, GR/SCF	0.0037	0.0003	0
37) FLUORIDE - TOTAL, GR/SCF	0.0104	0.0084	0
38) FLUORIDE - WATER SOL., GR/CF, STK CND.	0.0031	0.0003	0
39) FLUORIDE - TOTAL, GR/CF, STK CND.	0.0088	0.0071	0
40) FLUORIDE - WATER SOLUBLE, LB/HOUR	1.4283	0.104	0
41) FLUORIDE - TOTAL, LB/HOUR	4.0355	2.719	0
43) FLUORIDE - WATER SOL., LB/TON P2O5 FED	0.0499	0.0033	1
44) FLUORIDE - TOTAL, LB/TON P2O5 FED	0.1411	0.0871	1

S.T.P. ↔ DRY, 70 DEGREES F, 29.92 INCHES MERCURY

SOURCE TEST DATA

TEST NO -
 PLANT - I.M.C. PHOSPHATES
 SOURCE - INLET STATION N
 TYPE OF PLANT - DICAL
 CONTROL EQUIPMENT -
 POLLUTANTS SAMPLED - FLUORIDES

NO OF RUNS - 3

BARTOW, FLA.

	1	2	3
1) RUN NUMBER	1	2	3
2) DATE	3/14/72	3/15/72	3/15/72
3) TIME BEGAN	15.45	12.45	15.15
4) TIME END	17.45	14.21	16.33
5) BAROMETRIC PRESSURE, IN HG	30	30	30
6) METER ORIFICE PRESSURE DROP, IN H ₂ O	1.57	1.38	1.09
7) VOL DRY GAS, METER COND, CUBIC FEET	81.024	63.971	42.808
8) AVERAGE GAS METER TEMPERATURE, DEG F	85.8	84.6	89
9) VOL DRY GAS, S.T.P., CUBIC FEET	79.2	62.635	41.548
10) TOTAL H ₂ O COLLECTED, ML	55	50.2	29
11) VOL H ₂ O VAPOR COLLECTED, S.T.P., CU FT	2.61	2.41	1.37
12) STACK GAS MOISTURE, PERCENT VOLUME	3.2	3.7	3.2
13) ASSUMED STACK GAS MOISTURE, PCT VOL	10	3.2	3.2
14) PERCENT CO ₂			
15) PERCENT O ₂			
16) PERCENT CO			
17) PERCENT N ₂			
18) PERCENT EXCESS AIR	0	0	0
19) MOLECULAR WEIGHT OF STACK GAS, DRY	28.25	28.25	28.25
20) MOLECULAR WEIGHT OF STACK GAS, STK COND	28.5	28.45	28.5
21) STACK GAS SPECIFIC GRAVITY	0.98	0.98	0.98
22) AVG SQUARE ROOT (VEL HEAD), IN H ₂ O	0.761	0.632	0.561
23) AVERAGE STACK GAS TEMPERATURE, DEG F	140	137.7	139.3
24) AVG SQUARE ROOT (STK TEMP×VEL HEAD)	18.647	15.616	13.733
25) PITOT CORRECTION FACTOR	0.83	0.83	0.83
26) STACK PRESSURE, IN HG, ABSOLUTE	29.59	29.59	29.59
27) STACK GAS VEL, STACK COND, F.P.M.	2730.9	2289.3	2011.3
28) STACK AREA, SQ FEET	19.63	19.63	19.63
29) EFFECTIVE STACK AREA, SQUARE FEET	19.63	19.63	19.63
30) STACK GAS FLOW RATE, S.T.P., SCFMD	45350	37953	33424
31) NET TIME OF TEST, MINUTES	120	96	72
32) SAMPLING NOZZLE DIAMETER, INCHES	0.25	0.25	0.25
33) PERCENT ISOKINETIC	83.8	99	99.4
34) FLUORIDE - WATER SOLUBLE, MG	12.9	1.3	0
35) FLUORIDE - TOTAL, MG	53.4	34	0
36) FLUORIDE - WATER SOLUBLE, GR/SCF	0.0037	0.0003	0
37) FLUORIDE - TOTAL, GR/SCF	0.0104	0.0084	0
38) FLUORIDE - WATER SOL., GR/CF, STK CHD.	0.0031	0.0003	0
39) FLUORIDE - TOTAL, GR/CF, STK CHD.	0.0088	0.0071	0
40) FLUORIDE - WATER SOLUBLE, LB/HOUR	1.4283	0.104	0
41) FLUORIDE - TOTAL, LB/HOUR	4.0355	2.710	0
43) FLUORIDE - WATER SOL., LB/TON P2O5 FED	0.0499	0.0033	1
44) FLUORIDE - TOTAL, LB/TON P2O5 FED	0.1411	0.0871	1

S.T.P.→DRY, 70 DEGREES F, 29.92 INCHES MERCURY

SOURCE TEST DATA

TEST NO -

NO OF RUNS - 3

PLANT - I.M.C. PHOSPHATES

BARTON, FLA.

SOURCE - OUTLET STATION P

TYPE OF PLANT - DICAL

CONTROL EQUIPMENT -

POLLUTANTS SAMPLED - FLUORIDES

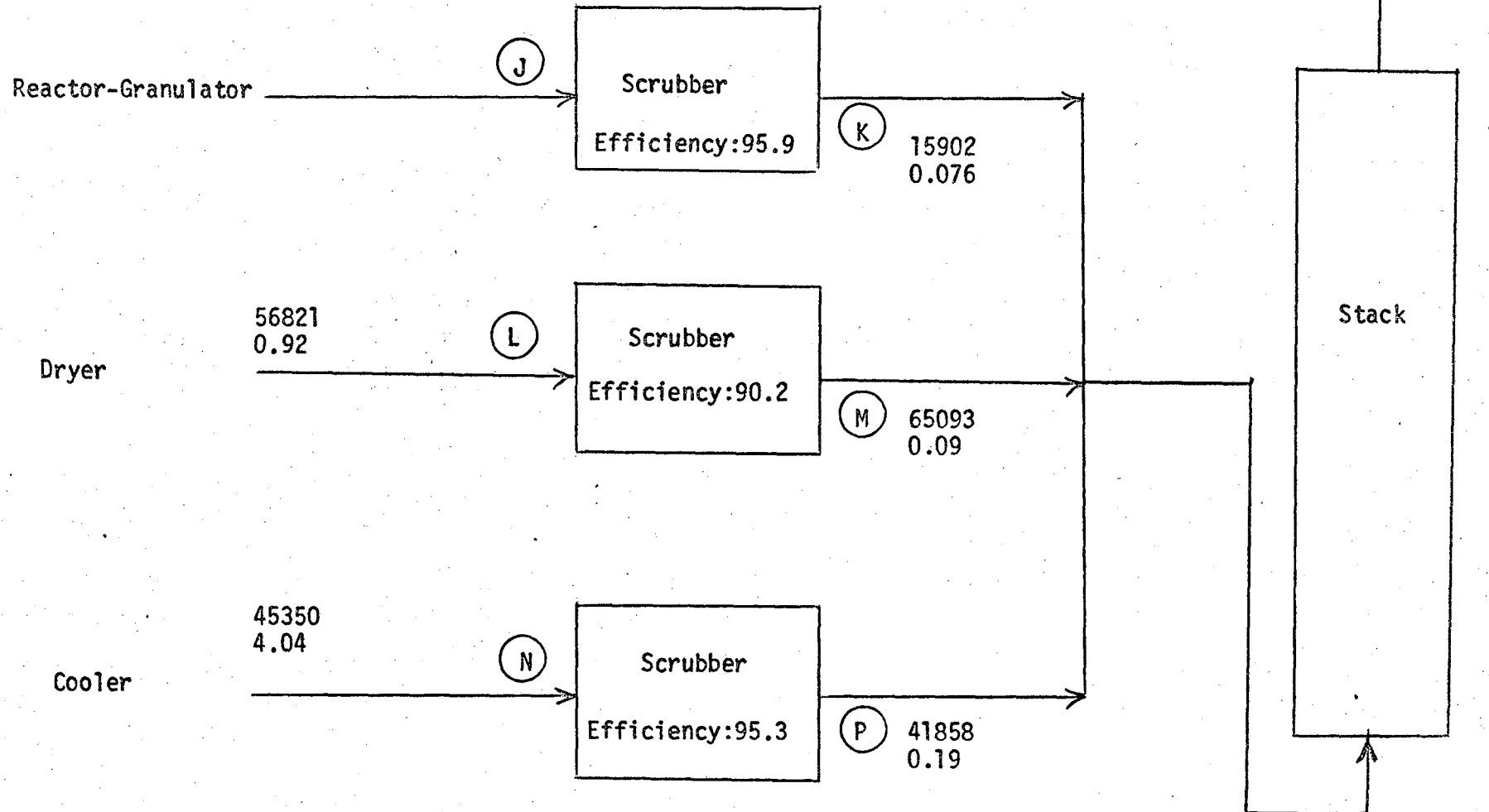
1) RUN NUMBER	1	2	3
2) DATE	3/14/72	3/15/72	3/15/72
3) TIME BEGAN	14:45	12:42	15:15
4) TIME END	16:45	14:12	16:25
5) BAROMETRIC PRESSURE, IN HG	30	30	30
6) METER ORIFICE PRESSURE DROP, IN H ₂ O	0.93	0.87	0.87
7) VOL DRY GAS, METER COND, CUBIC FEET	65.412	47.409	37.698
8) AVERAGE GAS METER TEMPERATURE, DEG F	82.2	78.2	84.3
9) VOL DRY GAS, S.T.P., CUBIC FEET	64.245	46.011	36.979
10) TOTAL H ₂ O COLLECTED, ML	184.5	154.6	119.3
11) VOL H ₂ O VAPOR COLLECTED, S.T.P., CU FT	8.75	7.33	5.65
12) STACK GAS MOISTURE, PERCENT VOLUME	12	13.5	13.3
13) ASSUMED STACK GAS MOISTURE, PCT VOL	14	12	12
14) PERCENT CO ₂			
15) PERCENT O ₂			
16) PERCENT CO			
17) PERCENT N ₂			
18) PERCENT EXCESS AIR	0	0	0
19) MOLECULAR WEIGHT OF STACK GAS, DRY	28.85	28.85	28.85
20) MOLECULAR WEIGHT OF STACK GAS, STK COND	27.55	27.38	27.41
21) STACK GAS SPECIFIC GRAVITY	0.95	0.94	0.95
22) AVG SQUARE ROOT (VEL HEAD), IN H ₂ O	0.531	0.511	0.514
23) AVERAGE STACK GAS TEMPERATURE, DEG F	124.3	125	124.9
24) AVG SQUARE ROOT (STK TEMP*VEL HEAD)	12.824	12.363	12.425
25) PITOT CORRECTION FACTOR	0.83	0.83	0.83
26) STACK PRESSURE, IN HG, ABSOLUTE	28.5	28.5	28.5
27) STACK GAS VEL, STACK COND, F.P.M.	1946.6	1882.2	1800.9
28) STACK AREA, SQ FEET	28.27	28.27	28.27
29) EFFECTIVE STACK AREA, SQUARE FEET	28.27	28.27	28.27
30) STACK GAS FLOW RATE, S.T.P., SCFMD	41858	39716	40005
31) NET TIME OF TEST, MINUTES	120	90	70
32) SAMPLING NOZZLE DIAMETER, INCHES	0.25	0.25	0.25
33) PERCENT ISOKINETIC	106.1	108.8	109.2
34) FLUORIDE - WATER SOLUBLE, MG	2.2	1.8	2.8
35) FLUORIDE - TOTAL, MG	2.2	1.8	2.8
36) FLUORIDE - WATER SOLUBLE, GR/SCF	0.0005	0.0006	0.0012
37) FLUORIDE - TOTAL, GR/SCF	0.0005	0.0006	0.0012
38) FLUORIDE - WATER SOL., GR/CF, STK CHD.	0.0004	0.0004	0.0009
39) FLUORIDE - TOTAL, GR/CF, STK CHD.	0.0004	0.0004	0.0009
40) FLUORIDE - WATER SOLUBLE, LB/ HOUR	0.1892	0.2011	0.4669
41) FLUORIDE - TOTAL, LB/ HOUR	0.1892	0.2011	0.4669
43) FLUORIDE - WATER SOL., LB/TON P2O5 FED	0.0066	0.0064	0.0135
44) FLUORIDE - TOTAL, LB/TON P2O5 FED	0.0066	0.0064	0.0135

S.T.P. ← DRY, 70 DEGREES F, 29.92 INCHES MERCURY

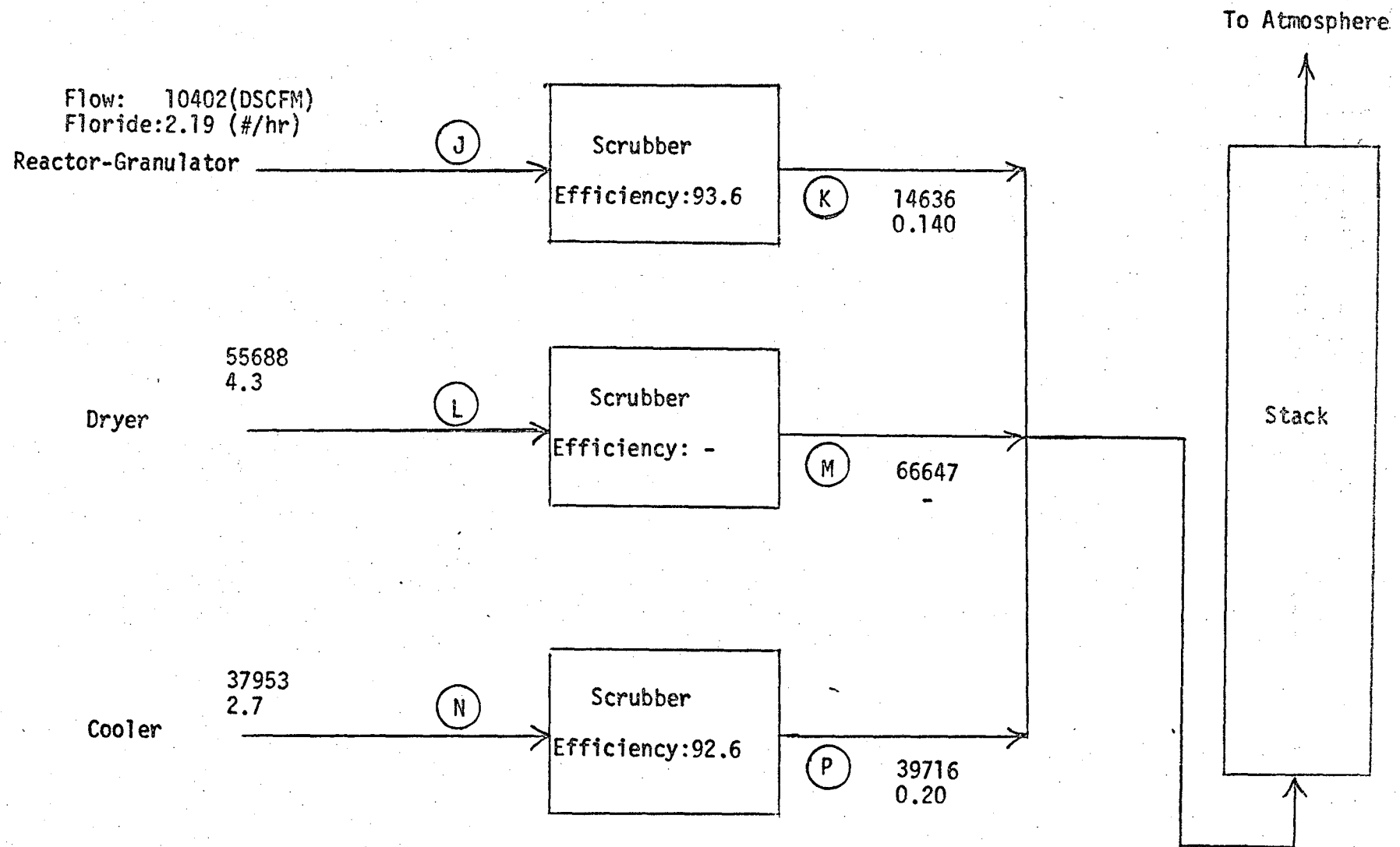
IMC DICALCIUM PHOSPHATE

RUN 1

Flow: 9319 (DSCFM)
Fluorides: 1.85 (#/hr)



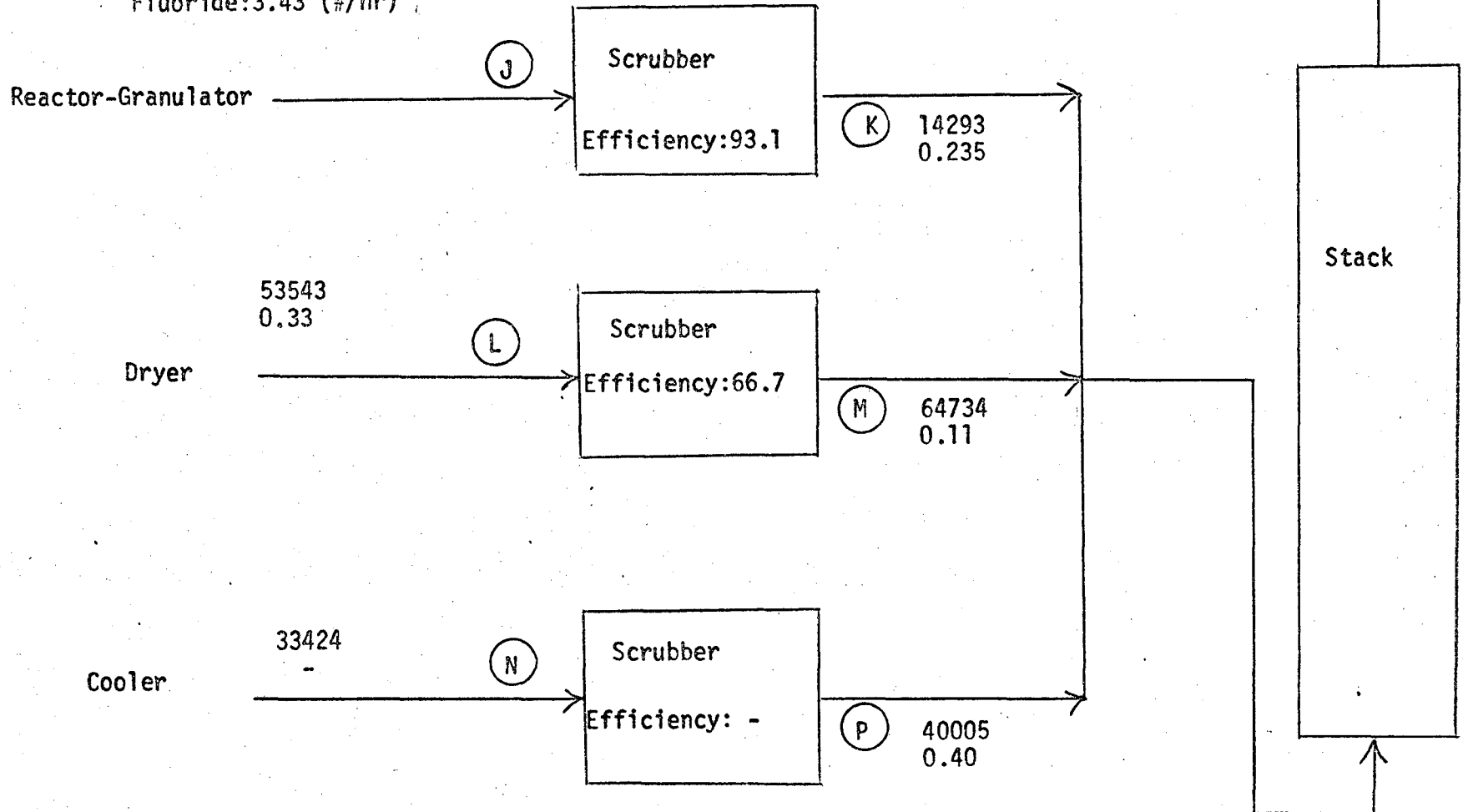
IMC DICALCIUM PHOSPHATE
RUN 2



IMC DICALCIUM PHOSPHATE

RUN 3

Flow: 10971 (DSCFM)
Fluoride: 3.43 (#/hr)



APPENDIX B

Field Data

PRELIMINARY MOISTURE CHECK

PLANT I.M.C. PHOSPHATES, BARTON, FLA.

STACK Sta. "J" - Reactor - Inlet

DATE 3-14-72

SAMPLE TIME 1028 - 1048

METHOD 1

Dry Bulb Temp. 135 °F, Wet Bulb Temp. 127 °F, Dew Point Temp. 122 °F.

Vapor Pressure of H₂O @ DP 3.69 "Hg.

Stack Pressure 29.5 "Hg.

Moisture Fraction 0.12,

Dry Air Fraction 0.88 "Hg.

METHOD 2

Final Dry Test Meter Reading 281.676 Ft³

Initial Dry Test Meter Reading 279.864 Ft³

Dry Test Meter Volume Sampled 1.812 Ft³

Average Meter Temp 70 °F

Average Orifice ΔH 0.45 "H₂O

Barometric Pressure @ Orifice Meter 30 "Hg

Dry Gas Volume Sampled @ STP 1.82 Ft³

Volume of Condensate 1.7 ml

Water Vapor Volume @ STP 0.08 Ft³

Moisture Fraction 0.04,

Dry Air Fraction 0.96.

PRELIMINARY MOISTURE CHECK

PLANT I.M.C. PHOSPHATES, BARTON, FLA.

STACK Sta. "K" - Reactor - Outlet

DATE 3-14-72

SAMPLE TIME 1100 - 1121

METHOD 1

Dry Bulb Temp. 125 °F, Wet Bulb Temp. _____ °F, Dew Point Temp. _____ °F.

Vapor Pressure of H₂O @ DP 3.95 "Hg. Stack Pressure 28.67 "Hg.

Moisture Fraction 0.14, Dry Air Fraction 0.86 "Hg.

METHOD 2

Final Dry Test Meter Reading 837.7 Ft³

Initial Dry Test Meter Reading 834.9 Ft³

Dry Test Meter Volume Sampled 2.8 Ft³

Average Meter Temp 75 °F

Average Orifice ΔH 0.07 "H₂O

Barometric Pressure @ Orifice Meter 30 "Hg

Dry Gas Volume Sampled @ STP 2.78 Ft³

Volume of Condensate — ml

Water Vapor Volume @ STP — Ft³

Moisture Fraction —,

Dry Air Fraction —.

PRELIMINARY MOISTURE CHECK

PLANT I. M. C. PHOSPHATES, BARTOW, FLA.

STACK Sta. "L" - Dryer - Inlet

DATE 3-14-72

SAMPLE TIME 1210 - 1230

METHOD 1

Dry Bulb Temp. 187°F, Wet Bulb Temp. 153°F, Dew Point Temp. 152°F.

Vapor Pressure of H₂O @ DP 7.95 "Hg. Stack Pressure 29.62 "Hg.

Moisture Fraction 0.27, Dry Air Fraction 0.73 "Hg.

METHOD 2

Final Dry Test Meter Reading 721.184 Ft³

Initial Dry Test Meter Reading 717.217 Ft³

Dry Test Meter Volume Sampled 3.967 Ft³

Average Meter Temp 80 °F

Average Orifice ΔH 0.20 "H₂O

Barometric Pressure @ Orifice Meter 30 "Hg

Dry Gas Volume Sampled @ STP 3.90 Ft³

Volume of Condensate 6.2 ml

Water Vapor Volume @ STP 0.29 Ft³

Moisture Fraction 0.07,

Dry Air Fraction 0.93.

PRELIMINARY MOISTURE CHECK

PLANT I.M.C. PHOSPHATES, BARTON, FLA

STACK Sta. "M" - Dryer - Outlet

DATE 3-18-72

SAMPLE TIME 1140 - 1155

METHOD 1

Dry Bulb Temp. 150 °F, Wet Bulb Temp. _____ °F, Dew Point Temp. _____ °F.

Vapor Pressure of H₂O @ DP 7.57 "Hg. Stack Pressure 28.65 "Hg.

Moisture Fraction 0.26, Dry Air Fraction 0.74 "Hg.

METHOD 2

Final Dry Test Meter Reading 659.348 Ft³

Initial Dry Test Meter Reading 657.265 Ft³

Dry Test Meter Volume Sampled 2.083 Ft³

Average Meter Temp 75 °F

Average Orifice ΔH - "H₂O

Barometric Pressure @ Orifice Meter 30 "Hg

Dry Gas Volume Sampled @ STP 2.07 Ft³

Volume of Condensate 12.3 ml

Water Vapor Volume @ STP 0.58 Ft³

Moisture Fraction 0.22,

Dry Air Fraction 0.78.

PRELIMINARY MOISTURE CHECK

PLANT I. M. C. PHOSPHATES, BARTOW, FLA.

STACK Sta. "N" - Screen Mill - Inlet

DATE 3-12-72

SAMPLE TIME 1138

METHOD 1

Dry Bulb Temp. 140 °F, Wet Bulb Temp. _____ °F, Dew Point Temp. _____ °F.

Vapor Pressure of H₂O @ DP _____ "Hg. Stack Pressure 29.59 "Hg.

Moisture Fraction _____, Dry Air Fraction _____ "Hg.

METHOD 2

Final Dry Test Meter Reading 717.216 Ft³

Initial Dry Test Meter Reading 713.956 Ft³

Dry Test Meter Volume Sampled 3.260 Ft³

Average Meter Temp 81 °F

Average Orifice ΔH 0.10 "H₂O

Barometric Pressure @ Orifice Meter 30 "Hg

Dry Gas Volume Sampled @ STP 3.20 Ft³

Volume of Condensate 1.0 ml

Water Vapor Volume @ STP 0.05 Ft³

Moisture Fraction 0.02,

Dry Air Fraction 0.98

PRELIMINARY MOISTURE CHECK

PLANT I.M.C. PHOSPHATES, BARTON, FLA

STACK Sta "P" - Screen Mill - Outlet

DATE 3-14-72

SAMPLE TIME 1100 - 1120

METHOD 1

Dry Bulb Temp. 125 °F, Wet Bulb Temp. _____ °F, Dew Point Temp. _____ °F.

Vapor Pressure of H₂O @ DP 3.95 "Hg. Stack Pressure 28.5 "Hg.

Moisture Fraction 0.14, Dry Air Fraction 0.86 "Hg.

METHOD 2

Final Dry Test Meter Reading 192.980 Ft³

Initial Dry Test Meter Reading 189.980 Ft³

Dry Test Meter Volume Sampled 3.000 Ft³

Average Meter Temp 74 °F

Average Orifice ΔH 0.10 "H₂O

Barometric Pressure @ Orifice Meter 30 "Hg

Dry Gas Volume Sampled @ STP 2.98 Ft³

Volume of Condensate 7.7 ml

Water Vapor Volume @ STP 0.36 Ft³

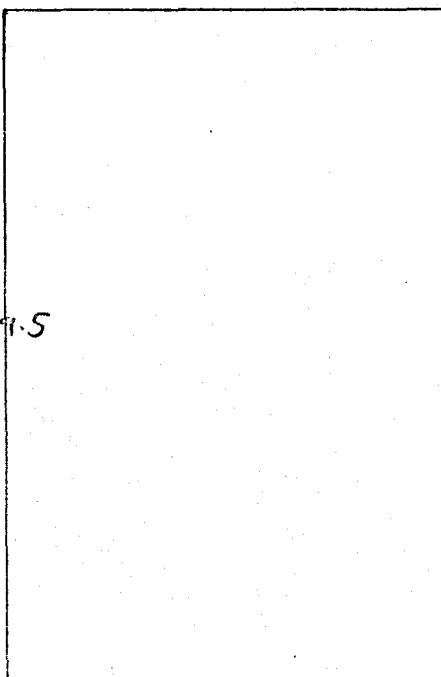
Moisture Fraction 0.11,

Dry Air Fraction 0.89.

ENVIRONMENTAL ENGINEERING, INC.
Gainesville, Florida

SOURCE SAMPLING FIELD DATA SHEET

Plant I.M.C. PHOSPHATES, BARTOW
Sampling Location "J"- REACTOR- INLET
Date 3-14-72 Run No. 1
Time Start 1445 Time End 1556
Sampling Time/Point 7 min (Total = 42 min)
DB 134 °F, WB 123 °F, VF @ DP _____ "Hg
Moisture 12 %, FDA _____, Gas Density Factor _____
Barometric Press 30 "Hg, Stack Press 30-0.5 "Hg 29.5
Weather Fair
Temp. 85 °F, W/D _____, W/S _____
Sample Box No. 1 Meter Box No. 4
Meter ΔH_0 1.62 Pitot Corr. Factor 0.83
Nozzle Dia. 1/2 in., Probe Length 6 ft
Probe Heater Setting 3070
Stack Dimensions: Inside Diameter 33 in
Inside Area 5.94 ft²
Height _____ ft



$C_p = 0.78$
 $P_{ref} = 1.65$

Mat'l Processing Rate _____
Final Gas Meter Reading 334.788 ft³
Initial Gas Meter Reading 281.674 ft³
Total Condensate in Impingers 91 ml
Moisture in Silica Gel 15 gm
Silica Gel Container No. 628 Filter No. 720454
Orsat: CO₂ _____
O₂ _____
CO _____
N₂ _____
Excess Air _____

Test Conducted by: J. Chadbourne
B. Pruitt

Remarks: 7/18 sampling pts. used

Port and Traverse Point No.	Distance from End of Port (in.)	Clock Time	Gas Meter Reading (ft ³)	Stack Velocity Head ("H ₂ O)	Meter Orifice Press. Diff. ("H ₂ O)		Stack Gas Temp. (°F)	Gas Sample Temp. @ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Test (°F)	Vacuum on Sample Train ("Hg)
					Calc.	Actual		In	Out			
Pt. 1	< 1"	1445	281.674									
2	1 9/32	1452	—	0.12	.35	.35	134	80	81		82	15.5
* 3	2 7/32	1459 1522	287.572	0.20	.58	.58 → .30	134	80	81			25.5
4	3 1/32	1535	301.2	0.45	.75	wide open	134	81	85		83	20.0
5	4 1/4	1542	311.	0.31	.75	"	134	90	85		90	20.0
6	5 7/16	1549	325.	0.21	.72	wide open	135	93	87		84	21.5

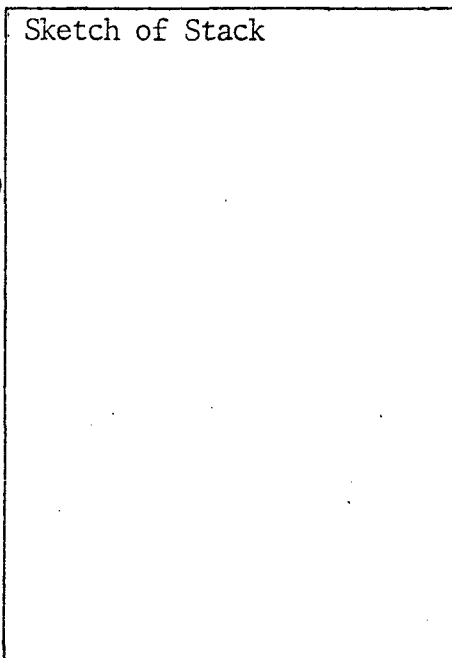
* 4' nozzle probe - 10' distance from 3' bagging point 3

[illegible]

SOURCE SAMPLING FIELD DATA SHEET

Plant I.M.C. Phosphates, Barton
 Sampling Location "J"-Reactor Inlet
 Date 3-15-72 Run No. 2
 Time Start 1245 Time End 1327
 Sampling Time/Point 2 min (Total = 4 min)
 DB 134 °F, WB 115 °F, VF @ DP _____ "Hg
 Moisture 8 %, FDA _____, Gas Density Factor _____
 Barometric Press 30 "Hg, Stack Press 24.5 "Hg
 Weather _____
 Temp. _____ °F, W/D _____, W/S _____
 Sample Box No. 1 Meter Box No. 4
 Meter ΔH 1.62 Pitot Corr. Factor 0.13
 Nozzle Dia. 1/2 in., Probe Length 6 ft
 Probe Heater Setting 95%
 Stack Dimensions: Inside Diameter 33 in
 Inside Area _____ ft²
 Height _____ ft

Sketch of Stack



Mat'l Processing Rate _____

Final Gas Meter Reading 396.327 ft³

Initial Gas Meter Reading 338.247 ft³

Total Condensate in Impingers 116 ml

Moisture in Silica Gel 220.2 - 208 gm

Silica Gel Container No. 1007 Filter No. 120157

Orsat: CO₂ _____
 O₂ _____
 CO _____
 N₂ _____
 Excess Air _____

Test Conducted By: J. Cardbourne
B. Pruitt

Remarks: 16
18 Sample Points were taken
from wide - 25" probe for
10 min. - Green Lead very

Port and Traverse Point No.	Distance from End of Port (in)	Clock Time	Gas Meter Reading (ft ³)	Stack Velocity Head ("H ₂ O)	Meter Orifice Press. Diff. ("H ₂ O)		Stack Gas Temp. (°F)	Gas Sample Temp. @ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Temp. (°F)	Vacuum on Sample Train ("Hg)
					Calc.	Actual		In	Out			
<u>1</u>	<u><1"</u>	<u>1245</u>	<u>338.247</u>	<u>---</u>	<u>---</u>	<u>---</u>	<u>---</u>	<u>---</u>	<u>---</u>	<u>---</u>	<u>---</u>	<u>---</u>
<u>2</u>	<u>1 9/32</u>	<u>1247</u>	<u>343</u>	<u>0.80</u>	<u>---</u>	<u>5</u>	<u>134</u>	<u>74</u>	<u>71</u>	<u>---</u>	<u>---</u>	<u>---</u>
<u>3</u>	<u>2 2/32</u>	<u>1249</u>	<u>---</u>	<u>0.90</u>	<u>---</u>	<u>---</u>	<u>---</u>	<u>76</u>	<u>71</u>	<u>---</u>	<u>---</u>	<u>---</u>
<u>4</u>	<u>3 2/32</u>	<u>1251</u>	<u>---</u>	<u>0.94</u>	<u>> 5"</u>	<u>---</u>	<u>---</u>	<u>76</u>	<u>74</u>	<u>---</u>	<u>---</u>	<u>---</u>
<u>5</u>	<u>4 1/4</u>	<u>1253</u>	<u>356.03</u>	<u>0.12</u>	<u>> 5"</u>	<u>---</u>	<u>---</u>	<u>77</u>	<u>75</u>	<u>---</u>	<u>---</u>	<u>---</u>
<u>6</u>	<u>5 1/2</u>	<u>1255</u>	<u>367.2</u>	<u>0.35</u>	<u>---</u>	<u>---</u>	<u>---</u>	<u>---</u>	<u>---</u>	<u>---</u>	<u>---</u>	<u>---</u>
<u>7</u>	<u>6 3/4</u>	<u>1257</u>	<u>359.9</u>	<u>0.31</u>	<u>wide open</u>	<u>N</u>	<u>134</u>	<u>77</u>	<u>75</u>	<u>---</u>	<u>73</u>	<u>---</u>
<u>8</u>	<u>8 1/4</u>	<u>1301</u>	<u>368.7</u>	<u>0.36</u>	<u>---</u>	<u>---</u>	<u>---</u>	<u>80</u>	<u>76</u>	<u>---</u>	<u>77</u>	<u>---</u>
<u>9</u>	<u>10 3/4</u>	<u>1307</u>	<u>---</u>	<u>0.30</u>	<u>---</u>	<u>---</u>	<u>---</u>	<u>81</u>	<u>76</u>	<u>---</u>	<u>76</u>	<u>---</u>

SOURCE 'SAMPLING FIELD DATA' SHEET

Plant IMC Phosphates, Bartow
 Sampling Location "J" - Reactor Inlet
 Date 3/15/72 Run No. 3
 Time Start 1501 Time End 30
 Sampling Time/Point 2 min (4 min = 3 min)
 DB 134 °F, WB 115 °F, VF @ DP _____ "Hg
 Moisture 8 %, FDA _____, Gas Density Factor _____
 Barometric Press 30 "Hg, Stack Press 29.5 "Hg
 Weather _____
 Temp. _____ °F, W/D _____, W/S _____
 Sample Box No. 4 Meter Box No. 4
 Meter ΔH@ 1.62 Pitot Corr. Factor 0.83
 Nozzle Dia. 1/2 in., Probe Length 6 ft
 Probe Heater Setting 45%
 Stack Dimensions: Inside Diameter 33 in
 Inside Area _____ ft²
 Height _____ ft

Sketch of Stack

Mat'l Processing Rate _____

Final Gas Meter Reading 448.192 ft³Initial Gas Meter Reading 396.328 ft³Total Condensate in Impingers 106 mlMoisture in Silica Gel 235 - 218.2 gmSilica Gel Container No. 626 Filter No. 720463

Orsat: CO₂ _____
 O₂ _____
 CO _____
 N₂ _____
 Excess Air _____

Test Conducted By: J. Chadbourne
B. Pruitt

Remarks: 14/18 sampling points used 2 min./pt
pump wide open - 1/2" nozzle to reduce clog
very high grain loading

Port and Traverse Point No.	Distance from End of Port (in)	Clock Time	Gas Meter Reading (ft ³)	Stack Velocity Head ("H ₂ O)	Meter Orifice Press. Diff. ("H ₂ O)		Stack Gas Temp. (°F)	Gas Sample Temp. @ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Temp. (°F)	Vacuum on Sample Train ("Hg)
					Calc.	Actual		In	Out			
1	1" START →	1501	396.328									
2	1 1/32	1503	400.3	0.46		5	134	89	90		82	19
3	2 1/32	1505	405.6	0.63				88	89		82	19
4	3 1/32	1507	410.3	0.50								
5	4 1/4	1509	419.8	0.35				89	89		80	20
6	5 1/6	1511	419.0	0.37				90	89		80	21
7	6 1/4	1513	423.2	0.46				90	89		79	21
8	8 1/4	1515	427.0	0.35				90	89		79	21
9	10 1/32	1517	431.0	0.42				92	90		79	22

SOURCE SAMPLING FIELD DATA SHEET

Plant IMC. PHOSPHATES, BARTOW

Sampling Location "K" - REACTOR - OUTLET

Date 3-14-72 Run No. 1

Time Start _____ Time End _____

Sampling Time/Point 10 min (Total = 120 min)

DB 125 °F, WB _____ °F, VF @ DP _____ "Hg

Moisture 12 %, FDA _____, Gas Density Factor _____

Barometric Press 30 "Hg, Stack Press 28.67 "Hg

Weather Clear

Temp. 79 °F, W/D _____, W/S _____

Sample Box No. 2 Meter Box No. 2

Meter ΔH 1.70 Pitot Corr. Factor _____

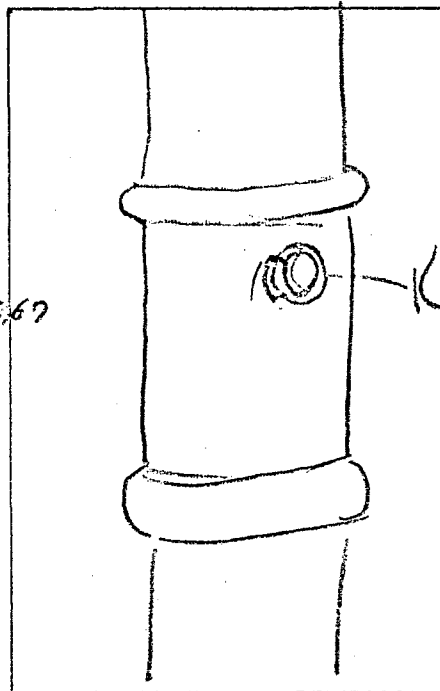
Nozzle Dia 3/4 in., Probe Length 8 ft

Probe Heater Setting 50°

Stack Dimensions: Inside Diameter 47 in

Inside Area 12.04 ft²

Height _____ ft



Mat'l Processing Rate _____

Final Gas Meter Reading 903.89 ft³

Initial Gas Meter Reading 837.74 ft³

Total Condensate in Impingers 13.7 ml

Moisture in Silica Gel 15.5 gm

Silica Gel Container No. 619 Filter No. 220435

Orsat: CO₂ _____

O₂ _____

CO _____

N₂ _____

Excess Air _____

Test Conducted by: L. Wurts

R. Fuller

Remarks: _____

* Stopped with Probe tip Rustle @ 3:35

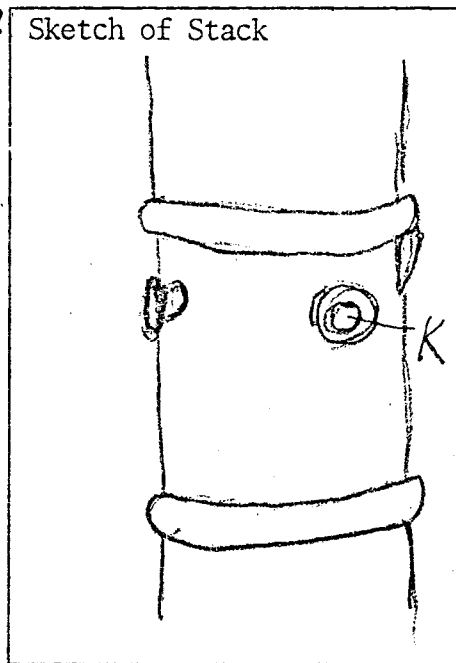
Port and Traverse Point No.	Distance from End of Port (in.)	Clock Time	Gas Meter Reading (ft ³)	Stack Velocity Head ("H ₂ O)	Meter Orifice Press. Diff. ("H ₂ O)		Stack Gas Temp. (°F)	Gas Sample Temp. @ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Test (°F)	Vacuum on Sample Train ("Hg)
					Calc.	Actual		In	Out			
1	1	2:55	845.7	1.5	2.5	2.5	120	80	79	—	74	2.0
2	3 1/8	3:05	957.6	1.75	2.5	2.5	120	80	79	—	74	2.0
3	5 1/8	3:15	873.8	1.75	2.5	2.5	120	80	79	—	74	2.0
4	8 5/16	3:45	777.2	0.20	0.31	0.31	100	84	81	—	83	2.0
5	11 3/16	3:55	650.0	0.15	0.235	0.235	120	84	81	—	83	2.0
6	16 1/16	4:05	443.1	0.20	0.32	0.32	120	84	81	—	83	2.0

[illegible]

SOURCE SAMPLING FIELD DATA SHEET

Plant Imc. Phosphate Bartow
 Sampling Location K-Reactor-outlet
 Date 3-15-72 Run No. 2
 Time Start 12:47 Time End 2:23
 Sampling Time/Point 8 min (total) = 96 min
 DB 120 °F, WB _____ °F, VF @ DP _____ "Hg
 Moisture 14 %, FDA _____, Gas Density Factor _____
 Barometric Press 30 "Hg, Stack Press 28.47 "Hg
 Weather Clear
 Temp. 77 °F, W/D _____, W/S _____
 Sample Box No. 2 Meter Box No. 2
 Meter ΔH 1.70 Pitot Corr. Factor _____
 Nozzle Dia. 1/4 in., Probe Length 8 ft
 Probe Heater Setting 50%
 Stack Dimensions: Inside Diameter 47 in
 Inside Area _____ ft²
 Height _____ ft

Sketch of Stack



Mat'l Processing Rate _____

Final Gas Meter Reading 945.92 ft³Initial Gas Meter Reading 903.90 ft³Total Condensate in Impingers 130 ml (42.9)Moisture in Silica Gel 221.5 - 208.9 gmSilica Gel Container No. 1015 Filter No. 720420

Orsat: CO₂ _____
 O₂ _____
 CO _____
 N₂ _____
 Excess Air _____

Test Conducted By: L. Wurts
R. Fuller

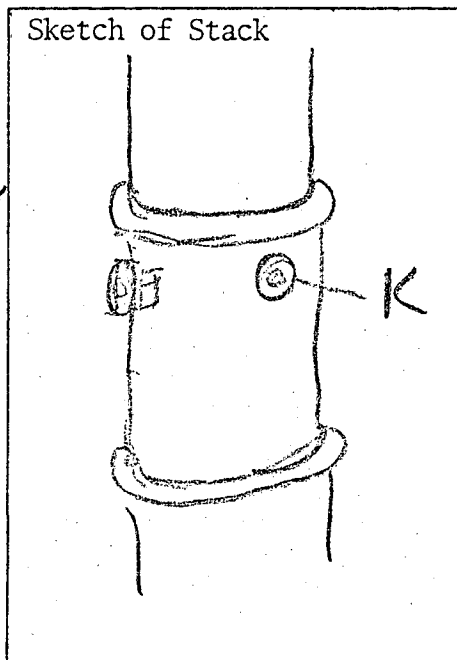
Remarks: _____

Port and Traverse Point No.	Distance from End of Port (in)	Clock Time	Gas Meter Reading (ft ³)	Stack Velocity Head ("H ₂ O)	Meter Orifice Press. Diff. ("H ₂ O)		Stack Gas Temp. (°F)	Gas Sample Temp. & Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Temp. (°F)	Vacuum on Sample Train ("H ₂ O)
					Calc.	Actual		In	Out			
1	1	12:55	908.1	0.25	0.73	0.73	120	77	75	—	77	4.5
2	3 1/8	1:03	912.2	0.23	0.68	0.68	120	77	75	—	77	4.5
3	5 1/8	1:11	915.5	0.17	0.52	0.52	120	79	76	—	77	4.0
4	8 5/16	1:19	918.8	0.17	0.51	0.51	120	79	76	—	77	4.0
5	11 3/4	1:27	922.0	0.17	0.48	0.48	126	80	77	—	77	4.0
6	16 1/16	1:35	925.2	0.17	0.48	0.48	127	80	77	—	80	4.0
7	30 5/16	1:43	928.4	0.21	0.58	0.58	128	81	77	—	81	4.5
8	35 1/4	1:51	932.3	0.22	0.61	0.61	128	81	77	—	81	4.5
9	38 1/16	1:59	935.8	0.22	0.61	0.61	128	81	77	—	78	4.5

SOURCE SAMPLING FIELD DATA SHEET

Plant Imc Phosphate Bartow
 Sampling Location K - reactor-output
 Date 3-15-72 Run No. 3
 Time Start 3:15 Time End _____
 Sampling Time/Point 6 min (Total - 72 min)
 DB _____ °F, WB _____ °F, VF @ DP _____ "Hg
 Moisture 14 %, FDA _____, Gas Density Factor _____
 Barometric Press 30 "Hg, Stack Press 2867 "Hg
 Weather Clear
 Temp. 80 °F, W/D _____, W/S _____
 Sample Box No. 2 Meter Box No. 2
 Meter ΔH_e 1.70 Pitot Corr. Factor _____
 Nozzle Dia. 1/4 in., Probe Length 8 ft
 Probe Heater Setting 50%
 Stack Dimensions: Inside Diameter 47 in
 Inside Area _____ ft²
 Height _____ ft

Sketch of Stack



Mat'l Processing Rate _____

Final Gas Meter Reading 974.619 ft³Initial Gas Meter Reading 945.920 ft³Total Condensate in Impingers + 84 ml (95)Moisture in Silica Gel 232.0 - 221.0 = 11 gmSilica Gel Container No. 1009 Filter No. 720467Orsat: CO₂ _____O₂ _____

CO _____

N₂ _____

Excess _____

Air _____

Test Conducted By: _____

Remarks: _____

Port and Traverse Point No.	Distance from End of Port (in)	Clock Time	Gas Meter Reading (ft ³)	Stack Velocity Head ("H ₂ O)	Meter Orifice Press. Diff. ("H ₂ O)		Stack Gas Temp. (°F)	Gas Sample Temp. @ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Temp. (°F)	Vacuum on Sample Train ("Hg)
					Calc.	Actual		In	Out			
1	1	1515	945.920									
2	3 1/8	1521	948.0	0.20	0.57	0.57	130	83	82		78	3.5
3	5 1/8	1527	951.0	0.27	0.75	0.75		84	82		78	4.3
4	8 1/16	1533	953.7	0.23	0.65	0.65		84	82		78	4.0
5	11 1/16	1539	956.0	0.15	0.43	0.43	130	84	81		78	3.5
6	16 1/16	1545	958.1	0.15	0.43	0.43		84	81		78	3.5
7	21 1/16	1551	960.3	0.16	0.44	0.44		84	82		79	3.5
8	30 1/16	1557	962.8	0.20	0.55	0.55		84	82		79	4.0
9	35 1/4	1603	965.4	0.22	0.60	0.60		84	82		79	4.0
9	38 1/16	1609	968.0	0.22	0.60	0.60		85	82		79	4.0

[illegible]

ENVIRONMENTAL ENGINEERING, INC.
Gainesville, Florida

SOURCE SAMPLING FIELD DATA SHEET

Plant I.M.C. PHOSPHATES, BARTOW

Sampling Location "L" - DRYER - INLET

Date 3-14-72 Run No. 1

Time Start 3:00 Time End 5:10

Sampling Time/Point 10 min (Total = 120 min)

DB 190°F, WB _____°F, VF @ DP _____"Hg

Moisture 20%, FDA 80, Gas Density Factor -

Barometric Press 30"Hg, Stack Press -"Hg 29.62

Weather INSIDE BLDG.

Temp. 70.5°F, W/D -, W/S -

Sample Box No. - Meter Box No. B

Meter ΔH₀ 1.65 Pitot Corr. Factor 0.83

Nozzle Dia. 1/4 in., Probe Length _____ ft

Probe Heater Setting _____

Stack Dimensions: Inside Diameter 69 in

Inside Area _____ ft²

Height HORIZONTAL ft

Mat'l Processing Rate _____

Final Gas Meter Reading 436.533 ft³

Initial Gas Meter Reading 336.873 ft³

Total Condensate in Impingers 736 ml

Moisture in Silica Gel 41.5 gm

Silica Gel Container No. 1017 Filter No. 720450

Orsat: CO₂ _____

O₂ _____

CO _____

N₂ _____

Excess Air _____

Test Conducted by: R. DURGAN

E. JOHNSON

Remarks: 12 sampling pts. used

★ ASSUMED

Port and Traverse Point No.	Distance from End of Port (in.)	Clock Time	Gas Meter Reading (ft ³)	Stack Velocity Head ("H ₂ O)	Meter Orifice Press. Diff. ("H ₂ O)		Stack Gas Temp. (°F)	Gas Sample Temp. @ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Test (°F)	Vacuum on Sample Train ("Hg)
					Calc.	Actual		In	Out			
		3:00										
		3:10	^{Rev} 339.0	0.70	1.64	3.40	190	84	83	-	105	24
Pt. 1	1 7/16											
2	4 5/8	3:20	8.5 sec/Rev	0.88	2.05	2.05	193	94	85	-	105	10
3	8 1/8	3:30	7.5 sec/Rev. (2)	0.90	2.10	2.10	193	92	90	-	103	10
4	12 3/8	3:40	7 sec/Rev. (2.3)	1.10	2.50	2.50	193	89	90	-	110	12
5	17 1/4	3:50	7 sec/Rev. (2.3)	1.10	2.50	2.50	190	89	90	-	110	11
6	24 1/2	4:00	8 sec/Rev.	1.00	2.30	2.30	190	93	90	-	110	13

[illegible]

SOURCE SAMPLING FIELD DATA SHEET

Plant IMC PHOSPHATES BARTON, FLA.Sampling Location DRYER INLETDate 3-15-72 Run No. 2Time Start 12:50 Time End 3:03Sampling Time/Point 8 min (196 min Total)DB °F, WB °F, VF @ DP "Hg* Moisture 28 %, FDA 72, Gas Density Factor Barometric Press 30 "Hg, Stack Press 29.72 "HgWeather INSIDE BLDG.Temp. 70 °F, W/D , W/S Sample Box No. Meter Box No. "B"Meter ΔH_e 1.65 Pitot Corr. Factor 0.83Nozzle Dia. 1/4 in., Probe Length 8 ftProbe Heater Setting 30%Stack Dimensions: Inside Diameter 69 inInside Area 25.97 ft²Height HORIZONTAL ft

Sketch of Stack

STA # LMat'l Processing Rate Final Gas Meter Reading 425.950 ft³Initial Gas Meter Reading 341.227 ft³Total Condensate in Impingers 642 mlMoisture in Silica Gel 238.2-206.1 gmSilica Gel Container No. 1008 Filter No. 720561Orsat: CO₂ 2O₂ 18CO N₂ 80

Excess

Air

Test Conducted By: R. DURGANE. JOHNSONRemarks:

* = ASSUMED FROM PREVIOUS DATA

Port and Traverse Point No.	Distance from End of Port (in)	Clock Time	Gas Meter Reading (ft ³)	Stack Velocity Head ("H ₂ O)	Meter Orifice Press. Diff. ("H ₂ O)		Stack Gas Temp. (°F)	Gas Sample Temp. @ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Temp. (°F)	Vacuum on Sample Train ("Hg)
					Calc.	Actual		In	Out			
Port #1		12:50										
Point #1		12:58	347.3	0.60	1.25	1.25	190	82	83	—	95	9.5
2		1:06	354.8	0.90	1.85	1.85	193	82	83	—	95	24
3		1:14	361.9	0.75	1.55	1.55	193	82	83	—	98	14
4		1:22	—	0.95	1.95	1.55	193	89	84	—	105	27
5		1:30	373.8	1.10	2.25	1.20	193	90	85	—	95	25
6		1:38	379.027	1.10	2.25	0.70	193	90	86	—	95	26.0
* 7		2:23	387.2	0.90	1.85	1.25	193	88	87	—	95	9.5
8		2:31	395.1	0.90	1.85	1.85	193	85	86	✓	95	9.5
9		2:39	402.9	0.85	1.75	1.75	193	87	86	—	95	15

= Stop FOR PLUNGED PROBE @ 1:38

Revised 10-15

[illegible]

SOURCE SAMPLING FIELD DATA SHEET

Plant INOC. PHOSPHATES BARTON, FLA.Sampling Location DRYER INLETDate 3-15-72 Run No. 3Time Start 3:35 Time End 4:35Sampling Time/Point 5 min. (60 min total)DB °F, WB °F, VF @ DP "Hg* Moisture 28 %, FDA , Gas Density Factor Barometric Press 30 "Hg, Stack Press 24.6 "HgWeather INSIDE CLOUDTemp. 75 °F, W/D , W/S Sample Box No. Meter Box No. "B"Meter ΔH 1.65 Pitot Corr. Factor 0.83Nozzle Dia. 1/4 in., Probe Length 8 ftProbe Heater Setting 30%Stack Dimensions: Inside Diameter 69 inInside Area ft²Height ft

Sketch of Stack

STA. # L

Mat'l Processing Rate Final Gas Meter Reading 483.511 ft³Initial Gas Meter Reading 425.950 ft³ (620)Total Condensate in Impingers 600 mlMoisture in Silica Gel 246.0 gmSilica Gel Container No. 623 Filter No. 720462Orsat: CO₂ O₂ CO N₂ Excess Air Test Conducted By: R. DURGANE. JOHNSONRemarks:

* = ASSUMED FROM PREVIOUS DATA

Port and Traverse Point No.	Distance from End of Port (in)	Clock Time	Gas Meter Reading (ft ³)	Stack Velocity Head ("H ₂ O)	Meter Orifice Press. Diff. ("H ₂ O)		Stack Gas Temp. (°F)	Gas Sample Temp. @ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Temp. (°F)	Vacuum on Sample Train ("Hg)
					Calc.	Actual		In	Out			
Port #1		3:35										
Point #1		3:40		0.65	1.35	1.35	193	94	93	—	93	6.1
2		3:45	435.1	0.85	1.75	1.75	193	92	92	—	95	7.5
3		3:50	439.9	0.90	1.75	1.85	193	93	92	—	95	10.0
4		3:55	444.8	0.95	1.95	1.95	193	93	92	—	100	10.0
5		4:00	449.5	0.95	1.95	1.95	193	93	92	—	100	11.0
6		4:05	454.1	0.90	1.85	1.85	193	92	92	—	108	10.5
7		4:10	458.7	1.00	2.05	2.05	193	90	92	—	110	11.0
8		4:15	463.5	1.10	2.25	2.25	193	89	91	—	110	13.0
9		4:20	468.6	1.10	2.25	2.25	193	87	90	—	110	13.5

[illegible]



ENVIRONMENTAL ENGINEERING, INC.
Gainesville, Florida

SOURCE SAMPLING FIELD DATA SHEET

Plant I.M.C. PHOSPHATES, BARTOW

Sampling Location "M" - DRYER-OUTLET

Date 3/14/72 Run No. 1

Time Start 14:45 Time End 16:37

Sampling Time/Point 14pts @ 8min 112min Total

DB 150 °F, WB _____ °F, VF @ DP _____ "Hg

Moisture 25 %, FDA _____, Gas Density Factor _____

Barometric Press 30 "Hg, Stack Press 30-1.35 Hg 28.65

Weather clear

Temp. _____ °F, W/D _____, W/S _____

Sample Box No. 4 Meter Box No. _____

Meter ΔH 1.68 Pitot Corr. Factor 0.83

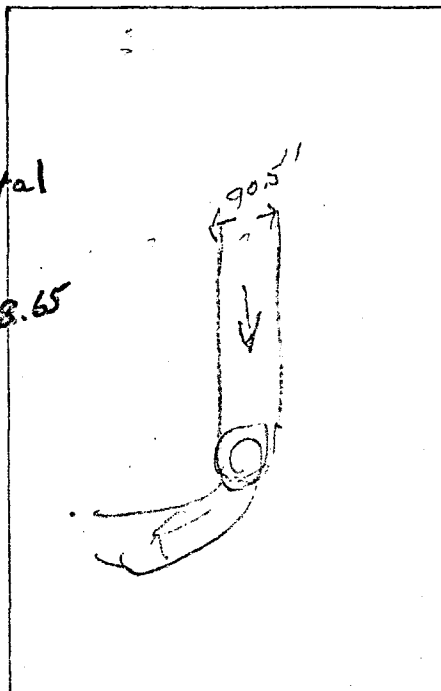
Nozzle Dia. 1/4 in., Probe Length 8 ft

Probe Heater Setting _____

Stack Dimensions: Inside Diameter 90.5 in

Inside Area _____ ft²

Height _____ ft



Mat'l Processing Rate _____

Final Gas Meter Reading 718.604 ft³

Initial Gas Meter Reading 659.348 ft³

Total Condensate in Impingers 253 ml

Moisture in Silica Gel 20.5 gm

Silica Gel Container No. 1014 Filter No. 72-0452

Orsat: CO₂ _____

O₂ _____

CO _____

N₂ _____

Excess Air _____

Test Conducted by: G. Allen

Remarks: Flow Varying

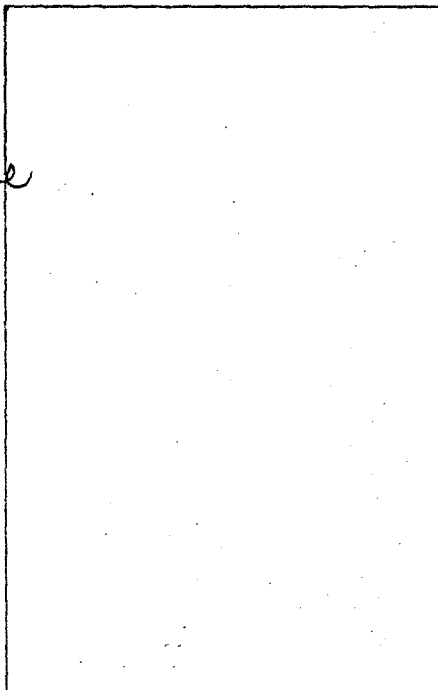
Port and Traverse Point No.	Distance from End of Port (in.)	Clock Time	Gas Meter Reading (ft ³)	Stack Velocity Head ("H ₂ O)	Meter Orifice Press. Diff. ("H ₂ O)		Stack Gas Temp. (°F)	Gas Sample Temp. & Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Test (°F)	Vacuum on Sample Train ("Hg)
					Calc.	Actual		In	Out			
			659.348									
1	1 3/16		662.8	0.25	0.565	0.565	152	81	82	0	82	3.0
2	5 5/32		670.4	0.22	0.495	0.495	152	81	82	8	82	3.0
3	8 3/32		-	0.25	0.565	0.565	152	82	82	1	82	3.0
4	13 7/32		674.4	0.30	0.670	0.670	153	82	82	9	82	3.8
5	18 3/16		677.9	0.22	0.495	0.495	152	82	82	2	82	3.2
6	24 1/32		681.7	0.25	0.565	0.565	152	82	82	10	82	3.4

[illegible]

'ENVIRONMENTAL ENGINEERING,' INC.
Gainesville, Florida

SOURCE SAMPLING FIELD DATA SHEET

Plant I.M.C. phosphates
 Sampling Location "M" Dryer outlet
 Date 3/15/72 Run No. 2
 Time Start 12.50 Time End 14.28
 Sampling Time/Point 14 pts @ 7 min 93 total
 DB 152 °F, WB _____ °F, VP @ DP _____ "Hg
 Moisture 20 %, FDA _____, Gas Density Factor _____
 Barometric Press 30 "Hg, Stack Press 28.65 "Hg
 Weather clear
 Temp. _____ °F, W/D _____, W/S _____
 Sample Box No. 4 Meter Box No. 5
 Meter ΔH₀ 1.68 Pitot Corr. Factor 0.83
 Nozzle Dia. 1/4 in., Probe Length 8 ft
 Probe Heater Setting ON
 Stack Dimensions: Inside Diameter 90.5 in
 Inside Area _____ ft²
 Height _____ ft



Mat'l Processing Rate _____
 Final Gas Meter Reading 772.835 ft³
 Initial Gas Meter Reading 718.605 ft³
 Total Condensate in Impingers 240 ml ²⁵⁵⁵
 Moisture in Silica Gel 234.1-218.6 gm
 Silica Gel Container No 622 Filter No. 72-000
 Orsat: CO₂ _____
 O₂ _____
 CO _____
 N₂ _____
 Excess Air _____
 Test Conducted by: G. Allen

Remarks: _____

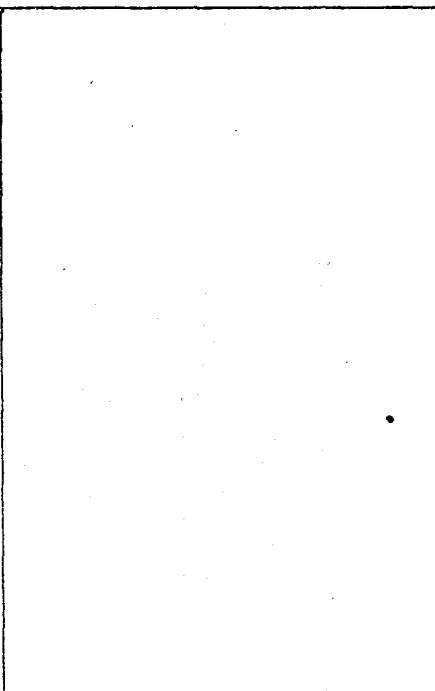
Port and Traverse Point No.	Distance from End of Port (in.)	Clock Time	Gas Meter Reading (ft ³)	Stack Velocity Head ("H ₂ O)	Meter Orifice Press. Diff. ("H ₂ O)		Stack Gas Temp. (°F)	Gas Sample Temp. @ Dry Gas Meter (°F)		Sample Box Temp. (°F) <i>Stop Watch</i>	Last Impinger Test (°F)	Vacuum on Sample Train ("Hg)
					Calc.	Actual		In	Out			
		<u>12:50</u>	<u>718.605</u>									
<u>1</u>	<u>Same Run #1</u>		<u>722.0</u>	<u>0.20</u>	<u>0.47</u>	<u>0.47</u>	<u>152</u>	<u>77</u>	<u>77</u>	<u>0</u>	<u>85</u>	<u>4.8</u>
<u>2</u>			<u>724.9</u>	<u>0.23</u>	<u>0.53</u>	<u>0.53</u>	<u>152</u>	<u>77</u>	<u>77</u>	<u>7</u>	<u>85</u>	<u>5.2</u>
<u>3</u>			<u>728.0</u>	<u>0.22</u>	<u>0.51</u>	<u>0.51</u>	<u>152</u>	<u>78</u>	<u>77</u>	<u>14</u>	<u>84</u>	<u>5.1</u>
<u>4</u>			<u>—</u>	<u>0.27</u>	<u>0.635</u>	<u>0.635</u>	<u>152</u>	<u>79</u>	<u>77</u>	<u>6</u>	<u>84</u>	<u>6.0</u>
<u>5</u>			<u>735.1</u>	<u>0.30</u>	<u>0.70</u>	<u>0.70</u>	<u>155</u>	<u>79</u>	<u>78</u>	<u>13</u>	<u>85</u>	<u>6.6</u>
<u>6</u>			<u>738.8</u>	<u>0.36</u>	<u>0.84</u>	<u>0.84</u>	<u>155</u>	<u>80</u>	<u>78</u>	<u>5</u>	<u>85</u>	<u>8.5</u>

[illegible]

ENVIRONMENTAL ENGINEERING, INC.
Gainesville, Florida

SOURCE SAMPLING FIELD DATA SHEET

Plant IMC Phosphates
 Sampling Location Station "M" Dryer outlet
 Date 3/15/72 Run No. 3
 Time Start 15:15 Time End 16:25
 Sampling Time/Point 14pts @ 2.5 min 70 total
 DP 165 °F, WB _____ °F, VF @ DP _____ "Hg
 Moisture 20 %, FDA _____, Gas Density Factor _____
 Barometric Press 30 "Hg, Stack Press 28.65 "Hg
 Weather Clear
 Temp. _____ °F, W/D _____, W/S _____
 Sample Box No. 4 Meter Box No. 5
 Meter ΔH @ 1.68 Pitot Corr. Factor 0.83
 Nozzle Dia. 1/4 in., Probe Length 8 ft
 Probe Heater Setting ON
 Stack Dimensions: Inside Diameter 90.5 in
 Inside Area _____ ft²
 Height _____ ft



Mat'l Processing Rate _____
 Final Gas Meter Reading 811.075 ft³
 Initial Gas Meter Reading 772.835 ft³
 Total Condensate in Impingers 187 m (197.3)
 Moisture in Silica Gel 207 - 196.7 gm
 Silica Gel Container No. 618 Filter No. 72-0466
 Orsat: CO₂ _____
 O₂ _____
 CO _____
 N₂ _____
 Excess Air _____
 Test Conducted by: G. Allen

Remarks: _____

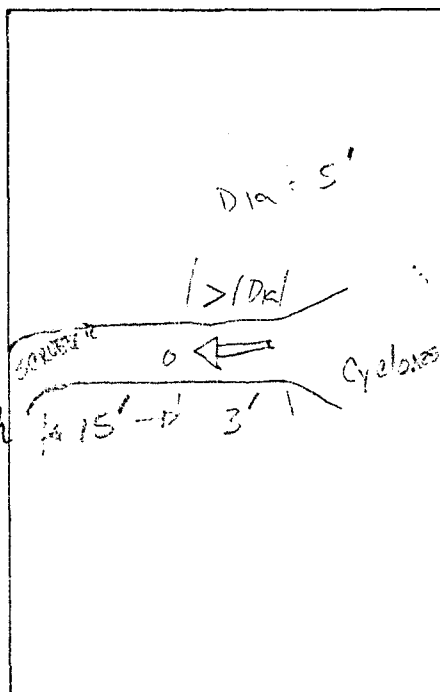
Port and Traverse Point No.	Distance from End of Port (in.)	Clock Time	Gas Meter Reading (ft ³)	Stack Velocity Head ("H ₂ O)	Meter Orifice Press. Diff. ("H ₂ O)		Stack Gas Temp. (°F)	Gas Sample Temp. @ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Test (°F)	Vacuum on Sample Train ("Hg)
					Calc.	Actual		In	Out			
			772.835							Stop Watch		
1		15:15	775.3	0.23	0.535	0.535	156	84	84	0	87	4.7
2			777.3	0.23	0.535	0.535	156	84	84	5	80	4.7
3			779.7	0.25	0.58	0.58	156	84	84	10	80	4.8
4			782.1	0.28	0.65	0.65	156	84	84	15	80	5.2
5			784.6	0.30	0.70	0.70	156	84	84	5	80	5.6
6			787.2	0.33	0.76	0.76	156	85	85	10		

[illegible]

ENVIRONMENTAL ENGINEERING, INC.
Gainesville, Florida

SOURCE SAMPLING FIELD DATA SHEET

Plant I.M.C. PHOSPHATES, BARTOW
Sampling Location "N" Screen Mill INLET
Date 3-14-72 Run No. 1
Time Start 1515 Time End 1715
✓ Sampling Time/Point 10 min (Total = 120 min)
DB 140 °F, WB °F, VF @ DP "Hg
✓ Moisture 10 %, FDA .90, Gas Density Factor
Barometric Press 30 "Hg, Stack Press 29.59 "Hg
Weather CLEAR
Temp. 80 °F, W/D W, W/S 5-10 mph
Sample Box No. 3 Meter Box No.
Meter ΔH 1.65 Pitot Corr. Factor 0.83
Nozzle Dia 0.25 in., Probe Length 8 ft
Probe Heater Setting OUT OF ORDER
Stack Dimensions: Inside Diameter 60 in
Inside Area 19.635 ft²
Height ft



Mat'l Processing Rate
Final Gas Meter Reading 802.224 ft³ ✓
Initial Gas Meter Reading 721.200 ft³ ✓
Total Condensate in Impingers 40 ml ✓
Moisture in Silica Gel 15 gm ✓
Silica Gel Container No. 100 Filter No. 70453
Orsat: CO₂
O₂
CO
N₂
Excess Air
Test Conducted by: A. L. WILSON
R. MAXWELL
Remarks: 12 sampling pts. used - 22
is the desired No. of pts.

Port and Traverse Point No.	Distance from End of Port (in.)	Clock Time	Gas Meter Reading (ft ³)	Stack Velocity Head ("H ₂ O)	Meter Orifice Press. Diff. ("H ₂ O)		Stack Gas Temp. (°F)	Gas Sample Temp. @ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Test (°F)	Vacuum on Sample Train ("Hg)
					Calc.	Actual		In	Out			
				✓			✓	✓	✓			
1	1 1/4	1515	721.200									
1	1 1/4	1525	729.5	1.8	5.3	2.3	140	80	80	—	85	—
2	4 1/32	1535	737.6	0.9	2.65	2.3	140	84	84	—	85	—
3	7 3/32	1545	744.9	0.5	1.5	1.5	140	85	84	—	85	—
4	10 5/8	1555	751.3	0.36	1.1	1.1	140	85	85	—	85	—
5	15 10.15	1605	757.6	0.42	1.26	1.26	140	86	85	—	85	—

[illegible]

SOURCE SAMPLING FIELD DATA SHEET

Plant IMC. Phosphates, Bartow, Fla.

Sampling Location Stat-N, cooler scrubber wet

Date 3-15-72 Run No. 2

Time Start 1245 Time End 1421

Sampling Time/Point 8 min (96 min Total)

DB 140 °F, WB °F, VF @ DP "Hg

Moisture 3.2%, FDA 97, Gas Density Factor

Barometric Press 30 "Hg, Stack Press 2959 "Hg

Weather CLEAR

Temp. 80 °F, W/D , W/S

Sample Box No. 3 Meter Box No.

Meter ΔH 1.65 Pitot Corr. Factor .83

Nozzle Dia. .25 in., Probe Length 8 ft

Probe Heater Setting OUT OF ORDER

Stack Dimensions: Inside Diameter 60 in

Inside Area 19.635 ft²

Height ft

see Run #1

Mat'l Processing Rate

Final Gas Meter Reading 868.196 ft³

Initial Gas Meter Reading 804.225 ft³

Total Condensate in Impingers 40 ml

Moisture in Silica Gel 216.7-205.9 gm

Silica Gel Container No. 617 Filter No. 720462

Orsat: CO₂

O₂ 20.8

CO

N₂

Excess Air

Test Conducted by: WILSON

MAXWELL

Remarks:

Port and Traverse Point No.	Distance from End of Port (in) ft	Clock Time	Gas Meter Reading (ft ³)	Stack Velocity Head ("H ₂ O)	Meter Orifice Press. Diff. ("H ₂ O)		Stack Gas Temp. (°F)	Gas Sample Temp. & Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Test (°F)	Vacuum on Sample Train ("Hg)
					Calc.	Actual		In	Out			
		1245	804.225									
1	0.15	1253	810.2	0.45	1.50	1.50	132	80	80	—	84	—
2	0.335	1301	816.2	0.55	1.8	1.8	132	82	80	—	84	—
3	0.59	1309	821.6	0.5	1.65	1.65	138	84	81	—	83	—
4	0.885	1317	826.6	0.35	1.18	1.18	138	85	81	—	83	—
5	1.25	1325	831.7	0.4	1.33	1.33	138	87	82	—	83	—
6	1.775	1333	837.0	0.4	1.33	1.33	138	87	83	—	82	—
7	3.215	1341	842.4	0.4	1.33	1.33	138	87	84	—	82	—

[illegible]

'SOURCE' SAMPLING FIELD DATA SHEET

Plant IMC. Phosphates, BARTOW, FL.

Sampling Location Stat-N, Cooler Scrubber

Date 3-15-72 Run No. 3

Time Start 1515 Time End 1633

Sampling Time/Point 6 min/pt (72 min)

DB 138°F, WB _____°F, VF @ DP _____"Hg

Moisture 3.2%, FDA, 97 Gas Density Factor _____

Barometric Press 30"Hg, Stack Press 29.59"Hg

Weather CLEAR

Temp. 80°F, W/D _____, W/S _____

Sample Box No. 3 Meter Box No. _____

Meter ΔH 1.65 Pitot Corr. Factor 83

Nozzle Dia. .25 in., Probe Length 8 ft

Probe Heater Setting OUT OF ORDER

Stack Dimensions: Inside Diameter 60 in
Inside Area 19.635 ft²
Height _____ ft

Sketch of Stack
INLET

SEE
RUN #1

Mat'l Processing Rate _____

Final Gas Meter Reading 911.005 ft³

Initial Gas Meter Reading 868.197 ft³

Total Condensate in Impingers 20 ml (29)

Moisture in Silica Gel 199-190.0 9 gm

Silica Gel Container No. 625 Filter No. 720 964

Orsat: CO₂ _____
O₂ _____
CO _____
N₂ _____
Excess Air _____

Test Conducted By: WILSON
MAXWELL

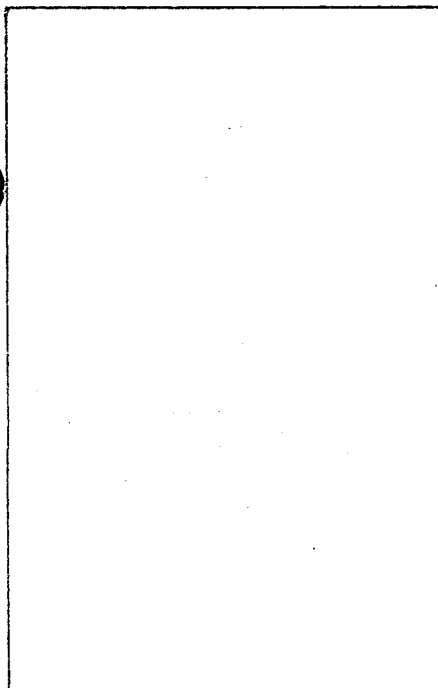
Remarks: _____

Port and Traverse Point No.	Distance from End of Port (in)	Clock Time	Gas Meter Reading (ft ³)	Stack Velocity Head ("H ₂ O)	Meter Orifice Press. Diff. ("H ₂ O)		Stack Gas Temp. (°F)	Gas Sample Temp. @ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Temp. (°F)	Vacuum on Sample Train ("Hg)
					Calc.	Actual		In	Out			
		1515	868.197									
1		1521	872.0	0.4	1.32	1.32	138	90	90	—	80	—
2		1527	875.8	0.35	1.18	1.18	138	90	90	—	80	—
3		1533	879.4	0.35	1.18	1.18	138	90	90	—	80	—
4		1539	883.2	0.39	1.32	1.32	139	89	89	—	80	—
5		1545	887.2	0.39	1.32	1.32	139	89	89	—	80	—
6		1551	891.3	0.34	1.14	1.14	140	89	89	—	80	—
7		1557	894.6	0.30	1.00	1.00	140	89	89	—	80	—
8		1603	897.7	0.20	0.68	0.68	140	89	89	—	80	—
9		1609	900.5	0.18	0.62	0.62	140	89	89	—	80	—

ENVIRONMENTAL ENGINEERING, INC.
Gainesville, Florida

SOURCE SAMPLING FIELD DATA SHEET

Plant I.M.C. PHOSPHATES, BARTON
Sampling Location "P"-COOLER-OUTLET
Date 3-14-72 Run No. 1
Time Start 14:45 Time End 16:45
Sampling Time/Point 12 min (Total = 120 min)
DB 125 °F, WB — °F, VF @ DP — "Hg
Moisture 14 %, FDA 0.86, Gas Density Factor —
Barometric Press 30 "Hg, Stack Press 28.5 "Hg
Weather Clear & Warm
Temp. 85 °F, W/D —, W/S CALM
Sample Box No. 1 Meter Box No. —
Meter ΔH@ 1.74 Pitot Corr. Factor 0.83
Nozzle Dia. 0.25 in., Probe Length 8 ft
Probe Heater Setting ON
Stack Dimensions: Inside Diameter 72 in
Inside Area — ft²
Height — ft



Mat'l Processing Rate —
Final Gas Meter Reading 259.412 ft³
Initial Gas Meter Reading 194.000 ft³
Total Condensate in Impingers 166 ml
Moisture in Silica Gel 18.5 gm
Silica Gel Container No. 629 Filter No. 720451
Orsat: CO₂ —
O₂ —
CO —
N₂ —
Excess Air —
Test Conducted by: T. Arroyo
T. Belanger
Remarks: —

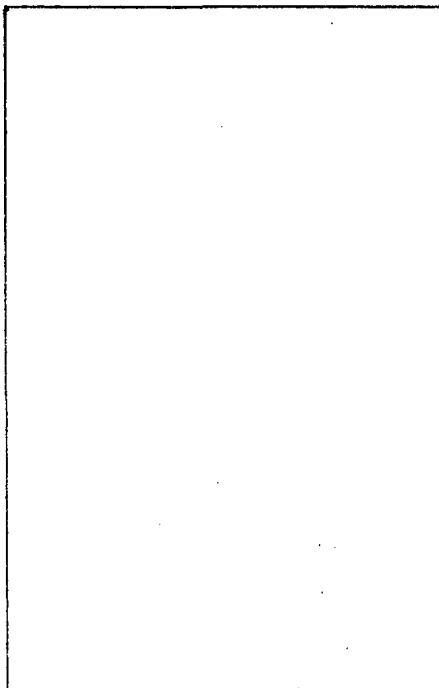
Port and Traverse Point No.	Distance from End of Port (in.)	Clock Time	Gas Meter Reading (ft ³)	Stack Velocity Head ("H ₂ O)	Meter Orifice Press. Diff. ("H ₂ O)		Stack Gas Temp. (°F)	Gas Sample Temp. @ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Test (°F)	Vacuum on Sample Train ("Hg)
					Calc.	Actual		In	Out			
			194.000									
Pt 1	1 13/16	14:45	200.1	.23	.74	.74	124	80	80		70	6
2	5 23/32	14:57	206.4	.25	.82	.82	124	81	81		65	7
3	10 1/2	15:09	212.3	.25	.82	.82	125	81	81		68	7.5
4	16 1/4	15:21	219.3	.35	1.15	1.15	125	82	81		70	8
5	24 5/8	15:33	226.3	.35	1.15	1.15	124	82	82		75	8
6	47 3/8	15:45	233.5	.32	1.05	1.05	125	83	82		78	7

[illegible]

ENVIRONMENTAL ENGINEERING, INC.
Gainesville, Florida

SOURCE SAMPLING FIELD DATA SHEET

Plant I.M.C. Phosphates
Sampling Location "P" Screener Outlet
Date 3/15/72 Run No. 2
Time Start 12:42 Time End 14:12
Sampling Time/Point 9 min @ 10 pts = 90 total
DB 124 °F, WB — °F, VF @ DP — "Hg
Moisture 12 %, FDA .88, Gas Density Factor —
Barometric Press 30 "Hg, Stack Press 28.5 "Hg
Weather clear & warm
Temp. 75 °F, W/D —, W/S ca/m
Sample Box No. 1 Meter Box No. —
Meter ΔH_e 1.74 Pitot Corr. Factor .83
Nozzle Dia. .25 in., Probe Length 8 ft
Probe Heater Setting 0.3
Stack Dimensions: Inside Diameter 72 in
Inside Area — ft²
Height — ft



Mat'l Processing Rate —
Final Gas Meter Reading 307.583 ft³
Initial Gas Meter Reading 260.174 ft³
Total Condensate in Impingers 142 ml (54 fl. oz)
Moisture in Silica Gel ^{F.Wt} 229.6 - 217.0 gm
Silica Gel Container No. 630 Filter No. 720459
Orsat: CO₂ —
O₂ —
CO —
N₂ —
Excess Air —
Test Conducted by: F. Arroyo
F. Belanger
Remarks: Smooth

Port and Traverse Point No.	Distance from End of Port (in.)	Clock Time	Gas Meter Reading (ft ³)	Stack Velocity Head ("H ₂ O)	Meter Orifice Press. Diff. ("H ₂ O)		Stack Gas Temp. (°F)	Gas Sample Temp. @ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Test (°F)	Vacuum on Sample Train ("Hg)
					Calc.	Actual		In	Out			
			260.174									
1		12:42	263.5	.14	.47	.47	12.4	76	76		75	6
2		12:51	268.1	.25	.82	.82	12.4	77	76		67	6
3		13:00	273.5	.35	1.15	1.15	12.4	78	76		69	6
4		13:02	278.8	.32	1.05	1.05	12.5	78	76		70	6
5		13:18	284.1	.33	1.08	1.08	12.5	79	77		72	6
6		13:27	289.1	.30	.97	.97	12.5	80	78		72	6

[illegible]

14 1 1/2
4.2 x 200 33
x = 200 33
54

ENVIRONMENTAL ENGINEERING, INC.
Gainesville, Florida

SOURCE SAMPLING FIELD DATA SHEET

Plant IMC Phosphates

Sampling Location Station P - Scraper Outlet

Date 3/15/72 Run No. 3

Time Start 15:15 Time End 16:25

Sampling Time/Point 7 min @ 10 pts - 70 min total

DB 125°F, WB °F, VF @ DP "Hg

Moisture 12%, FDA .88, Gas Density Factor

Barometric Press 30"Hg, Stack Press 28.5"Hg

Weather Clear

Temp. 85°F, W/D , W/S Calm

Sample Box No. 1 Meter Box No.

Meter ΔH@ 1.74 Pitot Corr. Factor .83

Nozzle Dia. .25 in., Probe Length 8 ft

Probe Heater Setting ON

Stack Dimensions: Inside Diameter 12 in

Inside Area ft²

Height ft

Mat'l Processing Rate

Final Gas Meter Reading 346.006 ft³

Initial Gas Meter Reading 308.318 ft³

Total Condensate in Impingers 109 ml

Moisture in Silica Gel 227.8 - 217.5 gm

Silica Gel Container No. 1013 Filter No. 7204

Orsat: CO₂

O₂

CO

N₂

Excess Air

Test Conducted by: A. Arroyo

Remarks:

Port and Traverse Point No.	Distance from End of Port (in.)	Clock Time	Gas Meter Reading (ft ³)	Stack Velocity Head ("H ₂ O)	Meter Orifice Press. Diff. ("H ₂ O)		Stack Gas Temp. (°F)	Gas Sample Temp. @ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Test (°F)	Vacuum on Sample Train ("Hg)
					Calc.	Actual		In	Out			
			308.318									
1		15:15	311.6	.15	.5	.5	125	83	83	/	83	6.5
2		15:22	315.0	.27	.87	.87	124	84	83	/	75	8
3		15:29	319.1	.32	1.05	1.05	125	84	83	/	70	8
4		15:36	323.2	.33	1.08	1.08	125	84	84	/	70	8
5		15:43	327.3	.33	1.08	1.08	125	84	84	/	70	8.5
6		15:50	331.4	.30	.965	.965	125	84	84	/	75	8

[illegible]

GRAB SAMPLE DATA SHEET

Plant I M C. DICAL

EPA Sample No.	_____	_____	_____	
Run No.	A	B	C	1
Date	_____	_____	_____	3/14/72
Time	3:00	_____	5:00	5:00
Sampling Point	30% Acid	To	RECYCLE	
Temperature, °F	110°	_____	130°	114°
pH	0.40	_____	0.45	0.45
Fluorides	_____	_____	_____	
P ₂ O ₅	_____	_____	_____	
Trace Metals	_____	_____	_____	

Remarks 2 Samples per Run

GRAB SAMPLE DATA SHEET

Plant T.M.C. Dical

EPA Sample No.	<u> </u>	<u> </u>	<u> </u>	
Run No.	A	B	C	1
Date	<u>3/14/72</u>	<u>3/14/72</u>	<u>3/14/72</u>	3/14/72
Time	3:00	<u>5:00</u>	5:00	5:00
Sampling Point	30% ACID	FROM RECYCLE		
Temperature, °F	108°	<u>120°</u>	120°	108°
pH	0.60	<u>0.60</u>	0.60	0.60
Fluorides	<u> </u>	<u> </u>	<u> </u>	
P ₂ O ₅	<u> </u>	<u> </u>	<u> </u>	
Trace Metals	<u> </u>	<u> </u>	<u> </u>	

Remarks 2 Samples per run

GRAB SAMPLE DATA SHEET

Plant IMC Dical

EPA Sample No.	<u> </u>	<u> </u>	<u> </u>	
Run No.	A	B	C	2
Date	<u> </u>	<u> </u>	<u> </u>	3/15/72
Time	11:00	<u> </u>	2:30	2:30
Sampling Point	30% Acid To	Recycle	TANK	
Temperature, °F	114°	<u> </u>	136°	116°
pH	0.60	<u> </u>	0.45	0.55
Fluorides	<u> </u>	<u> </u>	<u> </u>	
P ₂ O ₅	<u> </u>	<u> </u>	<u> </u>	
Trace Metals	<u> </u>	<u> </u>	<u> </u>	

Remarks Run #2 only 1 1/2 hrs. long
2 Samples only during run

GRAB SAMPLE DATA SHEET

Plant IMC Dical

EPA Sample No.	1	2	3	
Run No.	A	B	C	2
Date	11/15/72	11/15/72	11/15/72	3/15/72
Time	1:00	1:30	2:30	2:30
Sampling Point	30% Acid From Recycle Tank			
Temperature, °F	108°	108°	129°	112°
pH	0.90	0.90	0.90	0.90
Fluorides	1	1	1	
P ₂ O ₅	1	1	1	
Trace Metals	1	1	1	

Remarks Run #2 only 1 1/2 hrs. long
2 Samples only, during run

GRAB SAMPLE DATA SHEET

Plant I Mc Dical

EPA Sample No.	≈	≈	≈	
Run No.	A	≈	B	3
Date		✓		3/15/72
Time	3:00	↗	4:30	4:30
Sampling Point	30% ACID TO		RECYCLE	TANK
Temperature, °F	132°	X	143°	120°
pH	0.45	✓	0.35	0.45
Fluorides	≈	≈	≈	
P ₂ O ₅	≈	≈	≈	
Trace Metals	≈	≈	≈	

Remarks Only 2 Samples during Run

GRAB SAMPLE DATA SHEET

Plant TMC Dical

EPA Sample No.	<u>1</u>			
Run No.	A		B	3
Date				3/15/72
Time	3:00		4:30	4:30
Sampling Point	30% ACID FROM RECYCLE TANK			
Temperature, °F	122°	~	122°	108°
pH	0.90	~	0.90	0.90
Fluorides	~	~	~	
P ₂ O ₅	~	~	~	
Trace Metals	~	~	~	

Remarks Only 2 Samples during Run

APPENDIX C

Standard Analytical Procedures

ENVIRONMENTAL PROTECTION AGENCY

Research Triangle Park, North Carolina 27711

Reply to
Attn of:

Date: 12-21-72

Subject: Summary of Fluoride Analysis

To: R. Neulicht, EMB, IRL

This memorandum is in response to your request for a brief summary of our SPADNS-Zirconium Lake procedure for determination of fluoride in stack emission samples.

Samples received in our laboratory are filtered through fluoride free paper filters to yield water soluble and water insoluble portions. The water insoluble particulate collected on the filter is rinsed thoroughly to be sure that all water soluble fluoride is rinsed through. The water soluble fraction is distilled from sulfuric acid to a maximum temperature of 180°C. If chloride is suspected in the sample Ag_2SO_4 is added to the still. SPADNS solution is added to an aliquot of the distillate and the absorbance is read at 570 nm. The concentration of the sample is determined from a calibration curve prepared from standard fluoride solutions. It is very important that the temperature of the samples be the same as that of the standards when absorbances are recorded.

The water insoluble fraction of the sample is evaporated to dryness in the presence of a slurry of CAO, and then fused with NaOH. The fusate is dissolved with distilled water, neutralized with dilute H_2SO_4 , distilled and analyzed as described for the soluble portion.

Paper filters containing particulate are cut into small pieces, suspended in a slurry of CAO, evaporated to dryness and ashed prior to the alkali fusion and distillation.

If you have any questions about this procedure, let me know.

Howard L. Crist

Howard L. Crist
Chief, Source Sample Analysis Section
SSFAB, QAENL

cc: R. E. Lee

Phosphorous Pentoxide Determination

Colorimetric Molybdovanadophosphate Method

An aliquot of sample is hydrolyzed in the presence of HCl and HNO_3 acids by boiling almost to dryness.

The sample is cooled to room temperature, transferred to a 250 ml volumetric flask and diluted to volume with distilled water. A 20 ml aliquot is transferred to a 100 ml volumetric flask, 20 ml of molybdovanadate reagent is added and the flask is diluted to volume.

The absorbance of the yellow color is determined after ten minutes at 400 nm. The concentration of phosphorous pentoxide is determined from a calibration curve prepared with standard solutions.

APPENDIX D
Project Participants

PROJECT PARTICIPANTS

Robert Sholtes, Ph.D., P.E.	Project Director
John Dollar	Project Manager
George Allen	Environmental Specialist
Tony Arroyo	Environmental Specialist
Tom Belanger	Environmental Specialist
John Chadbourne	Environmental Specialist
Bob Durgan	Environmental Specialist
Ron Fuller	Environmental Specialist
Eric Johnson	Environmental Specialist
Bob Maxwell	Environmental Specialist
Buford Pruitt	Environmental Specialist
Jim Tscherfing	Environmental Specialist
A.L. Wilson	Environmental Specialist
Larry Wurts	Environmental Specialist
John Reynolds	EPA
Jerome Rom	EPA
Roy Neulicht	EPA