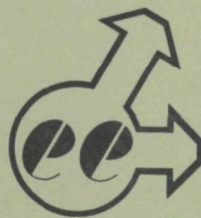


TEST NO. 72 - CI - 18
ROYSTER COMPANY
RUN OF PILE TRIPLE SUPERPHOSPHATE
MULBERRY, FLORIDA

FEBRUARY 29 - MARCH 1, 1972



environmental engineering, inc.

2324 S. W. 34th STREET / GAINESVILLE, FLORIDA 32601 / PHONE 904 / 372-3318

TEST NO. 72 - CI - 18
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Test Conducted By:
Environmental Engineering, Inc.
Contract # 68-02-0232

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INTRODUCTION

Under the direction of the Environmental Protection Agency, Environmental Engineering, Inc. conducted emission tests at the Royster Company Triple Superphosphate plant in Mulberry, Florida. Three test runs were conducted on February 29 - March 1, 1972. 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 scrubber inlet duct and at the two outlet stacks to the scrubber. The emissions from the mixing cone were also measured. Grab samples of the scrubbing liquid, the process reactants, and the process product were analyzed for fluoride and P_2O_5 content. A schematic flow diagram of all sampling locations is given in Figure 1. Complete test results are given in Appendix A.

SUMMARY OF RESULTS

All process and scrubber operating conditions were normal during the three test runs. No major sampling problems were encountered; the only irregularity occurred at the scrubber inlet duct. Since entrained water was present at this sample point, the percent stack gas moisture was calculated using a psychrometric chart.

For the third test run both the percent stack gas moisture and the fluoride concentration for the North and the South outlet stacks are extremely low compared to the other two test runs. No explanation is available for this anomaly.

A summary of stack gas conditions, fluoride emission levels, and scrubber

efficiencies for each test run are given in Tables 1 - 4.

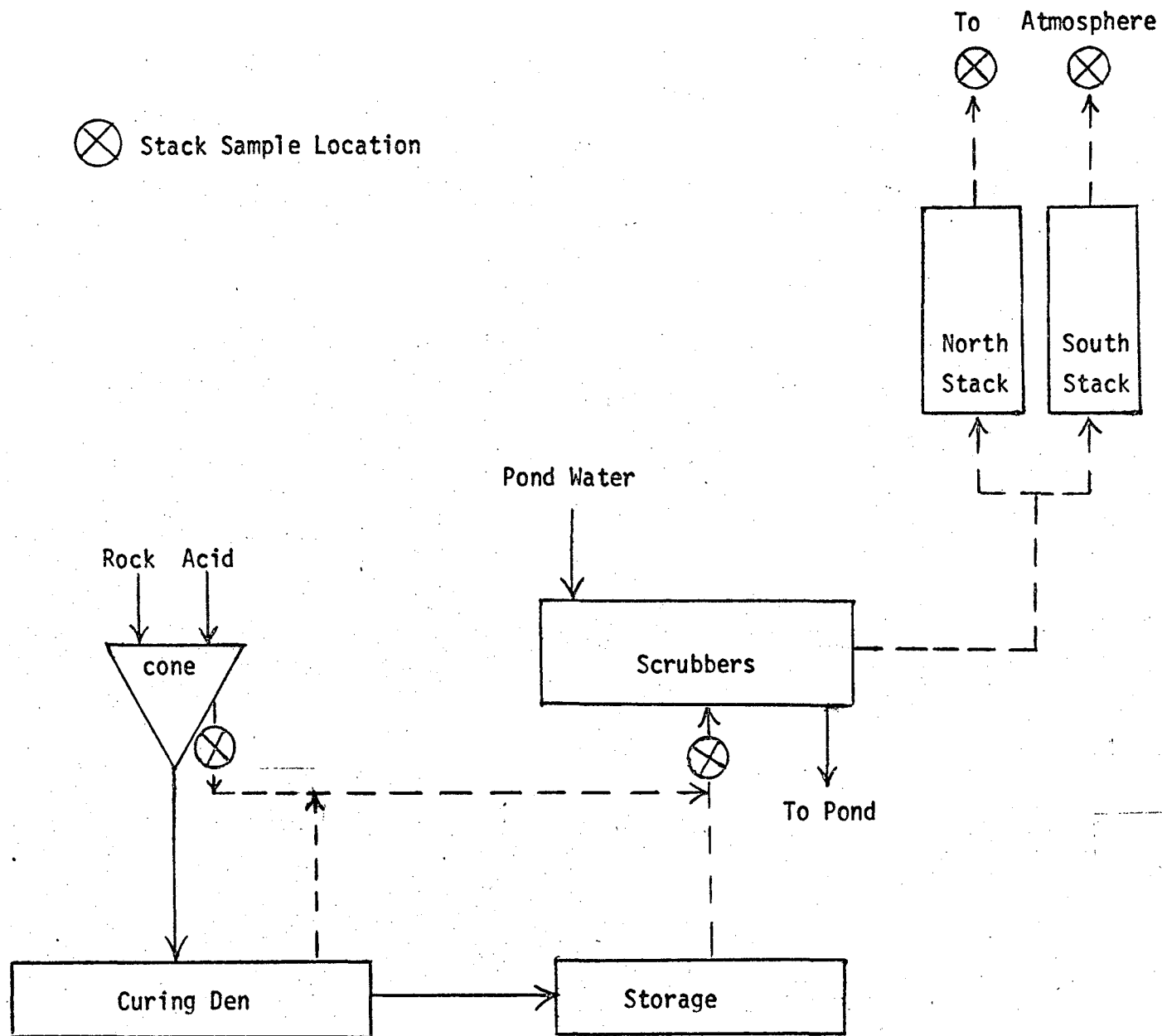


Figure 1
Schematic Flow Diagram
Royster Company

TABLE 1
SUMMARY OF RESULTS
FLUORIDES

SCRUBBER INLET

Run No.	1	2	3
Date	2/29/72	2/29/72	3/1/72
Barometric pressure, inches Hg	30	30	30
Stack pressure, inches Hg	29.62	29.62	29.62
Stack gas moisture, % volume **	3.2	2.9	2.9
Average stack gas temperature, °F.	77	75	74
Stack gas flow rate @ S.T.P.* , SCFM	105575	95245	136147
Vol. dry gas @ S.T.P.* , SCF	65.408	60.21	114.133
Fluoride, water soluble, mg	1600	1800	2100
Fluoride, total, mg	1600.36	1801.5	2101
Fluoride, water soluble, gr/SCF	0.3767	0.4604	0.2834
Fluoride, total, gr/SCF	0.3768	0.4608	0.2835
Fluoride, water soluble, gr/CF stk. cond.	0.323	0.385	0.2523
Fluoride, total, gr/CF stk. cond.	0.323	0.3853	0.2524
Fluoride, water soluble, lb/hour	340.8	375.8	330.7
Fluoride, total, lb/hour	340.9	376.1	330.8
Fluoride, water soluble, lb/ton P ₂ O ₅ Fed.	21.8	23.5	20.0
Fluoride, total, lb/ton P ₂ O ₅ Fed.	21.8	23.5	20.0
Scrubber efficiency, %	---	---	---

* Dry, 70°F., 29.92 inches Hg.

** Saturated gas; % moisture calculated from psychrometric chart

TABLE 2
SUMMARY OF RESULTS
FLUORIDES

MIXING CONE PICKUP

Run No.	1	2	3
Date	2/29/72	2/29/72	3/1/72
Barometric pressure, inches Hg	30	30	30
Stack pressure, inches Hg	30	30	30
Stack gas moisture, % volume	0.1	1.5	2.2
Average stack gas temperature, °F.	90	90	80
Stack gas flow rate @ S.T.P.* , SCFM	246	239	292
Vol. dry gas @ S.T.P.* , SCF	51.169	48.482	61.457
Fluoride, water soluble, mg	46.8	61	11.1
Fluoride, total, mg	405.8	408	778.1
Fluoride, water soluble, gr/SCF	0.0141	0.0194	0.0028
Fluoride, total, gr/SCF	0.1221	0.1296	0.195
Fluoride, water soluble, gr/CF stk. cond.	0.0136	0.0184	0.0027
Fluoride, total, gr/CF stk. cond.	0.1178	0.1233	0.1875
Fluoride, water soluble, lb/hour	0.0297	0.0397	0.007
Fluoride, total, lb/hour	0.2579	0.2654	0.488
Fluoride, water soluble, lb/ton P ₂ O ₅ Fed.	0.0019	0.0025	0.0004
Fluoride, total, lb/ton P ₂ O ₅ Fed.	0.0165	0.0166	0.0296
Scrubber efficiency, %			

* Dry, 70°F., 29.92 inches Hg.

TABLE 3
SUMMARY OF RESULTS
FLUORIDES

OUTLET NORTH

Run No.	1	2	3
Date	2/29/72	2/29/72	3/1/72
Barometric pressure, inches Hg	30	30	30
Stack pressure, inches Hg	30	30	30
Stack gas moisture, % volume	3	2.8	0.4
Average stack gas temperature, °F.	88	89	86
Stack gas flow rate @ S.T.P.* , SCFM	64741	65060	63591
Vol. dry gas @ S.T.P.* , SCF	95.346	96.426	94.688
Fluoride, water soluble, mg	34.4	24.8	6
Fluoride, total, mg	34.46	24.8	6
Fluoride, water soluble, gr/SCF	0.0056	0.004	0.001
Fluoride, total, gr/SCF	0.0056	0.004	0.001
Fluoride, water soluble, gr/CF stk. cond.	0.0052	0.0037	0.0009
Fluoride, total, gr/CF stk. cond.	0.0052	0.0037	0.0009
Fluoride, water soluble, lb/hour	3.08	2.21	0.53
Fluoride, total, lb/hour	3.09	2.21	0.53
Fluoride, water soluble, lb/ton P_2O_5 Fed.	0.197	0.14	0.03
Fluoride, total, lb/ton P_2O_5 Fed.	0.198	0.14	0.03
Scrubber efficiency, %	98.5	99.0	99.8

* Dry, 70°F., 29.92 inches Hg.

TABLE 4
SUMMARY OF RESULTS
FLUORIDES

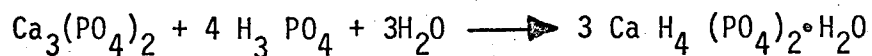
OUTLET SOUTH

Run No.	1	2	3
Date	2/29/72	2/29/72	3/1/72
Barometric pressure, inches Hg	30	30	30
Stack pressure, inches Hg	29.91	29.91	29.91
Stack gas moisture, % volume	2.9	3.1	0.2
Average stack gas temperature, °F.	89	90	87
Stack gas flow rate @ S.T.P.* , SCFM	42317	40952	43090
Vol. dry gas @ S.T.P.* , SCF	71.375	66.89	68.094
Fluoride, water soluble, mg	24.5	17.8	0.52
Fluoride, total, mg	24.59	17.8	0.52
Fluoride, water soluble, gr/SCF	0.0053	0.0041	0.0001
Fluoride, total, gr/SCF	0.0053	0.0041	0.0001
Fluoride, water soluble, gr/CF stk. cond.	0.005	0.0038	0.0001
Fluoride, total, gr/CF stk. cond.	0.005	0.0038	0.0001
Fluoride, water soluble, lb/hour	1.9	1.4	0.04
Fluoride, total, lb/hour	1.9	1.4	0.04
Fluoride, water soluble, lb/ton P_2O_5 Fed.	0.12	0.09	0.003
Fluoride, total, lb/ton P_2O_5 Fed.	0.12	0.09	0.003
Scrubber efficiency, %	---	---	---

* Dry, 70°F., 29.92 inches Hg.

Process Description

ROP triple superphosphate is made by reacting 32-34 percent P_2O_5 rock with phosphoric acid in a TVA cone-type continuous mixer to yield a product containing 46% P_2O_5 . The principal reaction is as follows:



The cone discharges to a slowly moving belt called the "den" on which the reactions continue until the slurry solidifies and is discharged to the storage pile. The reactions go to near completion in the pile where after sufficient curing the product is ready for shipment.

Process Operation

Run #1 was conducted from 12:40 p.m. to 3:20 p.m. on February 29, 1972. The second test was completed at 7:04 p.m. the same day. Run #3 was carried out from 9:08 a.m. to 11:12 a.m. on March 1. Process and scrubber conditions were normal throughout the three tests.

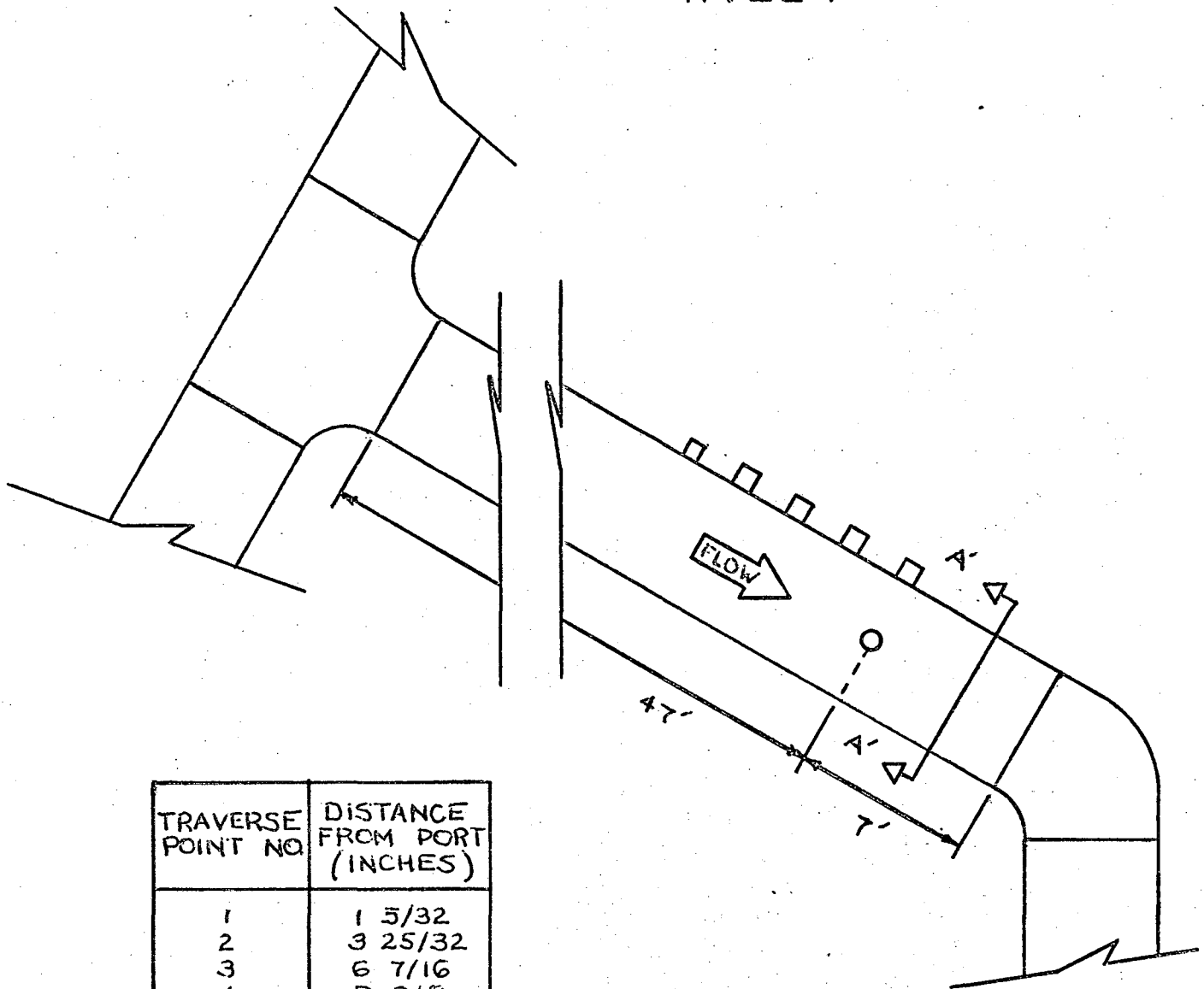
LOCATION OF SAMPLING POINTS

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 in some cases. The suggested number of traverse points per diameter was used where possible without sampling within one inch of the inner wall.

Figures 2 through 5 are schematic diagrams of the stack configurations near the sampling location, and the sampling points traversed during the emission tests.

INLET



TRAVERSE POINT NO	DISTANCE FROM PORT (INCHES)
1	1 5/32
2	3 25/32
3	6 7/16
4	9 3/8
5	12 9/16
6	16 5/32
7	20 5/16
8	25 15/32
9	32 27/32
10	53 5/32
11	60 9/16
12	65 23/32
13	69 27/32
14	73 7/16
15	76 5/8
16	79 9/16
17	82 7/32
18	84 13/16

86" I.D

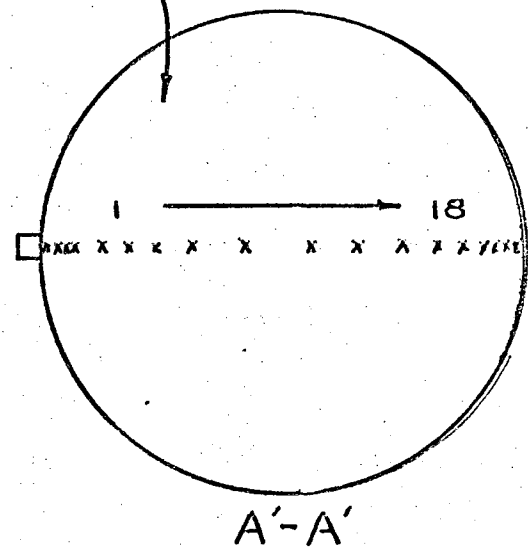
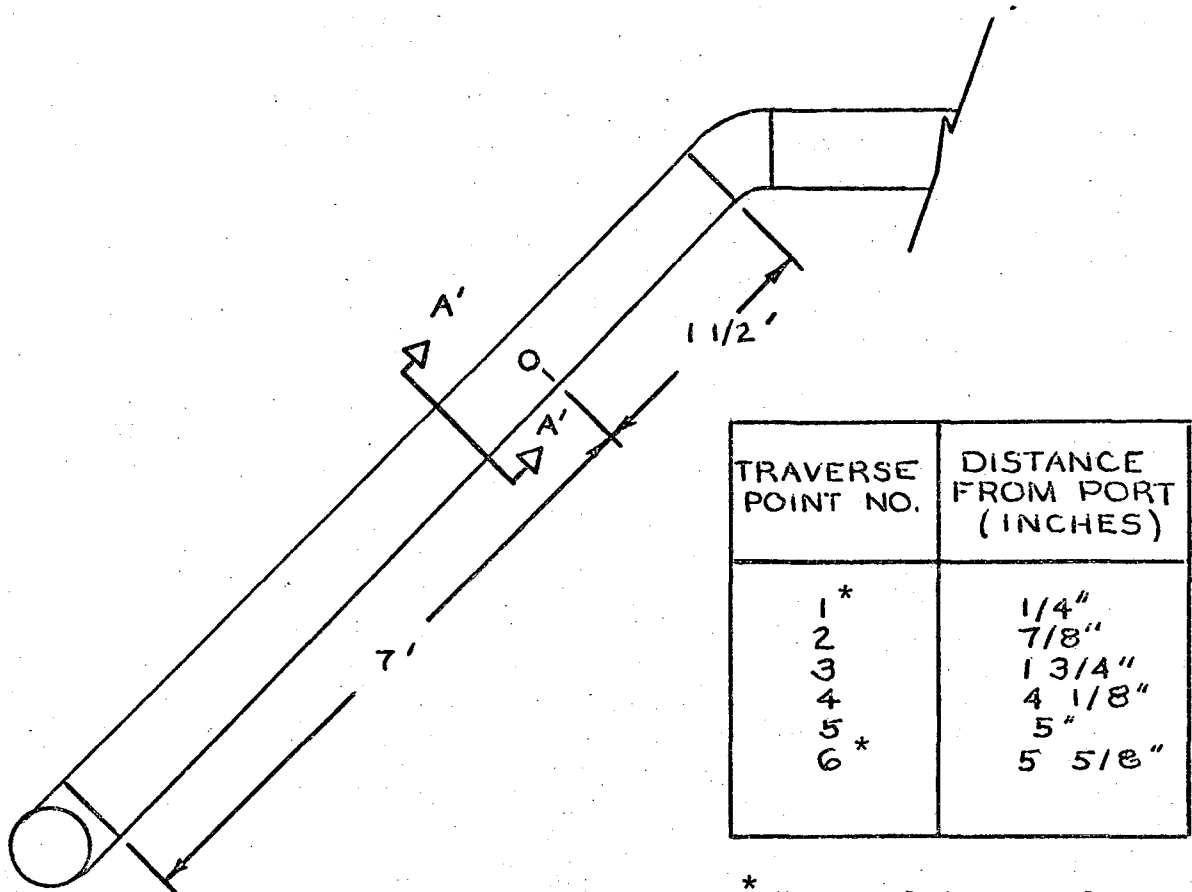


FIGURE 2

MIXING CONE PICK-UP



* Not sampled - too close to stack wall

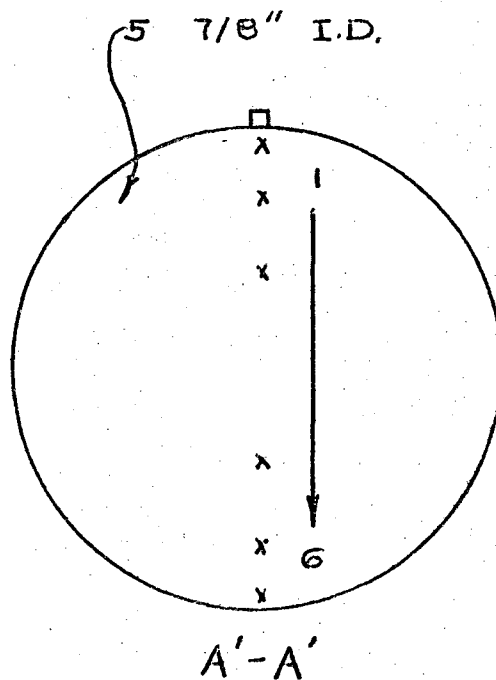
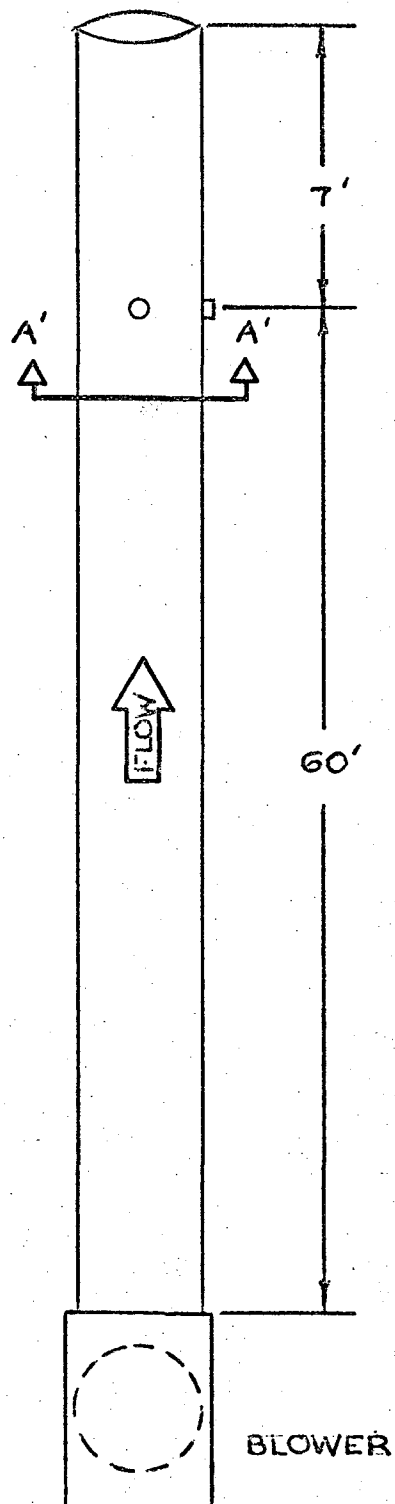


FIGURE 3

OUTLET NORTH



TRAVERSE POINT NO.	DISTANCE FROM PORT (INCHES)
1 *	1 5/32
2	3 17/32
3	6 1/8
4	9
5	12 5/32
6	15 27/32
7	20 3/8
8	27
9	45
10	51 5/8
11	56 5/32
12	59 27/32
13	61 1/2
14	65 7/8
15	68 15/32
16	70 27/32

* Not sampled

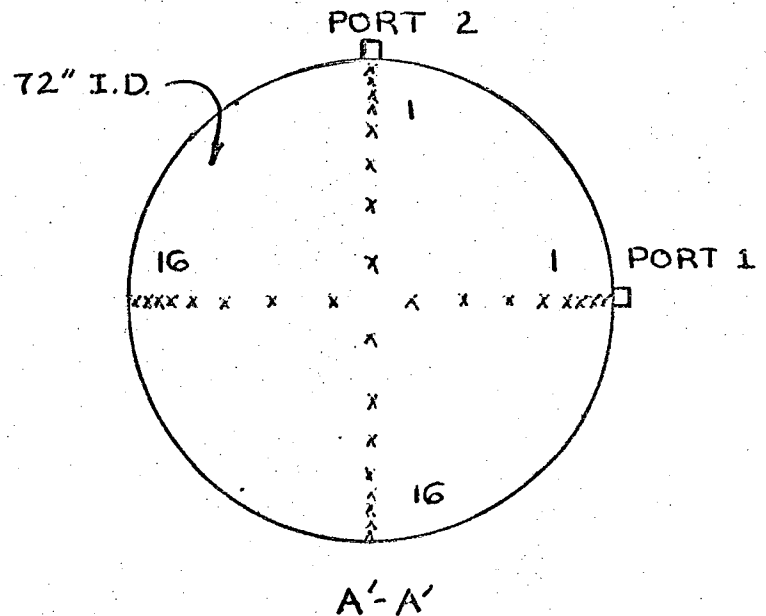
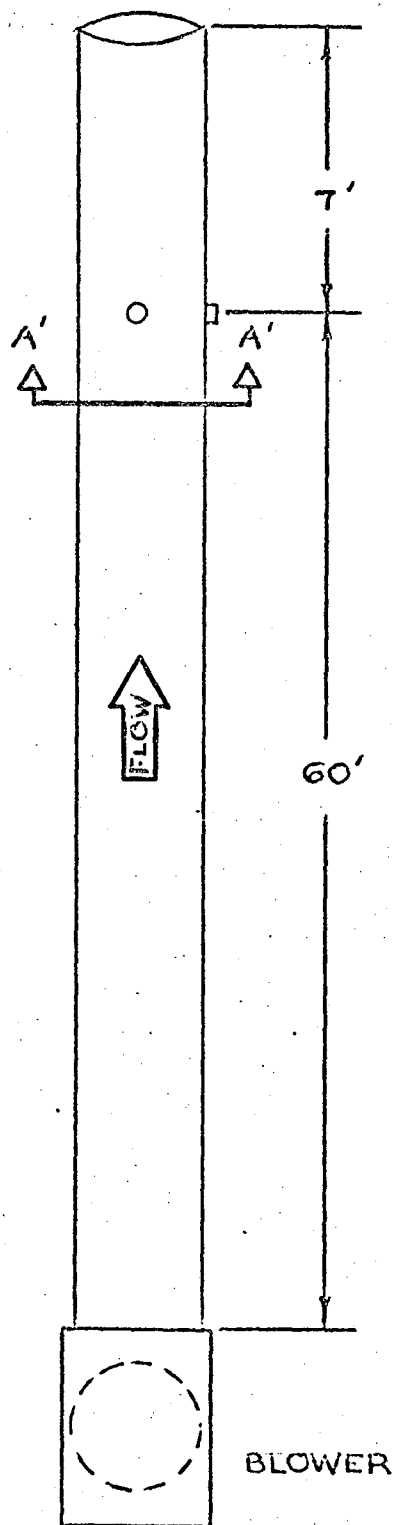


FIGURE 4
12

OUTLET SOUTH



TRAVERSE POINT NO.	DISTANCE FROM PORT (INCHES)
1 *	1 5/32
2	3 17/32
3	6 1/8
4	9
5	12 5/32
6	15 27/32
7	20 3/8
8	27
9	45
10	51 5/8
11	56 5/32
12	59 27/32
13	61 1/2
14	65 7/8
15	68 15/32
16	70 27/32

* Not sampled

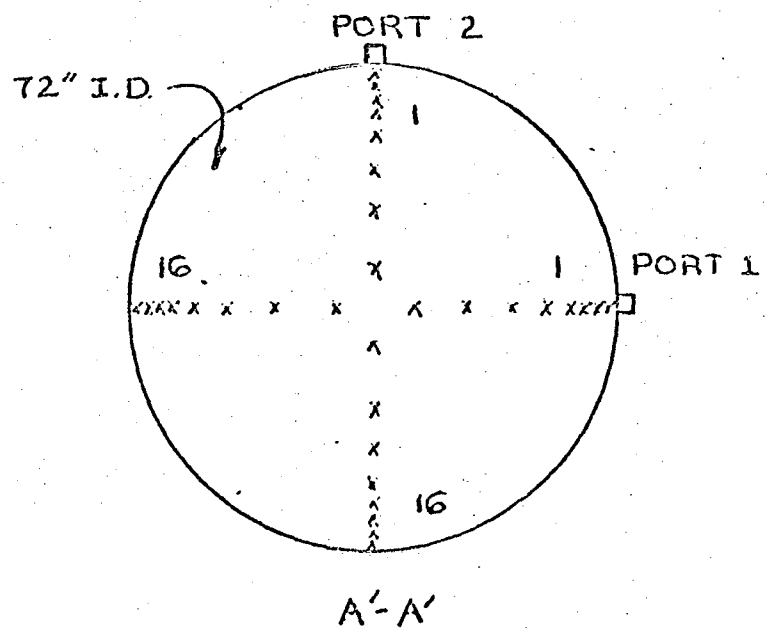


FIGURE 5

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 6). 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.

At sampling sites where liquid entrainment was a problem, the preliminary and final moisture contents were determined from wet and dry bulb thermometry.* See Appendix B for the data used in determining the preliminary moisture content of the stack gases.

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.

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

* Scrubber Inlet

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 7 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

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 polyethylene containers.

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. On some occasions, the 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.

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

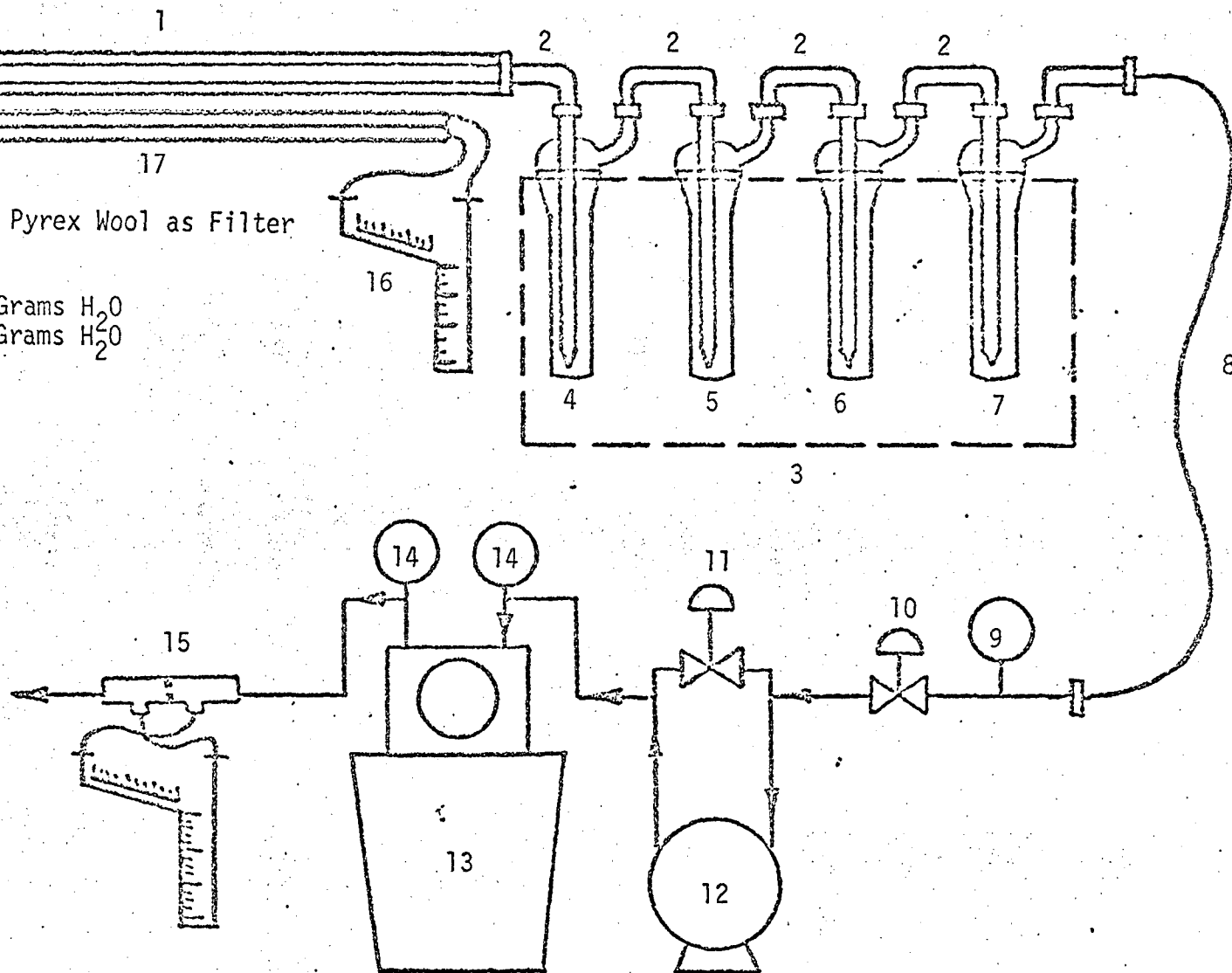


Figure 6

MOISTURE SAMPLING TRAIN

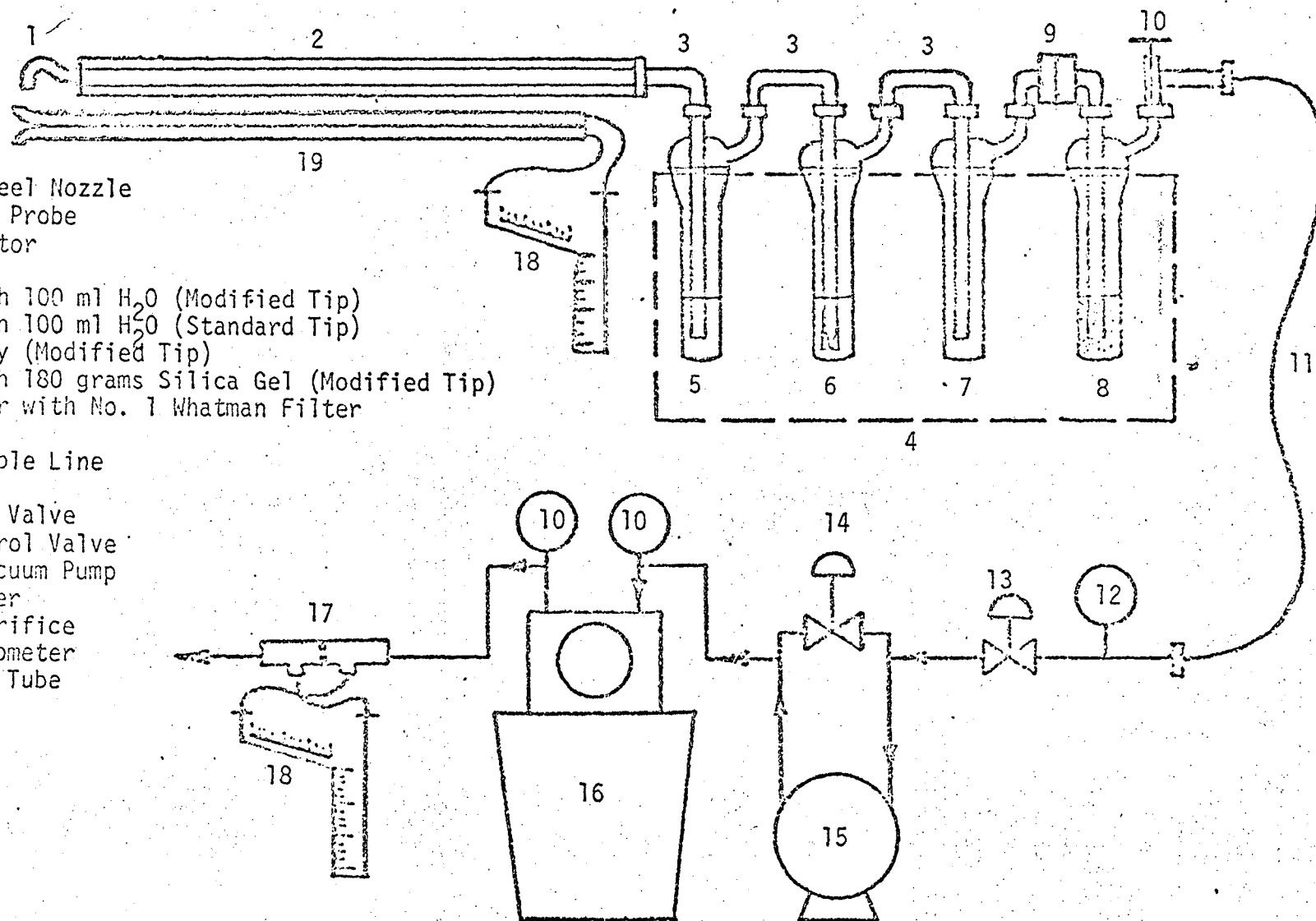


Figure 7

FLUORIDE SAMPLING TRAIN

APPENDIX

APPENDIX A
Emission Calculations & 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 impingers, 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)
- TIME - Total Sample Time (minutes)

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

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

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

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

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

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

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

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

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

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

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

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

FLUORIDE EMISSIONS

SOURCE TEST DATA

TEST NO -
 PLANT - ROYSTER ROP BARTOW, FLA.
 SOURCE - SCRUBBER INLET
 TYPE OF PLANT -
 CONTROL EQUIPMENT -
 POLLUTANTS SAMPLED -

NO OF RUNS -

1) RUN NUMBER	1	2	3
2) DATE	2/29/72	2/29/72	3/1/72
3) TIME BEGAN	12:41	16:59	08:56
4) TIME END	15:29	19:05	11:02
5) BAROMETRIC PRESSURE, IN HG	30	30	30
6) METER ORIFICE PRESSURE DROP, IN H ₂ O	0.93	0.74	2.78
7) VOL DRY GAS, METER COND, CUBIC FEET	68.492	62.296	115.325
8) AVERAGE GAS METER TEMPERATURE, DEG F	96.3	89.4	79.2
9) VOL DRY GAS, S.T.P., CUBIC FEET	65.408	60.21	114.133
10) TOTAL H ₂ O COLLECTED, HL	191.5	218.7	247.2
11) VOL H ₂ O VAPOR COLLECTED, S.T.P., CU FT	9.08	10.37	11.72
12) STACK GAS MOISTURE, PERCENT VOLUME*	3.2	2.9	2.9
13) ASSUMED STACK GAS MOISTURE, PCT VOL	3	10	2.9
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	28.50	28.54	28.54
21) STACK GAS SPECIFIC GRAVITY	0.98	0.98	0.98
22) AVG SQUARE ROOT (VEL HEAD), IN H ₂ O	0.815	0.732	0.831
23) AVERAGE STACK GAS TEMPERATURE, DEG F	77	74.8	74
24) AVG SQUARE ROOT (STK TEMP*VEL HEAD)	18.889	16.928	19.207
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.	2767.1	2478.5	3537.5
28) STACK AREA, SQ FEET	40.34	40.34	40.34
29) EFFECTIVE STACK AREA, SQUARE FEET	40.34	40.34	40.34
30) STACK GAS FLOW RATE, S.T.P., SCFMD	105575	95245	136147
31) NET TIME OF TEST, MINUTES	126	126	126
32) SAMPLING NOZZLE DIAMETER, INCHES	0.25	0.25	0.25
33) PERCENT ISOKINETIC	58.3	59.5	78.9
34) FLUORIDE - WATER SOLUBLE, MG	1600	1800	2100
35) FLUORIDE - TOTAL, MG	1600.36	1801.5	2101
36) FLUORIDE - WATER SOLUBLE, GR/SCF	0.3767	0.4604	0.2834
37) FLUORIDE - TOTAL, GR/SCF	0.3768	0.4608	0.2835
38) FLUORIDE - WATER SOL., GR/CF, STK CHD.	0.323	0.385	0.2523
39) FLUORIDE - TOTAL, GR/CF, STK CHD.	0.323	0.3853	0.2524
40) FLUORIDE - WATER SOLUBLE, LB/HOUR	340.8	375.8	330.7
41) FLUORIDE - TOTAL, LB/HOUR	340.9	376.1	330.8
43) FLUORIDE - WATER SOL., LB/TON P2O5 FED	21.8	23.5	20.0
44) FLUORIDE - TOTAL, LB/TON P2O5 FED	21.8	23.5	20.0

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

Saturated gas; % moisture figured from psychrometric chart, not from volume of water collected.

SOURCE TEST DATA

TEST NO - NO OF RUNS -
 PLANT - ROYSTER ROP BARTOW, FLA.
 SOURCE - MIXING CONE PICKUP
 TYPE OF PLANT -
 CONTROL EQUIPMENT -
 POLLUTANTS SAMPLED -

1) RUN NUMBER	1	2	3
2) DATE	2/29/72	2/29/72	3/1/72
3) TIME BEGAN	12:40	16:40	9:00
4) TIME END	15:12	18:40	11:00
5) BAROMETRIC PRESSURE, IN HG	30	30	30
6) METER ORIFICE PRESSURE DROP, IN H ₂ O	0.5	0.46	0.73
7) VOL DRY GAS, METER COND, CUBIC FEET	52.177	42.813	61.494
8) AVERAGE GAS METER TEMPERATURE, DEG F	82.6	86.6	72.7
9) VOL DRY GAS, S.T.P., CUBIC FEET	51.169	48.482	61.457
10) TOTAL H ₂ O COLLECTED, ML	0.6	15.5	29.4
11) VOL H ₂ O VAPOR COLLECTED, S.T.P., CU FT	0.03	0.73	1.39
12) STACK GAS MOISTURE, PERCENT VOLUME	0.1	1.5	2.2
13) ASSUMED STACK GAS MOISTURE, PCT VOL	2	2	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	28.84	28.69	28.61
21) STACK GAS SPECIFIC GRAVITY	0.99	0.99	0.99
22) AVG SQUARE ROOT (VEL HEAD), IN H ₂ O	0.4	0.389	0.473
23) AVERAGE STACK GAS TEMPERATURE, DEG F	90	90	80
24) AVG SQUARE ROOT (STK TEMP*VEL HEAD)	9.373	9.114	11.003
25) PITOT CORRECTION FACTOR	0.83	0.83	0.83
26) STACK PRESSURE, IN HG, ABSOLUTE	30	30	30
27) STACK GAS VEL, STACK COND, F.P.M.	1355.3	1321.4	1597.4
28) STACK AREA, SQ FEET	0.19	0.19	0.19
29) EFFECTIVE STACK AREA, SQUARE FEET	0.19	0.19	0.19
30) STACK GAS FLOW RATE, S.T.P., SCFMD	246	239	292
31) NET TIME OF TEST, MINUTES	120	120	120
32) SAMPLING NOZZLE DIAMETER, INCHES	0.25	0.25	0.25
33) PERCENT ISOKINETIC	95.6	94.2	97.7
34) FLUORIDE - WATER SOLUBLE, MG	46.8	61	11.1
35) FLUORIDE - TOTAL, MG	405.8	408	778.1
36) FLUORIDE - WATER SOLUBLE, GR/SCF	0.0141	0.0194	0.0028
37) FLUORIDE - TOTAL, GR/SCF	0.1221	0.1296	0.195
38) FLUORIDE - WATER SOL., GR/CF, STK CHD.	0.0136	0.0184	0.0027
39) FLUORIDE - TOTAL, GR/CF, STK CHD.	0.1178	0.1233	0.1875
40) FLUORIDE - WATER SOLUBLE, LB/HOUR	0.0297	0.0397	0.007
41) FLUORIDE - TOTAL, LB/HOUR	0.2579	0.2654	0.488
43) FLUORIDE - WATER SOL., LB/TON P2O5 FED	0.0019	0.0025	0.0004
44) FLUORIDE - TOTAL, LB/TON P2O5 FED	0.0165	0.0166	0.0295

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

SOURCE TEST DATA

TEST NO -
 PLANT - ROYSTER ROP BARTON, FLA.
 SOURCE - OUTLET NORTH
 TYPE OF PLANT -
 CONTROL EQUIPMENT -
 POLLUTANTS SAMPLED -

NO OF RUNS -

1) RUN NUMBER	1	2	3
2) DATE	2/29/72	2/29/72	3/1/72
3) TIME BEGAN	12:40	17:04	9:08
4) TIME END	15:20	19:04	11:12
5) BAROMETRIC PRESSURE, IN HG	30	30	30
6) METER ORIFICE PRESSURE DROP, IN H ₂ O	2.07	2.07	1.92
7) VOL DRY GAS, METER COND, CUBIC FEET	99.189	99.458	95.519
8) AVERAGE GAS METER TEMPERATURE, DEG F	95.6	90.9	78.6
9) VOL DRY GAS, S.T.P., CUBIC FEET	95.346	96.426	94.688
10) TOTAL H ₂ O COLLECTED, ML	62.1	58.5	7.2
11) VOL H ₂ O VAPOR COLLECTED, S.T.P., CU FT	2.94	2.77	0.34
12) STACK GAS MOISTURE, PERCENT VOLUME	3	2.3	0.4
13) ASSUMED STACK GAS MOISTURE, PCT VOL	2.9	2.4	2.5
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	28.53	28.55	28.81
21) STACK GAS SPECIFIC GRAVITY	0.98	0.98	0.99
22) AVG SQUARE ROOT (VEL HEAD), IN H ₂ O	0.715	0.718	0.686
23) AVERAGE STACK GAS TEMPERATURE, DEG F	88	88.7	86.2
24) AVG SQUARE ROOT (STK TEMP*VEL HEAD)	16.74	16.82	16.037
25) PITOT CORRECTION FACTOR	0.83	0.83	0.83
26) STACK PRESSURE, IN HG, ABSOLUTE	30	30	30
27) STACK GAS VEL, STACK COND, F.P.M.	2434	2444.7	2320.2
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	64741	65060	63591
31) NET TIME OF TEST, MINUTES	120	120	120
32) SAMPLING NOZZLE DIAMETER, INCHES	0.25	0.25	0.25
33) PERCENT ISOKINETIC	101.8	102.4	102.9
34) FLUORIDE - WATER SOLUBLE, MG	34.4	24.8	6
35) FLUORIDE - TOTAL, MG	34.46	24.8	6
36) FLUORIDE - WATER SOLUBLE, GR/SCF	0.0056	0.004	0.001
37) FLUORIDE - TOTAL, GR/SCF	0.0056	0.004	0.001
38) FLUORIDE - WATER SOL., GR/CF, STK COND.	0.0052	0.0037	0.0009
39) FLUORIDE - TOTAL, GR/CF, STK COND.	0.0052	0.0037	0.0009
40) FLUORIDE - WATER SOLUBLE, LB/HOUR	3.0827	2.2084	0.5318
41) FLUORIDE - TOTAL, LB/HOUR	3.0881	2.2084	0.5318
43) FLUORIDE - WATER SOL., LB/TON P205 FED	0.1971	0.138	0.0322
44) FLUORIDE - TOTAL, LB/TON P205 FED	0.1975	0.138	0.0322

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

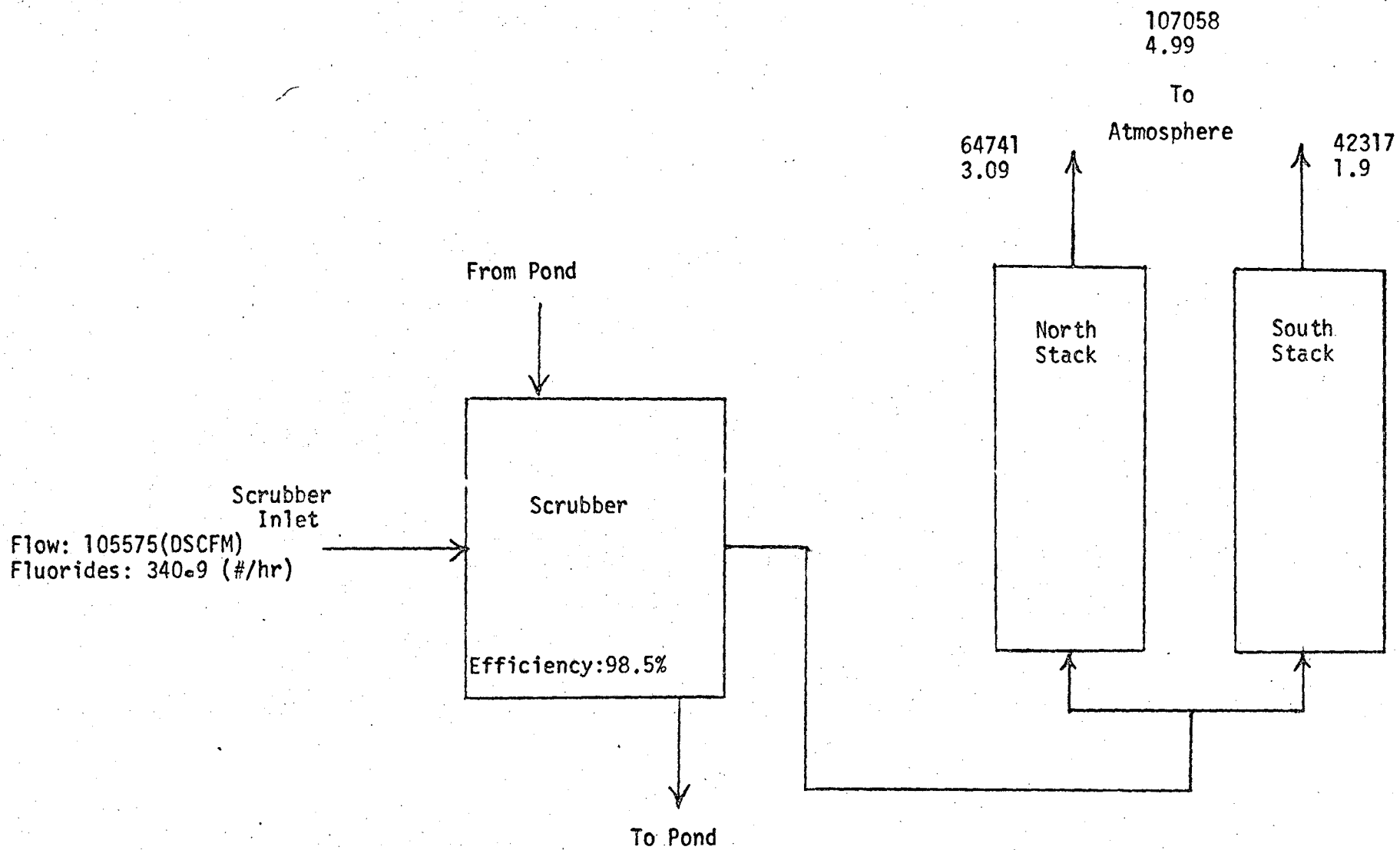
SOURCE TEST DATA

TEST NO -
 PLANT - ROYSTER ROP BARTOW, FLA.
 SOURCE - OUTLET SOUTH
 TYPE OF PLANT -
 CONTROL EQUIPMENT -
 POLLUTANTS SAMPLED -

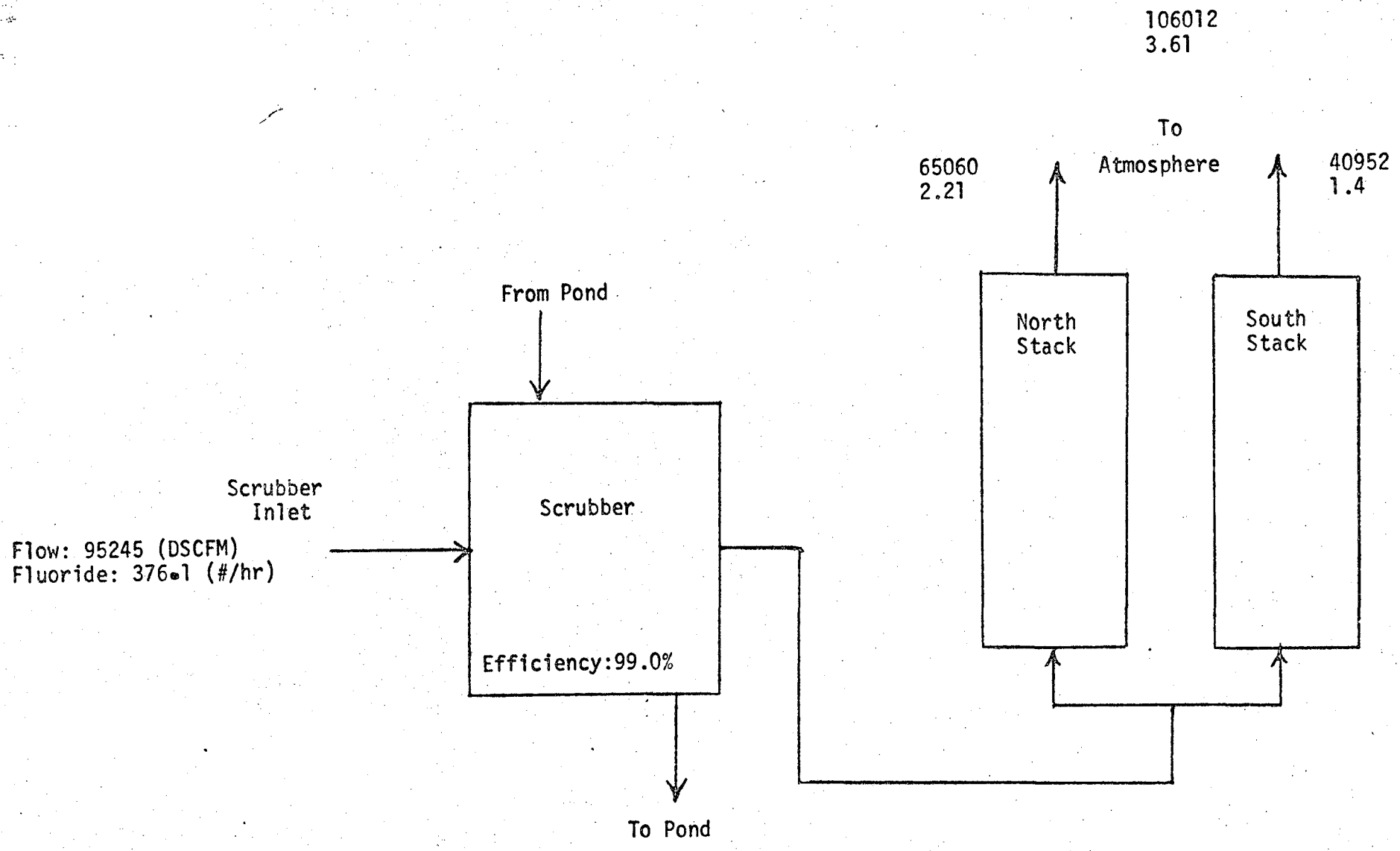
	1	2	3
1) RUN NUMBER	1	2	3
2) DATE	2/29/72	2/29/72	3/1/72
3) TIME BEGAN	12:40	15:58	9:00
4) TIME END	15:28	19:00	11:12
5) BAROMETRIC PRESSURE, IN HG	30	30	30
6) METER ORIFICE PRESSURE DROP, IN H ₂ O	0.91	0.85	0.86
7) VOL DRY GAS, METER COND, CUBIC FEET	73.402	69.198	68.503
8) AVERAGE GAS METER TEMPERATURE, DEG F	86.3	89.4	74.3
9) VOL DRY GAS, S.T.P., CUBIC FEET	71.375	66.89	68.094
10) TOTAL H ₂ O COLLECTED, ML	45.5	45	2.3
11) VOL H ₂ O VAPOR COLLECTED, S.T.P., CU FT	2.16	2.13	0.11
12) STACK GAS MOISTURE, PERCENT VOLUME	2.9	3.1	0.2
13) ASSUMED STACK GAS MOISTURE, PCT VOL	2.9	2.9	2.9
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	28.53	28.51	28.83
21) STACK GAS SPECIFIC GRAVITY	0.98	0.98	0.99
22) AVG SQUARE ROOT (VEL HEAD), IN H ₂ O	0.468	0.454	0.465
23) AVERAGE STACK GAS TEMPERATURE, DEG F	88.7	89.5	86.5
24) AVG SQUARE ROOT (STK TEMP*VEL HEAD)	10.968	10.645	10.872
25) PITOT CORRECTION FACTOR	0.83	0.83	0.83
26) STACK PRESSURE, IN HG, ABSOLUTE	29.91	29.91	29.91
27) STACK GAS VEL, STACK COND, F.P.M.	1596.9	1550.3	1574.7
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	42317	40952	43090
31) NET TIME OF TEST, MINUTES	120	120	120
32) SAMPLING NOZZLE DIAMETER, INCHES	0.25	0.25	0.25
33) PERCENT ISOKINETIC	116.6	112.9	109.2
34) FLUORIDE - WATER SOLUBLE, MG	24.5	17.8	0.52
35) FLUORIDE - TOTAL, MG	24.59	17.8	0.52
36) FLUORIDE - WATER SOLUBLE, GR/SCF	0.0053	0.0041	0.0001
37) FLUORIDE - TOTAL, GR/SCF	0.0053	0.0041	0.0001
38) FLUORIDE - WATER SOL., GR/CF, STK CHD.	0.005	0.0038	0.0001
39) FLUORIDE - TOTAL, GR/CF, STK CHD.	0.005	0.0038	0.0001
40) FLUORIDE - WATER SOLUBLE, LB/HOUR	1.917	1.4383	0.0434
41) FLUORIDE - TOTAL, LB/HOUR	1.9241	1.4383	0.0434
43) FLUORIDE - WATER SOL., LB/TON P2O5 FED	0.1226	0.0899	0.0026
44) FLUORIDE - TOTAL, LB/TON P2O5 FED	0.1230	0.0899	0.0026

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

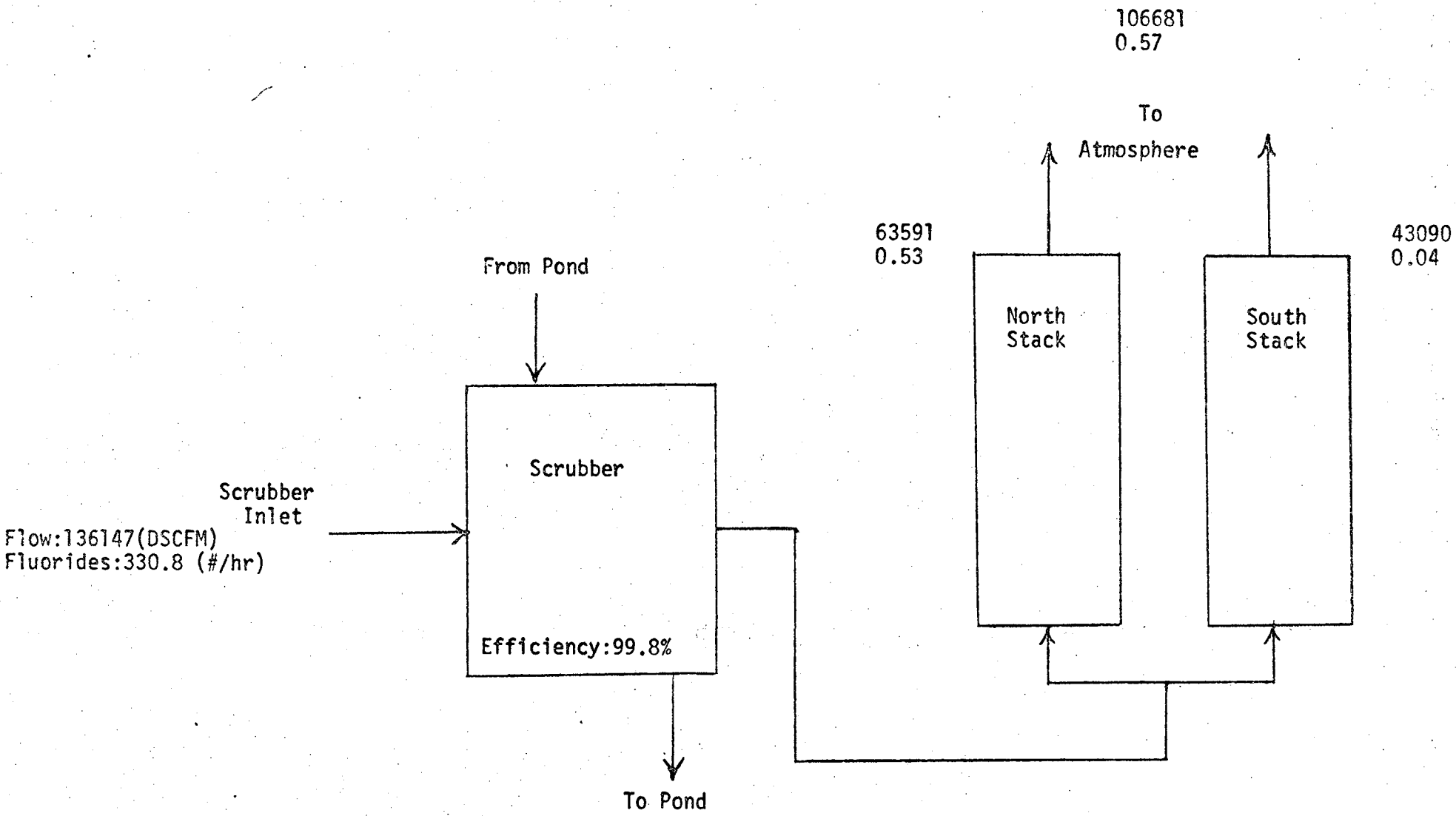
SCRUBBER EFFICIENCY



Royster Company
Triple Super Phosphate
Run 1



Royster Company
Triple Super Phosphate
Run 2



Royster Company
Triple Super Phosphate
Run 3

APPENDIX B

Field Data

PRELIMINARY MOISTURE DETERMINATION

R. Maxwell

PRELIMINARY CHECK FOR STACK GAS
MOISTURE CONTENT AND SPECIFIC GRAVITY

Plant RUN-0- Pile Mg: storage Stack Inlet
Date 2/21/71 Sample Time 1029 Barometric Pressure 29.92 "Hg
to 1041
11 minutes total time

Moisture Content -- Method 1

Final Dry Test Meter Reading 933.085 Ft³
Initial Dry Test Meter Reading 931.700 Ft³
Dry Test Meter Volume Sampled 1.385 Ft³
Average Meter Temperature 78 °F
Average Meter Vacuum ~~1.0~~ "Hg
Average Meter Orifice ΔH 0.05 "H₂O
Sampling Rate _____ LPM
Barometric Pressure @ Meter Orifice 29.92 "Hg
Dry Gas Volume Sampled @ 70 °F, 29.92 "Hg _____ Ft³
Condensate Volume _____ ml
Water Vapor Volume @ 70 °F, 29.92 "Hg _____ Ft³
Moisture Fraction, H₂O 0.0295 Fraction Of Dry Air, FDA _____

$T_s = 75^\circ\text{F}$
 $VP = .8750 \text{ in. Hg}$
 $M = \frac{1.8750}{29.62} \times 100$
 $M = 2.95$

Moisture Content -- Method 2

Dry Bulb Temp. _____ °F Wet Bulb Temp. _____ °F Dew Point Temp. _____ °F
Vapor Pressure Of H₂O @ DP _____ "Hg Stack Pressure 20 - $\frac{5.2}{15.4}$ "Hg
Moisture Fraction, H₂O _____ Fraction Of Dry Air, FDA _____

Specific Gravity

Dry Molecular Weight, $M_d = [0.44(\%CO_2)] + [0.32(\%O_2)] + [0.28(\%N_2 + CO)] =$ _____
Molecular Weight @ Stack Conditions, $M_s = [(M_d) \times (FDA)] + [(18) \times (H_2O)] =$ _____
Specific Gravity (Referred to air), $G_s = (M_s) \div (28.99) =$ _____

PRELIMINARY CHECK FOR STACK GAS
---MOISTURE CONTENT AND SPECIFIC GRAVITY

Plant Run-O-Pile Mfg. Storage Stack Mixing Cone Pick Up
Date 2/29/72 Sample Time 1000-1020 Barometric Pressure 30 "Hg

Moisture Content -- Method 1

Final Dry Test Meter Reading 993.450 Ft³
Initial Dry Test Meter Reading 990.813 Ft³
Dry Test Meter Volume Sampled 2.637 Ft³
Average Meter Temperature 75 °F
Average Meter Vacuum "Hg
Average Meter Orifice ΔH 0.06 "H₂O
Sampling Rate 0.13 LPM
Barometric Pressure @ Meter Orifice 30 "Hg
Dry Gas Volume Sampled @ 70 °F, 29.92 "Hg Ft³
Condensate Volume ml
Water Vapor Volume @ 70 °F, 29.92 "Hg Ft³
Moisture Fraction, H₂O Fraction Of Dry Air, FDA

Moisture Content -- Method 2

Dry Bulb Temp. 85 °F Wet Bulb Temp. 70 °F Dew Point Temp. 62 °F
Vapor Pressure Of H₂O @ DP 0.5601 "Hg Stack Pressure 30 - $\frac{0.32}{14.7}$ "Hg
Moisture Fraction, H₂O 0.20 Fraction Of Dry Air, FDA 0.98

Specific Gravity

Dry Molecular Weight, M_d = $[0.44(\%CO_2)] + [0.32(\%O_2)] + [0.28(\%N_2 + CO)] =$
Molecular Weight @ Stack Conditions, M_s = $[(M_d) \times (FDA)] + [(18) \times (H_2O)] =$
Specific Gravity (Referred to air), G_s = $(M_s) \div (28.99) =$

Start
10:00 / STOP
10:20

20 min

PRELIMINARY CHECK FOR STACK GAS
MOISTURE CONTENT AND SPECIFIC GRAVITY

Plant Run-O-Pile Mag. Storage Stack Outlet Martin
Date 2/29/72 Sample Time _____ Barometric Pressure _____ "Hg

Moisture Content -- Method 1

Final Dry Test Meter Reading 347.60 Ft³
Initial Dry Test Meter Reading 344.60 Ft³
Dry Test Meter Volume Sampled 3.0 Ft³
Average Meter Temperature 76 °F
Average Meter Vacuum _____ "Hg
Average Meter Orifice ΔH 0.065 "H₂O
Sampling Rate _____ LPM
Barometric Pressure @ Meter Orifice 30 "Hg
Dry Gas Volume Sampled @ 70 °F, 29.92 "Hg 2.97 Ft³
Condensate Volume ≈ 0.5 ml ml
Water Vapor Volume @ 70 °F, 29.92 "Hg _____ Ft³
Moisture Fraction, H₂O _____ Fraction Of Dry Air, FDA _____

Moisture Content -- Method 2

Dry Bulb Temp. 86 °F Wet Bulb Temp. _____ °F Dew Point Temp. _____ °F
Vapor Pressure Of H₂O @ DP _____ "Hg Stack Pressure _____ "Hg
Moisture Fraction, H₂O 0.04 Fraction Of Dry Air, FDA 0.96

Specific Gravity

Dry Molecular Weight, M_d = $[0.44(\%CO_2)] + [0.32(\%O_2)] + [0.28(\%N_2 + CO)] =$ _____
Molecular Weight @ Stack Conditions, M_s = $[(M_d) \times (FDA)] + [(18) \times (H_2O)] =$ _____
Specific Gravity (Referred to air), G_s = $(M_s) \div (28.99) =$ _____

PRELIMINARY CHECK FOR STACK GAS
MOISTURE CONTENT AND SPECIFIC GRAVITY

Plant Run-O-Pile Mfg. Storage Stack OUTLET SOUTH
Date 2/29/72 Sample Time 10:39 to 10:52 Barometric Pressure 29.92 "Hg

Moisture Content -- Method 1

Final Dry Test Meter Reading 344.601 Ft³
Initial Dry Test Meter Reading 342.907 Ft³
Dry Test Meter Volume Sampled 1.694 Ft³
Average Meter Temperature 75 °F
Average Meter Vacuum — "Hg
Average Meter Orifice ΔH 0.75 "H₂O
Sampling Rate _____ LPM
Barometric Pressure @ Meter Orifice _____ "Hg
Dry Gas Volume Sampled @ 70 °F, 29.92 "Hg _____ Ft³
Condensate Volume _____ ml
Water Vapor Volume @ 70 °F, 29.92 "Hg _____ Ft³
Moisture Fraction, H₂O _____ Fraction Of Dry Air, FDA _____

Moisture Content -- Method 2

Dry Bulb Temp. _____ °F Wet Bulb Temp. _____ °F Dew Point Temp. _____ °F
Vapor Pressure Of H₂O @ DP _____ "Hg Stack Pressure 29.9 "Hg
Moisture Fraction, H₂O _____ Fraction Of Dry Air, FDA _____

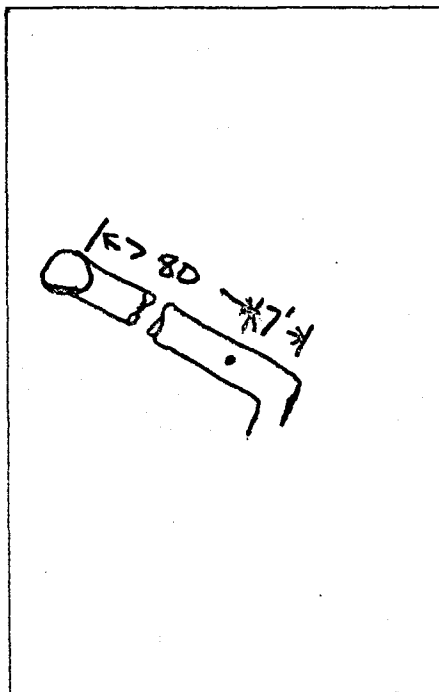
Specific Gravity

Dry Molecular Weight, $M_d = [0.44(\%CO_2)] + [0.32(\%O_2)] + [0.28(\%N_2 + CO)] =$ _____
Molecular Weight @ Stack Conditions, $M_s = [(M_d) \times (FDA)] + [(18) \times (H_2O)] =$ _____
Specific Gravity (Referred to air), $G_s = (M_s) \div (28.99) =$ _____

FLUORIDE EMISSIONS

SOURCE SAMPLING FIELD DATA SHEET

Plant RUN-O-Pile Mfg. Storage
Sampling Location Inlet
Date 2/29/72 Run No. 1
Time Start 1241 Time End 1529
Sampling Time/Point 7 min/pt (126 min)
DB 80 °F, WB 80 °F, VF @ DP 0.8750 "Hg
Moisture 295%, FDA 97, Gas Density Factor
Barometric Press 29.92 "Hg, Stack Press 29.62 "Hg
Weather Partly Cloudy
Temp. 80 °F, W/D , W/S
Sample Box No. 4 Meter Box No. 1
Meter ΔH₀ Pitot Corr. Factor .83
Nozzle Dia. .25 in., Probe Length 8 ft
Probe Heater Setting 20
Stack Dimensions: Inside Diameter 86 in
Inside Area 40.28 ft²
Height ft



DIA = 7.17 ft.

Mat'l Processing Rate
Final Gas Meter Reading 1001.582 ft³
Initial Gas Meter Reading 933.090 ft³
378-200=178
Total Condensate in Impingers 178 ml
Moisture in Silica Gel 245-231.5 gm
Silica Gel Container No. 631 Filter No. 720401
Orsat: CO₂
O₂
CO
N₂
Excess Air

Test Conducted by: A. L. Wilson

Remarks: LIQUID INTRUSION -
* VELOCITY HEAD FLUATED DRASTICALLY

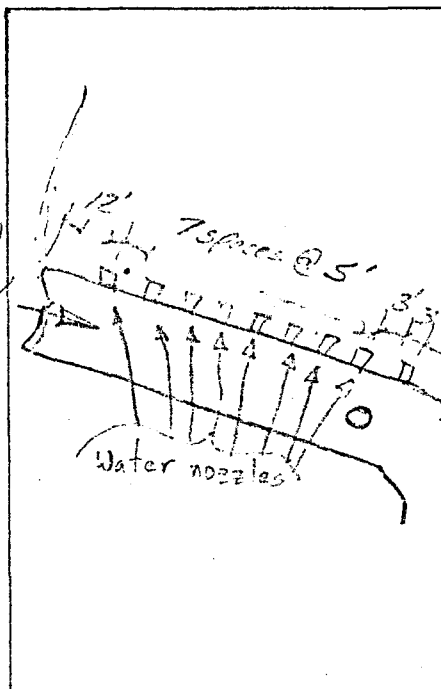
Port and Traverse Point No.	Distance from End of Port (in.) ft	Clock Time	Gas Meter Reading (ft ³)	Stack Velocity Head ("H ₂ O)	Meter Orifice Press. Diff. ("H ₂ O)		Stack Gas Temp. (°F)	Gas Sample Temp. @ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Test (°F)	Vacuum on Sample Train ("Hg)
					Calc.	Actual		In	Out			
	<u>1.35</u>	<u>1241</u>	<u>933.090</u>									
<u>1</u>	<u>0.45</u>	<u>1248</u>	<u>936.5</u>	<u>0.50</u>	<u>0.70</u>	<u>0.70</u>	<u>75</u>	<u>93</u>	<u>92</u>	<u>-</u>	<u>90</u>	<u>5</u>
<u>2</u>	<u>0.67</u>	<u>1255</u>	<u>940.6</u>	<u>0.95</u>	<u>1.30</u>	<u>1.30</u>	<u>77</u>	<u>94</u>	<u>92</u>	<u>-</u>	<u>87</u>	<u>5</u>
<u>3</u>	<u>0.89</u>	<u>1302</u>	<u>944.4</u>	<u>0.70</u>	<u>0.95</u>	<u>0.95</u>	<u>77</u>	<u>95</u>	<u>92</u>	<u>-</u>	<u>85</u>	<u>5</u>
<u>4</u>	<u>1.13</u>	<u>1309</u>	<u>947.4</u>	<u>0.40</u>	<u>0.56</u>	<u>0.56</u>	<u>78</u>	<u>95</u>	<u>92</u>	<u>-</u>	<u>80</u>	<u>5</u>
<u>5</u>	<u>1.40</u>	<u>1316</u>	<u>951.1</u>	<u>0.60</u>	<u>0.84</u>	<u>0.84</u>	<u>78</u>	<u>96</u>	<u>93</u>	<u>-</u>	<u>80</u>	<u>6</u>
<u>6</u>	<u>1.70</u>	<u>1323</u>	<u>959.8</u>	<u>0.60</u>	<u>0.84</u>	<u>0.84</u>	<u>78</u>	<u>96</u>	<u>93</u>	<u>-</u>	<u>80</u>	<u>6</u>
<u>7</u>	<u>2.04</u>	<u>1330</u>	<u>958.5</u>	<u>0.60</u>	<u>0.84</u>	<u>0.84</u>	<u>78</u>	<u>96</u>	<u>93</u>	<u>-</u>	<u>78</u>	<u>6</u>

[illegible]

RONALD L. JENNEL, INC.
Gainesville, Florida

SOURCE SAMPLING FIELD DATA SHEET

Plant RON-O-PILE Mfg. & STORAGE
 Sampling Location INLET
 Date 2-29-79 Run No. 2
 Time Start 1659 Time End 1905
 Sampling Time/Point 7 min (126 min)
 DB °F, WB °F, VF @ DP "Hg
 Moisture 10 %, FDA 90, Gas Density Factor
 Barometric Press 29.92 "Hg, Stack Press 29.62 "Hg
 Weather Partly Cloudy
 Temp. 75 °F, W/D , W/S
 Sample Box No. 4 Meter Box No. 1
 Meter ΔH 1.74 Pitot Corr. Factor 0.83
 Nozzle Dia. .25 in., Probe Length 8 ft
 Probe Heater Setting 25
 Stack Dimensions: Inside Diameter 86 in
 Inside Area 40.28 ft²
 Height ft



DIA = 7.17 ft

Mat'l Processing Rate
 Final Gas Meter Reading 063.978 ft³
 Initial Gas Meter Reading 001.682 ft³
 Total Condensate in Impingers 206 ml
406-200=206
 Moisture in Silica Gel 12.7 gm
 Silica Gel Container No. 625 Filter No. 720425
 Orsat: CO₂
 O₂
 CO
 N₂
 Excess Air
 Test Conducted by: A. L. WILSON
 R. MAXWELL

Remarks:

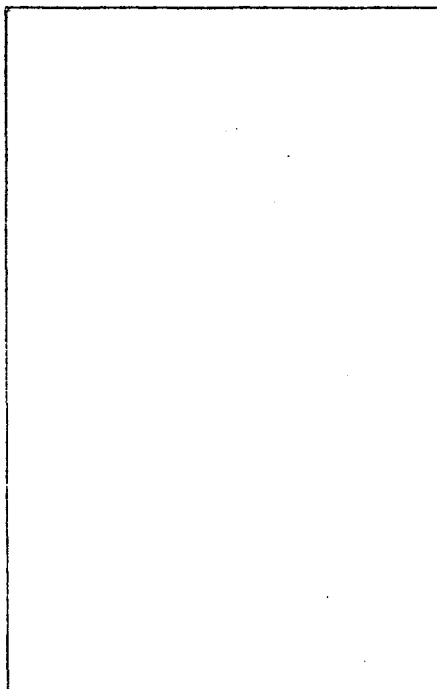
Port and Traverse Point No.	Distance from End of Port (ft)	Clock Time	Gas Meter Reading (ft ³)	Stack Velocity Head ("H ₂ O)	Meter Orifice Press. Diff. ("H ₂ O)		Stack Gas Temp. (°F)	Gas Sample Temp. @ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Test (°F)	Vacuum on Sample Train ("Hg)
					Calc.	Actual		In	Out			
	<u>t. 35</u>	<u>1659</u>	<u>001.682</u>									
<u>1</u>	<u>1 1/2 .45</u>	<u>1706</u>	<u>4.8</u>	<u>0.55</u>	<u>0.75</u>	<u>0.75</u>	<u>74</u>	<u>95</u>	<u>95</u>	<u>—</u>	<u>78</u>	<u>4.5</u>
<u>2</u>	<u>3 3/4 .67</u>	<u>1713</u>	<u>8.2</u>	<u>0.55</u>	<u>0.75</u>	<u>0.75</u>	<u>74</u>	<u>95</u>	<u>95</u>	<u>—</u>	<u>77</u>	<u>4.5</u>
<u>3</u>	<u>6 1/6 .89</u>	<u>1720</u>	<u>10.9</u>	<u>0.30</u>	<u>0.43</u>	<u>0.43</u>	<u>74</u>	<u>94</u>	<u>94</u>	<u>—</u>	<u>76</u>	<u>4.5</u>
<u>4</u>	<u>9 1/8 1.13</u>	<u>1727</u>	<u>13.7</u>	<u>0.30</u>	<u>0.43</u>	<u>0.43</u>	<u>75</u>	<u>93</u>	<u>93</u>	<u>—</u>	<u>75</u>	<u>5</u>
<u>5</u>	<u>12 1/4 1.40</u>	<u>1734</u>	<u>16.9</u>	<u>0.45</u>	<u>0.61</u>	<u>0.61</u>	<u>75</u>	<u>92</u>	<u>93</u>	<u>—</u>	<u>75</u>	<u>5</u>
<u>6</u>	<u>16 5/8 2.70</u>	<u>1741</u>	<u>20.5</u>	<u>0.54</u>	<u>0.74</u>	<u>0.74</u>	<u>75</u>	<u>91</u>	<u>92</u>	<u>—</u>	<u>75</u>	<u>6</u>
<u>7</u>	<u>20 1/2 2.04</u>	<u>1748</u>	<u>24.1</u>	<u>0.55</u>	<u>0.75</u>	<u>0.75</u>	<u>75</u>					

[illegible]

ENVIRONMENTAL ENGINEERING, INC.
Gainesville, Florida

SOURCE SAMPLING FIELD DATA SHEET

Plant ROVSTER
Sampling Location INLET
Date 3-1-72 Run No. 3
Time Start 0856 Time End 1102
Sampling Time/Point 7 min/pt (126 min)
DB °F, WB °F, VF @ DP .8750 "Hg
Moisture 2.92%, FDA .97, Gas Density Factor
Barometric Press 29.92 "Hg, Stack Press 29.62 "Hg
Weather CLEAR
Temp. 75 °F, W/D , W/S
Sample Box No. 4 Meter Box No. 1
Meter ΔH@ 1.79 Pitot Corr. Factor .83
Nozzle Dia. .25 in., Probe Length 8 ft
Probe Heater Setting 30
Stack Dimensions: Inside Diameter 86 in
Inside Area ft²
Height ft



DIA = 7.17 ft

Mat'l Processing Rate
Final Gas Meter Reading 179.205 ft³
Initial Gas Meter Reading 63.880 ft³
435-200 = 235
Total Condensate in Impingers 235 ml
Moisture in Silica Gel 12.2 gm
Silica Gel Container No. 618 Filter No. 720426
Orsat: CO₂
O₂
CO
N₂
Excess Air
Test Conducted by: A.L. WILSON
R. MAXWELL
Remarks: PLANT'S WATER PUMP FAILURE
CAUSED SAMPLING DELAY.

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			
		<u>0856</u>	<u>63.880</u> 63.880									
1		<u>0903</u>	<u>70.2</u>	<u>0.70</u>	<u>2.8</u>	<u>2.8</u>	<u>74</u>	<u>70</u>	<u>68</u>	<u>—</u>	<u>74</u>	<u>11</u>
2		<u>0910</u>	<u>75.7</u>	<u>0.60</u>	<u>2.36</u>	<u>2.36</u>	<u>74</u>	<u>73</u>	<u>69</u>	<u>—</u>	<u>74</u>	<u>9</u>
3		<u>0917</u>	<u>81.5</u>	<u>0.60</u>	<u>2.36</u>	<u>2.36</u>	<u>74</u>	<u>75</u>	<u>69</u>	<u>—</u>	<u>74</u>	<u>10</u>
4		<u>0924</u>	<u>87.3</u>	<u>0.60</u>	<u>2.36</u>	<u>2.36</u>	<u>74</u>	<u>76</u>	<u>70</u>	<u>—</u>	<u>74</u>	<u>10</u>
5		<u>0931</u>	<u>93.4</u>	<u>0.67</u>	<u>2.70</u>	<u>2.70</u>	<u>74</u>	<u>76</u>	<u>71</u>	<u>—</u>	<u>74</u>	<u>12</u>
6		<u>0938</u>	<u>99.4</u>	<u>0.60</u>	<u>2.36</u>	<u>2.36</u>	<u>74</u>	<u>78</u>	<u>72</u>	<u>—</u>	<u>74</u>	<u>11</u>
7		<u>0945</u>	<u>106.1</u>	<u>0.68</u>	<u>2.70</u>	<u>2.70</u>	<u>74</u>	<u>79</u>	<u>73</u>	<u>—</u>	<u>72</u>	<u>13</u>

[illegible]

SOURCE SAMPLING FIELD DATA SHEET

Plant ROYSTER BARTON, FLA.

Sampling Location Mining Core Pickup

Date 2-29-72 Run No. 1

Time Start 12:40 Time End 3:12

Sampling Time/Point 4 points @ 30 min = 120 min

DB 85 °F, WB 70 °F, VF @ DP 0.5601 "Hg

Moisture 2.0%, FDA 980 Gas Density Factor —

Barometric Press 30 "Hg, Stack Press 30 "Hg

Weather INSIDE BLDG.

Temp. — °F, W/D —, W/S —

Sample Box No. 2 Meter Box No. 4

Meter ΔH₂ 1.62 Pitot Corr. Factor 0.83

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

Probe Heater Setting 30%

Stack Dimensions: Inside Diameter 53 5/8 in

Inside Area 0.1882 ft²

Height — ft

Mat'l Processing Rate

Final Gas Meter Reading 1045.627 ft³

Initial Gas Meter Reading 993.450 ft³

Total Condensate in Impingers —14 ml

Moisture in Silica Gel 249.2-234.6 = 14.6 gm

Silica Gel Container No. 627 Filter No. 7208

Orsat: CO₂ —

O₂ —

CO —

N₂ —

Excess Air —

Test Conducted by: R. PURGAN

—

—

—

Remarks: Sampled @ 4 points.

Points 1 and 5 were too close

to Stack Wall

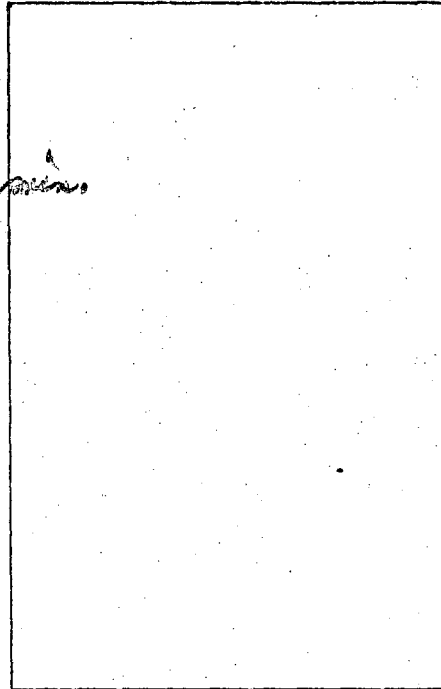
* NOTE: Plant stopped @ 1:43 (plug-up) Resume @ 2:15

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			
Port #1												
Point #1	1/4"	—	—	—	—	—	—	—	—	—	—	—
2	7/8"	12:55	999.0	0.10	0.29	0.29	90	79	80	—	83	5.0
		1:10	1004.0	0.12	0.34	0.34	90	80	80	—	85	5.0
3	1 3/4"	1:25	1009.7	0.12	0.34	0.34	90	82	80	—	88	5.0
		1:40	1015.2	0.12	0.34	0.34	90	83	82	—	92	5.0
50P 4	4 1/8"	1:43	1016.1	0.15	0.44	0.44	90	83	83	—	88	5.0
		2:27	1021.9	0.20	0.65	0.65	90	83	83	—	88	5.0
		2:42	1029.7	0.22	0.71	0.71	90	84	83	—	88	5.0

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ENVIRONMENTAL ENGINEERING, INC.
Gainesville, Florida
SOURCE SAMPLING FIELD DATA SHEET

Plant Royster BARTON FLA.
Sampling Location Mixing Cone Pickup
Date 2-29-72 Run No. 2
Time Start 4:40 Time End 6:40
Sampling Time/Point 4 points @ 30 min 120 min.
DB 90 °F, WB — °F, VF @ DP — °F
Moisture 2.0 %, FDA 98.0, Gas Density Factor —
Barometric Press 30 "Hg, Stack Press 30 "Hg
Weather INSIDE BLDG.
Temp. — °F, W/D —, W/S —
Sample Box No. 2 Meter Box No. 4
Meter ΔH 1.62 Pitot Corr. Factor 0.83
Nozzle Dia. 1/4 in., Probe Length 4 ft
Probe Heater Setting 30%
Stack Dimensions: Inside Diameter 5 3/4 in
Inside Area 0.1882 ft²
Height — ft



Mat'l Processing Rate —
Final Gas Meter Reading 95.440 ft³
Initial Gas Meter Reading 45.627 ft³
Total Condensate in Impingers 2 ml
Moisture in Silica Gel 248.4 - 284.9 = 13.5 gm
Silica Gel Container No. 628 Filter No. 72043
Orsat: CO₂ —
O₂ —
CO —
N₂ —
Excess Air —
Test Conducted by: R. Dungan

Remarks: Sampled @ 4 points
Points 1 and 6 were too close
to black wall

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			
<u>Port #1</u>												
<u>Point #1</u>	<u>1/4"</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>
<u>2</u>	<u>7/8"</u>	<u>4:55</u>	<u>51.3</u>	<u>0.15</u>	<u>0.44</u>	<u>0.44</u>	<u>90</u>	<u>86</u>	<u>86</u>	<u>—</u>	<u>87</u>	<u>5.0</u>
		<u>5:10</u>	<u>56.8</u>	<u>0.12</u>	<u>0.34</u>	<u>0.34</u>	<u>92</u>	<u>86</u>	<u>86</u>	<u>—</u>	<u>87</u>	<u>5.0</u>
<u>3</u>	<u>1 3/4"</u>	<u>5:25</u>	<u>62.0</u>	<u>0.10</u>	<u>0.29</u>	<u>0.29</u>	<u>92</u>	<u>87</u>	<u>86</u>	<u>—</u>	<u>88</u>	<u>5.0</u>
		<u>5:40</u>	<u>67.5</u>	<u>0.12</u>	<u>0.34</u>	<u>0.34</u>	<u>90</u>	<u>87</u>	<u>86</u>	<u>—</u>	<u>86</u>	<u>5.0</u>
<u>4</u>	<u>4 1/8"</u>	<u>5:55</u>	<u>73.8</u>	<u>0.15</u>	<u>0.44</u>	<u>0.44</u>	<u>90</u>	<u>87</u>	<u>86</u>	<u>—</u>	<u>84</u>	<u>5.0</u>
		<u>6:10</u>	<u>80.3</u>	<u>0.15</u>	<u>0.44</u>	<u>0.44</u>	<u>90</u>	<u>87</u>	<u>86</u>	<u>—</u>	<u>—</u>	<u>—</u>

[illegible]

SOURCE SAMPLING FIELD DATA SHEET

Plant Royster BARTON, FLA

Sampling Location Mining Core Pickup

Date 3-1-72 Run No. 3

Time Start 9:00 Time End 11:00

Sampling Time/Point 4 points @ 30 min = 120 min

DB 80°F, WB —°F, VF @ DP — "Hg

Moisture 2.0%, FDA 98.0 Gas Density Factor —

Barometric Press 30 "Hg, Stack Press .30 Hg

Weather INSIDE BLDG.

Temp. —°F, W/D —, W/S —

Sample Box No. 2 Meter Box No. 4

Meter ΔH 1.62 Pitot Corr. Factor 0.83

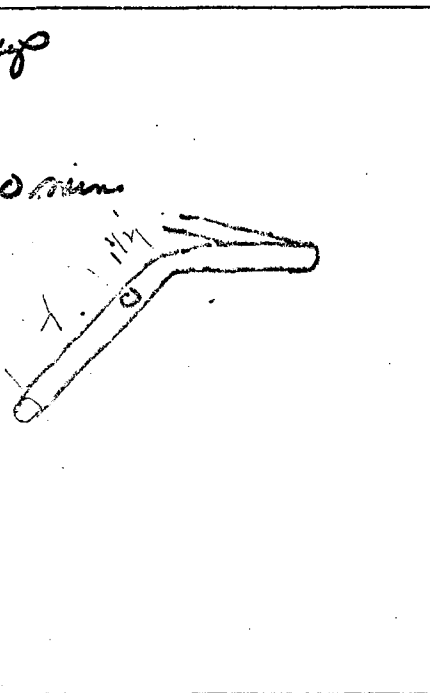
Nozzle Dia. 1/4 in., Probe Length 4 ft

Probe Heater Setting 30%

Stack Dimensions: Inside Diameter 57/8 in

Inside Area 0.1882 ft²

Height — ft



Mat'l Processing Rate —

Final Gas Meter Reading 156.935 ft³

Initial Gas Meter Reading 95.441 ft³

Total Condensate in Impingers 15 ml

Moisture in Silica Gel 249.9 - 235.5 = 14.4 gm

Silica Gel Container No. 629 Filter No. 720438

Orsat: CO₂ —

O₂ —

CO —

N₂ —

Excess Air —

Test Conducted by: R. Duragen

Remarks: Sampled @ 4 points.
Points 1 and 6 were in close
to stack wall.

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			
Port #1												
Point 1	1/4"	—	—	—	—	—	—	—	—	—	—	—
2	7/8"	9:15	101.5	0.15	0.44	0.44	80	69	69	—	72	5.0
		9:30	108.2	0.18	0.55	0.55	80	70	69	—	68	5.0
3	1 3/4	9:45	115.3	0.20	0.65	0.65	80	72	70	—	68	5.0
		10:00	123.3	0.25	0.81	0.81	80	73	71	—	70	5.0
4	4 1/8	10:15	132.1	0.28	0.94	0.94	80	75	72	—	70	5.0
		10:30	140.3	0.25	0.81	0.81	80	77	72	—	70	5.0

[illegible]

ENVIRONMENTAL ENGINEERING, INC.
Gainesville, Florida

SOURCE SAMPLING FIELD DATA SHEET

Plant Run - O - File Mfg & STORAGE

Sampling Location OUTLET NORTH

Date 2/23/72 Run No. 1

Time Start 12:40 Time End 15:20

Sampling Time/Point 4@30=120 total min

DB 86 °F, WB _____ °F, VF @ DP _____ "Hg

Moisture 2.9 %, FDA _____, Gas Density Factor _____

Barometric Press 30 "Hg, Stack Press 30 "Hg

Weather clear & warm

Temp. 80 °F, W/D VAR, W/S CALM

Sample Box No. 1 Meter Box No. —

Meter ΔHe 1.7 Pitot Corr. Factor .93

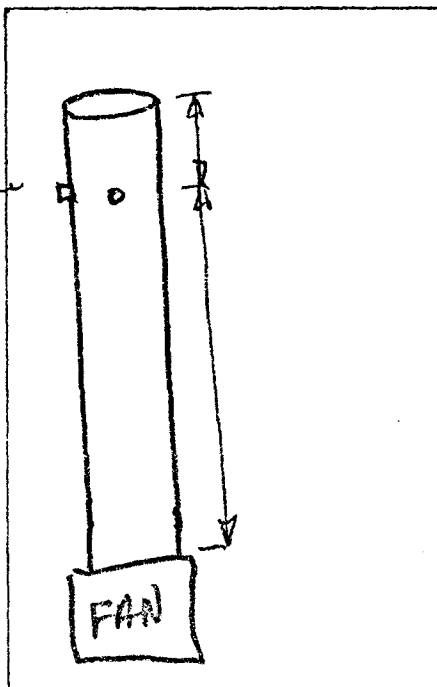
Nozzle Dia. .25 in., Probe Length 6 ft

Probe Heater Setting On

Stack Dimensions: Inside Diameter 72 in

Inside Area _____ ft²

Height _____ ft



Mat'l Processing Rate _____

Final Gas Meter Reading 627.679 ft³

Initial Gas Meter Reading 528.490 ft³

Total Condensate in Impingers 48 ml

Moisture in Silica Gel 295-232.9 g

Silica Gel Container No. 621 Filter No. 732122

Orsat: CO₂ _____

O₂ _____

CO _____

N₂ _____

Excess _____

Air _____

Test Conducted by: A. Arroyo

Remarks: Plant Shut Down on
pt. 2 port # 2.

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			
<u>omitted</u> ①	<u>15 1/32"</u>		<u>528.49</u>									
<u>1-1</u>	<u>3 17/32</u>	<u>12:40</u>	<u>530.7</u>	<u>.25</u>	<u>1.0</u>	<u>1.0</u>	<u>86</u>	<u>90</u>	<u>90</u>		<u>85</u>	<u>3.5</u>
<u>2</u>	<u>6 1/8</u>	<u>12:44</u>	<u>533.3</u>	<u>.30</u>	<u>1.2</u>	<u>1.2</u>	<u>86</u>	<u>92</u>	<u>87</u>		<u>80</u>	<u>5</u>
<u>3</u>	<u>9</u>	<u>12:48</u>	<u>536.0</u>	<u>.35</u>	<u>1.4</u>	<u>1.4</u>	<u>86</u>	<u>92</u>	<u>87</u>		<u>80</u>	<u>6.5</u>
<u>4</u>	<u>12 5/32</u>	<u>12:52</u>	<u>538.8</u>	<u>.40</u>	<u>1.6</u>	<u>1.60</u>	<u>86</u>	<u>94</u>	<u>87</u>		<u>82</u>	<u>7.5</u>
<u>5</u>	<u>15 27/32</u>	<u>12:56</u>	<u>541.9</u>	<u>.45</u>	<u>1.8</u>	<u>1.8</u>	<u>86</u>	<u>95</u>	<u>87</u>		<u>84</u>	<u>9</u>
<u>6</u>	<u>20 3/8</u>	<u>13:00</u>	<u>545.2</u>	<u>.50</u>	<u>2.0</u>	<u>2.0</u>	<u>86</u>	<u>97</u>	<u>88</u>		<u>86</u>	<u>10</u>
<u>7</u>	<u>27</u>	<u>13:04</u>	<u>549</u>	<u>.55</u>	<u>2.2</u>	<u>2.2</u>	<u>86</u>	<u>97</u>	<u>88</u>		<u>86</u>	<u>10</u>

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
					Calc.	Actual		In	Out			
8	45	1308	552.3	60	2.35	2.35	88	98	88		86	13
9	51 5/8	1312	555.9	65	2.55	2.55	88	98	88		88	14
10	56 5/32	1316	559.7	60	2.35	2.35	88	98	90		88	13.5
11	59 27/32	1320	563.0	60	2.35	2.35	88	98	90		87	13.5
12	61 1/2	1324	566.8	60	2.35	2.35	88	98	90		86	14
13	65 7/8	1328	570.6	60	2.35	2.35	88	98	90		80	13.5
14	68 75/32	1332	574.4	60	2.35	2.35	88	98	92		86	
15	70 27/32	1336	577.3	60	2.35	2.35	88	98	92		90	
2												
1		13:44	579.6	25	1.0	1.0	88	98	92		90	7
2		13:48	582.146	25	1.0	1.0	88	98	92		90	7
3		14:28	585.0	32	1.3	1.3	89	100	93		100	8
4		14:32	587.8	40	1.6	1.6	89	101	94		94	10
5		14:36	590.75	45	1.8	1.8	89	102	94		92	11
6		14:40	593.3	50	2.0	2.0	89	101	94		90	12
7		14:44	597.7	55	2.2	2.2	89	102	94		90	13
8		14:48	601.5	60	2.35	2.35	89	102	95		85	14
9		14:52	605.10	60	2.35	2.35	89	102	95		85	14.5
10		14:56	608.5	65	2.55	2.55	89	102	96		85	15
11		15:00	612.5	70	2.75	2.75	89	104	96		87	16
12		15:04	616.3	66	2.6	2.6	89	106	96		89	16
13		15:08	619.9	70	2.75	2.75	89	106	96		92	16
14		15:12	623.8	70	2.75	2.75	89	108	98		92	16
15		15:16	627.679	70	2.75	2.75	89	108	98		92	16

* PLANT - SHUT - DOWN

ENVIRONMENTAL ENGINEERING, INC.
Gainesville, Florida

SOURCE SAMPLING FIELD DATA SHEET

Plant RUN-O-PILE Mfg Storage

Sampling Location OUTLET North

Date 2/29/72 Run No. 2

Time Start 17:04 Time End _____

Sampling Time/Point 4 min @ 30 pts = 120 tot

DB 89 °F, WB _____ °F, VF @ DP _____ "Hg

Moisture 2.4 %, FDA 1976, Gas Density Factor _____

Barometric Press 30 "Hg, Stack Press 30 "Hg

Weather clear

Temp. 85 °F, W/D -, W/S CALM

Sample Box No. 1 Meter Box No. -

Meter ΔH₀ 1.70 Pitot Corr. Factor .83

Nozzle Dia. .25 in., Probe Length 6 ft

Probe Heater Setting on

Stack Dimensions: Inside Diameter 72 in

Inside Area _____ ft²

Height _____ ft

Mat'l Processing Rate _____

Final Gas Meter Reading 728.267 ft³

Initial Gas Meter Reading 628.809 ft³

Total Condensate in Impingers 46 ml

Moisture in Silica Gel 296 - 233.50 = 12.5 gm

Silica Gel Container No. 619 Filter No. 720440

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			
			<u>628.809</u>									
<u>1</u>		<u>17:04</u>	<u>631.0</u>	<u>.25</u>	<u>1.0</u>	<u>1.0</u>	<u>89</u>	<u>98</u>	<u>98</u>		<u>85</u>	<u>5</u>
<u>2</u>		<u>17:08</u>	<u>633.7</u>	<u>.35</u>	<u>1.4</u>	<u>1.4</u>	<u>89</u>	<u>98</u>	<u>95</u>		<u>80</u>	<u>6.5</u>
<u>3</u>		<u>17:12</u>	<u>636.5</u>	<u>.35</u>	<u>1.4</u>	<u>1.4</u>	<u>89</u>	<u>98</u>	<u>95</u>		<u>80</u>	<u>7</u>
<u>4</u>		<u>17:16</u>	<u>639.6</u>	<u>.45</u>	<u>1.8</u>	<u>1.8</u>	<u>89</u>	<u>98</u>	<u>94</u>		<u>80</u>	<u>10</u>
<u>5</u>		<u>17:20</u>	<u>642.9</u>	<u>.50</u>	<u>2.0</u>	<u>2.0</u>	<u>89</u>	<u>100</u>	<u>94</u>		<u>80</u>	<u>12</u>
<u>6</u>		<u>17:24</u>	<u>646.4</u>	<u>.55</u>	<u>2.2</u>	<u>2.2</u>	<u>89</u>	<u>100</u>	<u>94</u>		<u>80</u>	<u>13.5</u>
<u>7</u>		<u>17:28</u>	<u>650.0</u>	<u>.60</u>	<u>2.35</u>	<u>2.35</u>	<u>89</u>	<u>100</u>	<u>94</u>		<u>80</u>	<u>14</u>

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
					Calc.	Actual		In	Out			
8		17:32	653.5	.60	2.35	2.35	89	100	94		80	14
9		17:36	657.2	.62	2.40	2.40	89	100	94		80	14.5
10		17:40	660.8	.62	2.40	2.40	89	99	94		80	15
11		17:44	664.6	.62	2.40	2.40	90	98	94		80	14
12		17:48	668.9	.62	2.40	2.40	90	98	94		78	14
13		17:52	672.3	.60	2.35	2.35	90	98	94		78	14
14		17:56	675.1	.62	2.40	2.40	90	96	94		75	15
15		18:00	678.8	.62	2.40	2.40	90	96	94		75	15
2 1		18:08	681.3	.23	0.92	0.92	89	96	94		75	7
2		18:12	683.6	.27	1.08	1.08	89	94	92		75	8
3		18:16	686.3	.32	1.28	1.28	88	91	91		75	9
4		18:20	690.1	.40	1.60	1.60	88	90	90		70	11
5		18:24	692.4	.47	1.88	1.88	88	88	90		70	14
6		18:28	695.5	.47	1.88	1.88	88	86	88		70	14
7		18:32	699.0	.55	2.2	2.2	88	84	86		70	16
8		18:36	702.5	.60	2.35	2.35	88	84	86		70	16
9		18:40	706.1	.62	2.40	2.40	88	82	86		70	17
10		18:44	709.9	.62	2.40	2.40	88	82	84		70	17
11		18:48	713.5	.65	2.60	2.60	88	80	82		70	18
12		18:52	717.2	.65	2.6	2.6	88	80	82		70	18
13		18:56	700.8	.65	2.6	2.6	88	78	80		65	18
14		19:00	724.5	.65	2.6	2.6	88	78	80		65	18
15		19:04	728.767	.65	2.6	2.6	88	78	80		65	18

ENVIRONMENTAL ENGINEERING, INC.
Gainesville, Florida

SOURCE SAMPLING FIELD DATA SHEET

Plant RUN-O-Pile Mfg & STORAGE

Sampling Location Outlet-North

Date 3/1/72 Run No. 3

Time Start 9:08 Time End 11:12

Sampling Time/Point 4 min @ 20 pps = 120 total

DB 88 °F, WB — °F, VF @ DP — "Hg

Moisture 2.5%, FDA .975, Gas Density Factor —

Barometric Press 30 "Hg, Stack Press 30 "Hg

Weather clear

Temp. 75 °F, W/D —, W/S CALM

Sample Box No. 1 Meter Box No. —

Meter ΔH@ 1.7 Pitot Corr. Factor .83

Nozzle Dia. .25 in., Probe Length 6 ft

Probe Heater Setting ON

Stack Dimensions: Inside Diameter 72 in

Inside Area — ft²

Height — ft

Mat'l Processing Rate —

Final Gas Meter Reading 834.011 ft³

Initial Gas Meter Reading 738.492 ft³

Total Condensate in Impingers 7 ml

Moisture in Silica Gel 0.2 gm

Silica Gel Container No. 630 Filter No. 720427

Orsat: CO₂ —

O₂ —

CO —

N₂ —

Excess Air —

Test Conducted by: A ARROYO

—

—

Remarks: Silica Gel container

Broke lost small portion

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			
			738.492									
1	1	9:08	740.2	.20	.80	.80	86	73	70		84	3
2	2	9:12	742.4	.27	1.08	1.08	86	74	70		83	4
3	3	9:16	744.9	.30	1.20	1.20	86	74	70		83	4.5
4	4	9:20	747.5	.40	1.6	1.6	86	75	71		82	5.5
5	5	9:24	750.7	.45	1.8	1.8	86	76	71		83	6
6	6	9:28	753.9	.50	2.0	2.0	86	76	72		84	7
7	7	9:32	757.4	.55	2.2	2.2	86	78	72		85	7.5

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
					Calc.	Actual		In	Out			
8		9:36	760.9	.58	2.3	2.3	86	78	72		82	8
9		9:40	764.5	.60	2.35	2.35	86	79	73		82	8
10		9:44	768.1	.63	2.5	2.5	86	80	74		86	8
11		9:48	771.7	.61	2.45	2.45	86	80	74		85	8.5
12		9:52	775.2	.53	2.1	2.1	86	81	75		87	7
13		9:56	778.9	.55	2.2	2.2	86	81	75		87	7
14		10:00	782.1	.55	2.2	2.2	86	81	75		87	7
15		10:04	785.7	.55	2.2	2.2	86	82	76		89	7
2	1	10:12	787.6	.18	.69	.69	87	84	77		92	3
	2	10:16	789.9	.23	.91	.91	87	82	78		88	4
	3	10:20	792.5	.28	1.1	1.1	87	82	78		88	4
	4	10:24	795.3	.35	1.4	1.4	87	82	78		88	5
	5	10:28	798.4	.40	1.6	1.6	87	83	78		84	6
	6	10:32	801.7	.45	1.8	1.8	86	83	79		84	6
	7	10:36	804.9	.50	2.0	2.0	86	83	79		85	6.5
	8	10:40	808.6	.58	2.3	2.3	86	84	80		85	7.5
	9	10:44	811.9	.60	2.35	2.35	86	84	80		85	8
	10	10:48	815.7	.60	2.35	2.35	86	84	80		85	8
	11	10:52	819.3	.60	2.35	2.35	86	84	80		85	8
	12	10:56	822.9	.60	2.35	2.35	86	86	82		87	8
	13	11:00	826.5	.60	2.35	2.35	86	86	82		88	8
	14	11:04	830.3	.63	2.5	2.5	86	88	82		90	8
	15	11:08	834.011	.63	2.5	2.5	86	88	82		90	8

SOURCE SAMPLING FIELD DATA SHEET

Plant Regester Barrow
Sampling Location OUTLET SOUTH
Date 2/29/78 Run No. 1
Time Start 12:40 Time End 1528
Sampling Time/Point 4 min. (120 min)
DB °F, WB °F, VF @ DP "Hg
Moisture 29%, FDA , Gas Density Factor
Barometric Press: 29.92 "Hg, Stack Press 29.9 "Hg
Weather
Temp. °F, W/D , W/S
Sample Box No. 3 Meter Box No.
Meter ΔH₂ Pitot Corr. Factor .83
Nozzle Dia. .25 in., Probe Length 6 ft
Probe Heater Setting 28.5
Stack Dimensions: Inside Diameter 23 in
Inside Area 28.27 ft²
Height ft

Mat'l Processing Rate
Final Gas Meter Reading 421.002 ft³
Initial Gas Meter Reading 347.600 ft³
Total Condensate in Impingers 40 ml
Moisture in Silica Gel 2.35 - 200 gm 55
Silica Gel Container No. 626 Filter No. 720
Orsat: CO₂
O₂
CO
N₂
Excess Air

Test Conducted by: Bill Denny

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			
<u>North Port</u>		<u>12:40</u>	<u>347.60</u>									
<u>1</u>		<u>12:44</u>	<u>348.5</u>	<u>.10</u>	<u>.40</u>	<u>.40</u>	<u>88°F</u>	<u>80</u>	<u>81</u>		<u>88°</u>	<u>2</u>
<u>2</u>		<u>12:48</u>	<u>350.9</u>	<u>.13</u>	<u>.55</u>	<u>.55</u>	<u>88°</u>	<u>80</u>	<u>81</u>		<u>88°</u>	<u>2.5</u>
<u>3</u>		<u>12:52</u>	<u>352.9</u>	<u>.16</u>	<u>.65</u>	<u>.65</u>	<u>88°</u>	<u>82</u>	<u>81</u>		<u>88°</u>	<u>3.5</u>
<u>4</u>		<u>12:56</u>	<u>354.8</u>	<u>.16</u>	<u>.65</u>	<u>.65</u>	<u>88°</u>	<u>82</u>	<u>81</u>		<u>88°</u>	<u>3.5</u>
<u>5</u>		<u>1:00</u>	<u>356.9</u>	<u>.21</u>	<u>.84</u>	<u>.84</u>	<u>88°</u>	<u>83</u>	<u>81</u>		<u>93</u>	<u>3.8</u>
<u>6</u>		<u>1:04</u>	<u>361.9</u>	<u>.23</u>	<u>.92</u>	<u>.92</u>	<u>88°</u>	<u>83</u>	<u>81</u>		<u>93</u>	<u>3.0</u>
<u>7</u>		<u>1:08</u>	<u>364.5</u>	<u>.23</u>	<u>.92</u>	<u>.92</u>	<u>88°</u>	<u>84</u>	<u>81</u>		<u>85</u>	

Plant went down

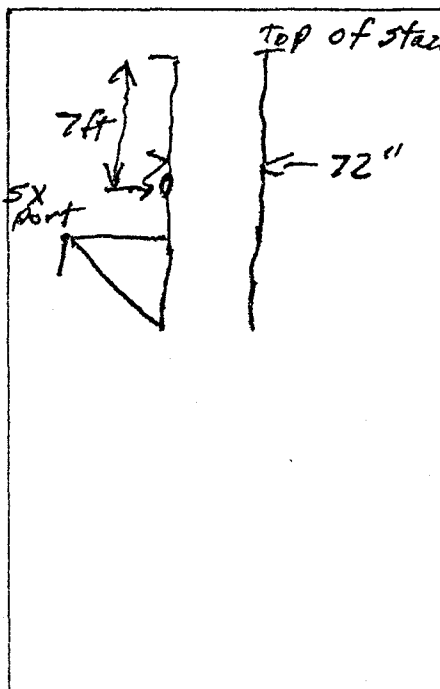
Port and Traverse Point No.	Distance from End of Port (in)	Clock Time	Gas Meter Reading (ft ³)	Stack Velocity Head ("H ₂ O)	Meter Orifice Press. Diff. ("H ₂ O)		Stack Gas Temp. (°F)	Gas Sample Temp. @ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Temp. (°F)	Vacuum on Sample Train
					Calc.	Actual		In	Out			
8		1:12	367.0	.23	.92	.92	88°	84	82		85	5
9		1:16	369.9	.26	1.05	1.05	89	85	84		91	5.2
10		1:20	372.8	.27	1.10	1.10		85	84		91	5.2
11		1:24	375.5	.29	1.18	1.18		85	84		91	5.0
12		1:28	377.6	.30	1.20	1.20		85	84		91	5.0
13		1:32	380.2	.30	1.20	1.20		85	84		91	5.0
14		1:36	381.5	.27	1.05	1.05		85	84		91	5.0
15		1:40	383.6	.27	1.05	1.05		85	84		91	5.0
1		1:46	385.4	.12	.49	.49		85	84		91	5.0
2		1:50	387.1	.13			Plant down					
3		2:34	389.1	.15	.62	.62						
4		2:38	391.6	.17	.69	.69		90	89		91	4.8
5		2:42	394.3	.20	.82	.82		90	89		88	5.0
6		2:46	396.4	.25	1.05	1.05		90	89		88	5.2
7		2:50	398.6	.25	1.05	1.05		90	89		88	5.2
8		2:54	402.4	.23	.93	.93		90	89		88	5.2
9		3:00	405.6	.25	1.00	1.00		91	90		88	5.2
10		3:04	408.4	.25	1.00	1.00		91	90		88	5.2
11		3:08	410.7	.25	1.00	1.00		91	90		88	5.2
12		3:12	412.8	.23	.93	.93		91	90		88	5.2
13		3:16	415.9	.22	1.05	1.05		92	91		88	5.2
14		3:20	418.1	.25	1.05	1.05		93	92		88	
15		3:24	421.1	.23	.94	.94		93	92			

3:28

ENVIRONMENTAL ENGINEERING, INC.
Gainesville, Florida

SOURCE SAMPLING FIELD DATA SHEET

Plant Run-o-Pile Mfg & Storage
 Sampling Location Outlet South
 Date 2-29-72 Run No. 2
 Time Start 1658 Time End 1900
 Sampling Time/Point 4 min. (120 min)
 DB _____ °F, WB _____ °F, VF @ DP _____ "Hg
 Moisture 2.9%, FDA _____, Gas Density Factor _____
 Barometric Press 29.82 "Hg, Stack Press 29.71 "Hg
 Weather Clear - Warm
 Temp. _____ °F, W/D _____, W/S _____
 Sample Box No. 53 Meter Box No. 5
 Meter ΔH 1.68 Pitot Corr. Factor .83
 Nozzle Dia. _____ in., Probe Length 6 ft
 Probe Heater Setting 28.5
 Stack Dimensions: Inside Diameter 72 in
 Inside Area 28.27 ft²
 Height _____ ft



Mat'l Processing Rate _____
 Final Gas Meter Reading 490.200 ft³
 Initial Gas Meter Reading 421.002 ft³
 Total Condensate in Impingers 35 ml
 Moisture in Silica Gel 10.0 gm
 Silica Gel Container No. 617 Filter No. 720424
 Orsat: CO₂ _____
 O₂ _____
 CO _____
 N₂ _____
 Excess Air _____

Test Conducted by: Demery & Johnson

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			
		<u>4:58</u>	<u>421.002</u>									
<u>1</u>		<u>5:02</u>	<u>422.8</u>	<u>.11</u>	<u>.45</u>	<u>.45</u>	<u>89</u>	<u>90</u>	<u>90</u>		<u>95</u>	<u>2</u>
<u>2</u>		<u>5:06</u>	<u>424.6</u>	<u>.13</u>	<u>.54</u>	<u>.54</u>	<u>89</u>	<u>91</u>	<u>92</u>		<u>93</u>	<u>2</u>
<u>3</u>		<u>5:10</u>	<u>426.5</u>	<u>.15</u>	<u>.62</u>	<u>.62</u>	<u>89</u>	<u>92</u>	<u>93</u>		<u>93</u>	<u>2.5</u>
<u>4</u>		<u>5:14</u>	<u>428.7</u>	<u>.15</u>	<u>.62</u>	<u>.62</u>	<u>89</u>	<u>92</u>	<u>93</u>		<u>92</u>	<u>3.0</u>
<u>5</u>		<u>5:18</u>	<u>430.8</u>	<u>.18</u>	<u>.73</u>	<u>.73</u>	<u>89</u>	<u>92</u>	<u>93</u>		<u>92</u>	<u>3.0</u>
<u>6</u>		<u>5:22</u>	<u>432.6</u>	<u>.19</u>	<u>.76</u>	<u>.76</u>	<u>89</u>	<u>92</u>	<u>93</u>		<u>92</u>	<u>3.0</u>
<u>7</u>		<u>5:26</u>	<u>434.6</u>	<u>.19</u>	<u>.76</u>	<u>.76</u>	<u>89</u>	<u>92</u>	<u>93</u>		<u>92</u>	<u>3.0</u>

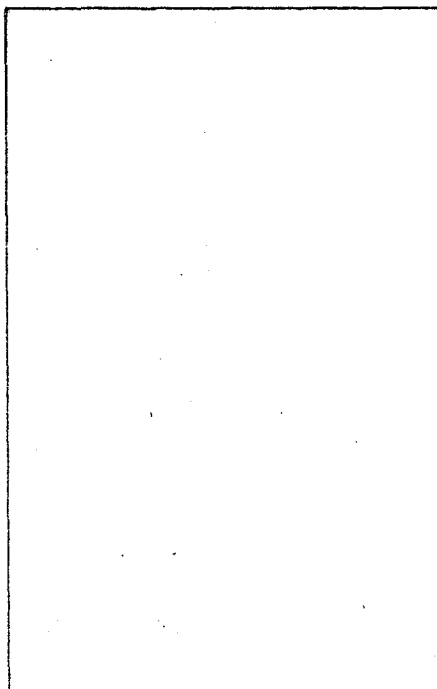
Port and Traverse Point No.	Distance from End of Port (in)	Clock Time	Gas Meter Reading (ft ³)	Stack Velocity Head ("H ₂ O)	Meter Orifice Press. Diff. ("H ₂ O)		Stack Gas Temp. (°F)	Gas Sample Temp. @ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Temp. (°F)	Vacuum on Sample Train
					Calc.	Actual		In	Out			
8		5:30	437.1	.20	.81	.81	88	92	93		92	4.0
9		5:34	439.7	.22	.89	.89	88	92	93		92	4.5
10		5:38	442.5	.26	1.10	1.10	88	92	93		92	4.5
11		5:42	444.9	.26	1.10	1.10	88	92	93		92	5.1
12		5:46	447.6	.27	1.10	1.10	90	91	92		88	5.1
13		5:50	450.3	.28	1.15	1.15	90	91	92		88	5.1
14		5:54	453.2	.28	1.15	1.15	90	91	92		88	5.1
15		5:58	455.8	.26	1.05	1.05	90	91	92		88	5.0
1		6:04	457.5	.10	.43	.43	90	89	91		78	3.0
2		6:08	459.1	.15	.63	.63	90	89	91		78	3.0
3		6:12	461.3	.19	.75	.75	90	89	91		78	4.5
4		6:16	463.4	.19	.75	.75	90	89	91		78	4.5
5		6:20	466.0	.20	.81	.81	90	88	90		74	5.0
6		6:24	468.1	.20	.81	.81	90	88	90		72	5.0
7		6:28	470.5	.21	.85	.85	90	87	89		72	5.1
8		6:32	477.7	.22	.88	.88	90	85	88		72	5.1
9		6:36	475.2	.23	.93	.93	90	85	88		72	5.1
10		6:40	477.7	.24	.95	.95	90	84	87		72	5.2
11		6:44	480.2	.24	.95	.95	90	84	87		70	5.2
12		6:48	483.4	.25	.98	.98	90	83	86		70	5.2
13		6:52	486.3	.25	.98	.98	90	82	85		70	5.2
14		6:56	487.9	.25	.98	.98	90	81	84		70	5.2
15		7:00	490.200	.23	.95	.95	90	81	84		70	5.0

Start 6:00

ENVIRONMENTAL ENGINEERING, INC.
Gainesville, Florida

SOURCE SAMPLING FIELD DATA SHEET

Plant Run - 0 - P/L Mfg & Stg.
Sampling Location Outlet South
Date 3/1/72 Run No. 3
Time Start 9:09 Time End 11:12
Sampling Time/Point 4 min ³⁰ 13 points = 120 min
DB _____ °F, WB _____ °F, VF @ DP _____ "Hg
Moisture 2.9%, FDA _____, Gas Density Factor _____
Barometric Press 29.92 Hg, Stack Press 29.71 Hg
Weather _____
Temp. _____ °F, W/D _____, W/S _____
Sample Box No. 3 Meter Box No. 5
Meter ΔH 1.68 Pitot Corr. Factor .83
Nozzle Dia. .25 in., Probe Length 6 ft
Probe Heater Setting 28
Stack Dimensions: Inside Diameter 72 in
Inside Area _____ ft²
Height _____ ft



Mat'l Processing Rate _____
Final Gas Meter Reading 559.3075 ft³
Initial Gas Meter Reading 490.805 ft³
Total Condensate in Impingers 2 ml
Moisture in Silica Gel 0.3 gm
Silica Gel Container No. 623 Filter No. 720437
Orsat: CO₂ _____
O₂ _____
CO _____
N₂ _____
Excess Air _____

Test Conducted by: Johnson & Demery

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			
			490.8									
1		8:58	492.5	.11	.43	.43	86	69	69		80	2
2		9:02	494.2	.12	.48	.48	86	70	69		80	2
3		9:06	496.1	.15	.59	.59	86	70	70		82	2-5
4		9:10	498.0	.16	.63	.63	86	70	70		82	3
5		9:14	499.9	.16	.63	.63	86	72	70		82	3
6		9:18	501.9	.16	.63	.63	86	72	70		82	3
7		9:22	504.1	.22	.85	.85	86	73	71		82	

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
					Calc.	Actual		In	Out			
8		9:26	506.3	.22	.85	.85	86	73	71		82	3
9		9:30	508.9	.24	.92	.92	86	74	72		82	—
10		9:34	511.3	.26	.99	.99	86	74	72		82	—
11		9:38	513.8	.28	1.08	1.08	86	75	72		82	—
12		9:42	516.3	.28	1.08	1.08	86	76	72		84	—
13	Last Read	9:46	519.0	.27	1.04	1.04	86	76	73		84	—
14		9:58	521.6	.27	1.04	1.04	86	76	73		84	—
15	10:02	9:54	524.2	.27	1.04	1.04	86	76	73		84	—
1	First read	10:06	525.8	.11	.43	.43	87	77	74		84	—
2		10:10	527.6	.13	.52	.52	87	77	74		84	—
3		10:14	529.6	.17	.68	.68	87	77	74		84	—
4		10:18	531.5	.17	.68	.68	87	77	74		84	—
5		10:22	533.7	.23	.88	.88	87	77	75		84	—
6		10:26	536.1	.23	.88	.88	87	77	75		90	—
7		10:30	538.6	.27	1.05	1.05	87	77	75		88	—
8		10:34	541.3	.26	1.00	1.00	87	78	75		88	—
9		10:38	543.7	.26	1.00	1.00	87	78	76		88	—
10		10:42	547.0	.28	1.08	1.08	87	78	76		86	—
11		10:46	549.1	.28	1.08	1.08	87	78	76		86	—
12		10:50	551.6	.28	1.08	1.08	87	79	76		86	—
13		10:54	554.2	.28	1.08	1.08	87	79	76		86	—
14		10:58	556.7	.25	.97	.97	87	79	76		82	—
15		11:02	559.3	.25	.97	.97	87	79	76		82	—

GRAB SAMPLE COLLECTION

GRAB SAMPLE DATA SHEET

Plant Royster Phosphate

EPA Sample No.				
Run No.	A	B	C	1
Date	2/29	2/29	2/29	2/29/72
Time	1:00 PM	1:45 PM	3:45 PM	3:45 PM
Sampling Point	SCRUBBER IN			
Temperature, °F	82°	82°	82°	82°
pH	1.20	1.25	1.15	1.20
Fluorides				
P ₂ O ₅				
Trace Metals				

Remarks Plant shut down approx. 1½ hrs. during
1st Run.

A, B, + C composited

GRAB SAMPLE DATA SHEET

Plant Royster Phosphate

EPA Sample No.				
Run No.	A	B	C	1
Date	2/29	2/29	2/29	2/29/72
Time	1:00 PM	1:45 PM	3:45 PM	3:45 PM
Sampling Point	SCRUBBER DUT			
Temperature, °F	78°	80°	80°	80°
pH	1.15	1.30	1.25	1.25
Fluorides				
P ₂ O ₅				
Trace Metals				

Remarks Plant shut down approx. 1½ hrs.
during run.

A, B, + C composited

GRAB SAMPLE DATA SHEET

Plant Royster Phosphate

EPA Sample No.				
Run No.	A	B	C	2
Date	2/29	2/29	2/29	2/29/72
Time	5:00 PM	6:00 PM	7:00 PM	7:00 PM
Sampling Point	SCRUBBER		IN	
Temperature, °F	82°	81°	82°	80°
pH	1.20	1.05	1.40	1.20
Fluorides				
P ₂ O ₅				
Trace Metals				

Remarks A, B, + C composited

GRAB SAMPLE DATA SHEET

Plant Royster Phosphate

EPA Sample No.				
Run No.	A	B	C	2
Date	2/29	2/29	2/29	2/29/72
Time	5:00 PM	6:00 PM	7:00 PM	7:00 PM
Sampling Point	SCRUBBER		OUT	
Temperature, °F	80°	80°	80°	78°
pH	1.25	1.30	1.20	1.25
Fluorides				
P ₂ O ₅				
Trace Metals				

Remarks A, B, C composited

GRAB SAMPLE DATA SHEET

Plant Royster Phosphate

EPA Sample No.				
Run No.	A	B	C	3
Date	3/1	3/1	3/1	3/1/72
Time	9:00 AM	10:00 AM	11:00 AM	11:00 AM
Sampling Point	SCRUTTER			IN
Temperature, °F	84°	83°	84°	83°
pH	1.10	1.20	1.60	1.45
Fluorides				
P ₂ O ₅				
Trace Metals				

Remarks A, B, C composited

GRAB SAMPLE DATA SHEET

Plant Royster Phosphate

EPA Sample No.				
Run No.	A	B	C	3
Date	3/1	3/1	3/1	3/1/72
Time	9:00 AM	10:00 AM	11:00 AM	11:00 AM
Sampling Point	SCRUBBER	OUT		
Temperature, °F	78°	79°	79°	79°
pH	1.10	1.15	1.65	1.35
Fluorides				
P ₂ O ₅				
Trace Metals				

Remarks A, B, + C composited

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, QAEML

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

John Dollar	Project Manager
Tony Arroyo	Environmental Specialist
Bill Demery	Environmental Specialist
Bob Durgan	Environmental Specialist
Eric Johnson	Environmental Specialist
Bob Maxwell	Environmental Specialist
A. L. Wilson	Environmental Specialist
Jim Tscherfing	Environmental Specialist
Jerome Rom	EPA
Leslie Evans	EPA
Roy Neulicht	EPA